# MAHARASHTRA PROOF OF PARKING POLICY

April २०२५

Concept note/discussion paper



Motor Vehicles Department

Government of Maharashtra

With input from:



**CRISIL Limited** 



Centre for Science and Environment



Institute for Transportation and Development Policy

# Vision and objective of the policy

### Vision

Maharashtra's economy has grown at a rate of over 9% in the past decade contributing to about 14% of India's GDP. It is the second most populous state, with population estimated to be about 12.83<sup>i</sup> crore in 2025 as per estimates in the state economic survey. The state exhibits significant urbanization, with 45.2% of its population residing in urban areas as of 2011. As one of India's most dynamic and rapidly urbanizing states, it faces the complex challenge of balancing economic growth with urban liveability.

The proposed policy on Proof of Parking with supplementary measure of congestion pricing aims to minimize the adverse impact of this growth in terms of toxic air pollution and public health, crippling congestion, productivity loss, energy costs, locking-in of disproportionate share of land resources for parking, and overall welfare losses. This aims to improve quality of life in cities even as cities are growing economically to ensure safe, convenient, affordable, clean, equity and sustainable mobility for all.

Parking is a sub-optimal use of our limited street space. It is as good as a personal storage on precious public streets. Street space should be prioritized for public usage rather than personal storage. Our vision for parking management should be to have minimum parking on streets, and use street space for traffic movement, well-designed footpaths, public transport infrastructure, trees, street amenities like benches, and other street elements for livable and safe streets.

### Objective

The policy aims to create an efficient urban mobility ecosystem by providing a framework to reduce traffic congestion and promote equitable use of urban spaces through regulatory measures such as Proof of Parking (PoP) and a congestion fee in dense urban areas in the state of Maharashtra.

This policy aims to frame Proof of Parking and parking management policy along with a parking pricing strategy to help contain growing demand for parking and parking pressure on the land and reduce dependence on personal vehicles with more improved availability of mass transport.

Proof of parking will help to connect car ownership with well organised and well managed legal parking areas to reduce crippling congestion.

- With redevelopment and new development of areas, new parking areas will be available as per the norms and their access can be properly defined. This will help to delineate seamlessly on-street and off-street parking spaces and establish access through digitization at the time of vehicle purchase and registration.
- Through a continuous process of old vehicle phase out or vehicle transfers more organised legal parking spaces to be defined based on parking management area plans that will become available without worsening the congestion impacts.
- At the same time integrated management of off street structured parking lots and on-street parking and the shared utilisation will further unlock currently underutilised parking.
- This will also aim to introduce congestion pricing at the designated areas to decongest roads, regain and regenerate common public spaces, and protect the competing needs of other essential land-uses and road users.
- This will be implemented with the help of parking management area plans for each ward/contiguous
  neighbourhood clusters that will also help to establish where parking cannot be allowed and help to conserve
  urban greens, footpaths and other road users. This will help to regenerate public spaces and improve liveability.

The Need for Vehicle Restraint Plan to Decongest Urban Areas is centred around 8 key objectives:

- To improve the quality of life of citizens
- To reduce air pollution and noise pollution
- To create a balance between available vehicular infrastructure and vehicular density
- To reduce traffic congestion on urban roads to reduce productivity loss, fuel cost, and improve sustainable
   mobility

#### Expected Outcomes of the Proof of Parking Policy:

- The future pressure of parking on limited street space is controlled and prevented, as newly registered vehicles are parked inside buildings. This gives an opportunity for the city to make streets more livable and safer by providing well-spaced footpaths, trees, bus-stops, and other street elements, in place of parking. Reduced demand for parking will also reduce overall demand for additional land to be committed to build more structured parking lots and free up public land for more essential services and housing.
- On-street parking will get more organized and disciplined with stricter enforcement. This is needed to ensure vehicles with proof of parking are parked inside buildings or in designated areas. This also gives an opportunity to enforce measures to prevent haphazard on-street parking such as double parking and parking encroachment.

# Rationale and scope of the policy

### Rationale for the policy

### Motorisation, pollution and energy impacts

Growing motorisation is contributing towards worsening of air quality in big cities of Maharashtra including Mumbai, Thane, Pune among others. Vehicles not only contribute to the ambient air quality §PMR.9, nitrogen dioxide levels and other pollutants – but also to the toxic exposures of the population. In fact, NOR that is emitted largely by the vehicles show pronounced elevation during traffic peaks hours in cities.

The trend in motorisation is rapid in most cities. Greater Mumbai, like others, continues to witness a steady rise in motor vehicle registrations, reflecting both the growing mobility demand and the challenges of urban transport planning. This is leading to urban mobility stress and infrastructure burden, particularly as private vehicle ownership becomes more prevalent.

The most critical factor necessitating a robust parking policy is the exponential growth in the number of registered motor vehicles within the state:

- From 2001 to 2024, the total number of registered vehicles has grown at a rate of 8.2% as per Maharashtra motor vehicle department statistics.
- New Registrations: Underscoring the ongoing growth, in the fiscal year 2023-24 alone, 25.8<sup>ii</sup> lakh new vehicles were registered across Maharashtra as per the department.
- Vehicle density: based on till date surviving population as per Vaahan, with approximately 2, 4°2 vehicles per square km (within this cars are 2,492 per sq. km), Mumbai's vehicle density is exceptionally high compared to other highly populous cities like Beijing (328 vehicles/sq km), Shanghai (288 vehicles/sq km), and even Tokyo (9,200 vehicles/sq km). While Maharashtra's overall state density (928<sup>iii</sup> vehicles/sq km) is lower than these megacities, Mumbai's figure underscores the intense concentration and pressure within the state's primary urban hub.

- As per Maharashtra Motor vehicle department statistics as of २०२३-२४, the vehicle population of २ urban clusters (MMR and Pune) amounts to ~४०-४५% of the state vehicle population, thus driving the need for urgent attention to solving the vehicle density problem in these cities.
- To add more context to this number, Delhi's car density is 4,365 cars per sq km (total car registrations 42.68 lakh; considering total built up area 977.9 sq km this excludes the natural areas (total area of municipal area of Delhi is 1483 sqkm)), and 31.5 cars per sq km per lakh population as per census population of 2011. However, Mumbai has much lower area available for further development as opposed to Delhi with more developable land as per the Master Plan 2041. But the lesson from Delhi is that despite having a much larger area, untamed motorisation can aggravate density and congestion requiring restraint measures.
- The high vehicle density points towards factors like a heavy reliance on private vehicles and immense pressure on limited urban land, roads and parking infrastructure. Conversely, cities like Beijing, Shanghai, and Tokyo often benefit from extensive, efficient public transportation networks and, in some cases, stricter government regulations on vehicle ownership and usage, which contribute to their lower densities.
- Global comparison demonstrates that Mumbai's challenge with vehicle density is among the most acute in the world.
   The sheer number of vehicles packed into its limited geographical space necessitates urgent and effective policy interventions.

## **Congestion impacts**

All key cities are now in the grip of growing congestion. Illustratively, in Mumbai, the analysis of TomTom data (a GPS based navigation service globally), shows that in the morning peak hours, arterial and sub-arterial roads—critical links in the city•s transport network—experience an average speed reduction of २२.३ percent, with maximum upto to ७٩.५ percent in some stretches. Collector roads and other major roads see an average drop of ٩७ percent, with the worst-hit segments slowing down by ६५.६ percent. The impact is most severe on residential and local roads, where speeds can fall by as much as ८० percent, indicating bottlenecks not only on main corridors but also deep within neighbourhoods.

Evening peak hours present a more pronounced slowdown across all road categories. Arterial and sub-arterial roads register an average speed decline of 29.2 percent, with maximum decreases reaching a staggering 22.2 percent on certain stretches. Collector and other major roads follow closely, slowing down by an average of २४ percent and up to ७४.५ percent in extreme cases. Residential and local roads, again, are the worst affected, with speed reductions reaching as high as ८४.८ percent.

#### Limits urban expansion and built area

Motorization also continues to make enormous demand on the precious urban land as growing numbers of vehicles make demand on land for both circulation as well as parking (cars remain parked for almost ε per cent of their lifetime).

Greater Mumbai, for instance has seen an increase of 4.& per cent in built-up area between 2009 and 2090, meanwhile Mumbai Metropolitan Region (MMR) was still growing at a high pace of 23 per cent during the same period. The Regional Plan of MMR (209&-38) states that during 2009-2090, built up area grew fastest in the Raigad district, while in the previous decade (98%9-2000), the built-up area in Thane and Raigad grew faster than Mumbai, Thane® growth being the fastest.

As of RogR, Mumbaiss land use pattern revealed a city nearing its spatial limits, with & g per cent of its land area already built up. Only 9.9 per cent of the land remained vacant and available for new development, highlighting the limited scope for future expansion within city boundaries.

Natural areas comprising २७ per cent of the land such as agricultural lands, urban forests, hills, coastal stretches, and creeks, serve as critical ecological buffers but are increasingly at risk due to urban sprawl. Just 9.9 per cent of the land was dedicated to primary activities like plantations and salt pans.

As per the Development Plan for Greater Mumbai २०१४-२०३४, Transport accounts for १२.८ % of the land use in Mumbai within which roads constitute a mere ८.१६% of the total area of Greater Mumbai. As a significant share of this gets blocked for on street parking, this further worsens the problem of demand supply mismatch in road infrastructure

### Parking pressure : Demand supply gap

Thus, the strain exerted by the growing parking demand from new car registrations in Mumbai is unsustainable. Between 2098 and 2024, Mumbai registered an average of more than &2,000 new cars each year, translating to roughly 900 cars every single day. Each car requires a minimum space of 23 square meters (standards parking space requirement for open

parking). This means the city effectively needs the parking space of three football fields (9οΥ meters by ξζ meters) every ten days just to accommodate (at least one parking slot per car), – these new vehicles.

With vehicles parked %& per cent of the time, street space § already limited § is under enormous pressure. This also translates to cars occupying 9 percent of all un-built land in Mumbai every year, or 38 per cent of all undeveloped land area excluding natural areas every year. Without strong parking management and restraint measures, this unchecked growth threatens to choke the cityes streets, reduce public space, and undermine sustainable mobility goals.

For instance, South Mumbai (MHo9) highlights a significant disparity between vehicular parking demand and available supply, indicating a substantial infrastructure gap. While registered Light Motor Vehicles (LMVs) in the area number between approximately 3.48 lakh as per Vaahan, the total estimated parking capacity–combining public, estimated on-street, and off-street residential/commercial spaces–ranges only from 9.9 to 2.2 lakh spaces (considering roads >93.9m for on-street parking). This suggests a current parking shortfall potentially ranging from 9.3 lakh to 9.8 lakh vehicles. These vehicles eventually end up parking informally in the city either in narrow lanes or in the form or angled or perpendicular parking thus impacting the traffic movement in the city

#### Competing demand on land

Furthermore, there is already competing demand on land from other land uses and essential services like housing, health care, infrastructure for public transport services etc and need for ecological spaces (green blue infrastructure for heat management plan). Cities need more housing § especially affordable housing, commercial complexes, office spaces, medical and educational institutions, amenities and so on. There is already a considerable diversion of housing stock for non-residential uses. There are also challenges of vacant housing due to speculative investments that locks in properties and parking spaces. A sizable section of the urban population live in informal settlements requiring formal housing spaces. Increasingly, parking will compete for space in already dense neighbourhoods, worsening urban congestion and straining infrastructure even further.

#### Mobility challenges and opportunities

With growing population, the number of daily commuting trips in Mumbai rose by 39 per cent – from 9.00 crore trips to 9.89 crore – between 2004 and 2098. But increasingly, the share of trips carried by public transport have reduced. Public transports overall share dropped by 29 per cent during the same period – bus and suburban rail trips fell by 99 per cent and 92 per cent respectively and metros introduction led to a 2 per cent boost to public transport. In contrast, the share of personal vehicles and Intermediate Public Transport (IPT) rose significantly – by 94.8 per cent and 8.3 per cent respectively – indicating a shift toward more space – and energy-intensive modes.

This modal shift is further complicated by a rising per capita trip rate, which climbed from 9.90 in 2004 to 9.89 in 2090, and a notable increase in the average trip length from 99.9 km to 92.3 km.

The journey distances are also growing longer. Mumbai currently manages 98.92 million motorised trips daily. With the city-s population projected to grow to 23 v million by 203 v, the number of motorised trips is expected to soar to 29 v million j the trip rate remains constant, which is highly likely to increase, making the projection a conservative lower bound.

