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**Shifting the TOD Discourse from Intensification of Built-up Area to Regulations
Managing High People Densities in Mumbai's Development Plan Revision**

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ABSTRACT

The 2011 Census report indicates a population of over 12 million people living in Mumbai city over an area of 427sq km. The Comprehensive Transportation Study of 2008 for the city and its region revealed that 51% of all trips (vehicular and non-motorised) are made by walk and 78.2% of purely vehicular trips are made by public transportation. This high usage of public transportation and walking modes are a result of dense, mixed use neighbourhoods that traditionally agglomerated around suburban railway stations.

Mass transportation system planning, implementation and operations however, are handled by agencies other than the city municipal corporation that plans land use and its regulation. Coordination between these agencies is typically a challenge, resulting in poor integration of transport and land use.

High transit dependency and ridership has prompted city stakeholders to presume that Mumbai has naturally, over the years, adapted to transit stations; while this is probably true; current realities indicate a worrying trend. Regulations set in the existing development plan greatly incentivise ownership of private vehicles with excessive sops available to build parking structures, even close to railway stations. Suburbs are incentivised to proliferate in a bid to decongest the old city areas. Metro and mono rail alignments are under construction without considerations to integrate land use.

This paper argues that current regulations incentivize vehicles and built densities around transit nodes. There is a dire need to rethink these regulations and develop a comprehensive 'transit oriented development' approach towards managing high people densities around transit nodes.

INTRODUCTION

Mumbai Transit Context

Mumbai city, the financial capital of India sits within the Mumbai Metropolitan Region (MMR), which is one of the fastest growing metropolitan regions in India. The city consists of three districts, the island city (or main city), the western suburbs and the eastern suburbs. Mumbai is a linear city (*refer Figure 1*) surrounded by water on three sides with an expanding suburban region to its North and East. The current island city was formed by seven successive reclamations. The city is connected across the north-south axes, through a system of rails along the western, central and eastern arterial corridors that continue into the mega-region across Greater Mumbai (GM) boundaries into the region.

The suburban railway transports up to 7 million people every day, of which most people travel from the MMR to the City for work, education and other purposes. Figure 1 illustrates the city's unique context while presenting key findings from the Comprehensive Transportation Study (1) (CTS), conducted by the Mumbai Metropolitan Region Development Authority (MMRDA), for the MMR. The report indicates walking as the main mode of mobility across the region. For trips made partly on motorized modes, 78% of the trips are conducted on public transit (i.e. Suburban Railway and BEST bus services) as the main mode, which is extremely efficient in terms of energy consumption, environmental costs and per capita space requirements. As for the 51% trips made on foot, the economically weaker sections (EWS) constitute 60% of those trips.

The CTS report states that a large percentage of people using public transit and walking modes live in high density and low-income housing types, with a low quality of life. Hence these are more captive choices and not habitual, based on several aspects such as low incomes, lack of affordable housing within the main city and low levels of service in public transit facilities. Increasing numbers of vehicle ownership within middle class households (2) can therefore be perceived as a threat to existing mode shares, because as incomes rise, dependency on public transit has a possibility of dropping.

Opportunities and Challenges in a Growing City

Increasing levels of congestion on Mumbai roads has created the need and aspiration for newer Mass Rapid Transit Systems (MRTS) to supplement existing modes and improve east-west connectivity. Currently, Mumbai city is in the process of developing two new rail-based modes, a Metro Rail and a Mono Rail, (see alignment in Figure 1). The Metro line 1 will connect Versova (a western suburb) to Ghatkopar (an eastern suburb), and the Mono rail, which is expected to connect Wadala (an upcoming residential area along the eastern water front) to Lower Parel (a largely commercial district in central Mumbai). These stations are expected to intersect with the existing suburban railways at key stations that would serve as interchange points from north-south to east-west. This presents new opportunities to look at inter-modal connectivity, and integrating these routes into the existing transport network of the city.

The CTS report states that population densities in GM are extremely high, (45,900 persons/ sq.km in the Island city and more than 20,000persons/ sq.km in the suburbs). Additionally, across the city we have a well distributed and diverse mix of land uses. The high mode share of walking trips can be clearly attributed to the diversity of uses within the city, making distances smaller with interspersed activities allowing for trip-chaining. Due to the restrictive geography of the city, there is little possibility for lateral expansion; hence the island city and the suburbs have a dense and compact built environment, concentrated close to suburban railway stations and major arterial roads. Owing to this high density is a resultant lack of space. The city has a total of 262.20 sq.km of open spaces (3), i.e. approximately 46,000 persons/ sq.km of open space, which is significantly low.

