Walkability and Pedestrian Facilities in Nagpur

2015 - 2016

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Acknowledgments

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Jacob Samuel
Director- Programmes

LIST OF ACRONYMS

ESAF	:	Evangelical Social Action Forum
NMC	:	Nagpur Municipal Corporation
NIT	:	Nagpur Improvement Trust
MSRDC	:	Maharashtra State Road Development Corporation Ltd
RTO	:	Regional Transport Office
PWD	:	Public Works Department
JNNURM	:	Jawaharlal Nehru National Urban Renewal Mission
AMRUT	:	Atal Mission for Rejuvenation and Urban Transformation
CIDCO	:	City and Industrial Development Corporation of Maharashtra Limited
NUTP	:	National Urban Transport Policy
MSRTC	:	Maharashtra State Road Transport Corporation
BRT	:	Bus Rapid Transit
BJP	:	Bharatiya Janatha Party
NURM	:	National Urban Renewal Mission
NMT	:	Non Motorised Transport

Executive Summary

Nagpur Walkability Study is undertaken as part of the Livable Cities Program implemented by ESAF with support from HealthBridge, Canada. The study involved a qualitative assessment of the pedestrian facilities including safety, security and convenience of pedestrians.

Walkability study provides information on the current pedestrian infrastructure and includes the following.

1. Field walkability surveys in selected eight areas of the city
2. Pedestrian Perception Survey
3. An assessment of current policies and institutions relating to the pedestrian and walking environment

Observation study in selected eight areas surveyed reflects the quality of the footpaths and other related amenities available for pedestrians. Pedestrian perception survey brings out individual point of view on pedestrian facilities. Assessment of policies and institutions governing these behaviors related to pedestrian environment is carefully analyzed in light of recommendation given and change brought in their framework of understanding. Effectiveness brought to them which reasonably enhanced pedestrian facilities and related factors responsible is also discussed and debated to understand the pedestrian framework. It suggests a lack of speedy change in the pedestrian infrastructure and behavior due to absence of dedicated institution which needed to tune them with changing urban realities. Such institution and organization are a necessity which could vigorously come up with an elaborate plan on urban areas. Existing policies needed thrust either by changing the mode of policy governance or bringing an altogether separate institution for planning and monitoring basic behavioral facilities like pedestrianization and related work in urban spaces.

The table below provides an overview of the specific issues addressed in the primary research, the research findings and issue specific recommendations based on the findings.

Issue	Findings (Field Walkability survey)	Findings (Perception survey)	Recommendations
Traffic volume	High volume road (high traffic volume) = 29% Medium volume (medium traffic volume) road = 59%	Fear to cross busy roads = 91%. Drivers are careless about pedestrians = 86%	Major city roads must be made low volume road so that pedestrian could walk without fear
Land use mix and Type of land use	Most segments are Little land use Mix - 56% or had some land use Some Mix - 26% Shop - 94% Restaurant – 76% House - 68% Office - 59%	NA Desired destination too far to walk - 45%	Increase land use mix will make walking viable mode of transportation. Increased neighborhood diversity should be prioritized, including aspects like parks and playgrounds
Footpath availability	Both side of the street - 42% One side of the street – 23% No footpath – 35%	84% of the respondent's trips involve walking in some way or the other	Footpaths must be available both sides in all the areas. Authorities must pay heed to it
Footpath composition and quality	Concrete -51% Tiles -37% Slabs -26% Fair condition -35% Poor condition -26% Good condition -3%	Ok - 60% Bad -31% Good -7% 66% of the respondents want clean foot paths	The footpaths made of concrete and tiles. Footpath should be cleaned properly
Footpath obstructions	Some obstruction - 35% A little obstruction - 25% A lot obstruction - 3%	52% of the respondents said that obstacles on the footpaths lessen their motivation to walk	Obstruction free footpaths are strongly advocated
Obstruction Type	Car motorbike - 41% Shop goods - 36% Trees - 55%		Policies to prevent these obstructions on footpaths should be brought and enforced.

	Trash cans - 32% Car exit/entry cuts -23% Vendors - 21% Construction rubbish - 17%		
Amenities for pedestrians	Trash bins - 67% Vendors - 54% Toilet & Seating - 48% Other- 57%	Improved street lighting - 78% Clean footpath - 66% Easy access for persons with disability - 61%	Amenities needed to be upgraded and improved to the standard. Improved pedestrian amenities increases walkability
Footpath disorder quantity	Some disorder - 35% A little disorder - 25% A lot disorder - 3%		Footpath disorder should be quantifiable in figures must sensitize authorities
Type of footpath disorder	Garbage – 44% Cigarette / bidi - 35% Urine smell - 28% Broken glass - 35% Can / bottle - 25%		NMC should care of this disorder and ensure regular cleaning of footpaths Trash bin and public toilet should be provided and maintained well
Street crossing facilities	Signs - 84% Zebra crossing - 71% Special light – 33%	91% of the pedestrian feared crossing busy streets 67% of respondents use signals to cross the road and 63% respondents preferred zebra crossing as the safest and most convenient way to cross. Crossing guard was preferred by 24% and 28% preferred to use foot over bridge	Pedestrianization must be taken as systematic approach. Authorities must invest a good deal in it. Awareness regarding pedestrian right is one of the essential choices to make.
Aggressive drivers	Aggressive drivers were observed on 71% of the road.	80% car and motorbike, a major source of fear for pedestrians 47% of the respondents fear commercial truck and 40% of the pedestrian fear bus	Traffic violation must be controlled and bullying on road by drivers and vehicle owner must be dealt stringently by authorities

Vehicle parking	Car/Motorbike illegally parked - 78% Car / motorbike legally parked - 20% Truck illegally parked - 24%	57% - A little 29% - to some extent 14% - A lot Problem facing by pedestrian to cross the road	Illegal on-street parking should be monitored and fine should be imposed Provision for paid parking could reduce congestion in the city centre

Table 1 - Overview of issues addressed, research findings and recommendations

"God made us walking animals – pedestrians," he says. "As a fish needs to swim, a bird to fly, a deer to run, we need to walk; not in order to survive, but to be happy."

- Enrique Peñalosa, the Mayor of Bogotá in Colombia

CHAPTER-I

INTRODUCTION

Walkability is a measure of how friendly an area is to walking. Factors influencing walkability include the presence or absence and quality of footpaths, sidewalks or other pedestrian rights-of-way, traffic and road conditions, land use patterns, accessibility, and safety, among others. There is currently much talk about creating walkable environments and improving walkability. Walking with documented benefits for health, environmental, and economics of a city and has been identified as a strategy to solve numerous challenges from the obesity crisis, lack of vibrancy to traffic congestion, environmental injustice, and social isolation and have become a defining feature of sustained urban growth which is considered essential in claiming a holistic idea of urban processes and growth throughout the world.

Current pace of urban growth and intense migration to urban areas in India is resulting in urban sprawl which essentially disqualifies parameters set for any sustainable urban practice. As we all know that pace of global population shifting to urban bases is now unprecedented in the entire human history has brought an urgent sense of infrastructural requisites and sustainable practices to create healthy habits and environment to live.

City planners, urban enthusiasts, policy makers, institutions and civil society have joined hands in creating and developing urban spaces taking up the livability concepts. Walkability is becoming an essential call among the urban practitioner and planners as this strengthen the sense of healthy city practices which in return provides safe streets and interactive social spaces. Cities in the west are already gearing up for active modes of transport and practice of claiming over the streets from vehicles. Indian urban realities are distinct in many senses and offer opportunities for a variety of experiments with evolving sustainable urban practices.

Figure 1 - Blocked walkway

Figure 2 - Broken walkway

1.1. Defining Walkability

In the words of Jan Gehl: "Life happens on foot. Man was created to walk, and all of life's events large and small develop when we walk among other people. There is so much more to walking than walking. There is direct contact between people and the surrounding community, fresh air, time outdoors ..."

General Theory of Walkability by Jeff Speck in Walkable City explains, to be favored, "a walk has to satisfy four main conditions: it must be useful, safe, comfortable, and interesting. Each of these qualities is essential and none alone is sufficient. Useful means that most aspects of daily life are located close at hand and organized in a way that walking serves them well. Safe means that the street has been designed to give pedestrians a fighting chance against being hit by automobiles; they must not only be safe but feel safe, which is even tougher to satisfy. Comfortable means that buildings and landscape shape urban streets into 'outdoor living rooms,' in contrast to wide-open spaces, which usually fail to attract pedestrians. Interesting means that sidewalks are lined by unique buildings with friendly faces and that signs of humanity abound". where A walkable city is also reflection of a healthy behavioral practice which adds up to cities urban built environment and improves its social character and overall livability index.

Attempt made by Dan Burden of Walkable Communities Inc. to define the walkability phenomenon keeps in mind several walkability variables like location of pedestrian facilities, adequacy of walkways, connectivity, street orientation, street speeds, aesthetics/pleasant sitting spaces, neighborhood schools which essentially determine its usability and prospects. Another attempt to dwell with the concept is made by Pedestrian and Bicycle Program, State Safety Office, Florida Department of Transportation which takes into account and adds with specific walkability variables like intersection, disability orientation and well illuminated streets.

Walkability variables depicted by Katherine Shriver in her work titled Influence of Environmental Design on Pedestrian Travel Behavior in Four Austin Neighborhoods focus on three macro variables namely; transportation system, land use and urban design and each encompassing many micro walkability variables. Transportation system is defined as local accessibility involving directness and route options and it also encompasses official bicycle routes and bus transit route. Another macro variable is land use which gauges pedestrianization by looking into the potential of the land use for sustained economic interaction, opportunity, accessibility, presence of commercial services, office sites, restaurants, community schools, day care centers, parks, religious spaces and green belts. Last walkability variable is urban design which encompasses potential of streets to encourage people to participate in street life, street trees per block and off street parking spaces per dwelling or per commercial use.

1.2. Why walkability survey in Nagpur

Nagpur is the third and thirteenth largest city in Maharashtra and India respectively. Rated as one of the greenest and cleanest city among tier two cities, Nagpur is also economic and social centre of Vidarbha region of Maharashtra. Winter session of Maharashtra State Legislative Assembly takes place in Nagpur which makes it second capital of Maharashtra. As per the figure available with Nagpur Municipal Corporation (NMC) which is based on 2011 Census, its urban metropolitan population is 2,497,777. Male constitute almost 51% and female 49% of the total population. Average population density is quite low in Nagpur. Nagpur has population density of 11056 persons per square kilometer. Most of the peripheries of Nagpur records dismally low population density with few exceptions. Almost all the density is

concentrated in cities central locations and bustling residential cum market places. Nagpur has total number of 446 identified slums by NMC. Total slum population is 8,58783 which is 36% of the total population of Nagpur City. Data estimate from Department of Traffic suggest that around 1.4 million population posses registered vehicle where Nagpur total population is 2.5 million. Nagpur witnessed 1099 road accidents in 2014 which took toll on life of 280 persons. In initial three months of 2015, almost 63 persons are dead caused by road accidents (Lokmat Samachar, 4th May, 2015).

This walkability research report would purely be an attempt to understand city-citizenry practice and claims essentially on safe walkability and various factors affecting the prospect of walking freely and safely on roads and streets. This work also attempt to understand the mood of the people about rampant abuse of the existing pedestrian facilities which subsequently offers a framework understanding on preliminary walkability behavior processes and would guide us for possible solutions in future which improves pedestrianization. This walkability research is undertaken in eight different identified locality of Nagpur which was marked as potential zone by our research team for the purpose.

1.3. Agencies Responsible for Transportation & Urban Planning in Nagpur

Following are the major institutions responsible for transportation and urban planning in Nagpur.

Organisation	Responsibility
Nagpur Municipal Corporation (NMC)	NMC is responsible for administering and providing basic Infrastructural facilities to the city.
Nagpur Improvement Trust (NIT)	NIT is the authority for land planning and land acquisition and is responsible for infrastructure such as roads, street lights, drainage & sewage systems and public utilities to meet the diverse needs of the citizens.
Department of Town Planning and Valuation	Provide assistance to municipality in preparation of development plans for township schemes by way of active advice and technical knowhow.
Maharashtra State Road Development Corporation Ltd. (MSRDC)	To improve and develop integrated transport infrastructure such as expressways, bridges, flyovers, MRTS, ports, rail projects, airports etc. MSRDC is also responsible for developing, building and maintaining roads in Maharashtra.
Regional Transport Office (RTO), Department of Motor Vehicle	To provide services as per the Motor Vehicles Act and Rules to all the citizens. To provide safe transportation of goods & passengers.
Public Works Department, (PWD)	Design, implementation and maintenance of all public works undertaken by government. Providing maintained road infrastructure and road safety.

Jawaharlal Nehru National Urban Renewal Mission (JnNURM)	Objective of JnNURM program is to improve the quality of urban life and infrastructure in cities. This program has lapsed but many of its scheme taking renewed shape under flagship program of Atal Mission for Rejuvenation and Urban Transformation (AMRUT).
Atal Mission for Rejuvenation and Urban Transformation (AMRUT)	The purpose of AMRUT is to (i) ensure that every household has access to a tap with assured supply of water and a sewage connection; (ii) increase the amenity value of cities by developing greenery and well maintained open spaces (parks); and (iii) reduce pollution by switching to public transport or constructing facilities for non- motorized transport (e.g. walking and cycling).
City and Industrial Development Corporation of Maharashtra Ltd. (CIDCO)	CIDCO Urban Transport Policy focuses the need to integrate land use planning with transport plan. The main objective of the urban transport policy is to reduce private car trips, improve public transport like mass transit system with improved level of services with people in focus.
Nagpur City Police	Nagpur police has four zones and operates from 23 Police Stations spread across the city. It also has the responsibility of traffic policing the city roads.

Table 2 - List of agencies responsible for transportation and urban planning

CHAPTER-II

RESEARCH METHODOLOGY

2.1. Objectives

1. To ascertain qualitative assessment of pedestrian facilities, walking conditions and its sustained durability in terms of safety and security

2. To acknowledge and evaluate evolving perceptions of pedestrians about the pedestrian facilities provided and their preference on potential facility up gradation

3. To engage, encourage and create awareness among general public, planners and policy makers on pedestrian rights

4. Enabling urban built environment by assisting urban planners, policy makers and enthusiasts on various facets of current pedestrian facilities and sustained changes required

2.2. Personnel

HealthBridge Foundation of Canada provided technical and financial support for the study. Ms Beena George (Manager, Livable Cities India) and Ms. Manju George, Project Manager, were directly responsible for implementation and Mr. Waqar Ahmad Usmani, Project Officer and Ms. Rekha Chandekar, Project Coordinator at Nagpur, conducted the study with the help of students from Matru Sewa Sangh Samiti, Institute of Social Work for conducting the surveys.

2.3. Design

Mainly primary data were collected for the study with help of secondary data to understand the prevailing realities. Primary data collection was done through observation and perception survey of pedestrian facilities. An observation study and simultaneously a perception study was undertaken to understand actual picture in Nagpur city. A total of 300 people were interviewed for perception survey which complemented the observation report. Segment pedestrian volume has also been analyzed for more pedestrian behavioral clarity.

2.4. Study Area

Eight areas were taken for walkability survey. Most of the areas are either bustling market & commercial places or reportedly famous for being students juncture because colleges and institutions. Few areas are traditional residential cum commercial area. Segment chosen for the study is spread across and vary in spatial assertion on pedestrian mood and behavior.

Figure 3 - Buldi Market place

Figure 4 - Sadar Area

The important roads studied include:

1.	Gandhi Bagh	2.	Sita Buldi
3.	Sadar	4.	Laxmi Nagar
5.	Seminary Hill Road	6.	Medical Square
7.	Itwari	8.	Mankapur

Figure 5 - Nagpur City Map

2.5 Methodology

The methodology used in the study is based on the Global Walkability Index (GWI), which include a field walkability survey. The study includes perception survey of pedestrians regarding the walking environment in the city and analyzes the pedestrian volume at selected points through walkability

observation survey. The field walkability survey and pedestrian perception survey were done by four students from Matru Sewa Sangh Institute of Social Work, Nagpur. They were given a three day intensive class room as well as field training by the project team.

2.6. Field Walkability Survey

A field walkability survey is a qualitative assessment of walking conditions including safety, security and convenience of the pedestrian environment. The survey was carried out in eight major localities of Nagpur in the month of January 2015. Segmentation of the roads was done by analyzing the intersections and junctions along each section of the road. A questionnaire previously developed by HealthBridge and WBB Trust (Work for a Better Bangladesh) was modified for the survey.

"Redistribution of space away from cars to create space for people, community and connected living.

Slowly but surely, cars will be squeezed out of our cities"- Phil Gray

2.7. Pedestrian Perception Survey

A pedestrian perception survey was conducted in order to evaluate pedestrians' perception of current walking facilities available in Nagpur. Their perceptions about future improvements were also studied. Three hundred pedestrians were randomly intercepted for the survey from eight carefully targeted localities in the city. These localities were selected based on traffic and pedestrian movement related reports covered often in newspapers.

