COMPLETE STREETS
POLICY FRAMEWORK

Smart City
MISSION TRANSFORM-NATION

Ministry of Housing and Urban Affairs
Government of India

ITDP

April 2019

Ministry of Housing and Urban Affairs
Government of India

The Ministry of Housing and Urban Affairs is the apex authority of Government of India to formulate policies, coordinate the activities of various Central Ministries, State Governments and other nodal authorities and monitor programmes related to issues of housing and urban affairs in the country. The Smart Cities Mission was launched by the Ministry in 2015 to promote sustainable and inclusive cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of 'Smart' Solutions.

ITDP

The Institute for Transportation and Development Policy works around the world to design and implement high quality transport and urban development systems and policy solutions that make cities more livable, equitable, and sustainable.

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introduction

Complete Streets (CS) are streets with safe and continuous footpaths, segregated cycle tracks, safe pedestrian crossings with refuges, uniform carriageway and organised on-street parking. These streets prioritise safety, convenience, and comfort of all users regardless of their age, ability, or mode of transportation. By promoting walking and cycling or “non-motorised transport” (NMT), complete streets help in achieving the sustainable goals of the city. Such high-quality streets make a city truly livable and transform public spaces into community hubs where people can meet, interact, do business, and have fun.

This document provides the rationale for making improvements to our streets. It explains the principles of complete streets and shares case studies of cities which have benefited from the same. Cities can reduce capital expenditure, fuel consumption, pollution levels, travel costs and save money for the Government and individual citizens by adopting the principles of complete streets. Building safe streets that cater to all road users can also save several lives. The creation of complete streets is a leap towards a smart city, that has the ability to create a sustainable, equitable and livable future.

This toolkit contains:

i. Complete Streets Policy Framework
ii. Complete Streets Policy Workbook
iiI. Complete Streets Planning Workbook
iv. Complete Streets Design Workbook
v. Complete Streets Implementation Workbook
vi. Complete Streets Evaluation Metrics
vii. Complete Streets Best Practices

List of acronyms

BoQ	Bill of quantities
BRR	Bus Route Roads
BRT	Bus Rapid Transit
CS	Complete Streets
CSMP	Complete Streets Master Plan
DBM	Dense Bitumen Macadam
DIP	Ductile Iron Pipes
DLC	Dry Lean Concrete
DWC	Double Wall Corrugated
FFL	Finished Floor Level
FRP	Fibre Reinforced Plastic
GIS	Geographic Information System
HDPE	High Density Polyethylene
HRIDAY	Heritage City Development and Augmentation Yojana
IRC	The Indian Road Congress
IPT	Informal Public Transport
MEP	Mechanical, Electrical and Plumbing
MLCP	Multi-Level Car Parking
MRT	Mass Rapid Transit
MS	Mild Steel
MUZ	Multi-Utility Zone
MoRTH	The Ministry of Road Transport and Highways
NMT	Non-Motorised Transport
PCC	Plain Cement Concrete
PCU	Passenger Car Unit
PMV	Personal Motor Vehicle
PQC	Pavement Quality Concrete
PVC	Polyvinyl Chloride
RCC	Reinforced Cement Concrete
RCC NP3	Reinforced Cement Concrete - Non-Pressurised class 3
RfP	Request for Proposal
RoW	Right-of-Way
ToR	Terms of Reference
ULB	Urban Local Body
WBM	Water Based Macadam
WMM	Wet Mix Macadam

definitions

Accessibility Facilities offered to people to reach social and economic opportunities, measured in terms of the time, money, comfort, and safety that is associated with reaching such opportunities.

Average trip length The average distance covered by a transport mode for a trip. This is commonly measured in kilometres.

Bus Rapid Transit (BRT) High quality bus-based mass transit system that delivers fast, comfortable, reliable, and cost-effective urban mobility through the provision of segregated right-of-way infrastructure, rapid and frequent operations, and excellence in marketing and customer service.

Bulb-out Lateral extensions of the footpath into the carriageway to reduce the crossing distance for pedestrians. They reduce vehicle speeds, provide enhanced protection and visibility for pedestrians, and lower the time taken to cross the street.

Complete streets Streets that are designed to cater to the needs of all users and activities, through equitable allocation of road space. Complete streets provide safe and inclusive environments that support users of all age groups, genders, and physical dispositions. They also guarantee efficient mobility by focusing on moving people, user safety, universal accessibility, vitality and liveability, sensitivity to local context, and environmental sustainability.

Eyes on the street Informal surveillance of any street by the residents, shopkeepers, and other users of the street.

Greenway A linear, landscaped pedestrian or bicycle route based on natural passages such as canals, rivers, or other scenic courses. It is typically for recreational use, with an emphasis on conserving and preserving vegetation.

