BUILDING 15-MINUTE NEIGHBOURHOODS

At the Intersection of Sustainable Mobility, Public Spaces, and Climate Action

DESIGN GUIDELINES

Prepared by
Jana Urban Space Foundation

In Partnership with
Mercedes-Benz Research and Development India

Jana Urban Space works towards transforming the quality of life in urban India through the streams of urban planning and design, across both policy and practice. Placing community and environmental sustainability at the heart of design, Jana Urban Space works on policies on land titling, spatial reforms, and street design guidelines, as well as regional plans, masterplans, and neighbourhood-level plans. The organization also focuses on the improvement of road infrastructure (Tender S.U.R.E.), rejuvenation of public spaces (markets, bus stands, lakes, parks, heritage and community centres), and the architecture of affordable housing.

Mercedes-Benz Research and Development India (MBRDI) is the largest research and development centre for Mercedes-Benz Group AG outside of Germany. Established in 1996, MBRDI plays a prominent role in the development of technologies like connected, autonomous, and electric in the world of mobility. With offices in Bengaluru and Pune, MBRDI currently employs over 8,500 professionals engaged in digital product development, interior component design, IT engineering and services.

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Design Guidelines
June 2024

MESSAGE

Prof. M. V. Rajeev Gowda

Former Member of Parliament,
Former Vice Chairman of Karnataka State
Policy and Planning Commission (KSPPC)

> ***The concept of 15-minute neighbourhoods aligns with the urgent imperative to address climate change by transforming how we design and inhabit our urban environments.***

The concept of a 15-minute neighbourhood, coined by Prof. Carlos Moreno in 2016, captured my interest profoundly. Through my interactions with residents in Bengaluru, I've come to recognise the critical importance of making essential needs both affordable and easily accessible.

Bengaluru stands at the precipice of a climate catastrophe. Rising temperatures, water crises, and traffic congestion have caused significant distress to our city which was once a retirement haven for many. **The concept of a 15-minute neighbourhood offers a potential solution to these challenges. By designing communities where essential services like groceries, schools, healthcare, and recreational facilities are conveniently located within a short walk or bike ride from one's home, we can significantly reduce our reliance on carbon-intensive transportation.**

It also encourages local economic development and enhances social equity by providing equal access to essential services and amenities regardless of income or background. **It aligns with the urgent imperative to address climate change by transforming how we design and inhabit our urban environments.**

In this context, "Building 15 Minute Neighbourhoods - Design Guidelines," written and conceptualised by Jana Urban Space in collaboration with Mercedes-Benz Research and Development India, is a pioneering effort towards realising this vision in Bengaluru. This design guideline intricately crafts a diverse vision for specific neighbourhoods in the city, offering a blueprint for a sustainable urban future. As we navigate the complex challenges posed by climate change, urbanisation, and social inequity, the ideas presented in this book serve as a testament to the transformative potential of urban planning.

I commend the authors and collaborators for their dedication to advancing this transformative agenda. I am certain that this book will inspire policymakers, urban planners, civil society organisations and residents to reimagine our Bengaluru for the betterment of our current and future generations.

MESSAGE

Mr. Rakesh Singh IAS

Additional Chief Secretary,
Urban Development Department,
Government of Karnataka

> ***Building 15-Minute Neighbourhoods - Design Guidelines*** **will serve as a catalyst for change and key tool in championing sustainable infrastructure development, improving the quality of life neighbourhood by neighbourhood.**

As we stand at the height of transformation in this era of sustainable development, the significance of India's urban areas in fostering progress cannot be overstated. **The "Building 15-Minute Neighbourhoods - Design Guidelines" emerges as a timely resource, offering inspiration to building thriving, inclusive, and dynamic cities, rejuvenating our urban landscapes.**

Bengaluru, a city that has long been at the forefront of innovation and growth, also grapples with the perils of rapid urbanisation. **The pressure of rapid development is felt in the city's living conditions, in addition to its impacts on the natural resources and ecology.** From traffic congestion and poor air quality to water scarcity and reduced green cover, the challenges loom large, demanding urgent attention and innovative solutions.

In the face of these challenges, the importance of neighbourhood-level planning becomes increasingly apparent. **Rather than relying on broad, one-size-fits-all approaches, it is crucial to tailor solutions to the unique needs and characteristics of each neighbourhood.** For example, Bengaluru's indigenous water system, with its interconnected network of tanks and nallahs, stands as a testament to the effectiveness of localised solutions. By reviving and safeguarding such assets at the neighbourhood level, we can begin to address the root causes of our urban woes and pave the way for a more sustainable future.

However, the scope of our efforts extends far beyond water management alone. **We must also confront other pressing urbanisation challenges, from mobility and air quality to access to public spaces and social amenities for the urban poor.** It is only by tackling these issues holistically, at the neighbourhood level, that we can truly transform our cities into vibrant, livable spaces for all.

The concept of 15-minute neighbourhoods offers a compelling vision for this transformation. By ensuring that essential services, amenities, and opportunities are within a short walk from every doorstep, we can foster a sense of community, reduce reliance on cars, and improve quality of life for residents. In doing so, we not only mitigate the impacts of urbanization but also lay the groundwork for a more equitable and sustainable future.

As we embark on this journey, it is my sincere hope that the principles outlined in the "Building 15-Minute Neighbourhoods - Design Guidelines" will serve as a catalyst for change and key tool in championing sustainable infrastructure development, improving the quality of life neighbourhood by neighbourhood. May they inspire policymakers, urban practitioners, and citizens alike to come together in pursuit of a shared vision: one of inclusive, resilient, and sustainable cities that serve as models not just within Karnataka, but across India and beyond.

Together, let us embrace the challenge and opportunity of urbanisation, forging a path towards a brighter future for generations to come.

MESSAGE

Mr. Manu Saale

Managing Director and CEO,
Mercedes-Benz Research and
Development India

The 15-minute neighbourhood guidelines report calls on us to act collectively as stakeholders to improve our cities by offering a comprehensive and targeted roadmap towards redefining urban living.

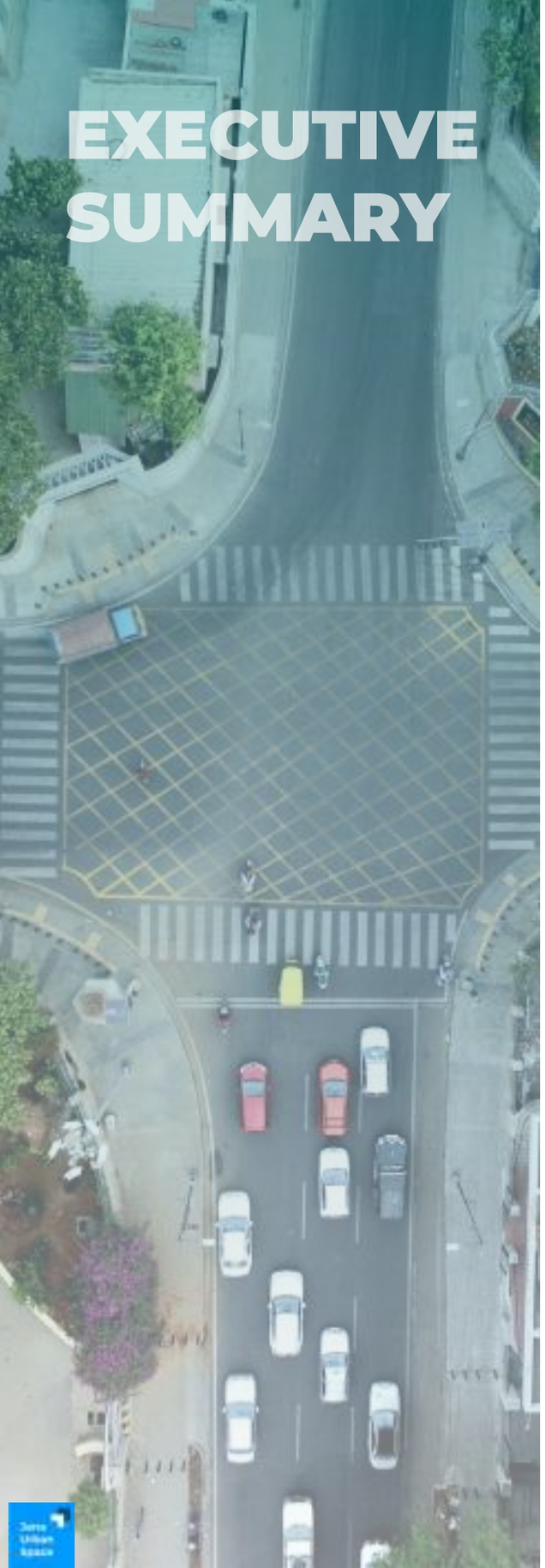
India's urban landscapes are fast-evolving, presenting both unprecedented challenges and unique opportunities. **In this dynamic environment, it is imperative that we recognise our role in shaping the future of our cities**.

At Mercedes-Benz, sustainability is integral to everything that we do. With innovative mobility and transport solutions, we want to make a significant contribution to improving the quality of life in cities. Guided by our Ambition 2039 vision, we are committed to making our entire fleet of new vehicles net carbon-neutral along the entire value chain and over the vehicles' entire life cycle by 2039. This commitment underscores our relentless pursuit of excellence and our unwavering resolve to lead by example. From pioneering electric mobility solutions to investing in renewable energy initiatives, we have made significant strides to minimise our carbon footprint. However, our vision extends beyond our operations; it also embraces sustainability through innovation, collaboration, and inclusivity directed towards communities where we are present.

We envision a future where sustainability and progress go hand in hand, shaping not just the vehicles we create but the very fabric of the cities they inhabit. **Our commitment to offering cutting-edge mobility and environmental solutions that produce public benefits to enhance quality of life is anchored and strategically guided by our Corporate Social Responsibility projects. Key to this vision is our effort to introduce the concept of 15-minute neighbourhoods, which aims to highlight the importance of people-centred urban development at a foundational level.**

The project began in 2022 with a detailed evaluation of connected mobility services, access to green spaces, and inclusivity of four neighbourhoods in Bengaluru. This has resulted in a comprehensive guidelines report that provides benchmarks and recommendations on evaluating, improving, and **implementing a holistic Move-Play-Sustain-Include model customised for varying socio-economic needs to enable the transformation into 15-minute neighbourhoods**. By decentralising amenities and services, we aim to reduce emissions, nurture vibrant communities, foster social cohesion, and enhance the overall quality of life.

The 15-minute neighbourhood guidelines report calls on us to act collectively as stakeholders to improve our cities by offering a comprehensive and targeted roadmap towards redefining urban living. Together, we can build a future where sustainability is not just a goal but a way of life—a future where every journey leads to a thriving and ecologically balanced world.



EXECUTIVE SUMMARY

BACKGROUND

Assessing quality of life in Indian cities

Cities are economic powerhouses. They attract millions of people each year with the promise of a better quality of life. But quality of life is not just dependent on the economy. It factors in other aspects of liveability such as access to quality infrastructure and basic amenities. Indian cities are expected to host over 800 million people by 2050, which is about half of the country's population. If this growth is not addressed efficiently, it poses the risk of increasing the existing deficit between the population and urban infrastructure. There exists an **undeniable need for a sustainable physical environment that addresses the basic requirements for living, working, playing, and moving.**

From an infrastructural perspective, quality of life could be significantly enhanced by providing access to basic amenities of high quality. It is also important to ensure that access to these amenities is facilitated by the most inclusive form of mobility – walking. The 15-minute neighbourhood is a method to ensure this: **Quality of life in neighbourhoods is enhanced by the availability, accessibility, and quality of amenities reachable within a 15-minute walk from one's residence.**

Redefining the concept of 15-minute neighbourhoods for Indian cities

At the global stage, the concept of 15-minute cities is defined in a variety of ways – from ensuring walkable access to amenities to ensuring low-carbon cities. However, in the Indian context, there is a need to redefine its applicability, given that all Indian cities are predominantly mixed-used in nature.

With the goal to create healthier, sustainable, and vibrant cities, a 15-minute neighbourhood focuses on having most amenities accessible within a 15-minute walk or cycle ride. However, this time frame can change from city to city due to different factors like land availability, population density, geography etc. Therefore, sometimes, destinations might be a bit farther than 15 minutes; we use 'X' to show this variable time – it could be less or more than 15 minutes.

To this end, a 15-minute neighbourhood focuses on enhancing quality of life through a 3 pronged approach –

- Ensure the availability of basic urban amenities required for a good quality of life in a given urban area
- Measure the quality of the available amenity, and ensure it meets the requirements of the population it serves.
- Ensure inclusive accessibility to the amenity – through high quality walking infrastructure.

What does a 15-minute neighbourhood concept achieve in developing cities?

The 15-minute neighbourhood concept addresses a key challenge in the planning process – tailored redevelopment of already-built, saturated cities to enhance the quality of life. In this context, it significantly differs from existing planning processes such as Land Use Planning, Transit Oriented Development, and Transport Planning – through a flexible and complementary approach to them, providing quick wins, addressing the gaps of contextual planning and siloed developments with neighbourhood-specific proposals.

APPROACH

Catalyst of Change

In response to these challenges, the project **Building 15-Minute Neighbourhoods - at the Intersection of Sustainable Mobility, Public Spaces, and Climate Action** emerges as a catalyst for change. It is an initiative by Jana Urban Space Foundation and Mercedes-Benz Research and Development India (MBRDI) with a vision to enable a model for people-centric, low-carbon cities with sustainable neighbourhoods at their core. The mission seeks to break away from piecemeal development, emphasising a framework for neighbourhoods that integrates sustainable mobility, public transit networks, and a network of open/ recreational spaces.

The project aligns with several Sustainable Development Goals (SDGs). By fostering inclusive urban environments, it contributes to Goal 11: Sustainable Cities and Communities. The emphasis on sustainable mobility and the reduction of carbon footprints addresses Goal 13: Climate Action. Additionally, the project's commitment to inclusivity, especially for vulnerable groups, resonates with Goal 10: Reduced Inequalities.

The project's targeted geography is Bengaluru and four distinct neighbourhoods – **Chickpete, Whitefield, Indiranagar, and Malleswaram** – were selected as case studies, each presenting its distinct characteristics with respect to primary land use patterns, population, built density, mobility patterns, availability of green spaces, distribution of public transit network, occupation, diverse social economic backgrounds, and availability of land for development. The potential for these neighbourhoods to transform into 15-minute neighbourhoods was identified through targeted interventions.

On ground and desktop research, user perception surveys, focus group discussions, and stakeholder consultations were undertaken to assess existing services like mobility infrastructure, public transport and green spaces, alongside gathering opinions on walkability, safety, and accessibility.

A comprehensive user perception survey covering parameters such as user satisfaction, universal accessibility, and safety, along with on-ground assessment of over 4 sqkm area covered the four selected neighbourhoods. Over 12km length of roads and 30 infrastructure points were assessed for quality in these neighbourhoods.

From this collected data emerged a vision for a 15-minute neighbourhood guidelines, conceptualised through the **Move-Play-Sustain-Include** framework. This vision emphasises aspects such as active transportation, safe public spaces, sustainable markets, and inclusive social spaces. Jana Urban Space, in collaboration with local communities, played a pivotal role in crafting an implementation toolkit to actualise this vision. The toolkit's evolution was shaped through on-site evaluations in the selected neighbourhoods.

Answering the question, ***"How do 15-minute neighbourhoods get created?"*** took the form of a 3P approach: Policy, Plan, and Project. Existing policies were reviewed, and new ones are proposed for development, transportation, and sustainability. Ideas for neighbourhood-specific plans and projects have been formulated, taking into account their distinct characteristics with the aim of improving life in these neighbourhoods.

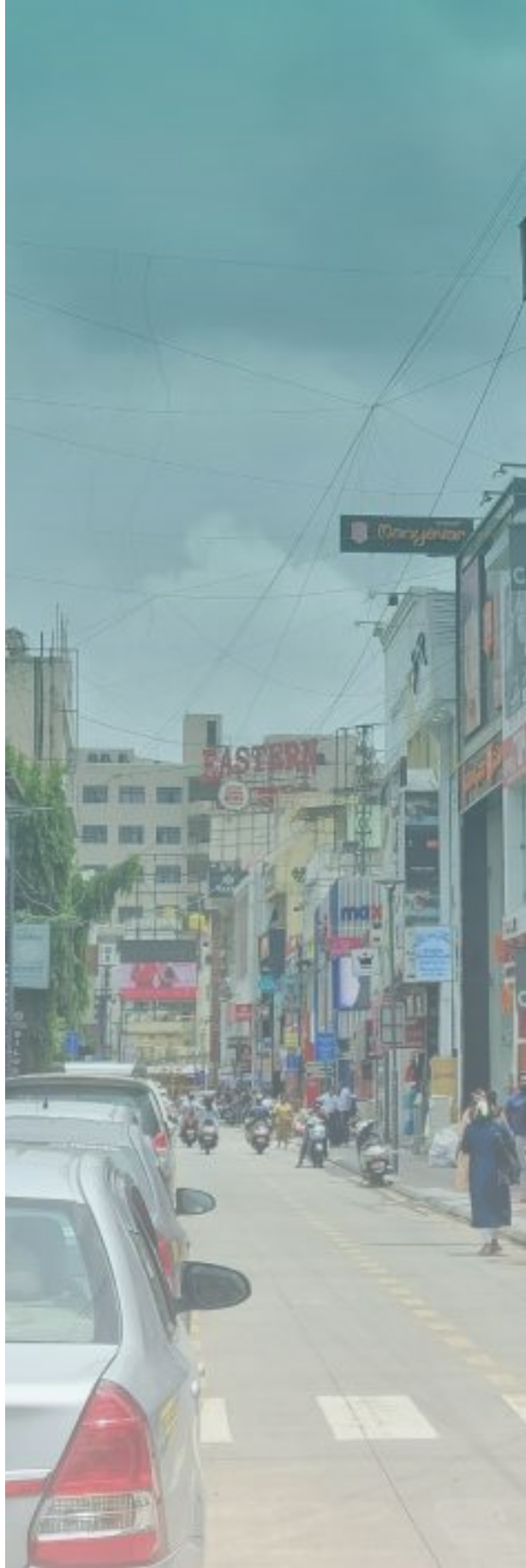
WAY FORWARD

Bengaluru must adapt to the needs of today and become a sustainable city, paving the way for the 21st century.

The goal of the 15-minute neighbourhood model is to make Bengaluru more walkable, vibrant, and healthy with high impact infrastructure designed for all irrespective of gender, age, or ability.

After the dissemination of the Guidelines and Toolkit, the project will entail a two-phase process. Firstly, advocate to secure stakeholder buy-in to develop a lighthouse neighbourhood in Bengaluru to showcase the guidelines, followed by a rigorous impact assessment.

The ultimate aim is to scale up the 15-minute neighbourhood model for implementation in various regions of Bengaluru, and potentially extend its reach to other parts of the country.

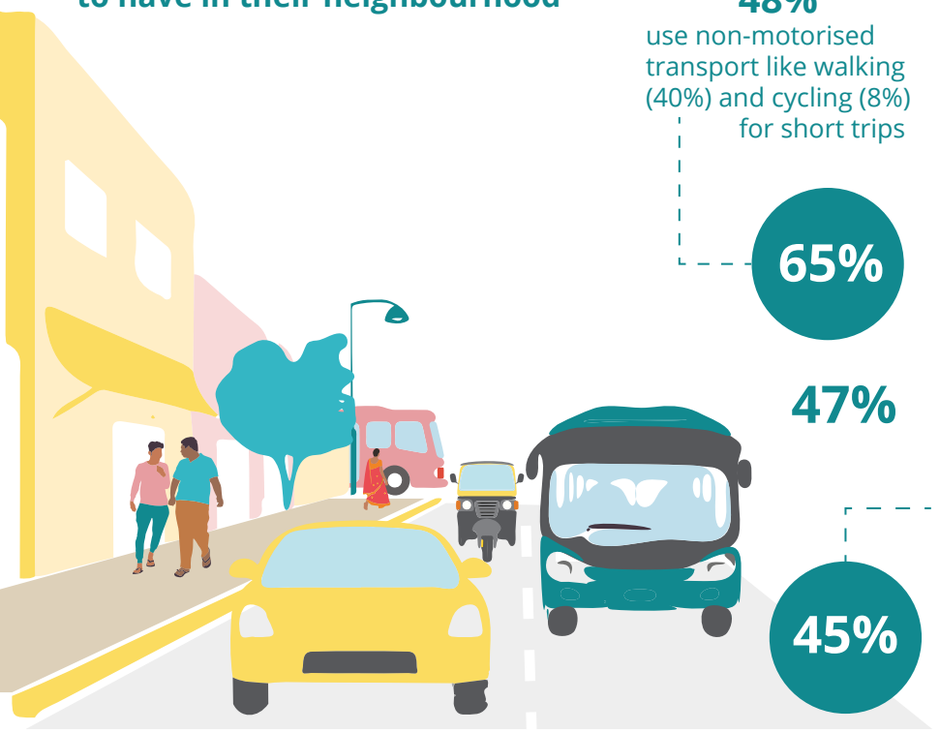


SURVEY FINDINGS

Neighbourhoods have their own distinctive characteristics and opportunities they provide. For this reason, an in-depth user perception survey sought to understand community concerns in neighbourhoods of Bengaluru. Online and offline public surveys* were conducted to capture residents' needs and aspirations for a 15-minute neighbourhood.

69%

consider transport infrastructure as the most important amenity to have in their neighbourhood



Survey participants

51% Male

48% Female

1% Preferred not to say

Travel characteristics

61% did not find good quality transport infrastructure near their homes

48% use non-motorised transport like walking (40%) and cycling (8%) for short trips

62% use private transport like two-wheelers (29%) and four-wheelers (33%) for long trips

65% reported poor quality footpaths near their residences

47% regularly use public and shared transport

10% Bus, **13%** Metro, **13%** Auto, **11%** Cab

45% had poor access to public transport from their residences

* Public surveys received 1664 responses across Bengaluru

Neighbourhood characteristics

70% found sufficient good quality **basic amenities such as grocery and convenience stores, healthcare facilities** in their neighbourhoods

27% visited open spaces like parks, playgrounds and lakes near their homes

50% want better infrastructure like footpaths, seating, and toilets in these open spaces

41% want cleaner surroundings near the open spaces in their neighbourhoods

38% want better and safer access for children, elderly, and people with disabilities

36%

want safer pedestrian crossings at road intersections and signals

55%

consider open green spaces a critical amenity to have in their neighbourhood

15-minute neighbourhoods for a **vibrant, walkable Bengaluru**

Residents' aspirations

Infrastructure developments

40%
want **safer streets** with better street lighting

39%
want **greenery and seating** along roads

31%
want better **traffic management at key intersections**

Digital tools

to improve day-to-day activites

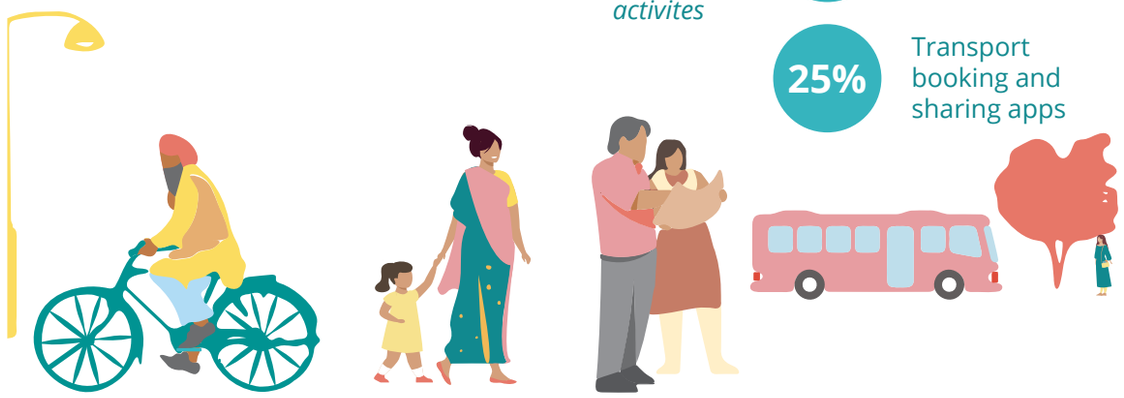
37% Digital bulletin for neighbourhood updates

32% Parking-finder apps

25% Transport booking and sharing apps

47%

suggest autos and feeder bus services to transit points will improve access



Amenities required within a 15-minute walk

#1 **Transport infrastructure**

#2 **Open spaces** such as parks, gardens, and playgrounds

#3 **Basic amenities** like grocery or convenience stores, and health-care services

#4 **Recreational facilities** such as restaurants, malls, and sports facilities

#5 **Social infrastructure** such as schools, community centres, and local markets

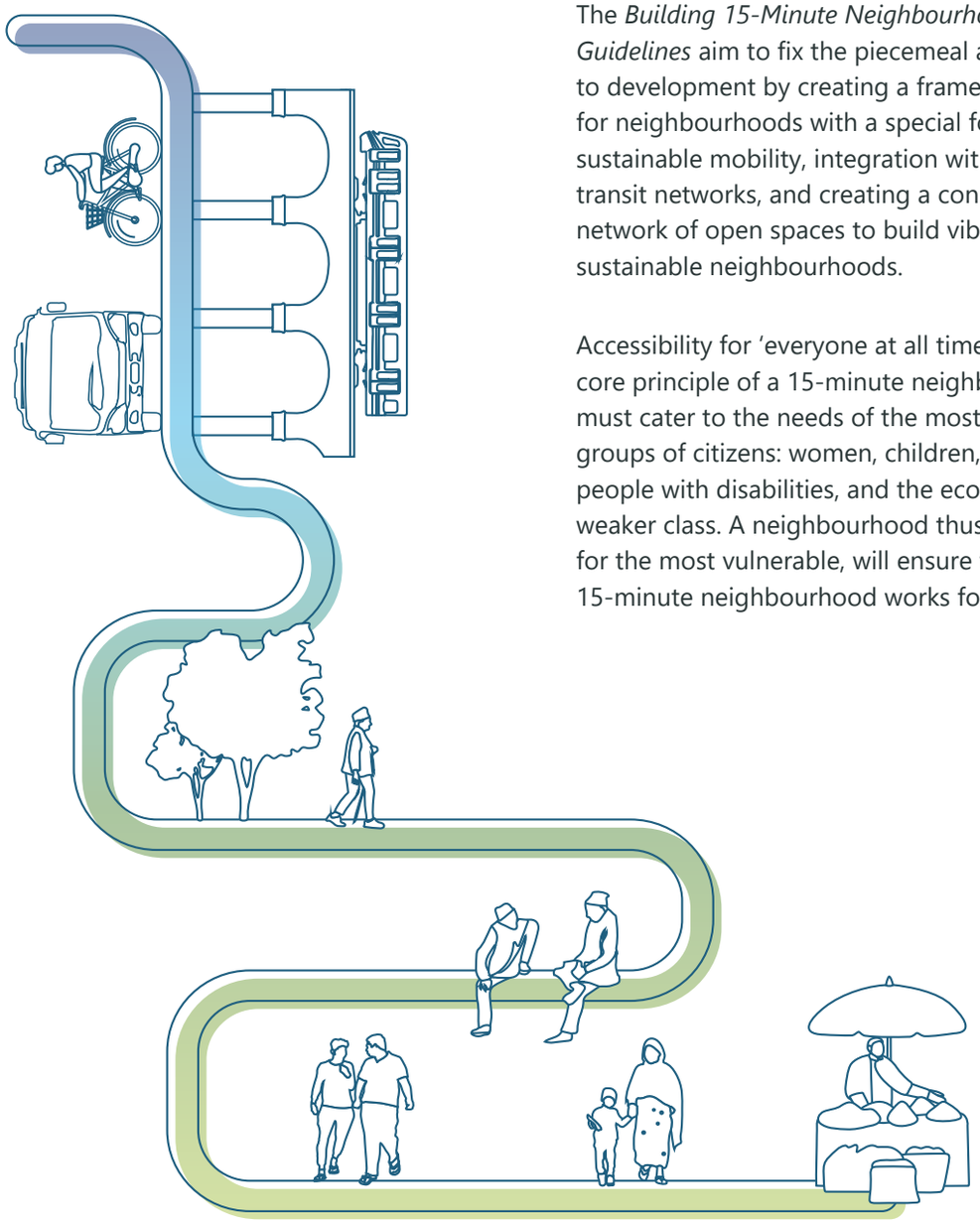
51%

wish for better pedestrian and cycling infrastructure in their neighbourhoods

58%

want to participate in their neighbourhood development through ward committees

ABOUT THIS GUIDELINE



The *Building 15-Minute Neighbourhoods Design Guidelines* aim to fix the piecemeal approach to development by creating a framework for neighbourhoods with a special focus on sustainable mobility, integration with public transit networks, and creating a connected network of open spaces to build vibrant and sustainable neighbourhoods.

Accessibility for 'everyone at all times' is the core principle of a 15-minute neighbourhood. It must cater to the needs of the most vulnerable groups of citizens: women, children, the elderly, people with disabilities, and the economically weaker class. A neighbourhood thus designed for the most vulnerable, will ensure that the 15-minute neighbourhood works for all.

WHO IS THIS GUIDELINE FOR

Bureaucrats
The Guidelines support bureaucrats and decision-makers in the planning and implementation of 15-minute neighbourhoods.

Technical experts
The Guidelines support urban development practitioners, architects, designers, and other technical experts in the planning of sustainable neighbourhoods. It provides planning strategies and design standards for public space development.

Community-based organisations
The Guidelines promote strong community engagement and involvement in the development of 15-minute neighbourhoods. CBOs can be included in implementation.

Citizens
The Guidelines promote citizen engagement in the development of 15-minute neighbourhoods. It provides a range of tools and approaches to involve them in planning and design processes.

WHAT THEY CAN REFER TO

Volume 1 gives an overview of the concept of 15-minute neighbourhoods and how Indian cities can benefit from such an approach. It highlights the potential of 15-minute neighbourhoods in addressing key urban issues of sustainable mobility and equitable access to quality public spaces and social infrastructure.

Volume 2 provides detailed information on developing 15-minute neighbourhoods in cities – from identifying potential neighbourhoods, conducting required studies to create a baseline study of the neighbourhoods, while integrating citizen participation with a tailored framework in the design process.

Additionally, the **Building 15-Minute Neighbourhoods Implementation Toolkit** gives an overview of the process for preparation, readiness and execution of a 15-minute neighbourhood in a city.

TABLE OF CONTENTS

Safe SURE at Rajghat, Delhi

1

15-minute neighbourhoods

This chapter discusses the project context with the potential application of the 15-minute neighbourhood concept in Indian cities.

1.1. QUALITY OF LIFE IN INDIAN CITIES

Indian cities are expected to host over 800 million people by 2050.

Cities are centres of economic growth. They attract millions of people each year with the promise of a better quality of life. While the quality of life and liveability depend on the economy, it is also influenced by factors such as access and availability of quality physical infrastructure, especially mobility infrastructure, but also basic amenities like open public spaces, fresh produce, education, healthcare and so on.

Indian cities are expected to host over 800 million people by 2050[1], which is about half of the country's population. If this growth is not addressed efficiently, it poses the risk of increasing the existing deficit between the population and urban infrastructure, which would have significant impacts on urban poor and other marginalised groups.

Urban infrastructure is not only required for economic growth and liveability, but to also build resilience towards climate change. Indian cities are facing rapid economic and demographic pressures, whose demands are resulting in environmental degradation. This has been evident from the rising temperatures[2] and increasing extreme events, such as floods, cyclones, and cloudbursts, in the last decade.

India has 1.2 buses per 1000 people.

India has 1.2 buses per 1000 people, less than the developing nation benchmarks, with a significant variation between states, such as 3.9 in Karnataka vs 0.02 in Bihar. Out of 458 Indian cities with a population of 1,00,000 or more, only 63 have a municipal bus system[3]. The Ease of Moving Index 2022 published by Ola Mobility Institute (OMI) showed that public transport reliability had decreased most in Delhi by 10%, followed by Kolkata (13%). In Bengaluru, however, this increased from 30% in 2018 to 39% (2022).[4]

As per the Urban Regional Development Plans Formulation and Implementation (URDPFI) guidelines (2014), 10–12 sqm of open space per person is recommended in Indian cities. The World Health Organisation (WHO) prescribes an area of 9 sqm of green space per capita in urban areas. In India, this figure varies with cities like Chennai and Pune having 0.81 sqm and 1.4 sqm per capita green cover respectively, well below both the national[5] and international standards.

According to a 2011 National Institute of Urban Affairs (NIUA) report on financing urban infrastructure, Government of India (GoI) estimated an 80% deficit in financing urban infrastructure. As per a 2022 World Bank report, private sources such as municipal borrowing and public-private partnerships (PPP) have not been utilised to their full potential. For instance, only 5% of the infrastructure needs of Indian cities are currently being financed through private sources[6].

Taking all of these challenges into account, there is an urgent need to address sustainable development and equitable access to urban infrastructure in Indian cities. The discussion around quality of life, along with a stringent need to develop a framework for assessing it has been increasing in recent years. A common factor in all these assessment frameworks is a sustainable environment that satisfies our primary needs to move, play, sustain, and include. The focus on cities to plan and provide infrastructure that facilitates this is thus indisputable. This leads us to question — do Indian cities facilitate a high quality of life?

A sustainable environment that satisfies our primary needs to move, play, sustain, and include.

Do Indian cities facilitate a high quality of life?

[5] Other national level policies and guidelines also provide spatial standards for city-level green cover such as MoHUA's Urban Greening Guidelines, 2014, the National Mission for Green India (GIM) under National Action Plan for Climate Change (NAPCC), and the National Clean Air Programme (NCAP).

1.2. NEIGHBOURHOODS AS THE START OF CHANGE

Neighbourhoods provide opportunities for change at the intersection of sustainable mobility, public spaces, and climate action.

A neighbourhood provides immense significance in helping mitigate the risks and challenges of rapid urbanisation and climate change, as it is the building block of a settlement. Neighbourhoods vary in area and character as well as socio-demographic compositions, which have drastically changed in the last three decades in India. These building blocks are thus an appropriate scale to develop social sustainability[7], as illustrated in *Figure 1*. They provide opportunity for change at the intersection of sustainable mobility, public spaces, and climate action.

A neighbourhood will often have a unique identity that enables it to be recognised not only geographically but also through its people, character, and brand.