The ongoing expansion of the metro network, expansion of electric bus programme, and further strengthening of the suburban rail and multi-modal integration are an opportunity for augmenting and modernising public transport services to meet the growing travel demand.

#### Status of public transport

The city's backbone-its suburban rail network-has yet to fully recover from the COVID-99 shock, with ridership in 2023 \$28 still 93.8 per cent below 2099 \$20 levels. The average passenger density on trains stands at 92 persons per square meter, far exceeding the internationally accepted standard of  $\xi$  \$2, making daily commutes difficult and often unsafe.

Although the introduction of Metro Lines RA and 9 by Mumbai Metro One Corporation Ltd. (MMOCL) in RoRR brought a welcome 8% per cent boost in metro ridership, it remains a small dent in the overall need for a robust and balanced high-capacity transit network.

Mumbai's bus services § (BEST) has managed to regain its pre-COVID ridership levels, the long-term trend remains concerning. Passenger numbers are still lower than they were a decade ago, with a negative compound annual growth rate of -? per cent for both ridership and fleet size. Effective kilometres run per day have shrunk from 0 lakh in 2098 9% to just 8.0 lakh in 2023 8.78. This deterioration is exacerbated by worsening road congestion, which significantly hampers the reliability and punctuality of buses.

However, the ongoing initiative to expand the metro system, electric bus programme and further strengthening of suburban rail are an opportunity to reengineer mobility in the city.

#### Growing opportunity for transit-oriented development

Proximity to public transit and expansion of metro network presents a powerful opportunity for Mumbai to adopt a more transit-oriented development (TOD) approach as per the central TOD policy. A network-based proximity analysis to assess how well public transit stops are accessible across the city, using buffers of 800 metres, 400 metres, and R kilometres, commonly used to represent walkable and cycling distances. In a densely populated cities, a sizeable share of Mumbai's population can live within 99 minutes walking distance from transit stations. Bridging these spatial gaps with street accessibility, multi-modal integration, are key to reducing reliance on personal vehicles and ensuring inclusive, efficient urban mobility. Mumbai particularly has enormous opportunity for that.

This emerging mobility scenario and the land limitation warrants a policy for rationalizing and managing parking within the operative restraints and congestion pricing to achieve sustainable and liveable cities.

### Scope of the policy

This policy will target to rationalize and attain integrated management of off-street or structured parking lots and on-street legal parking (to be earmarked based on essential criteria to be adopted for parking management area plans) to reduce parking congestion and reduce exponential increase in parking demand in the future.

 This policy will be implemented as a "Proof of Parking and Parking Management" policy that will be applied to the new car registration in key cities of Maharashtra.

- Two-wheelers will not be included in this policy due to the pragmatic nature of their parking. The "proof of parking" policy targets cars and large vehicles as these require significantly more parking space than two-wheelers. Also two-wheelers are often used for commuting and errands § especially as part of the delivery services and a "proof of parking" policy are often not practical for them. Moreover, a car which is of bigger size has on an average occupancy of 9.3, whereas two-wheelers that are much smaller, have minimum 9.0 occupancy. This makes two-wheelers a lot more space efficient. However, two-wheelers can be required to be parked within the parking areas to be identified by the parking area management plans.
- This will require prospective car buyers to provide proof of access to a designated legal parking area for a pre
  determined minimum duration of the day (e.g.99 pm to c am) to enable registration of a new private car. This will not
  apply to two wheelers.
- This policy will be linked with inventory of legal parking areas as per the parking management area plans for wards and contiguous clusters of neighborhoods that will help to identify the organized legal parking areas on roads, in buildings and commercial parking lots and any other.
- In order to achieve efficient implementation and avoid duplication of parking spaces for a given vehicles serialization of legal parking spaces would have to be undertaken
- This will also promote asset sharing of existing parking facilities to unlock the potential of the assets and maximise usage.
- To the extent possible across individual cities shared parking needs to be encouraged, wherein spaces with suboptimal utilization such as MLCPs, Commerical complexes and malls (night time), etc. can be evaluated as potential areas for shared parking through a digitized platform
- This shared parking can be facilitated through a market driven approach to parking wherein the onus to create any supply needed as well as management and monetization of the parking infrastructure can be done in a digitized manner through public private partnership mode.
- Organized and well managed parking will protect urban greens, footpaths, ecologically sensitive areas, emergency vehicle lanes on narrow roads, other road users among others.
- This policy can aim to create incentive for electric vehicles for its accelerated adoption for zero emissions transition.

- Effective and variable pricing of parking can help to rationalize the usage further.
- It becomes important that the Proof of Parking Policy be complemented with the City Parking Policy which comprehensively looks at on-street parking rules for all vehicle types to ensure parking discipline. Demand-based pricing for high demand on-street parking, and enforcement will be part of the parking policy.
- Area-level parking management plans will have to be developed to implement it. Cities like Delhi, Chennai have prepared such plans. Mumbai has also developed ward-level parking management plans for D, K-West, and S wards.
   Area-level parking management plans provide parking management strategies for Type 9-8 urban typologies as listed above.
- Parking management area plans will help to identify streets for night time parking of commercial vehicles. That will enable linking their registration with proof of parking as permitted under the Central Motor Vehicle Act and rationalize their parking.
- Parking management area plans will integrate public bike sharing systems and also facilities for parking of bicycles.

#### Supplementary actions to be undertaken

- 9. Night-time enforcement: This is to ensure that the vehicles with Proof of Parking certificate park inside the buildings. During the transition phase some on-street parking may be designated where needed. The day-time enforcement is to check on haphazard parking, illegal parking outside designated and demarcated areas, and non-payment of parking fees.
- Provide the second state of the second stat
- 3. Congestion pricing: To address the additional challenge of increased day time influx of vehicles from outside the cities as well as to address the crippling congestion in selected hotspots inside the cities a congestion pricing is also proposed to decongest the cities and to create vibrant and regenerated public spaces.

# Legal premise and framework

### Premise for proof of parking

The Central Motor Vehicle Act and Rules (9822 and amendments) have provisions that authorize the state Government to implement Proof of Parking Policy. This legislation is in the concurrent list that allows the State Government to carry out local amendments as needed but that needs to be consistent with the rules of the Central Act. At the state level this Act is administered by the Department of Transport.

There are two critical provisions that define the competence of the state government to define such rules.

Under the Chapter VIII on control of traffic (CMVA and Rules, 99CC),

- Section 990 provides for the State Government or any other authorized authority to determine places at which motor vehicles may stand either indefinitely or for a specified period of time, and may determine the places at which public service vehicles may stop for a longer time than is necessary for the taking up and setting down of passengers. Provided that the State Government or the authorized authority shall, give primacy to the safety of road users and the free flow of traffic in determining such places:
- Under Section 932 and Section 932(?)(e) the State Government has the power to make rules regarding the maintenance and management of parking places and stands, and any fees that may be charged for their use. These rules are part of a broader authority for the State Government to implement the provisions of the Act. These rules are part of a broader authority for the State Government to implement the provisions of the Act related to traffic control.

This rule empowers the State Government to not only decide on the provision of parking in any public streets and areas but also how other road users or spaces need to be protected from parking. The same rule states for instance also prohibits the use of footpaths or pavements by motor vehicles.

### Precedents of implementation of proof parking in other Indian cities

There are precedents especially in the landlocked and land limited hill towns where Proof of Parking have been implemented to contain the number of cars as limitless expansion is not possible.

**Mizoram :** Mizoram under the powers conferred by section  $\xi Y$  of CMV Act,  $9\xi \zeta \zeta$  that relates to registration of motor vehicles (Chapter IV) § amended the rule YS of Mizoram Motor Vehicle rules . Accordingly the Mizoram Vehicle Act,  $9\xi \zeta \zeta$  (No YS of  $9\xi \zeta \zeta$ ) and the Mizoram (Regulation and Control of Vehicles Parking) Rules, 2000 have amended the clause YS of Mizoram Motor Vehicle Rules  $9\xi Y$  to state that "Provided that before registering any type of vehicles including two-wheelers, the person intending to register shall obtain a certificate from any officers of the Transport Department or any agency i.e., local councils/ village councils authorised by Director of transport declaring that he has a garage under his lawful possession of a garage to hire from other person, for parking the vehicle he intends to get registered. The certificate will be as in Form  $\zeta 0$  appended to these rules."

Accordingly under clause (e) of section 932 of the Mizoram Vehicle Act, 9822 (No 48 of 9822) this regulation has been further defined to state that State Government may declare and specify from time to time parking areas in different parts of city/towns as parking places for vehicles of different kinds. Such parking areas shall be notified. No Motor Vehicles shall be parked on any public streets, road sides, thoroughfares or any open spaces within the limit of proper city/town areas except in particular places demarcated specifically by the Government or any authority authorised in this behalf the Government as parking areas. Government may charge a parking fee on Vehicles during the parking hours for parking in such places as declared as parking areas as per the rate prescribed.

Sikkim : Sikkim has also exercised the same authority under the section 932 sub section 2 (e) of the Central Motor Vehicle Act, 9822 to implement Proof of Parking for personal vehicles. This makes it mandatory for availability of parking space certificates to be produced for registration of all vehicles and authorized to issue such certificates. Superintendent of police charge of traffic and the concerned Panchayat will issue certificates only after proper physical verification of the parking space. For the rest of the areas the Transport (M.V. Division) Department officers are to visit the site of parking and submit details of space along with a rough map of the site. Delhi Maintenance and Management of Parking rules २०१९ has under the same clause and rules of the Motor Vehicle Act, १९८८ has included Proof of Parking for transport vehicles. Accordingly, the permits of Transport Vehicles shall be granted or renewed only upon submission of proof of parking space from an authorized body for at least one year.

Additionally, there have been judicial interventions to introduce Proof of Parking. For instance, the High court order dated RRnd May Rogy has directed that no new vehicle which is intended to be plied primarily within Shimla Municipal area will not be registered in the State unless the intending purchaser produces a certificate from the Collector, Shimla.

## Amendments for Proof of Parking (PoP) Policy

To enable implementation of PoP, several related legislations will require amendments.

#### Maharashtra Motor Vehicles Rules (Rules under the Central Motor Vehicles Act, 1988):

- Insert a new rule mandating submission of a certificate of 'Proof of Parking Availability' by applicants for registration of specified vehicle categories (e.g., private four-wheelers) in notified urban areas.
- The rule should:
  - Define acceptable proof (e.g., registered lease, ownership documents, society-issued certificate).
  - Empower RTO to verify submitted proof, including potential cross-verification with BMC/municipal databases.
  - Explicitly state that failure to provide valid proof will result in refusal of vehicle registration in designated areas (e.g., Mumbai).

#### Maharashtra Municipal Corporations Acts (e.g., Mumbai Municipal Corporation Act, 1888 / Maharashtra Municipal

Councils, Nagar Panchayats and Industrial Townships Act, 1965):

- Enable Municipal Corporations to maintain a digital database of off-street parking linked to property identification numbers.
- Empower Municipal Corporations to issue digitally signed certificates of 'Proof of Parking Availability'.
- Mandate secure sharing of parking data with State transport authorities via APIs.
- Strengthen enforcement by linking building permissions and occupation certificates with verified parking space provisions.

#### Maharashtra Co-operative Societies Act, 1960

- Mandate all housing societies to maintain accurate parking allotment registers.
- Enable societies to issue verifiable, legally recognised certificates confirming exclusive parking allocation and digitise parking records for third-party verification by authorities (RTO/BMC).
- Clarify transferability rules of parking slots linked to flat ownership.

#### Maharashtra Apartment Ownership Act, 1970

- Require apartment associations to issue verifiable documentation confirming exclusive parking rights for PoP.
- Ensure documentation of parking rights in the Deed of Declaration or conveyances.
- Provide mechanisms for associations/owners to obtain verifiable parking documentation suitable for PoP compliance.

#### Maharashtra Housing and Area Development Act, 1976 (Powers of the Affordable Housing Authority)

- Mandate that all new housing developments and redevelopment projects include designated parking spaces as per the development norms, with details recorded in official plans.
- Empower the Authority to maintain a digital registry of parking allocations linked to property records, accessible for verification by RTOs and Municipal Corporations.
- Strengthen enforcement by linking housing scheme approvals to verified parking arrangements.