Informal Public Transport (IPT) This includes vehicles like share autos, vans, minibuses that operate on a shared or per seat basis on specific routes, in an unregulated or semi-regulated environment, and with no government support. The service may or may not have a predefined “fare structure”.

Mass Rapid Transit (MRT) A high quality public transport system characterised by high capacity, comfort, overall attractiveness, use of technology in passenger information system, and ensuring reliability using dedicated right of way for transit vehicles (i.e. rail tracks or bus lanes).

Mobility Conditions under which an individual is capable of traveling in the urban environment.

Mode share The share of total trips carried out by different modes of urban transport including, but not limited to walking, cycling, bus, rail, share auto-rickshaws, private auto, two wheelers, and cars.

Non-Motorised Transport (NMT) All forms of human powered transportation including, but not limited to, walking and cycling.

On-street parking The space occupied by parked vehicles along the edge of the street or carriageway which otherwise could have been used by motorised or non-motorised traffic.

Off–street parking The term refers to the dedicated spaces provided for parked vehicles outside the right-of-way. It includes parking lots, multi-level car parking, and other off-street facilities.

Public Transport (PT) Shared passenger vehicle which is publicly available for multiple users.

Parking management A mechanism to facilitate efficient use of street space to ensure additional space dedicated for pedestrians, cyclists, public transport, and motorists. In addition, over time, collecting a fee for parking can manage its demand and ensure that personal motor vehicle users compensate the city for the use of valuable land on which they park their vehicles.

Right of Way (RoW) Measure of the width of the road taken from compound wall/edge on one side of the street to that on the other side.

Scarification This refers to the process of removing a pavement surface (asphalt, PCC, etc.) to improve the cross section and the surface profile, thereby preparing it for resurfacing.

Shared street A street where formal distinctions between spaces allocated for various users, is removed. The concept of shared streets is to ensure that each street user becomes progressively more aware and considerate of the others on the street. Specific design interventions can be made to force the vehicles to slow down and match the pace of those on foot.

Sustainable transport modes The following modes are categorised as “sustainable modes” of urban transport because when compared with personal motor vehicles, they consume the least amount of road space and fuel per person-km and also cost much less to build the infrastructure: walking, cycling, and public transport (including a regular bus service as well as MRT systems).

Traffic calming Traffic calming measures ensure pedestrian and vehicle safety by reducing the speed of motor vehicles through vertical and/or horizontal displacements, real/perceived narrowing of carriageways, material/colour changes that signal conflict point, or complete closure of streets for vehicular traffic.

A street is generally seen as a mere conduit for vehicles.

However, a street plays a much bigger role.

A street provides...

access to jobs, education and amenities

economic opportunities

Fig. (above)
Children on the way to school on Peter's Road in Chennai

Fig. (below)
A man making his living on the street by selling newspapers

social and recreational opportunities

an identity to a city

Fig. (above)
Celebrating on the street with music and dance during the trial run of the Pedestrian Plaza in Chennai

Fig. (below)
The Promenade in Pondicherry is the face of the city

A street has many uses

for mobility, service infrastructure

walking and cycling

formal and informal public transport

personal motor vehicles - mobile and parked; utilities

...and also as a public space

gathering

vending and shopping - eyes on the street

unique urban spaces such as food streets and mall roads

A street hosts many people

of different transport modes and gender

pedestrians and cyclists (vulnerable users)

