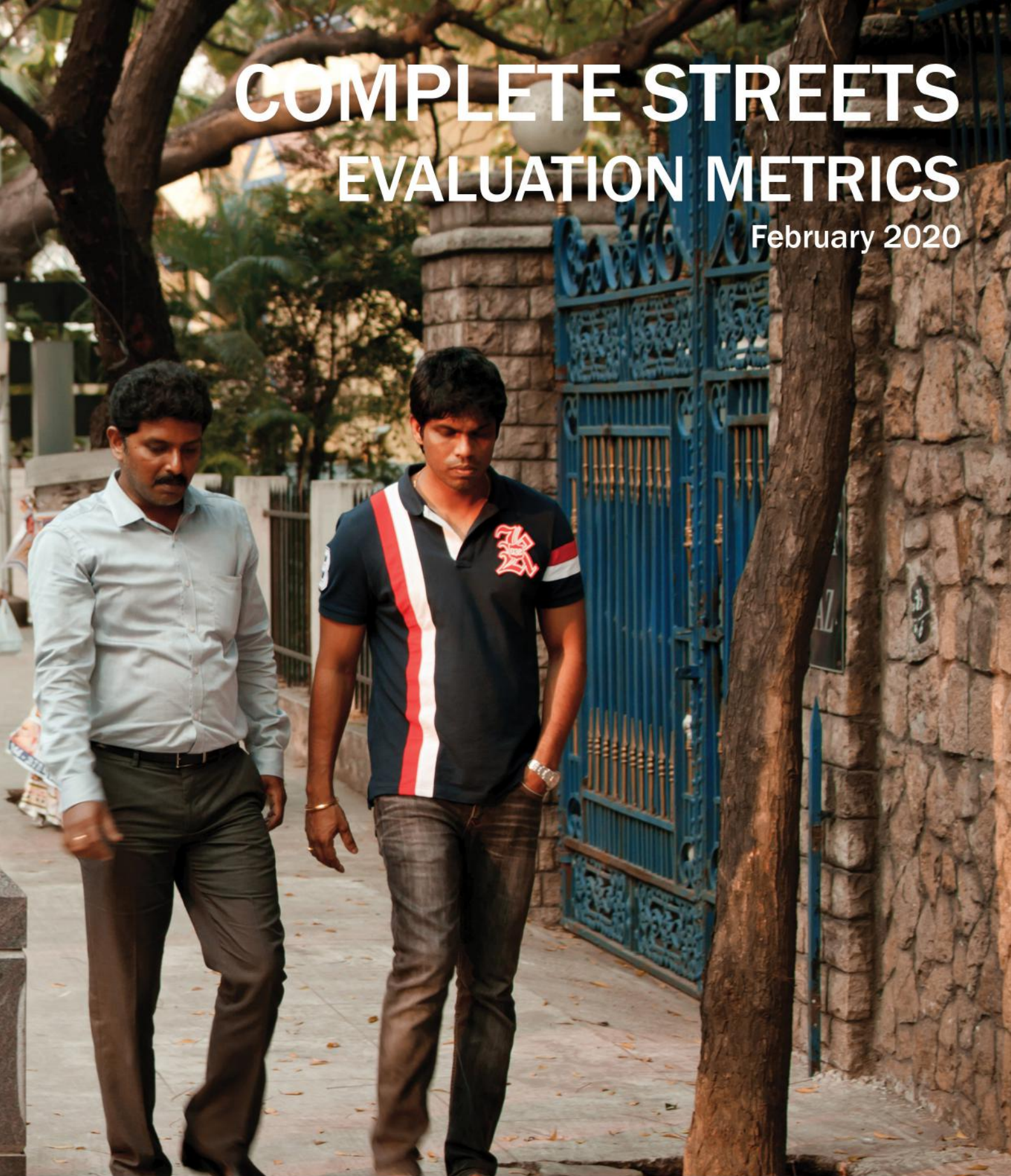


COMPLETE STREETS EVALUATION METRICS

February 2020



February 2020



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Prepared for



Greater Chennai Corporation, by



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introduction

In an age of vanishing footpaths and widening carriageways, the Greater Chennai Corporation (GCC) has been introducing a host of initiatives prioritising pedestrians and cyclists—giving these social heroes their due. From adopting a progressive policy that makes walking and cycling—or non-motorised transport (NMT)—its priority, to rigorously implementing the policy through its Chennai Street Design Project and the Smart City Mission, the city has been transforming itself from a car-centric to a people-friendly city.

The city has transformed over 140 Kms of Bus Route Roads with safe and accessible footpaths—directly benefiting at least half-a-million people everyday, created a vibrant Pedestrian Plaza in T-Nagar and is setting up a public bicycle-sharing system spanning across the city.

With many more streets in the pipeline to be redesigned, a set of guidelines is imperative to direct the design. Greater Chennai Corporation (GCC) is adopting these guidelines prepared in line with global best-practices, Indian Roads Congress (IRC) specifications and from its own experience of since the past five years.

The guidelines are the following:

1. Complete Streets Planning Manual
2. Complete Streets Design Manual
3. Complete Streets Implementation Manual
4. Complete Streets Evaluation Metrics

The Complete Streets Evaluation Metrics document provides a step-by-step approach for decision makers, city officials, engineers, planners, and consultants on evaluation and assessment of a city's policy goals.

The document is a collection of indicators and processes, required to evaluate complete streets policy goals and acts as a tool for an objective assessment of the quality of implemented Complete Streets projects.

The document walks the evaluators through a step-by-step process for conducting evaluation, by enhancing the city's internal capacity to conduct evaluations, giving the process for baseline setting, data collection, and measuring the city's performance with the benchmarks.

The document has separate performance indicators for evaluating different aspects of a complete street and gives detailed explanation of the data sources, collection frequency, and different service level benchmarking for each indicator.

It's important that the city conducts periodic evaluations to ensure identification of areas for improvement and help the city realise its policy goals more efficiently. Continuous evaluation over the year enables the city to demonstrate their programme's success or progress and communicate it in the public realm.

The document is divided into five sections:

- Introduction
- Establishing Monitoring and Evaluation Framework
- Establishing Baseline
- Expected Outcomes
- Outputs



contents

1	introduction	07
2	establishing framework	11
3	outcomes and outputs	17
4	establishing baseline	21
5	indicators and benchmarks	25
	outcome indicators	26
	core output indicators	28
	secondary output indicators	31
6	annexures	37
	list of references	38

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.

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.

