

PEDESTRIANISATION



18TH June Road

PANAJI

This publication has been produced as part of the Project Urban Living Lab in Panaji (PULL). PULL is a sandbox to test new approaches and solutions for sustainable, future-proof cities in collaboration with residents, policymakers, public bodies, businesses and academia.

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Executive Summary

There has been a significant paradigm shift in the transportation and accessibility sector. This has been partly brought on by the impending climate change crisis that has pushed this shift, making governments, cities and individuals to consider the amount of carbon emission the transportation sector contributes globally. More than half of global liquid fossil fuels consumption and nearly 50% of the world's energy related CO2 emissions comes from this sector (IEA, 2009). As well as these grim data outputs, it also impacts the social and mental health of the population specifically in urban areas and it is now imperative for cities to mainstream sustainable mobility policies into their development plans and use these opportunities to both improve environmental concerns and the welfare of their citizens.

To meet the objective of developing sustainable cities, The Royal Danish Embassy (RDE) initiated the Urban Living Lab on Sustainable and Smart Cities in India project, with its first pilot in Panaji, Goa in consultation with the Imagine Panaji Smart City Development Limited (IPSCDL). In collaboration with project partners Oxford Policy Management Limited (OPML), Transitions Research and The Energy and Resources Institute (TERI), the Project Urban Living Lab (PULL) has been working on various domains including Urban Water Management and Mobility. This Pedestrianisation Plan is amongst one of the major interventions of PULL that has the potential to ensure that city streets are people-friendly and promote a low-carbon trajectory for city growth and development.

Pedestrianisation has been identified as a key link for creating a culture of change about mobility behaviors in cities. Considering the Panaji's rich heritage character and the city's eminent importance for tourism, it was necessary to understand the perception of various stakeholders involved including the shopkeepers, users of the street and government officials. The PULL team also carried out a traffic count survey on the 18th June Road stretch to analyse the peak hours of traffic and its relation with the existing on-street parking capacity of the road. It is essential that provision of easy to access and use off-street parking be provided for the execution of the pedestrianisation plan. To address the existing challenges on the 18th June Road both the national and the international case studies with similar character and context are referred and their takeaways have formed a base to draft pedestrianisation plan for 18th June Road in Panaji.

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Abbreviations

City Corporation of Panaji (CCP)
Imagine Panaji Smart City Development Limited (IPSCDL)
Ministry of Housing and Urban Development (MoHUA)
Project Urban Living Lab (PULL)
Royal Danish Embassy (RDE)
Non-motorised Transportation (NMT)
Equivalent Car Space (ECS)
Central Business District (CBD)
Non-Motorised Vehicle (NMV)
Unified Traffic and Transport Infrastructure Planning and Engineering Centre (UTTIPEC)
Public Private Partnership (PPP)
Bruhat Bengaluru Mahanagar Palika (BBMP)
Closed Circuit Television (CCTV)
Urban Health Care (UHC)
2W (2 Wheelers)
4W (4 Wheelers)
Multi-Utility Zone (MUZ)

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Figure 1: Street character near Jawed Habebs Junction, 18th June Road



BACKGROUND

Setting the Context

Pedestrianisation is defined as the creation or conversion of different public spaces exclusively for pedestrian use (Dhar, 2016). In other words, these are the zones in towns or cities reserved for pedestrians only and where all vehicles are prohibited. These zones are instituted and supported by communities who feel that it is desirable to have pedestrian only areas. Often the need for pedestrianisation is realised when the existing footpaths are occupied and overrun with parked vehicles or street vendors, forcing people to then walk on the roads, potentially endangering their safety with fast moving vehicles running by and with either limited or no zebra crossings. Traditionally, the case for pedestrianisation has been made citing environmental, social and economic benefits. Additionally, the lack of maintenance and even the existence of footpaths, street furniture and utilities, including lights and benches, creates physical difficulties and may create a sense of fear and reluctance to use the streets for walking.

Left

Figure 2:
Benefits of pedestrianisation

Source

EMBARQ India,
WRI

Right

Table 1:
Economic,
Social and
Environmental
benefits of
pedestrianisation

Source

Compiled by
authors



CROWDED FOOTWAYS

In too narrow streets footways crowding conditions appear and deteriorate the walking experience substantially and exclude certain user groups.



PARKING ON FOOTWAYS

Footways are frequently used for parking often forcing pedestrians onto the road.



POORLY MAINTAINED FOOTWAYS

Lack of maintenance results in broken pavements, lack of street lights etc.



DIFFICULT CROSSINGS

To increase capacity for the congested vehicular traffic compromises have been made in the pedestrian landscapes



UNCLEAR PEDESTRIAN NETWORK

few significant walking routes and the connections between them are poor.



LACK OF PUBLIC SEATING

Absence of essential that ample opportunities to sit and rest

The table below encapsulates some key arguments for pedestrianisation as used globally.

Economic	Social	Environmental
Improved accessibility Particularly for non-drivers	Reduces external transportation costs (crash risk, pollution, etc)	Reduced energy consumption and emissions
Minimised conflict points with vehicles. Reduced transportation costs	Improved opportunities to preserve cultural resources (historic buildings)	Improved aesthetics Open space preservation
Facility to park vehicles/ cycle parking lot with locking facilities	Increased exercise	Open space preservation
Facilities such as trolley/ rest room/landscaping/ street furniture/ample shading/ way finding signs/ Boards	Very low levels of TW/car use, resulting in much less traffic on surrounding roads	Reduced land needed for roads and parking facilities
Increase local business activity and employment	High rates of walking and cycling	Less land taken for parking and roads - more available for green or social space
Health cost saving from improved exercise	Improved accessibility for people who are transport disadvantaged	No air pollution. Better for health of shopkeepers and shopper

Pedestrianisation in Panaji

Goa's capital city, Panaji, has always been popular owing to its heritage character, including its unique architectural styles of buildings and its rich culture. These factors, along with its prime geographical location along the coastline, has made the city one of the prominent tourist destinations of India. One of the characteristics that make the city perfect for developing a pedestrian network is the distance mapping from the City Business District (CBD) of the city to various tourist places. In 10 minutes, it is possible to tour the historic city centre on foot, which is not something most Indian cities can claim.

Moreover, the scenic beauty of the streets (Figure 3 & Figure 4) gives an extra edge for designing Panaji as a walkable city. This need has also been emphasised in multiple consultations with government officials. However, it has also been observed that there is a continued and growing great dependence on private vehicles for transport and these occupy excessive urban road spaces, subsequently leading to severe traffic congestion in Panaji. To efficiently gain the economic, social and environmental benefits of pedestrianisation, there is an urgent need to formulate policies and plans towards the restriction of vehicular traffic within the core city area. Steps being taken by the City Corporation of Panaji (CCP) include the Development of Pedestrian Plan under a holistic masterplan (CDC) which includes the following areas:

- 18th June Road
- Pedestrian Promenade along Mandovi river, Dona –Paula road
- Panaji city centre sector
- Mala – Patto sector

0.32

is the walkability index of Panaji (below average)

0.02

is the safety index in Panaji

In the Transport Performance Index, Panaji is below average in comparison to 30 Indian cities (MOUD, 2008)

Top Right

Figure 3:
From 18th June
Road towards
Church



Bottom Right

Figure 4:
Local street in
heritage area of
Panaji



Site Selection

Panaji's 18th June Road has been selected after performing an intensive data mining exercise including a scoring and ranking exercise, which is detailed out below:

1. The Streets for People, a programme initiated by Ministry of Housing and Urban Affairs (MoHUA), Government of India (GoI), has given a momentum to Panaji, identified as one of India's smart cities, to execute their objectives of Pedestrianisation set under their Holistic masterplan and Comprehensive Mobility Plan, 2041. The India Programme of the Institute for Transportation and Development Policy (ITDP) is the knowledge partner to MoHUA and is providing guidance through the preparation of resource material to facilitate the Streets for People challenge across all smart cities of India. They have identified a few factors that should be considered for shortlisting locations for promoting street activities including pedestrianisation.

The ULL team has conducted a further exercise of ranking the prominent streets in Panaji based on these factors (Table 2). To strengthen these factors, an initial scoring has been done and to avoid confusion with the further scoring method, it is been done in decimals, where 0.3 being the Necessary criteria, 0.2 is Preferable for pedestrianisation and 0.1 being the added advantage for the specific site (highlighted in green in Table 2). Further, the prominent sites in Panaji have been given scoring between the range of (0-5) and the description of scoring is explained in Table 3.

0.3

Necessary criteria for pedestrianisation

0.2

Preferable for pedestrianisation

0.1

Added advantage for pedestrianisation

Right

Table 2:

Factors taken for site selection

Source

NIUA (2021)

Site	Description	Factors (scale of 0-5)					Total Score	Rank
		Presence of Shade	Good Visibility	Good Accessibility to the Street	Alternate Traffic Routes	Sufficient Street Length		
Weights (%)		0.2	0.1	0.2	0.3	0.2		
Cafe Bhosle Square	The Cafe Bhosle Square and the roads leading up to it.	2	4	4	4	5	3.8	2
18th June Road	From Panjim Church to Dr. Shivgaonkar Road	4	5	4	3	5	4	1
Miramar Promenade	A segment between the Military Hospital and the IP-SCDL office	3	5	3	0	5	2.7	3

	Presence of Shade (in the early hours of the day)	Visibility	Good Accessibility to the Street	Alternate Traffic Routes	Sufficient Street Length
Description of score	0 - No tree shade	0 - Narrow Street with visual obstructions, little to no small businesses. Steep slopes along the length	0 - Little to no street connectivity	0 - Main thoroughfare blocked. No alternate traffic routes and no alternate parking	0 - Segments of less than 20 m without vehicular cross traffic
	1 - Very sparse tree shade	1 - Single Lane Street, some slopes and visual obstructions. Few small businesses along the length	1 - Connected to residential streets	1 - No alternate parking and alternate route of insufficient capacity exist	1 - Segments of 20-40m without vehicular cross-traffic
	2 - 25% of the street is under tree shade	2 - Single Lane Street, some slopes and visual obstructions. Few small businesses along the length	2 - Connected to several residential streets	2 - Alternate parking and alternate route of insufficient capacity exist	2 - Segments of 40-60m without vehicular cross traffic

	Presence of Shade (in the early hours of the day)	Visibility	Good Accessibility to the Street	Alternate Traffic Routes	Sufficient Street Length
Description of score	3 - 50% of the street is under tree shade	3 - Two lane wide street, some slopes and visual obstructions. Several small businesses along the length	3 - Connected to one major thoroughfare	3 - Insufficient alternate parking and alternate route of equivalent capacity exist	3 - Segments of 60-80m without vehicular cross traffic
	4 - 75% of the street is under tree shade	4 - Single Lane Street with no slopes or visual obstructions. Several small businesses along the length	4 - Connected to one major thoroughfare and residential streets	4 - Alternate parking spaces and one alternate route of equivalent capacity exist	4 - Segments of 80-100m without vehicular cross traffic
	5 - Nearly all of the street is under tree shade	5 - Two lane wide street, no slopes and visual obstructions along the length. Several small businesses along the length	5 - Connected to two major thoroughfares and multiple residential streets	5 - Alternate parking spaces and several alternate routes exist	5 - Segments of more than 100m without vehicular cross traffic

Table 3: Assessment of site selection through rating

Based on this ranking, it can be concluded that the 18th June Road has good visibility as well as sufficient street length amongst all three streets and the road is easily accessible from other parts of the city. Moreover, the presence of a good number of trees on the 18th June Road gives an extra edge to beautify the street including the natural elements.

2. Identify the service providers and capture their perceptions: It is essential to identify and include all the relevant stakeholders. This can be achieved by conducting exercises including a data mapping exercise for implementing such projects, which includes perception surveys, in order to gain the users insights. The results are presented in Section- Data Mapping and Stakeholder Consultation.
3. Government Official Consultations: Along with these key components is to have various discussions with the respective government officials, in order to understand their opinions and identify any challenges, to execute the activities of the project and to understand their overall vision. Elaborated in Section- Data Mapping and Stakeholder Consultation.

There are a number of innovative and creative ways to prepare a pedestrianisation plan, but the essential key is to mainstream the concepts and designs into the local context. The next chapter delves into understanding a few national and international best practices and their process of execution of the street pedestrianisation plans. The takeaways from these case studies will help to create a base for drafting the required interventions for 18th June Road in Panaji.

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Figure 5: Re-developed pedestrian street-Chandni Chowk, Delhi ¹



CASE STUDIES

Introduction

The need for leapfrogging with approaches that focus mainly on non-motorised ways and public transportation to meet the sustainable agendas, have started gaining traction around the world. The study as part of its research, compared various Indian and international case studies on the basis of their homogenous characteristics which included: - Historical significance, Architectural presence and Street nature. These characteristics are specifically chosen as Panaji has a heritage character, historical importance and is a prominent commercial street of the city in the CBD of Panaji. The takeaways from these case studies are imperative to analyse for designing and creating a pedestrianisation plan for 18th June Road.

These case studies are assessed on the various urban design elements that are intrinsic to transportation and accessibility.

Since urban design is a conjunction between people, space, and time, it becomes of utmost importance to emphasise it in grading the urban fabric of a place. This aspect can be studied in relation to various sub parameters including traffic calming measures such as speed breakers, street furniture, landscape elements.

Two national and two international case studies have been analysed based on above mentioned principles in order to gather key takeaways from previous international and national projects and interventions.



Figure 6: Aerial photo of Las Ramblas, Barcelona- Commercial pedestrian street

Chandni Chowk, Delhi

Population 16,787,941 (Census, 2011)

Street Extent 1.3 Km, Commercial in a heritage precinct

Background In 2018, the Delhi government initiated the beautification of the well-known historic and heritage area of Old Delhi 'Chandni Chowk'. The beautification project had an key objective to integrate the non-motorised policy interventions to redesign this historic neighbourhood, while keeping its heritage character intact. The initial activities of the Chandni Chowk Redevelopment Project included the pedestrianisation of a 1.3 km stretch between the Lahori Gate of Red Fort and Fatehpuri Masjid; which is also considered to be one of the most chaotic shopping streets in the capital. This stretch was modified to a non-motorised zone from 9 am to 9 pm to execute the pedestrianisation activities.

Design Elements

1. The street is at the same level for all the types of required functions, including vehicular movement, pedestrian movement, services, thus allowing ease in movement for all pedestrians, including differently abled, children and seniors.

Top Left
Figure 7:
Chandni Chowk
Pedestrian street-
Restricted entry
of Rickshaws and
2Wheelers³

Top Right
Figure 8:
Chandni Chowk-
Street furniture
material
complementing
the neighbouring
heritage



Design Elements

2. There is 5 metre wide pavement for Non- Motorised Vehicles (NMVs) stretching to both sides of the road following the UTTIPEC guidelines for NMV's
3. Footpaths which are 2.5 metre wide, are functional on each side of the road, also following the UTTIPEC guidelines for commercial roads (Sagrika G, 2021).
4. Trees and plants have been used as green buffers between cycle tracks and pedestrian ways, as well as, between roads and footpaths.
5. Electric vehicles will also be operated for the convenience of the senior citizens and those requiring mobility assistance.
6. All the services such as storm water drainage, water supply are underground in a dedicated strip down the middle of the street.
7. This strip also has various landscape elements, carefully planted keeping in mind the underground conditions.
8. Street furniture: Seating, bollards and planting pots are now available and factor into the overall design.

Operation and Maintenance

1. The entire project will be implemented in 4 stages with the 1.3 km stretch being covered in Phase 2. Phasing of the project ensured that the deliverables met their purpose at the end of each phase.
2. The project has been implemented under two nodal agencies, The Shahjahanabad Redevelopment Corporation and Public Works Department.
3. The maintenance of the project will be supported by a Public Private Partnership (PPP) model, where a private firm (yet to be chosen) will be assigned with North Delhi Municipal Corporation for maintaining the various aspects including landscape, horticulture and sanitation (Paras Singh, 2021).

Church Street, Bangalore

Population 8,443,675 (city) (Census, 2011)

Street Extent 715 metres, Commercial High Street

Background In 2015, the Bruhat Bengaluru Mahanagar Palika (BBMP) decided to redesign Church Street with the TenderSURE guidelines. The objective was to prioritise the safety and comfort of pedestrians and cyclists, following the TenderSURE guidelines which promote design that supports non-motorised transport. In 2020, the city decided to make the street completely free from vehicular traffic on weekends to promote the Clean Air Initiative and reduce pollution. Church Street was closed every weekend between November 7th, 2020 and February 28th, 2021. Urban planners and city officials worked with business owners and residential communities to experiment with this idea and build support. This was used as a test to see if this model could be scaled up to other streets in Bangalore.

Design Elements

1. Across the 700+ metre stretch of Church Street; different points were widened from up to 30 ft to 60 ft to increase space for pedestrians. This was in line with UTTIPEC guidelines for commercial roads.

Top Left

Figure 9:
Children playing on pedestrian only street, Church Street⁴

Top Right

Figure 10:
People strolling on pedestrian street⁵



Design Elements

2. Streets were designed with cobble stones but with local patterns such as the Kasuti design that symbolises local forms of art in Karnataka. This material also serves as a traffic calming measure.
3. LED and energy efficient lights were installed on the foot paths to ensure visibility for pedestrians in the evening
4. Colourful, tactile tiles have been placed at ramps and crossings for those with visual and physical disabilities
5. Parking bays have been redesigned to ensure no encroachments
6. Air quality sensors have been deployed to monitor air quality during pedestrian and non-pedestrian only times.
7. During the weekends, businesses were allowed to spill over onto the street, especially restaurant seating.

Operation and Maintenance

1. In accordance to TenderSure guidelines, utility ducts are placed underneath the wide foot paths
2. BBMP and Traffic police the implementing agencies to ensure that cars were not allowed during the car-free times on weekends
3. The cost of redesigning Church Street under the TenderSURE guidelines was Rs. 9 crores (Chatterjee, S. Newsminute)

Las Ramblas, Barcelona

Population 1,600,000(city)

Street Extent 1.5 Km, Pedestrian Mall / Commercial Street

Background This pedestrian mall is formed by five different streets that together make the 1.5 km stretch known as Las Ramblas. Las Ramblas was originally a riverbed outside of the historical city of Barcelona, but as the city expanded and the walled city was torn down, the pedestrian promenade was developed. The area became a central meeting place in the city and has remained a social gathering spot. The street is lined with medium-density buildings with active and interesting edges, ensuring there are always eyes on the street and creating a variable texture for tourists to enjoy. The approximately 3 metre wide walk paths are in the centre of the street with side lanes for vehicles, inverting the traditional road design.

Design Elements

1. The entire boulevard is between 10 to 24 metres wide, including car space. The space for pedestrians is on average 3 metres wide. (Las Ramblas, 2003)
2. Large trees are spaced 20 metres apart creating a canopy and protecting

Top Left

Figure 11: Public plaza as entry point of Las Ramblas⁶

Top Right

Figure 12: People strolling in the shade of trees lined-up on both the sides of Las Ramblas⁷



Design Elements

- pedestrians from hot summer sun
- 3. The street has a variety of eateries, shops, markets, vendors and attractions for people to socialise and interact with. The mixture of activities makes the street vibrant at all times of the day
- 4. Many of the vendors are open at night so the boulevard is safe at night
- 5. There is good connectivity to the metro/train and public transportation
- 6. There is a variety of seating across the boulevard for people to stop and rest

Operation and Maintenance

- 1. City administration is responsible for cleaning this area amongst other in the city
- 2. Business communities and stakeholders also have a role to play in the set up and logistics of the market
- 3. Local councilors and political districts are responsible for people's concerns and help improve the boulevard when required.

16th Street, Denver

Population 2,900,000(metro)

Street Extent 2 Km, Pedestrian Mall / Commercial Street

Background The 16th Street Mall in Denver opened in 1982 and has been a retail destination for the city ever since. The street is only open for pedestrians and mass transit, with footpaths and a central median that serve as public, pedestrian space. The evolution of this street has changed over time and various retail plans have supported this change. In the 1990s, the mall expanded and a business improvement district was formed to support the retail corridor and provide lessons to other streets. The mix of retail has changed over time but the physical infrastructure, especially paving, accessibility and lighting have not been up to code.

Recent plans for the corridor have focused on improving both the physical environment and the programmatic/retail mix to ensure a vibrant pedestrian corridor. This included upgrades to walk paths, lighting, a public access strategy and a retail plan.

Design Elements

1. Wide foot paths on both sides of the street that are at least 2.4 metres and

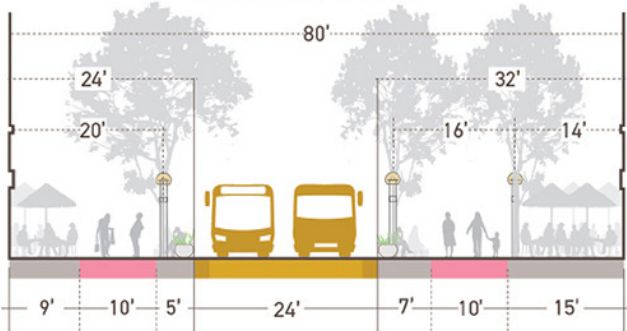
Top Left and Right

Figure 13:

Sections from different stretches of the 16th Street Mall⁸

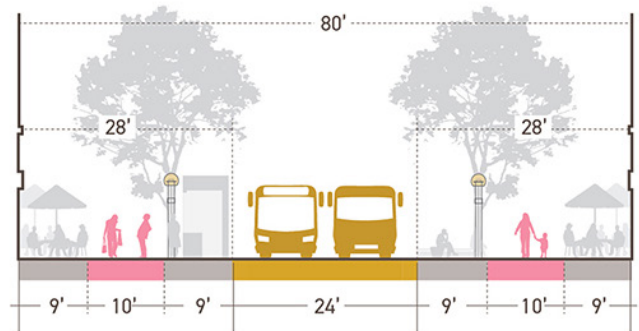
RECOMMENDED

BROADWAY - TREMONT
ARAPAHOE - MARKET



RECOMMENDED

TREMONT - ARAPAHOE



Design Elements

- sometimes larger on different segments (City and County of Denver et al., 2010)
2. Central/side median which is exclusively for pedestrians that can range up to 4 metres wide for programmes, outdoor dining and activities
 3. Fountains, flowers, benches and chairs are provided on the median to create a vibrant atmosphere and get people to stop and socialise
 4. Trash cans are provided frequently
 5. Public art has been installed along with tables and chairs
 6. Trees lining the median stretch to provide shade
 7. Lighting is provided at various heights to ensure visibility at night. This is meant to resemble daylight to the best of the light ability.
 8. Vending clusters are strategically placed
 9. 9. Mix of land uses along the mall, include some public spaces, some official buildings, some retail etc.
 10. Connected transit and mobility strategy to think accessibility through to attract foot fall at the mall
 11. Cycling parking provided at specific intersections
 12. Corner curb ramps are at maximum 1:12 gradient and must be 48 inches wide with warning/tactile strips to meet the American Disability Act guidelines

Operation and Maintenance

1. The Business Improvement District, consisting of retailers and stakeholders within the mall district, are part of a committee that manages the pedestrian mall. They are responsible for cleanliness and safety on the street
2. The street is open and pedestrian 24/7 except for lanes for public transit.

Conclusion

When planning an urban pedestrian project it is essential that the streets and public spaces should be well integrated into the surrounding urban and historic fabric of the city, as well as incorporate all principles of Universal Design.

For cities, the street design must meet the needs of people walking, driving, cycling and taking transit; local businesses; and essential works (services and utilities); all in a constrained space. All the streets in the city case studies included: wide pedestrian spaces, street furniture, an array of landscape elements and ramps or slopes when redesigning their streets into inclusive and pedestrian friendly zones (Table 4). The designs also included putting essential utilities and services, for example water drainage, underground. It is also noteworthy that in the majority of cases alternate transportation options, such as using electric vehicles have been proposed, to avoid convergence of movement of vehicles with pedestrians and to cut polluting emissions. The successful implementation, operation, and maintenance of these initiatives in various cities are a result of successful community participation and stakeholder engagement.

	Street Design Elements					
	Traffic Calming Measures	Street Furniture	Local Material	Landscape Elements	Universal Accessibility	Services and Utilities
Chandni Chowk, Delhi			✓	✓	✓	✓
Church Street, Bangalore	✓	✓	✓		✓	✓
Las Ramblas, Barcelona	✓	✓		✓	✓	
16th Street, Denver	✓	✓		✓	✓	✓

Table 4: Comparative analysis of case studies

Source: Compiled by authors

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Figure 14: PULL meeting in IPSCDL office with Mr. Ravi Dhavan (CEO, IPSCDL) and Dr. Tariq T



DATA MAPPING AND STAKEHOLDER CONSULTATION

Introduction

In many Asian cities, these factors have doubled the vehicular traffic in a small span of 5-7 years (UNCRD,2018). There are a plethora of detrimental impacts associated with a city's poor transportation systems, ranging from poor quality of life, traffic congestion, to air pollution; therefore a robust and sustainable accessibility model is imperative. A sustainable solution to the transportation sector goes further than helping achieve a better quality of life, but can also directly impact the economic growth of the city. Therefore a system of sustainable mobility should relate to every city individual or commuter with an aim to fulfil their mobility needs in a reliable, quick, efficient, safe and environmentally conscious manner (TERI, 2009).

Changes in complex constellations of mobility-related behaviours are required to move toward more sustainable mobility. This would need mapping of the representatives of various fields who are directly or indirectly impacted by the city's mobility system and collectively address these challenges. To fully grasp the possibilities for progress in this direction, it is necessary to look at the consumer side of sustainable mobility behaviours and the perspectives of stakeholders who offer services, infrastructure and policies as enablers, to practice this. In order to achieve this the research was been divided into two types of surveys, with The aim was to include a varied field of stakeholders and aggregate on data sets which then would help in understanding the trends, lacunas and acceptance of the current mobility pattern of the cities. The two major typologies of surveys being used for this project are:

Bottom Right

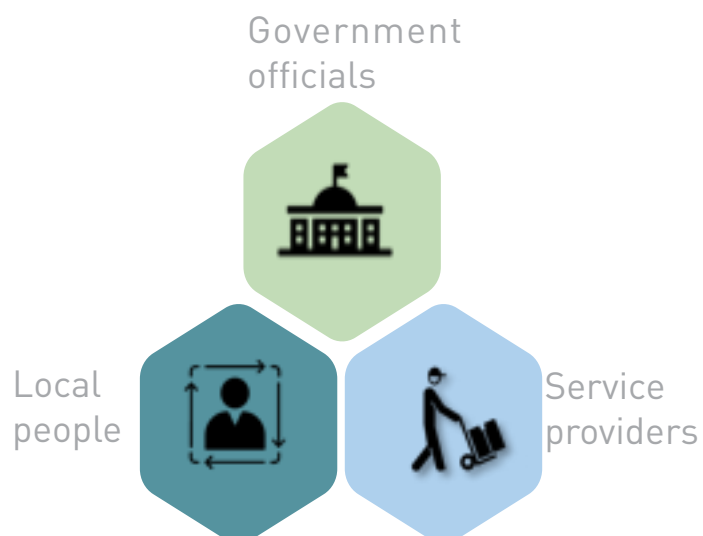
Figure 15:
Stakeholder
mapping

I. QUANTITATIVE SURVEY

The aim of the quantitative survey is to gather a set of numerical data used to measure different variables of city mobility. This gives in-depth information about a sample undertaken to carry out the study. Unlike Perceptive based surveys, its results are conclusive and objective. Considering it as a tool to validate hypotheses, this will give a better understanding of mobility players and enablers with regard to their energy consumption and influence on city emissions (d'Orey et.al, 2014)

II. PERCEPTION SURVEY

The perception-based method elicits people's impression of the status or trend in the mobility sector. It includes indicators of the mobility sector that directly impacts them. A participatory approach to data gathering, it involves surveys through questionnaires and interviews. This method aims to eliminate the conundrum related to construct validity in relation to the commuter's behaviour (Jones. A, 2020).



Survey Methodology

The selected stretch on Panaji's 18th June Road is approximately 800 m long and it starts from the historic Immaculate Conception Church (also known as Panjim Church) to the Jawed Habib Junction on 18th June Road (Map 1).

The objective of these surveys include:

- a. Measuring traffic flow variability on 18th June Road by different mode of transportation
- b. Availability of on and off-street parking
- c. Shop owners, users and government officials opinions on pedestrianisation

To pedestrianise a major commercial stretch within Panaji CBD, the first step would be to understand the movement of traffic on that road by cars and 2 wheelers at different intervals in a day. This becomes very important as when the pedestrianisation plan is implemented, the flow of traffic would be stopped during specific hours of the day. Another aspect that is crucial is to understand the available on-street and off-street parking spaces on or nearby that stretch, which is highlighted in the Documentation section of this report. This is imperative as currently the city residents majorly depend upon their personal vehicles for transportation. Therefore it is imperative there is a dedicated space for parking that easily links to the pedestrianised zone where the users or residents can walk and effectively utilise their 18th June Road. The demographic composition for the perception surveys will comprise of the daily commuters using the streets including cars, motorbikes or cycles; the pedestrians; and the shopkeepers on the 18th June Road selected stretch. In addition to that, multiple consultations and discussions were conducted with Government officials to understand the challenges for the execution of this project (Table 5).

Bottom

Table 5:

Survey type and stakeholders involved in Panaji

Source

Compiled by authors

The travel restrictions and multiple lockdowns in the city due to the COVID-19 pandemic became a major limitation for effectively conducting these surveys on various occasions. In addition to that, the inflow and outflow of tourists, due to the national and international travel restrictions caused by the pandemic, was also greatly effected, and significantly reduced the number of vehicles and people normally using the road from previous years. As a result these surveys and analysis might provide skewed/biased results.