women as much as men

often with caretaking responsbilities

... different age groups and physicalities

dependent and independent children

the elderly

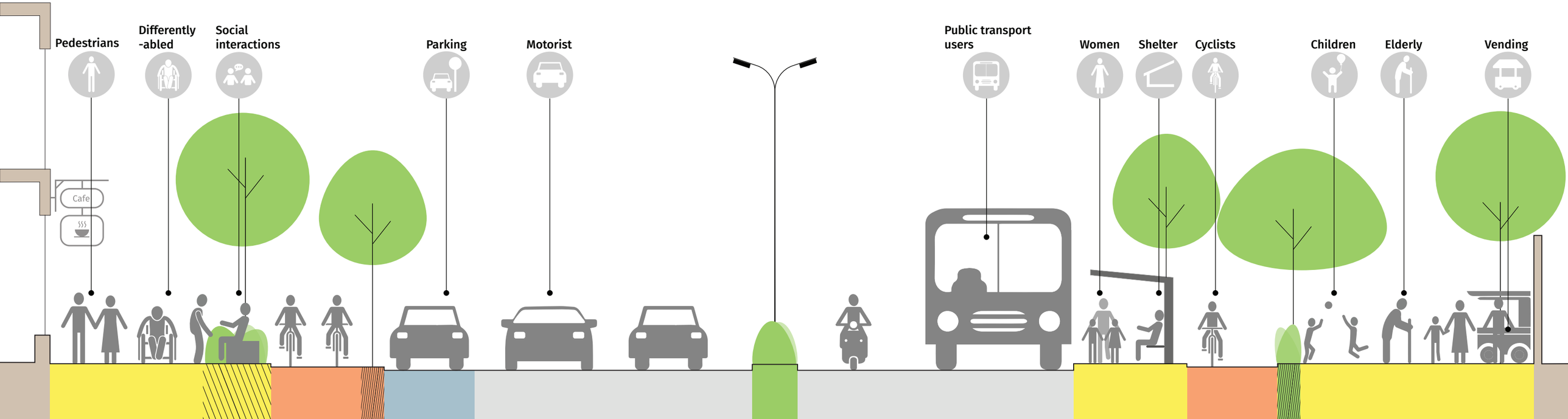
the differently-abled

A tale of two streets | YouTube
https://www.youtube.com/watch?v=fTv5063oqcc

WHAT IS A COMPLETE STREET?

A complete street is one that is

designed to cater to the needs of all users and activities, through equitable allocation of road space.



Active building edge
To improve vibrancy and safety

Footpath
With a multi-utility zone

Parking bays
along with on-street parking management

Carriageway
Of an optimal and uniform width

Transit facilities
To improve efficiency of the street

Cycle track
Segregated from fast-moving traffic

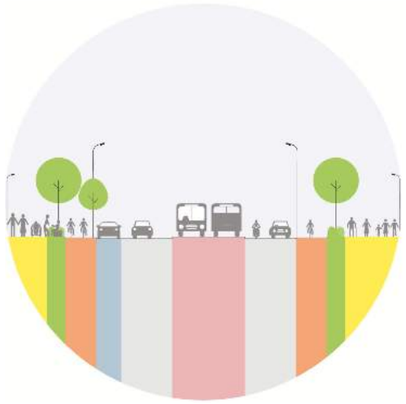
Buffer zones
To separate varying speeds

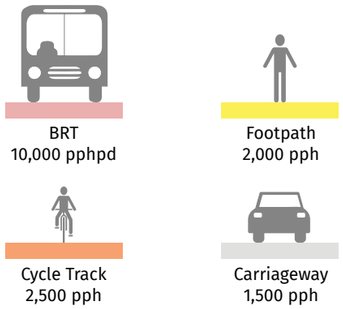
Vending zones
With a vending management plan

principles of a complete street

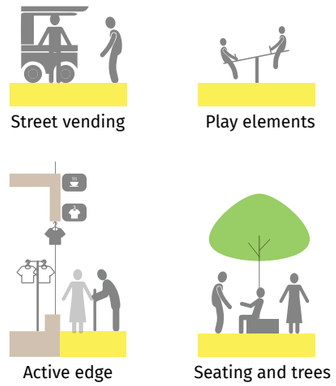
efficient mobility

A complete street ensures efficient mobility by offering multiple modes of travel, especially high quality facilities for public and non-motorised transport. With a greater capacity, a complete street moves more people by allocating space equitably for all users and not prioritising only the private motor vehicles.





Capacity of a complete street of
RoW 36 m = 26,000 people per hour (pph)

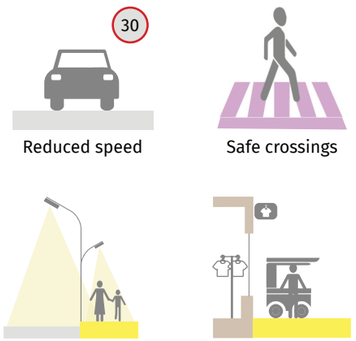


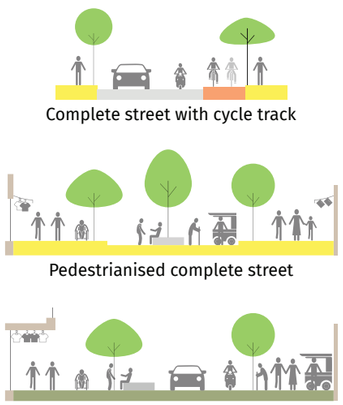
liveability

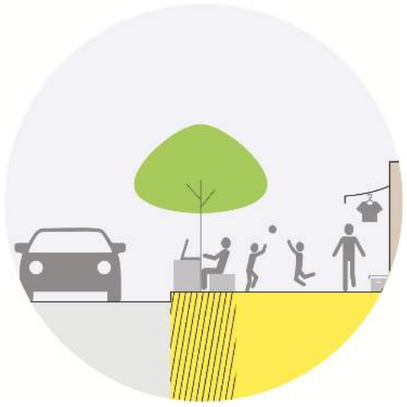
A complete street is full of life, with elements that improve activity. Improved liveability improves conditions for extisting users, attracts more users, increases retail activity and transforms the street into a vital public space.

safety

A complete street is safe for all user groups by providing segregated spaces for each and incorporating traffic calming measures. A complete street ensures personal safety as well, with good lighting and 'eyes on the street' through active edges and vending.