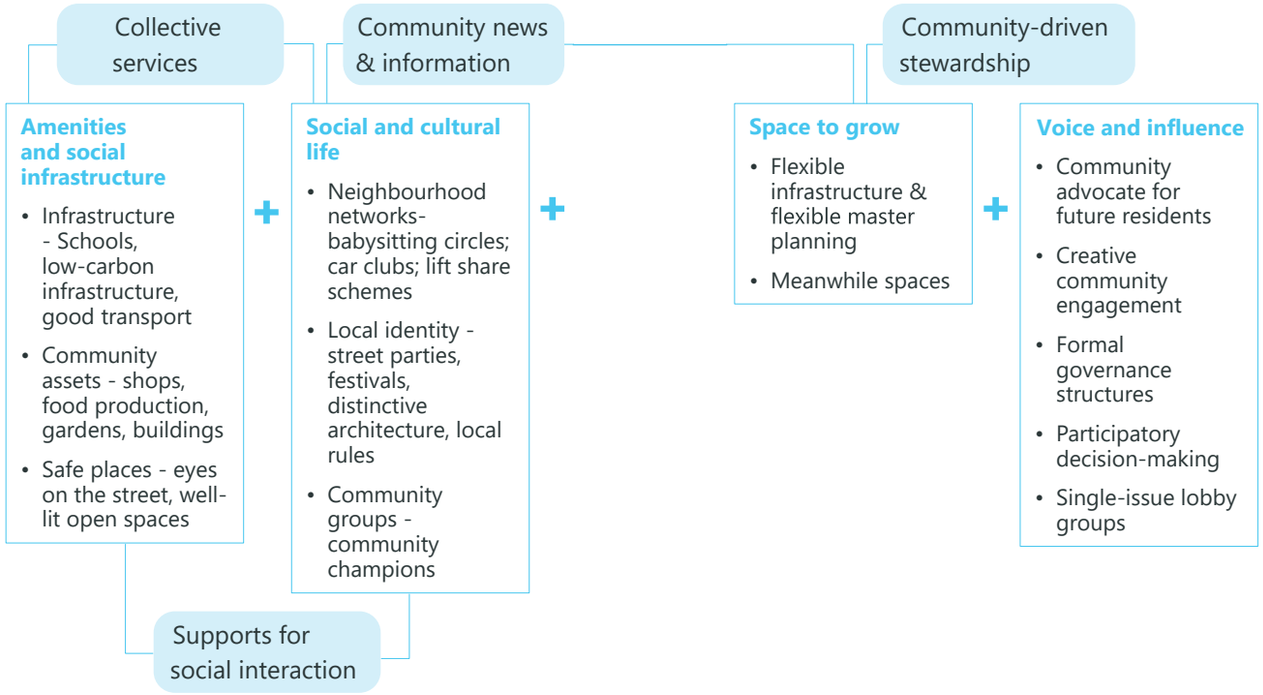


Figure 1. Building blocks for social sustainability
Source: Design for Social Sustainability: A framework for creating thriving new communities

This identity, along with the scale of the neighbourhood, means that decisions made within its boundary can directly raise ambition and change behaviours. This is why neighbourhoods provide a great opportunity to deliver net zero outcomes and create resilient, people-centred places.

People create a neighbourhood, as well as its character. Planning frameworks ensure creating sustainable and resilient neighbourhoods with recreational spaces and social infrastructure supported by an accessible mobility network.

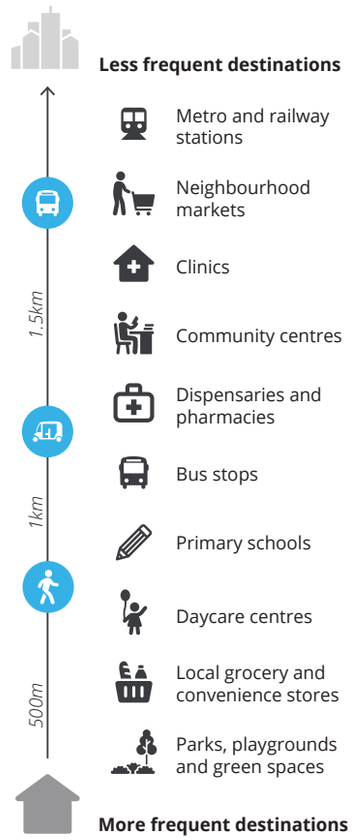


Figure 2. Frequent destinations of residents
Source: Adapted from 15-Minute Neighborhoods: Meeting the Needs of Babies, Toddlers, and Caregivers by ITDP

1.3. 15-MINUTE NEIGHBOURHOODS FOR INDIA

A 15-minute neighbourhood focuses on enhancing residents' quality of life by helping them meet most of their daily needs within 15-minutes of their homes.

With the goal to create better, healthier, and sustainable cities, a 15-minute neighbourhood focuses on enhancing residents' quality of life by helping them meet most of their daily needs within a 15-minute walk of their homes[8]. It envisions a walkable, vibrant and inclusive neighbourhood.[9]

To this end, a 15-minute neighbourhood supports improved quality of life through a three-pronged approach of **availability, accessibility, and quality** –

1. Identify the basic urban amenities required for a good quality of life, and ensure its availability in a given urban area.
2. Ensure inclusive accessibility to the amenity — through high quality walking infrastructure.
3. Measure the quality of the available amenity, and ensure it meets the requirements of the population it serves.

Figure 3. 15-minute neighbourhood for improved quality of life

[8] However, this time frame can change from city to city due to different factors like land availability, population density, geography, to name a few. Therefore, sometimes, things might be a bit farther than 15 minutes, 'X' can be used to show this variable time — it could be less or more than 15 minutes.

1.3.1. Benefits of a 15-minute neighbourhood

The 15-minute neighbourhood concept also addresses a key challenge in the planning process — tailored redevelopment of already-built, saturated cities to enhance the quality of life. In India's context, **it would help bridge the gap between a city's master plan and local area plan (LAP) — through a flexible and complementary approach to the planning process. It provides a range of opportunities to deliver quick wins and long-term change with neighbourhood-specific proposals.**

Research shows there are several environmental, health, social, and economic benefits associated with walkable 15-minute neighbourhoods. Some of these have been listed in *Table 1*.

BOX 1 Implementation of a 15-minute neighbourhood

Urban planning has become complex in India, with several agencies at the city and state levels being involved in planning, development, and execution. As a result, there are overlapping functions, lack of coordination, timeline delays, etc[10]. For instance, 65% of 7933 urban settlements[11] and 39% of India's capital cities do not have an active master plan[12]. Cities are experiencing siloed planning due to these incongruous regulatory structures, where different aspects of urban development, such as land-use, infrastructure, and transportation, are addressed independently, and without considering their interconnectedness. Such isolated planning has now lead to the development of disconnected neighbourhoods, and even urban sprawl.

39% of India's capital cities do not have an active master plan.

[9] As per the URDPFI guidelines of India, a neighbourhood is a planning unit of a population between 5,000–15,000. This unit is further divided into smaller units called housing clusters of 5,000 persons. A neighbourhood unit thus covers an area between 1–1.5 sq km, which would be typically walkable in 15 minutes.

Table 1 Benefits of a walkable neighbourhood

ENVIRONMENTAL BENEFITS

Improved air quality

Shift from private cars to active mobility, such as walking and cycling, for short trips can reduce air pollution. Increasing green cover in urban areas can also help to improve air quality.[13]

Studies estimate that Barcelona's Superblocks have reduced nitrogen dioxide pollution by 25% in some areas.[14]

Improving biodiversity

Planning walkable environments will help lower air pollution, congestion and increase greenery, while improving the local biodiversity.[15]

Climate resilience

By lowering the need for fossil fuels for transportation and reducing urban heat island (UHI) effect, walkable environments can assist in climate change mitigation and support climate resilience.[16]

HEALTH BENEFITS

Improved physical and mental well-being

The World Health Organization (WHO) global recommendation on physical activity for adults is 150 minutes of moderate-intensity activity (or equivalent) per week, measured as a composite of physical activity undertaken across multiple domains: for work (paid and unpaid, including domestic work); for travel (walking and cycling); and for recreation (including sports).[17]

A study in United Kingdom indicated that nearly 42% of short car trips of less than 3 miles could be substituted by walking or biking; the estimated CO_2 emissions reduction in such a case was an equivalent of 10.9% of all car travel.[18]

SOCIAL BENEFITS

Sense of community

Walkable neighbourhoods improve social interaction and sense of ownership of residents, and encourages them to be more involved in the community.

Safety

A report by the Institute for Transportation and Development Policy (ITDP) states that women are more likely to engage in active transportation modes, such as walking or cycling, when streets are designed to prioritise pedestrian safety.[19]

Inclusiveness

Safe roads and public transport infrastructure will help alleviate socially and economically disadvantaged residents of neighbourhoods[20].

Walkable environments also support the travel of older people as well as create opportunities for infant, toddler, caregiver-friendly (ITC) neighbourhoods[21].

ECONOMIC BENEFITS

Property value

Redeveloped roads with walkable footpaths had a positive impact with significant increase (30% in residential and 50% in commercial) in property values in neighbourhoods in Bengaluru, according to an IIM Bengaluru study conducted in 2021.[22]

Reduced road congestion

Increased active travel and use of public transport can help reduce traffic congestion on urban roads.

Redeveloped roads with walkable footpaths had a positive impact with 30% increase in residential and 50% in commercial property values in Bengaluru, according to an IIM Bengaluru study conducted in 2021.

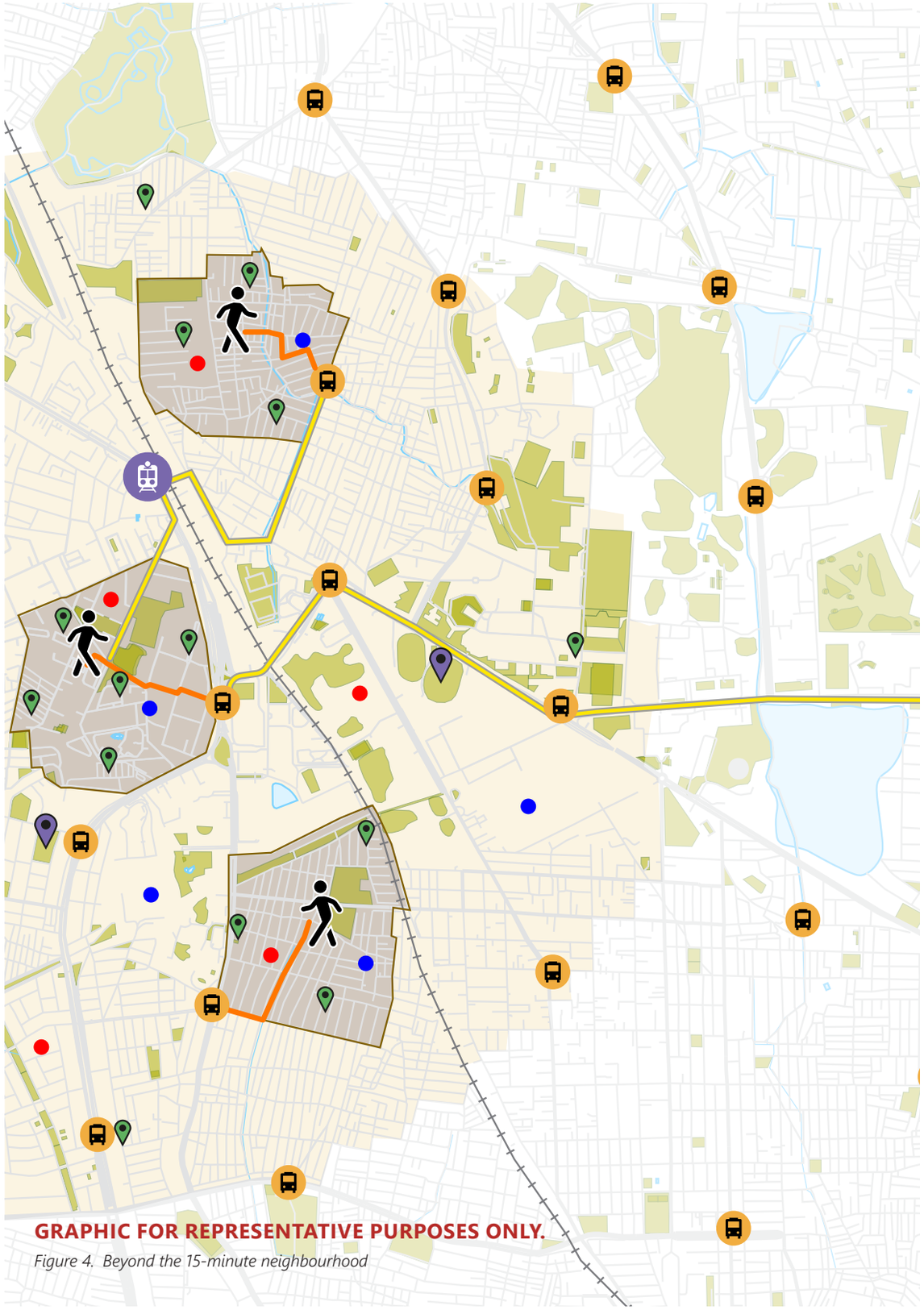
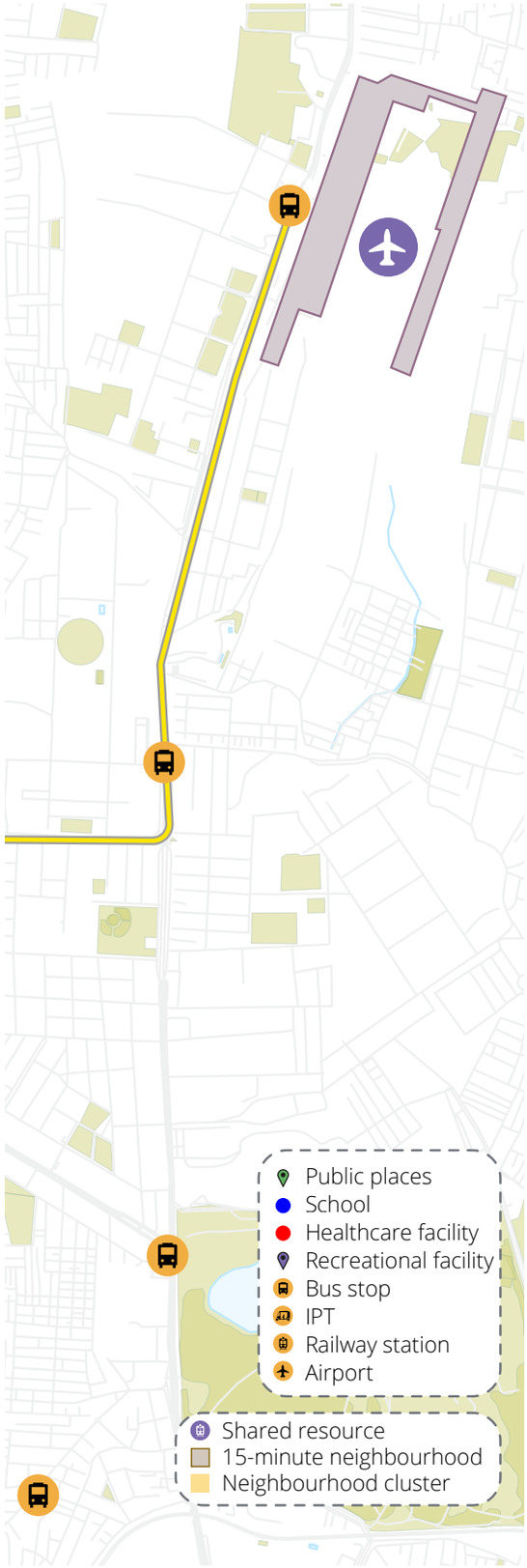


Figure 4. Beyond the 15-minute neighbourhood



BOX 2 Beyond the 15-minute neighbourhood

In a city, a 15-minute neighbourhood would not occur in isolation; instead, there would be multiple such neighbourhoods existing together. Given that the concept is geared to improve existing neighbourhoods, these walking distances might overlap or be separated by some distance. This brings the opportunity to explore what occurs beyond a walkable neighbourhood — in terms of planning, physical infrastructure and amenities.

If two–three 15-minute neighbourhoods are considered to exist near each other, there might be certain amenities and facilities lying outside the 15-minute walk periphery that may become shared resources for these units. However, a key consideration for such resources would be to ensure easy access within 30-minutes using public transport. These shared resources could include large-scale infrastructure that serve populations greater than 15,000 persons, including polyclinics, cultural centres, sports centres, and commercial centres, to name a few.

By improving public transport infrastructure within these units and clusters, city-level infrastructure like wholesale markets, colleges, hospitals, railway stations, and airports can also become easily accessible for residents. The aspiration is to improve the quality of citizen's lives while creating walkable neighbourhoods in a well-connected city.

2

Developing a 15-minute neighbourhood

This chapter delves into the framework for developing a 15-minute neighbourhood, and the planning principles that can be used to deliver such a neighbourhood.

2.1. MOVE-PLAY-SUSTAIN-INCLUDE FRAMEWORK

The tenet of the 15-minute neighbourhood concept is to improve residents' quality of life. Planning such a neighbourhood aims to enable residents to meet their daily needs within a 15-minute walk from their homes. Neighbourhoods of Indian cities already have features of a 15-minute neighbourhood. These Guidelines aim to make such neighbourhoods a reality by assisting their planning and development under the four-pronged approach of **Move–Play–Sustain–Include**.

The framework guides the outcomes of such a neighbourhood by translating into **actionable indicators** and further as **tangible design features to support the delivery of accessible and vibrant neighbourhoods.**

PRINCIPLE	MOVE	PLAY	SUSTAIN	INCLUDE
OUTCOME	Integrated mobility and transport networks	Safe and inclusive open public spaces	Sustainable produce markets	Social infrastructure
	Improved mobility, accessibility, and connectivity through a network of non-motorised and public transport, safe intersections, and organized utilities	Access to sustainable public spaces such as parks, playgrounds, and water bodies that improve environmental sustainability, climate responsiveness and increase civic pride	Access to local produce markets that promote sustainable farming and consumption patterns, reduce farm-to-table distances, and increase economic opportunities	Integrate social infrastructure for the vulnerable and urban poor by creating community halls, anganwandis, and safe spaces for girls

2.2. PLANNING PRINCIPLES

The 15-minute neighbourhood concept focuses on mobility of people and efficient spatial development towards a "compact city".

Considering India's rapid urbanisation, decision-makers and planning authorities have to plan cities that respond to emerging urban challenges while delivering liveable neighbourhoods. With a focus on mobility of people and efficient spatial development towards a "compact city", the 15-minute neighbourhood concept is a significant step forward from the current planning approach – retrofitting an uncontrolled urban sprawl. The implementation must therefore be supported across different levels of urban governance and development within a neighbourhood to improve residents' quality of life.

These Guidelines have identified three planning principles through which the 15-minute neighbourhood program can be implemented in a neighbourhood – interventions at the policy, plan, and project levels. These principles would enable place-based and contextual development of neighbourhoods through laws and regulations, spatial plans and surgical urban interventions, as illustrated in *Figure 5* below.

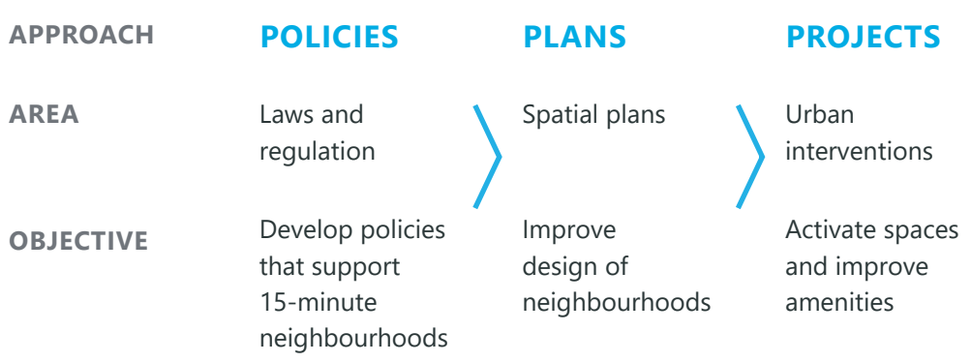


Figure 5. Planning principles

2.2.1. Policies

Policies at the state and city level can provide decision makers the opportunity and flexibility to support the 15-minute neighbourhood concept across a range of geographical contexts. The current policy landscape must therefore be analysed to identify gaps and formulate innovative policies in the realm of development, mobility, and sustainability. A non-exhaustive list of policies, with their scope and purpose, that can support 15-minute neighbourhoods are compiled in *Table 2*.

Table 2 Policies supporting 15-minute neighbourhoods

Policy	Scope and purpose
Land utilisation policy (draft) [22]	Ensure efficient use of land resources to improve livelihood, food, and water security in cities and neighbourhoods
Transit-Oriented Development (TOD)	Promote the development of neighbourhoods within walking distance of public transit systems and reduce the need for private travel
Traffic management policy	Mitigate congestion and risks associated with vehicular traffic in areas with high pedestrian volumes by recommending traffic management measures
Accessible streets, pedestrian facilities and safety policy [23]	Develop road design policies that prioritise pedestrians, cyclists, and public transportation
Parking policy	Facilitate organised parking for all types of vehicles, and subsequently reduce the demand for parking
Sustainability policies	Mitigate air pollution and encourage climate action through green practices such as planting trees, to reduce the carbon footprints of the neighbourhood

2.2.2. Plans

Building on the context, constraints and aspirations of an area, spatial plans can create a vision for development and a unique identity for the place. Such development plans prepared at the scale of a local area or neighbourhood can all promote the development of 15-minute neighbourhoods. Some examples of plans, already being prepared for Indian cities, that can incorporate the 15-minute neighbourhood concept are listed in *Table 3* below.

Table 3 Plans supporting 15-minute neighbourhoods

Plan	Scope and purpose [24]	Forms
Local Area Plan	Detail the Sub-city Land Use Plan and its integration with urban infrastructure, mobility, and services	Zonal Plan, Coastal Zone Management Plan, Town Planning Schemes, Ward Committee Plan, Urban Development Plan
Special Purpose Plan	Identify the needs of the special areas which require a special plan within the framework of the Development Plan	Smart City Plan
Mobility Plan	Integrate various modes of transportation such as walking, cycling, and public transport into creating a green street network	Comprehensive Mobility Plan (CMP), Bicycle/ Cycling Plan
Open space plan	Improve access to green and open areas by identifying locations for parks and other recreational areas	Green Network Plan

2.2.3. Projects

While plans provide the locations of amenities and services in an area, projects involve delivering specific interventions that mitigate local challenges and improve immediate surroundings to provide better quality of life. These projects (*Figure 6)* can promote walking and cycling in neighbourhoods across the thematic areas of **Move-Play-Sustain-Include**.

Figure 6. Projects under Move-Play-Sustain-Include framework

BOX 3 Mapping of policies and plans aligned with the 15-minute neighbourhood concept across India

2015
STATE ACTION PLAN, RAJASTHAN

Aims at **creating and upgrading green spaces, parks, and recreation centers** for children under the AMRUT Scheme

2013-15
AHMEDABAD - CENTRAL BUSINESS DISTRICT LOCAL AREA PLAN

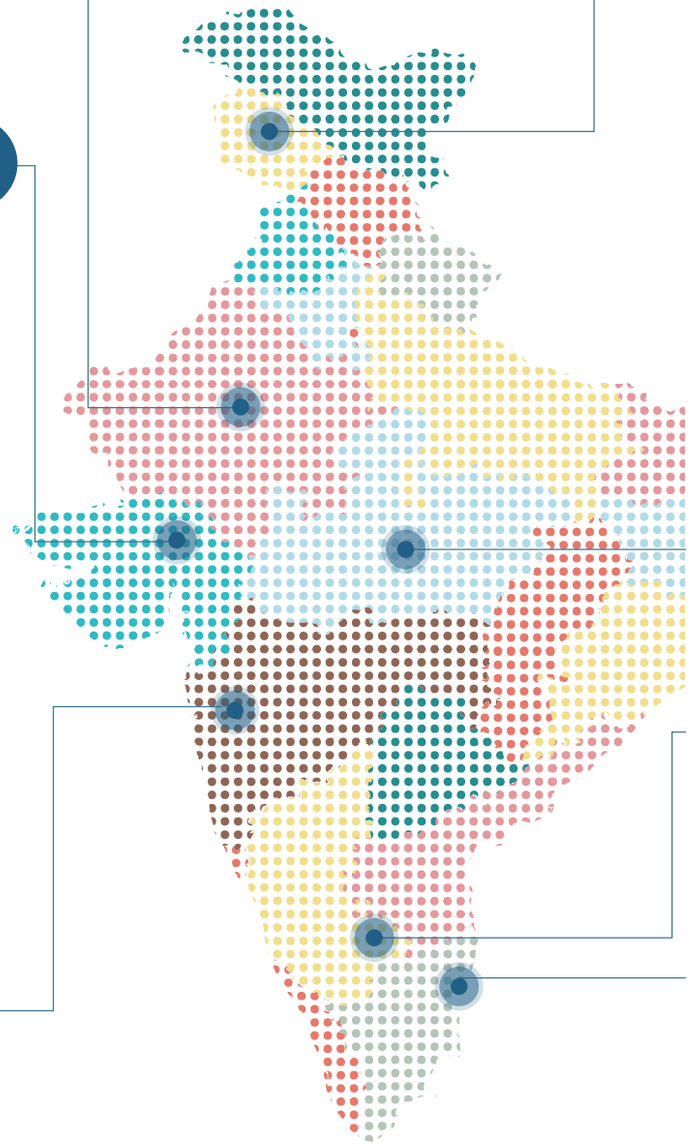
Divided plots into pedestrian friendly, walkable blocks, with an average 400m perimeter and intersections every 100-150m, as part of brownfield development of the central business district

1999
AHMEDABAD - TOWN PLANNING SCHEME

- **Redistribute urban land used by 95% of Ahmedabad** by appropriating private land for public spaces
- Develop 20% of total city land for roads.
- Released 162 ha of reserved land into the market in Prahladnagar

2016
PUNE BICYCLE PLAN

- Proposal to create **Cycle Network with over 300km of cycle tracks**
- Aims to **achieve atleast 50% of trips by cycles by 2031**



2011
PARKING POLICY OF SRINAGAR

- Aims to discourage private travel by making the **parking fees high and banning on-street parking in the central busineess district** (CBD)
- Incentivise public travel in the CBD by subsidising public transport fees

2022
BENGALURU CLIMATE ACTION PLAN

- Aims for the city to adopt a **multipronged transport sector** mitigation action combining *avoid-shift-improve* strategy

2010
SIKKIM STATE ACTION PLAN

- Promotes NMT system in Sikkim through **construction of new pedestrian pathways and footpaths, steps and stairs, rope ways**
- Aims to create 7 new urban centres complementing the "Shift and relocate work Centres" policy

2010
NMT PLAN, GANGTOK

- Proposes to **integrate new multi-use trail links with existing linking roads** by running along the contours
- Proposes to reschedule school hours to reduce congestion in peak hours

2016
MADHYA PRADESH ROAD SAFETY POLICY

- Carried out 3,198 Road Safety Audits for all major roads in Bhopal-Indore region
- Sanctioned a 'Strengthening State Road Safety' fund which is 100% contributed from compounding traffic violation fees

2014
NMT POLICY, CHENNAI

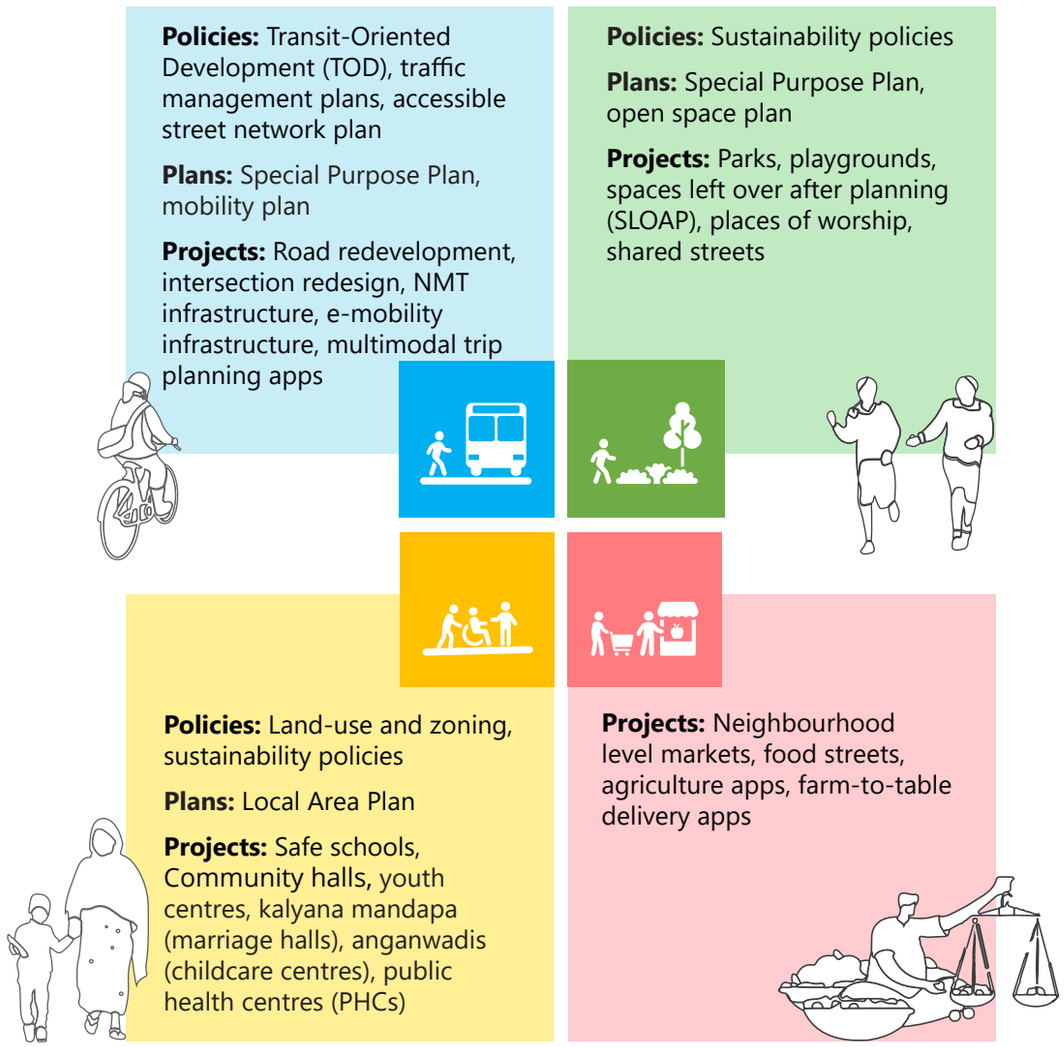
- Mandates **>60% of transport funding to create and maintain walking and cycling infrastructure** in the city
- Aims to **create 100km of pedestrian friendly street networks**

Figure 7. Policies and plans being implemented across India

2.3. RELATION BETWEEN FRAMEWORK AND PRINCIPLES

These Guidelines envision a relation between the Move-Play-Sustain-Include framework and the Planning Principles as represented in *Table 4*.

Table 4 Move-Play-Sustain-Include framework and Planning Principles matrix




Commisariat Road, Bengaluru

3

Pathways for implementation

In this chapter, the implementing process to deliver a 15-minute neighbourhood has been discussed. It delves into the unique focus of this project — stakeholder and citizen participation, by elaborating on the institutional setup and roll-out plan envisioned for such a program.

3.1. IMPLEMENTATION PROCESS

The implementation of the 15-minute neighbourhood is envisioned to be a collaborative effort between organisations and individuals of varied technical expertise. These Guidelines aim to equip them with the knowledge of creating a 15-minute neighbourhood through an 8-step implementation process (*Figure 8*), while also identifying the stakeholders who would be involved.

While the city urban local body (ULB) or state government will launch and fund the implementation, a technical Program Cell will be responsible for the development of neighbourhoods. Additionally, community-based organisations will also be involved to ensure citizen-centric designs and interventions. Methods to identify these stakeholders have been detailed out in further sections.

1 **Roll-out**
Initiation of the 15-minute neighbourhood program by the city government

2 **Budgetary allocation**
Government to allocate budget for implementation of the 15-minute neighbourhood program

3 **Institutional setup**
Allocate resources and setup a city-level Program Cell for implementation

4 **Select**
Select a potential 15-minute neighbourhood based on population, density, availability of infrastructure in the area (Chapter 4)

5 **Analyse**
Analyse the Availability, Accessibility and Quality of the selected neighbourhood's amenities (Chapter 5)

6 **Engage**
Identify and engage with community-based stakeholders to validate analysis against resident perceptions (Chapter 6)

7 **Design and implement**
Identify areas for intervention and develop bouquet of projects based on the 3P Planning Principles, and implement proposals (Chapter 7)

8 **Impact assessment**
Conduct impact assessments for interventions at strategic intervals to measure success of 15-minute neighbourhoods on predefined metrics such as climate, gender, and public health

Figure 8. Implementation process

3.2. INSTITUTIONAL SETUP FOR IMPLEMENTATION

Steering Committee will be the apex body and the Program Cell will oversee the implementation

Constituting an institutional setup is highly recommended to facilitate smooth execution of the Program as well as collaboration between the stakeholder groups of utility agencies, technical experts, and local communities. Based on these stakeholders, five main working groups have been identified for this institutional setup.

1. **Steering Committee** – this Committee will include local and state level representatives from Urban Development Departments, Municipal Corporations and Development Authorities
2. **15-Minute Neighbourhood Program Cell** – this Cell will comprise of the City Mayor, Ward Corporators, designers, planners, engineers, and other technical experts necessary for execution
3. **Municipal Departments** – Departments such as the State Planning Commission and other city service and utility agencies like the Transport Corporation
4. **External Consultants** – Subject matter experts working towards climate action, gender inclusivity, disaster management etc.
5. **Community-based organisations** – this includes community and resident groups such as Ward Committees, resident welfare associations (RWAs), slum development associations (SDAs), civil society organisations (CSOs), non-government organisations (NGOs), and self-help groups (SHGs) to name a few.

While the Steering Committee will be the apex body of the 15-Minute Neighbourhood Program, the Program Cell will oversee the program implementation. *Figure 9* illustrates a general institutional setup for this Program.

3.2.1. Roles and responsibilities

Each stakeholder group will have certain roles and responsibilities in the collaborative effort to develop 15-minute neighbourhoods, with certain outcomes mentioned in *Table 5*.

As per the proposed institutional setup, the Steering Committee will assist in overall coordination and mobilising funds for the Program. They will also establish the 15-Minute Neighbourhood Program Cell, which will provide technical knowledge and resources for getting the Program on ground. Lastly, relevant individuals and community-based organisations will be identified for knowledge sharing and implementation support in the neighbourhoods that will be transformed.