Parking management

Measure of the width of the road taken from compound wall/edge on one side of the street to that on the other side.

Right of Way (RoW)

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.

Scarification

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.

Shared street

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).

Sustainable transport modes

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.

Traffic calming





1

INTRODUCTION

1.0 introduction

benefits

Monitoring & evaluation helps programme implementers :

- Objectively assess the extent to which the programme is having or has had the desired impact, in what areas it is effective, and where corrections need to be considered.
- Make informed decisions regarding programme operations and service delivery based on objective evidence.
- Ensure the most effective and efficient use of resources.
- Meet organisational reporting requirements and convince funders and financiers that their investments have been worthwhile or that alternative approaches should be considered.

fundamentals

monitoring

Monitoring of a programme or intervention involves the collection of routine data that measures the progress towards achieving programme objectives. It is used to track changes in programme performance over time. In its simplest form, monitoring systems allow for collection, verification, and use of high quality data in a continuous manner to enable effective decision making. It is an ongoing process focused on present events.

evaluation

Evaluation measures how well the programme activities have met expected objectives and/or the extent to which changes in outcomes can be attributed to the programme or intervention. The difference in the desired outcome between having or not having the programme or intervention is known as its 'impact' and measuring this difference is referred to as 'impact evaluation'. For instance, if a bicycle sharing programme is created with the goal to increase public transportation ridership through improved last mile access, impact evaluation is the tool used to identify if the bicycle share programme contributed to increased public transport ridership or not and if there are additional causal linkages present, that explain any changes in ridership. Evaluations are usually conducted at specific points in time to assess the effectiveness and impact of the programme.

reporting

Reporting involves regular communication of results and findings at defined intervals. It is equally important in demonstrating commitment and accountability to the stakeholders and the general public. Reporting often follows pre-determined and structured formats to ensure that information gathered is more easily collated and synthesised.

verification

Verification is one of the three aspects of the MRV (Monitoring, Reporting, and Verification) framework that has been adopted by the European Union (EU) to account for reduction in climate emissions. Verification can be internal or external and is primarily used to enable accountability on the emissions reduction target for projects.

Indicators are clues, signs or markers that measure one aspect of a programme and show how close a programme is to its desired path and outcomes. They are used to provide benchmarks for demonstrating the achievements of a programme. One of the most critical step in designing a Monitoring & Evaluation (hereby referred to as M&E) system is, selecting appropriate indicators.

indicators

An indicator is a variable which changes value from a baseline level over the course of an intervention. For instance, the number of operational public buses could be one of the indicators used to monitor public transport coverage in the city.

International and national frameworks tend to use programme outcomes and indicators that are 'SMART', as defined below:

Specific - Is the desired outcome clearly specified and defined?

Measurable - Can the achievement of the objective be quantified and measured?

Appropriate - Is the objective appropriately related to the programme's goal?

Realistic - Can the objective realistically be achieved with available resources?

Time-bound - In what time period will the objective be achieved?

Baselines are a measurement of the initial conditions before the start of a project or a programme. These baselines or benchmarks are essential to understand the rate of change over time of an indicator.

baselines

Targets represent commitments made about the level and timing of results to be achieved by a programme or project. It is considered good practice that a target should be established for each outcome indicator or indicator selected. Although targets are usually quantitative, they can be qualitative, depending on their indicators.

targets





2

ESTABLISHING FRAMEWORK

2.0 establishing framework

A phased approach is proposed in this chapter to allow a city to develop a results-based monitoring and evaluation system. In this chapter, emphasis has been placed on the initial steps required in Phase 1 to enable quality adaptive frameworks at the city level.

phase 1: planning for monitoring

Expected time to complete phase 1: one year from initiation of effort.

In order to conduct successful monitoring and evaluations, it is essential that a prerequisite supporting system is already in place. The establishment of an Apex Committee and presence of a Complete Street Cell with adequately trained staff as per the recommendations of the Complete Streets Policy are vital before moving onto the first phase of monitoring.

Given the lack of experience and resources in this domain, it is recommended that the cities rely on external expertise in the initial stages of building a M&E system. Within this, the early focus should be on building and establishing a monitoring system. Parallely, efforts should be taken to enhance the internal capacity of the staff to enable them to include adaptive management principles into their ongoing work. This will also ensure that the staff and the system itself internalises M&E as a core concern of its work.

The city can consider the following practical steps to plan and design a functional monitoring system:

identify staff with adequate experience

Identify a staff member, who has adequate experience and skill sets in mobility issues. This staff member would be responsible for managing M&E for the mobility programme (including overseeing appropriate financing of the programme). As various departments typically handle aspects of sustainable mobility in a city, this staff member should be at a senior level and ideally be identified from a department that has the ability to work across various departments involved in mobility issues.

budget for M&E

A key function of planning for M&E is to estimate the costs, staffing, and other resources needed and budgeting for the same in public accounts.

There is no set formula for budget allocations; various organisations recommend that between 1 to 3 percent of a project's budget should be allocated to M&E. M&E budgets should not be so small as to compromise the accuracy and credibility of the results, but neither should it divert project resources to the extent that programme work is impaired.

To implement the system step by step, it is recommended that the appropriate budget be phased in, to support the scope of the established programme. During Phase 1, it is imperative that the budget allocated is sufficient to cover the staff time, expert time, infrastructure needs, training allocation as well as allocations for a pilot project.

identify external experts

Identify external experts in order to establish a robust and practical data collection, validation, and analytical process, this system will include guidelines formulated and roles assigned for each of these functions.

While identifying data that allows better decisions to be made is a crucial part of this process, it should be ensured that the tradeoffs in collecting the data are considered.

Some key questions to consider as part of the data systems development include:

key questions

- What are the sources of data?
- What are the data collection methods?
- Who will collect the data?
- Will repeated data collection provide consistent data?
- What are the infrastructure needs for storing, managing, and retrieving this data?
- How often will the data be collected?
- What is the cost and difficulty to collect the data?
- Who will analyse the data?
- Who will report the data?
- Who will use the data?

Work across relevant identified departments to identify pilot interventions to commence monitoring and to integrate the inputs of the M&E staff into all aspects of the project and system level planning.

identify pilot interventions

At the pilot scale, the primary aim is to establish an overall system and identify and rectify all issues in a timely and cost-effective manner. It is recommended that the pilot project identification be done with support from experts, so that the monitoring needs are sufficiently balanced with the capacity that has been developed till then.

phase 2: scaling to the city level

The learnings from the first phase, especially from the rollout of pilot interventions will help cities to identify how to expand their monitoring efforts to all programmes at the city level. Building on from the first phase, the M&E manager should identify personnel requirements for scaling up. She should work with external experts to build out a plan to have adequate internal capacity.