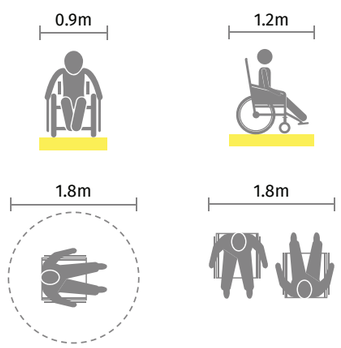


sensitivity to local context

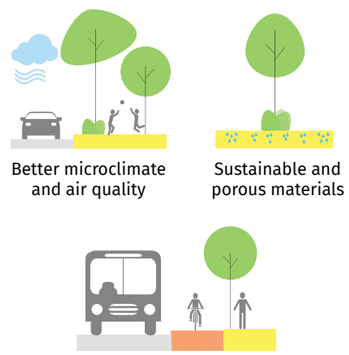
A complete street is designed to suit the local context, factoring in local street activities, patterns of pedestrian movement, nearby land uses and the needs of the people. Design interventions can range from elements added to the street to street-level interventions like shared or pedestrianised streets.

universal accessibility

A complete street should be accessible by all, including the differently-abled. Continuous and even-surfaced footpaths, table top crossings and ramps and tactile pavers wherever level differences occur are some measures to ensure universal accessibility.



Base dimensions for
universally accessible design



environmental sustainability

A complete street promotes sustainable modes of transport and has the scope to improve local climatic conditions. Trees and plants on streets help absorb pollutants and reducing heat. Well-designed complete streets also help properly capture and channelise rainwater.

Environmental sustainability

Trees and landscaping help absorb pollutants and improve air quality.

Livability

Furniture, landscaping and active building edges make complete streets vibrant public spaces.

Universal accessibility

Tabletop crossings and tactile pavers improve accessibility and navigation respectively, for the differently-abled.

Safety

Tabletop crossings and rumblers slow down vehicles, improving safety of people crossing the street. Street lights and activities further enhance personal safety.

Efficient mobility

Optimal and uniform width of carriageway ensures smooth flow of traffic.

benefits of a complete street

01 improves safety

02 reduces congestion

03 improves sustainable mode share

04 improves vibrancy

05 improves local businesses and increases jobs

06 reduces fatalities

07 improves air quality and health

08 allows equitable mobility for all

01 improves safety

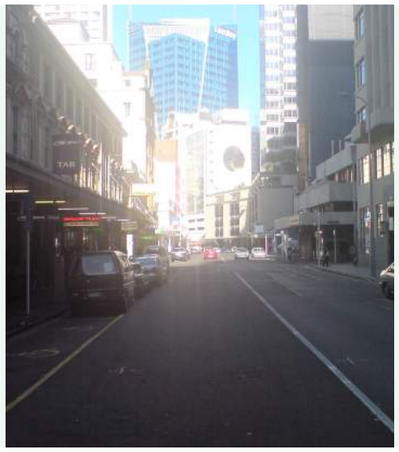
case: Fort Street in Auckland

Complete streets improve safety for users through various means. One example is the transformation of Fort Street in Auckland into a shared space. The carriageway was paved over to reduce vehicle speeds so pedestrians could walk across the entire street width. With increased street activity, personal safety also improved. 80% of the users of Fort Street felt safer after its transformation.

With increased street acitivity,

80%

of the users felt safer



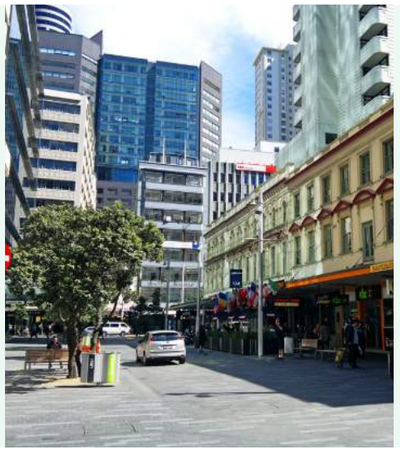


Fig.
Before and after images of Fort street in Auckland

02 reduces congestion

case: Boulevard de Magenta in Paris

Complete streets help reduce congestion by streamlining traffic and limiting the number of vehicles rather than increasing carriageway width to accommodate more vehicles. After Boulevard de Magenta in Paris was revamped with wider footpaths, narrower carriageway and streamlined parking, traffic volumes reduced by 50%. Cycle volumes on the other hand, increased by 145%.