The Pedestrian Perception survey form developed by HealthBridge and WBB Trust was used for the survey after being adapted following the pilot study by the project team.

2.8. Existing Policy and Institutional Approach

The existing policies related to pedestrian issues in Nagpur were reviewed. Media reports about citizens concern on pedestrian facilities, walking environment and safety was taken into consideration. The stakeholder survey form of Clean Air Initiative was used for the survey. Study reports and recommendations made by different organizations were also reviewed in the course of the study.

2.9. Finance

Financial support for the study was provided by HealthBridge Foundation of Canada.

2.10. Limitations of the Survey

The surveyors were given classroom as well as field training. All the surveys were monitored at regular intervals to avoid mistakes during the survey. Nevertheless, one of the limitations of the field walkability survey is the subjectivity of the responses, as they greatly depend on the individual assessment of the surveyors.

CHAPTER-III

RESEARCH RESULTS

This section discussed about the existing pedestrian environment and quality of such facilities made available for the citizens.

3.1 Segment Analysis Impacting Pedestrian Behavior & Traffic Volume

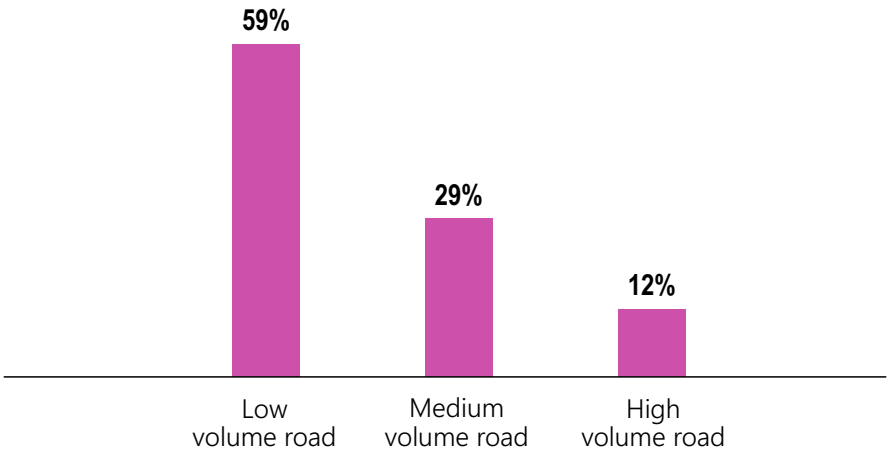

Figure 6 - Segment Type

Majority of the city has medium volume of vehicles plying on the roads. High traffic volume roads constitute almost one third of total roads while 12% has low volume traffic road.

Figure 7 - A book stall on pedestrian's walkway in Buldi

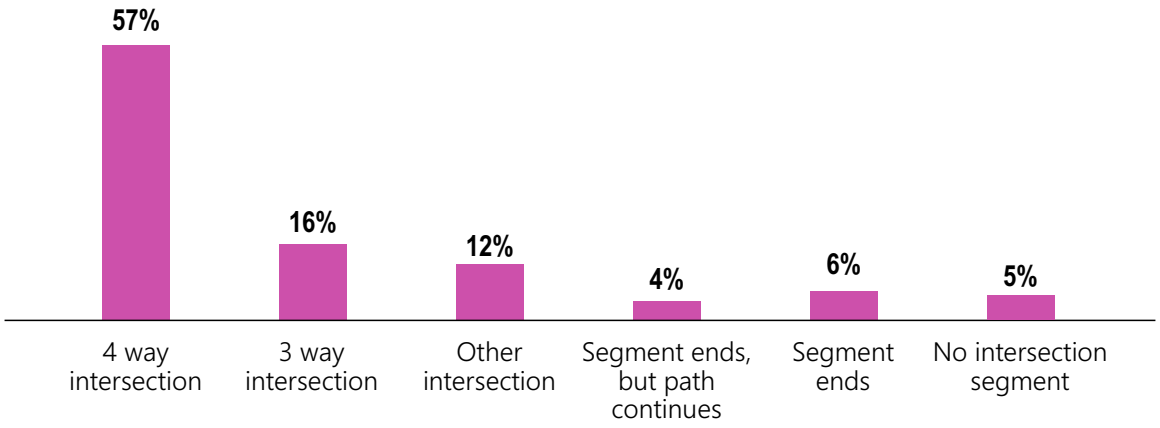

Figure 8 - Segment Intersections

Above figure, half of the city roads, around 57% are having four way intersections. 18% of the roads have three way intersections while 18% segment has no intersections at all.

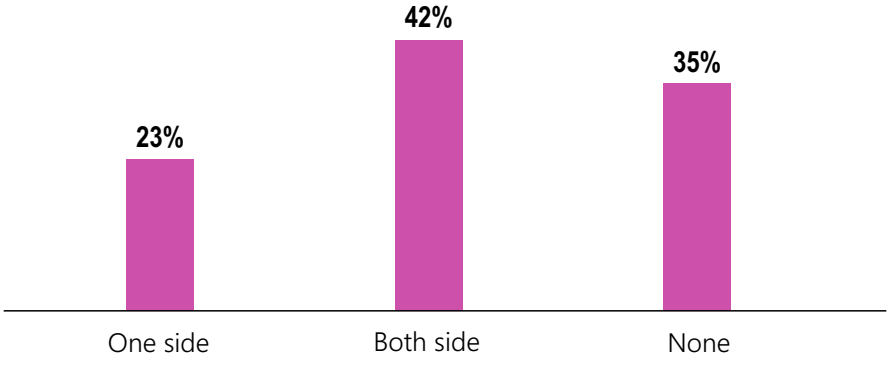

Figure 9 - Presence of a footpath or walkway in segment

The study results depicts that around 42% of the roads have footpaths on both side of the road whereas 23% have footpaths only on one side. Unfortunately 35% of the roads don't have any foot-paths at all.

Figure 10 - A narrow curved walkway in Mankapur

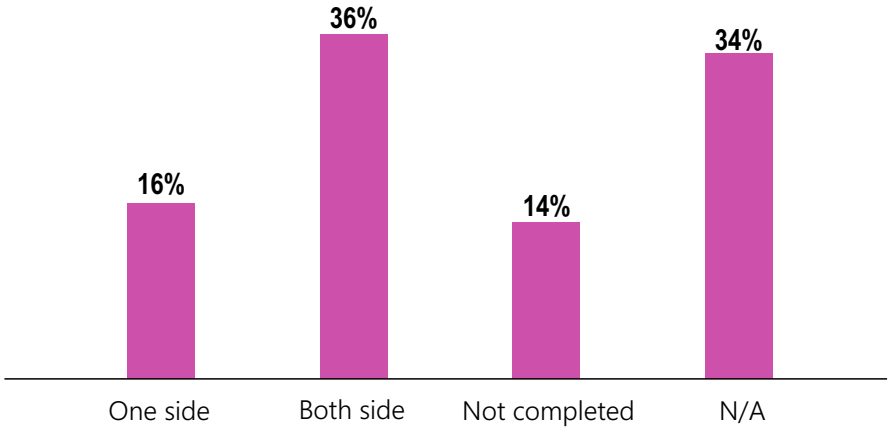

Figure 11 - Footpath complete in the segment

36% of the city footpaths were complete on both sides in the segment undertaken for walkability study. 16% are complete only at one side while 34% of segment has no footpath at all. 14% of the footpaths are under construction and not officially declared for use.

Figure 12 - Walkway under construction at Seminary Hill

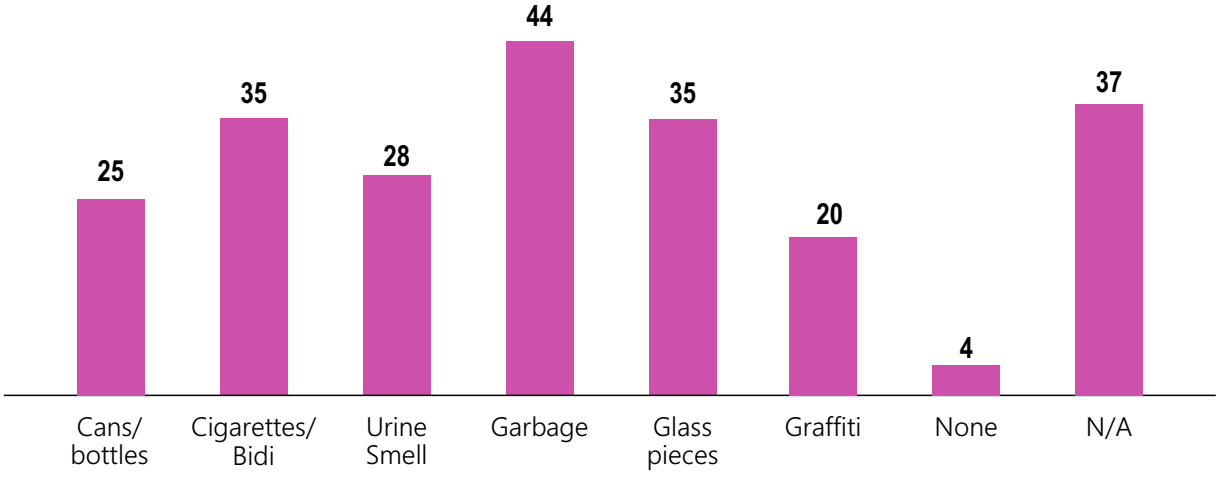

Figure 13 - Litter presence

Major highlight of the litter on each segment is garbage dumped which covers around 44%. Cigarette-bidi and cans-bottle constitute 35% and 25% respectively. Broken glasses dumped on road in the segment constitute 35%. Urine smell is noted as one of the hygiene issue in the segment which is mentioned by one third of the respondents.

Figure 14 - Religiosity on walkway at Sita Buldi

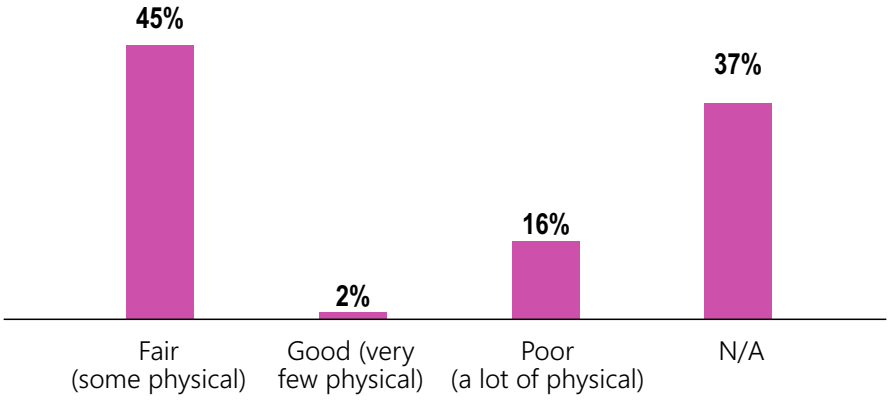

Figure 15 - Overall cleanliness of the segment

Around 45% of the footpaths are quite fair in terms of cleanliness and provide an average usable satisfaction with some physical discrepancies. 16% footpaths are poor in terms of physical inconsistencies and overall average cleanliness. Around 2% of the footpaths do fall under good category with few physical discrepancy and standard cleanliness.

Figure 16 - Monsoon brought vegetation, walkway covered in Laxmi Nagar

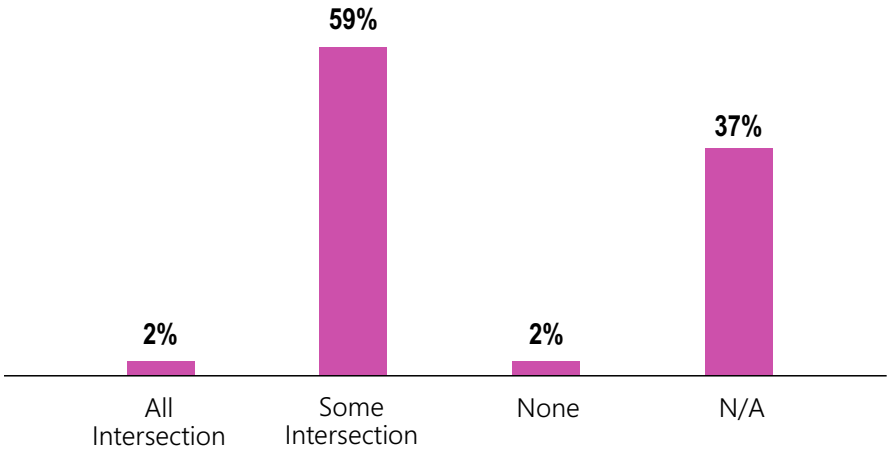

Figure 17 - Curvilinear or curb cuts on the footpath

Majority of the of the segments have some intersection and only 2% segments have curvilinear or curb cuts in all the segments.

Figure 18 - Rough cuts on walkway in Laxmi Nagar

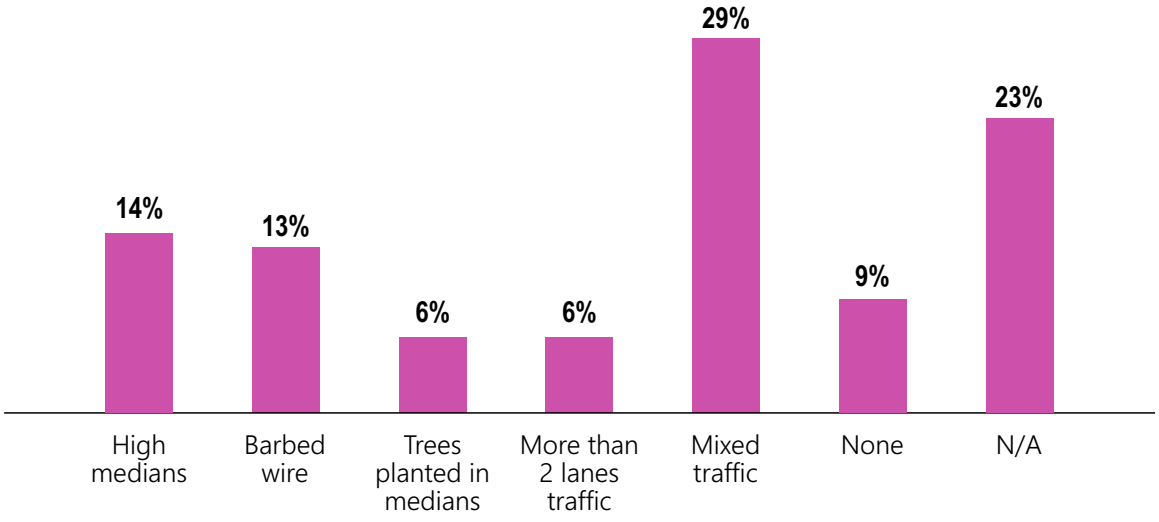

Figure 19 - Barriers for pedestrians to cross the road

Prominent pedestrian barrier which disallows free and uninterrupted movement are high medians which figures around 14% in each segment. Mixed traffic is yet another barrier to pedestrian movement which,

amounted to almost one third. The other major barriers are barbed wire (13%) and 6% have trees or sapling planted in the median which prevents free and safe pedestrian movements.

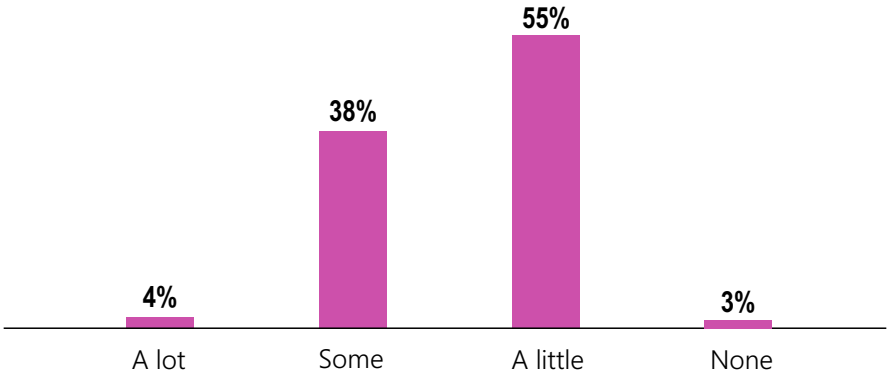

Figure 20 - Noise pollution

A little above half percentage of respondents felt that noise pollution is not high whereas 28% reported as high.

