# Compact City Concept: Applicability in Indian Cities

Thesis submitted in
Partial Fulfilment for
the Award of the Degree of

**Master of Urban and Regional Planning**

by

Bhavini Bharat Lodaya
Second Semester, MURP II – 2020-21

Primary Guide: Ms. Hiral Shah
Secondary Guide: Ms. Khyati Rathod


Master of Urban and Regional Planning (MURP) Program
Department of Architecture
Faculty of Technology and Engineering
The Maharaja Sayajirao University of Baroda
D. N. Hall, Pratap Gunj, Vadodara, Gujarat, India

**JUNE 2021**

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**CERTIFICATE**

# Compact City Concept: Applicability in Indian Cities

The contents presented in this Thesis represent my original work and it has not been submitted for the award of any other Degree or Diploma anywhere else.

**Bhavini Bharat Lodaya**

This Thesis is submitted in partial fulfilment of the requirements for the Degree of Master of Urban and Regional Planning
at the Department of Architecture
Faculty of Technology and Engineering
The Maharaja Sayajirao University, Vadodara, Gujarat, India
The present work has been carried out under our supervision and guidance and it meets the standard for awarding the above stated degree.

**Primary Guide:**
Ms. Hiral Shah

**Secondary Guide:**
Ms. Khyati Rathod

**Head of the Department,**
Dr. Bhawana Vasudeva.
Department of Architecture

**Dean**, Prof. C. N. Murthy
Director of the Master's Programs,
Faculty of Technology & Engineering, The Maharaja Sayajirao University

## Abstract

With the increasing urbanization, the core of the cities have started to accommodate more commercial activities resulting in less open green spaces and recreational places. People have started to move towards the outskirts of the city to live a peaceful and healthy life close to the nature and away from the hustles of the busy city core. This has resulted in haphazard and unplanned growth of the city as well as increase in travel time, energy and fuel consumption and traffic congestion on roads during the peak time for the job opportunities, daily essentials and services etc. Compact city can be viewed as a solution to this. The compact city concept promotes high residential density with mixed of use development. The mixed-use development helps to provide daily essential facilities and services such as hospitals, banks, schools, parks, shopping complexes etc. in 10-15 minutes walking distances.

The compact city conception is adopted in urban planning policies of many developed countries for the advantages like economical use of land while curtailing sprawl, reduction in transport network and reliability on mass transport, providing a socially interactive surroundings with vibrancy of activities, economic viability, etc. However, the application of compact city policies in developing countries continues to be debatable. Considering the compact city as a standard blanket solution in any context can be questionable and problematic. There's a necessity for developing additional compact city theories that match the context of developing countries. New theories need to customize selective choices of the compact city practices and policies in developed countries to match the new context.

The research tries to explore the applicability of the concept in Indian context. It tries to study the methodology and processes of policies framed in OECD's compact cities Toyama, Melbourne and Portland and Indian cities Pune and Nagpur which have adopted the compact city policies in their recent development plans. The analysis of the data has been on only four factors; land use, mobility, population density and open and green spaces. The policies and its outcomes have been studied and further on the basis of the findings and conclusions derived from the outcomes, a set of recommendations for the applicability of compact city policies in Indian cities have been suggested.

This thesis is dedicated to my parents,

**Mrs. Meena Lodaya and Mr. Bharat Lodaya,**

For their constant support and encouragement.

# Acknowledgements

First and foremost, I would like to thank God, with whose blessings I have finally completed my thesis.

I would also like to extend my deepest gratitude to all the people who supported and encouraged me throughout my thesis period.

I'm extremely grateful to my thesis guides, Ms. Hiral Shah and Ms. Khyati Rathod, for their valuable time, support and guidance. I would also like to express my gratitude towards the head of the department, Dr. Bhawana Vasudeva and all the faculties and staff of the department. I thank them all for the extensive amount of time and effort they have spared for me. This wouldn't have been possible without your help.

I would like to thank my parents and my siblings for their encouragement and patience throughout the duration of this project. Thank you for believing in me and having faith in my work.

I would like to express my gratitude to all my friends who stood by my side throughout my study. Their unwavering support and invaluable encouragement made it possible for me to achieve this. Thank you.

Last but not the least; I would like to thank all my classmates for their help and advice whenever required.

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## Abbreviations:

OECD- The Organization for Economic Co-operation and Development

USA- United States of America

NMC-Nagpur Municipal Corporation

PMC- Pune Municipal Corporation

NPO- Non-Profit Organizations

CBO- Community Based Organizations

NGO- Non-governmental Organization

TVC- Town Vending Committee

ULB- Urban Local Body

WHO- World Health Organization

MLIT-Ministry of Land, Infrastructure, Transport and Tourism, Toyama

CIP- Capital Improvement Program, Portland

TMA- Transportation Management Association, Portland

TDM- Transportation Demand Management, Portland

CMP- Comprehensive Mobility Plan

LRT- Light Rail Transit

# Chapter-1

## Introduction

With the increasing urbanization, the core of the cities has started to accommodate more commercial activities resulting in less open green spaces and recreational places. Because of this, the cores of the cities have become less liveable due to the constant air and noise pollution produced from the commercial activities carried out all day long. People have started to move towards the outskirts of the city to live a peaceful and healthy life close to the nature and away from the hustles of the busy city core. This has resulted in haphazard and unplanned growth of the city as well as increase in travel time, energy and fuel consumption and traffic congestion on roads during the peak time for the job opportunities, daily essentials and services etc. This has also increased the burden on the development authorities to cater the infrastructural needs of the expanding city. This scenario is enormous in large cities with more and more people attracted to these cities for job opportunities as well as for a better standard of living. The compact city concept has been viewed as the solution for the sprawling of the city and the problems derived from it.

The compact city concept promotes high residential density with mixed of use development. The mixed-use development helps to provide daily essential facilities and services such as hospitals, banks, schools, parks, shopping complexes etc. in 10-15 minutes walking distances. The main emphasis is put on to reduce the private transportation by introducing efficient public transport facilities and encouraging walking and cycling. It helps to reduce the private vehicle dependencies which reduces the consumption of fuels, energy emissions and traffic congestion and is helpful to reduce the pollution to save the environment as well as improve the health of the people. It also focuses on providing good public spaces and natural landscapes to improve air quality and also to increase the aesthetics of the city. Landscaping along the roads helps to provide shade and cool environment to the pedestrians and the cyclist and also helps to reduce the heat blooms of the city. It may also help to recharge ground water level by absorbing rain water and prevent flooding. A city can be divided into various self-sufficient neighbourhoods each having their own recreational spaces along with

overlapping of diverse public and private activities instead of similar activities. The network of these neighbourhoods can be addressed as a compact city. An effective public transport system connecting these neighbourhoods will further provide easy accessibility to the people of the city for their daily needs.

It is held that compact cities are able to improve environmental sustainability and establish ways for environmental enhancements. The situation that daily services are locally provided within walkable distances among pedestrian-friendly environments, and access to efficient public transportation available would minimize commuting distances and reduce reliance on private cars. Hence, consumption of energy sources, mainly fossil fuels, would decrease and emission of greenhouse gases would accordingly decline. Compact city policies can be useful to limit pollution, and help to protect resources. In addition, compact cities are assumed to be more sustainable as they generally result in more efficient land use and lower rates of land consumption. Research has shown that the implementation of compact city policies, though hard to pursue, have strong potential to limit urban sprawl. Limiting sprawl and reducing land consumption through compact city approach helps to avoid green development on the urban periphery, thus minimize loss of green areas and vegetation and protect agricultural land and valuable natural areas. In short, reducing the pressure of urban development on rural and agricultural land are also environmental benefits of the compact city.

Research has also suggested that compact city policies are positively associated with social sustainability and cultural development. It is noteworthy that social sustainability in this context involves two broad aspects, namely social equity and living quality. It is assumed that compact city policies can improve the quality of the urban life and enhance the social equity. More specifically, compact cities can directly increase the liveability of cities and provide a better quality of life through good public transport, proximity to services, opportunities for walking and cycling and preservation of green structures and public open spaces. Moreover, high urban density and mixing of land uses are anticipated to stimulate social interaction and cultural vitality; thereby, increase social mix, reduce social segregation and positively contribute to social equity. In this regard, compact cities have been considered more socially equitable compared to urban sprawl; since sprawl is usually created by the higher class of the society which

produces a spatial segmentation of the society based on the difference in their income. Likewise, the expected affordability of public transport and the enhanced overall acceptability can contribute to an equitable access to jobs and facilities thereby more social fairness.

Furthermore, the correlation between compact city policies and housing affordability, as one aspect of social justice, has been frequently addressed. Supporters of the compact city hold the belief that the policy has a positive impact on housing affordability as it can increase the supply of affordable housing. Given that urban compaction policies promote higher density land use including multi-family houses, which implies sharing a single land parcel among a number of dwellings, the final cost of each housing unit will decrease. Increasing the available number of cheaper-price dwellings means enabling more households to afford reasonable housing. In turn, this can enhance the aim of creating inclusive communities and reduce social segregation.

Turning to the economic sustainability of the compact cities, literature has revealed that development of compact cities makes economic sense. There is some evidence that compact cities are likely to create a considerable reduction of the costs of utilities and physical infrastructure. First, it is noticeable that higher densities allow for more cost-efficient delivery of services and utilities. Second, the development of compact cities can reduce the public spending and bring economic benefits to local governments by reusing existing infrastructure. Third, compact cities, which limit sprawl, can avoid the need for further construction of costly infrastructure in the suburban areas. Overall, in terms of capital costs and running costs, studies have indicated that compact development is less costly as sprawl. In turn, this saving would allow for further investment in inner-city areas and for an alleviation of the level of the delivered infrastructure; therefore enhance their living quality. Yet, economic benefits associated with compactness are not limited to the costs of infrastructure. Compact city policies can help to enhance business and trading activities within the city's borders. The justification is that highly populated urban areas, which are associated with compact cities, can reinforce local economies and support local businesses and services.

**Key Words:**

Compact city, Sustainable transportation, Indian Cities, High population Density.

## 1.1. Problem Statement:

The compact city conception is adopted in urban planning policies of many developed countries for the advantages like economical use of land while curtailing sprawl, reduction in transport network and reliability on mass transport, providing a socially interactive surroundings with vibrancy of activities, economic viability, etc. However, the application of compact city policies in developing countries continues to be debatable. Although the forces behind urban growth are common, there are vast variations among cities around the world, particularly between the developed and the developing countries' cities. Hence, imitating compact city policies of the developed countries for the cities in developing countries like India isn't practical. The element of informal development is high within the developing countries that could be a barrier to the success of the compact city policies. Higher population density which is one of the key ingredients of a compact city is one of the main characteristics of Indian cities. However, there'll be a rise in urban built-up space in growing Indian cities, and gross densities might decline, leading to sprawl. As an adverse impact, additional land for urban use and additional fuel for transport are going to be consumed.

## 1.2. Research Premise and Rationale:

The suitability of the compact city policy to developing countries and the opportunity to borrow from the experiences of the developed countries is coming to question. Studies take into account the compact city a potential solution for developing countries in general (OECD, 2012, p.163). However, urban planners are concerned about generalizing the suitability of the compact city approach to developing country cities. According to Burgess, the significant difference in nature between developing country's cities makes a generalization about the compact city-developing countries relationship invalid. Considering the compact city as a standard blanket solution in any context can be questionable and problematic. There's a wide consensus that the relevance of the compact city to a given urban area is context dependent, and that recognizing the context's characteristics and needs are the keys to finding compact city strategies that are most suitable for a given town or a settlement pattern. There's a necessity for developing additional compact city theories that match the context of developing countries. New theories need to customize selective choices of the compact city practices and policies in developed countries to match the new context. It's the task of

local planners and policymakers to develop the pattern that matches their own environment. This theoretical discussion validates the view that compact city ways need to be contextualized not generalized. Additionally, it reveals that developing countries do not need to reinvent the wheel; but, they can seek advice from the experiences of the developed countries as a raw model that they can re-shape and further develop.

## 1.3. Research Framework:

### 1.3.1. Aim of the Research:

- To identify the factors affecting the compact city policies in Indian cities and to suggest compact city guidelines.

### 1.3.2. Objective of the Research:

- The objective of the research is to do the comparative study of the compact city policies applied in OECD's (The Organization for Economic Co-operation and Development) compact cities (Toyama, Melbourne and Portland) and two Indian cities (Nagpur and Pune) and finding out the similarities and differences in their processes and methodologies to achieve the compactness. The analysis is to be done on:
  - Land use
  - Mobility
  - Population density
  - Green and open spaces
- Further on the basis of clues obtained from their policies and methods, factors which will be crucial for the application of compact city concept in context to Indian cities are to be identified.
- To provide guidelines to achieve the compactness in the Indian cities.

### 1.3.3. Research Questions:

- Is the concept of compact city applicable in Indian cities?
- What factors will affect the compact city policies in Indian cities and how?
- Can the high density of population in Indian cities benefit and support the compact city approach?

### 1.3.4. Scope of the Research:

- The scope of the research is to study the implementation of the compact city policies in the Indian context by comparing the policies implemented in the selected international as well as Indian cities.
- There are many components of the compact city concept but due to the time constraint, I intent to study only the following four factors:
  - Land use.
  - Mobility.
  - Population density
  - Open and green spaces.
- The study is done on the basis of secondary data collection and literature review.

### 1.3.5. Research Method:

This thesis is based on a **comparative approach**: it looks at policies that have been adopted in the selected cities and compares and analyses the outcomes. It is based on literature review, development plan reports and urban planning initiatives carried out in the selected cities. The analysis is carried out on the policies for compact city components like land use, mobility, population density and green and open spaces.

### 1.3.6. Conceptual Framework:

The research is divided into the following five parts:

- **Perception Study:**

  This chapter focuses on the current scenario in the Indian cities related to the unplanned growth of the city and problems arising from it. It also discusses the need of carrying out the study, aim, objectives and scope of the study. Further, on the basis of the factors and variables the cities which are most suitable for the study are selected and framework to conduct the research is also formulated.

- **Literature Review:**

  This section covers the introduction to the compact city concept, its components and variables and case studies related to the application of this concept in Indian and International cities.

- **Data Collection:**

  Data collection part includes the secondary data of the cities selected such as development plan reports, master plan reports, mobility reports, accessibility reports, transportation network reports, land use maps and any specific or special urban planning initiatives carried out by these cities.

- **Data evaluation and Analysis:**

  In this section, the evaluation and analysis of the policies of the cities is to be done. The evaluation of the policies related to the following is carried out:

  **Land Use:** The policies for increasing mixed use of land, policies for developing new quarters of efficient land use, policies for developing multiple city-centers etc. are studied.

  **Mobility:** The policies for implementation of public transport, policies for mobility through non-motorized modes of transportation, policies to provide infrastructure facilities to promote walking and cycling etc. are studied.

  **Population Density:** The policies for affordable housing and domestic living spaces, policies for accessibility and sufficiency of facilities, policies for health and well-being of the people etc. are studied.

  **Open and Green Spaces:** The policies for the prevention and protection of the environment, policies for the enhancement of existing recreational spaces and planning for new spaces etc. are studied.

- **Conclusion and Recommendations:**

  This section covers the conclusions drawn after the evaluation and analysis and further recommends the guidelines for the application of these compact city policies in the Indian context and also the policies for the future development of the cities to keep the compact nature of cities intact.

## 1.4. Selection and Justification of the Cities:

For the comparative study of the compact city policies, three international cities and two Indian cities are selected. The international cities selected are amongst the best compact cities around the world according to OECD's (The Organization for Economic Co-operation and Development) compact cities' policies, 2012. These cities are Toyama (Japan), Melbourne (Australia) and Portland (USA). They display a wide variety of metropolitan profiles in terms of geographical location, population size, etc. Moreover, the five regions have introduced a variety of policy instruments, each shaped by their local circumstances. These cities are the classic examples of the compact city concept not because they have already attained the goals of the compact city but because they are making significant efforts to towards achieving and maintaining these goals.

The Indian cities which are selected include Nagpur and Pune. Nagpur development plan focuses on the development along the public transport system and provision of mixed land use with high population density and easy accessibility while Pune has developed circularly over the years. Mixed-use development is predominant in the city core of the Pune city. These cities have a legacy of mixed land-use characteristics, with commercial-residential use being the most common. The recent development plans of these two cities have tried to incorporate compact city policies in their city planning process.

### 1. Toyama, Japan:

Located nearly 250 kilometres (km) northwest of Tokyo on the central Japanese island of Honshu, Toyama city is a key centre for the high school, robotics, banking, and pharmaceutical industries and is additionally home to a significant hydroelectric power industry.

The city's natural setting is on a sediment plain, with two major rivers and eight minor rivers, and is located between the 1,200-meters-deep waters of Toyama Bay and the 3,000-meter peaks of the Northern Japan Alps. Toyama covers an oversized area of 1,242 sq. kilometres with the land starting from sea level at Toyama Bay to the 3000 meter-high (10,000 feet) crest of the Northern Japan Alps that is barely thirty four kilometres from the city centre. The recorded annual snowfall on the

Northern Japan Alps is among the highest within the world. The significant snowmelt and loose volcanic soils underneath the city can combine to supply major floods. Additionally, 70 % of town lands are wooded, and there are extensive agricultural lands in town limits.

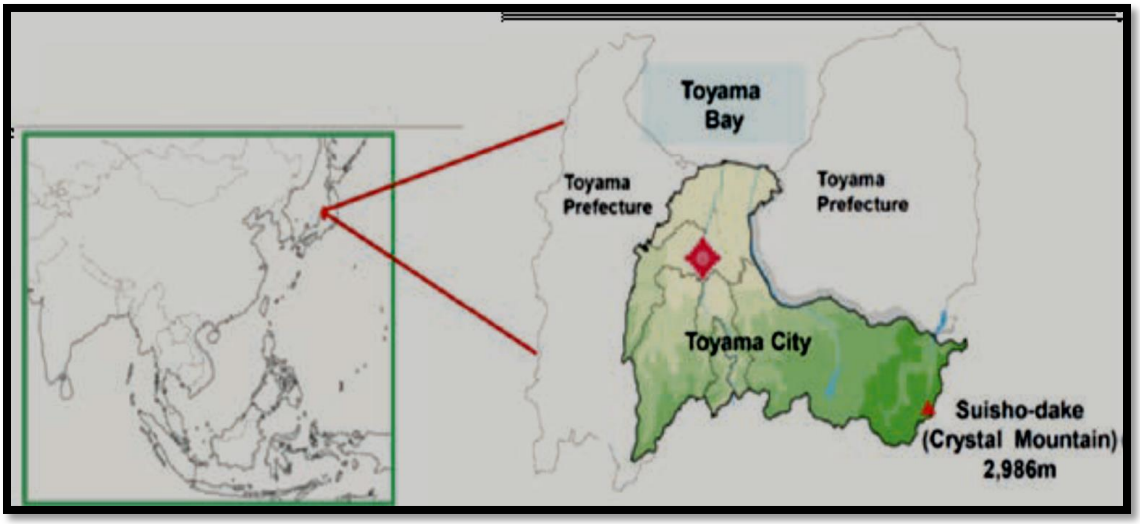


Figure 1.1 Location of Toyama City

*Source: The Development Story of Toyama- Reshaping compact and livable cities, 2019.*

## 2. Melbourne, Australia:

Melbourne, city is the capital of the state of Victoria, Australia. It's situated at the top of Port Phillip Bay, on the south-eastern coast. The city centre is home to approximately 136,000 folks and is the core of an extensive metropolitan area—the world's most southerly with a population of more than 1,000,000. In Australia it's second only to Sydney in population.

Metropolitan Melbourne is located at the northern end of Port Phillip Bay, thirty nautical miles (55 km) from the bay's narrow entrance. Most of the flat parcel of land is less than 390 feet (120 meters) above mean sea level. The growth of Melbourne from its origins at the mouth of the Yarra River to its present form displays a powerful correlation with the geology and drainage of the land. West of the initial city site, basalt flows throughout the Cenozoic era (i.e., the last sixty five million years) filled the present valleys and left flat, uniform plains.


Figure 1.2 Location of Melbourne city

*Source: Melbourne development plan, 2030.*

Melbourne's weather results from the eastward flow of aggressive cells separated by unaggressive troughs. These patterns pass south of the continent in summer and over northern Victoria in winter. The annual precipitation of twenty six inches (660 mm) is fairly evenly distributed throughout the year, with October typically the wettest month and January the driest. Temperatures are moderate, solely rarely falling below freezing; average daily maximum temperatures vary from fifty five °F (13 °C) in July to seventy nine °F (26 °C) in January.

### 3. Portland, USA:

Portland is Oregon's largest city, with a metropolitan area population of about two million. It's located at the confluence of the Willamette and Columbia Rivers. As of 2019, Portland had an approximate population of 654,741, making it the twenty sixth most inhabited cities within the United States. Portland features a warm-summer Mediterranean climate falling simply short of a hot-summer Mediterranean climate with cool and cloudy winters, and warm and dry summers. This climate is characterized by having overcast, wet, and dynamic atmospheric condition in fall, winter, and spring, as Portland lies in the direct path of the stormy westerly flow, and delicate and dry summers when the Pacific High reaches in northernmost point in

mid-summer. Winters are cool, cloudy, and rainy. The coldest month is December with an average daily high of forty six.3 °F (7.9 °C), though overnight lows sometimes stay higher than chilling by some degrees.


Figure 1.3 Location of Portland city

*Source: Portland's plan 2030.*

Portland additionally referred to as the "City of Roses," is the results of both probability and planning. Having obtained its name by the flip of a coin, the city is nowadays the model of a metropolitan area that has been effectively integrated with its atmosphere through controlled growth and development. Located within the natural beauty of northwest Oregon, Portland is laced with parks, gardens, and fountains and it lacks big-city issues such as traffic congestion, pollution, and litter. A deep-water port, international airport, and a various economy build Portland a thriving industrial centre; however the primary commitment is to conserving the city's individuality, its healthful atmosphere, and its friendly atmosphere.

## 4. Nagpur, India:

Nagpur is recognized as one of the speedily developing central India's metro city and additionally ranks third in the list of the urban centres in the state of Maharashtra. Nagpur enjoys the privilege of being termed as the richest town, greenest town, town with latent potential, hub of health care business within the state, tiger capital of the country, etc. As per R. K. Swamy's BBDO Guide to Urban Markets, 2005, Nagpur is considered to be the tenth richest town within the country. It's additionally second greenest town within the country.

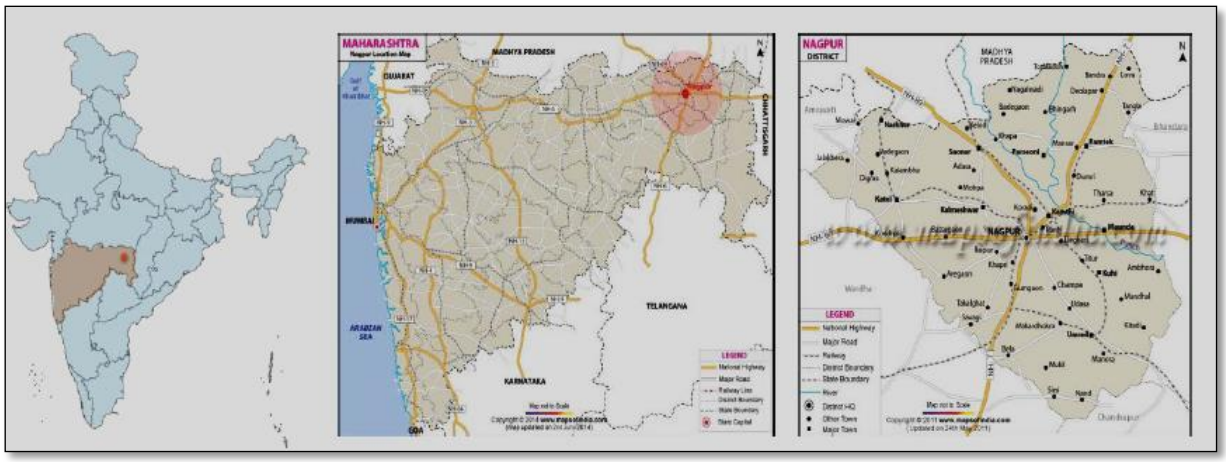


**Figure 1.4 Location of Nagpur City**

*Source: City Development Plan for Nagpur, 2041.*

Nagpur is a crucial urban centre in the Vidarbha region. Nagpur is the administrative capital of the district and therefore the largest urban centre in the district in terms of population and area. The city is a part of the Nagpur division. The Nagpur Municipal Corporation (NMC) has jurisdictional area of approximately 225.08 sq. km and it is further divided into 136 administrative wards. The population of town as per the 2011 census is about 24.48 lakhs. It is situated in the eastern part of Maharashtra. The city is located is found is found is found is found latitude. Nagpur is located at an altitude 310.5 m higher than mean sea level. Nagpur is classed as a town with tropical wet and dry weather conditions. Usually, the summers are hot and winters are cold in the city. The average precipitation during a day is about 92 millimetres.

Nagpur gets precipitation during the period of June to September because of the southwest monsoon. The city experiences extreme hot summers (March to May) with temperatures rising up to 48°C. Extreme summers are experienced throughout the month of May, and those days are locally mentioned as “Nava Tappa‟. Throughout November to February, the temperature drops as low as 10°C to 12°C. The least temperature is recorded throughout winters in the month of December, around 4°C.

### 5. Pune, India:

Pune has emerged as an outstanding location for manufacturing industries, and has currently been recognized as the information technology hub and education hub of the country. The city is contact covering of 243.84 Sq.km with a population of over three million. The rapid growth of the city has transformed from its character as Pensioner’s city to educational – centre and currently to an active economic centre. The city is known as the Oxford of the East and the cultural capital of Maharashtra. Pune is additionally one amongst the foremost renowned places among tourists coming to Maharashtra. The educational institutions, presence of variety of industries and branches of nearly every array have made Pune a prosperous city.

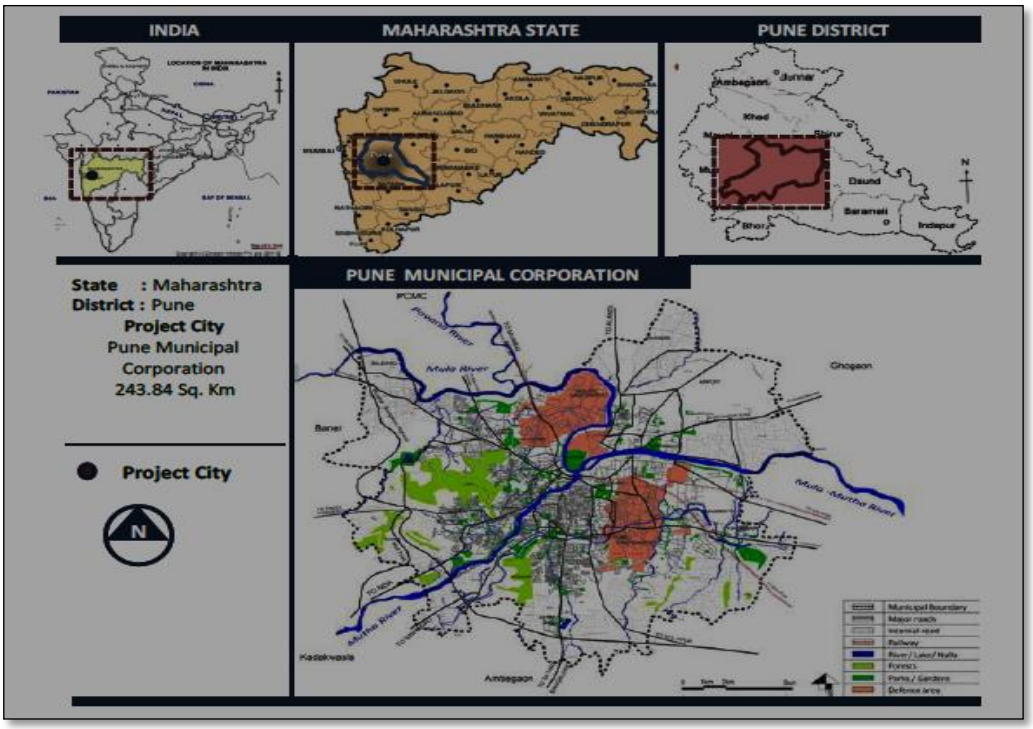


Figure 1.5 Location of Pune City

*Source: City development plan Pune, 2041.*

Pune city is situated in Pune District in the western region in Maharashtra state between 180 32' North latitude and 720 51’ East longitudes. It’s at an altitude of 560 m above mean sea level. The overall topography is contributory with its different ridges and valleys that culminate in the formation of independent watersheds, sloping towards Mutha and Mula rivers. These rivers are principal carriers of flood waters. Pune contains a tropical wet and dry climate, with three distinct seasons- summer, rains and gentle winter. The peak above sea level and the leeward location with regard to the Western Ghats have created the city climate moderate and salubrious. The weather is the warmest in the month of April in Pune. Even throughout the hottest months, the nights are usually cool because of Pune's high altitude. The evening breeze from west and north-west keeps the city summer night temperature within the bounds of comfort levels. The monsoon lasts from June to October, with moderate precipitation and temperatures. The winter sets in November and lasts until mid-February, whereas the summer slowly starts in March and lasts until mid-June.

The temperature usually ranges from 20°C to 30°C in the city of Pune. Typical summer months are from March to May, with maximum temperatures starting from 35°C to 38°C. The monsoon lasts from June to October, with moderate temperatures starting from 25°C to 27°C. Delicate winter begins in November; the daytime temperature hovers around 29°C whereas night temperature is below 13°C for most of December and January, usually dropping to 5°C to 6°C.

# Chapter 2

# Literature Review

## 2.1. Introduction to the Compact City Concept:

The compact city is a broadly outlined set of objectives instead of a single outcome. The conception idealizes a city that's distinctively urban in very general terms of density, however conjointly in more specific terms like a contiguous building structure, interconnected streets, mixed land uses, and the manner individuals travel within the city. Discourses of conviction regarding the compact city are heavily adopted by policy makers. Compact cities are promoted for increasing productivity because of agglomeration economies, for supporting sustainable city outcomes like shorter journeys, and for having smaller ecological footprints and better city health (Gleeson, 2013). Whereas the compact city conception still generates discussion, policy makers expect it to play a role in achieving sustainable town objectives as itemized by UNEDP, the World Bank (World Bank, 2010) and the OECD. Whereas the degree of spatial concentration of economic activity in urban areas is already high, the final consensus within the international policy discussion is that, on average, even higher densities within cities and urban areas are fascinating (cooper, 2011).

The vision of an ideal compact city has been progressively prospering. Most countries pursue policies that implicitly or explicitly aim at promoting compact urban form by now (OECD 2012; shopping centre Council of Australia 2011; IAU-IDF 2012), be it at the metropolitan (usually observed as ‘compact city policy’ or neighbourhood (usually spoken as ‘compact urban development’) level (OECD 2012; Geurs & van Wee 2006; Burton et al. 2003). Implicit to the wide support the ideas receive within the urban policy discussion, is the agreement that for the most part the returns to density and compactness exceed the cost, which can come in the shape of reduced affordability, traffic congestions, a high concentration of pollution, and loss of open and recreational areas. Critiques of the idea of the compact city, although present, are later on not as keenly adopted by policy discourses (Neuman 2005; O’Toole 2001; Cheshire 2006). Additional specific compact policies, like density or green belt policies have been more widely susceptible to critique because of their adverse effects on affordability (Cheshire & Hilber 2008; Thompson 2013).

The OECD defines the compact city as a ‘spatial urban form’ which is characterized by ‘compactness’ (OECD 2012, p.15). Its most up-to-date definition delineated the characteristics of the compact city as ‘dense and proximate development patterns,’ ‘urban areas connected by public transport systems’ and ‘accessibility to local services and jobs’ (OECD 2012, p.15). The term compact city is usually said to possess first been utilized by Dantzig and Saatay (1973) who were principally curious about a more economical use of urban resources. It conjointly stems from the critique of modernist planning approaches (Jacobs 1961), supporting both density and mixed use in line with a European-style address of inner-city areas. Its origins in this theoretical framework quickly make a case for the literature’s concentration on certain outcomes, like sustainable mode choice and improving accessibility (Thomas & Cousins 1996). Compact city policies focus on holistic approaches to attain ‘compactness’ by impacting on the ways urban environments are used. It is the comprehensive approach of compact city policies which are expected to fulfil a series of urban sustainability objectives by improving social, economic and environmental dimensions of the city, that have made them so popular.

Churchman (1999) first provided an itemized disentangling of the benefits and drawbacks of compact city features on economic, social, and environmental outcomes revealing the complexness and heterogeneity or the idea. Neuman (2005) conjointly presents a useful critique in his juxtaposition of ‘compactness’ and ‘sprawl’, however as with different publications that discuss the conception, the presence of various definitions of the compact city amplifies the difficulties in understanding characteristics and outcomes and generates confused discussion. The confusion additionally stems from rhetoric through case-study analysis (Neuman 2005; Williams et al. 2000; Roo & Miller 2000) of whether or not compact cities are sustainable, rather than addressing potential costs and advantages more specifically (with some exceptions (Churchman 1999)). In discussing specific outcomes, the literature focuses on the reduction of automobile journeys and the exaggerated use of alternative modes of transportation (Burton 2000; Schwanen et al. 2004; Neuman 2005), improving the environmental qualities of cities (Burton 2002; and the 1999) and therefore the provision of high-density housing in the proximity of retail and to support equity (Burton 2001; churchman 1999). Although the rhetoric focuses on these aspects, innumerable more mentioned.

## 2.2. The History of Compact City Concept:

The idea of compact city has evolved. The initial idea of compact city is the protection of natural environment and agricultural land from urban expansion. Recently, compact city has become a measure to fight against global climate change and energy crisis. The evolution of compact city is as follows (OECD, 2012):

**a) The emergent compact city:**

The traditional compact city emerged in the middle Ages. Residents got well protected within the wall which becomes an ancient compact city pattern. However, the eighteen-century industrial revolution and enormous amount of individuals moving into cities had radical impacts on the wall.

**b) Improve the living condition in the urban space:**

In eighteen- and nineteen- century, large-scale urbanization had led to reduction in open areas. Additionally, inadequate public facilities were unable to process sewage water and garbage and resulted in serious public health issue. During that time period, garden city proposed by Ebenezer Howard and radiant city proposed by Le Corbusier had become the transforming compact city. Such buffer zone of urban surroundings and natural setting has contentedly become the core of urban planning in England, Japan, Hong Kong, and other countries.

**c) The emphasis on diversity and liveability:**

After 1960, liveability became a vital issue in urban planning field. The green buffer zone isn't solely a segregation of urban area and natural environment however open area and leisure. Additionally, the vitality of urban activities and mixed land use may improve liveability in urban area (Jacobs, 1962). Until Dantzig and Saaty (1973), compact city has finally addressed with high density development and avoiding excessive urban sprawl.

**d) Focus on urban sustainability and green growth:**

The Green Paper on the urban environment (Commission of the European Communities, 1990) indicated that compact city is one of the planning measures to attain sustainable development. In fact, the compact city not only achieves sustainability

however satisfy multiple functions like the clustered economic effect, the decrease in travel distance and urban efficiency (Thomas and Cousins, 1996; churchman, 1999).

## 2.3. Indicators of the Compact City:

In planning literature, E. Burton achieves a dynamic definition of compact city from overall evaluations. Dynamism is the emphasized future of the contemporary definition of urban compactness. For her, “To determine the potential of urban compactness, it is necessary not only to address the heterogeneity of the concept but also to differentiate between ‘static’ or baseline levels and changes in these levels through the process of compaction.” (Burton, 2002: 219). Within this perspective, Burton conceptualize compact city at two levels: ‘product’ and ‘process’. Categories, which related to ‘product’, are ‘high density’ and ‘mixed-use’ and the one, related to process is intensification (Burton, 2002).

- **Centrality:**

The first indicator of urban compactness can be considered centralized physical structure and activity pattern. Hence, the existence condition of three components (high density, mixed-use and intensification) highly depends on centralization of urban form in mono/multi-nucleated urban structures. Intensification of an urban settlement homogenously through the whole of area is impossible. It is just because of the uneven concentration of urban services at selected nodes in urban land. The component of centrality of a compact urban form also provides a base for differentiation in compact urban patterns and creates various approaches based on multi or mono-centrality. In addition, different combinations of centrality -nodal, linear, concentric etc. - produce distinct compactness schemas. City’s pre-existing or adapted transport infrastructure and geo-morphological thresholds mostly determine the alternative compactness patterns.