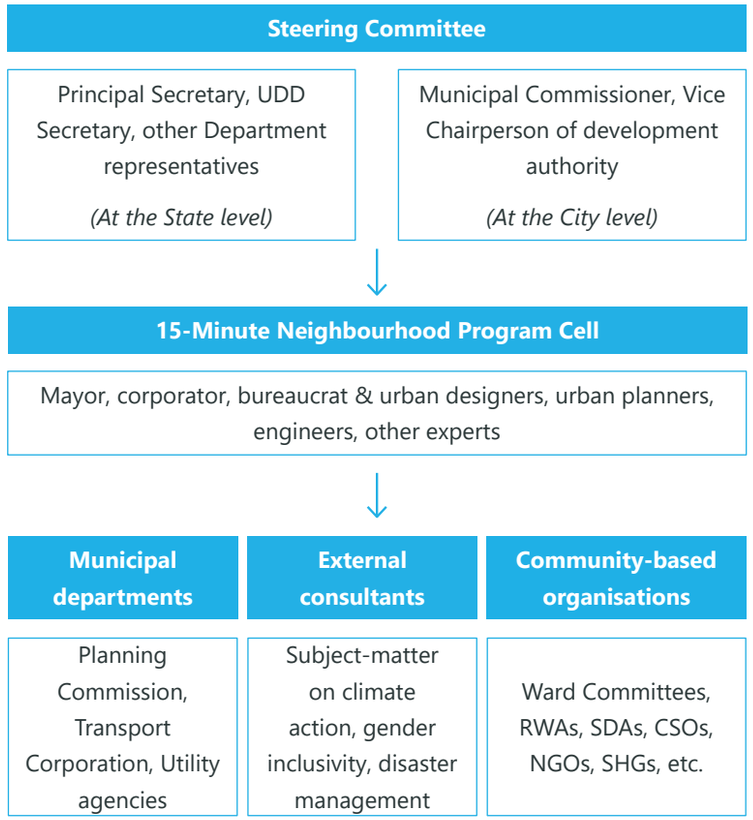


Figure 9. Proposed institutional setup

Table 5 Roles and outcomes of stakeholder engagement

Steering committee	Finding out citizens' requirements and ensuring alignment with existing local agendas	Providing spatial and socio-economic data	Overall coordination, direction setting, and decision-making Allocating resources for interventions and proposals Procuring government approvals and inputs
Program cell	Research, knowledge dissemination and guidance Monitoring and evaluation, training	Conducting assessments, gathering and analysing data Policy analysis and recommendations	Goal setting and role clarity Proposing interventions and design solutions
Municipal departments	Implementation support	Providing spatial and socio-economic data	Allocating resources
External consultants	Knowledge dissemination and guidance	Input into program design	Validating proposals
Community-based organisations	Expressing their needs Implementation support as needed	Providing feedback and perceptions of neighbourhood and surrounding environment	Validating proposals
Outcomes	**1. Interactions between stakeholder groups**	**2. Analysing the quality of neighbourhood and identifying gaps**	**3. Providing contextual urban design and planning solutions**

3.2. SUSTAINABLE FINANCIAL PLAN

It is important to develop a financial plan to deliver an impactful programme. If a city is taking up individual projects to develop areas into 15-minute neighbourhoods, these Guidelines envision a three-part financial model for doing so:

Capital Expenses:

Initial capital expenses, covering the planning and preparation phase for the 15-minute neighbourhood project, will primarily be sourced from government allocations. This funding will support activities in the inception stage such as the establishment of a steering committee, programme cell, development of project plans, and identification of target neighbourhoods.

Operation Expenses:

For the ongoing operation expenses, including the construction and implementation costs, diversification of funding sources is crucial. Corporate Social Responsibility (CSR) initiatives and exploring partnerships with philanthropic bodies aligned with the goals of sustainable urban development, present a promising avenue.

Maintenance Expenses:

Beyond the implementation phase, ongoing Operations and Maintenance (O&M) costs play a pivotal role in sustaining the functionality of projects. Along with the government, private organisations, local businesses, and Resident Welfare Associations are identified as potential funding partners for the maintenance, ensuring the continued provision of high-quality amenities.

Diversification of funding sources is crucial for a sustainable financial plan

3.4. SCALING UP

It is crucial to consider how applicable and relevant the same approach would be in other neighbourhoods

Securing additional financing and support for scaling up will depend on evaluating and advancing the 15-minute neighbourhood's success. Finding successful initiatives and interventions that have significantly improved residents' quality of life is vital. However, the conditions that made the success possible are equally important. Therefore, studying the development of a 15-minute neighbourhood to get insights and improve our approach is crucial. **Some conditions to consider include stakeholder support (including political), planning and design guidance, uptake rate and behaviour shift, and collaboration.** Analysis of these factors will help identify successful elements.

After identifying these elements, it is crucial to consider how applicable and relevant the same approach would be in other neighbourhoods and parts of the city. Other potential 15-minute neighbourhoods must be analysed based on their government structure, demographics, socio-economic landscape, geography, and existing amenities and services. This will help understand how each of these conditions will support or hinder the elements and approaches used in this neighbourhood[25]. The following can be considered:

- Are the financial model and policy mechanisms used in the first neighbourhood suitable for the next situation?
- Has the proof of concept and ongoing dialogue with city government opened up opportunities to further strengthen the 15-minute neighbourhood concept in local planning?
- Are there new local financing opportunities in the next neighbourhood?
- Can the established data points or costs be reused?

Consider stakeholder support (including political), planning and design guidance, uptake rate and behaviour shift, and collaboration

Lalbagh Botanical Garden, Bengaluru
Raghavendra Prasad on Unsplash

4

Identifying a potential 15-minute neighbourhood

This chapter details out the criteria developed to identify a potential 15-minute neighbourhood for development in an established city.

4.1. SELECTION CRITERIA FOR NEIGHBOURHOODS

Accessibility for 'everyone at all times' is the core principle of a 15 minute neighbourhood.

Neighbourhoods in India show diverse characteristics resulting from the city's rapid and unplanned development. They exemplify a range of densities, settlements, and socio-economic attributes. Therefore, their challenges and aspirations also range from better connectivity to the city to greener areas.

This guideline proposes a comprehensive criteria for neighbourhood selection, that can be grouped under four areas–

1. **Administrative factors**: This criteria caters to existing administrative boundaries such as municipal ward boundaries, as well as planning norms such as allocated land use and population distribution across the city. Refer *Table 6*.
2. **Transport infrastructure availability**: Given that the 15-minute neighbourhood concept relies on the seamless movement of citizens within their neighbourhood as well as further afield, it is important to consider the existing transport infrastructure of the city. Refer *Table 7*.
3. **Environmental factors**: It is imperative to ensure that any development taking place is attuned to the natural ecosystem of the city. Refer *Table 8*.
4. **Socio-economic factors**: Accessibility for 'everyone at all times' is the core principle of a 15-minute neighbourhood. To this end, the proposed neighbourhood should be planned to cater to the needs of the most vulnerable group of citizens: women, children, the elderly, people with disabilities, and the economically weaker class. A neighbourhood thus designed for the most vulnerable, will ensure that the 15-minute neighbourhood works for all. Refer *Table 9*.

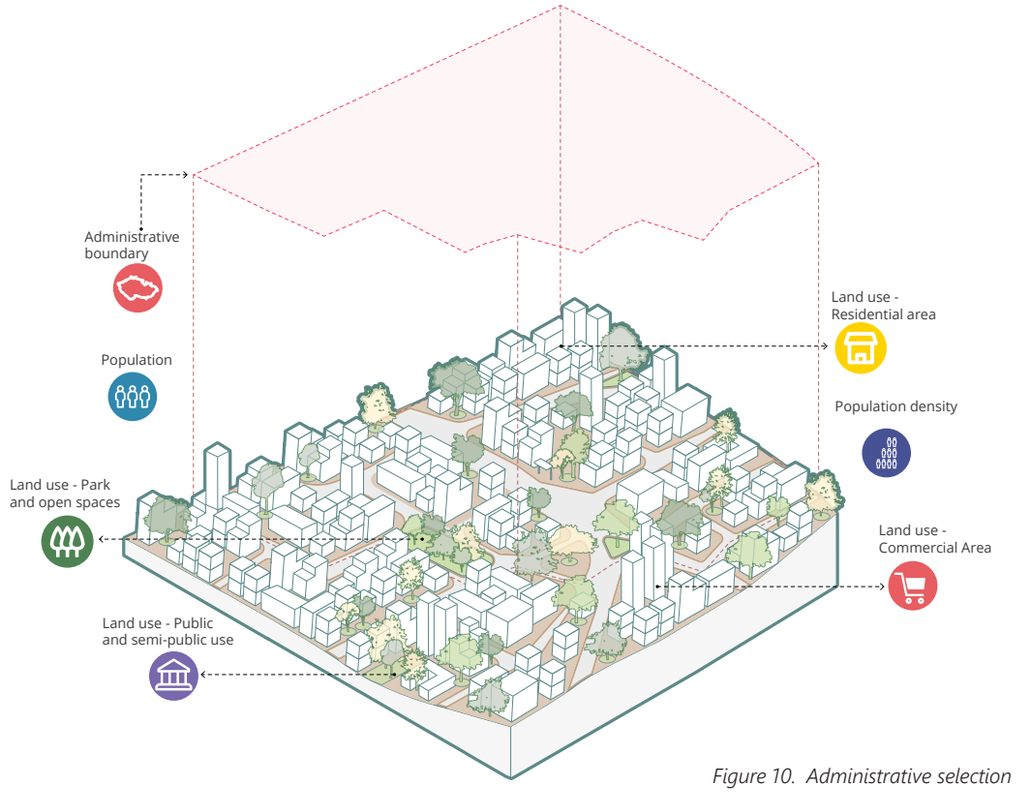


Figure 10. Administrative selection criteria

Table 6 Administrative criteria for neighbourhood selection

Indicator	Considerations	Data collection method
Administrative Criteria		
Administrative boundaries	Cities are divided into zones and wards, which are administered by urban local bodies. Such a consideration helps in procuring area-specific data and approaching respective elected representatives	Ward boundary maps and zonal plans from relevant government agencies
Existing land use character of the area	Residential cores and mixed-use zones can be identified based on the land use marked on city Master Plans and Development Plans	Statutory plans
Population	A neighbourhood unit is considered to have a population of 5000-15,000 people, as per the URDPFI guidelines	Census documents from urban local bodies
Density	Population density of a city's wards or administrative zones aid in planning amenities and services that can help achieve high-density neighbourhoods in fast growing cities	Census documents from urban local bodies

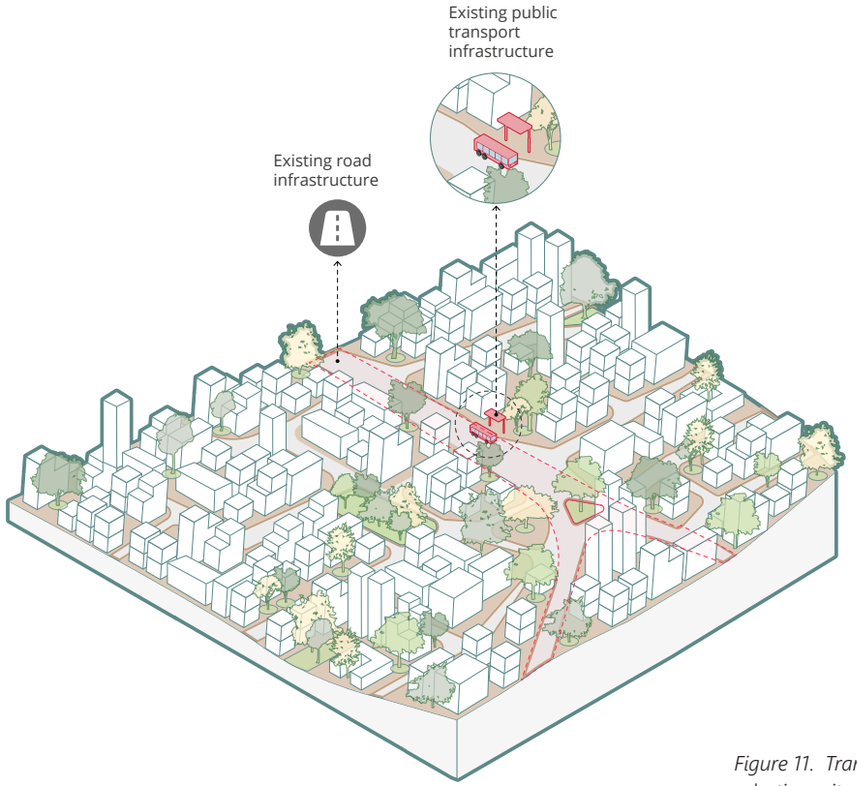


Figure 11. Transport infrastructure selection criteria

Table 7 Transport infrastructure criteria for neighbourhood selection

Indicator	Considerations	Data collection method
Transport Infrastructure Criteria		
Availability of existing road infrastructure	Residential areas located along sub-arterial roads are connected to other parts of the city, making it easier to travel longer distances	Mobility plans from relevant government agencies such as Comprehensive Mobility plans, ToD plans, Mass Transit plans
Availability of existing transport infrastructure	When a neighbourhood is connected to existing city transport infrastructure, investment cost and time taken to implement and start operations is significantly reduced	

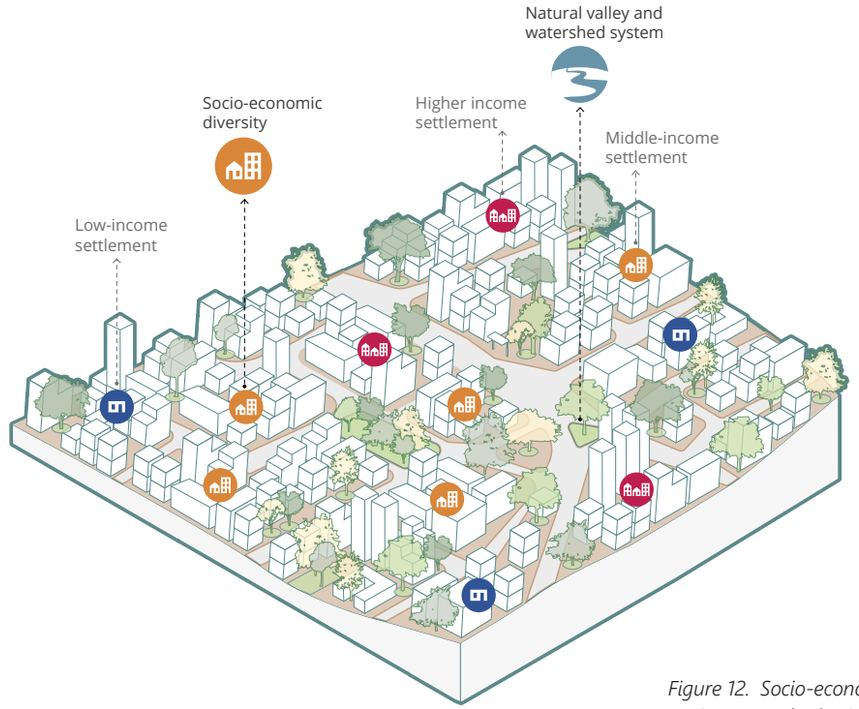


Figure 12. Socio-economic and environmental selection criteria

Table 8 Environmental criteria for neighbourhood selection

Indicator	Considerations	Data collection method
Environmental Criteria		
Natural features and disaster-prone zones	Development projects must consider geographic conditions such as watershed systems, urban forests, wetlands, to avoid encroachments on the natural ecosystem	Statutory plans from relevant government agencies, spatial mapping

Table 9 Socio-economic criteria for neighbourhood selection

Indicator	Considerations	Data collection method
Socio-economic Criteria		
Socio-economic diversity	It is important to consider the needs and aspirations of a socio-economically diverse community to help deliver a better quality of life to all living in the neighbourhood	Census documents, spatial mapping

CASE 1 Selecting potential 15-minute neighbourhoods in Bengaluru, India

For the purpose of this project, Jana USP selected four areas in Bengaluru and further went on to identify potential 15-minute neighbourhoods within these four areas, that shaped the selection criteria recommended in these Guidelines.

In 2023, the *Building 15-Minute Neighbourhoods* project was conceived to test the delivery of the 15-minute neighbourhood concept and inform the Guidelines and Toolkit for Bengaluru. The neighbourhoods were Whitefield, Indiranagar, Malleswaram, and Chickpete.

Each locality was selected considering its distinct characteristics with respect to ward boundaries, primary land use patterns, population, built density, and more. These areas presented various scenarios of intervention with respect to the 15-minute neighbourhood concept, where some areas already possessed characteristics to become such a neighbourhood, while others had a larger scope for transformation.

Of the chosen areas, Indiranagar, Malleswaram, and Chickpete fall within Planning Zone A of proposed Master Plan 2031 for Bengaluru. These are typically inner city areas with high built and population density, limited availability of land with very little scope for further development, and are plagued with challenges such as traffic congestion, poor and unsafe infrastructure, lack of sufficient green and open spaces and air/noise pollution. They are also well connected with prime educational, cultural, recreational, commercial amenities, etc.

Whitefield falls within Planning Zone B of the proposed Master Plan 2031. This zone has a comparatively lesser built and population density. The infrastructure in areas falling under this zone is poor in several cases, with particular absence of a good pedestrian network. In contrary, the presence of numerous water bodies and lakes, as compared to Planning Zone A, present a good opportunity to integrate sustainable planning strategies.

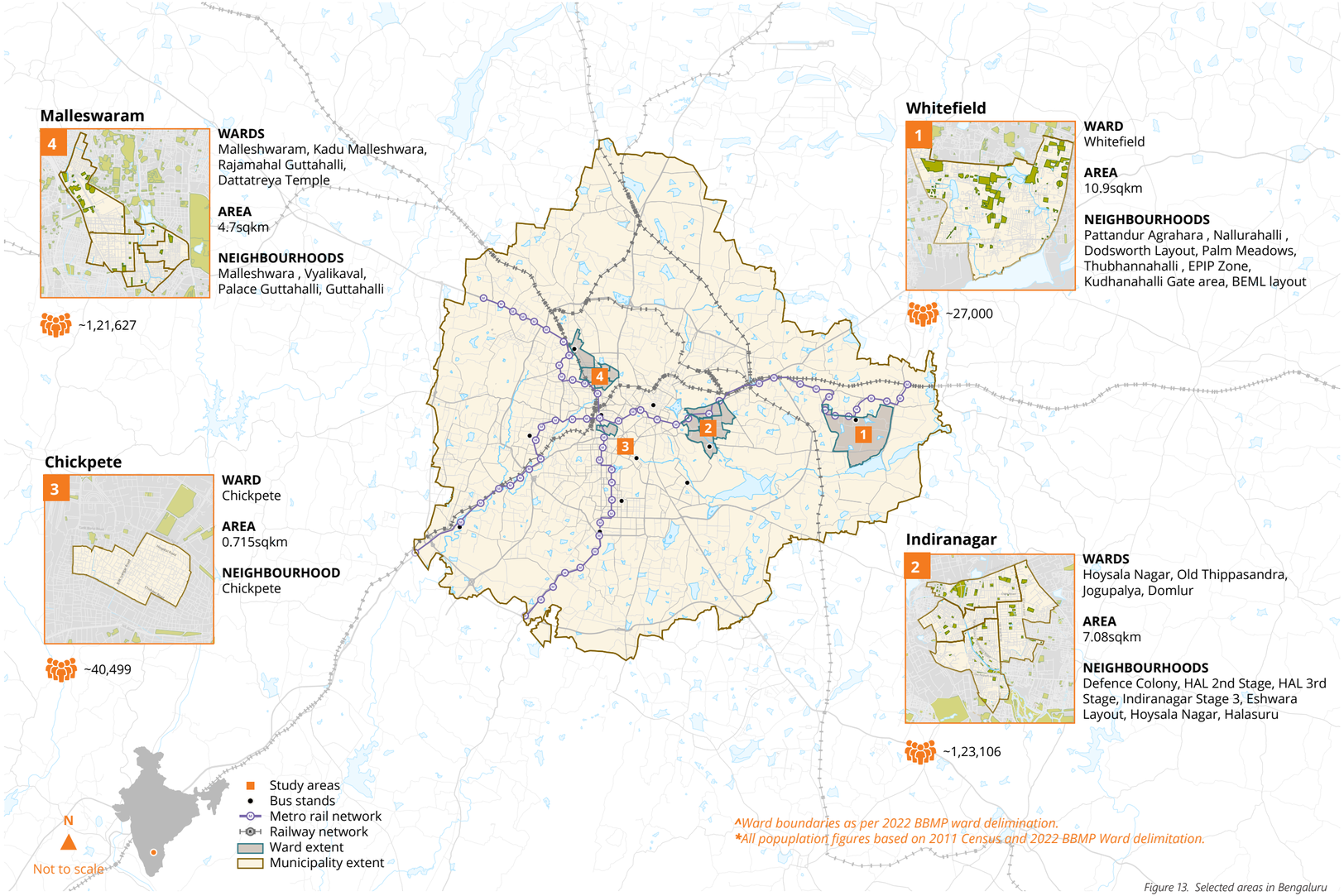
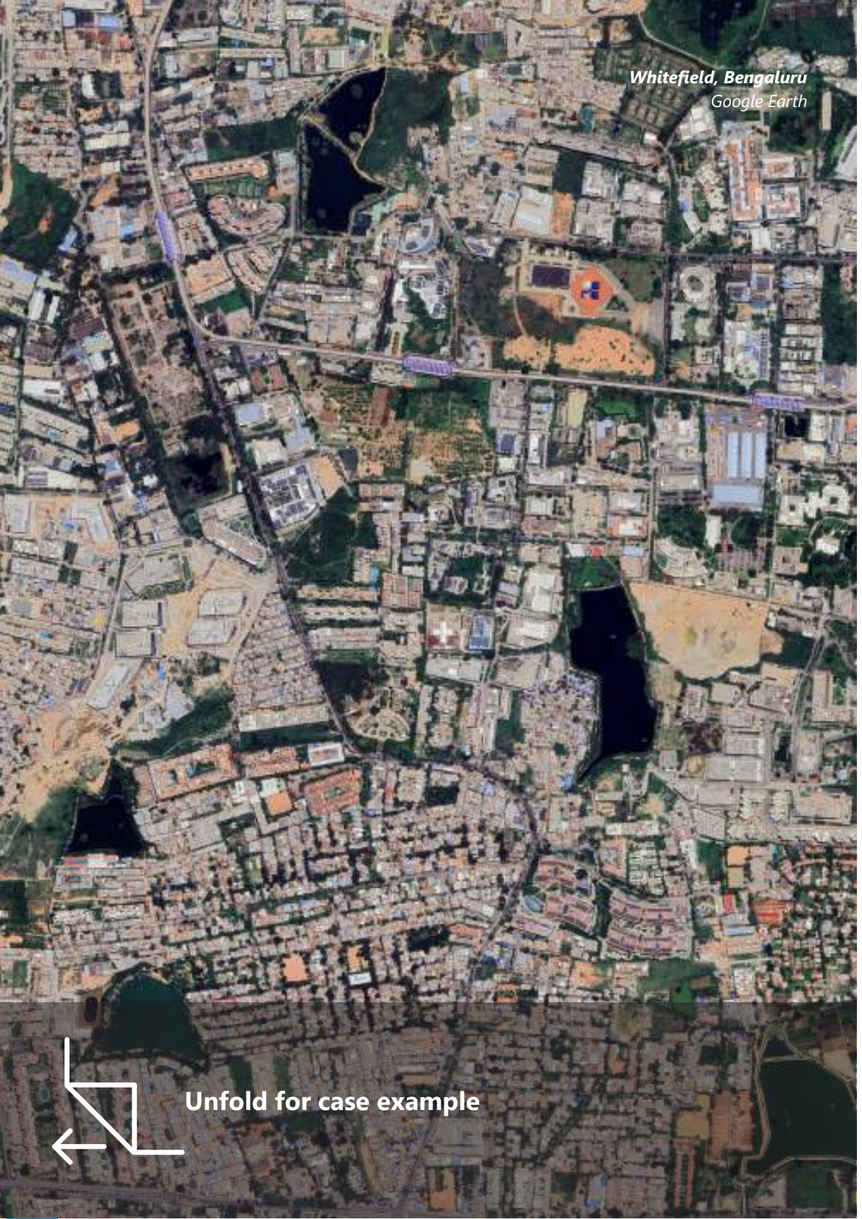
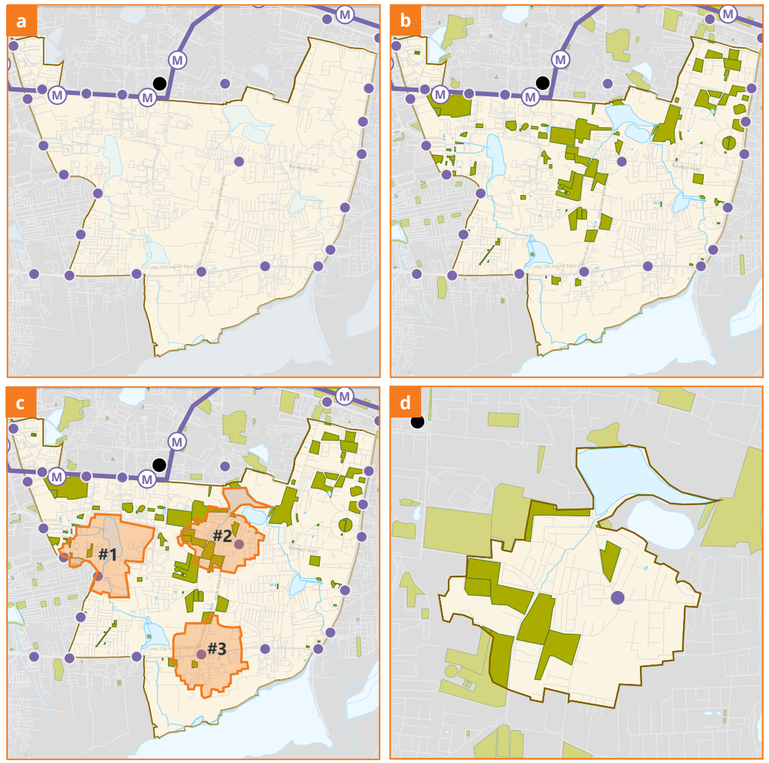


Figure 13. Selected areas in Bengaluru





Ward boundary as per 2022 BBMP ward delimination.

a. The **public transport network** available in and around Whitefield ward
b. **Lakes, green and open spaces** present in and around Whitefield ward
c. **Potential areas** of Kundalahalli (#1), Nallurhalli (#2) and Ramagondanahalli (#3) in Whitefield ward
d. **Nallurhalli** area in Whitefield ward

The above mentioned wards were further studied through primary and secondary research and analysis to identify two-three potential focused study areas within them. While each area is unique, certain parameters were selected to study these urban areas. Taking Whitefield as a case example, the distribution of public transport network, road network, and mobility patterns were mapped and studied first. **Presence of BMRCL metro rail and BMTC bus networks highlighted Kundalahalli, Nallurhalli and Ramagondanahalli areas as potential 15-minute neighbourhoods**.

Next, the socio-economic landscape of these areas were studied through secondary sources and site visits. This helped understand the diverse communities, especially vulnerable groups, and density of settlements that were situated in these areas. **Accessibility for all is the tenet of the 15-minute neighbourhood concept. Therefore, choosing a diverse neighbourhood was important.**

Lastly, the environmental landscape was studied for these three potential neighbourhoods. This included, but was not limited to, the valley and watershed system, and availability of green and open spaces. These were important to map and consider for sensitive and sustainable development of either of the potential areas.

After carrying out an in-depth SWOC (strength-weakness-opportunity-challenge) analysis of the three study areas in Whitefield, Nallurhalli was identified as the potential 15-minute neighbourhood for the project. The same process was carried out in the other localities to select one focused study area spanning a 15-minute walkable length from a reference residence. The other areas selected were Stage 3 in Indiranagar, Guttahalli in Malleswaram and all of Chickpete.

These areas, covering an approximate surface area of 1 sqkm, presented unique scenarios of development and challenges that could be addressed through the 15-minute neighbourhood concept to deliver a better quality of life.

5

Baseline assessment

This chapter provides information on amenities recommended in a neighbourhood, based on national and international standards. It also covers the different studies recommended to conduct a baseline assessment of the selected neighbourhood(s), along with the various steps and tools that must be undertaken to do so.

Indiranagar MRTS Station, Chennai
Anees Ahmed on Unsplash

5.1. CONSIDERATIONS FOR A 15-MINUTE NEIGHBOURHOOD

Residents must be able to meet most of their daily needs by walk or cycle in a 15-minute neighbourhood. As a result, these essential amenities and infrastructure must be planned in a way that serves the population residing in the neighbourhood. The Guidelines include a list (*Table 10)* of such essential amenities based on the Move-Play-Sustain-Include framework. Each direction of the framework has been defined with 8 indicators and 22 design features, which have been developed considering quality of life studies and community engagement, both of which have been discussed in *Chapter 5 Baseline studies* and *Chapter 6 Citizen participation* respectively. The basic requirements of these design features have been further elaborated under Distance, Density, and Area in these considerations.

In urban areas, each neighbourhood requires a context-based development to respond to its specific challenges and needs. As such, certain considerations may not be applicable to a neighbourhood. However, by evaluating the area against these considerations, one can ascertain the minimum essential amenities and facilities required in a 15-minute neighbourhood.

It's important to highlight that these considerations go beyond the specifics provided in this document, incorporating insights from established standards such as the National Building Code (NBC) and Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines for India. Furthermore, references to national guidelines like the National Building Code of India 2016 – Volume 2, Model Building Bye-Laws 2016, and Harmonized Guidelines Space Standards for Universal Accessibility in India-2021, along with insights from international examples of neighbourhood planning and 15-minute communities, have enriched the indicators and requirements for developing a 15-minute neighbourhood.

These considerations can be taken up as urban interventions to develop areas.

By evaluating the area against the considerations, one can ascertain the minimum essential amenities in a 15-minute neighbourhood.

Table 10 Considerations for a 15-minute neighbourhood

	Indicator	Design Feature	Distance	Density	Area	Remarks
M	**Move**					
M1	Access to NMT infrastructure	Footpaths	Minimum clear width for walking= 2m In addition to dedicated walking area on the footpath, following zones must be provided for better walking experience: • Minimum frontage zone width= 0.5m • Minimum multi-utility zone (MUZ) width= 1.5m	*Pedestrian density or pedestrian Level of Service (LOS) must be considered while deciding footpath widths*[26]	*Height of the footpath must not be more than 150mm.*	Gradient of the footpath must not be more than 1:20.
M2		Cycle infrastructure	Minimum clear width • Cycle track (unidirectional)= 2m • Cycle track (bidirectional)= 3m • Cycle lane= 1.5m • Segregated cycle lane (unidirectional)= 2m • Segregated cycle lane (bidirectional)= 3m	*Vehicle dimensions, clearance and volume (traffic) must be considered while deciding cycle track width.*[27]	*Raised cycle tracks with buffer from carriageway, which protects cyclists from vehicles at the road side. Cycle track is located 50mm below the footpath.*[28]	Cycle infrastructure network should preferably connect to transit stops and be equipped with cycle stands/ parking spaces.
M3	Access to public transport	Bus stops	Within 800m of neighbourhood Distance between bus stops: • Arterial/sub-arterial roads= 500m • Collector/local roads= 300 - 400m	• 2-3 bus stops for 0.6 sqkm neighbourhood area • 1 bus per 15,000 persons[29]	A stable platform of 1.2m minimum width and minimum length 9m must be provided with a shelter.	Bus stops near intersections must be avoided as they can lead to traffic queues.
M4		Metro stations	Within 800m of neighbourhood	*Before metro rail can be sanctioned, it would be desirable for the city to have atleast 1 million ridership per day on organised public transport (any mode).*[30]	*Not available*	Access to metro stations must be ensured by integrating metro rail to the existing public transport network, or by introducing feeder bus services and cycle lane network. Parking for personal vehicles should preferably be provided to encourage people to use public transport for long distance travel.
M5	Access to intermediate public transport (IPT)	Auto-rickshaws/ e-rickshaws/ taxi stand	Within 400m of neighbourhood	*Not available*	5-6 IPT waiting bays[31] of minimum area 6 sqm may be provided in one stand.	Stands should preferably be located within 100m of transit stops, markets and other major destinations, with appropriate signages.[32]

26 URDPFI Guidelines. (2015b). Ministry of Urban Development (MoUD), 1. 286.

27 URDPFI Guidelines. (2015c). (MoUD), 1. 201.

28 Urban Cycling Design Guidelines (UCDG). (2017). Pune Municipal Corporation. https://pmc.gov.in/sites/default/files/Pune-CyclePlan-Dec-2017.pdf

29 According to the service-level benchmarks for urban transport laid out by MoHUA, cities should have at least 60 buses per lakh population to achieve Level of service (LOS) 1

30 Recommendations of Working Group on Urban Transport for 12th Five Year Plan. (n.d.-a). MoUD. p76 from https://mohua.gov.in/upload/uploadfiles/files/UT_FYP_12.pdf

31 IRC: 103 - Guidelines for Pedestrian Facilities. (n.d.). Indian Roads Congress (IRC), 35. https://www.irc.nic.in/admnis/admin/showimg.aspx?ID=345

32 IRC: 103 - Guidelines for Pedestrian Facilities. (n.d.). IRC, 29.

	Indicator	Design Feature	Distance	Density	Area	Remarks
M6	Inclusive and accessible streets	Pedestrian crossings	At-grade crossings must be available at every 250m	*Not applicable*	*Pedestrian refuge should be the same width as the pedestrian crossing and the depth should not be less than 2m, enough to park a wheelchair.*[33]	As per IRC standards, the minimum width of the pedestrian crossing should be 2m, while areas with high pedestrian traffic must have 4m wide crossings.[34]
M7		Landscape buffer	Width= 0.3 - 1.2m	Trees must be planted every 5-7m in the landscape buffer along footpaths	*As per area available on collector, sub arterial or arterial roads*	A vertical clearance of 2.4m should be maintained[35]. Trees and shrubs should preferably planted in the multi-utility zone (MUZ).
M8		Pedestrian waiting area	Street furniture must be placed at 100m intervals along roads with high volume of people	*Not applicable*	Seating of minimum 0.4m width, with a clearance of 0.9m in front	The seating height of street furniture should preferably be between 0.45-0.5m, have a backrest and hand rests at 0.7m height.
M9		Street lighting	Spacing of street lights along: • Local/sub-local road: single sided, at 10m intervals • Collector road: staggered/opposite sides, at 15m interval • Sub-arterial road: central, at 30m intervals • Arterial road: central+opposite, at 30m intervals	*25-30 Lux level of lighting must be available on footpaths.*[36]	*Not available*	Height of street lights on: • Local/sub-local: 3m-6m • Collector: 9m • Sub-arterial: 12m • Arterial: 6m-12m
M10		Wayfinding and signage	Warning signs should preferably be located: • 1.2m ahead of pedestrian crossings • 50m ahead of intersections	*Not available*	*Not available*	Depending on the purpose it serves, signages can be directional, share information, identification, or be instructive.
P	**Play**					
P1	Access to open spaces	Parks	Within 300-800m	2-3 per 10,000 persons	18,000 sqm area in total, therefore minimum area 6,000 sqm per park	These Guidelines suggest increasing the area from 10,000sqm to 18,000sqm, and split into 2-3 parks for better distribution of open spaces.[37]

33 IRC: 103 - Guidelines for Pedestrian Facilities. (n.d.). IRC, 23.

34 IRC: 103 - Guidelines for Pedestrian Facilities. (n.d.). IRC, 21

35 IRC: 103 - Guidelines for Pedestrian Facilities. (n.d.). IRC, 26

36 IRC: 103 - Guidelines for Pedestrian Facilities. (n.d.). IRC, 18

37 As per Dutch standards, a min. 300 sqm/Ha i.e. 18,000sqm is provided for a Neighbourhood Park and 14,000sqm is recommended in Melbourne.