Survey Type	Methodology adopted	Stakeholders involved
Quantitative Survey	Each mode of transport including cars, 2 wheelers and their movement pattern were counted on all junctions of the selected stretch of 18th June Road. Also, the movement of vehicles was observed within that specific stretch	Local people, Traffic police
Perception Survey	Every second shop owner on selected stretch of 18th June Road were surveyed to gain their insights on this specific project	Shopkeepers on 18th June Road
Perception Survey	A ttRandom survey was done on a weekday and the users of the street were asked few questions and their opinions regarding challenges faced during walking	Users of 18th June Road
Perception Survey	Various consultations were being done with IPSCDL, CCP, Goa Traffic Department, Traffic Police Department officials	Government Officials

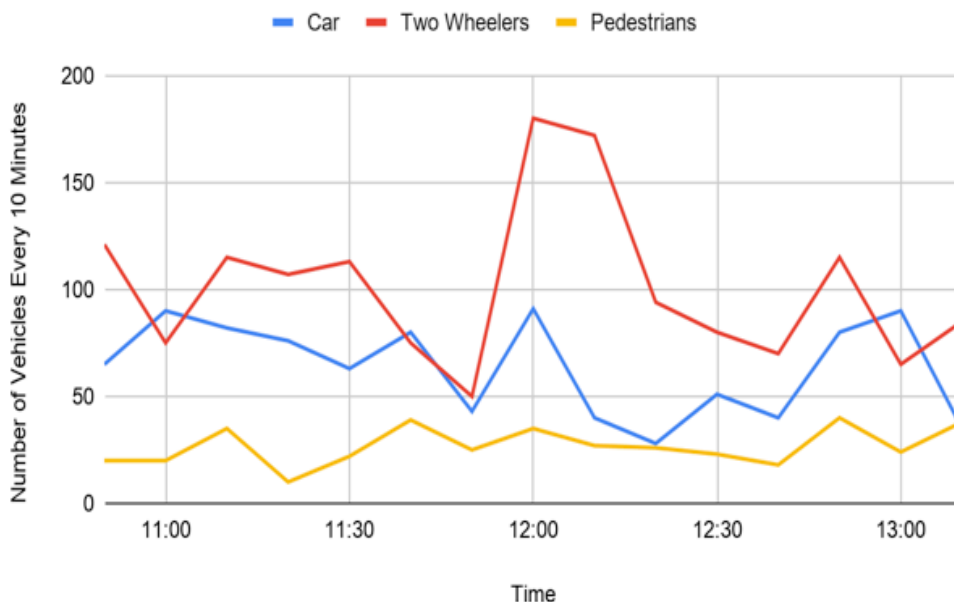
Quantitative Survey

The traffic counts analysed in Figure 16 were conducted at the intersection of 18th June Road and Praça da Igreja, a count of one-way traffic moving into 18th June Road.

No significant pattern in traffic volumes was observed on 18th June Road by the researchers/or study. Two wheelers were the most common mode of transportation followed by cars and pedestrians at the traffic count point

Left

Figure 16:
Traffic variation
by time on 18th
June Road



To further analyse the number of vehicles entering this area, a quantitative survey was conducted to count the number of vehicles for a whole weekday. The surveyors made 15-minute videos on all major junctions and high pedestrian intensity areas within this stretch. For each junction, a video was recorded in morning, afternoon and evening times to capture the diverse traffic volumes.

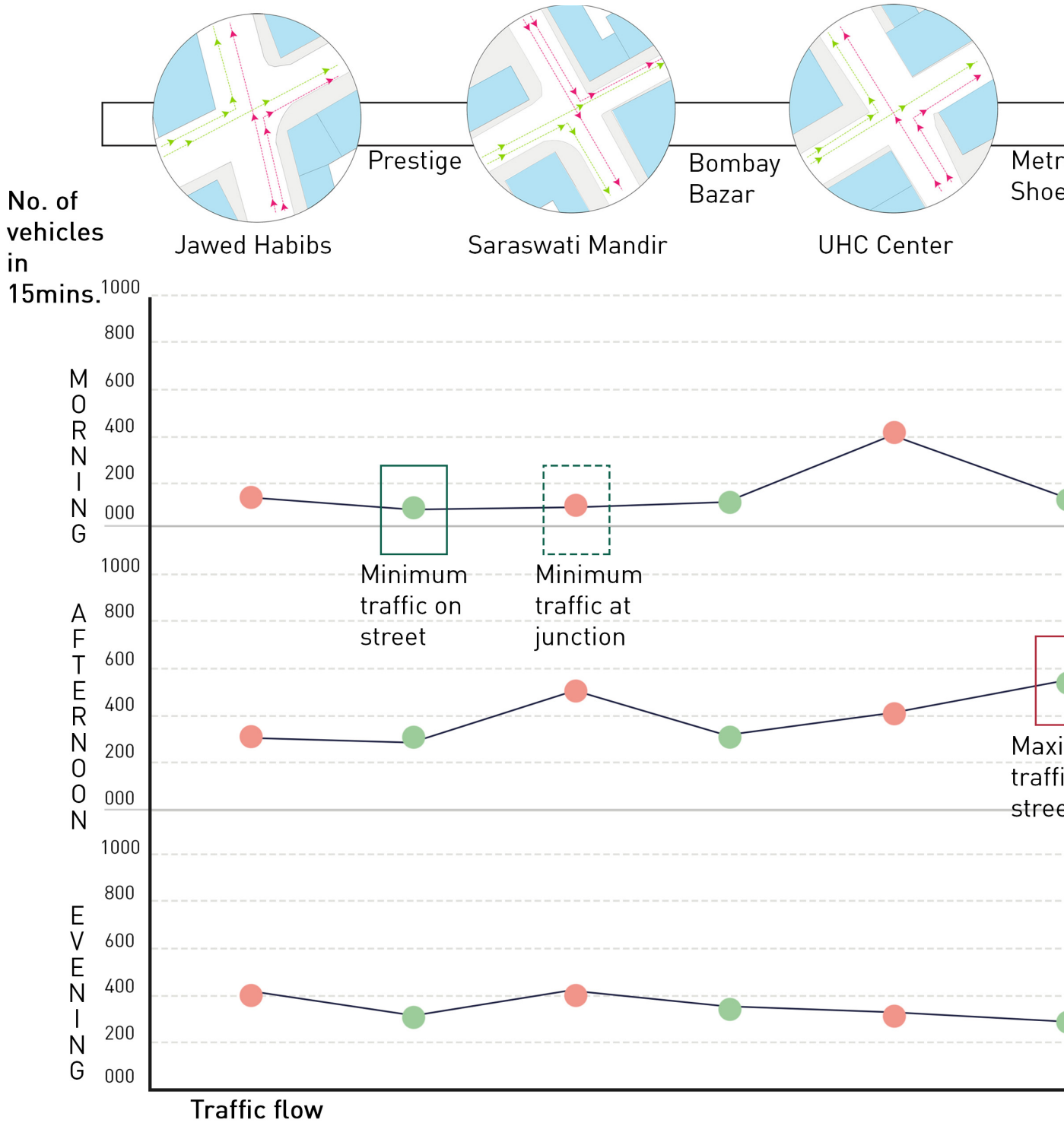
NEED FOR TRAFFIC VOLUME STUDY:

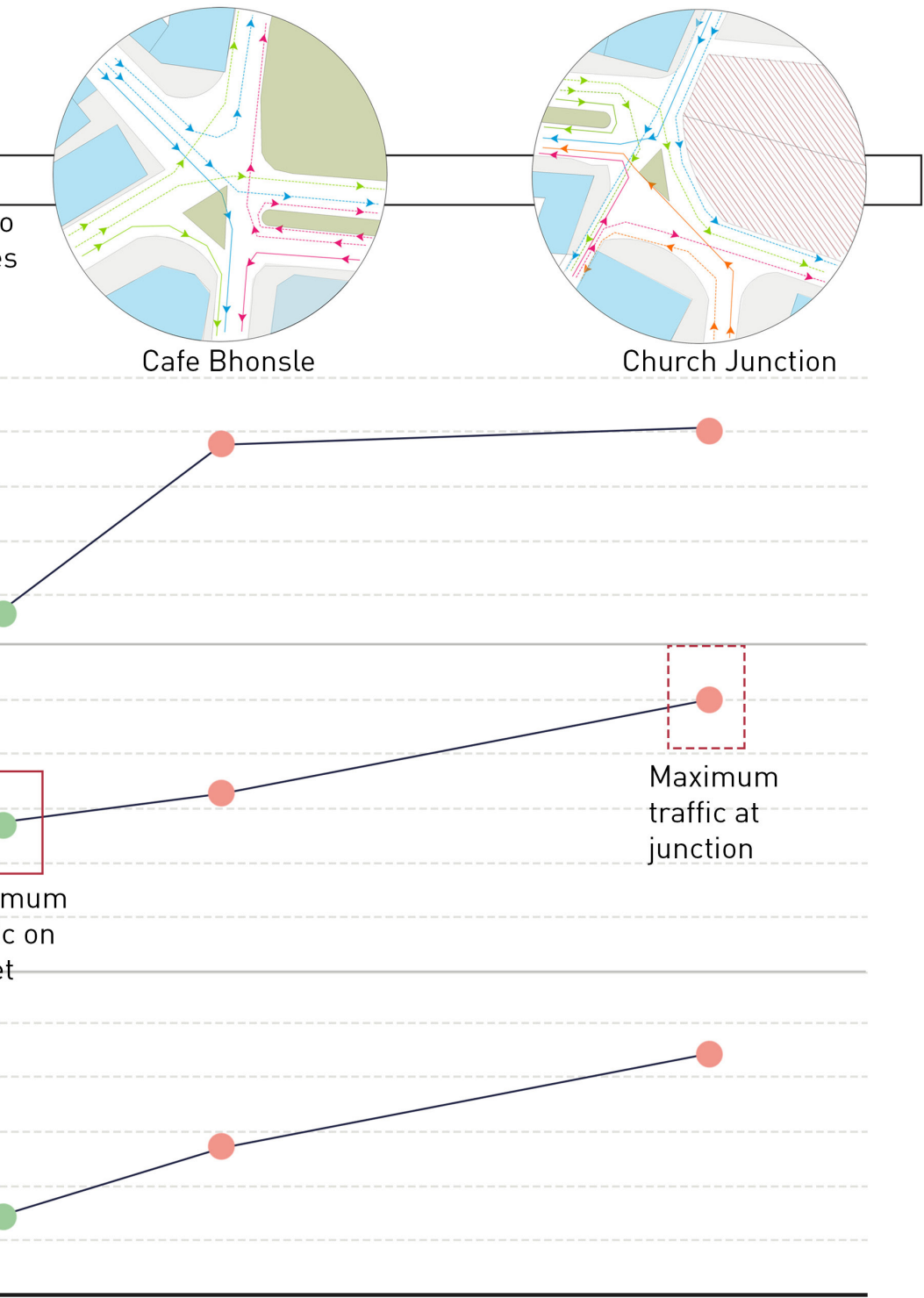
Vehicles are one of the most dangerous threats to the safety of pedestrians, and more so when the pedestrian movement is high, such as in a commercial street like 18th June Road. The road is one of the major connector roads of Panaji and hence has high intensity traffic. Traffic volume counts taken at different times of the day helps in understanding the intensity pattern at a given time and at a given place. This, in turn, leads to identification of pain points for pedestrian movements. A traffic count by different modes of transport including 2 wheelers cars and trucks, helps in understanding the dominant vehicles used and when converted to Equivalent Car Space (ECS), space share by type of vehicle can be derived. Vehicular count by direction, specifically at the intersections, gives an idea about traffic flow patterns from a particular direction. This becomes even more vital when mapping a neighbourhood that has alternate roads one-way for traffic. Analysis of above data can lead to introduction of traffic calming measures, traffic re-routing or traffic restrictions, restrict pedestrian movement at pain points, and other measures.

RESULTS OF TRAFFIC VOLUME STUDY (FIGURE 17):

1. The traffic increases from Jawed Habeebs to Church Junction.
2. The traffic is higher in the morning from Church Junction to Café Bhonsle. This stretch is one of the important commuter roads for office goers in the morning.
3. The traffic is higher during afternoon and evening from Café Bhonsle to Church Junction.
4. The traffic is at its maximum on the street near Metro Shoes during the afternoon. Mainly because of the heavy tourist footfall

TRAFFIC ANALYSIS





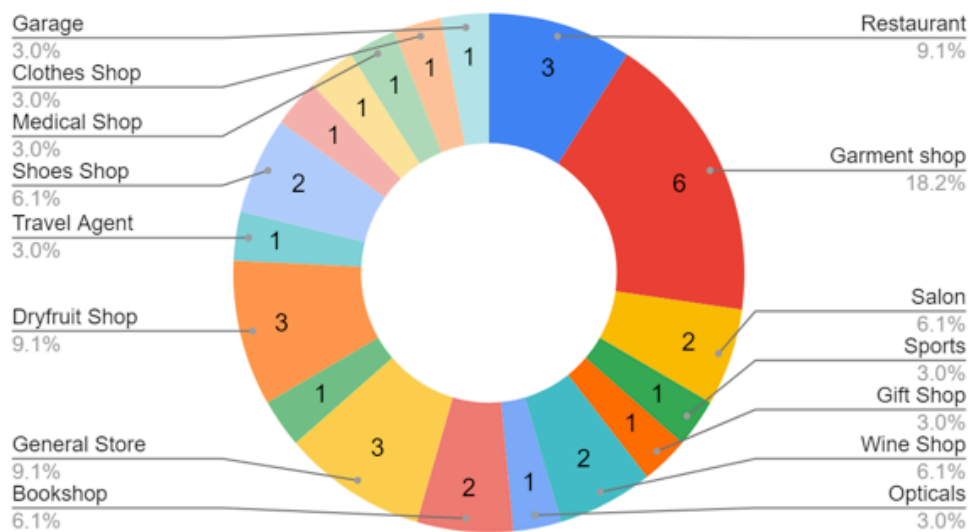
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Figure 17:
Traffic counts on
major junctions
and street for
15 minutes, 3
times a day

Survey Results- Shopkeepers

For the survey, 35 businesses were surveyed over two days and traffic counts were recorded over a period of three hours on a weekday morning at 18th June Road. Restaurants, garment shops, dry fruit stores, general stores and restaurants were most common at 18th June Road.

Left
Figure 18:
Distribution of
type of business



PARKING CHARACTERISTICS

- On street parking at 18th June Road is a mix of 2-wheeler and car parking spaces
- Most parking spaces charge a parking fee collected by parking attendants employed by the Corporation of the City of Panaji
- A few large businesses have gated off-street parking lots for customers on 2-wheelers and cars

PARKING ISSUES

- On-street parking spaces are not delineated by line markings on the road.
- The trees over parking spaces are not maintained regularly by the corporation, which causes branches to fall and damage vehicles, according to some business owners.

VISITOR AND EMPLOYEE MOBILITY CHARACTERISTICS

- Most employees travel to work on 2 wheelers
- Visitors tend to use both 2 wheelers and cars to access the businesses
- Tourists make up the majority of the visitors (up to 80% in some salons and general stores)
- Employees and business owners believe visitors would like to minimise the distance they walk
- Some large establishments, for example Bombay Bazaar, had employees residing at a single location in Panjim, within walking distance from the business.

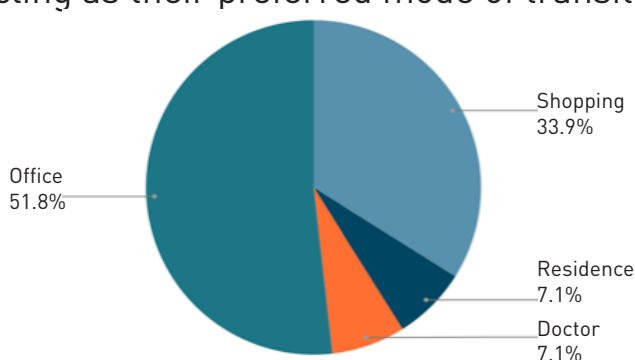
The NoMoZo initiative took place in Panaji in 2019. This initiative informed the business community around 18th June Road of the pedestrianisation plans, what it entails and of the process; and how this fits in with the national /state Government's intervention to pedestrianise the stretch in the road with stringent rules and guidelines.

Survey Results- Users

Through a robust perception survey that covered the majority of the users at the 18th June Road, it was observed that the area is a business district with almost 52% of the respondents travelling on a daily basis to their offices and places of work. The road also witnesses a decent footfall of shoppers who take advantage of the upscale cafes and ethnic luxury stores in the area (Figure 19). The majority of respondents answered that they use their private vehicles including two-wheelers and cars to reach their destinations, as shown in Figure 20. It was also noticed that cycling is the least preferred mode of travel in the area along with walking and public transport (for example a bus). This could be attributed to absence of public transportation in the city core (CMP, Goa), fragmented pavements, and the constant chock-a-block situation due to on street parking: as 64% of the respondents answered they struggled to get parking space in the vicinity (Figure 21). The respondents also imputed their lack of willingness to walk was due to safety concerns such as absence of street lights and the lack of proper safe pedestrian crossings. In addition to that, about 61% of the respondents mentioned that beautification of the streets plays an important role for choosing walking or cycling as their preferred mode of transit (Figure 22).

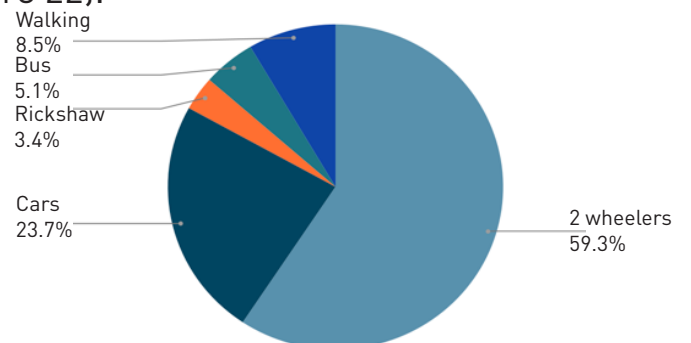
Bottom left

Figure 19:
Distribution of
purpose of travel



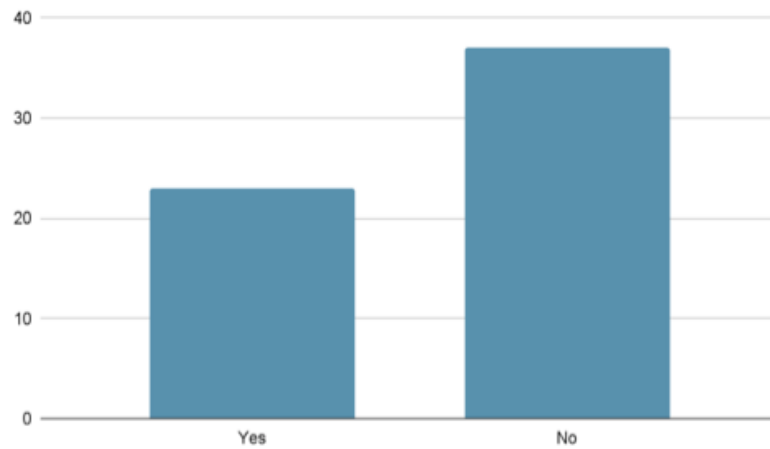
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Figure 20:
Distribution of
mode of vehicle to
travel



Top right

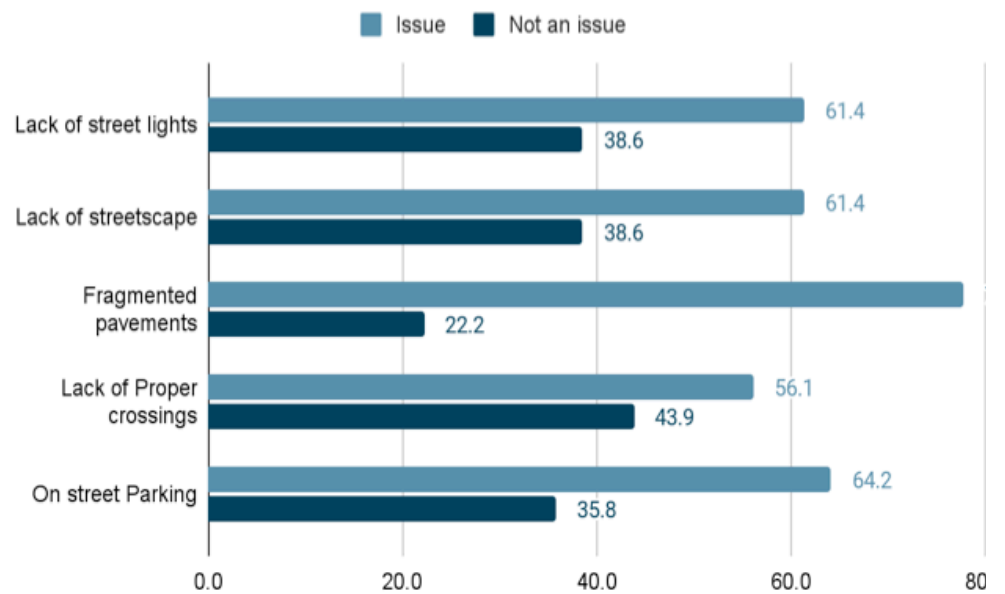
Figure 21:
Availability of
on-street parking



Bottom right

Figure 22:
Reason for lack
of willingness to
walk

Reason for lack of willingness to walk or cycle in %



Government Officials Consultation

Consultations and focused interviews with IPSCDL and CCP officials were done on multiple occasions and NMT Apex committee was also formed to facilitate discussions to draft and promote non-motorised transport policy of Panaji. Pedestrianisation of 18th June Road will become a major initiative to bring a behavioral change in residents of Panaji and adopt non- non-motorised modes of transit.

The major takeaways from discussions with Goa Transport Department, Traffic Police of Goa, IPSCDL and CCP include:

1. To pedestrianise the 18th June Road, the initial step would be to locate parking options within 250 metre radius of the specific stretch, so that the street could become accessible to all users. To streamline this mechanism, pedestrianised trial days should first conducted on weekends and before adding weekdays. Later, when the residents have adapted to the changes, additional transportation including electric shuttles and rickshaws to run within the 1-2 km zone, can be added for seamless movement of people.
2. The whole pedestrianisation project should be done in phases and multiple surveys should be conducted to record the feedback from users and shopkeepers and identify any challenges and seek solutions accordingly.
3. Installation of CCTV cameras is recommended to monitor the commuters and to manage the whole project. The installation can be done utilising smart City Mission funds.
4. Time based parking with induced heavy hourly tariffs can be initiated to discourage the use of vehicles.
5. Spaces near old GMC parking, Kampal or Football ground, Miramar circle near Maruti temple can be utilised effectively for design parking

Top Right

Figure 23:
PULL team meeting with Rohit Monserrate, Mayor, Panaji and Angelo Fernandes, Commissioner, CCP- August, 2021



Bottom Right

Figure 24:
PULL team meeting with Rajan Satardekar, Director, Directorate of Transport, Goa, August, 2021



Conclusion

Based on all the surveys and stakeholder consultations it is evident that distances in central Panaji are suitable for pedestrianisation as one can walk to the centre from the two ends within 10 minutes. As well the built environment, which includes several historic buildings in the core of the city supports pedestrianisation making the vicinity more pedestrian friendly. The 18th June Road has been identified as a favourable location for pedestrianisation as it caters to a total of 7 blocks between Caculo Junction and the Domino Pizza Junction. While these blocks open at the 18th June Road, they have designated by-lanes which can be easily accessed by pedestrians with a maximum walking distance of only 10-15 metres. Since the area also experiences heavy footfall of both domestic as well as foreign tourists, due to its historic characteristics and as a business district with many high-end shopping stores, it becomes imperative to pedestrianise the area for a better user interface.

SUGGESTIONS FOR PEDESTRIANISATION PILOTS

1. Alternate parking arrangements need to be made for cars and 2 wheelers that would have been previously parked within the pedestrianised zone. Parking structure that is within walking distance would be the best solution for it.
2. A circular shuttle connecting the pedestrianised area with the rest of Panjim would be key in ensuring the success of the pilot and filling gaps in the public transportation system according to some business owners. An electric shuttle would be optimal.
3. Freight vehicles can be operated at certain points of time in the day if pedestrianisation is done permanently.



Map1:
 Selected 18th June Road (in red) for pedestrianisation



Figure 25: Elderly lady crossing road at Shri Saraswati Junction, 18th June Road



DOCUMENTATION

Methodology

The documentation aims at understanding the current scenario of 18th June Road. A preliminary survey and observational analysis was used to form the basis of the documentation. The major observations include:

i. The 18th June Road is one of the major connector roads of the city i.e. it is one of the majorly used thorough roads in the city; ii. The road, being both in the capital city, the CBD of Panaji and home to one of the major tourist spots, the pedestrian footfall is mixed of locals, tourists, employees, etc. along the whole stretch; and iii. While the stretch in the road has a footpath with adequate width at most places, there were still a number of conflict/access and usability points while either approaching the footpath or actually on and using the footpath.

Based on these observations, documentation is divided into the following parts: Land use and street character and Vehicular movement and parking patterns. The findings from traffic counts at major junctions were covered in the previous section.

The following documentation is done in detail by dividing the street into four parts (refer Map 2 which covers from junction to junction):

- a. Building activity and pedestrian footfall
- b. Vehicular and pedestrians counts and Equivalent Car Space (ECS) count
- c. Obstructions encountered while approaching the footpath and on the footpath

Detail Part 1 - From Jawed Habeebs Junction to Shri Saraswati Mandir Junction -----

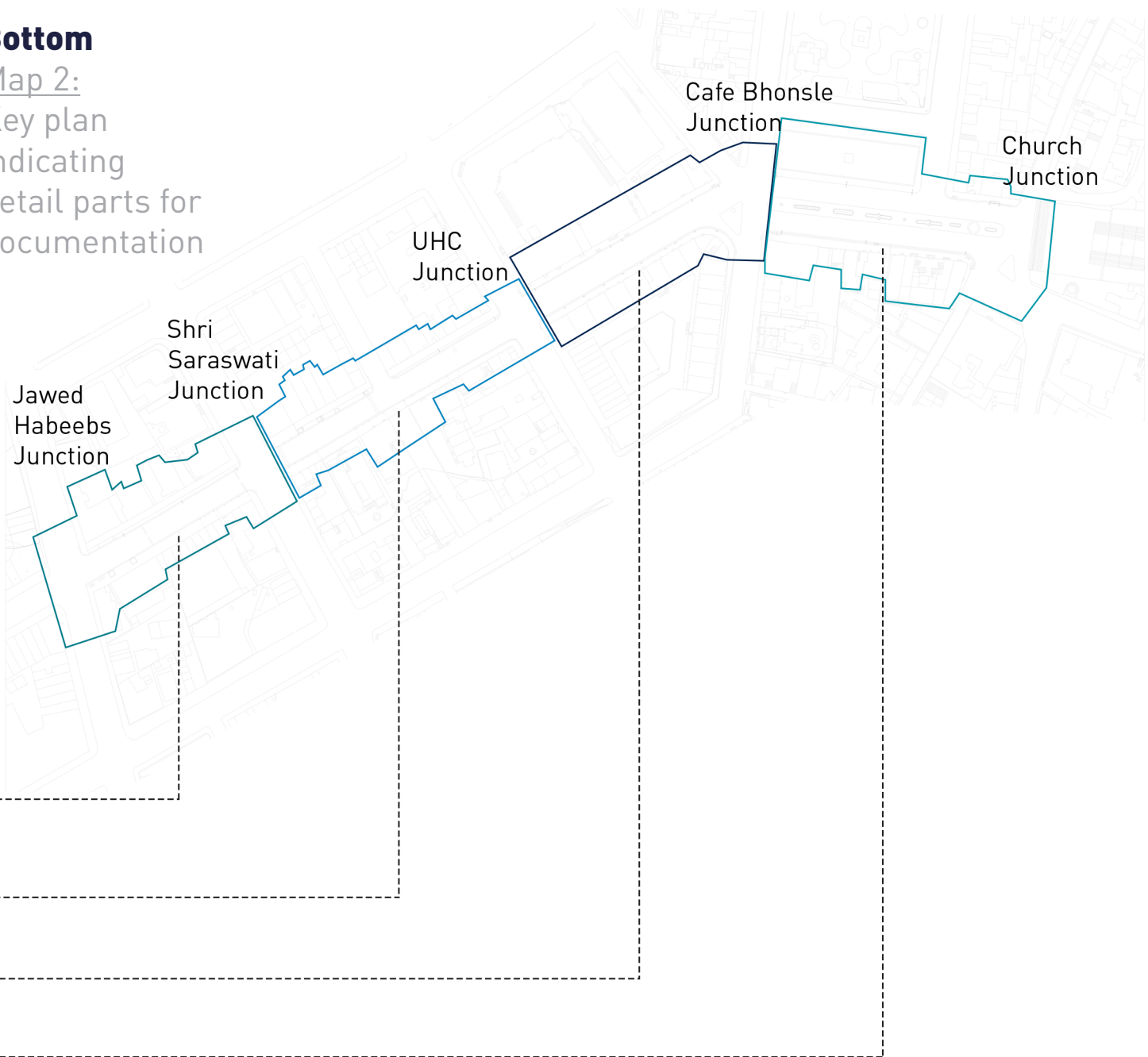
Detail Part 2 - From Shri Saraswati Mandir Junction to Urban Health Care (UHC) Junction -----

Detail Part 3 - From UHC Center Junction to Cafe Bhonsle Junction -----

Detail Part 4 - From Cafe Bhonsle Junction to Church Junction -----

Bottom

Map 2:
Key plan
indicating
detail parts for
documentation



NEED FOR STUDY OF HIGH PEDESTRIAN FOOTFALL, ECS, AND, PARKING PRICES

High pedestrian footfall:

Types of high pedestrian footfall magnets found on the street include:

Church

Souvenir shops

Garments shop

Dry fruit shops

Restaurants

1. Places with high pedestrian footfall could form an obstruction if not adequate breathing spaces are provided.
2. These types of spaces also require more pedestrian friendly infrastructure including lighting, seating and ramps.
- 3.3. It was also observed that such spaces also invariably attract more vehicles in and around those magnets, which in turn causes its own issues such as traffic jams, discomfort, conflict points for pedestrians and overall poor movement and access.