- **Contiguity:**

Compactness needs a coherent development to a particular degree. Unless it is not achieved, a compact structure is not likely to be maintained. Hence, compactness of urban area extremely depends on the unity of urban functions in a continual type. Otherwise, it is troublesome to sustain intensification within a fragmented urban pattern.

The Solid-void relationship can be used to define the degree of spatial coherence. Once the balance changes in favour of the proportion of the masses -buildings, structures etc. - among a particular area, the degree of contiguity of urban fabric comparatively increases. Such an increase enhances the compactness character of space. In this sense, spatial coherence will be thought to be a planning criterion of urban compactness. Although, overemphasis on urban coherence by tight space structure – narrow alleys, shrank public spaces- can be can sub-standard urban environments. Therefore, in the sense of urban space design, a balance between fragmentation by open spaces and continuity by buildings need to be ensured.

- **Density: high-density:**

Density is the key factor for urban compactness. By means of density factor, urban compactness can be shaped horizontally as well as vertically. This reciprocal relationship between horizontal and vertical formation operates diversely. The lower the density, the larger amount of area needed, which is mainly engaged by roads and open spaces. This increases the diameter of settlement area and raises walking limits. Urban area requires more land to sustain its low-density development pattern. It is the main reason for urban dispersion. Alternatively, a moderate increase in density level results in a decrease in the area covered. It is experienced that, greater number of public amenities can be located within urban are through high-density. As an outcome, compactness can be favoured by obtaining the land use gains (Urban Task Force, 1999: 60, 64). Common assumption on high density is based on the maximization of public investments (infrastructure services and transportation), allowing efficient utilization of land. Basically, concentrated people and activities are supposed to bring about revenue generations and increasing rates of return.

- **Diversity: mixed land-use:**

Integration of land use by increasing the proximity of urban activities is the basic definition of mixed land use. Mixed-land use automatically becomes a component of urban compactness because the characteristics of integration and proximity well compromise with the connotation of compactness. ‘Mix-of-use’ may be called as the density indicator of urban compactness. Mixed-use is the balance of residential and non-residential land uses and categorized in three aspects: number and ratio of the

facilities provided, horizontal mixture of land uses and vertical mixture of uses. While the primary indicator entails the degree of the variation in supply of services and facilities, horizontal mixture of uses implies the individual developments of various uses sit side by side within geographic region. Additionally, vertical mixture of uses refers the urban characteristic of 'living over the shop' (Burton, 2002: 223-224).

Since mixed land use provides a more diverse and sizable population within a compact space structure, this permits vitality and security in urban space with well-integrated streets, public spaces and retail activities. Economic consequences of such a space organization are substantial fiscal and economic benefits (Smart Growth Network, 2002). Resource efficiency is additionally valid in land-use diversity similar to the density issue. Shared parking, granted by multiple use of land, could be a way for spatial efficiency in urban areas. Close configuration of land uses either vertically or horizontally can be useful to achieve physical compactness. Some problems on urban performance emerge when urban compactness is dominantly determined by density measures without appropriate level of mixed-use. Mono functional parts of the city which are concentrated and densified are stressed during the day, while high investments on infrastructure and energy supply are all under-utilized during remaining time section of the day (Asioly, 1996: 12).

- **Intensity: high-degree of intensification:**

For urban settlements, the feature of the dynamism of urbanization compromises with the problem of compactness when we assert compactness. In a very broad term, human settlements tend to evolve in time, by growing or shrinking in size and dimension, underneath the consequences of social, political and economic forces. Once we take into account urban compactness in process, intensification gains validity as a third factor of compact urban form.

The basic feature, that makes spread, scattered, low-density city completely different from compact urban form, isn't its rapid expansion and increasing its size of urban area, itself. The lack of synchronization between population increase and growth of urban land at second dimension makes sprawl as opposing alternative to compact city instead. An urban settlement will transform a compact type or keep its compact character alive, providing it ought to realize its development process in an intense form.

In this process, compactness index becomes positive when development happens within the city limits or adjacently in the existing urban fabric. If new developments surface free from the present urban form, this is often the case that the settlement losses its compactness characteristic. In this case, the end product of the process may be a disintegrated, fragmented and patchwork-typed urban form.

According to Burton, who conceptualizes urban compactness underneath three indicators, intensification is a generic term for the urban processes of containment and consolidation. It's the proxy measure to replicate density increases. Thus, it should be thought-about in terms of three dynamics: increase in population, increase in development and increase in the mixture of uses within town boundary (Burton, 2002: 225). whereas increase in population refers re-urbanization process by raising residential capability through subdivision of existing urban land and produce existing vacant housing stock back to use, increase in development suggests that improvement of unoccupied land at higher densities and infills in open inlands. The aim of measurement of increase in the density of sub centres or nodes is to examine the centralization of urban facilities within clustered trip ends. It's vital to work out the density surfaces through the city whether or not it's uniform or multi-focused for promoting economical intra urban travel pattern. Finally, increase in density of latest development detects the compactness degree of new developments with relevance to a region or a ward (Burton, 2002: 224-227). For all, the period, subject to measure, is ten year. This is often an enough fundamental measure permitting noticeable changes in urban densities.

# Chapter 3

# Data Collection

This chapter includes the details of all the policies related to land use, mobility, population density and open and green spaces of all the five cities.

## 3.1. Land Use:

Land use refers to the distribution of functions and activities across space, classified into completely different classes. Widely known for its vital role in achieving sustainable urban forms, land–use mix denotes the variety and proximity of compatible land uses, a sort of cross–sectional residential, commercial, institutional, and cultural infrastructure related to living, working, and service and amenity provisioning. As a most popular categorization in sustainable urban planning and development, high density development overlaps with land–use mix as to provide variety of land uses like building densities, housing for all income groups through inclusive zoning, a range of different housing types, creating a balance between job and housing distances, family sizes and structures, cultural diversity, and age groups, thereby epitomizing the socio-cultural context of the urban form."

Both attractiveness and safety are meant to be accomplished by individuals touring the city both daytime and evenings—natural surveillance. The mixed land use generates new flows of individuals and creates opportunities for using places at completely different times of the day, particularly in the evenings once cultural and non–commercial activities are able to supplement the business supply.

### 3.1.1. Land Use Policies in Toyama City:

**A. <u>Downtown Revitalization Plan:</u>**

**i. First Phase Plan, February 2007 – March 2012**

Toyama began making progress in 2003 through the preparation of the Central City Revitalization Basic Plan (2003) and the Public Transport Revitalization Plan (2007). Key projects that soon followed included the Toyama LRT "Portram" in 2006, which created better access to the central city and catalysed further investment projects in the city core.

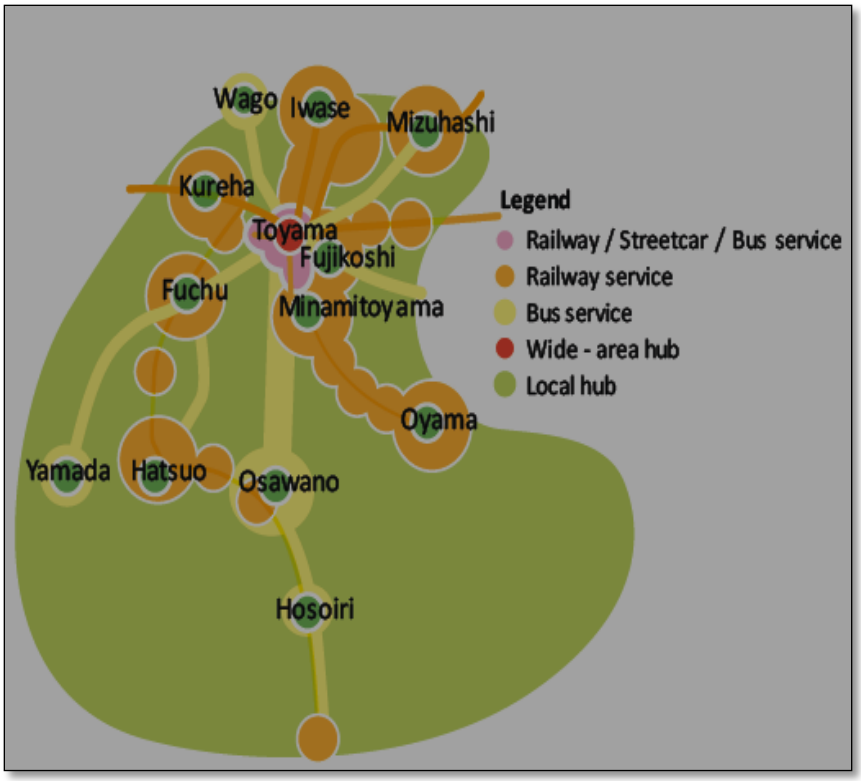


Figure 3.1 Toyama's Compact City Model

Source: The Development Story of Toyama- Reshaping compact and liveable cities, 2019.

Nationally, the challenges for city centres included year-on-year decreases in resident population, retail sales, and pedestrian traffic and the relocation of large-scale commercial facilities, and hospitals, to the suburbs. Therefore, the Downtown Revitalization Act was revised in August 2006 to include the establishment of a certification system by the Prime Minister (called the “Certified Basic Plan” or “Downtown Revitalization Plan”) and enhancement of supporting measures. In response to the amendments to the Downtown Revitalization Act in 2006, Toyama City established the Central City Revitalization Council, composed of the Toyama Town Management Organization and Toyama Chamber of Commerce and Industry. The Downtown Revitalization Plan set out compact city goals to create a sustainable, compact city of the future that addresses the challenge of its decreasing population and aging society. The associated compact city vision set out three main pillars:

- **Establish a compact city based on efficient public transport.**

1. Revitalize the public transport network to reduce car dependencies.

2. Consolidate city functions in the city center and along the public transport corridors.

- **Increase the quality and range of civic life amenities.**
  1. Redevelop commercial, cultural and civic facilities in the city core.
  2. Develop various urban housing types, including multi-family residences, commercial/residential mixed-use buildings, and assisted living care residences.
- **Take full advantage of the city's strengths.**
  1. Nurture existing local industries such as pharmaceutical industries, increase the use of renewable energy, and attract new businesses and incubate new industries.

On February 8, 2007, Toyama received Japan's first national certification and was then able to pursue the projects listed in the basic plan. Citizens, businesses, and various city departments came together to work toward the revitalization of the central urban area. This basic plan was also then incorporated into the Toyama's overall City Master Plan (2008).

### ii. Second Phase Plan, April 2012 – March 2017

Following the end of the planning period of the first phase, Toyama formulated the second-stage Toyama City Downtown Revitalization Plan, which was approved by the national government in March 2012. In the second phase, Toyama aimed to further revitalize the central city by increasing public urban renewal investment to lure private development. It also continued focus on essential public facility development. The plan also noted the importance of close collaboration among private enterprises, non-profit organizations (NPOs), universities, community-based organizations (CBOs) and the government entities. The participation from the diverse group enabled holistic approaches to develop more effective social and physical public infrastructure.

### iii. Third Phase Plan, April 2017 – March 2022

Toyama City has most recently formulated the third phase, "Basic Plan for Downtown Revitalization in Toyama City," receiving national certification on March 24, 2017. In this third plan, the city aims to connect the north and south sides of Toyama Station and integrate the entire tram network around the central city. It further attempts to strengthen collaboration among the stakeholders. In addition, it intends to support

longevity and high quality of life for all citizens by concentrating the medical, cultural, and commercial amenities and connecting them with the public transit network.

**B. Urban Facility Location Plan, 2017**

The national government recognized that the current zoning codes have become obsolete and required change to fit with compact urban development. Against this backdrop, the amendment of the Urban Revitalization Special Measures Law was enacted in August 2014. This law enabled municipalities to realign the zoning to scale down the urban areas by relocating residential, medical, welfare, commercial, and other critical facilities, which had supported the growth of suburbs for the past several decades. In 2017, Toyama City adopted the Toyama City Urban Facility Location Plan and became the leading model for the nation. The city continues to collaborate with the national government today, and some of Toyama's innovative approaches have also been adopted by the national government to counter those challenging issues.

### 3.1.2. Land Use Policies in Melbourne City:

**A. Build up activity centers as a focus for high-quality development, activity and living for the whole community.**

Activity centres in urban settings are used every day as people shop, work, keep appointments, do business or relax. They vary greatly in size and in usage. They may be shopping and community centres at local or regional level. There may be places that provide education and health facilities, such as university campuses or regional hospital complexes.

The key objectives for the development of activity centres are to:

- Reduce the number of private motorized vehicle trips by concentrating activities that generate high numbers of (non-freight) trips in highly accessible locations.
- Broaden the mix of uses appropriate to the type of centre and the needs of the population served.
- Improve access by walking, cycling and public transport to services and facilities for local and regional populations.
- Support the development of the Principal Public Transport Network.

Melbourne 2030 seeks to increase the concentration of activities in metropolitan Melbourne within a network of activity centres, both existing and planned. This network will comprise a range of centres that differ in size and function and are connected by public transport. Catchments of these centres may overlap, allowing as many people as possible the maximum choice in services, employment and social interaction. Metropolitan Melbourne's activity centres are classified into five types:

### i. Central Activities District

This is metropolitan Melbourne's largest centre of activity with the greatest variety of uses and functions and the most intense concentration of development. It provides services and functions such as commercial, retail, housing, highly specialized personal services, education, government and tourism. The Central Activities District will continue to be the preferred location for activities that have State or national significance, and for activities that have a significant impact as trip generators, drawing users from around the metropolitan area and beyond, and hence benefiting from being at the centre of the Principal Public Transport Network.

### ii. Principal Activity Centres:

Metropolitan Melbourne has a network of about 100 Principal and Major Activity Centres. The intent is to substantially reinforce the network by connecting the Principal Activity Centres into an expanded public transport network – the Principal Public Transport Network and encouraging more mixed-use development in appropriately located centres. New Principal Activity Centres will have to be on the Principal Public Transport Network or be linked to it as part of the cost of developing the site.

Melbourne's 25 Principal Activity Centres have, or should have, the following characteristics:

- a mix of activities that generate high numbers of trips, including business, retail, services and entertainment
- being generally well served by multiple public transport routes and on the Principal Public Transport Network or capable of being linked to that network
- a very large catchment covering several suburbs, and attracting activities that meet metropolitan needs

- The potential to grow and support intensive housing developments without conflicting with surrounding land uses.

### iii. Major Activity Centres:

This classification takes in most of the rest of Melbourne's largest activity centres. They have similar characteristics to Principal Activity Centres but serve smaller catchment areas. Continued development at Major Activity Centres supplements the network of Principal Activity Centres and provides additional scope to accommodate ongoing investment and change in retail, office, service and residential markets. As with Principal Activity Centres, the development of this network of Major Activity Centres is critical to metropolitan Melbourne's future economic performance. The intent is to substantially reinforce the network by connecting most of these centres into the Principal Public Transport Network and encouraging more mixed-use development in appropriately located centres.

### iv. Specialized Activity Centres:

Specialized Activity Centres provide a mix of economic activities that generate high numbers of work and visitor trips. They require similar transport management responses to other types of large centres. Their planning and development should reinforce their specialized economic function. Mixed uses that complement the role of these centres are encouraged, but they should not compete with nearby Principal or Major Activity Centres. Nor should these centres attract mixed uses that serve a wider catchment and might inhibit their specialized role. They must be located on the Principal Public Transport Network.

### v. Neighbourhood Activity Centres:

Metropolitan Melbourne has more than 900 Neighbourhood Activity Centres. These are dominated by small businesses and shops. They offer some local convenience services and at least some public transport. Their key features are:

- Generally, a limited mix of uses meeting local convenience needs
- Generally less than 10,000 square meters of retail floor space
- accessible to a viable user population by walking/cycling
- accessibility by local bus services, and public transport links to one or more Principal or Major Activity Centres

- Their role as important community focal points, ideally close to schools, libraries, child care, health services, police stations and other facilities that benefit from good public transport.

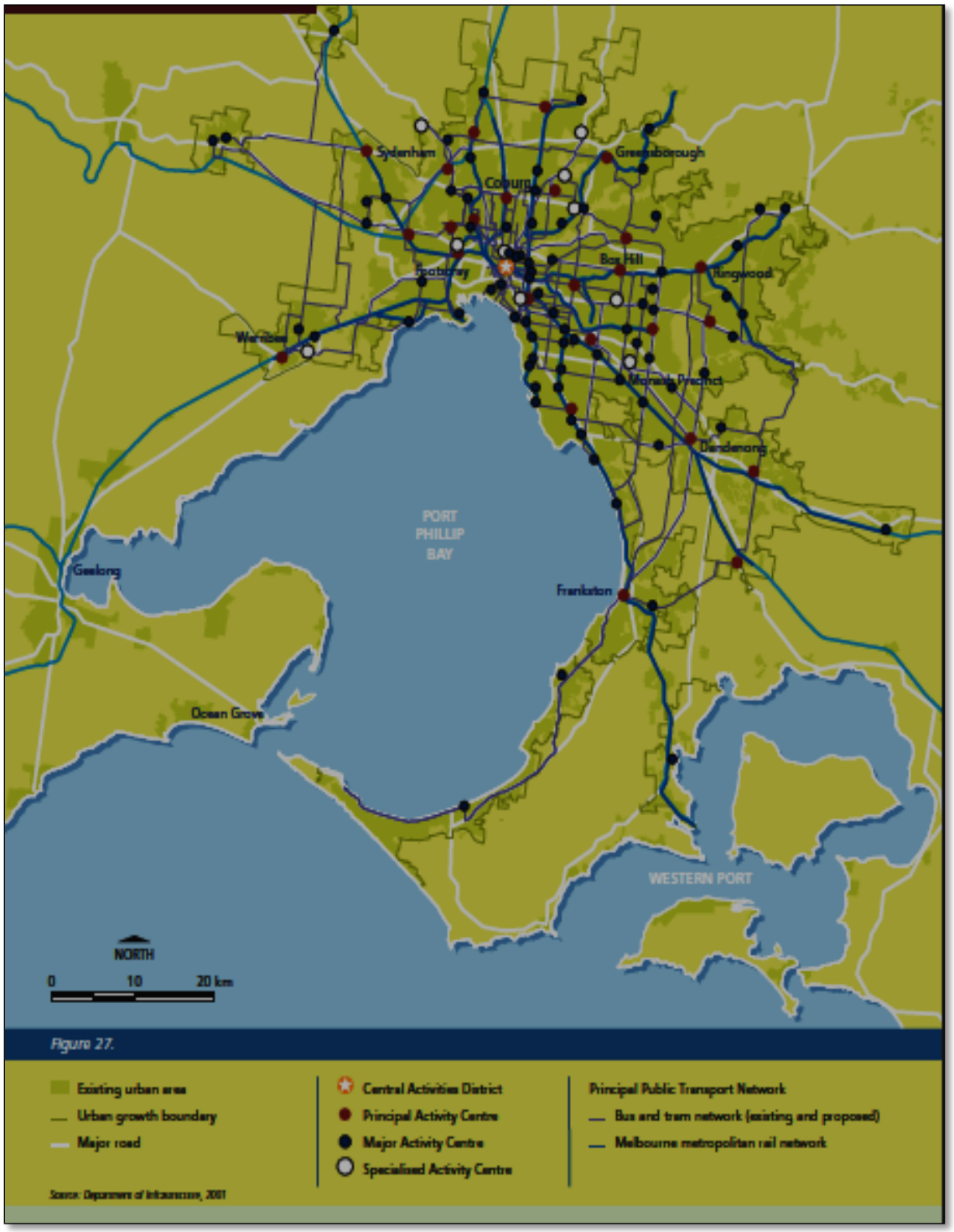


**Figure 3.2 Network of Activity Centers of Melbourne**

*Source: Melbourne development plan, 2030.*

From a metropolitan perspective, these centres contribute to the goal of encouraging walking, cycling and local public transport use, particularly where they are part of a network of centres. Redevelopment in middle and outer suburbs and development of new growth areas should provide viable locations for Neighbourhood Activity Centres in areas where their current distribution is inadequate. Their location should be planned in conjunction with the design of local public transport services.

**Initiatives:**

- Work with local government to revise local planning strategies, and to identify types of activity centres and actions that will improve the network of existing centres consistent with the policies in Melbourne 2030.
- Encourage development in Principal and Major Activity Centres and provide assistance through the Urban and Regional Land Corporation with site assembly, master planning and preliminary infrastructure development.
- Review existing business zones with a view to creating specific zones to implement the activity centre policy.

**B. Broaden the base of activity in centers that are currently dominated by shopping to include a wider range of services over longer hours, and restrict out-of-centre development.**

Government can contribute to the growth of strong activity centres by the decisions it makes about locating public facilities. When additional facilities and services are located in activity centres, the provision of public transport services becomes more viable and people using the centre can make one trip to meet several needs at one destination. More people, including those without cars, also have access to the centre.

Significant new education and health facilities – including secondary schools, university, libraries and hospitals – that attract users from large geographic areas, as well as justice, community and administrative facilities should be located in or on the edge of Principal or Major Activity Centres with good public transport. Such co-location will help share resources and will make the most of infrastructure and transport services. These facilities should be located at centres that are within the service catchment of the facility,

and in a type of centre appropriate to the intensity of service, measured by trip generation, and to the primary functions of the facility.

**Initiatives:**

- Lead by example in decisions by State government departments and agencies on the location of new health, education, justice, community and administrative facilities, ensuring consistency with Melbourne 2030.
- Work with local councils to review their policies on the location of new community and administrative facilities for consistency with Melbourne 2030.
- Adopt new development assessment guidelines and standards, and review the Victoria Planning Provisions, to encourage the concentration of new development in activity centres and to control out-of-centre development.
- Further develop and improve the Melbourne Cricket Ground/ Melbourne Park/Olympic Park precinct as the major sporting precinct for Melbourne and ensure that other major sporting facilities are well located for public transport.

### 3.1.3. Land Use Policies in Portland City:

The city's historic land use patterns are still very much in evidence today, traversing a spectrum from a relatively high-density historic centre to the rural character of Portland's islands. Its historic core is its mixed-use downtown and its active waterfront, where the city began and where employment, government, services, and goods converge to this day. Downtown is surrounded by higher density, inner ring neighbourhoods each with its own residential base and neighbourhood-scale goods and services. These neighbourhoods, with their traditional, walkable patterns of development, strong nodal centres, and high degrees of accessibility, have seen new development in recent years. Beyond the inner ring, the city transitions to relatively lower density residential patterns characteristic of the later part of the 20th century.

Portland's Plan anticipates that predominantly residential, industrial, institutional, mixed-use, and open space areas will remain largely consistent with existing patterns. The plan also anticipates that the regulations governing development will not be static, but will adjust and adapt to changing needs and policy direction. Zoning boundaries and specific use, dimensional, and performance standards will be modified over time as ordinances are revised and updated.

**Principles of future land use:**

**A. Complete Neighborhoods:**

Portland's Plan recognizes that strong, complete neighbourhoods are fundamental to the city's overall health. Portland's intent for its predominantly residential neighbourhoods is one where all residents regardless of age, ability, or income have access to the basic necessities of daily life - high quality and affordable housing, schools and other civic functions, food, open space, other amenities and services - within a walkable, bike able distance. The strength and diversity of these neighbourhoods is fundamental to the growth of a diverse city where residents can choose housing types, businesses, schools, and recreational opportunities. While the city's neighbourhoods should collectively support residents with a complete range of services and all are expected to accommodate a share of Portland's growth and development, policies should encourage the distinct qualities of each.

**i. Reinforce the center:**

Though Portland's commercial and entrepreneurial activity takes place throughout the city, Portland's Plan embraces the principle that downtown should continue to be a predominant locus of activity for the broader region.

**ii. Connect the Chain:**

Portland's Plan recognizes that physically integrated transportation systems, utilities, and open spaces provide the structure for the city's growth, and that a well-connected system is more efficient and more resilient. An integrated transportation system allows residents to access jobs, food, healthcare, and recreation from their homes while planning for an unbroken network of open space connects neighbourhoods and improves access to the outdoors.

**B. Priority nodes & corridors:**

Future land use focuses on those areas to be prioritized for change or evaluation over the coming decade. It does not, however, precisely delimit parcels of land or exhaustively catalogue areas that may undergo change in the coming years. Development may still occur elsewhere in the city, including incremental change and infill in residential neighbourhoods, redevelopment of obsolete commercial areas,

thoughtful expansion or investment in institutional and industrial sites, and modernization of existing affordable housing sites. Priority nodes and corridors indicate areas that would be appropriate for new development to provide needed housing, businesses, and services proximate to transit, or areas that otherwise warrant some examination of potential for positive change in form and/or function.

**i. Priority nodes:**

Nodes are areas with concentrated mixed-use activity, which can occur at varying scales and serve varying catchment areas; Portland's downtown supports a large successful node, but nodes can also be found at smaller convergences and intersections throughout the city. As mapped, nodes are not meant to sharply delineate boundaries, but to indicate general areas in need of further planning or investment. These nodes are placed into three broad categories that correspond with their respective stage of planning or investigation at the present time.

- Evaluate: City recognizes the need to review existing conditions and develop a strategy for future change. These nodes should be assessed for their ability to address neighborhood needs and serve as centers for complete neighborhoods.
- Transform: Areas which have been previously recognized as areas of significant potential transformation, but which need comprehensive revisioning.
- Enhance: Areas which have been studied and are awaiting or in the midst of plan implementation.

**ii. Priority corridors:**

The Priority Nodes & Corridors Map identifies key corridors — those that connect major nodes and neighbourhoods and therefore serve as major commuter routes — as areas for additional planning and investment. Priority corridors are major arterials that often see heavy vehicular traffic, but also have the capacity to improve mobility by capitalizing on their potential for increased walking, bicycling, and transit use. Priority corridors can also serve as areas of additional mixed-use, higher density growth to take advantage of the transit benefits and services that well-designed, diverse corridors can offer.

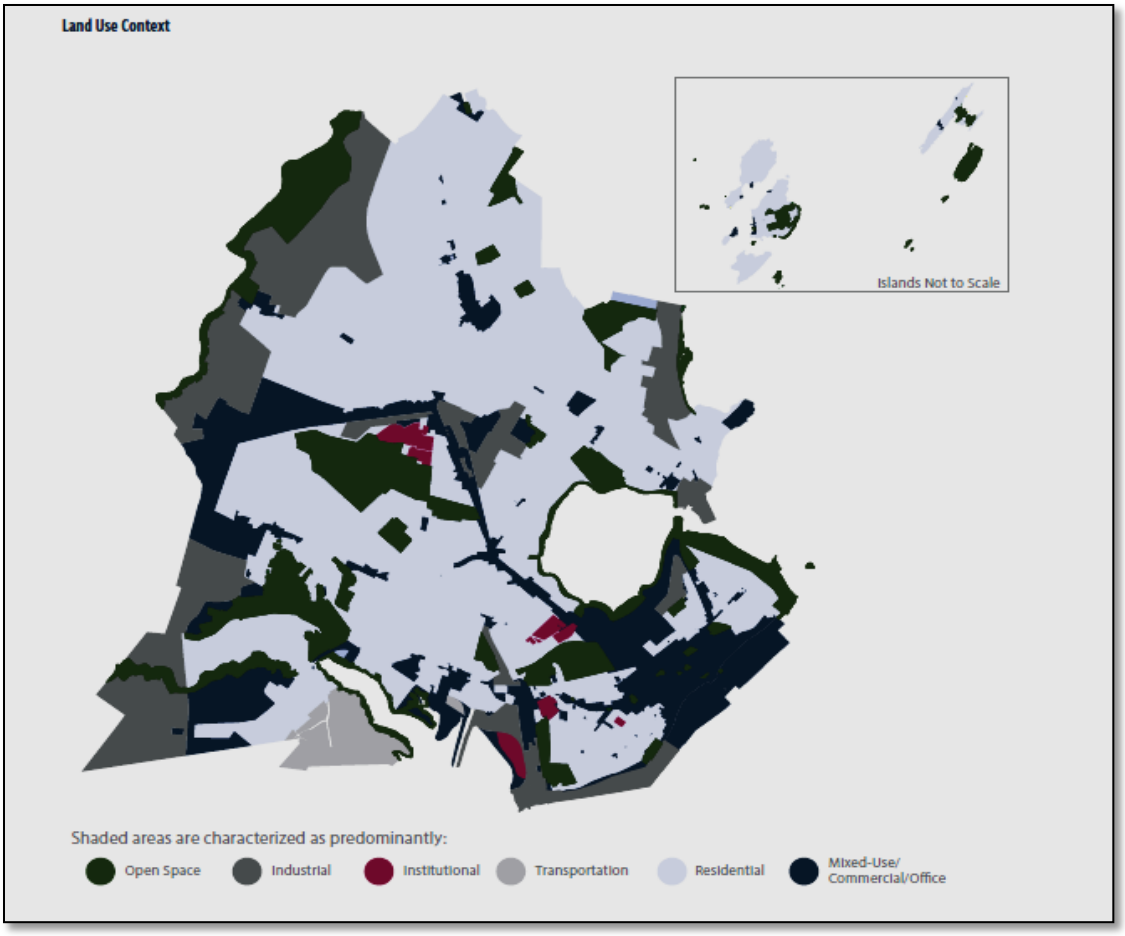


**Figure 3.3 Existing Land Use Map of Portland**

*Source: Portland's plan 2030.*

### 3.1.4. Land Use Policies in Nagpur City:

Nagpur has traditionally expanded horizontally with low-rise built-up spaces. Open space within the built-up spaces is very less, which means there is no space available for future Greenfield development within the city, except the peripheral areas. Only 8% of the space covered with green vegetation, which can be accessed by citizens for leisure and as a community space and for social purposes. No monitoring over the new development in the city is done. In spite of all these issues, no specific policies are framed in the development plan to regulate and contain the sprawling of the city other than the demarcation of street vending zones in few localities of the city. The vision of the development plan states the provision of mixed use planning around the growth centres of the city in order to increase walkability and accessibility but no policies are presented in the development plan.

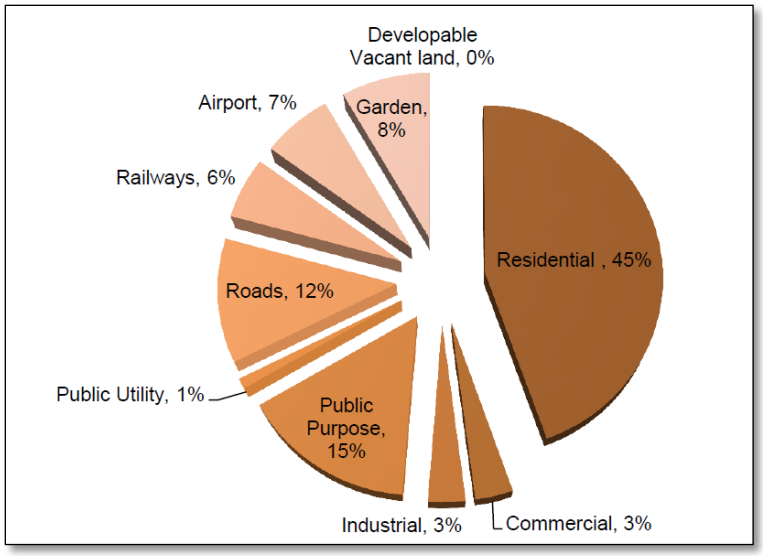


**Figure 3.4 Land Use Breakup of Nagpur**

*Source: City Development Plan for Nagpur, 2041.*

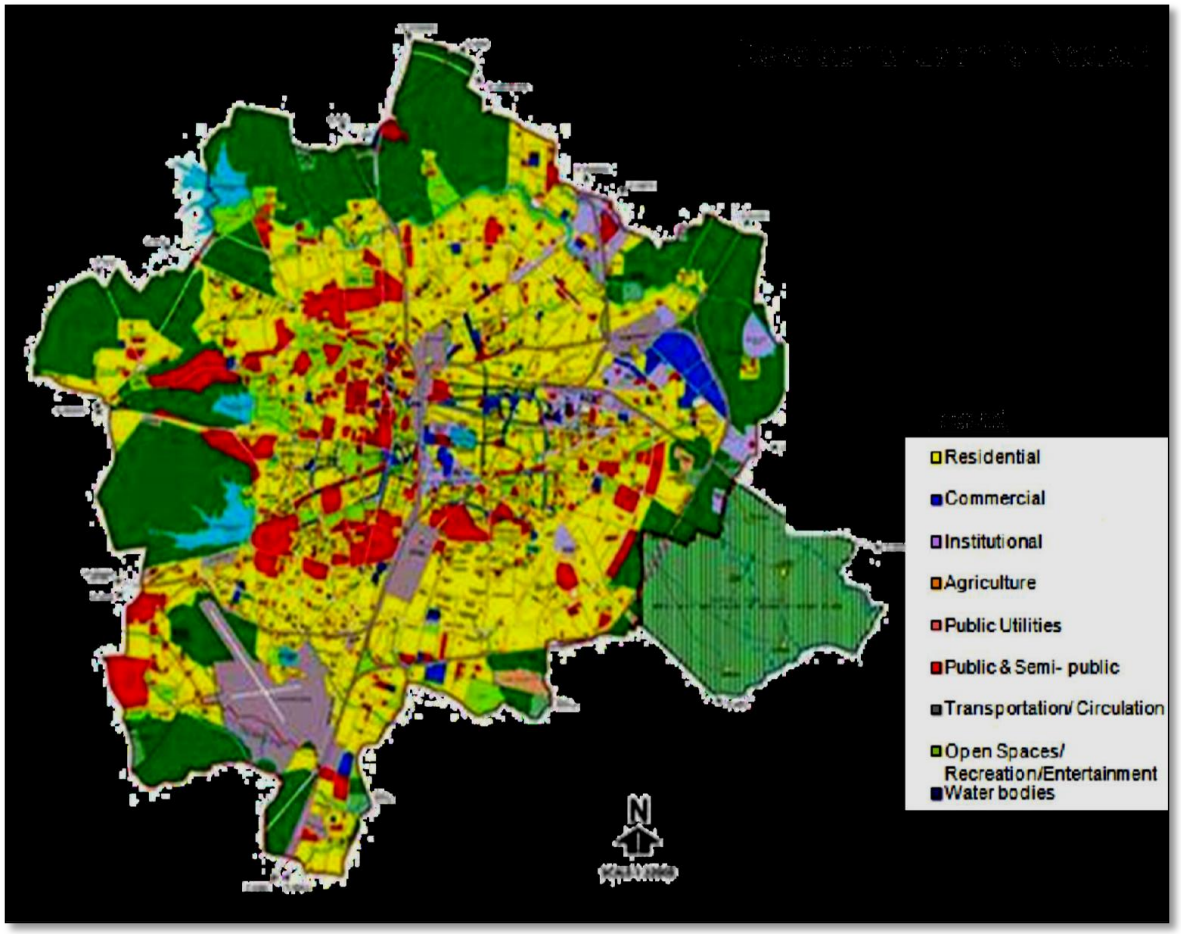


**Figure 3.5 Land Use Map of Nagpur**

*Source: City Development Plan for Nagpur, 2041.*

## A. Street Vending activities:

Street vending is an indispensable economic activity in urban India. It is the largest informal sector which caters to the livelihood of the urban poor. Since the era of economic reform in the country, the sector has faced many challenges. Street vendors count for about 2% of the population and provide affordable as well as convenient services to a majority of the urban population.

Figure 3.6 Street Vending Markets in Nagpur

*Source: City Development Plan for Nagpur, 2041.*

In past, street vending and hawking was considered a disturbing element for various reasons, even though without such informal activities the citizens will not be able to meet with their daily needs and requirements. Also it is a way of livelihood for the poor section of the people in the city. As such informal activities don't have a legal back-up or regularization through policy it is difficult to get place in the Governance of any ULB.