Figure 21 - A busy walkway in Sadar

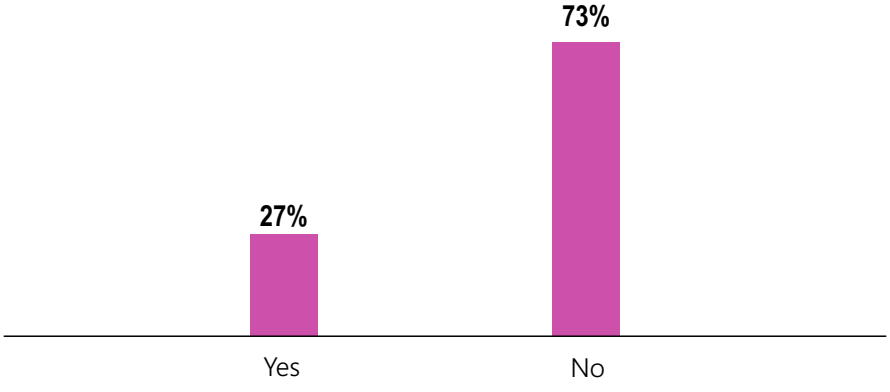

Figure 22 - Segment used by children

Only 27% children play in the segment while majority don't use the space for playing and majority do not play in any of these segments. This shows the safety concern or risk involved in the segments which needs to explored and addressed adequately.

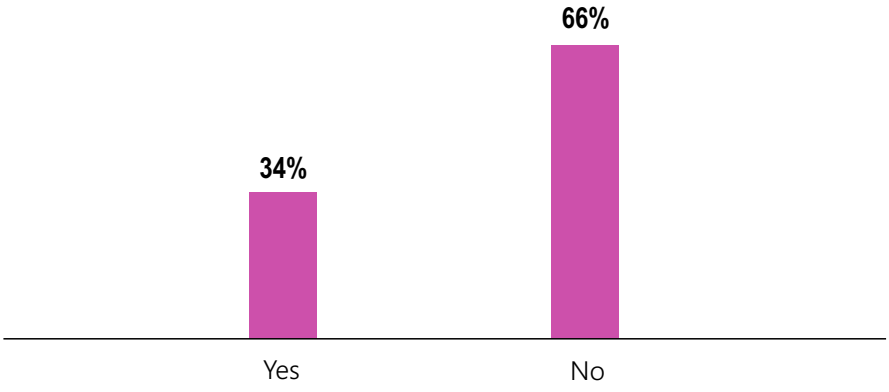

Figure 23 - Socialisation in the segment

People stop to talk while walking on the walkways suggests evolving communitarian life of the city. Majority of the respondents stops to chat and greet while walking.

3.2. Land use Diversity in Segment Surveyed

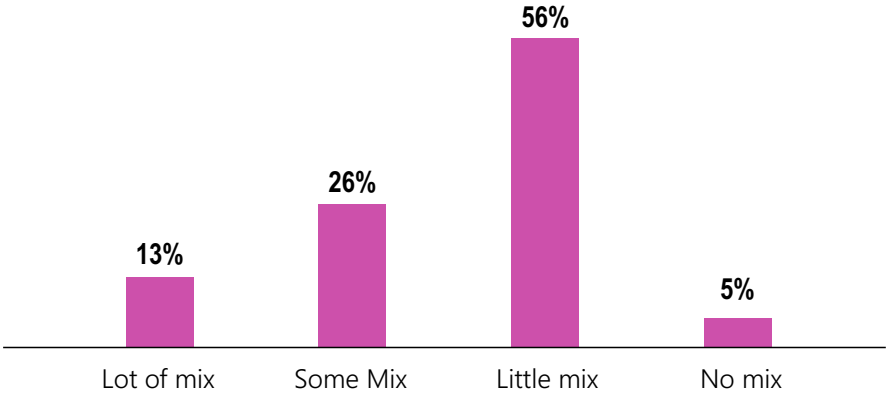

Figure 24 - Mixed Use - Residential and non residential

A little above half respondents described their area has mix land use to an extent whereas quarter percentage shared they have quite a number of mixed land used area.

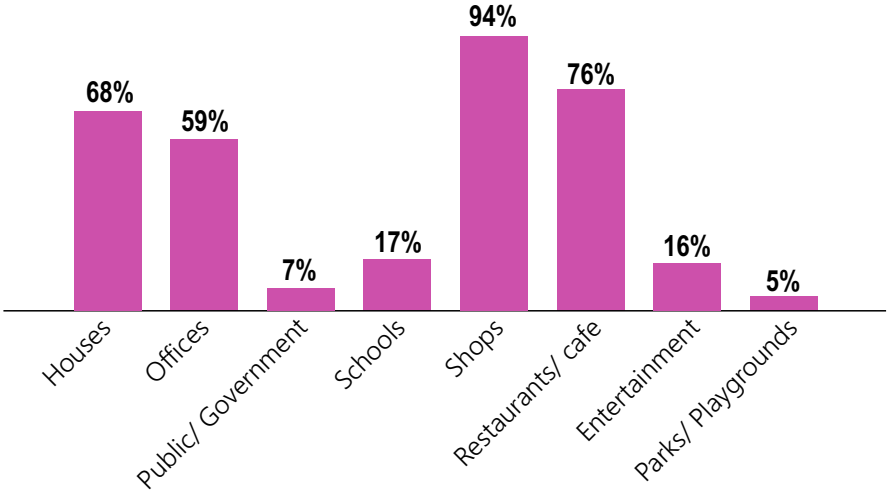

Figure 25 - Establishments in the segment

Majority of the segments are commercial area filled with shops. Houses and restaurant comes 68% and 76% respectively whereas land use in this segment for park and recreational spaces is mere 5%.

3.3. Footpath Quality & Availability

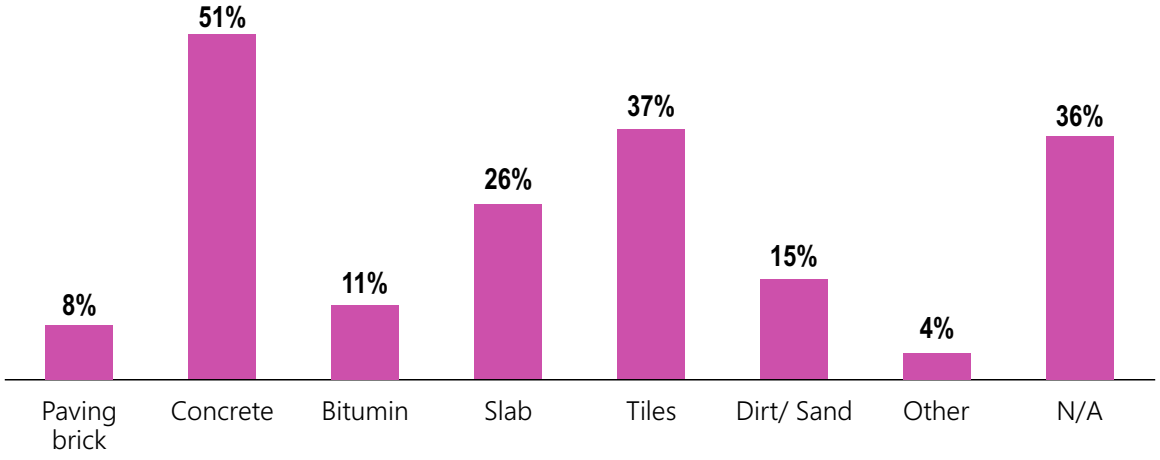

Figure 26 - Materials used for constructing footpath

Quality of footpaths is one of the important determinants of its sustainable use and availability. Around 51% footpaths are constructed using concrete, while 37% of footpaths are built using tiles and quarter percentage are constructed by using slabs. Other materials like bitumen and paving bricks are used 11% and 8% respectively.

Figure 27 - Rough patches visible at Seminary Hill

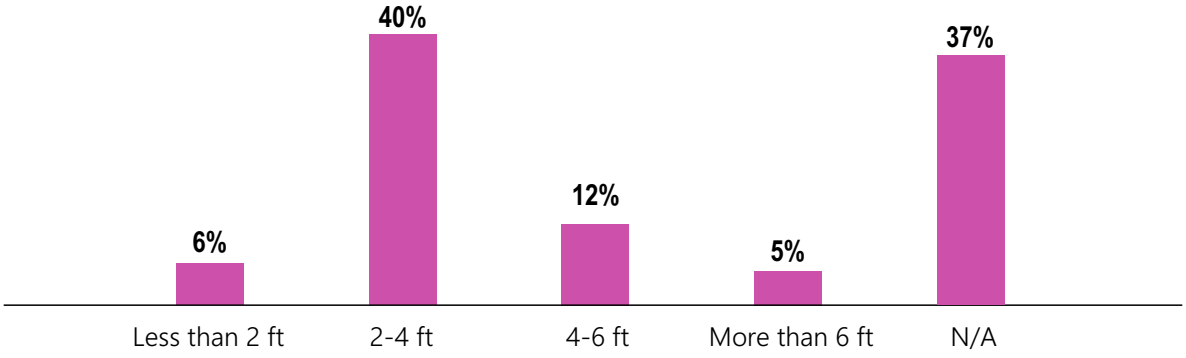

Figure 28 - Width of the footpath

Width of footpaths reflects safety for the pedestrians who uses it. In survey, it was found that 40% of the walkways do have width of two to four feet while 12% of walkways have the width ranging between four to six feet. 6% of the walkways have width of less than two feet and 5% of walkways have the width of more than 6 feet.

Figure 29 - A wide & clean stretch of walkway on other side of Seminary Hill

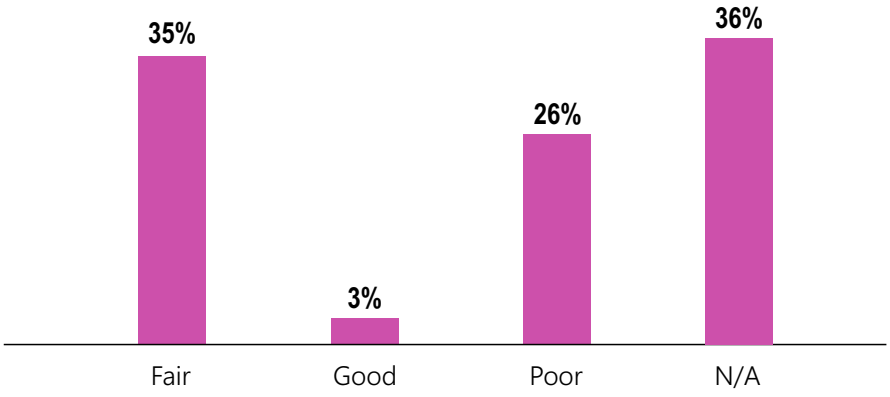

Figure 30 - Condition of the footpath

In survey 35% roads are treated having fair enough pedestrian walkways whereas almost quarter sector is rated as poor walkways. Only 3% walkways are appeared of really good quality.

Figure 31 - Trashes dumped on walkway & illegal occupation in Mankapur

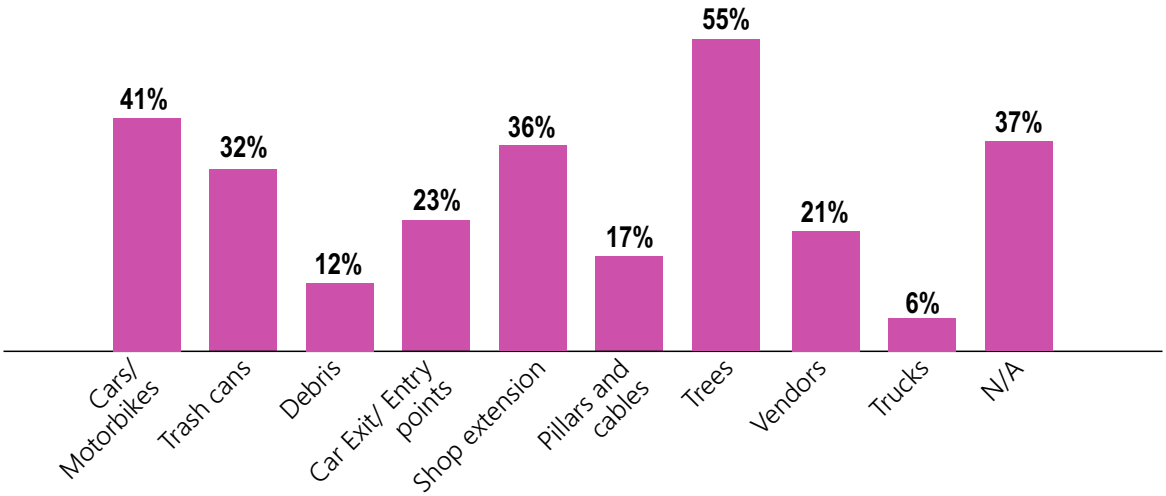

Figure 32 - Obstruction blocking the footpath

Obstruction on the footpaths or walkways is endemic feature of our cities and Nagpur is no exception. Most of the walkways are hindered spaces. Around 41% obstruction is caused by car and motorbike while trash cans and scattered construction related material causes 32% and 12% respectively. Car exit and entry cuts on the roads amounts to 23% of the obstruction caused to walkways. Around 6% of the obstruction to walkways is caused by trucks. Daily uses such as goods shops and unprecedented increase in pillars and cables features with obstruction rate of 36% and 17% respectively. There is some positive obstruction like trees, which accounts for 55%. Vendors constitute 21% of the obstructions. Vendors are quite a cultural appeal to our localized pattern of food purchasing and consumption habits. This issue is much contested than ever thought in our urban spaces.

Figure 33 - A vegetable vendor occupying prime walkway at Seminary Hill

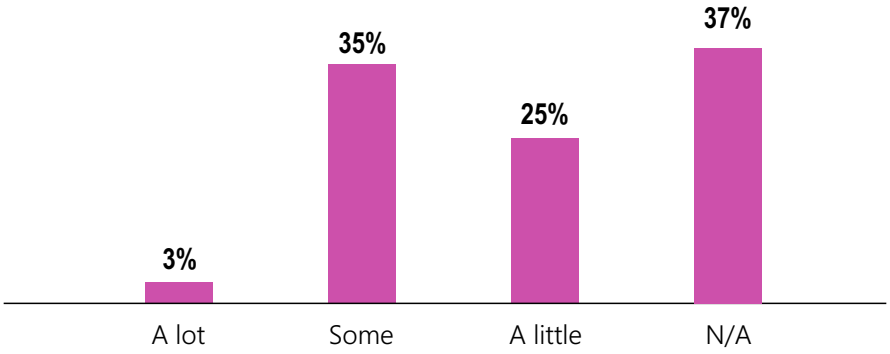

Figure 34 - Quantity of obstructions

Survey shows that a little above of one third of the footpaths has some obstruction while quarter segment have a little obstruction.

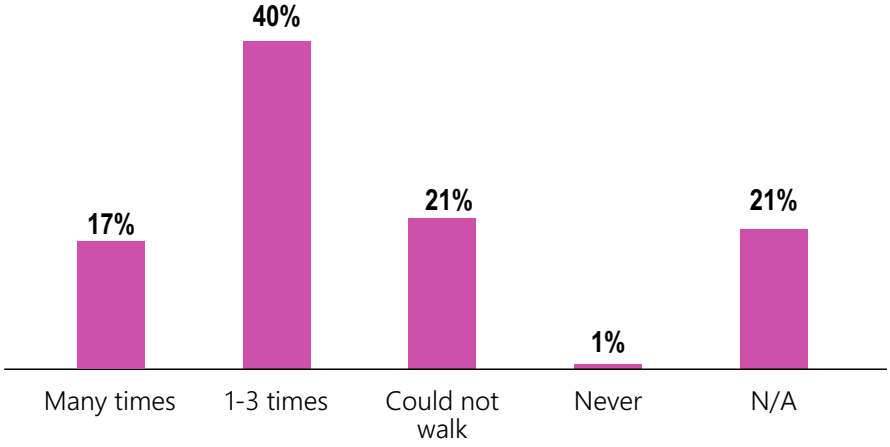

Figure 35 - Obstruction in the footpath that compel pedestrian to leave the footpath while walking

32% respondents report that they have to leave footpaths 1-3 times while walking because of obstruction. However 17% did mention that the condition of footpaths is not walkable at all. 13% of respondents reported of leaving walkway many times due to obstruction.