## Mumbai Metropolitan Region Development Authority (MMRDA) Act, 1974 (Powers of MMRDA as Special

Planning Authority):

- Incorporate mandatory parking provisions in the approval process of development projects within the metropolitan
  region and ensure that development permissions are conditional upon provision and verification of adequate
  permissible parking spaces.
- Facilitate integration of parking data into regional planning databases for better infrastructure management and cross-verification by transport authorities.
- Mandate cooperation with Municipal Corporations and RTOs by sharing verified parking data through secure mechanisms.

## Amendments for Congestion Pricing (CP) Policy

#### **Option A: Maharashtra Motor Vehicles Rules:**

Insert a new rule authorizing the State Government to:

- Notify "Congestion Zones" within urban areas and impose a "Congestion Fee" on motor vehicles entering or operating within such zones during specified times.
- Define a new levy as 'Congestion Charge' or 'Road User Charge', distinct from registration/fitness taxes.
- Enable electronic collection of the fee, using technologies like ANPR and FASTag.
- Define penalties for non-payment, leveraging either existing MVA structures or creating new ones.
- Provide flexibility for variable rates (time of day, vehicle class, emissions rating of vehicles).

#### **Option B: Maharashtra Motor Vehicles Tax Act, 1958:**

Insert a new section to:

• Empower the State Government to designate specific urban areas as High Congestion Zones and levy a "Congestion Fee" on vehicles entering or operating in these zones during specified hours.

- Allow differential pricing based on vehicle type, emissions, or time of entry.
- Permit digital collection (FASTag, etc.).
- Credit revenue to a dedicated fund for public transport and sustainable mobility.
- Enable rule-making powers for implementation, exemptions, enforcement, and penalties.

#### **Option C: Maharashtra Municipal Corporations Act / Councils Act:**

Amend to explicitly empower Municipal Corporations to:

- Declare "Congestion Pricing Zones" within their jurisdiction; and set, levy, and collect congestion charges for vehicles in these zones during specified times.
- Use ANPR and FASTag technologies for fee collection.
- Define exemptions and differential pricing structures and establish enforcement mechanisms/ penalties.
- Mandate allocation of collected revenue to a dedicated urban transport fund for city improvements.
- Mandate regeneration of these areas with improved accessibility, walkability, cycling, and intensification of public transport services.

#### Option D: Enact New State Act - "Maharashtra Urban Congestion Management Act"

Enact standalone legislation to:

- Provide comprehensive legal authority for congestion pricing across Maharashtra.
- Clearly define objectives: congestion reduction, pollution control, funding public transport and developing walkable streets.
- Grant powers to State Government and Municipal Corporations to implement CP schemes.
- Authorize designation of zones, variable charges, technology use (ANPR, FASTag), and exemptions.
- Establish mechanisms for collection, enforcement (penalties for non-payment), and appeals.
- Include provisions on data protection, transparency, reporting, and public accountability.

# **Operational framework**

## Implementation of Parking management area plans (PMAPs) for enabling Proof of Parking

Municipal Corporation of Greater Mumbai (MCGM) and the other concerned municipal authorities in other cities are empowered to frame PMAPs to identify and notify well-demarcated legal parking areas, common and public parking facilities in commercial and institutional areas, and available parking in buildings that are available for public parking while balancing the infrastructure needs of the other road users, street amenities and urban greening.

PMAPs can help in **inventorisation and serialization of parking slots** in the city, enabling **each parking space to have a universal unique serial ID**. This unique serial ID for each parking space provide the framework to ensure every car is assigned a unique parking space – but that if needed can be shared. This rationalization helps to provide legal access of car owners to parking, identify areas that are under-utilized and optimize usage through shared parking with different time usage.

Parking management area plans also define the areas that cannot be utilized for parking like green areas, parks, footpaths (as per the CMVR rules), emergency vehicle lanes in narrow streets, or very narrow streets, very close to intersections etc. This helps to reduce congestion and regenerate public spaces. This needs to be defined by the municipalities.

PMAPs need to integrate variable parking pricing based on duration and user pay principle as per National Urban Transport Policy and rationalise parking pricing of the structured multi-level car parks and on-street parking through an integrated management system. The on-street parking charge needs to be higher than the off street structured parking. Also reduce availability of on-street parking close to the multi-level car parks and as locally warranted. A part of the augmented parking revenue can be utilised for local area improvement to build public support.

PMAPs enable a phased approach towards regulating on-street residential parking along with the cooperative societies by assessing parking demand, and for earmarking areas for on-street parking. Parking supply can be augmented by use of stack parking wherever possible. Local bodies may consider a system of leasing parking permits for part use of public on-street parking space to the residents/RWA of an area. Based on PMAP the residents can be issued a residential parking permit.

PMAPs can help to identify streets that can be dedicated for night time parking of other modes of transport like taxis, city based commercial vehicles, trucks etc.

## Need of sub-district/ward level implementation plan within cities

Mumbai's urban landscape reflects striking intra-city variations across wards in terms of population density, slum concentration, and number of households, as evident from the 2011 Census data.

The city's population of over 1.24 crore is unevenly distributed across its 24 administrative wards, with significant variations in both total population and population density. Western Suburbs, one of the three areas under which the wards of Mumbai are located houses the greatest number of people at 44% of the total population followed by Eastern Suburbs at 31% and Mumbai central with the remaining 25%. For example, Ward P/N alone houses over 9.4 lakh people—more than five times the population of smaller wards like A and B.

The population density across wards underscores the stark heterogeneity within the city. While Wards like C (86,904 people/sq. km), G/N (68,383), and L (57,558) are extremely dense, others like Ward T (7,967) and P/N (20,160) are comparatively sparse. This contrast highlights why a one-size-fits-all parking policy will not be ideal. Densely populated wards may require stricter parking controls, whereas lower-density areas may benefit more from zonal pricing or demand-based solutions.

This spatial and demographic imbalance means that the pressures on land, infrastructure, and public services—especially parking—differ dramatically across the city. Recognizing and responding to these localised realities is crucial when planning any city-level intervention, and especially so for something as space-intensive and behaviour-sensitive as parking.

## Differing dynamics within cities : Ward Level typology

Additionally, a closer look at ward-level data reveals stark contrasts in slum population, household counts, and vehicle densities. For instance, slums in wards like P/N, L, M/E account for a disproportionately high share of ~33% to the city's population, while others like A, B, C and D have almost none.

These differences influence how public space is used, how streets are occupied, and how responsive communities might be to enforcement measures. Moreover, vehicle density and ownership patterns are unlikely to be uniform—wards with lower-income populations may see higher shared mobility or two-wheeler dependence, while wealthier wards may face higher private vehicle saturation. This is evident from the figures – as per Vaahan as of date there have been almost 39 lakh motor vehicles registered across the four RTOs of Mumbai (MH 01, 02, 03 and 47). A significant portion of these vehicles, over 46% are registered in the wards from Western Suburbs while the rest are more of less equally distributed amongst wards in Eastern suburbs and Mumbai central. The distribution of passenger cars follow a similar pattern with 46% of vehicles in Western Suburbs, 31% in Mumbai central and rest 23% in Eastern suburbs.

The dif	ferences	start	appear	when	we	look	at	vehicle	dens	sity	and	pen	etrati	on	levels	acros	s these	three	area	s:

Ward	No. of cars per 9000 persons	Car density		
		(per sq. km.)		
City	ଓદ୍	४,९६९		
W.S.	દ્દષ્ઠ	२,४०२		
E.S.	84	१,५९७		
Average	દ્દ૧	२,५१३		

Car ownership and density for the available area are the highest in Mumbai central area at 76 cars per 100 people and 4,969 cars per sq.km while for western suburbs it is 64 cars per 1000 people and 2,402 cars per sq.km. and for eastern suburbs it is 45 cars per 1000 people and 1,597 cars per sq.km.

There is also a lot of variability in the pattern of land-uses and built density across wards and neighbourhood clusters that have bearing on land availability. Hence, a policy that overlooks these dynamics risks being both ineffective and inequitable. Therefore, a ward-level implementation framework is crucial to align parking strategies with localized demographic, spatial, and socio-economic realities. Tailored interventions will not only improve effectiveness but also ensure equitable distribution of urban resources.

### Different parking availability within wards : building level typology within wards

Four distinct urban typologies or building development can be identified:

- 1. **Type 1: Areas with buildings that hardly have off-street parking:** These areas have buildings that are walk-up apartments (ground + 3 or 4 floors), with little or no building setbacks. Parking primarily happens outside the buildings, on streets. Areas like Bhuleshwar, Kalbadevi are examples.
- Type 2: Areas with buildings that have some off-street parking: These areas have buildings that are stilt + 3-7 floors, with building setbacks as per the old building regulations. Some parking happens in the stilt area and margins, and some spill-over happens on streets. Areas like Dadar Parsi Colony, Shivaji Park are examples.
- 3. **Type 3: Informal settlements (slums) with no off-street parking:** These have no off-street parking facility, parking only happens on the peripheral roads of the settlement.
- 4. Type 4: Areas with buildings with ample off-street parking: These areas have high-rise buildings with sufficient parking provision in the form of basement parking, podium parking, or mechanical/stack parking. Parking usually happens inside the building premises or complex. Many areas in Mulund, Vile-Parle, Goregaon have undergone redevelopment or have big residential complexes have such developments.

Those living in Type 1, 2, and 3 developments will most likely find it challenging to identify off-street parking spots within their place of living. In such cases, the user may rent public or private parking in a nearby location, if they wish to own a four-wheeler.

#### Complementary measures to be considered for implementation of Proof of parking

#### Management of night time parking : Night time parking restrictions

The critical element of Proof of Parking Policy is to rationalize and manage access to legal parking inside buildings and on-street during night time. The objective is to gradually eliminate all on-street parking in residential areas and reclaim this space as public common, creating safer and more vibrant neighbourhoods. Regeneration of residential areas will enable reorganisation of parking and accommodating parking needs within property premises.

Currently, there are no regulations for night time parking. This has led to excessive accumulation of night time parking and in many places and land-uses night time parking is nearly end to end of the streets. Night time parking demand is generated from both private cars and commercial vehicles.

The Proof of Parking will help to operationalize the night time parking management as the legal process of identification of night time parking spaces will have to be put in place. It can freeze the currently committed spaces and begin to rationalise this.

There are examples from other cities.

#### Example : Kolkata Parking Policy 2017

For instance, in Kolkata, as per the Parking Policy, 2017 of Municipal Corporation (KMC) car owners are allowed to park in front of their premises, after registering their parking location against a fee collected by the corporation. The parking location permission is awarded online after a self-declaration form is submitted by the vehicle owner. The permission can be cancelled if verification finds incorrect personal or location details, overlapping with an already registered space, obstruction or encroachment, etc. Also night time parking is applicable only in roads wider than 18 feet. Residential parking spaces located directly in front of individual homes are managed by the Kolkata Municipal Corporation (KMC). Designated on-street parking areas permitted for night-time use—predominantly serving commercial vehicles are operated by authorized third-party private agencies. Although private car owners may also avail of these facilities, the applicable tariffs are comparatively higher than those for residential spaces registered with KMC. Additionally, while developing the night time parking regulations, parking permits or stickers may be introduced for vehicles that have access to legal parking areas for identification and enforcement.

Global practices also indicate that night time parking regulations are critical for successful implementation of Proof of Parking.

#### Example : Japan's Night time parking ban

For instance, Japan that has implemented Proof of Parking successfully by enacting "Motor vehicle storage act 1962" has eventually banned on-street parking. It is mandatory to provide proof of parking or garage space (off-street space) certificates from local police in order to register new vehicles. In case, prospective vehicle buyers don't have a parking space then they are allowed to lease a parking space from others providing the space is available within 2 km from the buyer's residence. All vehicles except two-wheelers and small cars are exempted from this regulation. They have also introduced strict penal actions and fees in case any vehicle found parking illegally on-street at night. They are also mandated to register parking spaces owned by the citizens and they are required to pay an annual fee for the utilization of the same. It ensures annual updation of the parking registry and also helps to meet administrative costs like random audits or inspections. Japan's introduction of POP, also highlights the need of supplementary measures like demarcating legal and no parking spaces in the city for effective implementation.

## Market driven approach for management of parking spaces

The demand for parking, right on-street pricing in high-demand areas, and strict on-street parking enforcement provides a favorable environment for market-driven parking supply. Private owners, businesses, and start-ups can find renting vacant parking spots lucrative.