Based on discussion with members of Hawker's Association in Nagpur, it was understood that hawkers are ready to shift to a designated place by NMC, along with paying of a minimal fee for providing basic services like water supply, solid waste management etc. Thus, looking at the importance of the informal activities in the city and need to provide an enabling environment to the street vendors along with focusing on keep the local environment liveable and clean, NMC and TVC committee along with market department have proposed 16 new street vendor zones within city. The locations of the proposed zones are Gokulpeth market, Near Medical Chowk, Somewaripeth

Bazar (Budhwari Bazar), Mahatama Phuley Market (platforms), Shukrawari (platforms), Panch Paoli near flyover, Near Maskasath PWD office, Near Deputy signal, Mini-Matta nagar, Bhandewadi (Pardi), Dhobighat (Teenkhaba), Kamall Chowk, Near Jaripatka bus stand, Gittikhadan opp. To police station on Katol road, Mangalwari Market, along the sides of Anjuman engineering college, Dhantoli Flyover (near Kumbhartoli).

i. **Specific Norms for the Urban Local Bodies:**

- **Quantitative norms**:

At the town / city level enough space should be designated for vendors‟ markets at least to the extent of 2% to 2.5% of the total city population. The facilities that are required to be provided at the vendor markets invariably include: solid waste disposal facility, Public toilets to maintain cleanliness, Aesthetic design of mobile stalls/ push carts, electricity, drinking water facility, protective covers to protect their wares as well as themselves from heat, rain and dust and Storage facilities including cold storage.

- **Regulatory Process**:

The policy thrusts on having the system of registration of hawkers and non-discretionary regulation of access to public spaces in accordance with the planning standards and nature of trade/ service. All vendors in the city should be registered at a nominal fee and the registration should be renewed after every three years. They should be issued identity cards and it should charge a monthly fee for access to various services. For better system of regulation, there should be direct linkage between the urban local bodies (ULBs) and hawkers for collection of: registration fee, · monthly maintenance charges, fines, if any, etc. The Town vending Committee / Ward Committee should monitor the hawking activity of a particular ward and the quality of the services provided, take corrective action, if required, report to City level Committee, if required and recommend revaluation / changes in specified norms for hawking.

### 3.1.5. Land Use Policies in Pune City:

No policies for the practice of mixed land use or for the development of new quarters or multiple city- centres in the development plan as well as smart city proposals.

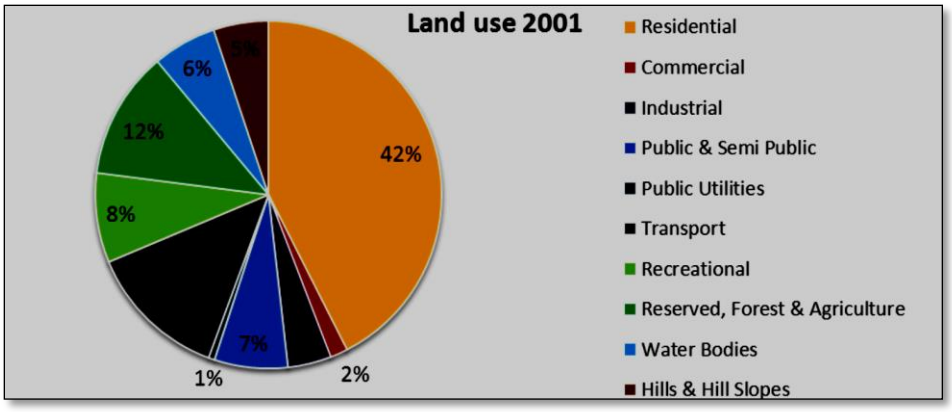


Figure 3.7 Land Use Distribution of Pune City

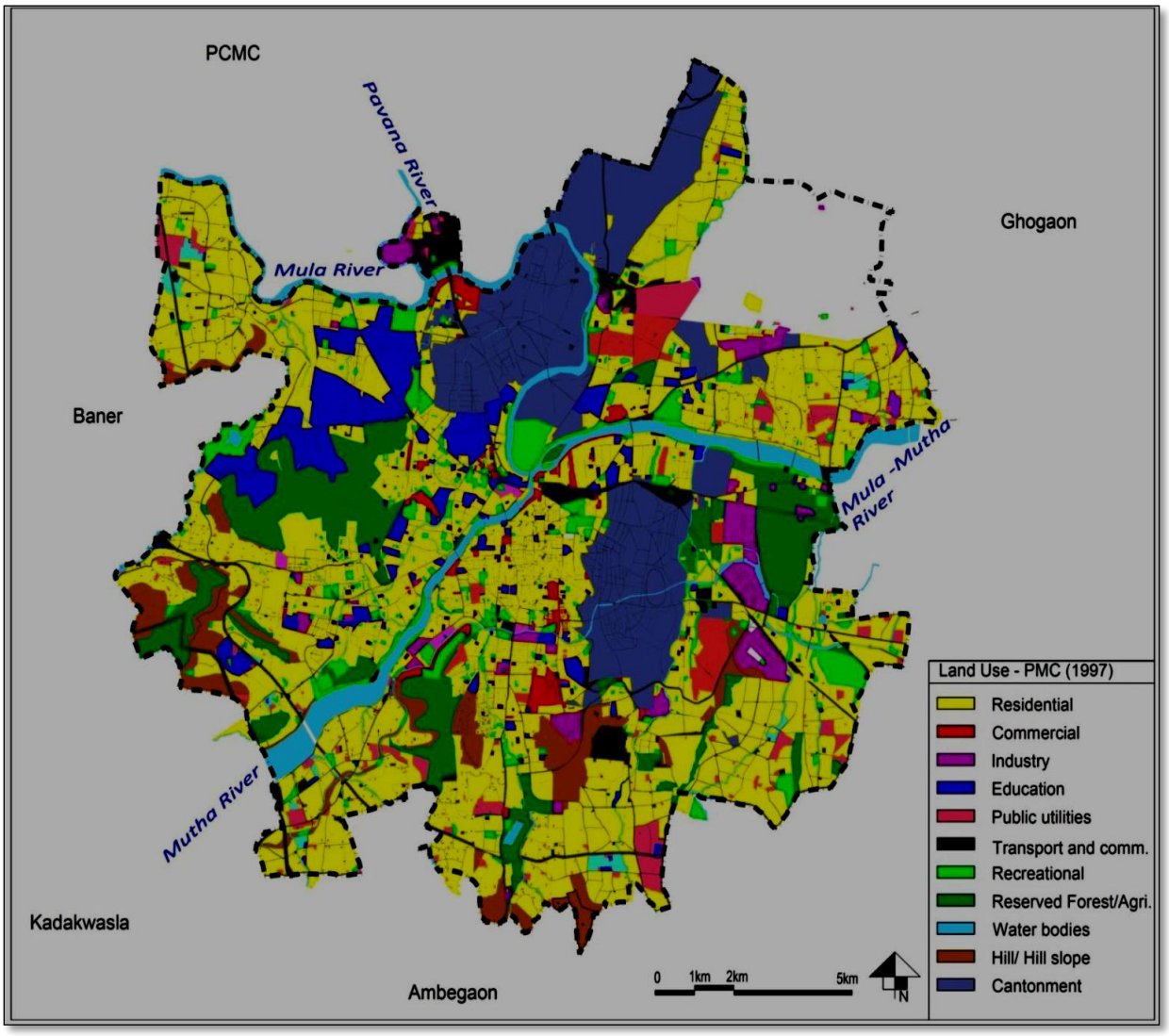


Figure 3.8 Land Use Map of Pune

*Source: City development plan Pune, 2041*

### 3.1.6. Summary of Land Use Policies:

Table 3.1 Summary of Land Use Policies

| No. | City | Policies | Key Points |
|---|---|---|---|
| **1** | Toyama, Japan | • Downtown Revitalization Plan.<br>• Urban Facility Location Plan, 2017 | Consolidate city functions in the city centre and along the public transport corridors, redevelop commercial, cultural and civic facilities in the city core, develop various urban housing types and realign the zoning to scale down the urban areas. |
| **2** | Melbourne, Australia | •Build up activity centres for high-quality development.<br>• Broaden the base of activity in centres. | Broaden the mix of uses, provide focal points for the community, improve accessibility, restrict out-of-centre development, encourage the concentration of new development in activity centres. |
| **3** | Portland, USA | • Complete Neighborhoods.<br>• Reinforce the Center<br>• Priority nodes & corridors | Residents regardless of age, ability, or income have access to the basic necessities of daily life, identification and enhancement of existing and potential important nodes and centres of the city. |
| **4** | Nagpur, India | •Street Vending activities. | Demarcation of vending zones |
| **5** | Pune, India | _ | _ |

The land use policies of the international cities focus mainly on reinforcing the city core and making and maintaining it as the main locus of the city along with focusing on providing the neighbourhoods and activity centres which are self-sufficient and along the transportation corridors. Toyama development plan aims to provide the residential zones along the transit corridor but it has no mention of neighbourhoods or activity centres. But, in case of Indian cities, the vision of the development plan focuses on promoting mixed land use to improve accessibility but there are no provisions or policies which could help to achieve the mix of uses in either of the cities. Also, the land use maps of both the cities have no mention of mixed use development.

## 3.2. Mobility:

The compact city provides larger opportunities to manage everyday life on foot, by bike, and by public transport due to the proximity to outlets, services, facilities, and workplaces. This reduces the requirements for long distance transports, as a lot of errands are often run by walking, cycling, or public transport, and more individuals will have an easier day–to–day life and be useful in attracting more people in the city. Additionally to this, a sustainable and economical public transportation system can also be useful to increase the mobility and accessibility in the city.

### 3.2.1. Mobility Policies in Toyama City:

**A. <u>Walkable City Strategy, March 2019–present:</u>**

This newly created strategy aims to build on Toyama City's successful development of its urban transport network and increased ridership. The strategy suggests that walking will not only bring about personal health and medical benefits, but also increase the vitality of the entire city, such as active streets, increased public transport usage, event participation, and community building. The strategy requires various city departments to develop comprehensive policies to encourage citizens to go out and experience the urban scenes on foot. The city created a tagline and a mobile app called "Tohokatsu" (active walking).

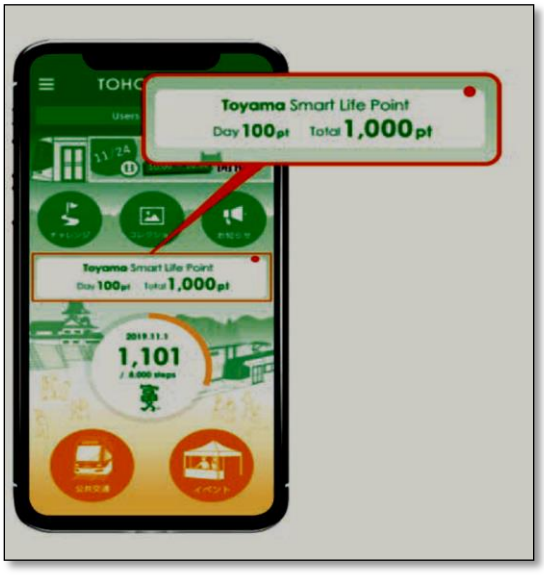


Figure 3.9 Tohokatsu Mobile App, Toyama City

*Source: The Development Story of Toyama- Reshaping compact and livable cities, 2019.*

Participants can accrue points by walking, using public transport, and participating in public events, and exchange the points with special prizes. The app has functions such as a pedometer, distance measurement, calorie calculation, and an event calendar. Each function can also be displayed as a daily chart, so the users can track the cumulative status of the activities.

## B. Development of Toyama light rail transit lines:

The development of LRT lines signifies the backbone of Toyama's compact city plan, offering easy accessibility around the central city and creating development opportunities along the transit lines to further activate the downtown core.

### i. Phase 1- Portram:

In 2006, ownership of Toyama Port Line was transferred from West Japan Railway Company to a newly formed joint public-private company, called Toyama Light Rail Co. Ltd, which reintroduced Japan's first full scale LRT system—Portram. It comprises a total length of 7.6 km and travel time of about 25 minutes. The city of Toyama, with significant support from the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), covers the entire expense for the railroads, stations; electric infrastructure and subsidies on ongoing maintenance and capital upgrade costs. Meanwhile, the private railroad company is responsible for the operations.


**Figure 3.10 Portram, Toyama City**

*Source: The Development Story of Toyama- Reshaping compact and livable cities, 2019.*

### ii. Phase 2- Centram (Toyama City Tram Loop Line):

Following the implementation of Portram, the strategy moved to extending the existing city centre tramline to form a loop.

The Centram city tram loop line was created by providing a 0.9 km tram line extension with three new stations in order to reactivate the central downtown area and make it

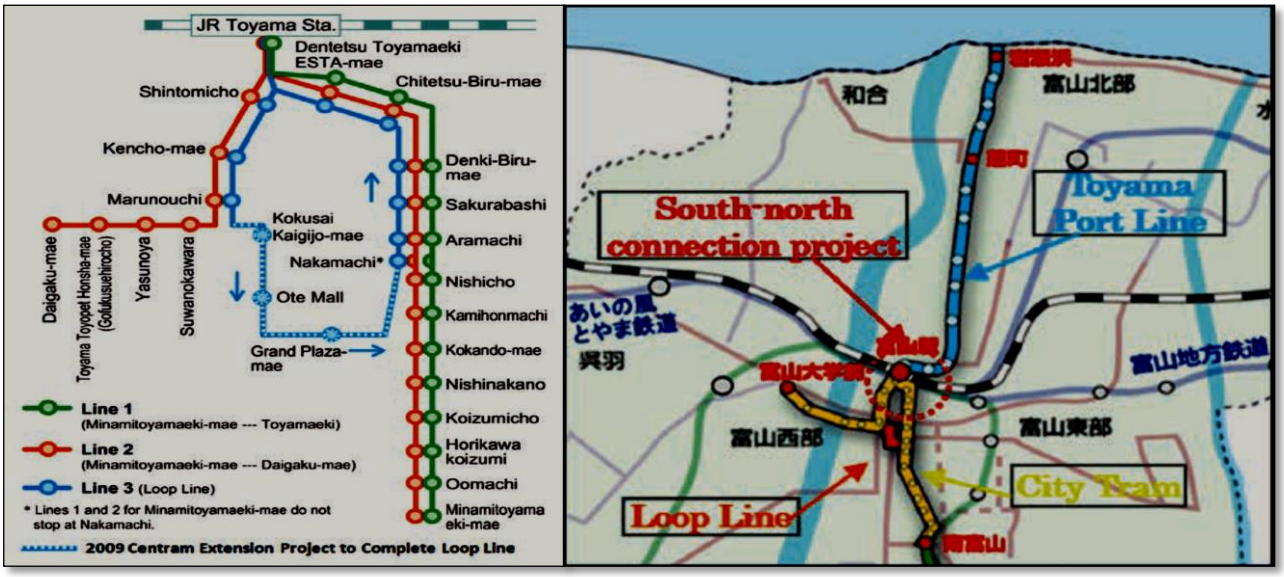


Figure 3.11 LRT Network Centering on Toyama Station and Centram Network (including Loop Line), Toyama City

*Source: The Development Story of Toyama- Reshaping compact and livable cities, 2019.*

more accessible. The existing two tram routes were then supplemented with an additional 3.4 km counter clockwise loop service. The Loop Line started operating in December 2009. To create a more attractive streetscape with less invasive construction work, the connecting rails were laid on an existing car lane, a plan which eliminated the need to acquire new right-of-way, reduced construction time, and achieved more pleasant road design. Three new low-floor trams and matching platforms were also introduced for improved accessibility at each station.

### iii. Phase 3- Completion of Intermodal Transport Connectivity in Toyama Station:

Portram and Centram lines were separated by about 250 meters on both sides of Toyama Station. The connection line was constructed in two stages. In stage 1, the Centram's loop line was extended to the north underneath the elevated section of Toyama Station to coincide with the commencement of the Shinkansen service. In

stage 2, Toyama Port Line, located at the northern side, was extended to connect to the loop lines. Taking advantage of the opportunity arising from this development, Toyama Chihou Railway Co. Ltd., the operator of the Centram, acquired Toyama Light Rail Co. Ltd., the operator of the Portram. This development also marked the first time in Japan that a city tram was constructed to operate right under a Shinkansen station building, creating a convenient transfer experience between the high-speed railway and the regional light rail**.**

### C. Pedestrian-Level Project: Cyclocity Bike-Sharing System:

Another integration measure undertaken by Toyama was the development of Japan's first full-scale bicycle share scheme, AVIRE. With 23 well-advertised bicycle stations around the city tram (Centram) loop lines, AVIRE provides convenient intermodal connectivity for local public transit users and tourists for their first- and last-mile travel needs as well as leisurely rides around town. While Cyclocity provided a suitable business model, the facility design, and ongoing operations and maintenance, the city covered the initial development costs of approximately ¥150 million, which was mostly subsidized by the national Ministry of the Environment.


Figure 3.12 Bicycle Share Program and City Tram Loop Line

*Source: The Development Story of Toyama- Reshaping compact and livable cities, 2019.*

### D. Rider incentive programs:

Rider incentive programs have been implemented as a multi-layered measure to create opportunities for elderly people to go out, socialize, and enjoy urban activities which improves vitality, commercial activities and the use of transit systems.

- **Senior discount pass.** Seniors 65 years and older living in Toyama can ride any public transport for ¥100 (about US$1) per ride.
- Pass holders can also receive small gifts or discounts at participating shops (about 70 shops) in the city center by showing the pass.
- Pass holders can use municipal facilities such as museums and gyms at half price or free of charge.
- **Free tickets with grandchildren**. For any grandparents in Toyama and surrounding cities traveling with grandchildren (or great-grandchildren) to visit museums and other facilities, the entrance fee will be free of charge.


Figure 3.13 Poster to Promote the Free Tickets with Grandchildren Program

*Source: The Development Story of Toyama- Reshaping compact and livable cities, 2019.*

**Target facilities:** In cooperation with these municipalities, the program has been widely implemented at 59 facilities, including 14 facilities in Toyama, such as the Toyama Science Museum and the Toyama Glass Art Museum.

### 3.2.2. Mobility Policies in Melbourne City:

**A. <u>Promote excellent neighbourhood design to create attractive, walkable and diverse communities.</u>**

Melbourne 2030 intends that neighbourhoods should be created as integrated and interconnected communities, not just as subdivisions. It adopts a set of Neighbourhood Principles that apply to the development of new areas and to major

redevelopment in existing areas. Because the population is made up of people of different ages, genders, family types, cultural backgrounds, interests and abilities, neighbourhoods must respond to different needs, opportunities and aspirations. New areas will be comprehensively planned as sustainable communities that offer high quality, frequent and safe local and regional public transport, and a range of local activities – living, working and recreational. Emphasis will be placed on fostering healthy lifestyles through initiatives such as creating walkable neighbourhoods where it is easy and attractive to walk or cycle to facilities and services.

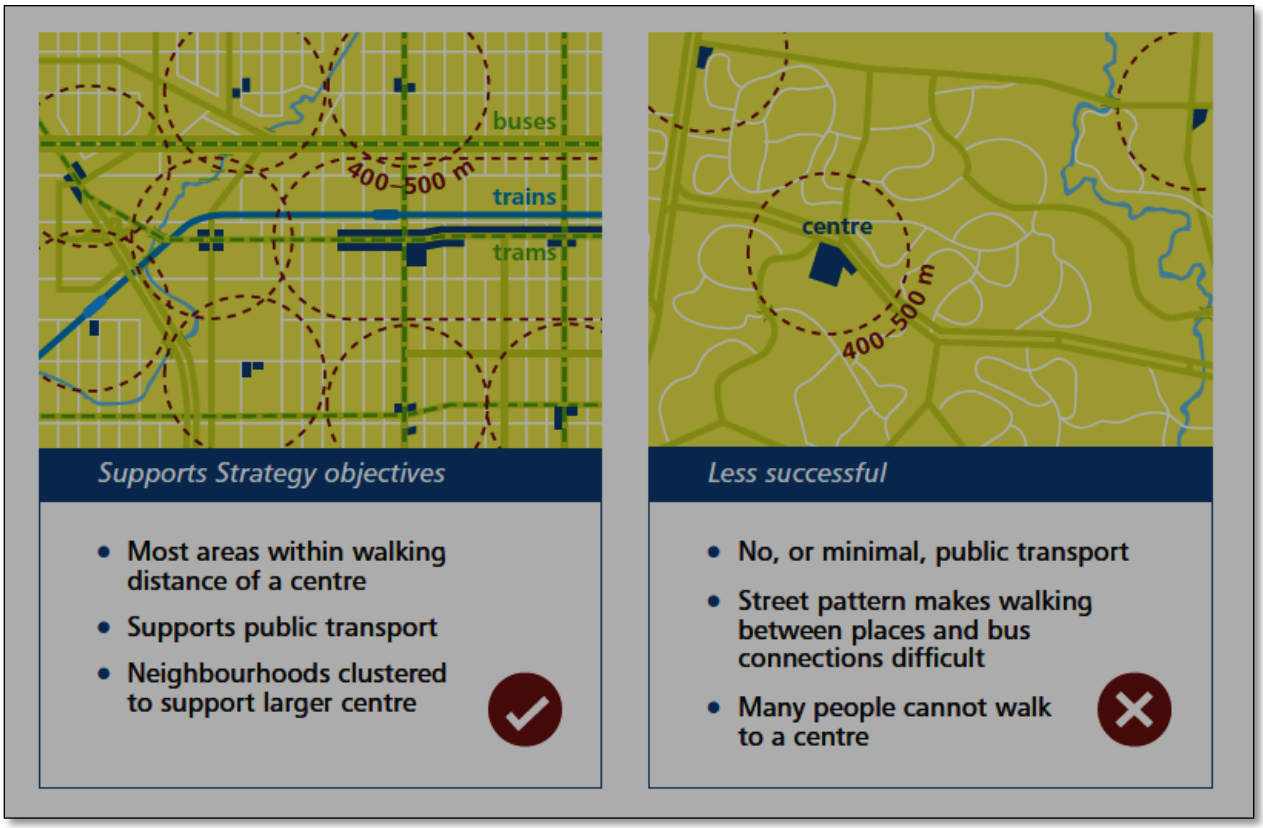


Figure 3.14 Network of Neighbourhoods in Melbourne

*Source: Melbourne development plan, 2030.*

**Initiatives:**

- Update the residential subdivision provisions in the Victoria Planning Provisions to promote the Neighbourhood Principles.
- Adopt guidelines to assist local government in supporting local convenience services.

- Apply the Neighbourhood Principles in the creation or review of growth area development plans, in structure plans for new subdivisions, and in planning for the improvement or redevelopment of existing areas.
- Promote the development of Neighbourhood Environment Improvement Plans to ensure that community environmental concerns are heard and addressed.

**B. <u>Upgrade and develop the Principal Public Transport Network and local public transport services to connect activity centers and link Melbourne to the regional cities.</u>**

By 2020, the Government intends that public transport's share of motorized trips within Melbourne will rise to 20 percent from the current level of 9 percent. Achievement of this target will be influenced to a large degree by changes in travel modes in outer suburbs.

It will depend on major improvements to public transport through the Principal Public Transport Network. More than half of this network is already in place through metropolitan Melbourne's radial train and tram system. The rest of the network – some 40 percent – will be added mainly through new cross-town bus routes. It will be complemented by new fast train services that serve key regional cities and townships and connect with Principal and Major Activity Centres along the radial routes leading to Central Melbourne. This will open up many opportunities for stronger links between cities and will help the economy to grow.

Key strategic transport corridors will be identified and planned to provide for fast, reliable and frequent public transport services. Most gaps in the system, however, will be met by new strategic cross-town public transport routes. Due to the radial design of rail network, a cross-town bus network is needed to meet changing needs and land use patterns across Melbourne.

Other areas where performance needs to be substantially improved include:

- Improvements in public transport frequency, reliability and ease of use.
- Faster on-road travel times.
- Coordination between services and interchanges.
- The implementation of a new ticket and fare system.
- Better information, including maps and timetables.

**Initiatives:**

- Produce a service development and management plan for Melbourne in 2003 that sets priorities and identifies the actions required to achieve the 2020 public transport use target of 20 percent. This will include improvements to the Principal Public Transport Network, improvements for local public transport services with a focus on transport interchanges at Principal and Major Activity Centres.
- Define and publish targets for public transport service delivery (coverage, frequency and reliability) to be met by the various elements of the public transport system.
- Plan for the selective expansion of the rail network to connect to new and existing Principal and Major Activity Centres that rely solely on bus connections and taxis.
- Identify key public transport, freight and private car routes between activity centres that can be upgraded to cross-town transport corridors.
- Work with the bus industry to identify, reorganize and plan for improvements to bus routes that will meet local travel needs and act as feeders to the Principal Public Transport Network.

**C. Improve the operation of the existing public transport network with faster, more reliable and efficient on-road and rail public transport.**

Melbourne has an extensive existing network of public transport services which needs to be better utilized to increase transport choice, reduce car dependency and meet the mode share target for 2020. Opportunities exist to significantly improve the frequency, reliability and efficiency of the existing network. A key target will be the 'red spots' – blockages that exist throughout the network, which limit the movement and reliability of buses, trams, and taxis. In order to achieve greater efficiency and reliability across the network, greater attention must be paid to identifying and resolving causes of delay to public transport services.

**Initiatives:**

- Identify and develop strategies to deal with on-road public transport 'red spots' that delay services across the network, through a cooperative program between VicRoads, the Department of Infrastructure and private transport providers.
- Undertake an annual program of works and/or road-space management measures to make on-road public transport faster and more reliable.

- Work with private rail operators to develop a parallel program to identify and treat rail ‘red spots’.
- Identify rail corridor capacity limitations, and develop long-term strategies to increase speed and loadings across the network – this will include identifying future requirements for additional tracks on existing corridors.

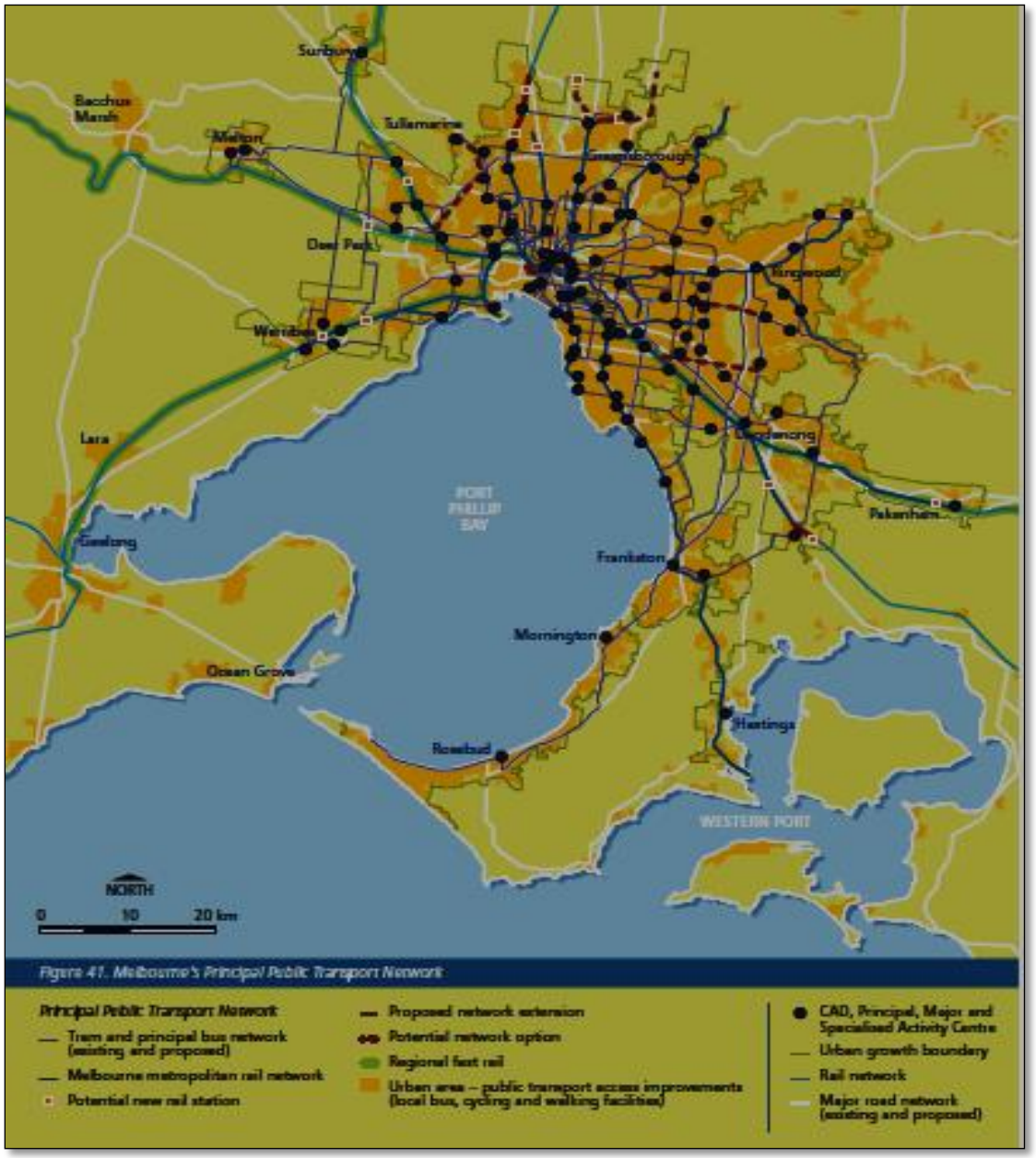


**Figure 3.15 Melbourne’s Principal Public Transport Network**

*Source: Melbourne development plan, 2030.*

**D. <u>Coordinate development of all transport modes to provide a comprehensive transport system</u>.**

It aims to meet specific mode share targets for public transport and freight, and to increase walking and cycling. The role and function of each mode will be determined within the context of overall travel demand and the capabilities of the transport system. Transport system management plans will be prepared in key transport corridors or other parts of the region where major investments are proposed, particularly where required to implement the Principal Public Transport Network. All new transport projects will be evaluated against common criteria that relate to the objectives of Melbourne 2030. Melbourne 2030 identifies the major infrastructure needs of the city. Over the life of Melbourne 2030, any new proposals for changes to the transport system will be tested for their consistency with its sustainability objectives.

**<u>Initiatives:</u>**

- Prepare a new road development and management strategy consistent with the outcomes and mode split targets established in Melbourne 2030.
- Incorporate provision for public transport and cycling infrastructure in all major new State and local government road projects.
- Develop new approaches and guidelines to improve the application of development contribution plans so that they help with the delivery of planned transport infrastructure, including arterial roads that are required to meet the needs of new communities.
- Incorporate public transport, cycling and walking improvements with the freeway development in the Scoresby Integrated Transport Corridor.
- Develop integrated guidelines for the evaluation and design of new developments which recognize all transport modes, for private and business access.

**E. <u>Give more priority to cycling and walking in planning urban development and in managing our road system and neighbourhoods.</u>**

For many trips, walking and cycling are the most energy-efficient and effective means of mobility, minimizing the environmental impacts of travel and providing direct benefits for personal health and social wellbeing. The design of many newer subdivisions locates

neighbourhood facilities such as local shopping centres and community facilities beyond convenient walking distance. These barriers will be removed to create an environment that is safe and attractive for all people, including pedestrians and cyclists, and particularly for the young and other vulnerable users. Local cycling networks and new cycling facilities will complement the metropolitan-wide network of bicycle routes.


**Figure 3.16 Provisions for Encouraging Cycling in Melbourne**

*Source: Melbourne development plan, 2030.*

**Initiatives:**

- Continue to develop the Principal Bicycle Network – to be completed (resources permitting) by 2015 – and give priority to sections that link with activity centres.

- Implement a walking action plan that includes provision for footpath bound vehicles such as wheelchairs, prams and scooters.
- Amend planning and/or building controls so that end-of-trip facilities for bicycles are provided in commercial buildings.
- Provide improved facilities, particularly storage, for cyclists at public transport interchanges and rail stations.
- Develop a bicycle action plan which brings together all elements needed to substantially increase bicycle use.

### 3.2.3. Mobility Policies in Portland City:

The goal of Portland city is to plan for, finance and develop an efficient system of public facilities and services to accommodate anticipated growth and economic development. To achieve its goals, the following set of objectives is decided by the planning authority:

- Promote multi-modal accessibility, enabling residents and visitors of all ages and abilities to participate fully in the social and economic life of the community.
- Support sustainability by reducing energy consumption, greenhouse gas emissions, and storm water impacts.
- Support economic vitality by ensuring the efficient movement of goods, services, and people.

**A. Fix it first:**

- Maintain existing infrastructure as the City's priority transportation objective, capitalizing on opportunities to incorporate modernization of existing infrastructure in the course of maintenance when possible.
- Keep the city's streets in a state of good repair, upgrade and coordinate traffic signal systems, maintain effective pavement markings, rehabilitate the sidewalk network, and replace the public transit fleet in a timely fashion.

**B. Modernize street design:**

- Make strategic investments in streets and street design to create Complete Streets and provide mobility, safety, and accessibility to all users.
- Invest in traffic signal modernization, street design safety modifications, and reconfigurations of existing streets to reinforce safer urban traffic speeds.

- Implement wayfinding, place making, and street lighting programs to unify the city's streetscape.
- Minimize impacts of highway infrastructure — such as ramps and overpasses — on city streets and neighborhoods.

**C. <u>Enhance the pedestrian realm:</u>**

- Invest in a walkable city through sidewalk maintenance, accessibility improvements, trail and path connections, snow clearance, lighting, landscaping, traffic calming, enhanced street crossings, strong urban design, artistic elements, and wayfinding.

**D. <u>Expand bicycle facilities:</u>**

- Complete and maintain the City's system of shared use pathways, neighborhood byways, and protected/ enhanced bike lanes in a legible and continuous network, and develop the complementary infrastructure, such as bicycle parking and wayfinding, to support it.
- Explore potential locations for separated bike infrastructure.
- Support the development of a bike share program.

**E. <u>Invest in public transit:</u>**

- Support initiatives to strategically increase the frequency and span of service, on-time reliability, and geographic scope of transit service.
- Deploy information technology and quality of service improvements, such as traffic signal priority, real-time transit information, fare integration, and Bus Rapid Transit service.
- Develop transit centers, enhance bus stops, and improve transit stop and transit corridor operations and accessibility.
- Create incentives to spur transit-oriented, mixed use development along corridors and in areas that can support high-quality transit service.
- Plan for multi-modal trip connections through bike storage, timetable coordination, or other measures that facilitate ease of transitions between modes of travel.
- Make bus and other transit options legible and easy to use for tourists and new riders through flexible payment options, marketing, improved technology and readily accessible route schedule and payment information.

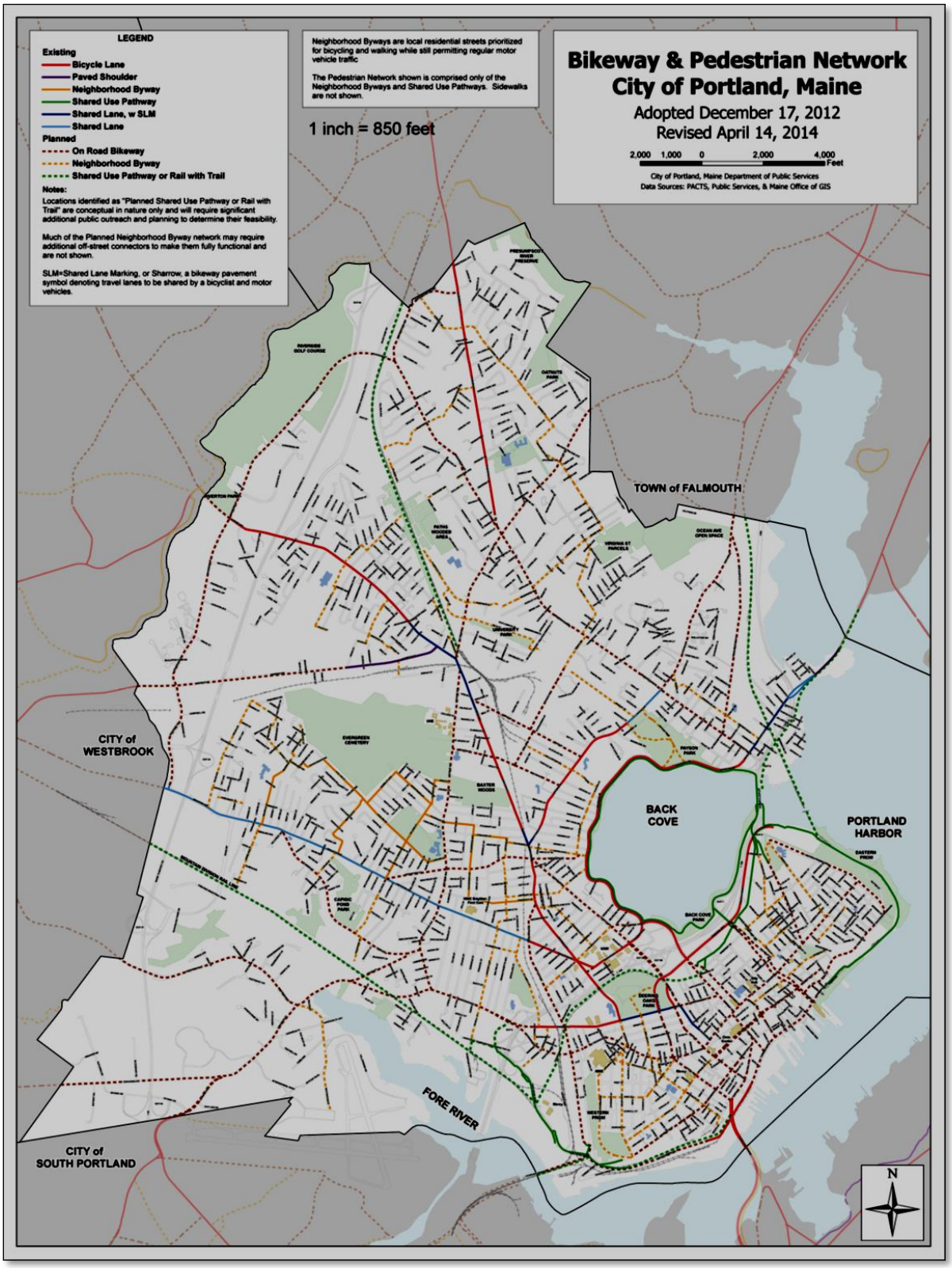


**Figure 3.17 Existing and Planned Bicycle and Pedestrian Network in Portland**

*Source: Portland's plan 2030.*

**F. Support age-friendly initiatives:**

- Consider specific measures to promote awareness and usability of our transportation system for the elderly.
- Ensure that seniors are aware of transit options, reduced fares, and specialized transit services.
- Consider senior transportation needs in areas of concentrated senior housing, including, but not limited to, new developments.
- Expand volunteer networks such as the Volunteer Snow Shoveling for Seniors Program, and prioritize snow and ice clearance from public sidewalks in areas with concentrations of seniors.

