

**Draft**  
**Bengaluru Transit Oriented Development Policy,**  
**February, 2019**

Bangalore Metro Rail Corporation Limited



**BMRCL**

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## Abbreviations

BBMP	Bruhat Bengaluru Mahanagara Palike
BDA	Bengaluru Development Authority
BESCOM	Bangalore Electricity Supply Company
BIAL	Bangalore International Airport Limited
BMA	Bangalore Metropolitan Authority
BMLTA	Bangalore Metropolitan Land and Transport Authority
BMR	Bangalore Metropolitan Region
BMRCL	Bangalore Metro Rail Corporation Limited
BMRDA	Bangalore Metropolitan Region Development Authority
BMTCL	Bengaluru Metropolitan Transport Corporation
BWSSB	Bangalore Metropolitan Water Supply and Sewerage Board
DDP	Detailed Development Plan
EWS	Economically Weaker Sections
FSI	Floor Space Index
GIS	Geographical Information Systems
LIG	Low Income Group
MMRCL	Maharashtra Metro Rail Corporation Limited
MoUHA	Ministry of Housing and Urban Affairs
NMSH	National Mission on Sustainable Habitats
NUTP	National Urban Transport Policy
PPH	Persons per Hectare
PPP	Public Private Partnership
TDR	Transfer of Development Rights
TOD	Transit Oriented Development
URDPFI	Urban and Regional Development Plans Formulation and Implementation
UMTA	Unified Metropolitan Transportation Authority
UTF	Urban Transport Fund

## 1 Introduction

- 1.1 Bengaluru is the capital of Karnataka state and fifth largest<sup>1</sup> city in India in terms of population. Bengaluru is the foremost IT hub of the country and popularly known as the 'Silicon Valley' of India. The Bengaluru Metropolitan Region<sup>2</sup> (BMR) is spread over an area about 1294 sq.km and houses 9.1 million people in which the Municipal Corporation area i.e. core of BMA is spread over an area of 712.54 sq.km with a population of 8.4 million as per 2011 census. The population density of BMR and BBMP is 70 pph<sup>3</sup> and 118 pph which can be considered as medium density. The city is one of the fastest growing cities in India with a decadal growth of 43.4% during 2001-2011 driven by strong growth in service sector spearheaded by information technology companies. The high rate of population is expected to continue in future and the BMR population is expected to double and reach about 20.3 million by 2031<sup>4</sup>.
- 1.2 The city accommodates 14.6% and 40% of total and urban population of the Karnataka and contributes about 60% of GDP of the state. Bengaluru has an estimated GDP<sup>5</sup> of \$110 billion which is 4<sup>th</sup> largest after Mumbai, Delhi and Kolkata. Bengaluru contributes 38% of India's total IT exports. In addition to information technology, economy of the city is diversified with automobile, bio-technology, aviation, light engineering, defence and textiles contributing significant share. Bengaluru is also emerged as the start-up hub of the country, bringing innovation and creating employment opportunities. The city is also a major education hub with presence of large number of higher educational institutions.
- 1.3 The vibrant economy of the city has attracted people from all over the India triggering the growth of the city both economically and spatially. This has resulted in huge increase in travel demand and has been predominantly catered to by private vehicles due to inadequate public transport. The current share of public transport is about 48%<sup>6</sup>. However, as per norms, the minimum share of public transport should be 70%<sup>7</sup>.
- 1.4 At present, Bengaluru Metropolitan Transport Corporation (BMTc) is the dominant mode of public transport catering almost 90% of the public transport trips. BMTc buses catering to over 45 lakh commuters per day with a fleet of about 6700 including feeder

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<sup>1</sup> As per Census 2011. The other top 4 cities are Mumbai, Delhi, Kolkata and Chennai

<sup>2</sup> Area under Bengaluru Development Authority for which Revised Master Plan-2031 (draft) has been prepared

<sup>3</sup> pph - persons per hectare

<sup>4</sup> Revised Draft Master Plan for Bengaluru-2031

<sup>5</sup> Business World, June, 2017

<sup>6</sup> Sustainable Transport Measures for Liveable Bengaluru, IISc Bangalore, April, 2018

<sup>7</sup> URDPFI Guidelines, MoUHA, 2014

services to Metro. BMTC is one of the most efficiently run city bus service in India. Road congestion and lack of bus priority lanes have resulted in lower average speeds and decline in ridership over the last few years. Bengaluru Metro Rail Corporation Limited (BMRCL) is implementing Metro Rail in Bengaluru. Phase-I over a length of 42.3 km is currently operational with a ridership of over 4 lakhs per day. Phase-II of Metro with a length of about 72 km is under implementation and there are approved plans to further expand the metro network by about 55 km. However, existing Metro rail system suffer from lack of safe and convenient access to transit stations, last mile connectivity, feeder services, multi-modal integration facilities and common ticketing for seamless mobility of people. Recently, major expansion of commuter rail project has been approved. Around 161 km commuter rail is being jointly developed by Indian Railways and Government of Karnataka.

- 1.5 Bus and Metro is supplemented by Auto rickshaws and Taxis. There are about 1.85 lakh auto-rickshaws<sup>8</sup> and about 1.57 lakh taxis<sup>9</sup> are operational in BMR. The share of aggregate taxis have been growing exponentially during last few years.
- 1.6 Rise in economic activities and income levels have fuelled the growth of private vehicles. As of May, 2018, Bengaluru has second highest number of registered vehicles in India i.e. 75.06 lakh<sup>10</sup> after New Delhi. The registered vehicles have been growing at an alarming rate of 9.9% per annum adding about 45.79 lakh new vehicles during the last decade alone. The steep growth in private vehicle had an impact on road fatalities and pollution. Bengaluru has recorded unacceptably 2938 accidents involving 4495 deaths and 1960 injuries during 2017. The pollution levels (i.e. PM10 and PM2.5) in the city have exceeded the prescribed standards causing health problems especially considerable rise in respiratory ailments. Among the 14 major cities study of commuting and emissions, Bengaluru is ranked third highest in overall emissions<sup>11</sup> and energy consumption after Delhi and Chennai.

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<sup>8</sup> RTO data (2018)

<sup>9</sup> RTO data (2018). It includes Motor cabs, Maxi cabs and others.

<sup>10</sup> In which 52.07 lakhs are two-wheelers and 14.49 lakh are cars

<sup>11</sup> As per CSE Report "The urban commute, and how it contributes to pollution and energy consumption", A CSE analysis and ranking of 14 cities in India, 2018. The 14 cities studied include Delhi, Mumbai, Kolkata, Chennai, Bengaluru, Hyderabad, Ahmedabad, Pune, Jaipur, Lucknow, Kochi, Bhopal, Vijayawada and Chandigarh. Kolkata and Mumbai emit least among six megacities due to high usage of public transport and walking; Kolkata also has short travel distances due to its compact form.

- 1.7 The limited road space<sup>12</sup> and lack of structured & connected road network<sup>13</sup> especially in rapidly growing areas exacerbated the situation and has led to lower travel speeds (i.e. about 10 kmph), longer commuting time, traffic congestion, road fatalities, vehicular pollution which in turn resulted in economic loss and had an adverse impact on the quality of life.
- 1.8 The current situation is unsustainable and therefore, there is a need for a paradigm shift in our urban and transport planning approach. Promotion of compact development and energy/space efficient travel modes is the need of the hour to achieve the sustainable mobility and allow optimum utilisation of public investments on transport and other basic infrastructure. The above is possible through Transit Oriented Development (TOD) which focuses on landuse transport integration and promotion of sustainable modes.

## **2 Scope and Applicability**

- 2.1 Bengaluru TOD policy shall come into force with immediate effect from the date of its official acceptance by Government of Karnataka.
- 2.2 The Policy is applicable for Bengaluru Metropolitan Region (BMR).
- 2.3 The policy is applicable for all the Local bodies, Departments, Agencies, Authorities, Parastatals and Companies that play a role in the planning, funding, implementation, management and monitoring of urban transport and landuse.

## **3 What is Transit-Oriented Development (TOD)**

- 3.1 Transit Oriented Development (TOD) is defined as the development of concentrated nodes of moderate-to-high density mixed landuse within 5 to 10 minutes of walking distance from mass transit stations. The nodes are planned and integrated around the transit stations as its core. In TOD approach, housing, employment, shopping and recreation are concentrated along a network of walkable and bikeable streets within 500 to 1000 m of the transit. TOD requires the development of mixed neighbourhoods which are well integrated with pedestrian, bicycle, feeder and transit networks.

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<sup>12</sup> The road density in Bengaluru is 8.2 km per sq.km whereas New Delhi has Road density of 21.6 km per sq.km. (Source : India Mobility Final Report by the Global Mobility Monitor Network)

<sup>13</sup> Traffic congestion in Whitefield and other growing areas can be attributed to in many ways due to large institutional areas and lack of secondary road network (Source : World Resource Institute (WRI))

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3.2 In TOD, transit station Influence area can be broadly classified as:

3.2.1 **Station Hub:** The area within 200 metres of the transit station includes the highest intensity of trip-generating retail, employment and commercial uses.

3.2.2 **Station Neighbourhood:** The area within 500 metres of the transit station is critical in the development of successful TOD. The 500 metre area represents a 5 to 6 min walk to the station.

3.2.3 **Area of Influence:** The area within 500 -1000 metres of the transit station influences the character of the station neighbourhood. The area represents a 10 to 12 min walk to station.

3.2.4 **Transition Area:** The area within 2000 metres of the transit station influences the character of the surrounding area and provides additional transit ridership through bicycles and feeder services. The area represents about a 10 min cycling distance to transit stations.

3.3 Transit stations are normally located within one km and therefore there is an overlap in the influence area and therefore upto 1000 m on either side of the mass transit corridors can be considered as TOD zone which can be further divided into three sub-zones for the purpose of application of TOD norms:

- a. **Intense TOD Zone** (500 m on either side of the transit corridor)
- b. **Standard TOD Zone** (500 m to 1000 m on either side of the transit corridor)
- c. **Transition TOD Zone** (1000 m to 2000 m on either side of the transit corridor)

3.4 Transit influence area (upto 1000 m from station) generates more than 90% of walk-up ridership. While Intense and Standard TOD zones shall be planned for higher densities and improved accessibility, the transition TOD zones shall be planned for improved accessibility for cycling and feeder services. The TOD influence zone is depicted in **Figure 3-1**.