Benefits of market-driven parking supply:

- 1. Government doesn't have to invest public land and budget to build parking, and can use it for other social amenities.
- Government doesn't have to mandate high minimum parking requirements in building regulations. This will keep the real estate price under control, as each parking can costs Rs. 5 – 30 lakhs in Mumbai, based on the location. It will be win-win for both consumers and developers.
- 3. Market-driven supply can boost business opportunities for start-ups and jobs. It can improve investments in upgradation of parking facility management.
- 4. Market driven on-street parking pricing can help to rationalise the fees based on demand and supply of parking in a given area while ensuring maximum capacity has been utilised.

## Implementation of a congestion fee

To address the additional challenge of increased day time influx of vehicles from outside the cities as well as to address the crippling congestion in selected hotspots inside the cities a congestion pricing is also proposed to decongest the cities and to create vibrant and regenerated public spaces.

As of date, there are a little over 11.5 lakh light motor vehicles registered within the city limits. Additionally, data from MSRDC toll plazas indicates that an average of 1.08 lakh vehicles enter the city daily representing an influx of approximately 8.5% over the city's base vehicle volume. This takes the effective daytime vehicle presence in the city to nearly 12.6 lakh. Such volumes not only strain infrastructure but also exacerbate issues related to air quality, travel time, and overall urban livability. A carefully designed congestion fee, with a targeted approach taking into consideration **high-traffic zones, narrow street zones** and **peak times**, can act as both a deterrent and a revenue source—helping fund sustainable mobility alternatives and public realm improvements.

## Implementation of a Digital Parking Management system

#### Smart parking and digitization

PMAP can also enable IT based parking area management and reform of contractual agreement for smart parking management. Both PMAP and Proof of Parking will require extensive digitisation of parking for monitoring and enforcement.

BMC and other municipal bodies need to reform parking contracts for upgraded facility management (hardware, software, and facilities) for proper road marking and demarcation, signages, dynamic display boards for commuter information, application of IT and information systems, monitoring of enforcement activities, etc.

Smart apps can give users real-time information of capacity and occupancy of on-street and off-street parking facilities, nearest available parking spot(s) and charges. Also in shared places it is necessary to remove the junk vehicles from roads.

Key technical considerations and guidelines for implementation of a Parking management solution

IT perspective	Considerations for implementation by city ULBs
	Wired vs. Wireless: Network connectivity needs at parking locations needs to be assessed during
	implementation. Wi-Fi and cellular data is convenient for mobile devices (e.g., handheld enforcement
	devices), but wired connections offer greater stability for critical systems like access control and gantries
Network	Bandwidth Requirements: Assessment of the bandwidth needed to support all devices (cameras, access
Infrastructure	control systems, payment terminals, mobile devices) especially video surveillance which can consume
for Parking	significant bandwidth.
Infrastructure	Network Security: Robust security measures (firewalls, intrusion detection/prevention systems) need to be
init astructure	in place to protect the network from unauthorized access and cyber threats. Network segmentation to be
	considered to isolate sensitive systems (e.g., payment processing) from other parts of the network.
	Redundancy and Failover: Network to be designed with redundancy in mind to minimize downtime.
	Implement failover mechanisms to ensure that critical systems are operational in event of network outage.
	On-Premises vs. Cloud: Decision to be taken whether to host the parking management system and related
	applications on-premises or in the cloud. Cloud solutions offer scalability and reduced maintenance
	overhead, while on-premises solutions provide greater control over data and security.
	Server Specifications: Determine the appropriate server specifications (CPU, memory, storage) based on
Sorvor	the expected workload.
Infrastructure	Operating System: Choose a suitable operating system (e.g., Windows Server, Linux) based on the
init astructure	application requirements and IT expertise.
	Database Management System (DBMS): A robust DBMS (e.g., MySQL, PostgreSQL, Microsoft SQL
	Server) to manage parking data. Ensure the DBMS is properly configured for performance and security.
	Backup and Disaster Recovery: Implement a comprehensive backup and disaster recovery plan to protect
	against data loss.
	Access Control Systems: Select appropriate access control hardware (e.g., gates, barriers, card readers,
Hardware	ANPR cameras) based on requirements of each parking location.
Infrastructure	Payment Kiosks: For shared parking, If accepting cash payments, deploy secure payment kiosks with
	appropriate security features.

	Payment Gateway: Securely processes online and mobile payments.								
Components	Access Control System: Hardware/software for controlling entry/exit to parking areas (e.g.barriers, ANPR)								
Core System	payments, and enforcement.								
	Parking Management System (PMS): The central software for managing parking spaces, reservations,								
	issuing tickets and managing parking violations.								
	Handheld Devices: Equip enforcement officers with handheld devices (e.g., smartphones, tablets) for								
	cameras are properly positioned and provide clear video footage.								
	Surveillance Cameras: Install surveillance cameras to monitor parking areas and deter crime. Ensure the								

# Institutional framework

- State level Apex Committee to be formed under the Chief Secretary, Government of Maharashtra with secretaries of all the departments concerned
  - Key roles: Oversight, monitoring of implementation and compliance.
- State level executive/steering Committee under the Additional Chief Secretary/Transport Commissioner
  - Key roles: Interdepartmental coordination for implementation of the policies in targeted cities.
  - The MVD can act as the nodal agency for policy implementation, monitoring, and coordination.
  - o Stakeholders in the State level committee
    - Motor Vehicles Department Policy oversight, parking space registration regulation, coordination with MoRTH & RTOs, monitoring compliance
    - Parking authorities/ city level UMTAs under Urban Local Bodies (ULBs) Issuance and verification of Proof of Parking Certificates, local parking space mapping, congestion zone enforcement
    - Traffic Police Enforcement of congestion fees, violations, data sharing from ANPR systems
    - Public Works Department (PWD)/Development departments of ULBs Infrastructure support (e.g., road reconfiguration, signage, geofencing setup)
- Parking authorities/ city level UMTAs for planning and implementation (to include city level representatives from urban local bodies, special purpose authorities, Urban development departments and land owning agencies (e.g. defence, ports, etc.), traffic police etc)
  - o Key roles
    - As each city has a different character, it is advisable that local UMTAs or parking authorities be responsible for Creation of Parking management area plans (PMAP) to inventorize and serialise parking spaces in the city, also creation a parking action plan for off street

- Creation and implementation of a sub division or ward level parking management plan and rollout strategy of measures such as proof of parking and supplementary measures such as congestion pricing and night time parking
- Effective Enforcement of Proof of Parking certifications as well as complimentary measures such as night time parking ban, market driven parking management system, congestion pricing, etc. in coordination with Traffic police/traffic wardens as the case may be.
- Skill and capacity building in implementation agencies : There shall be a need of a two pronged skilling and institutional capacity building initiative within the stakeholder and implementation agencies and their personnel : wherein one aspect shall be of aligning the implementation agencies with the broader goal of the policy, while the second shall be to empower and equip them with the necessary skills and knowledge to drive a ward level implementation plan of this policy

# Proposed impact of the policy

#### This policy can improve overall mobility and commuting in the city

This policy along with congestion pricing can catalyse behaviourial changes that can improve mobility and reduce congestion in the city. People can begin to combine trips to reduce several individual trips daily; they can decide to avoid peak time to travel when parking pricing can be high; promote car sharing; shift to cheaper parking areas off-street; opt for auto or a taxi, shared transport, ride share, bike share; avoid car trips for short distances; take metro or a bus § especially those who are long term parkers; chose to park and ride or park and walk and also reduce parking duration.

#### How Proof of Parking and Parking Management Policy benefits both car and non-car users

**Car user will benefit** due to reliable and predictable access to parking spaces. Their parking area will not be encroached by the outsiders during night time. Also during day time, they can get reliable information about parking availability at the destination point and reduce cruising time, fuel cost and pollution. With improved management of parking facilities they will get efficient billing that will make payment more transparent and accurate.

Non-car user will also benefit as their accessibility will improved with uncluttered footpaths, improve walkable and cyclable access to public transport and last mile connectivity to bus-stops, metro stations. Improves safety of children, women and elderly people. This will improve visibility of shops, shopping experience and throughput of customers. Improve overall environment, green areas and public recreational spaces. Makes it easier for emergency vehicles like ambulances, fire trucks, police, etc. to negotiate streets.

Urban local bodies to benefit will benefit from public revenue generation for transportation and local area development projects.

Local residents benefit as people from other areas cannot park in their area without permit.

# Annexures

## Maharashtrass economic growth



Source: Planning Department, Govt. of Maharashtra

## Population and urbanisation of Maharashtra

Particular (in '०००s)	ዓያዩዓ	୧୧७୨	१९८१	१९९१	२००१	२०११
Total population	३९,५५४	५०,४१२	६२,७८४	७८,९३७	९६,८७९	9,9२,३७४
Urban population	99,9&3	9५,७99	२१,९९३	૱,ૡ૪૨	४१,१०१	५०,८१८
Urbanisation (%)	૨૮.૨%	३१.२%	<b>રૂ</b> ५.૦%	३८.७%	४२.४%	૪५.२%

Source: Directorate of Economics and Statistics, Maharashtra

## Vehicle population as of २०२४

Period	Period Period Start Year Vehicle		End Year Vehicles	Approx. CAGR	
<b>1971-1981</b> 10 year		307,030	906,299	11.43%	
<b>1981-1991</b> 10 year		906,299	2,947,972	12.52%	

<b>1991-2001</b> 10 yea		2,947,972	7,265,533	9.44%	
2001-2011	10 year	7,265,533	16,014,198	8.22%	
2011-2019	8 year	16,014,198	35,510,946	10.47%	
2019-2024	5 year	35,510,946	44,478,190	4.61%	

Source: Motor Vehicles Department

## Ward-wise population

Ward	Total Population	Population Share	Area (Sq. Km)	Density (population
	4.05.044	4.0/	44	per sq. km.)
A	1,85,014	1%	11	16,513
В	1,27,290	1%	3	47,907
C	1,66,161	1%	2	86,904
D	3,46,866	3%	8	42, <mark>203</mark>
E	3,93,286	3%	7	54,097
F/S	3,60,972	3%	10	<mark>36</mark> ,898
F/N	5,29,034	4%	12	43, <mark>088</mark>
G/S	3,77,749	3%	9	40 <mark>,</mark> 666
G/N	5,99,039	5%	9	68,383
City	30,85,411	25%	71	43, <mark>230</mark>
H/E	5,57,239	4%	12	<b>44,</b> 888
H/W	3,07,581	2%	9	<mark>34</mark> ,081
K/E	8,23,885	7%	24	<mark>34</mark> ,396
K/W	7,48,688	6%	25	<mark>3</mark> 0,508
P/S	4,63,507	4%	25	18,408
P/N	9,41,366	8%	47	20,160
R/S	6,91,229	6%	18	<mark>37</mark> ,762
R/C	5,62,162	5%	48	11,710
R/N	4,31,368	3%	14	<mark>3</mark> 0,438
W.S.	55,27,025	44%	222	24,864
L	9,02,225	7%	16	57,55 <mark>8</mark>
M/E	8,07,720	6%	33	24,425
M/W	4,11,893	3%	17	23,677
Ν	6,22,853	5%	26	24,254
S	7,43,783	6%	30	25,009
Т	3,41,463	3%	43	7,967
E.S.	38,29,937	31%	164	23,293
TOTAL	1,24,42,373		458	27,162