Figure 36 - Obstruction caused by iron poll lying unattended on walkway at Sita Buldi

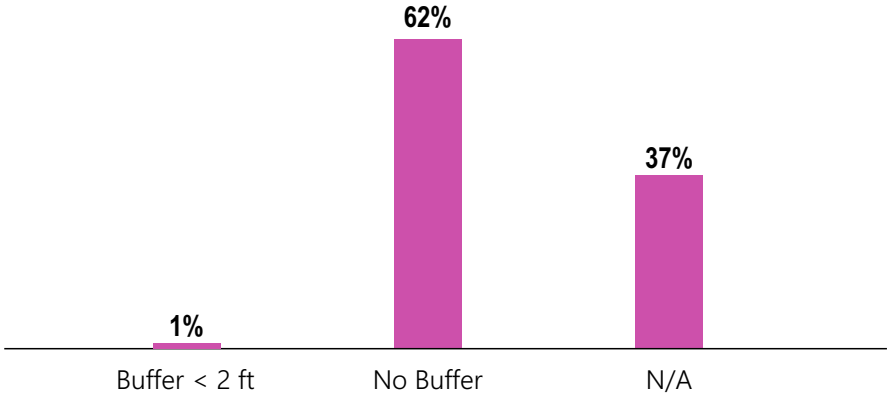

Figure 37 - Availability of buffer between footpath and road

Survey shows that most of the segment (62%), has no buffer between road and footpaths which pose great threat for the pedestrians while they are at these service locations.

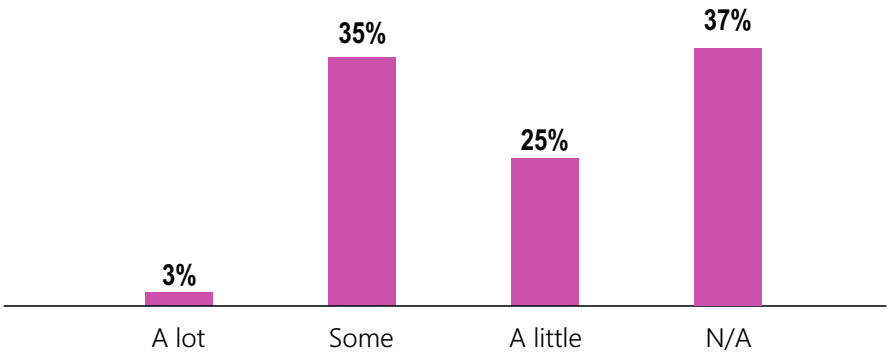

Figure 38 - Quantity of obstructions

Survey suggests 35% of the footpaths have some obstruction while 25% have a little obstruction. 3% of footpaths face extreme obstructions.

3.4. Facilities for persons with disability

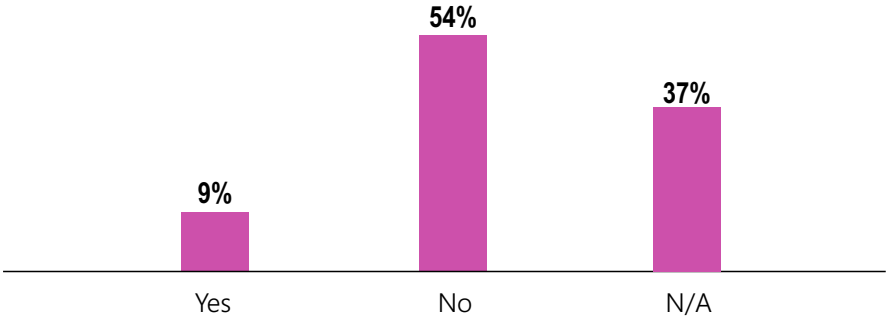

Figure 39 - Accessibility of wheel chair to footpath

More than half of the segment has absolutely no provision for persons with disability. Only 9% of footpaths are accessible for them. Any other enabling provision for special people like availability of wheel chair on crossing juncture is still ,a radical concept for the city.

Figure 40 - Pedestrian path's high and low cuts cause discomfort to persons with disability

3.5. Amenities Available and Safety Concerns of Citizens

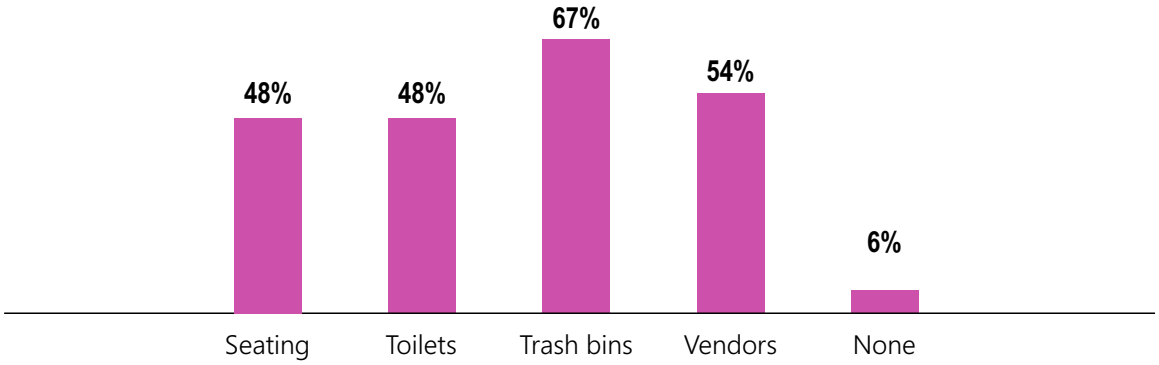

Figure 41 - Facilities available in the segment

Most of the segments do have trash bins and toilet facilities which take care of the basic necessity of the citizens. Almost half percentage does mention about the seating facilities available in the segment, which is quite people friendly . In addition to this, a little above half percentage has the presence of street vendors which is actually a good sign for city's livability and safety.

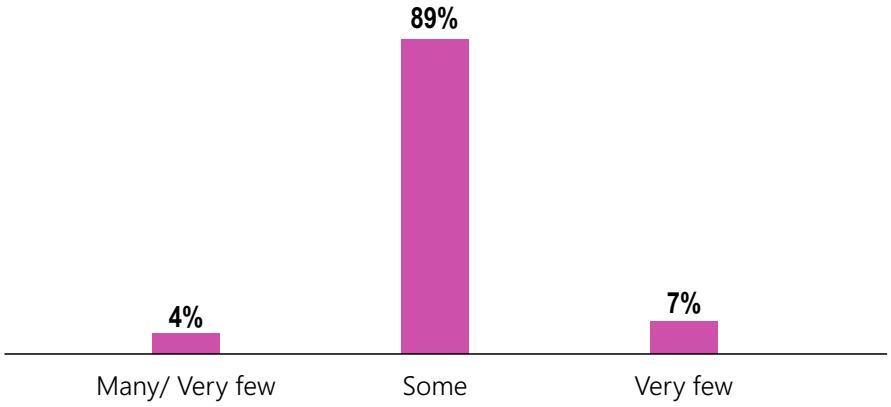

Figure 42 - Tree shades in the walking area

Almost 89% of the segment has trees which provide shade for the pedestrians.

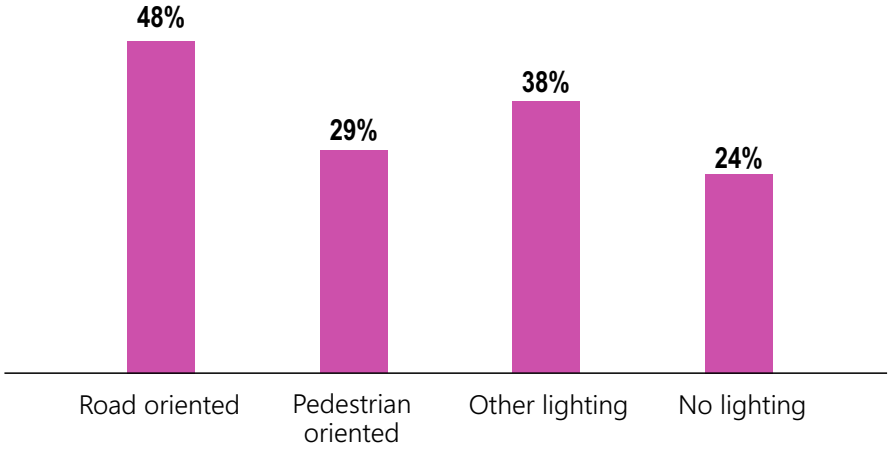

Figure 43 - Lightings on footpath

Almost half of walkways do have proper road oriented lighting while one third area have pedestrian-scale lighting. There are almost quarter segment of area where proper lighting facilities are not available at all.

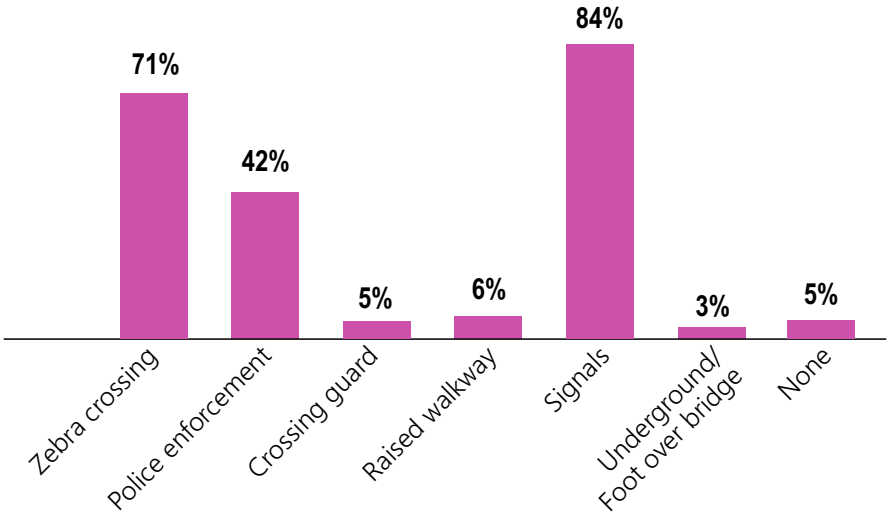

Figure 44 - Crossing aids for pedestrians

Majority of the city roads in the selected segment have sign-boards. 71% of the roads have zebra crossing while 42% of roads have police enforcement. Crossing guard in segments is 5% only

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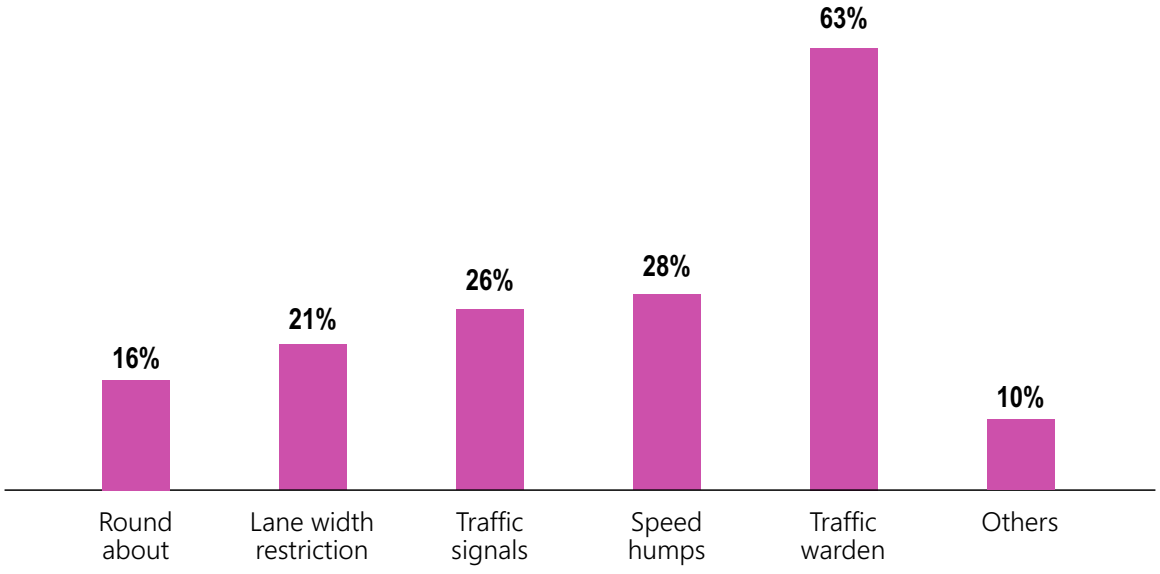

Figure 45 - Traffic calming measures

Around 63% of the segments do have traffic warden to help out the pedestrians to cross the street. 28% of segments have speed humps and 26% of segment has traffic signals. One fifth of the segments do have lane width restriction to help-out the pedestrians cross the street.

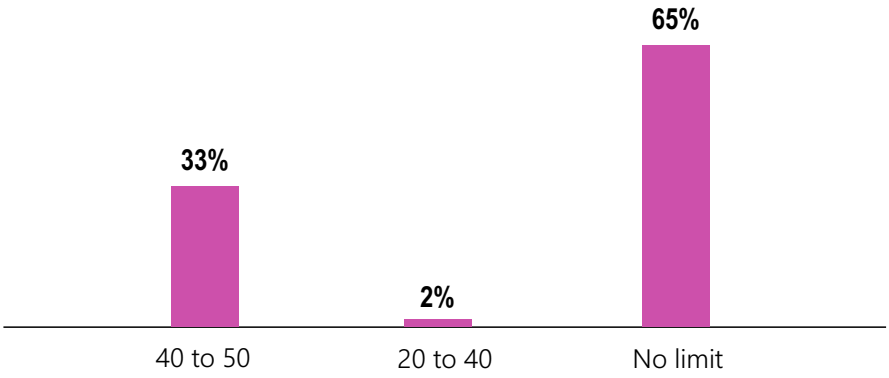

Figure 46 - Signages on speed limit

65% of the segment has no signages on speed limit while one third of segment finds mention of 40-50 KMPH speed limit.

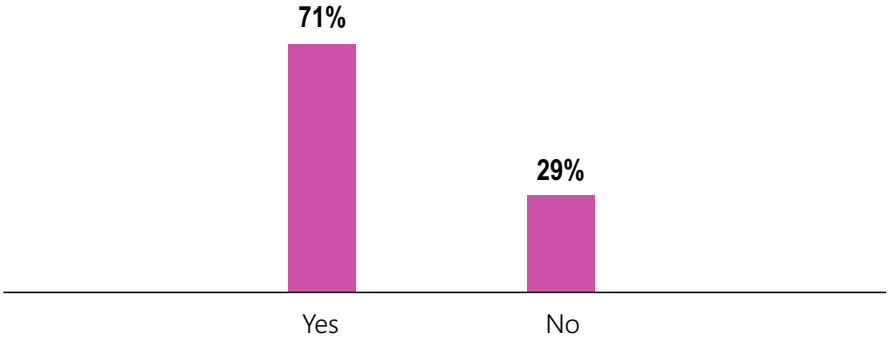

Figure 47 - Attitude of drivers

Majority of the respondents highlighted about the aggressive driving and bad attitude of the drivers towards pedestrians.

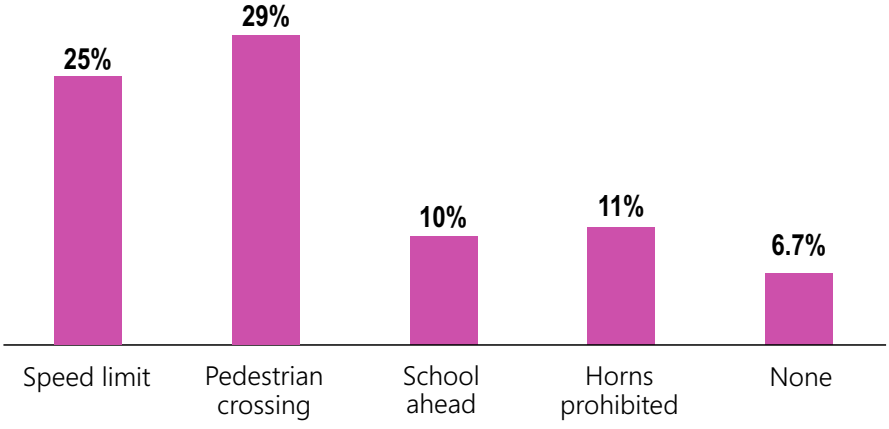

Figure 48 - Presence of signages

The study result depicts that 75% of the segment city roads have sign-boards on school ahead, speed limit, and horn prohibited. Signs supposedly add up to the safety concern of the pedestrians in a dignified manner.

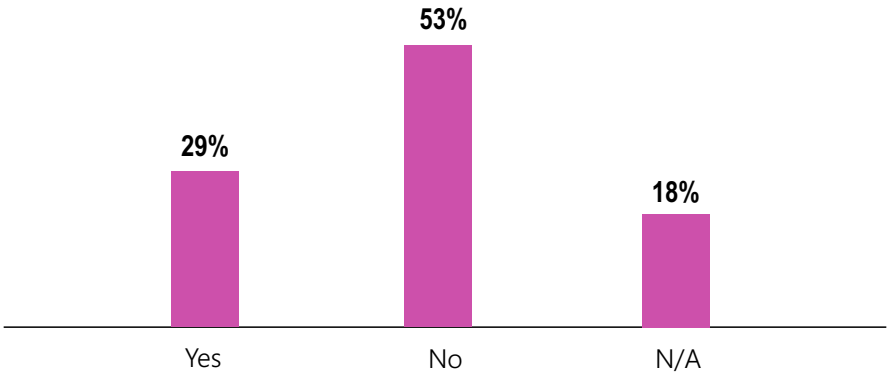

Figure 49 - Railing barriers to prevent the pedestrian crossing

Most of segment's roads have no railing barriers to prevent the pedestrians from crossing the roads at non designated areas. But 29% of the segment has railing barrier which prevents pedestrian from crossing.