Equivalent Car Space (ECS):

In a pedestrian street, priority for space allocation is usually given to pedestrian infrastructure. This varies with the vehicular intensity on the particular road. In Panaji, compared to other cities, a general observation is that the number of 4 wheeled vehicles are substantially higher. While vehicle counting shows although the number of 2 wheelers are more, 4 wheelers occupy much more space on 18th June Road. The observations included below must also factor into any pedestrianisation plans:

1. More parking space allocation for 4 wheeled vehicles on street
2. More space occupation by 4 wheeled vehicles on the road
3. In narrow streets such as 18th June Road, 4 wheelers could act as not only physical barriers but visual barriers and therefore solutions must be sought
4. In the absence of drop-off and parking spaces, like in Panaji, it is observed that 4 wheeled vehicles are temporarily parked on the road, creating traffic jams and making pedestrian access difficult.

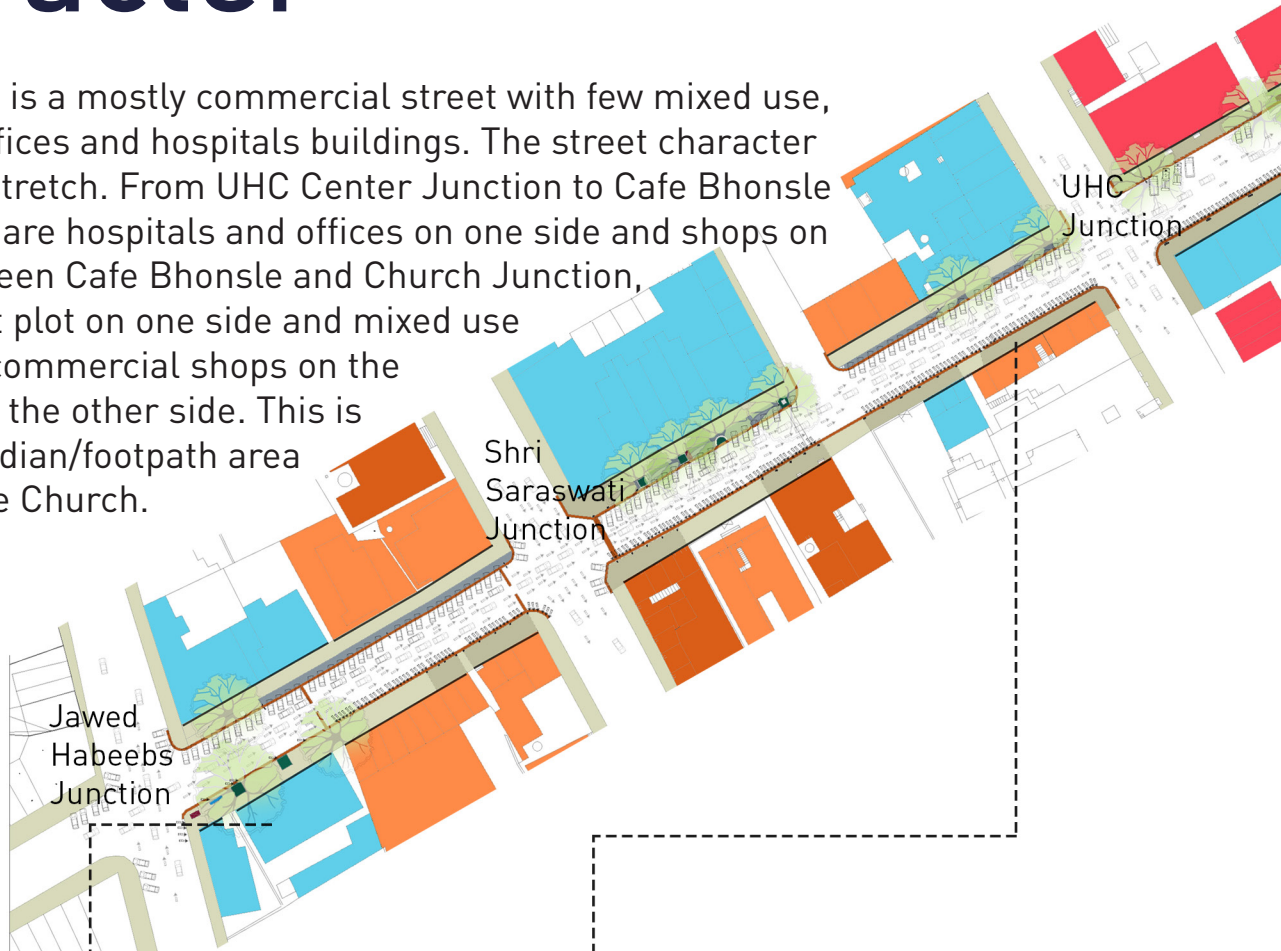
Parking price:

One of the solutions to reduce dependency on vehicles and promote walking is to optimise parking infrastructure. Paid parking not only benefits the agency financially, but it can also be used as a tool to discourage use of vehicles.

Building Use and Street Character

18th June Road is a mostly commercial street with few mixed use, government offices and hospitals buildings. The street character varies at each stretch. From UHC Center Junction to Cafe Bhonsle Junction, there are hospitals and offices on one side and shops on the other. Between Cafe Bhonsle and Church Junction, there's a vacant plot on one side and mixed use buildings with commercial shops on the ground floor on the other side. This is divided by a median/footpath area leading upto the Church.

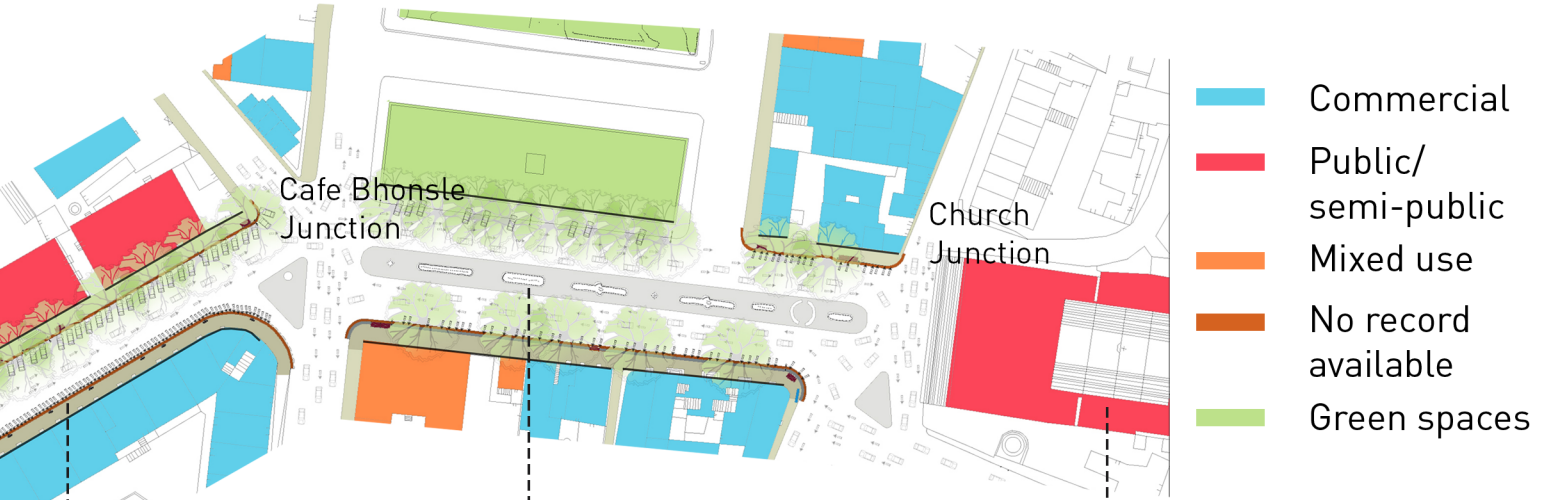
Two unique characteristics of this street are the covered walkways and line of trees on one side of the street.



Recreational activity- Restaurants Recreational activity- Shopping Covered



Figure 26: Type of activities and spaces on 18th June Road



Map 3:
Land use map of
18th June Road

walkways

Public spaces

Heritage- tourist spots



Vehicular movement and parking pattern

The general parking pattern observed is that 4 wheelers are parked towards the left side (North) and 2 Wheelers are parked on the right side (South) while some of the parking is reserved near UHC Center for rented 2W, ambulances, and Red-Cross Society vehicles

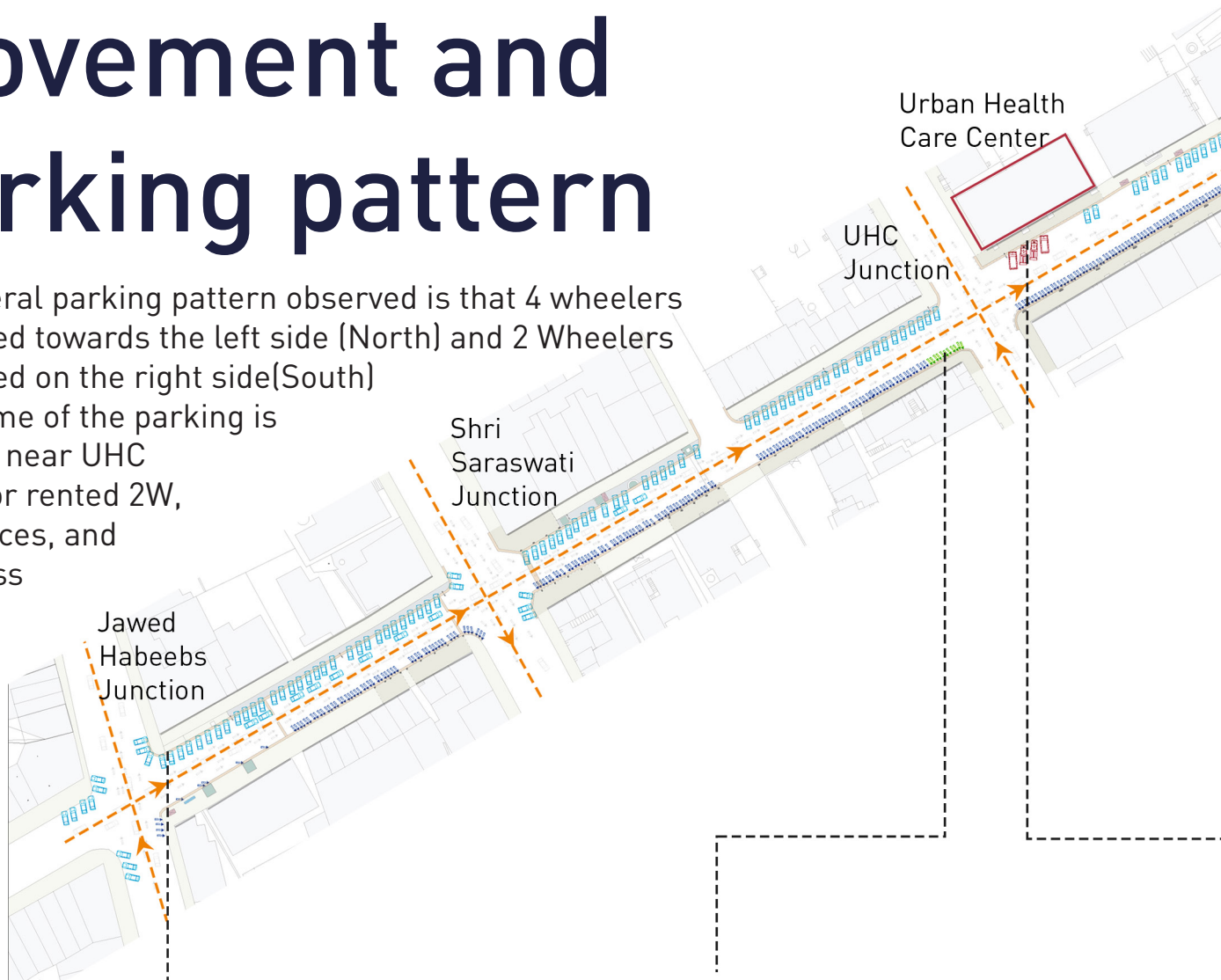
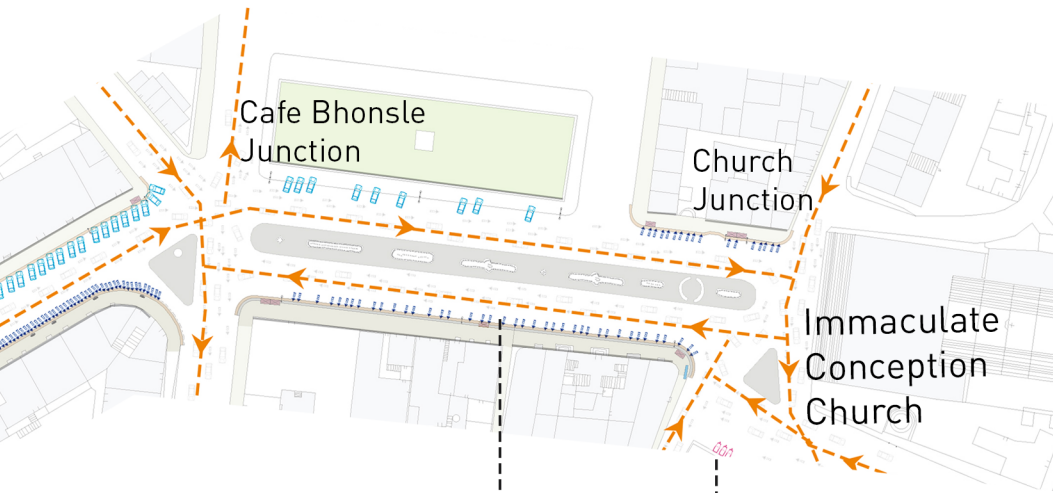


Figure 27: Types of parking on 18th June Road



- - - - - Vehicular movement
- Paid 4W parking
- Paid 2W parking
- Dedicated space for rented 2W parking
- Dedicated space for ambulance parking
- Auto-rickshaw stand

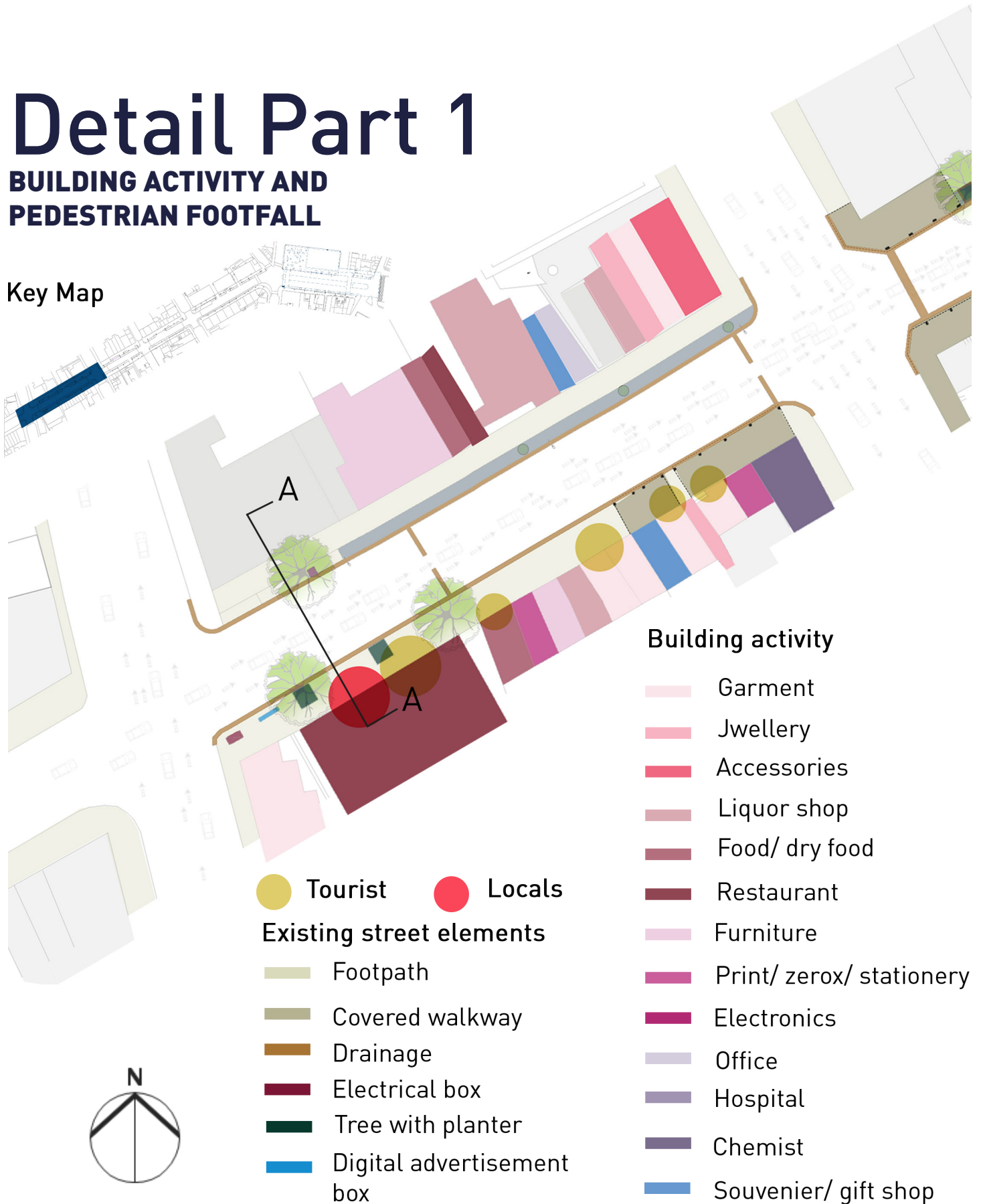
Map 4:
 Parking location of different type of vehicles and vehicular movement



Detail Part 1

BUILDING ACTIVITY AND PEDESTRIAN FOOTFALL

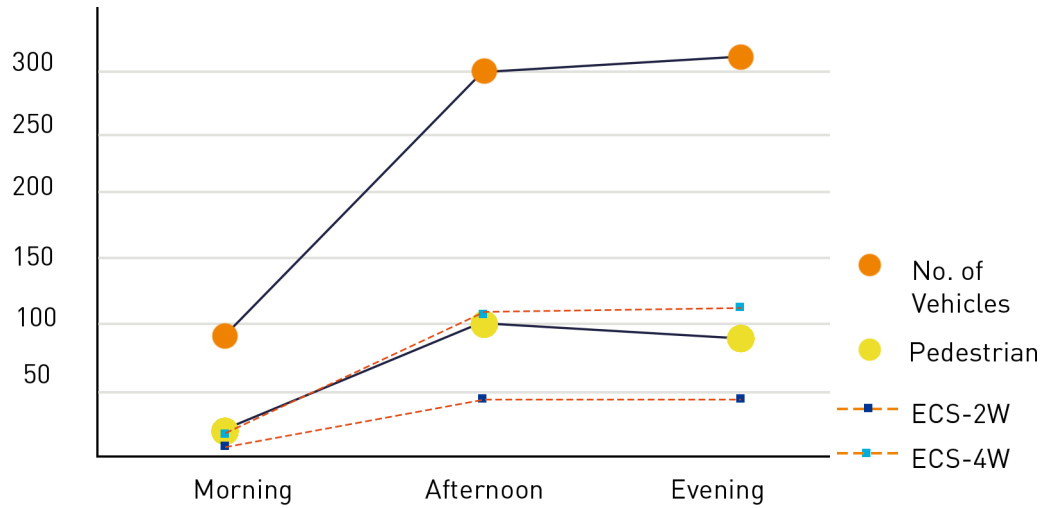
Key Map



Map 5: Detail part 1- Type of building activity and pedestrian intensity

VEHICLE, PEDESTRIAN COUNTS, AND ECS

The vehicular traffic is at peak during evening and pedestrian intensity is maximum during afternoon. Although the number of 2W are more than 4W, the space occupied by moving 4W is more than twice the space occupied by moving 2W during afternoon and evening

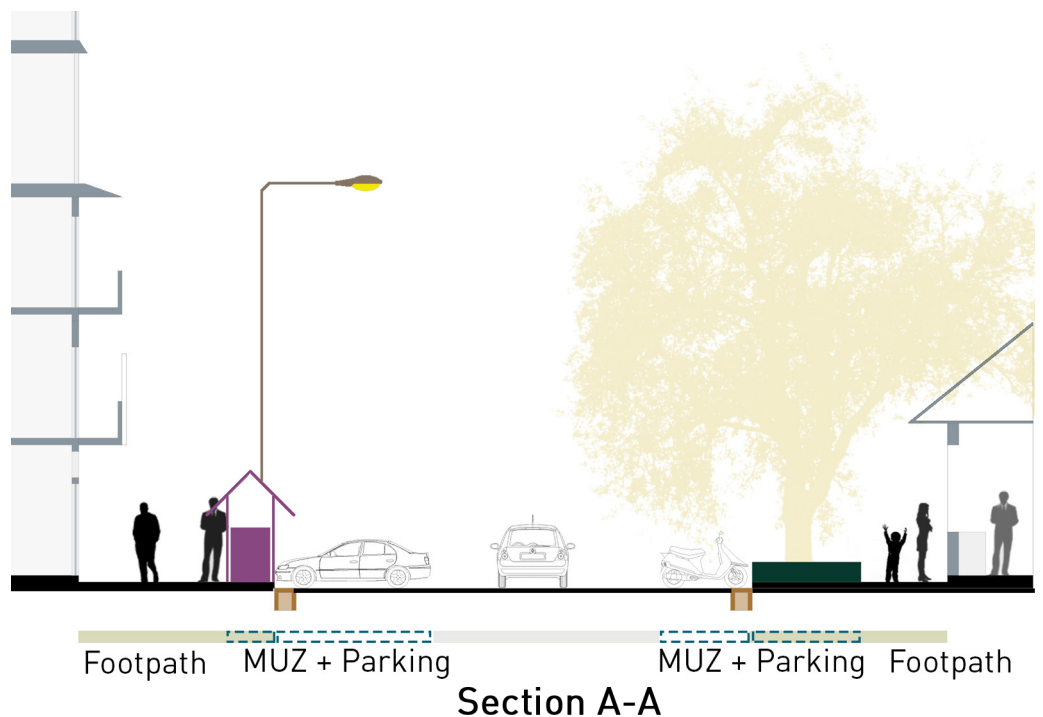


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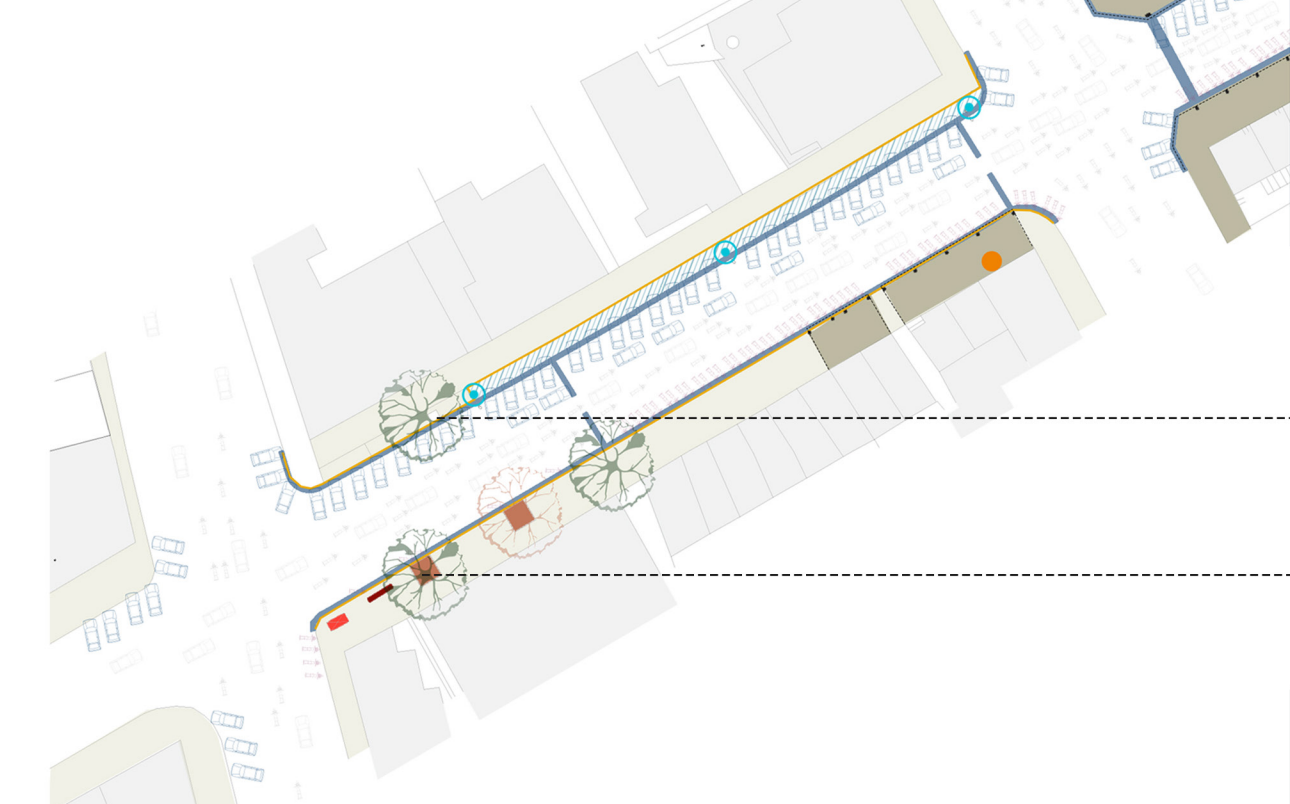
Figure 28:
Detail part 1:
Comparative analysis of vehicle, pedestrian and ECS count

Bottom

Figure 29:
Detail part 1:
Street section



OBSTRUCTIONS



Conflict points

Footpath

- Shop frontage
- Electrical box
- Tree planter
- Signages/ Digital
- Vendors

Approach to footpath

- Trees and planters
- Vehicles
- Drainge
- 4W- Physical & visual barrier
- 2W- Physical barrier
- Electrical box
- Street light
- Change in material
- Absence of universal accessibility

Map 6: Detail part 1: Obstructions



Right

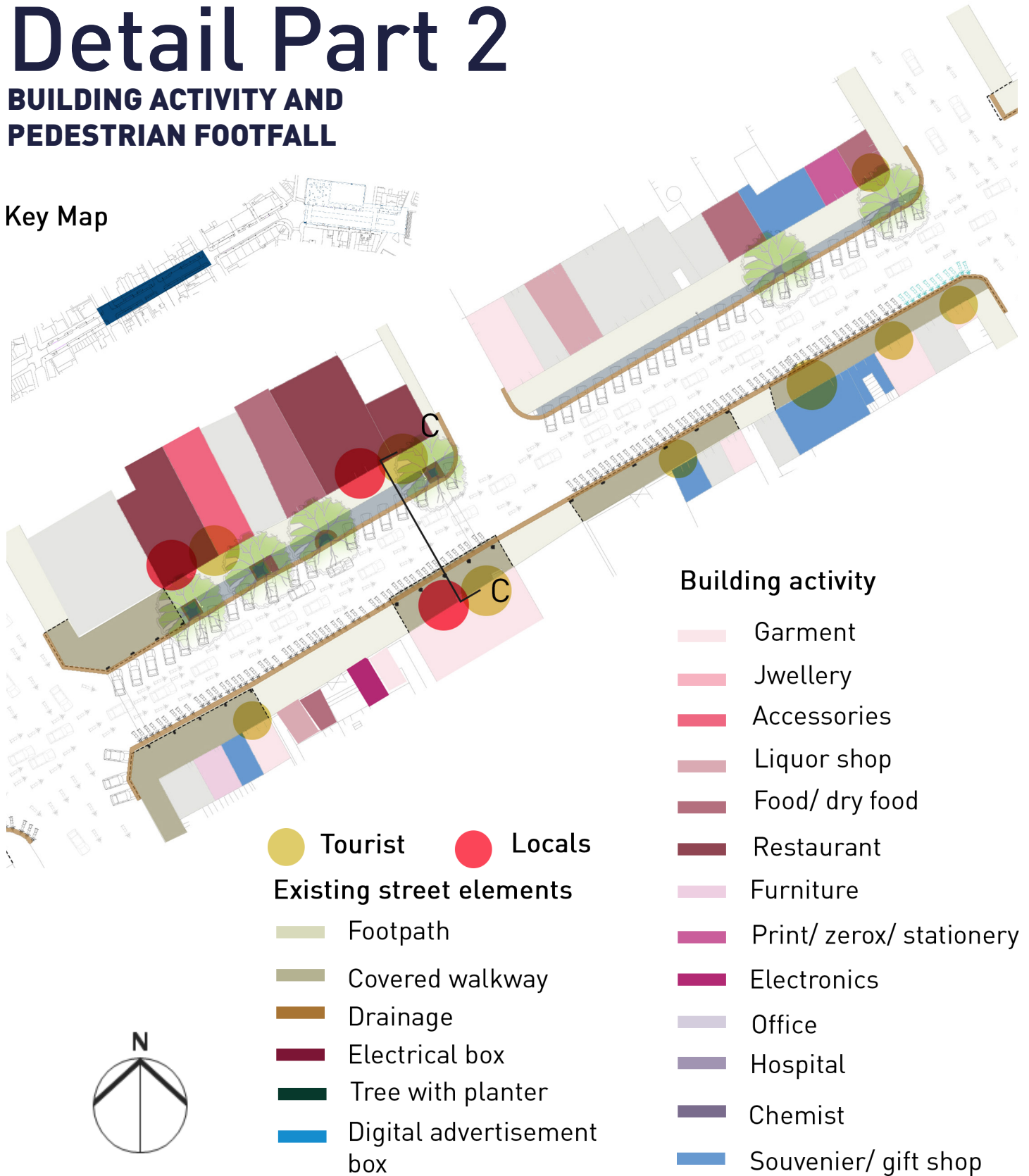
Figure 30:
Detail part 1:
Photos of
obstruction

of

Detail Part 2

BUILDING ACTIVITY AND PEDESTRIAN FOOTFALL

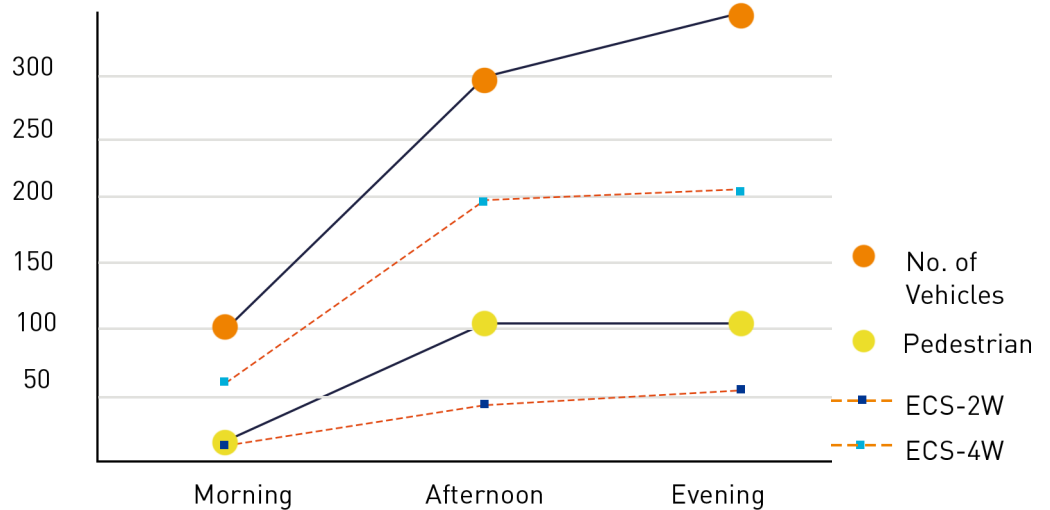
Key Map



Map 7: Detail part 2- Type of building activity and pedestrian intensity

VEHICLE, PEDESTRIAN COUNTS, AND ECS

The vehicular traffic is at peak during evening and pedestrian intensity is maximum during afternoon and evening. Although the number of 2W are more than 4W, but the space occupied by moving 4W is more than twice the space occupied by moving 2W during evening and almost twice that during afternoon.