Source: २०११ Census

## Slum population

Ward	Total Population	Slum	Non-slum	Slum Share of total Slum	Slum Share in the area	Non Slum Share	Homeless population	No. of household
Α	1,85,014	22,282	1,62,732	0%	12%	88%	4,112	43,866
В	1,27,290	12,711	1,14,579	0%	10%	90%	3,273	27,140
С	1,66,161	16,571	1,49,590	0%	10%	90%	4,685	36,479
D	3,46,866	34,699	3,12,167	1%	10%	90%	2,334	77,556
E	3,93,286	1,24,194	2,69,092	2%	32%	68%	1,555	78,346
F/S	3,60,972	1,80,128	1,80,844	3%	50%	50%	774	79,733
F/N	5,29,034	2,38,128	2,90,906	4%	45 <mark>%</mark>	55%	832	1,19,624
G/S	3,77,749	1,24,306	2,53,443	2%	<mark>3</mark> 3%	67%	1,642	83,457
G/N	5,99,039	3,61,674	2,37,365	5.5%	60%	40%	1,989	1,28,138
City	30,85,411	11,14,693	19,70,718	17%	<mark>3</mark> 6%	64%	21,196	6,74,339
H/E	5,57,239	3,88,923	1,68,316	6.0%	70%	30%	754	1,20,266
H/W	3,07,581	82,552	2,25,029	1%	27%	73%	1,204	72,943
K/E	8,23,885	5,72,818	2,51,067	8.8%	70%	30%	2,323	1,90,845
K/W	7,48,688	2,15,678	5,33,010	3%	29%	71%	1,538	1,68,076
P/S	4,63,507	2,30,829	2,32,678	4%	50%	50%	587	1,06,922
P/N	9,41,366	7,08,247	2,33,119	10.8%	75%	25%	1,021	2,11,642
R/S	6,91,229	4,14,395	2,76,834	6.3%	60%	40%	704	1,59,639
R/C	5,62,162	1,72,849	3,89,313	3%	31%	69%	1,375	1,34,795
R/N	4,31,368	2,81,151	1,50,217	4%	65%	35%	367	1,04,091
W.S.	55,27,025	30,67,442	24,59,583	47%	<b>55%</b>	45%	9,873	12,69,219
L	9,02,225	7,58,108	1,44,117	11.6%	84%	16%	907	1,86,833
M/E	8,07,720	6,85,994	1,21,726	10.5%	85%	15%	356	1,66,400
M/W	4,11,893	1,64,992	2,46,901	3%	<mark>40</mark> %	60%	830	93,607
N	6,22,853	2,49,229	3,73,624	4%	<mark>40</mark> %	60%	1,167	1,37,885
S	7,43,783	4,08,442	3,35,341	6.3%	55%	45%	394	1,69,962
Т	3,41,463	85,560	2,55,903	1%	25%	75%	685	81,698
E.S.	38,29,937	23,52,325	14,77,612	36%	61%	39%	4,339	8,36,385
TOTAL	1,24,42,373	65,34,460	59,07,913	53%			35,408	27,79,943

Source: २०११ Census

Ward	Extrapolated population from 2011	Area (Sq. Km)	Density (population per sq. km.)	Total Motor Vehicle Population	Total PV-Car Vehicle Population	No. of cars per 1000 persons	Car density (per sq. km. of road)
А	2,79,850	11	24,978				
В	1,92,538	3	72,464				
С	2,51,333	2	1,31,451				
D	5,24,666	8	63, <mark>836</mark>				
E	5,94,880	7	81,827	10 71 174	2 54 676	76	4 969
F/S	5,46,003	10	55,811	10,71,174	3,54,070	70	4,909
F/N	8,00,211	12	65,174				
G/S	5,71,379	9	61,511				
G/N	9,06,100	9	1,03,436				
City	46,66,961	71	65,389				
H/E	8,42,874	12	67,897				2,402
H/W	4,65,244	9	51,551		5,33,845		
K/E	12,46,200	24	52,027				
K/W	11,32,458	25	<b>4</b> 6,146			64	
P/S	7,01,096	25	27,843	19 17 6/1			
P/N	14,23,901	47	30,494	10,17,041			
R/S	10,45,546	18	57,118				
R/C	8,50,320	48	17,713				
R/N	6,52,483	14	46,040				
W.S.	83,60,121	222	37,609				
L	13,64,696	16	87,062				
M/E	12,21,749	33	36,944				
M/W	6,23,025	17	35,814				
N	9,42,121	26	36,687	10,10,388	2,62,594	45	1,597
S	11,25,039	30	37,828				
Т	5,16,493	43	12,051				
E.S.	57,93,123	164	35,233				
TOTAL	1,88,20,206	458	41.085	38.99.203	11.51.115	61	2.513

## Passenger vehicle penetration and density:

Source: Vahan, Crisil

## Vehicle Density by Type (२०२४):

Vehicle type	As of FY05	As of FY10	As of FY15	As of FY20	As of Date
Two-Wheelers	139	687	1,921	3,600	5,265
Three-Wheelers	10	32	135	399	484
Cars/Jeeps (Pvt.)	177	490	1,050	1,700	2,512
LGV (Goods)	1	4	16	63	148
HMV/HGV (Goods)	1	2	3	14	37
Buses (All Types)	2	8	14	22	37
Other Vehicles	2	3	6	13	26

TOTAL (Approx.)	331	1,226	3,145	5,811	8,508

Source: Vahan, Crisil Estimates

The vehicle density (vehicles per square kilometer) varies dramatically across these

## megacities

Rank (by Population)	City	Country	Vehicle Density (vehicle s/km²)	Source (Vehicles)	Source (Area)	Year (Vehicles )
1	Tokyo	Japan	1,800	MLIT Japan	Tokyo Metropolitan Government	2024
2	Delhi	India	8,012	Ministry of Road Transport and Highways	Government of Delhi	2020
3	Shang hai	China	849	Shanghai Municipal Bureau of Statistics	Shanghai Municipal Government	2022
4	Dhaka	Banglad esh	5,817	BRTA	Dhaka City Corporations	2021
5	Sao Paulo	Brazil	5,844	City's Total Vehicle Fleet	Prefeitura de São Paulo	2022
6	Cairo	Egypt	843	CAPMAS	Cairo Governorate	2023
7	Mexico City	Mexico	3,906	INEGI	Government of Mexico City	2018
8	Beijing	China	389	Beijing Municipal Bureau of Statistics	Beijing Municipal Government	2023
9	Mumb ai	India	8,508	RTOs Mumbai	BMC	2024
10	Osaka	Japan	1,859	MLIT Japan	Osaka City Government / Prefectural Govt.	2024

Source: Official publications, Crisil Estimates

## Demand supply analysis framework for parking spaces



Source: Crisil

# Case Studies/Examples

## Global case studies

### Proof of parking

#### Japan: The "Shako Shomeisho" (Garage Certificate) System

This is perhaps the most well-known and comprehensive example of a proof-of-parking policy.

#### • Regulation:

- Mandated by the "Act on Securing Vehicle Storage Spaces" (commonly known as the "Garage Act").
- Requires anyone purchasing a new or used car (or changing their registered address) to prove they have secured a designated, off-street parking space (a "garage").
- The parking space must be located within a specific radius of the owner's registered residence, typically ?
   kilometers.
- The dimensions of the parking space must be adequate for the vehicle being registered.
- Using public roads as the designated overnight parking space is strictly forbidden.
- There are some exceptions, primarily for "Kei" cars (very small engine capacity vehicles <9?••cc) in designated rural areas where parking pressure is low.

#### • Implementation Authority:

- The local Prefectural Police Department is responsible for verifying the parking space and issuing the "Shako Shomeisho" certificate.
- Applicants must submit documents including: proof of ownership or lease agreement for the parking spot, a map showing the location of the spot relative to their residence, and the dimensions of the spot.

#### • Enforcement Mechanism:

- Primary: The Shako Shomeisho is a mandatory document required for vehicle registration at the Land Transport Office. Without this certificate, the vehicle registration process cannot be completed, effectively preventing the legal use of the car.
- Secondary: Police can issue fines if a registered parking space is found to be non-existent, falsified, or used for other purposes preventing vehicle parking. Standard parking enforcement applies to vehicles parked illegally on streets, regardless of whether they have a registered spot elsewhere.

#### • Monitoring Mechanism:

- Initial Verification: When an application is submitted, the police verify the documents. Historically, physical site inspections by officers were more common. Now, verification often relies heavily on the accuracy of submitted documentation (maps, contracts), though spot checks or inspections in case of doubt can still occur.
- Ongoing: Monitoring largely relies on the robust initial check during registration. Ongoing compliance (i.e., ensuring the spot remains available and used) isn't typically actively monitored unless complaints are received or during specific traffic enforcement actions. The system assumes compliance once the certificate is issued and registration is complete.
## Brief overview of the parking policy

### **Overview**

- The rule was enacted in 1962
- Overnight on-street parking is banned in Japan.
- They have a 60-min time limit after which cars are towed away. This might be crucial for PoP to work it's a twin policy to prevent cheating.
- Rents for private parking could cost up to 20,000 yen /~12,000 INR p.m. – hence many people do not buy cars

## **Scope for certification**

- All models except light cars and 2W
- Although not all of the country, but major cities such as Tokyo, Osaka, Sapporo, Fukuoka, Nagoya, Sendai and Yokohama are covered without exception.

## **Conditions for parking place**

- **Distance:** Needs to be 2 km or less from base location
- · No obstacles to enter and exit
- **Right to use** the land or building as your parking place

#### Fees (paid via revenue stamps)

- Parking Place Certificate: 2,100 yen / ~1,200 INR
- Parking Place Sticker: 500 yen / ~300 INR

## Procedure for regular cars

#### **Certification process:**

Submit application documents at a police station Receive the acceptance card from the police station with date on which certificate will be issued A police officer or a parking place inspector will visit the parking place for inspection, usually 1 or 2 days after application Acceptance card is brought to police station to receive Parking Place Certificate and Parking Place Sticker.

If application contains false or incorrect information or if the place is inadequate, a Parking Place Certificate will not be issued

If chassis number of vehicle cannot be confirmed, a Parking Place Certificate will not be issued

## **Application form for Parking Place Certificate**





## South Korea: Parking Place Certificate System

- Regulation:
  - Many cities, particularly Seoul, have regulations requiring proof of secured parking for certain vehicle types or in specific areas, often mirroring the Japanese model.
  - The requirement might be tied to vehicle size (e.g., for larger vehicles) or specific residential development zones.
  - It mandates securing an off-street parking space before vehicle registration.

## • Implementation Authority:

 Local government offices or police departments are typically involved in verifying the parking space and issuing the necessary certificate. Documentation requirements (proof of lease/ownership, location map) are common.

## • Enforcement Mechanism:

- $\circ$  Primarily linked to the vehicle registration process § the certificate is needed to register the car.
- Standard parking enforcement applies for illegal street parking. Enforcement against misuse of the registered spot may be less rigorous than the initial check.

## • Monitoring Mechanism:

- Focuses on the verification stage during the application for the certificate and vehicle registration.
- o Ongoing monitoring is less emphasized, relying on initial compliance and regular traffic enforcement.

## China (Major Cities like Shanghai/Beijing): License Plate Restrictions

• These cities use lottery or auction systems to severely limit the number of new vehicle license plates issued each month. This *indirectly* addresses parking (and congestion/pollution) by capping vehicle numbers.

- While not a direct "proof of parking" requirement for *individual buyers* in the Japanese sense, there are often stringent requirements for *new residential and commercial developments* to provide a minimum number of parking spaces based on building size/units (enforced via building permits/planning approvals).
- Citizen Response: High demand leads to extremely low lottery win rates and very high auction prices for plates, causing significant frustration and equity concerns, but accepted as a measure to manage mega-city scale problems.

## Hong Kong

## **Overview**

- Hong Kong does not officially have a garage certificate system. Instead, a de facto garage certification system – considering the parking lot as a separate piece of real estate.
- To purchase a car in Hong Kong, you must purchase a parking lot and register it.
- The Transport Advisory Committee (TAC) plays an oversight role in parking policy development, while the Transport Department (TD) implements various measures to increase car parking provision

## **Application Process:**

- Applications can be made online, but if the service is unavailable, applicants must apply in person at the respective estate's Carpark Shroff.
- Completion of the online form does not guarantee a parking space.
- Monthly parking permits are subject to the discretion of the Housing Society or its authorized agents.

## **Fees and Adjustments:**

- Monthly parking fees are reviewed annually and may be adjusted based on market levels.
- Disabled drivers are charged half the normal license fee upon presenting a valid Disabled Person's Parking Permit.

## **Eligibility and Resubmission:**

- Applicants must be residents of the selected estate.
- Monthly parking users must resubmit applications every three years with updated vehicle registration and address proof.

## **Order of priority:**

- Priority 1: Applicant is disabled and holding a valid Disabled Person's Parking Permit
- Priority 2: Applicant is the registered vehicle owner
- Priority 3: Applicant is not the registered vehicle owner
- Priority 4: 2nd or 3rd car applicant

## Singapore: Vehicle Quota System & Developer Standards

Singapore employs a multi-faceted approach heavily focused on managing vehicle population and ensuring new supply of

parking, rather than requiring individual proof of parking upon purchase.

