

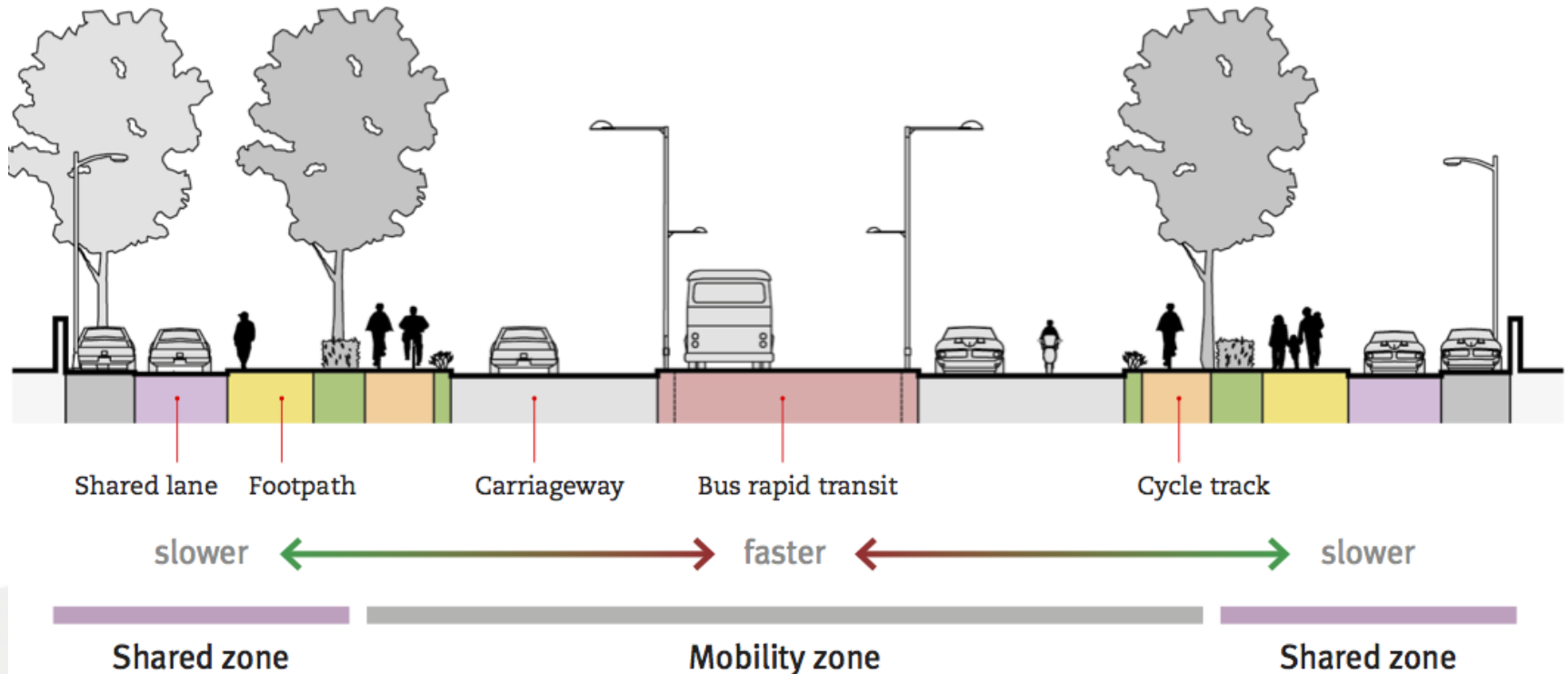
Street Design: Components and Guidelines



Street Design



What makes a complete street?



A street that provides separate spaces for walking and cycling, and, dedicated lanes for public transport.

Equitable allocation of street space



▲
People will walk in the carriageway if streets do not provide separate space for pedestrians.



▲
Streets with adequate space for walking and other activities is safe for pedestrians and allows smoother motor vehicle movement.

“Advanced cities are not those with highways and subways, but with dedicated spaces for walking and cycling” – Enrique Penalosa



Chennai

Footpaths



“Footpaths are the most important element
of a democratic city’s infrastructure”

- Enrique Penalosa



Lack of dedicated walking space is a symbol of inequality, lack of democracy and lack of respect for human dignity. ❌



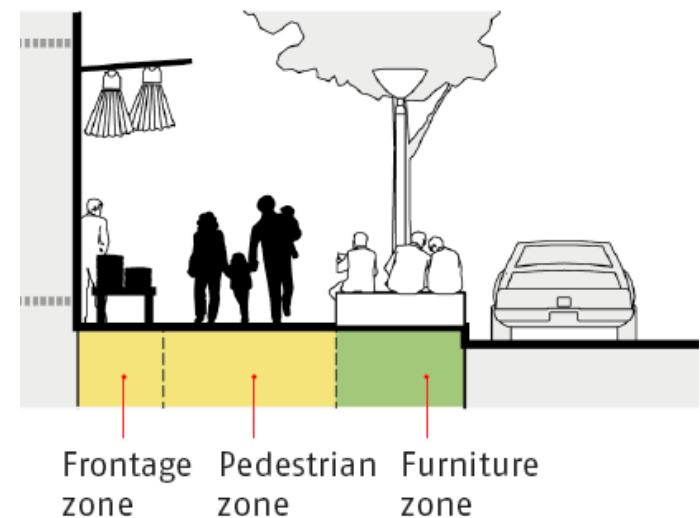
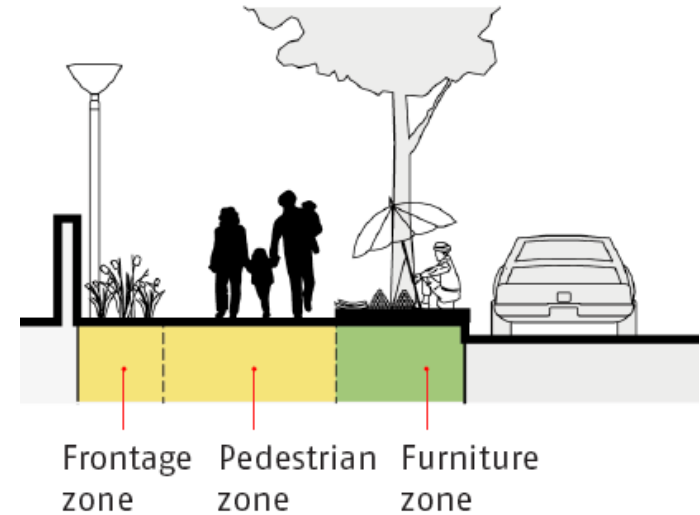
Good footpaths are inviting spaces where people can meet, talk, sit and eat.



Footpath design: The zone system

Good footpaths have 3 clear zones:

1. **Pedestrian zone:** continuous space for walking
2. **Frontage zone:** buffer between street-side activities and the pedestrian zone
3. **Furniture zone:** space for landscaping, furniture, lights, bus stops, signs and private property access ramps





IndusInd Bank
24 hrs ATM

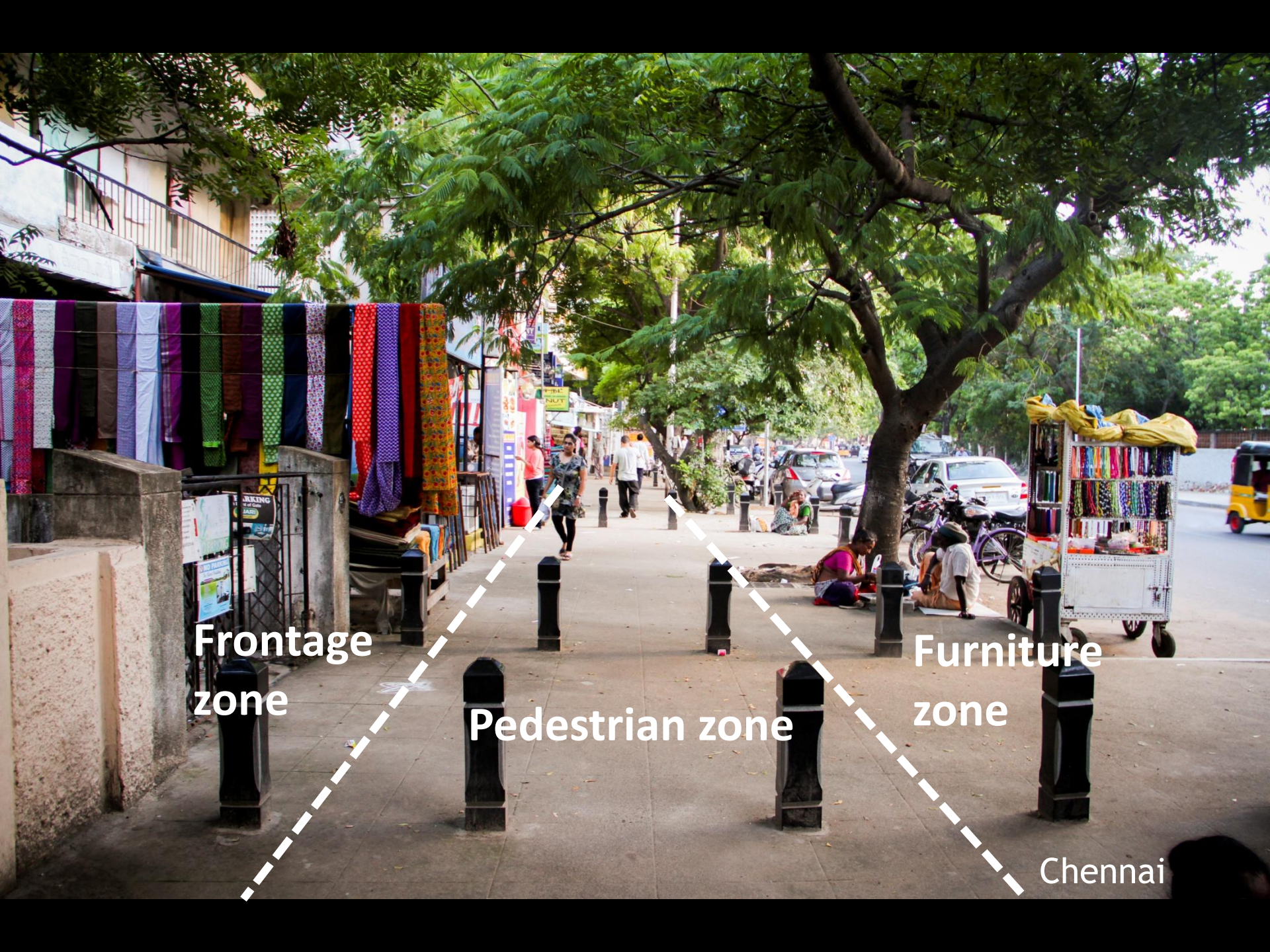
EROX

RUBBER
STAMP

Frontage zone

Pedestrian zone

Furniture
zone



Frontage
zone

Pedestrian zone

Furniture
zone

Chennai



SAREES
LADIES WEAR

GENTS WEAR
CHILDRENS WEAR

Ohlibaby



SAREES
LADIES WEAR

GENTS WEAR
CHILDRENS WEAR

WELCOME
TO
PONDY BAZAAR

Furniture
zone

Pedestrian zone

Frontage
zone

Chennai

Footpath design standards

3 basic elements of footpath design:

1. Maximum Height above carriageway -150mm
2. Minimum clear width - 1.8 m
3. Surface texture - Even



Kerb height above carriageway



Excessive heights make footpaths hard to use, and many pedestrians prefer to walk in the carriageway.



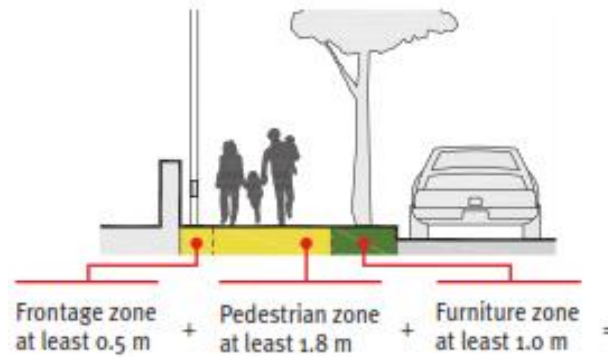
Footpaths with a height of no more than 150 mm are more likely to be used.

Footpath height should not exceed 150mm.



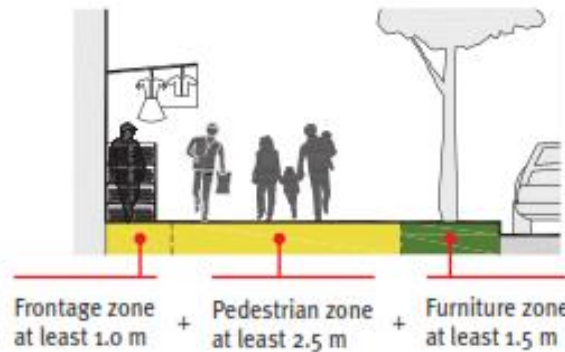
Width requirement according to land use

Residential zone



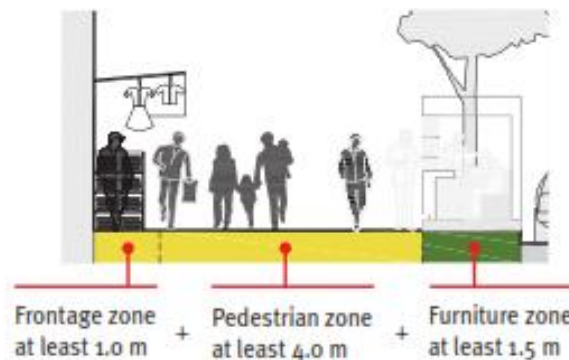
Minimum width = 3.3m

Commercial zone



Minimum width = 5.0m

High-intensity commercial zone



Minimum width = 6.5m

A minimum clear width of 1.8m is essential for obstacle-free pedestrian movement.