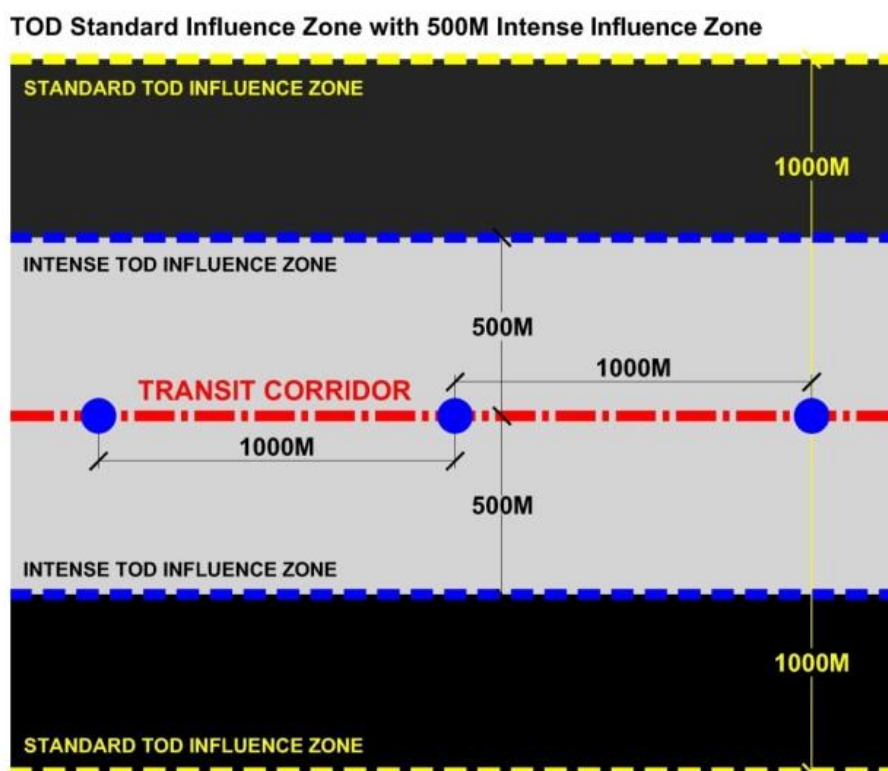


Figure 3-1 : TOD Zones

- 3.5 However, for Commuter Rail where the interstation distance varies from 1.5 km to 3 km, Intense and Standard TOD zone shall be designated as an area covering 400 m and 1000 m radius from the Commuter Rail Stations.

## 4 Components of TOD

- 4.1 TOD framework can be broadly explained through six components<sup>14</sup> (known as **6Ds**) which are important in achieving the TOD. These components are briefly discussed in this section and detailed TOD guidelines have been presented in **Section-9**.

- 4.1.1 **Density:** Density is defined as concentration of population/employment per hectare or sq.km. Higher population/employment density near transit stations will heighten convenience; reduce trip lengths and private vehicle use and results in higher patronage of sustainable modes i.e. walking, cycling and public transport. Various studies have shown that 10% increase in population or employment density results in 5% to 8% increase in transit ridership and therefore, TOD zones need to be designed to support high density development.

<sup>14</sup> Transit-Oriented Communities Design Guidelines, Creating more livable places around transit in Metro Vancouver, TRANS LINK, July, 2012



- 4.1.2 **Diversity:** Diversity is achieved by promoting the mixed landuse i.e. housing for diverse income groups and wide range of amenities within TOD zones. Diversity helps in achieving reasonable population to job ratio, availability of basic amenities within walking distance and reduces the trip lengths. Diversity reduces peak crowding on transit and enables spread of the travel demand throughout the day as well as either directions or thus in helps in optimal utilization of transit capacity.
- 4.1.3 **Design:** Good design creates lively environment that encourages walking and cycling and promotes the use of public transit for all age groups. Major aspects of design include complete street design with continuous pedestrian/biking environment, safe and smooth access to transit stations, active frontages, weather protection, multi-modal integration facilities, public art, landscaping, parks, benches, avenue trees, public meeting places and kiosks etc.
- 4.1.4 **Destination Accessibility:** Transit stations and surrounding road network need to be planned so as to facilitate access to wide variety of destinations such as homes, schools, work places, shops, service centres and recreational facilities. However, lack of accessibility to the transit system often discourages people from using the transit. Destination accessibility is achieved through (a) Inter-connected fine-grained street network (b) Multi-modal integration (c) First & Last mile connectivity (d) feeder services.
- 4.1.5 **Distance to Transit:** Distance to transit has substantial impact on viability and effectiveness of transit system. This component measures the proximity of the transit station from residential, work and shopping places. In view of above, direct routes to transit stations shall be developed.
- 4.1.6 **Demand Management:** Demand management focuses on optimal utilization of available transport infrastructure. These measures can be site specific within TOD zone or city-wide. Parking management, private vehicle restraining measures, reducing the need for travel, flexi-timings for offices, pedestrianisation and hawker management are some of the examples.

## 5 Advantages of TOD

5.1 The advantages of TOD are as follows:

- i. promotes compact development and supports walking, cycling and public transit and reduces private vehicle use and trip lengths
- ii. curbs the urban sprawl and saves precious agriculture lands
- iii. reduces pollution and energy consumption
- iv. enhances convenience by making available daily needs within walkable distance
- v. enhances quality of life and health of residents by promoting walking and cycling
- vi. incorporates affordable housing and promotes equity and prevents gentrification
- vii. allows optimum utilisation of transit networks and opens up avenues for value capture and increases the financial viability of transit
- viii. lowers the infrastructure cost. Typically, infrastructure cost on per capita basis is lower in TOD zones as compared to replicating similar infrastructure at outskirts to accommodate additional population
- ix. makes the city more liveable and resilient
- x. makes the city more competitive and promotes economic activities

## 6 Need for a Bengaluru TOD Policy

6.1 The population of the Bengaluru Metropolitan Region (BMR) is expected to double from 9.1 million in 2011 to 20.3 million by 2031. To accommodate the future population, it is not feasible to double the land requirement. In view of above, there is a need to optimise the available land and promote the compact development with augmentation of infrastructure. It is pertinent to mention here that traffic congestion is mainly caused by personal vehicles and inadequate road network. Population density is often blamed for congestion which is not true if served with high quality public transport. Thus, there is a need to define the appropriate density standards and plan mass transit network to accommodate future population sustainably.

6.2 The huge growth in population is resulting in urban sprawl. The city has been expanding at the rate of 39 sq.km per year<sup>15</sup> at peripheral areas which are not served by road and other infrastructure. The population growth in core areas has been declining where highest level of municipal services is available. This is uneconomical for the city. In this context, there is a need to evaluate the landuse policies in core areas.

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<sup>15</sup> Managing Urban Expansion, WRI

- 6.3 The current developments in Bengaluru are guided by provisions of Revised Master Plan-2015 (RMP-2015). To replace RMP-2015, Revised Master Plan-2031 (RMP-2031 Draft) has been prepared and is under consideration of state government for approval. RMP-2015 advocated high density, compact development of mixed use by introduction of ancillary use in development control regulations. However, it could not materialize as envisaged. RMP-2031 (draft) has adopted a divergent approach. As per approach, the area within outer ring road (i.e. Planning Area - A) has less scope for growth and high densities and crippled by congestion and pollution and therefore requires strategies to stabilise growth and interventions that discourage commercialisation of economic centres. Therefore, RMP-2031 has not proposed enhanced FSI in TOD Zone in Planning Area-A and enhanced FSI of 4 is proposed within 150 m on either metro in Planning Area-B (Area beyond ORR and upto conurbation area). RMP-2031 also proposes to add another 80 sq.km for urbanisation and thus encouraging urban sprawl.
- 6.4 While the Goals of RMP-2031(draft) is to develop adequate transport network with hierarchy, achieve landuse transport integration, promote TOD, increase public transport share, the intent is not supported by landuse strategies and development control regulations (DCRs). Therefore, regulations are not supportive of compact and connected development and appears to be no disincentive to build in peripheral areas despite service delivery issues<sup>16</sup>. In view of above, there is a need to re-orient the RMP-2031(draft) to the principles of transit oriented development. In this regard, separate chapter on TOD shall be included in RMP-2031(draft) clearly outlining the strategies for TOD supported development control regulations without any ambiguity.
- 6.5 Bengaluru is a medium density city with a gross population density of 70 pph in BDA area and 118 pph<sup>17</sup> in BBMP based on 2011 census. As per URDPFI Guidelines for Megapolis<sup>18</sup> gross population density should be more than 200 pph. A comparison of gross population density of Bengaluru with other 6 major metropolitan cities<sup>19</sup> reveals that only Greater Hyderabad Municipal Corporation (GHMC) has less density than BBMP and other cities have either almost same or higher densities.

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<sup>16</sup> Source : WRI

<sup>17</sup> Among 198 wards of BBMP, about 6 wards have gross density above 800 pph (which is 0.5% of total area of BBMP) whereas Ward-135 and 100 have maximum densities i.e. 1253 pph and 1001 pph. About 60 wards (73% of total area of BBMP) have gross density less than 150 pph and, only 13.9% and 8.0% of total area of BBMP have gross densities in the range of 150-250 pph and 250-400 pph, respectively.

<sup>18</sup> Settlement where population more than 1 Crore

<sup>19</sup> The Area and population densities of major Municipal Corporations in India : Mumbai (437 sq.km, 286 pph), Kolkata (205 sq.km, 219 pph), Chennai (426 sq.km,158 pph), Ahmedabad (467 sq.km,119 pph) and Delhi (1397 sq.km,118 pph), Hyderabad (650 sq.km,104 pph) and BBMP (712 sq.km,118 pph)

- 6.6 Bengaluru needs to align its landuse and transport policies as per National Urban Transport Policy (2014), National TOD Policy (2017), Metro Policy (2017) and guide the developments along the mass transit corridors to achieve the sustainable mobility.
- 6.7 There is a need to increase the public transport share from current 48% to 70% and enhance accessibility and mobility of people which is a pre-requisite for more liveable and resilient city. In this regard, huge investments are being made to expand the mass transit systems i.e. metro rail and commuter rail in Bengaluru. TOD policy promotes compact development and thus helps in achieving higher patronage of public transport. The above will help in optimum utilisation of public investments and opens up avenues for value capture from the investments made on mass transit.
- 6.8 Bengaluru TOD policy will serve as a guiding document for Government and Non-Governmental organisations to ensure that policies and schemes encourage TOD especially along the mass transit systems. The Policy will help in active participation of stakeholders in implementation of TOD.

## 7 Vision

- 7.1 Bengaluru will be a public transport oriented city that is compact, people friendly, environment friendly and support economic growth while offering a good quality of life.
- 7.2 Bengaluru will have a world class integrated mass transit network catering to more than 70% of motorised trips.
- 7.3 Walking and Cycling will become a preferred mode in Bengaluru for shorter trips and access/egress trips to public transit.

## 8 Goals

- 8.1 The broad goals of TOD Policy are as follows:
- 8.1.1 Combined Modal share of sustainable modes i.e. walk, cycling and public transport shall be 80% by 2031. The share of public transport shall be 70% in motorized trips<sup>20</sup>.
- 8.1.2 Around 60% of the population shall live within Intense TOD Zone. This may require about 600 km<sup>21</sup> of mass transit corridors<sup>22</sup>. The coverage of mass transit in core/dense areas shall be prioritized.

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<sup>20</sup> Current share of public transport is 48% in motorized trips

- 8.1.3 Population Density that can be accommodated along the Mass Transit corridors depends upon various factors including availability of infrastructure. However adequate infrastructure shall be developed so as to achieve the gross density ranging from 250 to 400 pph<sup>23</sup> along the Mass Transit corridors by 2031.