The budgeting for M&E should also be scaled up to the city level. Processes should be put in place to ensure that a fixed percentage - depending on the learnings from Phase 1 - of the city's budget is allocated to M&E efforts.

Additionally, as part of this phase, the city should develop criteria to help identify the scope of the monitoring effort. Some potential criteria can be the number of people impacted by the system, the monetary value of the projects being considered, its scope, and complexity.

The monitoring framework provided along with this document can be used as a guiding template. This is in line with the suggested goals included in the Complete Streets Policy Workbook.

phase 3: conducting evaluations

Result-oriented evaluation focuses on outcomes and impacts. It adds to, and builds on monitoring information. These are also typically carried out by independent experts.

As with monitoring, evaluation can be conceptualised within the context of the following steps:

- step 1** Confirmation of evaluation tools and systems - The city will identify most relevant evaluation tools or methodologies to be used, based on the purpose of the exercise. The city could engage external experts, as in the initial phase of monitoring, to create an evaluation framework. As the city gains more internal capacity, this role should be transferred to staff within the local government.
- step 2** Gathering and collation of information - Since evaluations are often undertaken by a service provider external to the project or process, the city will develop a Terms of Reference (ToR) for data collection and analysis.
- step 3** Analysis of information - The function of evaluation is analysing data collected and understanding why any changes occur in project implementation. This crucial step will help cities to analyse the impact of the programme and feed into its decision for future interventions.

Details about evaluation systems and methodologies are beyond the scope of the main intent of this document. If the phased approach is followed, the expectation is that the city will have developed and augmented its capacity to undertake an effective evaluation. For the same reason, the subsequent phase has also only been covered briefly.

phase 4: reporting on findings

The M&E framework will only be of value if findings are reported on and put into action, where necessary. In the fourth phase, the city should focus on creating an appropriate reporting framework based on the context of the city and its interventions.

The primary reason why reporting is suggested as a phase 4 effort is because the three phases leading up to this allow for the system to mature and provide valuable outputs. This reduces the risk of incorrect, misleading or incomplete information being produced by the system.

To encourage more transparency as well as inclusion in city planning, the communication of M&E findings to the city's wide range of stakeholders can be integrated into this phase. This may require the application of a detailed, stakeholder-relevant approach. A communication strategy aligned to the M&E plan will assist in ensuring follow-through in this regard.

While the city would take time and effort to developing a well-functioning system, the multiple benefits brought about from adaptive management and learning systems far outweigh the costs. With the right level of ambition and technical support, a transformation is possible in as little as five years. Strong leadership from senior officials at the city and state level will be one of the key drivers to enable this transition.

*Fig. (facing page)
Harrington Road, Chennai*







OUTCOMES AND OUTPUTS

3.0 outcomes and outputs

Cities should work towards evaluating and achieving the goals set in the 'Complete Streets Policy' to achieve the sustainable future vision. The 15-year planning horizon is long enough to ensure that all goals that are set are attainable. However, cities should aim to implement projects within the 10-year planning horizon and focus the last five years on maintaining projects and upgrading as needed.

The outcome indicators are broader sustainable transport indicators which the city should aim to achieve, to reach the desired vision. The outputs are specific measurable indicators for walking and non-motorized and public transport infrastructure and services which will help the city in achieving the overall sustainability outcomes. Each output is connected to one or more outcomes, and collectively they all lead to fulfillment of the outcomes.

It is important to note that the outcome goals cannot be achieved unless a package of policies and programmes such as Parking Management Plan, Vending Management, Public Bicycle Sharing, etc. are also implemented by the city. The ULB should urge other concerned agencies to take complementary actions to realise these goals.

complete streets: outcomes

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 greater capacity, a complete street moves more people by allocating space equitably for all users, and not prioritising only the private motor vehicles.

Outcomes:

1. Mode share - disaggregated by: Walk, cycle, bus, rail, metro, IPT, personal two-wheelers and personal four-wheelers
2. Registered vehicles data

livable, accessible, and comfortable streets

A complete street should be accessible by all, including the differently-abled. It is full of life, with elements that improve activity. Improved livability improves conditions for existing users, attracts more users, increases retail activity and transforms the street into a vital public space. It is designed to suit the local context, factoring in local street activities, pedestrian movement, nearby land uses and the needs of the people.

Outcomes:

1. Perception surveys (disaggregated by gender, age, ability, and income) on comfort
2. Percentage of non-walking activities like sitting, children play spaces, vending, etc. on streets (disaggregated by gender, age, and ability)
3. Share of local streets with traffic calming measures

Complete street principles associated with the outcome:

- Universal accessibility
- Livability

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.

Outcomes:

1. Traffic injuries per lakh population (disaggregated by mode and cause)

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 reduce heat. Well-designed complete streets also help properly capture and channel rainwater.

environmental sustainability

Outcomes:

1. Annual mean particulate matter concentration of PM10 and PM2.5
2. Reduction in carbon emissions from urban transport by 20%
3. The choice of materials or design of sidewalks

outputs leading to outcomes

OUTPUTS	OUTCOMES			
	Efficient mobility	Livable, accessible, and comfortable streets	Safety	Environmental sustainability
Budgeting for M&E	○	○	○	○
Extent and quality of walking and cycling environment	✓	✓	✓	✓
Parking management	✓	✓	○	○
Access to public transportation	✓	○	✓	✓
Monitoring and Coordination	○	○	○	○
Capacity Development	○	○	○	○
Communication and Outreach	○	○	○	○