Clear width of 1.8m+

Smooth footpath surface for walking



▲
An uneven surface can make a footpath difficult to use.



▲
Footpaths with proper surfacing can be used by pedestrians.

Footpaths should have flat walking surfaces.



Footpath elements

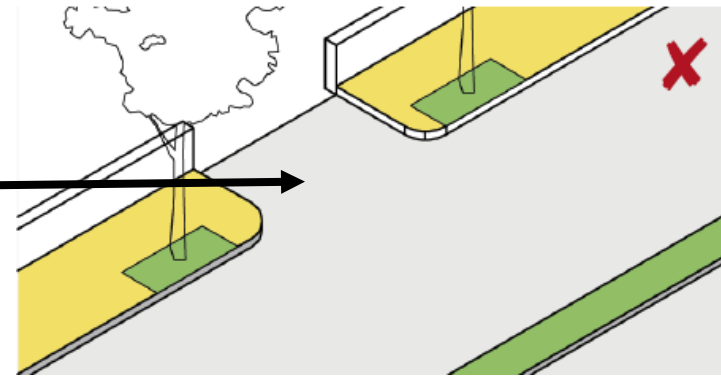
Well planned footpaths provide continuous space for walking. They also support other activities such as street vending and waiting at bus stops without compromising pedestrian mobility.

The success of a footpath depends on the integration of multiple elements including:

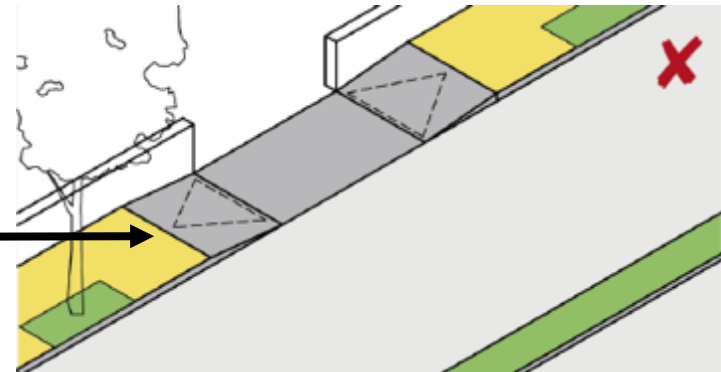
1. Property entrances
2. Bus stops
3. Landscaping
4. Street furniture
5. Transformers and electrical RMUs
6. Street Lighting
7. Stormwater drainage

1. Property entrances

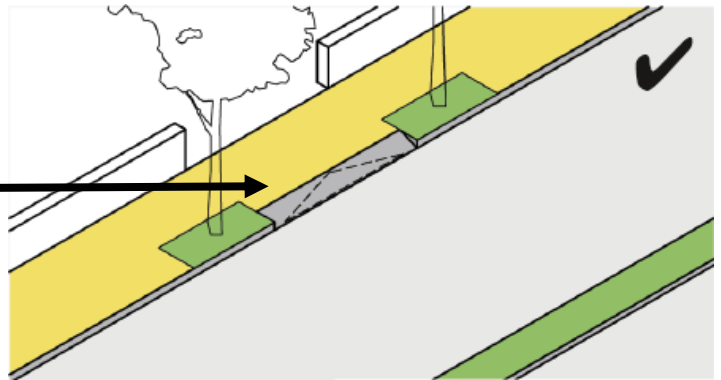
1. Ending the footpath with abrupt curbs is not acceptable



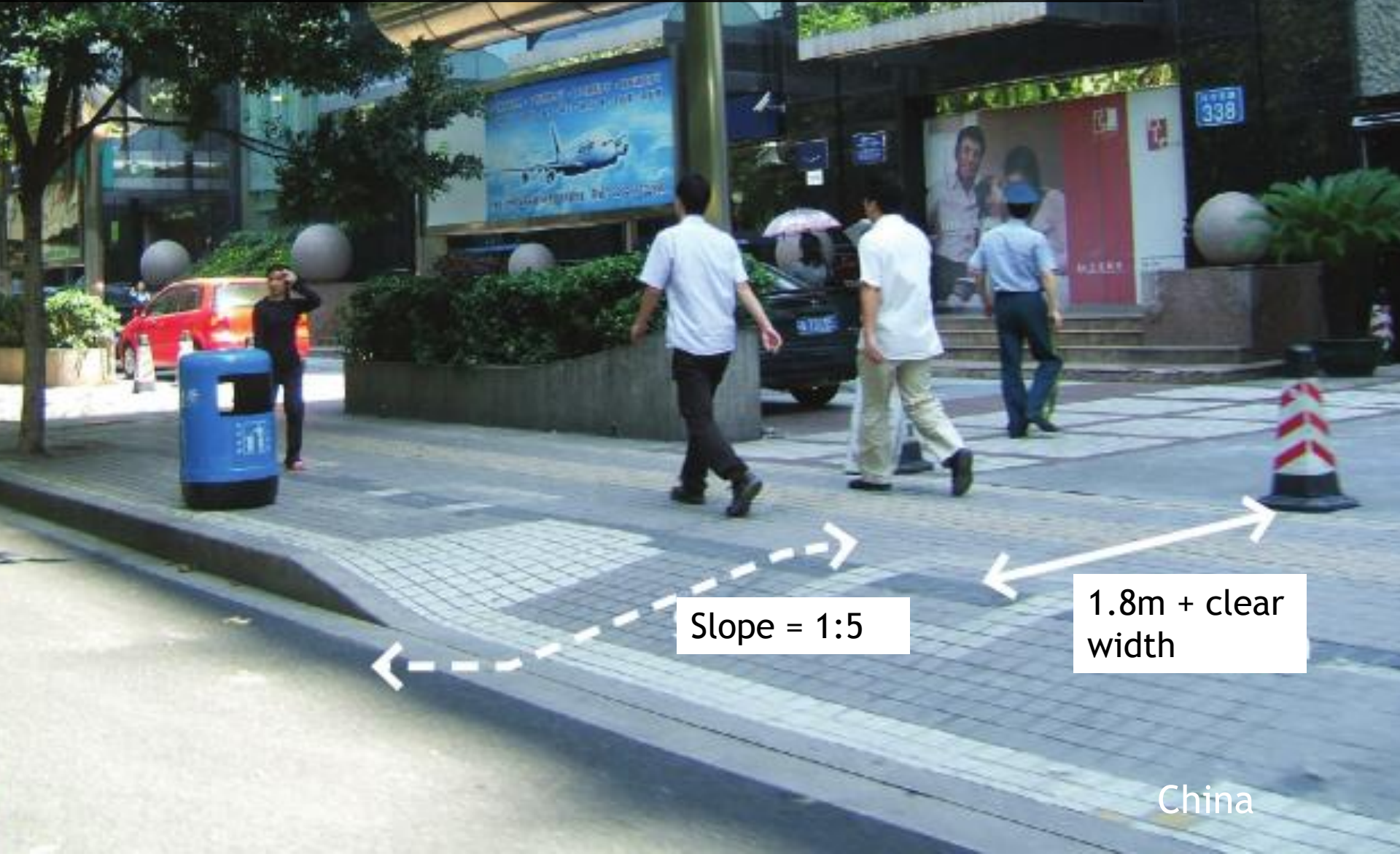
2. Lowering the entire footpath to the level of the carriageway is unacceptable as property entrances may become waterlogged



3. Vehicle ramps should be provided in the 'furniture zone' and not in the 'pedestrian zone'



Vehicle ramps at property entrances should be in the 'furniture' zone of the footpath

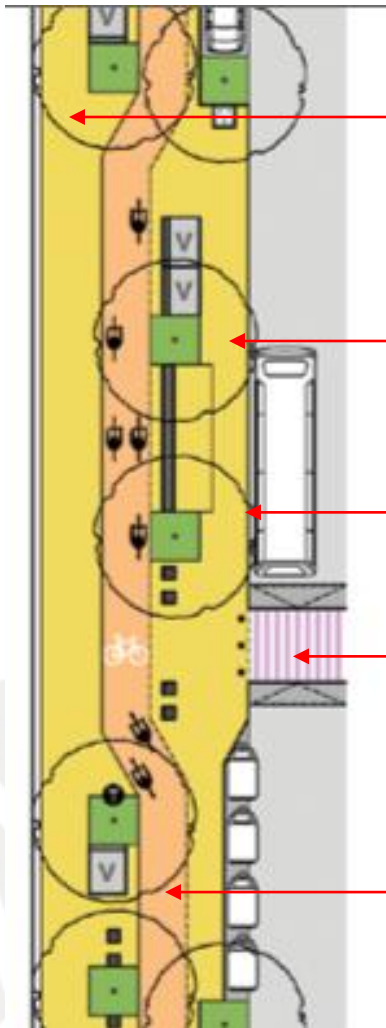


Slope = 1:5

1.8m + clear width

China

2. Bus stops



At least 1.8m of clear walking space should be provided between compound wall and the bus stop.

Bus bays must be avoided. They should be placed adjacent to the bus' linear line of travel so that the bus does not need to pull over to the left.

Bus bulb-out in parking lane.

Formal pedestrian crossing is required for safe pedestrian movement.

Cycle track should be located around the back of a stop.

Placement of bus stops



▲
Bus stops that are far from where buses stop, forces commuters to stand in the carriageway.

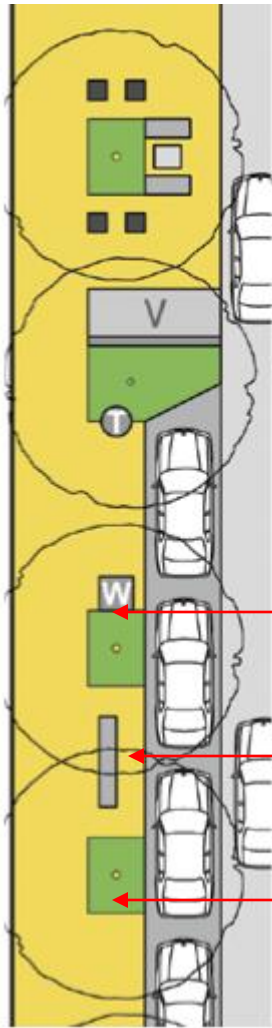


▲
Passengers can board directly from the curb rather than stepping into the street.

Clear space behind bus stops is required for safe walking and cycling movement



3. Landscaping



Benefits of good landscaping includes:

- Enhances aesthetics of streets;
- Provides shading;
- Reduces vehicle speeds by reducing perceived width of a street.

Continuous tree line at appropriate distances provides shade for pedestrians and cyclists.

Landscaping should be provided in furniture zone.

Tree pits should be at least 1.5m by 1.5m to accommodate maturing roots.

Continuous tree line provides shading for pedestrians and cyclists.



Tree line must be placed in the furniture zone and not obstruct pedestrian or cycle movement



Tree pits should at least be 1.5m by 1.5m to accommodate matured tree roots.



4. Street furniture

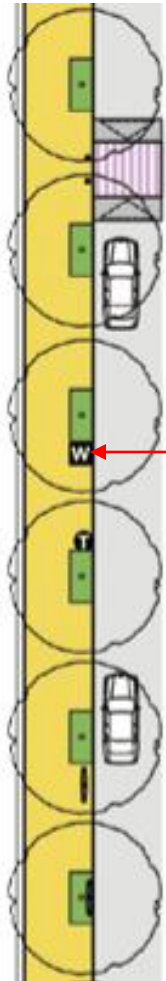


Benches and a sign post completely block the footpath, so pedestrians walk in the carriageway.

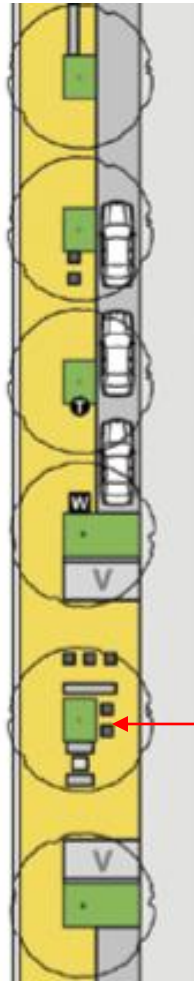


A tree pit doubles as a bench. Located in the parking lane, the bench leaves enough clear space for pedestrians.

Placement of street furniture



On a 3m wide footpath, furniture should be provided in the furniture zone to maintain 2m clear width for pedestrians.



Street furniture can be provided in bulb-outs of parking lanes.