	Indicator	Design Feature	Distance	Density	Area	Remarks
P2		Playgrounds	Within local schools and educational institutions	2 per 10,000 persons	2,000 sqm area	During non-school hours, these grounds may be used for sports practice and other purposes.
P3	Inclusive and accessible public spaces	Public toilets	Every 500m in areas with high volume of people	Provision for male: • 1 water closet (WC) per 100 to 400 persons • 1 urinal for 50 persons Provision for female: • 2 WCs per 100-200 persons[38]	Minimum internal dimensions of a WC must be 2.2 x 2m	While CPHEEO's Advisory on Public and Community Toilets suggests locating public toilets every 1 km[39], City of Melbourne's Public Toilet Plan 2008-2013 suggest a maximum of 500m between public toilets in major pedestrian areas.[40]
P4		Drinking water fountain	*Not available*	*Not available*	A clear space of 0.9 x 1.2m must be provided in front of drinking water fountains.[41]	Atleast one water spout should be at a lower height of 0.75m for wheelchair users to access.[42]
S	**Sustain**					
S1	Access to neighbourhood level markets	Local/ neighbourhood shopping complex	Within 1.5-2km of neighbourhood	1 per 15,000 persons	4,600 sqm	The local shopping complex can be planned as a shared resource between 2-3 neighbourhoods.
I	**Include**					
I1	Access to social infrastructure	Convenience or grocery stores	Within 300-500m of neighbourhood	1 shop for every 110 persons	220 sqm area per 1000 persons	Number of stores may be provided together for convenience shopping within an area of 1,500 sqm for every 5,000 persons. It is preferable to have resting areas and natural shading here.

38 Manual on Sewerage and Sewage Treatment (2nd edition). (2013a). Central Public Health and Environmental Engineering Organisation (CPHEEO), MoUD. https://cpheeo.gov.in//cms/manual-on-sewerage-and-sewage-treatment.php

39 Advisory on Public and Community Toilets. (2018). CPHEEO, 20. https://cpheeo.gov.in/upload/whatsnew/5c0a08232e7afAdvisory%20on%20public%20toilet.pdf

40 City of Melbourne Public Toilet Plan 2008 - 2013 (draft). (2008b). The Planning Committee, Melbourne. https://www.melbourne.vic.gov.au/about-council/committees-meetings/meeting-archive/meetingagendaitemattachments/39/723/pc_56_20080408.pdf

41 Harmonised Guidelines and Standards for Universal Accessibility in India. (2022a). MoHUA, 119. https://niua.in/intranet/sites/default/files/2262.pdf

42 ibid

	Indicator	Design Feature	Distance	Density	Area	Remarks
I2		Schools (pre-primary, nursery and primary)	Within 300-600m of neighbourhood	1 per 5,000 persons	4,000 sqm (2,000sqm built foot print and 2,000sqm playground)	• Schools must be located near a neighbourhood park. • It is recommended to provide playgrounds with minimum dimensions of 18m x 36m to ensure effective play.
I3		Dispensaries	Within 300-500m of neighbourhood	1 per 5,000 persons	800-1,200sqm	These should preferably be located within 1 km from the periphery of the underserved population of urban slum, vulnerable pockets, and temporary settlements.[43]
I4		Clinics such as primary health centres (PHCs)	Within 1.5-2km of neighbourhood	1 per 50,000 persons	500-800sqm	Since higher level health care facilities are readily available in urban areas, it is preferable to locate PHCs within 1km of urban slums.
I5		Community hall	Within 1.5-2km of neighbourhood	1 per 15,000 persons	2000sqm	URDPFI Guidelines also suggest providing community room of 750sqm area to serve a population size of 5000 persons.
I6		Day care centre/ crèches	Within 300-500m of neighbourhood	1 crèche shall have upto 30 children[44]	15-20 sqm (0.5-0.75 sqm per child)[45]	The day care centres or crèches should be planned with an open space of preferably the same size.[46]
I7		*Anganwadis*	Within 300-500m of neighbourhood	1 per 5,000 persons	200-300 sqm	It is preferable to locate *angawandis* near a housing area park.

43 Indian Public Health Standards (IPHS) For Primary Health Centres (draft). (2006). Ministry of Health & Family Welfare, 13. https://www.iapsmgc.org/userfiles/4IPHS_for_PHC.pdf

44 National Minimum Guidelines for Setting Up and Running Crèches under Maternity Benefit Act 2017. (2018). Ministry of Women and Child Development, 13. https://wcd.nic.in/sites/default/files/National%20Minimum%20Guidelines_0.pdf

45 National Crèche Scheme for Children of Working Mothers. (2017). Ministry of Women and Child Development (MWCD), New Delhi, 6. https://wcd.nic.in/sites/default/files/National%20Creche%20Scheme%20For%20The%20Children%20of%20Working%20Mothers_0.pdf

46 ibid

5.2. STUDY METHODOLOGY

Post identification and selection of a potential 15-minute neighbourhood, it is imperative to conduct a range of baseline studies before further design and planning. These Guidelines propose the **Availability – Accessibility – Quality** methodology to assess the amenities available in a neighbourhood. Each phase is incremental and recommends surveys for assessment, which fall under one or more of these phases. This methodology (refer *Figure 15)* has been designed to offer valuable information about the amenities in a neighbourhood, and help identify its challenges through a gap analysis. These Guidelines recommend the following framework.

Availability

The first phase aims at creating a baseline study of the selected neighbourhood. It is aimed at collecting quantitative data of existing infrastructure, using both digital and offline tools, to assess whether the recommended amenities are available within a 15-minute walk of the identified central node of the neighbourhood.

Accessibility

The second phase is aimed at collecting data with respect to accessibility of the above verified amenities. By the end of this phase, the user will have all relevant data about walkability, cycleability, Lux levels and infrastructure quality in the selected neighbourhood.

Quality

During the third phase, valuable information from the community at the selected neighbourhood is collected, preferably using digital tools. The level of civic engagement is highest in this phase as user's express their spatial perceptions and needs.

- What is the population of the selected study area?
- Which amenities and services are available, accessible, and what is their quality?
- What are residents' needs and aspirations?
- How to best address residents' needs and aspirations?

Figure 15. Survey methodology

5.3. RECOMMENDED SURVEYS

5.3.1. Demographic survey

This panel indicates the following details regarding a survey.

Requirement ranges between ✱Optional-✱✱Recommended-✱✱✱Mandatory

Level of difficulty ranges between ✱Low-✱✱Medium-✱✱✱High

Suggested time refers to expected time to complete the surveys

Participants indicates who would be required for the survey

Materials required suggests materials which can be utilised for the survey

Requirement
Recommended
✱✱❄

Level of difficulty
Medium
✱✱❄

Suggested time
1 week

Participants
Technical experts

Materials required
Smartphone

A demographic survey will provide crucial information to understand the background of residents in the survey area – with respect to their age, income, members in the households, among other aspects.

Steps

1. Define the target group based on the population within the survey area. It can be kept general or, if needed, can focus on a specific target group (women, children, urban poor, etc.).
2. Gather information about the population of the survey area in terms of size and composition from government records.
3. Calculate and define the sample group size that must be interviewed to get ensure a good representation of the entire survey area
4. Organise and compile demographic data

Outputs

1. Demographic data of survey area

5.3.2. Validation survey

This survey will involve creating an accurate and comprehensive inventory of neighbourhood amenities through identification, mapping and verification. The amenities can be mapped using online sources. However, since there is a possibility that these digital sources show old data, an on-ground verification and validation would be necessary. The on-ground validation survey may also include the identification of additional amenities that were not captured in the online research.

Steps

1. Prepare a map indicating the location of basic amenities available within a 15-minute walking distance of the selected area, using suggested tools as reference.
2. Verify the location of these amenities by conducting a site reconnaissance survey of the selected area.
3. Compile survey data of updated and verified list of amenities.

Tools

1. Considerations for a 15-minute neighbourhood *(Table 10 on page 74)*

Outputs

1. Collection of maps and list of verified and updated amenities that provide qualitative information about the neighbourhood

Phase
~~Availability~~
Accessibility
Quality

Requirement
Mandatory
✱✱✱

Level of difficulty
Low
✱❄❄

Suggested time
1 week

Participants
Technical experts

Materials required
Smartphone, printed collaterals and pen

CASE 2 Validation surveys conducted in select neighbourhoods of Bengaluru, India

Over 85 transport, public and social infrastructure amenities mapped and verified in the study areas.

A detailed mapping exercise was carried out to locate and verify the presence of essential services and amenities in the selected neighbourhoods. To start the exercise, a boundary for the potential 15-minute neighbourhood was drawn up in each place by keeping in mind a few thumb rules –

- The length and width of the area could be covered in a 15-minute walk from end the other
- The boundary that would be created of this walking distance would also have to be traversable

Online mapping tools such as Google Maps, Google Earth Pro and Google My Maps were used to create this boundary as a closed polygon for better reference. These were also used to map and create an online database of existing infrastructure, such as transport, open spaces, healthcare, education, and other social amenities, within each residential node of the four areas. The amenities listed in Considerations for a 15-minute neighbourhood (*Table 10)* were referred for this exercise. Over 85 transport, public and social infrastructure amenities were mapped and verified in the study areas.

According to URDPFI Guidelines, a neighbourhood must have 2-3 parks. In Guttahalli, 2 parks were available in a 15-minute walking distance.

After the maps and online database were created, their location was verified through site visits to each location. During these field visits, several additional amenities that were not listed in the database were also recorded for future reference. This verified and updated database was then used to analyse whether the residential node had the minimum recommended number of amenities for the population residing there prescribed by URDPFI Guidelines and Considerations for a 15-minute neighbourhood. Based on this analysis, certain questions were drawn for the user perception surveys that would be conducted later for each area.

Figure 16. Digital mapping and verified status report for Guttahalli, Malleswaram

Figure 17. (L) Government High School

Figure 18. (R) 8th Cross Vegetable Market in Guttahalli

Figure 19. (L) Malleswaram Swimming Pool Extension Park

Figure 20. (R) Sankey Tank

5.3.3. Infrastructure assessment survey

Phase

Availability

Accessibility

Quality

Requirement

Mandatory

Level of difficulty

Medium

Suggested time

2-3 days

Participants

Technical experts

Materials required

Smartphone

This survey involves an objective evaluation of specific types of infrastructure, including but not limited to mobility hubs, parks, playgrounds, grocery stores, markets, and other social infrastructure. It creates an objective picture of the features, surroundings and quality of these infrastructure points in the survey area.

Steps

1. List the infrastructure points or amenities that need to be evaluated
2. Use enlisted tools to evaluate the amenities and gather required information
3. Observe and interact with the surrounding
4. Get consent before taking pictures at the amenity
5. Evaluate and compile the survey data for each amenity

Tools

1. Infrastructure assessment checklist (*Table 11 on page 89*)

Outputs

1. Organised collection of assessment data with pictures

Tool - Infrastructure assessment checklist

Table 11 Infrastructure assessment checklist

Feature	Description	Observation/score
Universal accessibility	Ramp to enter (if necessary/steps are there)/can wheelchair enter)	Yes/ No
Walkability inside amenity	General walkability inside amenity	1 (poor) - 5 (excellent)
Access to infrastructure (within 100m distance)	General walkability around infrastructure (within 100m around amenity (entrance)	1 (poor) - 5 (excellent)
Safe pedestrian crossings (within 100m distance)	Pedestrian crossings/skywalk/subway crossing available within 100m of amenity entrance	Yes/ No
Pick-up/ drop-off zones around the amenity	Safe/(designated) drop off zone available for cars/bikes/cabs/ autos etc.	Yes/ No
Parking for two-wheeler	Designated Parking for 2 wheeler and/or street-parking available	Yes/ No
Parking for four-wheeler	Designated Parking for 4-wheeler and/or street-parking available	Yes/ No
Smart parking	Is there any smart parking available (for 2 or 4 wheeler)	Yes/ No
Cycle zone/ auto-rickshaw stand	Is there a cycle-hire/ auto rickshaw zone visible nearby?	Yes/ No
	Is there a cycle-hire zone/ auto rickshaw available now/within a few minutes for you to use (during your visit)?	Yes/ No
Signage at bus stop	Is there a sign(s)/board(s) with bus timetable, bus route map, bus route numbers/A countdown for incoming/ scheduled buses?	Yes/ No
Public toilet	Public toilet available (unlocked)	Yes/ No
	If available - extent the public toilet is clean and functional (has door, flush, water etc.)	1 (poor) - 5 (excellent)
Dustbins	Dustbins available	Yes/ No
Drinking water	Drinking water availability	Yes/ No
Bus shelter	Bus shelter available	Yes/ No
Inclusive public realm	Good quality (unbroken), clean, seating (inside) available	Yes/ No
Children's play equipment	Children's play equipment availability	Yes/ No
	Quality/usability score of play equipment	1 (poor) - 5 (excellent)
Overall cleanliness	Overall cleanliness score in/around/just outside	1 (poor) - 5 (excellent)
Lighting inside amenity	Lighting inside amenity	Yes/ No
Lighting around amenity	Lighting around amenity	Yes/ No
Are there any noticeable hazards?	Are there any noticeable hazards? Electric wires, unsafe drains/potholes (inside/by the amenity)	Yes/ No and note the type of hazard
Security	Are there any CCTV cameras available/visible at the gates/ entrance?	Yes/ No

CASE 3 Infrastructure assessment exercise carried out in select neighbourhoods of Bengaluru, India

14 transport points, 10 open spaces, 2 city-level markets, and 8 schools were chosen for infrastructure assessment.

Open spaces in Nallurhalli were not universally accessible.

A detailed assessment was carried out to technically assess the accessibility and quality of select infrastructure points in each potential neighbourhood. These places were selected for their proximity to and level of use by the entire neighbourhood and its residents.

For instance, some of the infrastructure points selected in the neighbourhoods for assessment were public amenities like bus stops, metro stations, parks, and lakes along with social infrastructure like government schools and *anganwadis*. These places were assessed for, but not limited to, the features highlighted in *Table 12*. From the verified list of amenities in the four neighbourhoods, 14 transport points, 10 open spaces, 2 city-level markets, and 8 schools were chosen for infrastructure assessment.

These technical assessments in the four neighbourhoods helped analyse the status quo through an expert lens as well as the challenges residents were facing. Such evidence-based assessments supported the case for place-based planning and intervention, which is the crux of the 15-minute neighbourhood concept.

Table 12 Sample of infrastructure assessment survey in Nallurhalli, Whitefield

Feature	Auto stand	Cycle stand	Bus stop	Bus stand	Lake	Park	School
Universal accessibility	✗	✗	✗	✓	✗	✗	✗
Walkability inside amenity					5/5	5/5	
Access to infrastructure (within 100m distance)	2/5	1/5	1/5	5/5	5/5	5/5	3/5
Safe pedestrian crossings (within 100m distance)	✗	✗	✗	✓	✗	✗	✗
Pick-up/ drop-off zones around the amenity	✓	✗	Some	✓	Some	✓	✓
Public toilet				✓	✓	✗	
Dustbins				✓	✓	✓	
Drinking water				✗	✗	✗	
Bus shelter			✗	✓			
Inclusive public realm			✗	✓	✓	✓	
Children's play equipment					✓	✓	✓
Overall cleanliness	4/5	1/5	1/5	5/5	4/5	4/5	3/5
Lighting inside amenity			✗	✓	✓	✓	✓
Lighting around amenity	✓	✓	✓	✓	✓	✓	✓
Are there any noticeable hazards?	✗	Open drains	Electrical transformer and garbage dumping nearby	✗	✗	✗	Electrical transformer nearby

✓ Available ✗ Not available ☐ Not applicable

5.3.4. Walkability survey

Phase

Availability

~~Accessibility~~

Quality

Requirement

Mandatory

Level of difficulty

Medium

Suggested time

1-2 days

Participants

Technical experts

Materials required

Smartphone, printed collaterals, pen, measuring tape

The walkability survey assesses the neighbourhood's suitability for walking as a mode of transportation. It evaluates factors such as sidewalk conditions, pedestrian safety, street crossings, and the overall pedestrian experience. This survey helps in understanding how accessible amenities are by foot, and may be taken up for select priority routes that experience high footfall in the area, for example– the route to a major mobility hub or public space.

Steps

1. Identify and map the pedestrian priority routes that will be surveyed for walkability
2. Observe the quality and condition of the footpath, as well as how pedestrians are using it
3. Measure the distance of footpath traversed as well as length of obstructions encountered along the route
4. Take pictures of any obstructions found along the way
5. Analyse the results of the survey using the tools listed below to arrive at walkability scores for the selected pedestrian priority routes

Tools

1. Walkability score sheet (*on page 93)*

Outputs

1. Digital data collected on length of footpaths traversed
2. Walkability score for survey routes

Tool - Walkability score sheet

A footpath is regarded as *walkable* if two people can walk on it side-by-side without having to step onto the road. Hence, for each road in the walkability study, the footpaths on either side(s) have to be traversed to analyse this, noting the frequency and severity of obstructions or encroachments encountered.

Some obstructions to walkability are related to infrastructure maintenance, such as broken pavers, caving in of the pavement, road works, etc. Others are related to enforcement, such as vendor carts, parking, littering, etc.

The obstructions are given a rating for severity on a scale of 1-5, where 1 is a minor obstruction that can be skirted around and 5 is a severe obstruction or encroachment that requires a pedestrian to step onto the road. Additionally, non-existence of a footpath on any stretch of the road is also considered as an obstruction level 5 since this requires citizens to walk on the road. Obstructions with a score greater than 3 must be measured in terms of length to indicate the amount of obstruction. The total length of obstruction must be captured on each footpath (on both sides of the road). This will then be considered against the total length of footpath and a walkability score will be attributed to each road. Example as below:

Obstructions to walkability are related to poor design, infrastructure maintenance, encroachments, parking, littering, etc.

Length of footpath surveyed	***Length of footpath without obstructions***	***% walkable footpath***
	Length of footpath surveyed - Total length of obstructions (score>3)	*(Length of footpath without obstructions/ Length of footpath surveyed)*100*
	2km - (6m+6m+ 10m+5m)	*(1973m/2000m)*100*
2km	**1.973km**	**98.65%**

CASE 4 Walkability surveys conducted along select roads in Bengaluru, India

Over 12km length of roads were surveyed across the four areas to assess footpath conditions, where 50% walkable footpaths were recorded.

As the basis of the 15-minute concept relies on a walkable neighbourhood, the technical assessment undertaken on walkability was one of the most important surveys conducted for the *Building 15-Minute Neighbourhood* program. For this survey, high pedestrian volume streets as well as collector, sub-arterial and arterial roads were prioritised over others in the potential neighbourhoods. Over 12km length of roads were surveyed across the four neighbourhoods to assess footpath conditions.

In the case of Nallurhalli in Whitefield, over 4km length of roads were surveyed. These routes were selected as they connected the neighbourhood to arterial roads, transport infrastructure as well as public spaces. These routes were traversed to analyse if they have walkable footpaths on both sides of the road. The frequency and severity of obstructions or encroachments encountered, such as like broken pavers, caving in of the pavement, vendor carts, parking, littering etc. were recorded using online mapping tools to further analyse the total length of walkable footpath available to residents in Nallurhalli. It was found that walkable footpaths were available along 2.39km on the left-side and 2.3km on the right-side of the 4km length of roads surveyed.

This survey in conjunction with the street lighting survey was important to determine which of these select routes to prominent public infrastructure were both walkable and well-lit at night, therefore more safe, for residents in Nallurhalli, Whitefield.

Figure 21. Reference map and photographs from the survey area of Nallurhalli, Whitefield capturing various kinds of obstructions and encroachments such as debris, broken pavers and utilities such as electrical transformers.

5.3.5. Cyclability assessment survey

Phase

Availability

Accessibility

Quality

Requirement

Mandatory

Level of difficulty

Medium

Suggested time

1-2 days

Participants

Technical experts

Materials required

Smartphone, printed collaterals and pen

Similar to the walkability survey, the cyclability survey aims to assess the neighbourhood's suitability for cycling. It considers bike lanes, bike-sharing facilities, and factors that affect the safety and convenience of cycling.

Steps

1. Identify and map the cycle lanes available in the neighbourhood
2. Observe the quality and condition of the cycle lane, as well as how cyclists are using it
3. Measure the length of cycle lanes traversed as well as length of obstructions encountered along the route
4. Take pictures of any obstructions found along the way
5. Analyse the results of the survey to determine cyclability of the neighbourhood's cycle lanes

Outputs

1. Digital data collected on length of cycle lanes traversed

5.3.6. Street lighting survey

Phase

Availability

Accessibility

Quality

Requirement

Mandatory

Level of difficulty

Medium

Suggested time

2 days

Participants

Technical experts

Materials required

Smartphone

This survey will help the user measure the quality of street lighting in the selected neighbourhood. Adequate lighting is crucial for enhancing safety and security, especially during the evening and night. Assessing street lighting and identifying areas in need of improvement can help create a safer environment for pedestrians as well as residents.

Steps

1. Identify and map the routes to be assessed for quality of street lighting
2. Conduct the survey post 7 P.M. when it is dark using selected tools
3. Start from one end of the route taking a measurement every 10 meters, on both sides of the road
4. Aggregate the data into "Left side" and "Right side" of the route
5. Analyse the results of the survey and give average lighting

Tools

1. Galactica Lux Meter

Outputs

1. Digital data collected on Lux levels of street lighting every 10m along priority routes
2. Average Lux level for each side of priority routes

CASE 5 Street lighting assessment carried out along select roads in Bengaluru, India

Some stretches recorded 64% lesser lighting than recommended levels.

Chickpete recorded the highest average illuminance of 38 Lux from the four study areas.

Street lighting assessments were conducted along routes that carried high volumes of pedestrian traffic, to determine the level of illuminance available to pedestrians. This assessment was conducted on the same routes as the walkability assessment survey, so that data from both these surveys could help analyse walkability and safety of these routes. The select routes were traversed on both sides of the road to capture the Lux level readings from streetlights after 7 PM in each neighbourhood.

Some stretches recorded illuminance of 9 Lux, which is 64% lesser than the recommended standards. As per the Indian Road Congress 103- Pedestrian Facilities Guidelines, the minimum recommended illuminance for pedestrian streets is 25 Lux. The range of Lux levels across these areas varied from 9–76 Lux. *Figure 22* shows the routes surveyed for walkability and street lighting in Chickpete. Two of the three routes recorded Lux level greater than 25 Lux. However, on average the street lighting in Chickpete met the recommended lighting levels. The other three study areas did not meet the minimum Lux levels, with Guttahalli recording the lowest at 14 Lux. *Table 13* shows the range and average illuminance recorded in the four study areas.

Table 13 Street lighting assessment data

	Neighbourhood	Range of illuminance (Lux)	Average Illuminance (Lux)
1	Nallurhalli, Whitefield	12-76 Lux	21 Lux
2	Stage 3, Indiranagar	9-72 Lux	15 Lux
3	Guttahalli, Malleswaram	12-76 Lux	14 Lux
4	Chickpete	9-76 Lux	38 Lux

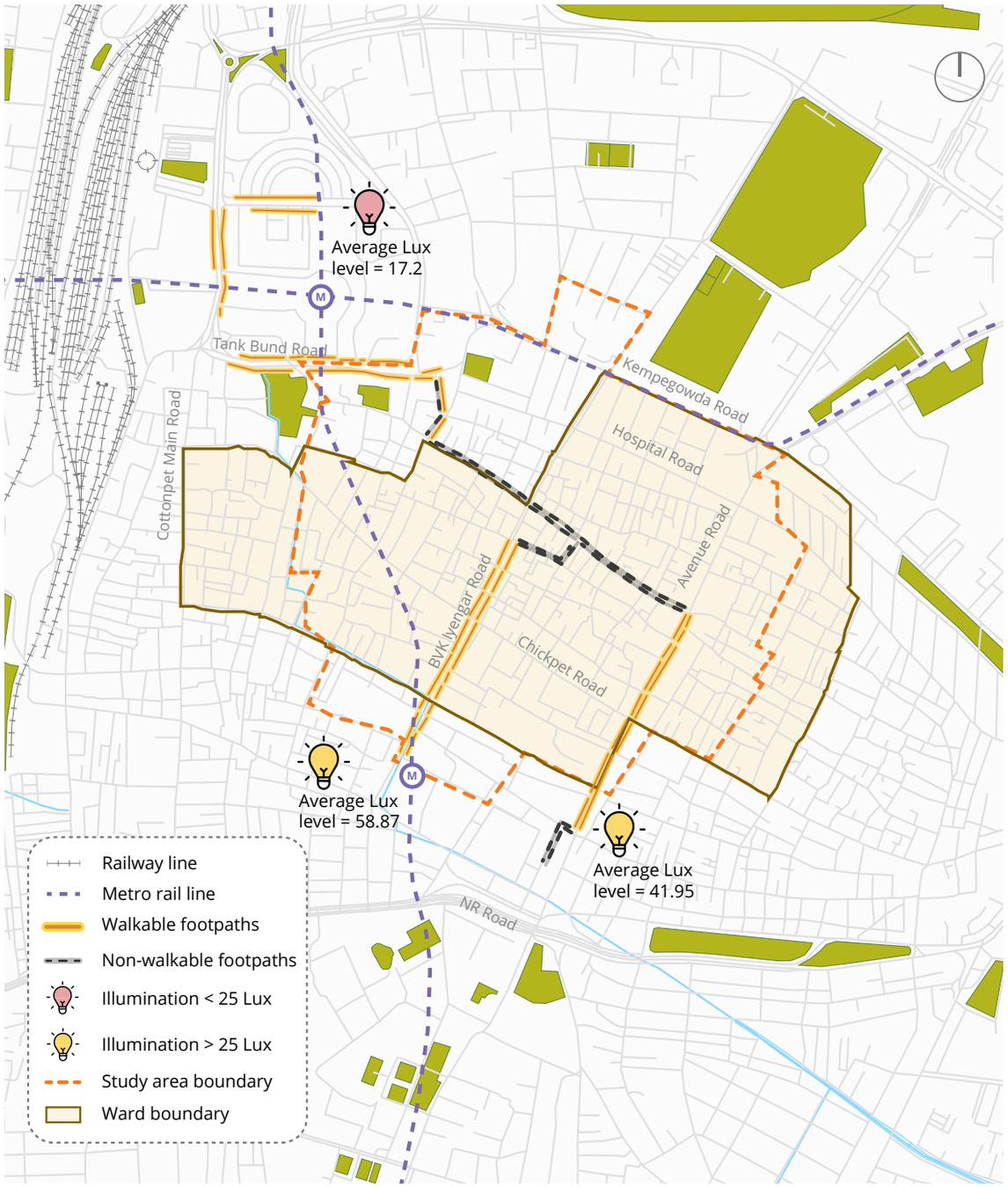


Figure 22. Survey roads for walkability and street lighting in Chickpete

5.3.7. User perception survey

Phase

Availability

~~Accessibility~~

~~Quality~~

Requirement

Mandatory

Level of difficulty

Low

Suggested time

3-4 days

Participants

Residents

Materials required

Smartphone, notebook and pen

To understand the area and its amenities from the perspective of residents, conducting a household survey or focus group discussion with residents of the survey area is highly recommended. The survey can cover questions on whether citizens visit the different amenities that were mapped and verified during the validation survey, their modes and travel times to these destinations, as well as quality and safety at these amenities, among other aspects.

Steps

1. List the people that need to be interviewed based on the stakeholder mapping and demographic survey
2. Prepare an online questionnaire for the survey composed of open and closed questions
3. Prepare to conduct the interview on-location, preferably during the weekend, with smartphones, which should not be more than 35 minutes
4. Get consent to take pictures of the surroundings
5. Take notes of key messages and/ quotes, that may not be captured in the online questionnaire
6. Organise the survey data and compile interview responses

Tools

1. Stakeholder interest and influence matrix

Outputs

1. List of interviewees
2. Analysis of survey responses

CASE 6 User perception surveys conducted in Bengaluru, India

Neighbourhoods have their own distinctive characteristics and opportunities they provide. For this reason, an in-depth user perception survey sought to understand community concerns and capture their needs and aspirations in neighbourhoods of Bengaluru. The survey questionnaire was based on the analysis derived from the technical assessments and surveys conducted.

Online and offline public surveys were conducted to capture residents' needs and aspirations for a 15-minute neighbourhood. The surveys' duration was approximately 8 weeks and received 1664 responses. Optional demographic questions on the survey included age, gender, number of members in their household and those with any disability impacting their daily movement.

The online public survey was disseminated through multiple channels, including social media pages and community message groups. Respondents had the option of indicating the localities they reside in, which allowed an examination of responses by location. Review and analysis of survey responses by neighbourhoods provided another layer of understanding and viewpoint to the responses.

The offline survey was conducted to specifically understand the perspective of residents in Whitefield, Indiranagar, Malleswaram, and Chickpete, which received a total of 500 responses. The survey questions assessed what services and amenities people prioritise within a neighbourhood, how they access amenities in their neighbourhood, and how would they like to be involved in the development of their neighbourhood. The public's responses to these questions played a key role in subsequent steps of the 15-minute neighbourhood project. Some key findings have been highlighted in the following spreads.

"Over 1600 responses from public surveys captured Bengaluru residents' needs and aspirations for a 15-minute neighbourhood

The survey questions assessed what services and amenities people prioritise within a neighbourhood, how they access amenities in their neighbourhood, and how would they like to be involved in the development of their neighbourhood.

Ward: Whitefield
Ward area: 10 sqkm
Ward population: 8,000

Nallurhalli recorded the highest percentage of walkable footpaths, followed by Guttahalli

Survey findings from Nallurhalli, Whitefield

SURVEY METRICS

67% Male

33% Female

4.1km
Surveyed roads

5
of 14 transport points assessed for infrastructure quality

TRAVEL CHARACTERISTICS

52% preferred 2W to move INSIDE

60% prefered 2W to move OUTSIDE

3.9% use public transport daily

21 Lux Average Lux

80% rated access to Public Transport as **POOR**

58% walkable **footpaths**

SAFETY

80.3%

rated safety at street crossings as VERY **POOR**

82.6%

felt there were insufficient calming measures in the neighbourhood

OPEN SPACE

82.6%

visited the open spaces near Nallurhalli regularly

Respondents wanted safer and cleaner spaces in Nallurhalli.

Survey findings from Stage 3, Indiranagar

SURVEY METRICS

66% Male

34% Female

2.3km
Surveyed roads

4
of 14 transport points assessed for infrastructure quality

TRAVEL CHARACTERISTICS

56% preferred to walk INSIDE

62% prefered 2W to move OUTSIDE

16% use public transport daily

15 Lux Average Lux

36% rated access to Public Transport as **AVERAGE**

45% walkable **footpaths**

SAFETY

26%

rated safety at street crossings as VERY **POOR**

36%

felt there were sufficient calming measures in the neighbourhood

OPEN SPACE

60%

visited the open spaces nearby regularly

Respondents wanted better walking and seating infrastructure at these places.

Ward: Hoysala Nagar, Jogupalaya, Domlur and Old Thippasandra
Ward area: 7 sqkm
Ward population: 36,770

Stage 2, Indiranagar exhibited highest utilisation of parks and green spaces compared to the other three neighbourhoods.

Survey findings from Guttahalli, Malleswaram

Ward: Malleswaram, Kadu Malleswara, Rajamahal Guttahalli and Dattatreya Temple
Ward area: 4.7 sqkm
Ward population: 24,800

SURVEY METRICS

67% Male

33% Female

2.7km
Surveyed roads

3
of 14 transport points assessed for infrastructure quality

TRAVEL CHARACTERISTICS

56% preferred to walk INSIDE

80% prefered 2W to move OUTSIDE

14% use public transport daily

14 Lux Average Lux

68% rated access to Public Transport as **BELOW AVERAGE**

55% walkable **footpaths**

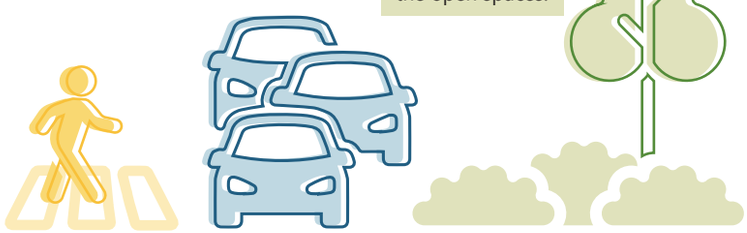
Guttahalli recorded the second-highest daily usage of public transport, after Indiranagar

SAFETY
74%
rated safety at street crossings as BELOW AVERAGE

80%
felt there were insufficient calming measures in the neighbourhood

OPEN SPACE
30%
visited the open spaces near Guttahalli regularly

Respondents wanted better seating and play equipment in the open spaces.



Survey findings from Chickpete

SURVEY METRICS

59% Male

41% Female

3.1km
Surveyed roads

2
of 14 transport points assessed for infrastructure quality

Ward: Chickpete
Ward area: 0.8 sqkm
Ward population: 40,499

TRAVEL CHARACTERISTICS

94% preferred to walk INSIDE

78% prefered 2W to move OUTSIDE

4% use public transport daily

38 Lux Average Lux

50% rated access to public transport as **POOR**

50% walkable **footpaths**

Chickpete recorded the highest Lux levels for street lighting

SAFETY
72%
rated safety at street crossings as BELOW AVERAGE

72% respondents also felt that there were insufficient calming measures at these intersections for pedestrian safety

OPEN SPACE
10%
visited the open spaces nearby regularly

Respondents wanted better safety with street lights and clean surroundings.

6

Citizen participation

This chapter imparts a range of tools to the citizens to engage, and present their local knowledge and requirements to decision-makers and technical experts for the planning, design, and implementation process.

6.1. STRATEGIES FOR STAKEHOLDER PARTICIPATION

6.1.1. Mapping the stakeholder network

Involving all relevant stakeholders in the planning process is crucial to any project's success. Numerous agencies are envisioned to be involved in the development of a 15-minute neighbourhood, and a number of community development organisations. This is required to establish a planning framework involving other agencies to ensure decisions taken are suited and feasible. To that end, the stakeholder network for a sustainable 15-minute neighbourhood can be grouped under four primary categories:

1. **Elected representatives** – this includes local, district, and state-level representatives elected to government who would champion the implementation and development of 15-minute neighbourhoods from their elected constituencies.

2. **Utility and service agencies** – this comprises of urban local bodies and city agencies involved in the planning, management, and distribution of services such as water, electricity, and sewerage in the city.

3. **Technical experts** – this includes designers, planners, engineers, and other subject matter experts such as environmentalists involved in the design, planning and implementation of 15-minute neighbourhood.

4. **Local communities** – this includes residents and community groups such as resident welfare associations (RWAs) and ward committees.

6.1.2. Level of participation

Each stakeholder group has a decided degree of influence and interest that informs their level of participation. The Spectrum of Public Participation[47] was adapted to derive a matrix of stakeholder participation for planning and implementing 15-minute neighbourhoods, indicated in *Table 14* below.

Table 14 Types and nature of stakeholder participation

Types of participation		Nature of participation
Inform		Inform relevant stakeholders of project specific information that is relevant to the objective and solutions provided
Consult		Engage stakeholders to obtain active feedback on subject matter expertise relevant to the project
Collaborate		Work directly with stakeholders on various aspects of the projects – from planning to implementation and maintenance
Empower		Engage stakeholders in the decision-making process in relevant stages of the project from planning to implementation

The nature of participation of each stakeholder can be further mapped in quadrants against their degree of influence and interest, as indicated in *Table 14*.