Infrastructure Outputs

Management and Monitoring Outputs

Financial Outputs

Communication and Outreach Outputs

✓ Directly related

○ Indirectly related

✗ Not related





4

**ESTABLISHING
BASELINE**

4.0 establishing baseline

The cities are required to obtain certain primary data to establish baseline information about the city to help them achieve the policy goals. Cities should review their existing streets to understand the extent of pedestrians' and cyclists' mobility issues. Surveys should be conducted to identify the existing characteristic of the street. The following data will be required to assist them in monitoring and evaluation of Complete Streets projects:

data required for monitoring and evaluation

Aspect	Activities Required
Mode share	Household survey with a sample size between 0.5-1% of the total population
Traffic injuries and fatalities	<ol style="list-style-type: none">1. Disaggregation of injuries and fatalities by pedestrians, bicyclists, two wheelers, and others2. Identification of black spots
Ambient air-quality	Set up air quality monitoring stations in the city in coordination with Central Pollution Control Board/State Pollution Control Board/Pollution Control Committees
Extent and quality of walking facilities	<ol style="list-style-type: none">1. GIS mapping of city-wide street network up to local streets2. Conduct city-wide accessibility audits for walking environment3. Conduct primary survey to assess accessibility, safety, comfort and quality
Extent and quality of cycling environment	<ol style="list-style-type: none">1. GIS-mapping of:<ul style="list-style-type: none">- City-wide cycling network- Ground-cover from satellite imagery- Ward-boundaries with population2. Conduct city-wide accessibility audits on cycling network3. Conduct primary surveys to assess accessibility, safety, comfort and quality
Parking Management	<ol style="list-style-type: none">1. GIS mapping of:<ul style="list-style-type: none">- All on-street parking locations with ECS and occupancy- All off-street parking locations with ECS and occupancy2. Installation of IT-enabled systems at designated parking locations

Aspect	Activities Required
Access to Public Transport	<ol style="list-style-type: none"> 1. GIS mapping of: <ul style="list-style-type: none"> -City wards with population - Ground cover from satellite imageries - Bus Stops - Bus Routes with frequencies - Mass transit stations - Mass transit routes with frequencies 2. Conduct accessibility audit of mass transit stations and bus stops 3. Carry-out primary surveys
Vibrancy and Inclusivity of Streets	Conduct primary survey to assess usage of streets by categories
Budgeting for M&E	Segregation of budget for walking and cycling in the transport budget from the current practice of clubbing these under road construction or improvement programmes
Monitoring and coordination	Set-up a high-powered Apex Committee or UMTA
Capacity Development	<ol style="list-style-type: none"> 1. Establish Complete Streets Cell 2. Installation of road-safety monitoring systems on roads 3. Conduct regular training for engineers and surveyors on monitoring and evaluation
Communication and Outreach	<ol style="list-style-type: none"> 1. Create a communications plan to engage with the general public 2. Conduct perception surveys





INDICATORS AND BENCHMARKS

outcome indicators | output indicators

5.1 outcome indicators

The outcome indicators are broader sustainable transport indicators which can help the city assess its progress towards achieving its sustainable policy vision. These set of indicators have been identified to collectively help the city assess its performance in terms of energy efficiency, resource consumption, air quality, security and equity in transportation sector.

efficient mobility

Indicator	Frequency	Level of difficulty in data collection	15-year benchmark
1. Mode Share - disaggregated by Walk, Cycle, Bus, Rail, Metro (where applicable), Taxi, IPT, personal two-wheelers and personal four-wheelers	Every 5 years	●	20% or more increase in walking and cycling from baseline 80% or more trips should be by walking, cycling and public transport
• Mode Share - disaggregated by Walk, Cycle and public transport- Bus, Rail, Metro (where applicable) [disaggregated by age and gender]	Every 5 years	●	10% or more increase in trips from baseline by women and children (both to be measured separately) 5% or more increase in trips from baseline for elderly (more than 60 years)

Data Source: Household Survey

Indicator	Frequency	Level of difficulty in data collection	15-year benchmark
2. Average trip length in the ULB Boundary [disaggregated by Walk, Cycle, Bus, Rail, Metro (where applicable), Taxi, IPT, personal two-wheelers and personal four-wheelers]	Every 5 years	●	Trip length should be reduced or maintained at the base-line level


Data Source: Household Survey

Indicator	Frequency	Level of difficulty in data collection	15-year benchmark
3. Vehicles per lakh population disaggregated by: - Transport (Commercial): Buses, Taxis and Auto Rickshaw - Non-Transport (Non-Commercial): Private Two-wheelers, Private Cars and Jeeps	Every year	●	Relative decrease in private vehicles, taxis and autos per lakh population For buses per lakh population refer to indicator 3 in core output indicators

Data Source: MoRTH


- Low
- Moderate
- High

safety

Indicator	Frequency	Level of difficulty in data collection	15-year benchmark
4. Traffic fatalities per lakh population (disaggregated by mode and cause)	Every year		50% or more reduction in deaths from road traffic accidents ¹


Data Source: Traffic Police / National or State Crime Record Bureau

livable, accessible and comfortable streets

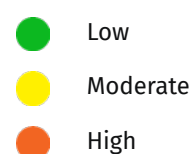
Indicator	Frequency	Level of difficulty in data collection	15-year benchmark
5. Level of safety, security, comfort and convenience on a trip journey (disaggregated by gender, age and ability)	Every year		80% or more women and girls perceive their trip journeys to be safe, secure, comfortable and convenient (each aspect to be evaluated separately)

Data Source: Household Survey

environmental sustainability

Indicator	Frequency	Level of difficulty in data collection	15-year benchmark
6. Air Quality Level at street level: -CO -NOx -SOX -PM10 -PM2.5	Every year		The air quality levels should be as per the recommendations of Central Pollution Control Board

Data Source: Most Indian cities do not have adequate (or any!) equipment for air pollution monitoring. Air quality data is usually collected at the state level, by State Pollution Control Boards. Depending on the financial and technical capabilities, SPCBs may or may not have the capacity to collect information on all the parameters listed above, with most cities only monitoring particulate matter. However, it is imperative that cities and SPCBs build this capacity so as to ensure that data on noxious pollutants from traffic such as SOx and NOx are also captured. Cities should also build their monitoring capacities to ensure that the various sub-city typologies are adequately represented; most Indian cities just have one or two stations for their entire population.



¹ [Goals 3.6 of Sustainable Development Goals](#)


5.2 core output indicators

The outputs are specific measurable indicators for walking, cycling and public transport infrastructure and services which will help the city in achieving the overall sustainability outcomes. Each output indicator also has a level of service benchmark against which a city can score itself. A city should aspire to move towards LOS 1 from the existing level of service.

The output indicators have been categorized into “Core” and “Secondary” output indicators. The core output indicators are prioritized indicators which are necessary to assess a city’s progress towards sustainable transport. Overtime as the city’s monitoring and evaluation system becomes strong, the city can move towards the secondary output indicators.

financial performance


The city will ensure that sufficient financial capital is allocated for implementation and monitoring of the projects.