Private vehicle ownership in Mumbai has grown by 47% over a decade (from 1996 to 2005) (4). Accident data for the Greater Mumbai region shows that in 2009 alone, 607 people suffered fatal accidents and 628 people were killed on the spot. An average of victims of fatal accidents in Mumbai from 2008-2012, by mode, shows that 58% of the victims were pedestrians and 29% were motorcyclists (5). Comparing the existing mode shares to vehicular ownership, the CTS report states that even though vehicle ownership has increased, a majority of the population still uses public transit or walks for most trips, and 30% of people owning vehicles continue to use public transport. However, due to the increase in fatalities and congestion levels in the city, some share of pedestrians, NMT and public transport users who own vehicles have shifted to private modes.

Pedestrian safety across the city is greatly compromised right from a lack of infrastructure to poor traffic behaviour, management and enforcement. With new transit modes planned in the city there is a huge opportunity to retain existing mode shares and promote a modal shift, addressing issues of appropriate design for *pedestrian access* to transit nodes and key destinations as an immediate priority.

The redevelopment of old dilapidated buildings within the inner city or the mill lands in central Mumbai, has been used as a tool to provide high end housing and office buildings to match prevalent land values, bringing populations of car users close to transit, while replacing some existing typologies of compact, affordable housing. The Island city, as mentioned earlier, has no scope for lateral expansion, although the demand for housing, amenities and services is extremely high. Using FAR [*Floor Area Ration: defined as a ratio of the*

total built up area of a building to the plot area the building is located on] as a tool to incentivize redevelopment, there is a huge opportunity to provide some of the most necessary amenities to the city. However, FAR is essentially used to intensify built-up area producing disproportionately tall and wide structures by amalgamating small plots (in the inner city) and privatizing large parcels of the Mill lands, without addressing the need for amenities.

Additionally, skewed parking policies applied as blanket norms across the city are resulting in buildings with very high FAR consumptions and liberal parking provisions, encouraging private vehicle ownership and use. The introduction section of the paper presents a detailed statistical account of Greater Mumbai, which constitutes a dense, compact built environment with a diverse mix of land uses. Extensive access to transit and subsequent efforts to supply multiple-modes present an advance and mature transit network in the city as a great opportunity to address some of the pressing challenges faced by the city today. The next section of the paper takes a closer look at the Development Control Regulations (DCRs) to show that blanket parking norms liberally applied across the city may, not only incentivize car ownership within transit rich precincts, but also decrease the city's transit dependency. Further, the paper argues that based on dominant income groups in a given area or plot, the neighbourhood layout, building typologies and importantly proximity to a transit node, the amount and type of parking provided should be regulated.

CURRENT REGULATORY FRAMEWORKS

Current Parking Regulations as per the existing Mumbai DP (1993 to 2013) (6)

Current parking norms for different land uses in Mumbai are laid out as a blanket policy applicable across the city. As per the DP 1991 (currently in effect) parking norms prevalent in the city include:

1. *For plots reserved as parking lots, a built up area equivalent to the zonal permissible FAR for the area under reservation will be available for free for the Corporation (MCGM) or any other appropriate authority; the area handed over as parking lot will be free of FAR. The authority or owner may be allowed to develop the parking lot for the public, utilizing the full built-up area equivalent to the FAR available. The parking lot may be provided as a basement, on an open space, under stilts or even upper floors.*
2. *Based on the cluster redevelopment policy DCR 33/ [9], an urban renewal scheme can be proposed for an area of minimum 4000 sq.mt with an incentive FAR of 55%. If a parking lot is proposed in the scheme, it can consume a built up area equivalent to the zonal permissible FAR for the area under reservation. The maximum permissible FAR for the plot (existing FAR + additional incentive FAR) should not be more than 4 (or 3 based on zonal codes). The Built up area consumed by the parking lot is free of FAR.*
3. *Additionally, for the sale component of either Cess building or slum redevelopment schemes, a minimum of one parking space per dwelling unit has to be provided. This adds to the overall parking provision and FAR consumed on any given plot within the Island city.*
4. *Developers or a public authority or organization proposing a multi-storeyed parking lot close to a transit node, follow the same norms as described above. Additionally, they are given a 50% incentive FAR. Within the Island city the total consumable FAR (not including built-up area consumed by parking) is capped at 4 and within Greater Mumbai it is 3.*
5. *Among these regulations, the BEST bus depot, station or Terminus redevelopment norms present a good example. For sites redeveloped to provide for proposed reservations for commercial or amenity use, only 30% of existing permissible FAR will be allowed, out of which 50% of built up area is proposed on the ground and the remaining on floors above. A Traffic Impact Assessment (TIA) study is expected to be conducted to ensure that the new development does not interfere with the existing functions of the BEST services, and does not negatively impact existing traffic volumes on the roads abutting it. If the TIA shows negative impacts, the Commissioner has the right to restrict the development to a justifiable extent. The development has to include the required parking and other services and utilities as per norms within the permissible FAR.*

Outcomes of the Current Parking Regulations in Mumbai

Current parking norms as listed in the previous section present a worrisome future towards city growth and urban renewal in Mumbai, especially within the Island City. Using intensification of built-up area (or additional FAR) as a key tool to incentivise redevelopment and planning within the city has resulted in segregated, unsafe and unliveable conditions of housing. Several streets are lined with inactive and empty parking lots often 20 storeys high with no commercial edge or activity to relate to the pedestrian scale and sight lines.

This condition of over provision has most drastically affected neighbourhoods in the inner city of Mumbai that fall under the cess building regulations. Based on the 2008 assessment of inner city precincts, there are 16,104 buildings under cess in Mumbai (7). Based on these regulations developers not only get an equivalent

FAR as that consumed by the plot to build a parking lot, but also an incentive 50% for accommodating a parking lot within the building, allowing them to build up to 4 FAR. This model is being widely adopted by developers building in the inner city as a means to go higher and consume more FAR in some of the most valuable areas of the city. These areas however, are also traditional and historic bazaar (market) precincts of the Island city. These neighbourhoods grew around transit stations, with a rich and diverse mix of land uses, affordable housing and compact living environments. The images (*figures 2 and 3*) are of buildings located in Girgaum; about 500 meters from Marine Lines railway station, and has buildings more than 100 years old.

The sequence of photographs (*figure 4*) show a commercial complex built as the redevelopment of Mill land, close to Elphinstone Railway station. The image below shows the experience of a pedestrian walking to Elphinstone station from the main road. This used to be a traditional pedestrian route taken by the mill workers and other employees working in the precinct and opened out directly into the station area.

What is striking in the above case examples is the proximity of transit to the buildings or complexes identified. Inappropriately high parking supply around transit nodes is resulting in an increase in 'car density' close to transit nodes. Due to a lack of regulations guiding urban form decisions, the most unsafe environments are proliferating. The Development Plan of Mumbai which will be in force for the next 20 years is currently under revision and presents an opportunity to integrate TOD regulations for the city to be transit and people oriented.

Background of the Mumbai Development Plan

The Development Plan of Mumbai follows the directives laid down in the State Town and Country Planning Act. Unfortunately for a plan that determines important parameters of growth of the city such as land use and its development control regulations, it is comprehensively to be revised once in twenty years. Added to that are long drawn delays in its sanctioning process which led to the existing plan which was published in the mid-80s to get sanction only in 1993. This particular plan which was formulated in the pre-liberalisation period had to last about twenty years after it.

Setting out growth directions for the financial capital of the country for an inconceivable twenty to thirty years ahead has had several drawbacks and failures and a meagre rate of success. The entire island city which houses the main CBD of the city for example was allocated a flat 1.33 FAR at a time when several buildings had already consumed an FAR of 3 and above. Without changes to the overall master plan itself the regulations underwent several piecemeal modifications to be able to accommodate post liberalisation macroeconomic market oriented trends. Transfers of development rights and 'bonus FAR' redevelopment norms have caused several sporadic high-rise structures and augmented FAR trends to proliferate around the city and its suburbs. The impacts of these changes were not fathomed in terms of adequacy in areas such as infrastructure, amenities, open spaces and parking.

