



# FORT

## MANAGEMENT PLAN

FORT MANAGEMENT  
PLAN  
2007-2010  
A PARTICIPATORY DESIGN  
APPROACH

Funded by the generous support of  
Institute of Financial Management and Research, Chennai.



# PREFACE

Since 1993, the Urban Design Research Institute (UDRI) has been engaged in several community based improvement initiatives that have resulted in restoration of heritage structures and implementation of legislative protection in Mumbai’s historic neighbourhoods. However, civic infrastructure in the area remains greatly overburdened, thus limiting the success of conservation efforts. In addition to its importance at a level of urban planning, Fort precinct maintains significance as the Central Business District and in the cultural formation of Bombay (Mumbai) as a metropolis.

The Fort Management Plan was first initiated by the UDRI in 2003 as a natural progression to its area wise studies of the various fort precincts and heritage building surveys started in the 1990. (For a detailed list of project undertaken by UDRI in the fort please refer Annex A ) This project undertaken by the Urban Design Research Institute is primarily a spatial exercise which however will often need the help of law enforcement in order to ensure that these usage patterns can be established in its initial stages and then maintained thereafter. However it is hoped that once the efficacy of the usage pattern is understood and all stakeholders understand the value of cooperating the pattern will be self regulated.

It is noted that many of these issues will have many stakeholders often with conflicting opinions on what constitutes “ The greater good” or perhaps unwilling to even place the greater good ahead of their own needs. These issues can only be resolved through dialogue and a sincere attempt to understand what the needs of each stakeholder are and the benefits and services their presence and views provide. We are sure that all proposed solutions in this document will be subjected to some debate and the proposal will itself have to be modified based on the greater understanding reached between different stakeholders. Therefore this document is tentative and open for suggestion and objection from all parties. It is hoped that through the mechanism of this document we will be able to have a rational and cooperative discussion that will embody democratic principles for ALL of the users of the vibrant heritage precinct of Fort.

The areas of study though highly interdependent can be broadly categorised into four aspects.

- Heritage Management
- Open Spaces
- Solid Waste Management
- Traffic and Transport

Recommendations for Heritage Management have been compiled as a set of Draft Special Development Control Regulations (DCR) for the Fort area. These have been forwarded to the Maharashtra Heritage Conservation Committee for review and comment. It is intended that the Special DCR’s will form an integral part of the new Development Plan for Mumbai that is currently being prepared by MCGM (Municipal Corporation of Greater Mumbai).

The three other aspects of the Management plan were studied through a physical surveys of the fort conducted with the help of students from the Bharathi Vidyapeeths College of Architecture. These ground surveys were conducted in May 2009 by a group of 50 students. The analysis of the ground situation led to identification of issue that needed to be addressed as follows-

- The design of pedestrian footpaths
- Locating and designing bus stops
- The taxi system
- Traffic interchange nodes
- Introduction of a Fort Circulator
- Pedestrian Crossings
- Parking Management
- Pedestrian streets and parking streets
- Hawking guidelines
- Social Amenities: toilets, water fountains, seating
- Signage and Way finding
- Solid waste management

The recommendations for each of these topics were created by looking at other solutions worldwide and gleaned from them those that might be usefully applicable to our own situation.

Solutions that have no relevance to the Fort have been left out to prevent a confusion of ideas from taking over the clarity of the proposal.

This report attempts to present the logic behind each of these recommendations clearly and succinctly so that those in charge of implementing it on the ground can clearly understand the rationale behind each idea and are in a position to make a independent decisions to suit the various ground situation they will encounter. It is felt that this is a very important aspect of the recommendations as often implementation gets held up due to the inability to make a decision.

The power to make decisions needs to lie as close as possible to the officer or worker in charge of the actual implementation of the idea and should be referred upwards to his superior only in cases where there are multiple decision makers involved. However, even in such cases, the implementing officers and workers should be given direct access to his contemporaries in other departments so that the matter can be resolved at his or her level without a need for escalation. This will also encourage the spirit of interdepartmental co-operation and communication essential for the smooth maintenance of a city.

These recommendations do not attempt to re-invent the wheel. We recommend that interested stakeholders should also refer to the following documents that provide detailed design guidance

on some of the major issues that impact the Fort. These documents are:

- 1) Planning and Design Guidelines for Street Furniture, Manual published in 2001 by the MCGM
- 2) Planning and Design Guidelines for Signage Systems for the streets of Mumbai, published in 2001 by MCGM
- 3) Dr Dadabhai Naoroji Road, Mumbai- Design Handbook Heritage Streetscape. Guidelines for Street Furniture and Signage, published by MMR-Heritage Conservation Society, Abha Narain Lambah
- 4) Fort management plan Special development control regulations Draft prepared in 2008 by UDRI
- 5) Practically Feasible and Economically Viable Method of Disposal of Plastic Waste generated in Greater Mumbai and major cities of Maharashtra. Report prepared for Maharashtra Pollution Control Board by Eco friend and co 2009 available at the URL:<http://mpcb.gov.in/images/pdf/plasticreport.pdf>

These guidelines also may need to be updated but should be used as the basis for further design re-working. We look forward to presenting this recommendation for your debate and comment and welcome any insights that you might have to offer in order to make this plan more effective. At the end of this process we hope to have the wholehearted support and cooperation of all of the stakeholders in order to affect a smooth implementation of the Fort Management Plan.



# SCOPE

## DESIGNATED OPEN SPACES AND INTEGRAL OPEN SPACES

The study of public spaces is interesting because it is in public spaces that worlds collide, religions meet, castes intersect, and where centuries rub up against each other. These are the spaces that make the city what it is today, a beautiful, vibrant cosmopolitan place but also the place where contradictions in city society are painfully revealed—there are no closed doors. These are the contested spaces in which conflicting aspirations, livelihoods, ideals and needs come head to head.

So what is Public Space in Mumbai? We have often seen public space through the narrow lens of a particularly metropolitan modality. We recognize wide open spaces, shaded gardens, fountains and recreational grounds as public space. These are the spaces that for some make Mumbai a bearable and beautiful modern city. For some Mumbaiker’s it is the loss of these designated open spaces that characterize—to some extent—the decline of Mumbai.

The places that are lost in the current discussion of public space are what we began to call the integral open spaces. These are the spaces where social aspects of life mix with vital needs and livelihood activities. These spaces are undefined, unenclosed and relatively unmappable. They are versatile and spontaneous gatherings that can change position throughout the year and even at different times of the day. The integral spaces that we found can be characterized by high levels of activity and communication. Some examples of integral spaces are; markets, street corners, chai wallas, front stoops, water taps and gatherings around food stalls.

These Integral open spaces need rethinking and modification in order to accommodate their current informal usage. They need to be provided with better servicing and management. They cannot be wished away as they provide the service needs of the fort residents, commercial enterprises and commuters. In order to do this we mapped the location of the elements of these public space; the hawkers, signage, seating, toilets, water

fountains, parking, pavements, trees and even shading. Through this mapping we hoped to be able to understand how spaces were being used and if these could be improved. These have then been used to formulate a set of recommendations.

## SOLID WASTE MANAGEMENT

In considering Solid Waste management the primary question was how to put in place a neighbourhood level waste management system that would handle as much of the waste generated in an internal disposal loop thereby reducing the burden on landfills and centralised waste disposal systems. In order to do this it was necessary to understand the existing garbage collection systems and the causes of their adequacy or inadequacies. Though the MCGM operates an exhausting schedule of street sweeping and garbage pickup, this is seen to be inadequate to service the area. This study will attempt to address this issue through a participatory dialogue between all the stakeholders in the garbage disposal process. In order to kick start this dialogue, the UDRI has put together a set of recommendations.

## TRANSPORT

The fort is the terminal stop for all three railway lines and also has two BEST Bus Depots. Large numbers of private cars are seen to park here throughout the day. The largest numbers of cabs converge onto the Fort during peak hours to pick up and drop off passengers. In addition to this tourist buses can be seen parked at strategic location waiting for groups of tourist mainly in the Colaba area. In the commercial and bazaar districts heavy vehicles are seen parked as they are loaded and unloaded and long distance passenger buses use this area as a start point for their journeys. The intersection of all of these modes of transport (including ferries at the gateway) makes transport interchange and pedestrian planning a priority issue for the management plan. The need for prioritising pedestrian paths and movement over other modes of transport is urgent. Public transport takes priority over private cars in our recommendations. It is also imperative to provide safe

interchanges between different modes of transport. Signage and way finding also becomes a factor affecting the ability to navigate through the fort area.

## HERITAGE MANAGEMENT

In providing recommendations and designing for the fort it is necessary to be aware of heritage buildings and to keep in mind the need to enhance their heritage value. This may be done by providing strategically located public and pedestrian spaces in front of them and clearing such spaces of obstructions wherever practically feasible. Also urban design solutions would have to fit the context of the heritage precincts in their detailing and use of materials.

## A PEDESTRIAN PRIORITY POLICY

At the very outset it is necessary to state that this document is based on the premise that pedestrians will have priority over all other transport. The pedestrian is the most important person to design for in order to make this city livable. The pedestrian experience and the comfort and safety of the common man on the street cannot be subordinate to cars. People cannot be relegated into mid air on skywalks (as has often been suggested in numerous infrastructure plans for the city). Walking on our city streets should be a pleasant and safe activity and should be the main form of commuting, improving the health of the walker and reducing pollutions and fossil fuel consumption. Even children should feel safe walking to their classes by themselves and not fear being run over by aggressive drivers at junctions and crossings. This can be achieved through a very strong pedestrian priority policy and by designing our street first for pedestrians, second for public transport and finally for private vehicles.

## COLLABORATORS

The Federation of Residents Trusts(FORT) are the key stakeholders who are driving force for the implementation of the recommendations presented in this document.

For the Federation of Residents Trust:	
Ms. Shirin Bharucha	OVAL Trust
Ms. Remu Jhaveri	Colaba Tourist Welfare Association
Dr. H H Vakil	Maharshi Karve Road Residents Association
Ms. Smita Crishna	Heritage Mile Association
Mr Ashad Mehta	Oval Cooperage Residents Association
Mr. Mehli R Cama	Horniman Circle Association
Ms. Sunayana Sadarangani	Marine Drive Residents Association – D Road
Mr. S M Pathania	Ballard Estate Welfare Association
Mr. Ashok Rao	Federation of Churchgate Residents Association
Mrs. Swarna Kohli	Nariman Point Churchgate Citizens Association
Mr. Maneck Davar	Kalaghoda Association
Ms. Kunti Oza	Clean Mumbai Foundation
Mrs. Priya Ubale	CLEAN- Sweep Forum
Ms. Meher Rafat	CLEAN-Air
Mrs Neera Punj	CitiSpace
Mrs. Nayana Kathpalia	NGO Alliance for Governance and Renewal (NAGAR)



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## 1.0 DELINEATING THE FORT PRECINCT

The Delineation of the Fort Precinct marked on the map, is based on the historic extent of what was originally the fortified town. The area encompassed in this fashion is literally the 'Fort Area.' However, once the fortifications were removed, the limits were expanded to encompass the space formerly occupied by the ramparts. New public buildings were built in this area and were integral to the Precinct, in that they were designed to physically and visually reinforce the originally fortified settlement. Thus, all such development have been included in the Fort Precinct delineation. These include the Ballard Estate in the north east. and Hornby Road (now D.N. Road) development. Also included is the Victoria Terminus Station node in the north and the Gothic buildings along the Maidans in the west and all the way upto the Royal Institute of Science in the south.

In addition, in the southern area the Cooperage development undertaken by the Improvement Trust in the 1910's, together with Gateway of India area, were included as they were consistent with the Core Fort Precinct in terms of Architectural as well as Urban Design qualities. In the north the triangle of buildings at the BMC (Bombay Municipal Corporation) and the Metro Cinema intersection as well as Crawford Market areas were included for the same reason.

These buildings, besides being consistent in terms of architectural and urban design qualities, are integral to the visual image of the Fort Precinct, when approached either from the north via the Metro or the Crawford Market or from the south, (starting at the Gateway of India). Similarly, the Eros Cinema circle has been included together with the Cross, Azad and Oval maidans as these spaces are all crucial in terms of the way we perceive the Fort Area. For it is these spaces that provide the crucial vistas imperative to the perception of this precinct. The precinct designation has been restricted to the area south of Lokmanya Tilak Marg as beyond it in the north, the urban fabric is of a totally different character comprising chiefly of vernacular residential architecture.

Source: 'THE FORT PRECINCT IN BOMBAY: A Proposal for Area Conservation Vol. II'  
Compiled by - Rahul Mehrotra + Sandhya Savant

After establishing a boundary line along Lokmanya Tilak Marg, the Fort Precinct designation line moved around the Crawford Market on to D.N. Road and turned east at the Victoria Terminus Station to include the St. George Hospital complex where fragments of the old fort wall exists (The demarcation could be extended upto the eastern waterfront to include some of the BPT lands. This inclusion would create a protective zone adjacent to the remnants of the old fort wall and would be a critical area if the BPT recycles this swath of land adjacent to the Fort Precinct and next to the walls of Fort St. George).

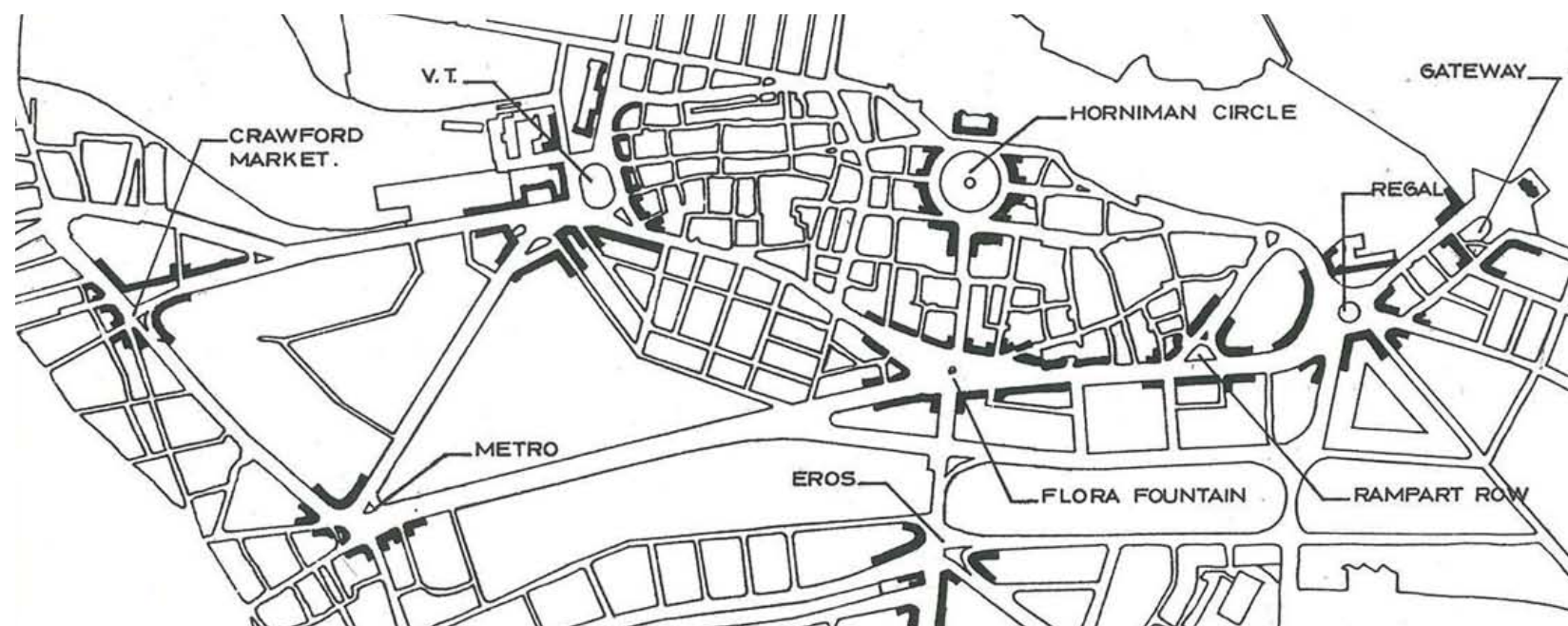
The Precinct designation extends to the south along the water edge upto the Gateway of India. The designation includes the old Taj Hotel and moves westwards to include the Cooperage development and then along the Maidan edges upto the Metro node and then again along the Tilak Marg upto Crawford Market.

The precinct demarcation is fine tuned based on the listing of Heritage Buildings published under the 1991 Development Control Rules (ref. appendix). For example, the Fort Precinct demarcation is articulated to encompass Jer Mahal, the Framji Cawasji Institute and Metro Cinema at the north western edge of the precinct. Similarly, the demarcation line around the Eros and the Gateway of India nodes is articulated to include the important buildings and view corridor essential to the overall image of the Fort Precinct.

The area delineated as the Fort Precinct all falls within the Municipal 'A' Ward boundary forming a sub-precinct within the larger Ward definition. Thus, the area designated as the Fort Precinct has a historic as well as contemporary basis. In addition factors concerning visual perceptions as well as physical cohesiveness is what determined the exact demarcation. The total area designated as a Heritage Precinct covers approximately 258 hectares.

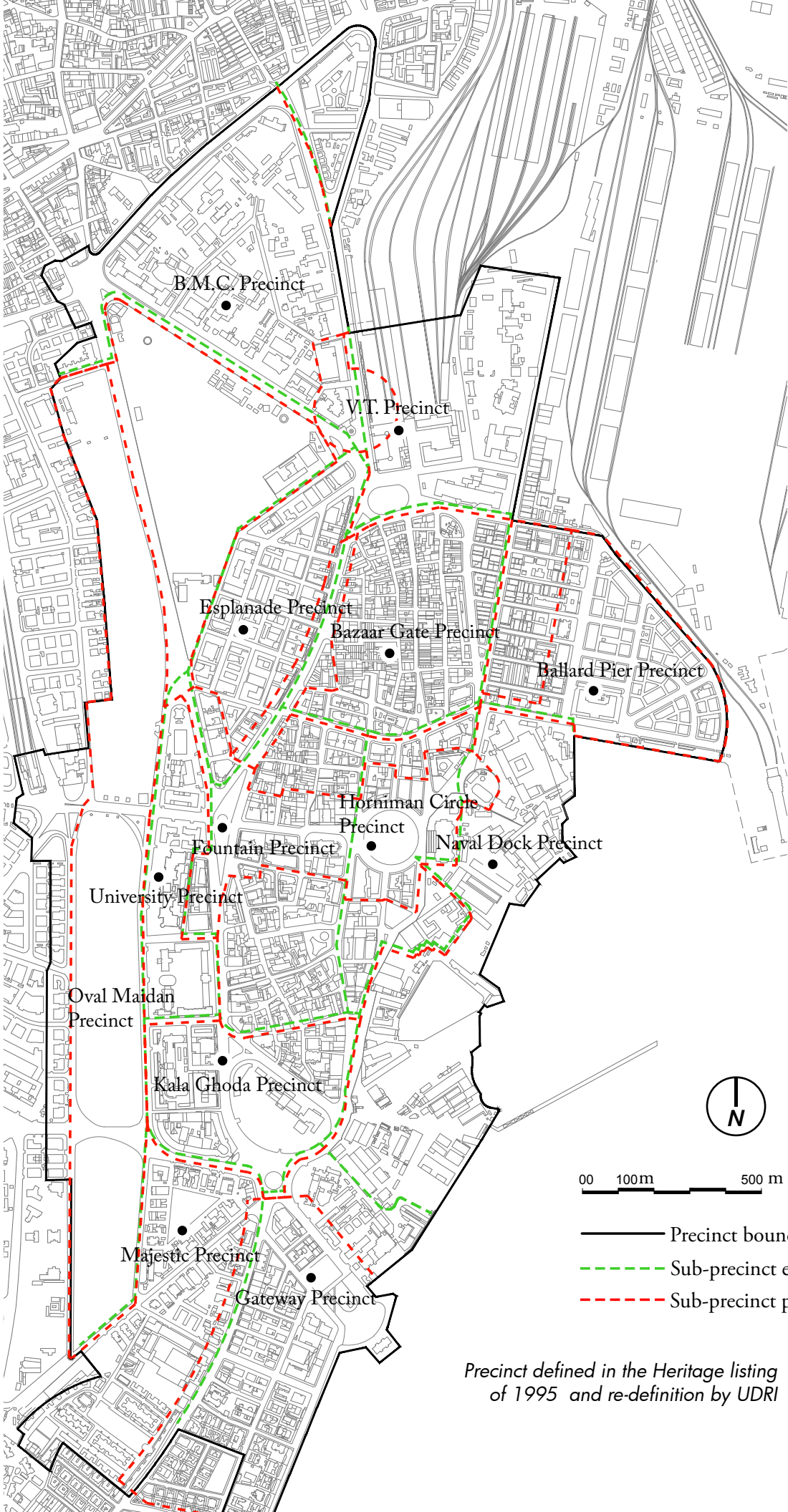


Source: 'Above Bombay', Jehangir Sorabjee



Source: 'THE FORT PRECINCT IN BOMBAY: A Proposal for Area Conservation Vol. II'  
Compiled by - Rahul Mehrotra + Sandhya Savant





**Corporate District**

Ballard Pier Precinct  
Naval Dock Precinct

**The Art District**

Museum Precinct

**Oval Maidan**

University Precinct  
Oval precinct

**Shopping Spine**

Esplanade Precinct  
Bazaargate precinct

**Civic Node**

BMC precinct  
V.T. precinct  
Crawford Market

**Tourist District**

Gateway precinct  
Majestic precinct

**Horniman Circle & Banking District**

Horniman Circle precinct  
Fountain precinct

*Precinct defined in the Heritage listing  
of 1995 and re-definition by UDRI*

FORT SUB-PRECINCT BOUNDARY

**The Corporate District:** The Ballard Estate Welfare Association (BEWA) formed in the early 1990s. It has recently commissioned an Urban Management Plan prepared by the Bombay First and the Urban Design Research Institute and is now in the process of working towards its implementation.

**The Art District** at Kala ghoda: Cultural institutions and art galleries in this area came together to form the Kalaghoda Association in 1998 and have been since working towards the conservation of this area. This association has prioritised its conservation tasks and organises art festivals annually between 1 to 14 February in order to bring attention to the area's art galleries and architectural heritage.

**Oval Maidan:** Citizens around the Oval precinct came together in 1994 to participate in the up gradation of this Grade-I heritage open space. Having gone through a tedious route of litigation with the State Government, finally from 1997 to 1999, the OVAL (Organization for Verdant Ambience and land), raised funds by private subscriptions and restored this historic Maidan.

**Shopping Spine along D.N. Road:** This area has emerged as an important commercial spine and is one of Bombay's prime heritage streetscapes. Through the MMR Heritage Conservation Society, a detailed design handbook has been prepared for rationalising the signage and street furniture in order to restore the ambience of this area. Currently the Municipal Corporation is actively pursuing a proposal to pedestrianise this zone. Although an association has yet to be formed, efforts towards this end have been made starting 1999.












**Civic Node:** This area comprising of the BMC headquarters, the old Victoria Terminus station building and institutions such as the Times of India are supporting the idea of creating an association to physically upgrade this important civic space in the city.

**Tourist District:** This area in the southern edge of the Fort Area has great potential to become a tourist district with its concentration of commercial establishments, large and small hotels as well as

numerous restaurants and could well organise itself to position the precinct as a tourist district. Its unique location between a beautiful seaside promenade and a bustling commercial street (Colaba Causeway), all in close proximity to the centre of the Fort area could make it an ideal tourist hub.

**Horniman Circle Association & The Banking District:** The Horniman Circle Association was instituted in early 1999 and has since prepared a detailed Conservation Blueprint for the restoration of this heritage precinct along with architectural controls to be followed by all buildings in the area. It is now in the process of expanding its scope to include the Banking District and act as a catalyst for its restoration and physical up gradation.

**Stakeholders:** The various stakeholders for each recommendation have been mentioned at the top of each page, and are as follows -

	Land owners business/ Residents		BEST
	Police		Pedestrians / Commuters
	Hawkers		NGO
	Taxis owners		Mumbai Heritage Conservation Committee
	Railways		FORT
	MCGM		Federation of Residents Trust



## 2.0 HERITAGE MANAGEMENT

### 2.1 Physical transformation survey

Over the years, the Fort Precinct has been considerably transformed quite often rather than insensitively. This map has attempted to graphically represent the kinds of transformations that have taken place in the last three decades within the Fort Precinct.

Additions of floors, facade alterations and reconstruction are common throughout the Fort. Most of the organically developed areas like Bora Bazaar have been reconstructed. As the buildings in this area are densely packed together, and quite old, most of them are in want of structural repair, as well as improved light & ventilation facility.

However, in the present context, with reconstruction one often loses architectural value of these buildings as there are no stipulated guidelines for such work. Most reconstruction mean that there are façade alterations or complete changes in the facade. Quite often it means additions of floors or additional wings. These are carried out quite insensitively destroying totally the architectural merit that the building or the street might have had.

In the map, where floors or wings have been added, these are shown as ‘Additions’. Often, people take advantage of the large floor heights and make lofts within the floors, this has not been mapped at this stage. Only the obvious facade alterations have been located and indicated. It is evident from this survey, how the development bylaws are insensitive to the existing fabric of the Fort Area. With the present blanket bylaws (imposed across the city) there is no scope for place oriented or area specific development. Hence a lot of new development is disharmonious in terms of building footprint, streetscape and scale.

The setbacks that are presently imposed, result in development which is totally contrary to the streetscape that characterize the

Fort Precinct. All the new developments with their setbacks take away the character of street affinity. Ironically, the Stock Exchange podium is perhaps the only new development which has not been setback, and instead attempts to continue the streetscape.

Alice building, which was reconstructed following the new setback pattern (leaving the old arcade standing disconnected: is a case in point to illustrate the damage the setback laws cause the streetscape. If other buildings along the D. N. Road are to be developed in a similar fashion, the essential character of this important street would be lost.

A lot of what was created as a part of conscious urban design gestures has also been destroyed insensitively by alterations or by out of scale interventions in the vicinity. A good example is the addition of floors to the Horniman Circle buildings, which were designed as a group to be of the same height.