## **9 Policy Guidelines for TOD in Bengaluru**

### **9.1 Density**

- 9.1.1 Mass Transit corridors offer higher capacity and therefore TOD zones can accommodate higher population/employment density as compared to rest of the city. It is imperative to have a higher density along the mass transit corridors to achieve the landuse transport integration. This will ensure optimum use of the premium land located close to the transit stations.
- 9.1.2 TOD may happen based on green field development, infill development and redevelopment depending upon availability of land.
- 9.1.3 The gross density of up to 2 times of the city population density shall be allowed in TOD Zone depending upon location, availability of infrastructure, landuse zoning and transit capacity. This will result in gross density of 250 pph to 400 pph in TOD zone.
- 9.1.4 To accommodate higher population density higher built-up density shall be allowed in TOD zones. The built-up density is regulated through Floor Space Index (FSI). Further, population density can be controlled by specifying the Dwelling Units (DU) per hectare and specifying the size of the dwelling units for EWS and LIG etc.
- 9.1.5 The FSI in Intense TOD zone (upto 500 m from transit station) and Standard TOD zone (500m to 1000 m) shall be 50% and 25% more than that of base FSI. Thus a graded FSI which varies based on distance from transit station shall be adopted. In addition to above, Commercial areas shall be allowed higher FSI as compared to residential area for value capturing the investments for supporting the mass transit system.

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21 It is based benchmark of 0.03 km Mass transit per 1000 population (Source : Reimagining public transport in India, KPMG,Oct, 2017)

<sup>22</sup> Metro Rail/Commuter Rail/ BRTS designed for a minimum Peak Hour Peak Direction Traffic (PHPDT) of 10,000 or more is considered as Mass Transit

<sup>23</sup> pph- persons per hectare

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- 9.1.6 Further, higher FSI more than the above shall be allowed in Intense TOD Zone which may vary depending upon on infrastructure availability, landuse zoning and transit capacity etc., It shall be allowed subject to preparation and approval of Detailed Development Plan (DDP) or Zonal Plan of the station influence area.
- 9.1.7 Higher FSI shall be allowed for transit stations i.e. Metro, Commuter Rail etc., to allow composite development (station cum commercial development) except in heritage zones. Similarly, Bus Depots/Terminals and multi-modal hubs falling into TOD shall be given higher FSI. To optimise the space multi-level bus parking shall be allowed.
- 9.1.8 The additional FSI over and above the base FSI shall be treated as premium FSI and shall be charged as a percentage of Guideline value. The revenue shall be deposited in TOD fund for augmentation of infrastructure in TOD Zone.
- 9.1.9 The minimum plot size for availing the higher FSI based on the above in TOD zone shall be 1000 sq.m and the minimum road width shall be 18 m. For other plot sizes and road widths, minimum of 20% higher than the existing FSI shall be considered.
- 9.1.10 Relaxation in setbacks and coverage<sup>24</sup> shall be allowed wherever appropriate in TOD Zone.
- 9.1.11 Amalgamation and reconstitution of plots for utilization of higher FSI shall be encouraged with incentives such as no charges for approval of plans etc. Amalgamated plots on wider roads will be eligible for higher FSI.
- 9.1.12 Historical, cultural and environmental sensitive areas shall be exempted from densification. Aesthetics and preservation of cultural heritage and environment shall be paramount.
- 9.1.13 All vacant lands and public lands are developed and land banking shall be discouraged by levying vacant land tax<sup>25</sup> on underutilized land and/or underutilized FSI. This will ensure time bound densification. Vacant land tax shall be levied on land vacant lands including that are owned by Government bodies.

## **9.2 Diversity**

- 9.2.1 TOD zone shall be designated as mixed use zone. Low density and private vehicle oriented (e.g. petrol pumps, free parking) landuse shall be discouraged in the TOD

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<sup>24</sup> For example, in Bengaluru DCR, setbacks are relaxed to the extent of 25% for receiving plots utilizing the TDR

<sup>25</sup> Currently Vacant Land tax is in force in Mumbai, Chennai and Visakhapatnam. In case of plots where built-up area is less than 25%, then remaining land can be considered as vacant land and tax can be imposed.

zones. Mixed used development can be achieved by horizontal mixing i.e. separate activities in separate plots/buildings or vertical mixing i.e. combining different activities within the same building.

9.2.2 Transit stations shall be classified based on typologies such as predominantly residential, commercial, and institutional and transit node etc., and accordingly Station Area Plans / Zonal Plans shall be prepared. For example, transit stations in predominantly residential neighbourhoods will require a different mix of uses from transit interchange or major employment node. Thus, classification of transit stations based on typology helps in assessing mix of landuse that will optimise the level of densities.

9.2.3 The landuse that supports TOD shall be encouraged such as:

- Mixed landuse with high density development
- Affordable housing
- Employment nodes
- Recreational facilities/Malls
- Common parking for shared use

9.2.4 The landuse that does not support TOD shall be discouraged such as :

- Low density housing and low -rise development
- Free parking and Surface/Multi-level parking
- Petrol Pumps/CNG stations
- Automobile garages
- Warehouses
- Cremation grounds

9.2.5 Redevelopment of older areas enhances the population holding capacity and provides the adequate space for development of roads and other social amenities. The policies encouraging redevelopment shall be incorporated in development control regulations. Separate Redevelopment Cell shall be established within BBMP/BDA to focus on redevelopment projects. Land pooling can be adopted for redevelopment /revitalisation of inner city which works on the principle that potential increase in land value after reorganisation of plots.

- 9.2.6 Mixed landuse integrated development shall be promoted for large parcels of land (with combination of housing for various income strata, commercial development, road and other infrastructure).
- 9.2.7 The minimum size of the plot where mixed development shall be permissible is 5000 sq.m. The minimum width of the road shall be 18 m.
- 9.2.8 In order to promote mixed landuse in large plots, an additional 25% premium FSI over and above permissible FSI in Intense and standard TOD zone shall be allowed. However, charges for premium FSI shall be exempted for affordable housing projects. No charges for amalgamation of plots should be levied.
- 9.2.9 The mix of uses to be proposed shall be decided as per the local conditions and trends in the real estate markets. However, following minimum share of land use to be allocated for major landuse and remaining share of landuse shall be allocated as per the zoning plan/prevaling market conditions and demand of the city.
- Residential: 30%
  - Commercial and Public/Semi-Public: 20%
- 9.2.10 The mixed use development has to mandatorily incorporate affordable housing and open spaces/circulation areas.
- 9.2.11 In order to promote affordable housing<sup>26</sup>, out of the 30% of residential use, a minimum of 20% of the built up area shall be utilized for EWS (30-40 sqm) and LIG (40-60 sqm) housing. Further, if according to the Zonal Development Plan, the land-use to be developed is residential, out of the 50% of the remaining built up area, a minimum of 30% will be reserved for EWS and LIG housing.
- 9.2.12 Rental housing and offices, Hostels shall be encouraged along the TOD zones.
- 9.2.13 Existing slums<sup>27</sup> in TOD zones shall be upgraded or encouraged for in-situ rehabilitation. As an incentive for slum redevelopment, a TDR of 30 sqm per slum household shall be provided.
- 9.2.14 Open spaces<sup>28</sup> is critical to offset the impact of dense mixed use developments and improve environment and quality of life. Bengaluru has only 2.2 sq.m<sup>29</sup> of open space

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<sup>26</sup> As per RMP-2031, 60% of the total housing demand in affordable housing category (47% EWS and 13% in LIG Category) and further MIG and HIG housing demand is 15% and 25% respectively.

<sup>27</sup> Bengaluru Slum population is about 8% to 14% of the total population. There are 576 slums in BBMP as per RMP-31(draft) Volume-III



per person whereas URDPFI (2015) guidelines recommends minimum of 12 to 14 sq.m per person. Therefore, Development control regulations shall incorporate provisions for creation of open spaces for recreational purpose such as parks, playgrounds etc., For example, regulations may be framed to mandate the developer to allocate 10% of the land abutting the road for development of recreational facilities which are accessible to general public for the plot sizes more than 2500 sq.m<sup>30</sup>.

9.2.15 Some of the adverse effects of densification can be off-set by creating the adequate open spaces and clearly classifying the commercial activities<sup>31</sup> which can be allowed based on impact on the neighbourhood.

### 9.3 Design

9.3.1 Good built environment will encourage walking and cycling and promote the use of public transport. As per NMSH<sup>32</sup> parameters, streets shall be designed.

9.3.2 Universal access in design shall be adopted to ensure safety and accessibility to all with special attention to women, children, senior citizen and differently abled.

9.3.3 Green buildings shall be encouraged by incentives such as additional FSI of 10%, reduced processing fee and priority clearance from development authority.

9.3.4 Regular Audits of NMT Infrastructure shall be carried out and appropriate improvement measures shall be taken up.

9.3.5 Proven and innovative sustainable building, energy, water, landscape and waste management practices shall be implemented.

9.3.6 BMLTA shall prepare and adopt street design guidelines. It shall also prepare policy for pedestrians, NMT and parking to cater to the local context and ensure implementation by allocating funds and monitoring at regular intervals. This will help ready reference for various agencies involved planning, design and construction of various infrastructure elements within the city. All the contracts shall adhere to the adopted guidelines.

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<sup>28</sup> Parks, play grounds, areas under landscaping and avenue tree plantations

<sup>29</sup> As per Janaagraha, BBMP has 19 sq.km of parks/playgrounds in 709 sq.km.

<sup>30</sup> Chennai DCRs have such provisions. It is known as Open Space Reserve (OSR) land.

<sup>31</sup> For example, RMP-31 (Draft), classifies commercial areas into 6 categories based on the permitted use/activity. While Category-1 one comprising of petty shops which have the least impact on neighborhood and whereas category-3 comprises of restaurants, hotels etc.,

<sup>32</sup> Parameters for the National Mission on Sustainable Habitat (NMSH)- Report of the Sub-Committee on Urban Transport

## **9.4 Destination Accessibility**

- 9.4.1 The ROW available along the mass transit corridors is observed to be less than 18 m in many instances and therefore to accommodate vehicular traffic including buses, pedestrian, cyclists and other uses a minimum of 30 m is recommended. At metro stations, interchange stations, terminals and multi-modal hubs, 30 m from the transit station is recommended for station area development for circulation, feeder services etc. The above shall be included in the Development Plan.
- 9.4.2 Apart from TOD corridors, other major public transport corridors shall be identified and developed as Mobility corridors. The minimum of 25 m ROW shall be reserved for the purpose. These corridors can be developed phase-wise based on budget and other criteria.
- 9.4.3 The Development Authority or Local body shall endeavour to provide at least one road on each side of the transit station of minimum ROW of 15 m to act as a feeder road to the transit.
- 9.4.4 The Development Authority shall identify and declare ROW provisions of public transport corridors as discussed above and shall include in Development Plan.
- 9.4.5 Public agencies such as BBMP, BDA, BMTC and BMRCL shall acquire lands along the Mass transit corridors for development of public facilities. This land requirement is critical for success of transit oriented development. Land will be required for road widening to accommodate the pedestrians/cyclists, public transport buses and development of multi-integration facilities and hubs. The city roads need to accommodate fleet of about 14,000 buses by 2031<sup>33</sup> in addition to vehicular traffic.
- 9.4.6 Land for development of roads and other transport facilities needs to be procured through various means a) land acquisition through compensation to land owners b) TDR c) through development control regulations by declaring ROW of arterial and sub-arterial roads d) creation of open spaces and parks by mandating certain portion of land shall be used for public purpose in development control regulations d) land re-adjustment e) redevelopment g) Pooling of lands belonging to government agencies for development of public transport facilities through joint development model.