Indicator	Frequency	Level of difficulty in data collection	15 year benchmark and level of service (LOS)
1. Percentage of transport budget allocated for planning, implementation and management of sustainable transport	Every year		Benchmark: More than 60% LOS: 1: More than 60% 2. 40% to 59% 3. 20% to 39% 4. Less than 20%




Data Source: ULB / City Transport Authority’s annual budget report

walking and cycling environment

All streets have continuous, safe, accessible, secure, and comfortable walking and cycling environment.


Indicator	Frequency	Level of difficulty in data collection	15 year benchmark and level of service (LOS)
2. Percentage of area under walkable block size of less than 2 Ha	During master plan preparation or addition of new streets in the city		Benchmark: More than 80% LOS: 1: More than 80% 2. 60% to 79% 3. 40% to 59% 4. Less than 40%

Data Source: Open Street Maps


-  Low
-  Moderate
-  High

public transport


Improving access to mass transit and Intermediate Public Transit

Indicator	Frequency	Level of difficulty in data collection	15 year benchmark and level of service (LOS)
3. No. of operating buses per lakh population	Every year		<p>Benchmark: More than 60 buses / lakh population</p> <p>LOS:</p> <p>1: More than 60 buses / lakh population</p> <p>2: 40 to 59 buses / lakh population</p> <p>3: 30 to 39 buses / lakh population</p> <p>4: Less than 29 buses per lakh population</p>

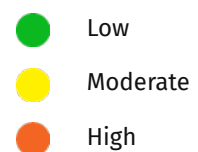
Data Source: State / City transport Undertaking

Indicator	Frequency	Level of difficulty in data collection	15 year benchmark and level of service (LOS)
4. Average daily ridership count on: - Metro - Rail - Bus	Every year		Relative increase in ridership

Data Source: State / City transport Undertaking


Indicator	Frequency	Level of difficulty in data collection	15 year benchmark and level of service (LOS)
5. Per Capita percentage cost of using public bus services for EWS	Every 5 years		<p>Benchmark: Less than 10%</p> <p>LOS:</p> <p>1. Less than 10%</p> <p>2. 11 to 15%</p> <p>3. 16 to 20%</p> <p>4. More than 21%</p>

Data Source: Urban Local Body and State / City Road Transport Undertaking




I parking management


All streets that have a parking occupancy of more than 60% during peak hours shall be brought under an IT-enabled parking management system.

Indicator	Frequency	Level of difficulty in data collection	15 year benchmark and level of service (LOS)
6. Paid on street public parking spaces per lakh vehicles	Every year		Relative increase in the ratio from baseline




Data Source: Urban Local Body

Indicator	Frequency	Level of difficulty in data collection	15 year benchmark and level of service (LOS)
7. Paid off street public parking spaces per lakh vehicles	Every year		Relative increase in the ratio from baseline

Data Source: Urban Local Body

Indicator	Frequency	Level of difficulty in data collection	15 year benchmark and level of service (LOS)
8. Ratio of highest hourly on-street and off-street ECS parking charges ²	Every year		Benchmark: More than 2 LOS: 1. More than 2 2. 1.5 to 2 3. 1 to 1.5 4. Less than 1

Data Source: Urban Local Body


-  Low
-  Moderate
-  High

² Off-street parking here refers to only multi-level car parking owned/managed by municipal corporation


secondary output indicators 5.3

financial performance

The city will ensure that sufficient financial capital is allocated for implementation and monitoring of the projects.

Indicator	Frequency	Level of difficulty in data collection	15 year benchmark and level of service (LOS)
9. Percentage of public transport revenue from non-fare revenue sources	Every year		Benchmark: More than 50% LOS: 1. More than 50% 2. 40% to 49% 3. 30% to 39% 4. Less than 30%


Data Source: State / City Road Transport Undertaking




Indicator	Frequency	Level of difficulty in data collection	15 year benchmark and level of service (LOS)
10. Operating Performance of public transport i.e earning:cost ratio per bus, metro and train.	Every year		Benchmark: Earning to cost ratio should be more than 1.5 LOS: 1. More than 1.5% 2. 1 to 1.5% 3. 0.5 to 1% 4. Less than 0.5%

Data Source: State / City Road Transport Undertaking

walking and cycling environment

All streets have continuous, safe, accessible, secure, and comfortable walking and cycling environment.

Indicator	Frequency	Level of difficulty in data collection	15 year benchmark and level of service (LOS)
11. Percentage of street length with design speeds of more than 15 kmph with: -Continuous -Barrier-free walking zone width as per IRC:103-2012 -Maximum footpath height of 150mm	Every 2 years		Benchmark: 75 to 100% LOS: 1. 75% to 100% 2. 50% to 74% 3. 25% to 49% 4. Less than 24 %

-  Low
-  Moderate
-  High

Data Source: Primary survey

Indicator	Frequency	Level of difficulty in data collection	15 year benchmark and level of service (LOS)
12. Percentage of street length with design speeds of more than 30 kmph having a segregated cycle track	Every 2 years	●	Benchmark: 75 to 100% LOS: 1. 75% to 100% 2. 50% to 74% 3. 25% to 49% 4. Less than 24 %

Data Source: Primary survey

Indicator	Frequency	Level of difficulty in data collection	15 year benchmark and level of service (LOS)
13. Total length of road network with functional street lights	Every year	●	Benchmark: More than 80% LOS: 1. More than 80% 2. 70% to 79% 3. 60% to 69% 4. Less than 60%

Data Source: Primary survey

Indicator	Frequency	Level of difficulty in data collection	15 year benchmark and level of service (LOS)
14. Percentage of crossings with universally accessible at-grade crossings	Every year	●	Benchmark: More than 80% LOS: 1. More than 80% 2. 70% to 79% 3. 60% to 69% 4. Less than 60%

Data Source: Primary survey


Indicator	Frequency	Level of difficulty in data collection	15 year benchmark and level of service (LOS)
15. Percentage of signalized intersections with adequately timed signal. (The time signal should be long enough for children /elderly / people with disabilities etc to cross at a speed of 0.41 m/s)	Every year	●	Benchmark: More than 80% LOS: 1. More than 80% 2. 70% to 79% 3. 60% to 69% 4. Less than 60%

Data Source: Primary survey


- Low
- Moderate
- High

public transport

Improving access to mass transit and Intermediate Public Transit

Indicator	Frequency	Level of difficulty in data collection	15 year benchmark and level of service (LOS)
16. Percentage of road length under arterial, sub-arterial and collector streets with dedicated bus lane	Every year		Benchmark: More than 60% LOS: 1. More than 60% 2. 40% to 59% 3. 20% to 39% 4. Less than 20%


Data Source: State / City Road Transport Undertaking

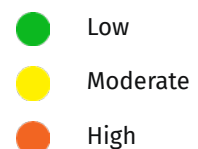
Indicator	Frequency	Level of difficulty in data collection	15 year benchmark and level of service (LOS)
17. Percentage of fleet in the following age ranges: - 0 to 5 years - 5.1 to 10 years - 10.1 to 15 years - More than 15 years	Every year		Benchmark: More than 80% of the fleet should be of less than 10 years of age LOS: 1. More than 80% 2. 60% to 79% 3. 40% to 59% 4. Less than 40%

Data Source: State / City Road Transport Undertaking


parking management

All streets that have a parking occupancy of more than 60% during peak hours shall be brought under an IT-enabled parking management system.