the revamped design reduced traffic volumes by

50%

increased cycle volume by

145%

Fig.
Before and after images of Boulevard de Magenta in Paris

Cycling in Paris | YouTube
https://www.youtube.com/watch?v=eGELdJTB5Wk

03 improves sustainable mode share

case: St. Mark's Road, Bangalore

Complete streets improve mode shares of sustainable transportation by providing better infrastructure for public and non-motorised transport. As part of the Tender S.U.R.E streets redesign programme, footpaths were widened and a segregated cycle track was added along with dedicated parking bays, in St. Mark's road in Bangalore and other adjacent streets. Pedestrian volumes have since gone up by 250%.

with the revamped design, pedestrian volumes have gone up by

250%

Fig.
Before and after images of St.Marks Road, Bangalore

04 improves vibrancy

case: Strøget, Copenhagen

Complete streets are vibrant and full of life, with elements that increase street-side activity. Strøget, Copenhagen's main thoroughfare, was invaded by cars in the 1960s. The city thus decided to shut the street off to vehicles and add furniture by the edge to improve liveability. The network of pedestrian streets now have 6 times more area for pedestrians and bustles with 145 people/min.

the revamp led to

6 times

more area for pedestrians and bustles with

145

people/min

Fig.
Before and after images of Strøget, Copenhagen

05 improves local business and increases jobs

case: Times Square, New York

Complete streets are highly active and thus attract more people, especially non-motorised and public transport users due to better infrastructure for them. This in turn improves retail activity and increases economic opportunities. When commerce in Times Square, New York increased, traffic became unmanageable. The street was then pedestrianised and a public plaza was created. Revenue has since increased by 71%.

after the redesign of the Times Square, revenue increased by

71%

Fig.
Before and after images of Times Square, New York

A Walk Up Stroget Street, Copenhagen, Denmark | YouTube
https://www.youtube.com/watch?v=6XTE8o6boVk

Walk down the Times Square in New York | YouTube
https://www.youtube.com/watch?v=ezyrSKgcyJw

06 reduces fatalities

case: Plaza Program, New York City

The ‘Greenlight for Midtown’ is a major initiative as part of the Plaza Program by the Department of Transportation in New York. By creating new pedestrian plazas and improving safety along the Broadway corridor, the initiative has helped decrease pedestrian accidents by 35%.

the Plaza Program help reduce pedestrian accidents by

35%

Fig. before and after images of New York plaza program.

07 improves air quality and health

case: Historic core of Oxford, England

Complete streets promote sustainable modes of transport and reduce congestion. Along with these factors, the trees on the streets also help reduce pollution and thus improve air quality and health. The historic core of Oxford, England was redesigned with cycling and bus priority routes, parking restrictions and traffic calming measures, to tackle congestion and air pollution. Air quality improved by upto 75%.

the redesign improved air quality by upto

75%

Fig.
Before and after images of the historic core of Oxford, England

08 allows equitable mobility for all

case: Avenida 9 de Julio, Buenos Aires

Complete streets provide equal mobility for all including public and non-motorised transport users. Avenida 9 de Julio, a former 20-lane highway in Buenos Aires and one of the widest streets in the world, was redesigned with a 4-lane BRT in the centre and wide footpaths. The revamped street impacts over 2,00,000 commuters and has reduced bus travel time by 63%.

The revamped street reduced bus travel time by

63%

positively impacting the lives of over

200,000

commuters

Fig.
Before and after images of Avenida 9 de Julio, Buenos Aires

Reclaiming Streets, Transforming Neighborhoods | YouTube
https://www.youtube.com/watch?v=_X5Xm-wC25A

A few case studies were referenced from Global Street Design Guide by Global Designing Cities Initiative

status quo

mode share of urban India

The mode share of urban India gives us a clear view of an excellent opportunity in disguise. When people around the world are trying to increase active modes of transportation, over 48% Indians already commute by either walking or cycling. However, the infrastructure on ground to support this mode of transportation is really not aligned with this.

lack of usable footpaths

The distance of over 70% of all trips in Indian cities are within 5km and can be covered by walk or cycle. Nine out of 10 trips by women are on foot or by public transport. However the corresponding infrastructure to facilitate walking and cycling does not exist.

Discontinuous and narrow walkways marred by uneven surfaces or worse, entirely missing footpaths are typical of Indian cities. This makes it difficult for the pedestrians to walk and dissuades more street users from walking.

lack of cycle tracks

While cycling accounts for about one-fifth the trips in urban India, usable cycle tracks are present in hardly a handful of areas across the country. Cities have not yet grasped the significance of a dedicated cycle zone physically separated from fast-moving traffic and its impact on improving the safety of cyclists. A few cities have cycle lanes which are merely painted portions of the street mostly used for parking and overtaking and do not aid in safer cycling.

priority for private motor vehicles

Indian roads are generally designed prioritising the movement of private motor vehicles. However, this user group makes up for only one-fourth of the trips in India. 75% of the road space is dedicated to a very small section of street users. Roads are continuously being widened and flyovers built to accommodate more vehicles. Increased width attracts more vehicular movement thus resulting in traffic congestion and subsequently, pollution.