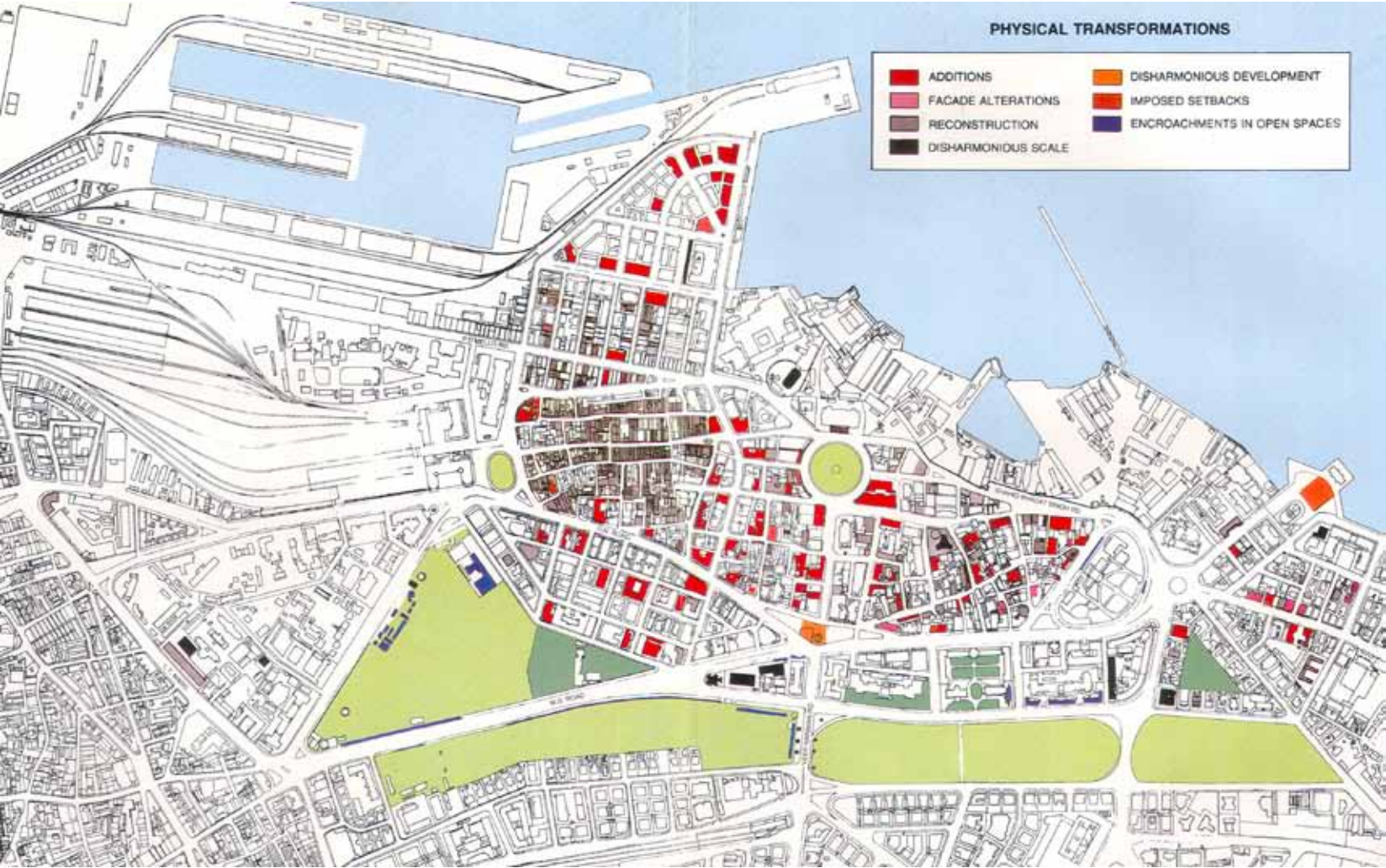
Sometimes there are interventions on public spaces or plazas by the planning authorities which are contrary to the general character of the precinct or that particular public space. The Flora Fountain & the plaza at Gateway of India are examples of such disharmonious development.

The Flora Fountain which was created to celebrate the junction of the bow like cross axis is almost drowned in incongruous development of parking lots and insensitively placed street furniture and related paraphernalia. Similarly the garden surrounding the fountain neither helps in directing the pedestrian traffic nor does it enhance the node but only adds to the visual clutter.

At the Gateway of India, a similar intervention has resulted in a patch of garden in the centre of the plaza which fragments the plaza creating a non-descriptive space around it. It also takes away the axial view of the city monument. The survey

also brings attention to the encroachments within the public open spaces. Many of these encroachments are within compounds of government owned buildings; hence in effect they are almost legalised encroachments. Invariably these encroachments are not well designed structures as their purpose ‘has been’ temporary in nature therefore most often marring the architectural merits of the other buildings in the compound. They also hamper the usage of what was planned as open space for the buildings and its users. Many of these encroachments block the vistas to important landmarks, and the views for open spaces that exist in the Precinct.

Among the structures reviewed for physical transformations 18% have additions made to them at a date after construction. 2% have facade alterations whereas a large section (69%) has been reconstructed. Among the structures that have physically transformed the precinct as a whole, 3% are sited as disharmonious scale and 8% as an encroachment on open areas.



Source: 'THE FORT PRECINCT IN BOMBAY: A Proposal for Area Conservation Vol. II'  
Compiled by - Rahul Mehrotra + Sandhya Savant

Source: 'THE FORT PRECINCT IN BOMBAY: A Proposal for Area Conservation Vol. II'  
Compiled by - Rahul Mehrotra + Sandhya Savant



## 2.2 Special Development Control Regulations

Map showing Heritage grading of buildings in Fort Precinct

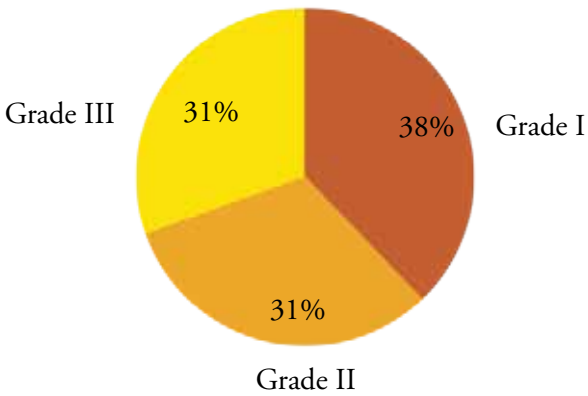


### Special Development Control Regulations for Fort Precinct

The Heritage Regulations for Greater Bombay 1995-Regulation 67 institutes conservation of building, areas, artifacts, structureS and precincts of historical, aesthetic, architectural value. Grants the power to alter, modify or relax the provisions of any other regulations of the Development Control Regulations 1991.

Special DCR are proposed for the entire heritage precinct. These regulations are concerned with -

- a) Maintaining skyline
- b) Facade & balcony control
- c) Setback control
- d) Amalgamation/subdivision
- e) Signage
- f) Usage

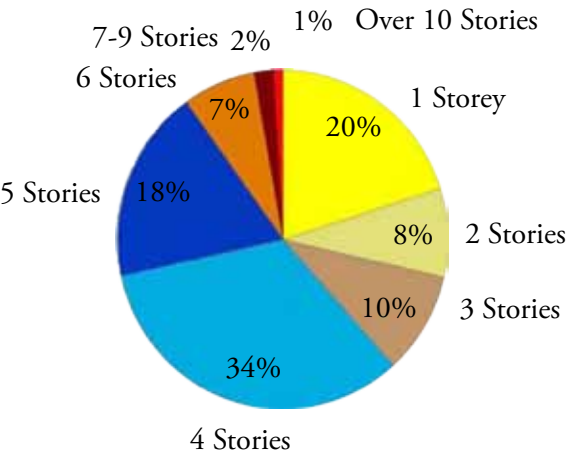


Map showing building heights in Fort Precinct



### a) MAINTAINING SKYLINE

- The height of the buildings after reconstruction shall be limited to the existing height of the buildings in the surrounding area.
- Imposed height restriction of 24m.



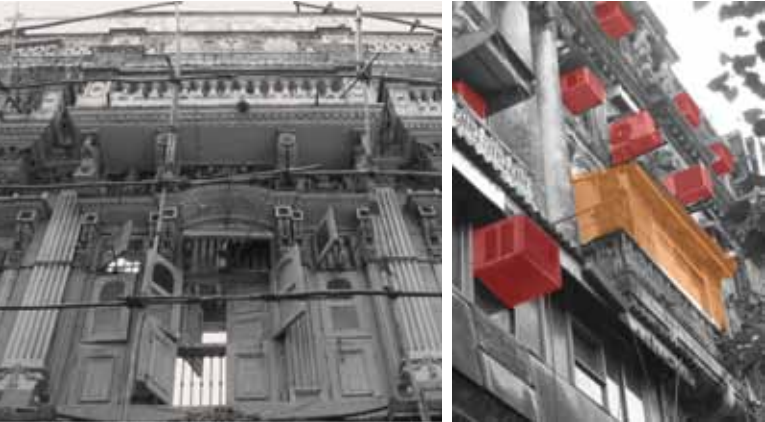
**Exception**–Veer Nariman 22m, Bora Bazaar 18m  
Building elements like domes etc. may attain a height of 30m.



⑥ FAÇADE/BALCONY CONTROL-

**Preservation of Architectural Features**

- No alteration to facades will be permitted.
- No Internal modifications that alter external treatment
- Air-conditioning units will be disallowed on facades abutting the street.
- No balconies will reduce the minimum marginal open space.
- Enclosure of balconies will not be permitted.



⑦ SETBACK CONTROLS

**Maintaining frontage/Arcades**

- The present external building edge abutting the street must be retained.
- In the case of adjoining structures with arcades, it is imperative that redeveloped plots / buildings maintain a covered walkway / arcade in keeping with the surrounding architectural aesthetic.



⑧ AMALGAMATION / SUBDIVISION

**Amalgamation of land will not be permitted**

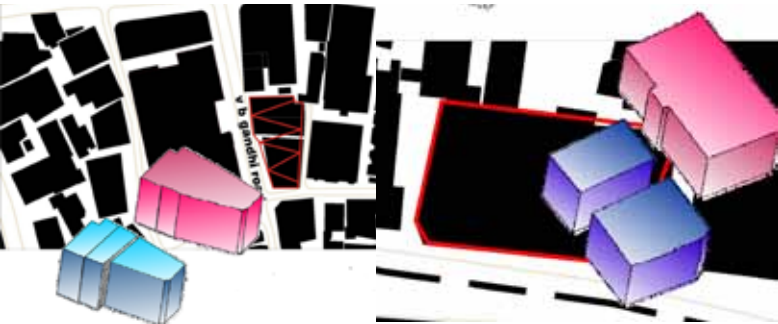
**Exception:**

Kala Ghoda: combined area < 500sqm  
Ballard Estate: combined area < 1200sqm

**Subdivision into a number of plots will not be permitted**

**Exception:**

Kala Ghoda: minimum area of subdivided plots = 200sqm.  
Ballard Estate: minimum area of subdivided plots = 600sqm.

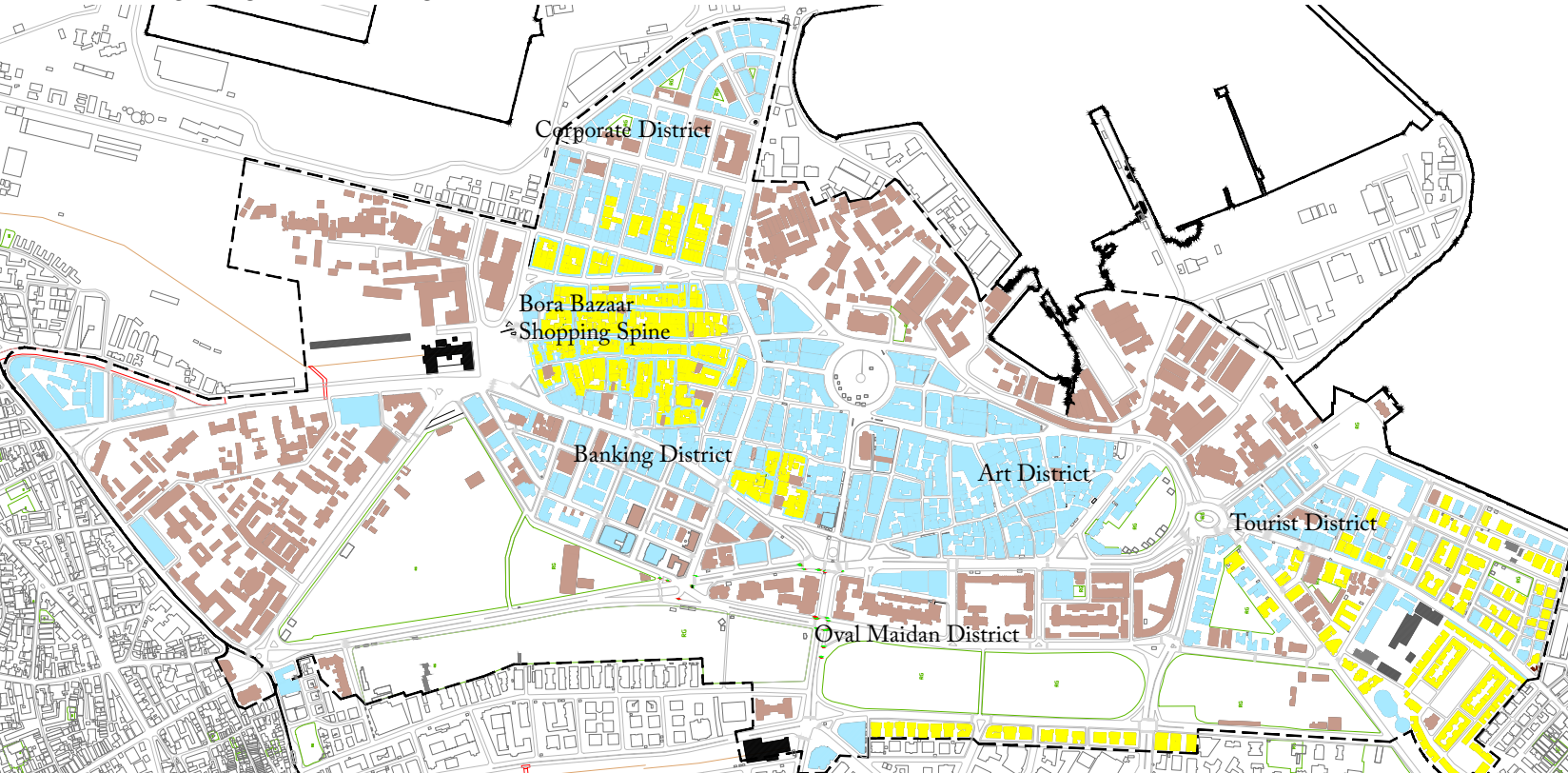


⑨ SIGNAGE

- Signage on any buildings or erection built or erected any skysigns, signboards, advertisements or any permanent or temporary attachment shall be permitted in the precinct under compliance with MHCC.
- Signage of any form will not mask the architectural characteristics of the building



Map showing usage of buildings in Fort



⑩ ENCOURAGED USAGE IN VARIOUS PRECINCTS

**Oval Maidan District**

No built form will be permitted  
Sports / Recreational Activities

**Art District**

Art Galleries / Art Studios  
Libraries / Bookstores  
Theatres / Screening Facilities  
Confectioneries / Bakeries / Cafeterias  
Printing / Publication Houses  
Business Offices

**Banking District**

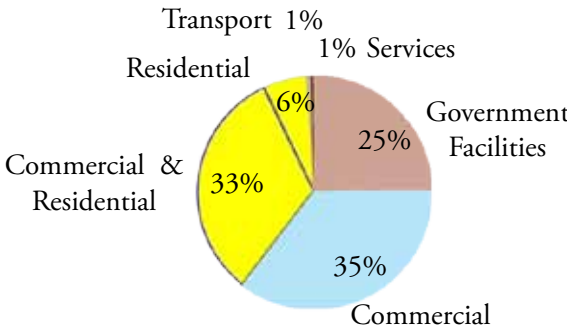
Financial / Banking Institutions  
Public Utility Buildings  
Business Offices  
Restaurants / Cafeterias  
Data Processing Units

**Corporate Distict**

Business Establishments / Headquarters  
Public Utility Buildings  
Restaurants / Cafeterias  
Conference Facilities  
Business Hotels

**Bora Bazaar Shopping spine**

Stores / Shops / Retail Businesses / Flour Mills  
Eateries  
Data Processing Units  
Grocery Stores / Dispensaries  
Travel Agencies  
Department Stores  
Restaurants



**Tourist District**

Stores/Shops/Retail Businesses/Flour Mills  
Restaurants/Cafeterias/Confectioneries  
Hotels/Dormitories  
Grocery Stores/Dispensaries  
Travel Agencies/Ticketing Centres



3.0

OPEN SPACES



A survey of all the open spaces designated in the Development Plan (DP) revealed an obvious lack of consideration towards the preservation of the public open spaces and their physical/functional integration into the city, despite the high density of the urban fabric.

Ownership of DOS in FORT Precinct		
Open spaces	Area of DOS (sq.M)	% of DOS
Owner - State	413 792	85.4
Azad Maidan, Cross Maidan, Oval Maidan, Cooperage, Asiatic Library Garden		
Owner - MCGM	17 645	3.6
Nagar Chowk, Horniman Circle, Dr. Mukherjee Chowk, Hutatma Chowk		
Owner - Private	27 807	5.7
MuseumGarden, St Anne High School, Holy Name High School, David Sassoon Library Garden		
Mumbai Port Trust	25 033	5.2
Four courtyards in Ballard Estate, BPT Garden, Gateway of India		
Total	484 277	100

Note: All data is approximate.



3.1 Issues regarding open spaces

VISIBILITY

All open spaces must be unobstructed from view. Oval Maidan is a prime example of a well managed open space that provides visual access from all sides. Cross Maidan however is completely blocked off from view on all sides

Open spaces that are open to public view and accessible to the public can be used as significant points of orientation for users of the fort precinct by providing visual orientation as well as providing

pathways through it. They can be places where people would feel comfortable stopping to orient themselves through appropriate signage and maps placed nearby.



View from inside Cross Maidan, hawkers at Fashion Street blocking all visual access from M.G. Road



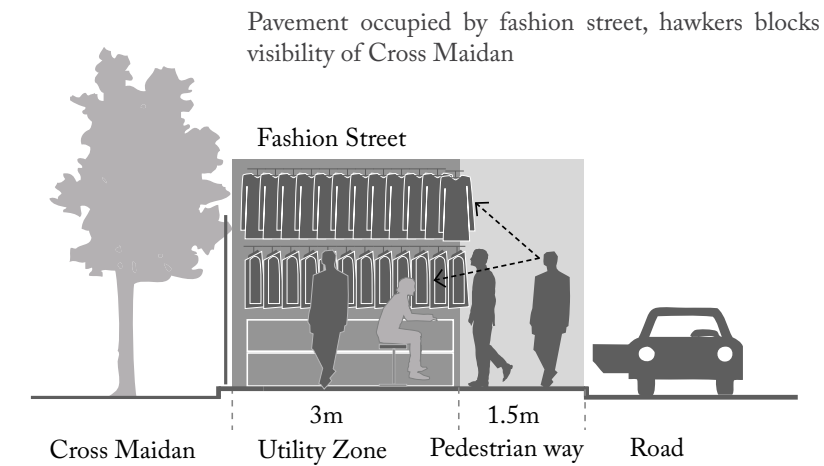
Solid boundary wall of residential societies blocking visual access at street level from New Marine Lines



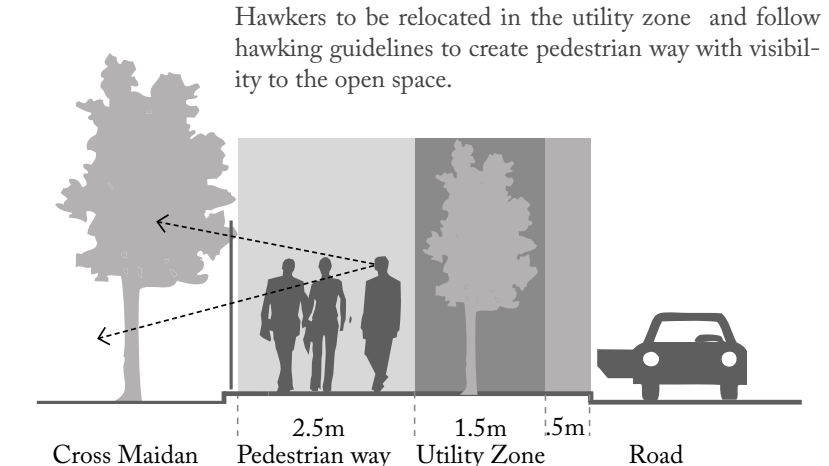
View from inside Cross Maidan looking at the rear surface of the hawker stalls at Fashion Street blocking all visual access



Railings around Oval maidan allows visual porosity



Existing section of edge condition at Cross Maidan



Proposed section of edge condition at Cross Maidan





Open space in Development Plan marked as RG, for Prince of Wales Museum



Aerial image of open space in Prince of Wales Museum

## ACCESSIBILITY

Many open spaces though in the public domain are completely inaccessible to the public. The Best examples of locked open spaces are the four courtyards in Ballard Estate that are used by squatters and are garbage dumps. The Prince of Wales museum garden though designated as an open space in the Development Plan cannot be accessed by the public even those who pay a ticket to gain access to the Museum. Cross Maidan is fenced off from the pedestrian passageway that cuts across it and gates along new marine lines are locked and boarded. Ensure that all open spaces are open to public from 6am to 9pm at the minimum.



View of closed entrance gate Ballard Estate, Courtyard 1



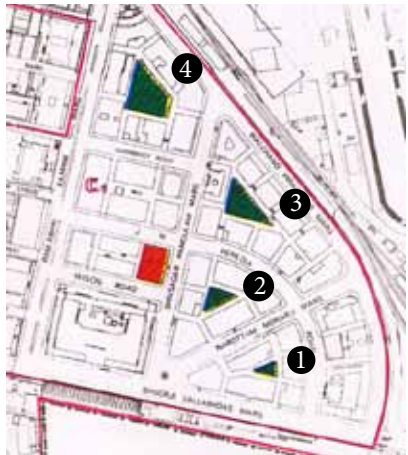
View of courtyard Ballard Estate, Courtyard 2



View of courtyard Ballard Estate, Courtyard 2



View of side lane from Courtyard 2



4 Courtyards in Ballard Estate



View of courtyard Ballard Estate, Courtyard 3



View of side lane from Courtyard 3



View of garden Ballard Estate, Courtyard 4

## ENCROACHMENTS:

There are many encroachments in the open spaces some of which such as maintenance sheds may be essential for the upkeep of the space. However all other nonessential encroachments need to be removed.



Electric room and storage in the courtyard Courtyard 2, Ballard Estate



Courtyard 3, Ballard Estate



Courtyard 3, Ballard Estate



Informal dumpyard, Courtyard 3, Ballard Estate



Flora Fountain, parking booth



Wellington Fountain, Police chowky



Fashion street hawkers facing M.G. Road



DESIGNATED OPEN SPACES USED AS PARKING

Flora Fountain, Wellington Fountain and the courtyard inside Ballard Estate should be converted into vibrant pedestrian plazas.



Courtyard no.4, Ballard Estate



Parking in Courtyard no.4



Parking in Flora Fountain and major commuter paths



Parking in Flora Fountain



Parking around Wellington Fountain marked in yellow

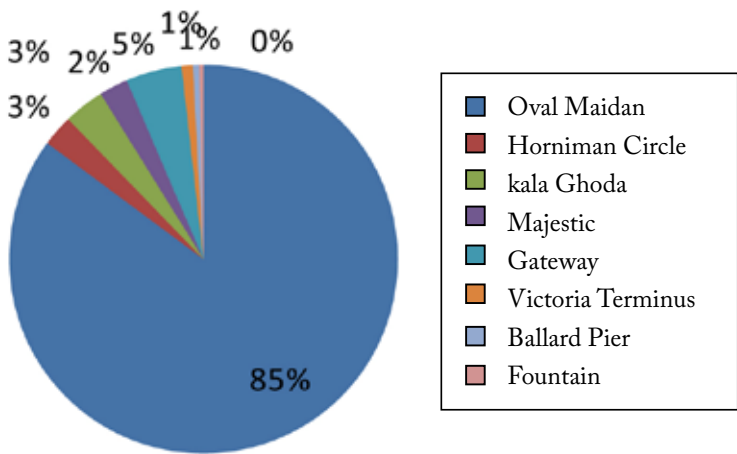


Fenced parking and booth in Wellington Fountain

CONGESTED BAZAAR AND COMMERCIAL PRECINCTS LACK OPEN SPACES:

The area of the Fort is covered by 16.9% of DOS. This figure gives the impression that the Fort is well equipped in open spaces. But looking at their distribution in the precinct, we realize that 88% of the area of DOS is concentrated in the four Maidans. If we look at the area of the Fort without the Maidans, the portion which is covered by DOS reduces to 2.9%. What's more, amongst these open spaces, only some of them are open to public. The portion which is covered by public DOS becomes 1.7%.

Distribution of Dos





AMENITIES AND MAINTENANCE

Seating

Gateway, Maidans, just about every open space except Horniman Circle lacks adequate seating. This can be built in plinths around trees and custom designed benches. Seating should be provided in under shade and be in level clean areas.

Well designed & maintained Landscaping

Horniman Circle and Oval Maidan are good examples of appropriately designed landscaping.

Garbage Cans

The largest Urban Plaza in the tourist district – The gateway Plaza lacks even a single Garbage can.

Paved walkways

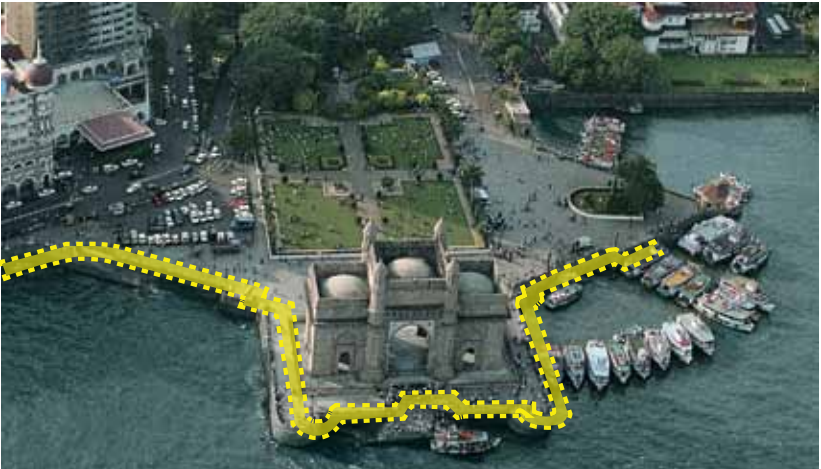
Walking paths need to be provided in the open spaces with heavy pedestrian usage.

Information and signage

Open space can serve as orientation points and need to be equipped with way-finding information signs.

Lighting

No provision of lighting in open spaces for aesthetic or functional purposes. Even the passages through the open spaces that serve as commuter paths are not lit.