- Regulation:
  - No Individual Proof-of-Parking: Singapore does *not* require car buyers to prove they have a parking spot

before registration.

- Certificate of Entitlement (COE): This is the primary vehicle ownership control mechanism. Prospective car owners must bid for a limited COE in the relevant category, which grants the right to own and operate a vehicle for 9° years. The number of COEs released is tightly controlled via a quota system based on vehicle de-registrations and targeted growth rates. High demand makes COEs extremely expensive, significantly limiting the overall vehicle population.
- Parking Provision Standards: The Land Transport Authority (LTA) and Urban Redevelopment Authority (URA) mandate strict minimum parking provision standards for all new developments (residential, commercial, industrial, institutional). These standards specify the number of car, motorcycle, and bicycle parking spaces developers *must* build, based on Gross Floor Area (GFA), number of units, location (e.g., reduced requirements near major public transport nodes), and type of development. This ensures parking infrastructure expands with urban development.
- Parking Management: Strict rules govern public parking in Housing & Development Board (HDB) estates and URA car parks, managed via electronic payment systems (<u>Parking.sg</u> app, Electronic Road Pricing Gantry upgrades) and season parking schemes for residents. Street parking is regulated and limited.

#### • Implementation Authority:

- LTA: Manages the COE system, sets Parking Provision Standards (jointly with URA), manages vehicle registration, regulates public transport, and oversees traffic management including parking enforcement technology.
- URA: Sets land use planning guidelines, including integrating parking standards into master plans and development approvals. Manages some public car parks.
- HDB: Manages parking within public housing estates, which house the majority of the population, including allocation of season parking.
- Singapore Police Force (Traffic Police): Enforces traffic regulations, including illegal parking.

## • Enforcement Mechanism:

- **COE:** Enforced through the mandatory bidding system and linking COE validity to vehicle registration. Owning/using a car without a valid COE is illegal.
- Developer Standards: Enforced through the planning and building approval process. Developments cannot get permits (Temporary Occupation Permit/Certificate of Statutory Completion) without meeting the mandated parking requirements.
- Parking Violations: Enforced rigorously through LTA and HDB officers, traffic police, and increasingly through automated camera systems. Fines and demerit points are issued for illegal parking. Digital payment systems also inherently track usage in paid zones.

## • Monitoring Mechanism:

- COE: Quota and bidding results are publicly tracked by LTA.
- Developer Compliance: Monitored through submissions during planning approval and site inspections by URA/LTA/Building and Construction Authority (BCA).
- Parking Usage/Violations: Monitored via digital payment data, electronic surveillance (cameras), and enforcement officer patrols. Public feedback via apps also contributes.

## Brief overview of the parking policy

## **Overview**

- Housing Development Board (HDB) and Urban Redevelopment Authority (URA) manage parking services.
- Singapore has only 14,533 explicitly marked onstreet car parking spaces and over 700,000 cars.
- It has different parking rates depending on the area.

## **Scope for certification**

- Owners of cars, commercial vehicles and motorcycles will need to pay a fee to HDB for parking their vehicles.
- Under the Vehicle Parking Certificate (VPC) scheme, heavy vehicles in Singapore need to have a parking space licensed by Land Transport Authority (LTA)
- If you drive or own a heavy vehicle, you can only park it overnight at specified heavy vehicle parks with a valid Vehicle Parking Certificate (VPC).

## **Conditions for parking place**

- When to apply:
  - Renewal of road tax
  - Transfer of parking arrangement from one parking place to another
  - Transfer of parking arrangement from one vehicle to another
  - Transfer of vehicle ownership
  - Registration of new vehicle
  - Registration of laid-up vehicle
- The maximum vehicle parking certificate (VPC) period allowable is 12 months

## **Payment modes for parking**

- Parking.sg app
- Coupon parking
- Stored-value cards for gantry car parks

## **Parking signs**



# There are three categories of parking in Singapore:

- 1. Spaces that are open to all are marked with white lines.
- Spaces for season-permit holders (long-term parking) are marked with red lines. These red spaces are for any vehicle with a permit for that neighborhood. There are no individually reserved slots.
- 3. Spaces that are public most of the time, but which are seasonparking only at night and on Sundays. These are marked with dashed red and white lines.

## Monthly parking charges

Location/ Type of Car Park	Season Parking Charges				
	Car		Commercial Vehicle *	Motorcycle	Motorcycle (requiring
	Tier 1	Tier 2			2 lots)
Restricted Zone / Car-lite Precinct (Surface/ Kerbside)	\$80	\$165	\$185	s15	\$30
Restricted Zone / Car-lite Precinct (Sheltered) <sup>1</sup>	s110	\$190	\$185	s17	\$34
Designated Area (Surface/ Kerbside)	\$80	\$15O	\$185	s15	\$30
Designated Area (Sheltered) <sup>1</sup>	s110	\$17O	\$185	s17	\$34
Rest of Island (Surface/ Kerbside)	\$80	\$90	\$185	s15	\$30
Rest of Island (Sheltered) <sup>1</sup>	\$110	\$120	\$185	s17	\$34
Special Precinct <sup>2</sup>	\$95	\$105	N.A.	N.A.	N.A.
Industrial Park (Multi-Storey Car Park)	\$110	\$120	\$13O	s17	\$34
Centralised Lorry Park	\$80	\$90	\$85	\$15	\$30

Tier 1 season parking rate will apply to a resident's first car of the household. Resident must be the registered flat owner/ occupier/ tenant living in the HDB precinct served by the car park.

Tier 2 season parking rate will apply to the residents' subsequent cars and all cars of non-residents.

These two tiers will also apply to registered flat owners/ tenants/ stall holders of HDB shops and market stalls.

\*1 Singapore Dollar equals 63.54 Indian Rupee

## Singapore discourages workplace provided free-parking

- Workplace parking in Singapore usually includes some paid public parking.
- For example, at many (perhaps most) office buildings in Singapore anyone can park there, even if you are not heading to that building. You can park in the paid parking and walk to some nearby destination if you want.
- Much of the off-street parking is open to public and priced:
  - Most office buildings include priced public parking
  - Shopping centres too
  - Parking in HDB housing estates is mostly open to the public

## **Order of Priority**

Prioritizing of parking allocation is necessary to ensure fair distribution of parking lots.

- 1. First vehicle owned by:
  - HDB flat owners, tenants, authorised occupiers, and approved tenants of whole flats
  - Registered tenants of HDB commercial and industrial premises
  - Market and hawker stallholders
  - Employees of HDB's shops/ offices
- 2. Second priority:
  - Second and subsequent vehicles owned by flat owners/ tenants/ authorised occupiers/ registered shop tenants
- 3. Third priority:
  - Residents who do not own the vehicle
  - Tenants of rooms of flat
  - Non-residents

## Congestion Fee/Pricing

## Singapore: Electronic Road Pricing (ERP)

- Regulation:
  - Scheme: Singapore pioneered large-scale electronic congestion pricing in 9882, replacing an earlier manual scheme. It uses a network of gantries on expressways and arterial roads leading into the central business district and other high-demand areas.
  - Pricing: Highly dynamic. Charges vary by location (specific gantry), time of day (in half-hour intervals), and vehicle type. Prices are adjusted quarterly (or even more frequently) by the LTA based on monitored traffic speeds, aiming to maintain optimal speeds on the priced roads (e.g., 89-&9 km/h on expressways, ?o-30 km/h on arterial roads). Prices increase if speeds fall below the threshold and decrease if they consistently exceed it. Operates mainly during peak weekday hours.
  - **Technology:** Traditionally used dedicated In-vehicle Units (IUs) with stored-value cards. A new satellitebased ERP **?**.• system (using GNSS) is currently being rolled out, allowing for more flexibility, distance-based charging in the future, and direct payment integration.
  - **Exemptions:** Emergency vehicles, police, and certain other vehicle types are exempt.9
- Implementation Authority: Land Transport Authority (LTA).
- Enforcement Mechanism: Fully automated. Gantries electronically detect the IU (or the On-Board Unit in ERP २.०). The fee is deducted automatically. Cameras capture license plates of vehicles without functioning units or insufficient funds, leading to fines being issued to the registered owner.
- Monitoring Mechanism: LTA continuously monitors real-time traffic speeds using extensive sensor networks and vehicle probe data. This data directly informs the dynamic price adjustments. Revenue, traffic volumes, travel times, and public transport usage are constantly tracked and analyzed.
- Citizen Response / Backlash:

- Generally accepted as a long-standing part of Singapore's transport system, integrated with comprehensive public transport and vehicle ownership controls (COE).
- Price adjustments, especially increases, often lead to public discussion and some grumbling but are usually accepted as data-driven measures.
- The ERP **?**.• rollout has generated discussion regarding the new hardware (larger OBU), installation process, and potential privacy implications of GNSS tracking, though LTA emphasizes data protection measures.

## London: Congestion Charge Zone (CCZ) & ULEZ

- Regulation:
  - Scheme (CCZ): Introduced in 2003. A defined zone covering Central London. Drivers pay a fixed daily charge if they drive within the zone during operating hours.
  - Pricing (CCZ): Currently ~£9's per day. Payable once per day regardless of how many times you enter/exit.
    Operates typically 0:00 AM ξ:00 PM weekdays and 92:00 PM ξ:00 PM weekends/bank holidays (hours subject to change).
  - Ultra Low Emission Zone (ULEZ): Operates २४/७ within a larger area (currently covers all inner London boroughs up to the North/South Circular roads). Charges vehicles that do *not* meet specific minimum emissions standards (Euro 8/IV for petrol, Euro ६/VI for diesel). This is primarily an environmental charge but functions similarly and adds cost for non-compliant vehicles within the same/larger area. The daily charge is ~£92.40 for light vehicles.
  - Exemptions/Discounts: CCZ offers discounts for residents within the zone, accredited breakdown vehicles, and blue badge holders (disabled). Electric vehicles used to be exempt but this is being phased out. ULEZ exemption depends purely on meeting emissions standards.
- Implementation Authority: Transport for London (TfL), under the Mayor of London.

- Enforcement Mechanism: Extensive network of Automatic Number Plate Recognition (ANPR) cameras record vehicles entering and moving within the zones. Owners must pay the charge(s) by midnight the day after travel (online, app, phone). TfL's database checks registered plates against payments.9ξ Non-payment results in significant Penalty Charge Notices (PCNs).
- Monitoring Mechanism: TfL continuously monitors traffic volumes, journey times, congestion levels, bus network performance, road safety, air quality (NOR, PMR.4), and scheme revenues. Detailed impact reports are published regularly, informing scheme adjustments (zone size, charge levels, hours, ULEZ expansion).

## • Citizen Response / Backlash:

- CCZ: Faced significant opposition initially from businesses and motoring groups. Credited with initial traffic reductions (~94-?0%) and increased public transport use. Ongoing debates about fairness, impact on central London economy, charge levels, and operating hours (weekend charge introduction was controversial). Revenue is legally ring-fenced for transport improvements.
- ULEZ: Expansion has been highly controversial, particularly the latest extension to outer London, facing legal challenges and significant political/public debate regarding costs for those with non-compliant vehicles and perceived effectiveness vs. economic impact.

## Stockholm: Congestion Tax (Trängselskatt)

- Regulation:
  - Scheme: Introduced permanently in 2000 after a successful trial and referendum. A cordon-based system charging vehicles passing control points entering or exiting the inner city zone.
  - Pricing: Variable charge based on time of day on weekdays (approx. ξ:οο AM ξ:ξο PM). Prices are higher during morning and afternoon peak commute periods. No charge on evenings, nights, weekends, or public holidays. There is a maximum daily charge cap per vehicle.
  - Technology: ANPR cameras at control points.

- **Exemptions:** Emergency vehicles, motorcycles, buses, diplomatic vehicles. Exemptions for alternative fuel/"green" vehicles have been largely phased out.
- Implementation Authority: Swedish Transport Agency (Transportstyrelsen) operates the system and collects fees.
  Swedish Tax Agency handles billing/tax aspects. Policy decisions involve the City of Stockholm and national government.
- Enforcement Mechanism: Automated ANPR system identifies vehicles. Registered owners are sent a monthly invoice detailing all passages and the total amount due. Non-payment incurs additional fees and can lead to enforcement action by the Swedish Tax Agency/Enforcement Authority.
- Monitoring Mechanism: The Swedish Transport Administration monitors traffic flows, travel times ,environmental impacts (emissions, air quality improvements), public transport usage (increased), accessibility, and economic impacts. Data informs evaluations and minor adjustments.
- Citizen Response / Backlash:
  - Initial public opinion (before the trial) was largely negative. However, after the trial demonstrated clear benefits
    (reduced congestion, improved travel times), a referendum voted in favour of making it permanent.
  - Public acceptance grew significantly *after* implementation and remains relatively high. The scheme is widely seen as successful in managing congestion and improving the urban environment. Revenue is earmarked for specific road and public transport infrastructure projects in the Stockholm region.