The Mumbai DP is a statutory document that can set planning priorities at the city level to ensure that the city, through its phases of redevelopment, is consciously oriented towards transit and pedestrian priority. However, the concept of a 'transit oriented development' is highly misunderstood in the context of Mumbai (in particular), and is driven by a discourse merely around intensification of built-up area without addressing amenity provision. In a city that is as transit dependent as Mumbai, Development Control regulations (DCRs) must stipulate transit oriented norms rather than ones that are private automobile-oriented.

TRANSIT-ORIENTED VS TRANSIT-ADJACENT DEVELOPMENTS

What is TOD?

Transit-oriented Developments or TOD can be defined as a planning paradigm that results in the creation of *compact, walkable and liveable* communities with *access to amenities*, built around high quality mass transit stations (8).

A TOD is planned within the 'influence zone' of a mass-transit system. The 'influence zone' is delineated based on access to the transit station by walk or non-motorized transit modes. It can be defined by an indicator called the 'ped-shed analysis' which correlates the distance walked/ cycled to the time taken to reach the station area. The influence zone of a transit station can be identified as a "TOD Zone" for a particular transit node, and may vary based on people's willingness to walk-to-transit in different city contexts. Additionally, the commuter capacity of a system and the proximity between stations may impact the extent of the TOD zone. TOD for a BRTS is often planned as a corridor like in Curitiba, Brazil, and that for a Metro Rail as in Delhi, is planned as nodes around key stations.

Ewing and Cervero developed a framework of 6-D variables (9), widely used as a method to moderate travel demand by changing the built environment; these variables include: Density, Diversity, Design, Destination Accessibility, Distance to Transit, and Demand Management. For the context of Mumbai these can be adopted as key principles towards developing a comprehensive approach to TOD in the revision of the Mumbai Development Plan. Key objectives could thus be defined local to the Mumbai context as, *a need to manage*

people densities, while ensuring a diversity of land uses, allowing well designed access to destinations, transit nodes and feeder networks, and rationalizing private vehicle usage through comprehensive demand management strategies.

TOD and TAD—Similar Concepts, Very Different Cities

A city that incorporates the 6-D variables into a comprehensive planning process for TOD enables a healthy, lively and attractive city life, that is ‘people-oriented’ and safe for all. However, only capitalizing on land values and accessibility advantages around station areas, to increase built-up density without addressing all the other D-variables, results in what is termed as Transit-adjacent Development (or TAD). TAD signifies development that is in close proximity to transit stations but promotes auto-oriented planning such as sparse people densities, luxurious living environments, single or segregated land uses and ample provision of parking. Hence, a TAD is similar to TOD as both paradigms prioritize and propagate development close to transit; however TAD as an approach is just limited to that. Adjacency to transit thus does not ensure a liveable, walkable and healthy neighbourhood with increased quality of life; it merely ensures proximity to transit by capitalizing on high land values. This form of planning is not people-oriented and in the context of Mumbai is often even auto-oriented.

Daily commuters of the suburban railways in Mumbai have to not only overcome peak hour crowding within the train compartments but must also suffer poor last mile connectivity to their work and home destinations. Most suburban railway stations provide inadequate to no infrastructure for intermodal connectivity to intermediate public transit (IPT) like auto-rickshaws and taxis, and feeder bus services. Station areas are characteristic of vibrant markets, active streets and high land values that prompt high densities. High footfalls of commuters, businesses and residents within the stations influence zones leads to congested station areas with low services provision.

Once new systems like the Metro or Mono rail begin operations in the city, it will be important to develop these TOD precincts with adequate provision of open spaces, housing, amenities like schools, hospitals and mixed uses that promote walking trips. However, it is not only a lack of accessibility, but a general disregard for all other TOD principles, which often result in station areas being the most undesirable spaces for work or living. Integrating the above objectives into the vision for the Development Plan of Mumbai will enable planning and building a city that is transit and people-oriented.

STAKEHOLDER ASPIRATIONS AND APPREHENSIONS

Recently revised development plans of other metropolitan cities such as Delhi and Ahmedabad indicate a trend of intensification of built up areas rather than addressing the comprehensive principles of TOD. When the on-ground effects of the current regulations were presented to MCGM it evoked concerns towards developing comprehensive strategies for parking within TOD zones. A realization that there is a need to shift the TOD discourse from intensification of built-up area to a management of people densities, providing access to amenities and a better quality of life, was brought to the table. This section facilitates a review of the current TOD discourse in India followed by a shift in the discourse.