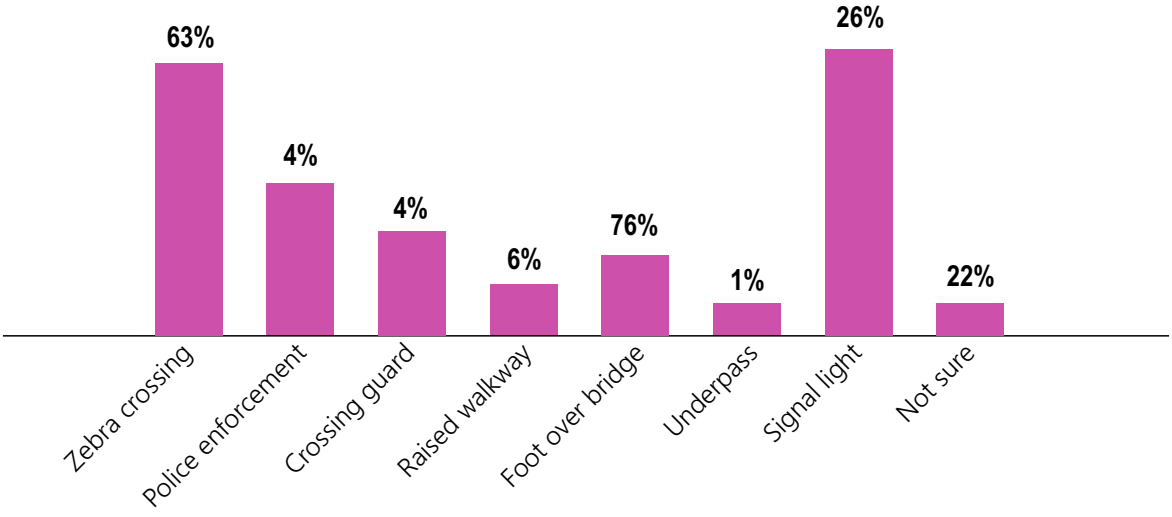

Figure 50 - Crossing aids for school children to cross the street safely

63% of the segment has zebra crossing facilities for school kids. Presence of police enforcement and crossing guards need to be thought about as far as safety of children are concerned. Preferences for utilizing the services of theirs should be discussed by school authorities.

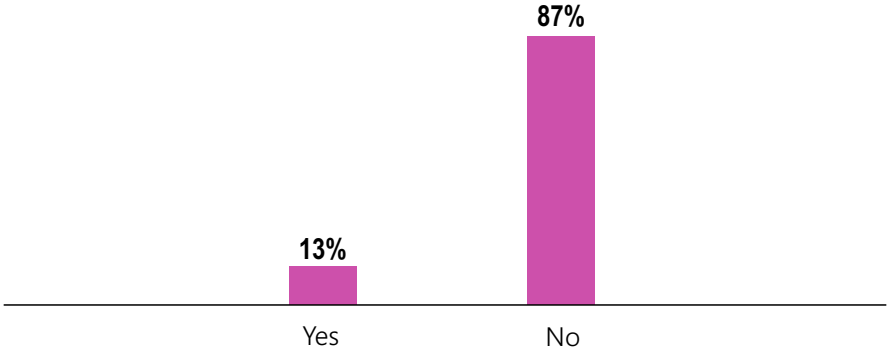

Figure 51 - Availability of walking space for children to walk comfortably

Survey shows that only 13% children have walking space to walk comfortably. Majority of the segment is devoid of any such facility for children which throw a serious concern towards the safety of children.

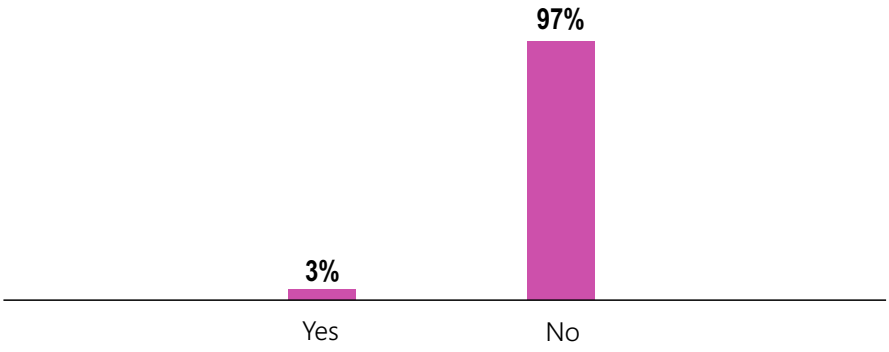

Figure 52 - Cycle stand facilities in school

Only 3% have cycle rack and 97% do not have any facilities to park their bicycles. For a city like Nagpur, where people still go on bicycle for their short trips and errands, this trend seen in schools attributes to the transition of attitude and the way city is growing ahead.

3.6. Vehicular Parking Situation in Nagpur

Nagpur has high incidence of illegally occupied parking space. Around 78% of the total vehicles are parked are clearly designated 'No Parking' zones. Heavy vehicle like trucks which constitute quarter of the illegal parking cover-up are another incidence of traffic high handedness.

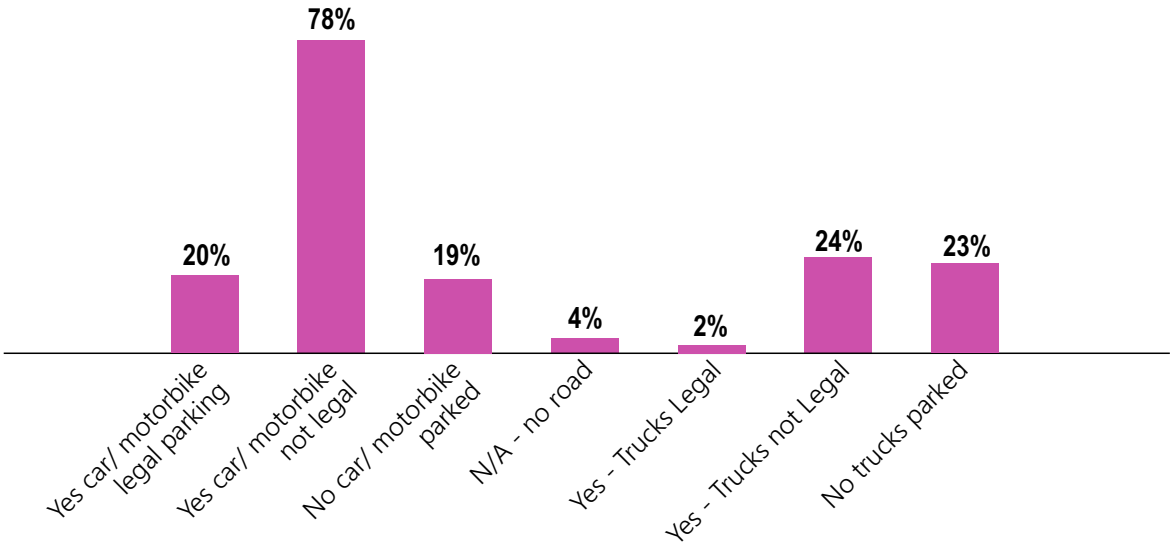

Figure 53 - Vehicles parked on the road

4% of the heavy vehicles claims no place available for them to park the vehicle, leave alone legality or illegality of the space used. Only 2% of the trucks are parked legally. Nagpur like any other tier two city is facing huge crisis of parking spaces.

Figure 54 - Motorbike illegally parked on pedestrian paths

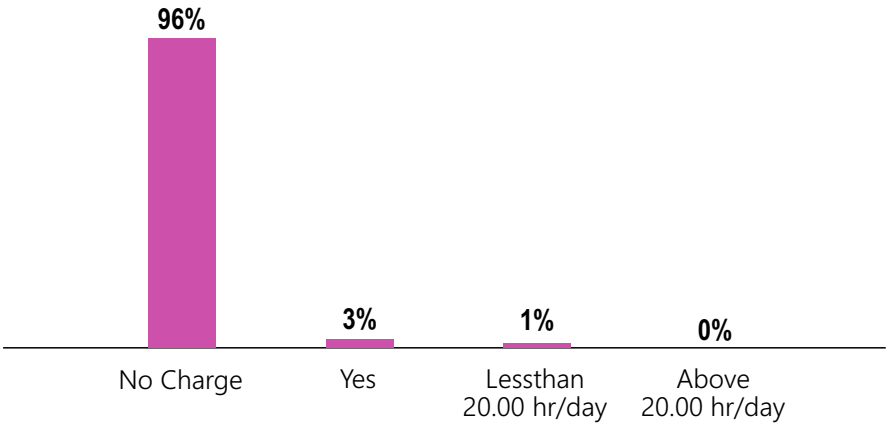

Figure 55 - Parking fees charged

Although a meager 3% do charge parking spaces around 96% of parking spaces are free of parking charges.

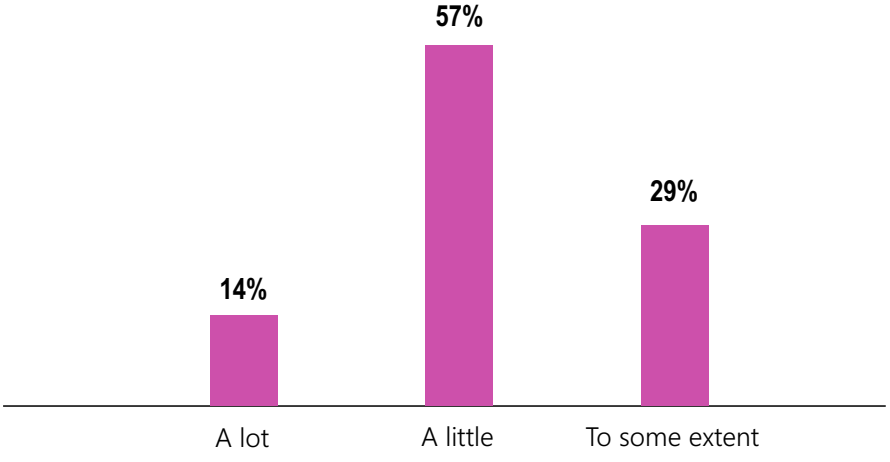

Figure 56 - Parking as hindrance in the mobility of pedestrians

There are some very distinct responses to hindrance caused to the flow of the pedestrian commuters by illegal parking in Nagpur. 14% agree on the palpable situation created by illegal parking causing a lot of problems to pedestrian directly. 29% agree on its bad impact caused to pedestrians up to some extent, while 57% does not consider it as a major issue.

CHAPTER-IV

RESULTS: PERCEPTION SURVEY

4.1 Travelling mode and pedestrian preference

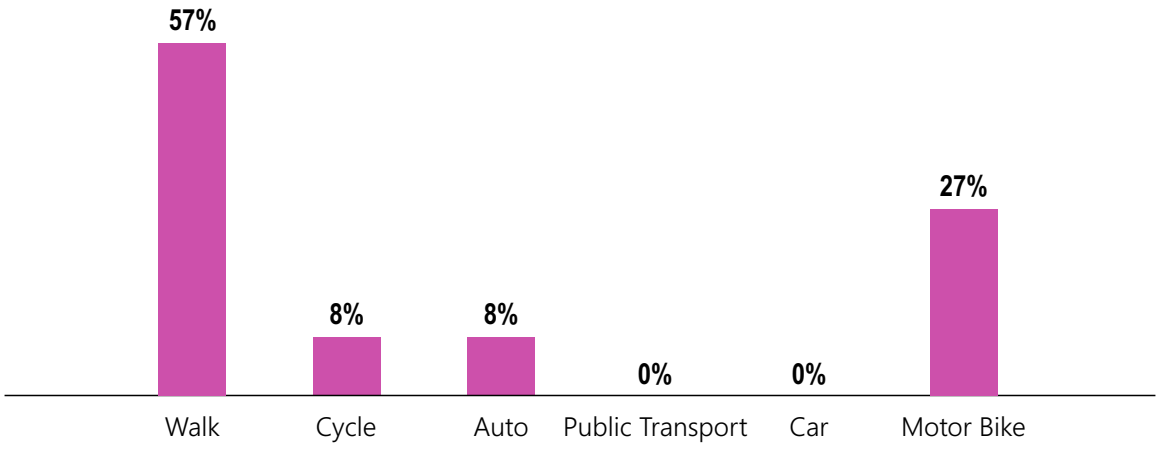

Figure 57 - Mode of transportation used for less than 2 km

57% admitted walking as the best way to reach a shorter distance like within two kilo meter. 27% suggested of using motorbike to cover the distance. 8% say using of auto services while public transport does not get any mention. 8% acknowledged cycling to reach the shorter distance. The preference for non motorised transport such as cycling is in the decline needs to be pushed further.

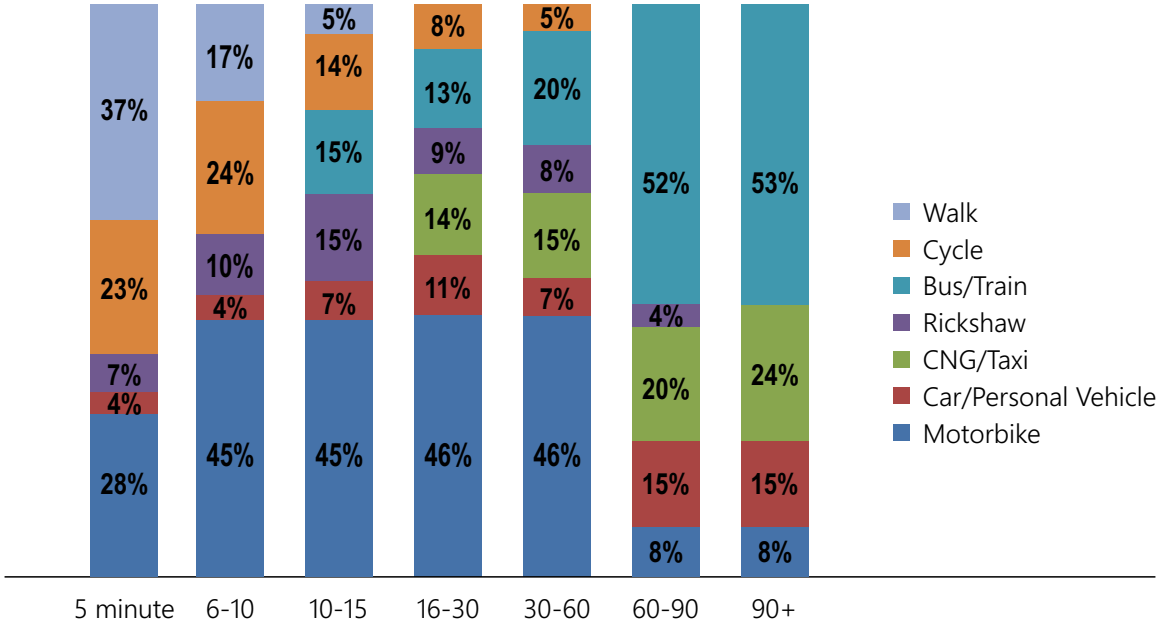

Figure 58 - Time spend on travelling

This figure seems to be quite interesting in terms of NMT perspective. People are ready to walk when the walking time duration is within 15 minutes which covers almost one fifth for an average. Same goes with cycling as the distance is more, the rate of people using the cycles for commute has come down. Another interesting factor is the use of public transport is increase in proportion with the time they have to cover which means distance they have to traverse.

This clearly indicates that adequate and appropriate infrastructure in place will indeed encourage people to use non motorized and public transport.