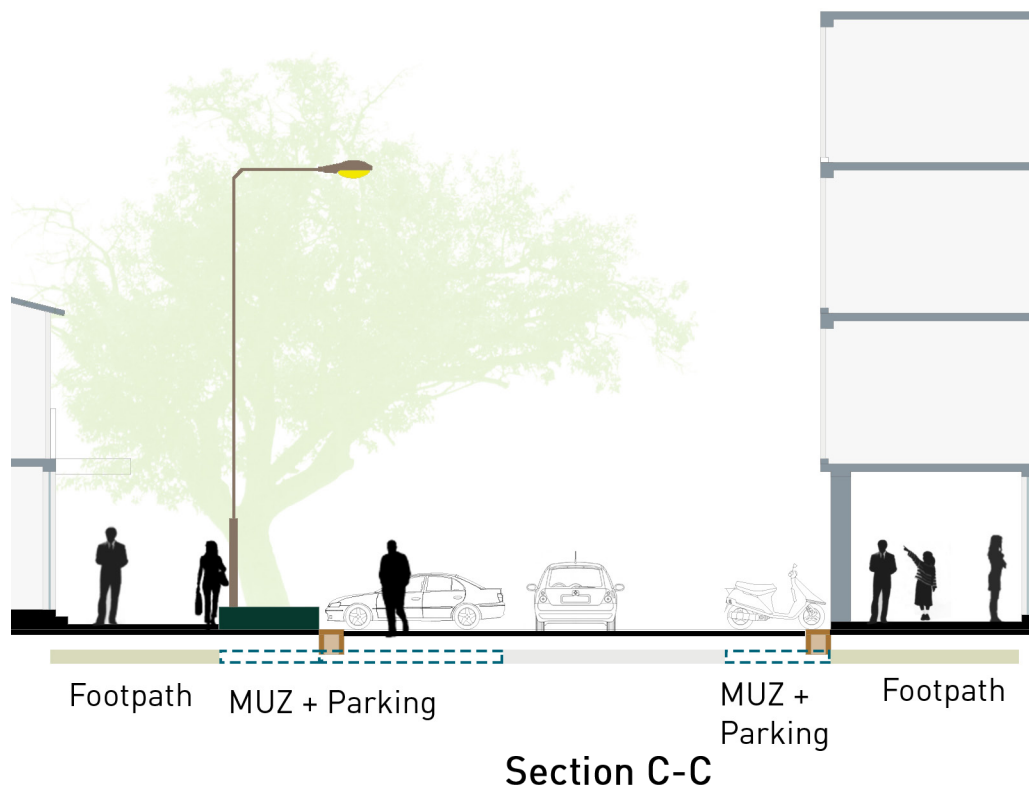


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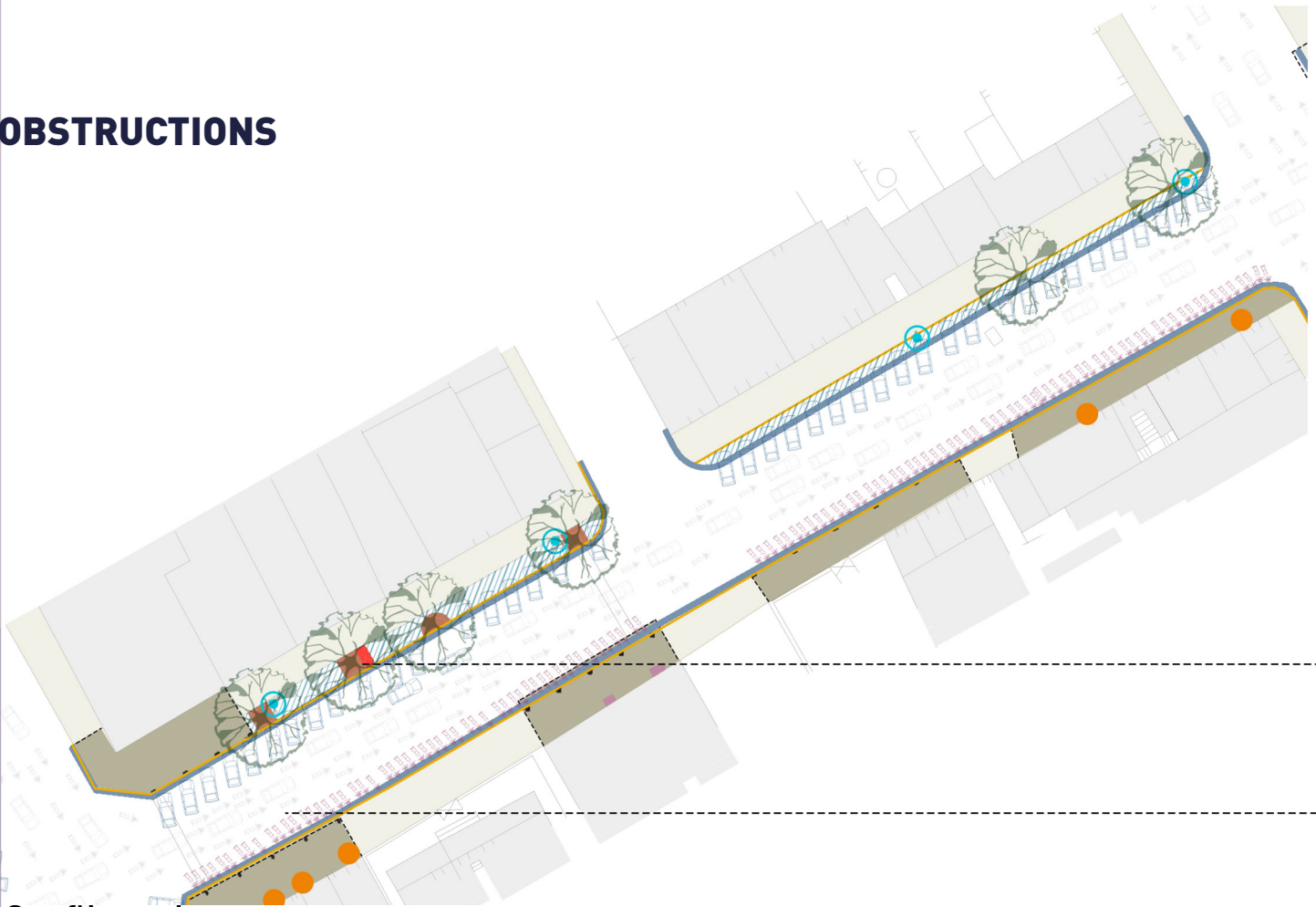
Figure 31:
Detail part 2:
Comparative analysis of vehicle, pedestrian and ECS count

Bottom

Figure 32:
Detail part 2:
Street section








OBSTRUCTIONS












Conflict points

Footpath

-  Shop frontage
-  Electrical box
-  Tree planter
-  Signages/Digital
-  Vendors

Approach to footpath

-  Trees and planters
-  Vehicles
-  Drainage
-  4W- Physical & visual barrier
-  2W- Physical barrier
-  Electrical box
-  Street light
-  Change in material
-  Absence of universal accessibility

Map 8: Detail part 2: Obstructions

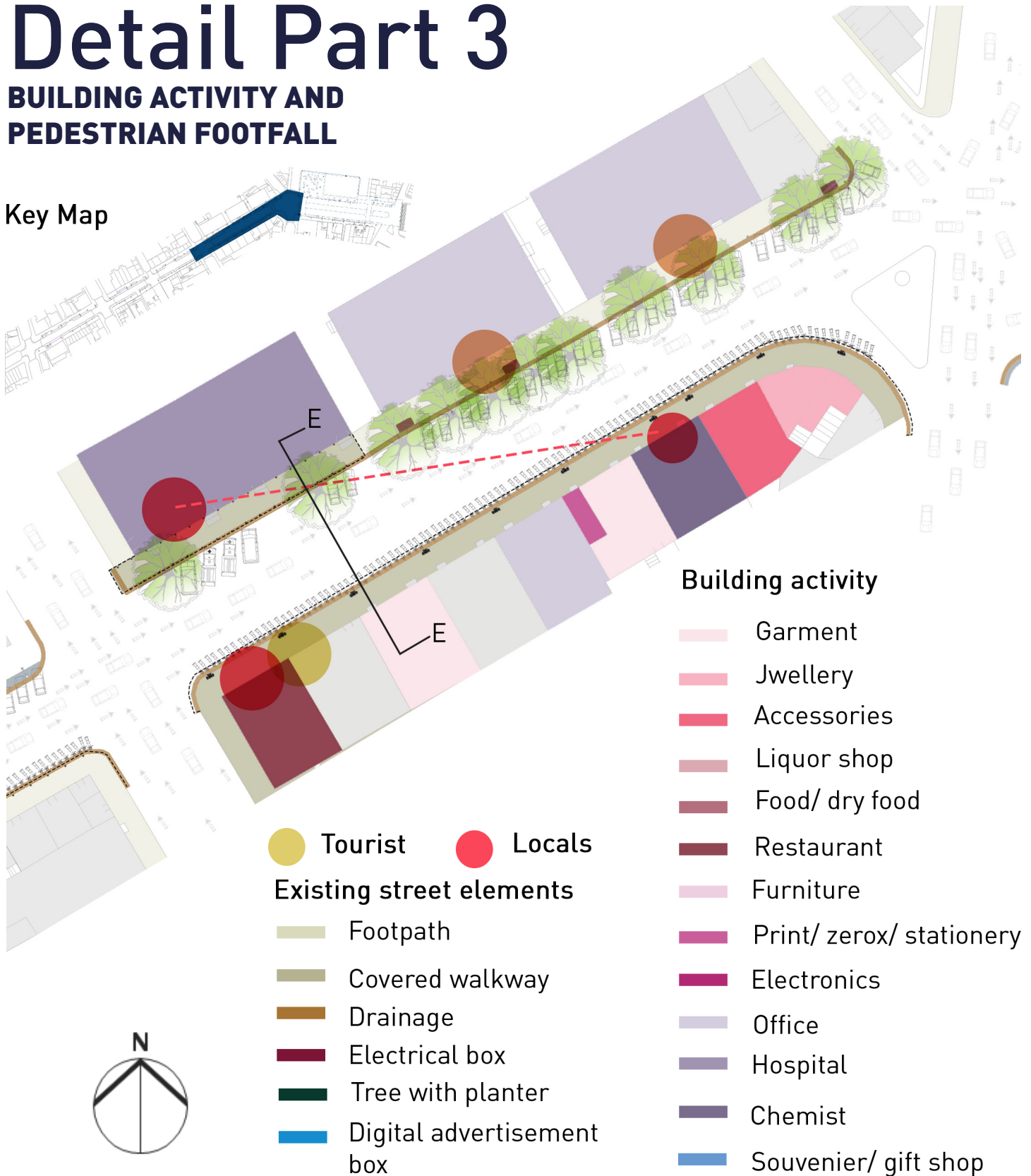


Right
Figure 33:
Detail part 2:
Photos of
obstruction

Detail Part 3

BUILDING ACTIVITY AND PEDESTRIAN FOOTFALL

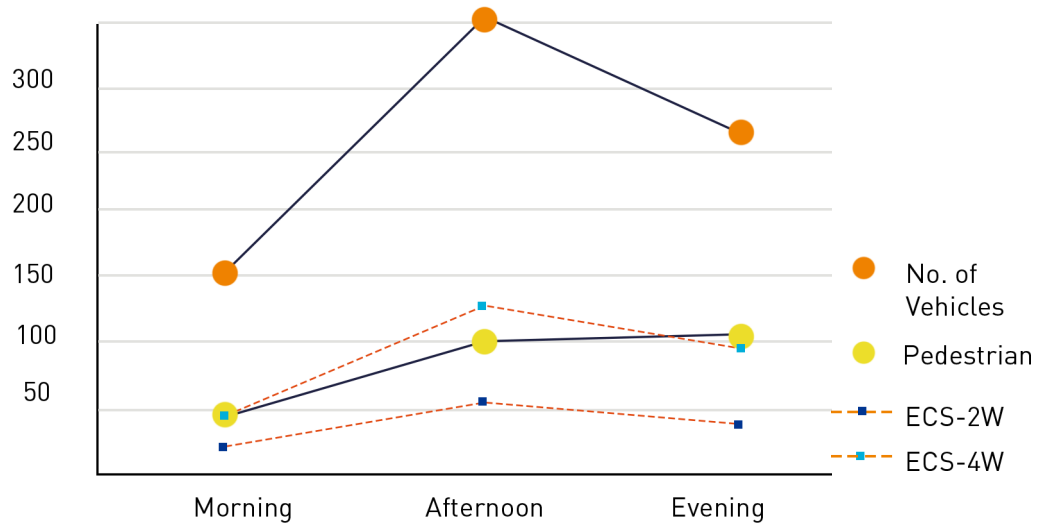
Key Map



Map 9: Detail part 3- Type of building activity and pedestrian intensity

VEHICLE, PEDESTRIAN COUNTS, AND ECS

The vehicular traffic is at peak during afternoon and pedestrian intensity is maximum during the evening. Although the number of 2W are more than 4W, but the space occupied by moving 4W is more than twice the space occupied by moving 2W during afternoon and evening

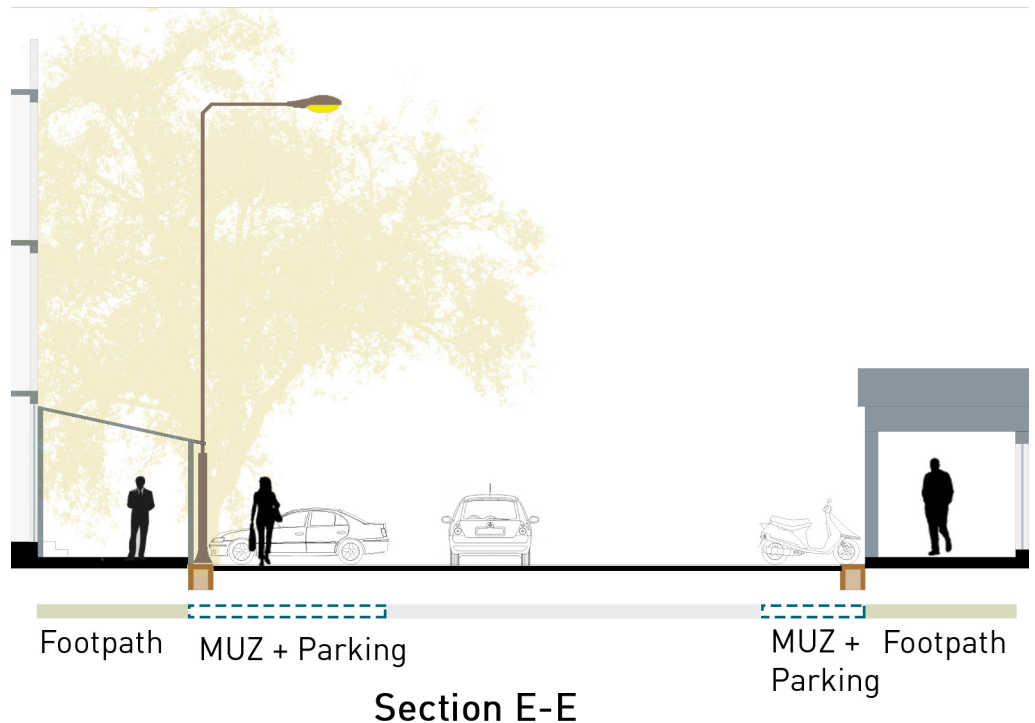


Top

Figure 34:
Detail part 3:
Comparative analysis of vehicle, pedestrian and ECS count

Bottom

Figure 35:
Detail part 3:
Street section



OBSTRUCTIONS



Conflict points

Footpath

- Shop frontage
- Electrical box
- Tree planter
- Signages/ Digital
- Vendors

Approach to footpath

- Trees and planters
- Vehicles
- Drainge
- 4W- Physical & visual barrier
- 2W- Physical barrier
- Electrical box
- Street light
- Change in material
- Absence of universal accessibility

Map 10: Detail part 3: Obstructions



Right

Figure 36:
Detail part 3:
Photos of
obstruction

of

Detail Part 4

BUILDING ACTIVITY AND PEDESTRIAN FOOTFALL



Map 11: Detail part 4- Type of building activity and pedestrian intensity

VEHICLE, PEDESTRIAN COUNTS, AND ECS

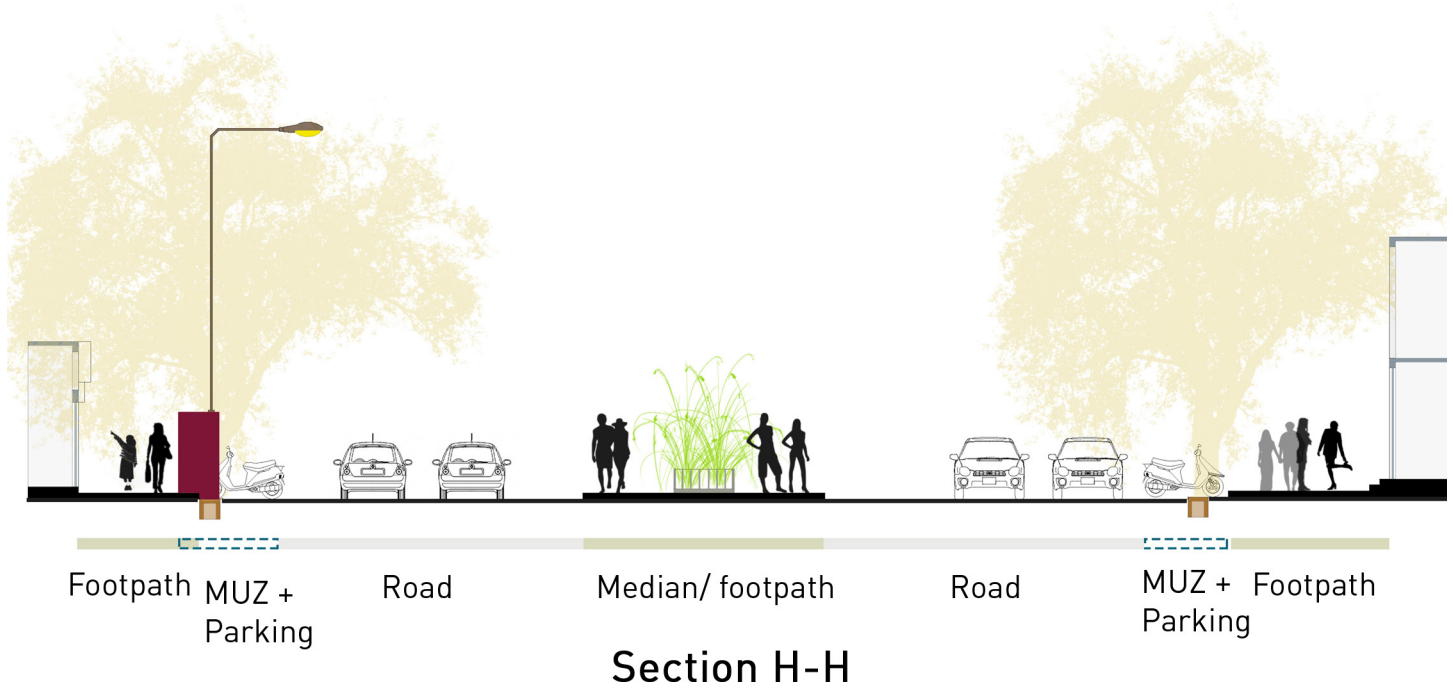
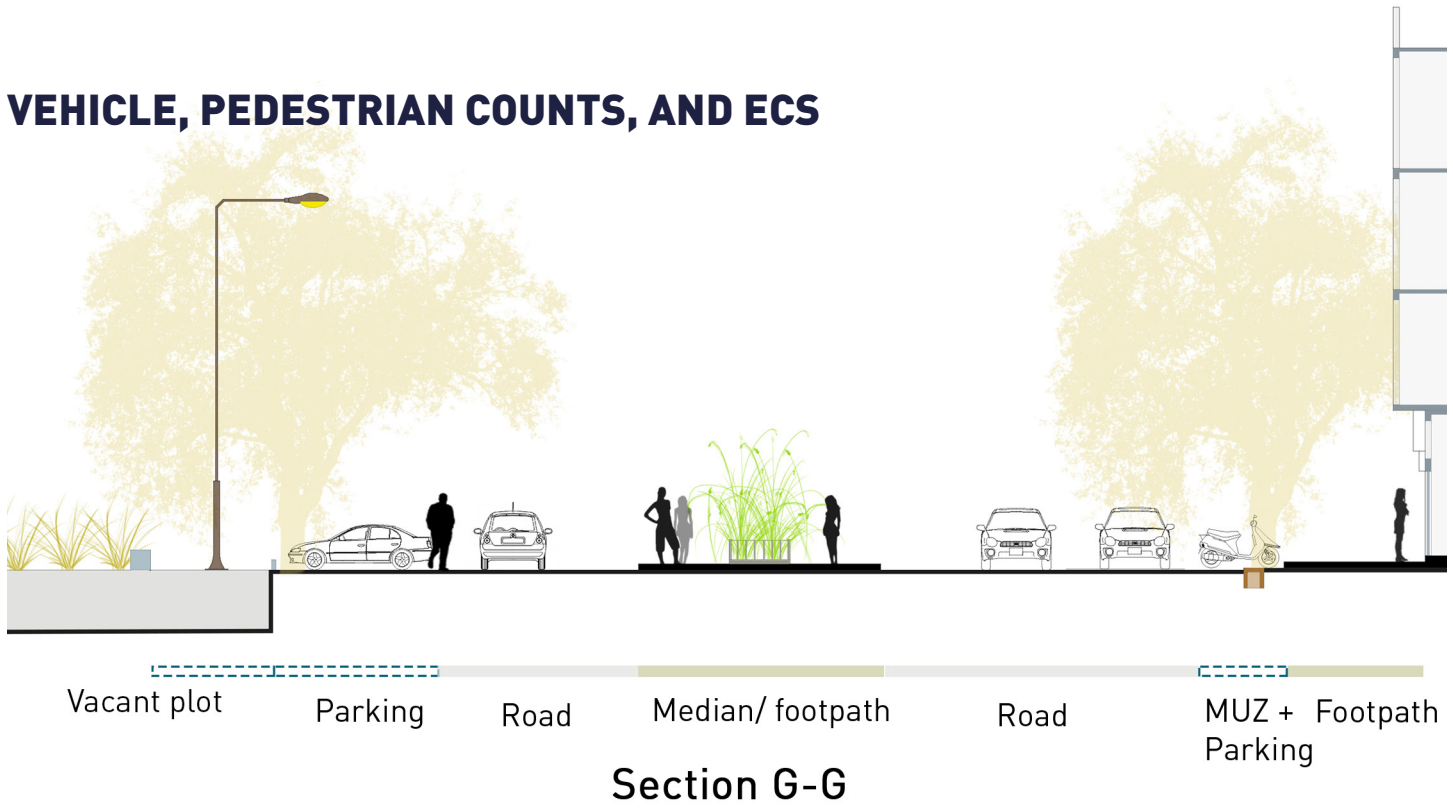
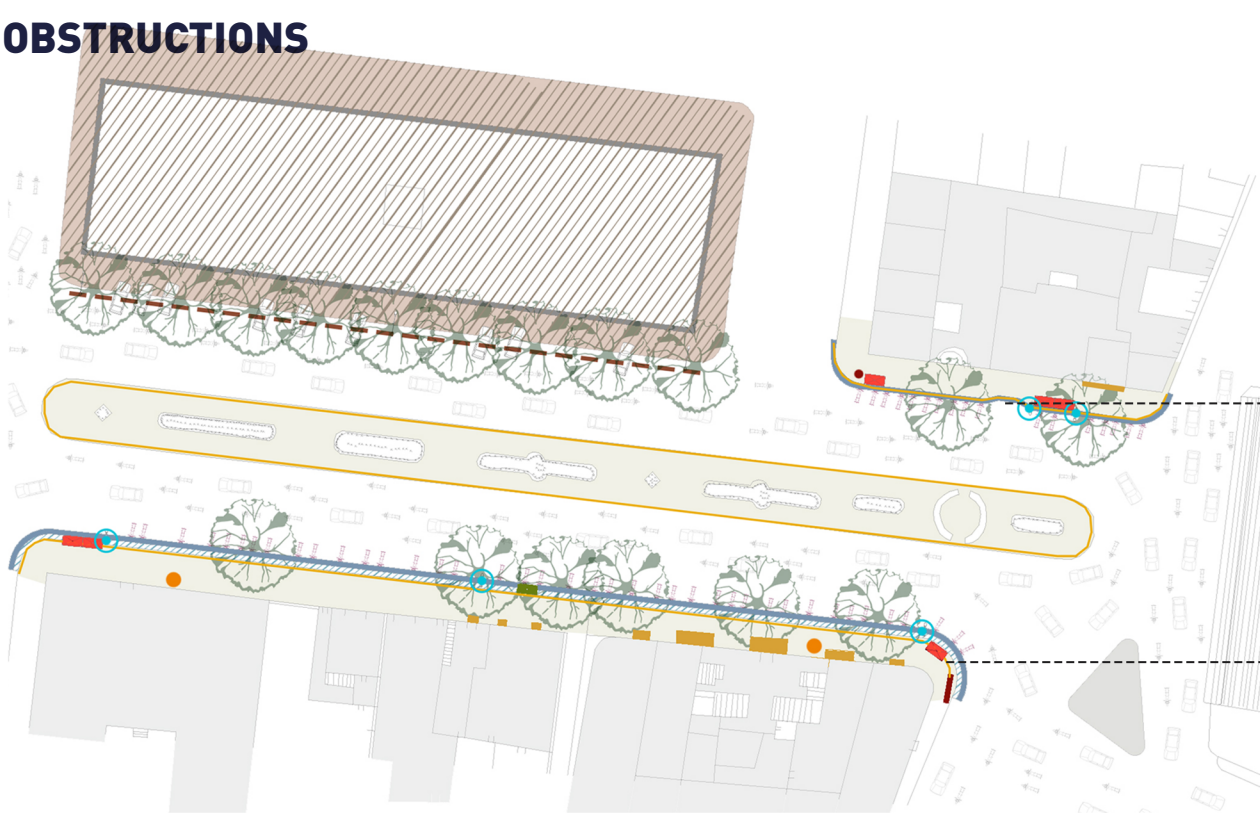
















Figure 37: Detail part 4: Street sections

OBSTRUCTIONS



Conflict points

Approach to footpath

- | | | |
|---|------------------------------------|---|
|  | Trees and planters | Footpath |
|  | Vehicles |  Shop frontage |
|  | Drainge |  Electrical box |
|  | 4W- Physical & visual barrier |  Tree planter |
|  | 2W- Physical barrier |  Signages/ Digital |
|  | Electrical box |  Vendors |
|  | Street light | |
|  | Change in material | |
|  | Absence of universal accessibility | |

Map 12: Detail part 4: Obstructions



Right
 Figure 38:
 Detail part 4:
 Photos of
 obstruction

Findings and Conclusion

LAND USE AND STREET CHARACTER

Due to uneven distribution of mixed use buildings on the 18th June Road, some stretches such as those near Cafe Bhonsle square and the area near Church are isolated at night due to lack of people on the street. The walkways pose a threat of safety issues at night due to their being dimly lit.