## Milan: Area C

- Regulation:
  - Scheme: Implemented in २०१२, replacing an earlier pollution charge (Ecopass). Covers the central historic area (Cerchia dei Bastioni). Operates weekdays during daytime hours (e.g., 0:30 AM 0:30 PM, times may vary).

- Pricing: Daily access charge (around ·9 ·0.9, subject to change). Price can vary based on vehicle emissions;
  older, more polluting vehicles may be banned entirely or face higher charges, blurring the line with a Low
  Emission Zone (LEZ).
- Technology: ANPR cameras at entry points.
- Exemptions: Residents (limited free access days/year, then discounted rates), electric vehicles, some hybrids (may change), motorcycles/scooters, public transport, taxis, emergency/utility vehicles, disabled permit holders often have free or discounted access.
- Implementation Authority: Municipality of Milan (Comune di Milano) through its transport and environment agency AMAT (Agenzia Mobilità Ambiente Territorio).
- Enforcement Mechanism: ANPR cameras identify vehicles entering the zone. Drivers must purchase and activate an entry pass (online, app, phone, retailers) generally by midnight the following day. The system checks plates against activated passes. Fines are issued for non-compliance.
- Monitoring Mechanism: AMAT monitors traffic volumes entering Area C (significant reduction reported, ~30%), vehicle fleet composition (shift towards cleaner vehicles), public transport speed and ridership, air quality levels (PM90, NOR reductions), and revenues. Reports guide policy adjustments.
- Citizen Response / Backlash:
  - o Met with initial protests from shopkeepers, residents, and motorists concerned about costs and accessibility.
  - However, credited with significantly reducing traffic and pollution in the city's core, making it more pedestrian-friendly.?
     Acceptance has generally increased over time. Revenue is reinvested in public transport, cycling infrastructure, and mobility services.

## New York City: Planned Congestion Pricing Program

Regulation (Planned): A cordon zone planned for Manhattan south of ξoth Street. Variable pricing by time of day was proposed, aiming to reduce traffic, improve air quality, and generate substantial revenue for public transit (MTA). Technology likely E-ZPass transponders and ANPR.

## Indian cases and examples

Case of Chennai

## Current Parking Scenario and Challenges

Despite initial efforts, parking management in Chennai remains fragmented:

- In २०१६-٩७, the demand for ٩२,000 Equivalent Car Spaces (ECS) was estimated across arterial roads, with tenders issued to address this.
- By २०२३, only ५,००० ECS had been effectively managed over five years.
- Revenue generation has been modest (~₹9.99 lakh/day), with a pricing system based on ECS rather than dynamic demandbased or hourly pricing.
- Challenges such as violations, insufficient enforcement, lack of integration with transit systems, and limited public communication have hindered progress.

To address these challenges, Greater Chennai Corporation (GCC) passed a resolution introducing differentiated parking pricing:

- General:₹२०/car and ₹५/two-wheeler; Premium:₹४०/car and ₹٩०/two-wheeler.
- T. Nagar (pilot): ₹ξο/car and ₹२०/two-wheeler (on-street); ₹२०/car and ₹५/two-wheeler (MLCP)

Chennai now has begun implementing a comprehensive Parking Policy that aims to shift from fragmented street-level parking management to a more integrated, area-level approach:

- Area-Level Parking Plans (ALPs): These plans ensure parking management across neighborhoods using demand-based pricing, structured allocation, and enhanced enforcement.
- Prioritization of NMT (Non-Motorized Transport): The policy mandates safe pedestrian paths, cycling infrastructure, and public transport access before allocating space for vehicles.
- **Dynamic Pricing**: Parking charges are adjusted based on demand, location, and duration, with higher fees for on-street spaces to encourage the use of off-street facilities for long-term parking.
- Technological Enforcement: Technology supports compliance through real-time monitoring, smart sensors, and mobile apps.

The policy also includes structural changes to improve long-term efficiency, such as the introduction of residential parking permits, Proof of Parking (PoP) for new vehicle registrations, traffic impact assessments for major developments, and the establishment of a citywide digital parking network

#### Implementation of Parking Policy through a pilot Area-Level Parking Plan (ALP) in Anna Nagar, Chennai

Anna Nagar, a key residential and commercial area, was selected as the pilot for the city s first Area-Level Parking Plan (ALP). This plan covers a ξ sq. km area with a 83.9 km road network, focusing on 2ξ.9 km of primary and secondary streets.

- **Demand:** The area has a demand for 99,89& ECS (cumulative parking that were recorded over a 98-hour survey period), with a peak demand of 3,09C ECS (number of parked vehicles recorded in 30 minutes interval) and a current supply of 9,892 ECS.
- Proposed Pricing: A demand-based pricing strategy includes:
  - ₹?• per hour for off-street parking and ₹४º for on-street parking (cars)
  - o ₹9º per hour off-street and ₹२º on-street (two-wheelers)
  - ο ₹ ξo per hour for larger vehicles (LCVs and HCVs)

The rates are higher than the city<sup>s</sup> general pricing due to the area<sup>s</sup> higher motor vehicle use. The pricing model, coupled with an ∠4:94 revenue-sharing structure, is expected to generate ₹3.39 crore annually, supporting both operational costs and urban development.

- Enforcement: Penalties for parking violations are enforced via ground teams and technology, with ९१५ surveillance cameras, १२० body cameras, and १२० walkie-talkies among the tools.
- Infrastructure: The plan includes 400 QR codes for payment, 920 bicycles and e-bikes for enforcement staff, and other equipment like towing vehicles and clamping devices.

#### Integrated On-Street and Off-Street Parking Management: Enhancing Utilization through Dynamic Pricing and Coordinated Strategy

The strategy integrates on-street and off-street parking systems within a 400m radius to optimize usage. By setting higher prices for onstreet parking, this system encourages drivers to shift long-duration parking to underutilized off-street facilities.

T. Nagar and DB Road: Examples include the T. Nagar multi-level car parking (MLCP) with a 40% occupancy rate and the DB
 Road MLCP with under 30% occupancy, both linked to nearby on-street parking to optimize space usage.

#### A Single Authority to manage plan, design, price, enforce and manage:

To improve coordination, the Parking Policy recommends establishing a centralised Parking Management Unit (PMU) under the Chennai Unified Metropolitan Transport Authority (CUMTA). This PMU will oversee all aspects of parking management-planning, pricing, enforcement, and implementation-ensuring streamlined decision-making and consistent enforcement across the city.

• Centralisation of Functions: The PMU will manage on-street parking and work with ULBs and road-owning agencies. Legal provisions support this centralisation, including sections of the CUMTA Second Amendment Act (?o?t) and the Motor Vehicles Act (9%cc).

Presently, Maharashtra Urban Development Department-9 is developing the UMTA Act, with an intention to operationalize UMTA in Mumbai, Pune, and Nagpur. UMTA can a potential body in these cities to manage parking.

#### Empowering CUMTA°s PMU to manage parking in Chennai:

The new Parking Policy aims to empower CUMTA by centralising parking management responsibilities. Legal provisions allow for delegating enforcement and management powers to CUMTA, ensuring unified regulation and implementation.

Legal Framework: Provisions from the CUMTA Second Amendment Act and the Motor Vehicles Act enable this shift. ULBs and other agencies can delegate management responsibilities to CUMTA for a more coordinated approach.

#### Addressing Parking Supply Gaps through Shared Parking and Regulatory Amendments

In Tamil Nadu, the disconnect between permissible parking provisions under the Tamil Nadu Combined Development and Building Rules (TNCDBR) and the actual supply on ground has led to a dual challenge: under-provisioning and over-provisioning of parking. Both scenarios result in inefficiencies-under-provisioning leads to spillover onto public streets, while over-provisioning encourages private vehicle use and undermines sustainable transport goals.

A survey conducted by ITDP in 2028 across 90 residential locations revealed that **&4% (49 locations)** provided **less off-street parking** than required by development regulations. On average, these residential developments had only **3c**% of the permissible parking supply, underscoring the urgent need for more context-sensitive regulations.

To address this imbalance and promote sustainable mobility, the CUMTA recommended the following regulatory changes:

- Introduction of parking maximums to prevent excessive provisioning that discourages transit and non-motorised transport.
- Reduction of minimum parking requirements by ?o§30% for new residential, commercial, and public developments.
- Mandating 30 § 40% of parking spaces to be accessible for public use, facilitating shared parking and better utilisation of existing resources.

As part of the **Area-Level Parking Plan for Coimbatore**, a citywide survey assessed developments against permissible standards and actual occupancy. Initial findings indicate that **only ?4% of developments** have more than **Co% occupancy** in their permissible parking spaces, highlighting significant underutilisation and reinforcing the need for shared parking models and restructured parking norms.

#### Inclusion in Tenders Documents (RfP Clauses)

- Define the scope for public consultation, outreach, and awareness campaigns.
- Mandate integration with existing data systems and ITS platforms.
- Include design, implementation, and monitoring components under a unified contract.

#### Scale-Up Strategy for Citywide Parking Reform

The successful implementation of the pilot Area-Level Parking Plan (ALP) in Anna Nagar, along with integration initiatives in T. Nagar and Coimbatore, demonstrates a robust, scalable framework for citywide parking reform. Building on this momentum, Chennai is poised to systematically scale up the parking policy across the entire metropolitan area by leveraging lessons from the pilots, strengthening institutional capacity, and deepening cross-agency coordination.

The scale-up strategy focuses on three key pillars:

- 9. Phased Rollout of ALPs: Expand Area-Level Parking Plans across high-demand neighborhoods based on vehicle density, land use, and transit access. Prioritize commercial and institutional areas with significant spillovers, ensuring pricing, enforcement, and infrastructure are tailored to local conditions.
- R. Institutional Empowerment and Capacity Building: Operationalize the Parking Management Unit (PMU) under CUMTA as a fully staffed, cross-functional body. Strengthen inter-departmental coordination through MoUs and legal delegations, and invest in capacity-building programs for ULB staff, enforcement teams, and technical personnel.
- 3. Technology-Driven Integration and Public Engagement: Scale the digital architecture citywide by integrating real-time monitoring systems, mobile applications, and centralized dashboards. Launch sustained awareness and behavior change campaigns, ensuring public buy-in and reinforcing the policy<sup>os</sup> principles of efficiency, equity, and sustainability.

Through this strategy, Chennai can create a citywide, unified parking ecosystem that supports its broader goals of sustainable mobility, improved public realm, and reduced dependence on private vehicles.

## Case of Bengaluru:

Bengaluru based -Get My Parking<sup>o</sup> company had developed a marketplace for vacant private parking for rent through a mobile application. The parking spaces were listed by private individuals who put out their vacant parking units or land on the platform. A lot of bachelors came on to the platform who didn<sup>o</sup>t own a vehicle, as this gave them an extra income. The application had about 30,000 parking units listed on the mobile platform until 2096.

The rent was decided by the individuals, and not the company. In high-demand business areas, the rent per slot went upto Rs 2000 per month. As a business model, the company would earn around 20% profit on top of the price quoted.

A lot of demand came from the neighbourhoods like Whitefield and Ejipura. These are the places where streets are narrow and parking on street would hinder the traffic flow. Residents there had more cars, and were looking for places to park.

Monthly subscription as a model worked better, than the hourly basis. Hourly basis required a lot of management and monitoring. The parking spots were made available for rent for a month, three months, six months, and even on a yearly basis.

Shared parking was an issue in gated housing complexes due to security reasons. The company made sure that there was an identity check. The company would get user to submit Aadhar card. The owner of the parking spot would inform the security of the complex. The company also made agreements with the individual who was putting out the parking on rent.

Legally, it was considered as subletting of the space, and enabling exchange of the information on the platform. However, its implication could be different f it is at a large scale and revenue. It will need support from the Transport Department.