impact of increased usage of private motor vehicles and unsafe walking and cycling facilities

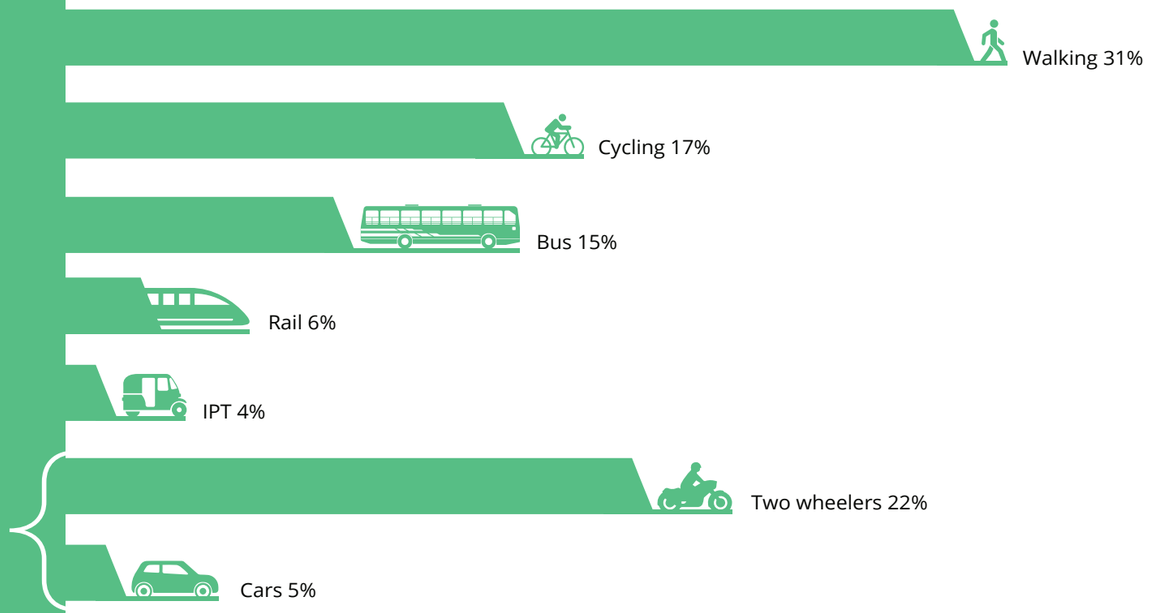
The lack of infrastructure for walking and cycling encourages more people to shift to personal motor vehicles. Adding to the already growing number of PMVs owing to high public aspirations, this shift from non-motorised to motorised transit largely contributes to the increasing congestion on the streets. Road fatalities have also been rising drastically as a result - over 66 non-motorised transport users died everyday in India in 2017. More vehicles mean more emissions and pollution. These have grave consequences, contributing to over 20 lakh deaths every year including the death of 1 lakh children.

over
70%
of the urban trips are
<5km
and can be done by walking or cycling

Only
27%
of the trips are by private motor vehicles but they occupy
75%
of the RoW

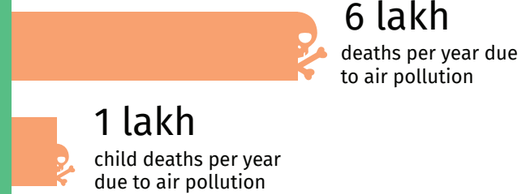
9/10
trips by women are on foot or by public transport

mode share of urban india



deaths due to accidents per day in 2017

deaths due to air pollution



a change in perspective

can transform vehicle-oriented roads

into people-friendly complete streets!