VEHICULAR MOVEMENT AND PARKING PATTERN

18th June Road is a part of grid-iron patterned streets network in CBD of Panaji. This pattern is characterised by almost every street being a one-way street with the opposing way of direction on an alternate street.

Whole stretch has a paid parking system with 4 wheelers on one side and 2 wheelers on the other. Although there are some restrictions to parking such as reserved parking for the hospital and no parking around intersections, vehicles were observed to be parked on it.

BUILDING ACTIVITY AND PEDESTRIAN FOOTFALL

The majority of building activity comprises of garment and dry fruit shops, restaurants, souvenir shops and offices and these activities have the highest pedestrian footfall. The Immaculate Church attracts the most tourists and therefore the footfall surrounding that area is highest during the day.

VEHICULAR, PEDESTRIAN COUNTS AND EQUIVALENT CAR SPACE (ECS) COUNT

The highest vehicular count is recorded between UHC Center Junction and Cafe Bhonsle Junction, near Metro Shoes, in the afternoon. The pedestrian count is almost similar during the afternoon and evening near Big Bazar and Metro Shoes. Although, count was not taken between Cafe Bhonsle and the Church Junction, a large concentration of tourists were observed towards the Church Junction

On all the stretches, the space occupied by moving 4 wheelers during the evening and

afternoon is almost always double the space occupied by moving 2 wheelers. This along with vehicles parked on the street creates traffic congestion at peak hours.

OBSTRUCTIONS WHILE APPROACHING THE FOOTPATH AND ON THE FOOTPATH

The obstructions found on the approach to footfall are majorly lack of safe pedestrian crossing infrastructure, absence of ramps, trees, parking, electrical boxes, signages etc. The obstructions found on the footpath were majorly electrical boxes, vendors, in some cases street lights and signages.

Challenges identified in documentation:

1. Prioritising vehicle parking instead of people and pedestrians
2. Lack of breathing/ample movement spaces at places where there is high footfall and congestion
3. Vehicular congestion due to uneven distribution of vehicles
4. Too many level differences at approach to footpath, making it difficult to access, especially for differently abled persons
5. Absence of safe pedestrian crossing infrastructure
6. Random placement of street elements often creating barriers and obstructions
7. Vehicular parking acting as both physical and visual barriers and blocking access and safe movement of pedestrians
8. Security risks due to dead spaces at night



Figure 39: People shopping inside covered walkway near Bombay Bazar



DESIGN
RECOMMENDATIONS

Design Strategy

Challenges identified Survey

1. Feeling of dis-comfort (Lack of seating spaces and shading)
2. Threat to safety at night (not sufficient lights)
3. Exposure to risk while crossing road
4. Lack of utilities-toilet, drinking water, etc.
5. Less willingness to walk due to poor pedestrian infrastructure, streetscape, or encroachment

Documentation

1. Parking 1st policy instead of people first
2. Lack of breathing spaces at places of high footfall
3. Vehicular congestion due to uneven distribution of vehicles
4. Too many level differences at approach to footpath
5. Absence of pedestrian crossing infrastructure
6. Random placement of street elements
7. Vehicular parking acting as physical and visual barriers
8. Security risks due to dead spaces at night

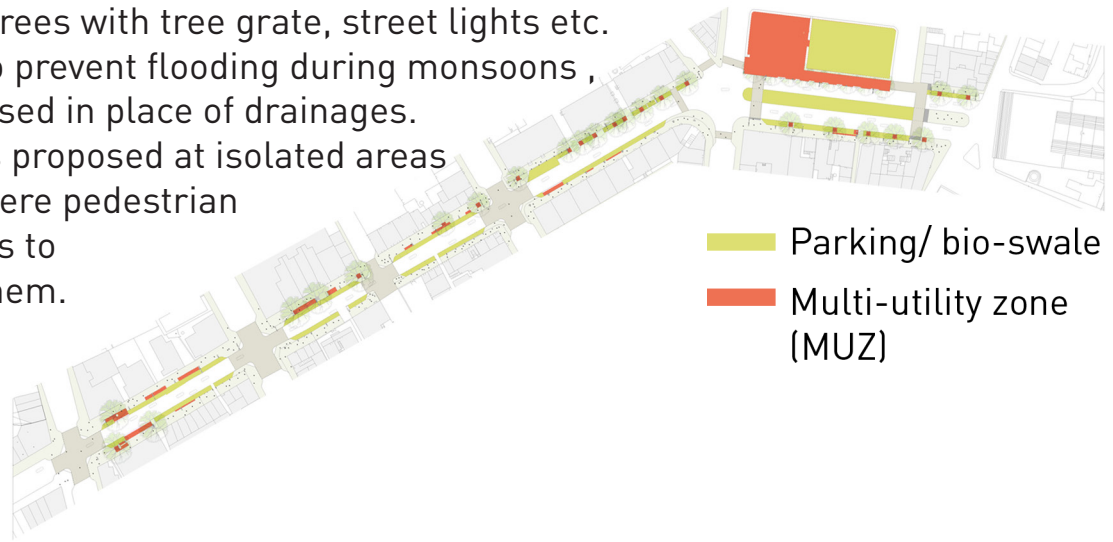
Based on the findings from survey and documentation of 18th June Road clubbed with the learnings from case studies, followings strategies have been adopted to create an environment conducive for pedestrians:

1. De-congestion of vehicular congestion
2. Segregation of space by use
3. Creating interactive public spaces and breaking the monotony
4. Improving streetscape
5. Traffic calming measures
6. Activating spaces at night
7. Providing accessible public utilities
8. Incorporating universal accessible design elements

APPLICATION OF STRATEGIES ON 18TH JUNE

1. Segregation of space by use

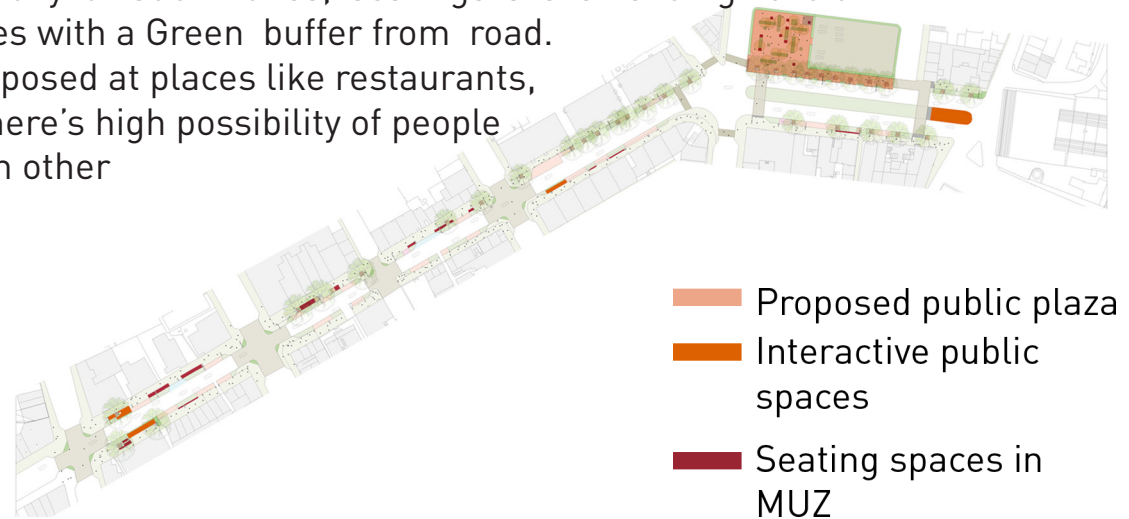
Two zones proposed parallel to the footpath are MUZ and parking/ bio- swale. MUZ comprises of all the street design elements such as street furniture, trees with tree grate, street lights etc. mostly in one line. To prevent flooding during monsoons , bioswales are proposed in place of drainages. 2 wheeler parking is proposed at isolated areas in bio swale lane where pedestrian intensity is less so as to avoid conflict with them.



Map 13:
Strategy 1
adopted on 18th
June Road

2. Creating interactive public spaces and breaking the monotony

To break the monotony of such zones, seatings are extending to bio swale)/ parking zones with a Green buffer from road. Such spaces are proposed at places like restaurants, temple, etc where there's high possibility of people interacting with each other

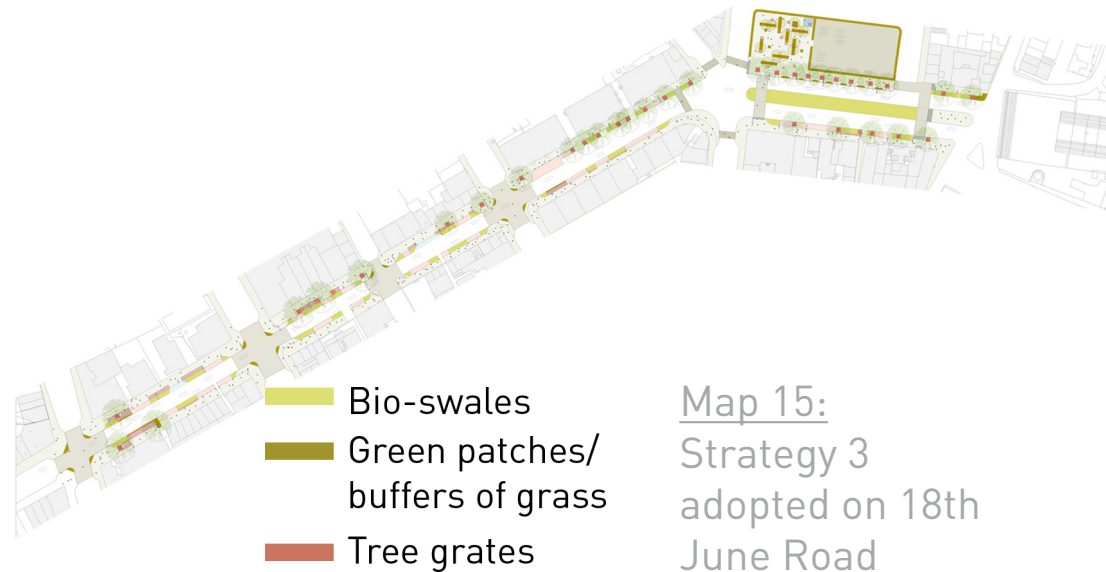


Map 14:
Strategy 2
adopted on 18th
June Road

3. Improving streetscape

2 streetscape improving elements are:

1. Facade treatments of covered walkways through urban art, etc.
2. Landscaping elements such as bio-swales, green patches of bushes/ grass, and tree grates



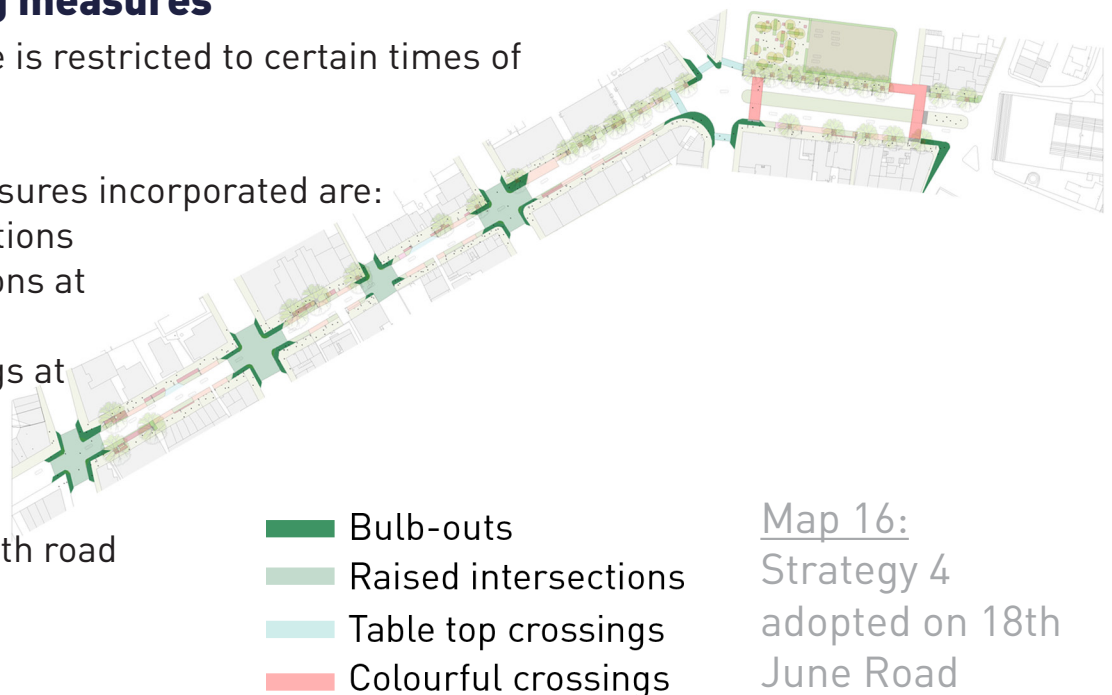
Map 15:
Strategy 3
adopted on 18th
June Road

4. Traffic calming measures

Movement of vehicle is restricted to certain times of the day. (refer 8b)

Traffic calming measures incorporated are:

1. Bulb-outs at junctions
2. Raised intersections at small junctions
3. Table top crossings at big junctions
4. Colourful pedestrian crossing at grade with road



Map 16:
Strategy 4
adopted on 18th
June Road

5. Activating spaces at night

Vacant plot near church and space outside offices, are proposed to be converted to night markets during night. Additionally, street lights are provided to illuminate footpaths and covered walkways at night

Map 17:

Strategy 5
adopted on 18th
June Road



6. Providing accessible public utilities

Toilets to be provided at proposed public plaza near Church- a place of high tourist footfall

Map 18:

Strategy 6
adopted on 18th
June Road

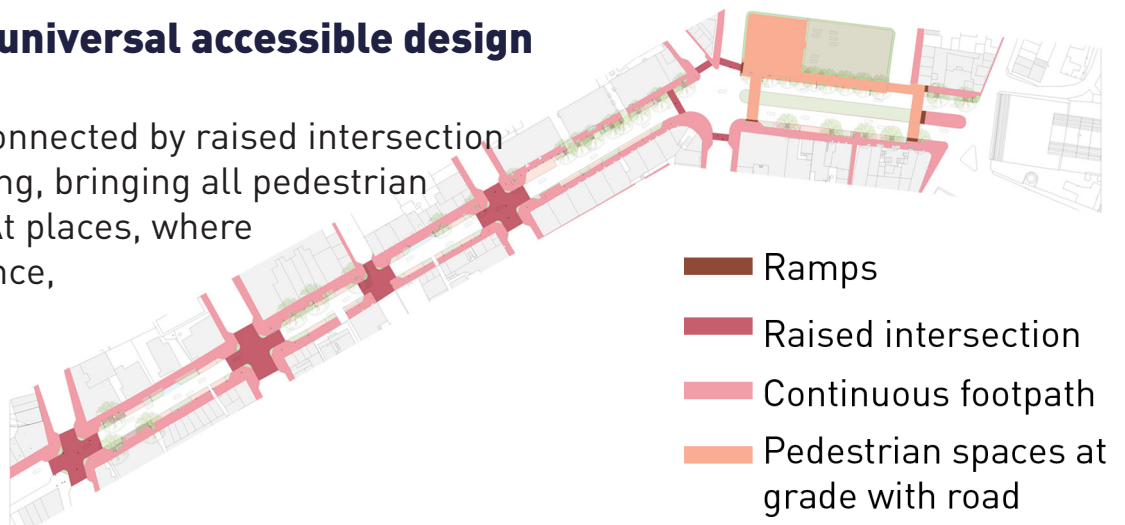


7. Incorporating universal accessible design elements

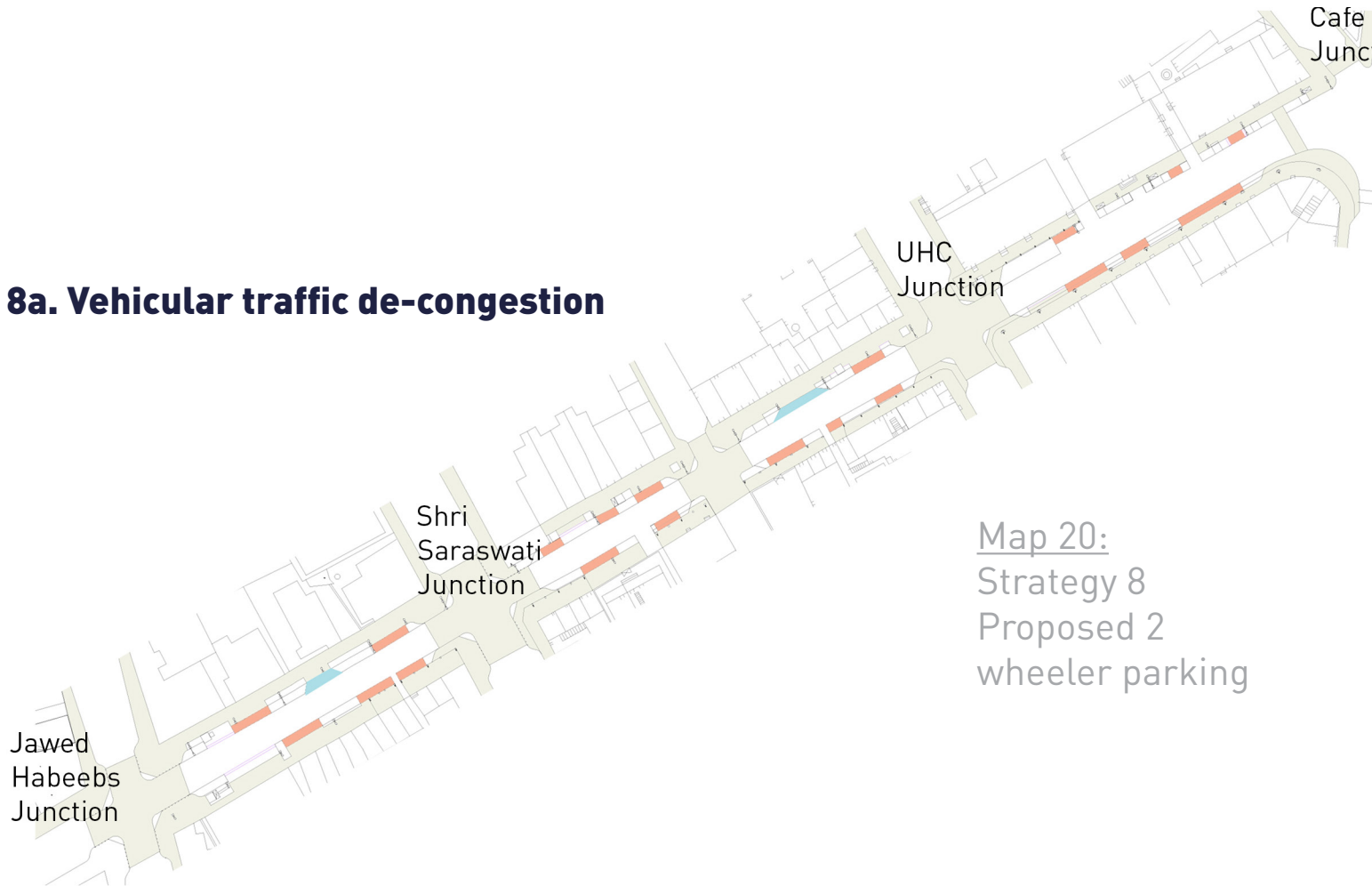
The footpaths are connected by raised intersection and table top crossing, bringing all pedestrian areas at one level. At places, where there's level difference, ramps are provided.

Map 19:

Strategy 7
adopted on 18th
June Road



8a. Vehicular traffic de-congestion



Map 20:
Strategy 8
Proposed 2
wheeler parking

8c. Proposed parking and vehicular movement

	From Jawed Habees junction to Shri Saraswati Mandir Junction				From Shri Saraswati Mandir Junction to UHC Center Junction			
	Vehicle movement		Vehicular parking		Vehicle movement		Vehicular parking	
	2W	4W	2W	4W	2W	4W	2W	4W
MORNING	✓	✓	✓	✗	✓	✓	✓	
AFTERNOON	✓	✗	✓	✗	✓	✗	✓	
EVENING	✓	✗	✓	✗	✓	✗	✓	

Table 6: Proposed parking and vehicular movement



- Proposed 2wheeler parking
- Drop-off/ pick up points

8b. Approach to vehicular de-congestion

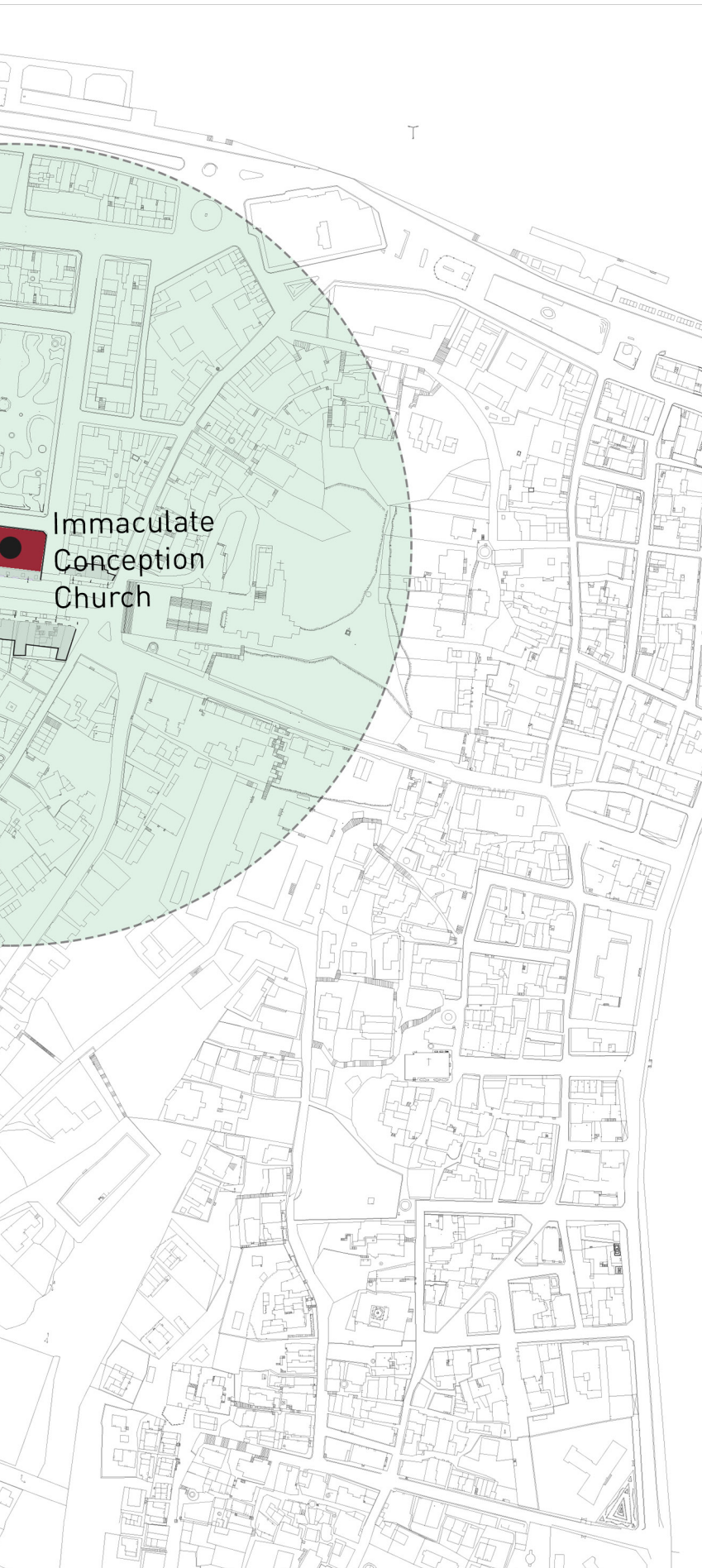
1. To de-congest 18th June Road, it is proposed that 4 wheeler parking be removed from the street and shifted to adjoining streets and vacant plots.
2. Since the road is also used as thorough road, and 4 wheelers comprise of the majority share of the vehicles, it is proposed to restrict 4 wheelers movement at stretches during different times of the day where congestion is more.
3. Loading/ un-loading time is restricted only to 9pm to 9am

Additionally, traffic calming measures are undertaken to slow down the traffic and ensure smooth movement of pedestrians.

Junction	From UHC Center Junction to Dominos Junction				From Dominos Junction to Church Junction			
	Vehicle movement		Vehicular parking		Vehicle movement		Vehicular parking	
	2W	4W	2W	4W	2W	4W	2W	4W
UHC Center Junction	✓	✓	✓	✗	✓	✓	✓	✗
Dominos Junction	✓	✗	✓	✗	✓	✗	✓	✗
Church Junction	✓	✓	✓	✗	✓	✓	✓	✗





8d. proposed 4 wheeler parking





4 Wheeler parking is proposed to be completely restricted throughout the day on 18th June Road. The parking is proposed on adjoining road (Swami Vivekanand Rd) as paid-on street parking and at a vacant plot near Church Junction. Currently, one side of Swami Vivekanand Rd is a No-Parking zone.

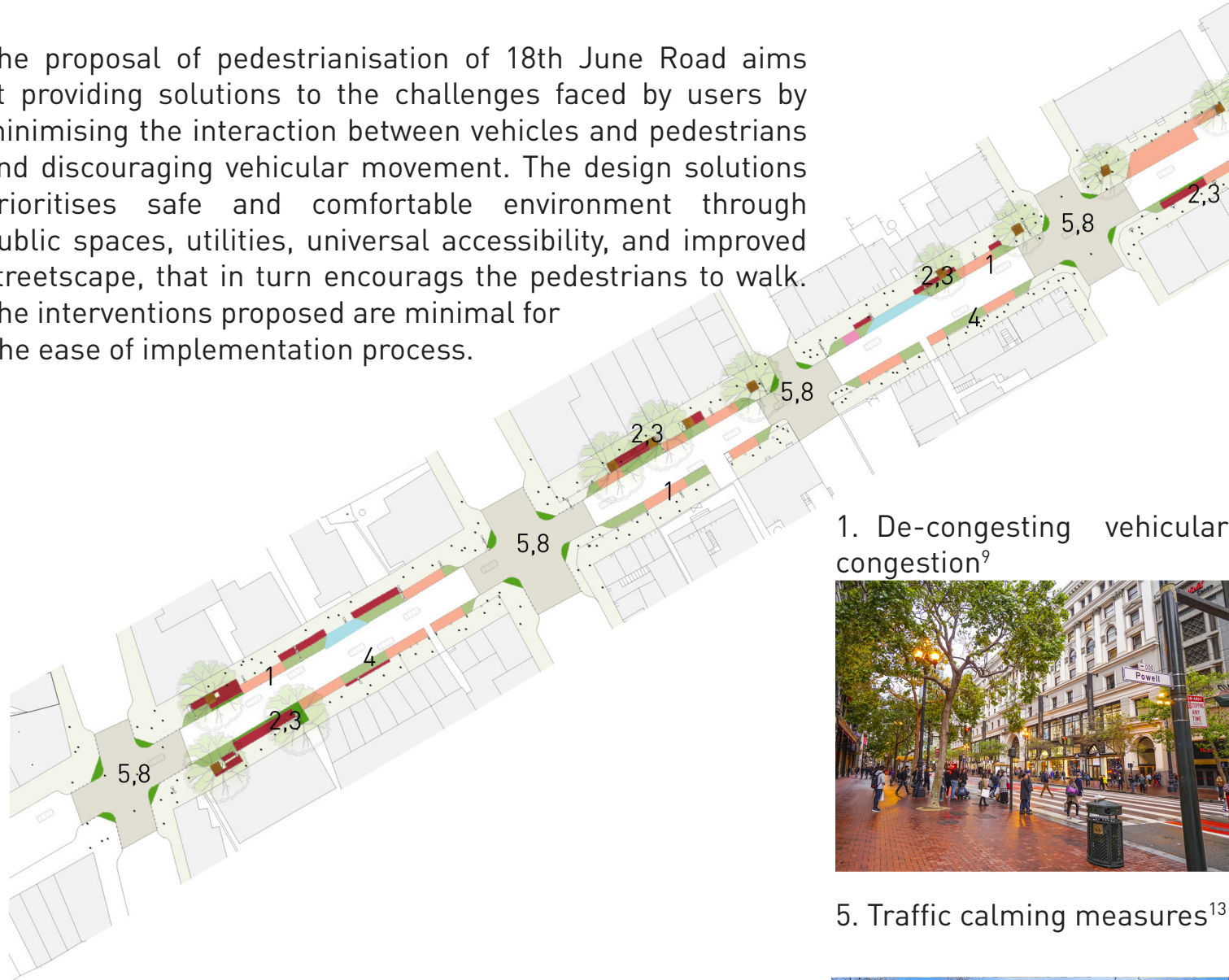
The farthest parking points are at walking distances (250m) to/ from 18th June Road, thus ensuring there is 4w parking available within easy walking distance from any point of 18th June Road

-  Walkable distance from end points of proposed parking
-  Intervention area
-  Proposed on- street 4w parking
-  Proposed off- street 4w parking

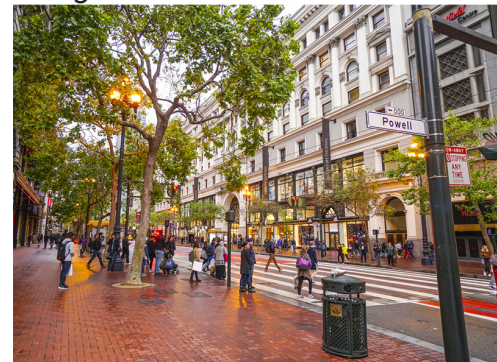
Map 21:
Strategy 8
Proposed 4
wheeler parking

Master Plan

The proposal of pedestrianisation of 18th June Road aims at providing solutions to the challenges faced by users by minimising the interaction between vehicles and pedestrians and discouraging vehicular movement. The design solutions prioritises safe and comfortable environment through public spaces, utilities, universal accessibility, and improved streetscape, that in turn encourages the pedestrians to walk. The interventions proposed are minimal for the ease of implementation process.