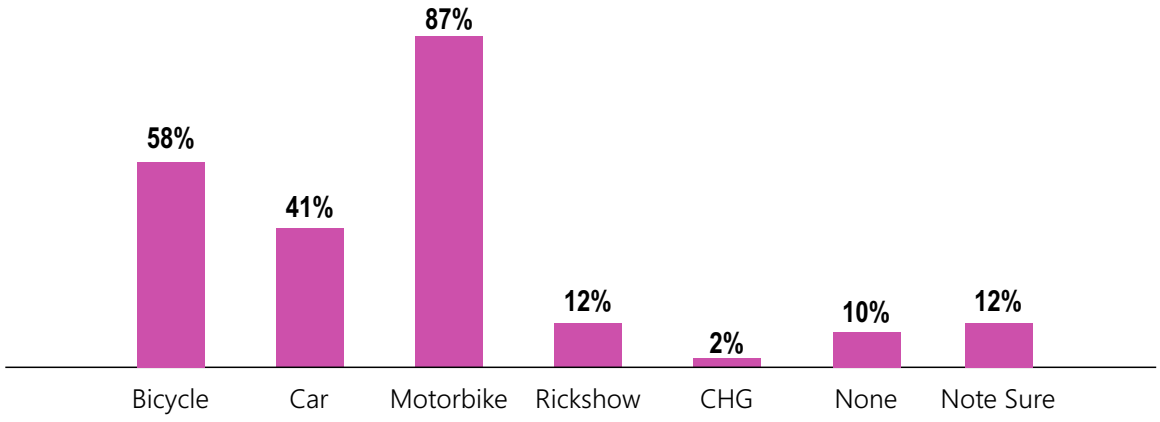

Figure 59 - Ownership of vehicle

Majority of the families own motorbike while 58% cycle in the surveyed segment. 41% possess car and 12% rickshaw. Increase in the number of motorbike is increasingly a traffic concern which traffic department has to take into consideration. Nagpur is turning into city of motorbike.

4.2. Pedestrian facilities and pedestrian perception

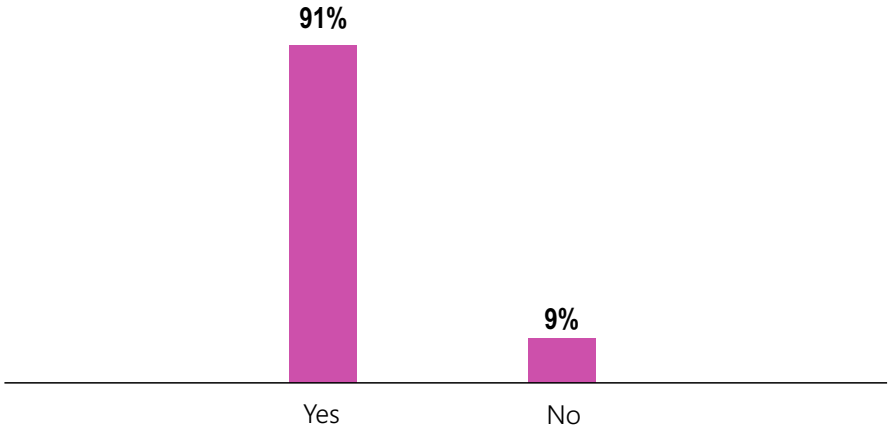

Figure 60 - Fear while crossing busy roads

Fear while crossing roads is reported to be very high. 91% people in the surveyed segments fear while crossing the road.

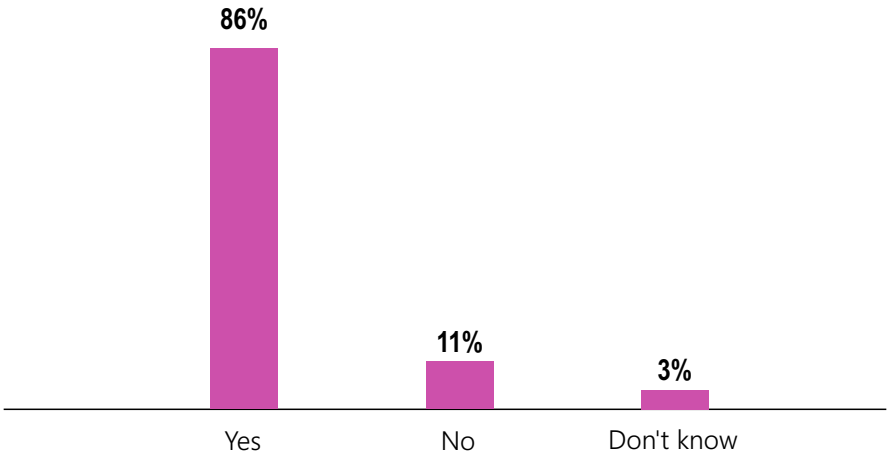

Figure 61 - Driver's attitude towards pedestrians and cyclists

Majority of the respondents shared that drivers give less care to pedestrians and cyclists. This needs to be addressed at the various levels by government officials and NGO's.

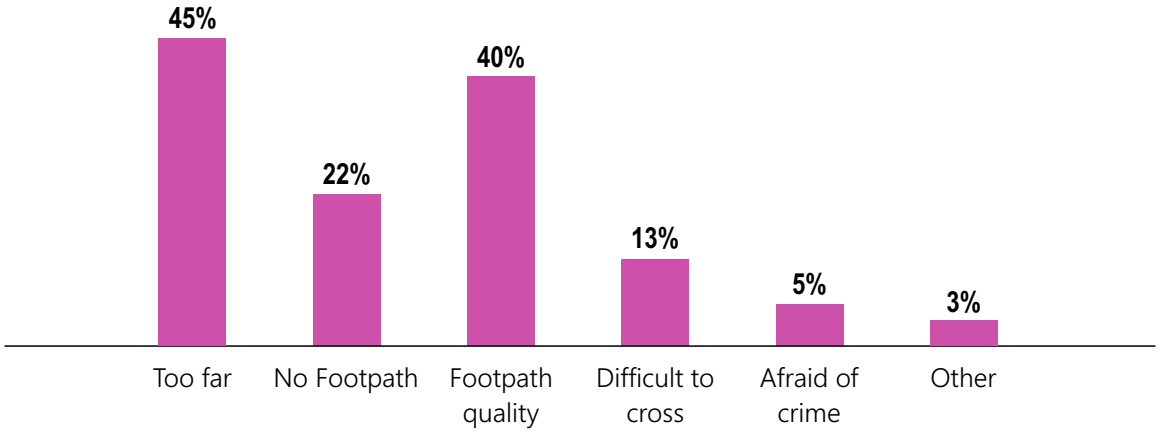

Figure 62 - Walkability to any location

45% attribute distance as a reason which deters them to reach a place by walk. 22% suggests of no footpath while 40% complains of footpath quality which prevent them to walk to some places. 5% are afraid of crime while difficult in crossing is attributed by 13%.

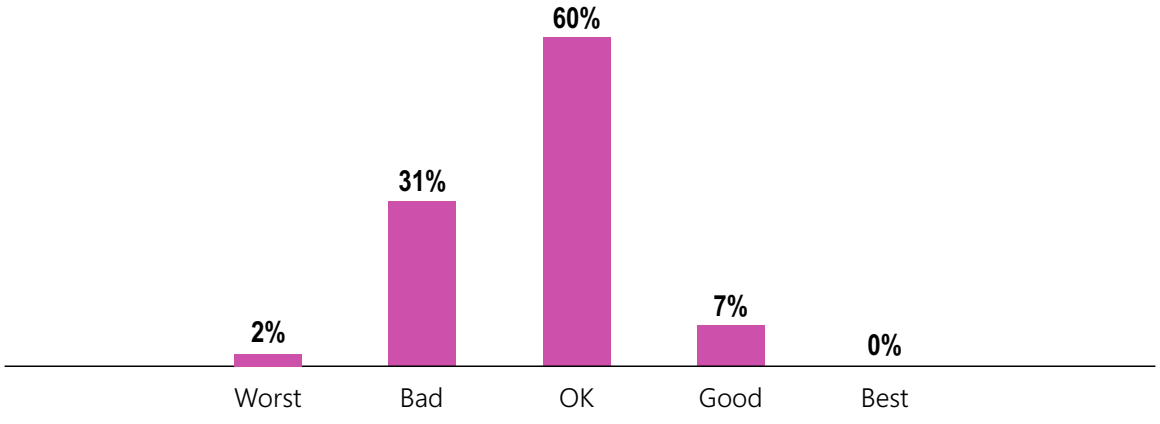

Figure 63 - Rating on pedestrian facilities

Almost 60% rate pedestrian facilities are adequate enough while 2% call it worst. One third of the respondents mentioned as bad which shows considerable amount of efforts have to go in for pedestrian facilities.

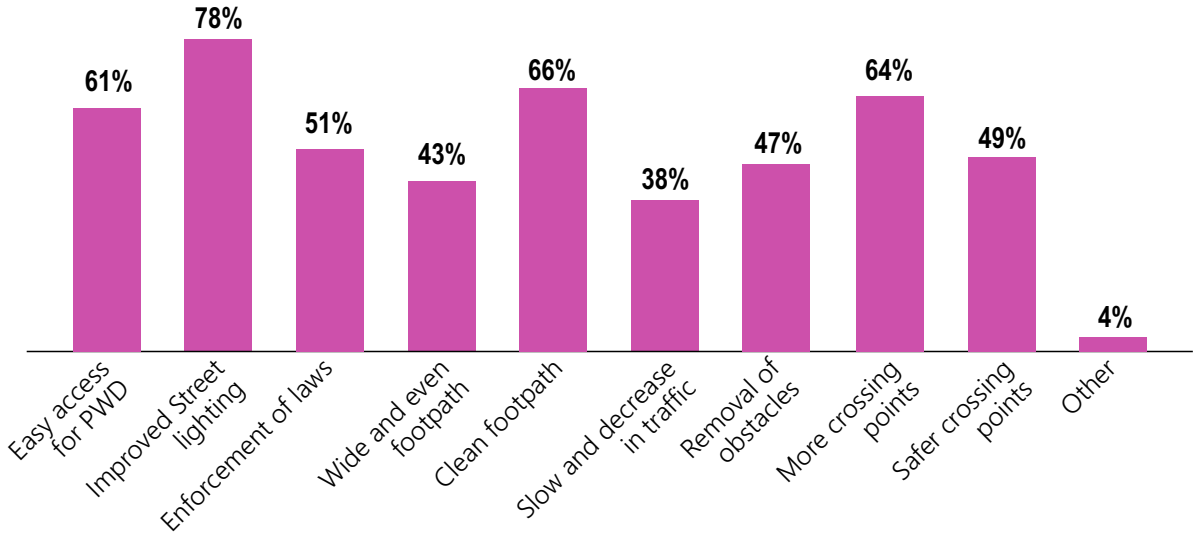

Figure 64 - Improvement like to have in pedestrian infrastructure

Pedestrian perception on facilities has some remarkable feature to reflect on. 61% wants easy access for persons with disability while 78% wants improvement in street lighting. Slightly higher than half population believes enforcement of laws as a facility and 43% demands wider footpaths. 66% talk of clean footpaths and 47% wants removal of all obstructions from the footpath. 64% want more crossing point to add with the facility while 49% wish safer crossing points.

This gives clear idea on the issues people faced daily and in what are the areas concerned officials have to put their efforts.

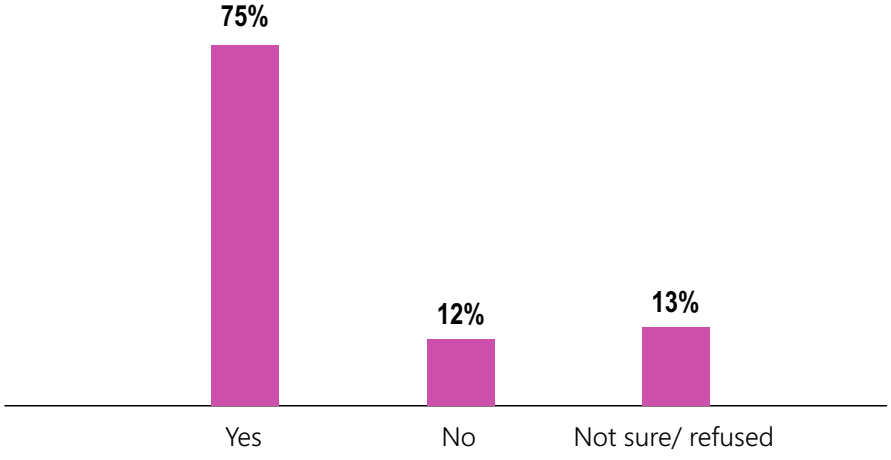

Figure 65 - Proper management of hawkers

Three fourth of the population wants proper management for hawkers whereas 12% does not see them as a problem.

4.3. Safety and Pedestrian perception

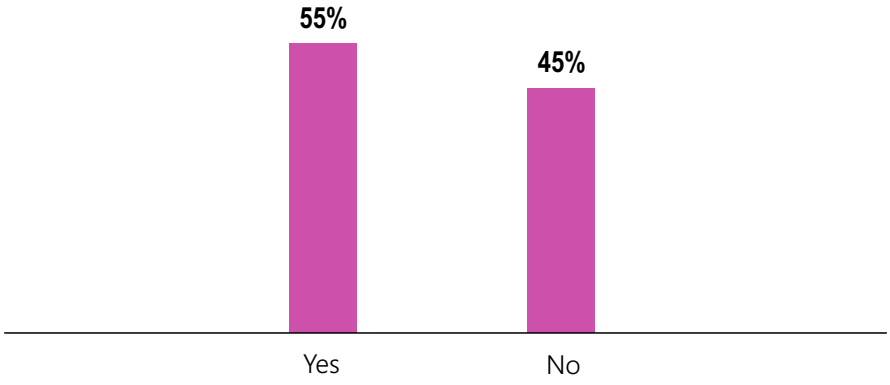

Figure 66 - Feeling safe to walk during night time

City seems to be relatively safe for people to move around even at night, which is a positive point. But the figure shows that there needs to be considerable amount of effort for people to feel proud about their city.

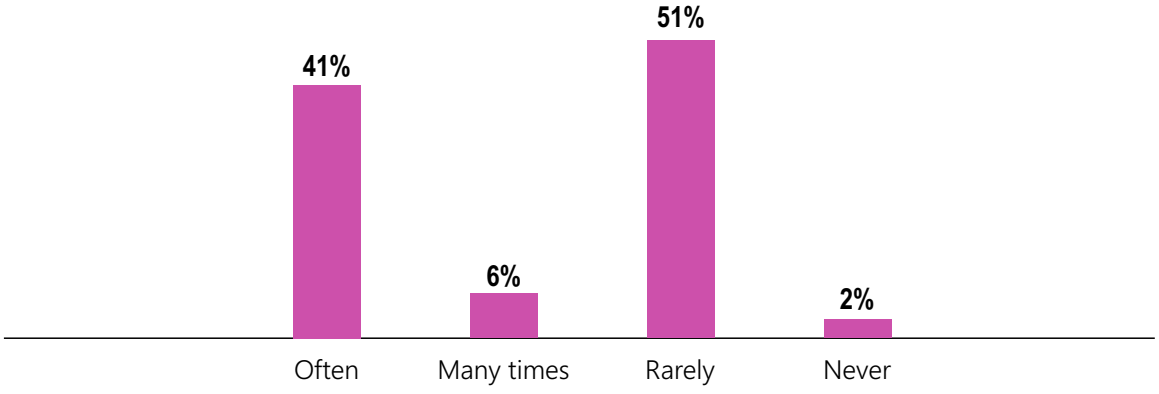

Figure 67 - Experience abuse from motorists while crossing the roads

Considerable amount of respondents feel that they are abused by motorists while crossing the roads. Civic and traffic sense has to be pitched in and it has to be addressed from school level onward for them to inculcate and practice.

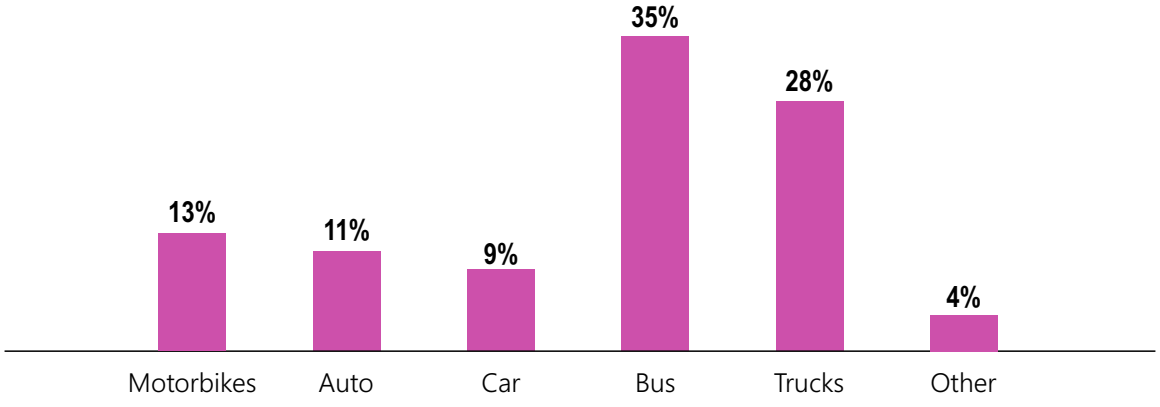

Figure 68 - Type of vehicles causing havoc to pedestrians

Bus and trucks top the chart in causing havoc on road for pedestrians.