**G. Complete streets policies:**

In late 2012, the City of Portland passed a Complete Streets Policy, representing a new and progressive approach to transportation planning in the city. The Complete Streets Policy, like the movement that generated it, is founded on the principle that streets should work for all users and all modes, from the baby in the stroller to the bicycle commuter to the grandfather on the bus.

Figure 3.18 Complete Streets of Portland

*Source: Portland's plan 2030.*

As the policy states, “The goal is to create a connected network of facilities accommodating each mode of travel that is consistent with and supportive of the local community, recognizing that all streets are different and that the needs of various users will need to be balanced in a flexible manner.” In adopting the policy, the City has recognized that Complete Streets contribute too many of the City’s most basic objectives — to create a comprehensive, equitable, and fully accessible transportation network; enhance public safety and public health; complement land use patterns and economic development; and achieve energy and environmental sustainability.

### 3.2.4. Mobility Policies in Nagpur City:

The comprehensive mobility plan has focused on making Nagpur a vibrant city. The mobility plan has been prepared with the objective of achieving a balanced modal mix and to discourage personalized transport. The plan has proposed to introduce various transport initiatives in terms of road network development, non-motorized transport and mass transit systems, especially to improve the first and last mile connectivity for the existing mass transit systems to reverse the trend of decreasing public transit share.

**Strategies and projects:**

**A. Land use transport strategy:**

This strategy is focused on accessibility, connectivity, mixed land use developments to minimize vehicle trips, encourage transit oriented development, and the long term transport strategy be framed around the structural form of urban growth envisaged.

**B. Public transport strategy:**

One of the goals identified as part of the vision is to increase the integrated public transport share (PT+IPT) to 60% from the existing 43%. For this purpose, we could consider augmentation of City Bus System, including Route Rationalization, before embarking on capital intensive system(s). Bus systems only may not be able to meet the desired goal and on key corridors (mobility corridors) a case exists for providing a higher capacity mass transit system such as Monorail / LRT/ Metro.

**C. City bus system improvement:**

It is proposed to develop the city bus allied infrastructure to facilitate operations with proposed augmented fleet size. To carry out periodic maintenance activities of the

augmented bus fleet new Bus depots are proposed in addition to modernization of existing depots. New terminal facilities are proposed for route termination and bus parking. Modernization of existing bus depots and terminals and provision of new depots and terminals shall be taken up for efficient operations. The proposed depots shall also have an integrated terminal facility thus acting as origin or destination points for the future routes and minimizing dead mileage. Also exclusive terminals are required to be developed. The location for depots and terminals are identified based on future demand areas and through discussions with the MSRTC officials. Location of proposed depots and terminals are listed in Table 49. At each proposed location, land required for a Depot would be approximately 5 acres for 100 buses and some additional area would be required for terminal facility. In absence of sufficient land, the possibility of multi-story bus parking could be explored through a detailed technical and financial feasibility study. Route rationalization and expansion also need to be carried out in future years for expanding reach of city bus system.

### D. Multi modal transit hubs:

Inter-modal integration is a strategy proposed for Nagpur which will ensure efficient and effective coordination across various transport modes.

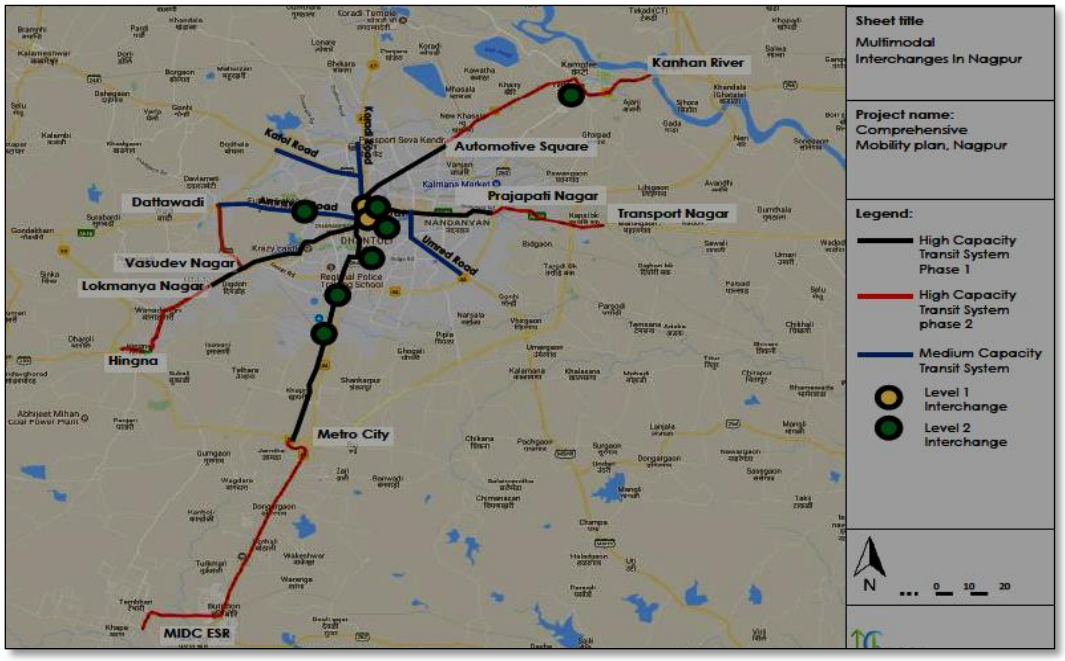


**Figure 3.19 Interchanges and Terminals for Multimodal Integration in Nagpur City**

*Source: City Development Plan for Nagpur, 2041.*

Various transport modes must functions in a coordinated manner to provide seamless mobility to the people. Inter-modal integration is a strategy proposed for Nagpur which will ensure efficient and effective coordination across various transport modes. Multi Modal Hubs are transit facilities provided at the interaction points of different modes to facilitate seamless transfer of commuters across different modes. Apart from physical integration it is also proposed that fare integration and information integration must also be achieved.

## E. Non-motorized transport proposal:

### i. Construction of Footpaths:

As observed from surveys it is learned that about 80% of the road network does not have footpaths, thus it is proposed to construct these footpaths. Apart from the proposed new roads 664 km (614 km + 50 km) must also have proper footpaths.

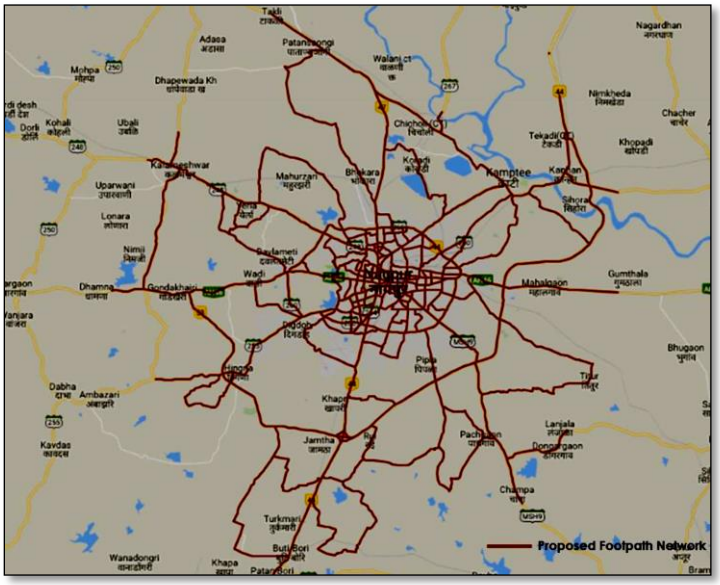


Figure 3.20 Map Showing Proposed Footpaths in Nagpur City

*Source: City Development Plan for Nagpur, 2041.*

### ii. Construction of Cycle Track:

The corridors identified as mobility corridors in Nagpur are proposed as priority corridors for providing cycle track on both side of the road. The cycle tracks are proposed to be

constructed along with the construction of proposed Mass Transit System along these corridors. Phase-1 Cycle Track network is proposed along High Capacity MRTS Corridors. Apart from phase-I cycle track corridors some mobility corridors and several other roads are identified for construction of cycle tracks in Phase-2.

The total road length proposed for cycle track provision is 146 km, 87km is proposed to be constructed in Phase-I and the remaining shall be constructed in Phase-2.

- **NMT Only Corridors**- Only pedestrians and cyclists will be permitted in the corridor
- **Dedicated NMT Corridors** with provision of dedicated footpaths and bicycle tracks of minimum clear widths of 1.8M on both sides of roads.
- **Shared NMT Routes** where the Bicycle users will share the carriageway with mixed traffic. Appropriate road signs and lane marking will also be provided. Shared NMT Routes should give high priority for NMT users in terms of pavements, signages, lane markings, sign boards etc. depending upon the characteristics of the road.

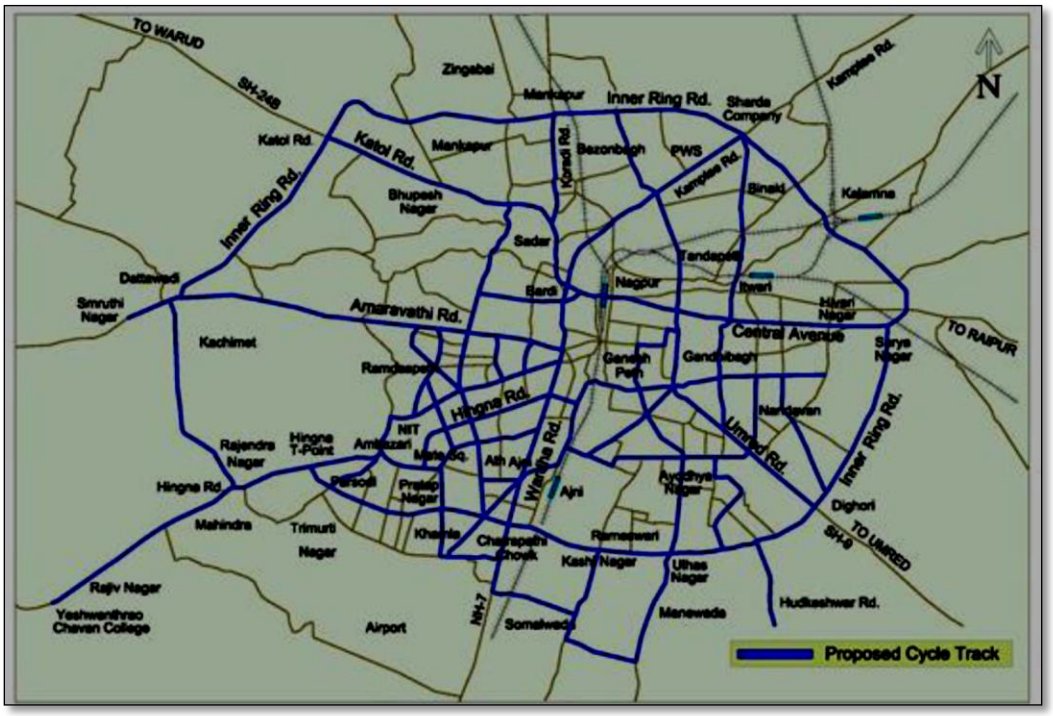


Figure 3.21 Proposed Cycle Tracks in Nagpur City

*Source: City Development Plan for Nagpur, 2041.*

### iii. Public bike sharing scheme:

PBS is a public transportation system based on cycles. The central concept of this system is to provide affordable access to cycles for short-distance trips in urban areas as an alternative to motorized public transportation or private vehicles. PBS encourages its users to rent cycles for a shorter time period which range from a few minutes to a few hours. Users are economically incentivized to return cycles at the earliest by making usage free for the first thirty minutes or so. Moreover, while traditional systems use cycles which are commercially available, PBS make use of cycles which are specially designed for the system and hence unique.

All the mobility corridors are recommended for dedicated cycle tracks on both sides of the roads. As part of their infrastructure requirement and bike sharing scheme, the major docking stations are proposed at each Transit station (MRTS station, major bus station and Interchanges etc.).

**Figure 3.22 Bicycle Sharing System in Nagpur City**

*Source: City Development Plan for Nagpur, 2041.*

Considering the heavy pedestrian movement, four areas are proposed as vehicle free zones in Nagpur which are Sitabuldi, Mahal, Itwari and Sada.


**Figure 3.23 Map Showing Locations of Vehicle Free Zones in Nagpur**

*Source: City Development Plan for Nagpur, 2041.*

The restriction on vehicular movement has to be decided after careful consultations among concerned agencies including Traffic Police. The restriction could be during evening hours every day or during the weekends or at all times. Central Bazaar Road (Lokmat Square to Humpy Yard and Lokmat Square to Kalpna Apt.) can be considered for vehicle free zone or vehicle restriction zone for limited period in a day.

### 3.2.5. Mobility Policies in Pune City:

Pune City's economy and transportation continued to evolve. Some of the key challenges are as follows:

- Public Transit: The increase in personalized vehicles coupled with the slow growth in the PMPML fleet has reduced the share of public transportation trips in Pune. Initiatives were started by the PMC such as the Pilot BRT project to not only improve the image of public transport but increase the public transport dominance in the Pune urban transport. Transportation funding falls short of transportation needs.
- Non-Motorized Transport: Historically Pune is known for its use of bicycles. Over the recent years the use of bicycles has come down significantly due to the rise in motorized vehicles. Due to the significant slum population and student population there is a significant continued usage of bicycles in Pune. Walking and cycling constitute approximately 33-35% of the total trips in Pune. It is important that

initiatives are taken to not only preserve but to enhance the share and safety of the NMT.

The CMP seeks to make public transport facilities available to all residents within a reasonable distance from their homes, work places and other destination points. It also seeks to encourage greater use of non-motorized modes by making their use safer. Recognizing that Pune is a rapidly growing city and travel demand will continue to grow, there is no escape from having to decongest some of the highly choked areas and intersections in the city. This is being suggested because long idling of motor vehicles at crowded junctions and corridors adds to pollution and unnecessary use of an imported fuel as also global warming. Measures have also been suggested to discourage the use of motor vehicles and attract a large part of the growing travel demand towards public transport and non-motorized modes.

## A. Mobility Plan Elements:

### i. Designate Mobility Corridors:

Functionally urban roads are classified as Arterial, Sub-arterial, collector/distributor and Local Streets. Functional classification of the urban roads is an important step wherein design and management of roadway would be standardized. In Pune even though the hierarchy of roads exists the roads are not maintained according to the required standards. By designating certain roads as mobility corridors, these corridors get priority for increasing the throughput as well as operating level of service. Therefore for a mobility corridor increasing the throughput as well as speeds would then be focused and appropriate solutions would be identified.

Experience indicates that as speeds of public transport vehicle reduce travel times increase to such an extent that commuters look for personalized modes of travel. In addition to the user travel preferences, the road design and operations also have bearing on the traffic congestion. Congestion results in lower traffic speeds for all vehicles and more for public transport vehicles.

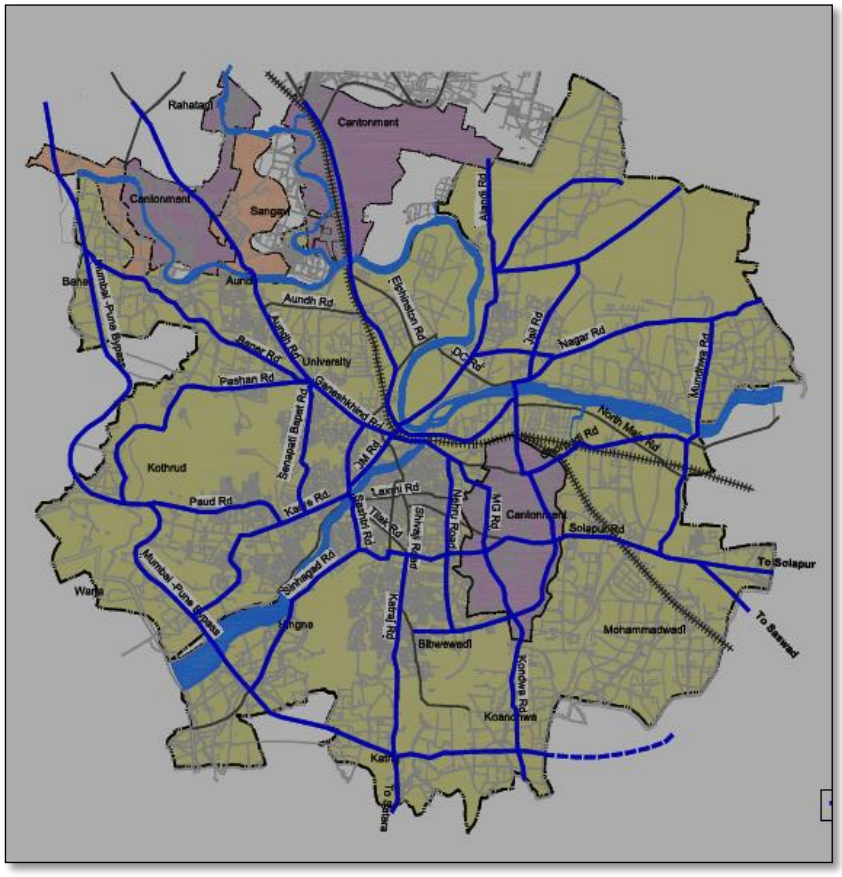


**Figure 3.24 Mobility Corridors in Pune**

*Source: City development plan Pune, 2041*

It is very imperative that certain strategic roads be designated as Mobility Corridors for focusing the corridor mobility. These corridors would be expected to have the following cross sectional elements:

- The road cross section would be at least 25m for mixed traffic conditions or 30m for dedicated public transport lane conditions. The roads if necessary must be widened up to the width shown in the Development Plan.
- Continuous Kerb, footpath-cum-drain & bi-cycle lanes.
- Service roads where feasible
- Restriction or preferably prohibition of parking on the carriageway/shoulders. The parking must be shifted to off-street parking locations or cross roads.

- At-grade/grade-separated public transport systems as per the public transport master plan.

The radial road network would be complemented with circumferential roads to form a radial and ring pattern of the urban network. Three circumferential rings have been envisaged in the study area:

- The first ring would utilize the existing sections of the road and encircle the core area. Traffic not destined to the core area can utilize this ring to bypass the core area thereby relieving congestion in old city and vicinity.
- The proposed HCMTR in the DP would form the second ring
- The third ring would be a regional ring circumscribing both PMC as well as PCMC. The existing westerly bypass would form the western portion of the ring. The easterly portion must be developed connecting NH4-Nasik Rd-Nagar Rd-Solapur Rd-Saswad Rd-Satara Rd.

**ii. Traffic Segregation:**

To reduce accident risk and increase level of service central medians are to be provided on mobility corridors. Bicyclists and pedestrians are more efficient users of scarce road space than private motor vehicles, helping to combat congestion. Bicycling and walking are the most efficient and environmentally sustainable means of making short trips. Pune has already begun implementing bicycle lanes and must continue to do so on all corridors, more specifically mobility corridors. Cyclists using the carriageway along with motor vehicles and other road traffic, cause hazards for themselves. This is particularly true when cycle traffic is more. Under such circumstances, it is necessary to segregate cyclists from other traffic. Provision of a separate bi-cycle lanes of at least 2m width would improve the overall traffic flow. To provide separate NMT facilities sometimes the shoulders and carriageway may need to be widened within the ROW. Parking may need to be relocated to make way for the NMT facilities at certain locations.

**iii. Pedestrian Crossings / Signals:**

On the mobility corridors specifically at busy intersections and mid-block bus stops (at public transit corridors) Pedestrian foot-over-bridges or subways would

be required. A TEFS must be conducted before finalizing the location and type of grade separation. Where grade separated facilities cannot be provided at-grade facilities such as zebra crossings, striping, pedestrian flashing signals etc. would be provided.

**iv. Bus Bays:**

Many of the bus stops are located close to major junctions and no recessed bus bays exist. There are instances when the buses are forced to stop in the middle of the roads which then develop the queues behind the buses spilling back up to the junctions and disrupting the regular vehicular movement at the junction. This only worsens the traffic congestion problems in the area and creates unsafe driving conditions. It is recommended that the bus stops be moved to at least 60 meters away from the junction and wherever carriageway width permits to provide a bus lay by.

**v. Encroachment & Hawker Management:**

These hawker encroachments are hindrance to the movement of people and also reduction to the capacity of the roadways. The pedestrians are forced to walk on the carriageway at these locations of encroachments, thereby creating hazardous situations for both themselves and the traffic. In this regard, the Consultants have proposed “Hawker Zones” aimed at decongesting main roads in Pune, while at the same time, protecting the interests of street hawkers.

Accordingly, three types of zones are proposed for Pune to regularize the street vending operations:

Green Zone: The areas / Roadways marked as ‘Green Zones’ will allow hawkers to do their business at all the times at the specified locations without any restrictions. The locations around the market areas generally are designated as Green Zones.

Amber Zone: The areas that come under Amber zone have some restrictions for the vendors and hawkers. These restrictions could either be by time of the day, or by the day of the week. On the times/days specified, hawkers could not be allowed to do their trade, standing on the street. On all other times, vending is allowed at designated areas.

Red Zone: As the name itself suggests, hawking/vending are not allowed at these designated areas at any time. The zones identified as Red Zones will always prohibit hawkers. All the busy corridors of the town, will come under the cover of Red Zone, and hence, are hawker-free zones.

### vi. BRT Based Public Transport Plan:

One of the successful ways of increasing the public transport trips in addition to the fleet augmentation is to increase the speed and capacity of the public transportation system by way of dedicated public transport corridors. A public transport corridor is an alignment mostly on existing transport network system either at grade or grade separated with dedicated carriageway to carry public transport trips. The forecasted model is used to designate and size the public transport corridors in terms of the carrying capacity requirements. The traffic flows of the corridors, desired line data, future growth centers and the transport model were used to identify various “public transport corridors”.

PMC’s BRTS Report (Network Development for BRT for Pune City under the Scheme of JNNURM – Main Report, July 2006) identifies 21 corridors/routes for BRTS, based on among others, earlier studies and some fresh surveys. Various parameters such ROW, present PMPML ridership etc. are considered in the determination of the routes. This project was accorded an “in-principle” approval by the JNNURM Central Sanctioning and Monitoring Committee in their meeting held on August 11, 2006.

### vii. BRT and Ring Corridors and High Speed High Capacity Mass Transit System Plan:

In addition to the Ring and BRT corridors possible High Capacity & High Speed Mass Transit System such as LRT/Metro/Monorail etc. are assumed for implementation on appropriate corridors.

Currently the local trains running on the Central Railway line between Pune and Pimpri Chinchward also provide an alternative way of public transport. However the existing railway line and station capacity does not accommodate the forecasted trips within the existing ROW. There is a proposal to add additional line to the pune-Mumbai section. It is also expected that a dedicated freight

corridor is expected between Mumbai-Chennai sections. Increasing the existing frequency and routing certain PMPML buses will certainly increase the modal share carried by local trains. However the additional capacity will not be able to meet the public transport demand requirements between Pune and Pimpri. Unless exclusive used for LRT operations during peak hours, the existing railway line cannot eliminate the need for a road based public transport corridor. This would require relocation of the long distance railway line.

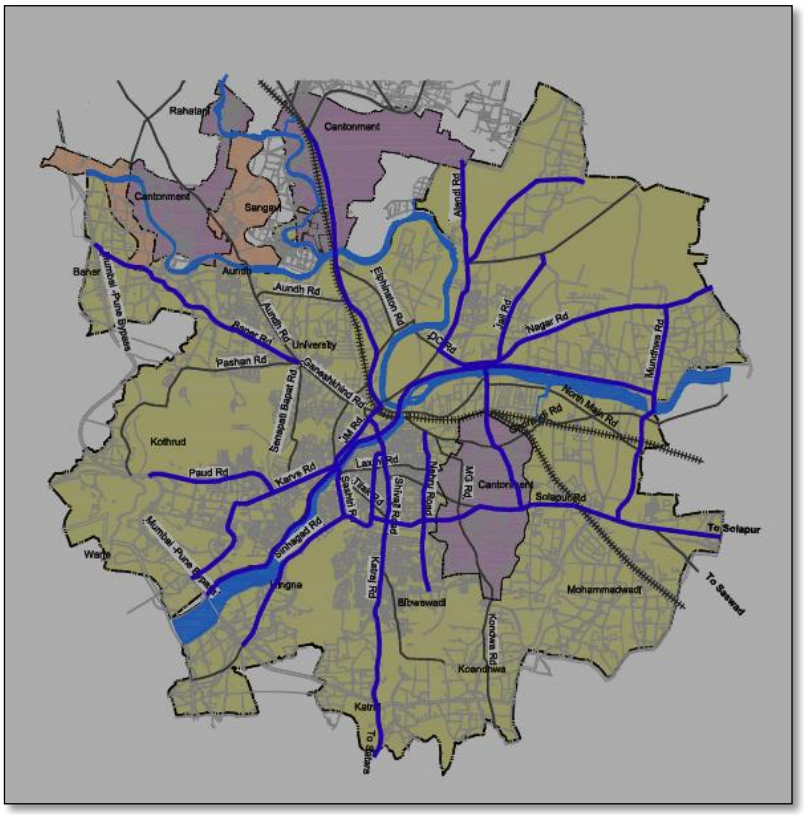


Figure 3.25 JNNURM Approved BRTS Corridors in Pune

*Source: City development plan Pune, 2041.*

**B. <u>Non-Motorized Plan:</u>**

**i. Install Footpaths:**

Walking is healthy, cheap and effective mode of transportation for shorter trips. Most of the motorized trips begins and ends in walking. A significant portion of the study area trips (~ 22%) are made completely by walk. To encourage and cater to walking trips footpaths must be installed on all roads without any exception. The following is suggested for the installation of footpath:

- A minimum usable width of 1.5meters should be provided for footpath.
- It is desirable to have a footpath width of 2.0meter for all roads.

- Where possible obstructions on footpath must be relocated
- Footpath design must discourage two wheelers using the footpath during periods of congestion

**ii. Install Pedestrian Grade Separated Facilities:**

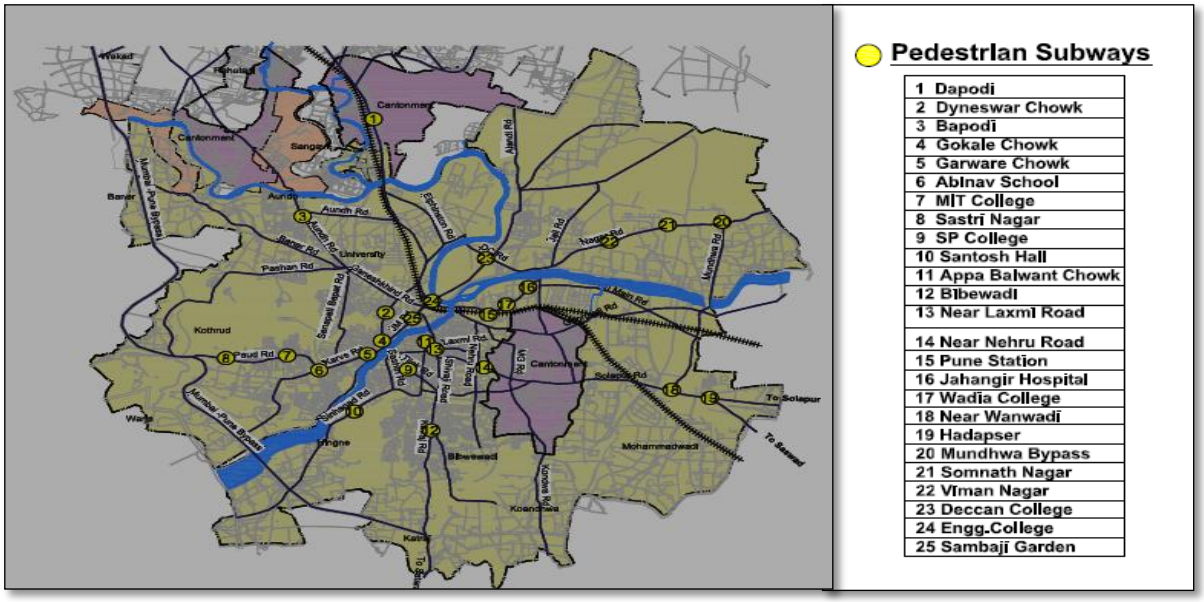


Figure 3.26 Locations with Pedestrian Grade Separated Facilities in Pune

*Source: City development plan Pune, 2041.*

It is very essential that pedestrians are dispersed from public transportation systems safely onto footpaths. If dedicated carriageway is provided for public transport, the method of dispersal must take into consideration the bus stop location. If the center lane of carriage way is dedicated for public transportation grade separated pedestrian crossing facilities must be provided for bus-stops located away from major intersections.

**iii. Install Bi-cycle Lanes:**

Cycling is healthy and effective mode of transportation for many commuters in Pune. Several trips exceeding a trip length of 3-4KM are made through bi-cycle. A significant portion of the study area trips (~ 11%) are made completely by cycling. The cycle lane must be continuous and form a network. As part of the Master Plan of the BRT, submitted by CIRT and IIT-Delhi, a cycle network has been prepared for the Pune city. A review and study of the network indicates that it is continuous and forms a network connecting all the important destinations of the core city as well as the rest of the Pune city.

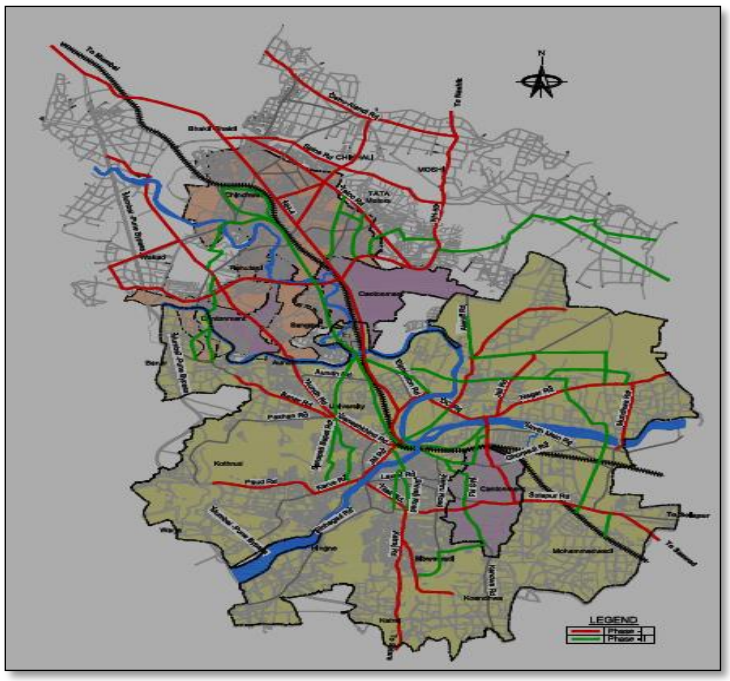


Figure 3.27 Bicycle Lanes Proposed in Pune

*Source: City development plan Pune, 2041.*

The cycle lanes are provided on all roads that have high share of bi-cycle traffic as well as on those roads that constitutes the draw area for the proposed public transport corridors. This network must be integrated along with public transport network improvements. It is recommended that this network be implemented.

**iv. <u>Encourage and Designate Pedestrianisation in Core Area:</u>**

The core area with its array of high density retail and commercial uses and narrow streets is well suited for pedestrainisation. Well designed and placed public spaces can enliven an area. M.G. Road in the city is already being made as a Pedestrian Plaza on Sundays. One of the pedestrian busy streets in core area is Laxmi road as can be seen from the pedestrian survey results. Similarly the surrounding roads also have very high pedestrian volumes. On an experimental basis vehicles may be banned on Laxmi Road and adjoining streets (within 50m to 200m) from 8 am to 8 pm, effectively turning an area of approximately about 0.5~1.0 square kilometers into a vehicle-free zone to ease the chronic air pollution and traffic jams that plague the old city. International experience shows that despite the initial resistance and acceptance, pedestrainisation often improved the businesses and economy of the area in addition to the social benefits. If the ban proves successful, it could become permanent and extended.

### 3.2.6. Summary of Mobility Policies:

Table 3.2 Summary of Mobility Policies

| No. | City | Policies | Key Points |
|---|---|---|---|
| **1** | Toyama, Japan | • Walkable City Strategy.<br>• Development of Toyama light rail transit lines.<br>• Cyclocity Bike-Sharing System | Creation of mobile app called "Tohokatsu" (active walking), development of LRT in three phases portram, centram and inter modal connectivity, rider incentive programs, easy accessible transportation infrastructure irrespective of age. |
| **2** | Melbourne, Australia | • Create attractive, walkable, diverse communities.<br>• Connect activity centers with transportation links | Comprehensively planned sustainable communities, provisions of light rail, tram and express bus services on non-radial routes connecting major activity centers, encouraging access by cyclists and pedestrians, implement a walking action plan. |
| **3** | Portland, USA | • Promote multi-modal accessibility.<br>• Invest in safety and accessibility.<br>• Enhance the pedestrian realm.<br>• Complete streets policies. | Sidewalk maintenance, accessibility improvements, trail and path connections, expand bicycle facilities, develop transit centers, enhance bus stops, support age-friendly initiatives, and enhance public safety and public health. |
| **4** | Nagpur, India | • Develop public transit system in conformity with land use.<br>• Multi-modal transit hubs.<br>• Non-motorized transport proposal. | Ensure safety and mobility of pedestrians and cyclists, city bus system improvement, Intelligent transportation system (its), Construction of footpaths and cycle tracks, public bike sharing scheme, provision of vehicle free zones. |
| **5** | Pune, India | • Installation of BRT system.<br>• Non-Motorized Plan.<br>• Mobility Plan Elements. | Designated Mobility corridors, management of encroachment and hawkers, installation of footpaths, pedestrian grade separators, bicycle lanes, pedestrian only zones, and feeder bus systems. |

The policies for the mobility addressed by all the five cities are almost the same. They focus on providing an efficient public transport collecting all the activity centres

or important nodes and also providing the feeder transportation systems to further connect the distant areas. It also focuses on improving the walkability and accessibility by designing self-sufficient neighbourhoods and communities and also provides infrastructure and safety to the pedestrians and cyclists such as segregated paths, cycle tracks, footpaths, bike sharing systems etc. Toyama city has developed a mobile app for promoting active walking which encourages the citizens to walk by giving incentives and rewards on the basis of the distance travelled in the city on foot by recording the footsteps individually. The Indian cities, Nagpur and Pune have demarcated certain vehicle free zones and pedestrian zones in the city to reduce the usage of private vehicles.