1. De-congesting vehicular congestion⁹

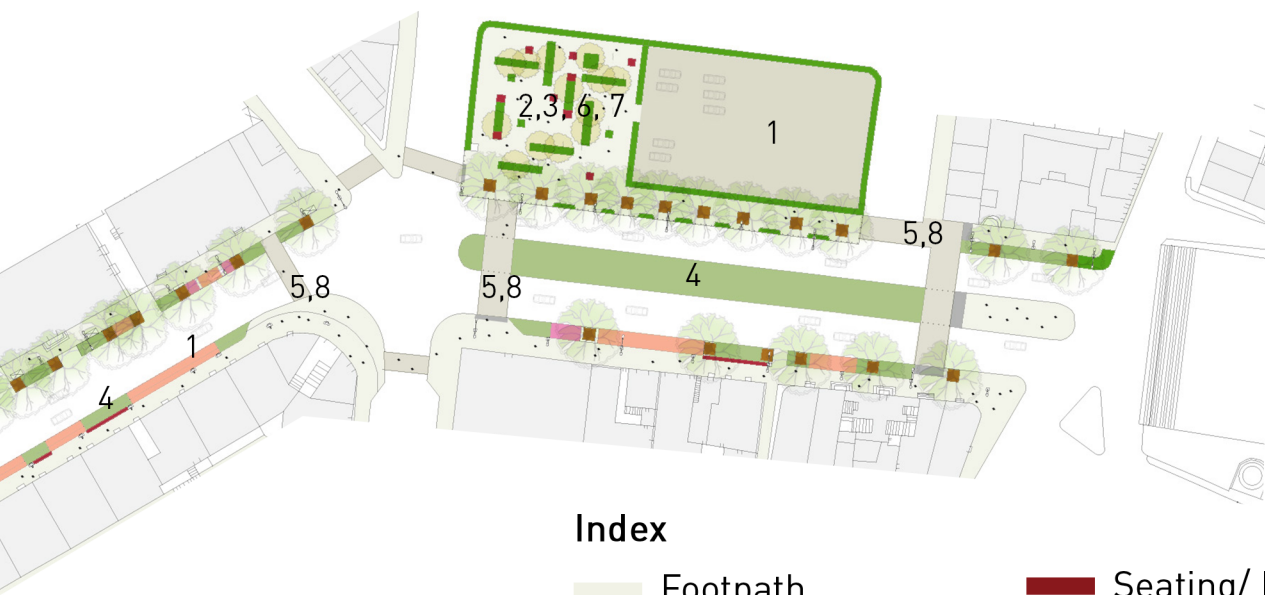


5. Traffic calming measures¹³











Map 22: Proposed pedestrian street design plan for 18th June Road

Each stretch is detailed out in sections Detail part 1, Detail part 2, Detail part 3, and Detail part 4. Each detailed part is divided into following sections: Proposed plan, major strategies adopted, and comparative before and after proposed street



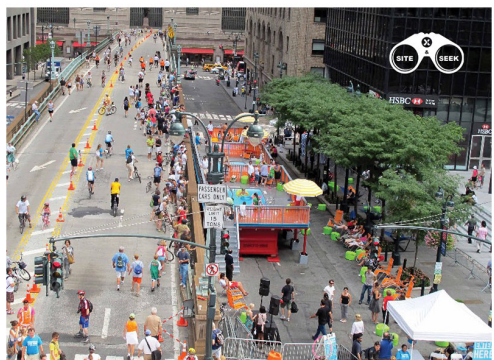
Index

- | | |
|---|--|
|  Footpath |  Seating/ MUZ |
|  Raised intersection |  2W paid parking |
|  Green buffers |  Drop off point |
|  Bio-swailes |  Covered footpath |

2. Segregation of space by use¹⁰



3. Creating interactive public spaces¹¹



4. Improving streetscape¹²



6. Activating spaces at night¹⁴



7. Providing accessible public utilities¹⁵



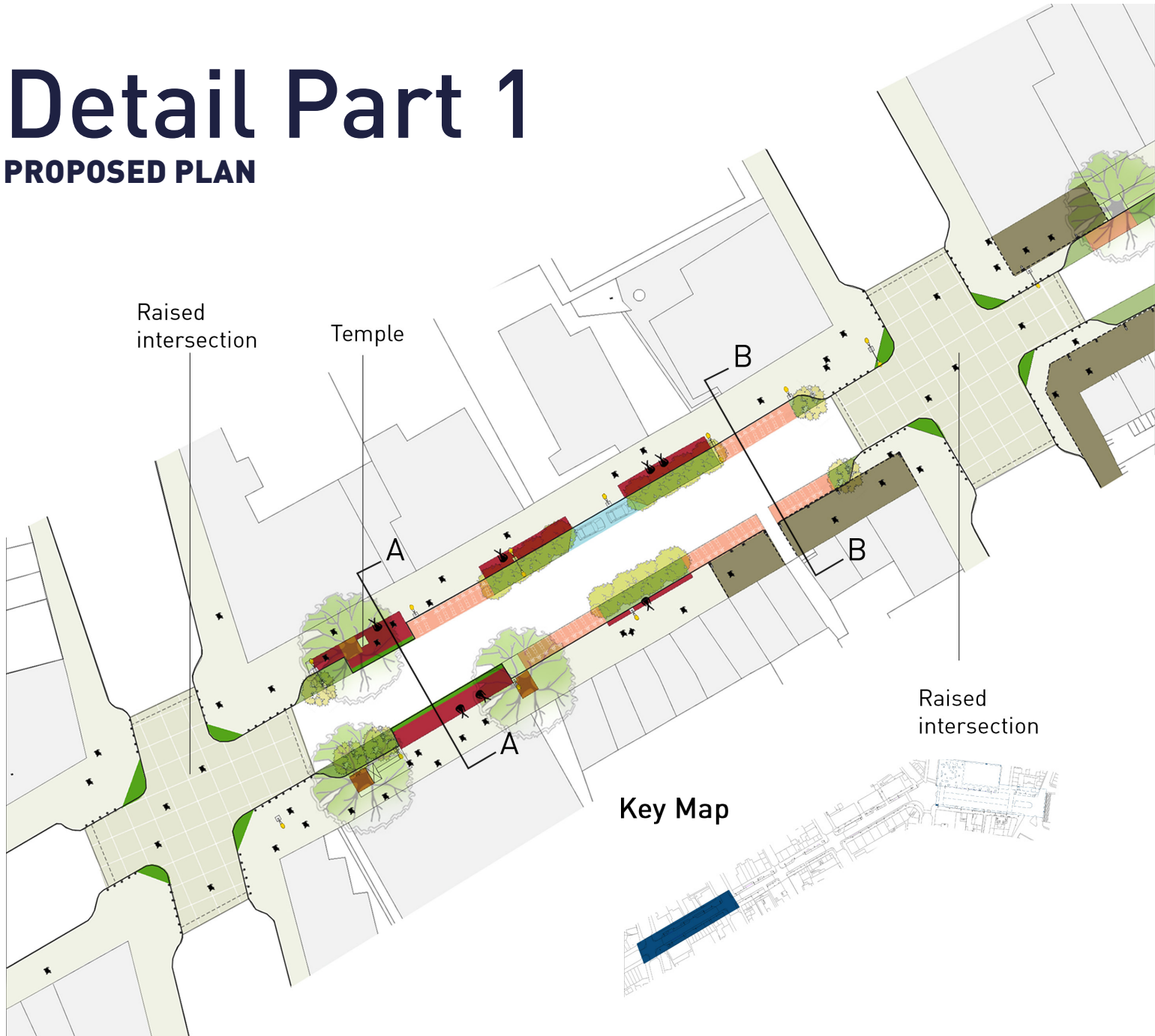
8. Incorporating universal accessible design elements¹⁶











Figure 40: Reference photos where strategies are implemented

Detail Part 1

PROPOSED PLAN



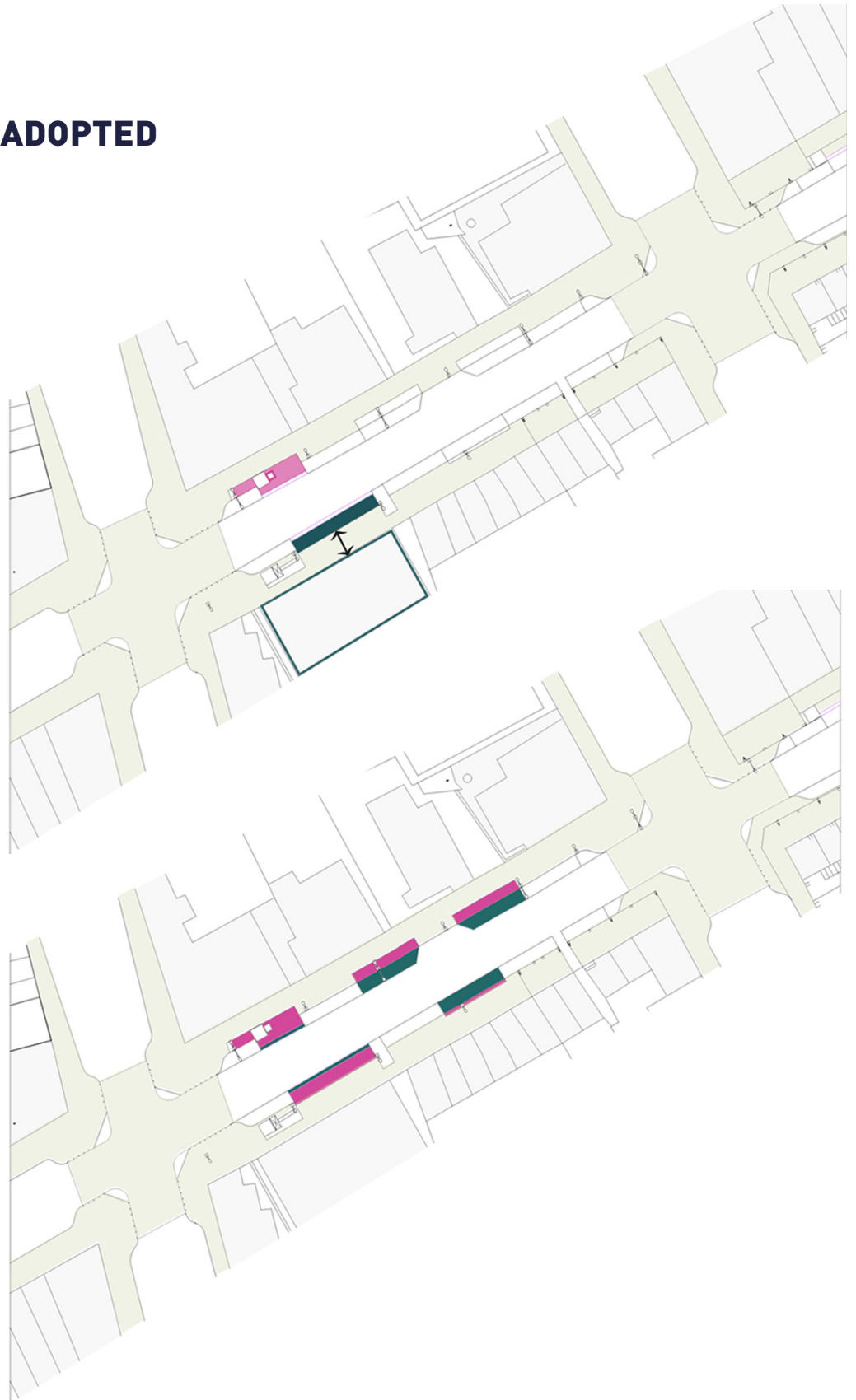
- | | |
|---|--|
|  Footpath |  Seating/ MUZ |
|  Raised intersection |  2W paid parking |
|  Green buffers |  Hawking zone |
|  Bio-swales |  Covered footpath |

Map 23: Detail part 1: Proposed pedestrian plan

MAJOR STRATEGIES ADOPTED

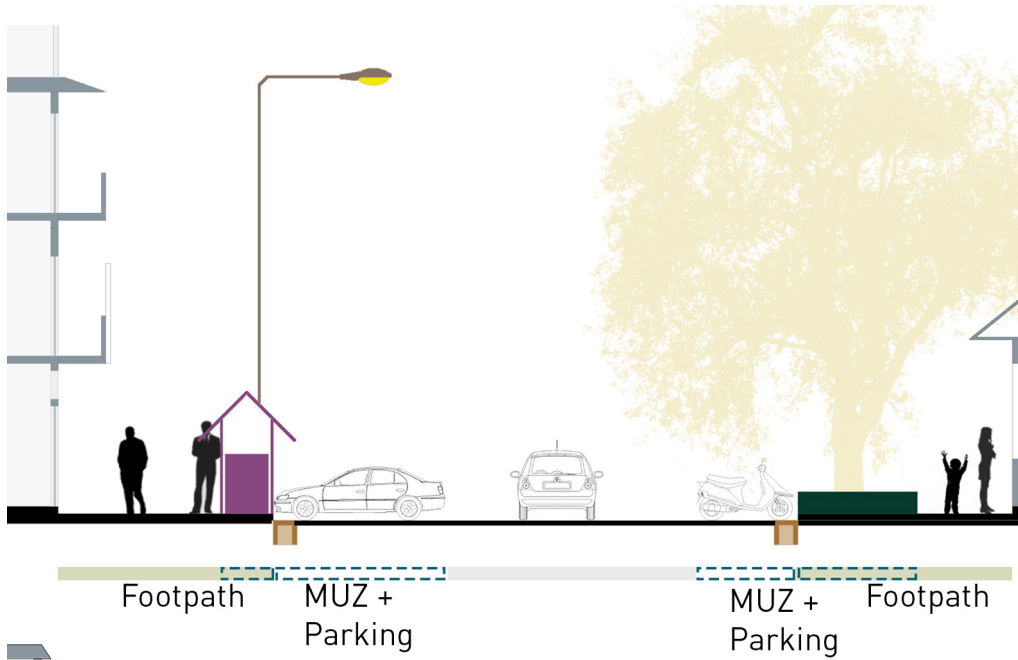
Strategy 1:
i. Creating interactive public spaces surrounding temple
ii. Open seating spaces near restaurants

Strategy 2:
Buffers (bioswales) between seatings and road for safety and comfort



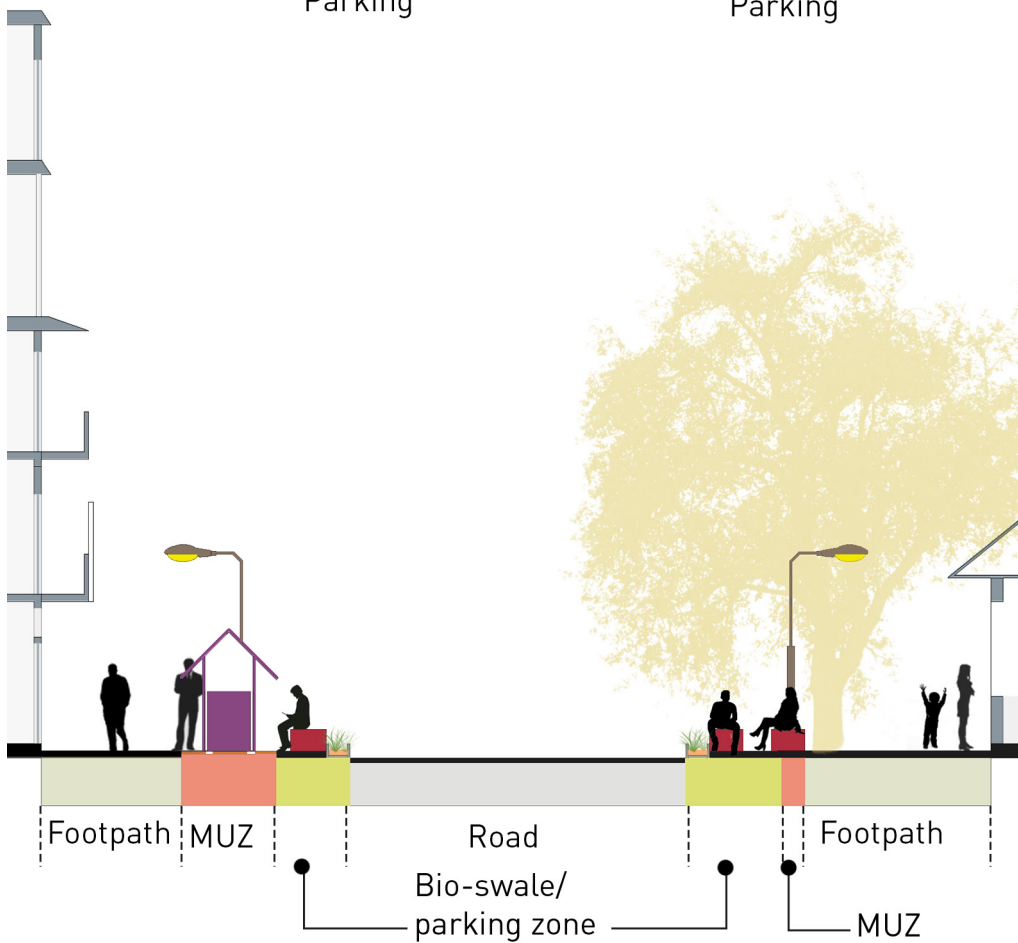
Map 24: Detail part 1: Strategies adopted

SECTIONS



BEFORE

Temple and tree planter acting as obstructions in the way of walking



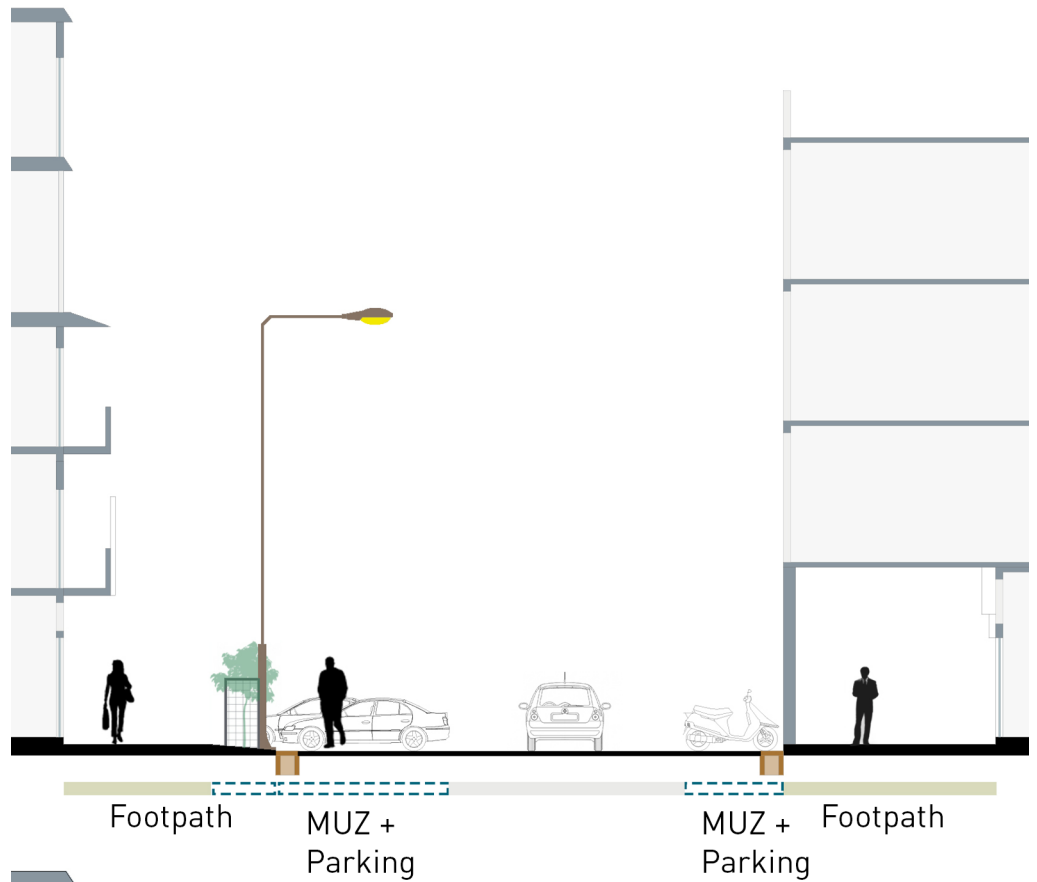
AFTER

Converting the obstructions by providing seatings and converting into interactive spaces

Section A-A

BEFORE

Encroachment of car and a newly planted tree in MUZ



AFTER

Segregating MUZ from parking and allocating car parking space to bio-swales

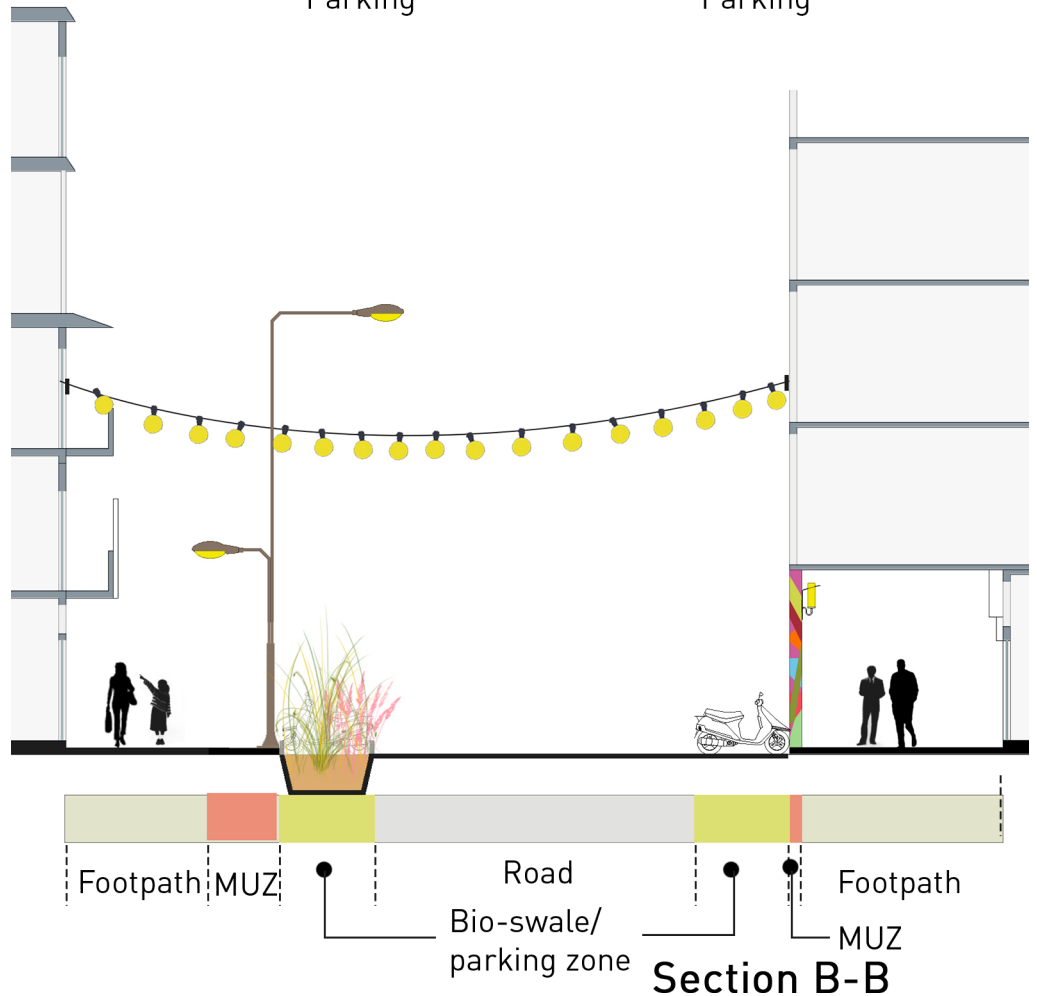
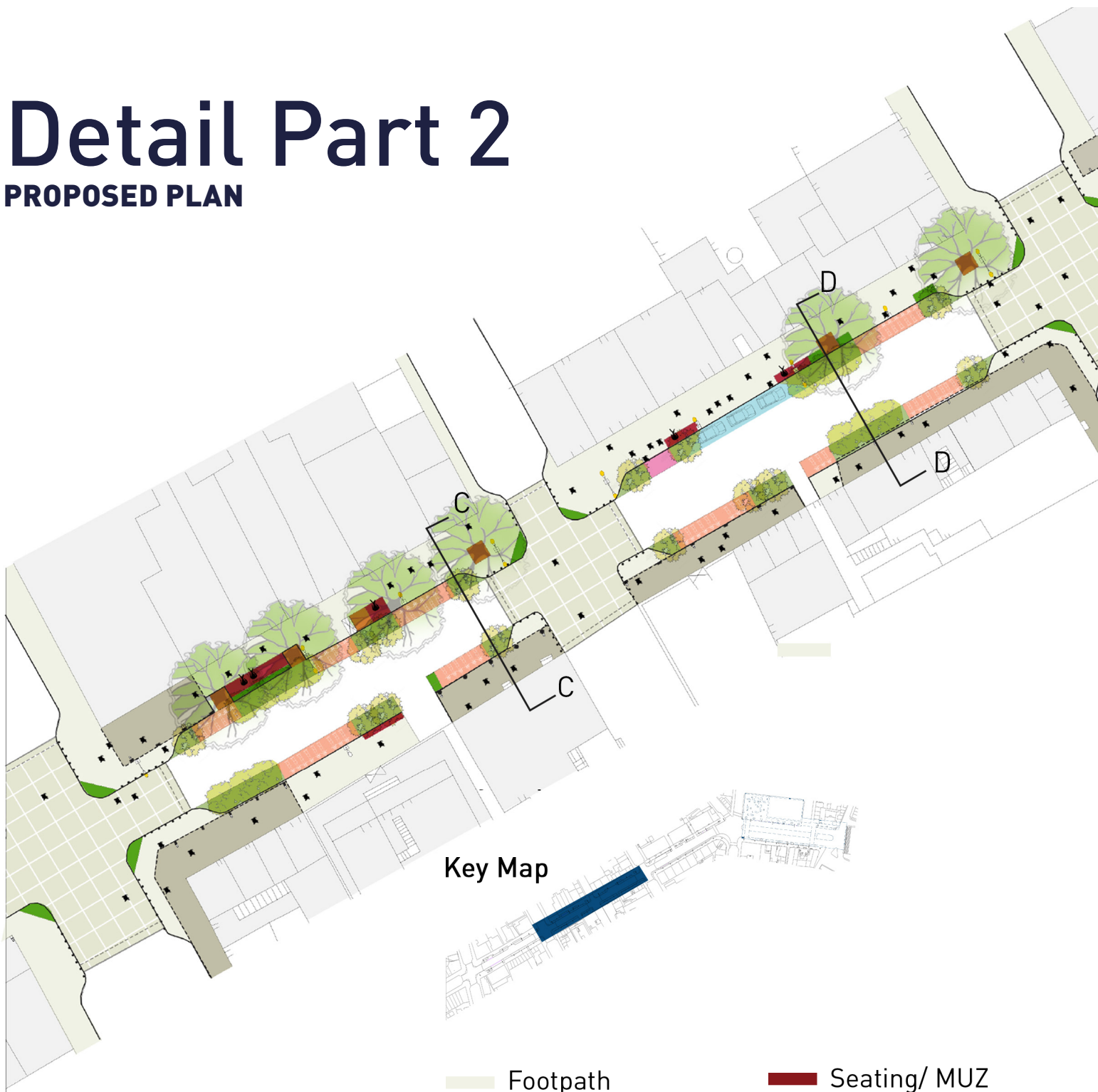


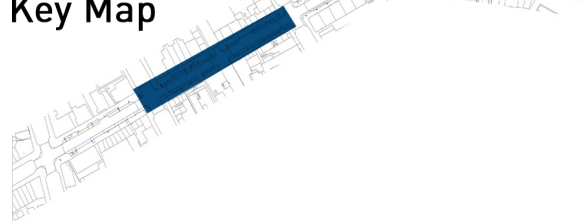
Figure 41: Detail part 1: Existing and proposed sections









Detail Part 2

PROPOSED PLAN



Key Map



- | | |
|---|--|
|  Footpath |  Seating/ MUZ |
|  Raised intersection |  2W paid parking |
|  Green buffers |  Hawking zone |
|  Bio-swales |  Covered footpath |