1. Stakeholders projecting a high level of influence and interest can be engaged through consultations, collaborations, and empowered.

2. On the opposite end of the spectrum, engagement with stakeholders with a low degree of influence and low interest can be limited to presenting timely information of ongoing project objectives and activities.

3. Engaging with stakeholders with a high degree of influence but low interest can be done in two manners – informing them of the project objectives and activities, and consulting them on relevant expertise.

4. For stakeholders displaying a high interest and low influence, such as academic groups and think tanks, it is beneficial to consult with them on relevant expertise. Local community groups such as Residential Welfare Association, Apartment Associations etc., should be empowered to engage in the decision-making process related to design and implementation of projects.

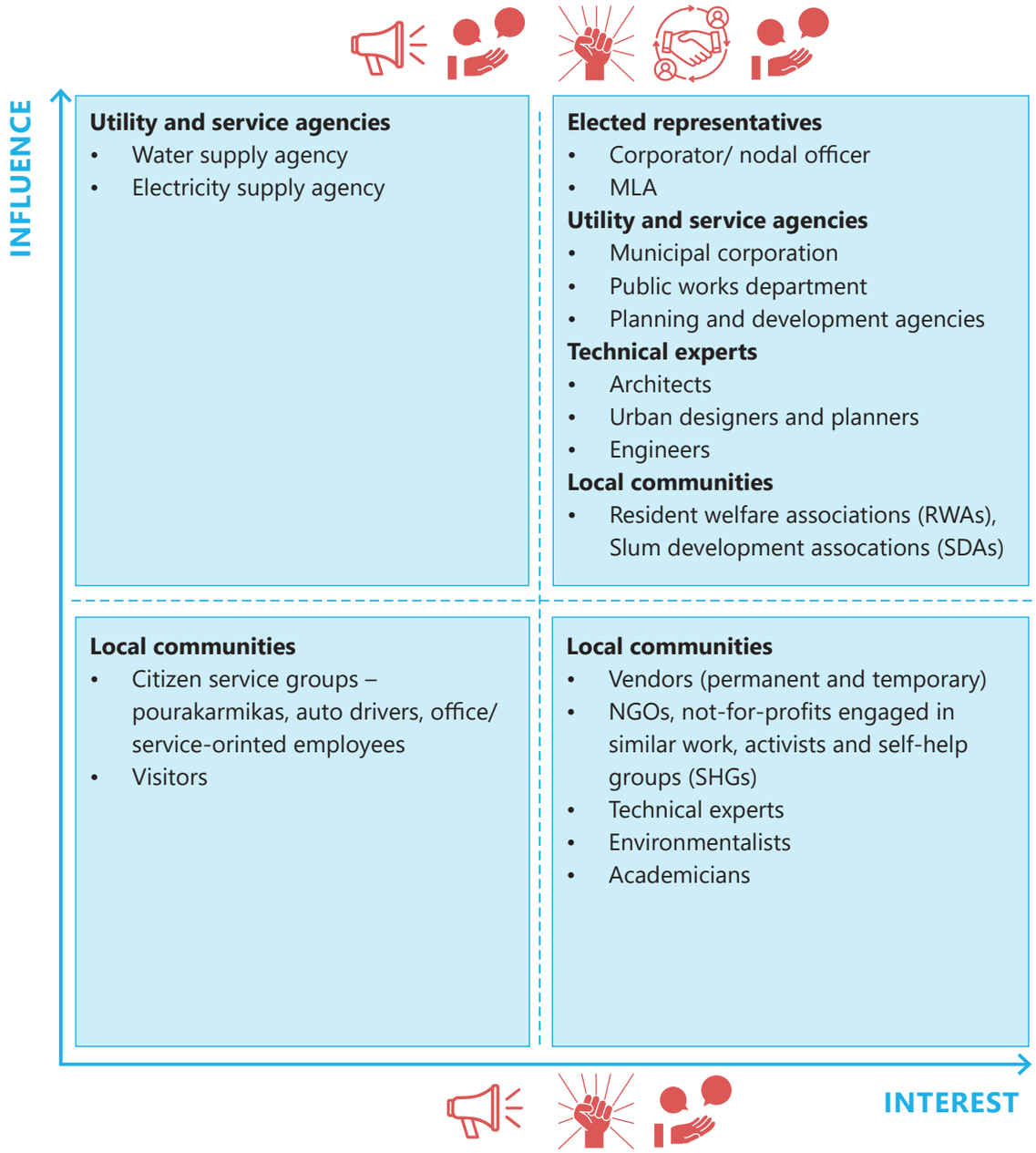


Figure 23. Stakeholder interest and influence matrix

6.2. NEED FOR CITIZEN PARTICIPATION

Interacting with citizens at the neighbourhood level aids in social and behaviour change, as well as ensuring government schemes reach target citizen groups.

In promoting the 15-minute neighbourhood concept, the focus is on enhancing residents' quality of life. Citizens play a vital role in providing insights and feedback on the status quo. Therefore, to ensure contextual and data-driven development that addresses community needs, decision-makers and experts must engage with citizens. Interacting with citizens at the neighbourhood level aids in social and behaviour change[48].

Engaging local community, especially the vulnerable, elderly, people with disabilities and children, in decision-making process ensures that spaces meet the specific requirements and cultural preferences of the people who will use them. Analysing the demographics and their specific requirements is instrumental in determining the key functions to be incorporated into the public realm. This strategic approach can help offset the deficiency in the minimum requirements of amenities, ensuring it is accessible and safe for all.

Early engagement empowers individuals to influence decisions affecting their daily lives, fostering greater support for project outcomes. When residents feel their voices are heard, they are more likely to take ownership of the project and continue the intent even after implementation. An inclusive approach ensures well-run processes and improved results. This involvement streamlines project delivery by ensuring alignment with societal perspectives. Bringing the community together can serve as a catalyst for celebrating and showcasing local art and culture. This, in turn can contribute to the establishment of a unique and vibrant identity for the public realm.

6.3. STRATEGIES FOR CITIZEN PARTICIPATION

A core objective of the 15-minute neighbourhood is citizen involvement in the design and development process of their neighbourhood's transformation. These Guidelines envision the following strategies for citizen engagement and participation –

1. **Inclusive quality of life study**: Surveys across neighbourhoods to establish a baseline for quality of life; considering factors like gender, age, economic status, and ability *(refer Chapter 5)*.
2. **Framework for public participation**: These Guidelines adapt public participations techniques from multiple case studies[49,50] to create a framework for public participation. This framework outlines tools and roles of citizens at each stage and their expected outcomes, provided in *Table 15*.

BOX 4 Community participation laws in India

The Community Participation Law/Model Nagar Raj Act, introduced under Jawaharlal Nehru National Urban Renewal Mission (JnNURM), envisions a three-tiered decentralisation plan beginning at the city government, followed by ward committees and Area Sabhas in order to increase community participation. Even though Area Sabhas and ward committees are good examples of neighbourhood platforms for citizen engagement, they have not been established by states, despite their benefits and utilities. According to ASICS 2023, only five out of 35 states/UTs, including Andhra Pradesh, Assam, Bihar, Mizoram and Tamil Nadu have passed the Community Participation Law (CPL) that requires the formation of both ward committees and Area Sabhas, and have issued regulations in line with the law across all city governments. Additionally, **just 22 per cent of cities in 8 out of 16 states in India have active ward committees**.[51]

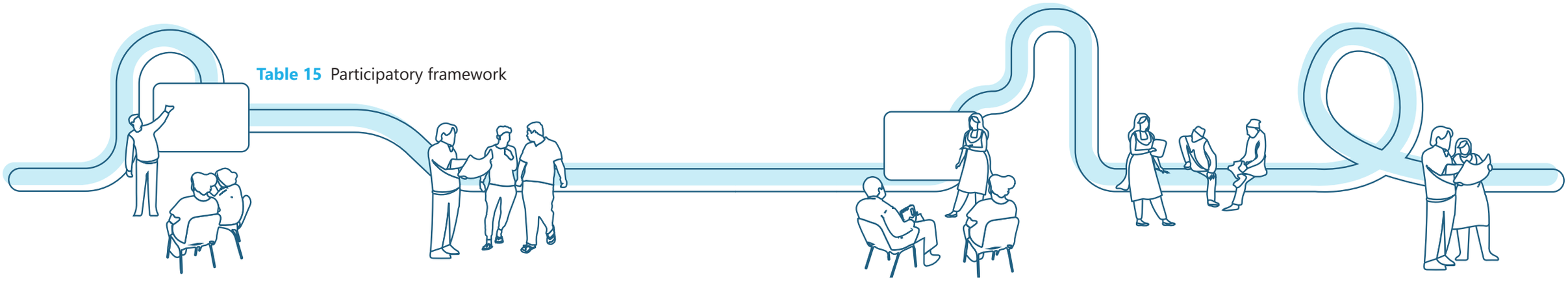


Table 15 Participatory framework

	Inform Pre-project phase	**Consult** Planning phase	**Collaborate** Implementation phase	**Empower** Post-project phase	**Involve** Post-project phase
Tools	**Awareness Campaigns**: Detail strategies for raising awareness about the project's goals and potential impacts. **Information Dissemination**: Provide accessible and comprehensible project information to the public.	**Workshops and Consultations**: involving the public in workshops and consultations can gather valuable input for project planning. **Collecting Public Input**: Entail methods for gathering community feedback, such as surveys, focus groups, or online platforms.	**Monitoring and Feedback Mechanisms**: Developing monitoring systems and feedback mechanisms to address issues in real-time. **Engaging Local Communities**: Involving local communities in project activities to promote ownership and cooperation.	**Evaluation and Review**: Evaluating project outcomes and conducting reviews to identify lessons learned.	**Sustainable Maintenance and Use**: Discuss strategies for ensuring the long-term sustainability of the neighbourhood and continued community engagement.
Role	**Ideation and Needs Assessment**: Citizens can contribute by providing input on their needs and preferences for the project. This can include suggestions on the type of public space, amenities, and design elements they desire.	Citizens can brainstorm ideas and collaborate with project planners is vital. Their local knowledge can inform the project's initial design. Citizens can also advocate for the project by engaging with local authorities, attending public hearings, and mobilising community support to secure funding and approvals.	**Monitoring**: Citizens can play a watching role, monitoring construction to ensure it aligns with the approved plans and quality standards. They can report issues or deviations to project authorities.	**Community Involvement**: Citizens can volunteer in activities related to the project, like tree planting or mural painting, fostering a sense of ownership and pride. Citizens can collaborate with local organisations or form community associations to sustain the project's benefits and ensure ongoing maintenance.	**Feedback Gathering**: Post-implementation, citizens can provide feedback on the functionality and accessibility of the public space, helping identify areas for improvement. **Usage and Maintenance**: Encourage citizens to actively use and maintain the space, reporting any issues promptly to maintain its quality.
Outcome	**Increased Awareness and Support**: Awareness campaigns can lead to increased public support and interest in the project. **Identification of Concerns and Expectations**: Gathering community input helps identify their concerns and expectations.	**Inclusion of Local Knowledge and Preferences**: Involving citizens enhances project planning by incorporating local knowledge and preferences. This could help in building an identity for the public space. **Enhanced Project Design and Feasibility**: Public input can lead to more practical and sustainable project designs. It can also help prioritising functions that need to be incorporated in design.	**Reduced Conflicts and Increased Community Cooperation**: Community engagement can mitigate conflicts and foster cooperation. **Timely Issue Identification and Resolution**: Monitoring and public involvement can lead to the quick identification and resolution of project issues.	**Successful Project Outcomes**: Community suggestions and involvement in all stages of the design of development projects by providing an array of diverse perspectives and concerns can reduce the risk of overlooking important issues.	**Long-term Community Engagement and Stewardship**: Continued community involvement can ensure the continued success and sustainability of the neighbourhood.

CASE 7 Citizen engagement programs in select neighbourhoods of Bengaluru

Residents expressed the urgent need for improving pedestrian facilities and access to public transport.

Workshops and stakeholder meetings were conducted over seven days to strengthen the design concept of 15-minute neighbourhoods by involving citizens. The workshops also involved Jana USP team members with varied expertise to gather insights on the adaptability of such a concept.

Resident welfare associations (RWAs) and civil society organisations (CSOs) were invited for stakeholder meetings in the selected neighbourhoods. These meetings took place in-person as well as online. Key highlights from the survey findings were presented to them for feedback and further discussion. They expressed the urgent need for improving pedestrian facilities and access to public transport, thereby establishing alignment with the project focus and direction.

Whitefield Rising, a registered Charitable Trust based out of Whitefield, shared their efforts in improving areas in and around Nallurhalli. Their work focused on active mobility, improving first and last-mile connectivity, and enhancing open spaces present nearby. While discussing the common themes emerging from the user perception survey analysis, members highlighted several interventions that could improve mobility in Nallurhalli, and Whitefield at large. Malleswaram Social, a citizens group, also shared similar thoughts when presented with the findings from Guttahalli. These discussions proved to be highly insightful in validating the study and survey analysis as well as setting the direction for the next steps for the project.

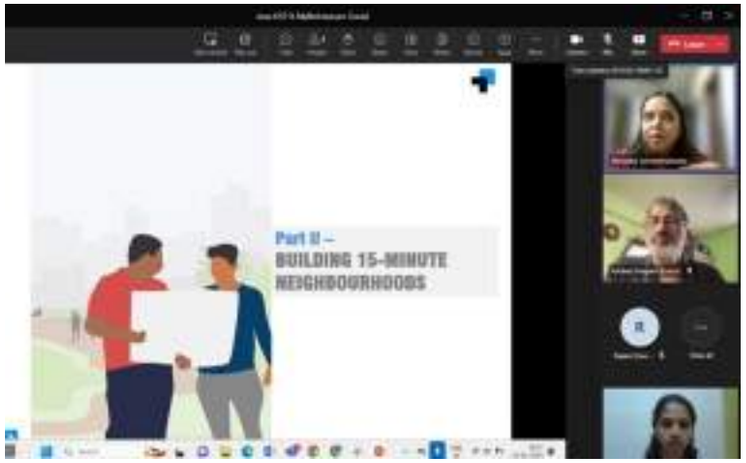


Figure 24. Stakeholder meetings in Whitefield and Malleswaram

7

Project identification

This chapter provides design standards for potential urban interventions, falling under the Move-Play-Sustain-Include framework. Best practices from projects executed nationally and internationally for each type of intervention have also been included.

7.1. URBAN INTERVENTIONS

Enhancing neighbourhoods through urban interventions becomes a dynamic process tied to the specific needs and opportunities, of the community. In this section, there is a deep dive into the design recommendations and essential prerequisites for potential urban interventions, aligning with the concept of the 15-minute neighbourhood.

The framework employed is the Move-Play-Sustain-Include, providing a comprehensive structure for transformative projects. In the following sections, each thematic area outlines expected outcomes and introduces relevant initiatives to positively impact neighbourhoods and their surroundings. Within this framework, each project is further detailed out into specific design elements with design considerations and standards, as applicable, aimed to be adaptable to local and geographical contexts.

In essence, this section serves as a strategic guide, laying the groundwork for thoughtful urban interventions tailored to the distinct character and aspirations of each neighbourhood.

Move **Play** **Sustain** **Include**

Disclaimer: *While efforts have been made to ensure accuracy in design standards, readers are recommended to verify data against most recent standards and norms.*

Note: *All dimensions are in mm, unless mentioned otherwise.*

Smart Janpath, Bhubaneswar | Smart Cities Mission

MOVE

OUTCOME

Integrated mobility and transport networks

In a 15-minute neighbourhood, the default choice for people to move around will be walking, cycling, or other non-motorised transport (NMT) modes. The concept promotes active transport by creating well-designed spaces and supporting infrastructure and services. For instance, street space can be reclaimed from private vehicles, allowing for wider footpaths, pedestrian zones, segregated cycle lanes, safe crossings, and greener streetscapes, thereby creating a more inclusive environment.

Discouraging the use of private vehicles, the focus shifts towards prioritising other modes of transport such as zero-emissions public transit and vehicle sharing. The result is a green and thriving neighbourhood where walking and cycling become the natural and encouraged choices for residents, fostering a sustainable and vibrant community.

PROJECTS

1. **NMT Infrastructure**
   In a 15-minute neighbourhood, the focus is on promoting sustainable mobility through non-motorised transport. This means creating well-maintained footpaths and dedicated cycle tracks, ensuring a smooth and enjoyable experience for pedestrians and cyclists.

2. **Road Redevelopment**
   Urban roads form 20% of a city's surface area, and are movement corridors for people, goods and utilities, providing both property level and city level connections.

3. **Intersection Redesign**
   A road intersection is a point at which two or more roads intersect, designated for movement to turn directions. Overall traffic flow depends on the performance of the intersections.

1

NMT infrastructure

To truly improve walkability and the cyclability of a city, for a city that offers opportunities to live, work and play in a 15-minute radius, **a robust network of pedestrian footpaths and cycle infrastructure are to be planned for connecting public transit, commercial nodes, schools, and home.**

To achieve that, NMT must be given greater weightage while designing urban roads for better first and last mile connectivity and to promote sustainable transport patterns. Improved NMT infrastructure provides better connectivity to public transit, schools, landmarks and other nodes, improved safety for women and vulnerable groups, and allows for walking and cycling to become a viable mobility choice for all.

Good NMT infrastructure will reduce congestion and improve air quality for all. NMT area includes footpaths, cycle infrastructure and also public space for landscaping, street furniture, art, signage and above-grade utilities and amenities such as bus stops, dustbins etc.

1.1. FOOTPATH

M1*

PLANNING CONSIDERATIONS

- It is important that there is a continuous unobstructed path for pedestrian movement; not hindered by street furniture, utilities, vending or trees and landscape. The footpath should be separated from motorised travel lanes and cycle tracks. Where possible, based on right-of-way (R.O.W.) availability, pedestrian movement should be separated from other modes of travel- vehicular and bicycle. A level difference, kerbs, landscape strips with hedges and trees, bollards, paving patterns, paint etc. can be used to create this separation.

- It is preferable that the footpaths are at level and not broken/ made to change level at vehicular entry/exits, and instead the vehicles use a ramp to access the property.

*Each urban intervention has been referenced to the corresponding design feature (M1, M2, M3...) as per the Considerations for a 15-minute neighbourhood (*Table 10*)

Continuous unobstructed footpaths are a must.

- The width of the pedestrian pavement can vary based on the number of pedestrians using the road, for instance commercial/shopping streets need to have wider footpaths.
- Shaded footpaths are preferred in a country like India, for increased pedestrian comfort. Seating areas must be provided around high pedestrian activity zones such as transit hubs, markets, open spaces, etc.
- Well lit footpaths with no dark spots are essential for women's safety as well as other vulnerable users.
- Public transit hubs such as bus stops and stands, metro, and railway stations must have a robust pedestrian network around them. Pedestrian safety must be ensured with designated pedestrian crossings and traffic calming measures near these places.

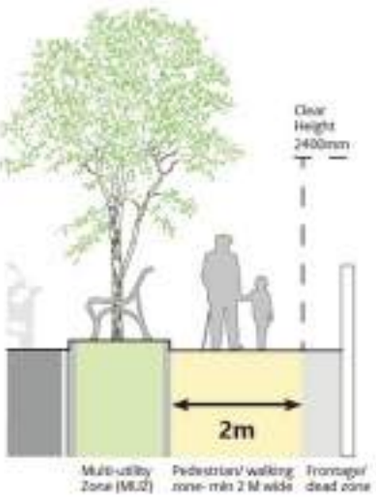


Figure 25. Typical footpath

DESIGN STANDARDS

- **Footpath width:** The minimum clear width for walking on a footpath should be 2m on both sides of the travel lane. In certain areas, based on land-use and context, an extra width of 0.5-1m can be provided (refer *Figure 25)*.
- **Footpath height:** It is recommended that the footpath be raised by 150mm from the travel lane and edged with chamfered kerbs.

In addition to the height and width standards, the following points must be incorporated in the design of footpaths:

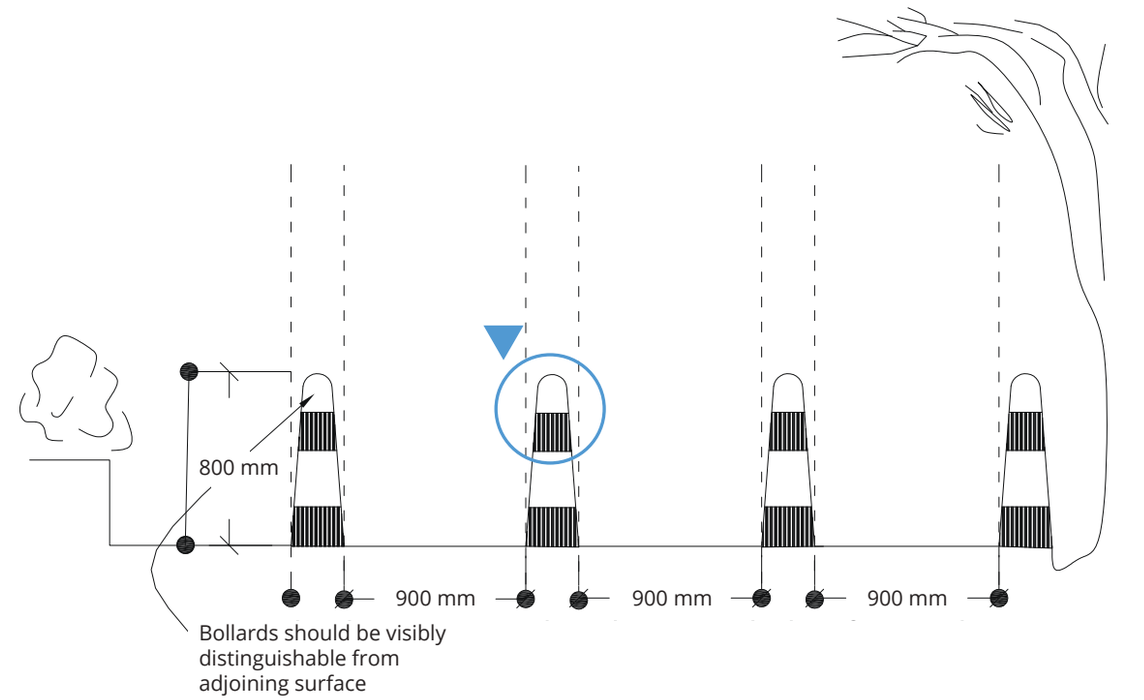


Figure 26. Spacing of bollards

- A multi-utility zone (MUZ) of minimum 0.5-1.5m width must be provided to accommodate street elements such as seating, bus stops, IPT stands, landscape, signage, electric boxes, etc, to provide clear footpath width for walking.
- Gentle slopes of 1:10-1:12 need to be provided to ramp down the footpath at crossings and other areas where there is a level difference, to allow for universal access to the physically challenged, wheelchair users and for strollers.
- Tabletop crossings must be provided for continuous pedestrian movement at small side streets or at pedestrian priority areas.

Landscape must be integrated into the streetscape where possible.

- At crossings and at ramps that provide vehicular access to properties, bollards or other design elements that can prevent vehicles from using the footpath can be used.
- The bollards should be 0.8m high with a clear spacing of 0.6-0.9m between them to ensure movement of wheelchair users, caregivers with strollers, etc.
- Where the width permits, a landscape edge is to be provided to separate pedestrian movement from others.
- The width of the landscape strip can vary between 850mm to 1.2m and above. When the width of the landscape strip is wider than 1.2m, trees can be planted at regular intervals to provide a shaded and comfortable pedestrian experience.
- The footpath should be evenly paved and finished with a non-slippery surface to allow for comfortable movement of all. Tactile patterns and paving should be used to indicate directions, obstacles and crossings for the visually impaired.
- The footpath should be finished with a slope towards the storm water drain or landscape strip for rainwater run off, if applicable.
- Where required, additional pedestrian lights are recommended to augment the street lights, there can be separate poles of height between 3-6m at 9-16m distance or additional lights at lower heights added to the street light poles

1.2. CYCLE INFRASTRUCTURE

M2

PLANNING CONSIDERATIONS

Livelihood cycling has always been part of urban mobility in India, but a lack of safe routes, risk of crashes coupled with other societal aspirations and economic pressures has resulted in it not being a preferred choice of mobility.

Redesign R.O.W.s prioritising cycle infrastructure by narrowing existing travel lanes, removing parking, covering drains, and extending the footpath.

- It is important to provide safe and designated cycle infrastructure where the R.O.W. permits, and try and create a cycle network. With the provision of connected cycle infrastructure including cycle tracks, cycle shares and cycle stands, cycling as a viable choice of transport can be promoted across all age groups.
- It is desirable to redesign R.O.W.s prioritising cycle infrastructure by narrowing existing travel lanes, removing parking, covering drains and extending the footpath
- It is preferable that cycle infrastructure is continuous and forms a network, especially to public transit hubs and other frequent destinations of cyclists.
- New cycling infrastructure must be integrated with any existing network or infrastructure. Missing links in existing infrastructure must be identified and integrated as well to create a cohesive network for cyclists.
- Comprehensive routes and appropriate wayfinding will improve cyclists' experience.

NMT infrastructure

- Cycle infrastructure must enable as many direct routes as possible and have minimum detours. These must be provided at one level, to help cyclists conserve energy.

- As cyclists travel in a speed that is less than vehicular speeds and far greater than pedestrian speeds, it is ideal to separate cycle tracks from other modes of travel through level differences, kerbs, landscape, bollards etc.

- Cycle lanes are to be marked along the travel lane or designated cycle tracks must be provided, separated from other modes of transport. This helps increase the safety of cyclists. Other measures for safety can include traffic calming measures and sufficient illumination of roads.

- Vehicular entries and parking are to be factored into the design of cycling infrastructure.

- To encourage more people to take up cycling, cycle infrastructure can be made inviting and attractive. A well-planned cycling network can be supported by landscaped areas, shaded tracks and well-maintained spaces can help achieve this.

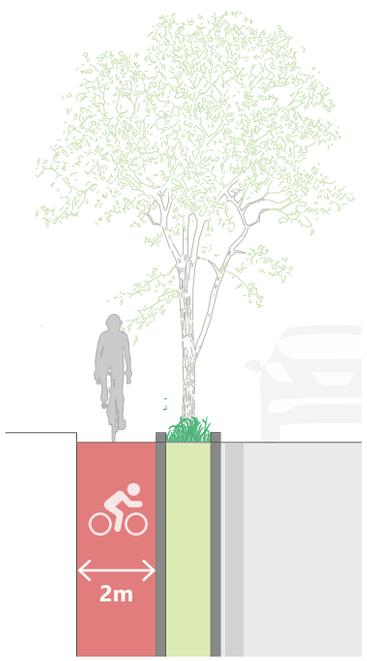


Figure 27. Typical cycle track

DESIGN STANDARDS

- **Cycle track width**: As per IRC, the minimum width of a cycle track should be 2m for a one-way cycle track and 3 m for a two-way cycle track to allow for reasonable speeds.

- Signage and paint markings should be provided to demarcate the cycle track from other modes of transport.

Redesign R.O.W.s prioritising cycle infrastructure by narrowing existing travel lanes, removing parking, covering drains and extending the footpath.

- Cycle tracks should be finished with a smooth surface - asphalt or concrete. Paver blocks are to be avoided.

- Manhole covers should be avoided and, if unavoidable, should be level with the surrounding surface.

- It must be ensured that cycle tracks are separated from footpaths with a level difference. Additionally if possible, landscape strips are also to be provided. In case of special conditions, the cycle track can be at-grade with footpaths for a short distance.

- If the cycle track has to change levels, a ramp with a gentle slope of 1:10 or greater is preferred.

- Cycle crossings are to be provided at intersections and side roads along with pedestrian crossings. Location and spacing of mid–block crossings are recommended as per IRC:103.

- The cycle track should be finished with a slope towards the storm drain or landscape strip for rain water run off.

- Where required, additional lights are to be provided for the cycle track. Specifications will remain same as lighting for footpaths.

- Cycle parking must be located at regular intervals and near transit points. A cycle parking bay should be a minimum size of 0.8m x 2m. Docks and railings must be provided for locking cycles.

BOX 5 Access to public transport

In India, two-thirds of households rely on public transport for mobility. Access to high-quality public transport has proven to have far-reaching impacts such as economic growth, increased mobility of vulnerable groups, and environmental sustainability. While it is crucial to provide better access to public transport through high-quality NMT infrastructure, **public transport infrastructure itself must be integrated, planned with a "people-first" approach and be adapted to mobility trends.**

PLANNING CONSIDERATIONS

- Bus stops must be available within 800m of neighbourhoods. The distance between bus stops on arterial/sub-arterial roads must be 500m, and for collector/local roads should be between 300 - 400m.
- Metro stations must also be carefully located when being planned within the city. For existing metro stations, adequate measures must be put in place to enable better first and last mile connectivity of commuters from surrounding areas.
- Bus terminals, metro stations, and railway stations must ensure accessibility for all users by providing a barrier-free environment.
- There must be a robust pedestrian and cycle network around these transit points (refer *Section 7.2.1 NMT infrastructure*).
- These must provide safety to all users, with designed intersections, sufficient pedestrian crossings, and appropriate traffic calming measures (refer *Section 7.2.3. Intersection redesign*)
- NMT infrastructure is crucial in linking interchange points of different transport modes as well. These connections must be the most direct route which is safe for pedestrians and cyclists, as well as other users. In some cases, grade separated crossings like foot-over bridges (FOBs) and skywalks allow users unhindered access between transit points.
- Skywalks must be carefully planned and integrated with the entry/ exit of the transit point. The substructure of the skywalk must not hinder pedestrian movement on the footpath below.
- Lifts, escalators, and tactile pavers must be provided to enable universal accessibility of the skywalk as well as to the transit point.
- Intermediate public transport (IPT) stands for auto rickshaws and taxis must be provided near bus stops and metro stations to facilitate first and last mile connectivity. Cycle parking must also be provided near these services.
- Adequate signage must be provided to indicate upcoming/ nearby transit points.

DESIGN STANDARDS

- Streets around 500m of entry/ exit of public transit hubs such as bus terminals, metro and railway stations must prioritise walking, cycling and use of IPT.
- Frequent pedestrian crossings must be located every 80-150m near transit points.
- Bus stops, cycle parking, and public toilets must be provided within 50m of bus terminals, metro and railway stations. IPT stands should be placed within 100m of these transit points.
- For comfortable circulation and safety, walkways in transit areas must have minimum area of 1.9-3.3 sqm/ person.
- Ramps and elevators must be available not less than 200m away, in case of floor change at transit points.

2

Road development

The focus is to create streets that are walkable, accessible, and comfortable for everyone, regardless of age, gender, or ability. The promotion of a robust mobility network within and beyond a neighbourhood is crucial to providing citizens with increased access to vital social, economic, and community services. Additionally, a commitment to sustainable and inclusive streets is integral to reducing carbon emissions and fostering a sustainable future.

This section elaborates on various elements of street design, such as equitable division of right-of-way, street lights, landscape, and more, each supported by design considerations and standards from various national street design guidelines.

M7, M8, M9

Equitable division of right-of-way ensures equal priority for all user groups.

PLANNING CONSIDERATIONS

- **Equitable division of right-of-way:** Ensure equal priority for all user groups, provide dedicated space for amenities and street furniture, integrate public spaces and landscaping into the design, designate areas for vending, and emphasize aspects of place-making and identity creation.

- **Uniform travel lanes:** Mitigate speeding on wider stretches and address road bottlenecks, encouraging lane discipline and maintaining steady speeds. The key factors that govern the width of travel lanes are classification of road, desired speed, and volume of traffic expected. Wider the lane widths, higher would be the allowable vehicular speed.

- **Promote NMT:** Prioritise sustainable mobility by ensuring continuous, well-paved footpaths and designated cycle tracks, and offer a diverse range of sustainable mobility options, including ride shares and curb-side charging points.

- **Organised utilities:** Organise underground utilities

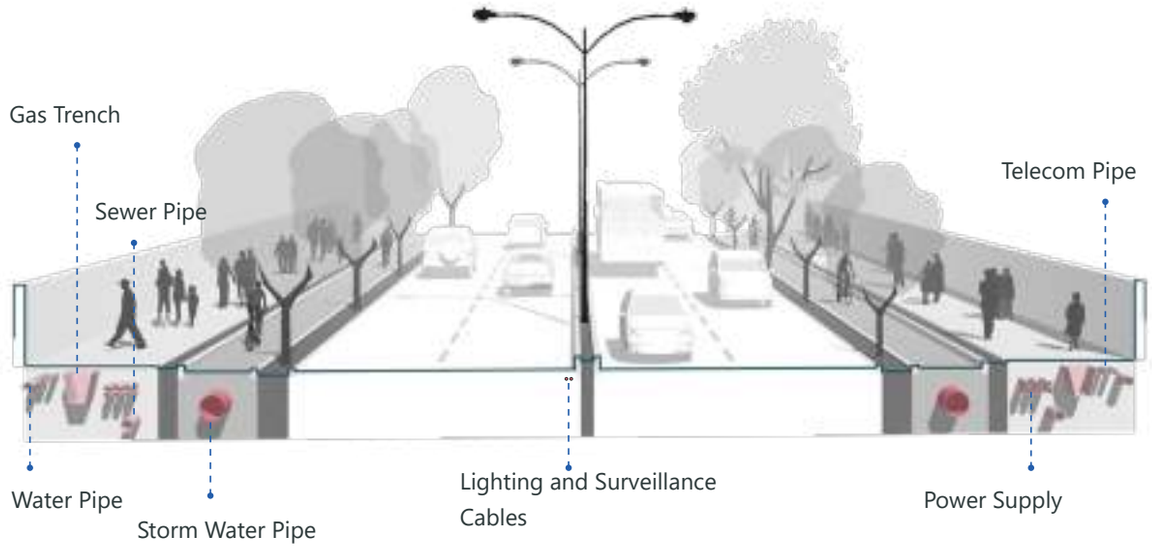


Figure 28. A typical cross section showing the organised underground utilities within the R.O.W beneath a road. The utility lines are grade-separated and have regular chambers for easy access.

beneath the footpath, catering to both individual property and network connections. Implement robust storm water drainage systems and ensure good street lighting, along with safety measures for vulnerable groups.

- **Safe intersections:** Improve intersection geometry to enhance safety and user-friendliness. Explore the potential for place-making and landmarking at key intersections.

- **On-street parking:** Assess the demand for parking in a particular area and provide on-street parking after giving adequate space for pedestrian movement, landscape strips, and cycle infrastructure.

- **Designated street vending**: Study existing vending patterns on a street and provide for designated vending areas where the R.O.W. permits.