### 3.3. Population Density:

Density is an essential strategy in determining the compact urban form. Urban density refers to the quantitative relation of dwelling units or individuals to land area. Dense settlements are planned to be developed around strategic hubs that compile functions and people to create living areas for many hours of the day. These areas are characterized by a combination of functions such as housing, offices, services, cultural facilities, and recreational areas to achieve a vibrant urban setting, combined with a decent access to conveyance and good cycle paths connected with the rest of the city, meant to facilitate the mobility of individuals. On the whole, the compact city strategy aims to create high density nodes so as to contain the sprawl and implementation of an efficient conveyance system and thereby reduce the car dependency.

The inner city, the central development and redevelopment areas nodes are expected to be able to contain development volumes of various numbers of homes per annum. Also, a high density is to be hunted for all nodes, and this development will contribute to strengthening the areas' central points and can help to achieve a multidimensional form of mixed-use, i.e., physical, economic and social mix. Similarly, a high density is to be aimed for altogether prioritized development areas, and this development shall contribute to reinforcing the areas' central points. Density ought to be prioritized close to these future central points, as shall supplements to achieve an honest mix of functions and an honest social mix. The multidimensional mixed–use strategy should go hand in hand with the high–density strategy.

### 3.3.1. Population Density Policies in Toyama City:

**A. <u>Promotion of residence in the city center and along public transport lines:</u>**

**i. Community Development Promotion Project 1: Machinaka (City Center Zone) Development:**

To promote the housing in the downtown area that was set out in the Toyama City comprehensive plan, the city supports business operators who build new high-quality apartment housing and citizens who newly build, purchase, or lease housing. The Machinaka is one such development area in the city center of about 436 hectares and borders Shinonome Street to the east, Azami Street to the south, Keyaki Street to the west, and Hokuriku Shinkansen, Itachi River, Boulevard, and Fugan Canal Park to the north.

To accommodate high-quality housing and living in the town center in Machinaka, the city adopted “Housing and Living Environment Guidelines” (HLE Guidelines) and provides support when new housing is acquired according to the guidelines.

The main policies and subsidies targeted at supporting developers/construction companies include:

- **Promoting the construction of apartment housing.** The city assists businesses whose newly built apartment housing conforms to HLE Guidelines. (¥500,000/house].
- **Regional high-quality rental housing improvement expenses subsidy.** In accordance with the certification of regional high-quality rental housing in Toyama City, the subsidy assists developers’ who develop residential housing for senior citizens with services. (¥1.2 million/house).
- **Support for facilities that are part of residential buildings.** Machinaka support projects for housing with commercial and other facilities. If the new apartment building or housing conforms to the HLE Guidelines, the program assists those businesses that register at the lower floors and provide medical and welfare facilities. (¥20,000/square meter).
- **Machinaka housing conversion support project.** The project promotes diverting office and commercial use buildings into housing. Funding assist converting unused office and commercial buildings into communal residences that conform to HLE Guidelines. (¥500,000/house).

The main policies and subsidies targeted at supporting citizens who wish to buy or rent include:

- **Promotion of housing acquisition**—Machinaka housing purchase support project. The project assists those who acquire single-family homes and condominiums of a certain quality inside Machinaka. (¥500,000/house).
- **Rent subsidies for rental housing**. Home rent is subsidized for households moving into rented apartments in the Machinaka area from outside of Machinaka. (¥10,000/month for three years or for university students until graduation).
- **Machinaka reform assistance subsidies**. The program assists those who will acquire secondhand houses in Machinaka and renovate them for themselves, or those who will renovate the house they currently live in to increase the number of households who live there. (¥300,000/house).

**ii. Community Development Promotion Project 2: Transit Station Buffer Areas:**

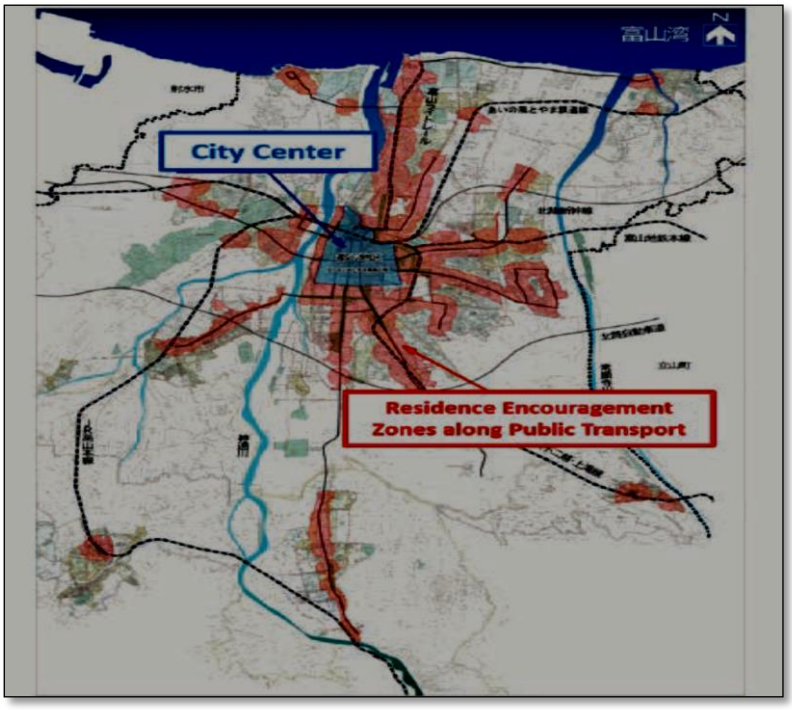


Figure 3.28 Residents Encouragement Zones along Public Transit Corridors

*Source: The Development Story of Toyama- Reshaping compact and livable cities, 2019.*

To promote living in the Residential Promotion along Public Transport District (RPPT) stated in the city basic plan, the city supports business operators who build new high-quality apartment housing and citizens who build and purchase new houses. RPPT districts are located within a 500-meter radius of rail/tram stations, within 300-meters of bus stops on high-frequency corridors. The city provides citizens with assistance when they acquire new houses that conform to “Housing along the public transport/living environment guidelines” for housing along public transport corridors.

The main policies and subsidies targeted at supporting

Developers/construction companies include:

• **Promotion of construction of joint housing along a public transport project.** The city will assist businesses building new apartment housing that conform to “Housing along the public transport / living environment guidelines.” (¥350,000/house)

• **Area high-quality rental housing development subsidy.** With approval within the supply plan for the area’s high-quality rental housing in Toyama City, the city will assist those who build new housing for senior citizens with services in RPPT districts. (¥700,000/house)

• **Promotion of housing land development project along public transport.** The city will assist people who develop a high-quality residential section in RPPT districts. (¥500,000/development)

The main policies and subsidies targeted at supporting citizens who wish to buy or rent include:

• **Housing acquisition support project.** The project assists citizens who build or acquire qualified privately owned houses or condominiums in the residential area along public transport. (¥300,000/unit, ¥100,000 additional assistance when the citizen moves from outside the area or when the house is occupied by two generations of a family.)

• **Renovation support project for houses along the public transport.** The city supports citizens who acquire and settle in second-hand housing in the residential

area along the public transport lines or who renovate their houses along the public transport lines to increase the number of households. (¥300,000/house)

**B. <u>Establishing a downtown community care center (sogawa legato square):</u>**

**i. Machinaka General Care Center:**

This is the focal point of the Legato Square development, which is dedicated to developing businesses to promote childcare support and home medical care and to foster local communities (by increasing social capital) and to promote the development of a healthy community where all local citizens including infants, the elderly, and people with disabilities can live in peace and health. The center is unique in that it has delivered two new programs that are first in Japan for a public entity: childcare program for sick children and postpartum care support program.

### 3.3.2. Population Density Policies in Melbourne City:

**A. <u>Locate a substantial proportion of new housing in or close to activity centers and other strategic redevelopment sites that offer good access to services and transport.</u>**

A large number of new dwellings will be required over the 30-year planning period. Current trends indicate that most will be households of fewer people – on average – than today. Melbourne 2030 provides for an increasing proportion of housing to be developed within the established urban area, particularly at activity centres and other strategic sites suitable for redevelopment.

Presently, more than 130 major redevelopment sites have been identified across metropolitan Melbourne with potential for large residential development (more than 100 dwellings) outside activity centres. Additional strategic redevelopment sites will be identified by local planning authorities with government assistance. Locations should be:

- In or around the Central Activities District.
- In or within easy walking distance of Principal or Major Activity Centres.
- In or beside Neighbourhood Activity Centres that are served by local public transport.
- Abutting tram, train, light rail and bus routes that are part of the Principal Public Transport Network and close to Principal or Major Activity Centres.

**Initiatives:**

- Ensure an adequate land supply for urban housing development across the region to maintain competitiveness in the housing market. This should include an adequate supply of redevelopment opportunities within the established parts of the city to reduce the pressure for fringe development.
- Work with councils to identify major sites with potential for intensive housing redevelopment and to resolve any problems that inhibit appropriate development.
- Update current development controls and planning processes, and develop new guidelines for more intensive development so that the planning system can promote well designed higher-density housing at strategic redevelopment sites.
- Work with councils to develop local housing strategies that address local housing issues and needs, including:
    - Identifying projected population trends, and any significant changes in household structure and composition.
    - Providing for a range of housing opportunities to meet increasingly diverse housing needs.
    - Identifying appropriate locations for higher density housing.
    - Ensuring an adequate supply and distribution of affordable housing.

**B. Improve community safety and encourage neighbourhood design that makes people feel safe.**

Concerns about safety may restrict people's mobility and levels of activity and may exclude them from some places, particularly at night. Such concerns can lead to loss of independence, isolation or constraint on some activities. The perception of safety can have as great an impact on people's lives as do actual levels of safety or crime. Different groups may feel more vulnerable than others, making safety an important equity issue. All people should be safe, and they should feel safe.

The Government is implementing a number of initiatives related to community safety. The recently launched 'Safer Streets and Homes' strategy sets out how government and community initiatives can mesh to help people feel confident about their safety. It acknowledges that the built environment can make a considerable contribution to safety and perceptions of safety, through the design of buildings and public spaces

and the mix of activities therein. Provision will be made in activity centres for suitable locations for police stations and fire brigade, ambulance and emergency services. In newly developing areas, these services will be located together. Public safety and perceptions of safety will be considered when developing or amending planning provisions, structure plans and urban design guidelines, criteria and standards. Melbourne 2030 is committed to improving public safety in all circumstances. As perceptions of safety have an influence on travel choice, the Strategy takes an integrated approach to travel safety.

**Initiatives:**

- Set up programs to improve the safety and security of people in public places and while using public transport, walking or cycling.
- Establish an interagency forum to improve community safety through the application of urban design principles.
- Locate police, fire, ambulance and other emergency services in or near activity centres to enable stronger linkages and faster action in emergencies.
- Include 'safer design' guidelines and principles in the planning system to improve perceptions of safety and reduce the occurrence of crime and violence in built environments.

**C. Promote excellent neighbourhood design to create attractive, walkable and diverse communities.**

Melbourne 2030 intends that neighbourhoods should be created as integrated and interconnected communities, not just as subdivisions. It adopts a set of Neighbourhood Principles that apply to the development of new areas and to major redevelopment in existing areas. Not only will new developments meet basic needs, they will also build a strong sense of place and community. Because the population is made up of people of different ages, genders, family types, cultural backgrounds, interests and abilities, neighbourhoods must respond to different needs, opportunities and aspirations.

In some areas, low population densities combined with inappropriate development patterns make it difficult to provide easily accessible local facilities, services, public transport and job opportunities. People can become isolated at home or dependent on others for access to services. Due to these difficulties, while housing may be

relatively inexpensive, the total cost of living is often higher than it need be. New areas will be comprehensively planned as sustainable communities that offer high quality, frequent and safe local and regional public transport, and a range of local activities – living, working and recreational. Emphasis will be placed on fostering healthy lifestyles through initiatives such as creating walkable neighbourhoods where it is easy and attractive to walk or cycle to facilities and services. It is important that convenience services, meeting day-to-day needs, are available within walking distance of where people live.

**Initiatives:**

- Update the residential subdivision provisions in the Victoria Planning Provisions to promote the Neighbourhood Principles.
- Adopt guidelines to assist local government in supporting local convenience services.
- Apply the Neighbourhood Principles in the creation or review of growth area development plans, in structure plans for new subdivisions, and in planning for the improvement or redevelopment of existing areas.
- Promote the development of Neighbourhood Environment Improvement Plans to ensure that community environmental concerns are heard and addressed.

**D. Increase the supply of well-located affordable housing.**

The existing distribution of public housing does not match changing housing needs, especially the need for a wider range of housing options in the middle and outer suburbs. Strategies for public housing estates are being developed to reduce concentrations of public housing and overcome social and economic disadvantage. Public and community housing stock are not increasing in step with demand. Increasingly, public housing is targeted to households with multiple needs, rather than to those who simply cannot afford private rental accommodation.

The supply of affordable housing in all parts of the metropolitan area will need to be increased. It is recognized that this need exists, and that the planning system alone is not well equipped to meet it. A significant proportion of new development, including new development at activity centres and strategic redevelopment sites, must be affordable for households on low to moderate incomes, especially those that are experiencing housing stress but are unlikely to gain access to public or social

housing. Ways of achieving this will be explored. The monitoring of housing affordability will be important in finalizing eligibility criteria for these dwellings.

**Initiatives:**

- Monitor supply and demand in affordable housing at local and regional levels and publicize examples of best practice in the provision of well-designed affordable housing.
- Increase the supply of affordable housing through joint programs with the Urban and Regional Land Corporation, the Office of Housing, local councils and the not-for-profit sector.
- Continue the redevelopment and renewal of public housing stock to better meet the needs of existing and future clients.
- Address areas of particular disadvantage, especially where high concentrations of public housing exist, through the Office of Housing's Neighbourhood Renewal Strategy.
- Develop and implement initiatives to increase the supply of appropriately located affordable housing throughout the metropolitan area.
- Work with all stakeholders, including the Office of Housing and the private sector, to identify opportunities and develop techniques and solutions to facilitate a mix of private, affordable and social housing in Transit Cities' projects.

### 3.3.3. Population Density Policies in Portland City:

The main goal of the Portland development plan is to encourage and promote affordable decent, housing opportunities for all Main citizens. It also visions to provide residence to the people who visit the city for work purposes.

**Future strategies to achieve the goal:**

**A. Build on existing programs:**

- Reinforce existing housing tools, policies, and programs while continuing to explore emerging best practices.
- Continue to implement best practices in workforce and affordable housing development such as the Housing Trust Fund, inclusionary zoning, and other tools.

**B. Remove housing barriers:**

- Evaluate whether current zoning allows for new development consistent with historic patterns of form, density, and/or use, as well as whether it allows for priority growth areas.
- Assess the impact of current parking requirements on housing development, and evaluate the suitability of fee-in-lieu programs for some neighborhoods.
- Identify priority growth areas.
- Coordinate linkages between accessible transportation and housing affordability.
- Allow for a range of housing models in City codes, whether small units, co-housing, or others that may suit changing needs and demographics.

**C. Promote sustainability:**

- Encourage energy efficiency in new construction and rehabilitation of Portland's housing stock.
- Encourage housing that is resilient in the face of climate change, severe weather events, and storm surges, especially in vulnerable low-lying areas.
- Encourage rehabilitation of existing historic buildings and materials.

**D. Leverage underused properties:**

- Consider the sale of City-owned land that may be appropriate for housing development.
- Consider incentivizing affordability restrictions as part of City-owned property transactions, as well as the potential to return improved properties to the City's tax rolls.

**E. Plan for shelter:**

- Ensure that the land use code aligns with City Council policy direction on homeless shelter placement and contemporary facility requirements.

**F. Support age-friendly housing options:**

- Support programs and tools that facilitate aging safely in place.
- Create, promote, and facilitate safe, affordable, and practical housing solutions that will meet the evolving needs of Portland residents as they age.

**G. Adapt affordable housing:**

- Assess the capacity of existing affordable housing developments, many of which were built over four decades ago, to adapt to current best practices by

improving energy efficiency and physical and social connections to surrounding neighborhoods.

- Pursue new opportunities for increased energy efficiency, increased densities, mixed incomes, and greater connectivity to surrounding neighborhoods.

**H. Ensure adequate emergency preparedness:**

- Update the City's Emergency Action Plan to ensure adequate integration of emergency responders.
- Leverage community partnerships to plan and implement steps to improve emergency preparedness.
- Evaluate Fire Department facilities and vehicles, looking at the adequacy of buildings and equipment for 21st century life safety needs, as well as the location of facilities in relation to changing growth patterns.

**I. Address homelessness:**

- Align the City's land use code with City Council policy direction on shelter placement, shelter models, and facility requirements.
- Continue to embrace innovation and best practices towards eliminating homelessness.

### 3.3.4. Population Density Policies in Nagpur City:

Nagpur has a wide catchment area with a radius of 300 km due to presence of better health facilities. Surrounding villages are dependent on public health care facilities in Nagpur and thus the service load on public facilities is more. Even, Urban poor is completely depended on government hospital in the city. It is extremely important to increase the bed strength of the Government Medical College and Daga Hospital since it is accessed by urban poor. The condition of health/Medical facilities has deteriorated significantly in the city. Also, the quality of services at the government hospitals is being deteriorated. Public health facilities are not conforming to the URDPFI guidelines. But, considering the private and public both, majority of the health facilities are conforming to the URDPFI guidelines. Also, there are no subsidy programs for urban poor to avail critical and super specialty services in other private hospitals.

**Issues for housing and basic infrastructure provision:**

- Though 70% of the slums have access to basic services and have basic infrastructures; but these slums are not de-notified.
- Due to non-de-notification of slums the footprint and population share residing in the slums is high, which is not the real case.
- Presence of political resistance delaying the implementation of housing projects
- No effective implementation of housing projects due to presence of multiple agencies in provision of same functions and absence of single authority in the city.
- Coordination issues between agencies. NIT is carrying out development works in slums in the city. Details of works carried out by NIT in the slums are not been shared with NMC. Thus, repetition of works is taking place.
- NMC, NIT, SRA, and MHADA are working for slums in Nagpur. MHADA is now working in slums located in the city outskirts.

**A. Basic Services for Urban Poor (BSUP):**

In Nagpur, the scheme under JNNURM is been implemented by SRA Nagpur on behalf of NMC. Under this scheme, 6,246 dwelling units (DU) along with infrastructure and amenities have been proposed and sanctioned in 18 slum communities in Nagpur.

The Nagpur Municipal Commissioner is the Chief Executive Officer of SRA. under BSUP scheme, 251 dwelling units have been completed and allotted to respective beneficiaries, and work on 2,000 dwelling units is in progress at 10 slum communities.

Initially, the scheme under BSUP was sanctioned for in situ redevelopment in G+2 housing cluster. Slum dwellers in Nagpur have bigger footprint sizes, and almost 70% of the slums in the city has basic infrastructure, due to which there was resistance from slum dwellers, and hence the pace of implementation was slow in initial 3 years of the project timeline. In March 2012, the scheme was revised based on the interactions with slum dwellers and local elected representatives, and a mixed bag approach was proposed.

In situ redevelopment in G+2/G+3 housing clusters with complete infrastructure: Under this strategy, SRA has sanctioned 1,206 dwelling units in 7 slum communities.

Work on all the 7 projects is in progress, and the work is expected to finish within the mission period.

In situ construction of new houses on same footprint with infrastructure gap filling: Under this strategy, 3,292 dwelling units in 11 slum communities have been sanctioned, work in 5 slums is in progress, and bid management has been completed for the remaining 6 slums. However, work on 25 DU"s under this strategy is initiated in 1 slum community; 15 DU"s are completed and allotted. This strategy is very popular among the slum dwellers and elected representatives; however, the process of implementation is slow because the houses have to be constructed on the same footprint, which consumes more time, thereby delaying the implementation.

**B. Rajiv Awas Yojana:**

Nagpur has been selected as one of the pilot cities under Rajiv Awas Yojana (RAY) - SRA has been appointed as the implementing agency for RAY in Nagpur. The agency has initiated the preparatory process for RAY. The Rajiv Awas Yojana cell has been constituted by SRA as per the guidelines of RAY. Surveys of 130 slums have been already completed and socio-economic surveys as per formats issued by GoI are underway. SRA has completed the initial surveys and mapping for 1 cluster (which consists of 5 slums) and is taken up for implementation on pilot project basis under RAY.. The possibility of involving private players to cross subsidize the schemes, are being worked out by SRA.

### 3.3.5. Population Density Policies in Pune City:

**A. Affordable housing& slum eradication:**

i. **Scale up and expedite redevelopment and rehabilitation of slums by involving civil society:** Proportion of population living in slums is on the increase in Pune – it was ~33% in 1991 and stands at ~37% in 2011. For Pune to become a truly global city, it needs to create affordable housing on a mass scale.

ii. **In-situ up-gradation:** Suitable for slums that are on tenable land and where density is not excessively high. In such a condition, only upgradation of services and dwelling units may be required. This may involve a mixture of provision or upgrading of service and infrastructure levels, incremental housing improvements or selective replacement of kutcha houses. PMC successfully upgraded 4000

households in Yerwada under this scheme, where civil society played an instrumental role

iii. **Rehabilitation:** If the slum is on non-tenable land and density is excessively high for safe habitation, those households are rehabilitated at different locations by creating affordable housing for them through easing of land markets and standardization of designs and technology

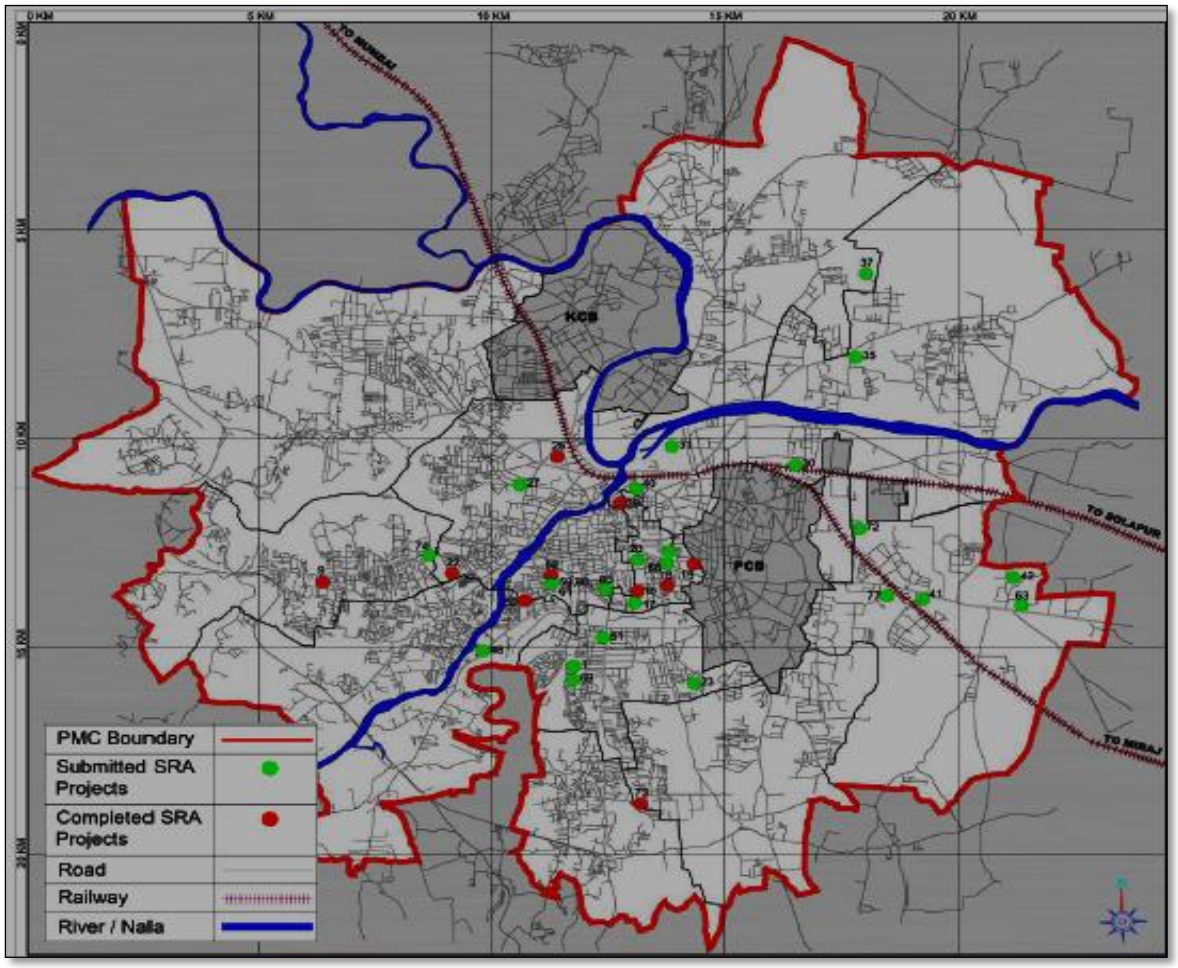


Figure 3.29 Locations of Sanctioned and Completed Schemes of SRA, Pune

*Source: City development plan Pune, 2041.*

iv. **Strengthening the role of SRA (Slum Rehabilitation Authority):**

- By modification of rules in simplifying the procedures and more accessible to beneficiaries
- By making Slum Rehabilitation Scheme (SRS) more attractive
- Making Pune slum-free by 2025 by constructing 20,000 affordable houses every year, for the next 10 years
- Safety and security

- While Pune already has extensive CCTV surveillance, the vision will be to make it fully “crime-free” by enhancing surveillance further and providing emergency help. All these will be driven in the local area and then replicated across the city.

### 3.3.6. Summary of Population Density Policies:

Table 3.3 Summary of Population Density Policies

| No. | City | Policies | Key Points |
|---|---|---|---|
| **1** | Toyama, Japan | • Promotion of residence in the city center and along public transport lines<br>• Downtown<br>• Community health-care centre. | Providing subsidies for the renovation or construction of houses in the city core, subsidies for developing housing sectors along the transit system, childcare centres close to work places and elderly community centres close to the work places. |
| **2** | Melbourne, Australia | • New housing in or close to activity centers.<br>• Improve community safety. | Provide housing for the future population, increase accessibility, encourage neighbourhood design that makes people feel safe, enable faster action in emergencies. |
| **3** | Portland, USA | • Promote affordable and decent housing opportunities for all Main citizens.<br>• Ensure adequate emergency preparedness | Adapt affordable housing, address homelessness, Support age-friendly housing options; provide public safety, emergency response, and emergency management facilities and services, coordinate linkages between accessible transportation and housing affordability. |
| **4** | Nagpur, India | • Housing and basic services for urban poor. | Affordable housing schemes for the poor, provision of subsidies to buy or rent the houses in the city to the urban poor. |
| **5** | Pune, India | • Affordable housing& slum eradication.<br>• Eco-Housing Concept | Redevelopment and rehabilitation of slums prevent creation of new slums by reforming the land market, to encourage developers to adopt eco-friendly techniques by providing subsidies and eco ratings to the houses constructed. |

The international cities focus on providing affordable houses in the city core or along the transit corridors for all income groups while the Indian cities are only focusing on providing housing to the poor people and eradication of slums. Toyama city has introduced various subsidies on different types of housing accommodation whereas Melbourne focuses on providing houses close to the activity centres and design neighbourhoods which make people feel safe and secure in the city. Portland has the provisions to support age-friendly housing options to main citizens. It also focuses on providing efficient emergency services and facilities. Pune has introduced eco housing concept, in which it provides subsidies for the construction of eco houses and further provides rating to these houses.

### 3.4. Open and Green Spaces:

Greening is a key design conception for sustainable urban forms. Green areas are often defined as the areas of nature found in the urban landscape. It includes trees, grass like patches, water features, flowerbeds, and rock gardens. Green space relates significantly to health and recreation for a higher quality of life. The protection of large natural, agricultural, and cultural areas is also perceived as an important outcome of the compact city model. When individuals move around in the town, they prefer to use parks and squares with green features, whereas green space is highly appreciated in high residential densities. Thus it's a matter of what individuals perceive the city life to be and what attracts them to live in it. Nevertheless, there's additional to green area than just health and recreation. Green areas enhance the physical urban surroundings by removing carbon dioxide emissions and alternative toxin from the air, enhance the aesthetics of urban areas and therefore make them more pleasant, enhance the urban image and increases economic attractiveness, and facilitate to regulate storm runoff.

#### 3.4.1. Open and Green Spaces Policies in Toyama City:

**A. Community Garden Project:**

Traditionally, it was common to grow flowers but not vegetables in the flower beds of parks. However, planners had the idea that growing vegetables in the parks would extend healthy lives for the elderly and contribute to the development of local communities. Thus, in a new way of using the park that suits the times, the city is

instituting one of the few attempts nationwide to grow not only flowers but also vegetables in the park flower beds.

Figure 3.30 Toyama Community Garden Project

*Source: The Development Story of Toyama- Reshaping compact and livable cities, 2019.*

As of 2019, the project has been implemented in seven parks. Cultivating potatoes and sweet potatoes and sharing the joy of harvesting with children motivate the elderly to go outside and gain a new purpose in life. Many of them are voluntarily managing the park gardens. The city supports both soft and hard work by consulting on vegetable cultivation and lending out small-sized cultivators for harvesting and baked sweet potato makers for roasting the products.

### 3.4.2. Open and Green Spaces Policies in Melbourne City:

**A. <u>Protect the green wedges of metropolitan Melbourne from inappropriate development.</u>**

The green wedges include areas that have strong environmental and landscape value for Victorians - many of which are of State, national or even international significance. They provide important resources for recreation and tourism. Melbourne 2030 will protect the green wedges for non-urban uses and encourage proper management of these areas. Each green wedge has unique features and will require a tailored management approach to promote and encourage its diversity.

The Government is committed to providing better protection for green wedges through tougher planning controls over use and development, the introduction of the

urban growth boundary, changes to planning provisions and changes to legislation. The Government will work with local councils and the community to properly plan, manage and protect these areas.

Small communities that are located in the green wedges will have restricted development opportunities. Settlements in these areas will be allowed to expand only to the extent indicated in current Municipal Strategic Statements. In future, change in the amount of urban zoned land will only be allowed if there is no adverse impact on the role and features of the green wedges. Local councils will be encouraged to consider the possibilities for urban intensification within their existing urban areas, subject to environmental and servicing constraints, rather than adding to the total urban area.

**Initiatives:**

- Implement new planning scheme provisions to secure the protection of metropolitan green wedges in the planning system.
- Work with local councils to support the consolidation of new residential development into existing settlements in the green wedges, where planned services are available and relevant values can be protected.
- Amend planning schemes affecting green wedges to ensure that recreation-type developments, such as golf courses with associated housing development, are only approved where they support Melbourne 2030 and local settlement policies.
- Legislate to provide protection for areas of high environmental and scenic value in metropolitan green wedges.

**B. Promote good urban design to make the environment more livable and attractive.**

The physical environment affects people's ability to participate in community activities, access services and facilities, and undertake their daily lives. It also affects their sense of community and security. Urban design, including the design of buildings, streets and neighbourhoods, can foster or discourage interaction and participation in civic life. New development or redevelopment will contribute to community and cultural life by improving safety, diversity and choice, the quality of living and working environments, accessibility and inclusiveness, and environmental

sustainability. High-quality design will be expected for private and public buildings and spaces, transport routes and corridors, and related infrastructure – the Government's new Victorian Design Advisor Council will support this expectation. Development will respond to its context in terms of urban character, cultural heritage, natural features and climate.

Attractive landscapes are valuable in metropolitan Melbourne and the surrounding region. Because a number of distinct landscape types come together in the centre of this region, residents can enjoy a wide range of scenic environments for living, working and recreation. Melbourne 2030 intends that future development will respond to the surrounding landscape. Transport corridors are a public face of our cities, towns, suburbs and countryside. In some urban areas, they represent the biggest single public open space resource. Land-use planning, urban design and transport planning will be integrated in these corridors. Particular attention will be paid to urban design aspects such as open space potential and the use of vegetation to maintain wildlife corridors and greenhouse 'sinks'. Urban design is also important in creating safe, walkable and attractive environments, which will make using public transport more attractive.

**Initiatives:**

- Provide leadership in sustainable urban design and integrated place management through awards, advice and training programs, and by ensuring that government projects are exemplary.
- Review and revise urban design guidelines for incorporation in the planning system, ensuring that development provides quality environments consistent with the objectives of Melbourne 2030.
- Develop urban design projects with local government and other partners to apply good urban design principles and meet the outcomes sought by Melbourne 2030, giving priority to areas of social need.
- Integrate land-use planning, urban design and transport planning, and prepare guidelines for development and management of transport corridors with particular attention to urban design aspects.

- Review the rate of progress in putting powerlines (11 kV and below) underground, giving priority to visually sensitive areas, and investigate alternative funding mechanisms.
- Provide assistance to local councils for projects to improve landscape qualities, open space linkages and environmental performance in green wedges, conservation areas and non-urban areas

**C. Improve the quality and distribution of local open space and ensure long-term protection of public open space.**

Parks Victoria manages more than 6,000 hectares of parks in metropolitan Melbourne. These regional parks and trails are a major contributor to Melbourne's liveability. However, local public open space is a vital component of the urban fabric. It, too, makes places more liveable. Surveys indicate that people visit local parks more often than district or regional parks that are at metropolitan scale. However, these local spaces are sometimes relatively poor in quality and may lack diversity. Social and demographic changes and changes in urban form mean that parks designed for community needs in the 1960s may not be as relevant today, and that their quantity, as well as quality, needs reassessment.

**Initiatives:**

- Review mechanisms for strategic open space planning in consultation with open space management agencies in light of the Parks Victoria strategy Linking People and Spaces.
- Apply the open space planning principles set out in the Parklands Code to guide decision-making on issues such as open space protection and management.
- Establish a planning framework and guidelines relating to open space and sporting facilities at local and district level.
- Help local government to improve the quality and distribution of local open space by:
    - Researching changing community attitudes and usage patterns.
    - Providing advice on innovative park design.
    - Identifying opportunities to improve provision in areas identified as deficient.

- Developing strategies to maximize the open space and conservation potential of neglected or underused areas such as some railway land, cemeteries and schools.

## D. The Parklands Code: urban open space principles:

To sustain the benefits of open space into the future, and to support the broad strategies and actions contained in Linking People and Spaces, the following metropolitan-wide guidelines are proposed for the planning and management of open space. These objectives relate to the network of urban open space including regional parks, waterways, reserves that have conservation and cultural value, coasts, and shared-use trails.

The government commits to these principles for urban open space that is controlled by the Department of Natural Resources and Environment and Parks Victoria located in Melbourne. Other managers of open space such as local government will give due consideration to these principles for their parklands.

### A. Involving the community:

Open space belongs to the community. Individuals and community groups should therefore be encouraged to take an active role in decision making for the network's future. Open space managers should promote this participation through open consultation, especially when major changes to park management and use are proposed. Managers should also continue to support community involvement in planting, regeneration and conservation of natural and cultural values.

### B. Transparent planning processes:

To ensure clear understanding of the management objectives for parks, any major urban park of an area of more than 100 hectares should be covered by a management plan, whereby decision-making frameworks and strategies for appropriate uses and developments are identified. The aim of these plans should be to provide long-term strategic direction, and the plans should be reviewed within a planned time horizon. Either a management plan or an explicit statement of management objectives should be developed for other urban parks. To maximize broad-community access to open space, any exclusive occupation of parkland by community organizations should be restricted to activities that are consistent with the park's management objectives. When proposals exist to use parkland in a way that

is inconsistent with management plans or zoning, the outcome should be determined through proper processes under the Planning and Environment Act 1987, whereby adequate opportunities are provided for public objections to be heard.

Buildings and other infrastructure can be used to facilitate people's enjoyment and use of open space. It is nonetheless important to ensure that their provision is consistent with the management objectives of the park and subject to appropriate Planning Scheme processes.

**C. Securing the future of open space:**

Appropriate zoning of open space is integral to its long-term security and Public Park and Recreation Zone or Public Conservation and Resource Zone are the most applicable zonings for parkland purposes. The zoning should be consistent with relevant management plans and objectives for the land, whereby conservation zoning is applied in order to protect areas of high conservation value in which limited development of visitor facilities is limited. Large regional parks and significant Conservation areas should be protected under legislation, ideally by being permanently reserved under the Crown Lands (Reserves) Act 1978.