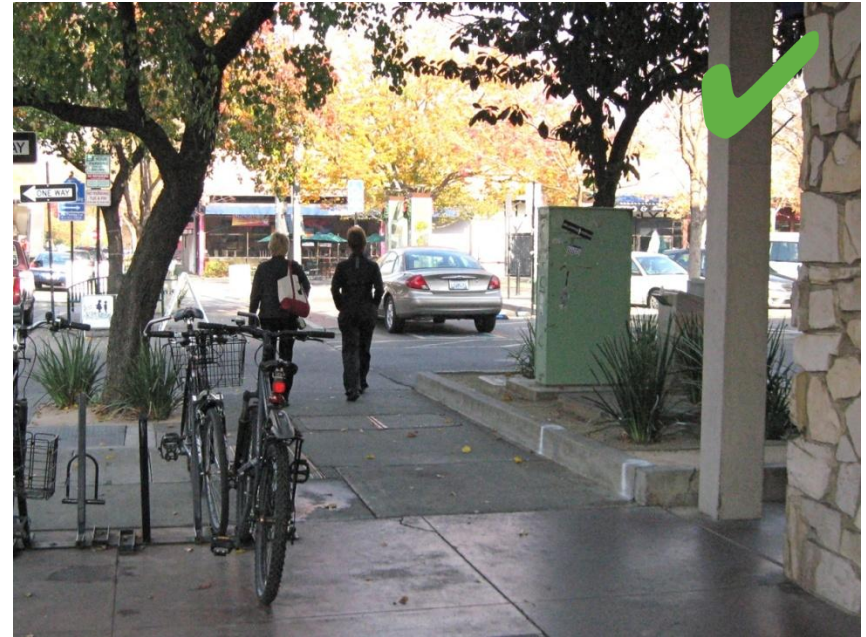
Seating should be placed in the furniture zone.
On narrow footpaths, seating must be located in tree line,
which also provides shading.



5. Transformers and electrical boxes

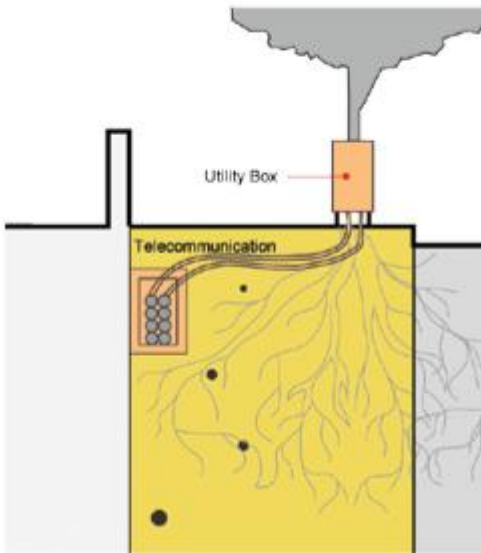


Ad-hoc placement of utility boxes and transformers on causes hinderance to pedestrian movement.



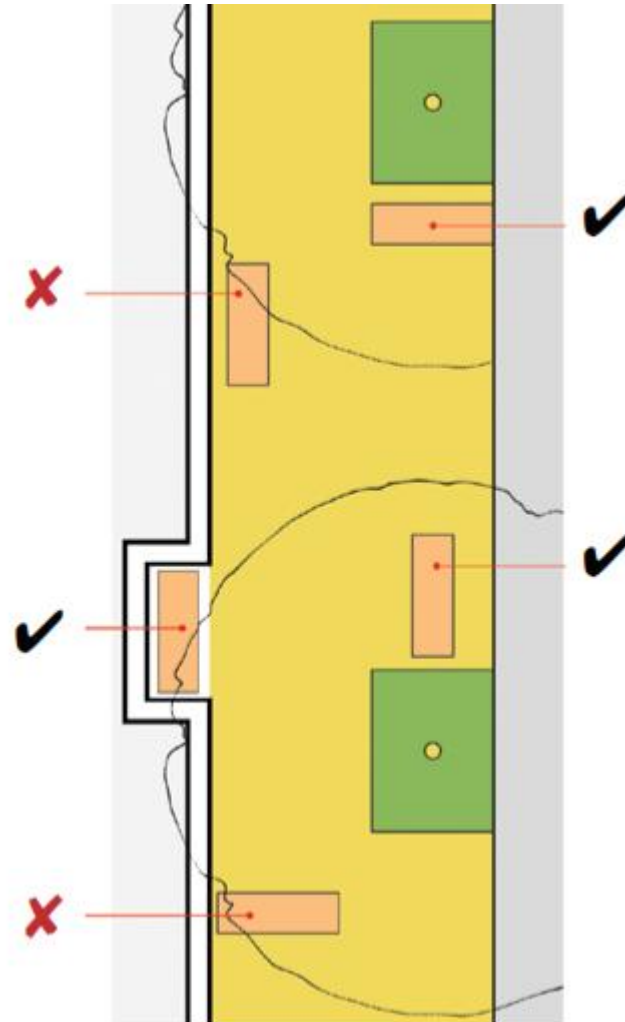
Utility boxes on footpaths should be oriented parallel to the street in order to maximise the free space available for pedestrian movement.

Placements of utility boxes



Place utility boxes in line with tree pits, to avoid conflicts with pedestrians.

If there is no way to avoid placing it in the pedestrian zone, place it parallel to the street.



Utility boxes should be located in the furniture zone.



Mumbai

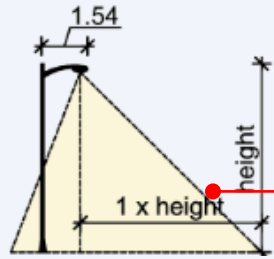
6. Street lighting

Placement standards for street lighting includes:

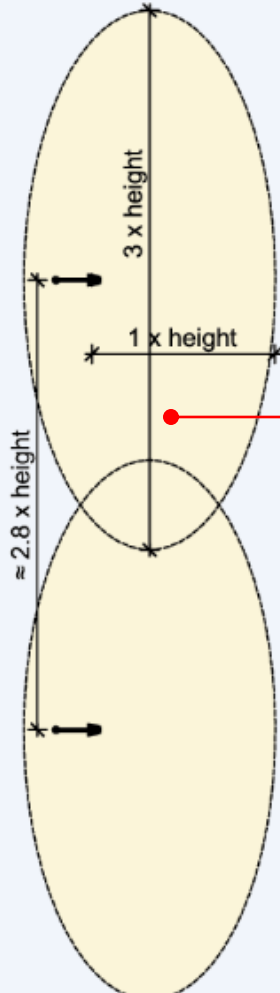
- Placement in furniture zone.
- Place lightings so that trees or hoardings do not impede proper illumination.
- Space between two light poles should be three times the height of the fixture.

Light pole height and spacing options		
Street Type	Pole height (m)	Spacing (m)
Footpath or cycle track (< 5m width)	4.5-6	12-16
Local street (< 9m width)	8-10	25-27
Arterial or collector (> 9m width)	10-12	30-33

Street lighting illumination



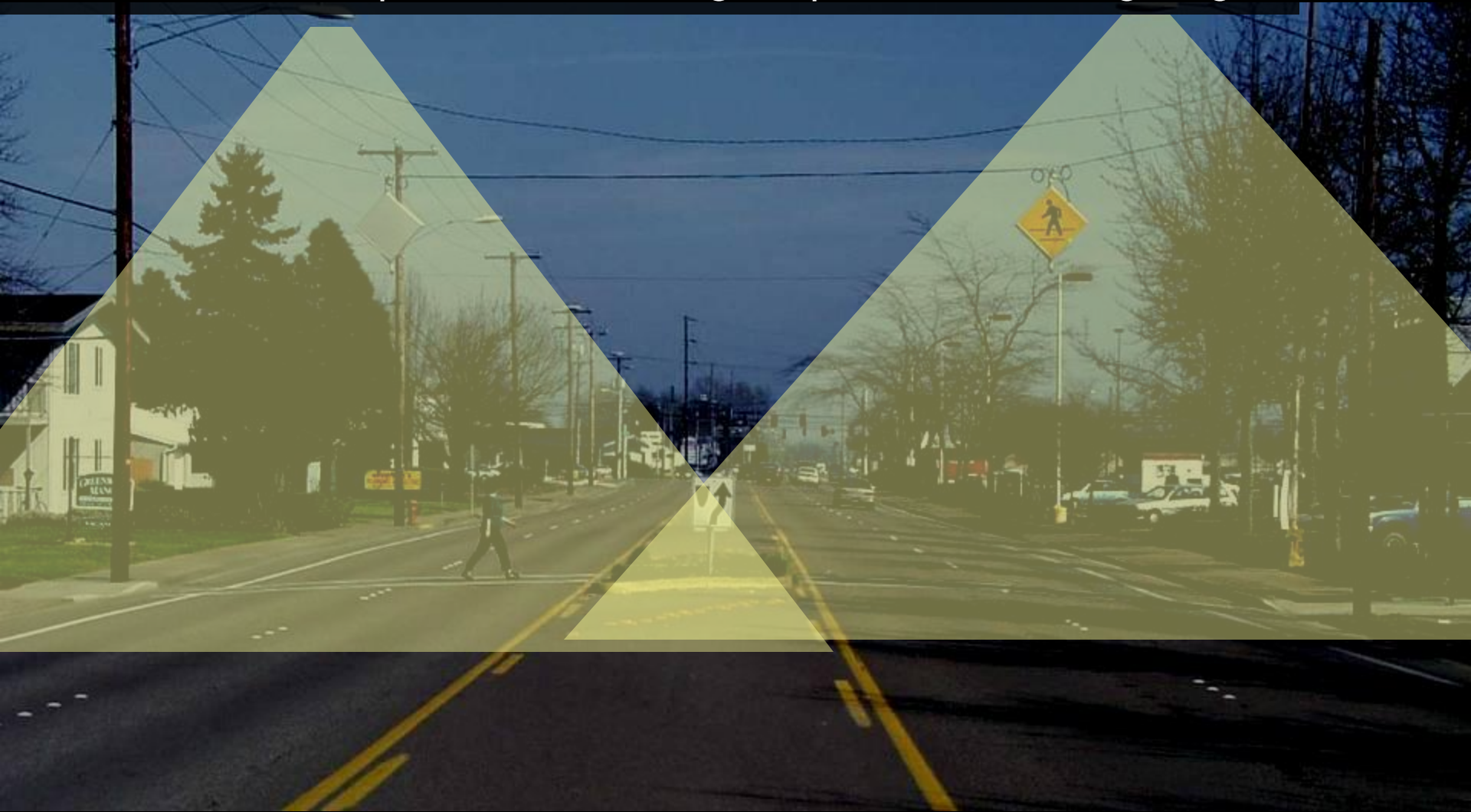
Horizontal dimension of illumination is slightly longer than the pole height.



The longitudinal dimension of illumination is equivalent to three times the pole height.

A single row of light posts is generally sufficient for streets up to 12m. Dual lights can be mounted on a single post on wider streets.

Intersections and pedestrian crossings require maximum lighting.



7. Storm water drainage

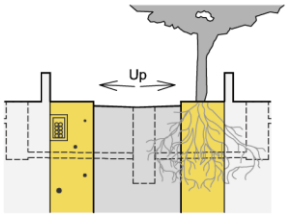


Drains placed in an ad-hoc manner and at lowest points force people to wade through water during rains.

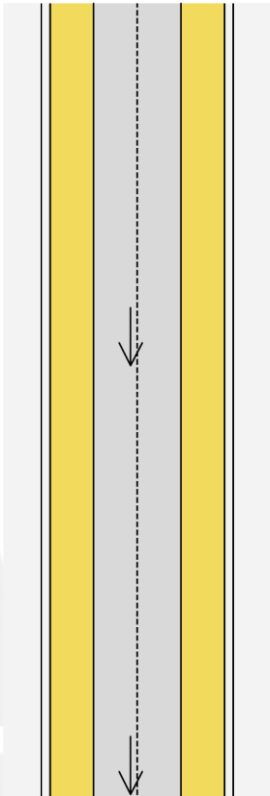


Catchpits should be located at regular intervals, and at the lowest point of the street cross section.