Table 16 Travel lane details for urban roads

Road Classification	Traffic Volume	Right of Way (m)	Design Speed (kmph)	Number of Travel Lanes	Typical Lane (m)
Arterial	High	> 40m	80	6	3.50
Sub-Arterial	High / Medium High	30 - 40m	60	4 - 6	3.50
Collector	Medium Low	20 - 30m	40	4	3.20
Local (2 Way)	Low	10 - 20m	30	2	3.00
Local (1 Way)	Low	10 - 20m	30	3	3.00

DESIGN STANDARDS

2.1. Travel Lanes

For existing roads, the narrowest width of the travel lane is to be taken and redivided into required number of travel lanes. It is suggested that an even number of travel lanes be maintained for two way roads and even/odd number of lanes be maintained for one way roads. The typical width of travel lanes can be designed as mentioned in *Table 16*.

- With regards to storm water drainage, travel lanes should also have a cross sectional slope towards the storm water drains and be levelled to prevent ponding.

- A cross sectional slope of 1:50 is acceptable for travel lanes. Where the longitudinal slopes are high, the cross sectional slopes are to be minimised.

Medians must have breaks in them to allow for pedestrian and cycle crossings at designated intervals.

2.2. Median Design

A median is a physical barrier between travel lanes, to segregate traffic moving in different directions. While medians are essential for road safety on high speed roads, arterial and sub-arterial roads, they are good to have on collector roads. However, medians are not recommended on local roads as the right of way is shared by a wide variety of users.

- The minimum height of the median is to be 300mm.

- The width of the median will depend on the R.O.W. available. A minimum width of 300mm is recommended. Medians at pedestrian crossings must be of minimum 1.2m width to provide pedestrians an area to wait, of 50mm height.

- Bollards should be placed here to prevent vehicles from taking U-turns. For medians of greater than 300mm width, two pre-cast kerbs can be used with the chamfered sides facing the travel lanes. The medians can be finished with a variety of materials, but landscape is preferred for improved aesthetics.

- Medians must have breaks in them to allow for pedestrian and cycle crossings at every 250m.

- Where the width of the median is equal to or greater than 500mm, street lights and sign boards can also be fixed on the median.

- On some roads the storm water drain can run below the median, with catch pits at regular intervals. The minimum width of median in this case should be 1.2m.

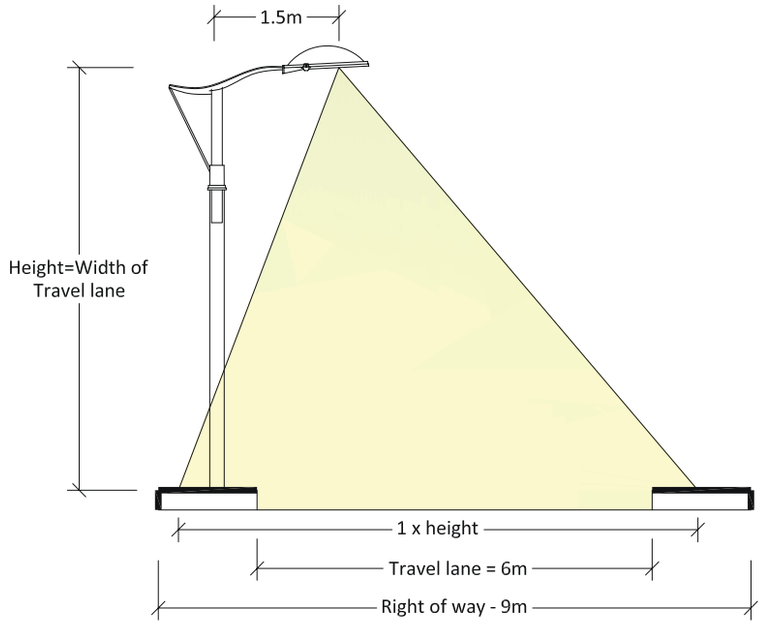


Figure 29. Height - width guide for light poles and location of light source

2.3. Street Lights

Street lights are important for providing safety of movement for pedestrians and motorists alike. The height of the street light poles and the distance between poles will be dictated by the R.O.W. of the road and the Lux level of the light fixture.

- The standard heights of the street light poles are 12m, 10m, 8m, 6m and 4m and based on the width of the road, they can be placed on both sides or on one side of the road, or in a staggered fashion.

- On sub-arterial and collector roads, without medians, 8m light poles may be placed 24m apart on both sides of the road, with an additional pedestrian light attached at a lower height to the main street light pole or between the street light poles. On local roads, 6m light poles may be placed in a staggered fashion.

- In certain areas, street light poles may not be sufficient. For example, at wide intersections, roundabouts etc. high mast lighting may be required in these areas. These poles are generally 10 to 12m high.

Landscape must be integrated into the streetscape where possible.

2.4. Landscape

Landscape can be integrated into the streetscape as trees, shrubs and ground cover; in designated areas, traffic islands and also as continuous strips/ buffer zones to segregate different modes of mobility. It can even be provided as planters, hanging flower baskets and as bio-swales. However, care must be taken so that provision of landscape does not hinder movement, mobility, or road visibility. Landscape elements in the street can be divided into the following types:

- **Trees:** All existing trees are to be saved and incorporated into the design. The minimum clear width of the landscape strip should be 1.2m for trees.

- **Landscape strips**: Based on the ROW, continuous strips of landscape can be provided along the footpath or cycle kerb. The minimum clear width of the landscape strip should be 300mm for shrubs. In continuous strips, shrubs can be planted between trees.

- **Swales:** These are designed for allowing increased percolation of storm water and are a sustainable solution for

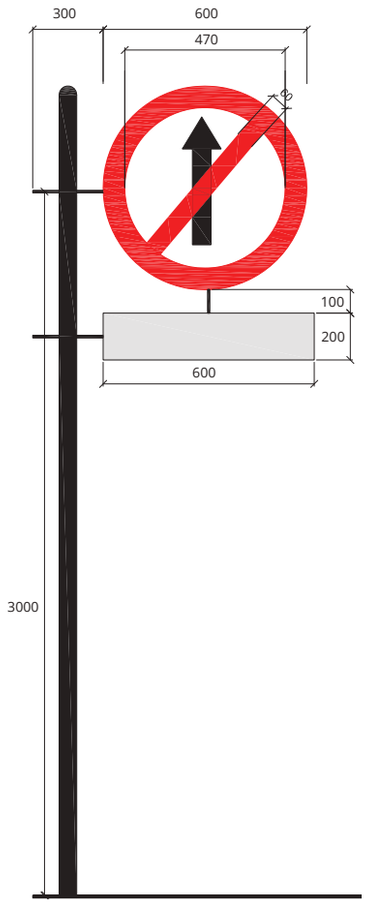


Figure 30. A typical road sign

urban drainage. They also provide opportunities for greening - in terms of embankment plants in the sloped areas and spontaneous vegetation during non monsoon months.

- **Ornamental landscape:** Flowering baskets can be hung from street lights for improved aesthetics, with a clear height of 2.4m from the footpath surface.

2.5. Signages

Traffic signs for India are prescribed in Motor Vehicles Act, 1988. These signs hold importance as they communicate essential road safety rules, indicate permitted speeds and directions, warn of potential hazards, and provide information on destinations, directions, and distances.

Commonly used signs and markings are Mandatory/Regulatory signs such as 'Stop' and 'Give Way' signs, 'No Parking' and 'No Stopping' signs, 'Speed Limit' and 'Vehicle Control' signs; Cautionary/ warning signs indicate intersections, narrow bridge/ narrow road, road widens, gap in median, pedestrian crossing, school zone, men at work etc; and Informatory signs show directions at key public spaces.

- The signs shall be so placed that motorists and pedestrians can recognise them easily and in time. Normally the signs shall be placed on the left hand side of the road.

- As per the IRC standards, the signs should be erected not less than 600mm away from the edge of the kerb in case of kerbed roads and at a distance of 2-3m from the carriage way edge in case of unkerbed roads. Mounting height suggested is 1.5m for unkerbed roads and 2m for kerbed roads.

- If placed on the shoulder/ footpath/ refuge island, signs must have a clear height of 2.4m.

Traffic calming measures improve the road safety and livability standards by reducing traffic volume speeds.

2.6. Traffic calming measures (TCM)

Traffic calming measures (TCM) on roads, such as changing alignment, introducing barriers, etc. reduce traffic volume speed. There are two main principles for reducing speed, i.e. visual measures - such as speed limit signs, painted strips across the road, zebra crossing, stop marking on the road surface, three dimensional markings, road surface patterns and plants etc., and physical measures - like raised intersections, speed breakers/ humps, and roundabouts.

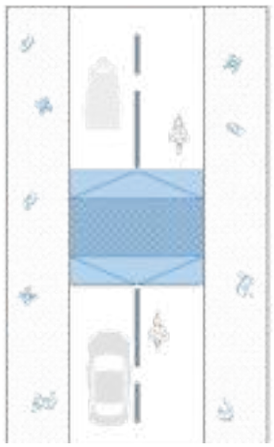
- **Raised intersections:** These are flat raised areas covering an entire intersection, with ramps of minimum slope 1:8 on all approaches and often with brick or other textured materials on the flat section. The crossing should be minimum 2m wide. They rise to the level of the footpath. These are good for intersections with substantial pedestrian activity, and recommended for all unsignalised crossings.

- **Speed humps:** These are rounded raised areas placed across the carriageway. The profile of a speed-hump can be circular, parabolic, or sinusoidal. They are generally 3.5m long and 12-15cm high. Speed humps are recommended to be placed 5m ahead of a minor road meeting a major road.

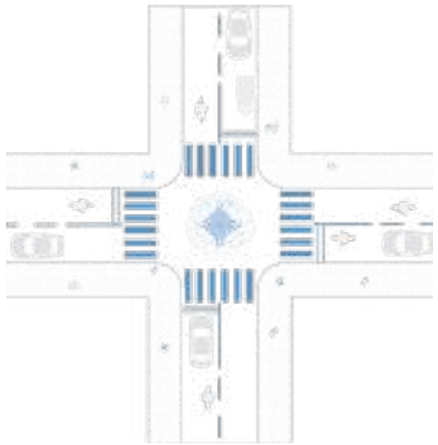
- **Speed tables:** These are flat-topped speed humps often constructed with brick or other textured materials on the flat

Raised Intersections

Speed Humps



Speed Table



Roundabouts

Figure 31. Types of traffic calming measures

section. The profile of speed tables is trapezoidal. Generally, the top width of the speed table would be around 3m and bottom width is 6m. Speed tables are good for locations where low speeds are desired but a somewhat smooth ride is needed for larger vehicles.

- **Roundabouts:** These require traffic to circulate around a centre island. Unlike traffic circles, roundabouts are used on higher volume streets to allocate right-of-way between competing movements. In roundabouts, the minimum of the central island must be 9m or at least the total width of the carriageway.

By promoting non-motorised transport and public transit, minimise the need for on-street parking.

2.6. On-street parking

The issue of parking, especially the lack of organised on-street parking, plagues most urban areas in the country. The focus should be to design neighbourhoods and streets for people, to promote non-motorised transport and public transit and by doing so, minimise the need for on-street parking.

- As per IRC:103, the parking bay dimensions for parallel parking four-wheelers should be 2m x 6m. Where additional parking capacity is desired and service lane is available, angled parking may be adopted. Standard parking dimensions required for different parking angles are outlined in *Table 17*.

- As a rule of thumb, 1 car parking space = 4 two-wheeler slots = 10 cycle parking slots. A typical two-wheeler parking space is 1m x 2m (refer *Figure 32*).

- Parallel parking space for one auto rickshaw, e-rickshaw and cycle rickshaw should be 1.5m x 3m.

- Cycle parking systems such as wheel clamps or inclined wheel braces may be provided near transit stations, bus stops, market places, public spaces etc.

Road development

Table 17 Parking space requirements for four-wheelers

Type of Parking	Standard Space (m)	Notes
Parallel	2 x 6	Best in local roads
90°	2.3-2.5 x 4.5-5.5	Effective in low turnover rate or long term parking areas Most efficient and economical since it accommodates the most vehicles per liner meter
30°	2 x 5	Ideal for fast turnover or short term use Inefficient circulation patterns and one-way aisles Ideal for collector or sub-arterial roads

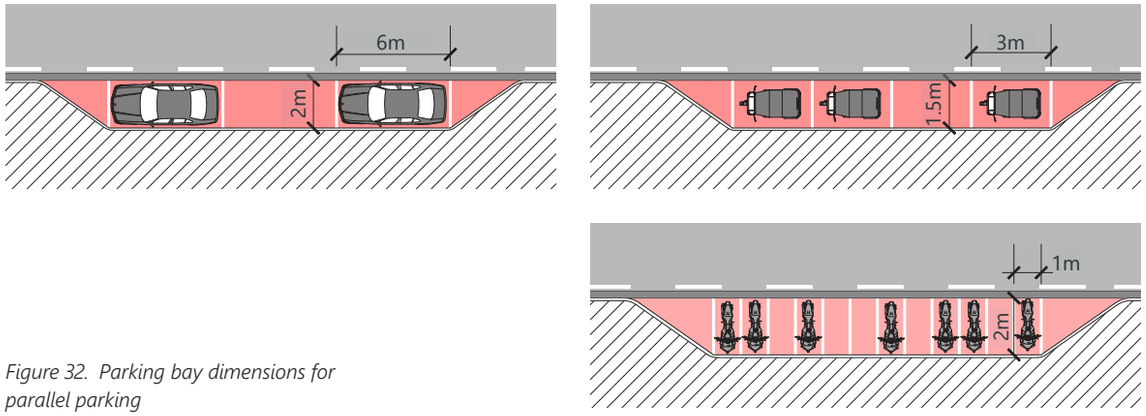


Figure 32. Parking bay dimensions for parallel parking

- Lay-bys are to be provided in school zones, public transit zones and near shopping areas for drop offs/pick ups. A 5 to 15 minute parking only rule must be enforced on these bays. Depending on the demand, the length of the lay-by can accommodate between one to four vehicles.

- Designated parking bays for auto-rickshaw stands are to be provided near public, social and civic infrastructure and near transit hubs.

3

Intersection redesign

A road intersection is a point at which two or more roads cross. This area is designated for movement to turn directions. Overall traffic flow depends on the performance of the intersections. In urban road hierarchy, traffic flows from sub-local to local or collector; local to collector; collector to sub-arterial and sub-arterial to arterial. Intersections formed due to local + local and local + collector roads would require traffic calming and signboards to manage traffic. The objective is to establish landmark intersections that facilitate seamless vehicle flow and ensure secure pedestrian crossings. This involves enhancing geometry for safe and user-friendly intersections, creating opportunities for place-making and landmarking.

M6

PLANNING CONSIDERATIONS

Intersection design needs to be based on factors such as users, geometric configurations, volume of travel, capacity of roads and traffic control requirements. Appropriate intersections must be adopted based on the traffic generated on roads (refer *Table 18*). Allowances have to be made for space needed for traffic signs, lighting columns, drainage, public utilities, etc.

- **Simple intersections**: An intersection where the R.O.W. widths of all converging legs are the same and additional space for turning traffic is needed or cannot be provided due to constraints of adjacent land use. This type of intersection is suitable for locations where two local roads meets another or with a low volume collector road.

- **Intersections with additional turning lanes**: In certain locations with high volume traffic, additional lanes need to be provided to accommodate turning traffic and to create additional capacity for through traffic. This is achieved by utilising the space in the medians, utility corridors or by flaring.

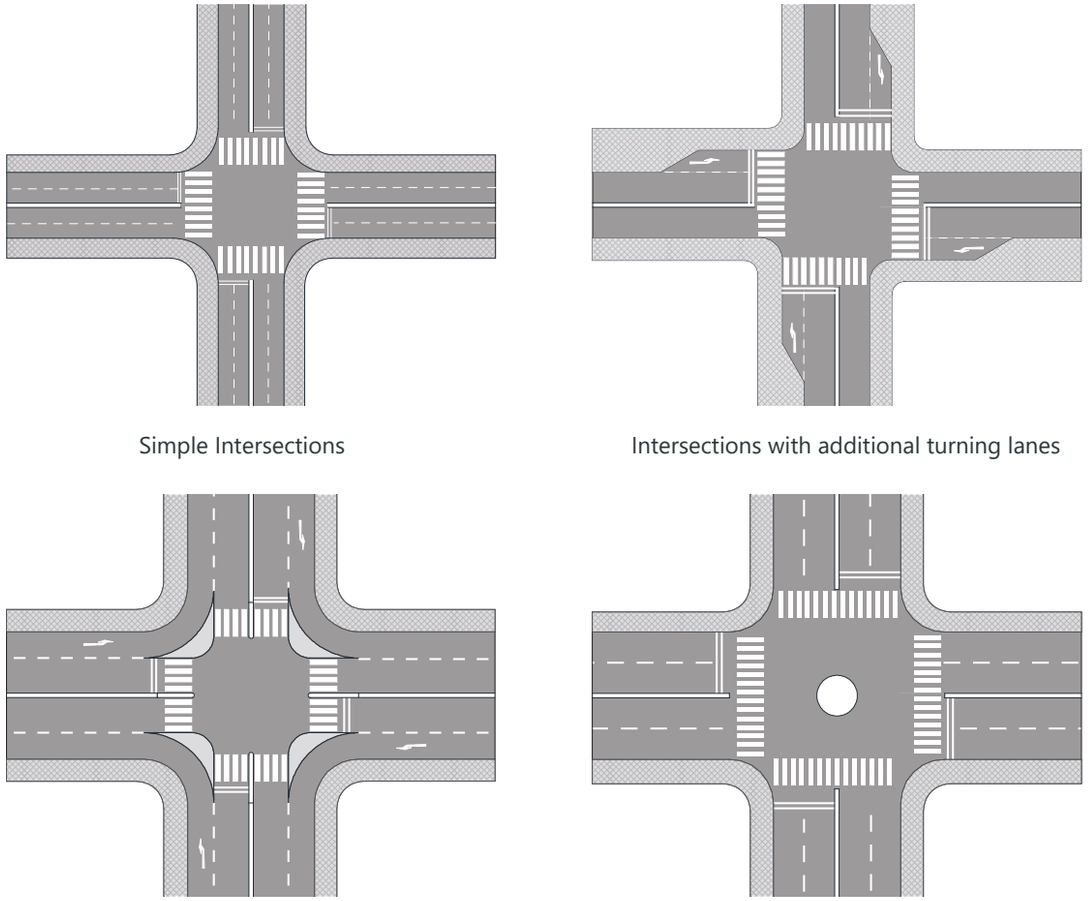
Intersection redesign

Table 18 Recommended intersection based on intersecting road types

Intersection formed due to merging of	Mini Traffic Circle (slightly more than rotary)	Rotary with Single Circulatory Lane (3,000 vehicles per hour)	Rotary with Double Circulatory Lane (3,000 vehicles per hour)	Signalised (up to 10,000 vehicles per hour)
Arterial + Collector Street				+
Sub Arterial + Sub Arterial				+
Sub Arterial + Collector				+
Collector + Collector		+	+	+
Collector + Local Street		+	+	
Local Street + Local Street	+			

- **Channelised intersections**: Raised islands and/or roads markings are used to channelise or designate vehicular paths in the intersections. Channelisation helps in control, direction or division of vehicular paths for better traffic management of motorised and non-motorised vehicles.

- **Roundabout intersections**: Roundabouts channel movement of traffic in one direction around a central island. A roundabout may be for three-leg or four-leg or multi-leg intersection. The central island is generally circular in shape, but can also be oval or dumbbell shaped.



Simple Intersections | Intersections with additional turning lanes

Channelised intersections | Roundabout intersections

Figure 33. Types of intersections

- **Mini traffic circles:** These are types of roundabouts characterised by a circle of small diameter and traversable islands (central island and splitter island). Mini-circles offer most of the benefits of regular roundabouts with added benefit of a smaller footprint. They are best suited to environments where speed are already low and

environmental constraints would preclude the use of a larger roundabout with a raised central island.

In addition to the type of intersection, the following points must be incorporated in the design of intersections:

Pedestrian safety must be kept in mind when increasing turning radii, as it increases the pedestrian crossing distance simultaneously.

- **Blind spots:** Intersections must be treated accordingly to avoid blind spots, which cause majority of accidents at intersections.
- **Turning radius:** Adequate turning radii must be provided to prevent speeding while allowing large vehicles comfortable access. Pedestrian safety must be kept in mind as increasing turning radii increases the pedestrian crossing distance simultaneously.
- **Pedestrian crossings:** Roads must have frequent crossings so pedestrians are able to cross roads safely and conveniently. They should have sufficient crossing time, refuge islands, and safe mid-block crossings must be provided at signalised intersections.
- Pedestrian crossings must be marked at all intersections where there is substantial conflict between vehicle and pedestrian movements. The location of the pedestrian crossing should be selected properly to ensure adequate visibility, sufficient space on footpath for the pedestrian to wait and freedom from obstructions with refuge islands.
- **Sight distance:** Another important factor to consider is sight distance, for the safe operation of roadways. Drivers approaching an uncontrolled intersection on a cross street must have sufficient sight distance across the intersection corners to adjust speeds or stop. At signalised intersections, the first vehicle stopped on one approach should be visible to the driver of the first vehicle stopped on each of the other approaches.

Parking should not be allowed within 50m from an intersection.

- **Traffic signals:** Traffic signals alternate traffic to proceed and stop. At signalised intersections, a traffic signal is installed at two locations – one on the footpath towards left of approaching vehicles (termed as primary signal) and other on the opposite side of the road (termed as secondary signal).
- **Markings:** Intersection markings also help direct traffic. In addition to the warning lines on approaches to intersections, directional arrows should be used to guide drivers in advance approaching busy intersections.

DESIGN STANDARDS

- A turning radius of 4m on local and collector roads, and 9m on sub-arterial and arterial roads must be maintained.
- In roundabouts, the minimum radius of the central island must be 18m or at least the total width of the carriageway.

Roads must have frequent crossings so pedestrians are able to cross roads safely and conveniently.

3.1. Pedestrian Crossings

Crossings are required to provide for a safe passage across the road. Where possible, separate crossings are to be provided for pedestrians and cyclists. Crossings are required at all intersections, where there is a break in the footpath and cycle

At-grade pedestrian crossings are recommended over grade-separated crossings, as they provide quick, short and comfortable crossing.

track and also at mid-block points and near public transit nodes, educational institutes and other points of interest. This will allow for improved connectivity, walkability, and safety.

- Pedestrian crossings must be provided every 150m and mid-block crossings every 250m.
- Pedestrian crossing should have minimum width of 2m, and in areas with high pedestrian volumes, like schools and transit stops, 4m width is recommended.
- Traffic calming measures must be provided before unsignalised crossings for pedestrian safety.
- **Zebra crossing:** These crossings are marked with white, evenly spaced stripes on the vehicular travel lane providing for a safe passage for pedestrians. In general the width of the painted strip is 500mm and the gap between two strips is also 500mm.
- The footpath needs to ramp down to the crossings to provide universal accessibility. There must be space near the ramps for pedestrians to wait and cross the road, without hindering thorough pedestrian movement.
- **Tabletop crossings:** In certain areas the crossing maybe raised to the level of the footpath, with ramps of minimum 1:8 slope for vehicular access. These are mostly used over smaller side roads and in pedestrian priority areas.
- **Cycle crossings:** These are dedicated crossings marked with paint lines along with/ adjacent to the zebra crossings.

Some intersections may have a designated signal system for cyclists and in some they may share it with pedestrians.

- **Grade separated crossings:** These can be either foot over bridges or subways and require detailed architectural and structural design. They are not preferred in dense urban areas but are important to cross high speed corridors, railway lines etc. Both foot over bridges and subways should not hinder at grade pedestrian movement and should be designed to allow visibility from the road, universal access and good lighting. Foot over bridges should also provide a clear height of 6m over the vehicular carriageway to allow for unhindered movement of fire-trucks and heavy vehicles.

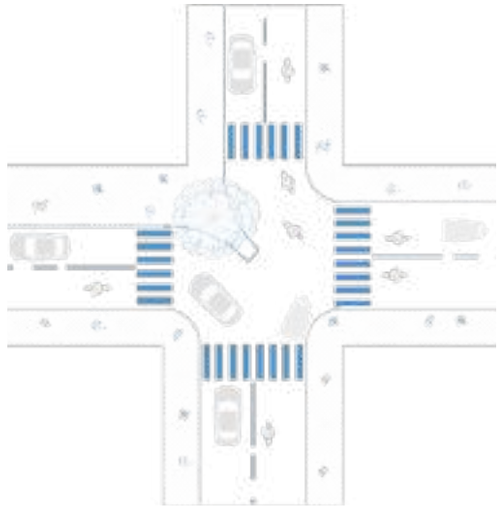
3.2. Traffic calming measures (TCM)

As discussed earlier, TCM increase pedestrian safety by reducing traffic volume speeds. The following types of TCM can be adopted at intersections.

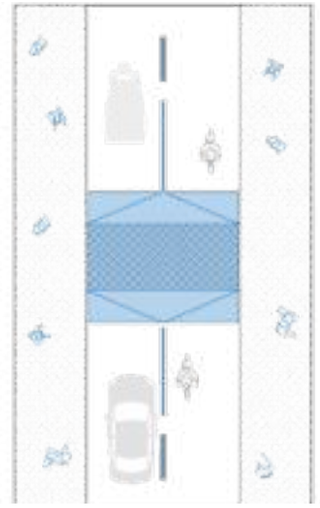
Traffic circles are good for calming intersections within neighbourhoods, where speeds, volumes, and safety are major concerns.

- **Forced turn islands:** These are raised islands that block certain movements on approaches to an intersection. They are good for local street connections to main streets where through traffic volume along the continuing local street is a problem, and main streets where left-turns or through movements out of the side street are unsafe.
- **Raised crosswalks:** These are speed tables outfitted with crosswalk markings and signage to channelise pedestrian crossings, providing pedestrians with a level street crossing. Also, by raising the level of the crossing, pedestrians are more visible to approaching motorists. Raised crosswalks are good for locations where pedestrian crossings occur at

Intersection redesign



Forced Turns



Raised Crosswalk/ Speed Table

Figure 34. Types of traffic calming measures

haphazard locations and vehicle speeds are excessive.

- **Traffic circles:** These are raised islands, placed in intersections around which traffic circulates. They are good for calming intersections, especially within neighbourhoods, where large vehicle traffic is not a major concern but speeds, volumes, and safety are problems.

3.3. Markings

- **Pedestrian crossings:** These must be marked at all intersections where there is substantial conflict between vehicle and pedestrian movements. The marking bands should be 0.5m in width and 0.5m apart.

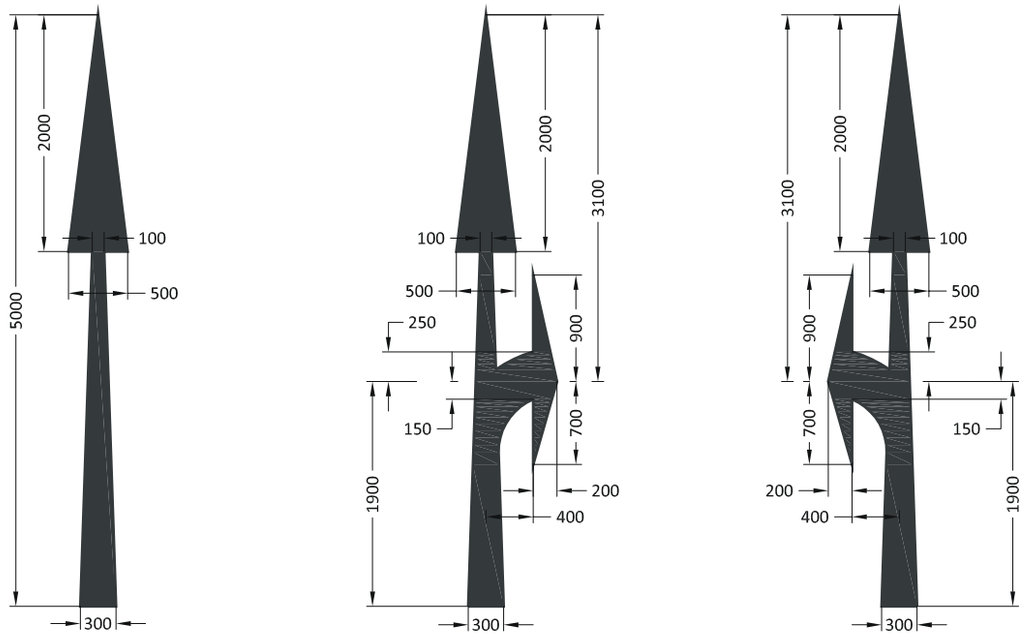


Figure 35. Directional arrows with dimensions

- **Stop lines:** These are solid white lines provided transversely to the carriage way and used to indicate the point behind which vehicles are required to stop in compliance with the STOP sign, traffic signal or traffic police. The width of stop line must be 20 cm. Stop lines are ordinarily located not less than 1m and not more than 3m in advance and parallel to the nearest boundary of pedestrian crossing marking.

- **Directional arrows:** Used to guide drivers in advance approaching busy intersections, these are elongated in the direction of the traffic flow to provide adequate legibility, due to the low angle at which such markings are viewed. For speeds up to 50 kmph, the arrows should be 3.5 m in length.

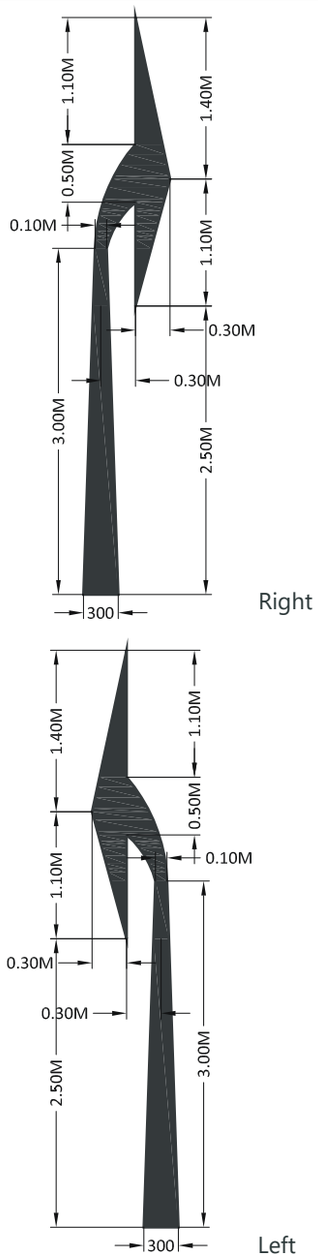


Figure 36. Directional arrows with dimensions

For higher speeds, the length should be 5m.

- **Box junction:** A box junction is a traffic control measure designed to prevent gridlock at busy road junctions. The surface of the junction is marked with a criss-cross grid of diagonal painted lines and vehicles may not enter the area so marked unless their exit from the junction is clear.

Additional resources:

1. *IRC:103-2022 Guidelines for Pedestrian Facilities*
2. *Tender S.U.R.E (specifications for urban roads execution) street design guidelines*
3. *Urban Street Design Guidelines for Pune*
4. *Street Design Guidelines by Unified Traffic and Transportation Infrastructure Centre (UTTIPEC)*
5. *Urban Street Design Guide by National Association of City Transportation Officials (NACTO)*

Sri Ramakrishna Chowk, Bengaluru
Raghavendra Prasad on Unsplash

Best Practice

Tender S.U.R.E. (Specificiations for Urban Road Execution) Roads

Figure 37. View of Cash Pharmacy intersection

Bengaluru, India

Tender S.U.R.E. is the first set of street design and procurement guidelines for urban roads in India, conceived and authored in 2011 by Jana Urban Space Foundation. Recipient of several awards, other cities and states have also emulated the Tender S.U.R.E model for road projects.

These specifications have created a widespread acknowledgement that roads are meant for all. Tender S.U.R.E. roads provide for an equitable distribution of the right-of-way with uniform travel lanes, safe intersections, continuous well–lit footpaths and cycle tracks, allowing for unhindered movement of all modes of mobility. These also provide organised underground utilities contained within the footpath, with regular access chambers and allocated space for all amenities such as vending, bus shelters, dustbins, signage, and landscape.

228% more pedestrians on Tender S.U.R.E. roads.

Impact

Tender S.U.R.E. roads have transformed the quality of life for citizens of Bengaluru, India with robust well-designed streets and intersections that have catalysed urban rejuvenation, attracted investments and allowed for NMT to be a convenient and safe choice for all, thereby improving public health and air quality. All modes of transport are given equal importance, which increases commuter safety and convenience. This has led to a behavioural change on how people perceive and use urban roads, with people choosing to voluntarily walk, cycle and use public transport on Tender S.U.R.E. roads. According to a monitoring and evaluation study by Jana Urban Space, there were 228% more pedestrians on Tender S.U.R.E. roads. Such transformations are crucial to the function and success of walkable neighbourhoods, making Tender S.U.R.E. model guidelines for improving mobility on urban roads.

Figure 38. Before and after view of Residency Road

Best Practice

Urban Street Design Guidelines

Figure 39. View of bus stop

Pune, India

Urban Street Design Guidelines (USDG) for Pune prioritises place and people over vehicle mobility and places a strong emphasis on the idea of "equitable allocation of street space". The goal of USDG is to offer a method for creating a street network that will support expansion, offer options for transit, and make the city livable.

In order to obtain better results in maintaining vastly better streets throughout the city, USDG aims to enhance the current policy, legal, and technical effort. Through this, the city has revamped more than 100 kilometres of city streets to improve mobility and accessibility by including wide, secure, and continuous bike lanes and sidewalks. Other strategies under the guidelines offer means of reducing impact of streets on nature and to increase the green cover with multi-utility belts (MUBs), storm water management and plantations.

With more than 39km of bus rapid transit system (BRTS) corridors, 60% residents use public transport in Pune.

Impact

A wide variety of recreational spots, traffic education areas, parks, adventure zones and gardens have been implemented under this initiative all across Pune. There has also been an increase in placemaking elements, cycle lanes, and bus rapid transit system (BRTS) corridors which has led to a significant rise in use of public transport by citizens as well as land value. Based on studies conducted by Pune Smart City Development Corporation, the public bicycle sharing system (PBS) has helped achieve a 40-45% NMT trip share. With more than 39km of BRTS corridors in Pune, 60% residents use public transport. The guidelines set a successful example wherein pedestrians are of focus and made to feel safe and engaged. USDG also serves as a primary model for neighbouring and other cities where walkability is given more importance and design features are accordingly devised.

Figure 40. View of cycle track along FC Road

Figure 41. View of traffic park at Aundh road

Case Study

Chattarpur Metro Station

Figure 42. View of plaza
Source: Oasis Designs Inc.

Delhi, India

The Chattarpur Metro Station in South Delhi is one of the first multi-modal hubs in the city. It was designed with the aim to enable a convenient, modern, safe and universally accessible, barrier-free environment for people to connect to different modes of transport like public buses, feeder buses, non-motorised transportation, and other para-transit modes.

As a pedestrian-first zone, the multi-modal integration encourages better connectivity to and from the metro stations that could shift short vehicular trips to more sustainable modes. Services at the metro station include first-mile last-mile connectivity, sustainable mobility, as well as pedestrian plazas, parks, and shopping areas to create a vibrant destination that allows people to pause and play.

The redeveloped Chattarpur Metro Station recorded over 20,000 daily commuters.