Existing public land that immediately adjoins waterways and coasts must remain in public ownership, and any developments through which public access along stream banks or foreshores is prevented will not be permitted. When additional land is identified as being critical to completion of open space links, through any proposed rezoning or subdivision of land planners will seek to ensure that the link is transferred to public ownership for open space purposes.

**D. <u>Rectify gaps in the network of metropolitan open space by creating new parks and ensure major open space corridors are protected and enhanced.</u>**

The metropolitan open space network consists of:

- Major urban parks, such as those in Central Melbourne managed by Melbourne City Council.
- National and State parks
- Major (regional) parks managed by Parks Victoria
- The Metropolitan Trail Network
- Linear open space corridors including waterways
- Areas of cultural and environmental significance
- The coastal foreshores and waters of Port Phillip Bay and Western Port.

While metropolitan Melbourne and the surrounding region are noted for the quality of its parks, there are gaps in the network of parkland and it is unequally distributed.

Parks Victoria's management responsibilities include major (regional) parks and strategic planning responsibility for the linear open space network. It gives funding assistance to local government for priority projects. Linking People and Spaces focuses on ensuring equitable access in the development of major parks and trails, and on protecting and enhancing conservation values and sites of significance. Melbourne 2030 supports this work.

Melbourne 2030 gives priority to developing open space networks in growth areas where existing open space is limited and demand is growing, and in non-metropolitan parts of the region. This includes Melbourne's west, north and south-east.

**Initiatives:**

- Reserve land for six new metropolitan parks to redress the current imbalance and provide for future growth areas:
    - Werribee River Regional Park
    - Werribee Township Regional Park
    - Kororoit Creek Regional Park
    - Merri Creek Regional Park
    - Melton Township Regional Park
    - Cranbourne Regional Park
- Extend the 'chain of parks' concept by creating four continuous open space links and trails:
    - Western Coastal Parklands (linking Point Gellibrand, Point Cook and Werribee)
    - Merri Creek Parklands (extending to Craigieburn)
    - Maribyrnong River Parklands
    - Frankston Parklands (linking existing parks from Carrum to Mornington)


Figure 3.31 Regional Public Open Space in Melbourne City

Source: Melbourne development plan, 2030.

- Provide long-term planning protection to meet demand for future open space, until land can be acquired and developed for public use in key areas that include:
    - Plenty Gorge Parklands
    - Yarra Valley Parklands
    - Cardinia Creek Parklands
    - Heatherton/Dingley ‘Sandbelt’ Parklands
    - Dandenong Valley Parklands

- Strengthen current policies and review the adequacy of planning controls relating to the Yarra and Maribyrnong Rivers to ensure the long-term protection of open space, conservation values – with the first priority being the Yarra River corridor between Punt Road and Burke Road.
- Continue adding to the recreational and tourism potential of the Yarra River and Maribyrnong River corridors by:
    - Completing high-priority infrastructure and landscaping for riverbank and water-based activities along the lower Yarra River before the 2006 Commonwealth Games.
    - Identifying and completing high priority infrastructure, landscaping works and enhancement of pedestrian and bicycle trail links along the lower Maribyrnong River.
    - Completing links between the Main Yarra trail and Darebin and Plenty trails, the Maribyrnong trail and Bay trail at Williamstown, and connecting the Yarra trail to the Bay at Port Melbourne.

**E. <u>Protect coastal and foreshore environments, and improve public access and recreational facilities around Port Phillip Bay and Western Port.</u>**

Residents and visitors alike enjoy the environment, the recreational opportunities and the lifestyle settings of the Victorian coastline. The bays, beaches and hinterlands are commercially important, contain a rich and diverse suite of plants and animals, and are highly sought after for residential living and for recreation. However coastal ecosystems are extremely complex and sensitive to disturbance, such as removal or loss of coastal vegetation through development. Also, recreational pressures allow invasive weeds to become established and cause erosion of dunes and cliffs.

Melbourne 2030 applies the same principles for coastal development that are set out in the Victorian Coastal Strategy 2002. This will focus development at discrete locations so that:

- The extent of settlements (activity nodes) is defined.
- Areas between settlements remain largely undeveloped.
- The extent of recreation nodes is defined.

Directing coastal development to discrete locations is designed to:

- Minimize the impact of use and development, and protect sensitive areas.
- Contain use and development to a limited number of locations.
- Define the scale of use.
- Establish boundaries for development areas.
- Manage development pressures.
- Provide a focus for facilities that relate to the coast.

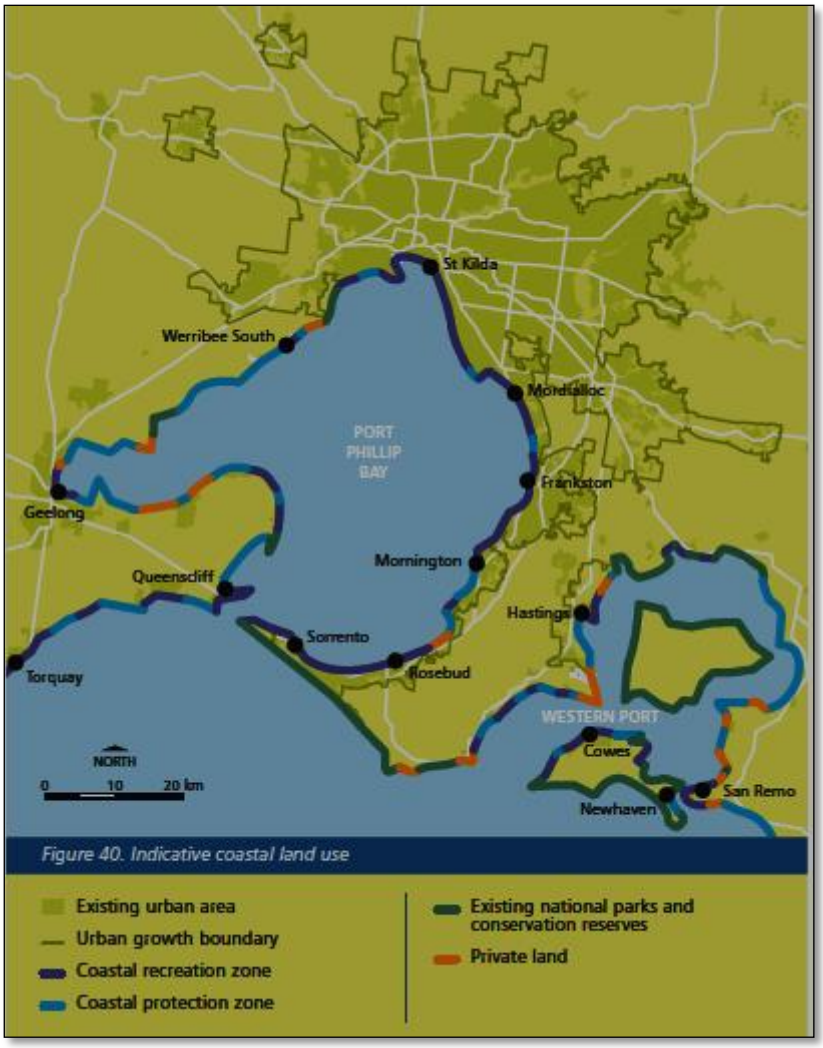


**Figure 3.32 Indicative Coastal Land Use of Melbourne**

Source: Melbourne development plan, 2030.

Activity and recreation nodes are being identified in coastal action plans. This will help local councils to define the purpose and function of activity centres along the coast. A relatively small proportion of the foreshore is privately owned. These areas should be managed consistently with the adjoining public land.

Melbourne's open space strategy, Linking People and Spaces, sets out priorities for improving public access, including the trail network around Port Phillip Bay. There are opportunities to enhance Melbourne's role as a bay side city. Parks Victoria is also developing strategic directions for Port Phillip Bay and Western Port, which will feed into a whole-of-government framework, 'Bays for Life'. Key recreational and tourism precincts will be improved, as will facilities for boating and cruising yachts.

In areas such as the Mornington Peninsula, there will be no expansion of existing urban areas outside the urban growth boundary. Municipal Strategic Statements will reflect the diverse characteristics of coastal urban areas, and planning scheme provisions will ensure that coastal developments are separated to maintain the character of settlements along the coast.

**Initiatives:**

- Implement the Victorian Coastal Strategy 2002 for metropolitan Melbourne and the surrounding region.
- Further improve maritime precincts at key sites including Williamstown and St Kilda.
- Improve the appeal of Port Phillip Bay as a cruising destination by upgrading boating facilities and infrastructure at Patterson River, and complete a significant maintenance program at Mornington.
- Ensure completion of the Port Phillip Bay trail between Mordialloc and Port Melbourne and between Williamstown and Werribee (linked by the punt service at Spotswood).

### 3.4.3. Open and Green Spaces Policies in Portland City:

The goal for the current Portland city development plan is to promote and protect the availability of outdoor recreation opportunities for all citizens, including access to surface waters. It also aims to protect and enhance the natural environment and flora and fauna of the city.

**Future strategies to achieve these goals:**

**A. Adopt measurable objectives:**

- Employ measurable objectives that collectively provide a desired level of service for Portland's open space system.

- Develop specific metrics for levels of maintenance, accessibility, funding health, programming, ecological health, connectivity, safety, and citizen stewardship through the use of rapid park quality assessments and maintenance plans.
- Consistently monitor the quality and condition of park and open space facilities.

**B. Maintain existing facilities:**

- Add amenities, such as cigarette receptacles, trash cans, bike racks, dog waste bags, and water fountains, where appropriate.
- Maintain trails, sports fields, courts, playgrounds, and other amenities such as seating and landscaping, in good condition.

**C. Ensure equity:**

- Pursue opportunities, in collaboration with partners, to create new open spaces in areas that are currently underserved.
- Pursue opportunities for new and enhanced walking and biking trails as a means of filling existing gaps and investigate paper streets, vacant land, medians, and other often overlooked areas for the potential for park linkages, trails, and other improvements to the urban landscape.
- Distribute community gardens, playgrounds, fields, public art, historic resources, and other program elements where the demand and need are greatest, and periodically assess demands and needs.
- Promote citizen stewardship in open space maintenance and programming.

**D. Improve safety, visibility and accessibility:**

- Employ consistent signage to reflect distinct identities of elements of the open space system, as well as aid in wayfinding, while respecting historic district and neighborhood branding initiatives.
- Expand safe, well-lit walking and cycling routes to open spaces, including crosswalks, sidewalks, and bike lanes.
- Improve ADA accessibility in and to public open spaces.

**E. Incorporate multiple functions:**

- Improve the utility of existing spaces by developing and programming parks and open spaces for diverse, simultaneous, and complementary uses.

**F. Increase ecological health:**

- Develop and implement forest management plans for wooded parcels, and improve the health and quantity of trees and natural areas in parks where forest management plans are not appropriate.
- Model ecologically sound landscape management practices in open spaces, such as planting native species, planning for potential wildlife corridors, planning for pollinators, and limiting the use of pesticides and fertilizers.

**G. Some Initiatives:**

**i. Redesigning congress square:**

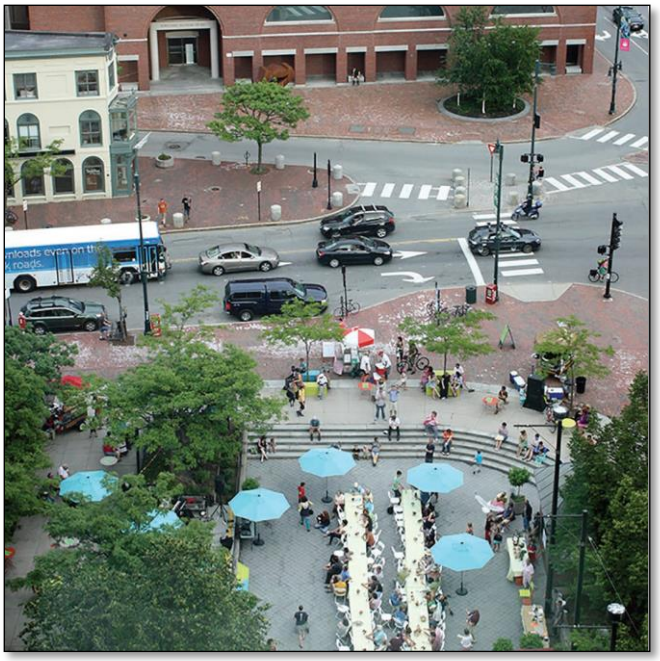

Figure 3.33 Redesign of Congress Square

*Source: Portland's plan 2030.*

Congress Square is a central public open space located in a mixed use neighbourhood of retail establishments, arts and educational organizations, and affordable and market-rate housing. As the city grows, Portland residents are craving

social connection and demanding public gathering spaces that are inspiring and interactive. The Congress Square Redesign and Public Art Commission is a design project, three years in the making, to fulfil that need in the heart of the City's Arts District. Creative place making is at the core of Congress Square's transformation from a neglected, inaccessible, car-dominated space into a vibrant gathering and arts place.

### ii. Community gardens:

**Figure 3.34 Community Garden of Portland**

*Source: Portland's plan 2030.*

The City of Portland currently hosts 10 community gardens in neighbourhoods across the city. Managed in collaboration with Cultivating Community, an organization that advocates for a sustainable local food system through education on urban food production, nutrition, and refugee and immigrant farmer-training, these gardens provide valuable community space with clear public health, education, social, and environmental benefits. Previously a contaminated site that required City soil remediation efforts, the garden now has an orchard of 25 fruit trees, raspberry and blackberry bushes, honey bees, and a separate youth garden run by high school students to grow food for Cultivating Community's Elder Share CSA Program.

## H. Toward an integrated trail network:

The City of Portland, in partnership with Portland Trails, hosts a world-class network of trails, accessible within a half mile of every household, which offers Portland residents and visitors opportunities to bike to work, walk to school, and access parks,

businesses, and arts and entertainment. Just as importantly, the city's trails allow residents to take a hike, run, bike, experience wildlife, and enjoy the bay, our rivers, and our woodlands. In recent years, the City has prioritized the completion of key linkages in the trail system which would allow for more widespread use.

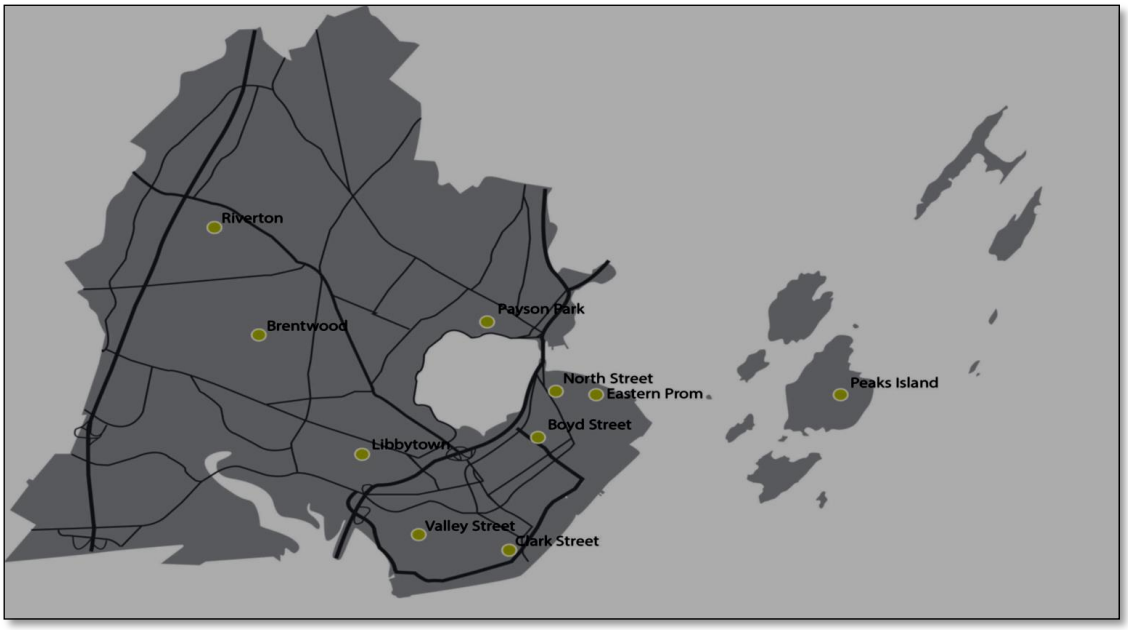


**Figure 3.35 Community Gardens in Portland City**

*Source: Portland's plan 2030.*

### 3.4.4. Open and Green Spaces Policies in Nagpur City:

Nagpur had received recognition as the second greenest city in India. But the practice of tree plantation has not been maintained and greenery has declined substantially. The key issues in the development and maintenance of green spaces and roadside plantations are water scarcity during the summer season, air pollution due to increased vehicular traffic, and lack of civic sense among citizens.

Recreation space in the city like parks and gardens and playgrounds is scattered across the city. As per the URDPFI norms, there is a huge deficit in the area required under parks and playgrounds. It is observed that the city core is already saturated, and identification of land for recreation in the core city is a challenge. In case of lakes and rivers, existing condition of the natural features is not fit for using them as a recreational space. Also, natural features are being encroached by developments, which will make it difficult for the water front development in future.

Nagpur development plan aims to make all the lakes and rivers in the city pollution free and preserve the flora, fauna and also avifauna of the region. The objectives stated by the corporation are as follows:

- NMC should develop a robust monitoring and database management system related to ground water extraction, air pollution, noise pollution and water pollution in the city.
- Develop and maintain green spaces in the city.
- Rejuvenate the rivers in the city and explore water front development possibilities.
- Rejuvenate the lakes and make it a place for recreational use by the citizens.
- Conduct classical morning raga sessions in the parks and gardens in the city.

An initiative to rejuvenate the lakes has been stated by the NMC in which 10 lakes in the city have been considered for rejuvenation purpose. Also, under the project other components like beautification, walkways, construction of RC embankment walls, abatement of non-point source of pollution, cleaning of water, construction of low cost sanitation, and lake front development are also included.

### 3.4.5. Open and Green Spaces Policies in Pune City:

The goal of the Pune municipal corporation is to retain, preserve, restore and develop city's natural resources such as rivers, hills, vegetation air and water quality and to develop open spaces and green areas and to provide a variety of quality leisure opportunities to residents and visitor and further to conserve the resources by maximizing efficiency of water and energy resources.

**Initiatives:**

- Demarcation and Protection of existing Hills/ Forest & Recreational areas.
- Urban Forestry and Plantation Schemes for the city to increase green cover within the city.
- Plantation in dividers to curb dust, pollution and to restore aesthetic looks. Planned Plantation with a choice of air/ noise pollution resistant tree species in order to minimize ambient air/ noise pollution.
- Regular monitoring of compensatory tree plantation.

- Development of urban green corridors to enhance the local climate and linking of Green corridors, urban green areas & urban wildlife.
- Develop and implement a Biodiversity Management Plan.

**A. Biodiversity Park:**

Pune Municipal Corporation (PMC) had reserved Bio-diversity Parks for restoring the local flora and fauna, to produce carbon sinks and to create awareness about nature conversation. The Biodiversity Park once implemented will conserve the native biodiversity and make the public aware of the varied natural heritage and ensure quality life to its people. The proposed Biodiversity Park will have the following impact on the city:

- Biodiversity Park when developed will function as a mini ecosystem having capacity to render all ecological services.
- It will serve as green lungs to Pune city and will have positive impact on amelioration of the local climatic conditions.
- Pune city being in close proximity to the Western Ghats (50 km), the proposed parks will ensure space for all important plant communities to ensure protection to important species.
- It will function as an ideal training center for individuals and organizations involved in eco-restoration and conservation programs.

**B. Compensatory Afforestation:**

PMC has laid down the regulations for compensatory tree plantation which are to be followed while constructing new buildings or any new development. These regulations are based on the area of the plot to be built or developed. To make these regulations readily available to the citizens, PMC has taken the initiative to upload the information on their website. This compensatory afforestation policy has a gap, which is related to the monitoring of this effort. To make this initiative successful, PMC officials check the trees plantation at the initial stage of construction, but this is not checked later on, after the occupancy of the building; due to this in many cases the plantations are not taken care of after the necessary formalities are over.

### 3.4.6. Summary of Open and Green Spaces Policies:

Table 3.4 Summary of Open and Green Spaces Policies

| No. | City | Policies | Key Points |
|---|---|---|---|
| **1** | Toyama, Japan | •Community Garden Project. | Encouraging growing of vegetables along with flowers in the gardens to make the city self-sufficient, educating kids about farming and cultivation. |
| **2** | Melbourne, Australia | •Protect the green wedges.<br>•Control development in rural areas to protect agriculture.<br>•Improve the quality and distribution of local open space.<br>•Improve public access and recreational facilities. | Amend planning schemes affecting green wedges, establish a planning framework and guidelines relating to open space, involving the community, encouraging transparent planning processes, securing the future of open space, provide long-term planning protection to meet demand for future open space, improving public access to the waterfront, complete mapping of biodiversity assets for existing and future urban areas. |
| **3** | Portland, USA | •Promote and protect the availability of outdoor recreation opportunities.<br>•Redesigning congress square.<br>•Community gardens. | Maintain existing facilities, improve safety, visibility and accessibility, increase ecological health, promote citizen engagement, preserve the intrinsic values of the park and open space system, pursue opportunities to create new open spaces. |
| **4** | Nagpur, India | •Make all the lakes and rivers in the city pollution free.<br>•Preserve the flora, fauna and avifauna of the region. | Develop monitoring and database management system related to ground water extraction, air pollution, noise pollution and water pollution in the city, maintain green spaces, rejuvenate the lakes, explore water front development possibilities. |
| **5** | Pune, India | •Biodiversity Park.<br>•Compensatory Afforestation. | Enhancement of existing parks and open spaces, exploring the potential of future open spaces, regular assessment of the recreational zones, eco-restoration and conservation programs. |

Toyama city has no such policies related to open and green spaces other than the community garden projects. It focuses on planting vegetables along with fruits in the gardens to make the city self-sufficient and teach the kids the importance of farming and allow them to practice farming. Melbourne and Portland have designed policies for the prevention and enhancement of green wedges in the city and further develop them as recreational zones. Melbourne also focuses on making all the open and green spaces easily accessible to the people and provides long term policies to meet the future demand of the open spaces as well. Portland also focuses on creating new open spaces and also to increase the ecological health of the city and further making the city more attractive. Nagpur focuses on protecting the lakes and rivers in the city as well as the flora and fauna of the city while Pune focuses on development of bio-diversity parks and creation of afforestation in the city. These two Indian cities also focus on regular and timely assessment of recreational zones

# Chapter 4

# Outcomes and Evaluation of the Policies

## 4.1. Outcomes of Land Use Policies:

### 4.1.1. Outcomes of Land Use Policies in Toyama:

**<u>Observation:</u> Revitalizing the city centre helped in attracting the people and commercial activities back to the city and further resulted in increased land prices at few important points of the city.**

Toyama's city centre experienced some degradation in the past as the city's population decreased and sprawl to the suburbs grew. Therefore, Toyama has taken steps to provide integrated development in the downtown area, including large commercial centres and multipurpose, all-weather plazas, and other key facilities. The structures have been developed along the LRT lines for convenient access.

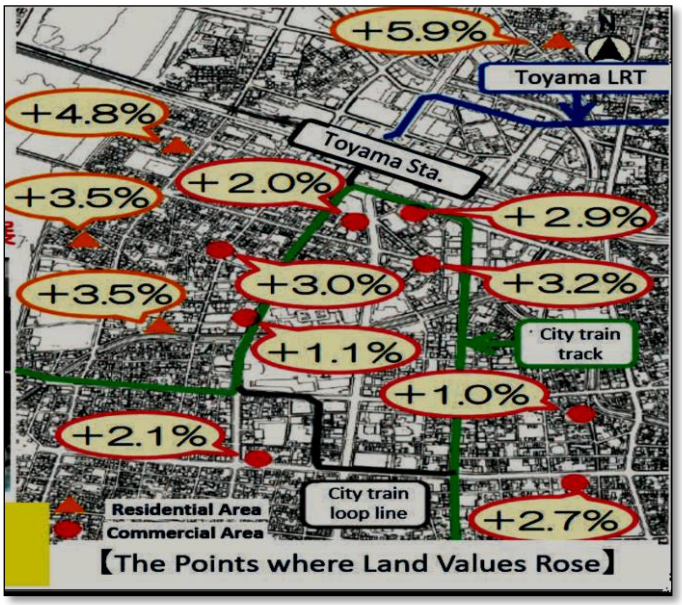


Figure 4.1 Location of Land of which the Prices Increased in Toyama

*Source: The Development Story of Toyama- Reshaping compact and livable cities, 2019.*

As these recent injections of development capital produce results, property values in the central city have increased accordingly over the past years. On average, property values went up about 0.7 percent in the city, while some parts of the central

city witnessed increases of as much as 3.2 percent for commercial areas and 5.9 percent for residential areas.

### 4.1.2. Outcomes of Land Use Policies in Melbourne:

**<u>Observation</u>: Melbourne aimed to identify and develop the activity centres in the city around which the development was to be carried out.**

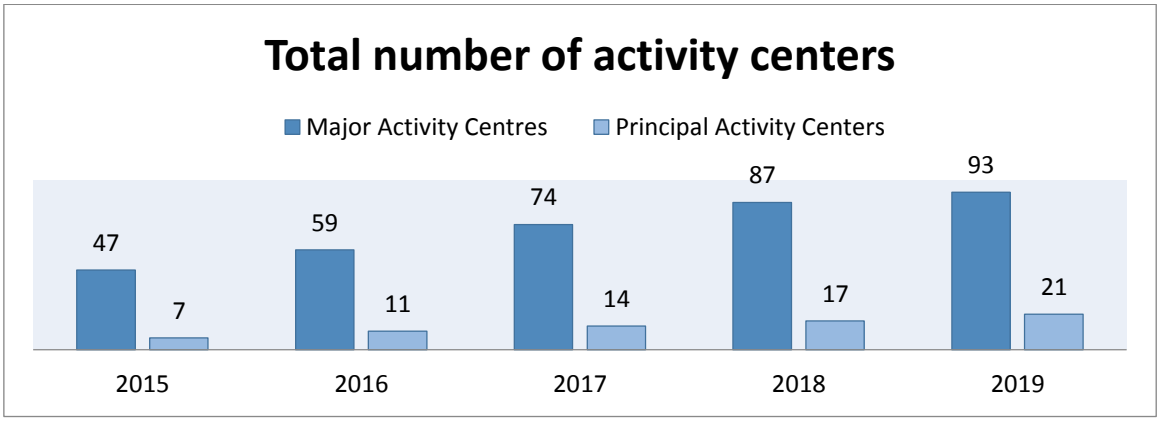


**Figure 4.2 Activity Centre Numbers in Melbourne (2015-19)**

*Source: Annual Assessment report of Melbourne development plan (2015-2019).*

The number of major activity centres in the city was 47 which increased to 93 in 2019 and the total number of principal activity centres was 7 which increased to 21 in 2019.

### 4.1.3. Outcomes of Land Use Policies in Portland:

**<u>Observation 1:</u> The number of people living in complete neighbourhoods showed an increase from the year 2010 to 2019.**

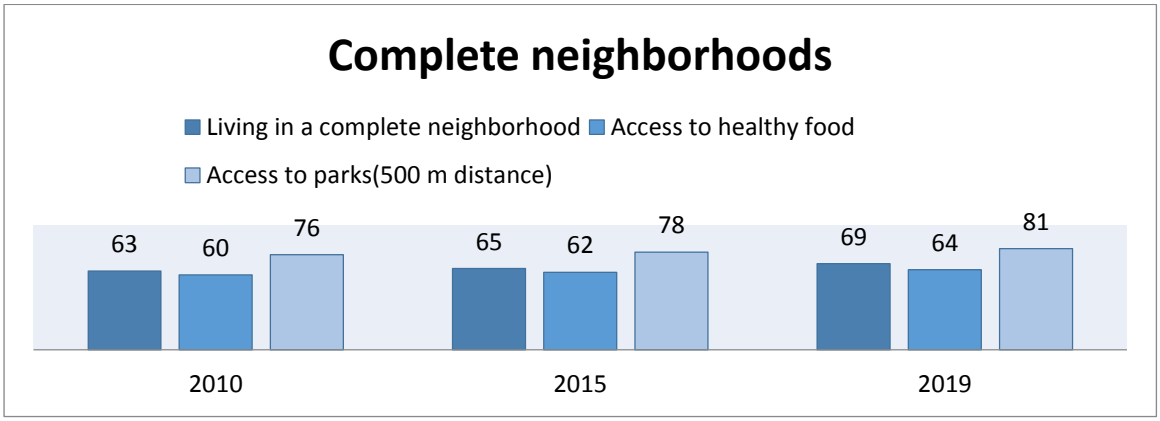


**Figure 4.3 Numbers of Complete Neighbourhoods in Portland (2010-19)**

*Source: Assessment report of Portland, 2019*

In 2016, about two-thirds of Portlanders lived in complete neighbourhoods with good access to essential services and infrastructure. This rating rose from 63 percent in 2010 to 65 percent in 2016 to further 69 percent in 2019. This improvement is largely attributed to the demand for housing in Portland's close-in walkable neighbourhoods.

**Observation 2: The priority nodes and corridors which can be developed in the future have been identified.**

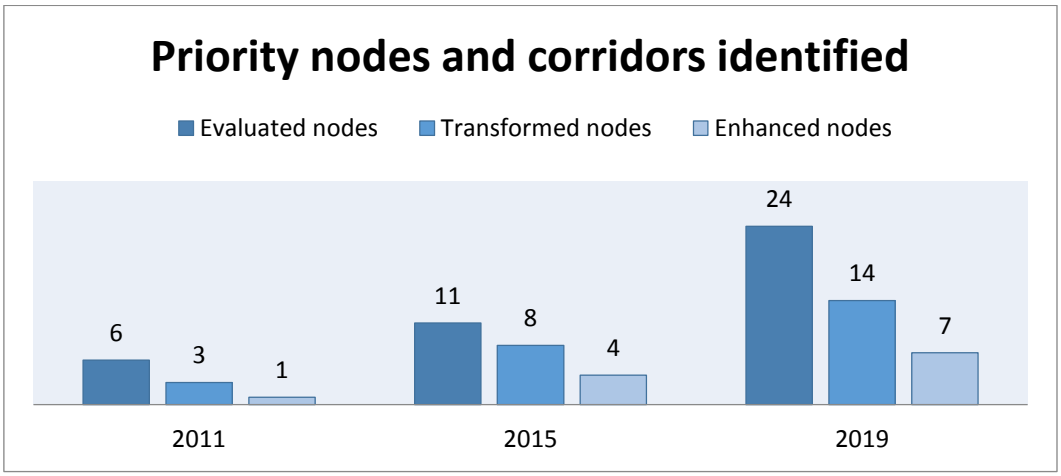


Figure 4.4 Identified Priority Nodes and Corridors in Portland (2011-2019)

*Source: Assessment report of Portland, 2019*

Priority nodes and corridors indicate areas that would be appropriate for new development to provide needed housing, businesses, and services proximate to transit, or areas that otherwise warrant some examination of potential for positive change in form and/or function. These nodes are placed into three broad categories that correspond with their respective stage of planning or investigation at the present time.

- Evaluated nodes: City recognizes the need to review existing conditions and develop a strategy for future change. These nodes should be assessed for their ability to address neighborhood needs and serve as centers for complete neighborhoods.
- Transformed nodes: Areas which have been previously recognized as areas of significant potential transformation, but which need comprehensive revisioning.
- Enhanced nodes: Areas which have been studied and are awaiting or in the midst of plan implementation.

### 4.1.4. Outcomes of Land Use Policies in Nagpur and Pune:

The development plans of both Nagpur and Pune have not formulated any policies related to mixed use development or regulating the existing land use to improve the accessibility. Moreover there are no assessment reports formulated to check the status of the implementation of any of the policies or the outcomes of the implemented policies.

However, Nagpur development plan has demarcated few areas as street vending zones.

### 4.1.5. Summary of Outcomes of Land Use Policies:

Table 4.1 Summary of Outcomes of Land Use Policies

| Sr. No | Name of the city | Land Use Policies | Outcome | Remarks |
|---|---|---|---|---|
| **1** | Toyama, Japan | Downtown revitalization Plan | Attracted the people back into the town and land prices increased | Satisfactory |
| **2** | Melbourne, Australia | Build up activity centres for high-quality development. | A total of 93 major activity centres and 21 principal activity centres were developed up to the year 2019. | Satisfactory |
| **3** | Portland, USA | Develop complete neighbourhoods, identification of priority nodes and corridors for future development | 69 % people are living in complete neighbourhoods as compared to 65% in 2015.<br>Up to the year 2019, 24 priority nodes were evaluated, 14 were transformed and 7 were enhanced. | Satisfactory |
| **4** | Nagpur, India | No land use policies framed | - | **Not satisfactory** |
| **5** | Pune, India | No land use policies framed | - | **Not satisfactory** |

## 4.2. Outcomes of Mobility Policies:

### 4.2.1. Outcomes of Mobility Policies in Toyama:

**<u>Observation 1:</u> Toyama was facing issues of car dependencies, poor accessibility and increase in ageing population. To address these issues, Toyama light rail transit was introduced as the solution. Overall ridership increased dramatically since the introduction of the LRT lines.**

The development of LRT lines signifies the backbone of Toyama's compact city plan, offering easy accessibility around the central city and creating development opportunities along the transit lines to further activate the downtown core. The compact city plans called for LRT lines to reduce dependency on cars. Elderly people who don't go out and tend to be less healthy need more help. Riders aged 65 and over can buy a senior discounted pass at an annual cost of ¥1,000 to travel anywhere on the network for ¥100 ($0.90) a trip. Compared with the daily user count of original Toyama Port Line in 2005 (2,266 riders on weekdays, 1,045 on weekends), there has been a 110 percent increase during the weekdays and 230 percent increase on the weekends. Also notable is the increase in usage by elderly customers (50 years old and older), which increased 266 percent during the same period.