Parapet edge marked in yellow serves as primary seating at the Gateway of India in the absence of provision of alternative seating.  
*Photo credit: 'Above Bombay', Jehangir Sorabjee*



Visitors to Gateway rest on the lawn and the plaza



Cross Maidan



Garbage dumping in Cross Maidan



Make-shift spectator stand



Decrepit goal post in Cross Maidan



Ballard Estate



Ill-maintained areas in Ballard Estate mostly used for dumping waste



Ill-maintained areas in Ballard Estate



Absence of adequate formal seating in Flora Fountain



No provision of lighting in open spaces even in the passages that serve as commuter routes. In this photo- Oval maidan



Broken swings in Horniman Circle



Broken paving in Horniman Circle



Non-functional lamp poles in David Sasoon Library



David Sasoon Library



Garbage dumped in David Sasoon Library



Ill-maintained garbage bins in David Sasoon Library



3.2 Re- Designation of Open Spaces

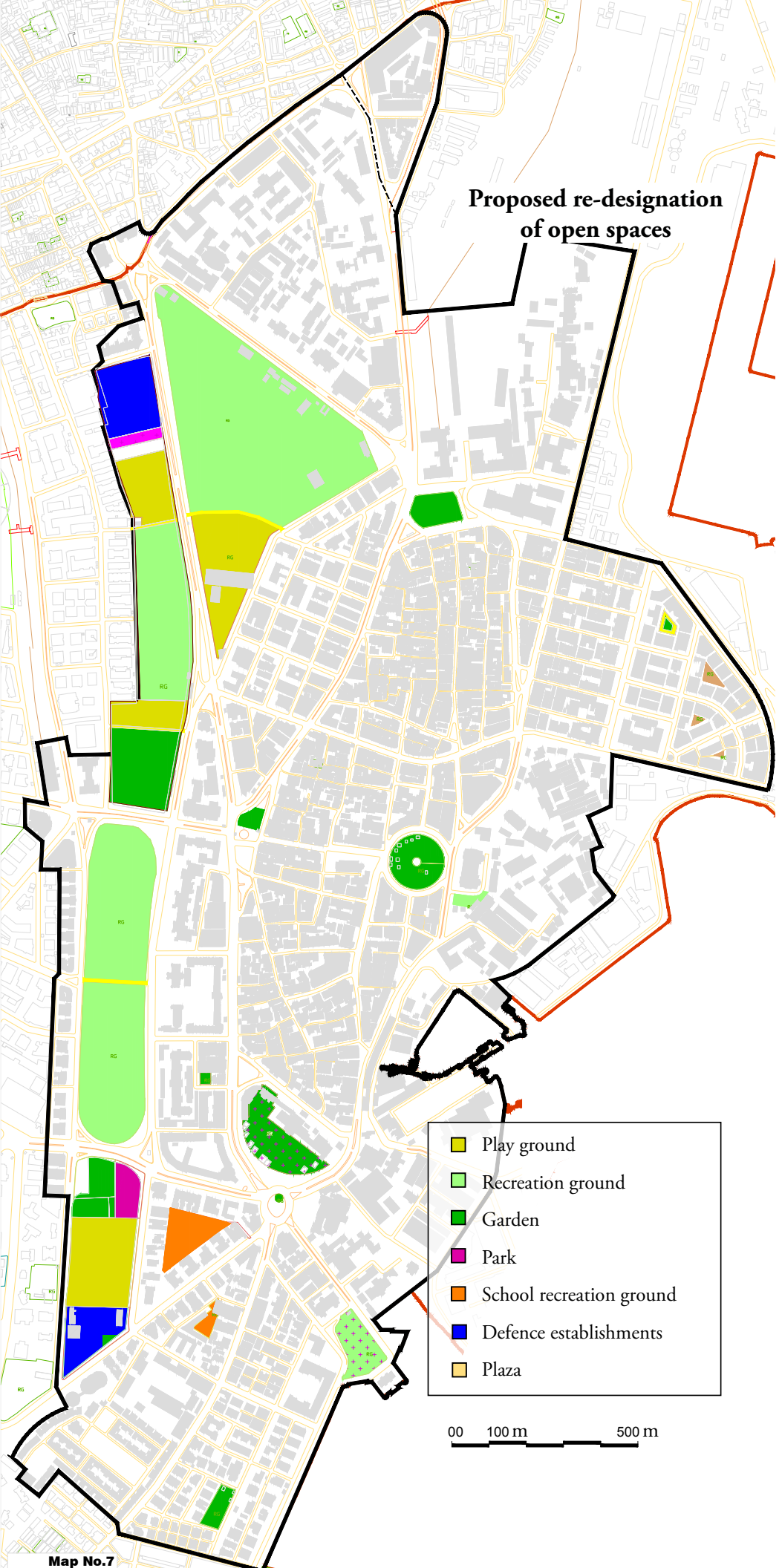
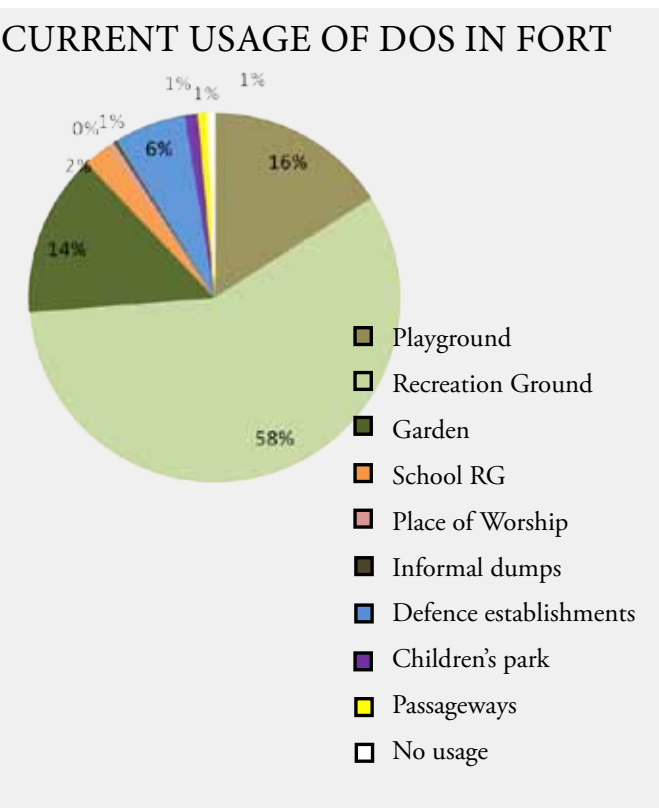
The Designated Open Spaces (DOS) are designated in the DP but the designated usage type does not correspond to their actual usage. In the Fort, all the DOS are designated as “Recreation Ground. Some gardens have been restored/created like Horniman Circle Garden (restored in 1986) or David Sasoon Library Garden in 1996. The Maidans are mainly used as playgrounds. Azad Maidan is also a place of gathering for protest meeting or political rallies, Part of Cross Maidan is used for public exhibitions, and Oval Maidan is also used for recreational purpose. Three open spaces (Azad Maidan, Cross Maidan and Cooperage) have been divided into different plots which have different kinds of usage. But the DP doesn’t take into consideration this division:

Four courtyards in Ballard Estate are designated as RG, but they have never been restored and they are used as Garbage dumps, parking lot, slum dwellings and private garden. Appropriate designations will give a more comprehensive understanding of the state of the open spaces in the Fort. Also, MCGM should make sure that this plan is respected in terms of usage and protection of the open spaces. The courtyards in Ballard Estate needs imperatively to be restored and transformed into real public spaces..

CRITERIAS FOR RE-DESIGNATED OPEN SPACES

Typologies of Open Spaces	Users	Activities				Public thoroughfare	landscaping type	Usage fees	Type of amenities
		Sports	Play	Rest	Eating				
Playground/ recreation ground	Open to all	YES	YES	YES	YES	YES	Open ground	Free Access	Has to have Toilet/water/ seating/garbage disposal/ lighting
Private Recreation ground						Not Applicable			
Defence Establishments						Not Applicable		Not Applicable	
Garden	Open to all	NO	YES	YES	YES	YES	Heavily planted and landscaped	Free Access	Has to have Toilet/water/ seating/garbage disposal/ lighting
Park	Open to all	No	YES	YES	YES	YES	Open ground and shade	Free Access	Has to have Toilet/water/ seating/garbage disposal/ lighting
Plaza	Open to all	NO	NO	YES	YES	Accessible from all pedestrian routes	Urban character	No access restrictions	seating/garbage disposal/ lighting

Edge Condition	Public Events	Timings
maintain visual access, define boundary	need to establish clear guidelines for holding public events	Establish opening and closing timing
maintain visual access, define boundary	YES	Establish opening and closing timing
maintain visual access, define boundary	YES	Establish opening and closing
Access from all sides	YES	





## ***WAY FORWARD***

- 1) Ensure visibility and accessibility of Open Space.*
- 2) Remove encroachments.*
- 3) Secure Open Space with appropriate fencing.*
- 4) Limit Parking in urban courtyards and plazas to create public space.*
- 5) Provide seating, landscaping, garbage receptacles, paved walkways, lighting and information signs.*
- 6) Re-designate open spaces to reflect usage and design/landscape open space to benefit usage.*
- 7) Ensure that all open spaces are open to the public from 6AM to 9 PM at the minimum.*



# 4.0 PEDESTRIAN MOVEMENT

WIDTH OF PAVEMENTS ON COMMUTER PATHS.





4.1 Issues

Obstacles on the pavement in order of numbering - hawkers, potted plants, construction debris, parking, signage and utility boxes, trees, BEST bus box, parking extended on top of pavement.



Hawkers stand blocking pavements



Appropriations of pavement by land owners



Garbage dumped on the pavement



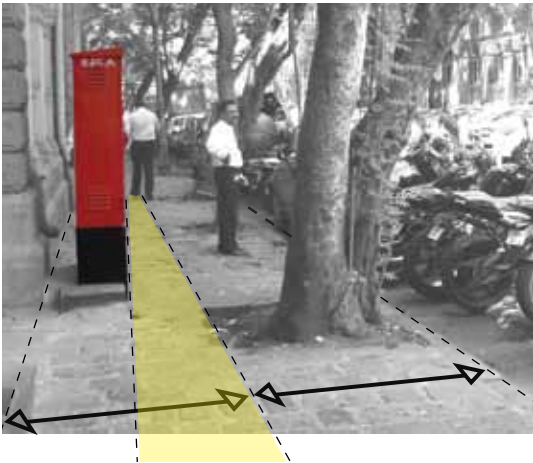
Parking on the pavement



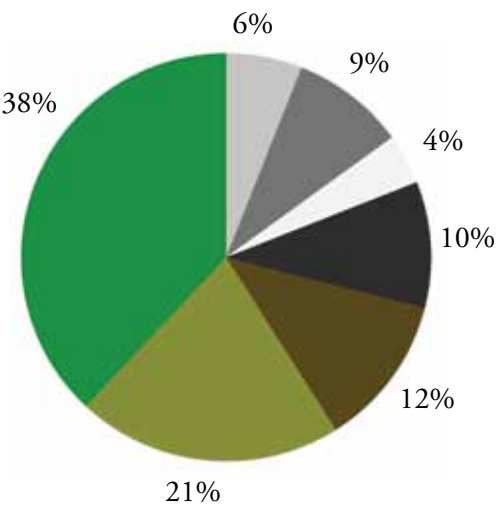
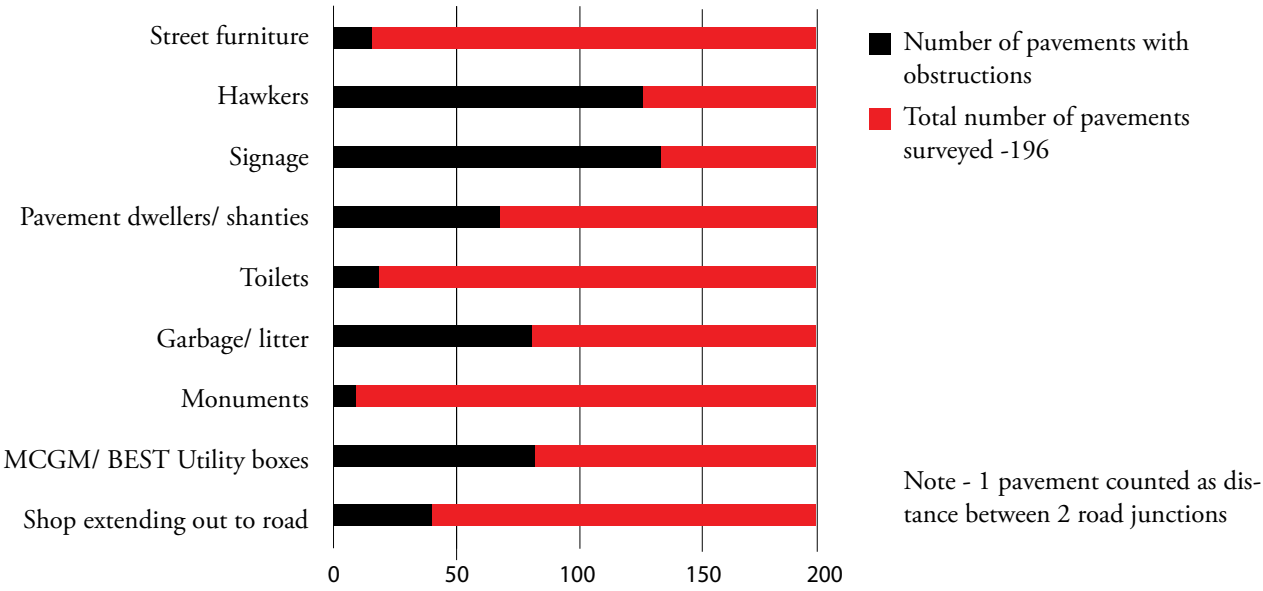
Parking on the pavement



BEST boxes and signage cause severe obstructions



Parking extending over pavement



Footpath used for resting



Appropriations of pavement by land owners

- Poor condition of pavement
- Paving type is an issue
- Railings prevent access
- Other
- Level differences
- Over crowded/ Too narrow
- Physical obstructions



Legal booth not limited to the utility zone



Legal booth by the MCGM

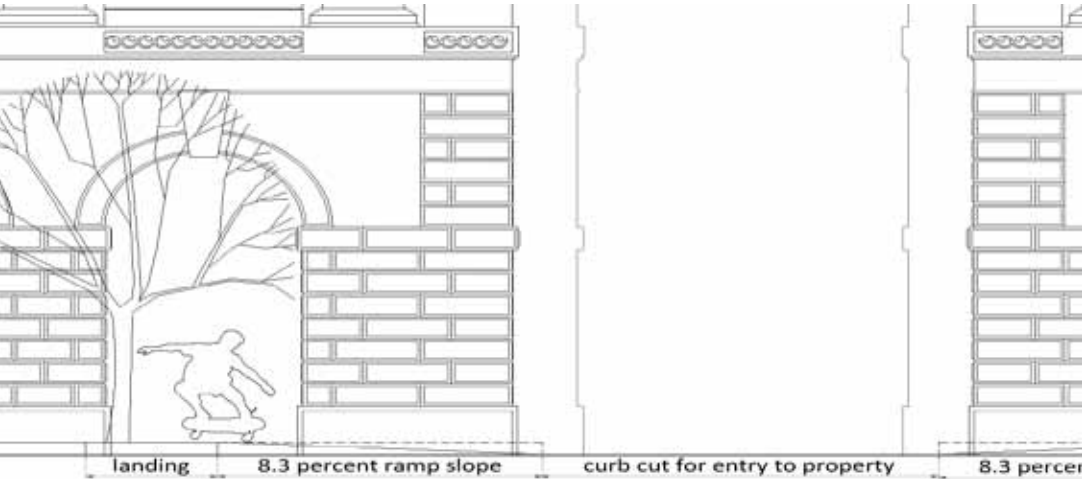


## 4.2 Pavement grade changes

Often the reason people choose to walk on the road rather than the pavement is because the vehicular carriageways are designed without any level changes for wheeled traffic. The same principle if applied to pedestrian footpaths would significantly improve the comfort and usage of the pavement and ensure that people do not find the vehicular carriageway more comfortable then the pedestrian footpath.



Treatment of Level Changes at Curb Cuts to property entrances -



Avoid level drops at curb cuts at intersection to properties. Provide instead a gradual slope to the pavement to and away from such a curb cut.

Ramp length for perpendicular curb ramps based on ramp slope:

Change in Elevation	Ramp Length for 7.1% Slope	Ramp Length for 8.3% Slope
203 mm (8 in)	3.99 m (13.1 ft)	3.23 m (10.7 ft)
178 mm (7 in)	3.48 m (11.4 ft)	2.82 m (9.3 ft)
152 mm (6 in)	3.00 m (9.8 ft)	2.42 m ((7.9 ft)
127 mm (5 in)	2.49 m (8.2 ft)	2.01 m (6.6 ft)
101 mm (4 in)	1.98 m (6.5 ft)	1.60 m (5.3 ft)

This table assumes that the sidewalk corridor has a 2 percent cross slope.

In some retrofitting situations, it may not be possible to design a curb ramp with a slope less than 8.3 percent.

- A slope between 8.3-10% is permitted for a maximum rise of 152 mm (6 in);
- A slope between 10-12.5% is permitted for a maximum rise of 76 mm (3 in);and
- A slope steeper than 12.5% should be avoided regardless of the length of the ramp.

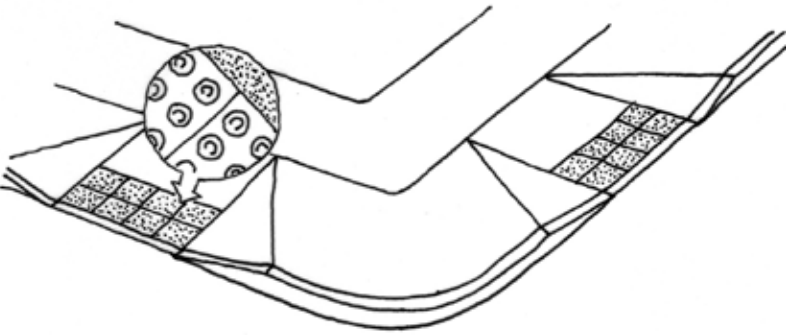
These specifications for steeper curb ramps should not be used in new construction.

Source: Federal Highway Administration (FHWA)-US Department of Transportation ramp length guidelines.

### 4.2.1 TREATMENT OF LEVEL CHANGES AT INTERSECTIONS

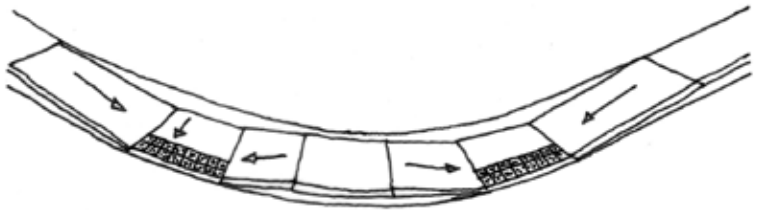
#### Perpendicular curb ramps

Perpendicular curb ramps should be located outside of the pedestrian walkway, such as in a planting strip or similar location where pedestrians would not normally walk.



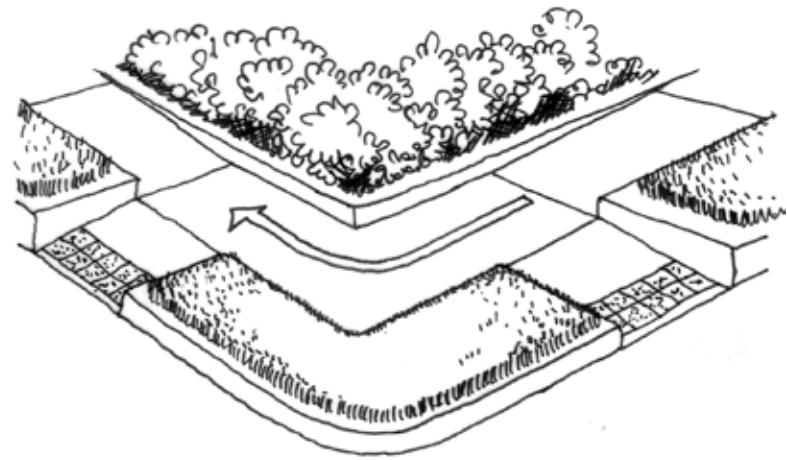
#### Parallel curb ramps

A parallel curb ramp has two ramps leading down towards a center level landing at the bottom between both ramps with a level landing at the top of each ramp. A parallel ramp curb can be used where the pavement is too narrow to accommodate a perpendicular ramp curb.



#### Combination curb ramps

A combined parallel and perpendicular curb ramp utilizes the best characteristics of both parallel and perpendicular curb ramps. A combined curb ramp uses the concept of the parallel ramp to lower the elevation level of the landing and then uses a perpendicular ramp to bridge the remaining elevation gap between the landing and the street. This design is particularly helpful for enhancing access in problematic situations where the sidewalk is narrow, has a steep grade, or a high curb



Source: Federal Highway Administration (FHWA)-US Department of Transportation ramp length guidelines.



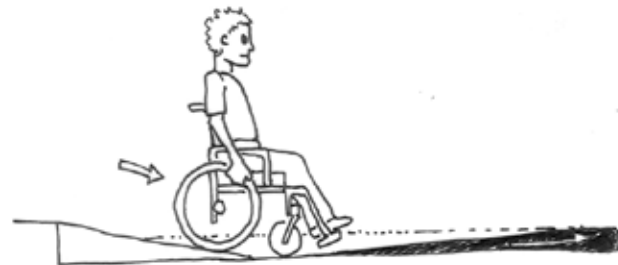
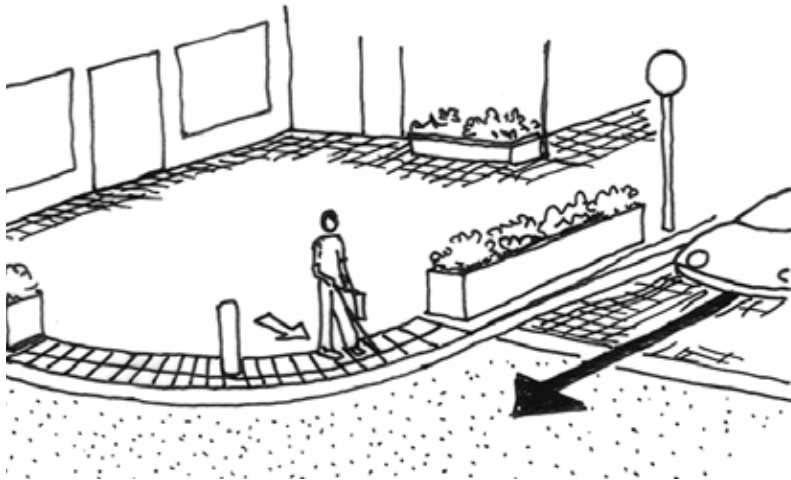
Depressed corners

Depressed corners gradually lower the level of the sidewalk, through an almost undetectable change in slope, to meet the grade of the street. Depressed corners are often designed as an expanded diagonal curb ramp that extends around the entire corner at the intersection. In addition, a decorative pattern is often used in downtown urban areas to visually blend the sidewalk and the street, giving the effect of one smooth pathway.

Change of Grade

Transitions should have minimum grade changes (algebraic difference of less than 11%) for a gradual transition for wheelchair users. Grade changes that happen over a short interval, such as between the gutter and ramp, can cause wheelchair users to fall forward

Transition points found within the curb ramp area include:  
Street and gutter;  
Gutter and ramp;  
Ramp and landing; and  
Landing and sidewalk approach.



Source: US department of Transportation Federal highway Administration. Website: [www.fhwa.dot.gov](http://www.fhwa.dot.gov).

4.3 Guidelines for footpath width

How Much Traffic Does the Footpath Allow?

Required width of footpath	Capacity in (persons) (in one hour)	
	All in one direction	In both directions
1.5	1220	800
2.0	2400	1600
2.5	3600	2400
3.0	4800	3200
4.0	600	4000

This table above provides capacity guidelines for design of footpath as recommended by the UDPFI guidelines

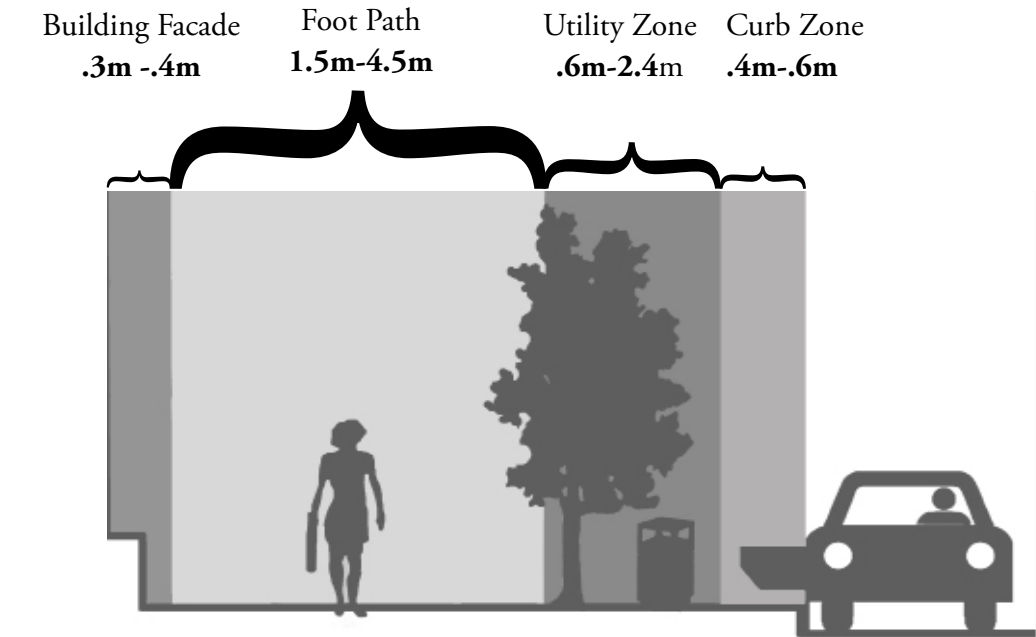
Source:  
*Urban Development Plans Formulation & Implementation Guidelines (UDPFI).*

A clear zone for building facades of .3m-.4m of width is desirable due to the tendency of pedestrians to maintain a clear distance from walls. A space of .6m-2.4 m is desirable for street furniture and utilities. A curb zone of .4m-.6m should be left for car door to open.

The Urban Development Plans Formulation and Implementation Guidelines (UDPFI) specifies that the minimum width of footpaths should be 1.5 meters. The width should be increased by at least 1 meter in business/shopping areas to allow for dead width. Footpaths adjoining shopping frontage should be at least 3.5 meters and a minimum of 4.5 meters is desirable adjoining longer shopping frontages.

HOW WIDE SHOULD THE PAVEMENT ACTUALLY BE?

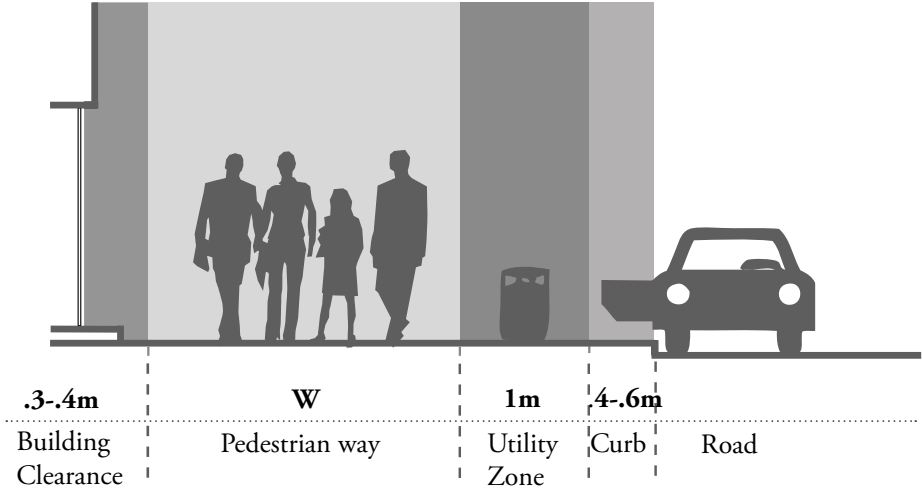
The Pedestrian footpath width cannot be understood as the entire width of the pavement from curb edge to building facade as the footpath is used for many purposes. A pavement is zoned to create unobstructed walking paths. It is divided into the building facade clear zone, the footpath, a utilities and furniture zone and the curb zone. UDPFI guidelines describes only “clear widths” for the footpath zone. The total width of the pavement must be much wider to accommodate these three other zones.