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<sup>33</sup> Estimated based on 70 buses per lakh population which is derived on best public transport oriented cities in the World. To accommodate the buses, the existing ROW is inadequate and Road widening will be required for public transport corridors with a minimum ROW of 25 m.

- 9.4.7 For new and redevelopment projects, maximum area of a block shall be kept as one hectare to ensure a good network of public streets, with priority for at-grade walking and cycling facilities. The length of any side of the block shall not exceed 150 m.
- 9.4.8 Hierarchy of multimodal integration is required to be defined and accordingly planning and designing of transport infrastructure shall be planned. First priority is to be assigned to pedestrians followed by bicycle, public transport and IPT and finally for private vehicles.
- 9.4.9 Multi-modal integration shall be achieved through physical connectivity, information integration and fare integration<sup>34</sup>. The aim is to achieve the smooth, comfortable transfers with least travel time.
- 9.4.10 Dedicated access shall be provided to Mass transit systems from either side of the station for safety of commuters.
- 9.4.11 High frequency feeder services in terms of regular buses, mini buses, Mini vans shall be provided by transit agencies depending upon the commuter demand. Since feeder services demand is thinly spread on many routes, it is preferable to run high frequency mini bus rather than standard buses. As feeder services are not as viable as trunk routes as their demand is mainly seen during peak periods, therefore a fixed fare (higher fare as compared to regular bus service) shall be adopted. The possibility of running the buses with smart cards without conductor shall be explored to reduce the staff costs.
- 9.4.12 In addition to BMTC feeder buses, transit agencies such as BMRCL should tie-up with IPT, taxi-aggregators and endeavour to provide feeder services at economical cost.
- 9.4.13 There is a need for rationalisation of BMTC buses running parallel to Metro services as well as regulation of shared para-transit services which compete with Metro. This will enable optimal utilisation of Mass transit capacity as well as other infrastructure. BMLTA shall be empowered to carry out the above tasks.
- 9.4.14 In general, Park and Ride facilities shall be developed within station area for all the transit stations. Larger park and ride facilities shall be developed at terminal stations as well as stations at outskirts where availability of land will not be a major constraint. This will enlarge the catchment of transit station beyond 2 km. Facilities for bicycle/two-wheeler parking shall be developed within 200 m radius of the transit

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<sup>34</sup> Common ticketing with integrated cashless fare collection system

station if land is not available within station area. Bicycle and two-wheeler parking shall be prioritized over car parking so as provide benefit to maximum no. of commuters.

- 9.4.15 Concessional parking rates for Bicycle parking shall be adopted to promote the use of bicycles as an access mode to transit. Integrated network of Public Bike Sharing Scheme (PBS) shall be implemented.

## **9.5 Distance to Transit**

- 9.5.1 Direct access to transit stations shall be provided by overcoming natural and landuse barriers.
- 9.5.2 Streets should form a fine-grained network, and be designed to be safe, comfortable and attractive for people to move around on foot and by bicycle.
- 9.5.3 Direct walking paths to be provided to transit stations without any detour e.g. walking paths through parks, walkways over water bodies, exclusive skywalks from major trip generators such as railway stations, bus terminals, malls, major institutions etc. The above facilities can be developed through joint development model by sharing the cost.

## **9.6 Demand Management**

- 9.6.1 The examples for demand management are parking management, congestion pricing and hawker management. Other measures of demand management includes flexi office timings, shift-wise schools<sup>35</sup> and reducing the need for travel i.e. work from home few days in a week etc., and encourage home delivery of consumer goods and groceries.
- 9.6.2 Free parking is an invitation to use the private vehicles which leads to inefficient utilization of limited space. Therefore, Parking supply in TOD influence zone shall be reduced and all the parking (on-street & off-street) demand should be managed with pricing.
- 9.6.3 On-street parking shall be prohibited within 100 m of the transit station except for freight delivery and pickup or drop-off and discourage and restrict on-street parking within 200 m of the metro station. Along the metro corridor, on-street parking shall be demarcated and allowed on the principle of pay and use. This will help in regulating

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<sup>35</sup> This is being implemented in Mumbai schools a) Morning shift b) Afternoon shift

the haphazard parking and accrue revenue to local body. On-street parking charges shall be higher than off-street parking to discourage parking on the streets. Long term parking shall be discouraged with higher parking charges. Similarly, peak hour charges shall be higher than off-peak parking charges. On-street parking slots shall not be continuous. Parking on both sides of the road for the same section of road shall not be allowed. The long term parking especially from shop keepers shall be managed with monthly passes. If there is a more demand than no. of slots, it should be auctioned. Atleast 5% to 10% parking space shall be reserved for bicycle parking depending upon the location. Residential parking shall be managed through residential associations through permit system. The BBMP can auction the designated on-street parking locations to private parties. BMLTA shall revise the parking fees every year based on consumer price index. Latest technologies such as parking meters, cameras which are connected to central control room, mobile apps shall be used for parking management.

- 9.6.4 Shared parking will optimise the available parking spaces for various uses by taking advantage of different peaks for different uses. Thus, shared parking increases the parking turnover. For example, on a typical working day residential parking is vacant during office hours whereas demand for office parking space peaks during the same time. However, security and parking management issues needs to be addressed for the acceptance of residential owners. Shared parking concept will be successful if the parking lots are developed on separate exclusive plots. Therefore, development control regulations should encourage development of exclusive parking lots by appropriate provisions.
- 9.6.5 Unbundling of parking<sup>36</sup> is an effective way of discouraging private vehicles and promoting the public transport. For example, as per Delhi Transport Department draft guidelines, all new projects - residential, commercial etc. at least 50% of equivalent car spaces (ECS) be provided as unbundled, shared parking facility. Parking is a “hidden cost” to the buyer who may or may not own a car. This would reveal the true cost of parking to end users and unsold parking spaces can be sold to other users. Therefore, buyers should be given the option to purchase an ECS-space separately during the application process for an apartment or commercial space.
- 9.6.6 There is a need to increase the supply of paid off-street parking facilities at strategic locations to contain the tendency of on-street parking. Shared parking shall be

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<sup>36</sup> Unbundling of parking implies separating the cost of parking from purchase price of residential or commercial unit or renting

developed at depots, terminals and multi-modal hubs etc. Registration of new cars shall be allowed subject to proof of having the parking facility at residence or shared parking facility of the community.

9.6.7 In TOD zone parking of 1.33 ECS<sup>37</sup> per 100 sq.m of development shall only be permitted.

9.6.8 Regulation of hawkers is important to reduce the encroachments and allow free flow pedestrians and vehicles. Some of the busy areas where intensity is very high local body can issue licences to regulate the no. of hawkers. In order to streamline the hawking activity, designated hawker locations shall be identified based on local context.

- a. Red Zone : No hawking allowed
- b. Amber Zone : Hawking is allowed during selected timings
- c. Green Zone : Hawking can be generally allowed

9.6.9 On-street parking is present in about 41%<sup>38</sup> of the road length in Bengaluru. Due to large scale on-street parking, investments in off-street parking is required. Option of development of multi-storied parking and mechanised parking through PPP shall be explored and BBMP shall prepare norms, guidelines for viability gap funding of such projects. In residential areas, communities shall be encouraged to develop common/shared off-street parking facilities to contain the on-street parking.

9.6.10 Use of financial tools for bringing about a change in the user behaviour shall be considered i.e. higher vehicle registration charges for new vehicles, parking charges and pollution taxes for old vehicles etc.

## **9.7 Augmentation of Infrastructure**

9.7.1 Mass transit systems will require less space and transport more people and can serve dense areas. It underlines the fact that congestion is caused by vehicle density and not the population density if adequate road infrastructure is developed. Dense development shall be allowed where infrastructure is already available or can be upgraded rather than developing new infrastructure at outskirts of the city.

9.7.2 Adequate provision of infrastructure is pre-requisite for transit oriented development. BMLTA in association with BBMP and other infrastructure agencies shall prepare a

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<sup>37</sup> ECS (Equivalent Car Space) of Car, 2-Wheeler, Cycle, Bus and Commercial vehicle is **1.0, 0.25, 0.1, 3.5 and 3.5** respectively.

<sup>38</sup> Bangalore Mobility Indicators (2010-2011) Study, Directorate of Urban Land Transport (DULT)

comprehensive plan integrating all the utilities, physical infrastructure and essential facilities such as roads, sewers, drainage, electric lines, green spaces, police post, fire post, electric sub-stations etc. The plans shall assess the carrying capacity of the existing infrastructure and the up gradation needed to meet the increased demand once TOD is implemented.

9.7.3 Some of the parameters that can be evaluated for assessing the carrying capacity of transport and other Infrastructure within TOD Zone are as follows:

- **Road:** (i) Share of land under transport and open spaces (ii) Share of government lands which can be utilized for development of transport infrastructure (iii) Existing capacity of roads and saturation levels<sup>39</sup> (iv) Road density<sup>40</sup> per hectare (v) no. of intersections per hectare (vi) Availability of footpaths of width min 1.5 m and more than 1.5 m (as percentage of road length) (vii) Synchronisation of signals and use of ITS.
- **Public Transport:** (i) Length of Bus routes (in Km) (ii) Length of Mass Transit routes (in Km) (iii) No. of Bus Stops/ Mass Transit stations/ Multi-modal transfer stations and hubs (iv) No. of Bus stops, auto stands, terminals/Multi-modal integration facilities.
- **Water:** (i) Length of water pipe line as a percentage of total road length (ii) Length of water lines by size (iii) Water supplied vs demand (iv) Hours of water supply (v) Capacity of water treatment facilities for future needs (vi) Metering of water (vii) percentage of water losses<sup>41</sup> (viii) adoption of water reuse technologies and systems
- **Sewerage:** (i) Length of sewer pipe lines as a percentage of total road length (ii) Capacity and length of sewer lines (iii) Generation of sewerage vs treatment.
- **Solid Waste management:** (i) System of waste collection and transport (ii) Identification of Land fill areas.
- **Storm water Drainage:** (i) Length of storm water pipe lines as percentage of total road length (ii) Capacity and length of storm lines.
- **Electricity:** Land for laying lines and substations.

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<sup>39</sup> Expressed in Volume/Capacity (V/C) Ratio

<sup>40</sup> Km per sq.km of area

<sup>41</sup> At present, around 49% of losses in distribution which is very high (Source : WRI)

- **Parks:** (i) Availability of open spaces for parks and playgrounds. (ii) Tree coverage and Avenue tree plantation<sup>42</sup>

9.7.4 Hierarchical, dense and connected road infrastructure is critical for TOD. Strategic road widening of Mass transit and public transport corridors shall be carried out in order to serve the mobility needs of city residents.

9.7.5 TDR is an effective tool to minimise land acquisition costs and time consuming acquisition process for road widening and development of public transit facilities. Therefore, attractive TDR<sup>43</sup> provisions shall be proposed.

## 10 Institutional Framework

10.1 TOD is a complex urban development project with time horizon spanning from short to long term involving multiple agencies who carryout functions such as policy making, financing, development and management of various infrastructure facilities.