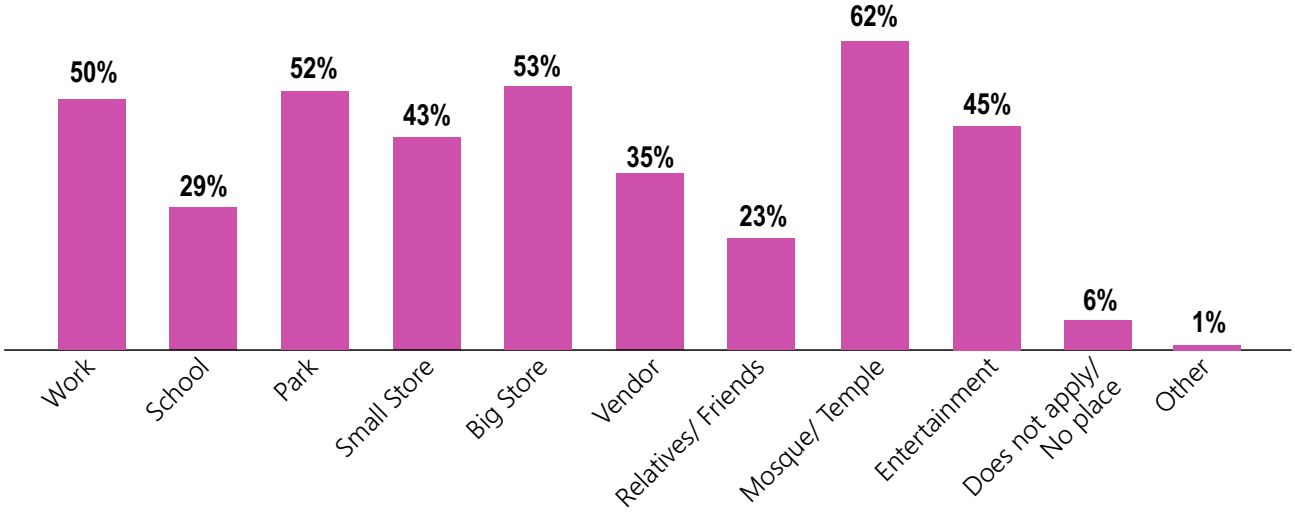

Figure 69 - Any location that you would like to walk but currently unable to

Places that people would like to go for walking are religious institutions, parks, work place, big stores for purchase and entertainment facilities. This shows that if facilities are provided, people do prefer to have accessibility to these locations by non motorized transport. This point back to the design and planning one should look at when city envisage facilities for the citizens.

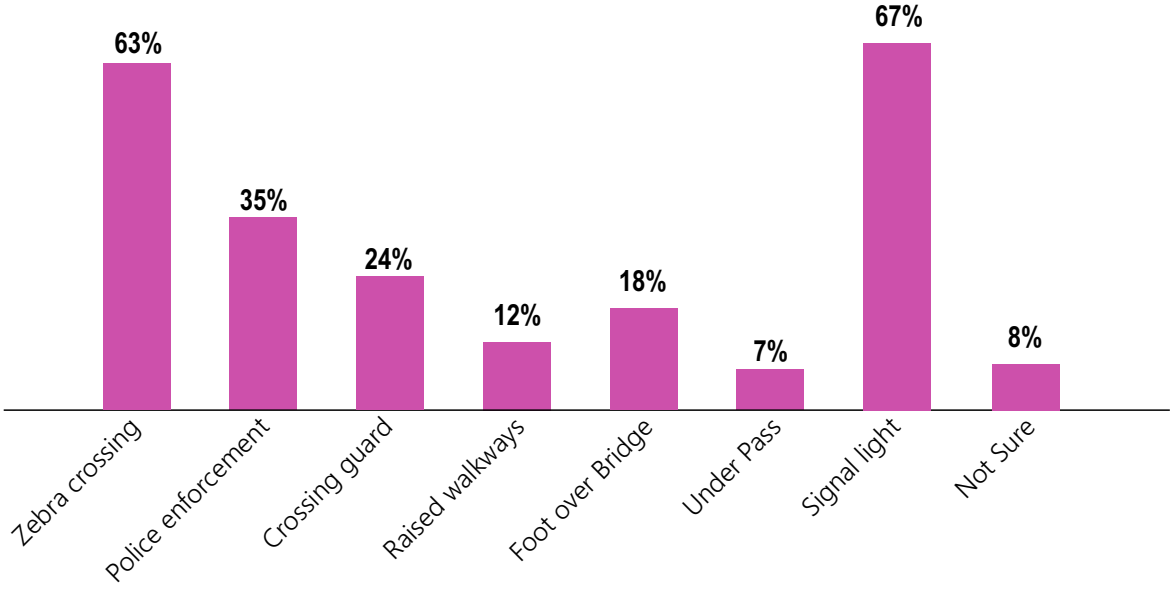

Figure 70 - Preference for crossing aid

Majority prefer to have signals and zebra crossing for safe crossing the road. Beyond that people generally look forward to the assistance from police guards at signals. Almost one fifth do mention about foot over bridge, but once the facility is made available, we need to see how it is been used. Foot over bridges are another facility which is considered ideal by transport and urban planners, but hardly used by the pedestrians due to the various issues and inconveniences associated with it.

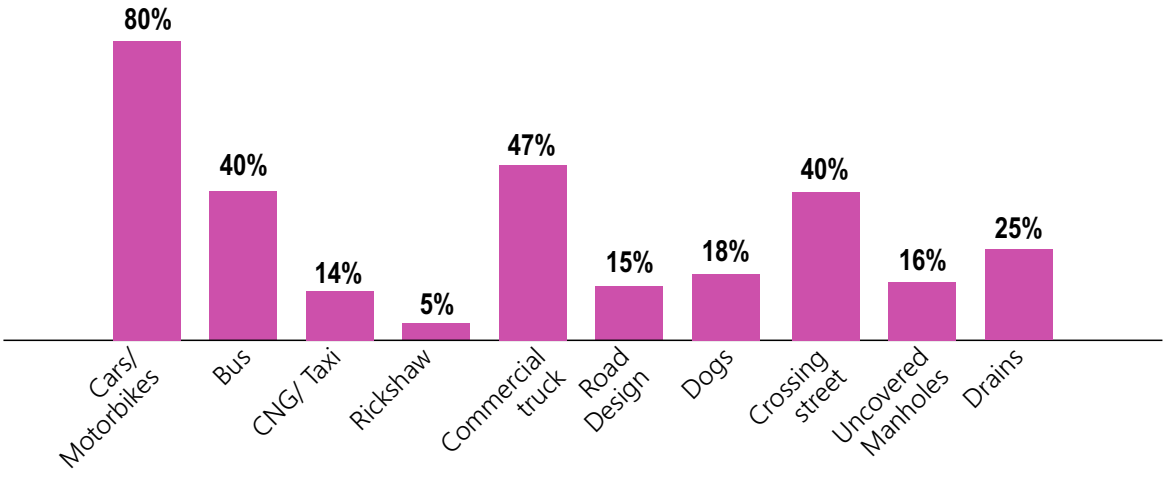

Figure 71 - Fear to cross the road

The figure clearly depicts the aversion and fear pedestrian have when they have to cross the road. Majority are concerned about motorized transport and traversing through these vehicles.

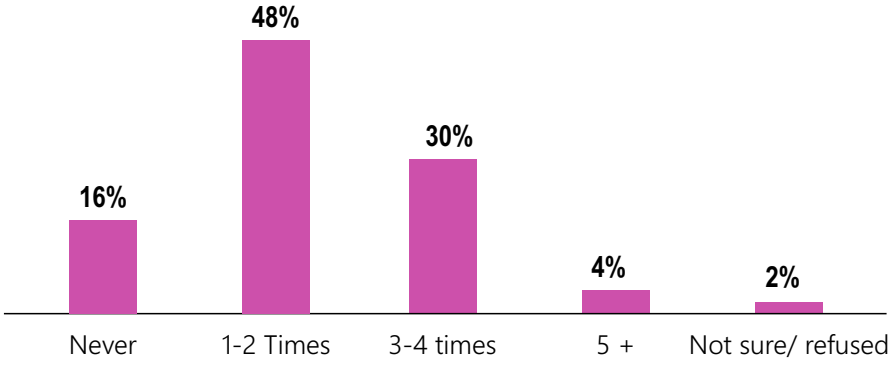

Figure 72 - Incidences of injury due to poor quality of the footpath

Majority of the respondents are injured on an average one to two times whereas one third mentioned it as high as three to four times. This shows the apathy of our city designers when the needs of pedestrians have to be fulfilled.

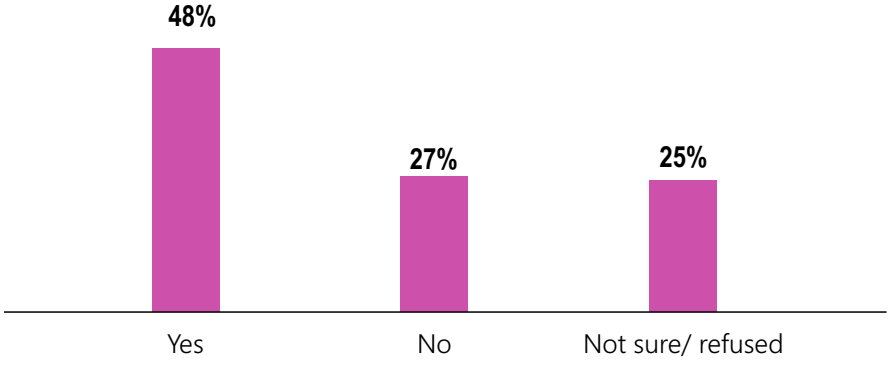

Figure 73 - Feel safe when walking on the street

48% participants feel safer when there are other people walking on the road. The issues and perception of the other half of the population needs to be addressed.

CHAPTER-V

IMPROVING WALKABILITY

5.1. Transport Policy, Maharashtra

Maharashtra Draft Transport Policy is revamping its infrastructural institutions keeping in view an efficient improvement in public transport system which currently requires urgent attention. One of the biggest state with biggest urban sprawling, Maharashtra still awaits a proper policy to be instituted in order to make public transport more reliable and functional in many of its regions. Vidarbha region specifically requires immediate attention, although Nagpur almost seems an exception here among regional cities in terms of efficiency of public transportation but a positive policy intervention with carefully guided initiative is much required. An encouragement which matured into action like investment in metro rail is already underway in Nagpur. Currently there are around 16000 buses of Maharashtra State Road Transport Corporation (MSRTC) plying on the road which carry seven million passengers daily on 17000 routes. It is one of the third largest public bus service providers in India. But Vidarbha region still needs an entirely fresh review in terms of transportation facilities as it happens to be most backward region in the State in almost all the indicators.

Nagpur City has bus service called StarBus provided by JnNURM scheme to Nagpur urban area. At present almost 210 StarBus are plying on 47 routes in the city with a vigorous plan of expansion which Regional Transport Officer has to consider (Times of India, 13th October, 2013). Successive BJP government at the centre has transformed JnNURM into AMRUT with enhance potential and added capability to change the urban spaces.

A major policy suggestion of wide network of roads spanning across the state connecting all the major district and talukas is efficiently achieving its purpose. Good connectivity between the small cities and talukas are also strengthened by public transport reducing the dependability on private vehicles. One of the major concerns of public transport system often contested by public is lack of hygiene and cleanliness in the buses which Government of Maharashtra has promised to deliver with efficiency. Old buses are being replaced with new one. Road infrastructural requirement like pedestrian paths and egalitarian road spaces for commuters are a well accepted policy agenda. Most of the cities are being set in tune by providing such facilities and up gradation. Urban practitioners and enthusiasts taking up the cause of sustainable practices like cycling which still needed to be pushed officially in letter and spirit.

Maharashtra happens to be the land with one of the biggest megalopolis in the country; it seems to treat and plan well for its emerging cities like Pune and Nagpur. Giant city of Mumbai is landmark urban lab which suggest and prepare policy makers and officials to treat other cities with due diligence. Road widening and quality road infrastructure is part and parcel of transport policy which also brags of giving India its first expressway connecting the city of Mumbai with Pune.

5.2. Parking Policies

Transport Policy of Maharashtra is well aware of issue of availability of parking spaces in cities and has remarkably strengthened its position by asking municipalities and local urban governance institution especially those directly engaged in urban housing and infrastructure governance to carefully implement the agenda of the government. Policy directs municipal and local bodies involved to fully adhere with the principles by invoking and implementing adequate parking spaces before issuing building permits. NUTP also directs the state governments to amend building by-laws in million plus cities so that adequate parking space is afforded to all the citizens. Policy also recommends multi level parking facility to be developed mandatorily in bustling city centers full of high rise commercial complexes to counter the increased pressure of parking. High parking charges are also mooted by NUTP.

Free parking comes with great social disadvantage to city which hampers many movements. In fact private vehicular movements and their parking related behavior only eat up genuine use of spaces for parks, recreational spaces and play grounds which determine the city character.

Private vehicular movement is a moving phenomenon ambushing public space. Our cities already fragile character leave almost no room for adventure and then private automobile become standard case of abuse of urban equity which must certainly in return invoke 'fixed responsibility' for the same. Private vehicular movements are choking our city spaces by severely reducing terminal capacity which could be used efficiently by invoking sustained use of public transport. Bicycles are another eco-friendly medium which needed to be upgraded in practice and approach but there is no much voice on it. A greater concern for urban built environment and a 'fixed responsibility framework' which only invoked ethically till now, needed to taken care by policy makers stringently. Transit system can be shaped as that depends much on city citizens practices for a sustainable change.

5.3. National Urban Transport Policy (NUTP)

Urban population currently constitutes around 30% of its total population in India. Experience across the world has been that as economies grow, rapid urbanization takes this proportion to over 60% before it begins to stabilize. As such, it is projected that India's urban population would grow to about 473 million in 2021 and 820 million by 2051, as against only 285 million in 2001. Hence, cities must not only meet the mobility needs of the current population but also provide for the needs of those yet to join the urban population.

NUTP recommends equitable allocation of road space with a focus on people, not vehicles. To achieve this, reserving lanes and corridors exclusively for public transport and non-motorized modes of travel were suggested. Under the heading “Priority to the use of public transport and NMT", the policy states that "The central government would promote investments in public transport as well as measures that make its use more attractive than in the past. Towards this end, the central government would encourage

all State capitals as well as other cities with a population of more than one million to start planning for high capacity public transport systems."

JNNURM is an incentive to cities and states across the country to implement modern bus systems, in particular Bus Rapid Transit (BRT) which has been successfully matured into AMRUT schemes by the successive BJP government with added capability features. The main aim behind this scheme is to encourage the public transportation system in cities and thus to reduce the use of private vehicles within city limits. At present such buses are introduced and plying successfully across the City and are famously known as 'CityBus' service.

NUTP, under the heading "Priority for Non Motorized transport", further states that" 'The Central Government would give priority to the construction of cycle tracks and pedestrian paths in all cities, under the NURM, to enhance safety and thereby enhance use of non-motorized modes" which is certainly a welcome move once its transformed into actual urban practice.

Review of city budget expenditure reveals that there is grossly insufficient funding for NMT. Not surprisingly, there are no budget lines for improving NMT.

Pedestrian infrastructures have well been take care in Nagpur city although its sustainable use and spatial disparity across city's different region needed to be focused with more educative drives involving city citizens. Private vehicular movement control is least being taken care of which requires an immediate educative and policy intervention. Cycling lanes are nowhere a concern but civil lines area of Nagpur can certainly prioritize it.

5.4. Hawker's Policy

Hawkers are street vendors who occupy public spaces and provide essential goods and services and often are either registered or unregistered. Hawker's perspective in cities creates many claims and liability encompassing their right to livelihood as entitlement but also features into urban institution's efficiency to provide those public spaces to public for free and uninterrupted use. This contested nature of hawkers has been quite a tricky concern for our urban spaces and Nagpur is no exception. Hawkers mainly occupy pavements. There are around 40000 registered and 5000 are unregistered hawkers in Nagpur. Registered hawkers are either mobile or stationary and they are charged Rs. 600/- per month. Concerned urban authorities also take care of necessary infrastructure for hawkers.

The Honorable Supreme Court ruling on street vendors policy states that, "If properly regulated according to the exigency of the circumstances, the small traders on the sidewalks can considerably add to the comfort and convenience of general public, by making available ordinary articles of everyday use for a comparatively lesser price. An ordinary person, not very affluent, while hurrying towards his home after a day's work can pick up these articles without going out of his way to find a regular market. The right to carry on trade or business mentioned in Article 19 (1)g of the Constitution, on street pavements, if properly

regulated cannot be denied on the ground that street are meant exclusively for passing or re-passing and no other use."