Indicator	Frequency	Level of difficulty in data collection	15 year benchmark and level of service (LOS)
18. Percentage of priced parking facilities (on and off street) with parking management system	Every year		Benchmark: More than 80% LOS: 1. More than 80% 2. 60% to 79% 3. 40% to 59% 4. Less than 40%




Data Source: Urban Local Body

Indicator	Frequency	Level of difficulty in data collection	15 year benchmark and level of service (LOS)
19. Percentage of off-street parking spaces with parking occupancy of 75-85% in the peak hour	Every year		Benchmark: More than 80% LOS: 1. More than 80% 2. 60% to 79% 3. 40% to 59% 4. Less than 40%

Data Source: 24-hour parking Occupancy surveys should be conducted in all off-street parking facilities. The survey will give the peak hour and the occupancy in the peak hour.

management and monitoring outputs

The city will ensure coordination among various street-related stakeholders/ departments.


Indicator	Frequency	Level of difficulty in data collection	15 year benchmark and level of service (LOS)
20. Organise monitoring and coordination meetings with members of a high-powered committee like Apex Committee or UMTA etc. where at least 50% of the members should be present.	Every year		Once every quarter or more

Data Source: Primary survey




communication and outreach outputs


The city will ensure that the ULB has the capacity to implement and monitor the projects.

capacity development


Indicator	Frequency	Level of difficulty in data collection	15 year benchmark and level of service (LOS)
21. Establishing Complete Streets Cell - Number of capacity building workshops, exposure visits organised, etc.	Every year		Increase in number from baseline

Data Source: Urban Local Body

-  Low
-  Moderate
-  High

Indicator	Frequency	Level of difficulty in data collection	15 year benchmark and level of service (LOS)
22. No. of people trained from government departments related to CS implementation	Every year		Relative increase in number from baseline


Data Source: Urban Local Body

Indicator	Frequency	Level of difficulty in data collection	15 year benchmark and level of service (LOS)
23. Number of air quality monitoring stations in the city	Every year		As per Central Pollution Control Board recommendations


Data Source: Urban Local Body

The city will take initiatives to communicate the benefits of Complete Streets projects, increase awareness, and get support of the public.


communication and outreach

Indicator	Frequency	Level of difficulty in data collection	15 year benchmark and level of service (LOS)
24. Number and frequency of open-street events like bicycle Sunday, car free Sunday, public transport days, street art festivals, etc.	Every year		Relative increase in percentage from baseline

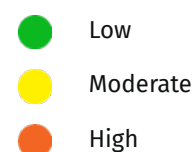
Data Source: Urban Local Body

Indicator	Frequency	Level of difficulty in data collection	15 year benchmark and level of service (LOS)
25. Average number of participants per open-street events	Every year		Relative increase in percentage from baseline

Data Source: Urban Local Body

Indicator	Frequency	Level of difficulty in data collection	15 year benchmark and level of service (LOS)
25. Percentage of bus stops, metro stations, railway stations, and other transit stations with signages and information panels guiding pedestrians, cyclists, and public transport users on shortest routes, distance, and time taken to reach major landmarks	Every year		Benchmark: 75 to 100% LOS: 1. 75% to 100% 2. 50% to 74% 3. 25% to 49% 4. Less than 24 %

Data Source: Primary Survey



ANNEXURES

list of references

list of references

Following are some of the acts, laws, and initiatives undertaken until now by the Central and the State Governments, and other organisations in the road and transportation sector prominently related to vehicles, road construction, and road users. The Complete Streets Evaluation Metrics has taken into consideration the information and suggestions as mentioned in these studies.

Indian Road Congress Guidelines

The Indian Roads Congress (IRC) was set up by the Government of India in consultation with the State Governments in December, 1934 and is a registered society under the Registration of Society Act. It is the premier body of Highways Engineers in India. The principal objectives of the India Roads Congress are to provide a national forum for regular pooling of experience and ideas on all matters concerned with the construction and maintenance of highways, to recommend standard specifications, and to provide a platform for the expression of professional opinion on matters relating to roads and road transport, including those of organisations and administration. It also publishes journals, monthly magazines, and research bulletins.

Few of such journals regarding design of urban roads have been considered in the study for the framework documents. The documents recommend to follow the given IRC for the technical specifications and details for construction of street elements:

1. IRC:35-2015 Code of Practice for Road Markings
2. IRC:36-2010 Recommended Practice for Construction of Earth Embankments and Subgrade for Road Works
3. IRC:37-2012 Guidelines for the Design of Flexible pavements
4. IRC:67-2012 Code of practice for Road Signs
5. IRC:70-2017 Guidelines on Regulation and Control of Mixed Traffic in Urban Areas
6. IRC:98-2011 Guidelines on Accommodation of Utility Services on Roads in Urban Areas
7. IRC:99-2018 Guidelines for Traffic Calming Measures in Urban and Rural Areas
8. IRC:103-2012 Guidelines for Pedestrian Facilities
9. IRC:SP:50-2013 Guidelines on Urban Drainage
10. IRC:SP:055 Guidelines on Traffic Management in Work Zones
11. IRC:SP:057 Guidelines for Quality Systems for Road Construction
12. IRC:SP:112-2017 Manual for Quality Control in Road and Bridge Works
13. IRC:SP:117-2018 Manual on Universal Accessibility for Urban Roads and Streets
14. IRC:SP:119-2018 Manual of Planting and Landscaping of Urban Roads

MoRTH Specifications

The Ministry of Road Transport and Highways, is a ministry of the Government of India. It is the apex body for formulation and administration of the rules, regulations, and laws relating to road transport and transport research in India. Some of the MoRTH regulations and specifications referred in the Complete Streets framework documents have been listed below:

1. MoRTH Section 300: Earthwork, Erosion Control and Drainage
2. MoRTH Section 400: Sub-Base, Bases Not-Bituminous and Shoulders
3. MoRTH Section 500: Base and Surface Courses (Bituminous)
4. MoRTH Section 800: Traffic Signs, Markings and Other Road Appurtenances

Design of Urban Roads-Code of Practice, 2012¹

The code of practice for designing of urban roads has been prepared by the Transportation Research and Injury Prevention Programme (TRIIPP) for the Institute of Urban Transport (IUT), Ministry of Urban Development. The primary purpose of this document is to provide a code of practice for various urban road components. It has been developed in five parts:

- Part I : Urban road cross section design
- Part II : Intersection design
- Part III: Road markings
- Part IV : Signages
- Part V : Traffic Calming methods

Among other recommended codes, the document has two major variations from IRC codes in terms of road design for intended speed limit and linking of lane width with speed limit.