The Current TOD Discourse in India

The current TOD discourse in India focuses on densification. Ahmedabad City has incorporated a TOD framework into their Development Plan (DP). However, the framework is geared towards building high density ‘transit corridors’ across the BRTS corridor, with purchasable FAR. Land use regulations are addressed as an ‘overlay zone’ to allow for transit supportive land uses along the TOD corridor. In terms of parking the DP reduces parking by 10% for commercial uses; however there is no cap or reduction in parking norms for residential uses (10). Additionally, the DP seems to present high level visions for TOD, but regulations enforcing better design norms and encouraging a modal shift, remain unaddressed.

The Delhi Master Plan has also incorporated a TOD strategy along their Mass Rapid Transit System (MRTS) corridors. Here, land use regulations are addressed as a special use called the ‘White Zone’. All areas that fall under the White Zone follow specific land use regulations. Unlike Ahmedabad, the Delhi plan incorporates detailed strategies with an extremely holistic approach. However, due to an existing auto-centric plan, the TOD strategy for Delhi is geared towards increasing densities along the MRTS corridor and around stations within a 1km radius (i.e. within the ‘white zone’). The plan also prescribes ‘mixed land uses’ as a special category and prioritizes mixed use developments within the TOD influence zone.

As the Development Plan for Mumbai (1993 to 2013) has reached its terminal year the Municipal Corporation of Greater Mumbai (MCGM) had floated a request for proposal to invite consultants to assist in the plan’s revision. Transit Oriented Development (TOD) was a stated requirement in the scope of work. However the stakeholder aspiration is reflected in terms of built up area densification only, as stated “*FAR pattern should respond to accessibility variation on account of transport infrastructure and should not be lower than already consumed FAR that can prevent redevelopment. If TDRs are proposed ‘originating’ and ‘receiving’ areas may*

be carefully defined.” While acknowledging that the previous pattern of uniform blanket FAR could now vary, it suggests varying patterns could be addressed with respect to transit and a few other parameters such as water features and conservation areas.

Shifting the TOD Discourse:

As part of EMBARQ India’s efforts to influence the revision of the Development Plan to incorporate a more comprehensive TOD framework rather than just address FAR, it was met with some reservations from city stakeholders. The sheer numbers of people who use public transport and the high densities of the city (as discussed earlier) prompted stakeholders to comment that TOD was not a requirement in Mumbai as all of Mumbai was anyway TOD. With important challenges such as housing, redevelopment, higher FAR consumption and transfer of development rights taking priority in the stakeholders’ minds, the on-ground cumulative effects of such policies have not been assessed. The vision for the city may not be very far from one that prioritizes transit as an important spine for the city; it however fails to support it with adequate regulations and guidelines to enforce a people-oriented plan, and is instead incentivising vehicle oriented regulations.

An argument presented by the city stakeholders against a comprehensive TOD framework was that a development plan which addresses the city at an aggregate scale does not address the ‘nitty-gritties’ of street design and accessibility but rather deals with land utilisation and its related regulations within plots. This is often a challenge in the Indian context wherein the use of private land has city level regulations and restrictions but regulations for the public realm however are neither comprehensive nor binding on any particular government agency. This is a scenario when more than 45% of the city’s land is publically owned such as highways, urban roads, street networks, parks, water bodies, beaches etc. Also since a plethora of agencies act in this public realm no single agency can be assigned the onus of its design and upkeep.

Picking on the aspect of parking regulations being an integral part of the plan and by highlighting the drawbacks and cumulative effects the current regulations has had on the city, immediately struck a chord with the stakeholders. This angle of parking became a key entry point for EMBARQ India to engage more deeply in the TOD conversation within the Development Plan. A comprehensive approach to manage vehicles and prioritise people is a pressing need, and EMBARQ India is engaging with key stakeholders as an effort to develop an approach contextual to Mumbai.