Map 25: Detail part 2: Proposed pedestrian plan

MAJOR STRATEGIES ADOPTED

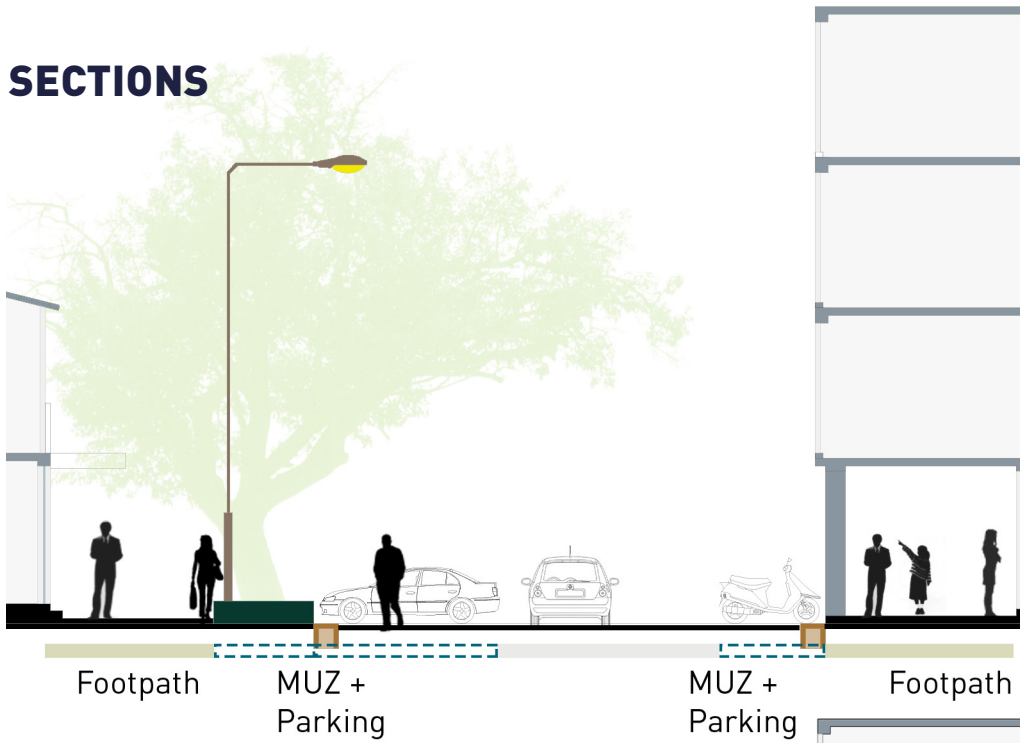
Strategy 1:
Minimalist
elements in MUZ in
covered footpaths
to improve visibility
at night

Strategy 2:
Seating spaces and
drop-off spaces
near high intensity
footfall areas



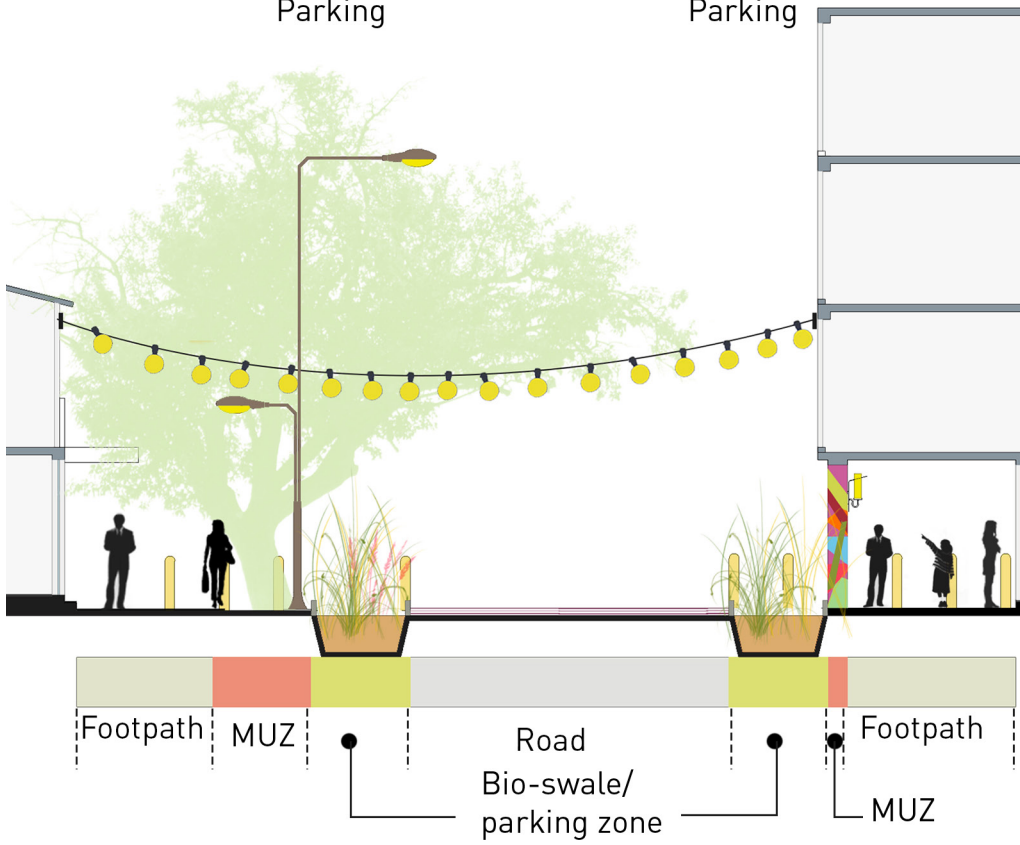
Map 26: Detail part 2: Strategies adopted

SECTIONS



BEFORE

Tree planter encroaching the pedestrian way and currently under-used as a seating



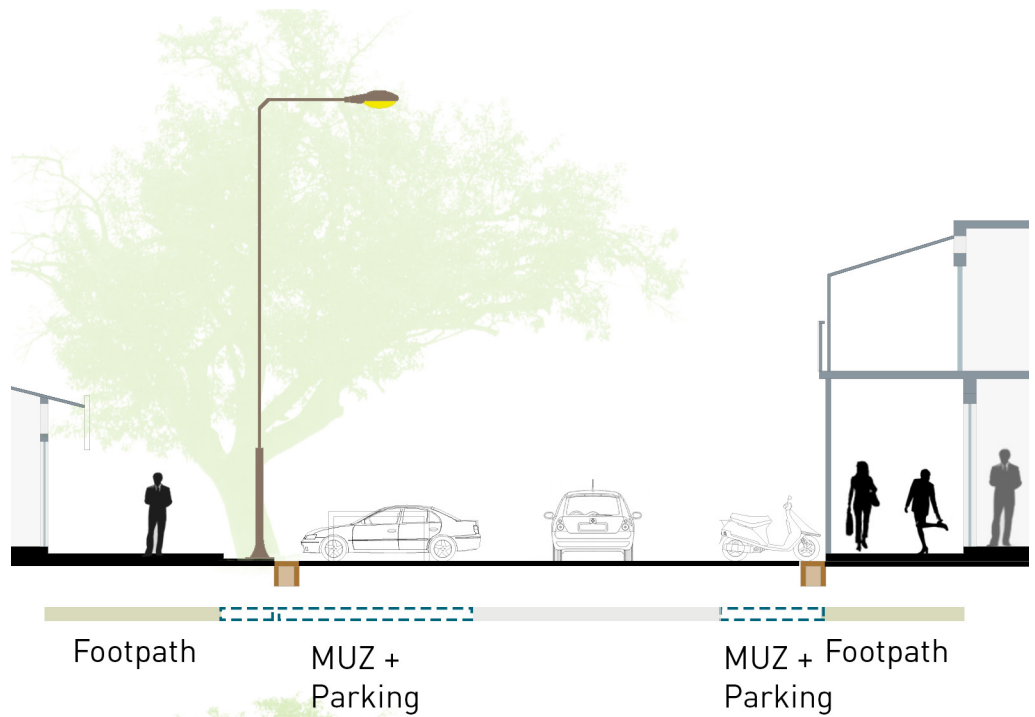
AFTER

Removing tree planters instead providing tree grates. Additionally colouring columnnade with urban art to improve streetscape

Section C-C

BEFORE

Car parking encroaching the pedestrian walk path



AFTER

Removing car parking and dedicating the space to bioswale

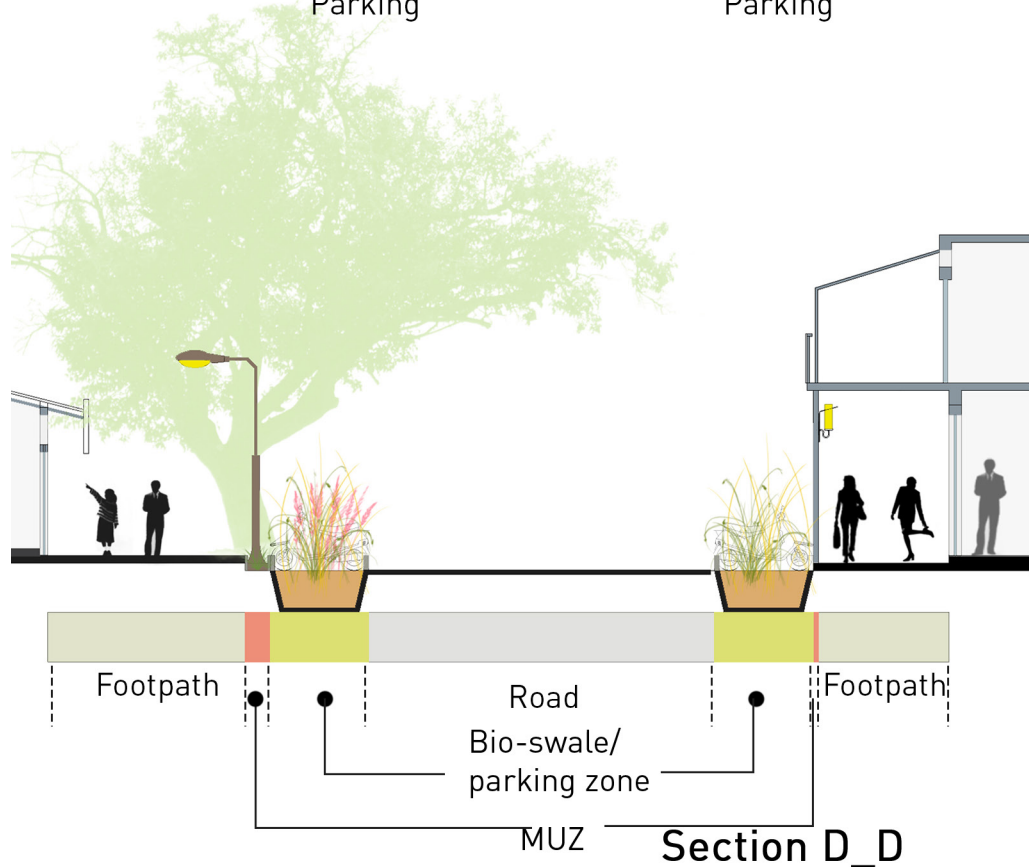
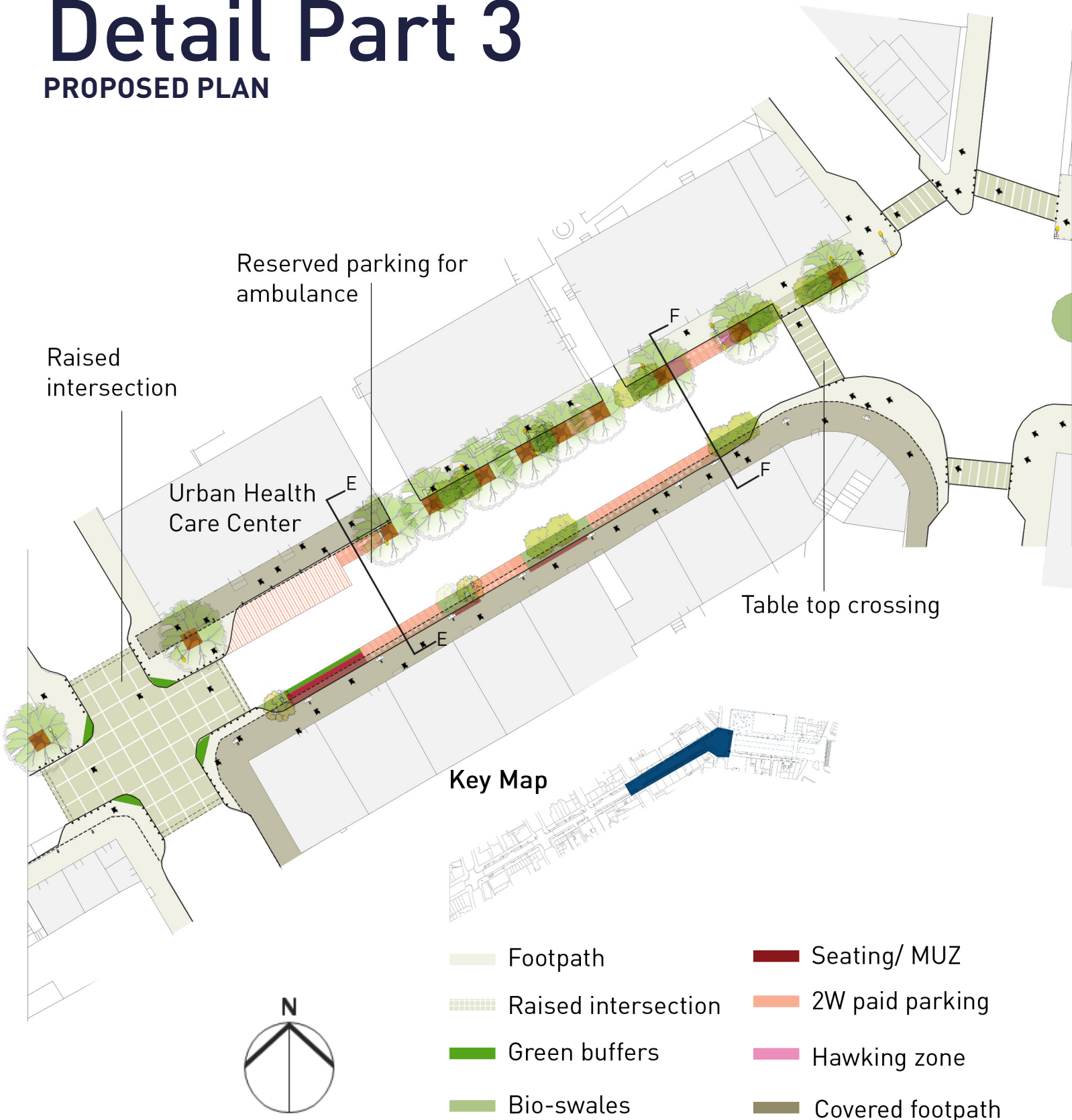


Figure 42: Detail part 2: Existing and proposed sections

Detail Part 3

PROPOSED PLAN



Map 27: Detail part 3: Proposed pedestrian plan

MAJOR STRATEGIES ADOPTED

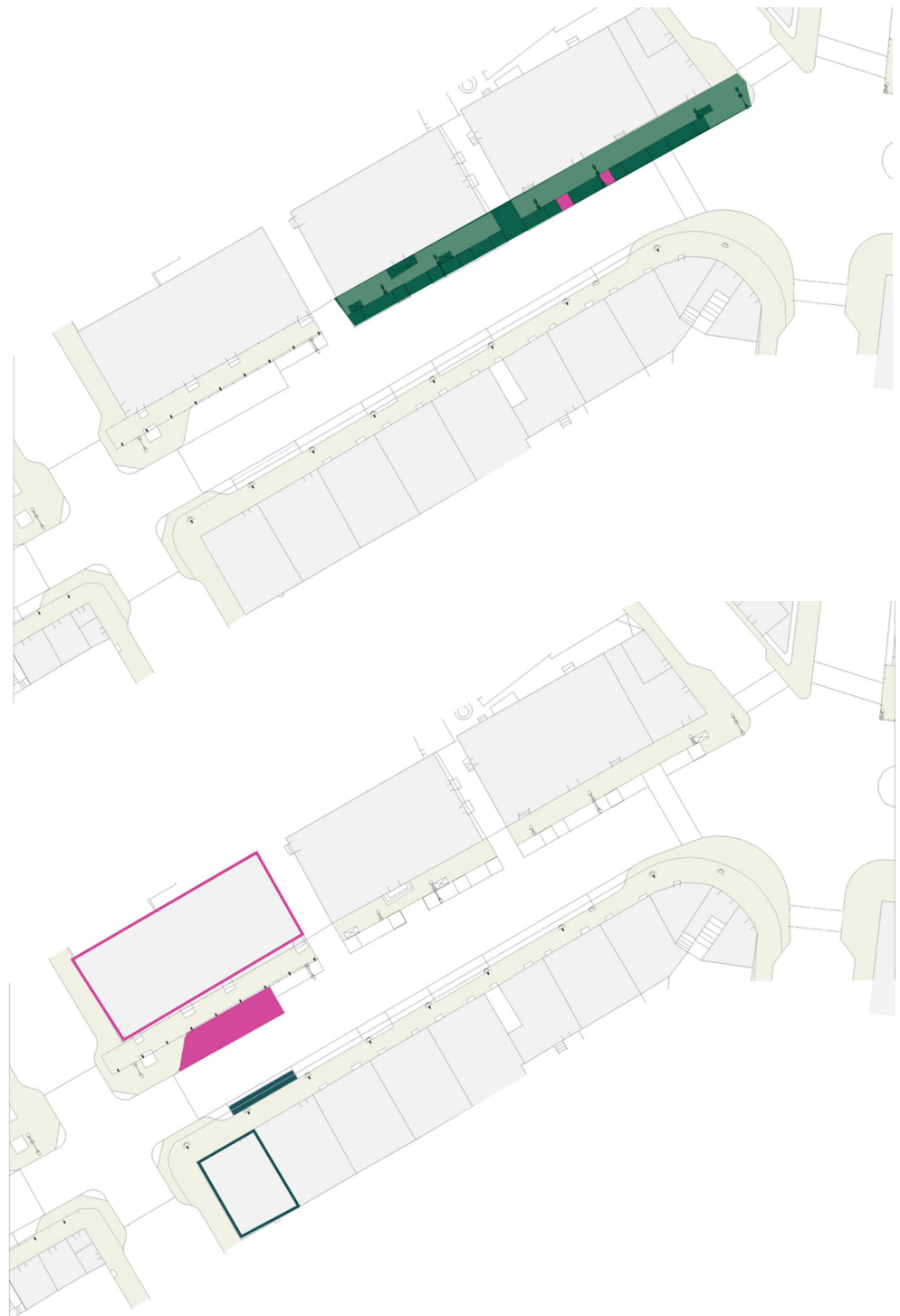
Strategy 1:

Hawking zone during days to activate the spaces

Proposed night market to activate the otherwise dead space at night

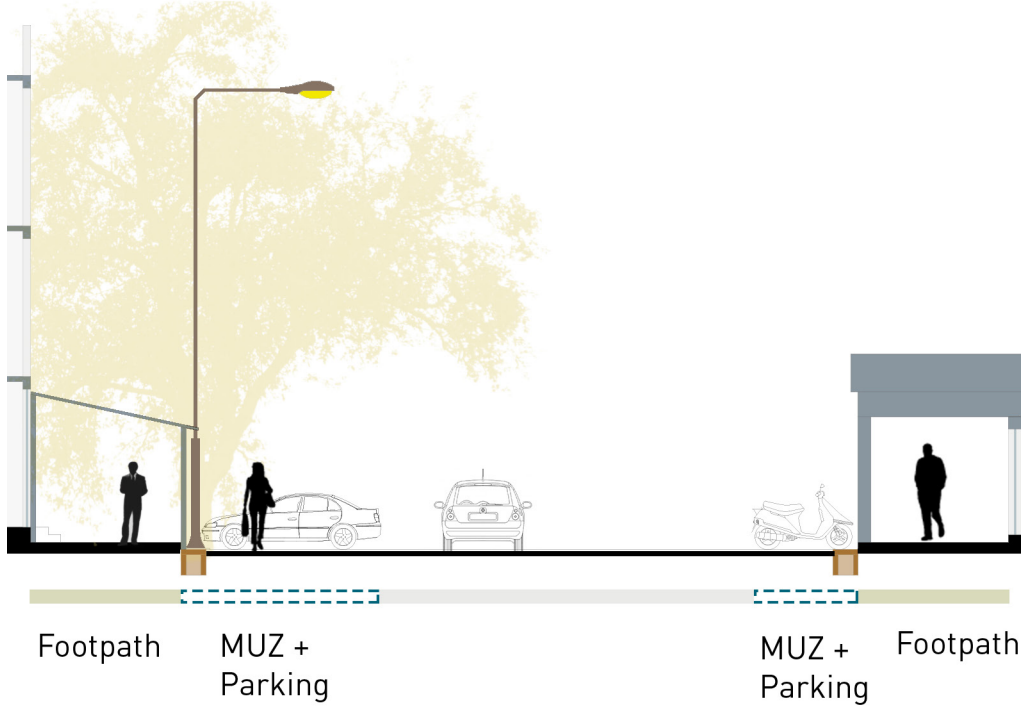
Strategy 2:

Extended MUZ to create interactive public spaces near high footfall areas



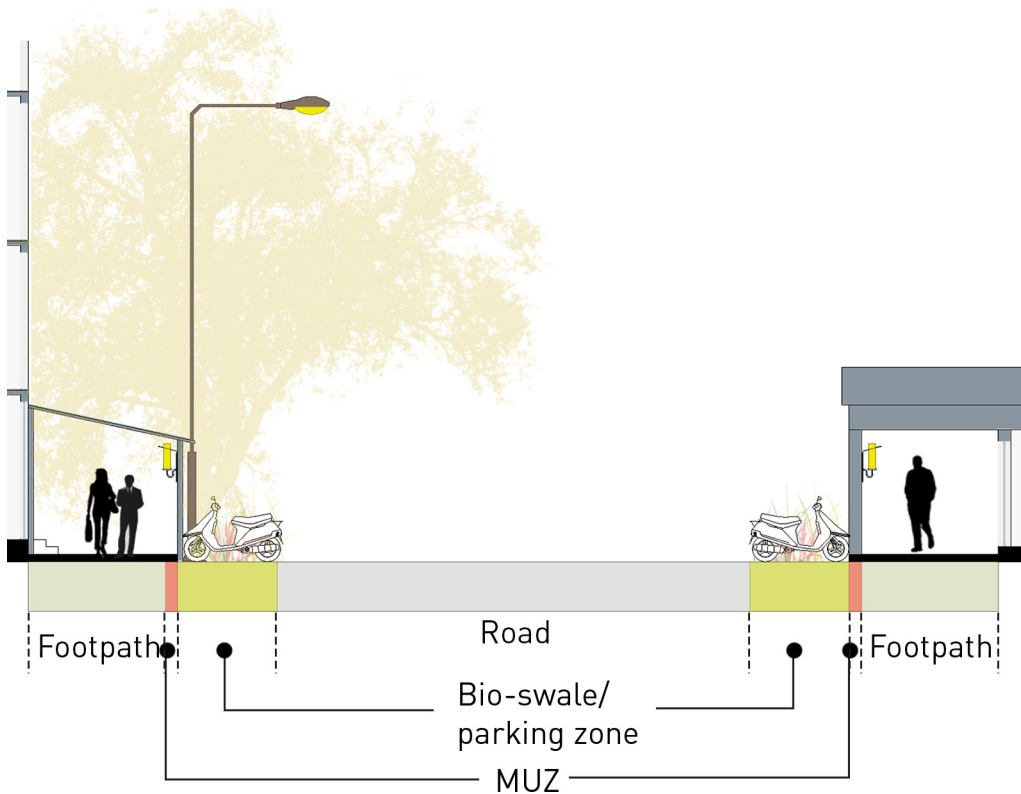
Map 28: Detail part 3: Strategies adopted

SECTIONS



BEFORE

Lack of light inside the covered walkway at night

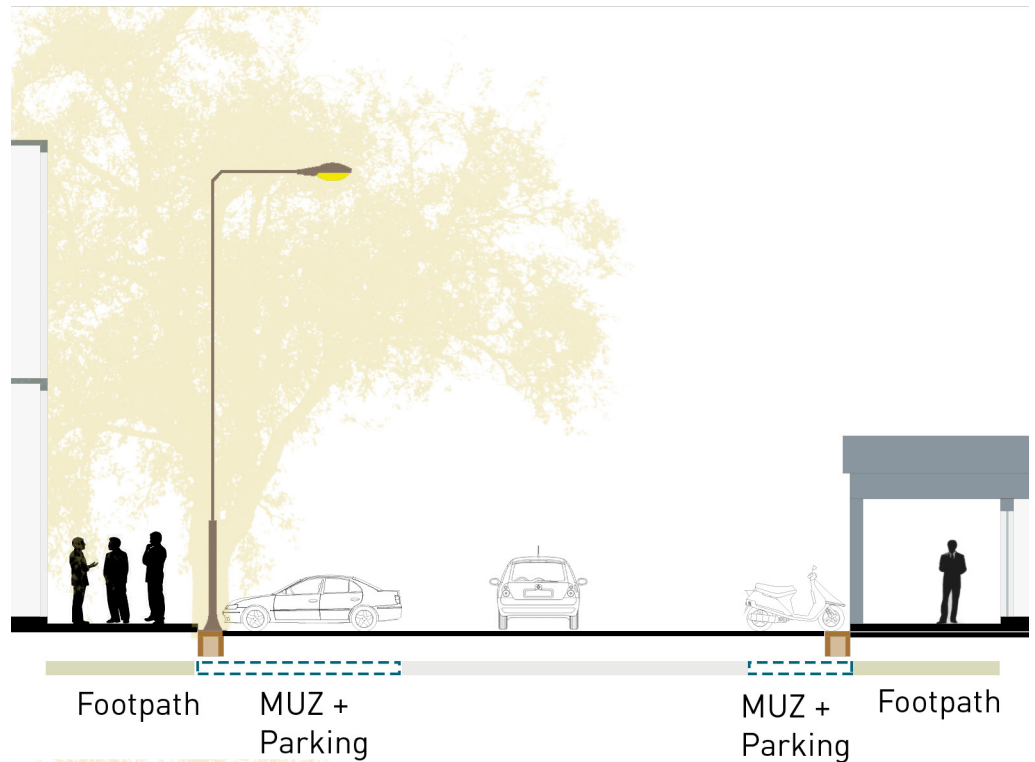


AFTER

Wall-mounted lights proposed to illuminate covered walkways

BEFORE

Dead space in front of office at night



AFTER

Proposed seatings and night markets to activate the dead spaces at night

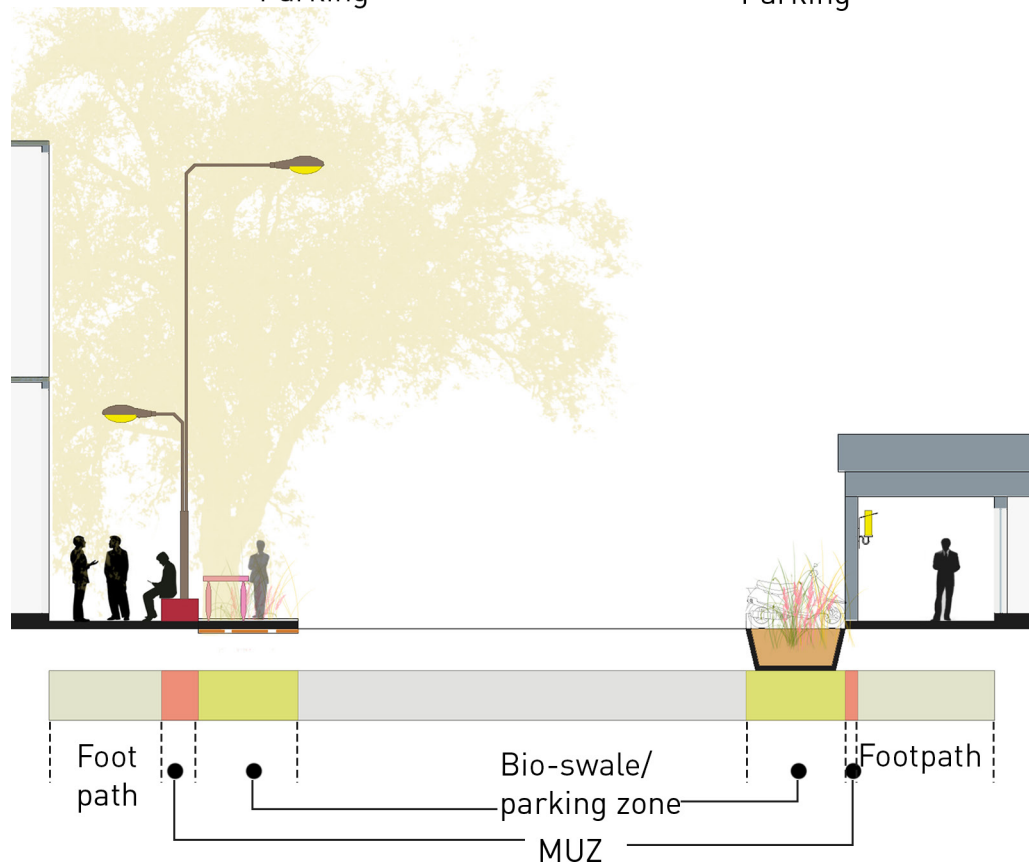


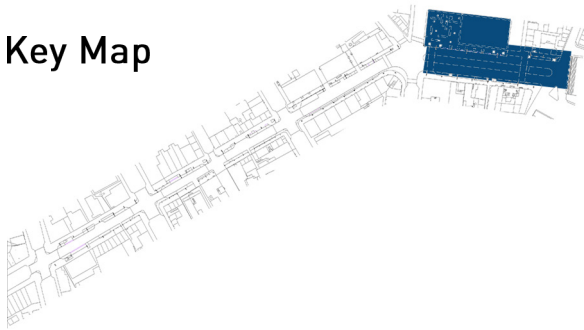
Figure 43: Detail part 3: Existing and proposed sections