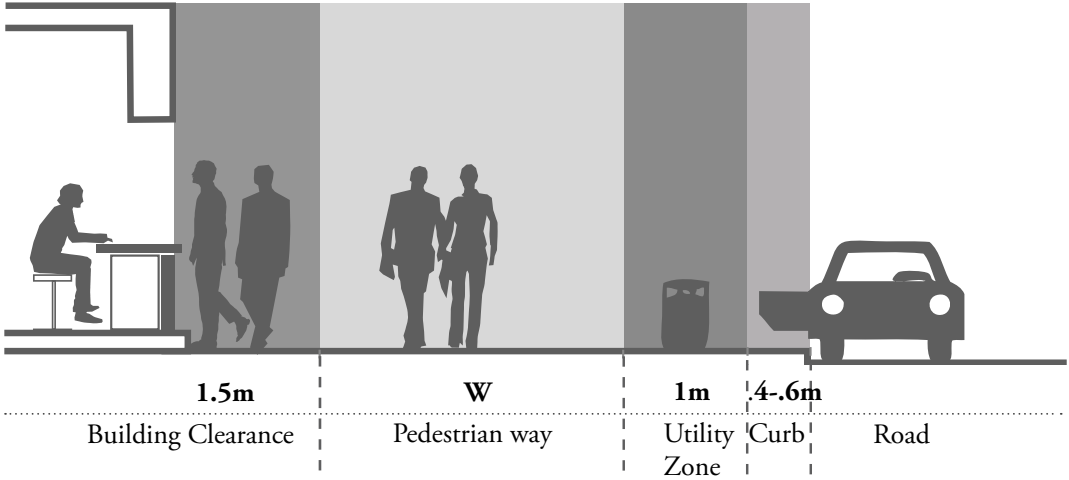


Type of Street				Width required for building clearance	Footpath width required	Utility	Curb	Total
	Shops	Hawkers	Bus Stop					
A	.	.	.	.3-.4 m	W	1 m	.4-.6 m	
B	✓	.	.	1.5 m	W	1m	.4-.6m	
C	.	✓	.	.3-.4 m	W	2.5m	.4-.6m	
D	✓	✓	.	1.5 m	W	2.5m	.4-.6m	
E	✓	✓	✓	.3-.4 m	W	2.5m	2.4m	

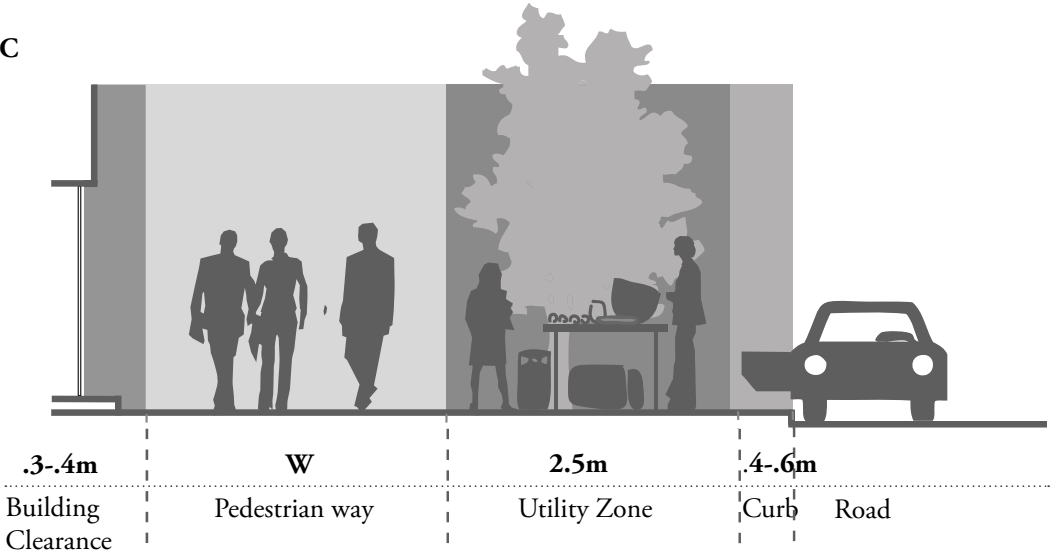
Type A



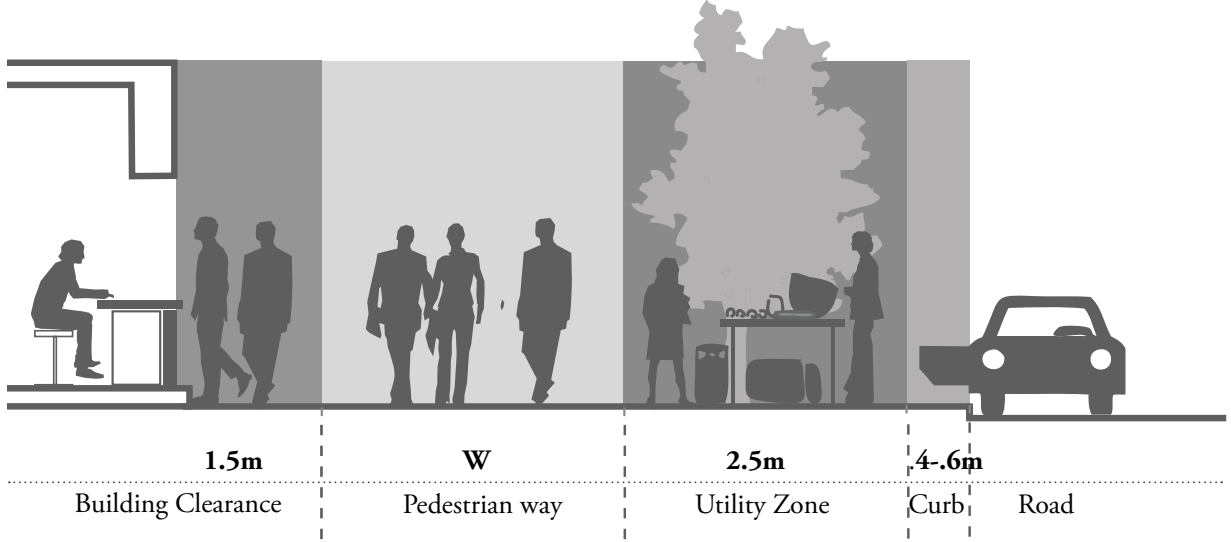
Type B



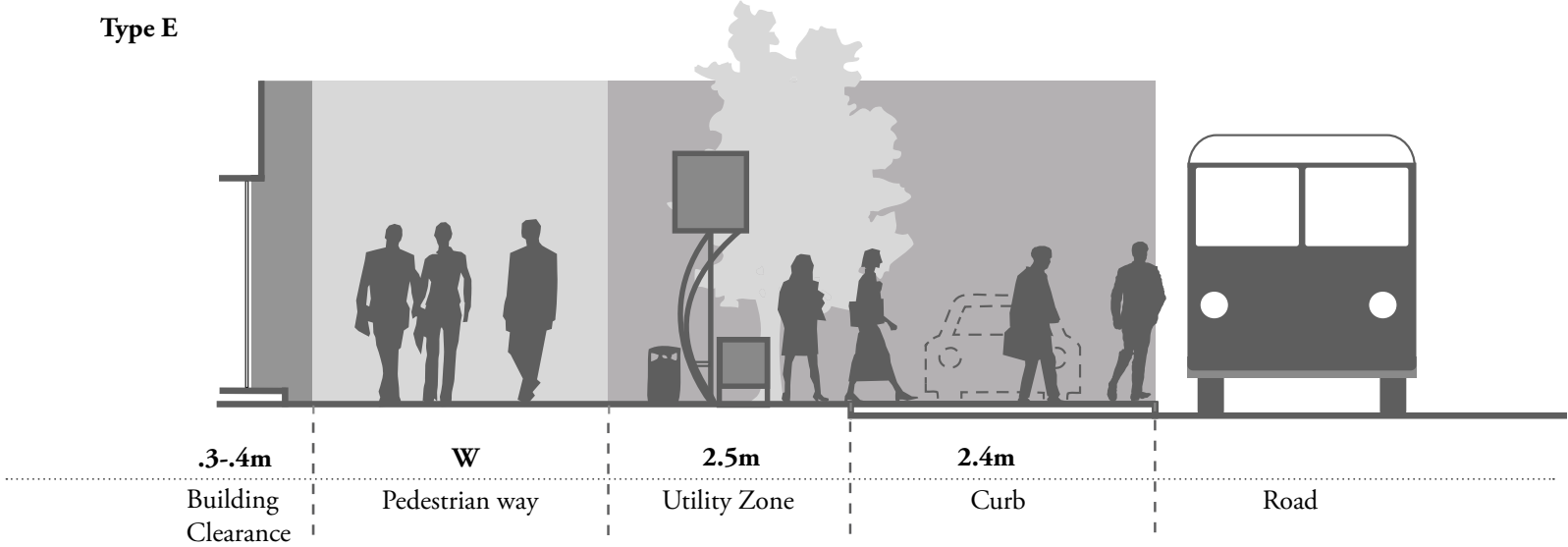
Type C



Type D



Type E







4.4 Tree cover on Streets

GUIDELINES FOR TREES ON PAVEMENTS

Trees should be placed within the utilities zone of the pavement around 4’-8’ from curb edge. They can be planted 15’-30’ apart to provide continues shading onto the street. They should be place away from sight triangles at intersections and driveways and grow to a height above the street lamps so as not to block its illumination. Utilities such as cables should be housed in designated underground ducts in the Utility Zone of the pavement. The tree should not block views of street signs and signals.

Selection of trees:

- Select deep root trees to prevent damage to paved surface.
- Select shade trees to cool urban paved areas.



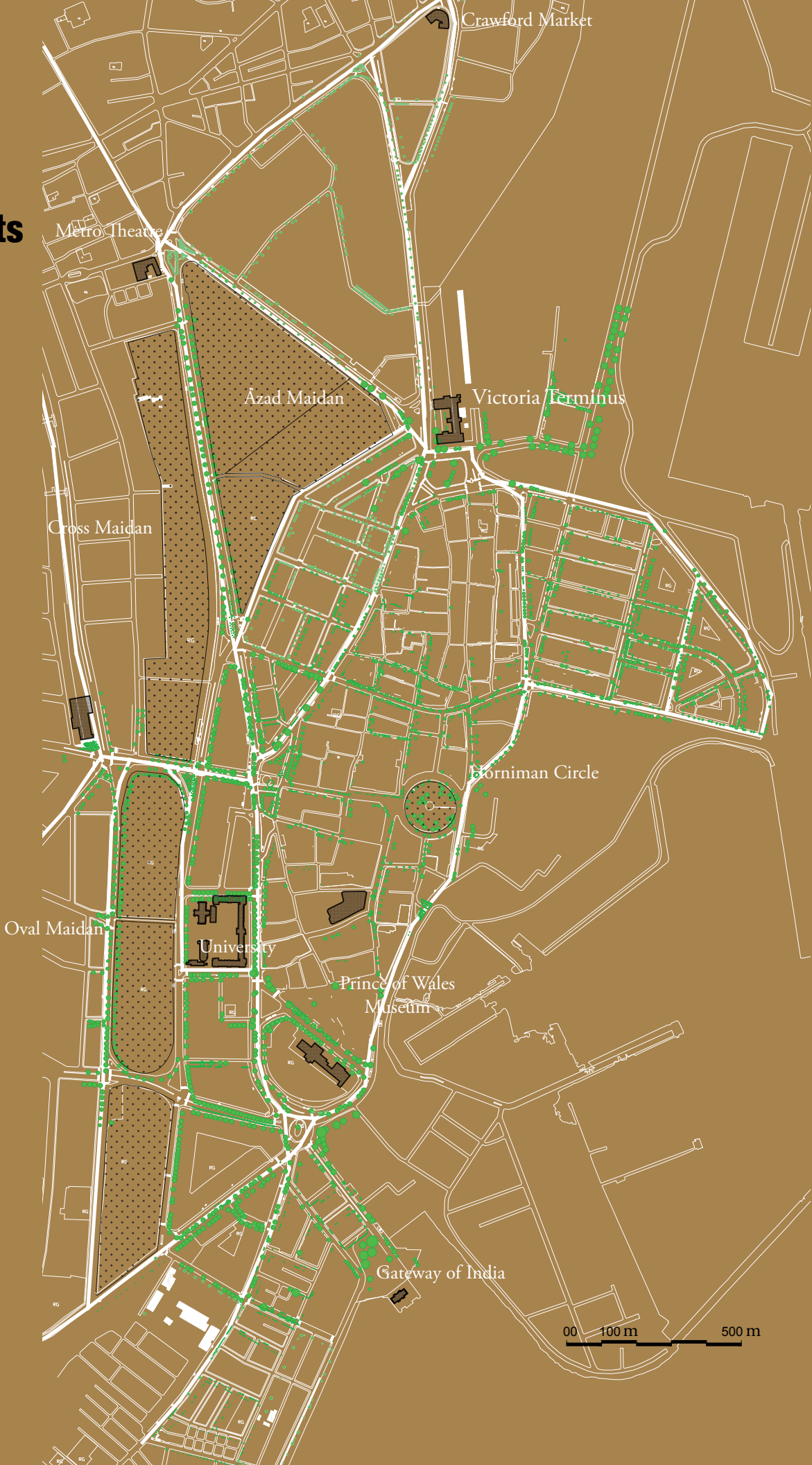
**Pavement treatment around trees:**  
The MCGM has adopted guidelines for tree grating around the tree at pavement level. (see picture below of tree garting as per MCGM guidelines) These should be adopted consistently in both new planting as well as existing tree.



Above, a pilot project for heritage sensitive street furniture was implemented on Dada bhai Naoroji street based on heritage guidelines of the MMR Heritage Conservation Committee. As seen the pavement has a separate zone for furniture and utilities demarcated by paving type. However the curb zone and façade clear zone have not been provided for. The full width of the pavement is 3 meters wide, however that leaves a clear unobstructed footpath width of only 1meter for pedestrians.

Map indicating tree cover on the pavements

Tree cover on pavement



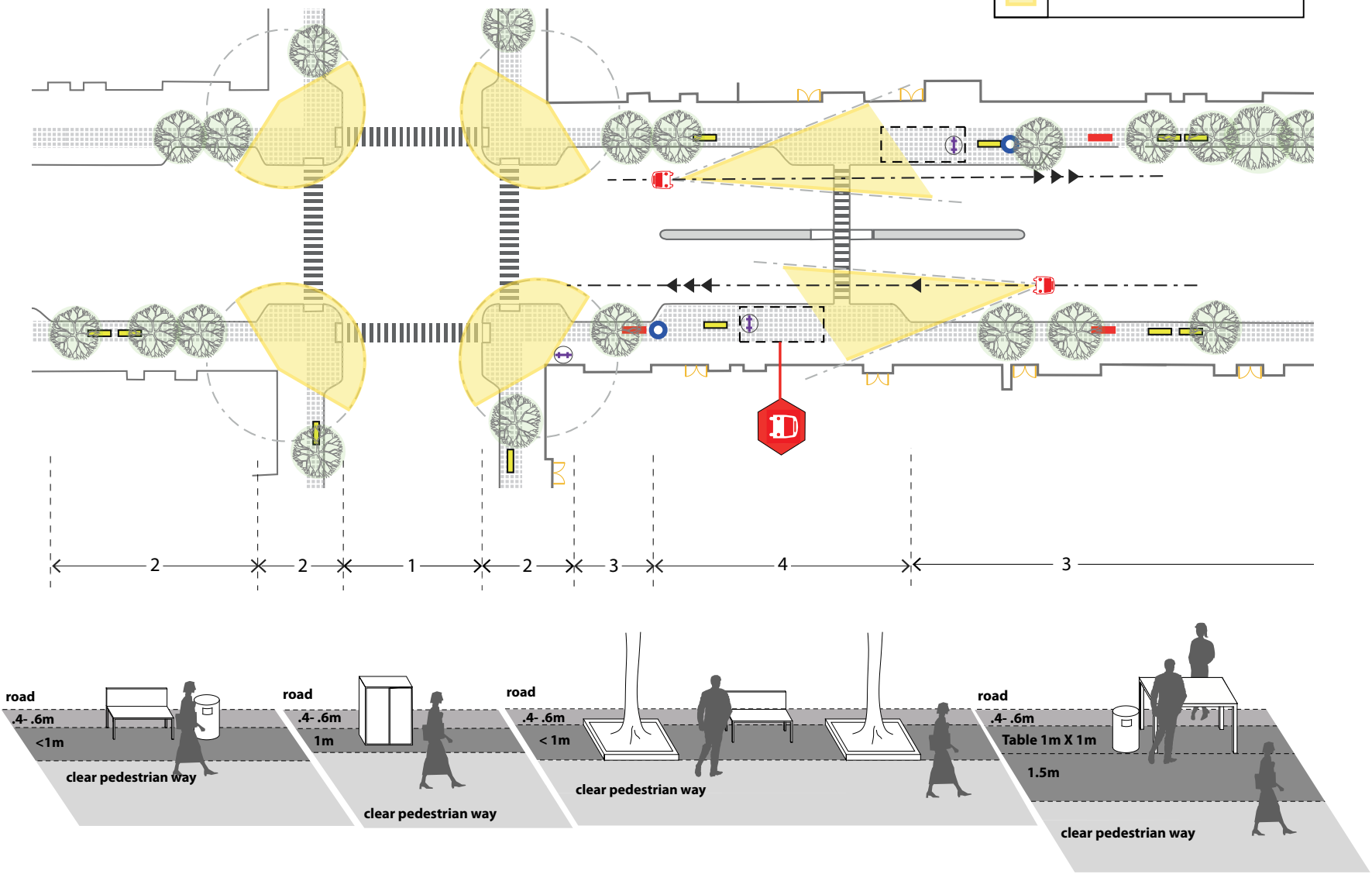


## 4.5 Utility Area

### GUIDELINES FOR USAGE AND PLACEMENT OF AMENITIES WITHIN THE UTILITY ZONE

Street Furniture  
Bus Stop  
Dustbins  
Space for Best Boxes  
Hawkers  
Pavement lighting  
Signage and way finding maps

Sign	Item	Zone Allocation
	Best Box	3
	Benches	3,4
	Trees	3,4
	Signage	2,4
	Dustbin	4,3
	Building entry	
	Sight-lines	
	Bus	
	Direction of traffic	



## 4.6 Bus stops

### 4.6.1 ISSUES

- 1) Double stopping of buses where bay length cannot accommodate frequency as the same bus stop services multiple routes
- 2) Adjacent bus stops are located too close to each other to allow for entry and exit of buses that arrive simultaneously.
- 3) Conflict with Taxi pick up & drop off
- 4) Vehicles parked in bus stop zone
- 5) At rest stop point for Bus Drivers, buses are parked at the Bus Stops and block other buses plying this route
- 6) Passengers wait on road in front of the Bus Stop



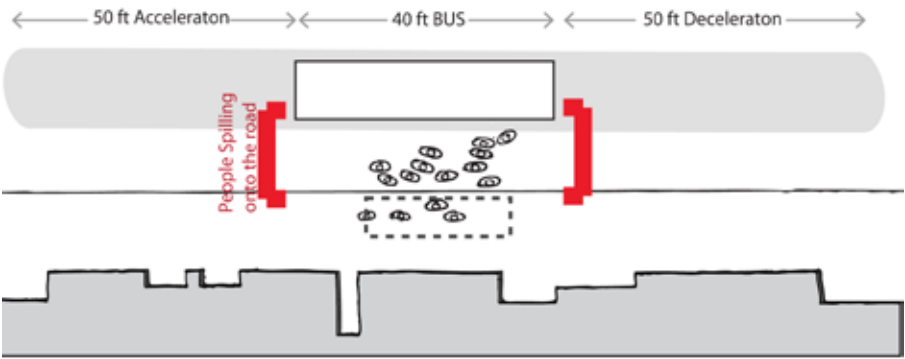
Condition 1 and 2



Condition 3

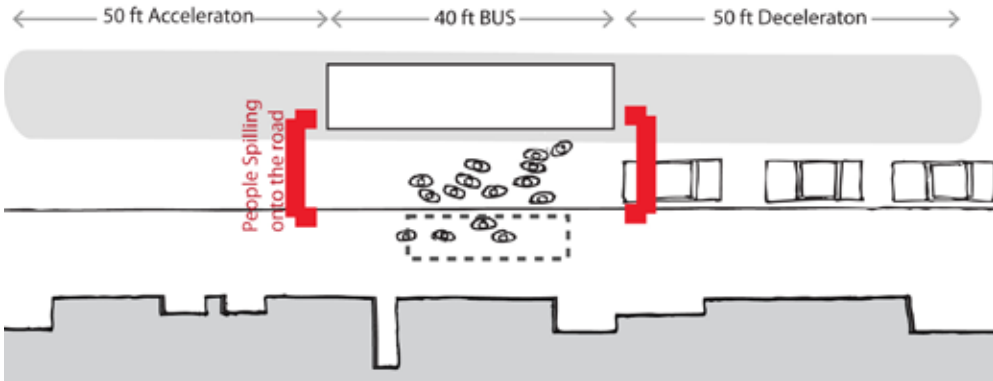
### Condition 1

Location of bus stop at the edge of the pavement does not allow adequate standing room for waiting commuters



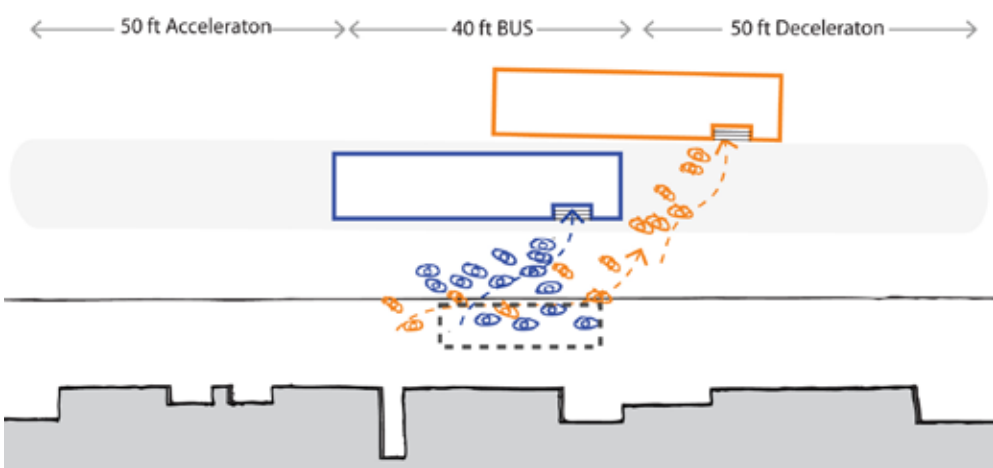
### Condition 2

Private car parking an obstruction for commuters and the bus

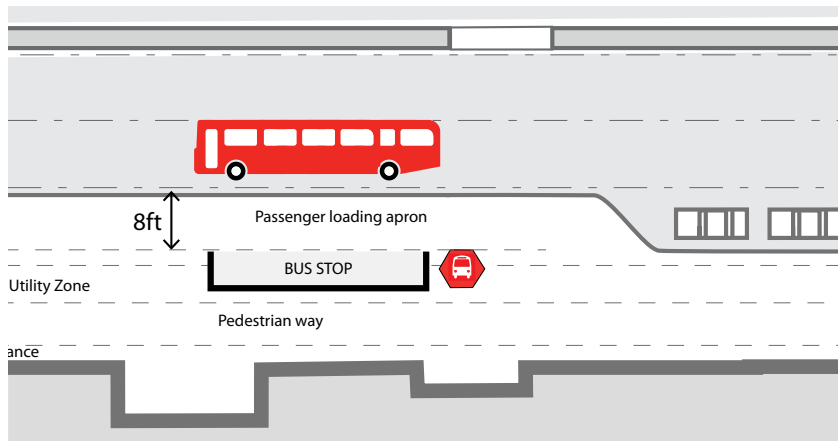


### Condition 3

Multiple bus routes stopping simultaneously







Designate bus stop zone with lines on the road

The length of the bus stop zone must be 140 feet with a 8ft wide apron for waiting passengers to stand. When multiple buses are expected to arrive simultaneously this zone need to be lengthened by 40 ft per bus.

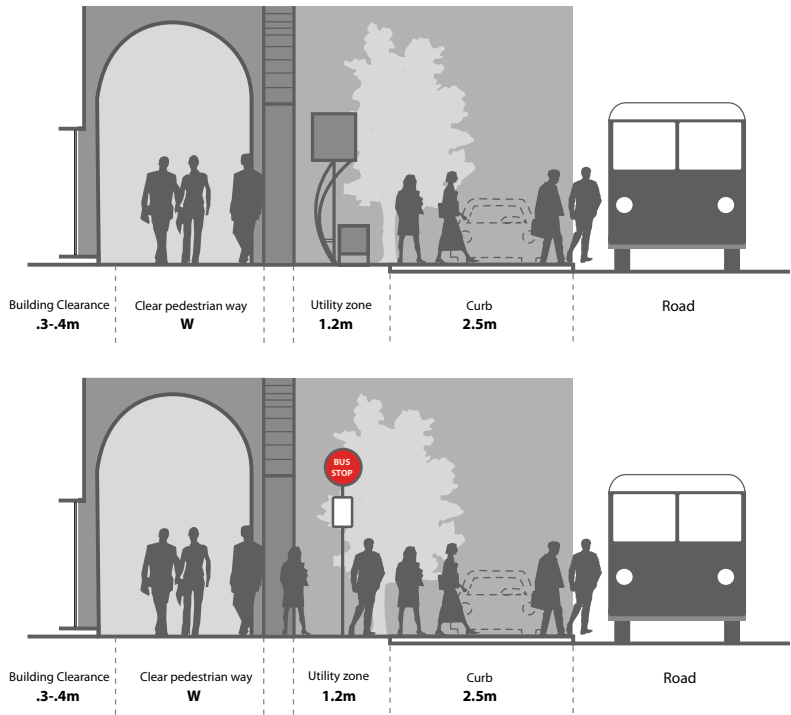


Table 3 suggests bus stop capacity requirements based on a range of bus flow rates and passenger service times. For example, if the service time at a stop is 30 seconds and there are 60 buses expected in the peak hour, two bus loading positions are needed. The arrival rate is based on a Poisson (random) arrival rate and a 5 percent chance the bus zone capacity will be exceeded.

Peak-Hour Bus Flow	Capacity Required (Bays) When Service Time at Stop is				
	10sec.	20sec.	30sec.	40sec.	60sec.
15	1	1	1	1	1
30	1	1	1	1	2
45	1	1	2	2	2
60	1	1	2	2	3
75	1	2	2	3	3
90	1	2	2	3	4
105	1	2	3	3	4
120	1	2	3	3	5
150	2	3	3	4	5
180	2	3	4	5	6

Source: TRANSPORTATION RESEARCH BOARD- Guidelines for the Location and Design of Bus Stops, NATIONAL ACADEMY PRESS Washington, D.C. 1996



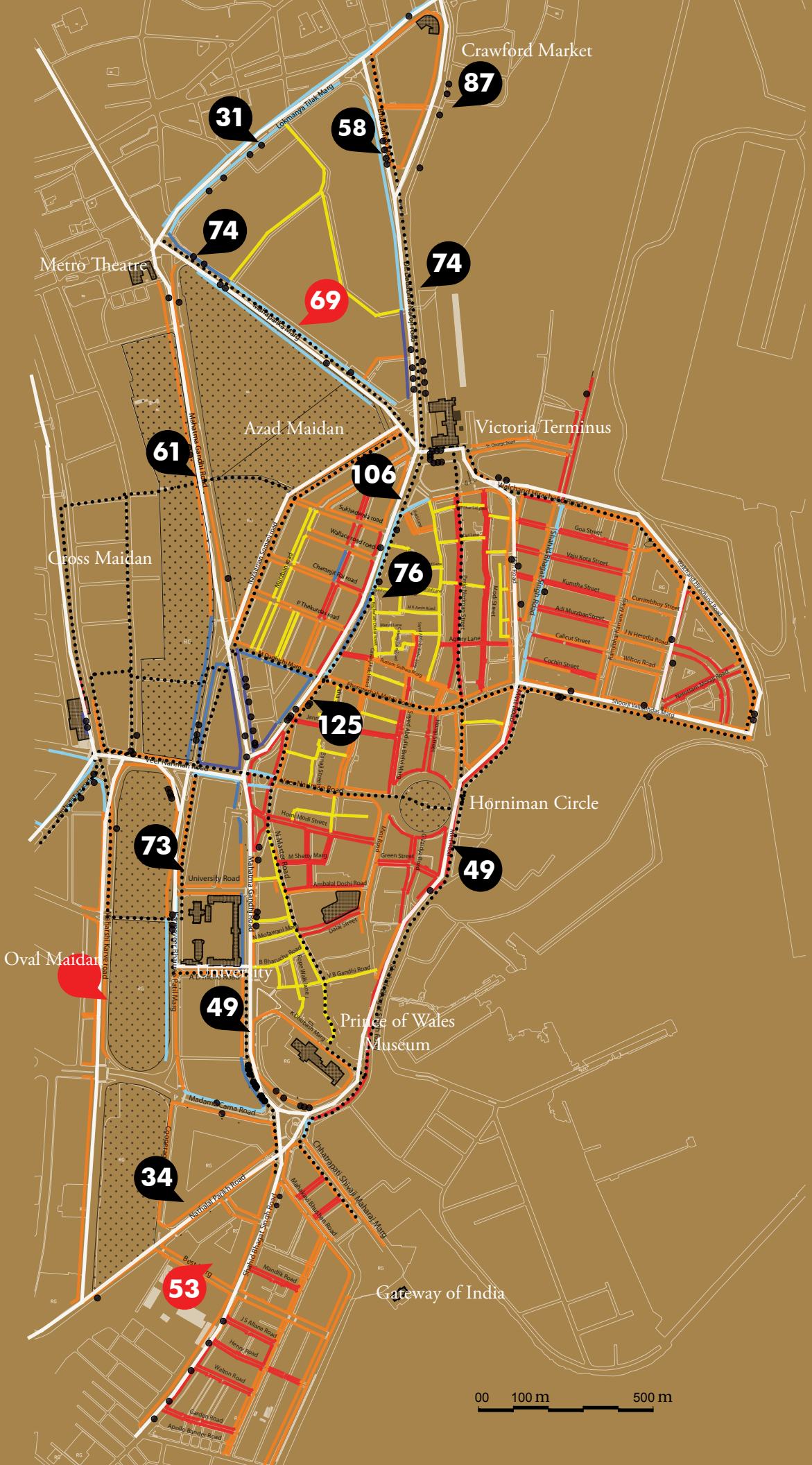
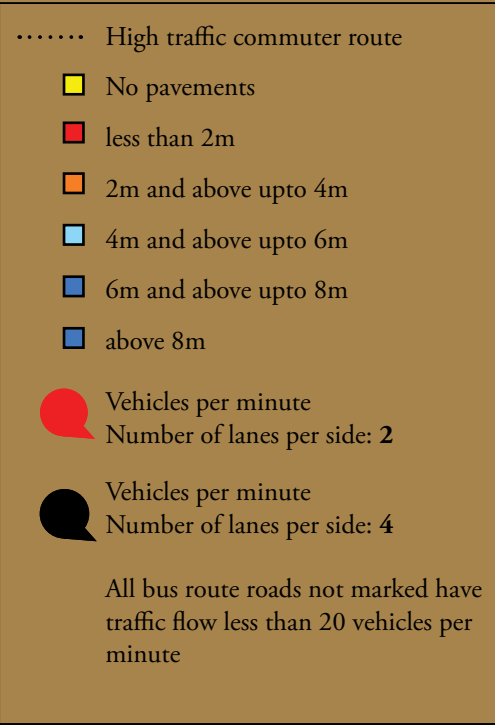
Condition 1



Condition 2

#### 4.6.2 The map indicates existing pavement widths, traffic flow and the position of the Bus Stops.

Using this map we can know which pavements can be extended as curbs at bus stop zones keeping in mind the traffic condition on the road.