CONCLUSIONS

In most countries across the world trying to move from auto-oriented to people-oriented planning, parking is part of a larger umbrella of Travel Demand Management (TDM) strategies. The Victoria Transport Policy Institute (VTPI) refers to Travel Demand Management as, “a variety of strategies that change travel behaviour (how, when, and where people travel) in order to improve transportation system efficiency and achieve key regional objectives, such as reduced traffic congestion, increased safety and mobility, energy conservation and emission reductions (11).” TDM strategies are two pronged: they provide guidelines for the built environment, and enable a shift in travel behaviour towards more sustainable mode choices.

The city of Mumbai is on the anvil of planning and visioning the city’s growth path for the next twenty years through the revision of its development plan. Policies incentivizing redevelopment and an intensification of FAR coupled with overprovision of parking supply, have resulted in largely single-use, auto-oriented living environments with low standards of walkability. These policies show even worse results in the inner city precinct of Mumbai, where street widths are narrow and plot sizes are small. Easy and cheap availability of parking supply has incentivised an increase in vehicle ownership. This in turn increases the demand for auto-oriented planning, thereby reversing the trend from sustainable mode shares to private vehicular modes.

Conversely, enhancing land use planning regulations and enforcing strict parking norms will ensure a modal shift to sustainable and affordable modes, which in turn will result in increase in transit dependency (12). In Mumbai, parking has presented itself as one of the critical entry points towards facilitating ‘transit oriented’ neighbourhoods, and therefore the right approach towards parking provision needs to be articulated at city and local neighbourhood levels.

Defining a Parking Approach for Mumbai

EMBARQ India has been working with Dr. Paul Barter (13), Adjunct Professor at the LKY School of Public Policy at the National University of Singapore (NUS) and author of the book, “Parking Policy in Asian Cities”, to develop a comprehensive approach towards off-street parking within TOD influence zones. Dr. Barter delineates two distinct approaches to parking—one being the *conventional*, ‘business as usual’ approach and the other an efficient *parking management* approach. In Mumbai currently, the conventional approach is what is prevalent, resulting in an extreme overprovision by projecting present and future demand and attempting to match it. EMBARQ India with Dr. Barter have been in conversations with MCGM to develop a comprehensive approach towards parking and travel demand management in Mumbai as a framework that guides TOD

strategies towards managing “people densities” rather than merely increasing built-up area. There are *five* distinct strategies that are being explored:

1. *‘Walkable Park-Once TOD neighbourhoods’:*

TOD influence zones (and other transit efficient, walkable or sensitive areas) can be determined as ‘park-once’ precincts where parking norms are defined at area or neighbourhood level, and not for individual plots. Parking spots are commonly shared across the neighbourhood irrespective of where they are located, and can be regulated by providing residential permits or congestion pricing for different uses. These are essentially dense, walkable, mixed-use precincts where parking is either privately provided or is public. These would include:

- a. Controlled Parking Zones (CPZ) where effective parking management can be carried out;
- b. Restrict or abolish parking supply around transit stations to effectively decongest the area and provide better access for commuters;
- c. Unbundle parking and housing, to ensure homeowners and buyers are not forced to buy parking lots and further new cars.

2. *Revert to Parking Maximums within TOD zone! (Or at least much lower minimums).*

Parking minimum norms are based on projecting a demand for parking and matching it to the minimum, hence result in overprovision of parking supply. Abolishing minimums, at least within TOD influence zones, and replacing them with parking *maximums*, will ensure that the projected demand is matched at maximum, and nothing more will be provided. This is only effective with an extremely stringent enforcement and management of on-street parking; hence a comprehensive off-street and on-street management model must be developed. Strategies would include:

- a. Different parking norms for TOD zones and non TOD zones, enforcing zero minimums within TOD zones as private vehicle ridership is low in Mumbai and public transit ridership is the highest.
- b. Parking toolkits or calculators can be developed to allow developers and investors to calculate the amount of parking through transparent models to minimize conflict within stakeholders.

3. *Urban Form guidelines for quality Off-Street Parking*

Provide Urban Design guidelines to enable developers building public parking lots within their dedicated plot areas, to make sensitive design choices that result in active streets, safe for pedestrians at all times. Most examples of poor built form typologies seen in the previous section are a failure of non-descriptive urban form guidelines that could help deliver better street interfaces and human conditions of living. These would include:

- a. Building plan approval procedures must include a section on urban form guidelines for better street interface;
- b. Parking provided whether stilt or surface level should be strictly set to the rear of the building and not at the street edge; building frontage must incorporate an active street edge with pedestrian friendly uses such as shops, restaurants, amenities and other diverse land uses.
- c. Instead of making all allowable parking to be free of FAR, only a percentage, say 25%, of parking above ground can be considered free of FAR while anything above and beyond that is counted in FAR.
- d. If public parking is provided within a new building, every square feet of parking until the maximum is to be counted within FAR.