10.2 The major agencies such as BBMP, BDA, BMRCL, BMTC, BWSSB, BESCOM, Traffic Police and RTO shall be involved in TOD project. In addition to above, PWD and NHAI shall be involved where mass transit passes through the state and national highways. Similarly, Indian Railways shall be involved for TOD along the suburban rail corridor. Bengaluru International Airport Limited (BIAL) shall be involved for Metro connectivity to Airport.

10.3 There is often a conflict in priorities among the various government agencies which needs to be resolved through co-ordination and consultations and all the agencies needs to be aligned to the principles of TOD which in medium to long run leads to sustainable mobility and urban development.

10.4 In order to co-ordinate with multiple agencies and aligning the agencies to TOD principals, there is a need for an umbrella organisation i.e. Unified Metropolitan Transport Authority (UMTA) with adequate powers to facilitate co-ordination, eliminate overlapping functions and ensure adequate provision of budget for the modes, integration of transport modes and research and awareness.

10.5 UMTA is recommended by National Urban Transport Policy, 2006 for million plus cities. In view of above, Bangalore Metropolitan Land Transport Authority (BMLTA) was created vide GO No. UDD 134 BMR 2006 (2) Bangalore 09.03.2007. However, BMLTA

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<sup>42</sup> Please refer for full details, “**Urban Greening Guidelines, 2014**”, Town and Country Planning, Government of India, Ministry of Urban Development

<sup>43</sup> Government of Karnataka has announced a new TDR Policy through GO no. UDD 283 BEMPUPRA 2015 dated 04.03.2015



has limited powers to facilitate co-ordination, planning and implementation of urban transport programs and could not play the role of UMTA as envisaged. Therefore, BMLTA needs to be given legislative anchoring<sup>44</sup> with adequate powers, funding and technical and managerial staff to discharge the functions of UMTA.

10.6 BMLTA was setup through Government Order. BMLTA need to be formed through comprehensive Act to be effective. BMLTA shall establish a committee to focus on TOD along the transit corridors. It shall be assigned following functions to achieve landuse transport integration in TOD zones.

- a) Policy formulation
- b) Strategic planning and programming
- c) Project preparation and approvals
- d) Regulatory functions
- e) Funding, PPP
- f) Oversee Implementation and monitoring
- g) Research, studies and Awareness

10.7 BMLTA shall make appropriate recommendations for regulation of private vehicles through appropriate policies.

10.8 Participation of private sector is critical for successful implementation of TOD projects. Therefore, BMLTA shall frame appropriate policies and guidelines for private sector participation.

10.9 TOD projects shall be monitored at regular intervals as deemed necessary by BMLTA. Based on the review, necessary decisions and actions to be taken by various agencies shall be indicated. The monitoring can be based on certain parameters related to landuse, transport and environment. These parameters shall be monitored through geographic information Systems (GIS).

10.10 BMLTA shall review the funding of TOD projects and take steps for mobilization of funds and encourage Public Private Participation (PPP). It shall laydown principles of sharing the revenue collected from various sources and ensure revenue is actually disbursed to all the agencies involved in TOD.

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<sup>44</sup> A comprehensive draft “Bengaluru Metropolitan Land Transport Authority Bill, July, 2018” is under discussion and likely to be passed by State Government soon.

- 10.11 There is a need for a capacity building in all the organizations in the area of urban planning, transport planning, economics, financing and PPP, real estate etc., to handle the TOD projects. Financing, PPP and real estate market dynamics are critical for success of TOD projects and therefore BMLTA shall build capacity in these areas.

## **11 Financing of TOD Projects**

- 11.1 Government of Karnataka has already taken progressive steps for innovative financing of Metro rail. The following innovative financing methods for resource mobilization through cess/TDR were envisaged while sanctioning Phase-II of Bangalore Metro of 72 km.
- 11.1.1 Levy of Cess and Surcharge under Section 18A of the Karnataka Town and Country Planning Act at 5% of the market value of land or land building in future Developments, to be credited to Metro Infrastructure Fund and to be shared by BMRCL, BWSSB and BDA at 65%, 20% and 15% respectively.
- 11.1.2 To extend the benefit of 4 FSI for all properties lying within a distance of 150 m<sup>45</sup> from the Metro alignment. To levy a cess of 10% in respect of residential buildings and 20% in respect of commercial buildings on the additional FAR granted in respect of Phase-I and Phase-II of the Metro Rail Project and the share among BMRCL, BBMP, BWSSB and BDA in the ratio of 60%, 20%, 10% and 10% respectively.
- 11.1.3 To allow BMRCL to issue TDRs in lieu of compensation for acquisition on of land for Metro Rail Project.
- 11.2 The various sources for value capture include charges for premium FSI, Development charges, one time betterment levy, transfer of development right (TDR), Cess on stamp duty and registration charges etc., Other potential sources of revenue include enhanced property taxes in TOD influence zone, Vacant land tax to discourage land banking etc.,
- 11.3 The revenue sources available for transit companies include property development, lease from commercial space, advertisement, multipurpose smart cards for ticketing etc.

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<sup>45</sup> The additional FSI of 4 up to 150 m from the metro alignment is not adequate and effective in aiding the transit oriented development. The additional FSI shall be extended upto 5 min to 10 min walking distance (upto 1000 m) from the Metro corridor. A graded densification can be followed upto 500 m (5 to 6 min walking distance) and 500 m to 1000 m (10-12 min walking distance) from the metro alignment.

- 11.4 Air rights of transit station areas are not utilized much in India over the Metro stations<sup>46</sup>. This need to be explored through various funding and development models with private sector. Commercial development over transit stations presents huge opportunity for revenue generation without need to invest on land. Transit stations being the prime locations, commercial property will yield attractive revenues through rentals and capital appreciation.
- 11.5 In order to discourage the private vehicles Cess on fuel, Cess on registration of new vehicles, green tax on older vehicles (more than 10 years) at city level shall be considered.
- 11.6 A strategy to collect revenues from TOD zones commensurate with funding required for infrastructure augmentation shall be framed.
- 11.7 Transit companies can also raise capital by floating tax free Bonds and loans from multi-lateral agencies like World Bank, ADB, JICA and EIB etc.,
- 11.8 It is recommended that separate TOD fund shall be created for infrastructure up-gradation/maintenance, enhancement of viability of transit systems etc. The fund should be in the form of escrow account; from which financing is to be provided to various agencies for the identified projects and balance can be used by ULBs for other development purposes such as public transport development and up-gradation. The above is in addition to city level Urban Transport Fund (UTF).

## **12 Implementation Strategy**

- 12.1 In order to achieve the stated vision and goals, an appropriate policy, institutional framework, funding and implementation strategy is required. BMLTA shall undertake planning, design, funding and oversee implementation of TOD projects. Actual implementation shall be carried out by respective infrastructure agencies such as BBMP, BMRCL, BMTCL, BMVSSB etc.
- 12.2 TOD Policies shall be incorporated in the Master Plan. Development Control regulations which are part of Master Plan shall be revised in line with philosophy of TOD. A separate chapter shall be incorporated on TOD in Master Plan<sup>47</sup> describing

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<sup>46</sup> However, In Navi Mumbai, CIDCO has developed commercial properties over 3 major suburban Railway stations i.e. Vashi, Belapur and Seawoods. While the first two stations are developed with Railways funded through surcharge in tickets, Seawoods Railway station is developed through PPP.

<sup>47</sup> For example, DDA has included separate chapter on TOD as part of Development Plan

overall objective, demarcation of TOD zones, Landuse and Transport strategy, provisions and incentives for promotion of TOD.

- 12.3 Within the TOD Zone, the carrying capacity of transport and other infrastructure shall be assessed through traffic and infrastructure assessment studies. Fire safety and Disaster management shall be given due consideration.
- 12.4 Redevelopment is critical for realizing the full benefits of TOD as significant stretch of mass transit systems pass through the older and dense catchment areas. Redevelopment makes the landuse relevant to the current times and maintains economic competitiveness. However, redevelopment is a slow and long drawn process. In order to focus on redevelopment, there is a need for a separate redevelopment cell as part of BBMP/BDA to identify, conceptualise, plan, implement and market the potential redevelopment projects in older and decayed neighbourhoods. This is often the only way to augment the infrastructure in core areas. It will allow intense use of land by replacing old dilapidated buildings and release the land for development of new residential/commercial facilities along with adequate roads, social amenities etc.
- 12.5 Violations of development control regulations are rampant in Indian cities due to lack of enforcement and political will. This is resulting in not only building more than what is planned but also results in huge revenue loss to local government. Therefore, GIS mapping shall be used with regular field verification and updating of information to identify the violations. This will bring in transparency and availability of rich source of useful information for monitoring real estate trends, forecast of revenue from value capture and accordingly plan the future development strategies. It is often seen that inadequate staff is deployed for field verification. Therefore, staff strength shall be increased.
- 12.6 Special Planning Authority status if given to a transit company in TOD Zones has several advantages such as faster planning, implementation and avoids delays due to various approval processes. For example, Hong Kong rapid transit railway system (known as MTR) acts as transit operator and real estate developer. MTR plays a significant role in the master planning and controlling the development process. In India, Maharashtra Metro Rail Corporation Limited (MMRCL) has been given the special planning authority status<sup>48</sup> for the specified areas of TOD zone in Nagpur.

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<sup>48</sup> Government of Maharashtra, Urban Development Department appointed MMRCL as the special planning authority under Maharashtra Regional and Town Planning Act, 1966 under section 40 on 11<sup>th</sup> June, 2018 in the respect of Metro Rail projects (Metro alignment, Station Buildings, Control Centres, Commercial Buildings/Residential Quarters and Property development etc.)

MMRCL need not take approval for any planning work related to metro alignment, stations and other buildings related to Metro etc. This shall be examined for Bengaluru.

- 12.7 Funding is critical for implementation of TOD project. The BMLTA shall prepare the broad resource plan clearly identifying various sources of revenues, rules for sharing of costs, benefits and risks among the stakeholders. This will ensure long term commitment of public agencies and private sector for implementation of TOD projects.
- 12.8 To implement TOD, capacity building in various organisations in the area of urban & transport planning, land administration, real estate and PPP shall be carried out.

### **13 Communication and Outreach**

- 13.1 Communication and Outreach programmes shall be primarily be carried by BMLTA in addition to local bodies and infrastructure agencies. BMLTA shall have a team for specific function of research, studies and dissemination of information. In this task, non-governmental organisations who are working in the area of sustainable transport shall also be involved.
- 13.2 Implementation of TOD projects can only be successful if the concepts of TOD and benefits are communicated to broader audience i.e. various stakeholders involved in landuse and transport planning, private developers and general public through workshops, consultations and market outreach programs through print, electronic and social media. These programs shall be conducted at city level as well as station level. This will provide useful inputs while planning, designing and implementation of TOD policies and programs.
- 13.3 BMLTA shall prepare and disseminate the good practices, city specific policies and standards to various implementation agencies.
- 13.4 BMLTA shall conduct workshops and organise training programmes in TOD for public officials who are involved in various aspects of urban and transport planning to enhance the expertise and facilitate better planning and implementation.
- 13.5 Atleast 0.5% of the annual budget of TOD shall be earmarked for communication and outreach programs.