4.6.3 PROBLEMATIC BUS STOPS



- Multiple bus stops in close proximity
- Bus Stops which also serve for Bus parking zones

**TYPES OF BUS STOPS AREAS -**  
The Bus Stop Areas need to be defined under 3 types based on the number of routes and the set of routes it caters to as well as whether it is a terminal or not.

Bus Stop Area Typology	Bus routes	Bus Stop design
Through	No clash of bus timing of multiple routes	For standing and seating
Junction	Multiple buses of separate routes to stop at the same time	Possible multiple route queuing of commuters
Terminal	Starting and ending point of bus routes	Single route queuing of commuters

4.6.4

BUS STOP DESIGN

	New	Old
Allow long queues of people to wait	X	✓
Provide shelter from sun and rain	X	X
Visually porous back wall to allow people walking on the pavement behind the bus stop to see the bus.	X	✓
Allowing queuing for multiple bus routes	X	✓

New bus stop



The design hinders queuing

Old bus stop

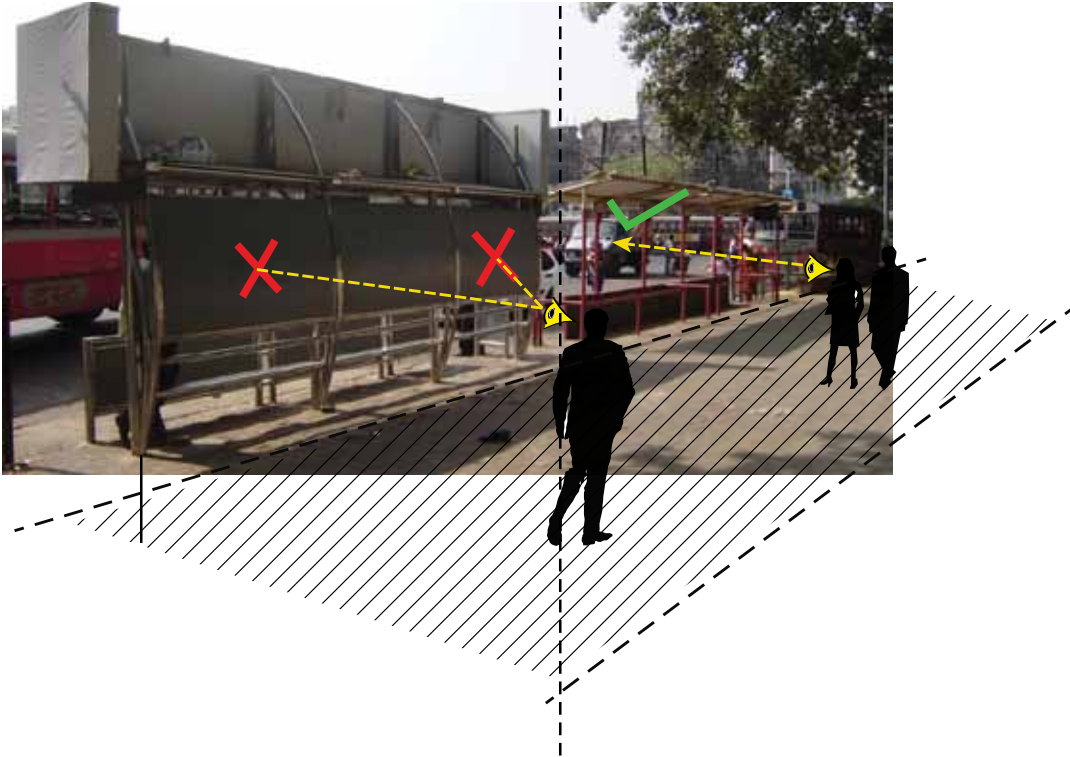


The open ends allow for queuing



The illustration shows an example of a bus stop where these issues have been resolved by placing the advertising panel on the upstream end of the bus stop which does not block the view of approaching buses. However it does not allow for queuing of passengers.

Source: [www.newyorkparkingticket.com](http://www.newyorkparkingticket.com)







### 4.7 Issues faced by pedestrians in crossing streets

1) Very wide streets do not have refuge point at the median to stand



2) Signal timings are inadequate to cross the street especially for the slow/old/handicapped.



3) Obstructions at crossing such as lamp posts signage and other utility objects hamper movement.



4) Crossings not located in line with pavement footpath but inset leading to detour for pedestrians and in most cases car stop over the zebra crossing when stopped at a signal. (D N Road)



5) No place to cross at critical junctions results in illegal pedestrian behaviour such as jumping across medians and squeezing through broken railings



6) Sight lines to oncoming vehicles are not maintained at crossings.

7) Pavements not wide enough for gathering pedestrians who wait for the walk sign at crossings leading to pedestrians standing on the road while they wait, Ensure wide pavement aprons as holding areas at crossings.

8) No respect for pedestrians waiting to cross at unsignaled zebra crossing.



9) Cars parked on zebra crossing.



10) Pedestrian crossings are not designed with ramps to allow handicap accessibility and often have level changes.



#### UNSAFE MOTORIST BEHAVIOR:

- Failing to yield to pedestrians, especially in crosswalks (the law often ignored requires drivers to stop for pedestrians in crosswalks)
- Running red lights or STOP signs
- Parking or stopping in crosswalks
- Turning right or left at intersections without yielding to pedestrians
- Exiting or entering driveways or alleys without yielding to pedestrians
- Passing stopped cars (especially ones stopped at crosswalks)
- Driving while distracted (e.g., by cell phones, radios, eating food,)
- Vehicle stop lines and pedestrian courtesy need to be enforced

#### UNSAFE PEDESTRIAN BEHAVIOURS:

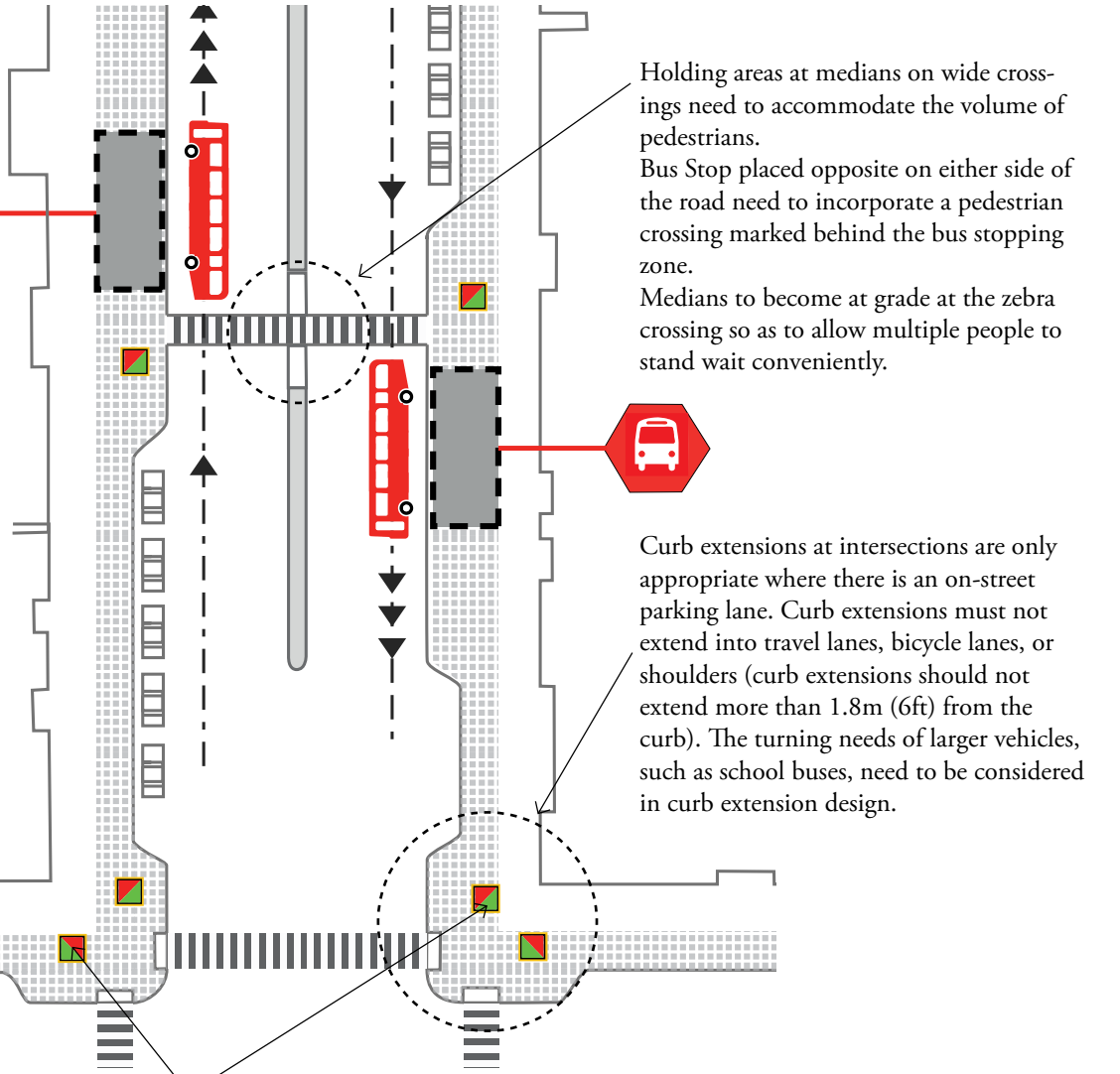
- Crossing a street at an undesirable location.
- Darting out between parked cars into the path of oncoming cars.
- Not following the directions of traffic signals
- Entering a stream of traffic and disrupting the flow.
- Walking while wearing headphones, or while talking on a cell phone.
- Walking on the carriageway

#### SOME DIFFERENT STRATEGIES FOR EFFECTIVE LAW ENFORCEMENT:

- Traffic complaint hotline
- Pedestrian safety enforcement operations/pedestrian decoy
- Photo enforcement
- Progressive ticketing, Educating, Warning, Ticketing
- Double fines in school zones and other special interest areas



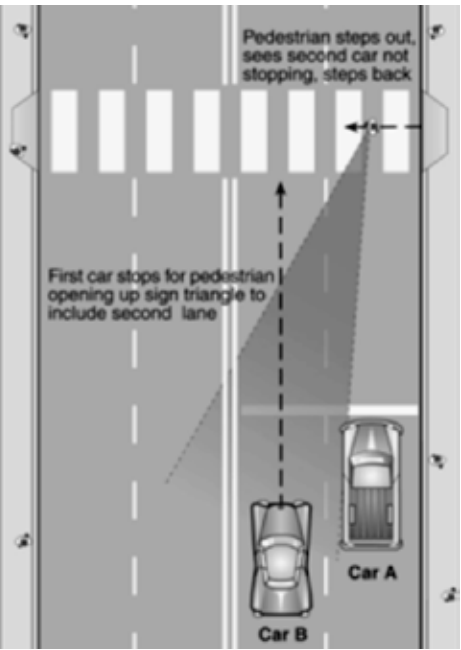
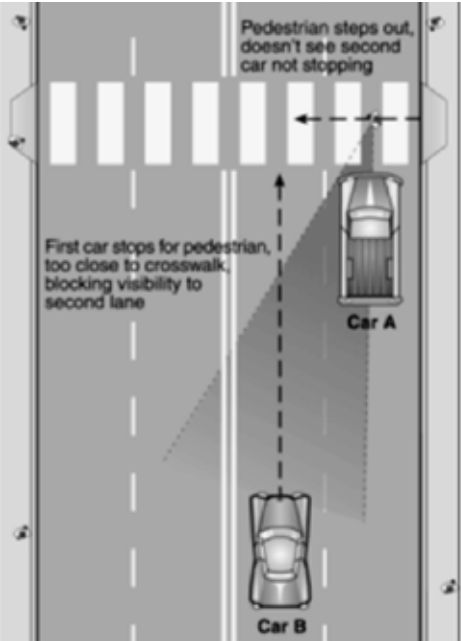
4.8 Road markings-



Countdown timers at all pedestrian crossings

Countdown Timers

Countdown timers allow people to judge crossing time/ speed/ distance so they are not caught in the middle of the crossing at a signal change.



Source: <http://www.walkinginfo.org/engineering/crossings-enhancements.cfm#crossing-islands>

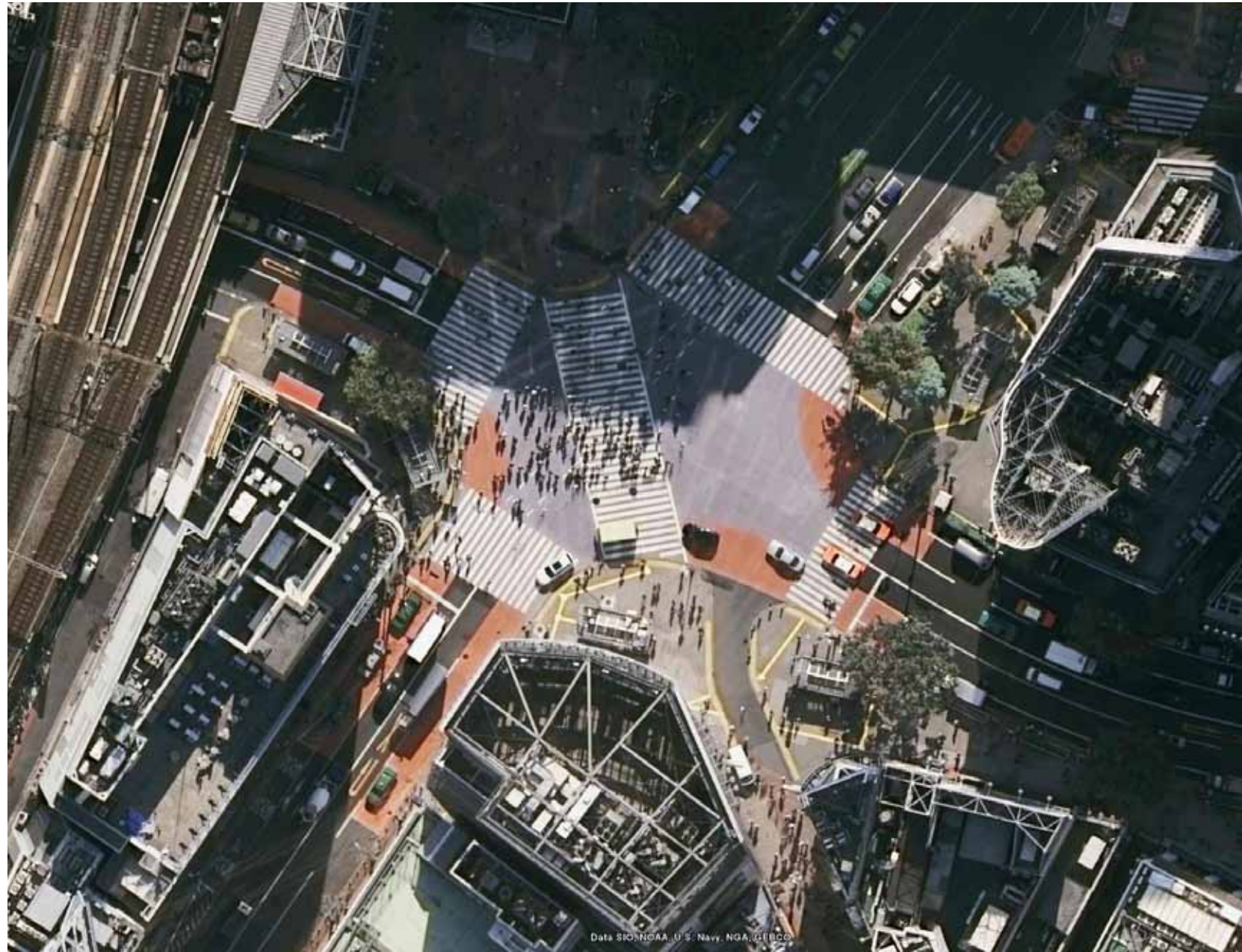
4.9 Scramble Crossing



SCRAMBLE CROSSING at Oxford Circle London

Source: [www.metro.co.uk](http://www.metro.co.uk)





Shibuya Crossing, Shibuya, Japan

Source: Google Earth

## SHIBUYA CROSSING

A pedestrian scramble, also known as a 'X' Crossing (UK), diagonal crossing (US), scramble intersection (Canada), exclusive pedestrian phase, and more poetically Barnes Dance, is a pedestrian crossing system that stops all vehicular traffic and allows pedestrians to cross an intersection in every direction, including diagonally, at the same time.

To implement such a scramble crossing it is necessary that the pavements at street corners are widened as a holding area for waiting pedestrians. Countdown timers and audible warnings should also be provided for pedestrians to be able to judge the crossing time and be able to clear the junction in time for the vehicular phase of the signal. This sort of crossing is only required in locations with very high pedestrian traffic at the junction and can be implemented at major transit nodes such as Churchgate station and CST.

The most famous implementation of this kind of intersection is in Shibuya, Tokyo



Shibuya Crossing time lapse photos

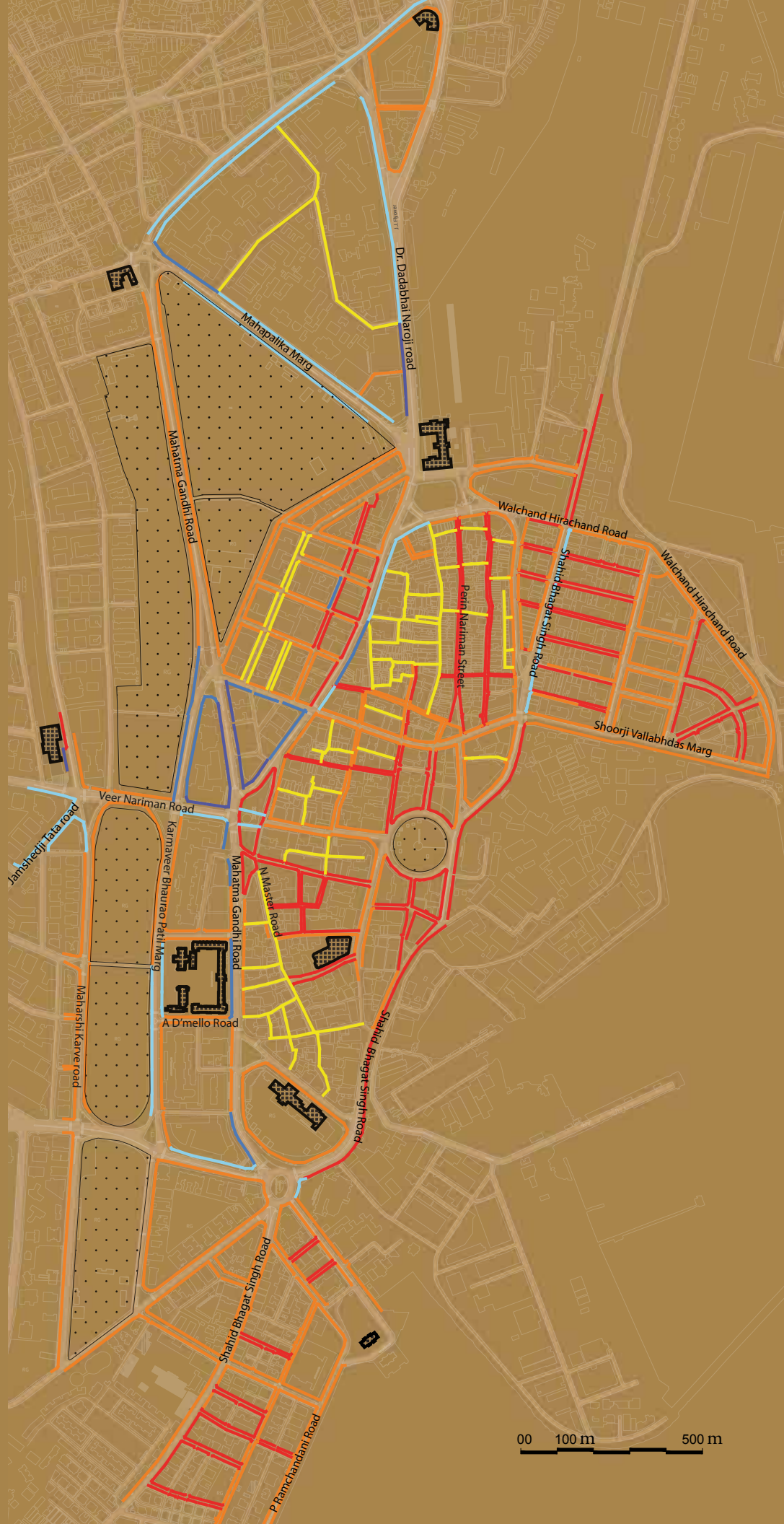
Source: [www.vimeo.com](http://www.vimeo.com)



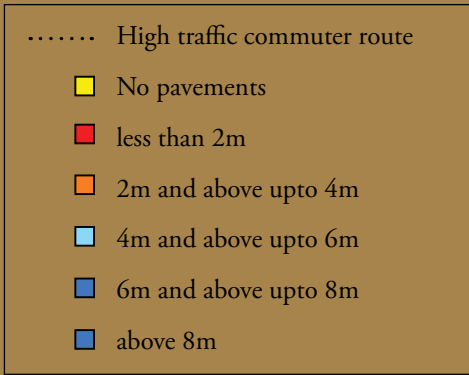
## ***WAY FORWARD***

- 1) Remove obstacles to pedestrian flow and grade changes in pedestrian path by redesigning curb cuts and junctions*
- 2) Ensure that footpaths are designed with clear demarcation of utility zone, Curb Zone, Building facade zone and Pedestrian Way and each of them is sized appropriately.*
- 3) Ensure that trees planted are surrounded with a grating that is level and flush with the pavement. Trees should not obstruct sight lines at junction, pedestrian crossings and bus stops. Plant more trees wherever possible.*
- 4) Ensure that the utility placed in the zone are organized in the relevant sections and do not create an obstruction either to pedestrians or to sight lines.*
- 5) Bus stops to be designed with 8 foot wide curb in front to allow passengers to wait safely. Multiple bus stop routes converging at a single bus stop should be redesigned or re-timed.*
- 6) Bus stops to be designed to facilitate queuing and waiting. Remove rear advertisement panel.*
- 7) Provide safe pedestrian crossing with properly timed signals and marking in line with pedestrian path.*
- 8) Enforce safe motorist and pedestrian behavior with support of the police. Enforce stopping of vehicles before the stop line at pedestrian crossings.*
- 9) Redesign major pedestrian crossings such as church gate and university and fountain junctions as scramble crossings. (as in Japan or the UK)*





### Existing pavement widths and major commuter paths



Street name	Existing Pavement width	Usage Type				Clear required pedestrian way	Total Pavement width	total footpath width + utility	Width of footpath that permits hawking	Recommendation
		Com-muter Path	Shops	Hawkers	Amenities in Utility Zone					
Mahapalika Marg	4 <6 and 6<8	*****			Bus stops	4M	.6+Utility+4+.3	5M+utility	>7m	Footpath needs widening in sections
Mahatma Gandhi Road	2 <4, 6 <8 and >8	*****		*****	Bus stops	4M	.6+Utility+4+.3	5M+utility	>7M	Footpath needs widening in sections
Dr. Dadabhai Naroji Road	<2, 4 <6 and >8	*****	*****	*****	Bus stops	4M	.6+Utility+4+.3	5M+utility	>7M	Footpath needs widening in sections
Walchand Hirachand Road	2<4	*****			Bus stops	4M	.6+Utility+4+.3	5M+utility	>7M	Footpath Needs widening
Shoorji Vallabhdas Marg	2<4	**			Bus stops	2M	.6+Utility+2+.3	3M+ utility	>5M	Footpath Needs widening
Perin Nariman Street	<2	*****	*****	*****	Bus stops	4M	.6+Utility+4+1.4	6M+utility	>8M	Footpath completely inadequate
Bora Bazaar Street	0	*****	*****	*****	Bus stops	4M	.6+Utility+4+1.4	6M+utility	>8M	Footpath completely inadequate
Pherozsah Mehta Road	2<4	*****			Bus stops	4M	.6+Utility+4+.3	5M+utility	>7M	Footpath completely inadequate
Veer Nariman Road	2<4	*****	*****	*****	Bus stops	4M	.6+Utility+4+1.3	6M+utility	>8M	Footpath needs widening in sections
Shahid Bhagat Singh Road	2<4 and 4<6	*****			Bus stops	2M	.6+Utility+2+.3	3M+ utility	>5M	Footpath needs widening in sections
N Master Road	0	*****	*****	*****	Bus stops	4M	.6+Utility+4+1.3	6M+utility	>8M	No footpath
A D’ mello Road	2<4	****			Bus stops	3M	.6+Utility+3+.6	4M+utility	>6M	footpath inadequate
Karmaveer Bhaurao Patil Marg	2<4 and 4<6	*****			Bus stop	3M	.6+Utility+3+.6	4M+utility	>6M	footpath inadequate
P Ramchandani Road	2<4	*****		**		4M	.6+Utility+4+1.3	6M+utility	>8M	footpath inadequate
Maharshi Karve Road	2<4	*****			Bus stop	4M	.6+Utility+4+1.3	6M+utility	>8M	footpath inadequate
Jamshedji Tata Road	4<6	*****	***	**	Bus stop	4M	.6+Utility+4+1.3	6M+utility	>8M	footpath inadequate
New Marine Lines	0	*****			Bus stop	4M	.6+Utility+4+1.3	6M+utility	>8M	footpath inadequate



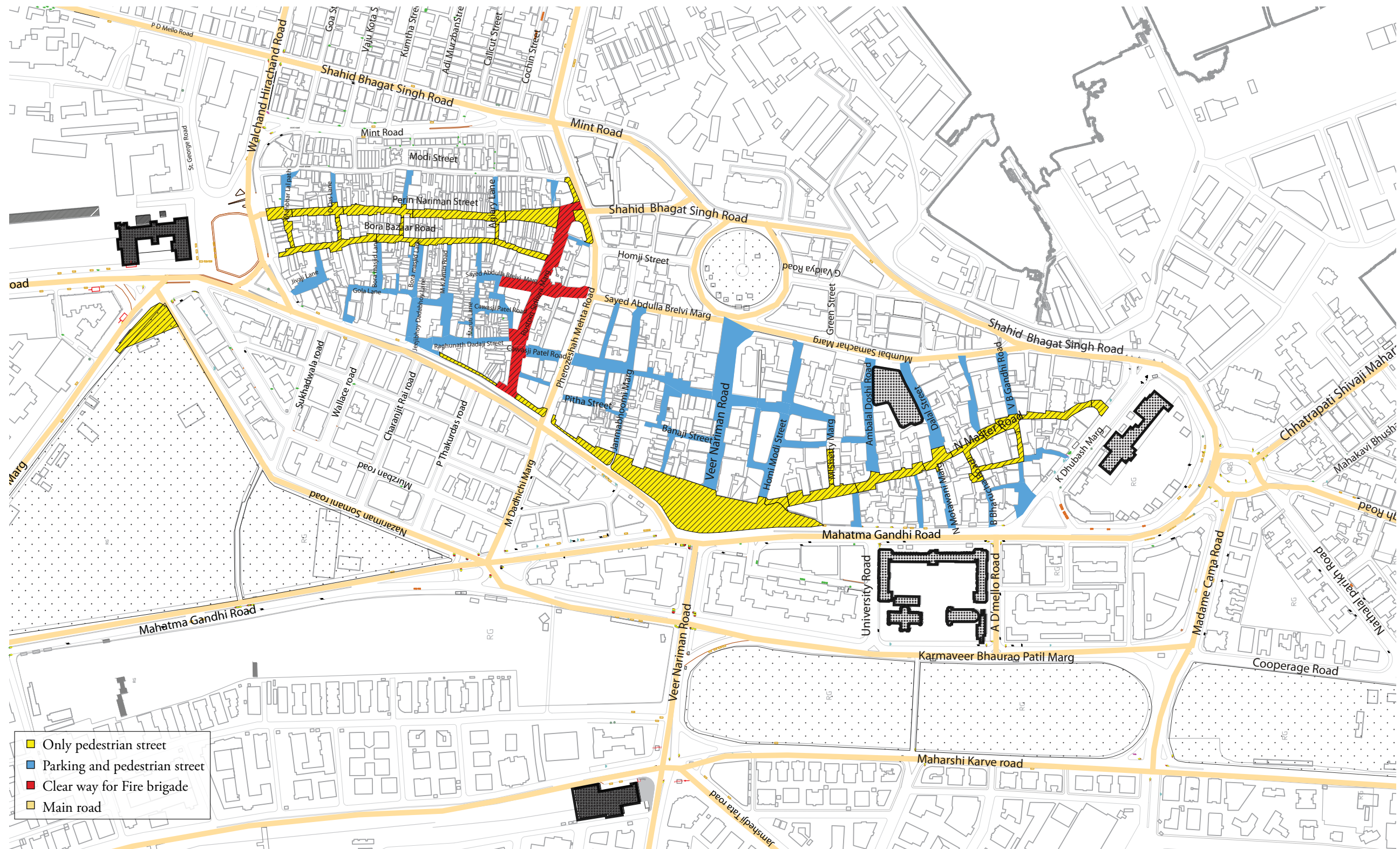
## 5.0 PEDESTRIANISING STREETS

### REDUCING PEDESTRIAN VEHICLES CONFLICT

The internal streets in the traditional market areas of the fort (such as fountain, bazaar gate) are not provided with pedestrian footpaths. Vehicles thoughtlessly attempt to squeeze their way through this mass of pedestrians. Cars parked on either side of the road add to the confusion of the streets. These internal bazaar streets that are predominantly used for foot traffic can easily be converted into “pedestrian only’ zones. This would also alleviate the squash of street stalls and food hawkers that are based in these areas. Vehicular movement in the fort can be easily diverted to the outer main roads.