4. *Parking norm flexibility with Deficiency Charges (“Parking-in-lieu fee”).*

Ensuring a certain amount of flexibility in special areas, like TOD influence zones, heritage precincts, inner city areas, or Central Business Districts, to meet required parking norms.

- a. Authorizing shared parking norms, thereby allowing developers to meet parking requirements within a 100-200 meter distance of his plot through purchased parking spaces;
- b. Applying Deficiency charges (or parking-in-lieu fees) to allow parking deficiency in some areas. Heritage areas could apply deficiency charges;
- c. Local stakeholders and community groups could participate in pricing models thereby being allowed to use a portion of the revenues generated towards the maintenance of the neighbourhood.

5. *Lower parking norms for small sites/ developments (and exempt smallest altogether)*

Most cities have a tendency of developing unfeasible regulations and then running them into fiscal tools, which can be very harmful in the long run. Relating parking maximums to plot areas and FAR consumption rather than number of tenements and tenement sizes, helps regulate the amount of provision.

- a. Exempt plots smaller than 500 sq. mt from providing parking, while encouraging large plot buildings to accommodate for more parking; this will help retain smaller plot sizes and walkable block-sizes.

Housing is a Right, Parking is not!

In Mumbai, there is a large majority of people who live in sub-standard living conditions. The CTS report states that 50% of people in Greater Mumbai and 27% of the people in the MMR region live in some form of informal housing that is poorly serviced by basic infrastructure. That is, from the total population of people living in informal settlements in the region, 75% live in Greater Mumbai. A total of 1,959 slum settlements have been identified in GM, with a population of 6.5million people. The report also shows that slum households have 8% more people working than apartment households, and modal splits by housing types show that almost 60% of the people who walk to work, live in slums (in the MMR).

There is an acute shortage of housing in the city that demands even working class families to live in sub-standard living conditions. In a city where housing is a scarce commodity and quality of life is marginalized, giving free FAR to parking spaces will further exacerbate the housing crisis and housing costs. In residential high rises, monthly maintenance and rent increases with increase in building height, which may lead to an eventual suburbanization of the poor currently concentrated within Greater Mumbai.

Trends of development in Mumbai today are directed towards increasing FAR without engaging in a more relevant practice of managing “people densities”. Based on the incredible mode shares recorded in the city it would be unfortunate to merely use densification as a tool to address development and redevelopment within TOD zones. This approach is seen to incentivise larger dwelling unit sizes, land price escalation, and the suburbanization of poverty. With an unfavourable trend towards increased private vehicle ownership in the city as incomes rise, and demand for parking exceeds supply during most periods of the day, increasing the number of public parking places by order of magnitude, is essential. A blanket ‘one size fits all’ parking policy however, has become a means to promote car ownership and therefore shift modes towards private car use.

Vehicle ownership within the city is still fairly low. In emerging economies, where vehicular ownership is gradually increasing but is still not an indispensable mode or habit, planning methods and regulations need to protect the existing modal splits and make sustainable transport modes an attractive and easily accessed option. Setting the city on a sustainable growth path should also be prioritised, despite other pressing problems, by orienting urban development around transit.

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- ¹² Ed. Dittmar, H., Ohland, G. The New Transit Town: Best Practices in Transit-Oriented Development. Island Press, Washington DC, 2004.
- ¹³ Dr. Barter was invited as an expert by EMBARQ India to build capacities internally and with external partner agencies and city stakeholders.