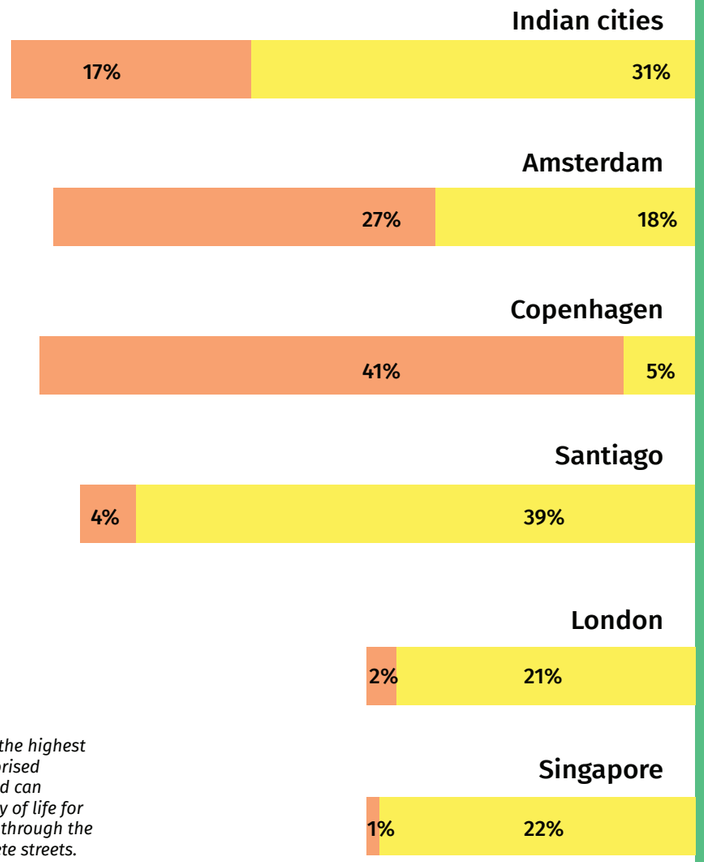
a paradigm shift

the NMT capital

The present allocation of road space in Indian cities favour the private motor vehicles over the majority users, comprising of pedestrians and cyclists. Most cities lack continuous and safe walking spaces, forcing pedestrians to walk on the carriageway. Increased traffic congestion, pollution and road fatality rates in the Indian cities, reflect the impact on the liveability and wellbeing of the city.

Through this paradigm shift of prioritising pedestrians over private vehicles, we open up new ways of experiencing the cities. India can march ahead to becoming the Non-Motorised Capital of the world, tapping into the inherent landscape of public transportation users.

mode share comparisons



Indian cities have the highest share of non-motorised transport users and can improve the quality of life for millions of people through the creation of complete streets.