## 5.2 Proposed Pedestrianisation Plan



### DEMARCATING A PEDESTRIAN ONLY STREET

Removable /Retractable bollards are placed at the entry to pedestrian only streets. This is to facilitate entry for emergency vehicle. Cleaning vehicle and loading vehicles are provided access thru the street at designated times of the day. This is generally during late night and early morning hours (eg.- 10pm to 8am).

### DEMARCATING A PEDESTRIAN AND PARKING STREET

High traffic commercial streets generate conflicts between pedestrians, through vehicular movement, parked cars and hawking. Removing one of the elements – thru traffic – can greatly reduce the congestion in the streets as vehicles will access the street only in order to park. A possible pedestrian parking street could be Veer Nariman Road from Flora fountain to Horniman Circle.

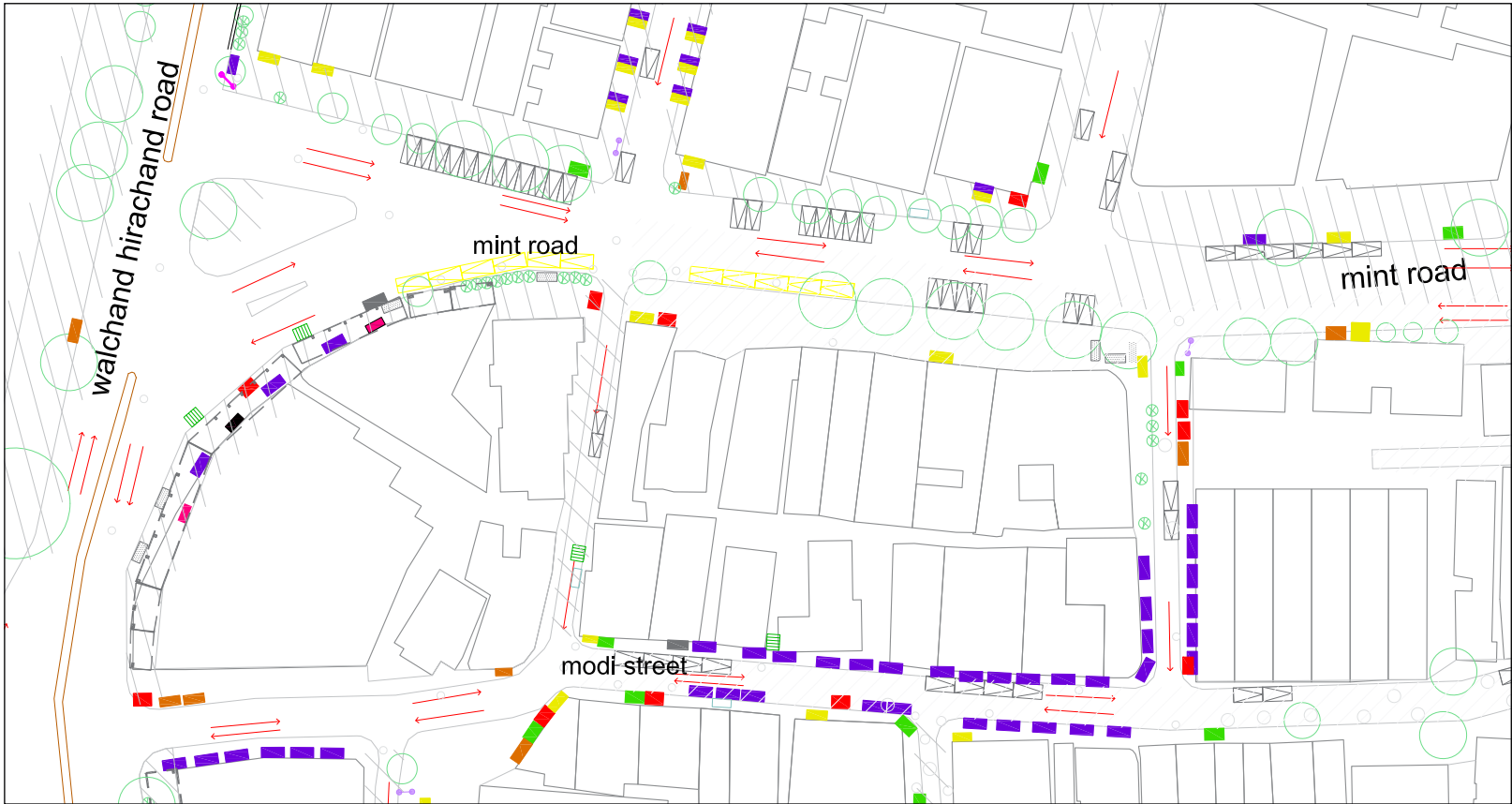
Both ends of the parking street is closed off with boom barriers and a parking attendants booth. All cars entering the street collect a ticket and pay it at the time of exit. Pedestrian have unrestricted access to the space. The street is redesigned to provide organized parking while enhancing the pedestrian experience. Hawking can be allowed on the street if space permits. A clear manoeuvrable path of 14 foot width must be left for access by emergency and cleaning vehicles. The building facade creates the edge to the space. Well conserved heritage buildings in the precinct would provide character and create a sense of place.

## WAY FORWARD

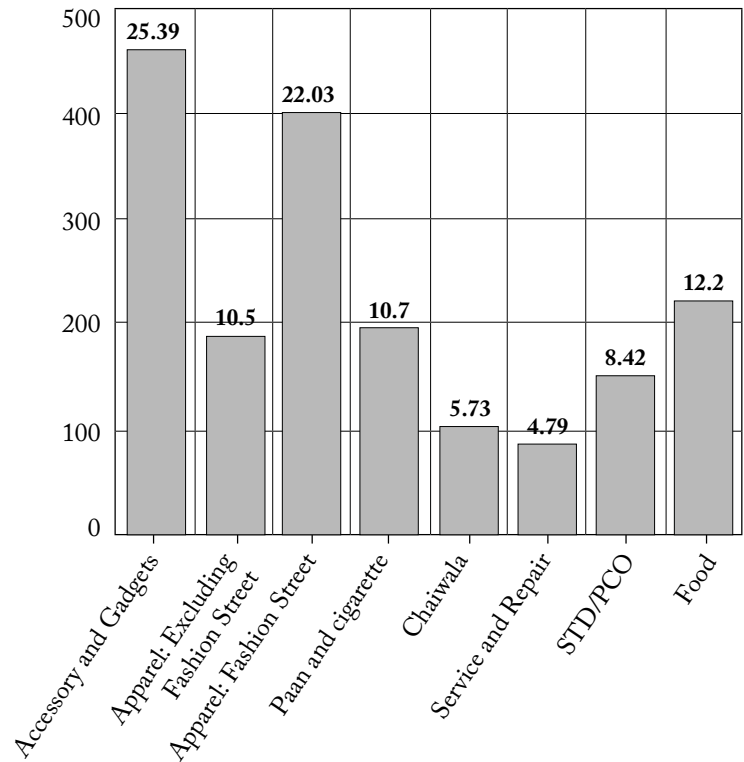
- 1) Heavy flow commuter paths through dense urban fabric to be pedestrianised.
- 2) In heavy shopping and commercial used streets, parking only pedestrian zones to be demarcated to prohibit thru traffic.
- 3) Route outside fire station to be pedestrianised and left clear for the fire trucks to move.



5.3 Eating streets and Hawkers



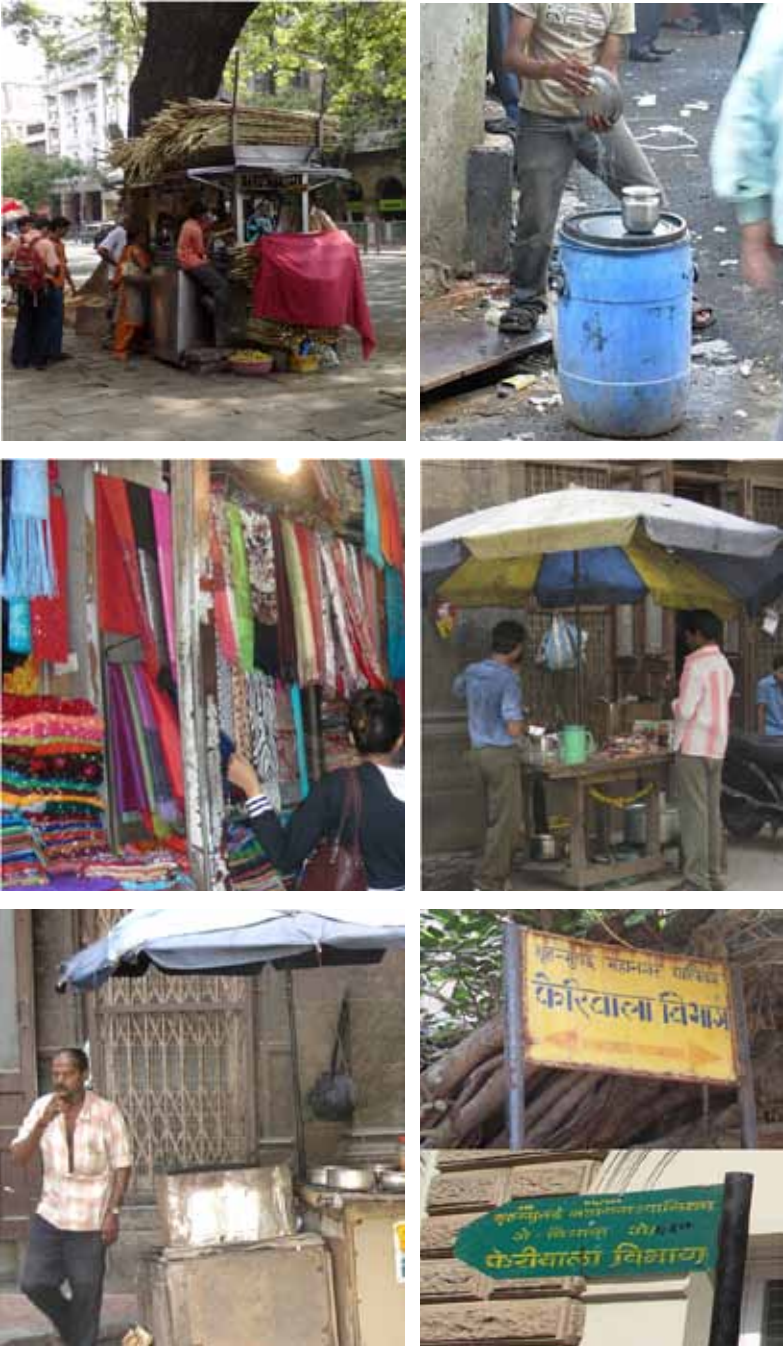
Extracts of physical survey



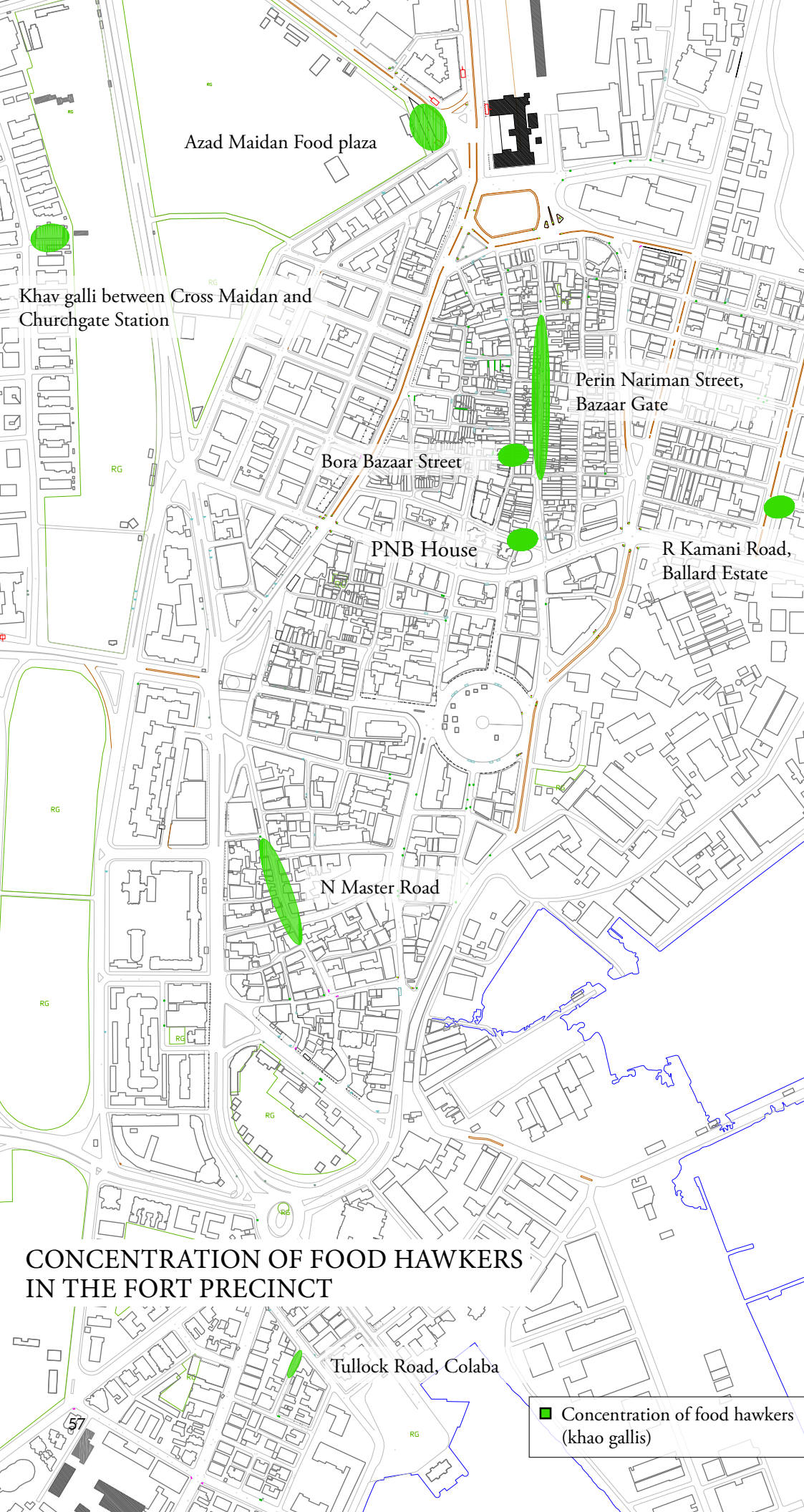
Hawkers	Number
Accessories and gadget hawkers	461
Apparel (excluding fashion street)	191
Apparel - fashion street + colaba causeway	400
Paan and cigarette walas	196
Chaiwalas	104
Service and repair	87
STD/PCO	153
Food	223

SURVEY OBSERVATIONS:

- Hawkers selling the same food items do not normally locate themselves in the same area. They are careful to provide complimentary or different food.
- Hawkers selling gadgets and apparel do normally locate themselves in the same area as seen on fashion street, jewellery and handicrafts hawkers of Colaba Causeway and the gadget hawkers in the MG Road arcades
- More than 50% of the hawker stalls were fixed in place.
- More than 35% of hawkers had access to electricity supply. The others did not need it to operate and used street lighting.
- More than 50% of hawkers were perceived as an obstruction on the pedestrian path.
- More than 35% of hawkers required water supply. This was either carried to the hawking location or purchased from hath-gadis or tankers.
- More than 35% of hawkers has access to storage space. (not including fashion street)
- Only about 25% of the hawkers were in designated hawking zones. (not including fashion street)



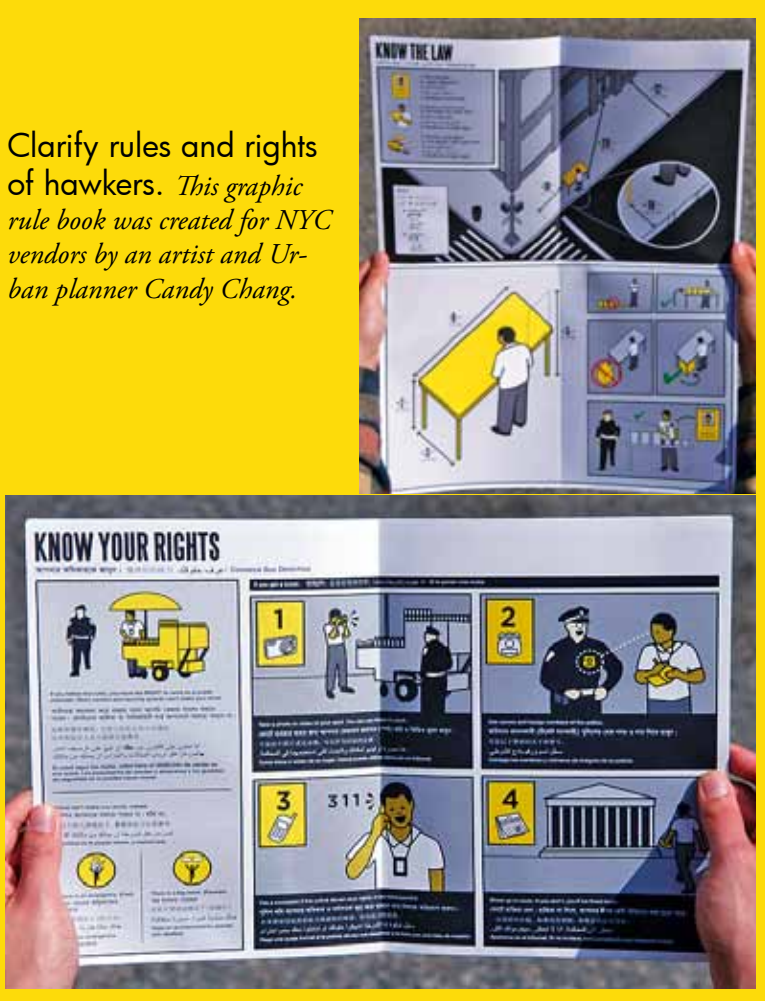




# WAY FORWARD

- 1) Establish pedestrian priority: Pedestrians will have to be given priority at all times and hawker pitch allocations by MCGM or decisions by the hawkers committees may not in any way be in conflict with pedestrian movement at grade.
- 2) Establish a clear set of rules for hawking and establish the rights of hawkers so that hawkers, commuters and enforcement authorities are clear regarding the rules as ambiguity leads to harassment and draft.

Clarify rules and rights of hawkers. This graphic rule book was created for NYC vendors by an artist and Urban planner Candy Chang.



- 3) All hawkers to be in utility zones that are wider than 2.5m.
- 4) Rotational system for use of hawker space: Where licensed hawkers are in excess to the available space, a rotational system could be put in place where a single hawking spot may be used by multiple hawkers by establishing a clear time schedule.
- 5) Establish minimum guidelines for each street: Decisions made by hawkers committee must be moderated by these set of guidelines. Such as-
  - A minimum width acceptable for pedestrian movement.
  - A minimum width for carriageways, right of way for servicing and fire trucks etc.
  - These minimum mandatory widths should follow the UDPFI guidelines for pavement widths based on the number of pedestrian users per hour wherever this can be practically achieved.
- 6) Each hawking pitch needs to be clearly specified by Ward committees and marked on site along with the license of the hawker occupying the spot. This is to ensure that a hawker limits his activities to the space designated and does not in any way encroach onto pedestrian and vehicular areas.
- 7) Hawker rules must also apply to - Cobler Pitch/Stall, PCO Booth, Aarey Sarita Stalls and other general stalls, police chowkies and public toilets.
- 8) Hawking not to be permissible on foot over bridges, skywalks and flyovers.
- 9) Creation of hawking plazas: These can be created by removing existing parking from plazas and redesigning them as hawking and pedestrian plazas. There should be safe access for pedestrians to such hawker plazas in the form of marked crossing, signalling etc.
- 10) Establish timings of vehicular servicing: Vehicular servicing can be done at non-peak hours of the day, early morning or after business hours.
- 9) Hawker stalls to be removed at the end of the day (no part may be left behind), leaving the space clear for maintenance and cleaning.



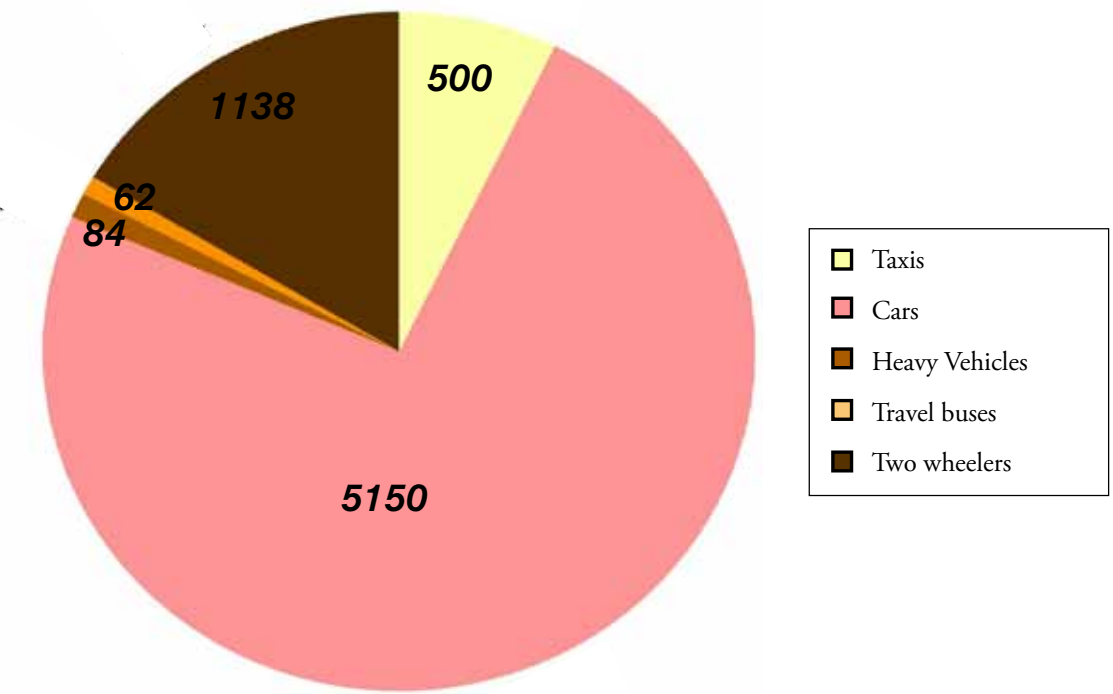


6.0 PARKING

6.1 Parking of Private cars is one of the largest space eaters of public space in the fort. Our surveys of parking in fort show that 74% of parking is used by private vehicles. Cars are parked on pavements, at bus stop zones, double parked and in no parking area. They occupy centre islands, plazas and spaces around heritage monuments meant as public spaces. They surround gardens and block access to shop fronts. To reclaim the limited public space of the Fort precinct there needs to be proper management of parking demand.

To maximise public space for pedestrians it is necessary that policies be put in place to discourage long term parking at the fort and to encourage the use of public transport systems to get around by introducing a bus circulator system. Providing convenient and frequent Air conditioned buses is the step in the right direction to encourage commuters to step out of their cars and into public transport and needs to be extended to train routes as well.