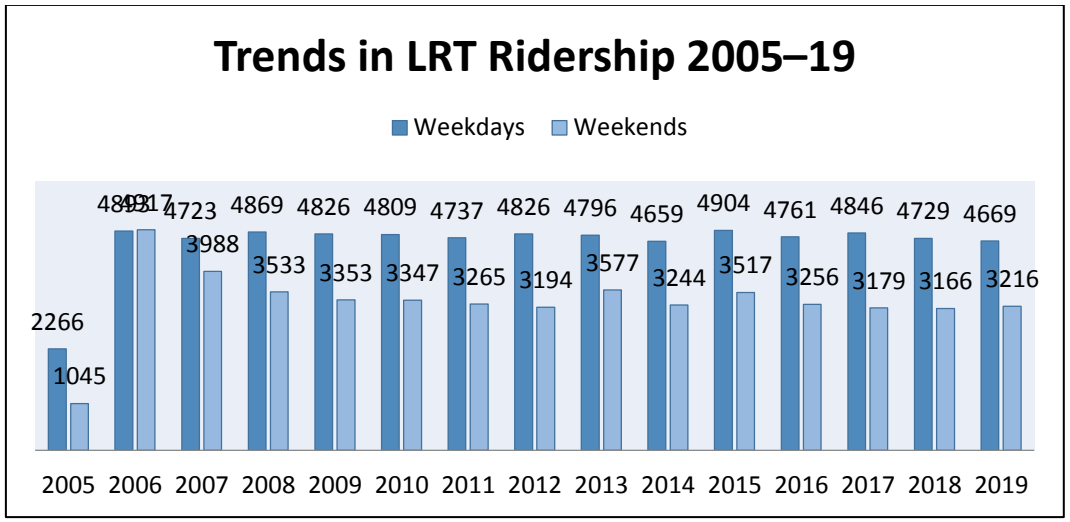


Figure 4.5 Trends in LRT Ridership in Toyama (2005-19)

*Source: The Development Story of Toyama- Reshaping compact and livable cities, 2019.*

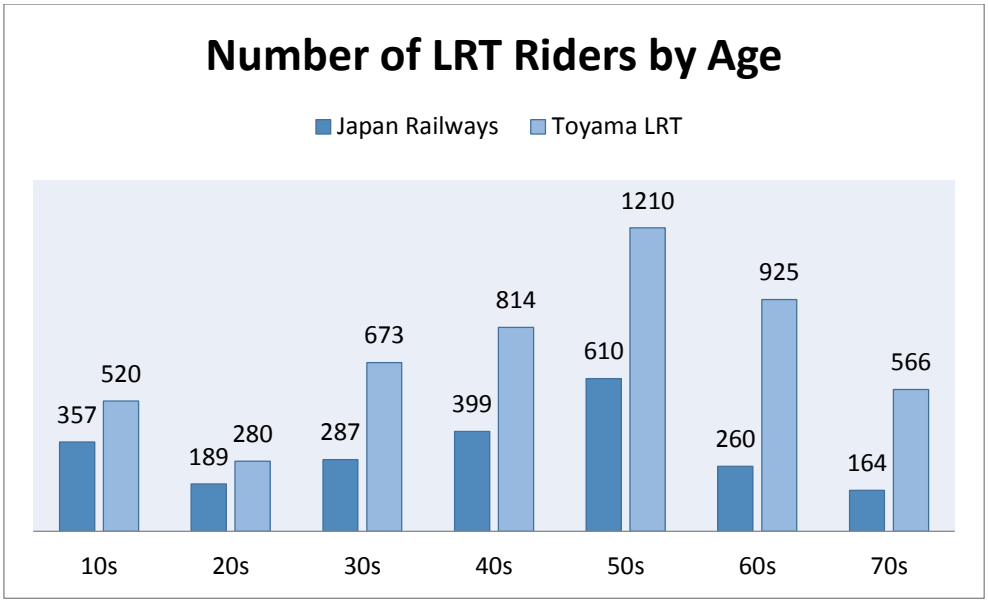


Figure 4.6 Number of LRT Riders by Age in Toyama

*Source: The Development Story of Toyama- Reshaping compact and livable cities, 2019.*

**<u>Observation 2:</u> Toyama had more than 25% of its population aged 60 and above in 2011. So, to encourage its people to walk and live a healthy life style, Toyama introduced walkable city strategy (mobile app) and rider incentive programs to encourage the elderly people to step out.**

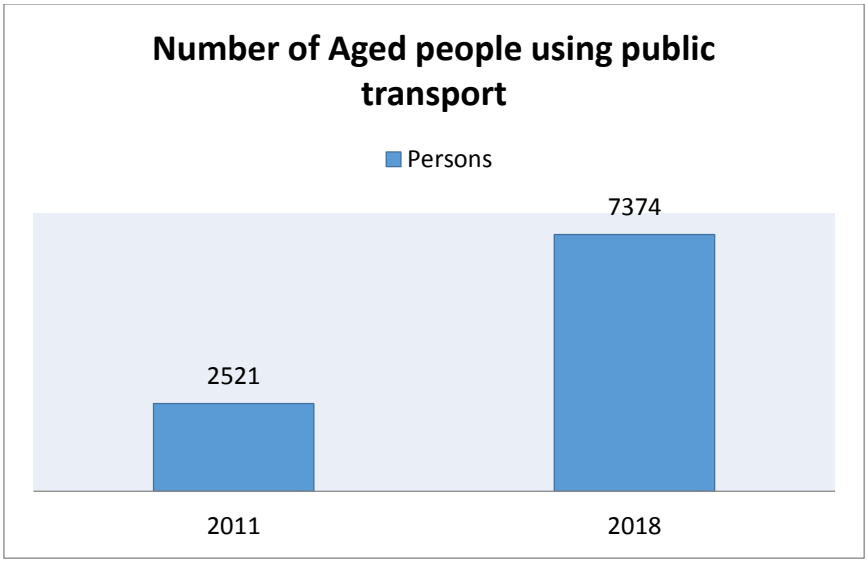


Figure 4.7 Aged People Using Public Transport in Toyama (2011-18)

*Source: The Development Story of Toyama- Reshaping compact and livable cities, 2019.*

After the rider incentive program and mobile app was introduced, the number of people using the public transport increased from 2521 in 2011 to 7374 in 2018.

### 4.2.2. Outcomes of Mobility Policies in Melbourne:

**Observation 1: The users of public transport have increased over the years after the public transport was upgraded and all the neighbourhoods were linked by these public transportation networks.**

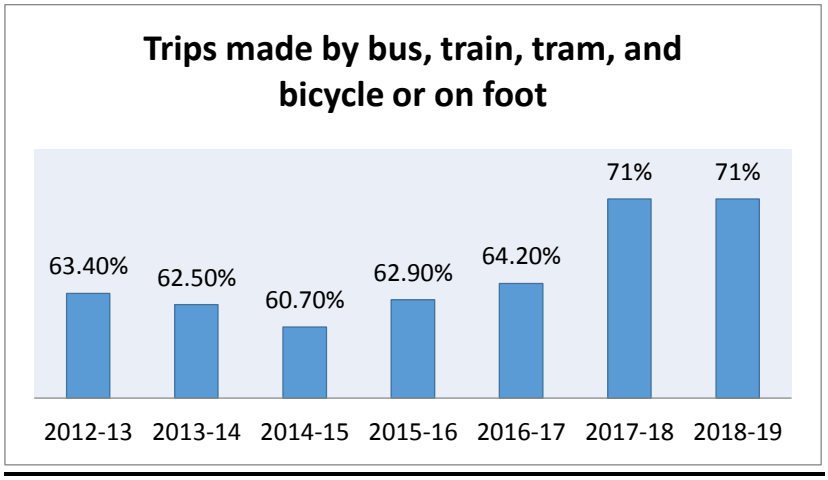


Figure 4.8 Percentage of Trips Made by Different Modes in Melbourne (2012-19)

*Source: Annual Assessment report of Melbourne development plan (2015-2019).*

The percentage of people travelling from bus and train or who prefer to use bicycles or prefer to walk has been increased over the years. The percentages of people using these modes of travelling are 71% in the year 2018-19.

**Observation 2: The facilities and infrastructure for the pedestrians and cyclists have remained same over the years.**

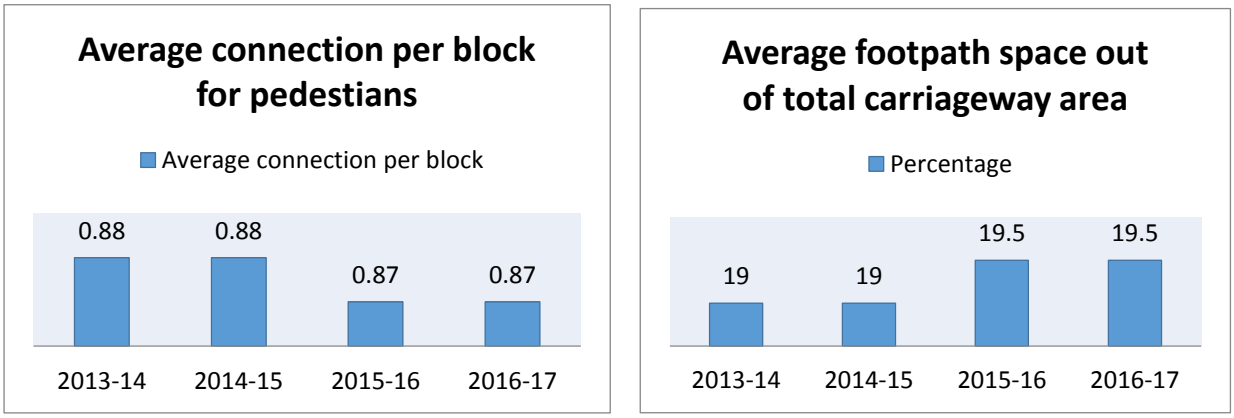


Figure 4.9 Average Connection Per Block for Pedestrians and Average Footpath Space Out of Total Carriageway in Melbourne (2013-17)

*Source: Annual Assessment report of Melbourne development plan (2015-2019).*

The number of pedestrian street connections is measured in two ways. The first relates to the average connections per block allowing pedestrians to travel safely from one side of the street to the other, and from one street to another, including via mid-block pedestrian crossings, lanes and arcades. The second measure relates to the average area of footpaths, roads and nature-strips combined that is devoted to pedestrians.

### 4.2.3. Outcome of Mobility Policies in Portland:

**<u>Observation 1:</u> The percentages of people who prefer to use transit or cycle or walking to reach their work places have increased.**

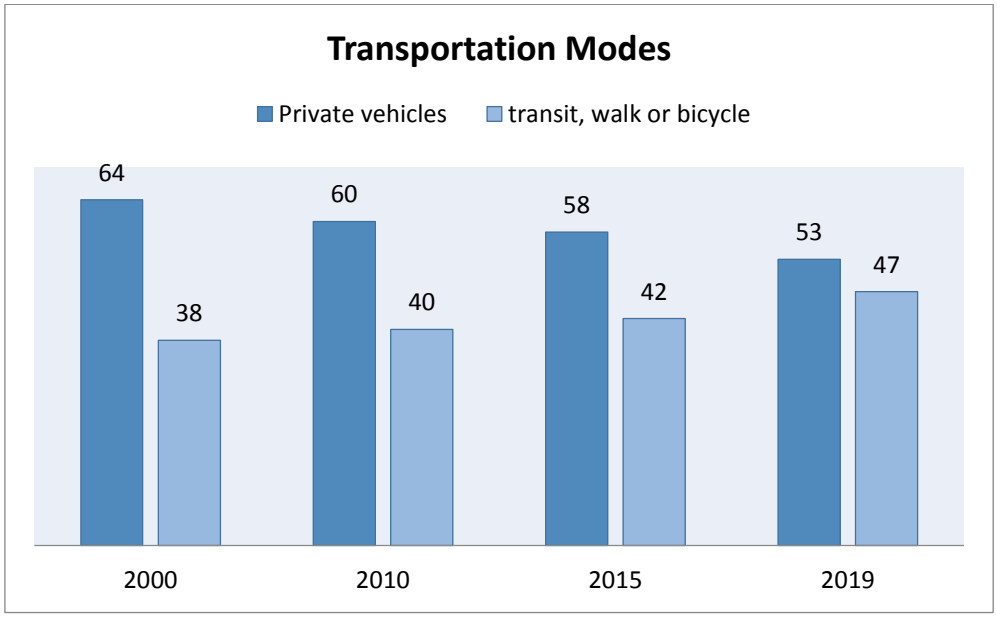


Figure 4.10 Percentage of People Using Different Modes Of Transportation in Portland (2000-2019)

*Source: Assessment report of Portland, 2019*

The percentages of people using private vehicles have decreased from 64% in the year 2000 to 53% in the year 2019. The percentages of people who prefer to use public transport or prefer to walk or cycle have increased from 38% in the year 2000 to 47% in 2019.

**<u>Observation 2</u>: The number of road accidents has decreased from 2000 to 2015.**

The number of road accidents have showed a decline from the year 2000 to 2005 which has further increased in the year 538 but has again decreased to 467 in the

year 2015. So from the year 2000 to 2015, there has been an overall decrease in the number of road accidents.

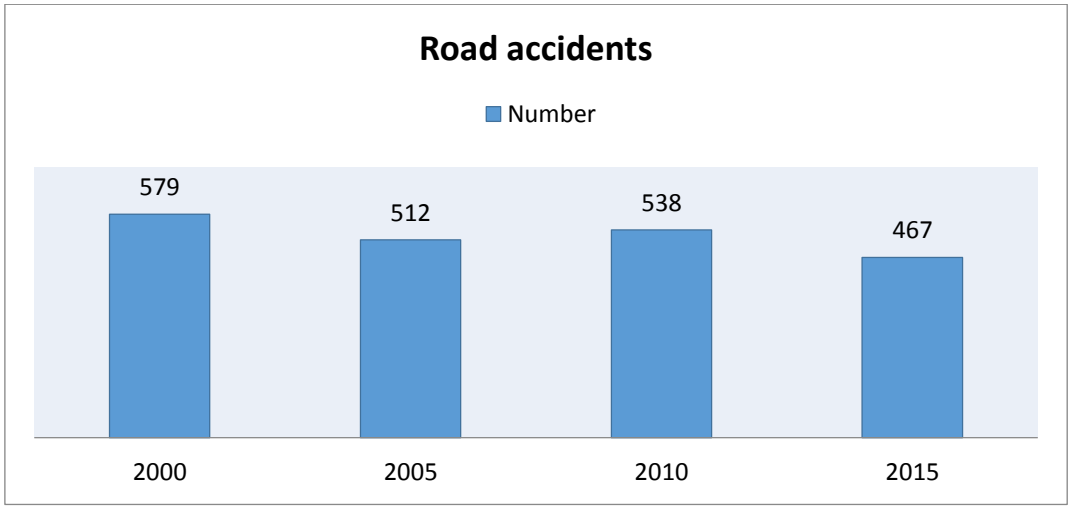


Figure 4.11 Road Accidents Data of Portland (2000-15)

*Source: Assessment report of Portland, 2019*

### 4.2.4. Outcomes of Mobility Policies in Nagpur:

**Observation 1: The transportation infrastructure increased in the year 2016 from that in the year 2010.**

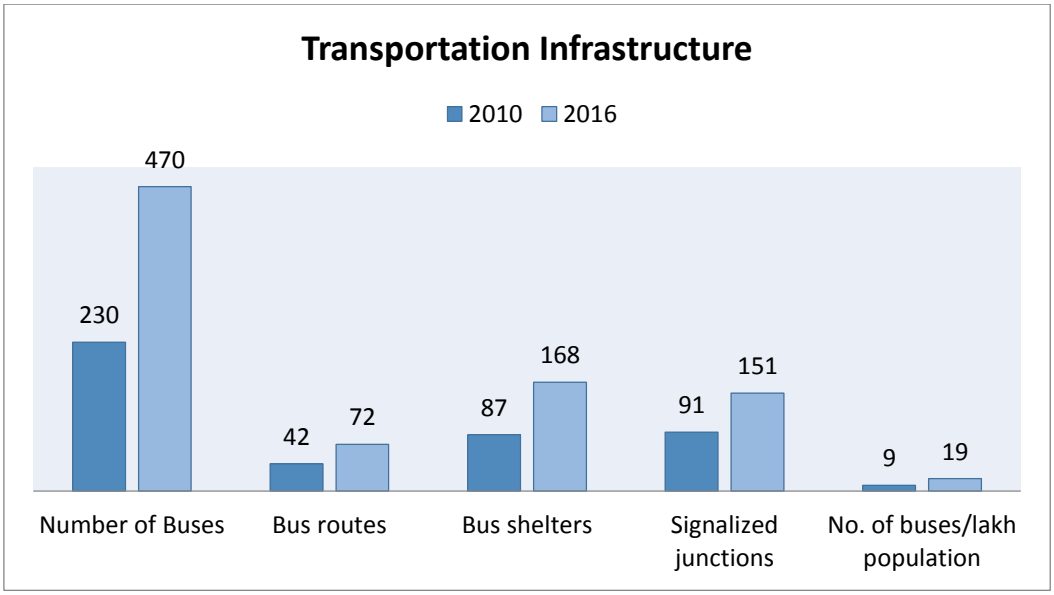


Figure 4.12 Transportation Infrastructure of Nagpur (2010-16)

*Source: Smart city proposals assessment of Nagpur, 2016.*

The transportation infrastructure has developed from 2010 to 2016 in the Nagpur city. The number of public transport buses increased from 230 to 470, a total of 72 bus routes is available in the year 2016 as compared to 42 in 2010. The numbers of bus shelters and signalized junctions have also increased in 2016 as compared to 2010. But no details for ridership information or related to the construction of footpaths or cycle tracks or for the infrastructure development for the pedestrians and their safety are made available. Also, the public centric assessment of the infrastructure is done.

### 4.2.5. Outcomes of Mobility Policies in Pune:

**Observation: The public transport network has improved from 2010 to 2016 which has also resulted in increase in number of ridership.**

The BRT system used to run in 14 km length in 2010 which increased to 27 km length in 2016. The numbers of buses also increased from 478 to 660 and 220 buses were equipped with intelligent transportation management system (ITMS).

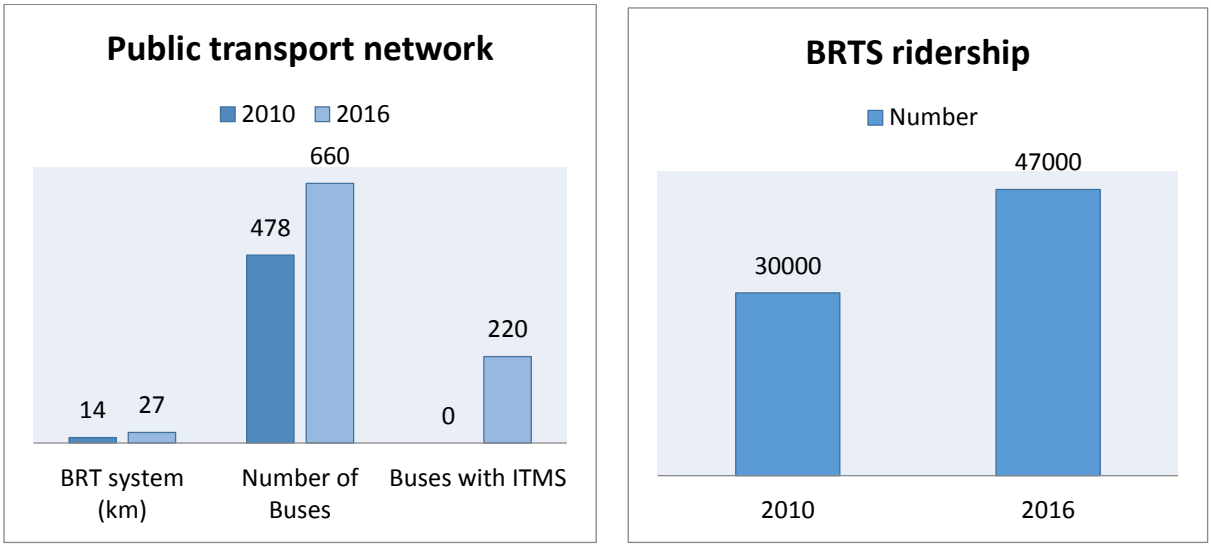


Figure 4.13 Public Transport Network and BRTS Ridership in Pune (2010-16)

*Source: Smart city proposals assessment of Pune, 2016.*

The data related to the pedestrian infrastructure or the infrastructure related to the increasing to increase the cycling in the city is made available. The assessment of this infrastructure is not carried out by conducting the interviews or surveys from the people.

### 4.2.6. Summary of Outcomes of Mobility Policies:

Table 4.2 Summary of Outcomes of Mobility Policies

| Sr. No | Name of the city | Mobility Policies | Outcome | Remarks |
|---|---|---|---|---|
| 1 | Toyama, Japan | Light Rail Transit, Walkable city strategy | Ridership for LRT increased as compared to the previous Japan Railways, aged people ridership also increased. | Satisfactory |
| 2 | Melbourne, Australia | Upgrade and develop the Principal Public Transport Network, More priority to walking and cycling. | The users of public transport and non-motorized vehicles have increased but infrastructural development for pedestrians have remained same over the years. | **Partially Satisfactory** |
| 3 | Portland, USA | Invest in public transport, encourage walking and cycling, ensure pedestrian safety. | The use of private vehicles has decreased and public transport or walking and cycling have increased. Road accidents have also decreased. | Satisfactory |
| 4 | Nagpur, India | Improve public transport, encourage walking and cycling, bike sharing system. | The network of public transport has increased, more buses and corridors are provided but no details of non-motorized development are available. | **Partially Satisfactory** |
| 5 | Pune, India | Improve and enhance public transport system, construction of footpaths and cycle tracks, segregate traffic lanes. | The number of buses and length of routes have increased. Also, the ridership has increased. The images of non-motorized infrastructure are available but the numerical data is not shared by the authority. | **Partially Satisfactory** |

## 4.3. Outcomes of Population Density Policies:

### 4.3.1. Outcomes of Population Density Policies in Toyama:

**<u>Observation 1:</u> Promotion of residence in the city centre and along public transport lines helped bring back the population which had shifted to the suburbs and helped to increase the population density of the city centre.**

Rather than strengthening regulations for the realization of compact urban development, the city chose to gradually guide residential construction by increasing the attractiveness around each station and bring back the migrated people. For this reason, the city provided support for the construction and purchase of housing, as well as other assistance, in the city centre and along public transport lines in residential promotion districts. Compact city–related residential policies have provided citizens with increased opportunities to live in the central areas with the many subsidy options. The subsidies are a unique approach for a Japanese city and demonstrate the innovative mind set of Toyama.

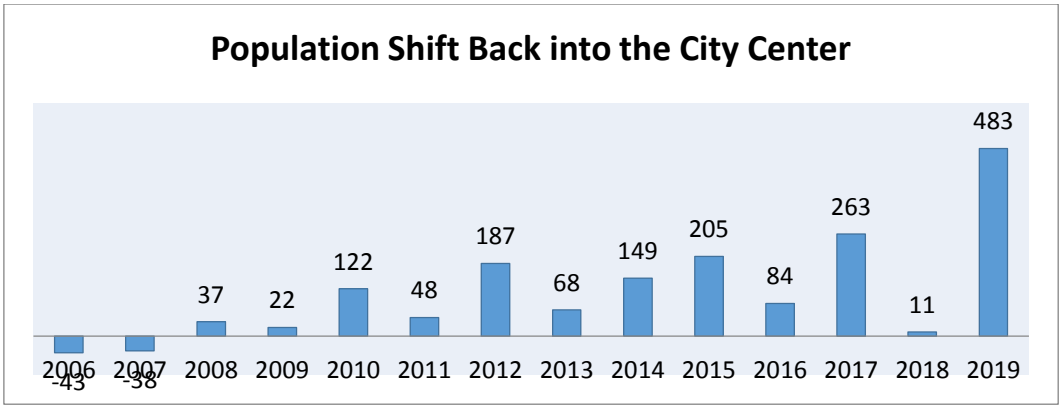


Figure 4.14 Population Shift Back into the City Centre in Toyama City (2006-2019).

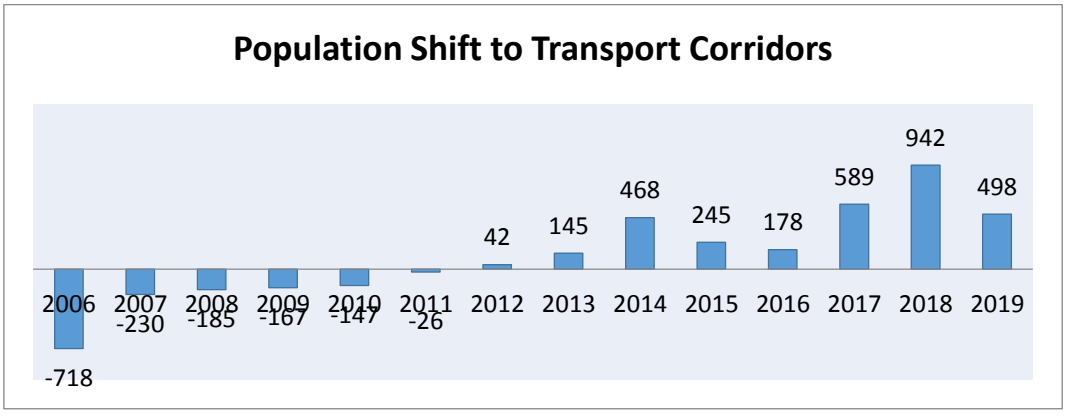


Figure 4.15 Population Shift to the Transport Corridors in Toyama (2006- 2019).

*Source: The Development Story of Toyama- Reshaping compact and livable cities, 2019.*

**<u>Observation 2:</u> The establishments of Downtown community care centres helped people take up jobs and leave their elders or children at the centre to be taken care of during their work hours.**

Early in 2011, many people had to leave their jobs in order to care of the elders of the house or their children but after this initiative the number of people who had to leave their work reduced drastically.

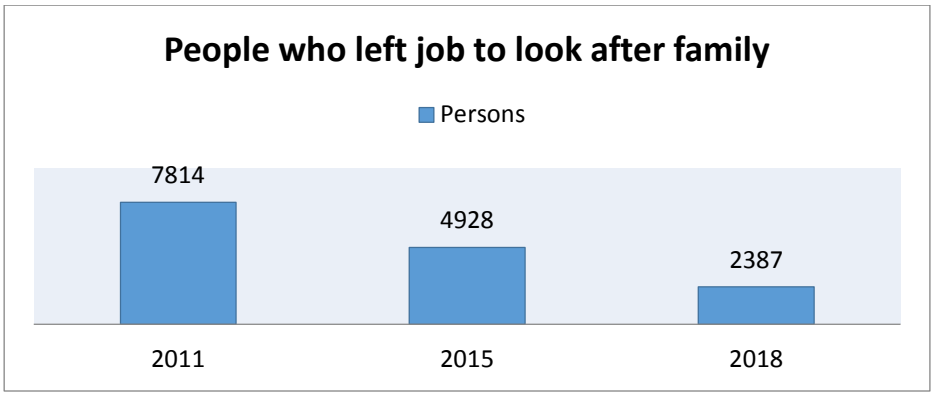


**Figure 4.16 Decline in Number of People Who Left Job after the Community Centre was Set Up in Toyama City (2011-18).**

*Source: The Development Story of Toyama- Reshaping compact and livable cities, 2019.*

### 4.3.2. Outcomes of Population Density Policies in Melbourne:

**<u>Observation 1:</u> A significant number of affordable houses were constructed in or close to the activity centres by the municipal corporation to address the need of homelessness.**

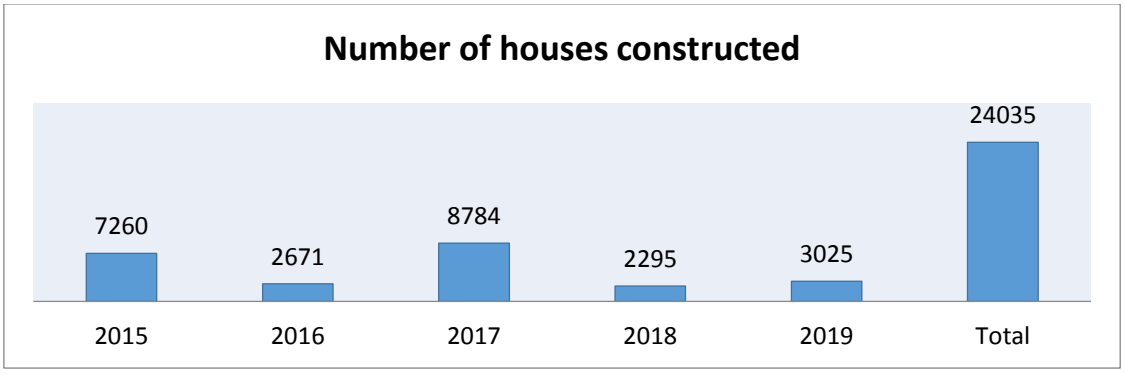


**Figure 4.17 Number of Affordable Houses Constructed in Melbourne (2015-2019)**

*Source: Annual Assessment report of Melbourne development plan (2015-2019).*

A total of 8784 houses were constructed in the year 2017 which the highest number of houses constructed from 2015-2019 followed by 7260 houses constructed in 2015**.** The total numbers of houses constructed from 2015 to 2019 are 24035.

**<u>Observation 2:</u> There are policies to improve the safety of people in the city and also to provide easy access to community services and facilities but still the accessibility to daily essential services is reducing and people are feeling unsafe in the city.**

The percentage of people who feel safe in the daytime increased from 96.2% in 2013 to 97.1% in 2014 and then it kept on declining and reduces to 83.5% in 2018-19. The percentage of people, who feel safe at night, is highest in the year 2015-16 and lowest in the year 2018-19.

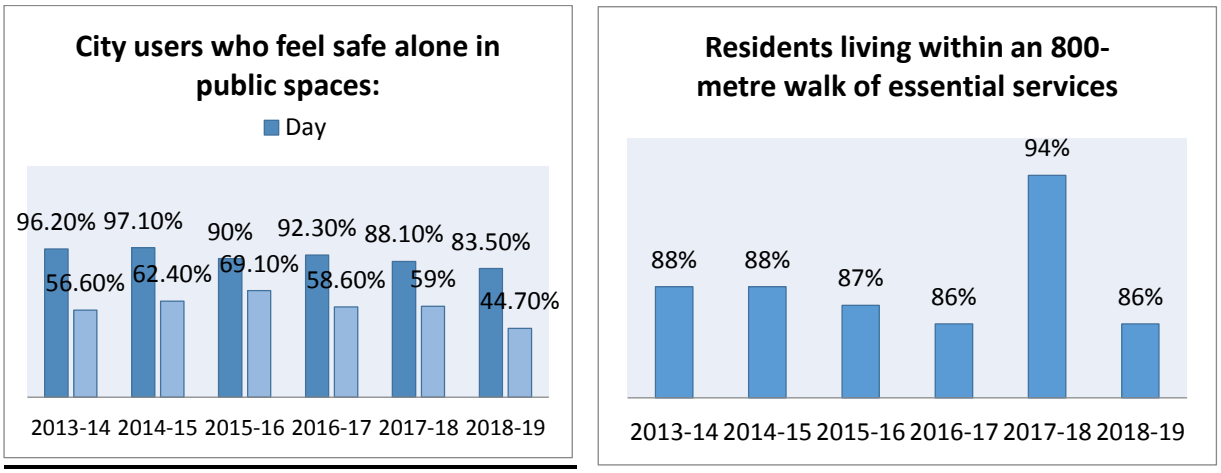


**Figure 4.18 Safety and Accessibility to Essential Services in Melbourne (2013-19)**

*Source: Annual Assessment report of Melbourne development plan (2015-2019).*

The percentage of residents living within an 800 meter walk of daily essential facilities is decreasing in the coming years. It is the highest in the year 2017-18.

### 4.3.3. Outcomes of Population Density Policies in Portland:

**<u>Observation 1:</u> The percentage of people who feel safe in the city increased but the percentage of people satisfied with the liveability of the city decreased.**

In 2000, 51 percent of Portlanders felt safe or very safe walking alone at night in their neighbourhood which increased to 59 percent in 2011 and further to 61 percent in 2015. In 2019, 66 percent of the people feel safe to walk alone in the neighbourhood. While Portlanders rate neighbourhood liveability high, overall city liveability ratings

have fallen. In 2011, 87 percent were satisfied with the liveability of their neighbourhood. 81 percent were satisfied with the liveability of the city. In 2015, neighbourhood satisfaction ticked down slightly to 85 percent, still a very positive level of satisfaction. Overall city satisfaction dropped to 63 percent which further decreased to 57 percent in 2019. The percentage of people who felt safe walking in the neighbourhood at night in 2019 decreased to 83 percent.

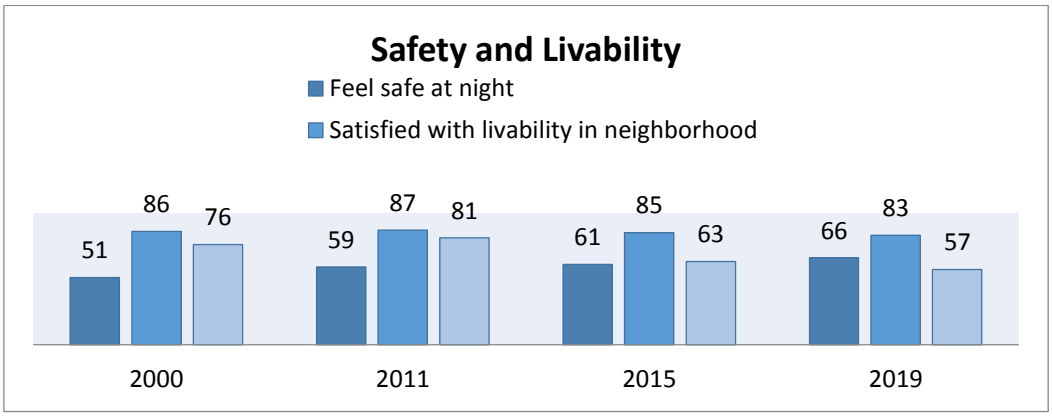


Figure 4.19 Safety and Live Ability of People in Portland (2000-2019)

*Source: Assessment report of Portland, 2019*

**<u>Observation 2:</u> The number of affordable and age- friendly housing options have increased from 2010 to 2019.**

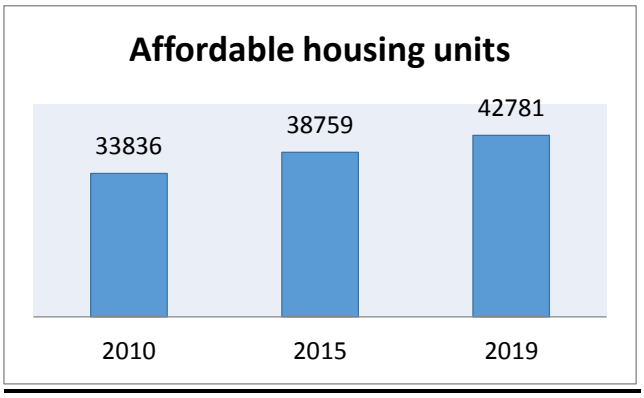


Figure 4.20 Number of Affordable Houses in Portland (2010-2019)

*Source: Assessment report of Portland, 2019*

### 4.3.4. Outcomes of Population Density Policies in Nagpur:

**<u>Observation 1:</u> The number of affordable housing projects has increased from 2010 to 2016.**

A total of 1548 houses were completed in the year 2010 and 1862 were in progress while in 2016, 3671 houses were completed and 4201 were in progress. The affordable houses scheme is only for the poor but no provision of such scheme is available for other income group people of the city.

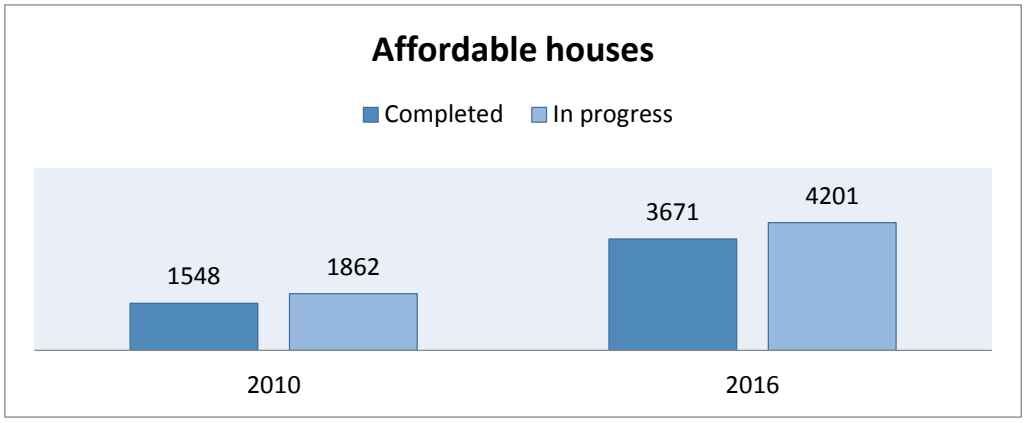


Figure 4.21 Affordable Houses in Nagpur (2010-2016)

*Source: Smart city proposals assessment of Nagpur, 2016.*

**Observation 2: The safety measures to ensure the safety of the citizens have also increased from 2010 to 2016.**

A total of 712 CCTV cameras were installed in the year 2016 and 21489 street lights were also installed. All these facilities and safety measures are taken for the public but no surveys related to the safety issues felt by them or their opinion on safety in the city are taken.

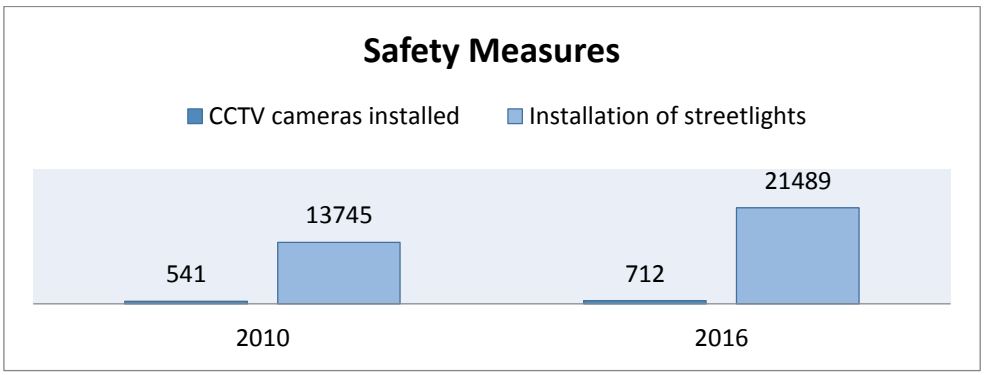


Figure 4.22 Safety Measures in Nagpur City (2010-2016)

*Source: Smart city proposals assessment of Nagpur, 2016.*

### 4.3.5. Outcomes of Population Density Policies in Pune:

**Observation 1: The number of affordable houses has increased in 2016 as compared to 2010.**

There were 4581 houses completed and 6520 houses in progress in 2010 which increased to 7176 completed houses and 10092 in progress in the year 2016. Same as the case in Nagpur city, no provisions for providing affordable houses to other income group people have been made.