Indian cities have a sum total of

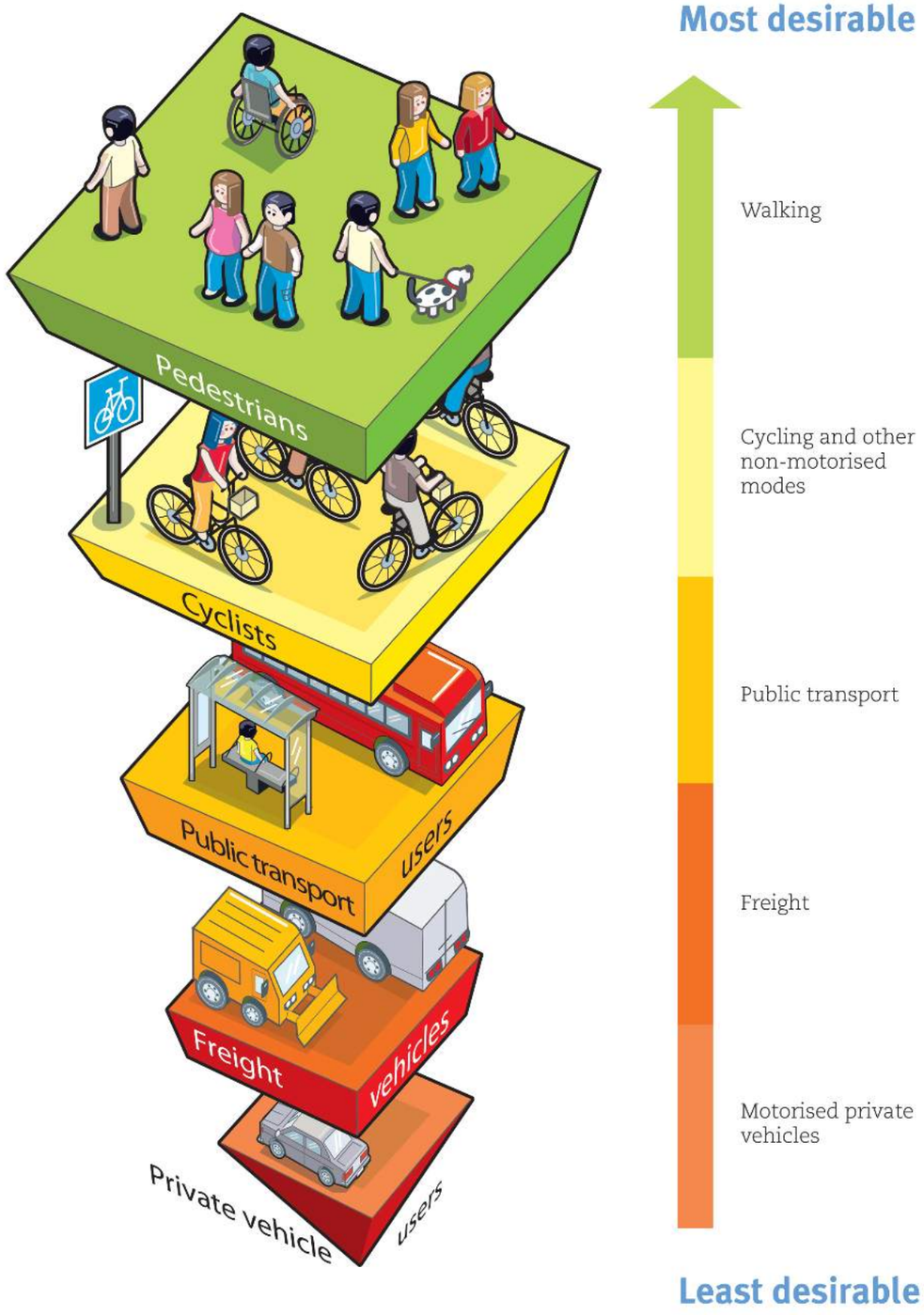
48%

of the mode share, walking and cycling

A paradigm shift could make India the

NMT Capital

of the world.



creating complete streets

Complete Street A street designed to cater to the needs of all users and activities, through equitable allocation of road space is referred to as a complete street.

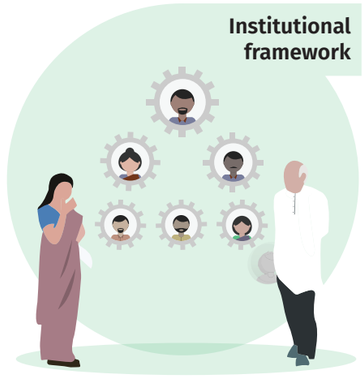
Volume 01 of the Complete Streets Toolkit - Complete Streets Policy Framework - adresses the rationale for making improvements to streets.

Transforming successful pilots into larger city-wide networks of complete streets requires cities to embrace a progressive long-term vision. This can be achieved by adopting a Complete Streets Policy.

Volume 02 of the Complete Streets Toolkit - the Complete Streets Policy Workbook - for Smart Cities across India, provides a step-by-step approach for developing and adopting a Complete Streets Policy that is supported by a strong institutional set-up.

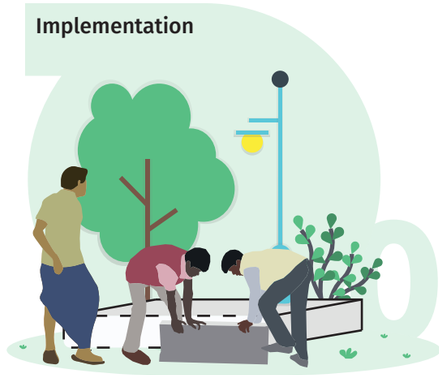
Volume 03 of the Complete Streets Toolkit - Complete Streets Planning Workbook - provides a step-by step guidance to city officials, engineers, planners, and consultants on creating a city-wide walking and cycling networks.

The output created through this process includes a long-term master plan for a Complete Streets network with proposed phasing and estimated investment. This includes streets with continuous footpaths, segregated cycle tracks (where possible), safe intersections, uniform carriageways, and organised parking. It also includes greenways, pedestrian-only streets, non-motorised vehicle and public transport priority streets, shared-streets, and junction redesign projects.



Creation of complete streets involves cooperation and collaboration between multiple stakeholders (such as ULBs, traffic police, planning agencies, consultants, experts, community groups, and others) at different stages, at both the city and the zonal level. Setting-up a dedicated committee and cell, as elaborated in volume 02, is an essential step to ensure the successful implementation of the Complete Streets projects.

It is important to obtain the reviews and approval from various stakeholders at each stage of the process of creation of complete streets to ensure that the end product caters to the expectations and needs of all.



More often than not, the process of creating complete streets happens in isolation without involving the end users or the other agencies pivotal to the operation of the street. This leads to a disconnect between the local context and the design, which eventually renders the redesigned street unusable.

A participatory approach to street design involves the stakeholders - government representatives, public, NGOs, etc - in the design process to ensure that the final design caters to the needs of the intended users. The result of such a process is invariably more feasible and also innovative.

Many cities have initiated work on redesigning their streets. However, they are currently following different methods and standards due to the lack of a single guiding document for street design. There is, thus, an urgent need for a national-level document that serves as a guideline for the design of complete streets.

Volume 04 of the Complete Streets Toolkit - the Complete Streets Design Workbook - for Smart Cities across India, elaborates on the best practice standards and guidelines, as well as the process designing complete streets to city officials, engineers, urban designers, and consultants.

Apart from design execution, the mismanagement of the entire construction process can cause delays and inconvenience to residents. The diversion of traffic, dug-up roads with poor attention to on-site safety, obstruction at property entrances, and water logging add to the problems of residents.

Volume 05 of the Complete Streets Toolkit - the Complete Streets Implementation Workbook - for Smart Cities across India, aims to highlight the typical steps of project implementation that can ensure a good final product - a truly Complete Street.

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