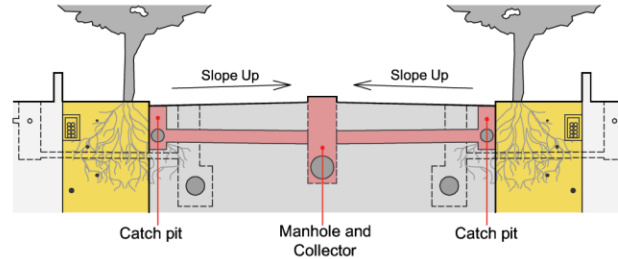
Narrow streets



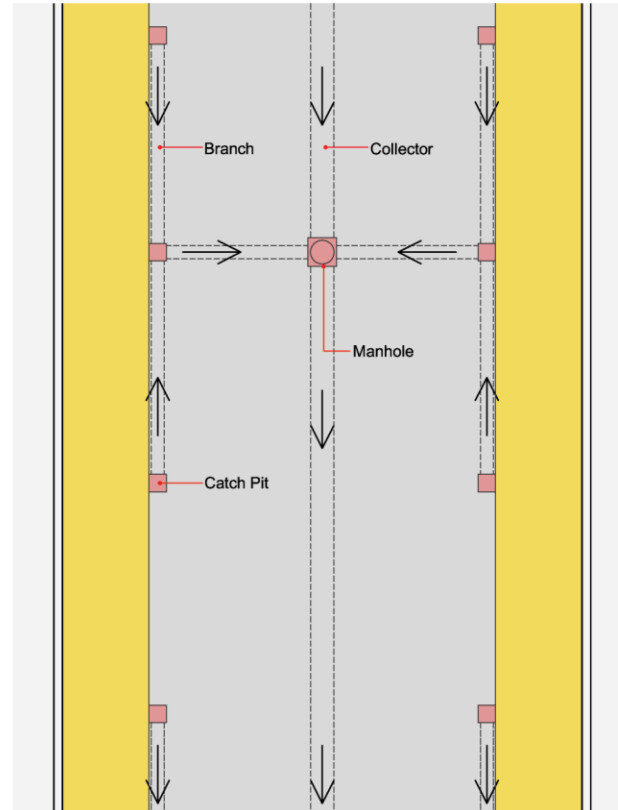
Underground piping is not required. Water can be carried off on the carriageway with the lowest elevation in the centre.



Wide streets



A hierarchy of storm water pipes is necessary to reduce the number of manholes in the driving zone.



8. Street Vending



Ad-hoc placement of street vending ends up using spaces intended for pedestrians.



Well-planned spaces for street vending provide citizens with secure and dignified areas for the trade of goods and service.

Vendors should be positioned so as to ensure the continuity of pedestrian zone on footpaths.



Pedestrian
zone

Chennai

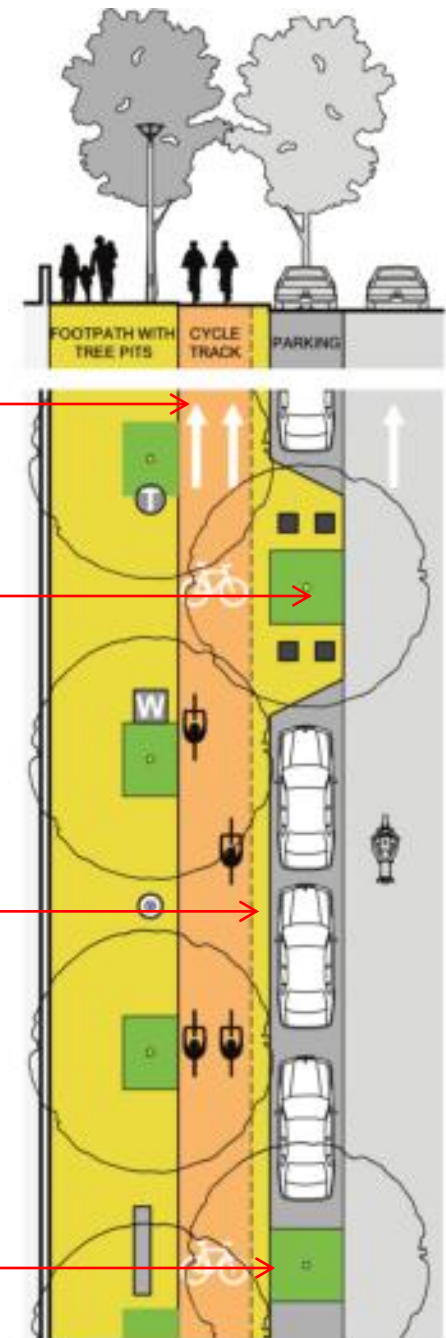
9. On-street parking

Parking should be provided after adequate space is allocated for footpaths and cycle tracks.

Bulbouts between parking areas provide space for street furniture and vending.

A 0.5m buffer is required so that car doors do not open over cycle tracks.

Integrated tree pits to provide shade.



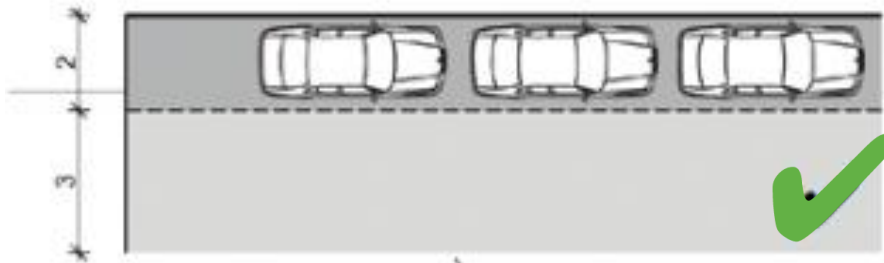
Parking on footpaths force pedestrians to weave their way through the parking area. ❌



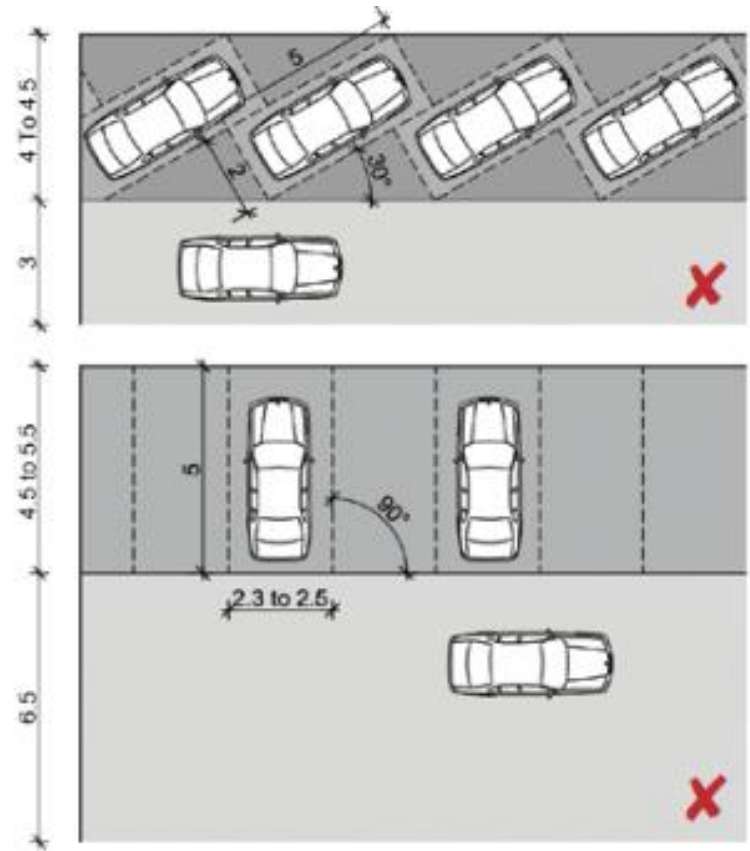
Bollards at 1.2m intervals prevent vehicles from parking on pedestrian zone. (min 900mm)




Parallel parking is most efficient



- Parallel parking for cars is the most efficient parking layout in terms of the number of vehicles relative to the area occupied.
- Parallel parking can be used as perpendicular parking for two-wheelers



Parking management

- Parking is a commodity that is used by individuals for a personal /private purpose. It is not a public good.
 - Use existing parking areas rather than expanding the supply of parking.
 - Parking user fees will generate income for the government.
 - Government bodies should not subsidize creation of multi-level parking structures, through allocation of land, funds or other benefits.
- 

Best practice examples in Chennai



70 Feet Scheme Road - Today



Police Commissioner's Office Road - Today



←
சென்னை
CHINTADRIPET
↑
பாந்தியன் சாலை
CHINTADRIPET
→
புத்தூர் சாலை
PUDUPET

Pantheon Road- Today



Besant Nagar 2nd Avenue - Today



Pedestrian crossings



Existing issue in most Indian cities.



Footover bridges are inconvenient



At-grade crossing is the better option

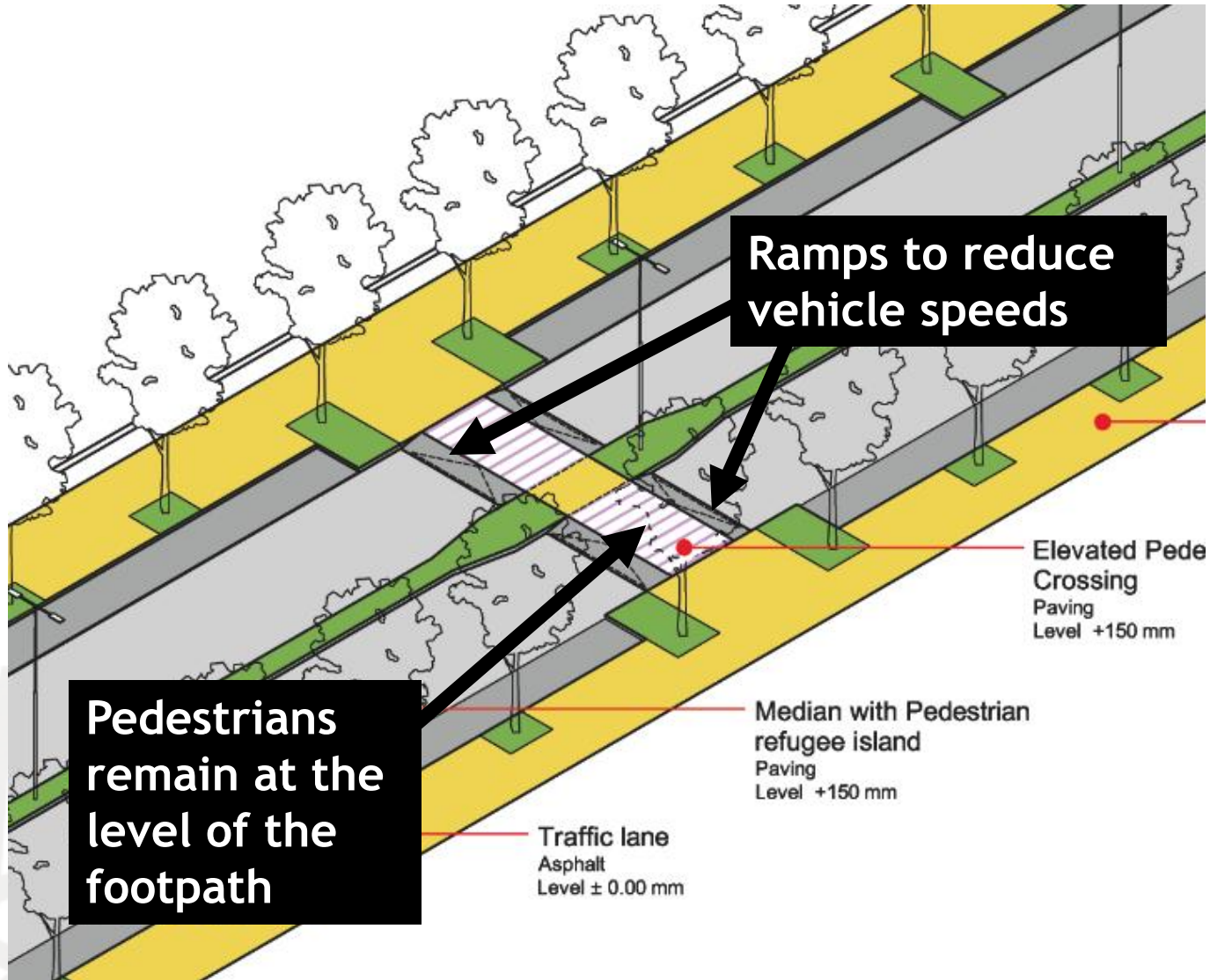


▲
Foot-over bridges are not accessible to persons with disabilities. Dangerous at night (and maybe during the daytime too!)



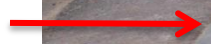
▲
At-grade crossing compels vehicle users to slow down and improves convenience for pedestrians.