Impact

The metro station's catchment covers approximately 7 sqkm, with up to 19,000 commuters travelling by various modes of transport to access the service. Dedicated halt-and-go parking bays were provided for buses and auto rickshaws to ensure smooth traffic flow and reduce congestion during peak hours. A pedestrian network with landscape and seating spaces linking the different services created smooth pedestrian movement and increased pedestrian safety. Unorganised parking and hawking around the station were hindering pedestrian movement. Hence, underutilised areas around the station were combined to develop dedicated plazas, shopping areas and seating areas to create an inviting public space for commuters and nearby residents. The redeveloped station has recorded over 20,000 daily commuters.

Figure 43. View of pedestrian walkway to the station
Source: Oasis Designs Inc.

Figure 44. View of halt and go zones
Source: Oasis Designs Inc.

PLAY

OUTCOME

Safe and inclusive open public spaces

In a 15-minute neighbourhood, the primary emphasis is on fostering safe and inclusive public spaces, aligning with the concept's commitment to creating vibrant and healthy communities. Beyond essential amenities, roads, and social infrastructure, individuals require a well-defined hierarchy of public spaces that cater to play, recreation, and leisure. These spaces become accessible hubs for art, culture, entertainment, open nature, and commerce, playing a crucial role in enhancing the overall quality of life within the community. By prioritising the development of such safe and inviting public spaces, a 15-minute neighbourhood ensures that residents can easily access a diverse range of enriching experiences, contributing to a healthy way of living.

PROJECTS

1. **Parks and Playgrounds**
   Presence of good quality parks are a vital tool for play and pause in urban areas. Such open spaces offer places of leisure, community interaction, and regeneration of natural surroundings.

2. **Spaces Left Over After Planning (SLOAP)**
   SLOAP accounts for areas in a city that identify as leftover spaces. They vary across scale and could range from pocket parks, unused parking spots, to flyover-under spaces and open grounds. The core identity of such spaces is the lack of a specific functional goal, they adopt functions based on the context, driven by the local community.

3. **Waterfronts**
   Waterfronts form a central part of public spaces in all cities. They thrive across all scales - from ponds and lakes to nallahs, canals and rivers. Waterfronts function as an active public space, engaging people across all ages.

1

Parks and playgrounds

Parks and playgrounds are essential breathing spaces in neighbourhoods and cities. They are not only important for early childhood development of children, but have proven to improve physical and mental health of all users. Additionally, they benefit the local economy in terms of stimulating increased land values.

Neighbourhood-level parks and playgrounds can solve a range of urban problems as social and commercial activators by creating places of play and engagement.

P1, P2

Design green area networks, complimented by a robust pedestrian and cycle infrastructure.

PLANNING CONSIDERATIONS

- Neighbourhood parks and playgrounds must be placed within 300-500m distance from the neighbourhood, in 3-4 numbers for better distribution to residents.
- While major changes to the neighbourhood layout with new parks and playgrounds may be implemented over a long period of time, it is recommended to improve the quality and access to existing open spaces in the short term.
- Designing green area networks, complimented with robust pedestrian and cycle infrastructure, must also be considered and explored when developing new parks/ playgrounds in neighbourhoods.
- For new greenfield developments, parks and playgrounds should be spread as evenly as possible around the neighbourhood for better access.
- Design of smaller parks may be explored in denser neighbourhoods to increase residents' access to green spaces within a 15-minute walk.

Design smaller parks in denser neighbourhoods to increase residents' access to green spaces within a 15-minute walk.

- The minimum width of the access road(s) leading to the park/ playground should be 9m.
- Footpaths near the open space should have a minimum clear width of 2m. Continuous and accessible footpaths with ramps at entry/ exits points to the park/ playground are a must.
- There should be adequate waiting areas with appropriate wayfinding elements and accessible street furniture available for users near the enty/ exit points to the open space.
- The park and playground premises, as well as immediate surroundings, must be well-lit to ensure safety of users.
- Parking spaces, especially for cyclists, and drop off bays must be provided near the park/ playground's entrance/ exit.
- A minimum of one reserved parking bay must be provided for people with mobility challenges. Ramps to the footpath and appropriate signage must be provided at the reserved parking bay.
- Depending on footfall at the open space, one accessible toilet in both male and female toilet groups or one unisex/ gender neutral accessible toilet room with independent entrance shall be provided.

DESIGN STANDARDS

- The minimum area for a park must be 6,000 sqm and 2,000 sqm for a playground.
- Entrances to the parks and playgrounds will have a minimum clear width of 1.5m to enable access to wheelchair or mobility-aid users. Table-top ramps of minimum 1.2m width and 1:20 slope should be provided at entrances.
- Footpaths to the open space should have a clear walking width of 2m. Depending on the location and footfall, the width of the footpath may be increased to provide a comfortable walking experience to both park/ playground users and other pedestrians.
- A multi-utility zone of minimum 1.5m width is recommended, to accommodate seating, wayfinding and signage, on-street parking, etc. On-street parking spaces shall be designed as per *Table 17 on page 142*.
- Ramps of 1:10-1:12 slope must be provided at any instance of level difference in and around the park and playground.
- If the park has walkways more than 60m in length, resting areas with accessible seating must be provided at regular intervals of 30m.
- Sufficient lighting should be provided inside the park/ playground and near all entry/ exit points for visibility and to create a safe environment for users.

2

Spaces left over after planning (SLOAP)

SLOAP accounts for areas in a city that identify as leftover spaces. In neighbourhoods, such spaces offer the opportunity to positively utilise and redesign them. Such an approach can solve instances of inactive and unsafe spaces, thereby enhancing the overall experience around otherwise underutilised parcels of land.

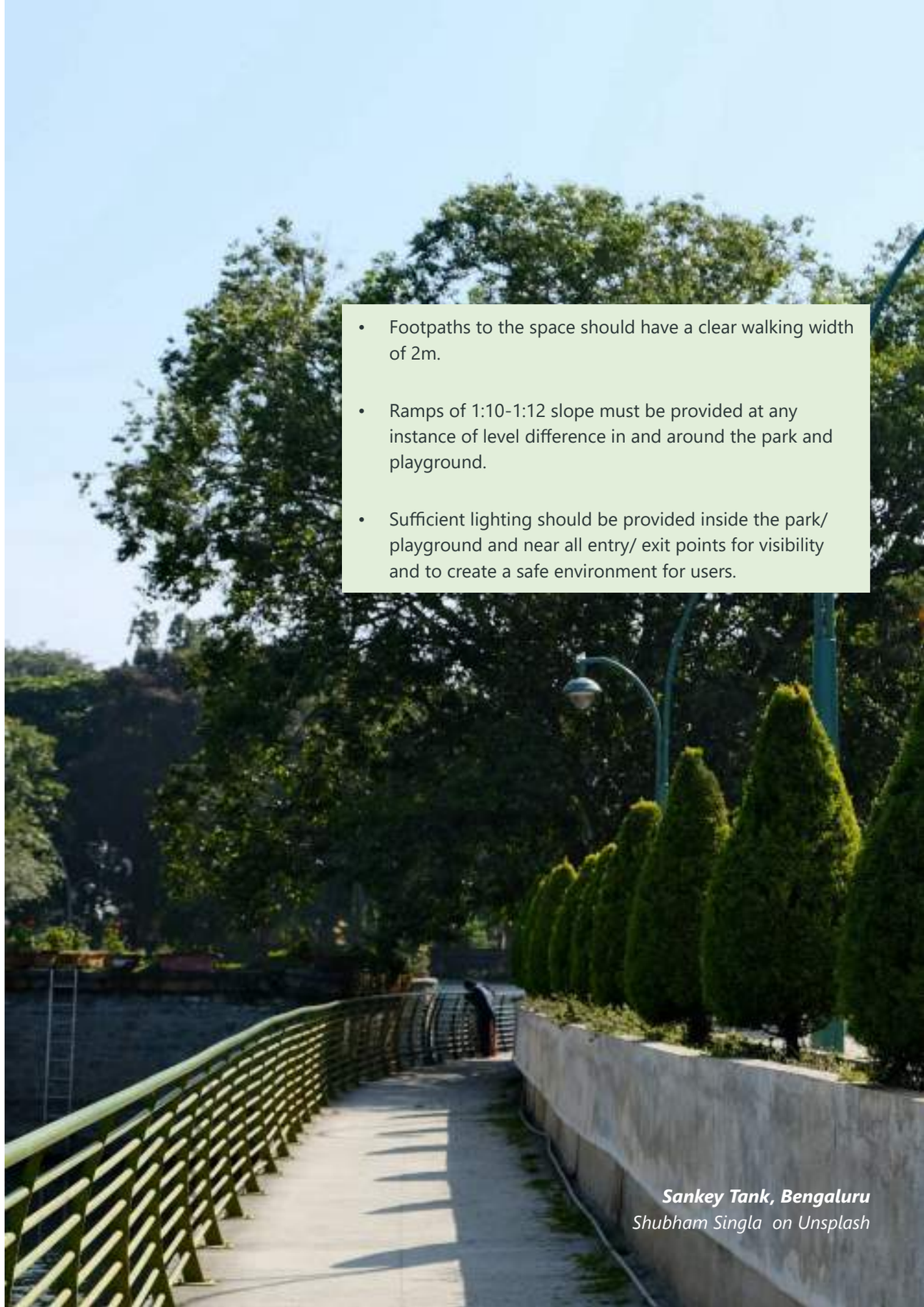
Provide vegetation, seating areas, and pathways to activate leftover spaces.

PLANNING CONSIDERATIONS

- Design of leftover spaces must be taken up on a case-by-case basis, with due consideration given to the needs and aspirations of the community, and factors such as land available area, location, adjacent uses, etc.
- Instances of SLOAP can be considered as opportunities for pause and play. Providing more vegetation, seating areas, and creating pathways can activate such spaces and invite people to use them.
- The final designed space must be easily accessible from the neighbourhood with adequate pedestrian infrastructure and should be a barrier-free environment.
- Perception of safety is of utmost importance. Opaque and/or high boundary walls, fences, and dense vegetation must be avoided to enable "eyes-on-the-street". Adequate lighting must be ensured to avoid any dark spots in the space.

DESIGN STANDARDS

- Entrances to the parks and playgrounds will have a minimum clear width of 1.5m to enable access to wheelchair or mobility-aid users.
- Table-top ramps of minimum 1.2m width and 1:20 slope should be provided at entrances.
- Footpaths to the space should have a clear walking width of 2m.
- Ramps of 1:10-1:12 slope must be provided at any instance of level difference in and around the park and playground.
- Sufficient lighting should be provided inside the park/ playground and near all entry/ exit points for visibility and to create a safe environment for users.



Sankey Tank, Bengaluru
Shubham Singla on Unsplash

3

Waterfronts

Often, local water bodies and features are mistreated due to neglect and lack of maintenance which has led to instances of garbage dumping and release of sewage. This has led to significant degradation of the natural environment as well as hygiene.

Establishing well-maintained waterfronts for natural and man-made water features can benefit neighbourhoods in terms of ecology, public health, and local economy. There is potential to transform these features into local attractions and even tourist destinations. This can further create an identity for the neighbourhood and foster social cohesion.

Waterfront designs may help preserve the riparian edges of water bodies as well as revive riparian ecology.

PLANNING CONSIDERATIONS

- Connectivity between the waterfront and neighbourhood must be ensured by establishing green mobility corridors or providing quality NMT infrastructure.
- Water bodies must be protected from encroachment, sewage disposal and solid waste dumping through design interventions, as well as enforcement, to maintain and improve water quality.
- Waterfront designs may help preserve the riparian edges of water bodies as well as revive riparian ecology. In areas experiencing overflow and flooding, suitable interventions must be implemented to mitigate urban flooding.
- Waterfronts must enhance residents' connection to local water bodies by creating a vibrant public space that invites them. A range of activities, such as active, passive and economic, can cater to their needs and aspirations. Some ways of providing a variety of uses include eating and vending areas, parks, seating, exhibition areas, etc., subject to availability of land.

Waterfront designs can help preserve the riparian edges of water bodies as well as revive riparian ecology.

- Before designing a water front, the National Green Tribunal (NGT) regulations for developing water bodies must be referred to establish a buffer zone on either side of the water feature, as only certain interventions and construction are permitted within buffer zones (refer *Figure 45*).
- These spaces should provide opportunities to walk, run and cycle along the water body by creating different routes with continuous, generous and high quality space for users.
- In order to create a waterfront accessible by all, universal accessibility and barrier-free features must be provided all along the water body's edge. Tactile paving, ramps, and railings must be provided. Approaches and pathways should be wide enough for wheelchair users.
- Utilities and services such as toilets, waste bins, and drinking water fountains (near vending zones) must be provided to create a comfortable public environment for users.

DESIGN STANDARDS

- Entrances, if provided, will have a minimum clear width of 1.5m to enable access to wheelchair or mobility-aid users. Table-top ramps of minimum 1.2m width and 1:20 slope should be provided at all instances of entrances.
- Footpaths can be placed in the buffer zone of the water body, whereas cycle tracks must be placed beyond the buffer zone.
- Play areas, parks, and seating areas can be placed within the buffer zone as well. Seating areas should be provided at regular intervals of 100m along the waterfront.

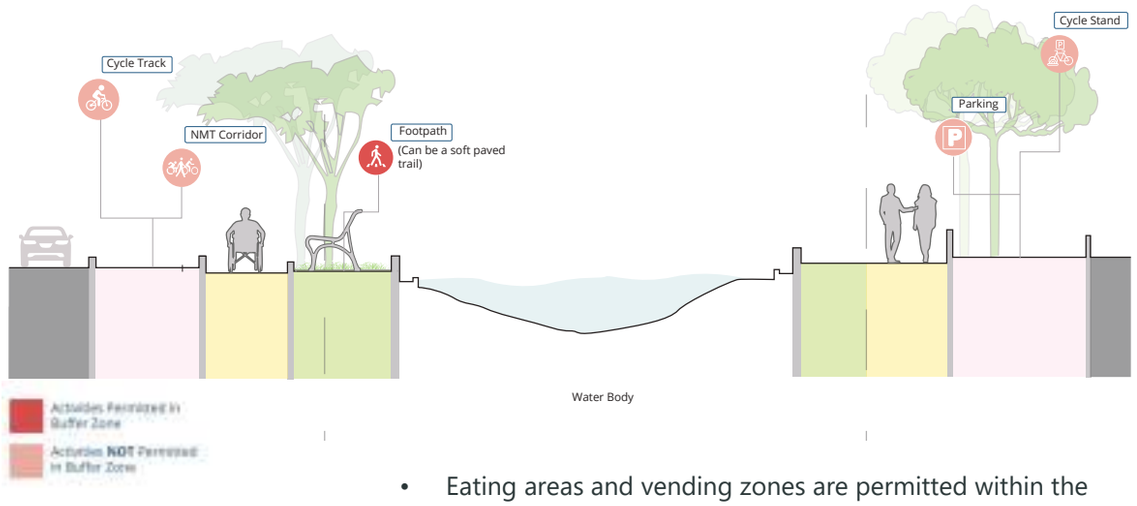


Figure 45. Buffer zone specifications for access and circulation zones

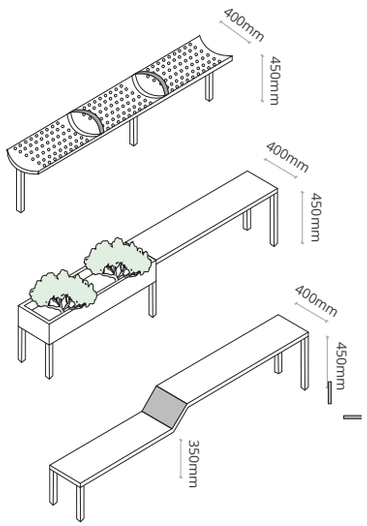


Figure 46. Types of seating for public spaces

- Eating areas and vending zones are permitted within the buffer zone. However, they must be provided 1-2m away from the water body edge.

- Seats should be provided at regular intervals of every 30m along access routes, and especially near level changes such as external steps or ramps. Refer *Figure 46* for types of seating recommended for public spaces.

- Public toilet blocks should be located within walking distance, or a maximum of 800m, from the entry/ exit points of the waterfront.

- To maintain clean and hygienic surroundings, waste bins should be located within 100-250m of all activity generating areas along the waterfront. They must also be provided near all entry/ exit points.

- Drinking water facilities must be provided near vending zones, if any. It must be ensured that these facilities are placed a minimum 1.8m away from toilets. In high activity zones, drinking water faucets must be provided every 200m. They could be placed every 500m in low activity zones.

- Lighting near water bodies should have a minimum mounting height of 13.7m, to ensure no aquatic life present in the water body is harmed. They must be placed in such a way that less light is thrown on riparian edges.

- Reserved parking shall be provided within maximum distance of 30m from the waterfront entrances. Minimum 10% of parking facilities should be reserved for people with disabilities, which must include a 1.2m side transfer zone.

- Signages for identity, information, and direction must be provided at appropriate locations to enable easy navigation for users. Identity signages can be placed at entrances and central nodes. Information and direction signage may be located at important junctions or near prominent landmarks of the public space.

3.1. ACCESS TO BUFFER ZONE

Access to the buffer zone can be provided through pedestrian pathways, cycle tracks, access ramps, steps, parking, and exit/entry points.

3.1.1. Pedestrian pathway

- A hierarchy of pedestrian pathway can be established, ranging from primary to tertiary paths. Primary pathways must be minimum 2.5m wide, whereas secondary pathways must be 1.8m wide. Tertiary paths consist of non-circulation routes and shall be minimum 1.5m wide.

- Guide strips should be laid where pathways cross each other. A tactile guiding area, preferably with two rubber tiles of minimum 0.9m x 0.9m dimensions, should be constructed where the pathways branch off.

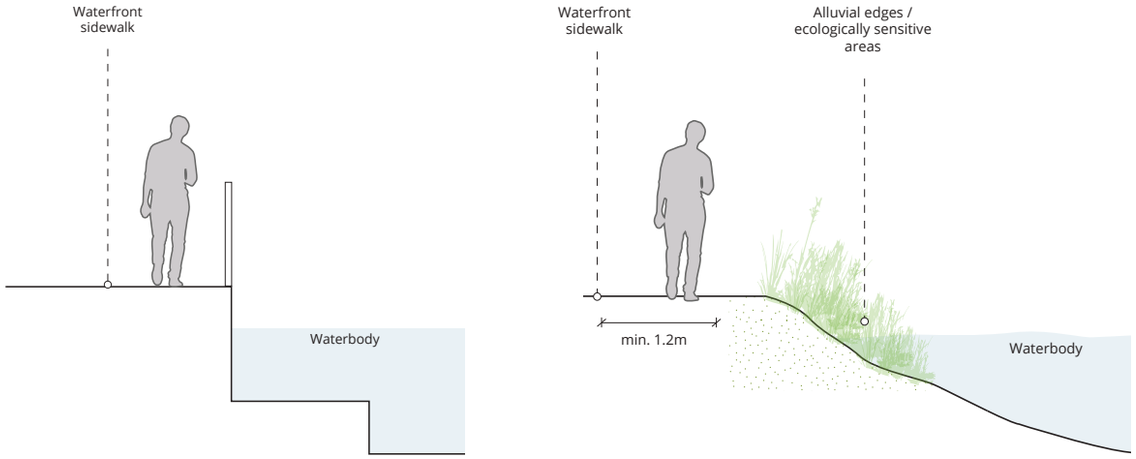


Figure 47. Details of different waterfront sidewalks

3.1.2. Cycle track

- A minimum clear width of 1.5m must be ensured if cycle tracks are being provided along the waterfront.

3.2. ACCESS TO WATER BODY

- Access to the buffer zone may be established through pedestrian pathway/ waterfront walkway, and viewing deck/ landing dock.

3.2.1. Waterfront sidewalk

- Boardwalk elements must be anchored with structurally designed pilings or foundations, and provide for well founded transitions with other paving materials and structures to provide an even walking surface.

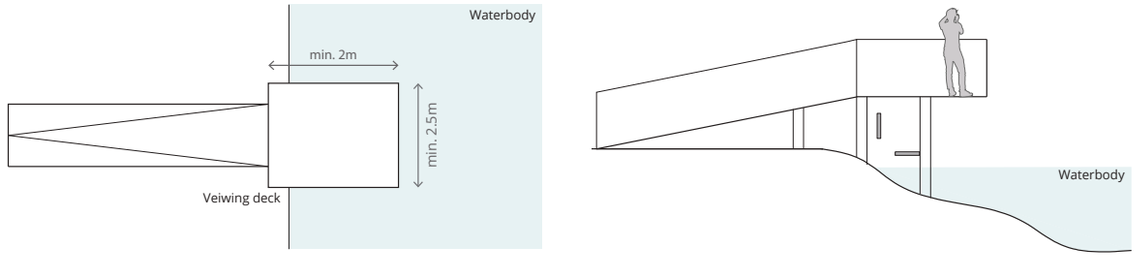


Figure 48. Section of a viewing deck

- Boardwalk elements must be above normal high water lines, and be designed to withstand flood conditions if below 100-year flood plain elevations.
- In case of alluvial edges at the water body, it is recommended that the boardwalk should not be hardscaped (refer *Figure 47*).

3.2.2. Viewing deck

- The number of viewing decks should be decided based on the footfall expected at the water body. The minimum dimension must be 2m x 2.5m (refer *Figure 48*).
- There should be a minimum 18m linear berthing surface, with a minimum dock width of 3m provided at the waterfront.

Additional resources:

1. *URDPFI Guidelines, India*
2. *Urban Greening Guidelines, India*
3. *Harmonized Guidelines and Standards for Universal Accessibility in India*
4. *Water S.U.R.E. Guidelines, India*

Best Practice

Portable parklet

Figure 49. Shared street space organically designed in the sidewalk
Source: WMB Architects

London, United Kingdom

Portable parklet explores a set of micro-interventions to create sustainable public spaces that provide greening, street furniture, and environmental data visualization through air quality monitoring. The parklet won the Fresh Air Square competition by Team London Bridge, an initiative that aimed at creating micro-urban spaces with air quality monitors with an aim to educate Londoners on the surrounding air quality.

The proposed design kept sustainability, circularity, and modularity as a focus. The parklet converts two regular, standardised car parking spaces into a modular wooden seating built from standard scaffolding boards. Planters are interspersed among the seating, built with low-cost, off-the-shelf material such as galvanized steel pots. An on-site air quality monitoring captures and sends real-time data to an online application.

Technology and digital tools can be incorporated into public space design in such manner to create opportunities for data-driven decision-making.

Impact

A parallel aim of the parklet was to serve as an urban green buffer, providing passers-by respite from the busy road. A post occupation analysis observed that the place became a regular stop for passers-by. Children particularly used the seating as a landscape to be climbed and explored, emphasizing the tactile nature of the seating. The modular design enabled the design to be scaled across various parts of London around the London Bridge area. In a developed city, such projects can reclaim underutilised road area into the public realm.

The air quality monitor has become a part of the wider network of air quality data collection points within London, bringing environmental data visualization and advocacy for greening and awareness to the forefront. Technology and digital tools can be incorporated into public space design in such manner to create opportunities for data-driven decision-making.

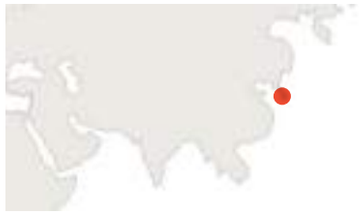
Figure 50. Placement of panels creating a vibrant, vertical pattern.
Source: WMB Architects

Figure 51. View with the panels and plants used to mitigate air pollution
Source: Ed Butler and Mickey Lee.

Best Practice

Restoration of Chheonggyecheon Stream

Figure 52. View of the rejuvenated area
Source: Nicholas Sheen



Seoul, South Korea

Cheonggyecheon is an urban environmental and public space restoration project, that reclaims a river that was turned into a 10-lane roadway and a 4-lane elevated highway carried over 170,000 vehicles daily.

The restoration was initiated due to a steady decline in Seoul's downtown area urban condition, defined by stagnation and a decrease in housing occupation. The restoration project aimed to enhance the urban environment by removing the expressway to restore the river, develop a green corridor and strengthen public transport systems, and upgrade public transportation and connectivity to the area.

Environmental rejuvenation of downtown Seoul was supported by creating 16.3 ha of green public space.

Impact

In neighbourhoods that have waterfronts in the form of lakes, canals and rivers, **restorative measures can provide multiple beneficial outcomes such as restoring local biodiversity, improving the micro-climate, boosting local economy while providing accessible public spaces to residents**. The project led to an environmental rejuvenation of downtown Seoul, creating a total of 16.3 ha of green public space. It also directly impacted surrounding temperature through the strategic plantation of native flora, and restoring ecological habitats. The area turned into a diverse cultural hub, hosting approximately 259 events in a duration of 2 years from 2005-07. The most significant impact was seen in the increase of housing and commercial population in the area. The number of employers in the downtown Seoul area rose by around 50,000, from approximately 570,000. Additionally, subway ridership increased by 9% in the downtown area, and 3.3% in overall Seoul.

Figure 53. Before and after intervention
Source: Seoul Metropolitan Government

Case Study

Citizen's Waterway K100

Figure 54. Stepped landscape near Shanthinagar
Source: Sudhakara Jain

Bengaluru, India

The K100 project aims to create among citizens a sense of responsibility and ownership of the Bengaluru's traditional water network and management system of *rajakaluves,* or primary storm water drains, which have been mistreated and used as open sewers and garbage dumps. The goal is to provide for an ecological corridor in the city and conserve and enhance the urban natural environment with walkways, cycle tracks, malls, parks, and other recreational spaces for the public. K100, one of the most historically significant *rajakaluves,* has been taken up as a pilot in the larger project to rejuvenate the city's SWD system.

The primary drain is 11.4km in length, and a total network of 28.06km including its secondary drains. The project aims to assess the surrounding area's natural resources, look at existing land usage, and find solutions that will support the city's sustainable future growth.

This project will serve as the first step in understanding and addressing the interconnectedness of public health management in the city.

Impact

This project will serve as the first step in understanding and addressing the interconnectedness of public health management in the city. Within the project area, the project aims to provide infrastructure for pedestrians as well as solid waste management, water sanitation, and sewage. With local engagement, the K100 projects intends to ensure improved management of the *rajakaluves* by devising an effective communication and social mobilisation strategy toward behavioural change. It aims to positively impact the residents along the edges of the waterway by increasing the amount of open public space, improving their health and well-being, as well as boost the local economy by providing a clean and maintained waterfront. Additionally, after installing more than 20 sewage treatment plants (STPs) in the neighbouring apartments for proper sewage disposal, there has been a 92% reduction in sewage disposal, from 120MLD to 5MLD.

Figure 55. Work on pathway and footpath development, landscaping and seating arrangements under construction
Source: DH Photos

Figure 56. Desilted drain with filter section

Case Study

Nanalal D Mehta Garden

Figure 57. View of the walking track and seating areas
Source: One Matunga

Mumbai, India

Nanalal D Mehta Garden is the culmination of an initiative led by the local residents of the Matunga neighbourhood, the Brihanmumbai Municipal Corporation (BMC) and One Matunga NGO. Before its transformation into the park, the flyover under space was monitored for a period of two years by the residents of Matunga, to keep it free of encroachment. Private security and regular cleaning were overseen by them to discourage misuse and parking. Post this encroachment-free period, the residents approached the city municipal corporation to take up the revitalisation project.

As per the final design, the flyover under space measuring 600m in length and 3.6m wide, was converted into a public garden and walking track, interspersed with seating. The rest of the area has been segregated into dedicated zones for different activities as well as users, all connected by the 600m long walking and jogging track.

The 7,200sqm park is a breathing space in a dense city.

Impact

This project was able to reclaim underutilised spaces in a highly dense city, with residents' involvement and the support of a 2013 high court order prohibiting the use of space under flyovers as parking lots. Since its inauguration, it has become a regular stop during pedestrian journeys, as well as a valuable gathering space for residents of surrounding neighbourhoods. With good lighting and CCTV cameras for surveillance, the 7,200sqm park is frequented by all age-groups, from children to elderly, throughout the day. The park has over 50 different types of plant species placed on both sides of the public space, shielding it from vehicular exhaust as well as interspersing landscape along the adjacent roads.

Figure 58. View of the walking track and seating areas
Source: One Matunga

SUSTAIN

OUTCOME

Sustainable produce markets

The significance of sustainable produce markets in neighbourhoods lies in their role as essential contributors to the availability of high-quality produce. They play a crucial part in promoting sustainable farming and consumption practices, and contribute to the reduction of farm-to-table distances. Access to quality produce through sustainable markets becomes a pivotal factor in fostering healthy communities. Moreover, such markets have the potential to transform into attractive tourist destinations in cities, positively contributing to urban public spaces.

PROJECTS

1. **Neighbourhood Market**
   Neighbourhood markets can bring high-quality produce closer to residents with good connectivity, designed vending spaces, and public amenities while creating a local identity.

1

Neighbourhood markets

Neighbourhood markets play a large role in catering to the needs of people in neighbourhoods. These foster sustainable food practices by providing fresh produce, while also creating an identity for the area.

Nowadays, such market complexes house multiple uses along with the usual retail and convenience shops. However, as a neighbourhood-level public space, it must respond to the local needs and aspirations of residents.

S1

The market must provide spaces for activities such as shopping, commercial offices, bank or ATM facility, along with informal shopping and weekly markets.

PLANNING CONSIDERATIONS

- A neighbourhood market must be planned to cater to a population of up to 15,000 people.
- The market complex must be easily accessible from the neighbourhood supported by good pedestrian and road network. The access road(s) leading to the complex must be provided with adequate wayfinding and signage.
- It must provide spaces for activities such as shopping, including retail services and conveniences, commercial offices, bank or ATM facility, along with informal shopping and weekly markets.
- It is recommended to provide one shop for every 200 people expected to access the market.
- The market complex must be adequately serviced by public utilities such as water, electricity, sewage, and storm-water disposal as well as civic facilities like public toilets, storage and parking areas to ensure a safe and hygienic environment.

Neighbourhood markets

- The market must strictly adhere to the statutory fire safety norms. All safety, hazard, and caution signs should be prominently displayed at relevant places outside and within the facility. As per current norms, sprinklers are to be provided at ground level markets. Smoke detectors and wet risers must be placed on all levels. Alarm system and extinguishers must also be included.

- Proper waste disposal and management is crucial to maintain a hygienic environment for both shoppers and vendors. As per SWM 206 Rules, a bio-methanaton plant is recommended at a suitable location within the market. The capacity of the bio-methanation plant is to be decided based on the wet waste generated at the market.

Informal vending must be formalised by providing designated vending spaces with basic amenities like storage spaces, electric points and water supply.

- All entry/ exit points to the market complex must be universally accessible with ramps, guard rails, and tactile pavers to alert visually-challenged users.

- It is recommended to provide a designated area for the loading/ unloading and sorting of goods. The loading/ unloading areas must be categorised and organised based on type of produce being brought to the market.

- Drinking water facilities should be provided at each floor, if the market is a mutli-storey structure.

- Appropriate signage and wayfinding must be provided regarding the public amenities available, such as washroom facilities, drinking water area, seating spaces etc. and the emergency exit routes.

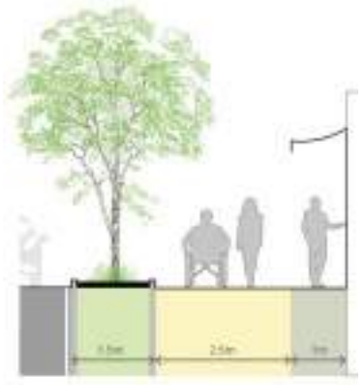


Figure 59. Footpath cross section in front of commercial spaces

NMT and public transit must be promoted to access markets and minimise the need for on-street parking.

- Any unused spaces in or around the market must be activated for other ancillary or complimentary uses.

- In case of instances of informal vending, it must be formalised by providing designated vending spaces with basic amenities like storage spaces, electric points and water supply.

DESIGN STANDARDS

- The market must be built on a plot of minimum 4,600sqm area, or have 300sqm area for every 1000 people.

- Footpaths around the market must have a clear width of 2.5m, and an additional 1m can be provided as a frontage zone for the market complex (refer *Figure 59)*.

- A multi-utility zone (MUZ) of minimum 1.5m width should also be provided between the travel land and footpath for street furniture, IPT stands, trees, landscape, and on-street vending to support various commercial activities and create a vibrant public realm.

- NMT and public transit must be promoted to access markets and minimise the need for on-street parking. However, minimum 300 sqm must be provided for parking cars. An additional 25-50% parking spaces should be allocated for parking other types of vehicles, such as tempos, trucks for goods, etc. A dedicated area for loading and unloading activities must be provided at 3.5m x 7.5m per 1000 sqm floor area of the market.

Neighbourhood markets

In order to formalise informal vending near markets, it is recommended to provide 3-4 units of 4 sqm each per 10 formal shops at the market.

- The minimum width for circulation areas, such as passages and corridors, inside the market shall be 1.5m.
- In order to formalise informal vending near markets, it is recommended to provide 3-4 units of 4 sqm each per 10 formal shops at the market. Informal eating spaces may also be accommodated by providing 1 informal eating place per 1 lakh people and allocating 2000 sqm.
- Accessible toilets should be located within the market complex. Minimum provision as per current norms is 4 toilets for 100 men and 6 for 100 women.
- To maintain clean and hygienic surroundings, waste bins must be provided every 50m along the market periphery.
- Entrances to the market need a minimum clear width of 1.5m to enable access to wheelchair or mobility-aid users. Table-top ramps of minimum 1.2m width and 1:20 slope shall be provided at entrances.
- Sufficient lighting should be provided inside the market and near all entry/ exit points for better visibility and to create a safe environment for shoppers and vendors.

Market in Hyderabad, Telangana
Tejj on Unsplash

Best Practice

Centenary Farmer's Market

Figure 60. View of the two storey structure of Centenary Farmers Market
Source: Tashi Yoedling

Thimphu, Bhutan

The Centenary Farmer's Market (CFM) is a weekend farmer's market operated by the Ministry of Agriculture in Thimphu, Bhutan. The market is known for promoting local fresh produce of vegetables, fruits, and other commodities. Almost all the produce sold in the market is grown by Bhutanese farmers, with a minor fraction imported from India and Nepal. The market is a two-storey structure with 400 open stalls.

The maintenance and management of the market is overseen by a committee under the Bhutan Agriculture and Food Regulatory Authority (BAFRA), instated by the Ministry of Agriculture. The presence of a dedicated committee to oversee the functioning of the market and strict enforcement of rules pertaining to allocation of vending spaces, timings and cleanliness contributes to the smooth functioning of the market.

The market promotes sustainable consumer behaviour by advocating and selling local fresh produce.

Impact

The market has become a major local tourist attraction and recreational place for tourists and residents alike, owing to the selling and promotion of local foods and produce central to the Bhutanese diet. The market thereby promotes sustainable consumer behaviour by advocating and selling local fresh produce. A stage and exhibition hall in the market premises allow space to conduct other activities to vendors and residents. The National Commission for Women and Children (NCWC) also established a crèche in the market premises for the children of the market vendors, with the objective of creating a conducive working environment for them and supporting childcare. This crèche is run under a Public Private Partnership (PPP) model including CFM, NCWC and parent representatives. Such initiatives not only improve the quality of life of residents, with effective functioning of the market, but also of vendors who work there.