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FIGURE 1 Mumbai Transit Context

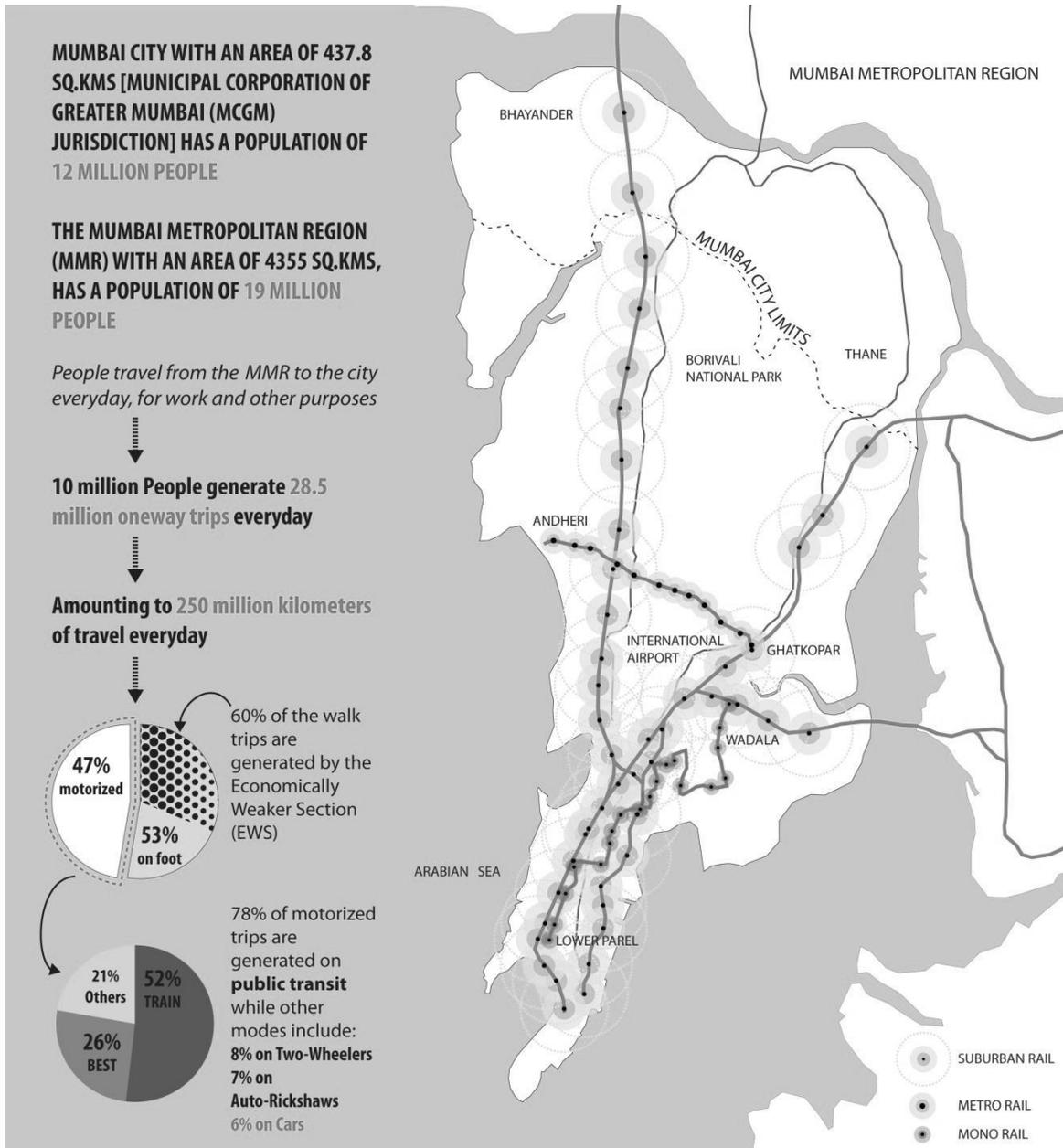


Fig. 1: Map of Mumbai City, showing the suburban rail network for regional connectivity, and two newer proposed modes—mono and metro rail

FIGURE 2 Inner City Redevelopment, Girgaum, Mumbai (1)



Fig. 2: Rehabilitation building in the centre with parking lots towering up to 7 stories on all three sides Girgaum, Mumbai (photo credit: Author)

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Fig. 3: Multi-level car parking lot towering up to seven stories, Girgaum, Mumbai (photo credit: author)

FIGURE 4 Elphinstone Mill redevelopment



Fig. 4: One India Bulls Commercial Complex (*extreme right*) and Elphinstone Road railway station access (*left and centre*) road, Elphinstone Road, Mumbai (photo credit: Author).