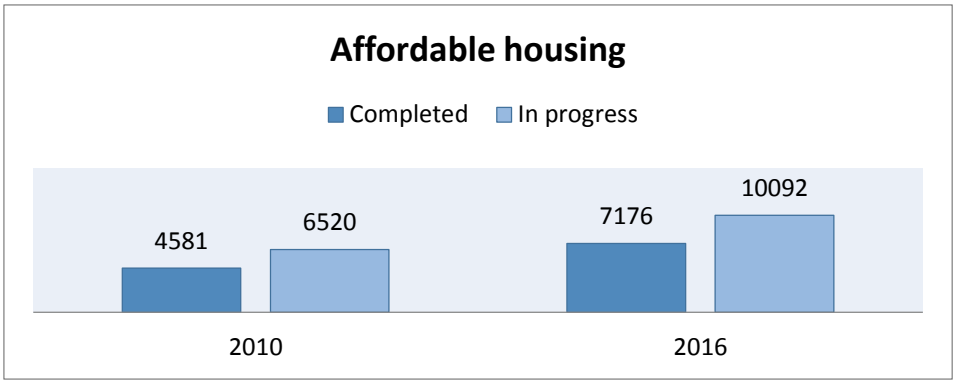


Figure 4.23 Affordable Houses in Pune (2010-2016)

*Source: Smart city proposals assessment of Pune, 2016.*

**<u>Observation 2:</u> The safety and security measures have also been increased from 2010 to 2016.**

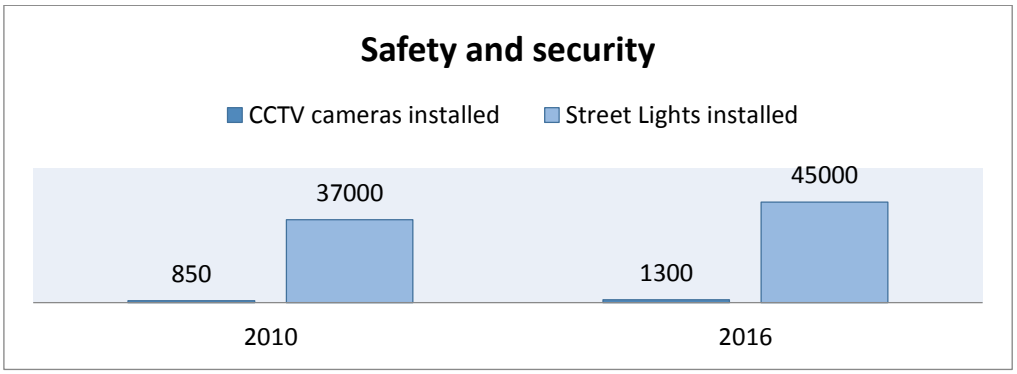


Figure 4.24 Safety Measures in Pune City (2010-2016)

*Source: Smart city proposals assessment of Pune, 2016.*

In 2010, 850 CCTV cameras were installed and 37000 street lights were installed while in 2016, 1300 CCTV cameras were installed and 45000 street lights were installed. Same as Nagpur, no opinion of the people is taken related to the safety issues faced by them.

### 4.3.6. Summary of Outcomes of Population Density Policies:

Table 4.3 Summary of Outcomes of Population Density Policies

| Sr. No | Name of the city | Population Density Policies | Outcome | Remarks |
|---|---|---|---|---|
| 1 | Toyama, Japan | Subsidies for residential development in city centre and along transit corridors and establishment of community care centres. | People moved back to the city centres from the suburbs over the years and community care centres helped people take care of their children and elders during the working hours. | Satisfactory |
| 2 | Melbourne, Australia | Provisions for affordable houses and address homelessness, improving the accessibility to services, ensuring public safety. | A significant number of affordable houses were proposed but the accessibility to services and safety of people has decreased over the years. | **Partially Satisfactory** |
| 3 | Portland, USA | Housing options for age- friendly and affordable houses, improve public safety, improve liveability | Approximately 42000 units of affordable houses were provided till 2019. The safety of people has increased but the livability has decreased according to the people. | **Partially Satisfactory** |
| 4 | Nagpur, India | Provide safe and affordable houses to the poor | The number of affordable houses in the city has increased from 2010 to 2016 but these houses are only for the poor. | **Partially Satisfactory** |
| 5 | Pune, India | Affordable houses for the poor and citizen's safety | The number of houses and safety measures has increased but only for the poor and no opinion of the people is considered. | **Partially Satisfactory** |

## 4.4. Outcomes of Open and Green Spaces Policies:

### 4.4.1. Outcomes of Open and Green Spaces Policies in Toyama:

**<u>Observation:</u> Community garden project helped develop bonds between grandparents and grandchildren and also proved to be beneficial to make the children learn the importance of growing and cultivating vegetables.**

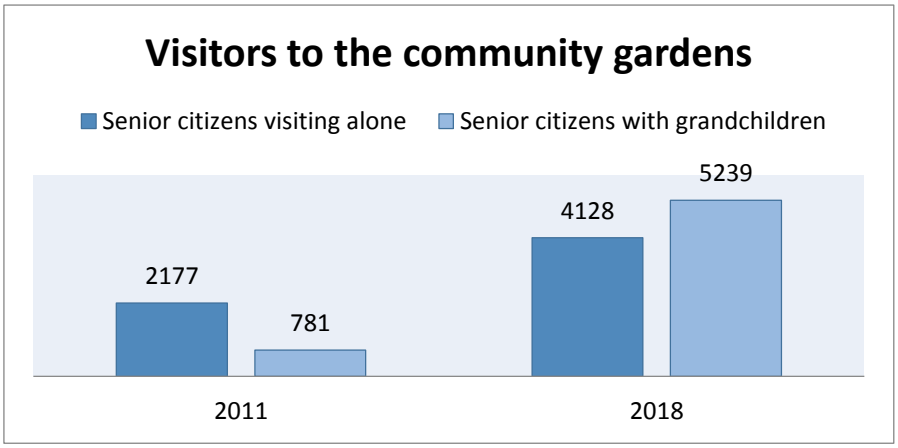


Figure 4.25 Visitors to the Community Garden in Toyama (2011-18)

*Source: The Development Story of Toyama- Reshaping compact and livable cities, 2019.*

The number of senior citizen visiting the gardens alone increased from 2177 in 2011 to 4128 in 2018 and the number of senior citizens visiting the gardens with grandchildren increased from 781 in 2011 to 5239 in 2018.

### 4.4.2. Outcomes of Open and Green Spaces Policies in Melbourne:

**<u>Observation 1:</u> Provisions of number of policies for the enhancement of public spaces and providing access to the people are made in the development plan yet people are not satisfied with the quality of public spaces.**

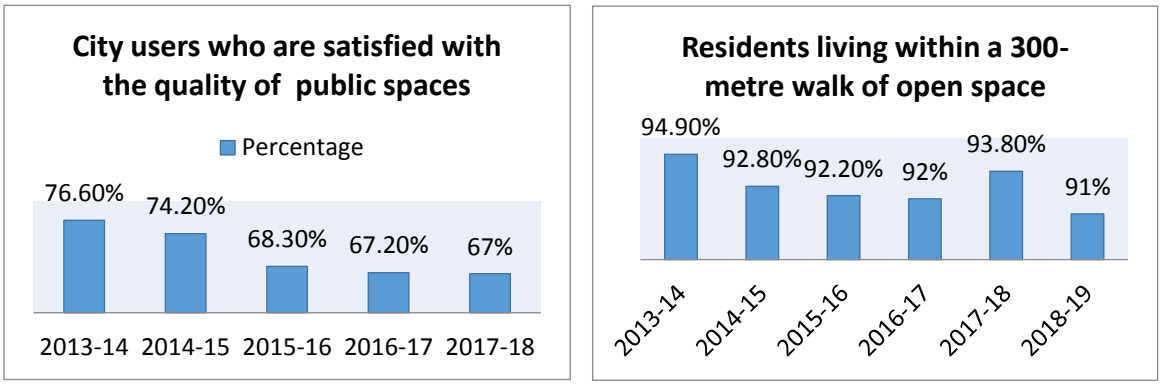


Figure 4.26 Quality of Open Spaces and Access of People to the Open Spaces in Melbourne (2013-19)

*Source: Annual Assessment report of Melbourne development plan (2015-2019).*

The satisfaction level of the people regarding the quality of public spaces has kept on declining continuously from 2013 to 2018 in spite of provisions of number of policies for the enhancement of recreational and public spaces. The survey was carried out based on several quality aspects of public open spaces, including sun and shade, sights and sounds, fresh air, greenery, the presence of art and furniture, accessibility and ability to enjoy using the space. The estimated population living within a 300-metre radius of open spaces, including parks and reserves, sports fields and outdoor recreation areas, squares and publicly accessible private outdoor space has declined from the span of 2014 to 2016, while it increased to 93.8% in 2017-18 to again decline in 2018-19.

**<u>Observation 2:</u> Melbourne development plan aims to protect the environment and vegetation but the green cover of the city has declined over the past years.**

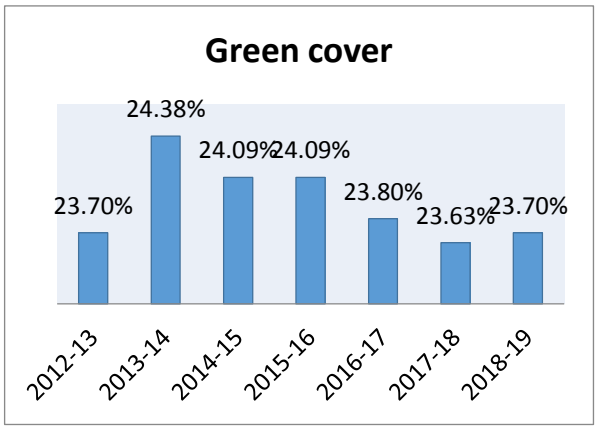


Figure 4.27 Green Cover of Melbourne City (2013-19)

*Source: Annual Assessment report of Melbourne development plan (2015-2019).*

The green cover of the city was 23.7% in 2012-13 which increased gradually for two years but after 2015-16, it has started to decrease. There is a slight decrease in these years.

### 4.4.3. Outcomes of Open and Green Spaces Policies in Portland:

**<u>Observation 1:</u> The tree canopy increased in the city from the year 2000 to 2015.**

The tree canopy cover of the city has increased from 27.3% in the year 2000 to 30.7% in 2015.

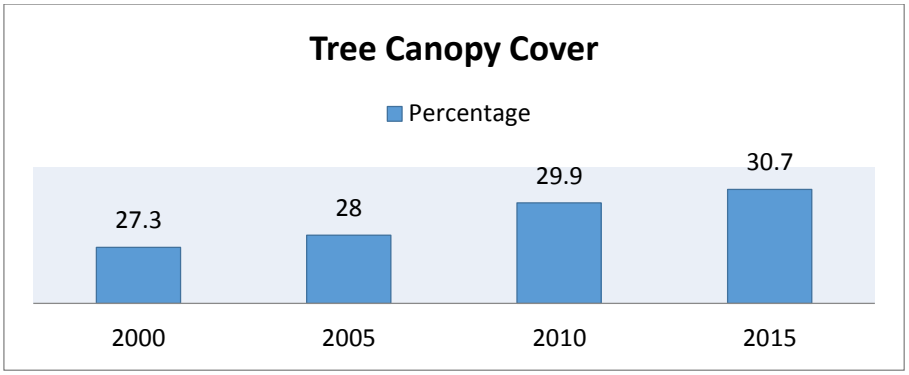


Figure 4.28 Tree Canopy Cover of Portland (2000-15)

*Source: Assessment report of Portland, 2015*

**<u>Observation 2:</u> The percentages of people who can access the open spaces and waterfronts within a reach of 500 m have increased from 2010 to 2015 and also the quality of open spaces and waterfronts has increased according to the residents.**

Portland's extensive network of parks and open spaces provides a variety of active and passive recreation opportunities for residents, workers, and visitors. These areas also serve other functions, protecting environmentally sensitive land, establishing habitat continuity, and improving public access to the water among them.

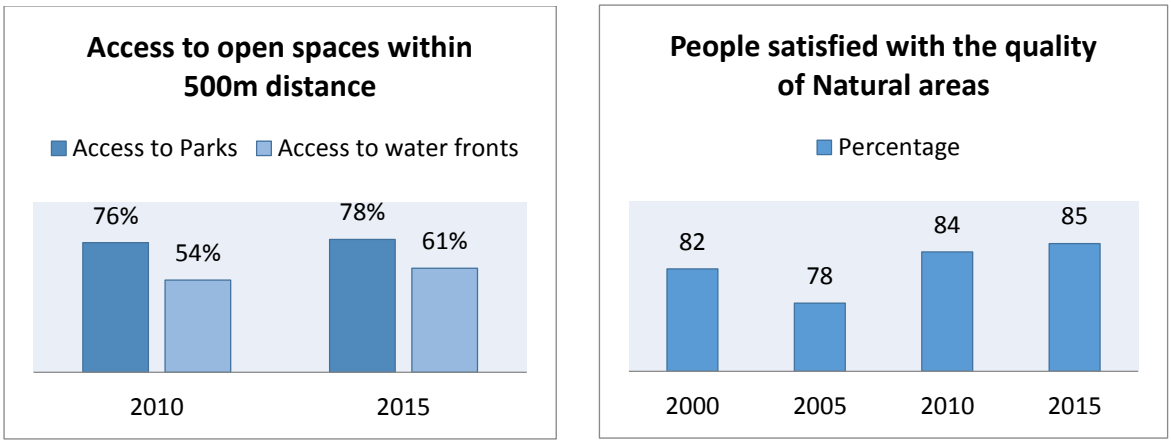


Figure 4.29 Access of People to Open Spaces and their Quality in Portland

*Source: Assessment report of Portland, 2015*

The percentage of people who have an access to parks within a distance of 500m has increased from 76% in 2010 to 78% in 2015. While the percentage of people

who have access to water fronts have increased from 54% to 61% in the year 2015. 85% people were satisfied with the quality of natural areas of the city.

**<u>Observation 3:</u> The number of parks and recreational spaces has increased from 2010 to 2015.**

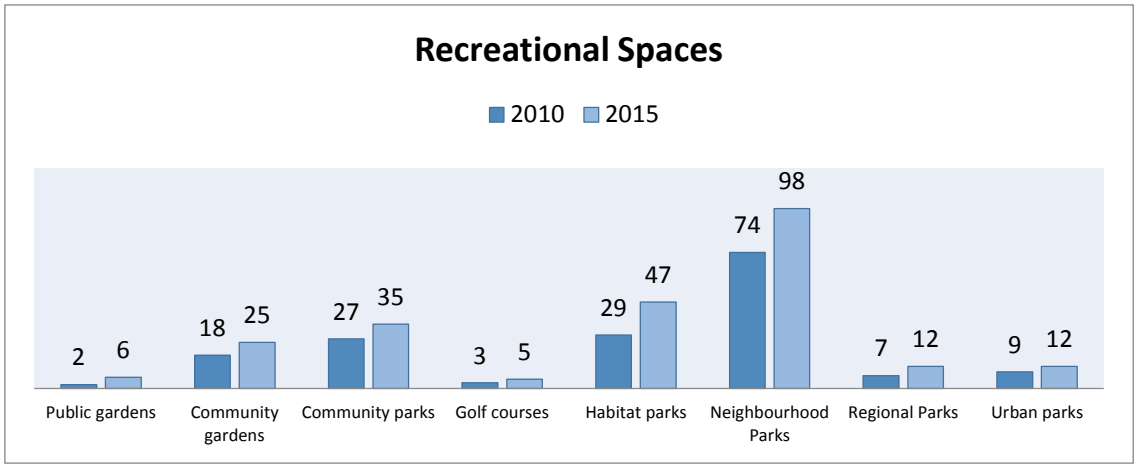


**Figure 4.30 Number of Recreational Spaces in Portland (2010-15)**

*Source: Assessment report of Portland, 2015*

### 4.4.4. Outcomes of Open and Green Spaces Policies in Nagpur:

**<u>Observation:</u> The city has reached the saturation point in the number of open spaces. No more area in the city is available for future open spaces.**

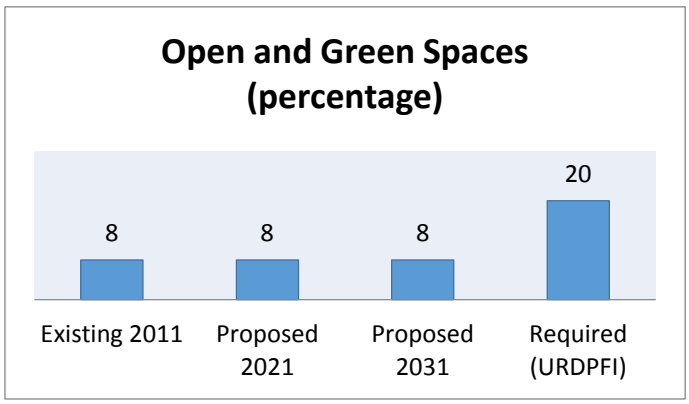


**Figure 4.31 Open and Green Spaces in Nagpur**

*Source: City Development Plan for Nagpur, 2041.*

Nagpur has traditionally expanded horizontally with low-rise built-up spaces. Also the open spaces within the built-up spaces are very less, which means there is no space available for future green field development within the city, except the peripheral

areas. Only 8% of the space is covered with green vegetation, which can be accessed by citizens for leisure and as a community space and for social purposes. Also, no progress report is available related to the lake and river front development of the lakes for the city selected for the development.

### 4.4.5. Outcomes of Open and Green Spaces Policies in Pune:

**Observation: Biodiversity parks and gardens are developed but no assessment report is available.**

Table 4.4 List of Biodiversity Parks and Gardens in Pune

| Sr.No. | Biodiversity Park | Area (ha) | Sr.No. | Name of Theme Gardens | Location |
|---|---|---|---|---|---|
| 1 | Baner – Pashan Lake | 118.08 | **1** | Japanese Garden | Sinhagad Road |
| 2 | Pashan Panchwati | 48.89 | **2** | Garden in mine | Maharshinagar |
| 3 | Sutarwadi | 25.02 | **3** | Ayurved Garden | Kondhwa |
| 4 | Hadapsar | 13.65 | **4** | Naksjatra Garden | Erandvane |
| 5 | Mohammadwadi | 12.71 | **5** | Nalla Park | Sahakarnagar |
| 6 | Kondhwa Budruk | 2.89 | **6** | Lake Garden | Model Colony |
| **Total** | **221.24** | | **7** | Rose Garden | Sahakarnagar |
| | | | **8** | Papilion (butterfly garden) | Aryaneshwar |

*Source: City Development Plan for Pune, 2041.*

A total of six biodiversity parks and eight gardens have been developed in the Pune city from 2010 to 2016 but no progress report or assessment report is provided for the access to the people.

### 4.4.6. Summary of Outcomes of Open and Green Spaces Policies:

Table 4.5 Summary of Outcomes of Open and Green Spaces Policies

| Sr. No | Name of the city | Open and Green Spaces Policies | Outcome | Remarks |
|---|---|---|---|---|
| 1 | Toyama, Japan | Community gardens. | Increased activities for the senior citizens and helped to learn the importance of cultivation of vegetables to the kids. | Satisfactory |
| 2 | Melbourne, Australia | Increase the green cover of the city, enhance the existing parks and open spaces and improve accessibility to these places for the people. | The green cover of the city decreased, people are not satisfied with the quality of open spaces and accessibility has also decreased. | **Not Satisfactory** |
| 3 | Portland, USA | Increase the quality of existing parks and open spaces and provide easy accessibility to the people, increase the green cover of the city, increase the number of parks and open spaces for the future needs. | People are satisfied with the quality of open spaces, the accessibility to waterfronts and open spaces has increased and the number of recreational spaces has also increased. | Satisfactory |
| 4 | Nagpur, India | Develop and maintain open spaces, provide new open spaces, water front development and prevention of flora and fauna. | No more space available in the city for providing additional open spaces to the future population. | **Not Satisfactory** |
| 5 | Pune, India | Protect the flora and fauna, enhance and increase the open spaces and set up bio diversity parks | Bio diversity parks and gardens have been developed in the city but no progress report is made available. | **Partially Satisfactory** |

## 4.5. Findings from the Case Studies:

- Every city has some specific issues which need proper planning solutions. These issues are to be found out first in order to generate the policies. Every issue needs one major factor which can solve it. Rest all factors of the concept shall act as secondary factors and further enhance the policies framed for the first factor.
- Time to time assessment and evaluation of the implementation of policies and their outcomes should be done and further modifications should be done in the previously existing policies.
- The perception of the people related to the compactness of the city should be collected by questionnaires or interviews. The involvement of the citizens in the planning process should be done and their suggestions should be incorporated.
- Age-friendly and physical ability friendly planning policies should be incorporated in order to plan for all groups of people.
- The areas of further development should be identified in the present itself to control the development of these areas and prevent haphazard development of the city.
- All the residents of the city should have access to daily essential services as well as recreational requirements and open spaces irrespective of the age, ability or income. Affordable houses should be provided to all income groups in the vicinity of the development or activity nodes so their needs of services and facilities are fulfilled.
- Local conditions and culture of the city should be incorporated in the planning process to develop the unique identity of the city and to further enhance it.
- The different planning authorities working parallel to each other should be coordinated well to provide better planning solutions.
- The existing schemes such as Town planning schemes, smart city missions, JnNURM, Awas Yojanas etc. should be molded in the favor of the compact city concept to extract maximum benefits of these policies.

# Chapter 5

# Conclusions and Recommendations

## 5.1. Conclusions:

The rapid growth of Indian cities driven by growing economy needs to be discussed in relation to the quality of life in cities, resource consumption and environmental impacts. Building sustainable cities will be a key to hold India's economic growth in future. As there is a widespread consensus that urban form contributes to urban sustainability and reduces the ecological footprint of cities, there is a need to explore the compact city concept for its possible intervention in restructuring and planning of Indian cities. The application of compact city policies for cities in India is possible only through certain other supporting conditions. Infrastructure improvement will play a key role in holding high densities and compact urban form with less negativity. Also urban management, administration and strict regulations will help to sustain the said benefits of compact living. Besides this, holistically evolving sustainable urban form along with compact city policies is a comprehensive approach. Two preferable urban forms are: densification and activity intensification of identified sub-centres within urban structure, resulting in polycentric growth pattern; and linear transit oriented form as a result of boosting growth along mass transport axes coupled with densification, intensification and mixed land use. Majority of the environmental problems, high energy use and carbon emissions in urban areas are directly related to urban structure; thus the structural changes of mobility systems, coordinated land use and transportation planning and integrating built and natural environment; can help bring the solutions.

Moreover the factors such as weather conditions, lack of communication between different planning authorities, rigid mind set of people and non-involvement of people in planning process might affect the compact city policies in Indian cities and can act as a barrier. Majority of the Indian cities have hot and humid climate for nearly 7-8 months a year, which makes it difficult for the people to walk or ride a cycle in the scorching sun. People in the cold countries can walk for 15-20 minutes easily because of the cool environment but in the hot countries like India, people can walk for a minimum of 5-7 minutes. Also, in Indian planning processes, a number of

authorities are interlinked such as town planning department, roads and building department, construction works department etc. These departments work individually without consulting or coordinating with one another which leads to unplanned and irregular development works and thus can affect the implementation of the policies. Moreover, the ideas and visions of the citizens are not incorporated in the Indian cities which are a benefit for the international cities., Majority of the people are not aware about the benefits they can get from these policies framed by the development authority and how they can have an impact on the nature and environment as well which needs to be addressed and also people are not ready to accept change or try something different than their traditional methods of accessing their daily needs and work places. Moreover, they also feel shy to use a bicycle to go to work or feel that their reputation might be shattered if they use public transports systems or preferred to walk instead of using their motorized vehicles.

The high population density may benefit the compact city approach but up to a specified optimum density for a neighbourhood or a town planning scheme level. If the density increases beyond that number, the infrastructure and the land use may not be able to cater the needs of these exceeding people. Only increasing density without investment in infrastructure may have an adverse impact on sustainability. Moreover further densification may have an adverse impact on heat island effect in hot climates and vulnerability during natural hazards like earthquakes. The population to open spaces ratio may also decrease if the density keeps on increasing. People may tend to move out from these neighbourhoods to the outskirts again in search of natural environment which may again lead to the sprawling of the city. For e.g.: - In case of Nagpur, there is no space in the city which can be developed and used as open space or for the recreational use for the future needs of the city. So, if the population density of Nagpur will keep on increasing, the land use and infrastructure will not be able to cater the needs of this future population. Hence, a specific optimum population density should be fixed for a neighbourhood and no further residential development should be allowed in that specific neighbourhood.

## 5.2. Recommendations and Guidelines:

**Land Use:**

- Few parcels of land demarcated as government land should be used to set up public schools, hospitals, community centers, street vending zones etc. within the walking distances from the major transportation nodes in the city.
- The redevelopment and regeneration of vacant lands and low density developments in core areas of cities and along public transport corridors should be done for maintaining the city's compactness. Providing high density mixed use development in these areas should be considered as the major element of the city's development plan. For efficient and optimum utilization of existing urban land, a strategy should be developed to accommodate additional population in these areas depending on their carrying capacities (based on the carrying capacities of infrastructure facilities like water supply, sewage, road network etc. including what is existing and the potential for supplementing).

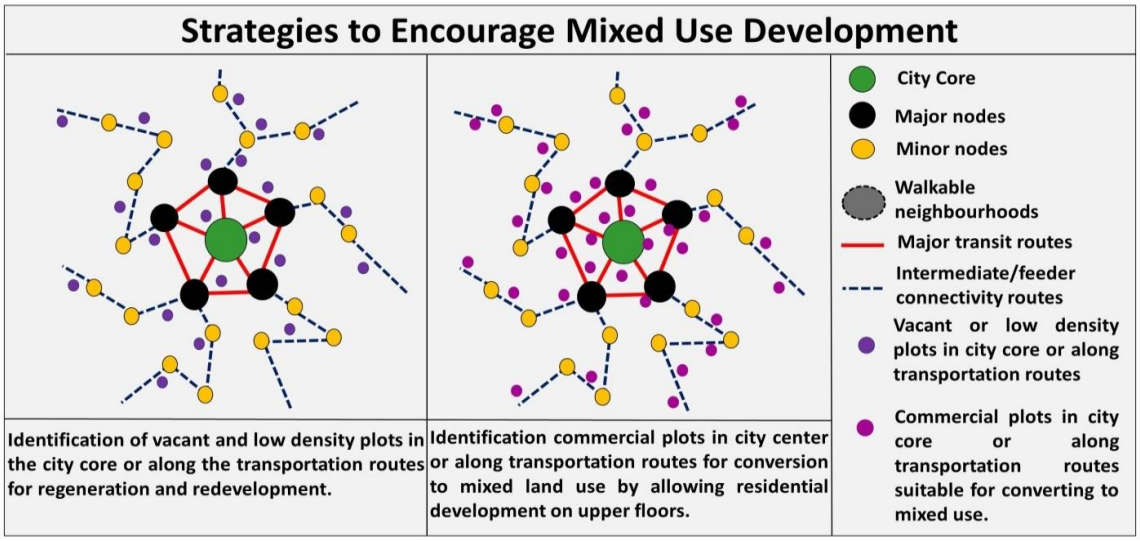


Figure 5.1 Strategies to Encourage Mixed Use Development

- The commercial areas in the city core as well as along the transportation nodes should be given subsidies or concessions for construction of residential houses on the upper floors of the buildings for encouraging the mixed use development to accommodate more people.

- The outcomes of the existing development plan should be assessed every 2 or 3 years and further changes should be made in the existing proposals. Also, along with the development plan, an additional set of suburban development plan should be framed in which identification of potential future development nodes or activity centers should be done and their infrastructural requirements should be addressed.

**Mobility:**

- Hierarchy of transit systems should be made instead of single type of bus system. The first level of buses or transits should cover all the major nodes of the city such as railway station, major land marks on the ring roads etc. The second level of buses should provide connectivity from these major nodes to the minor nodes like the activity centers of the neighbourhood or the TP schemes. Identification of clusters of activities close to the minor transportation nodes in need of connectivity should be done and to complete this network pedestrian and cycle infrastructure should be provided to connect these activities. These pedestrian and cycle infrastructure (cycle systems, cycle stands, footpaths, zebra crossings, segregated lanes for cyclists, benches and sitting areas along the roads etc.) will be the third hierarchy of the transportation system. The first hierarchy of buses should be available at every 20-30 mins time interval while the second hierarchy buses should be available at every 30-40 min time interval.

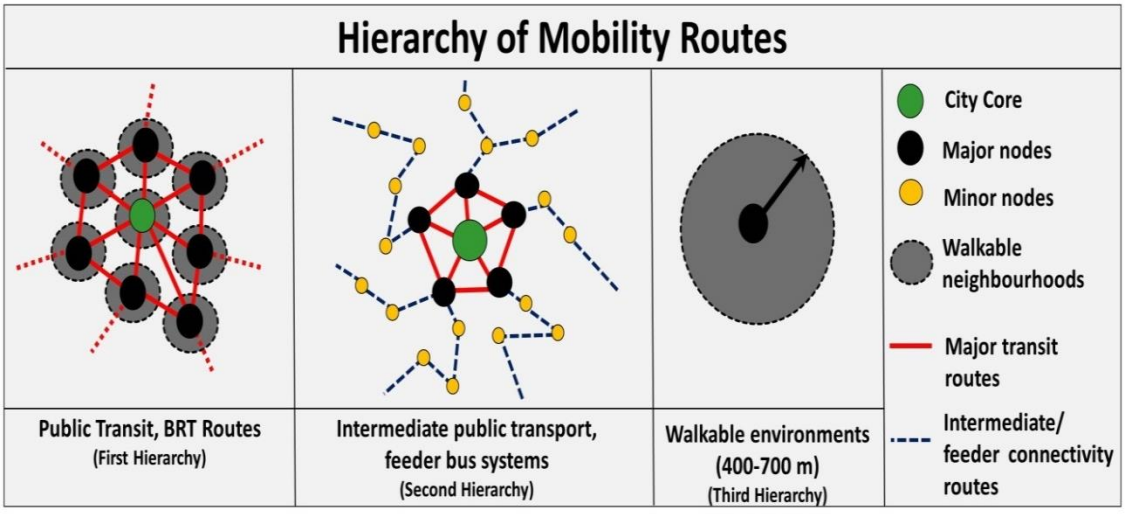


Figure 5.2 Hierarchy of Mobility Routes

- To encourage the people to use the public transport, passes for daily commuters or subsidized passes for senior citizens and students should be provided. Moreover, age friendly infrastructure at the bus stops or intermediate stations should be provided to encourage all age group of people to access the public transport.
- The core of the city or the congested areas with narrow streets should be converted to motorized private vehicle prohibition zones.

**Population Density:**

- The policy of increasing FSI (Floor Space Index) can help to accommodate more population in the same existing space. The FSI for the few identified areas and especially along the transportation nodes and the core city should be kept high, moderate FSI near sub-centers and low FSI near the suburbs. It will help to create cheaper floor space, vital and dense CBDs and reduce the shortage of housing and accommodation in the city.

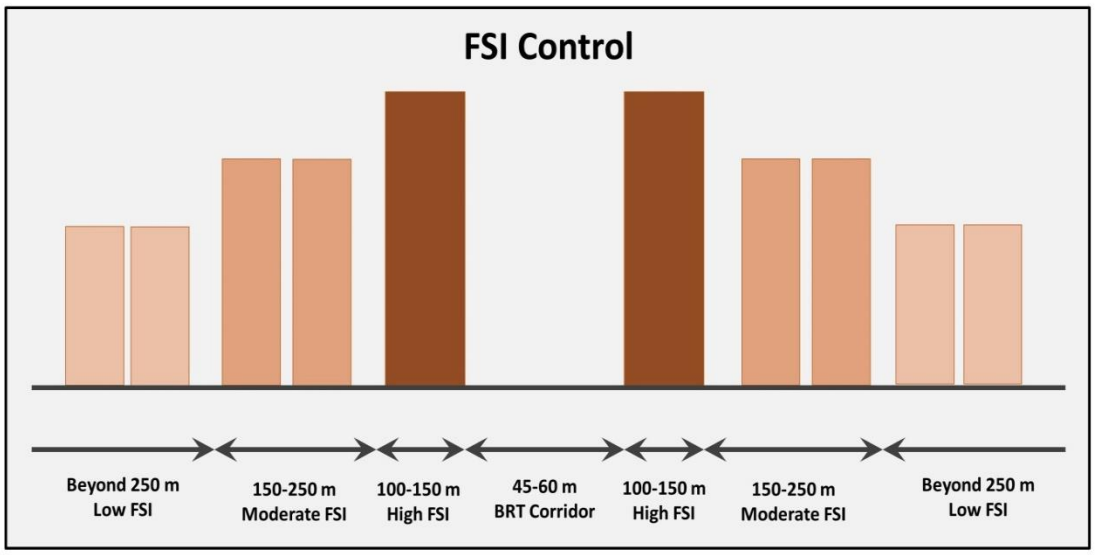


Figure 5.3 FSI Control Strategy

- Multi dwelling units in single parcel of land should be promoted instead of single dwelling in the city center or along the transport corridors by increasing the land and infrastructure tax on single dwelling houses and by giving subsidies and concessions on construction of multi dwelling housing units especially near the transportation nodes and in the city core. This will lead to vertical development

instead of horizontal development and will help to stop the expansion of the city to the suburbs.

**Open and Green Spaces:**

- Identify the different kinds of vacant or underutilized government land in the city close to the residential areas and allow the private developers to develop and maintain these land parcels as gardens, parks or open spaces on PPP basis. Age and ability friendly infrastructure should only be allowed at these spaces.
- Mandatory plantation of trees on the sides of the roads and along the divider should be done to compensate for the heat during the summers and provide the walkers and cyclists with shade while commuting.

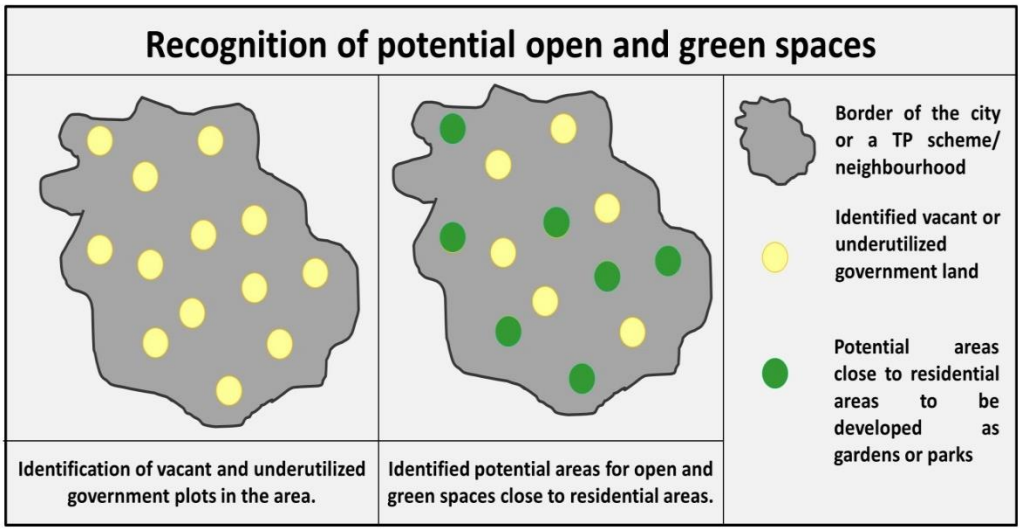


Figure 5.4 Recognition of Potential Open And Green Spaces

- Every TP scheme should have at least 15% of its area as open or green space and these open spaces should spread across the whole area and not concentrated at one place. These open spaces should be developed as parks or gardens by the development authority and their quality should be assessed and maintained in regular time intervals.

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