Figure 61. Waste segregation is advocated for both vendors and consumers within the market
Source: Tashi Yoedling

Figure 62. Local produce from Bhutanese farmers is sold in the ground floor of the market
Source: Tashi Yoedling

INCLUDE

OUTCOME

Social infrastructure

Accessibility for all is a tenet of the 15-minute neighbourhood. It intends to achieve this by planning and designing the neighbourhood for the most vulnerable groups residing there. The significance of social infrastructure, such as schools, community halls, anganwadis, health care centres, etc. is underscored by the key role it plays in fostering inclusive and equitable urban development. Providing these facilities on a need-basis at the neighbourhood scale will ensure these services reach vulnerable communities and urban poor, thereby creating a more inclusive environment.

The concept promotes safe and equitable access to high-quality infrastructure. Community infrastructure available in close proximity to public transit points increases the likelihood of usage by working individuals. Further supporting community infrastructure with opportunities for active mobility will collectively result in sustainable, healthy and vibrant neighbourhoods.

PROJECTS

1. **Safe Schools**
   Children are the most vulnerable users of streets. By creating safe streets to schools, neighbourhoods can become safer for children, and by extension all others.

2. **Community infrastructure**
   Provision of infrastructure that supports residents' essential needs within a 15-minute walking distance or near public transit points promotes active mobility, reduces dependency on private vehicles, and improves people's quality of life.

The following facilities have been discussed in this section:

- **Primary Health Centres (PHCs)**
  PHCs are the first stop while accessing healthcare in India, intended especially for under served communities and urban poor.

- **Community Halls**
  Communities require dedicated spaces for socio-cultural facilities, recreation, and fostering community interaction.

- **Daycare Centres**
  Daycare centres support the early childhood development of children of working individuals by providing health and childcare services.

- **Anganwadis**
  Anganwadis also support early childhood development of children from and economically-weaker sections of society by providing childcare, food, educational, and healthcare services.

- **Public Libraries**
  Free or low-cost and accessible public libraries ensure citizens outside of the formal educational system are more aware of news and the world.

1

Safe schools

Children are the most vulnerable users of roads, due to their limited decision-making ability and use of good judgment when dealing with speeding vehicles. Their short height makes them invisible to drivers and increases their exposure to exhaust pipe pollution.

Nowadays, children's journeys to schools, by various modes of transport, is filled with obstacles. Often, there is an absence of continuous footpaths, clear indications for a school zone and haphazard parking near school gates, causing difficulty in navigation.

Children's access to schools, especially by walk and cycle, must be safe, comfortable and enjoyable. The focus is to provide such safe journeys to children, with due consideration given to children's mobility and traffic management around schools.

I2, M6, M8, M10

School zone covers the road network, with streets, bus stops, intersections, and parking area, in the area around a school.

PLANNING CONSIDERATIONS

A school zone is defined as the area around a school covering road network with streets, bus stops, intersections, and parking areas. School zones can be safely designed based on the following principles:

- Reducing the number of elements on the road itself, so as to not burden children and motorists with excessive information and design elements.
- Distancing children from potential harm with crash barriers and reduction of conflict points between children and motorists.
- Reducing vehicular speeds and adopting softer paving materials to reduce the severity of possible crashes.

Other considerations for design include, but are not limited to:

Reduce vehicular speeds near schools to reduce the severity of possible crashes.

- Splitting the school zone into areas with increasing intensity of road safety. The immediate surroundings of the school entrance gate(s) would have the most design interventions and enforcements, which would gradually decrease as one moves away from the school. This can be supported by providing visual warnings, traffic calming measures, vehicular speed limits, etc. to name a few.
- Footpaths leading to the school entrance(s) must be well-maintained and free from any undulations.
- If there is an intersection near the school entrance, table-top crossing design is recommended, as it provides greater safety advantage to pedestrians. If table-top crossings are not possible, traffic calming measures such as kerb ramps and bollards must be provided to ensure pedestrian safety.
- Pedestrian crossing signage is recommended to be stamped onto the footpath for better visibility to children.
- Separate gates for vehicular and pedestrian traffic must be provided to enter/ exit school premises.
- Paved waiting area with seating and space for mobility aid users, such as wheelchairs, must be provided near the entrance gates.
- There must be designated pick up and drop areas for school buses and vans, cycle, and auto rickshaws in front of the school entrance(s). These must be universally accessible and fitted with strategically located signage.

Table-top crossings are recommended for intersections near schools, as they provide safety advantage to pedestrians.

DESIGN STANDARDS

1.1. School zones and speed management

- **School Access Zone (SAZ)**: This zone comprises of roads leading to every entrance of a school, extending 100m on either side of the school entrance. It would extend an additional 30m if there is an intersection within 100m from school entrance. (Refer *Figure 63*)

- **School Proximal Zone (SPZ)**: This zone covers the area after the SAZ and around the school where most students would be present on roads either by walk, cycle or public transport.

- **Transition Zone (TZ)**: Designated stretched of roads leading to an SPZ, where motorists are made aware about the approaching school zone. The length of transition zones has been provided in *Table 19*.

Table 18 Length of transition zones

Road Category	Design Speed (kmph)	Prescribed Speed Limit in SPZ (kmph)	Length of Transition Zone (m)
Arterial road	60	30	70
Sub-arterial road	60	30	45
Collector street	40	30	35
Local street	30	15	20

Figure 63. School zones

1.2. Traffic calming measures

- Three sets of Transverse Bar Marking (TBM) with each set having 6 bars measuring a thickness of 15mm shall be provided on the main corridor to reduce the speed in the transition zone.

- Speed tables shall be provided along with a Speed Limit Sign, erected at about 30m before the school entrance(s), to facilitate safe crossing of school children.

1.3. Pick-up and drop areas

- Pick up and drop areas must be located at least 20m away from either side of school entrance gates to avoid crowding.

- Accessible parking and pick up and drop bays for wheelchair

Accessible parking and pick up and drop bays must be provided closest to the school entrance.

users should be provided closest to the school entrance. Clear walking space must be available at the pick up and drop area.

1.4. Pedestrian infrastructure

- In school zones around primary schools, guard rails may be provided up to a length of 50m for improved safety of young children. The guard rails should be between 700 mm to 1000 mm high.

1.5. Pedestrian crossings

- Table-top crossings should be installed within 20m of school entrance gates, to slow down vehicular traffic and allow students to cross safely.

- Pedestrian refuge islands shall be provided at every instance in the school zone, and should not be less than 1.5 meters in width and 3.6 meters in length.

- Zebra crossing marking must be provided at all refuge islands.

1.6. Cycle infrastructure

- Single direction cycle tracks shall have a minimum clear width of 2m, and bi-directional cycle tracks shall have a minimum clear width of 3m.

- The surface of cycle tracks and lanes shall be painted green.

- Cycle parking should be provided inside the school premises to encourage cycling amongst students and staff. If parking inside the premises is not possible, parking racks must be installed along the compound wall of the school. However, these must not encroach onto the walking space of pedestrians.

Figure 64. School zone ahead sign

1.7. Signage

- A "School Zone Ahead" sign shall be erected in the direction going towards the school zone at the edge of the transition zone. The prescribed speed limit on that road may also be added to the sign.

1.8. Road markings

- All objects within the carriageway, that are usually painted as alternate black and yellow or black and white stripes, shall be painted as alternating red and white stripes in the school zone.

- This includes pedestrian crossings, speed breakers and refuge islands. At pedestrian crossings, alternate stripes of white and red of 500 mm width each must be painted. An additional 250 mm wide border in red colour shall be painted on either side of the pedestrian crossing perpendicular to the direction of travel. (Refer *Figure 65)*

- Colourful patterns are encouraged over traditional alternate white stripes for tabletop crossings.

- All pedestrian crossings in the school zone should have "Look Left" or "Look Right" painted at start of the crossing.

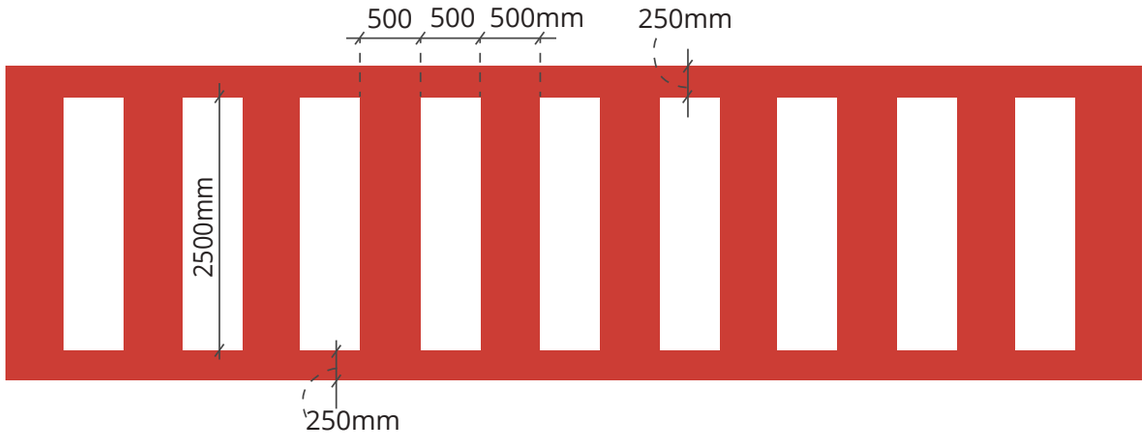


Figure 65. Pedestrian crossing for school zone

1.9. Parking

- Each parking bay for a full-size bus should be minimum 4m wide.
- All on-street parking should be discouraged within SAZ, especially on the road adjacent to schools and especially during school hours.

2

Community infrastructure

2.1. PRIMARY HEALTH CENTRES (PHCs)

Primary health centres (PHCs) aim to provide community-based and programmatically-based preventative, promotive, basic curative, palliative, and rehabilitative care. India's primary healthcare system has been composed of Urban Primary Health Centres (UPHCs) in urban regions and Sub-Centres and Primary Health Centres in rural areas under the National Health Mission (NHM), erstwhile the National Rural Health Mission.

I4

The PHC should be situated no more than one kilometer from underprivileged residents of urban slums for ease of access.

PLANNING CONSIDERATIONS

- It is preferable to locate them no more than one kilometer from underprivileged populations, urban slums, and temporary settlements.
- They must have good access to the PHC with robust road connectivity. Adequate wayfinding and signage should be available along roads leading to the facility.
- Provision of counselling areas, waiting areas, laboratories, clear wayfinding and signage, parking, gardens, washrooms, drinking water, and universal accessibility must be considered as per the latest Indian Public Health Standards (IPHS) for PHCs.
- The PHC must be adequately serviced by public utilities such as water, electricity and telephone connectivity, sewage, and storm-water disposal. There must also be arrangements for constant water supply, along with additional storage with capacity to store at least 3 days water requirement.
- The facility must ensure sanitation and safety with appropriate collection, transportation, treatment, and

disposal of biomedical waste, as per the latest Bio-Medical Waste Management Rules (BMWM).

- The PHC infrastructure must strictly adhere to the statutory fire safety norms. A fire exit plan with fluorescent signage should be placed where appropriate.
- All safety, hazard, and caution signs should be prominently displayed at relevant places within the facility.
- All infrastructure should be climate, environmental change and disaster resilient. The facility must consider water harvesting and solar energy, along with adequate biomedical waste management and drainage, if appropriate and possible.

DESIGN STANDARDS

- The PHC must be located within a plot of minimum 500-800 sqm area.
- For ease of convenience and universal accessibility, ramps of mimimum 1.8m width should be provided at all entry/ exit points with 1:15 to 1:18 slope. Tactile pavers and pathways must also be provided to aid mobility of visually-challenged individuals.
- Footpaths with minimum clear width of 2m must be maintained along the access road(s) of the PHC. An additional 0.5-1.5m may be added to incorporate elements such as trees, street furniture, signage, etc. in front of the facility.
- Emergency vehicle access into the PHC premises must be minimum 6m wide to ensure unobstructed passage.
- Dedicated parking spaces for people with disabilities must be reserved near the entrance of the PHC.
- Adequate lighting, as per IPHS standards, shall be provided near all entry/ exit points of the facility for better visibility.

2.2. COMMUNITY HALLS

Cities must provide socio-cultural facilities and infrastructure that support vulnerable communities and urban poor living there. As per India's national guidelines, these facilities are prescribed in the form of community halls, kalyana mandapas (marriage halls), baraat ghars, etc. for neighbourhoods.

These facilities must correspond to the changing demography and lifestyles of residents, and provide a platform for social events, community interaction, recreation and vocational training; as well as livelihood and economic generating activities.

I5

The community hall shall be planned for multi-purpose activities based on the requirements of the residents.

PLANNING CONSIDERATIONS

- The community hall can be planned for multi-purpose activities based on the requirements of the residents, such as adult education, training programmes for economic generation activities, child and family welfare programmes etc. This would ensure optimum utilisation as well as maintenance and management of the community building.
- The neighbourhood community space shall either be 15 percent of the area of the layout, or 0.3 to 0.4 ha per 1000 persons.
- The community hall must be located along an access road of minimum 15m width.

Community infrastructure

- The facility must have accessible entry/ exist points to the main community hall as well as any other public gathering areas in the premises.
- Accessible toilet facilities must be provided nearby, as per building bye-laws.
- Various accessible seating and viewing choices must be available for persons in wheelchairs throughout the facility.
- In case of a new building, the premises shall have rain water harvesting structure, storage, and recharge pits.
- The facility must adhere to the statutory fire safety norms to ensure safety of users.

DESIGN STANDARDS

- For a population of 5000 persons, a community room can be provided in a plot of minimum 750 sqm area.
- For a population of 15,000 persons, a community hall can be provided in a 2000 sqm plot.
- The minimum average dimension of the hall shall be not less than 7.5m. Additionally, if the average width of the hall is less than 24m, the length should be more than 2.5 times of the average width.
- While a minimum clear width of 2m must be maintained along the road(s) leading to the hall, the width may be suitably increased on account of higher pedestrian volume. An additional 0.5-1.5m may be added to incorporate elements such as trees, street furniture, signage, etc. in front of the facility.
- Entrances to the community hall premises shall have minimum clear width of 1.5m for wheelchair or mobility-aid users. Table-top ramps of minimum 1.2m width and 1:20 slope shall be provided at all entrances.
- Sufficient quantity of accessible seating must be provided near the entrance(s) of the facility to create a comfortable environment for users.
- To ensure visibility and safety of users, adequate lighting must be provided at all entry/ exit points of the facility.
- Based on the footfall at the community hall and demand, on-street parking may be provided near the entrance. Reserved parking must be provided within maximum distance of 30m from the facility. From the total parking spaces, minimum 10% should be reserved for people with disabilities. A 1.2m wide side transfer zone must be provided beside the reserved parking to help users access the footpath.

2.3. DAYCARE CENTRES/ CRÈCHES

Daycare centres/ crèches are supported under the provisions of the Maternity Benefit (Amendment) Act, 2017, which states that act is applicable to all establishments employing 10 or more persons and the crèche facility is mandatory for every establishment employing 50 or more employees. Daycare centres must intend to provide a nurturing and inclusive environment for children aged between six months to six years.

I6

The daycare centre must provide dedicated spaces for children to rest, play, and learn.

PLANNING CONSIDERATIONS

- Daycare centres must have safe, clean, and clearly defined access from the neighbourhood. Ramps and handrails must be provided at entry/exit points for better accessibility.
- The facility must provide dedicated spaces for children to rest, play, and learn for the duration of their stay. There

should be separate areas for different age groups (below 3 years and 3-6 years) at the facility.

- The daycare centre must have child-friendly toilets and a clean drinking water facility.
- It is recommended that an outdoor play area and a kitchen be provided within the daycare centre premises.
- Fire extinguishing equipment and other fire fighting material should be provided at the facility.

DESIGN STANDARDS

- The daycare centres must be located within 500m of the neighbourhood, of minimum 25 sqm area for 30 children, to ensure they can comfortably play, rest, and learn.
- Footpaths with minimum clear width of 2m must be maintained along the access road(s) to the daycare centre.
- To ensure safety of caregivers and children accessing the daycare centre, appropriate traffic calming measures must be established near the facility's entrance(s). Table-top ramps of minimum 1.2m width and 1:20 slope are recommended. Bollards may also be provided near the entrance(s) to increase safety and ensure motorists do not encroach or use the footpath.
- It is recommended to provide accessible waiting areas provided near the entrance(s) to provide a comfortable environment for users.
- Visibility and safety of users must be ensured when they access the facility. It is essential to provide adequate lighting at all entry/ exit points, as well as along the access road(s) to the daycare centre.

2.4. ANGANWADIS

Anganwadis (childcare centres) are supported by the Ministry of Women and Child Development that provide health care and community support, amongst other services. They provide early childhood development (ECD) oriented facilities to vulnerable groups and urban poor in cities and towns.

I7

The immediate surroundings of anganwadis must be made safe and playful for children and caregivers.

PLANNING CONSIDERATIONS

- Anganwadis must have clearly defined access, dedicated play opportunities and convenience from the surrounding neighbourhood. Ramps and handrails must be provided at entry/exit points for better accessibility.
- The immediate surroundings must be made safe and playful for children and caregivers with place making elements, public art, traffic calming measures, and safe crossings.
- It is recommended to locate anganwadis near a park. The anganwadi may also be located within the same premises as a school, primary health centre, or maternity hospital. In such a case, dedicated spaces with sufficient waiting areas must be provided for the anganwadi.
- The anganwandi must be child-friendly, provided with separate spaces for seating, kitchen, storage provisions, examination/ counselling room, child-friendly toilets, drinking water facility and play areas (indoor and outdoor).

DESIGN STANDARDS

- An anganwadi must have a minimum area of 56 sqm for 20 children, situated in a plot of minimum 300 sqm area.

Community infrastructure

- Footpaths with minimum clear width of 2m must be maintained along the access road(s) to the anganwadi. It is recommended to provide shaded walkways with trees and rest areas with accessible seating to create a comfortable experience for caregivers and children. These elements can be placed within an MUZ of minimum 1.5m width along the footpath.

- Appropriate traffic calming measures must be established near the anganwadi's entrance(s) for better safety of caregivers and children. Sufficient lighting also aids in improving perception of safety, and must be provided as per standard norms.

2.5. PUBLIC LIBRARIES

Public libraries play an important role in the development of society as spaces for education and community development. They are intended to be accessed by all, irrespective of age, gender and ability. Libraries can especially empower low-income communities by providing them a sense of place and belonging in neighbourhoods.

PLANNING CONSIDERATIONS

- The public library must be located in close proximity to under served communities to ensure they have easy access to the facility, especially children, women, and elderly. It may be located with other community buildings available in the neighbourhood.

- Irrespective of the size of the library unit, it must provide the minimum facilities of reading rooms and a children's section, along with adequate provisions for a canteen, accessible toilets, and parking spaces.

- For safety and fire fighting purposes, it is recommended to situate the library near a public fire brigade.

DESIGN STANDARDS

- The library premises shall abut a road of minimum 12m width. The entry/ exit gate into the public library premises should have a minimum clear width of 4.5m.

- Footpaths with minimum clear width of 2m must be maintained along the access road(s) to the library.

- Appropriate traffic calming measures must be established near the library's entrance from the road. Table-top ramps of minimum 1.2m width and 1:20 slope are recommended. Bollards may also be provided near the entrance(s) to increase safety and ensure motorists do not encroach or use the footpath.

- It is recommended to provide accessible waiting areas around the library to invite people to the public space and create a comfortable environment for all.

Additional resources:

1. *National Buidling Code-Volume I and II, India*
2. *Best Practices in Anganwadi Services by Integrated Child Development Services (ICDS), India*
3. *Guidelines for Community Health Centres, National Health Mission, India*
4. *Dignity Guidelines, India*

Best Practice

Protect the Schools

Figure 66. View of the public space in front of the school
Source: Carnet Barcelona

Barcelona, Spain

The Municipality of Barcelona launched the *Protegim les escoles* (Protect the Schools) project in 2020 to provide safe surroundings around schools, with comfortable and healthy public spaces. The project aims to offer all 585 schools in Barcelona with such spaces, that can be used by children, caregivers and others, by 2030.

Since its inception in 2020, the program has encouraged the use of traffic calming techniques, new urban furniture and greenery, and the removal of parking spots to transform the streets next to 217 schools in the city of Barcelona till 2023. There is growing evidence that school street initiatives benefit the health and well-being of kids and families from surrounding neighbourhoods. A program evaluation study of eight schools found that children, families, and locals enjoy higher-quality, more inclusive, and healthier environments due to the recently constructed school streets.

Three-times more children used public spaces where motorised vehicles were not allowed.

Impact

The study observed there was a general increase in number of pedestrians in front of these eight schools. The overall interventions adopted as part of the program led to an 80% traffic reduction in front of all schools. The decrease in traffic led to a three-time increase in use of public spaces by children where vehicular movement was limited. The program also contributed in generating more inclusive spaces for elders and children, especially girls, as the study found 20% more girls playing outside these schools, as compared to just 10% before the transformations. A 2-7% decrease in NO2 levels was also observed, which would help reduce respiratory problems in children. Overall, the program has proved to be a successful tool in achieving healthy neighbourhoods, while prioritising the most vulnerable population in favour of all citizens.

Figure 67. View of a seating installation
Source: Carnet Barcelona

Figure 68. Community participating in installation work
Source: Carnet Barcelona

Case Study

Parichaya Centres

Figure 69. View of the Parichaya Centre

Several locations in Odisha, India

Parichaya Centres are community centres built as part of a project to transform informal settlements by the Odisha state government in India. These centres aim to provide a multi-purpose platform for necessary civic infrastructure and services to 2919 de-listed informal settlements in the state, while establishing the centre as a landmark for these communities.

Key considerations to the design were climate resilience and modularity, allowing for easy replication, while being inclusive public spaces for the community. The centres had multi-functional space as the base, and additional verandas, seating areas, and a store/office room were included where possible. Larger modules of the centres included landscape and play areas. Since inception, more than 800 such community centres has been built across the state of Odisha.

800 such community centres have given local communities much needed public spaces.

Impact

These centres gave the community much needed public space where they could gather and interact. Participatory design has been an important aspect of establishing these community centres. Communities can choose from three modules with areas ranging from 100sqm to more than 200sqm. The modules are kept spatially flexible, and can be partitioned to allow for varied programming – community meetings, a classroom, a vaccination drive, an indoor sports tournament or a movie screening. This provides opportunities for the communities to use the space as per their needs and requirements, fostering a sense of ownership. The larger modules have provision for landscape and play areas, creating inclusive spaces for children and caregivers. Local communities were further invited to paint the Parichaya Centres with traditional symbols and art forms to create a relationship between people and the building, its use and maintenance.

Figure 70. View of the Parichaya Centre

8

Annexure

LIST OF SOURCES FOR DESIGN STANDARDS

1. Ministry of Road Transport and Highways book on Road Safety Signage and Signs https://morth.nic.in/sites/default/files/road_safety_books.pdf

2. Design of Urban Roads - Code of Practice

- Part I: Urban road cross section design http://164.100.161.224/upload/uploadfiles/files/IUT-1.pdf
- Part II: Intersection design http://164.100.161.224/upload/uploadfiles/files/IUT-2.pdf
- Part III: Road markings http://164.100.161.224/upload/uploadfiles/files
- Part IV: Signage http://164.100.161.224/upload/uploadfiles/files/IUT-4.pdf

3. Guidelines and Toolkit for Urban Transport Development Modules

4. NMT Guidance Document, 2016 https://smartnet.niua.org/sites/default/files/resources/nmtguidancefinal.pdf

5. Street Design Guidelines for Bhubaneswar, 2021 https://cms.bhubaneswarone.in/uploadDocuments/Notice/notice_bda_24032022.pdf

6. Street Design Guidelines for Greater Mumbai https://bicycleinfrastructuremanuals.com/manuals4/Street%20Design%20Guidelines%20for%20Greater%20Mumbai.pdf

7. Complete Street Planning Manual for Greater Chennai Corporation https://chennaicorporation.gov.in/images/Complete_Street_Planning%20Guidelines.pdf

8. Urban Street Design Guide by NACTO https://nacto.org/publication/urban-street-design-guide/

9. Footpath Design Guide by ITDP

10. National Mission on Sustainable Habitat: Report on Urban Transport https://mohua.gov.in/upload/uploadfiles/files/NMSH-2021.pdf

11. Inclusive Cities—Urban Area Guidelines https://www.adb.org/publications/inclusive-cities-urban-area-guidelines

12. Environment Safeguards: A Good Practice Sourcebook (draft) https://www.adb.org/documents/environment-safeguards-good-practice-sourcebook

13. Operational Guidelines for Setting up of Terminal Market Complex https://agriportal.cg.nic.in/horticulture/PDF/Download/Operational_Guidelines_for_Terminal_Market_Complex.pdf

14. Market Infrastructure Planning. A Guide for Decision Makers by United Nations https://www.fao.org/3/X4026E/x4026e06.htm

15. Indian Health Facility Guidelines: Part A3 Guidelines for Community Health Centres https://india.healthfacilityguidelines.com/Guidelines/Index/HFG-India

GLOSSARY OF TERMS

15-minute neighbourhood	An urban planning concept in which residents can easily reach their most daily necessities and services by a 15-minute walk from their homes.
Accessibility	Refers to the quality of being easy to get to or use.
Amenity	Anything that benefits or adds value to a location and contributes to its enjoyment, thereby also raising its value.
Anganwadi	A type of child-care centre, which may also provide basic healthcare services to the surrounding population.
Arterial road	High-capacity urban road that sits below national/ state highways on the road hierarchy in terms of traffic flow and speed. It serves as a transition between highways and the city road network.
At-grade crossing	A pedestrian or bi-cycle crossing provided at the road level.
Boardwalk	An elevated footpath, usually built of wooden planks for pedestrians to cross wet, muddy or marshy lands.
Bollard	A structure with a foundation, usually in metal, stone or concrete, placed strategically to prevent vehicular traffic from entering areas such as footpaths and cycle tracks.
Brownfield development	Building on land that has been previously built upon. The projects can range from renovation of an old building to demolition and redevelopment of abandoned and unusable sites.
Building bye-laws	The legal tools used to regulate buiding density, height, bulk and other aspects of construction to achieve an orderly development of an area.
Bus feeder system	A type of public transportation service that typically runs on shorter and localised routes to complement mass transit such as trains, express buses and metro-rails so that commuters can easily reach their destinations.
Carriageway	A width of the road on which a vehicle is not obstructed by any physical barriers or separators to move laterally.
Catchment area	An area of land from which water runs off/ drains into a river, basin or reservoir.
Collector road	A low-to-moderate capacity road which serves to move traffic from local streets to arterial roads.
Compact city	An urban area associated with dense occupation, mix-use buildings and access to quality public transport.
Cyclability	The degree of ease of bicycle movement. A cyclable road is one that is fit for or designed to accommodate bicycle riding.
Cycle lane	Portions of a roadway set aside for cycle use, with the lanes distinguished from the motor vehicle portion of the roadway by painted strips, kerb or parking blocks.
Cycle track	A path separated from motor-traffic for cyclists to use.
Encroachment	The condition that occurs when a property owner intentionally or unintentionally trespasses into their neighbour's property by building beyond their property line/limit.
Equitable access	Ensures people with mobility impairments or vulnerabilities have the same opportunities as able-bodied people to access all parts of the network and at the same comfort levels.

Equivalent car space	It is the space equivalent of the parking space required for one car.
Footfall	Presence and movement of people walking around in a particular space.
Grade separated crossing	A pedestrian or bi-cycle crossing that is over or under the road.
Greenfield development	Building on a fresh, open land parcel that does not involve any demolition, reconstruction or rehabilitation of existing structures.
Inclusive space	A space that makes one feel safe, welcomed and belonged regardless of their socio-economic background and cultural identity.
Informal settlement	The residential area of a group of people who do not have legal security of staying in the area either due to illegal occupation or informality of rental deeds.
Intersection	An area shared by or a point where two roads meet. This area is designated for vehicles to change their direction of movement, and for pedestrians to cross, to reach their desired designations. Intersections can be signalised or non-signalised, to manage the traffic flowing across them.
Kerb	A stone edging to a pavement or raised path.
Land-use	The process of regulating the human use of land by a governing authority. It is usually done to promote social, economic and environmental outcomes by efficient use of resources.
Landscape buffer	A strip of land provided with grass/ shrubs/trees to create a safety barrier for pedestrians between the road and footpath.
Last-mile connectivity	The umbrella term for different modes of transport used by commuters to reach their destinations from a larger, primary public transport.
Local road	A street that is primarily used to gain access to the property bordering it.
Master plan	A long-term conceptual plan for a district, city, neighbourhood or waterfront done by a governing body. This is usually revised once every few years.
Median	The area between opposite lanes of traffic, usually defined by pavement markings, raised medians or islands.
Mid-block crossing	The designated areas between two road intersections for pedestrians to safely and conveniently cross the road.
Mobile Urban Elements	The temporary physical units of the city placed in public spaces usually referring to street furniture.
Mobility	The potential for movement and the ability to get from one place to another using one or more modes of transport.
Modular	A design approach that divides a larger system into individual elements called modules that can be created independently.
Multi-modal hub	A transport node where people can switch between different modes of transport.
Multi-modal transport	A travel journey that includes at least two different modes of transport such as rail, bus, walking etc.

Multi-utility zone	Part of the footpath is allocated for necessary utilities needed for the street such as vendors, seating, landscaping, streetlights, signages etc. so that the waking space is clear of obstructions.
Neighbourhood	An area surrounding a particular place, person, or object, loosely demarcated by a group of streets, landmarks, etc.
Pavement	A path on the sides of a road for people to walk on.
Paver block	The porous blocks, generally made of stone, cement and/or clay to cover the pavements and footpaths.
Pedestrian crossing	Designated crossing where pedestrians may safely cross a road or intersection.
Placemaking	The creation of spaces centred around people and communities, strongly relying on their needs and aspirations.
Rajakaluve	The Kannada word for a storm water drain.
Ramp	An inclined plan, usually in RCC, allowing access to footpaths, and vehicular access to properties.
Refuge island	The protected space at the medians in the centre of two-way roads to facilitate pedestrians and bi-cyclists to pause safely before crossing the other side.
Right-of-Way	The width of the public road and public area, belonging to the municipality - from property edge to property edge - to be used for mobility and public amenities.
Sewage treatment plant	A place to treat sewage before discharging the wastewater such that it does not harm the environment and public health.
Signage	A board of information that guides people in using public spaces.
Streetscape	The collective appearance of buildings, footpaths, and landscaping of a road which forms the visual and experiential quality of the space.
Storm water drain	A channel or pipe to carry excess rain and ground water away from impervious surfaces such as roads, car parks, parking lots, footpaths etc.
Sub-arterial road	A road connecting arterial roads to areas of development and carrying traffic directly form one part of a region to another.
Subway	A tunnel under the road, generally used by pedestrians to cross the road.
Tactile element	An element made of a surface material that is desirable to touch and feel.
Tender	A formal offer made for the supply of goods and services in response to an invitation for tender published.
Traffic volume	The amount of traffic at a particular time. More specifically, the number of people or vehicles that pass a cross-section of the road or a transport facility during a specific perriod, usually one hour.
Transverse bar marking	It is a traffic calming measure provided at accident-prone zones by making repeated bar markings on the carriageway to alert the drivers and reduce vehicle speeds.
Travel lane	A strip of width 2.75-3.5m, delineated to with paint, on a road to accommodate a single line of vehicles.

Universal accessibility	The character of an environment that makes it usable by everyone, including people with disabilities.
Urban road	Roads that are characterised by low-moderate traffic speeds, infrastructure development, designed with intersections, pavement, parking facilities.
Urban sprawl	The unplanned and, usually, uncontrolled population growth around city limits. This phenomenon is generally accompanied by rapid construction, inefficient use of land, transport and resources.
Vernacular architecture	The design that uses locally available resources and traditions to address local building needs. Vernacular architecture evolves over-time to reflect the environmental, cultural and historical context in which it exists.
Walkable footpath	A footpath is regarded as walkable if two people can walk on it side-by-side without having to step onto the road.
Watershed	An area at the ridge of land that separates water flowing into different water bodies.
Wayfinding	The use of signage, colour and other design elements to help people navigate a space.
Wetland	An area with the presence of water at or near the surface of soil for a significant part of the year.

ABBREVIATIONS

BAFRA	Bhutan Agriculture and Food Regulatory Authority
BBMP	Bruhat Bengaluru Mahanagara Palike
BDA	Bangalore Development Authority
BMC	Brihanmumbai Municipal Corporation
BMWM	Bio-Medical Waste Management
BRTS	Bus rapid transit system
CBOs	Community based organisations
CCTV camera	Closed circuit television camera
CFM	Centenary Farmer's Market
CMP	Comprehensive Mobility Plan
CPHEEO	Central Public Health and Environmental Engineering Organisation
CSOs	Civil society organisations
CSR	Corporate social responsibility
DULT	Directorate of Urban Land Transport
ECD	Early childhood development
ECS	Equivalent car space
EPIP Zone	Export Promotion Industrial Park Zone
EV	Electric vehicles
GDP	Gross Domestic Product
GHGs	Greenhouse gas emissions
GoI	Government of India
IPHS	Indian Public Health Standards
IPT	Intermediate public transport
IRC	Indian Road Congress

ITC	Infant-toddler-caregiver
ITCN	Infant-toddler-caregiver neighbourhood
ITDP	Institute for Transportation and Development
Jana USP	Jana Urban Space
LAP	Local Area Plan
MBRDI	Mercedes-Benz Research & Development India
MLA	Member of the Legislative Assembly
MLD	Millions of liter per day
MUBs	Multi-utility belts
MUZ	Multi-utility zones
NACTO	National Association of City Transportation Officials
NCWC	National Commission for Women and Children
NDCs	Nationally Determined Contributions
NGOs	Non-governmental organisations
NGT	National Green Tribunal
NHM	National Health Mission
NIUA	National Institute of Urban Affairs
NMT	Non-motorised transport
O&M	Operations and Maintenance
PBS	Public bicycle sharing system
PHC	Public health centres
PPP	Public–private partnership
R.O.W.	Right-of-way
RCPs	Representation Concentration Pathways
RWAs	Resident welfare associations
SAZ	School access zone
SDAs	Slum dweller associations
SDGs	Sustainable Development Goals
SHGs	Self-help groups
SLOAP	Spaces Left Over After Planning
SPZ	School proximal zone
STP	Sewage treatment plant
SWD	Storm water drain
TBM	Traverse bar marking
TCM	Traffic calming measures
Tender S.U.R.E.	Tender Specifications for Urban Road Execution
TOD	Transit Oriented Development
TZ	Transition zone
UHI	Urban heat island
ULBs	Urban Local Bodies
UNFCCC	United Nations Framework Convention on Climate Change
UPHC	Urban primary health centre
URDPFI	Urban and Regional Development Plans Formulation and Implementation
USDG	Urban Street Design Guidelines
WC	Water closet
WHO	World Health Organization

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