**Annexure to  
Draft Bengaluru Transit Oriented Development Policy,  
February, 2019**

5th February, 2019



**BMRCL**

The Annexures supplements the Draft Bengaluru TOD Policy with additional information

## **Annexure-A: Approach of RMP-2015, RMP-2031 and Draft TOD Policy**

### **1. Approach of Revised Master Plan (RMP-2015)**

#### **i. Approach**

- Preserve western belt
- Open up development in North/South Direction
- Promote IT related developments on South-East direction
- High density compact development of mixed land-use.
- Introduced a) Mutation Corridor b) Commercial Axis c) Residential (mixed)

#### **ii. Observations:**

- Population grown more than anticipated in the Plan for example projected population of BMA is 8.01 million for 2011 while the realized population is 9.1 million
- FSI of 4 is allowed 150 m on either side of Metro corridor irrespective of landuse, road width and plot size. This incentive could not be utilized due to various constraints. The provision of TOD zone as 150 m on either side of Metro corridor is adhoc and not based on any criteria.
- Compact, dense development could not happen as envisaged rather resulted in urban sprawl. Development happened where there is no provision of infrastructure.
- Mixed landuse is encouraged through ancillary use

### **2. Approach of Revised Master Plan (RMP-2031) (Draft)**

#### **i. Vision**

A liveable and well governed Bengaluru premised on efficient mobility and vibrant ecology

#### **ii. Goals of RMP-31 related to Mobility**

1. Transport Network and hierarchy
2. Land-use and Transport Integration
3. Increase the share of Public transport
4. Promote TOD
5. Incentivize the battery operated vehicles

#### **iii. Transport Strategy RMP-31**

1. Pre-eminence of PT & NMT
2. Demand Management
3. Land-use Transport Integration
4. PT share target : 50% in all trips (70% in motorised trips)
5. To bring 20-25% of planning area under TOD (Note : TOD zone is not defined)
6. Reorganise interstate bus and rail hubs
7. Promote NMT (walk, Cycle) by providing adequate infrastructure

**iv. Division of Planning Areas**

**a. Planning Area A: comprises of the innermost core falling within BBMP ( Area falling within ORR)**

- Little scope for growth due to high densities
- Crippled by congestion and pollution
- Requires strategies stabilizing growth and interventions discouraging commercialization of economic centres

**b. Planning Area B: areas between outer ring road and Conurbation limit of RMP-2015**

- Numerous lakes/water bodies
- Infrastructure availability is poor along with narrow roads
- Improvement in infra needed to hold more population
- Considered as Zone of Consolidation

**c. Planning Area C: outermost zone from conurbation limits till BMA boundary**

- Agricultural lands
- Considered as Zone of Preservation

**i. Growth Strategies**

Three growth scenarios were developed for BMA i.e. Containment Scenario, Corridor Driven Scenario which is TOD scenario and Differential Strategy Scenario. Finally based on the evaluation, **Differential Strategy Scenario** was adopted. The three scenarios are briefly described below.

**a. Confinement Policy**

- Confining all new developments in BBMP with higher densities
- Prohibiting developments in existing villages
- Population forecast is 15.4 million by 2031
- Population density in BBMP and rest of BMA is 190 pph and 38 pph respectively
- Projected public transport share is 66.5% (in motorised trips)
- No major challenge in meeting the demand supply of infrastructure facilities

**b. Corridor driven Growth Strategy**

- High density major ring and radial roads
- Areas within 500 m of Metro/CRS will be eligible for higher FSIs which is expected to result in high rise, high density developments
- Promotes commercialization of the core city (within outer ring road) and promotion of economic activities along ring and radial roads
- Population Forecast is 24.7 million by 2031
- Projected public transport share is 68.3% (in motorised trips)
- High FAR in the core part of the city likely to further commercialize the core and all the transport corridors which is not desirable
- Water demand is difficult to meet



**c. Differential Strategy Scenario**

- Aims to minimise commercialisation in the city core and promote economic activities along the periphery of BMA
- Additional agricultural land of 80 sq.km required for urbanisation
- Focus on development adjacent Local Planning Area (LPA)
- Population forecast is 20 million by 2031
- Projected public transport share is 66.6% (in motorised trips)
- Developments in outskirts so that need to travel to core city will be avoided
- With dual pipe system, reducing unaccounted-for-water (UAW), sufficient water can be supplied

**i. Observations**

- Intent is not supported by landuse strategies and policies on TOD and rather encourages urban sprawl
- The possibility of infrastructure augmentation to accommodate more population is not explored
- The plan did not review the case studies of Indian cities where much higher densities are accommodated.
- Not defined the density norms in terms of population per hectare or Dwelling Units per hectare (DU)
- FSI of 4 is only proposed 150 m on either side of Metro corridor/Peripheral ring road in Planning Area - B i.e. beyond ORR. Suburban Railway corridor is not considered. Unless Mass transit is proposed higher FSI shall not be allowed along the peripheral ring road which will only encourage personal vehicles for mobility.
- The Plan estimates around 15,000 buses will be required by 2031 but did not check the adequacy of the road network to accommodate the future bus fleet requirement.

### **Not static Master Plans but evolving Ecosystems**

The dominant tool of managing urban development in India has been that of master planning, which prescribes land use and densities. Master planning is a static concept. In a rapidly urbanizing country, physical planning has to be dynamic, adaptive, iterative and continuous process of anticipating population dynamism and managing socio-economic changes taking place.

Town planning practices in India are based on principles and models of the West. The West did not grapple with the problem of rapid urbanization on the scale India is now facing. The emphasis of urban planning has to shift from land-use planning to guiding complex, inter-related processes of socio-cultural, demographic and economic change.

A city consists of many systems (i.e. energy, transport, water supply, waste management, education, health, commerce, socio-cultural activity, etc.). These systems interact and form an evolving 'system of systems', which generates complexity in cities. The ecosystem approach views the city as being more than the sum of its parts. Contrast this with the old approach that insisted on neatly zoned silos. Thus, the new approach is much more sympathetic to mixed use, and adapting to changing use patterns.

**The principle is to deal with cities as evolving, organic ecosystems, with greater attention to the series of transitions that the city undergoes over time. Mixed and changing land uses are considered a natural part of urban management.**

This approach implies constant feedback-based adjustment. Data science and GIS are necessary tools for dealing with the system-of-systems approach. However, active leadership and public participation are crucial to the success of such an approach.

**Source : National Urban Policy Framework, 2018, Ministry of Housing & Urban Affairs**

## Annexure-B: Review of Population Densities of Indian cities and Comparison with Bengaluru

### 1. Population Density of Metropolitan Cities in India

- Bengaluru is a medium density city with a gross population density of 70 pph in BMR area and 118 pph in BBMP. As per URDPFI Guidelines for Megapolis gross population density should be more than 200 pph
- Based on city gross density, Bengaluru ranks 4<sup>th</sup> among the major metropolitan cities with a gross density of 119 pph; behind Mumbai, Kolkata and Chennai
- Comparing the city core densities, Mumbai dominates the scenario with 460 pph followed by Delhi (391 pph) and Chennai (270 pph) whereas Bengaluru city core has density of only 214 pph

**Table 1: Population Density of Indian Metropolitan Cities**

No.	City	Corporation	Population (In Lakhs)	Area (sqkm)	Density (pph)	Core Area Density (pph)	Core Area (in sq.km)
1	Mumbai	MCGM	124.78	437	286	460	67.7*
2	Kolkata	KMC	44.96	205	219	219	205
3	Chennai	GCC	67.27	426	157	270	176**
4	Bengaluru	BBMP	84.25	712	118	214	216***
5	Delhi	MCD	164.19	1397	118	391	22.74****
6	Hyderabad	GHMC	67.31	650	104	232	172.6*****

\*South Mumbai

\*\*Erstwhile Chennai Corporation

\*\*\*Planning Area 01 to 08. The density of population within ORR is 229 pph

\*\*\*\*Delhi Zone A & B (City Core and Core Extension) - Excluding NDMC

\*\*\*\*\*Area of the Twin Cities i.e. Hyderabad and Secunderabad

### 2. Population Density Distribution in BBMP

- Among 198 wards of BBMP, about 6 wards have gross density above 800 pph (which is 0.5% of total area of BBMP) where Ward-135 and 100 have maximum densities i.e. 1253 pph and 1001 pph, respectively
- About 60 wards (73% of total area of BBMP) have gross density less than 150 pph and, only 13.9% and 8.0% of total area of BBMP have gross densities in the range of 150-250 pph and 250-400 pph, respectively
- Bengaluru Metro (Phase-I) passes through 29 BBMP wards that have an average gross density of 234 pph. The maximum density is observed in Ward-76 (554 pph), followed by Wards-121 (467 pph) and 124 (415 pph) whereas the minimum density have been observed in Wards-111 (57 pph), 110 (63 pph), 38 (71 pph) etc.
- Based on the above discussion, there is a scope for densification in many wards where minimum TOD threshold density of 250 pph is not achieved.
- For wards, where population density is crossed over 1000 pph, focus should be on redevelopment (for older areas) and augmentation of infrastructure.

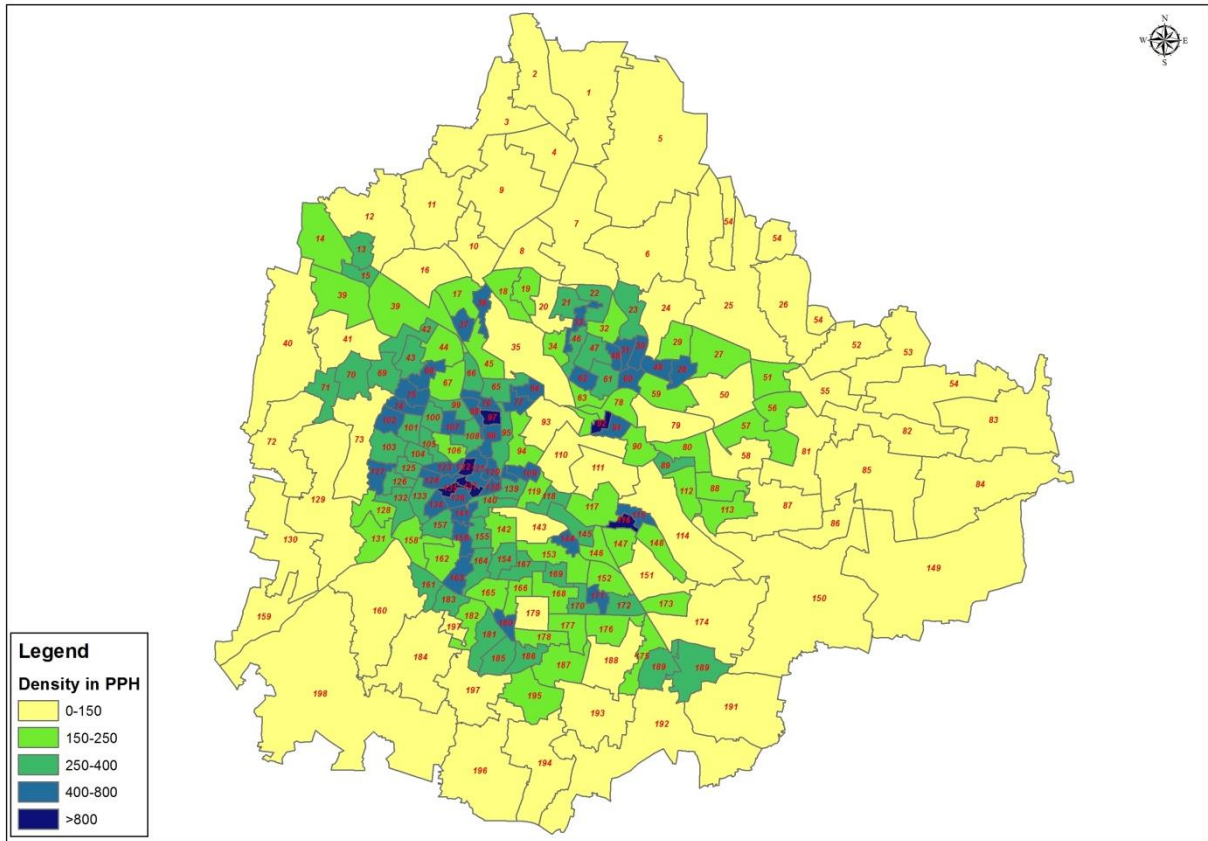


Figure 1: Population Density in BBMP (2011)