Detail Part 4

PROPOSED PLAN



Key Map

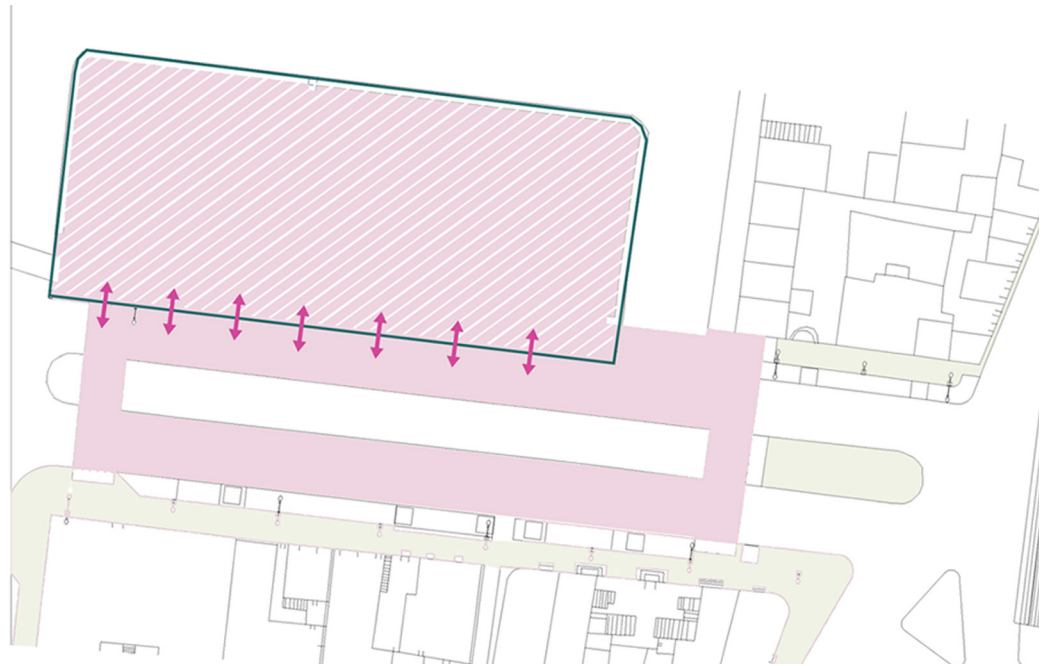


- | | |
|---|--|
|  Footpath |  Seating/ MUZ |
|  Raised intersection |  2W paid parking |
|  Green buffers |  Hawking zone |
|  Bio-swales |  Covered footpath |

Map 29: Detail part 4: Proposed pedestrian plan

MAJOR STRATEGIES ADOPTED

Strategy 1:
Activating dead space (vacant land) through night market and minimal barriers between road and public spaces



Strategy 2:
Restrictive pedestrian crossing through green spaces as barrier



Map 30: Detail part 4: Strategies adopted

SECTIONS

BEFORE

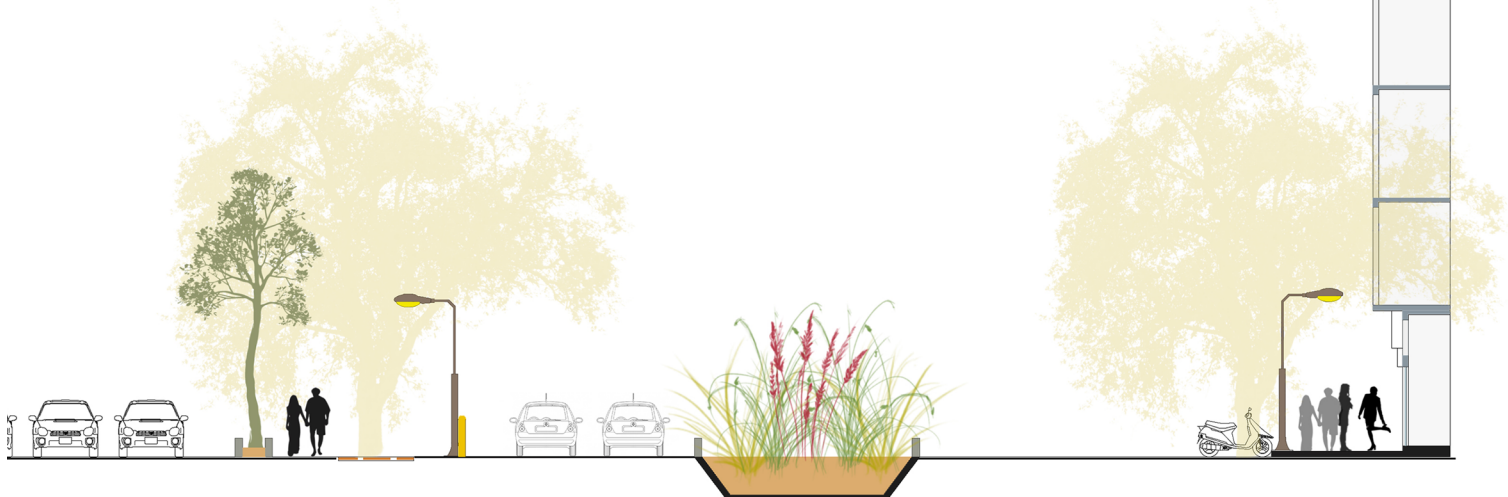
Absence of footpath on one side of the road and haphazard pedestrian crossing



AFTER

Vacant plot MUZ + Parking Median/ footpath MUZ + Parking Footpath

Adequately lit footpath on both the sides of the road. To prevent flooding, bio-swale proposed also acting as barrier and restricting pedestrian cross movement

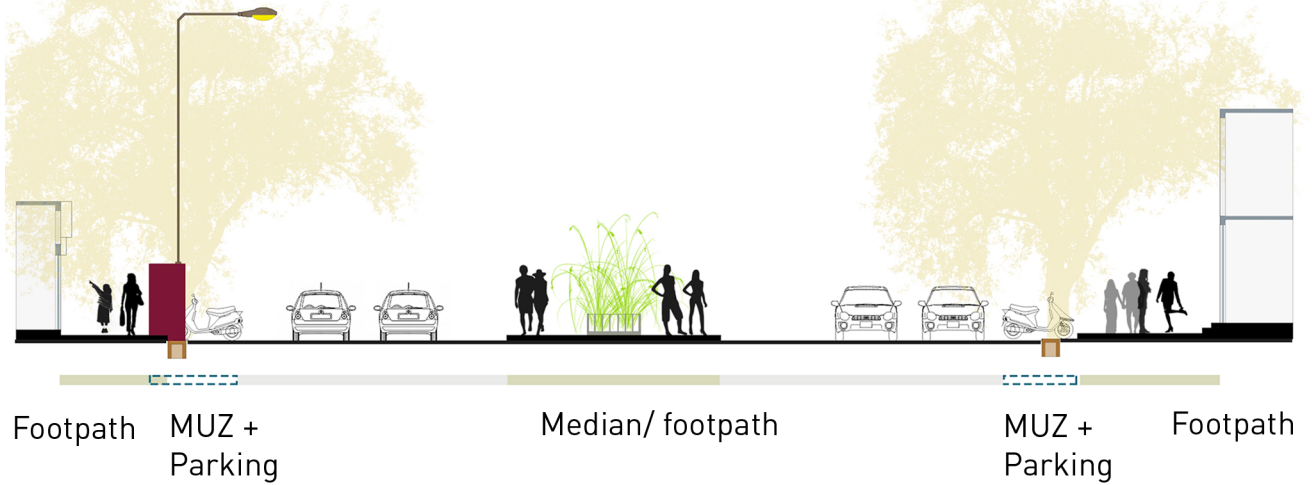


4-wheeler off-street parking Footpath at grade with road Road Bio-swale Road Bio-swale/parking zone Footpath MUZ

Section G-G

BEFORE

Encroachment of electrical box and street light on footpath



AFTER

Segregation of MUZ and parking zone providing clear way for pedestrians. Additionally, providing ramps and bollards for universal accessibility

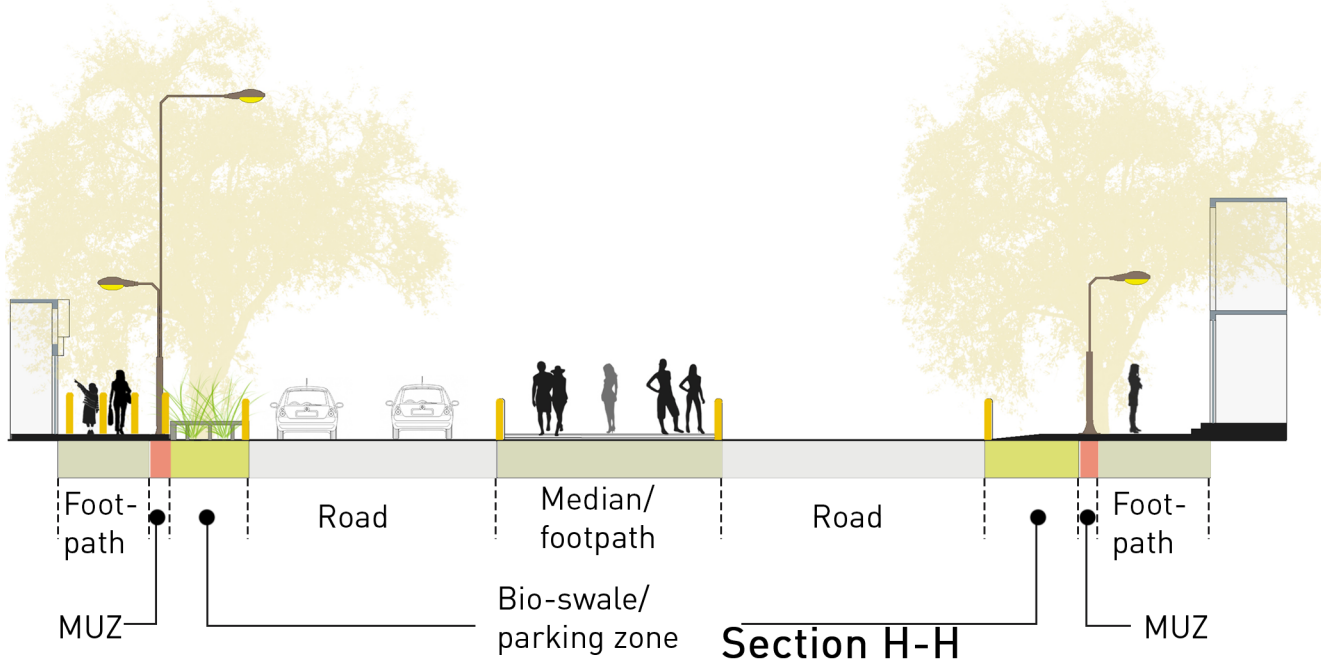


Figure 44: Detail part 4: Existing and proposed sections

Implementation Strategies

Before the implementation of the project, it is necessary to test out the essential parts of the projects on the site through various initiatives. The aims of such placemaking initiatives are to demonstrate the vision of a 'people-centric city' through citizen and local government involvement and implementing important parts of the design through low-cost and easy techniques. The impact of such demonstration projects is documented before and after the implementation and the results are incorporated in the scale-up strategy. The bottom-up approach is much needed where all stakeholders are involved from the beginning of the project and reduce the chance of any resistance that may occur in the future.

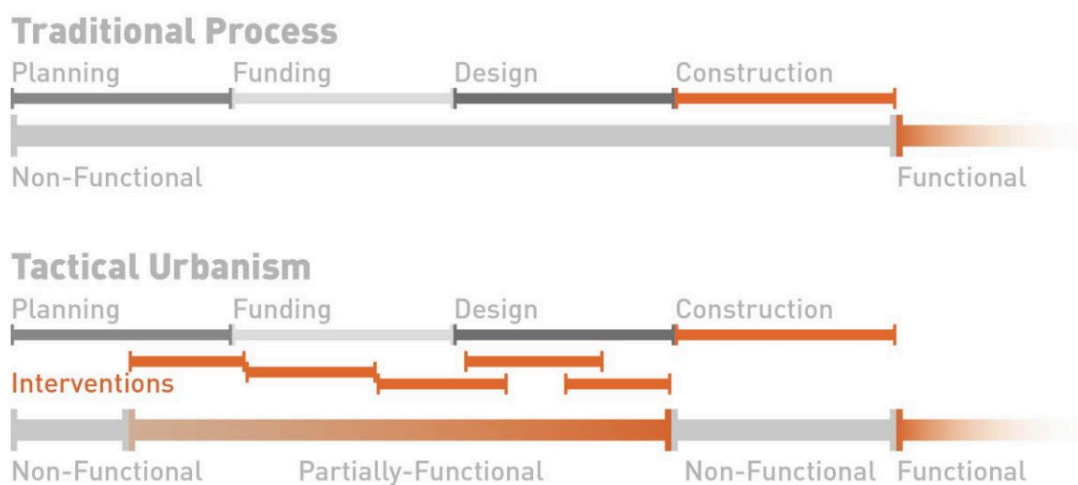


Figure 45: Traditional Planning Process vs Tactical Urbanism Incorporated process¹⁷

NoMoZo received positive feedback on 18th June Road when it experimented with a car-free zone on the street in 2012. To re-build the momentum of a people-centric street, the following are some of the successful initiatives in India that can be conceived again by Panaji:



Figure 46: Transition of a plaza through various initiatives

TACTICAL URBANISM

This concept can be coined as a middle stage in between the planning and the realization of a complete community vision where cities are treated as units to test innovative and creative ideas. Temporary bicycle lanes and public spaces, traffic calming for a day or a month, colorful crosswalks, turning parking lots into pop-up parks—such activities are taking place across America, formalized by techniques and strategies called tactical urbanism (CNU, 2017). One of the successful examples is the NYC Plaza Program where The New York City Department of Transportation (NYC DOT) works with selected organizations to create neighborhood plazas throughout the city to transform underused streets into vibrant, social public spaces. The NYC Plaza Program is a key part of the City’s effort to ensure that all New Yorkers live within a 10-minute walk of quality open space (NYC DOT, 2021).

HAPPY STREETS

“Happy Street is an initiatives by The Times of India which encourages people to use non-motorised transport and to come out onto the streets to socialise every Sunday morning through a wide array of activities” (TOI, 2020).

This is amongst one of the creative initiative by Ahmedabad Municipal Corporation and National Institute of Design (NID) where a 325m long and 26.5 m wide stretch has been remodeled to match the ancient heritage of Ahmedabad including ancient-looking walls with carvings, fort-like structures, and glamorous lighting to enhance the heritage ambience (Dave, 2020). People from varied age groups can come up to sing, dance, exercise, draw, play and do whatever they feel doing happily on Sunday mornings (Bhachech, 2017).



Figure 47: Family engaged in chalk-art during a Happy Street event



Figure 48: People dancing on street at a Raahgiri event

RAAHGIRI DAYS

Started in 2013, Raahgiri became India's first sustained car-free event. This day people are encouraged to walk, cycle, exercise, and reclaim their streets for safer roads, cleaner air, increased physical activity, and community building (WRI, 2014). This day was launched in Gurugram, where every Sunday, a few selected streets are closed to all motorised vehicles until noon and various activities are being conducted to bring a change in people's perceptions of public space in India.

CAR-FREE DAYS

Car Free Day is an internationally celebrated event every 22nd September where people are encouraged to move around in a train, bus, bicycle, carpool, vanpool, subway, or walk. The main motive of this day is to let people explore more modes of transport than driving cars. Car Free Day is organized in various cities throughout the world in different ways, but with the common goal of reducing the number of cars on the streets. The benefit to greater society is a day with less traffic congestion, a greener environment, and reduced gasoline demand (CarFreeDay, 2021).

To foster community spirit, Car Free Day in Vancouver this year was shifted to Car-Free Month starting from August 29th to 25th September (Lalonde, 2021). Over the four weeks, Car Free Vancouver hosted a series of smaller-scale events like markets, performances, parklets, bike rides, audio tours, and more, all intended to offer a peek at what Vancouver could look like with more space for pedestrians and less for cars (Figure 49).

These initiatives inspire and empower a new generation of engaged citizens, urban designers, land-use planners, architects, and policymakers to become key actors in the transformation of their communities.



Figure 49: People engaged in various activities at a car-free day event in Vancouver

NEXT STEPS

The immediate next step recommended is a placemaking initiative or a demonstration exercise to gain the momentum for a pedestrian street on 18th June Road. This will also help guide the next steps (listed on right). Along with the activities listed here, it is also recommended to coordinate with various agencies that might impact this project and work in coordination with them to avoid any conflict/ overlaps. Projects of such large scales are implemented in phases or stages. Hence, it is necessary to make a stage-wise implementation plan prioritising based on the finance plan and places that require immediate attention.

Place-making initiatives:

Tactical Urbanism/ Happy streets/ Raahgiri Day/ Car-free days

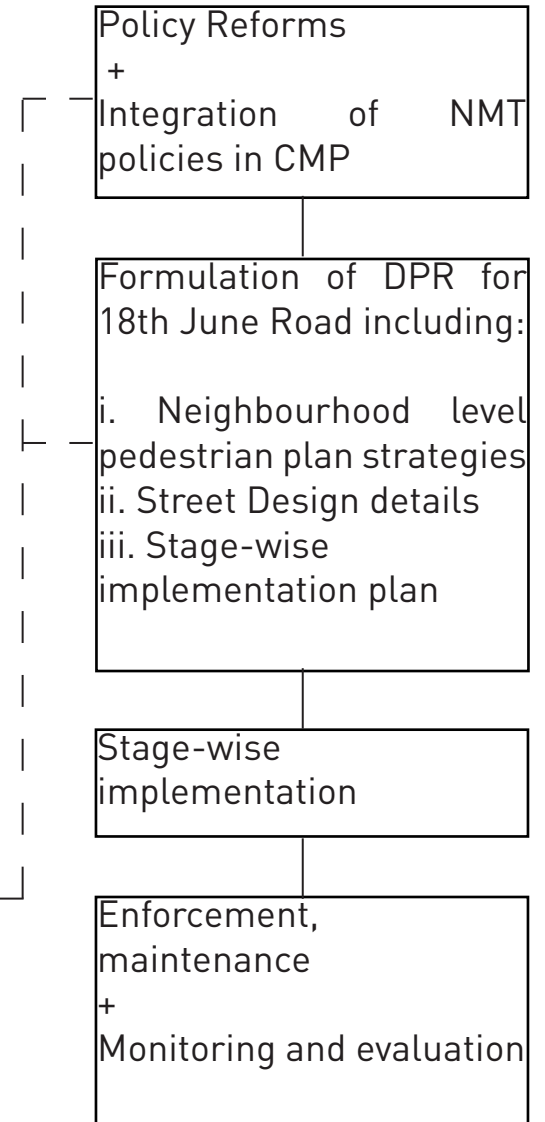




Figure 50: View of 18th June Road from Immaculate Conception Church's steps

CONCLUSION

The streets of Panaji are dominated with vehicular traffic, mainly cars. This has not only created problems with vehicular congestion and pollution but is also a threat to pedestrian safety. The 18th June Road is one of the important commercial, tourist streets and a primary thorough road for vehicles of Panaji, needs immediate street design intervention that could create an environment conducive to pedestrians and safe from vehicles. The results from this study's survey of the users, shopkeepers and businesses on the road, demonstrates their willingness to walk on the street more, if it is made car-free and has easy safe access.

While 18th June Road already has footpaths at most places with sufficient width there were a number of challenges found through documentation and surveys. The main challenges for safe pedestrian usage included vehicular parking, obstructions on the footpath as well as the approach to footpath, dead spaces at night, lack of public spaces and lack of pedestrian amenities including toilets, water fountains and seats. The intervention recommendations are flexible and are keeping in terms of addition of street design elements, thus complementing and enhancing the existing infrastructure. Recommendations include vehicular restriction during different times of the day, easily accessible vehicle parking areas, converting dead spaces into public spaces, and safe drop off points. The recommendations can be implemented in stages over the years and can be experimented with in terms of their rate of success. Along with the interventions at street level, it is also necessary to incorporate NMT policies in CMP at city level.

Implementation of recommendations of this report, will lead to a pedestrian street that would be beneficial to Panaji in terms of social (interactive public spaces), economic (boosting tourist activities) and environmental (reduction of vehicular pollution, more green space/plants).

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APPENDICES

Appendix A: User Survey

Personal Details:

Name: _____

Age: _____

Gender: _____

Area of residence: _____

1. What is your purpose of visit to the 18th June road?

- a. Shopping
- b. Area of residence
- c. Doctor's
- d. Office

If any other, please specify.

2. How did you come to the street?

- a. 2Wheeler
- b. 4Wheeler
- c. Rickshaw
- d. Bus
- e. Walking
- f. Cycle

3. If came by private vehicle, where did you park it?

- a. In front of the shops
- b. 50meters from the shop
- c. 100meters from the shop
- d. In a parking lot
- e. on streets adjacent to 18th June road
- f. If any other, please specify

4. If came by private vehicle, did you get space for parking easily?

- a. Yes
- b. No

5. Who are you accompanied by?

- a. Alone
- b. Partner
- c. Parents
- d. Friend (s)
- e. Children
- f. If any other, please specify

6. How often do you visit 18th June road?

- a. Daily
- b. Once a week
- c. Once in 2 weeks
- d. Once a Month
- e. Depends of the need

Appendix B: Shopkeepers Survey

Survey Area/ Name of Road:

Date:

Name of Surveyor:

Name of Respondent:

Zone/Ward Number - _____

Name of Establishment- _____

Type of Establishment- _____

Government Office

Pvt. Office

IT

Bank

Industry

Other Office

Garment Shops

Electronic Shops

Furniture Shops

General Store

Malls

Transport Accessories Shops

Theatres

Educational Institution

Hospital/Clinic

Hotel/Lodge

Restaurants/Food Court/ Dhaba

Others

If Others, What type of Establishment?

Office/ Shop Timings _____

Number of Working Days/Week: _____

Approx. Floor Area of Establishment (with units)- _____

Occupancy of Building (Rented/Owned)-

If Rented, then what is the Rent per Month-

Total number of Employees working in premise- _____

Peak hours for the premise- _____

Major Access Mode of Employees (in numbers)

Car-

2-Wheeler-

Ola/Uber-

Hired Auto

Shared Auto

Bus

e-Rickshaw

Cycle

Walk

Metro

Others (If others, then what it is)-

Residence of Employees (to understand the distance of their travel)? _____

Avg. Commuting distance of Employees from place of residency? _____

Average No. of Visitors visiting the premise/day? _____

Major Access Mode of Visitors

Car
2-Wheeler
Ola/Uber
Hired Auto
Shared Auto
Bus
e-Rickshaw
Cycle
Walk
Metro
Others (If others, then what it is)

On- Street Parking

Parking availability on establishment premise?
If Yes, Number of Parking spaces Available?
Car Parking Space
2-Wheeler Parking Space
Others - Parking Space

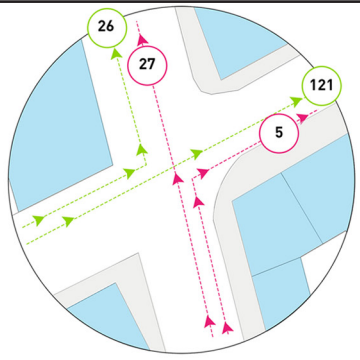
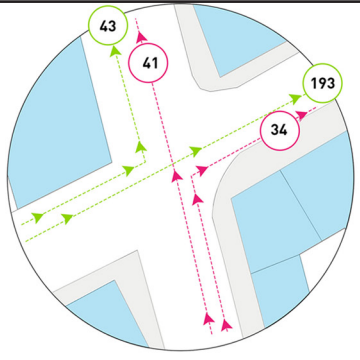
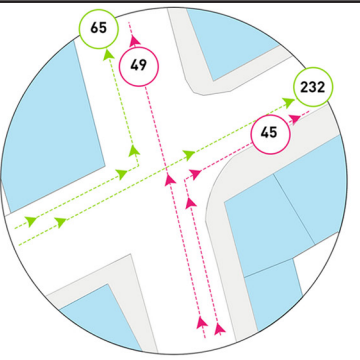
Off-Street Parking Space

Available Car Parking Space
Available 2-Wheeler Parking Space
Available Others Parking Space
Nearest Parking area distance
Commuting from that Parking Area options-

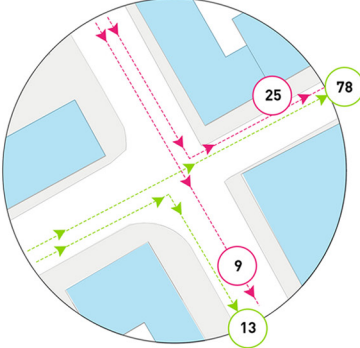
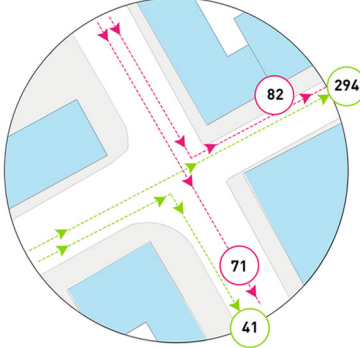
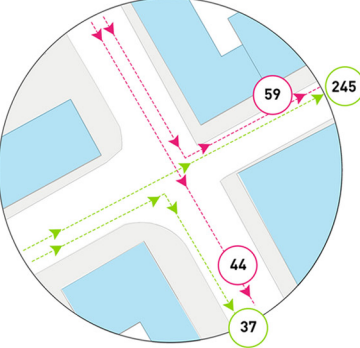
What are major concerns of the retailers or shop owners around the streets?

Appendix C: Traffic Counts

JAWED HABEEBS JUNCTION

	MORNING	AFTERNOON	EVENING
			
2 wheeler	111	209	222
4 wheeler	53	94	151
Auto-rickshaw	1	4	2
Cyle	10	3	1
Bus	0	0	1
Tempo	4	1	12
Truck	0	0	1
	179	311	391

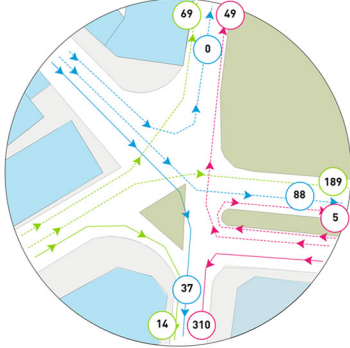
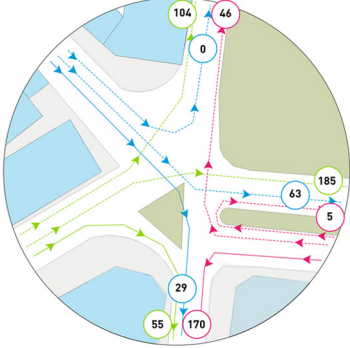
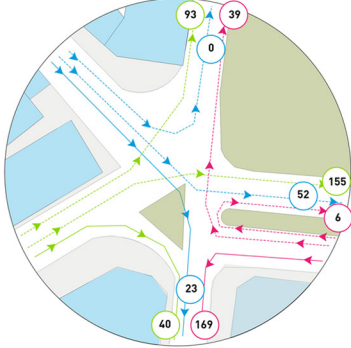
SHRI SARASWATI JUNCTION

	MORNING	AFTERNOON	EVENING
			
2 wheeler	75	300	227
4 wheeler	34	177	144
Auto-rickshaw	3	4	6
Cyle	5	1	4
Bus	1	0	0
Tempo	6	6	3
Truck	1	0	0
	125	488	385

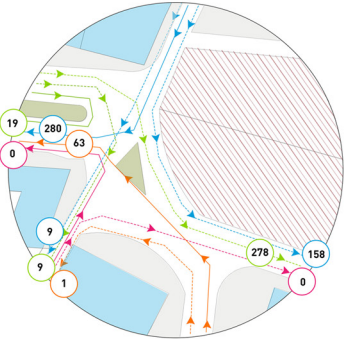
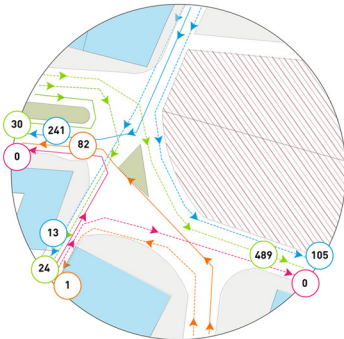
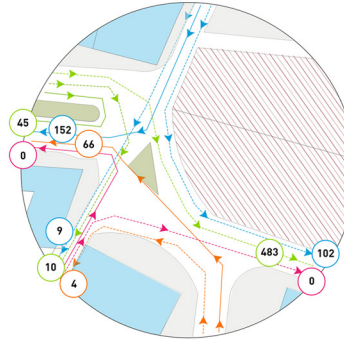
UHC JUNCTION

	MORNING	AFTERNOON	EVENING
2 wheeler	306	255	193
4 wheeler	105	145	113
Auto-rickshaw	1	4	4
Cyle	10	3	2
Bus	2	0	0
Tempo	8	4	3
Truck	0	1	0
	432	412	316T

CAFE BHONSLE JUNCTION

	MORNING	AFTERNOON	EVENING
			
2 wheeler	513	386	331
4 wheeler	225	246	225
Auto-rickshaw	6	8	4
Cyle	7	5	4
Bus	1	4	3
Tempo	4	7	7
Truck	4	1	2
	761	657	577

CHURCH JUNCTION

	MORNING	AFTERNOON	EVENING
			
2 wheeler	541	564	555
4 wheeler	256	401	292
Auto-rickshaw	9	5	8
Cyle	5	2	11
Bus	0	2	0
Tempo	3	8	4
Truck	3	3	1
	817	985	871

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