The National Policy for Street Vendors, 2004 suggests demarcation of vending zones. According to policy, the demarcation of hawking zones should be city/town specific. It should be done in participatory process by a Town Vending Committee which would consists of municipal authority, traffic police, associations (marketers, traders) etc. The policy suggests that all vendors need to be registered at a nominal fee and they be issued an identity card. The town vending committee is entrusted to monitor the hawking activity. Street vendors are most vulnerable to forced eviction and denial of basic right to livelihood. The policy restricts the ability of authorities to carry out forceful eviction of street vendors and they should be served a notice of 30 days if the eviction is urgent.

5.5. The Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995

The Act lays down provisions to help ensure that people with disabilities can have easy access to the streets. The Act, among other things mentions that the appropriate governments and the local authorities shall, within the limits of their economic capacity and development, provide for:

- Installation of auditory signals at red lights in the public roads for the benefit of persons with visual handicap;
- Causing curb cuts and slopes to be made in footpath for the easy access of wheel chair users;
- Engraving on the surface of the zebra crossing for the blind or for persons with low vision;
- Engraving on the edges of railway platforms for the blinds or for persons with low vision

CHAPTER-VI

CONCLUSION & RECOMMONDATION

Existing infrastructural facilities in most of the cities including Nagpur are strained and new pool of migration and material resources to sustain them with emergent livelihood capacities are already seeking an arduous explanation from policy makers. A material expansion in infrastructural capacities blindly followed will only improve discrepancies with multiple urban crises. Expanded roads, increased numbers of flyovers and now ambitious Metro rail project are certainly an infrastructural necessity which must be carefully heeded to, but the larger question of urban efficiency does not lie in expanded infrastructure. This missing link of sustainable urban governance and improved city-citizenry practices advocating for walkability and safe streets needed to be consistently explored and achieved. Increased numbers of private vehicles are also projected as a sign of booming economy which ply on city roads without many advantages. In Nagpur, Traffic Department official data estimate suggest that around 1.4 million population posses registered vehicle where Nagpur's total population is 2.5 million. Traffic collision and increased conflict on the roads are daily news in most of the newspapers. Sense of vehicular dependability is so rampant and prevalent that people will be using private vehicles for even small distances. This disastrous private vehicular dependability and possession devoid of preliminary understanding of safe streets needed to be taken care of and people must be sensitized. Growing motorization has ambushed already existing pedestrian spaces and city planning agencies are succumbing to this unwanted pressure. Pedestrian fatalities and increased number of daily accidents reported are alarming metamorphosis of our cities which needs sustained solutions. Our cities should be 'walking' friendly and the planner must follow a model where people could reach necessary destination by walk. A healthy city requires safe walkway where social side of city could get reflected and people could walk and feel the city. A walkable city ensures and actively contributes to urban built environment which a city must strive to maintain. Growing number of Non Communicable Disease (NCDs) in cities can also be taken care of if people have immediate safe passage to walk or else they develop tendency to demand safe passage to walk. Walkability adds to growing balance of urban built environment and it also provides city a much required livability characteristics.

6.1. Specific recommendations in brief

- Proper sidewalks should be provided across the city
- Railing barriers or any other buffer has to be placed in view of safety of pedestrian
- Cleanliness of the footpath has to be maintained and ensured
- Accessibility for wheel chair bound persons at ease should be ensured
- Designs should be taken care in view of the need of persons with disability

- Footpath should be made even and continuous for people to use
- Ensure that garbage is removed and strict monitoring on dumping of garbage and other debris on footpath
- Provide amenities such as benches, drinking water, tree shades, space for vendors, trash cans and toilets

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ANNEXURE - 1 : Field Walkability Survey

Field Survey Form - Quality of Pedestrian Environments
By: Livable City Program (ESAF)

Volunteer Name: ..... Date: ..... Section ID: .....

Segment ID: ..... Start Time: ..... End Time: .....

---

1. Is road construction underway?

   ☐ Yes ☐ No

   If yes, skip all questions and begin next segment on a new sheet.
   If no, .continue to Question 1.

2. Number of Lanes:

   ☐ 4 or more lanes ☐ 3 lanes ☐ 2 lanes ☐ 1 Lane

   ☐ No Lanes

3. Two way traffic

   ☐ Yes ☐ No

4. Vehicle Speed

   ☐ Not Posted ☐ 15 mph ☐ 20 mph ☐ 25 mph

   ☐ 30 mph ☐ 35 mph ☐ 40 mph ☐ 45 mph

   ☐ 45+ mph

5. Segment Type:

   ☐ Low VolumeRoad ☐ MediumVolumeRoad ☐ High VolumeRoad ☐ Path/NoRoad

   ** if no road, skip the "Safety" section

6. Segment Intersections (check all that apply):

   ☐ 3 way intersection ☐ 4 way intersection ☐ Other intersection ☐ Segment ends but path continues

   ☐ Segment ends ☐ Segment has no intersections

Land Use Diversity

7. Are residential and non-residential land-uses mixed in this segment?

☐ No mix ☐ Little mix ☐ Some mix ☐ A lot of mix

8. What uses do you see in this segment? (check all)

☐ Houses ☐ Office ☐ Public/ Government ☐ Schools

☐ Shops ☐ Restaurant/ Cafe ☐ Entertainment ☐ Park/ Playground

Footpath Availability

9. Presence of a footpath or walkway in segment?

☐ None ☐ One side ☐ Both sides

** if no footpath or walkway skip to question 22

10. Is the footpath/walkway complete in this segment?

☐ Not complete ☐ Complete one side ☐ Complete both sides

Footpath Quality

11. Is there a buffer between the road and path?

☐ No mix ☐ Little mix ☐ Some mix ☐ A lot of mix

12. What materials are used for footpath/walkway? (check all that apply)

☐ Paving Brick ☐ Concrete ☐ Bitumim ☐ Slab

☐ Tiles ☐ Dirt/Sand ☐ Other

13. What is the width of the footpath/walkway?

☐ Less than 2ft ☐ 2ft to 4ft ☐ 4ft to 6ft ☐ More than 6 ft

14. What is the condition of the footpath/walkway?

☐ Poor (many heaves, broken sections) ☐ Fair (some heaves, broken sections) ☐ Good (very few heaves, broken sections)

15. Are there obstructions blocking the footpath/ walkway? (check all that apply)

☐ Cars/ Motorbike ☐ Trash cans ☐ Construction rubbish ☐ Car Exit/ entry cuts

☐ Shop goods ☐ Pillers and cables ☐ Trees ☐ Vendors

☐ Trucks ☐ None

16. What is the quantity of obstructions blocking the footpath/walkway?

☐ None ☐ A little ☐ Some ☐ A lot

17. Did you need to leave the footpath/walkway because of the obstructions?

☐ Never ☐ 1-3 times ☐ 4+ ☐ Could not walk on path

18. Is there physical disorder visible in the segment (on footpath or road)?(check all that apply)

☐ Cans/bottles ☐ Cigarette/ bidi ☐ Urine Smell ☐ Garbage

☐ Broken glass ☐ Graffiti ☐ None

19. What is the overall cleanliness of the segment?

☐ Poor (a lot of physical disorder) ☐ Fair (some physical disorder) ☐ Good (very few physical disorder)

Facilities for the Disabled .

20. Are there curvilinear or curb cuts on the footpath/ walkways of this segment?

☐ None ☐ Some intersections ☐ All intersections

21. Would a person in a wheelchair be able to travel along the footpath/walkway in this segment?

☐ Yes ☐ No

Safety

22. Are there barriers that make it difficult or prevent pedestrians from crossing the street?

☐ High medians ☐ Barbed wire ☐ Trees/ plantings in medians ☐ More than 2 lanes traffic

☐ Mixed Traffic ☐ None

23. Are there crossing aids for pedestrians to cross the street safely? (Check all that apply)

☐ Zebra Crossing ☐ Special Lights ☐ Police Enforcement ☐ Crossing Guard

☐ Raised walkway ☐ Signs ☐ Underground/ Foot over bridge ☐ Cars obey laws/ yield

☐ None

24. Are there traffic-calming and controlling devices to reduce volume or speed? (check all that apply)

☐ Roundabout ☐ Lane width restriction ☐ Traffic signals ☐ Speed humps

☐ Signs (other) ☐ None

25. What is the posted speed limit? (if there is no posted limit, enter 999) .....r

26. Do you see cars being driven in segment?

☐ Yes ☐ No

*if no, skip to question 24

27. Are there aggressive drivers (i.e. speeding, not giving pedestrians the right of way)?

☐ Yes ☐ No

28. What are the major sign/sign boards seen in a segment/ check all ?

☐ Speed limit ☐ Pedestrian crossing ☐ School Ahead ☐ Horns Trohibited

☐ Other ☐ None

29. Is there any Railing barriers to prevent the pedestrian crossing the roads in stretches without zebra crossing?

☐ Yes ☐ No ☐ Not Applicable

Availability of Amenities

30. What types of service amenities exist in this segment? (check all that apply)

☐ Seating ☐ Toilet ☐ Trash bins ☐ Vendors

☐ Other ☐ None

31. Are there trees shading the walking area?

☐ None/very few ☐ Some ☐ Many/ very dense

32. Are there lights? (check all that apply)

☐ Road-oriented lighting ☐ Pedestrian-scale lighting ☐ Other lighting ☐ No lighting

Other

33. Are there vehicles parked on the road in this segment? (check all that apply)

☐ Yes-car/motorbike legal parking ☐ Yes -cars/ motorbike not legal ☐ No cars/ motorbike parked ☐ N/A - no road

☐ Yes- trucks Legal ☐ Yes -trucks not legal ☐ No trucks parked

34. If yes , Is there any charge for parking ?

☐ No charge ☐ Yes ☐ Less than 20 per hr/day ☐ Above 20 per hr/day

35. Does the parking hinder the mobility of pedestrians / cyclist ?

☐ A little ☐ To some extent ☐ Alot ☐ No Hindrance

36. How much noise pollution is audible in this segment (e.g. traffic, construction, factories)?

☐ None ☐ A little ☐ Some ☐ A lot

37. How many people do you see in this segment?

☐ None ☐ 1-6 ☐ 7-14 ☐ 15+

38. Are there children playing in this segment?

☐ Yes ☐ No

39. Are there people stopping to talk or greet one another?

☐ Yes ☐ No

40. What was the weather condition ?

☐ Hot Summer ☐ Raining

Safety in the School Premises

41. Are there crossing aids for school children to cross the street safety ? (Check all that apply)

☐ Zebra Crossing ☐ Special Lights ☐ Police Enforcement ☐ Crossing Guard

☐ Raised walkway ☐ Signs ☐ Underground/ Foot over bridge ☐ Cars obey laws/ yield

☐ None ☐ Restriction for some vehicle in school time

42. Are there enough walking space for children to walk comfortably across the road on peak times ?

☐ Yes ☐ No

43. Are there tracks for cycling in the school premises?

☐ Yes ☐ No

ANNEXURE - 2 : Pedestrian Perception Survey

Perception Survey Form - ESAF Livable City Project

Instructions: Complete the survey for every person you talk to. If they say they will not participate, check off "no" for questions 1 and then start a new survey for the next person.

1. We are conducting a survey of pedestrians to understand what would make the streets better for you. Do you have a few moments to answer a survey?

   ☐ Yes ☐ No

   If yes, proceed to question 2.
   If no, "Thank you for your time." End of survey. Start new form.

2. Where are you living? Instruction: Write address as precisely as possible

   .....

3. Where did you start your journey today? (instructions: do **not** prompt unless confused, select one answer)

   ☐ Work ☐ School ☐ Home ☐ Relatives
   ☐ Friend ☐ Shopping ☐ Mosque/Temple ☐ Entertainment
   ☐ Don't know ☐ Other (specify) .....

4. Where are you going on this journey? (instructions: do **not** prompt unless confused, select one answer. If person says they are going to multiple places select their next destination)

   ☐ Work ☐ School ☐ Home ☐ Relatives
   ☐ Friend ☐ Shopping ☐ Mosque/Temple ☐ Entertainment
   ☐ Don't know ☐ Other (specify) .....

5. What is the address of your next destination? Write address as precisely as possible

   .....

6. Do you fear to cross busy roads?

   ☐ Yes ☐ No

7. Do you think that most of the times drivers give less care for pedestrians and cyclists?

   ☐ Yes ☐ No ☐ don't know

8. What mode of transportation would you choose to travel to places that are below 2kms in distance?

☐ Walk ☐ Cycle ☐ Auto ☐ Bus/Public transport

☐ Car ☐ Motorbike ☐ Other (specify).....

9. Do you feel safe to walk during night time?

☐ Yes ☐ No

10. Do you experience abuse from motorists while crossing the roads or in similar circumstances?

☐ Often ☐ Rarely ☐ Many times ☐ Never

11. According to you which type of vehicles cause more havoc to pedestrians?

☐ Auto ☐ Bus ☐ Trucks ☐ Cars

☐ Motorbikes ☐ Other (specify) .....

12. Think about the trip that you are currently on. How much time will you spend travelling one way using the following modes: (Instructions: read out the first mode, let the person answer with no prompt, select the appropriate answer, then read the next mode, select the appropriate answer. Continue until the end).

Mode	None	<=5min	6-10	11-15	16-30	31-60	61-90	90+	Not Sure
a. Walk									
b. Cycle									
c. Bus/Train									
d. Rickshaw									
f. CNG/taxi									
h. Car/Personal Vehicle									
i. Motorbike									

13. What type of vehicle(s) does your family own? (do not prompt, check all that apply)

☐ Bicycle ☐ Car ☐ Motorbike ☐ Rickshaw

☐ CNG ☐ None ☐ Not sure

14. Is there any place that you would like to walk (such as to work or to a relatives house) but you currently are unable? (Instructions: Check all that apply)

☐ Work ☐ School ☐ Park ☐ Small Store

☐ Big Store ☐ Vendor ☐ Relatives/Friends ☐ Mosque/temple

☐ Entertainment ☐ Does not apply/ no place ☐ Other (specify).....

15. Why can't you walk to this place (places)? (Instructions: Do not prompt unless confused. Check all that apply)

☐ Too far ☐ No footpath ☐ Footpath quality ☐ Difficult to cross street

☐ Afraid of crime ☐ Other (specify) .....

16. How would you rate the pedestrian facilities in Kochi? (Instructions: list the options, check one answer)

☐ Worst ☐ Bad ☐ OK ☐ Good

☐ Best

17. If given the opportunity, what improvements would you like to have in pedestrian facilities?
The following are important possible improvements. Please pick the 5 that you think are most important.
(instructions: you may need to show the person the list. Only choose the top 5. If refuse, cross out)

Improvement	**Check if chosen ✔**
a. Easy access for disabled people	
b. Improved street lighting	
c. Enforcement of laws	
d. Wider and level footpaths/walkways	
e. Clean footpaths/walkways (e.g. clear of disorders, rubbish, syringes, graffiti)	
f. Reduced and slow traffic on road	
g. Removing obstacles e.g. parking from footpath	
h. More crossing points	
i. Safer crossing points	
j. Other (specify):	

18. If you have to cross the road, what do you prefer? (Instructions: Do not prompt, unless confused.
Check one answer. If person has many, ask which one they would like the most)

☐ Zebra Crossing ☐ Special Lights ☐ Police Enforcement ☐ Crossing Guard

☐ Raised walkway ☐ Foot over Bridge ☐ Underpass ☐ Sign

☐ Not sure

19. In one week, how often do you feeling fear while walking because of the following?
(instructions: read out the first , let the person answer with no prompt, select the appropriate answer, then read the next mode, select the appropriate answer. Continue until the end.)

	None/Rarely	1-3 days	4-6 days	Every day	Many times a day	Not sure/ refused
a. Car/ motorbike/ personal vehicle						

b. Bus						
c. CNG/taxi						
d. Rickshaw						
e. Commercial Truck						
f. Road design						
g. Dogs						
h. Crossing street						
i. Uncovered manholes						
j. Drains						

20. How many times you been injured because of the poor quality of the footpath/walkway in the last 3 months? (instructions: do not prompt unless confused, select one answer)

☐ Never ☐ 1-2 times ☐ 3-4 times ☐ 5+

☐ Not sure/ refused

21. Have you seen or personally experienced the following crimes while walking in the last 3 months? (instruction: read out the first, let person answer, select appropriate answer then continue)

Crime	**Yes**	**No**	**Not sure**
a. Teasing			
b. Hijackers			
c. Political Conflict Group			
d. Conflict			
e. Addicted people/mad person			

22. Do you feel safer when there are other people walking on the street?

☐ Yes ☐ No ☐ Not Sure

Socio - Economic Profile

23. Would you like proper management for hawkers?

☐ Yes ☐ No ☐ Not Sure

24. Sex:

☐ Male ☐ Female

25. Age

☐ 15-30 ☐ 30-50 ☐ >50

26. Occupation

.....

27. Household Income/month

☐ <=3000 ☐ 3001 - 6000 ☐ 6001 - 9000 ☐ 9002 - 12000

☐ 12001 - 15000 ☐ Enter Amount .....