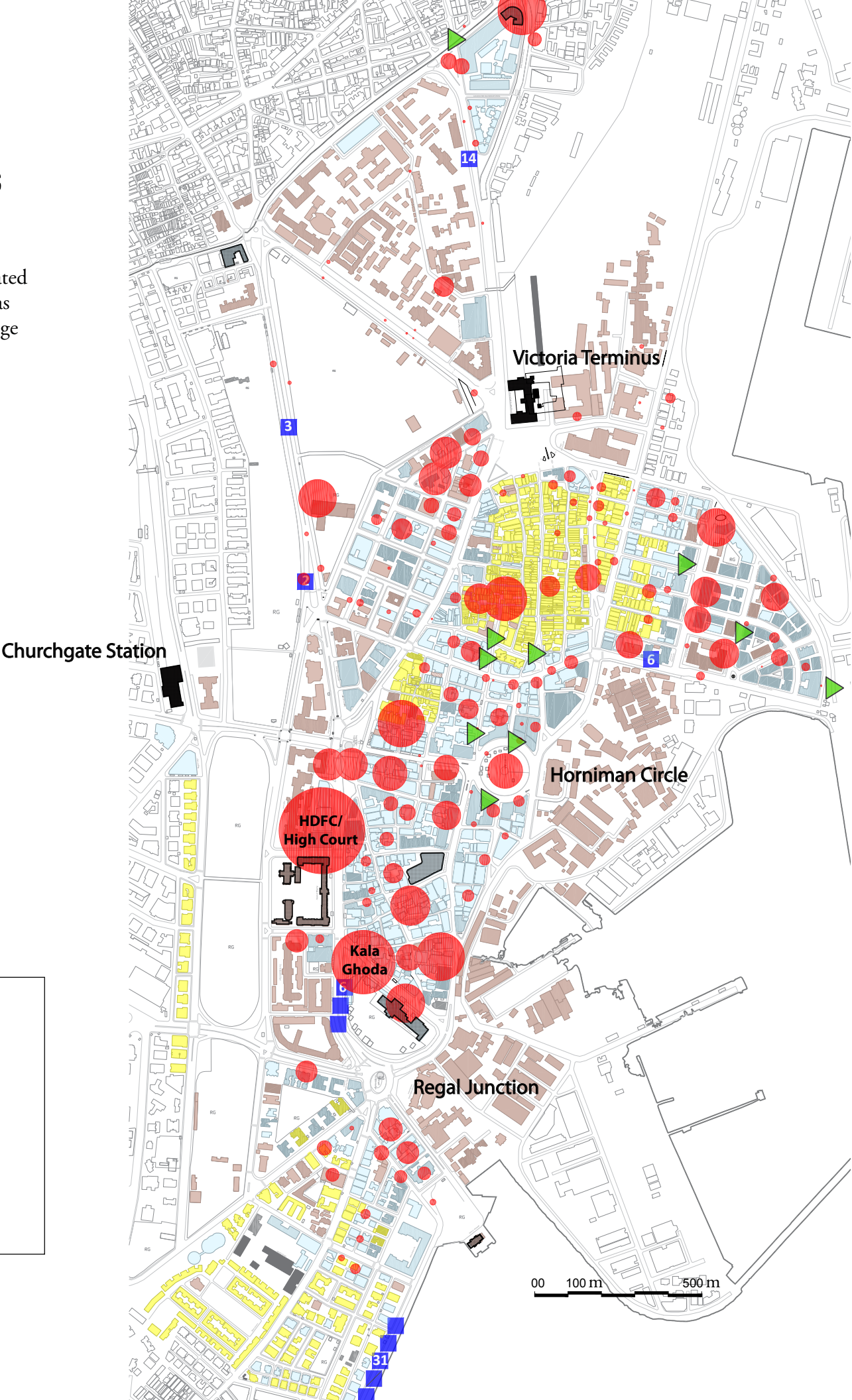
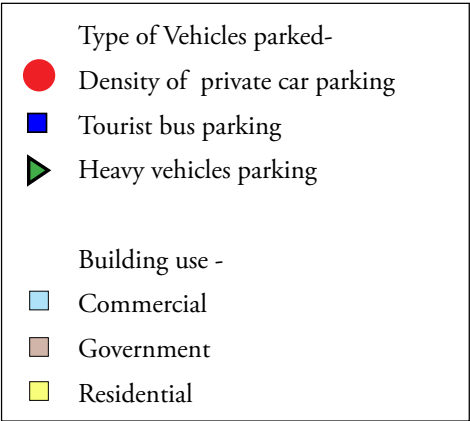
Parking in Fort  
In total 6,933 vehicles were counted



Discontinue the use of private open spaces for parking and discourage private vehicles in the Fort precinct

6.2 Parking densities and building use

Parking in the Fort is concentrated near large establishments such as the High Courts, Stock Exchange and the Banks





Number of vehicles parked in Fort 6.2.1





6.3 Re-Pricing Parking

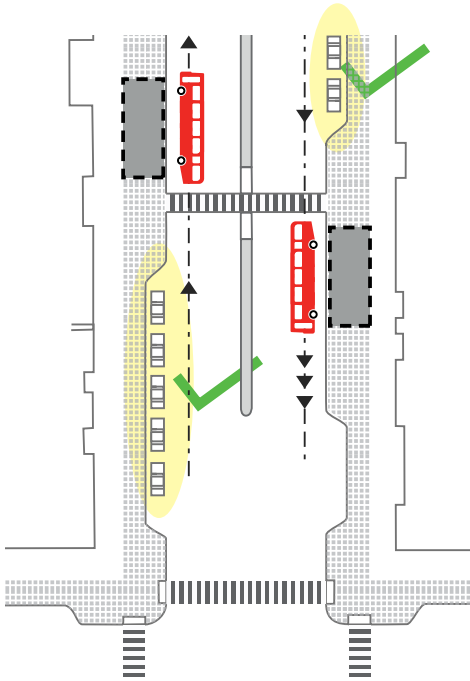
Reprice parking to reflect the cost of public space occupied -

CURRENT PARKING CHARGES		PROPOSED PARKING CHARGES		CONVENIENCE PARKING CHARGES	
Two wheelers	Four wheelers	Suggested pay and park rates on-street parking at peak hours (10am to 6pm)		Priority convenience parking slots (convenient slots in front of shops, government buildings, etc)	
1 hr - Re1	1 hr - Rs5				
2 hrs - Rs2	2 hrs - Rs8	First and second hour	Rs 30 per hour	15min increment upto an hour	Rs 15 each
3 hrs - Rs3	3 hrs - Rs11	Third and Fourth hour	Rs 40 per hour		
Beyond 4 hrs - Rs5	5 hrs - Rs17	Fifth hour onwards	Rs 50 per hour	Per hour after	Rs 100 each
		Off peak rates for on-street parking (6pm to 10am)			
		Per hour	Rs 20		

PARKING USAGE PATTERN/ DURATION

Duration		Use	Examples
2 mins	Used at locations where people are likely to be picked up/ dropped off and vehicle is likely to be attended	Drop-off or pick-up zones for passenger or goods	Chruchgate Station, CST Station, BSE drop off
5–10 mins	Used at locations where people are likely to be picked up and dropped off	Hotels, movie theatres, airports, schools	
15 mins	Used at locations where people exit the car for short-duration visits	Single land use facilities, eg dairy, banks	ATMs
30 mins	Locations with a high turnover of shoppers	Number of small shops or multi-use shops	D N road, Vir Nariman Road, Collaba Causeway and Tourist district
1 hour	Where there is a high turnover of shoppers and major demand for parking	Major shopping centres, professional services (eg lawyers, medical centres, accountants)	Fountain, High Court area
2 hours	Major demand for parking	Professional services Shopping centres	High Court area, M G road banks, BSE
4 hours	Used for those areas where all day parking is not desirable.	Areas where shopping/professional services apply.	Ballard Estate, Horniman circle.

6.4 Parking Guidelines



Parking needs to be behind the curb, in case proximity to a Bus Stop.

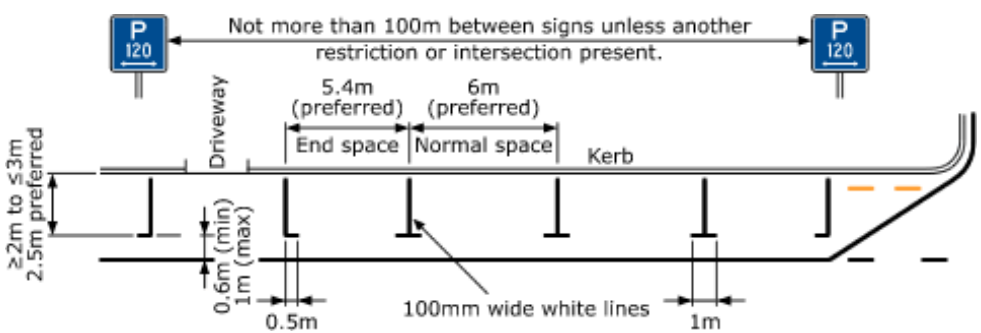
ENFORCEMENT

With any type of parking regulation, enforcement must be undertaken to effectively manage the parking system. Without ongoing enforcement, road users will become complacent and the measures put in place to manage congestion and parking issues will not be effective.

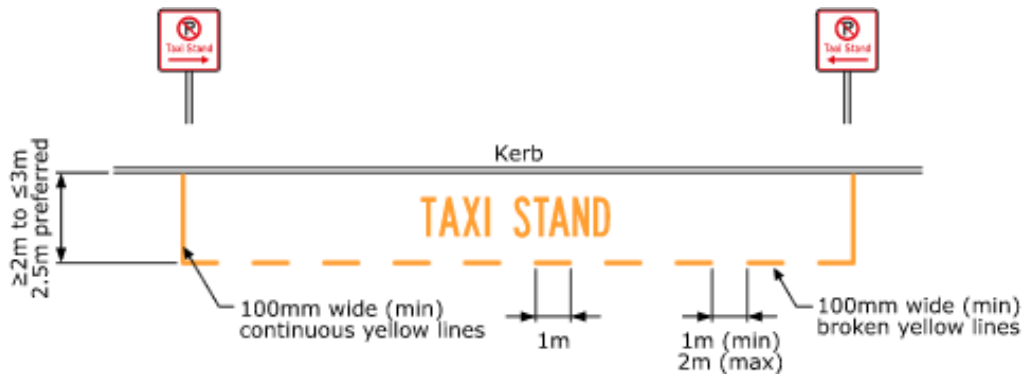
There are three main methods for the law enforcement of parking controls:  
1) Issuing tickets  
2) Wheel clamping  
3) Tow-away

RESIDENT PARKING GUIDELINES

- 1) New residential societies should build their own parking structure or pay parking charges the same as commercial parking.
- 2) Old residential building to be allowed on-street parking at the rate of 1 car per apartment minus the number of car parking slots available within the society.(ie: Number of apartment units - Parking slots in society = Number of car passes assigned for on-street parking) All cars in excess to pay parking charges the same as commercial parking.
- 3) Cancel all licenses of garages in residential societies which are used for non-parking usages.
- 4) Ensure that on-street parking costs are equivalent to or higher then parking garages in the area.



TAXI PARKING



TOURIST BUSES

Tourist buses can be seen to be parked in the Tourist District, Special zones and parking bays will need to be demarcated for the same

Source: Traffic Control Devices Manual Part 1, Parking Control, LAND TRANSPORT NZ, Lkiiki Whenua Aotearoa



## 6.5 Loading, Unloading & Service Vehicle Guidelines

- 1) Removable /Retractable bollards are placed at the entry to pedestrian only streets. This is to facilitate entry for emergency vehicle. Cleaning vehicle and loading vehicles are provided access thru the street at designated times of the day. This is generally during late night and early morning hours (e.g.: between 10 pm to 8 am)
- 2) A manoverable path of 14ft width must be left for access by emergency and cleaning vehicles.
- 3) As most loading and unloading activites within the Fort occurs in the middle of the street, this should be permitted at non-peak hours (for example between 8pm and 8am). Service vehicles such as CMC garbage trucks will also only operate during these times.



## 6.6 Parking Signage



BUS STOP- The sign indicates which bus routes stop at this location, their destination and the bus stop address. No standing regulations apply. This means that you may NOT wait or stop to load/unload packages or merchandise at curbside. You may stop to expeditiously drop off or pick up passengers.



NO PARKING REGULATION Sign indicates that vehicles may NOT park at this location at any time. You may stop to load/unload packages or merchandise at curb

side and you may stop to expeditiously drop off or pick up passengers



No standing regulations apply during specified hours except for commercial vehicles or trucks.



NO STOPPING REGULATION Sign indicates that vehicles may NOT stop at this loca-

tion at any time. You may not wait, stop to load/unload packages or merchandise at curbside, or drop off or pick up passengers at this location.

## WAY FORWARD

- 1) Re-price parking to reflect the actual cost of public space occupied by parked car.
- 2) Encourage short term parking and discourage long term parking.
- 3) New Residential societies to build their own parking structures or pay parking charges the same as commercial parking.
- 4) Old Residential building to be allowed on street parking at the rate of one car per apartment unit minus the number of cars parking slots available within the society.( i.e.: number of apartment units – parking slots in society=number of car passes assigned for street parking) All cars in excess to pay parking charges the same as commercial parking.
- 5) Cancel all licenses of garages which are used for non-parking usage.
- 6) Provide special parking zones for tourist buses.
- 7) Define and enforce loading and unloading times for all vehicles servicing the fort.
- 8) Provide clear and well designed parking signage.

Source: [www.nyc.com](http://www.nyc.com)





## 7.0 TRANSPORT INTERCHANGES

Commuters arrive at the fort either by Train, Bus or Taxi, and become pedestrians who often use more than one mode of public transport to get around. This point of interchange between systems of transport needs to be safe and easy to navigate.

To make the city more pedestrian-friendly, the emphasis must be on integrated transport strategies which provide a choice of different means of travel, with purpose-built interchanges ensuring that the transfer from one mode to another is achieved quickly, conveniently and reliably.

A well co-ordinated public transport network is clearly essential; but other physical factors that aid smooth connections include the accessibility of the interchange terminal (including disabled access), its layout and operational efficiency and the ready availability of travel information.

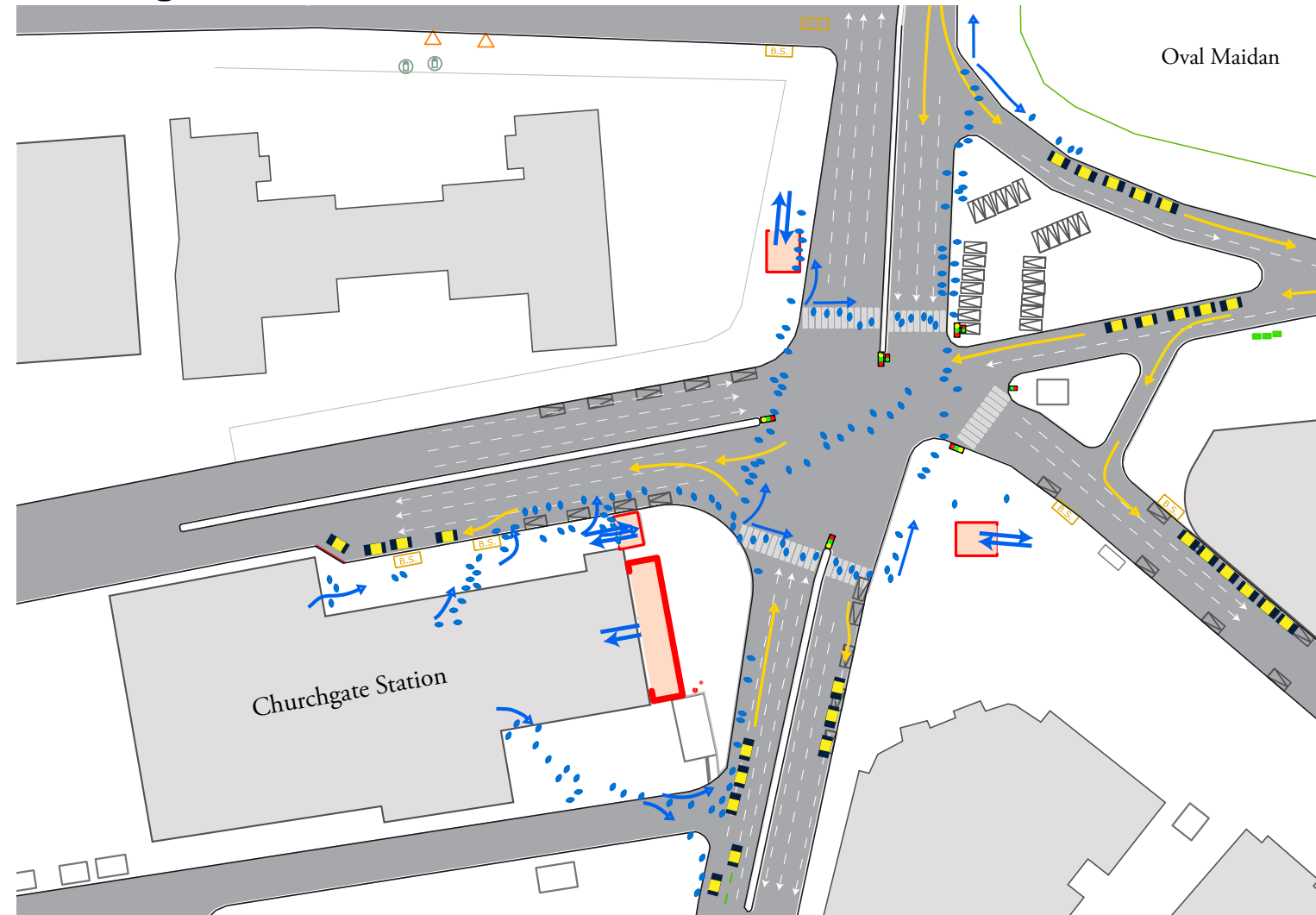
In these recommendation we have looked at Bus stops and Taxi transfers, Pedestrian paths and crossings at the two train terminals Churchgate and Chatrapati Shivaji Terminus (CST) and the introduction of a bus circulator. Signage and way finding also plays a crucial role in easing the stress of navigation.



Source: 'Above Bombay', Jehangir Sorabjee



## 7.1 Churchgate Station



Even though there are underpasses at Churchgate station junction and many commuters choose to use them there are still a substantial number of pedestrians who defy the railings and barricades placed in this junction and choose to cross the road at grade. They squeeze through barricades in front of the churchgate station entrance on Marine Lines to enter the station. Passengers waiting for buses stand on the road as the barricades stop them from accessing the pavement and the newly fabricated stainless steel bus stops are too narrow for the large crowd that waits here. Multiple bus routes converge to this point and can be seen double parked in the 2nd and third lanes as they pick up passengers sometimes cutting off all traffic behind them. Taxis also do the same as they pick up and drop off passengers.

The entire corner of the front of churchgate station is occupied by a fenced and landscaped garden with animal sculptures and a public toilet. This space which should rightfully be a pedestrian apron from which to access the station building is currently occupied with facilities that could be easily placed elsewhere. Those trying to make their way from Marine lines to Marine Drive are forced to walk on the street.

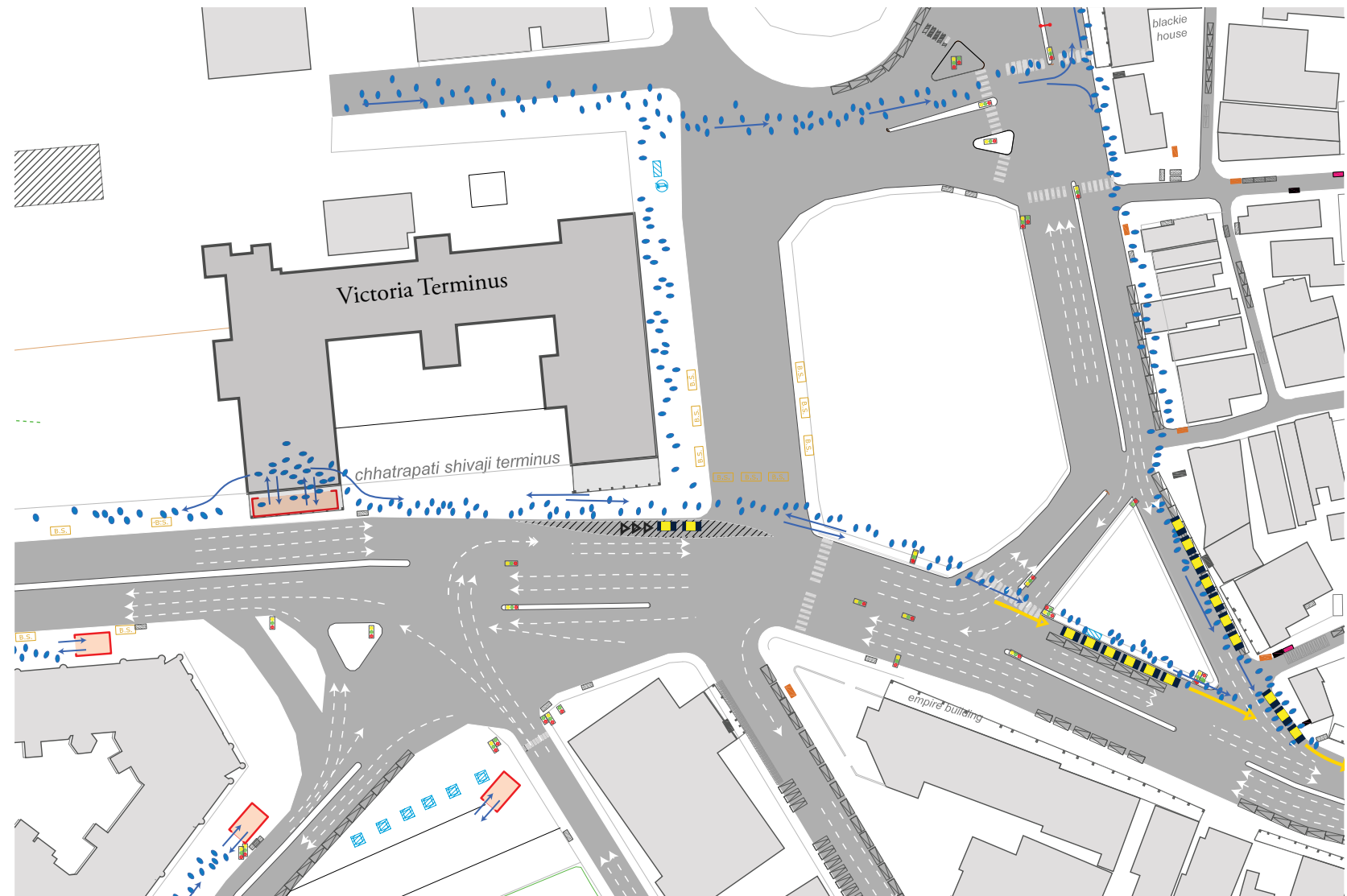
This node serves as the starting point for share-cabs which gather at each of the turns as they collect passengers. This facility needs to be considered in the redesign of this vital interchange point as does the interchange from the buses that arrive here. Parking located for three wheelers and cars at this crucial junction may be a misallocation of space that would be better used to design share cab parking.



Source: Google Earth



## 7.2 Victoria Terminus / CST



Even though CST node seems to function better than Church-gate node this is possibly because of the tight barricades and high medians that prevent pedestrians from crossing the street on grade and forcing them to use the pedestrian underpasses. Here the bus stop is located right next to the train station as a logical extension of the station zone. However the garden next to it is fenced off and cannot be used in any way that will enhance this public transport interchange point.

A Share cab starting point for numerous destinations, taxis are forced to park illegally here and daily risk being ticketed as no facilities are provided for this obvious commuter need.

Here right under the nose of the MCGM, the pavements are generally hawker free though official security points and cordons still inconvenience and obstruct pedestrians. Pedestrians are unable to cross DN Road on grade though a few brave souls still try. This is definitely a node that has given priority to the private vehicle and pedestrians and taxis come after other forms of public transport. This is a situation that has to be rectified so that pedestrians can reclaim their right full place on the ground and are not relegated to subterranean tunnels.



Source: Google Earth

## WAY FORWARD

- 1) Redesign critical commuter junctions to give priority to pedestrians at grade.
- 2) Create pedestrian plaza in front of CST and Church gate stations to facilitate interchange from trains to taxis and buses.



# 8.0 FORT CIRCULATOR

**8.1** The FORT Circulator is proposed as a resource for commuters in the Fort. There will be a single loop service to corporate and government offices entertainment and restaurants in fort, colaba, nariman point, crawford market, CST and churchgate

The circulator may runs free of cost so no conductor may be necessary to collect fare, just a driver.  
Revenue for running this service can be generated by advertising on buses. However, the advertising must not cover the windows of the bus and passengers should have a clear view in order to identify landmarks.  
The interior of the bus should provide comfortable standing room for hop-on hop-off passengers. Seating may be provided on the periphery of the bus with a large open central space for standing passengers.  
Buses may be air-conditioned but there will be delay for door opening and closing at each stop.



Key Features:
- Ac/ Non -AC
- Runs free of cost
- Electric/CNG vehicle- Every 5 minutes; Mon-Sat Hours: 7:00 AM - 11:00 PM Sun Hours: 1:00 PM - 8:00 PM
- No conductor necessary

## 8.2 Proposal 1 for Circulator

Blue Bus Routes (anticlockwise) | Red Bus Routes (clockwise)



Source: Google Earth





Source: Google Earth

## Proposal 2 for Circulator

8.3

- 1** Churchgate Station - Metro Theatre - Victoria Terminus - D N Road - Flora Fountain
- 2** Mantralaya - Churchgate Station - Flora Fountain - D N Road - Victoria Terminus - Crawford Market
- 3** Churchgate Station - Flora Fountain - Regal Theatre - Navi Mumbai (R C Church)
- 4** Churchgate Station - Flora Fountain - D N Road - Ballard Estate
- 5** Victoria Terminus - Shahid Bhagat Singh Road - Regal Theatre - Navi Mumbai (R C Church)

### WAY FORWARD

- 1) Implement the Fort Circulator in collaboration with BEST by defining the bus stops, route and dedicating buses for this purpose.
- 2) Create awareness of the route and service.



# 9.0 SOCIAL INFRASTRUCTURE



Public Toilets

Need toilets here

Drinking water fountains

Need drinking water fountains here

Heritage Pyavs

Food Court/ Streets

High traffic commuter routes

- 5 HERITAGE PYAVS:
- 1) Devidas Purshottamdas Kothari kabutarkhana & pyav.  
Opposite GPO at the junction of Mint Road and Walchand Hirachand Road
  - 2) Bomanjee Hormasjee Wadia  
At junction of Perin Nairman Street
  - 3) Fountain at St. Thomas Cathedral
  - 4) Ruttontsee Mul'ee Fountain  
At intersection of Mint road and Shahid Bhagat Singh Road
  - 5) Madhavdas Laxmidas Lothari Pyav
  - 6) Pyav inside Crawford Market





## 9.1 Drinking Water fountains and pyavs

### 5 Heritage Pyavs:-

- 1) Devidas Purshottamdas Kothari kabutarkhana & pyav.  
Opposite GPO at the junction of Mint Road and Walchand Hirachand Road
- 2) Bomanjee Hormasjee Wadia  
At junction of Perin Nairman Street
- 3) Fountain at St. Thomas Cathedral
- 4) Ruttontsee Mul'ee Fountain  
At intersection of Mint road and Shahid Bhagat Singh Road
- 5) Madhavdas Laxmidas Lothari Pyav
- 6) Pyav inside Crawford Market

## WAY FORWARD

- 1) There are 6 public drinking water fountains in the fort. Many more public drinking water fountains need to be provided in the suggested localities in utility zones of pavement or other appropriate spaces.

Water fountains need to be located in the following areas:

- |                                  |                           |
|----------------------------------|---------------------------|
| 1) Oval Maidan                   | 6) At Flora Fountain      |
| 2) Cross Maidan                  | 7) Prince of Wales Museum |
| 3) Azad Maidan                   | 8) Ballard Estate         |
| (Repair and renew existing pyav) | 9) Bazaargate             |
| 4) Crawford Market               | 10) Churchgate            |
| (Repair and renew existing pyav) | 11) Colaba Causeway       |
| 5) Near MCGM offices             | 12) Cooperage Grounds     |

- 2) Renovating Heritage pyaavs - Heritage pyaavs that are neglected and disused should be conserved and renovated and brought back into public use. These traditional piyaos are a heritage sensitive answer to the need for water fountains in the fort precinct.