Safe at-grade crossings specifications

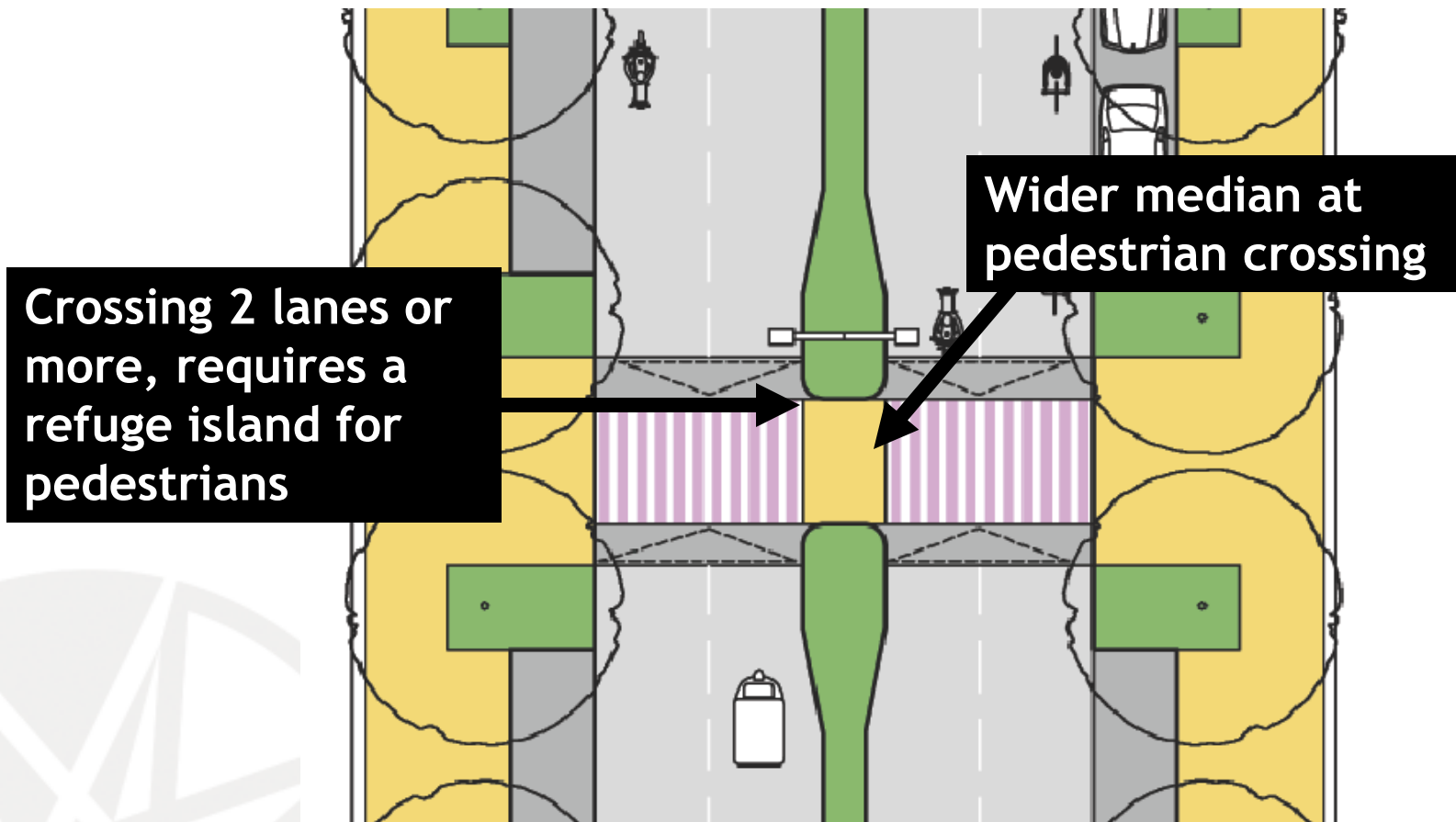


Raised pedestrian crossing compels vehicle users to slow down.

The height of the crossing should be the same as that of the adjacent footpath.



Pedestrian refuge island



In the absence of refuge islands, pedestrians are forced to stop in the middle of carriageway. ❌

Tree planters and other obstructions should not be placed on refuge islands.



Median refuge for pedestrians (Minimum 2m).



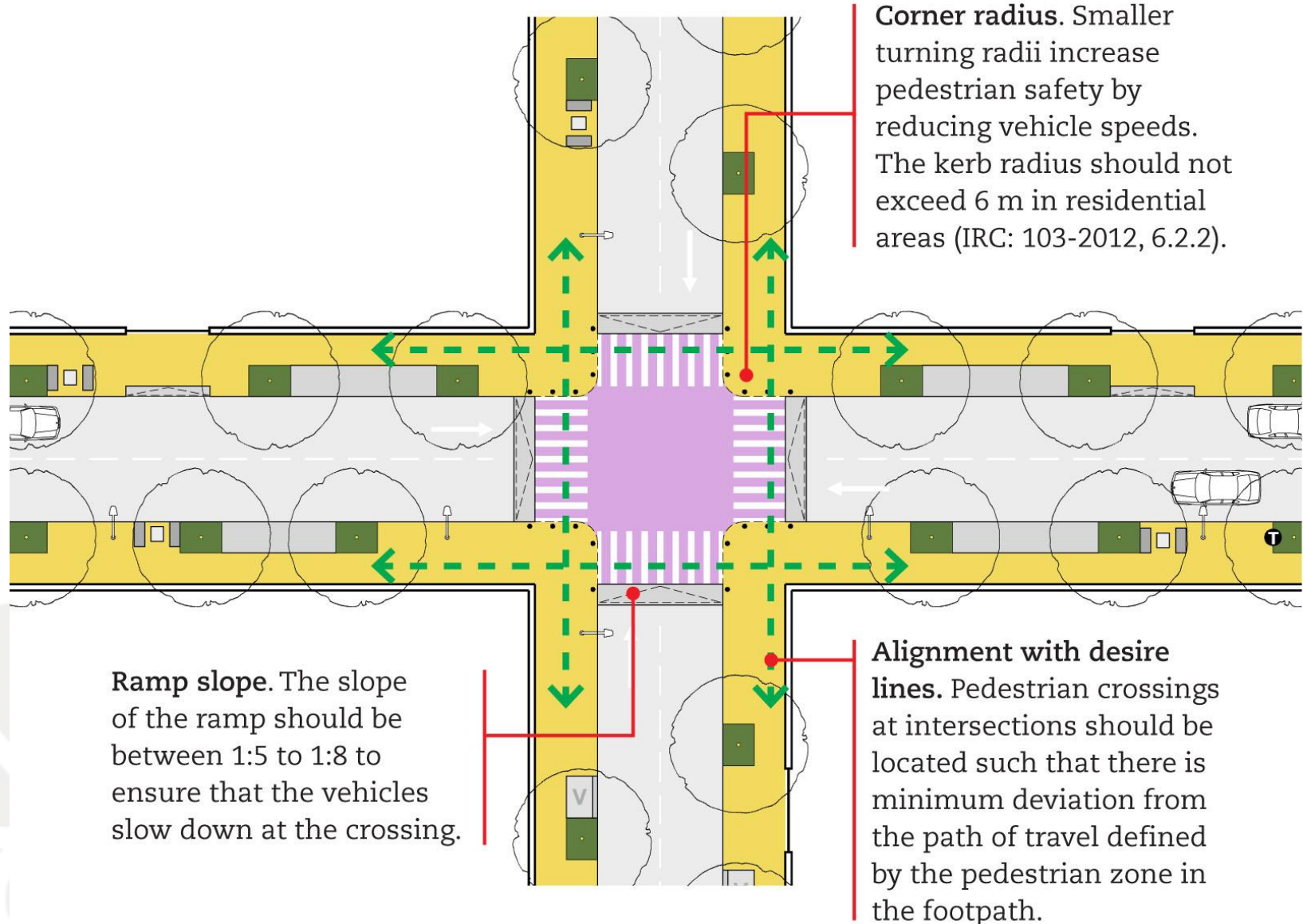
Surmountable refuge for pedestrians - open space without any shrubs / trees ✓



Intersections



Crossing at intersections



Corner radius. Smaller turning radii increase pedestrian safety by reducing vehicle speeds. The kerb radius should not exceed 6 m in residential areas (IRC: 103-2012, 6.2.2).

Ramp slope. The slope of the ramp should be between 1:5 to 1:8 to ensure that the vehicles slow down at the crossing.

Alignment with desire lines. Pedestrian crossings at intersections should be located such that there is minimum deviation from the path of travel defined by the pedestrian zone in the footpath.

Most intersections are too large



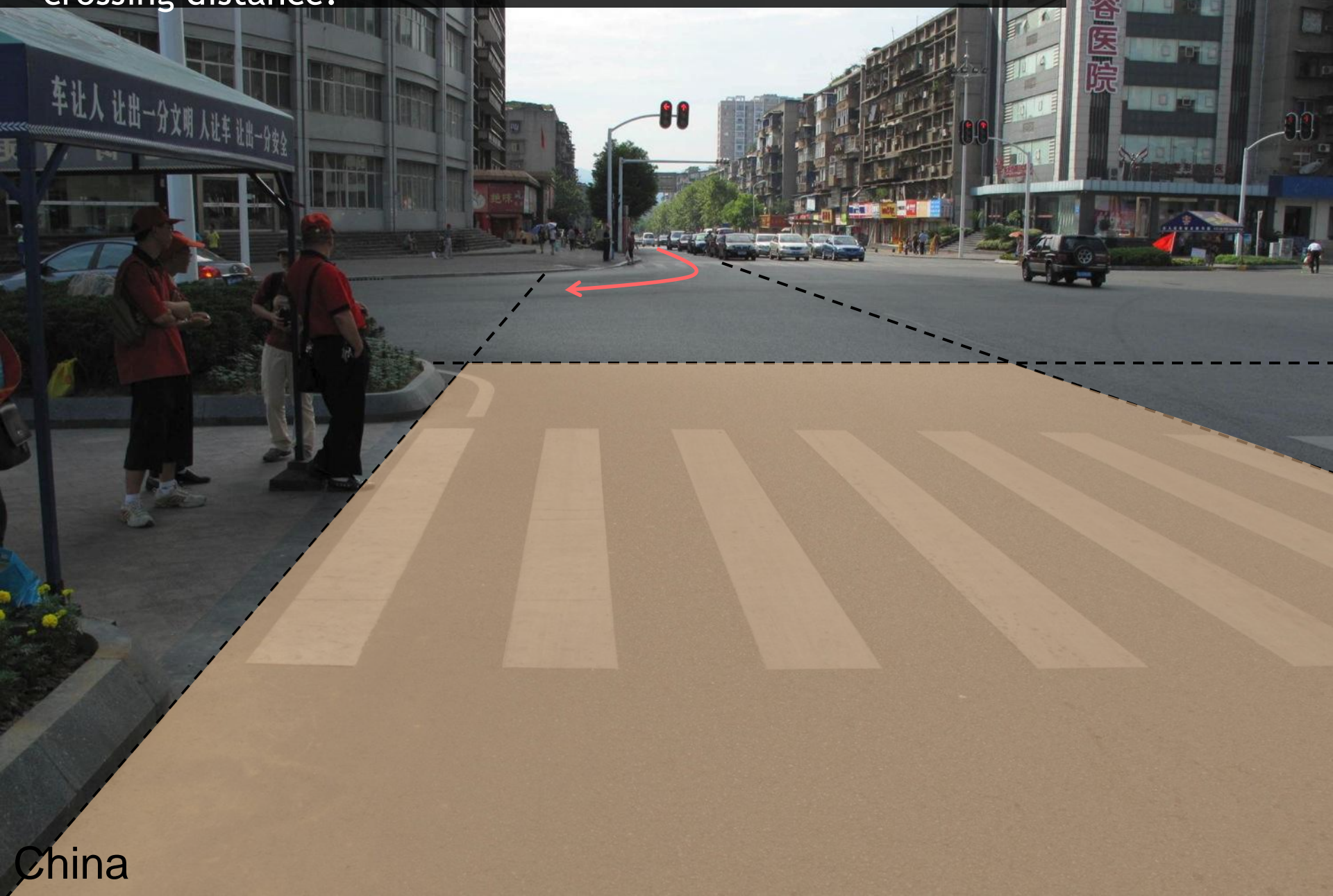
Mexico City: before



Mexico City: after



Tighter intersections are safe and reduce pedestrian crossing distance.



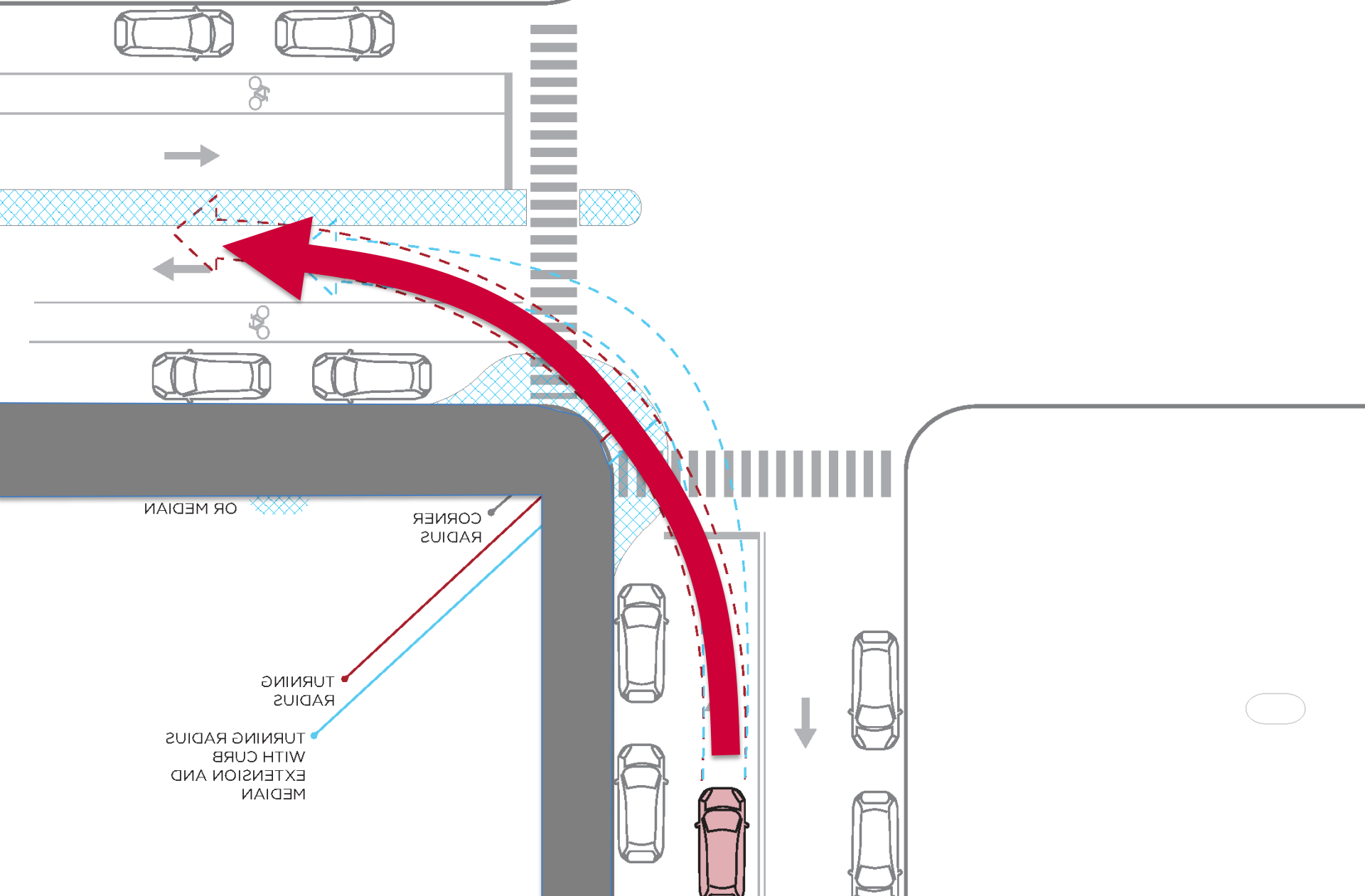
Intersection treatment in New York.