### 3. Case for Higher Population Density for Bengaluru

- In spite of higher population densities, Mumbai and Kolkata have been emitting least pollution among the six metropolitan cities in India as per CSE study (2018). Therefore, provision of public transport is critical for sustainable mobility.
- Constraining the population density will result in urban sprawl and results in longer trip lengths and more private vehicle use which results in huge economic loss to the city.
- Presently, the gross density of BBMP is about 119 pph whereas for the city core and its surrounding areas the density is about 214 pph, which is less than URDPFI standards for Megapolis. Also, it has been observed that Bengaluru is expanding at 36 sq.km per annum to accommodate demand for space for urbanisation. In view of above, there is a need to prepare the zonal plans to optimize the density and promote redevelopment of older areas.
- As per NMSH (National Mission on Sustainable Habitats, 2011), 175 pph of developed land has been considered as the minimum urban density that supports mass transit systems and 250 du/ha (1025 pph) has been considered for gross residential density
- Delhi TOD Policy states that in order to avail FSI of 4.0, a minimum gross residential density of 600 du/ha (2750 pph) shall be required.
- Nagpur TOD policy states that minimum gross density of 200 du/ha (800 pph) for availing the 4 FSI.

Almost all Indian cities are crowded and congested, especially in the historic core of the city. The response so far has been to “decongest” by limiting density through Master Plan, which has proved to be both ineffective as well as expensive. The old approach has led to the development of far-off suburbs. In turn, this has created urban sprawls that use up a lot of land, and put a heavy burden on infrastructure systems that have to cover a much larger expanse than is necessary or feasible. This is also linked to increasing commute times and traffic congestions.

**The principle is to anticipate and accommodate density. Proximity to transit or to clusters of human capital naturally attracts higher densities. In new areas, in particular, infrastructure should be pre-built to accommodate high density. International experience shows that if sufficient infrastructure is installed, even dense urban environments can support a high quality of life.**

**Density is critical for Public Transport:** Allowing higher density is not just an expedient solution for the problem of accommodating a large number of people, it is critical for efficiently running many forms of infrastructure such as public transport and allowing for efficient and safe non-motorized transport options. The efficiency and economic viability of safe and accessible public transport systems get severely compromised by urban sprawls. Indeed, multi-modal public transport systems are directly predicated on urban density in order to provide enough throughputs for the network. This is even truer for a world where we may be sharing and renting transportation solutions using digital platforms.

**Density is not bad for Quality of Life:** The current Indian approach views decongestion as the best way to improve Quality of Life. This may be a leftover of the colonial era disdain for the Indian bazaar in contrast to the ordered civil lines of British rulers. However, some of the most successful 21<sup>st</sup> century cities in the world are very dense – Hong Kong, Shanghai, Tokyo, New York and so on. The issue is whether or not the infrastructure can support the density. This is why Indian cities should build the infrastructure for density (incidentally, it is much cheaper to build a concentration of infrastructure than build the same spread over a large area). Note, however, the desired level of density will depend on context; the optimal density will be very different in Mumbai and Allahabad, and may be different for different parts of the same city. It is needless to say that Floor Space Index (FSI/FAR) regulation should be linked with infrastructure investment. In Seoul, as in New York and Singapore, city planners have been very selective in designating FSI levels so that they are closely aligned with infrastructure (mainly transit capacity but also water and sanitation, pedestrian flows) and policies to develop commercial as well as mixed commercial and residential activity centers

**Source: National Urban Policy Framework, 2018, Ministry of Housing & Urban Affairs**

## Annexure-C: Floor Space Index (FSI) and other Development Control Norms of RMP-2015 and RMP-2031

### 1. As per RMP-2015 & 2031

- No density standards have been prescribed in Development Control Regulations
- Existing DCR (RMP-2015) proposes 4.00 FSI for a distance of 150 m from the Metro alignment. (Not based on any reasonable criteria or best practice). Existing DCR have same FSI for residential and commercial areas
- Higher FSI not realizable due average plot sizes and road widths in the city. High base FSI has hampered effective utilization of TDR (RMP-2015)
- RMP-2031 suggests that areas falling within 150 m radius from the metro stations or terminals (only in Planning Zone B), a maximum of 4.00 FSI within the 150m zone may be permitted for all permissible uses

### 2. Development Control Regulations as per RMP-2015

Table 2: FAR for various land-uses as per RMP-2015

Land-Use	Plot Size (sqm)	Road Width (m)	Ground Coverage	FAR
Residential				
Main	Upto 360	Upto 12.0	75%	1.75
	360-1000	12.0-18.0	65%	2.25
	1000-2000	18.0-24.0	60%	2.50
	2000-4000	24.0-30.0	55%	3.00
	4000-20000	Above 30.0	50%	3.25
Mixed	Upto 20000	Upto 12.0	70%	1.75
		12.0-18.0	65%	2.25
		18.0-24.0	60%	2.50
		24.0-30.0	55%	3.00
		Above 30.0	50%	3.25
Commercial				
CBD	-	-	75%	2.50
Business	Upto 12000	Upto 9.0	55%	1.50
		9.0-12.0	50%	1.75
		12.0-18.0	50%	2.25
		18.0-24.0	45%	2.50
		24.0-30.0	40%	3.00
		Above 30.0	40%	3.25
Mutation Corridor	Upto 12000	Upto 30.0	55%	2.75
		Above 30.0	50%	3.25
Commercial Axes	Above 240	Upto 15.0	Based on the main land-use	

Land-Use	Plot Size (sqm)	Road Width (m)	Ground Coverage	FAR
Above 15.0				
Public/ Semi-Public				
	Upto 500	-	-	1.50
	Upto 1000	-	-	1.75
	1000-2000	-	-	2.00
	Above 2000	-	-	2.25
Transportation				
	Upto 500	-	60%	1.00
	Upto 1000	-	55%	1.25
	1000-2000	-	50%	1.50
	Above 2000	-	45%	1.50

Table 3: Setbacks for various land-uses as per RMP-2015 (for plots upto 4000 sqm)

No.	Building Height	Front (m)	Rear (m)	Right (m)	Left (m)
1	Below 11.5 (Width of site upto 6m)	1	0	1	1
2	Below 11.5 (Width of site upto 6-9m)	1	1	1	1
3	Below 11.5 (Width of site above 9m)	12%	8%	8%	8%
4	11.5-15.0	5	5	5	5
5	15.0-18.0	6	6	6	6
6	18.0-21.0	7	7	7	7
7	21.0-24.0	8	8	8	8
8	24.0-27.0	9	9	9	9
9	27.0-30.0	10	10	10	10
10	30.0-35.0	11	11	11	11
11	35.0-40.0	12	12	12	12
12	40.0-45.0	13	13	13	13
13	45.0-50.0	14	14	14	14
14	Above 50.0	16	16	16	16

### 3. Development Control Regulations as per RMP-2031

Table 4: FAR for various land-uses as per RMP-2031

Plot Size (sqm)	Road Width (m)	Ground Coverage	Base FAR	TDR	Total FAR
<b>Residential</b>					
<b>Planning Zone-A</b>					
Upto 60	Below 6.0	75%	1.50	-	1.50
60-120	6.0-9.5	75%	1.50	-	1.50
120-240	9.5-12.5	70%	1.50	-	1.50
240-360	12.5-15.5	70%	1.50	-	1.50
360-750	15.5-18.5	65%	1.80	0.45	2.25
750-2000	18.5-24.5	60%	1.80	0.60	2.40
2000-4000	24.5-30.5	50%	1.80	0.70	2.50
4000-20000	Above 30.5	40%	1.80	0.90	2.70
<b>Planning Zone-B</b>					
Upto 60	Below 6.0	75%	1.50	-	1.50
60-120	6.0-9.5	75%	1.50	-	1.50
120-240	9.5-12.5	70%	1.80	-	1.80
240-360	12.5-15.5	70%	1.80	-	1.80
360-750	15.5-18.5	65%	2.00	0.4	2.40
750-2000	18.5-24.5	60%	2.00	0.70	2.70
2000-4000	24.5-30.5	50%	2.00	1.00	3.00
4000-20000	Above 30.5	40%	2.00	1.20	3.20
<b>Commercial</b>					
<b>Planning Zone-A</b>					
Upto 12000	Below 9.5	60%	1.20	-	1.20
	9.5-12.5	60%	1.20	-	1.20
	12.5-18.5	50%	1.00	0.50	1.50
	18.5-24.5	50%	1.50	0.60	2.10
	24.5-30.5	40%	1.50	0.75	2.25
	Above 35.0	40%	1.50	0.90	2.40
<b>Planning Zone-B</b>					
Upto 12000	Below 9.5	60%	1.50	-	1.50
	9.5-12.5	60%	1.50	-	1.50
	12.5-18.5	50%	2.00	0.60	2.60
	18.5-24.5	50%	2.00	0.80	2.80
	24.5-30.5	40%	2.00	1.00	3.00



Plot Size (sqm)	Road Width (m)	Ground Coverage	Base FAR	TDR	Total FAR
Above 35.0		40%	2.00	1.20	3.20
<b>Public/ Semi-Public</b>					
Upto 500	-	60%	-	-	1.50
Upto 1000	-	55%	-	-	1.75
1000-2000	-	50%	-	-	2.00
Above 2000	-	45%	-	-	2.25
<b>Transportation</b>					
Upto 500	-	60%	-	-	1.0
500-1000	-	55%	-	-	1.3
1000-2000	-	50%	-	-	1.5

Table 5: Minimum front setbacks for various land-uses as per RMP-2031

<b>Minimum Front Setbacks</b>			
No.	Road Width (m)	Front Setback (m)	Building Line from Road Centre
1	6.0	1	4.0
2	7.5	1	4.8
3	9.0	1.75	6.3
4	12.0	2	8.0
5	15.0	2.5	10.0
6	18.0	3.5	12.5
7	24.0	3.5	15.5
8	30.0	4	19.0
9	45.0	6	28.5
10	60.0	6	36.0