On D.N. Road, Flora Fountain Junction



On D.N. Road, Flora Fountain Junction



At the plaza of Gateway of India



At Prince of Wales Museum



Toilet at Corner of K Dubash Marg, Kalaghoda and Toli at churchgate station occupies entire pavement



At Gateway of India

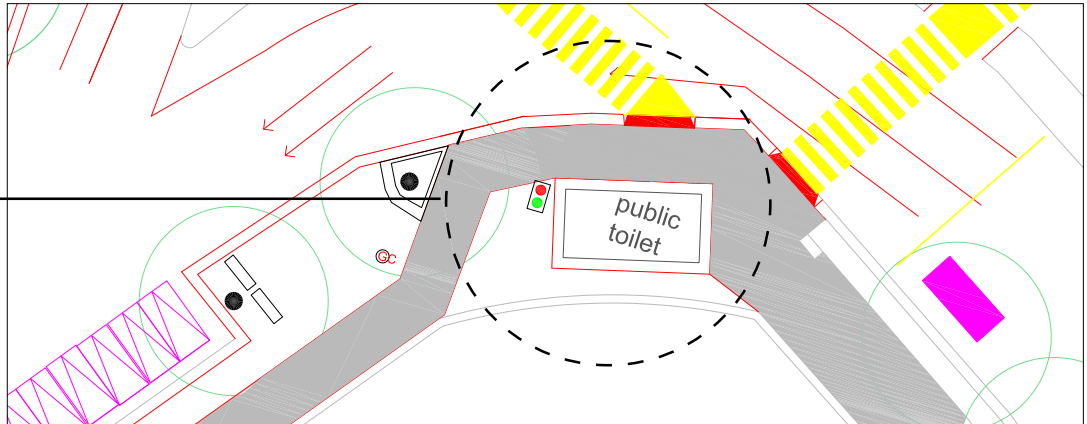


Near Victoria Terminus

## Toilets

### Locating toilets

- Toilets can be located with access from the pavement but not occupying the clear footpath zone.
- Toilets such as the one located on the corner of K Dubash Marg is built in the middle of the pavement. In such cases it is advisable that the pavement is widened around the toilet to maintain the width of the pedestrian path.



Reconfigured footpath to allow clear path around existing toilet and reorganised pavement elements

## WAY FORWARD

- 1) Ensure that toilets are not an obstruction on the pavement.
- 2) Implement a stronger cleaning and maintenance regime for the toilets that have already been built.
- 3) Provide new toilets in the locales identified taking into account the distribution of toilets in Fort. The following areas have been identified as needing toilets as there are none in the proximity-
  - 1) Colaba causeway
  - 2) Ballard estate
  - 3) Bazaargate
  - 4) Bombay stock exchange



9.3

## Seating



### WAY FORWARD

- Provide more formal and informal seating area in public squares and in the utility zones of pavement and under trees.

- Seating- formal and informal
- Tree cover on pavement

Formal seating in Fort



Informal seating in Fort





10.0

SOLID WASTE MANAGEMENT

**BRIHANMUMBAI  
MAHANAGARPALIKA**

**Public Notice**

Under Section 368 of the Mumbai Municipal Corporation

WHEREAS the MUNICIPAL CORPORATION OF GREATER MUMBAI hereinafter referred to as MCGM, is obliged under Aection 61C of the Mumbai Municipal Act, 1888 to remove and dispose of excrementious and other filthy material, ashes, refuse and rubbish, etc. AND WHEREAS it has been observed that the citizens in the residential / commercial areas throw garbage generated by them on the streets, nallahs, etc. AND WHEREAS, because of the above act of throwing the garbage, there is a threat to public health and sanitation. AND WHEREAS, in order to check this menace it is required to store the garbage at source by all the citizens and deposit the same in the manner prescribed by the MCGM. Therefore, in accordance with the powers given under Section 368 of the Mumbai Municipal Corporation Act, 1888, the following directions are given to all citizens:-

1 All the owners/occupiers of their respective pre-mises are hereby required to keep two receptacles [bins], one for dry garbage i.e. paper, plastic, glass etc., and another for degradable wastes e.g. food waste and kitchen waste and store daily waste into the two re-ceptacles.

2 The owners/occupiers of the premises are re-quired to deposit only wet biodegradable waste in the vehicles of the MCGM or deposit the same in the near-est community bin. The dry waste be disposed off by handing over the same to rag pickers or scrap dealers directly.

3 The citizens are required to deposit the gar-bage in the community bin and not around it.

Failure to observe the above directions will at-tract the punishment under Section 471 of the Mum-bai Municipal Act, 1888 can extend to a fine of Rs. 1000/- for every breach.

By Order  
Municipal Commissioner  
MUMBAI MUNICIPA CORPORATION OF GREATER MUMBAI



WAY FORWARD

- 1) Locating, sorting and cleaning facilities for rag pickers:  
The possible area wise breakup for locating a sorting facility -
  - Ballard Estate for the CBD area
  - Crawford Market and Bazaar area
  - Marine Drive area
  - Colaba area

2) Locating area composting units:  
Locate an area composting unit only for A ward as it is furthest away from the land fill.
  - Clean Air Island Pumping Station in Colaba
  - Sassoon Dock.
  - Large establishments such as markets to implement their own composting facility on site.

3) Implementing an on-call waste pick up system for construction debris and the dump trucks to be monitored by GPS to prevent illegal land filling.

4) Extra pickup for large waste generators:  
Provide higher frequency of garbage pick-up services for large waste generators such as restaurants and markets to prevent build up of garbage at these locations.

5) Locating of trash cans:  
A significantly larger number of trash cans will need to be installed along all pavement routes. These are to be checked and emp-

6) Keeping users informed as to the timings for waste pick up and the systems that are being put in place.  
In order to implement this, a clear timeta-ble and other systems will need to be put in place and followed. Only after a reliable and predictable system has been put in place can people be expected to synchro-nize their garbage disposal with the gar-bage collection system to ensure the mini-mum of litter and garbage lying around.

7) Enforce cleanliness:  
Activate and empower cleaning marshalls to enforce cleanliness among public. Fine littering, spitting and urination. MCGM and press to run a campaign to advocate this. Police, Street sweepers and BMC workers to have authority to impose this fine.

8) Cleaning area for hawkers:  
Provide centralised zones in hawker areas for cleaning of vessels etc.



10.1 REQUIREMENTS FOR COMPOSTING

Say we need to process 200 tons per day of compostable waste in A Ward. It is estimated that this would probably need about 6 acres or little over 2.5 hectares of land. The composting facility will also need to accommodate space for equipment storage, compost storage, screening and sizing machinery, grinders and shredders. The facility would need covered sheds to prevent the compost from getting too wet in the monsoon and concrete pads for the composting area to prevent leachate from entering the ground. The compost will need to be oxygenated by turning or other methods to prevent anaerobic decomposition and the resultant smells from occurring. The presence of rodents and vermin may not be avoidable as well as stray dogs and crows etc. The site will need power and water supply for moistening the compost

The ratio of the compost needs to be maintained between nitrogen substances (fresh greens) and carbon substances (dry leaves) in order to achieve proper composting. This ratio is to be ideally kept at 30:1 for Carbon: Nitrogen though the ration may vary between 20 and 40 Another method is the something called the EcoPOD formulated by agbag environmental that would eliminate many of these problems using an innovative plastic tube for storing the compostable material during the process. This is oxygenated mechanically and odor vermin and animals as well as wind drifting nuisances are removed. (www.ag-bag.com)

Organic Wastes	Inorganic Wastes	Inorganic Wastes
Biodegradable	Recyclable	Non recyclable
Kitchen Wastes	Newspapers	Old medicines
Tea Leaves	Paper books and magazines	Paints
Egg Shells	Glass	Fluorescent tubes
Vegetables	Wires	Spray cans
Fruit and Vegetable peels	Fertilizers & pesticide containers	
Meat, bones	Plastic	Batteries
Metal objects	Metals	Shoe polish
Flowers, fruits & vegetables	Rags	Other domestic hazardous wastes
Garden and animal wastes		Leather
Leaf litter	Rexine	
Soiled paper	Rubbers	
Scraps of paper	Thermocol / Styrofoam	
House dust after cleaning		
Coconut shells		

RECYCLING PLASTIC

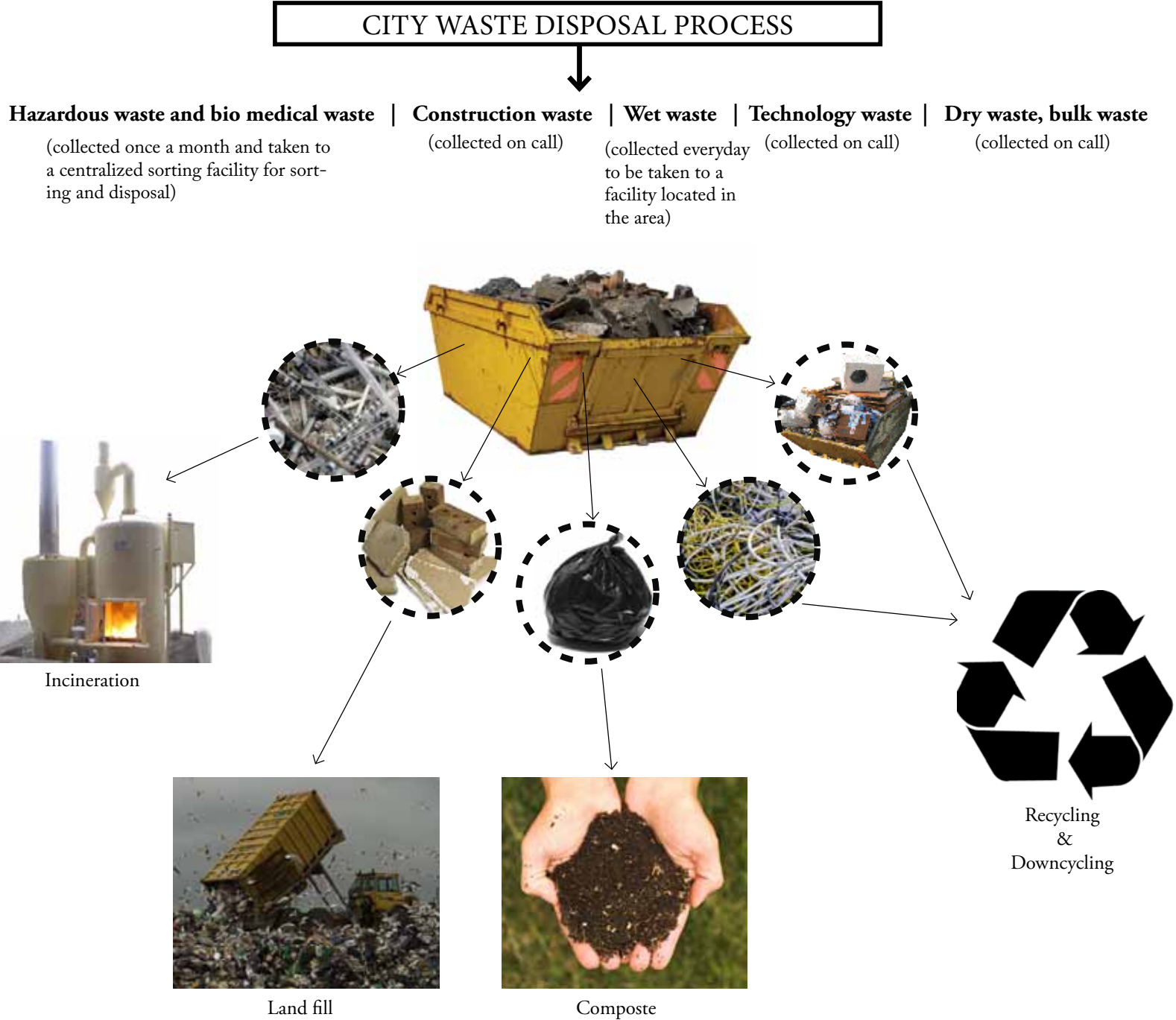
Broadly, the following technologies are available:

1. Recycling, consisting of making Plastic Granules to be moulded into goods thereafter.
2. In the construction of Tar Roads.
3. Conversion into Petroleum (Refuse Derived fuel, or RDF).
4. Disposal in Cement Manufacturing Kilns.
5. Disposal in Blast furnaces.
6. Energy recovery and /or Generation of Power in Incinerators.
7. Plasma Pyrolysis.
8. Disintegrating plastics by processing into the basic Chemicals which are harmless.
9. Disposing off the waste by using some bacteria.

Practically Feasible and Economically Viable Method of Disposal of Plastic Waste

10.2

10.3



Generated in Greater Mumbai and major cities of Maharashtra. Report prepared for Maharashtra Pollution Control Board, Eco friend and Co. 2009



COLLECTION → SEGREGATION → RECYCLING

Categories of Waste			Process	Recommendation
Compostable waste	Wet kitchen waste street sweepings organic compost from hawker stalls	<ul style="list-style-type: none"><li>• Vegetable and Fruit waste</li><li>• Meat bones kitchen scraps coffee and tea grind</li><li>• Garden and animal waste</li><li>• Leaf litter</li><li>• Egg shells</li><li>• Cartons of paper</li><li>• Soiled paper and paper scraps, Paper plates and cups</li><li>• House dust after cleaning Coconut shells</li></ul>	<ul style="list-style-type: none"><li>• Collected and sent to Landfill or Decentralised bulk composting shared by neighbourhood buildings in a convenient location close to source. This may be more conveniently done by residential buildings.</li><li>• <b>Offices and Commercial buildings may not be so interested in participating in such a scheme</b></li><li>• <b>Bulk producers of compostable waste such as restaurants may also not have the same composting on their premises.</b></li></ul>	<ul style="list-style-type: none"><li>• Centralised composting facility for area or ward such as the initiative by</li><li>• Clean Air Island at the Colaba Pumping Station could also be put in place. This can be extended to more locations in the area.</li></ul>
	Waste that already has an established system of recycling	<ul style="list-style-type: none"><li>• Paper, glass, aluminium and plastic</li></ul>	Can continue to be collected at source by the radhdhi wala. Sorting is simple and materials are sold directly to the exporter/recycler.	
Other recyclables	Rest	<ul style="list-style-type: none"><li>• Plastic Wrapping</li><li>• Tetrapacks</li><li>• Oil bottles</li><li>• Soft drink bottles</li><li>• Styrofoam Plates and cups</li><li>• Bubble packaging and blister packs Shoes and Chappals</li><li>• Plastic bottles containing chemicals and detergents makeup and creams Clean and soiled Plastic Bags</li></ul>	Down-cyclable waste needs sorting and cleaning before being re-used to make products of a lower raw material quality.	<ul style="list-style-type: none"><li>• Sorting and cleaning centres to be established at locations to close to each source area. These will be serviced and used by rag pickers who currently do this work in the pavements and other open spaces.</li></ul>
Technology Waste	Batteries Electronic waste and appliances Old medicines AEROSOL CANS Paints and Thinners Printer Cartridges/ Ink Videotapes and CD's Fluorescent tubes and bulbs Fertilizers & pesticide containers Shoe polish Other domestic hazardous wastes		Technology waste that requires some amount of technical knowledge for separation of valuable resources needs to be handled at a centralised location for Mumbai. The MMRDA has initiated plans for such a facility.	
			Other than that the only place that does some sort of technology waste recycling is located in the area of Lamington Road. These recyclers are not able to completely reuse and recycle all of the valuable components of technology waste.	This waste can be collected from every area on a monthly basis and sent directly to the recycling facility

Categories of Waste		Process	Recommendation
Construction Waste to fill sites/ on call pick up	Small quantities of construction	On call pick up by private transportation	Debris will be picked up by MCGM within 24 hours of being called in by the disposer. This will be consolidated and sent to land fill sites that require construction debris.
	Bulk construction debris	The land fill site can pay a fee for obtaining the fill material as well as the disposer will pay a fee for disposal.	A database of required filling operations will have to be maintained in order to ensure that demand and supply can be coordinated The collection transport and disposal of construction debris can be handled through independent contractors selected by the MCGM
Bio-medical and hazardous waste	Syringes Hospital Waste		Waste is picked up from entities that produce biomedical waste and are registered for this service.
	Biomedical waste from homes		Hazardous waste from source to be collected on a monthly basis from various areas and forwarded to the recycling facility.
Waste needing Incineration	<ul style="list-style-type: none"><li>• Soiled Diapers and Sanitary napkins</li><li>• Upholstery cushioning and rugs</li><li>• Leather, Rexene, Rubbers</li><li>• Old Clothing, Rags</li><li>• Timber Waste</li><li>• Laminates and boards</li></ul>	Waste that can only be disposed through incineration	It can be collected in separately in segregated bags at source on a daily basis and sent directly to a controlled incineration/energy generation unit located in each area
Waste for Landfill	<ul style="list-style-type: none"><li>• Only waste that cannot be disposed of through any of the above methods will make it to a city landfill</li></ul>		Only waste that cannot be disposed of through any of the above methods will make it to a city landfill



# FMP PROJECT 1994-2007

## Research Projects:

A more detailed inventory of UDRI’s Research Projects in the area of conservation are as follows:

- Listing And Grading Of Heritage Buildings And Precincts in Greater Mumbai.

The Mumbai Metropolitan Regional Heritage Conservation Society commissioned a project with a two-fold mandate

**A. Re-evaluation of the existing list:**

- a. To record the changes that have occurred since the 1995 listing in the buildings and precincts that had been listed. This would indicate the effectivity of the regulations in controlling the development of the sites.
- b. To re-evaluate the sites on the basis of the changes that are observed; and on the basis of the value of the project as per the Heritage guidelines. Thus new Grading suggestions along with the elaboration of the Special Features and the Value Classification will be made.
- c. To remove inconsistencies and errors that may exist in the existing list. These would include spelling errors, mistakes in addresses, the duplication of buildings, etc. These were classified as Tasks 1 and 2 with Task 1 being the re-valuation of the sites numbered 1 to 316, along with the Fort Precinct (numbered as 633)

**B. Suggestions for the addition of new sites to the listing in the following areas**

- a. The Island City of Mumbai
- b. The Western suburbs
- c. The Eastern suburbs

The Urban Design Research Institute (UDRI) was assigned Task 1 of the above outlined project. The scope of this study for the Urban Design Research Institute was to review and rectify the existing heritage list that is enumerated in items 1 to 316 along with item 633 of the ‘Heritage Regulations for Greater Bombay, 1995’. This was to be supported with an exhaustive database, which would consist of making detail inventories for each and every building and precinct.

A typical inventory for a structure includes studying the building under various parameters such as access, ownership, usage, planning, style and special features and making recordings of these. It also involves examining the materials used and making an overall assessment of the condition, which would help in gauging any threat to the structure.

This technical assessment was supported with detailed photo documentation and data from various sources like the Urban Design Research Institute Database, archival material and other sources.

- Status Report on Grade - I Heritage Structures: The UDRI commissioned a Conservation Architect to survey and document Grade - I Heritage Structures in Mumbai with recommendations regarding what needs to be done viz: the conservation of these historically important buildings (1998).

- Conservation Proposal for Fort Precinct: A project team set up by UDRI to document (through maps and photographs) the entire Fort Precinct with the intent of having it designated a Conservation Zone. The project also included cataloguing all conservation worthy individual buildings in the area as well as suggesting legislative modifications and financial incentives, in order for the government to legislate the area as a Conservation Zone. In November, 1994 this proposal was submitted to the government and made legislation in (1995)

- Tourist District Plan: This involved mapping an area in south Bombay in order to position it as a Tourist District for the city. The effort also included facilitating the creation of a citizens group for the area. The plan outlined assets and resources in the area from a tourism perspective and outlined a strategy for the establishment of the District.

- Churchgate Revival Plan: This proposal focused on evolving a Master Plan for the Churchgate area to create a framework within which the citizen’s groups that exist in the precinct as well as the different establishments that are located there can interact in order to create a transformation in the physical environment of

the area. This project was initiated by local citizen’s organizations and sponsored by the Brihanmumbai Municipal Corporation.

- 20th Century Architecture Society of India: This Society has been formed with the support of the UDRI to list and document architecture of the 20th century. The Society’s aim is to create awareness through lectures, seminars, exhibitions and publications on Twentieth Century Architecture in India and South Asia. The objectives include the setting up of an archive and lobbying with State Governments for their protection.

- Kala Ghoda Conservation Plan: The UDRI initiated the formulation of an Association of users and building owners in the Kala Ghoda area of Bombay. Together with the Association, UDRI undertook extensive documentation and mapping of the area together with proposals for how this area could be treated as an Art District. An art festival was organized in Jan 1999 to bring the area into public focus. The funds generated from the festival were used to restore the buildings and street furniture in the area. The UDRI co-ordinated the physical interventions and improvement schemes in the area. (1998-99).
- Ballard Estate Conservation Plan: The UDRI were commissioned by the Ballard Estate Association and Bombay First to prepare for the conservation as well as an Urban Management for this business district (1999).

- Restoration of the Horniman Circle and a Banking District for Bombay: This report was prepared for the Horniman Circle Garden Trust and outlines issues for conservation of the Horniman Circle in addition to recommendations for the Conservation of buildings around it (1998).

- Conservation Study for Esplanade Mansion: The UDRI documented the Esplanade Mansion (formally Watson’s Hotel). The project was funded by the Renzo Piano Foundation.(1998-99).

- Master Plan for the Churchgate Area in Bombay: The UDRI together with five Resident Associations and the Bombay Municipal Corporation prepared a Master Plan for this intensely

used urban node and area. The recommendation range from issues to do with commuter interchange designs to pedestrianize some streets as well as improvements in the streetscape through appropriate street furniture, allocation of space for hawkers etc. (1998-99).

## Publications:

Publications in the form of monographs on issues related to Urban Design and Architecture. The publications are prepared with the view to inform the policy making process. Some of the books published by UDRI between 1994 and 2004 relating to conservation are as follows:

- Conservation After Legislation - Issues and Ideas for Bombay: co-edited with Abha Narain Lambah, published by the, Urban Design Research Institute, Bombay, 2004

- Creating A Tourist District -The Gateway Of India Precinct: A proposal for upgrading and managing the area. Prepared and published by Urban Design Research Institute, Sponsored by : Indian Hotels Company Limited, 2004.

- Heritage Buildings & Precincts Mumbai – A Conservation Manual for Owners & Occupiers: This booklet is a guide to understanding the need for the protection and restoration of heritage buildings and precincts. This book was published by Urban Design Research Institute 2002

- Restoring a Banking District: This brochure, prepared for the Horniman Circle Association, outlines the crucial issues that must be dealt with in order to formulate a comprehensive plan for the emerging Banking District, centered on the Horniman Circle. Suggestions are offered for the physical improvement of this area 1999

- Buildings in the Kala Ghoda Art District: The catalogue highlights the qualities of this area and its unique positioning as a centre of cultural and artistic activities in the heart of Mumbai.



The buildings of the area are presented in the form of plans, elevations and sectional drawings. This book was published jointly with the Max Mueller Bhavan and Marg Publications.2000

- Ballard Estate: A Corporate District: This book is based on a report prepared by UDRI and Bombay First for the Ballard Estate Welfare Association and outlines the crucial issues that must be dealt with in order to formulate a comprehensive plan for this area. Suggestions are offered for the enhancement of the Estate as a conservation area while facilitating its use as a commercial and corporate district. 2000

- Through the Looking Glass – The Grade I Heritage of Mumbai: This book is authored by Conservation Architect Abha Narain Lambah, published by the UDRI, documents the condition of Grade I Heritage buildings in Bombay and inventories their present condition. 2003

- Churchgate Revival: This publication documents the Master Plan prepared by the UDRI for the Churchgate area. The plan addresses issues of traffic management, street furniture and suggests way the area can be pedestrianized in the future. (2002)
- From The 50's: This publication brought out in collaboration with The Twentieth Century Architectural Society of India (20 CASI) documents four significant architectural projects form the 1950's in Bombay. The publication contains drawings, photographs and brief histories of these buildings. 2001

**Public Events:**

A Lecture Series involving speakers from all over India as well as abroad that created a wonderful forum on a wide spectrum of contemporary issues that included conservation and urbanism in general.

- Conservation Conversation III: Was the third in a Series of interfaces between the Heritage Committee and the Public (April 2003)

- The Conservation Of Colonial Cities: Was organized by the Max Mueller Bhavan Bombay, & Urban Design Research

Institute. The conference involved participants from Denmark, Germany, Sri Lanka, Bangladesh and India. The intention of the conference was to articulate a position towards evolving a charter specific to the conservation of Colonial Cities in the South Asian context (February 27– 28, 2003)

- Conservation After Legislation - Issues and Ideas for Bombay: In April 1995 the draft regulation for the protection of heritage buildings became legislation. This was a landmark event in the history of conservation in India. The protection of buildings and precincts in the city by this legislation formalized a movement that had been evolving over the preceding two decades. The legislation (The Heritage Regulations for Greater Bombay - 1995) was in operation for exactly five years when the conference took place. While there had been many successes, numerous issues simultaneously emerged highlighting the need for the legislation to further evolve to meet changing needs as well as respond to contemporary aspirations of the city. In order to facilitate this process of examining the Heritage Legislation, the UDRI organized this seminar to bring together experts in the field to examine, evaluate as well as suggest directions and ideas for the evolution of the legislation. The seminar was divided over two days into four sessions - each focusing on particular aspects of the legislation. The objective of the conference was to initiate a debate on the next steps - that architects, planners and citizens who are concerned with the conservation of Bombay's built heritage need to focus on to take the conservation movement to its logical next step (April 2000).
- Conservation Conversations II : Organized to coincide with the conference titled Conservation after Legislation, this was the second of a public meet where the Heritage Committee that advises the Municipal Commissioner on the conservation of historic buildings could meet with the public (April 2000).

- Conservation Conversations: Organized on World Heritage Day, 18 April, 1998, this workshop involved a public meeting with the Heritage Committee - for the first time since its inception the committee interacted with the public on issues related to conservation in Bombay. (April, 1998)



# Fort Management Plan Project Credits

**Project Director**

Pankaj Joshi

**Analysis and Illustrations**

Deepali Mody, Ankit Bhargava

**Book Design**

Ankit Bhargava

**Survey Documentation and Coordination**

Deepali Mody  
Kirti Makhija, Pawan Bang  
Ritu Deskmukh, Gulshan Kumar

**Students of Bharati Vidyapeeth’s College of Architecture, Navi Mumbai:**

Akshada Thakur	Lognadhan Gowda	Priyanka Mohite
Amit Kadam	Mahesh Zinzad	Rahul Walimbe
Ankush Tripathi	Manali Rane	Sanjay Gangeria
Aruna Pangle	Manish Jethmalani	Sayali Patil
Babita	Mariya Daruwala	Sayantini
Bapu Kawthankar	Mrunmmayee Deshpande	Shefali Naik
Bhagyashree Patil	Nafees Khan	Shreya Kshatriya
Deven Bhadesiya	Neelam Deshmukh	Sophia Rayin
Dipti Shukla	Neha Chavan	Stuti Damania
Divya Jhawar	Neha Karayi	Swapnali Takke
Farzan A R Juwle	Nikita Mathur	Taher Rangwala
Fatima Sheikh	Oshmi Ghosh	Urvi Jain
Gaurav Singh	Pooja Gori	Varsha Naik
Hareesh Haridasan	Prajakta Sawalkar	Varsha Patel
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**Architectural Documentation**

Pankaj Joshi Consultants  
Students of Technical University, Berlin

**Fort Heritage Study**

The Fort Precinct in Bombay, A Proposal for  
Area Conservation Vol II, compiled by -  
Rahul Mehrotra, Sandhya Savant

**Photo Credits**

Students of Bharati Vidyapeeth’s College of  
Architecture  
Charlotte Michaut  
‘Above Bombay’, Jehangir Sorabjee

**The UDRI staff**

Isaac Mathew  
Omkar Gupta  
Ian Nazareth  
Rosaline Vaz  
Priyanka Sane  
Alfred Fernandez  
Ganesh Bhoir

URBAN DESIGN RESEARCH INSTITUTE

43, V B GANDHI MARG, KALAGHODA  
FORT, MUMBAI 400 023  
TEL: (91-22) 6573 5773 / 2282 2924  
EMAIL: info@udri.org  
WEBSITE: www.udri.org

The Urban Design Research Institute is a public charitable trust setup in 1983 dedicated to the protection of built environments and the improvement of urban communities. Understanding that an interdisciplinary and holistic view of our urban environment will lead to practical solutions for its improvement, the UDRI provides a forum promoting interaction between architects, urban designers and professionals from related fields such as economics, sociology, planning, conservation and history. To this end, the UDRI organizes public lectures, exhibitions and fora, as well as publications, a research fellowship programme, the Bombay Studio and a Research and Resource Center focused on the study of Mumbai. UDRI has undertaken successfully several urban conservation projects and initiatives which are research based as well as have been implemented as policy and on site as physical projects. To this effect UDRI is geared to undertake research / policy drafting for culturally significant sites through its studio, programs and publications.

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