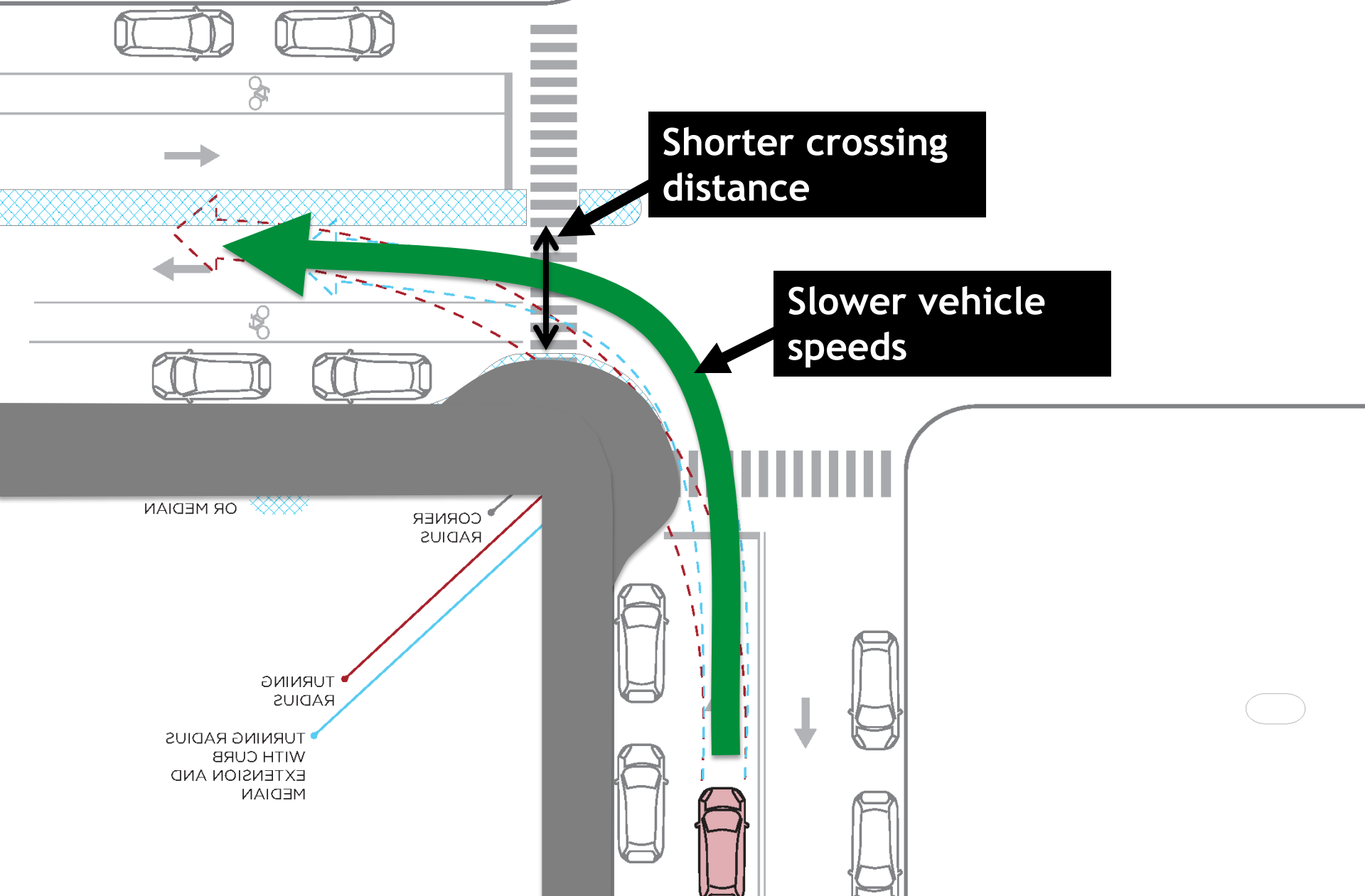
Intersection treatment in USA.



Reducing turning radii



Reducing turning radii



Shorter crossing distance

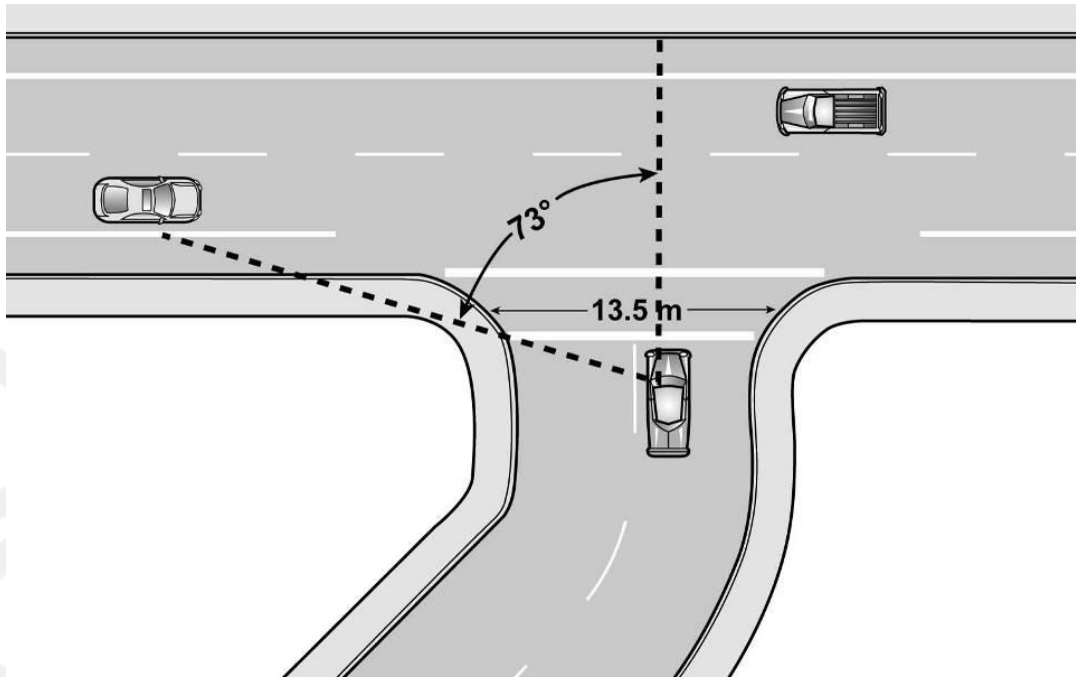
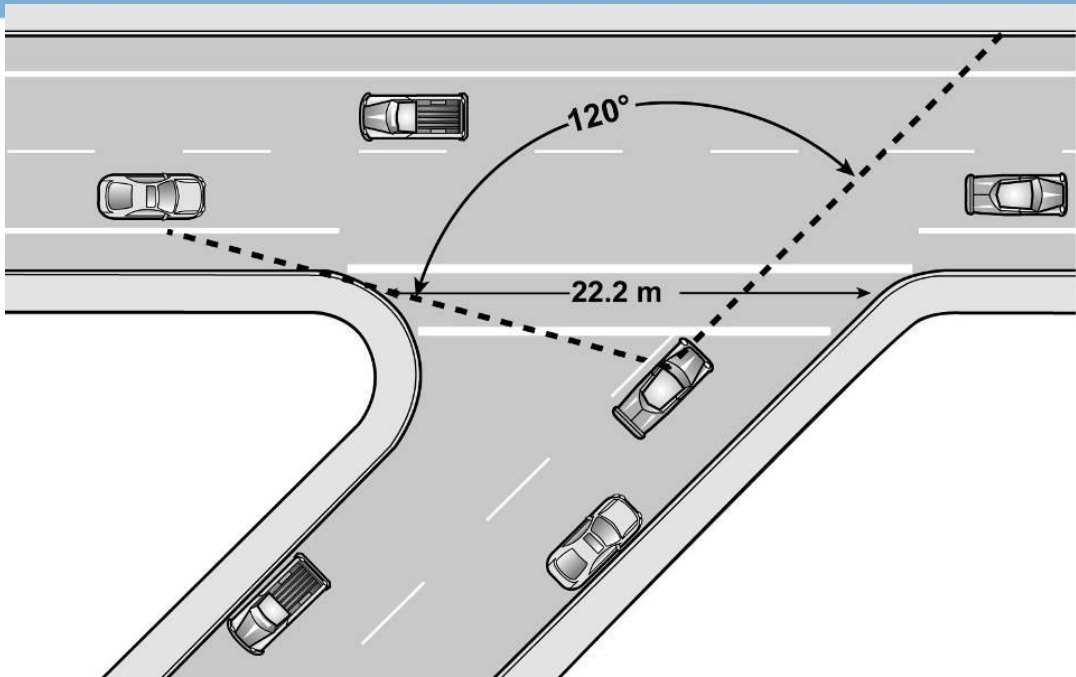
Slower vehicle speeds

OR MEDIUM

CORNER RADIUS

TURNING RADIUS

TURNING RADIUS WITH CURB EXTENSION AND MEDIUM



Direct crossing should follow pedestrian desire line.



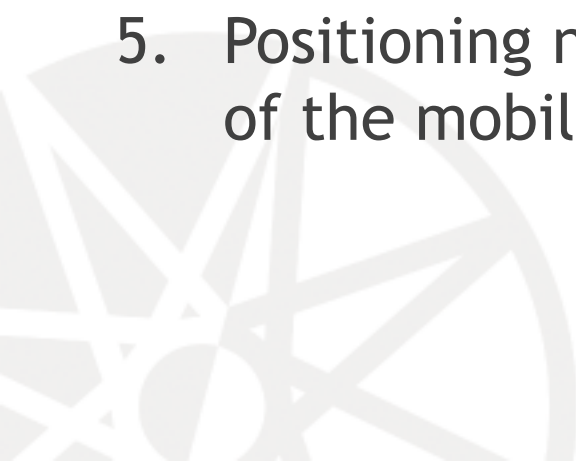
Barcelonà, Spain

Cycle Tracks

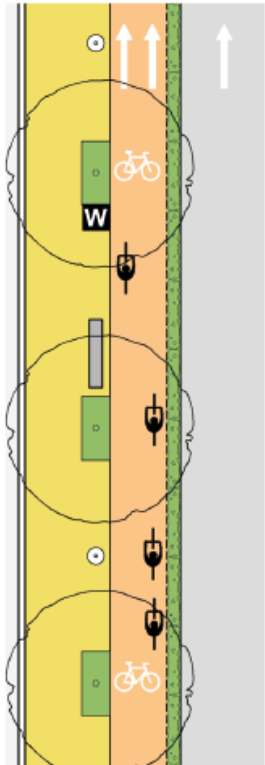


Cycle track design standards

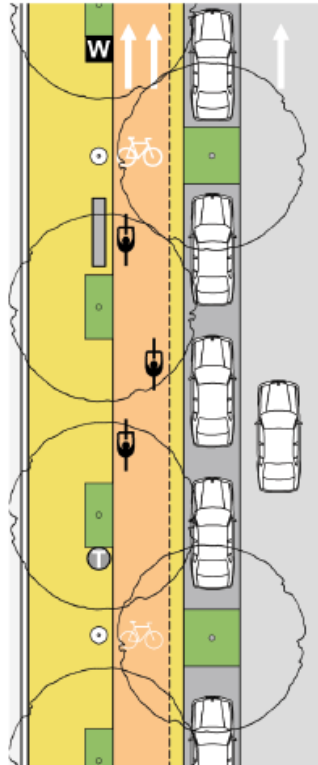
Basic elements of cycle track design are:

1. Physical separation from the carriageway, not paint.
 2. Minimum clear width for one way movement - 2m
 3. Height above carriageway - 150mm+
 4. Smoother surface material - concrete or asphalt, not paver blocks
 5. Positioning near the carriageway: cycle tracks are part of the mobility zone
- 

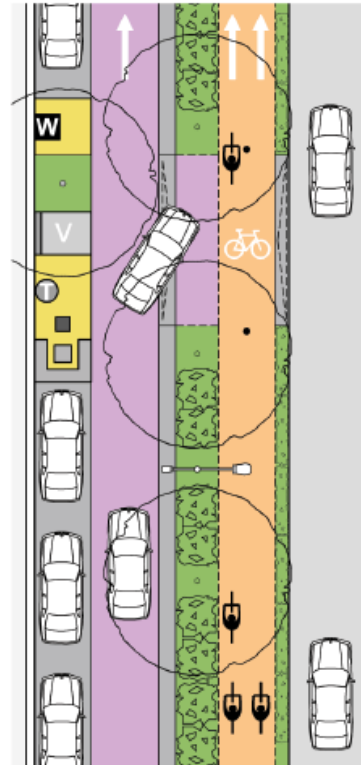
Cycle track typologies



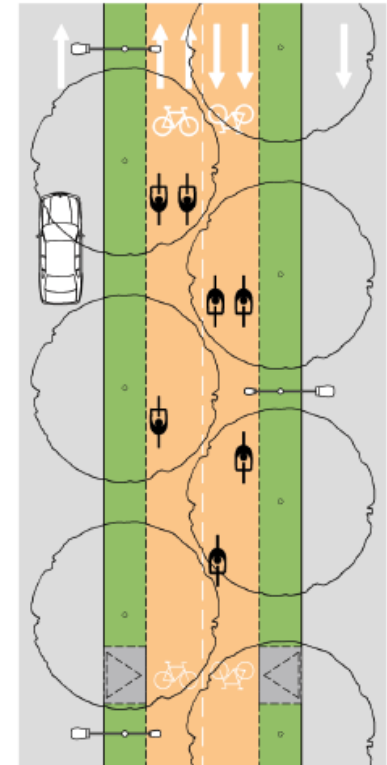
Next to footpath



Next to parking



Next to service lane



Median cycle track

Basic physical design flaws prevent the use of cycle tracks.



Parked vehicles
in cycle track

Uneven surface

Mumbai



Cycle tracks should be continuous and shaded with a minimum clear width of 2m



Shaded and continuous lane

Buffer zone

Concrete 2m wide cycle track

Delhi



If you provide it, they will use it.



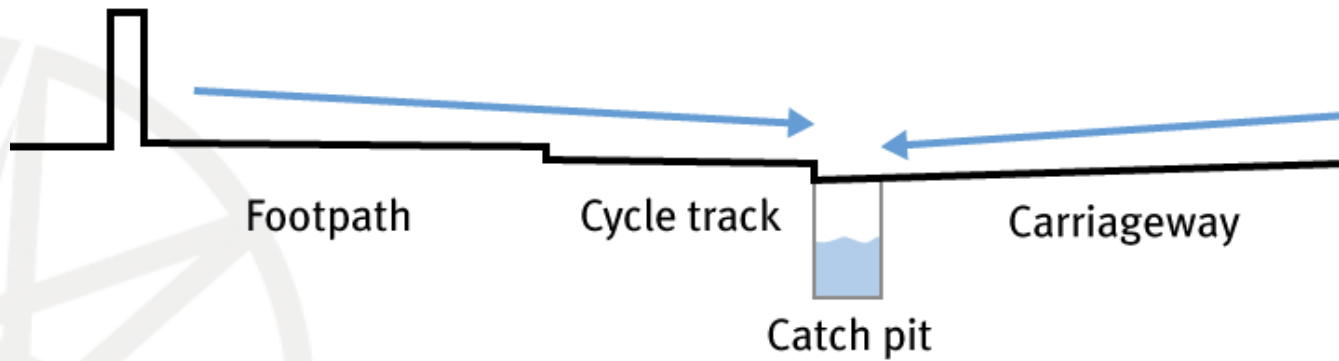
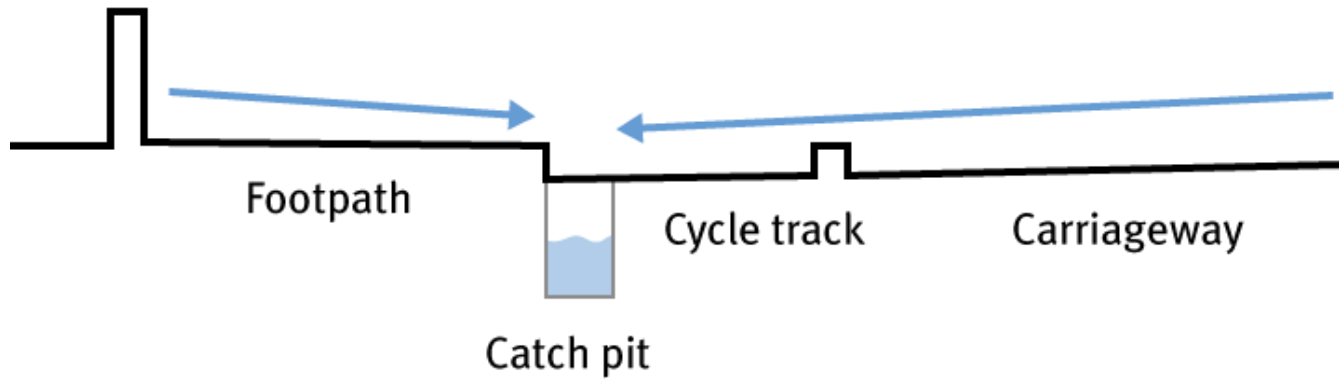
Delhi

Paris reclaiming streets for bicycles.

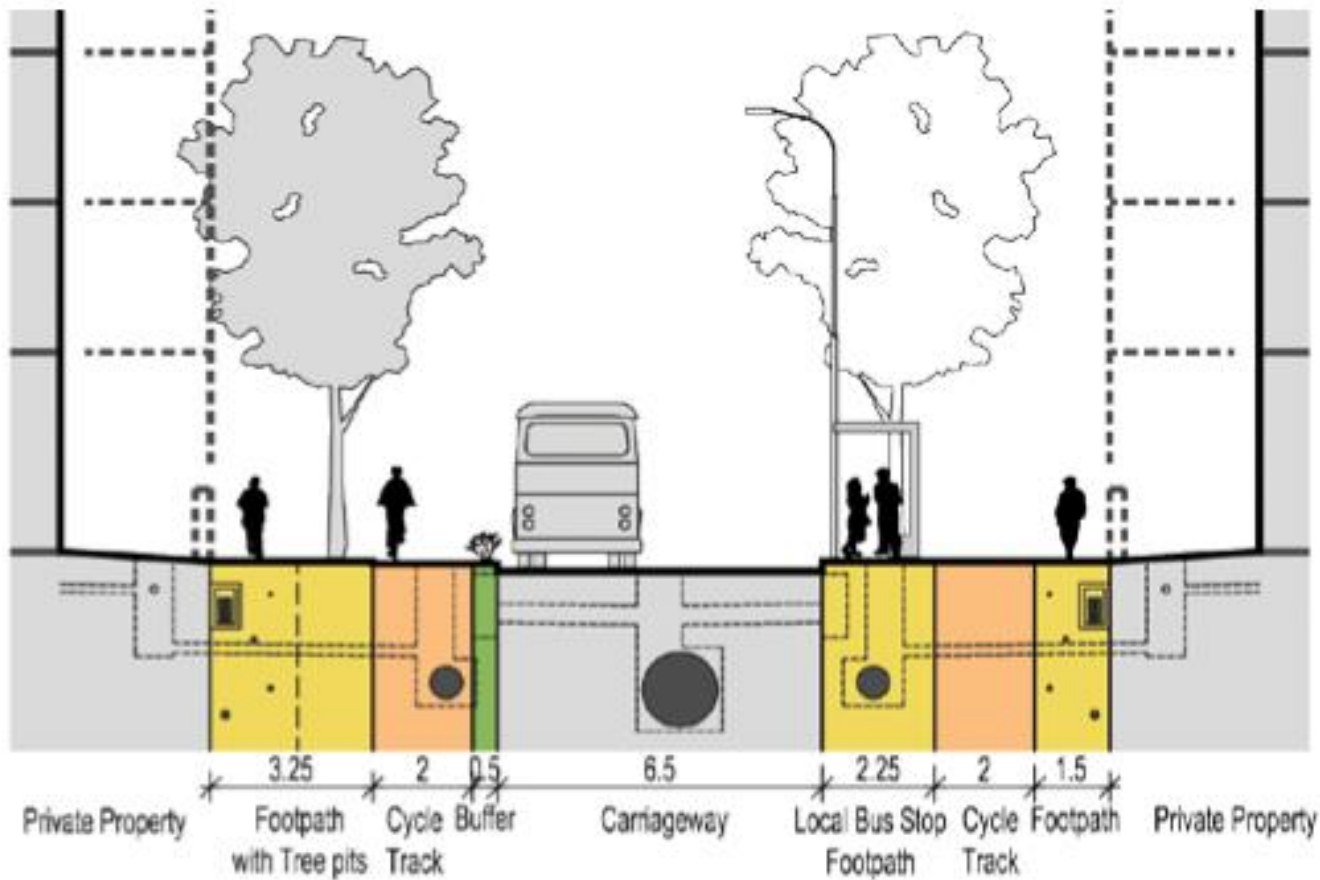
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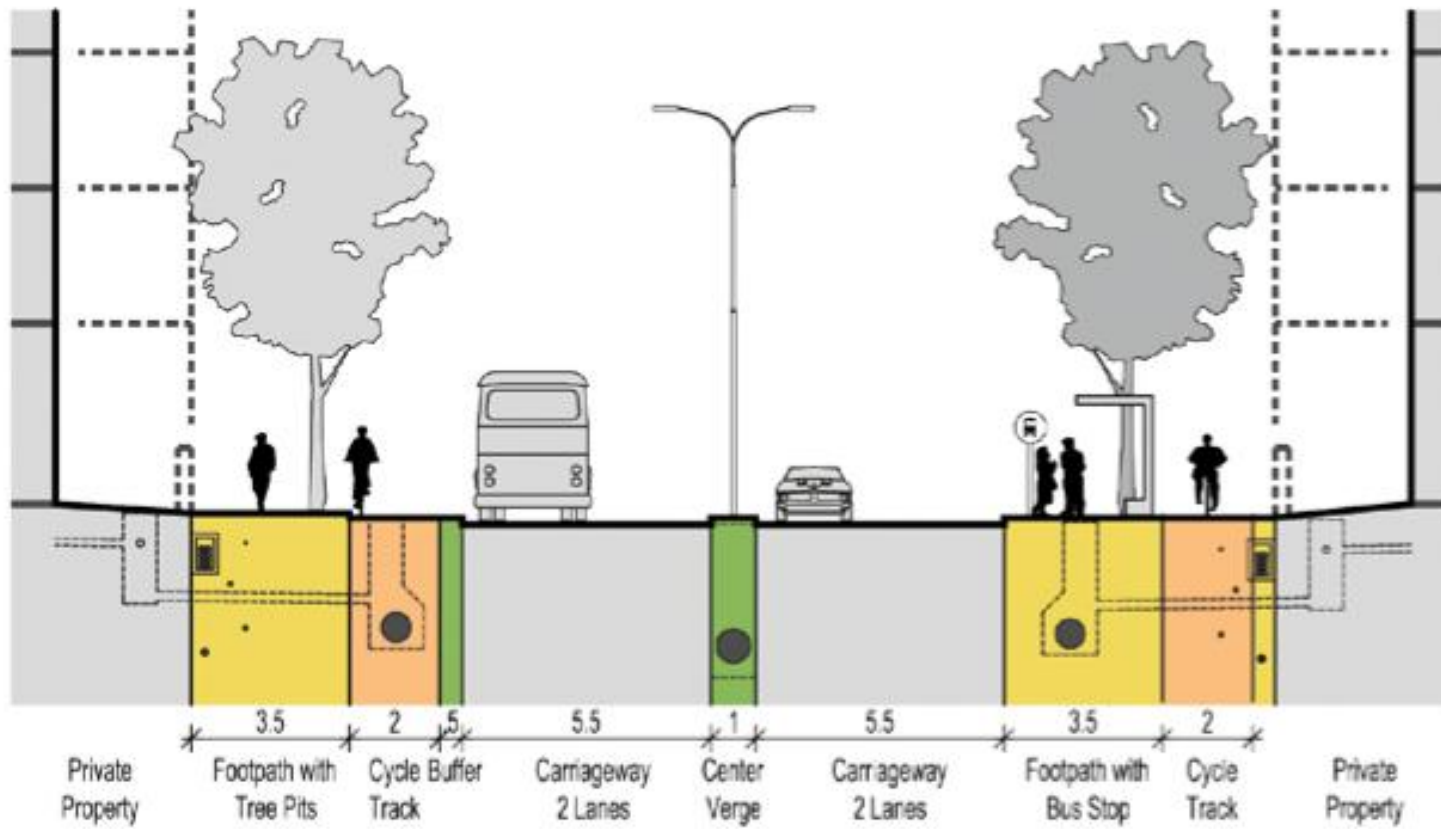
Storm water drainage