Motor Vehicles Act²

The Motor Vehicles Act, 1988 is an Act of the Parliament of India, which regulates all aspects of road transport vehicles. The Act came into force from 1 July 1989. It replaced Motor Vehicles Act, 1939 which earlier replaced the first such enactment Motor Vehicles Act, 1914. The Act provides in detail, the legislative provisions regarding licensing of drivers/ conductors, registration of motor vehicles, control of motor vehicles through permits, special provisions relating to State Transport Undertakings, traffic regulation, insurance, liability, offences, and penalties, etc.

Disabilities Act³

The Rights of Persons with Disabilities Act replaces the Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995. It fulfills the obligations to the United National Convention on the Rights of Persons with Disabilities (UNCRPD), to which India is a signatory. The Act came into force during December 2016.

Accessibility is one of the rights that is given importance under this Act, which makes it mandatory to provide for disabled friendly design of public places, including roads and streets. The rules under this Act, have specified the standards for accessibility through Harmonised Guidelines and Space Standards for Barrier Free Built Environment for Persons With Disabilities and Elderly Persons⁴. The guidelines, prepared by the Ministry of Urban Development are comprehensive guidelines, inclusive of all provisions updated and harmonised to act as an easy v to Practitioner's Guide for Barrier Free Designs with universal access, responding to the varying needs of the persons with disabilities.

¹ <http://mohua.gov.in/cms/Design-of-Urban.php>

² <http://www.tn.gov.in/sta/Mvact1988.pdf>
http://164.100.47.4/BillsTexts/LSBillTexts/PassedLoksabha/214C_2016_LS_Eng.pdf

³ <http://disabilityaffairs.gov.in/upload/uploadfiles/files/RPWD%20ACT%202016.pdf>

⁴ <https://cpwd.gov.in/Publication/Harmonisedguidelinesreleasedon23rdMarch2016.pdf>

The Guidelines and Toolkits for Urban Transport Development

The Guidelines and Toolkits for Urban Transport Development were prepared by a Technical Assistance on Urban Transport Strategy (TA 4836-IND) funded by the Asian Development Bank for the Ministry of Urban Development (MoUD), Government of India. These documents are designed to help decision makers and practitioners in States and Municipal Governments, who are concerned with urban transport development in medium-sized cities in India.

It consists of 5 modules addressing topics like -

- Comprehensive mobility plans⁵
- Bus Rapid Transit Systems (BRTS)
- Guidelines for Bus service improvement
- Guidelines for parking measure
- Guidelines for NMT measures

The National Urban Transport Policy (April 2006)⁶

It was approved by the Government of India to tackle urban mobility issues to ensure a safe and sustainable urban mobility in the coming decades. It provides for integrated land use and transport plans in cities, coordinated planning for urban transport, people oriented equitable allocation of road space, capital support in the form of equity participation and/or viability gap funding, innovative financing, dedicated urban transport funds, non-motorised transport, car restraint measures, clean fuel and vehicle technology, private sector participation, and pilot projects in cities to establish models of best practices.

Recommendations of Working Group on 12th FYP⁷

The Working Group on Urban Transport for the 12th Five Year Plan has made recommendations on investments and plans on nine broad themes in urban transport which were identified in line with the National Urban Transport Policy (NUTP) developed by the Government of India.

Study on Traffic and Transportation Policies and Strategies in Urban Areas in India, MOUD, 2008⁸

The study aimed at updating the transportation information and projections made from the previous study 'Traffic and Transportation Policies and Strategies in Urban Areas in India 1994', in order to review the National Urban Transport Policy in light of the new and comprehensive data provided within this report.

⁵ https://smartnet.niua.org/sites/default/files/resources/file_1016201405372097.pdf

⁶ <http://www.iutindia.org/downloads/Documents.aspx>

⁷ http://planningcommission.gov.in/aboutus/committee/wrkgrp12/hud/wg_%20urban%20Transport.pdf

⁸ http://mohua.gov.in/upload/uploadfiles/files/final_Report.pdf

Service Level Benchmarking, 2009⁹

Since 2009, the Ministry of Housing and Urban Affairs (then titled Ministry of Urban Development) has adopted the practice of service level benchmarking. Through the Service Level Benchmarking (SLB) initiative, the Ministry hopes to create a robust set of indicators across sectors for which data would be collected at the city levels and collated and published at the National level. This would then help create a ranking for cities, aided by a positive competitive spirit. At the same time, cities were also expected to set targets for themselves and better their performances over time.

Within urban transport, pedestrian and non-motorised transport facilities were assigned indicators - such as the share of city roads with footpaths and the coverage and efficiency of street lighting, etc.

National Mission on Sustainable Habitat: Report of the Sub-Committee on Urban Transport

Under the National Action Plan for Climate Change, the National Mission on Sustainable Habitat has been launched to cover various aspects, which include better urban planning and modal shift to public transport. Regarding urban transport, the objectives of the National Mission on Sustainable Habitat (NMSH) are “To address the issue of mitigating climate change by taking appropriate action with respect to the transport sector such as evolving integrated land use and transportation plans, achieving a modal shift from private to public mode of transportation, encouraging the use of non-motorised transport, improving fuel efficiency, and encouraging use of alternative fuels, etc.

UTTIPEC Guidelines for Street Design¹⁰

As per the recommendations of National Urban Transport Policy, DDA, Delhi has notified Unified Traffic and Transportation Infrastructure (Plg. & Engg.) Centre (UTTIPEC) to enhance mobility, reduce congestion, and to promote traffic safety by adopting standard transport planning practices.

Recently UTIPEC has published street design guidelines to promote sustainable transportation system in the city of Delhi.

The Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act, 2014¹¹

Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act, 2014 is an Act of the Parliament of India. This Act was drafted with the legislative intent of protecting the livelihood rights of street vendors as well as regulating street vending through demarcation of vending zones and laying out conditions/restrictions for street vending. The Act now governs over all matters in regards to the rights and duties of the street vendors in India.

⁹ http://mohua.gov.in/upload/uploadfiles/files/Service_level.pdf

¹⁰ http://smartcities.gov.in/upload/uploadfiles/files/StreetGuidelines_DDA.pdf

¹¹ <http://legislative.gov.in/sites/default/files/A2014-7.pdf>

Chennai Non-Motorised Transport Policy, 2014¹²

The Chennai Municipal Corporation adopted a progressive non-motorised policy in October, 2014, to make walking and cycling its priority. The policy aims to arrest the current decline in walking and cycling in the city, by creating safe and pleasant network of footpaths, cycle tracks, greenways, and other NMT facilities.

Urban Street Design Guidelines, Pune 2016¹³

In accordance with the key principles of moving people before vehicles in National Urban Transport Policy, the Municipal Corporation of Pune adopted the 'Urban Street Design Guidelines' as a new policy document aimed at 'equitable allocation of street space'. The guidelines give an overview of the various elements that go into designing streets, making them universally accessible and also provide standard templates for different sizes and uses of streets.

Policy for Pedestrian Facilities and Safety, Pune 2016¹⁴

The Municipal Corporation of Pune, in 2016 adopted a Pedestrian Facilities and Safety Policy, keeping in view the focus set in NUTP and CMP for Pune. The policy establishes good quality public transport system as well as safe, adequate, and usable facilities for pedestrians and cyclists as the solutions to city's traffic problems and aims at providing consistent, high quality pedestrian infrastructure with equitable allocation of road space.

Public Parking Policy, Pune 2016¹⁵

The policy on Public Parking adopted by Pune Municipal Corporation in 2016, is expected to help the city in becoming more 'people friendly' than 'vehicle friendly'. The policy aspires to discourage usage of private modes, encourages efficient use of available parking spaces, aids in evolving a better transportation system, builds a strategy to reduce congestion, pollution, and also helps the public transport system to grow.

NMT Guidance Document, 2016¹⁶

The guidance document for preparing Non-Motorised Transport (NMT) plans has been undertaken by the Sustainable Urban Transport Project, Ministry of Urban Development (MoUD), Government of India (GOI) with support from Global Environment Facility (GEF), UNDP, and World Bank. The focus of the Guidance Document is to establish a systematic process for plan preparation, serving more as an implementation manual with checklists of potential alternatives, rather than providing technical standards for development of detailed specifications.

¹² <https://www.itdp.in/wp-content/uploads/2014/10/NMT-Policy.pdf>

¹³ https://pmc.gov.in/sites/default/files/road_img/USDG_Final_July2016.pdf

¹⁴ <http://smartcities.gov.in/upload/development/5a9009c9843cdPolicy%20for%20Pedestrian%20Facilities%20and%20Safety%20in%20Pune%20City.pdf>

¹⁵ <https://pmc.gov.in/sites/default/files/project-glimpses/PMC-public-parking-policy-English-revised-March2016-Final.pdf>

¹⁶ <https://smartnet.niua.org/sites/default/files/resources/nmtguidancefinal.pdf>

Coimbatore Street Design & Management Policy, 2017¹⁷

Keeping with the approach set-out in NUTP-2006, the Coimbatore City Municipal Corporation (CCMC) adopted a Street Design & Management Policy to ensure the implementation of high-quality transport systems. The policy seeks to achieve an environment that supports more equitable allocation of road space by incorporating a focus on non-motorised transport (NMT) and public transport (PT) in the planning, design, managing, and budgeting stages.

Ease of Living Index, 2018¹⁸

The SLB initiative has been reimagined and expanded into the Ease of Living Index, covering more sectors and aspects of citizen lives. Within transport however, the larger set of indicators remain largely similar to the earlier SLBs.

Specifications for Urban Road Execution, Tender SURE

Bangalore City Connect Foundation (BCCF) in conjunction with Indian Urban Space Foundation (IUSF) approached the State Government of Karnataka to build an Urban Road and Tender Manual in 2010. The publication contains guidelines on designs, specification, and procurement of contract for urban roads execution, with the priority on the comfort and safety of pedestrians and cyclists, as well as recognising the needs of street vendors and hawkers.

Urban Street Design Guide, NACTO

NACTO's (a non-profit organisation) 'Urban Street Design Guide' gives guidance through toolbox and tactics that cities can use to make streets safer, more livable, and more economically vibrant. The guide outlines both a clear vision for complete streets and a basic road map for how to bring them to fruition.

Better Streets, Better Cities, ITDP¹⁹

A street design manual for Indian cities prepared by ITDP, (a not for profit organisation) that discusses design details of various street elements and street sections on 'complete streets' principle.

Parking Basics, ITDP²⁰

Parking Basics, a guiding document by ITDP, outlines the key principles and steps involved in managing on-street parking and regulating off-street parking.

¹⁷ https://www.itdp.in/wp-content/uploads/2018/01/CoimbatoreStreetDesignandManagementPolicy_ITDP-170218.pdf

¹⁸ <https://easeofliving.niua.org/assets/upload/pdfs/ease-of-living-national-report.pdf>

¹⁹ <https://www.itdp.org/wp-content/uploads/2011/12/Better-Streets-Better-Cities-ITDP-2011.pdf>

²⁰ <https://www.itdp.org/wp-content/uploads/2015/10/Parking-Basics.pdf>

Footpath Design: A guide to creating footpaths, ITDP²¹

This design guide prepared by ITDP is a quick reference document, which highlights key concepts from the IRC Guidelines, including footpath design standards. The guide also draws from local and international best practices for some themes not covered in the IRC publication.

Footpath Fix, ITDP²²

Footpath Fix, the second volume after Footpath Design, is a step-by-step guide on footpath construction detailing for urban designers, municipal engineers, and contractors. The guide aims to highlight the steps of footpath construction in chronological order, from pre-excavation to above-ground construction. It also features necessary precautions, drawn from experience on-ground, that must be taken into consideration at each stage of the construction.

²¹ https://www.itdp.in/wp-content/uploads/2014/04/05-Footpath-Design_Handout.pdf

²² <https://www.itdp.in/wp-content/uploads/2018/07/Footpath-Fix.pdf>