Table 5: Minimum all around setbacks for various land-uses as per RMP-2031

No.	Max. Floors	Height (m)	Plot Area (sqm)	Front (m)	Rear & Sides (m)
1	G+1	Below 9.5	Upto 60	1.0	0.5
2	G+1/S+2		60-120	1.0	1.0
3	G+2/S+3	9.5-12.5	120-240	2.0	2.0
4	G+3/S+4	12.5-15.0	-	3.0	3.0
5	G+4/S+5	Below 15.0	-	4.0	4.0
6	G+5	15.0-18.0	-	6.0	6.0
7	G+6	18.0-21.0	-	7.0	7.0
8	G+7	21.0-24.0	-	8.0	8.0
9	G+8	24.0-27.0	-	9.0	9.0

No.	Max. Floors	Height (m)	Plot Area (sqm)	Front (m)	Rear & Sides (m)
10	G+9	27.0-30.0	-	10.0	10.0
11	G+11	30.0-36.0	-	11.0	11.0
12	G+13	36.0-42.0	-	12.0	12.0
13	G+15	42.0-48.0	-	13.0	13.0
14	G+17	48.0-54.0	-	14.0	14.0
15	G+19	54.0-60.0	-	15.0	15.0
16	Above G+19	Above 60.0	-	16.0	16.0

#### 4. Other Provisions of RMP-2015

##### RMP-2015: Integrated Township

- Minimum Plot Area required: 40 Ha
- Permissible usage: Residential-40%, High Tech-55% and Commercial-5%
- Minimum Road Width requires is 18 m
- 10% of total area to be reserved for parks and open space and 5% of total area to be reserved for public and semi-public

#### 5. Other Provisions of RMP-2031

##### Area Re-Development Scheme

- Additional FSI of 0.5. above the permissible shall be applicable for i) Plot area upto 5 Ha and min. access road width of 15 m, ii) Plot area above 5 Ha and min. access road width of 18 m
- Regulations to be based on non-residential development plans
- Mandatory Traffic Impact Assessment

##### Slums and EWS Housing

- Applicable on land earmarked for residential, commercial, industrial and PSP use
- Max. Ground Coverage: 60%
- Base FSI: 1.50-3.50 (Based on Planning Zones and Site Area)
- Min. 60% of the total built-up area shall be towards Affordable/ EWS Housing
- Schemes on roads of 18 m and above, additional FSI of 0.50 shall be applicable on TDR basis for PPP and free of cost for urban local bodies

##### Integrated Township

- Minimum Plot Area: 25 Ha
- Max. Permissible Land-use: Residential-40%, Economic-55% and Commercial-5%
- Minimum Road Width: 24 m
- Minimum Internal Road Widths: 18 m
- 10% of total area to be reserved for parks and open space and 5% for public and semi-public use
- Ground Coverage: 30-45% and FSI: 3.0-4.0

- Smart City Guidelines to be integrated
- Mixed Development is encouraged in RMP-2015 through ancillary use

#### **Integrated Development Plan**

- Minimum Plot Area: 5-10 and 10-25 Ha
- Max. Permissible Usage: Residential-80% and Commercial/ Economic-20%
- Minimum Road Width: 18 and 24 m
- Minimum Internal Road Widths: 12 and 15 m
- 10% of total area to be reserved for parks and open space and 5% for public and semi-public use
- Ground Coverage: 30-50%
- FSI: 2.4-4.0
- Smart City Guidelines to be integrated
- EWS Housing: 5% of total site area x ratio of residential built up to the total built up

#### **Road Development Strategy**

- Demarcation of Master Plan Road (18 m or above) on Ground
- Up-gradation/Widening of existing roads
- Development of New Links
- Preparation of Parking plans for streets and areas

## 6. Comparison of Existing and Proposed FSI (as per TOD Policy)

- As per RMP-2015, the FSI for residential and commercial ranges from 1.50 to 3.25. As per the proposed TOD policy where 50% in Intense TOD Zone and 25% in Standard TOD Zone of additional FSI is permitted for plots above 1000 sqm and located on or above 18m roads and 20% for plots below 1000 sqm and located below 18 m roads , the proposed FSI ranges from 2.00 to 5.00.

**Table 7: Existing and Proposed FSI as per Proposed Bengaluru TOD Policy**

Residential					
No.	Plot Size (sqm)	Road Width (m)	Existing Permissible FSI	Permissible FSI as per TOD Policy	
				Intense	Standard
1	Up to 360	Up to 12m	1.75	2.00	
2	360-1000	12-18	2.25	3.00	
3	1000-2000	18-24	2.50	4.00	3.25
4	2000-4000	24-30	3.00	4.50	3.75
5	4000-20000	Above 30	3.25	5.00	4.25
Commercial (Business)					
No.	Plot Size (sqm)	Road Width (m)	Existing Permissible FSI	Permissible FSI as per TOD Policy	
				Intense	Standard
1	Upto 12000	Less than 9	1.50	2.00	
2		9-12	1.75	2.50	
3		12-18	2.25	3.00	
4		18-24	2.50	4.00	3.50
5		24-30	3.00	4.50	4.00
6		Above 30	3.25	5.00	4.25

## 7. Comparison of FSI in TOD Zones in Indian Cities

- Typically FSI along the TOD corridor influence zone across Indian cities is 4.00. Only Delhi and Mumbai have adopted the concept of station level FSI; 4.0 in Delhi and 8.00 in Mumbai. Chennai as such does not have a dedicated TOD influence zone and the FSI is uniform throughout CMA (Chennai Metropolitan Area). FSI in TOD zones in cities like Delhi, Mumbai, Ahmedabad and Gurgaon, does have any co-relation with plot sizes and adjacent road widths whereas cities like Chennai, Pune, Nagpur and Lucknow have specified the criteria to avail higher FSI.

Table 8: Permissible FSI in TOD Zones in Indian Cities

No.	City	FSI		FSI for TOD Zone	Remarks
		Residential	Commercial		
1	Delhi	1.20 - 3.50	1.20 - 3.50	Corridor Level: 4.00 Station Level: 6.00	Station Level FSI may vary as it is based upon the Local Area Plans prepared by the local authorities for each transit station
2	Mumbai	2.50 - 3.00	3.00 - 5.00	Station Level: 2.00-8.00	FSI for TOD Zone shall be based upon the Station Area Development Plans approved by the local authorities
3	Chennai	2.00 - 3.62	2.00 - 3.62	Uniform FSI throughout CMA 4.87	Minimum Plot for MSB is 1200 sq.m and 18 m Road Premium FSI is 50% base FSI (18 m or above Road), 40% for 12 m to 18 m Road 30% 9m to 12 m Max. premium FSI is 1.62 Total FSI = 3.25+1.62 = 4.87
4	Pune	1.10 - 2.00	1.10 - 2.00	4.00	Min Plot Size 4000 sq.m / Minimum road width is 30 m
5	Ahmedabad	0.30 - 2.70	1.80 - 2.70 CBD - 5.40	4.00	Maximum FSI provided has no correlation with the plot size and adjacent road hierarchy
6	Gurgaon	1.40 - 2.20	1.75 - 2.00	2.50 - 3.50	Maximum FSI provided has no correlation with the plot size and adjacent road hierarchy
7	Nagpur	1.50 - 1.95	2.00 - 2.20	4.00	Minimum Plot size 2000 sq.m / Road Width 15 m
8	Lucknow	1.25 - 2.50	1.20 - 3.00	Developed Areas - 4.00 Un-Developed Areas - 5.00	Minimum land Plot size Developed Area is 0.5 ha Undeveloped Area 4.0 ha and road width is

## 8. Policies and Guidelines

Bengaluru need to have following approved policies in place for promotion of TOD

- Parking Policy
- NMT Policy
- Street Design Guidelines

## **Annexure-D: GOs and Acts relevant to Transit Oriented Development**

Government of Karnataka has issued several GOs to aid the transit oriented development and funding of Metro Rail in Bengaluru. These Acts have been summarised below. These GOs expected to provide boost to Transit oriented development in Bengaluru.

### **1. GO No. UDD 179 PRJ 2011, Bengaluru dated 21.02.2012**

- This GO is related to levy of cess on new layouts and property developments in Bengaluru city and on additional FSI to be allowed in the influence areas on either side of metro alignments in the Phase-I and Phase-2. The cess proceeds shall be shared among BMRCL and other civic agencies for funding phase-II of Metro

### **2. GO on TDR : GO No. UDD 283 BEMPUPRA 2015 dated 04.03.2015**

- Transfer of Development Rights is an effective tool to minimise land acquisition costs and time towards acquisition process
- The new regulations have removed zoning classification and are now linked to market value
- TDR shall not be applicable for plots with adjacent road less than 9 m
- The additional floor area based on the notional land <sup>1</sup>may be utilized in the remaining portion of the original plot with the condition that the maximum additional FSI shall not exceed 0.6 times the ordinary permissible FSI
- Relaxation in the setbacks and ground coverage may be permitted to an extent of 25%
- Cost of the buildings demolished will be compensated
- The amount collected by the planning authority as Deposit amount and fee for issue or transfer or utilization of the Development Right Certificate shall be kept in a separate account called the 'Transferable Development Fund' and shall be shared in the ratio of 50: 50 by planning authority and local body.
- The planning authority will publish details of total number of TDR certificates.

#### **Observation:**

- TDR generated outside TOD zone shall not be allowed to use within TOD Zone

### **3. GO No. UDD 385 PRJ 2018, Bengaluru dated 19.01.2019**

- Government of Karnataka accorded approval of Airport Metro line as extension of the ORR line from K R Puram to Kempegowda International Airport via Hebbal as Phase-2B of the Metro project
- Administrative approval for the revised scope and alignment with total 38 km line and 17 stations
- In principle approval for PPP with BIAL for transferring a part of the assets at cost and leasing them back for permitting levy of user development fee on the air travellers
- The proceeds from monetization of lands given by the state government to BMRCL should be utilized towards the cost of land acquisition needed for the Airport line and ORR line. BMRCL should come up with standard operating procedure and the norms for monetization of the lands assets.

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<sup>1</sup> Notional land for land area surrendered in Sq.m = Land Area surrendered at the original plot in sq.m X 2

- The implementation of the decision for levy of cess on premium FAR, newer layouts and re-development of existing properties as per the government order UDD 179 PRJ 2011, dated 21-02-2012 should be expedited. The legal backing and mechanism for levy and collection of these cess should be expedited and put in place in next 3-4 months. Those cess proceeds should come to the Public Accounts of the State Government. Thereafter, the share of the respective infrastructure and civic agencies tasked with Bangalore development should flow from the Public Account as per the scheme of distribution of the cess proceeds. The proceeds flowing to BMRCL should be treated as part of the State Government's contribution for the Metro Projects in Phase-2, Phase-2A and Phase-2B. Urban Development Department in consultation with Finance Department should establish the scheme of distribution of the cess proceeds expeditiously.
- The proceeds of the public private partnership to be entered into with BIAL on commissioning of the airport line should be used for servicing the senior debt taken for the airport line and thereby reducing the need for shadow cash support from the State Government to enable BMRCL for meeting its debt servicing obligations.

In addition to above, Government of Karnataka planning to for issuing GOs on following

- Allowing higher FSI in the TOD zone (1 km on either side of Metro) and the quantum of impact fees for utilization of higher FSI
- Circulated a draft on Management and Maintenance of Parking rules, 2018 (Transport Department) for discussion
- GoK has also prepared a Draft BMLTA Act, July, 2018 which is likely to be passed in coming days