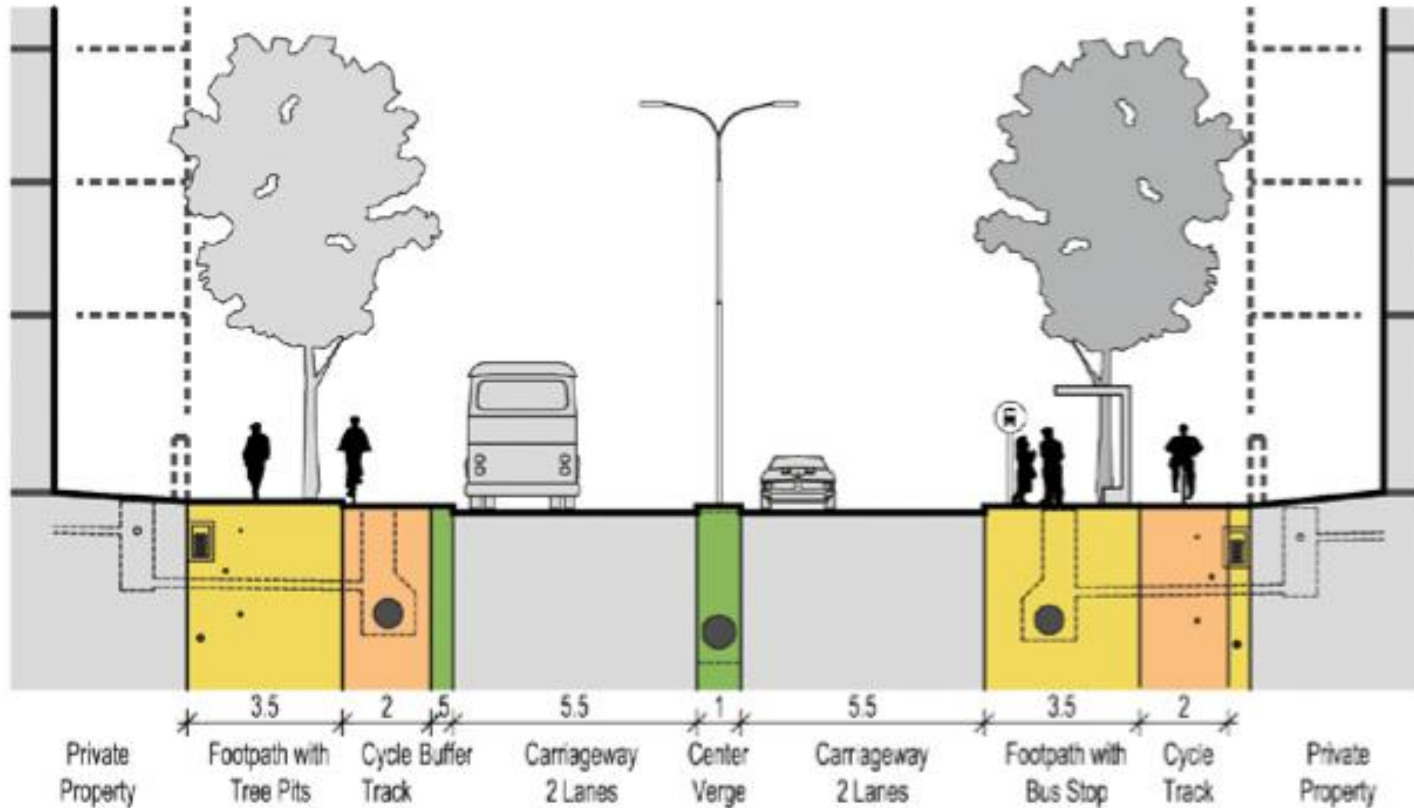
Cycle track on 18m ROW



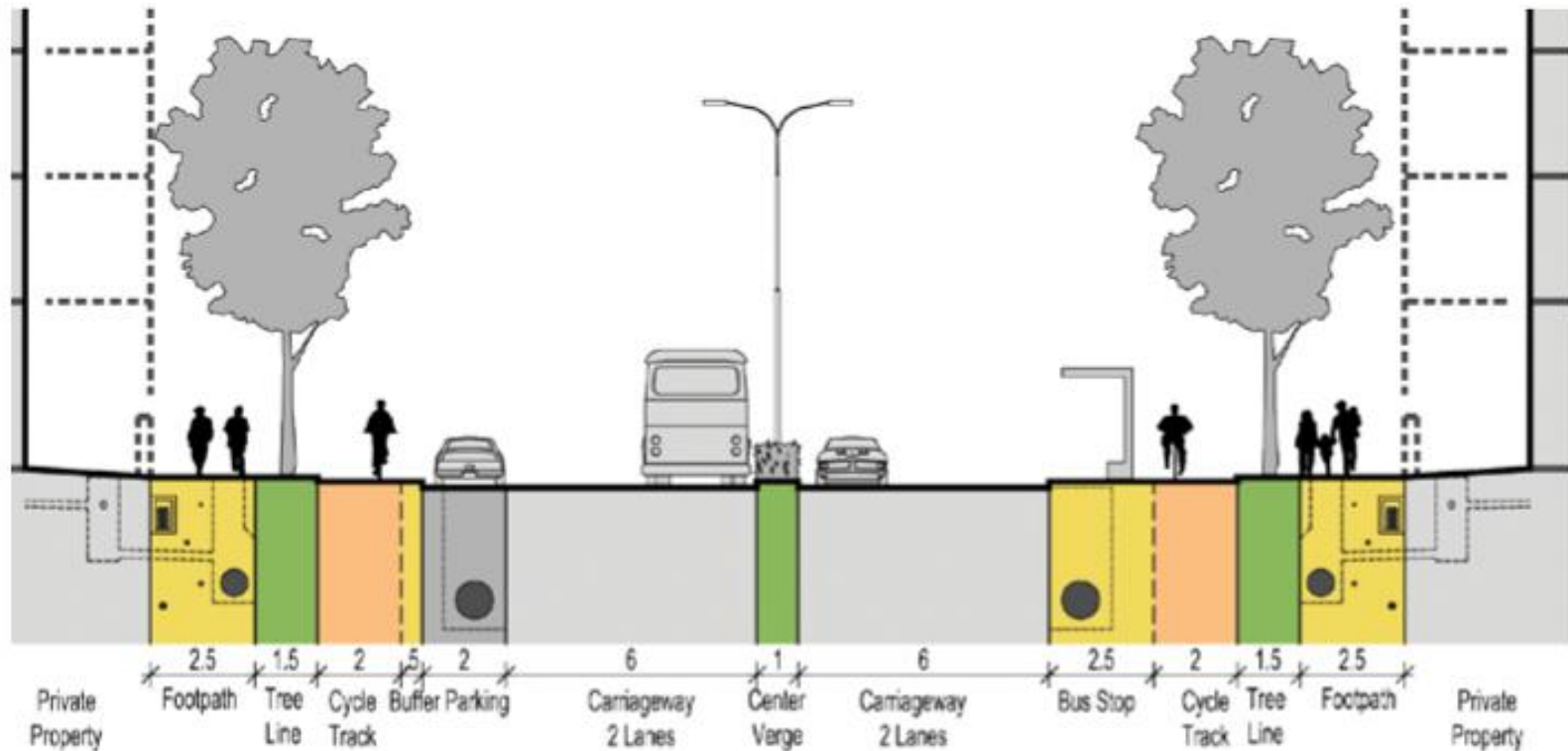
Cycle track on 24m ROW



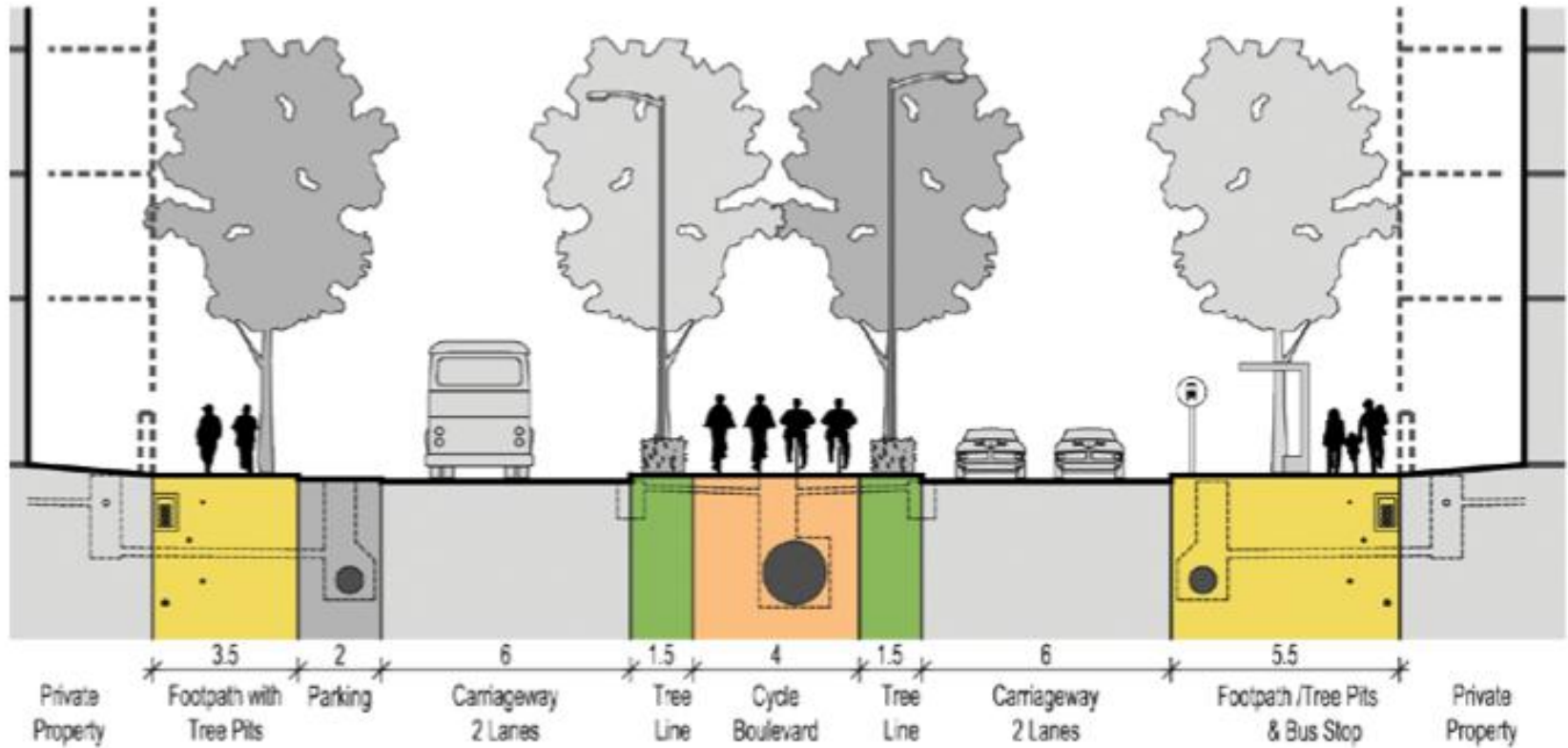
Median cycle track on 24m ROW



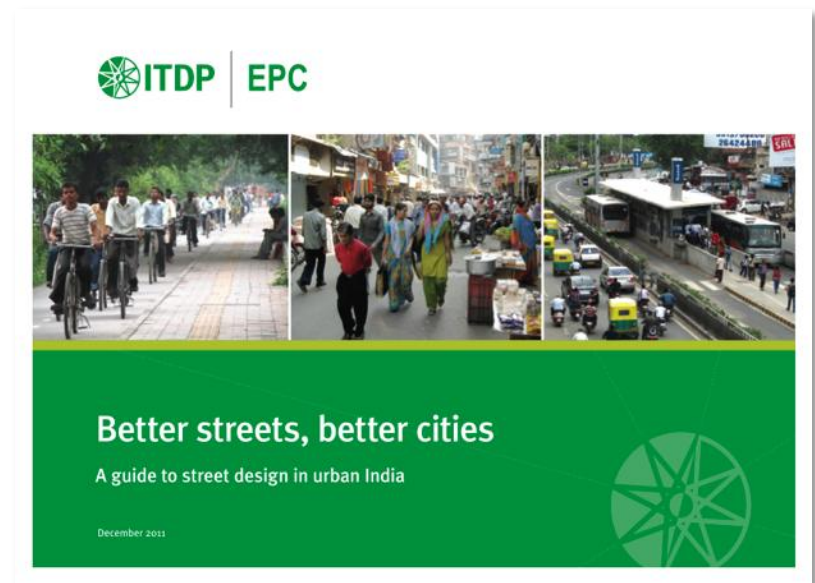
Cycle track on 30m ROW



Cycle Boulevard on 30m ROW



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