## Case of Delhi

The Government of National Capital Territory of Delhi has notified Delhi Maintenance and Management of Parking Places Rules, २०१९ under clause (४१) of section २ read with Section ११७, sub-section (३) of Section १२७ and clause (e) of section १३८ of the Motor Vehicle Act, १९८८ (No ५९ of १९८८). This mandates all urban local bodies, including land-owning agencies, to implement local area-specific integrated parking management area plans (PMAPs).

These rules have sought implementation of parking management area plans to identify and demarcate legal parking areas on ground in each ward or earmarked zones, penalise illegal parking, prohibit parking on footpaths, green areas and near intersections, enforce variable parking pricing and enable proper management of parking areas and local area improvement by investing a part of the revenue to be earned from parking fees. It has further provide for electric charging facilities in parking areas.

Following the Supreme Court directives pilot schemes on parking management area plans were implemented during २०१९-२०२० as per the Delhi Maintenance and Management of Parking Places Rules, २०१९. These include Lajpat Nagar III (South Delhi Municipal Corporation); Kamla Nagar (North Delhi Municipal Corporation); and Krishna Nagar (East Delhi Municipal Corporation). Based on the successful implementation of these plans the apex Court had directed city-wide implementation.

In २०२४, the Commission for Air Quality Management (CAQM) has further issued advisories to the urban local bodies to develop structured parking plans for implementation in Delhi and NCR. As of now, 98 PMAPs are available for public review on the Municipal Corporation of Delhi's website.

Delhi rules have included Proof of Parking for transport vehicles under clause *%*. This states *"¤. the permits of Transport Vehicles shall be* granted or renewed only upon submission of proof of parking space for such vehicles: Provided that the proof of parking space shall be only from an authorized parking contractor of civic agencies and shall be for a duration of at least one year.

## Case of Ranchi

Ranchi had implemented demand-based on-street pricing on a R km commercial market street. The street was divided into 8 zones based on demand: orange, yellow, green, and red. Orange zone was the high demand parking zone that charged Rs. 8° per hour for car parking and Rs. 9° for two-wheeler parking. Yellow zone was the medium demand parking zone that charged Rs. 3° per hour for car parking, and Rs. 9° for two-wheeler parking. Green zone was low demand parking zone that charged Rs. 2° per hour for car parking, and Rs. 4 for twowheeler parking. Red zone was no parking zone.

High on-street parking price, informally led the private owners-along the street-to open their available spaces for parking to visitors at a cheaper rate.

## Case of Shimla

The High Court of Himachal Pradesh has issued a directive on on Proof of Parking for Shimla. This order dated २२nd May २०९५ states: "We direct that henceforth no new vehicle which is intended to be plied primarily within Shimla Municipal area will not be registered in the State unless the intending purchaser produces a certificate from the Collector, Shimla that he has a parking space and the said certificate shall be issued only after a report to this effect that too after physical inspection and verification is issued by the SHO of the Police Station in whose jurisdiction the area falls".

This has been implemented. Prospective car buyers have to apply along with the document proof of owning or leasing a parking space with photographs to the dealers. Then dealer will submit the document to the local police for verification. Once the police verifies the parking space availability and approve it, all the requisite documents are sent to the District Magistrate office for final approval. Once the District Magistrate gives the final approval, the dealer registers the vehicle in the owners name and address.

# Ward-wise analysis

## Ward A

#### **Demographics & Area Overview**

Ward A has a total population of 185014 accounting for 1% of Mumbai's population. Spanning an area of 11.2sq. km, the population density stands at 16513 persons per sq. km. The ward is home to 43866 households, along with a homeless population of 4122

#### **Slum & Non-Slum Distribution**

A few of the population resides in slum areas, with 22282 individuals living in slums and 162732 in non-slum settlements. Slums contribute to 0.3% of the total slum population in Mumbai and cover 12% of the ward's area. The remaining 88% of the ward is non-slum area.

#### **Parking Infrastructure**

The ward provides a total of 5723 LMV on-street and nil LMV off-street parking slots. The road network consists of 110 roads with a combined length of 47051 meters and an average width of 22.2 meters.

### **Road Classification & Restrictions**

The total road length is distributed among arterial, sub-arterial, collector, and local roads as follows:

- Arterial Roads: 410 m
- Sub-Arterial Roads: 12,558 m
- Collector Roads: 29,636 m
- Local Roads:4,447 m

## Ward B

#### **Demographics & Area Overview**

Ward B has a total population of 127,290 accounting for 1% of Mumbai's population. Spanning an area of 2.7sq. km, the population density stands at 47907 persons per sq. km. The ward is home to 27140 households, along with a homeless population of 3273

#### **Slum & Non-Slum Distribution**

Small share of the population resides in slum areas, with 12711 individuals living in slums and 114,579 in non-slum settlements. Slums contribute to 0.2% of the total slum population in Mumbai and cover 10% of the ward's area. The remaining 90% of the ward is non-slum area

#### **Parking Infrastructure**

The ward provides a total of 0 on-street and off-street parking slots. The road network consists of 13 roads with a combined length of 8540 meters and an average width of 19.1 meters.

## **Road Classification & Restrictions**

The total road length is distributed among arterial, sub-arterial, collector, and local roads as follows:

- Arterial Roads: No Arterial road is present
- Sub-Arterial Roads: 1600 m
- Collector Roads: 5430 m
- Local Roads: 1510 m

## Ward C

## **Demographics & Area Overview**

Ward C has a total population of 166161 accounting for 1% of Mumbai's population. Spanning an area of 1.9 sq. km, the population density stands at 86904 persons per sq. km. The ward is home to 36479 households, along with a homeless population of 4685

#### **Slum & Non-Slum Distribution**

A small share of the population resides in slum areas, with 16571 individuals living in slums and 149,590 in non-slum settlements. Slums contribute to 0.3% of the total slum population in Mumbai and cover 10% of the ward's area. The remaining 90% of the ward is non-slum area.

## **Parking Infrastructure**

The ward provides a total of 259 LMV on-street and 0 off-street parking slots. The road network consists of 9 roads with a combined length of 6645 meters and an average width of 18.2 meters.

## **Road Classification & Restrictions**

The total road length is distributed among arterial, sub-arterial, collector, and local roads as follows:

- Arterial Roads: No Arterial roads in this ward
- Sub-Arterial Roads: No Sub-arterial roads in this ward
- Collector Roads: 5205 m
- Local Roads: 1440 m

## Ward D

## **Demographics & Area Overview**

Ward D has a total population of 346,866 accounting for 3% of Mumbai's population. Spanning an area of 8.2sq. km, the population density stands at 42203 persons per sq. km. The ward is home to 77,556 households, along with a homeless population of 2334.

## **Slum & Non-Slum Distribution**

Minuscule share of the population resides in slum areas, with 34699 individuals living in slums and 312,167 in non-slum settlements. Slums contribute to 0.5% of the total slum population in Mumbai and cover 10% of the ward's area. The remaining 90% of the ward is non-slum area.

## **Parking Infrastructure**

The ward provides a total of 427 m on-street and 385m off-street parking slots for LMV vehicles. The road network consists of 85 roads with a combined length of 49156 meters and an average width of 18.2 meters.

## **Road Classification & Restrictions**

The total road length is distributed among arterial, sub-arterial, collector, and local roads as follows:

- Arterial Roads: No Arterial road in the ward
- Sub-Arterial Roads:2,777 m
- Collector Roads: 37,149 m
- Local Roads: 9,230 m

## Ward E

## **Demographics & Area Overview**

Ward E has a total population of 393,286 accounting for 3% of Mumbai's population. Spanning an area of 7.3 sq. km, the population density stands at 54,097 persons per sq. km. The ward is home to households, along with a homeless population of 1555

## Slum & Non-Slum Distribution

A portion of the population resides in slum areas, with 124,194 individuals living in slums and 269,092 in non-slum settlements. Slums contribute to 1.9% of the total slum population in Mumbai and cover 31.6% of the ward's area. The remaining 68.4% of the ward is non-slum area.

## **Parking Infrastructure**

The ward provides a total of 0 on-street and 1782 off-street parking slots for LMV. The road network consists of 21 roads with a combined length of 17,110 meters and an average width of 18.1 meters.

## **Road Classification & Restrictions**

The total road length is distributed among arterial, sub-arterial, collector, and local roads as follows:

- Arterial Roads: No Arterial road in the ward
- Sub-Arterial Roads: 805 m
- Collector Roads: 9,410 m
- Local Roads: 6,895 m

# Ward F/S

## **Demographics & Area Overview**

Ward F/S has a total population of 360,972 accounting for 3% of Mumbai's population. Spanning an area of 9.8sq. km, the population density stands at 36,898 persons per sq. km. The ward is home to 79,733 households, along with a homeless population of 774

### **Slum & Non-Slum Distribution**

A portion of the population resides in slum areas, with 180,128 individuals living in slums and 180,844 in non-slum settlements. Slums contribute to 2.8% of the total slum population in Mumbai and cover 49.9% of the ward's area. The remaining 50.1% of the ward is non-slum area.

#### **Parking Infrastructure**

The ward provides a total of 0 on-street and 1012 off-street parking slots for LMV's. The road network consists of 24 roads with a combined length of 21,476 meters and an average width of 19.3 meters.

#### **Road Classification & Restrictions**

The total road length is distributed among arterial, sub-arterial, collector, and local roads as follows:

- Arterial Roads: No Arterial road in the ward
- Sub-Arterial Roads: 4,615 m
- Collector Roads: 11,185 m
- Local Roads: 5,676 m

## Ward F/N

## **Demographics & Area Overview**

Ward F/N has a total population of 529,034 accounting for 4% of Mumbai's population. Spanning an area of 12.3 sq. km, the population density stands at 43,088 persons per sq. km. The ward is home to 119,624 households, along with a homeless population of 832

## **Slum & Non-Slum Distribution**

A portion of the population resides in slum areas, with 238,128 individuals living in slums and 290,906 in non-slum settlements. Slums contribute to 3.6% of the total slum population in Mumbai and cover 45% of the ward's area. The remaining 55% of the ward is non-slum area.

#### Parking Infrastructure

The ward provides a total of 152 on-street and 445 off-street parking slots for LMV's. The road network consists of 77 roads with a combined length of 43,574 meters and an average width of 19 meters.

#### **Road Classification & Restrictions**

The total road length is distributed among arterial, sub-arterial, collector, and local roads as follows:

- Arterial Roads: No Arterial roads in the ward
- Sub-Arterial Roads: 12,941 m
- Collector Roads: 22,883 m
- Local Roads: 7,750 m

# Ward G/S

## **Demographics & Area Overview**

Ward G/S has a total population of 377,749 accounting for 3% of Mumbai's population. Spanning an area of 9.3sq. km, the population density stands at 40,666 persons per sq. km. The ward is home to 83,457 households, along with a homeless population of 1642

## **Slum & Non-Slum Distribution**

A decent share of the population resides in slum areas, with 124,306 individuals living in slums and 253,443 in non-slum settlements. Slums contribute to 1.9% of the total slum population in Mumbai and cover 32.9% of the ward's area. The remaining 67.1% of the ward is non-slum area.

## **Parking Infrastructure**

The ward provides a total of 482 on-street and 15,013 off-street parking slots. The road network consists of 41 roads with a combined length of 29,742 meters and an average width of 17.1 meters.

## **Road Classification & Restrictions**

The total road length is distributed among arterial, sub-arterial, collector, and local roads as follows:

- Arterial Roads: No Arterial road in the ward
- Sub-Arterial Roads: No Sub-arterial road in the ward
- Collector Roads: 18,577 m
- Local Roads: 11,165 m

# Ward G/N

## **Demographics & Area Overview**

Ward G/N has a total population of 5,99,039 accounting for 4.8% of Mumbai's population. Spanning an area of 8.8 sq. km, the population density stands at 68,383 persons per sq. km. The ward is home to 1,28,138 households, along with a homeless population of 1,989

## **Slum & Non-Slum Distribution**

A decent share of the population resides in slum areas, with 3,61,674 individuals living in slums and 2,37,365 in non-slum settlements. Slums contribute to 5.5% of the total slum population in Mumbai and cover 60.4% of the ward's area. The remaining 39.6% of the ward is non-slum area.

## **Parking Infrastructure**

The ward provides a total of 979 LMV and 17 HMV off-street parking slots. The road network consists of 43 roads with a combined length of 33,158 meters and an average width of 18.1 meters.

## **Road Classification & Restrictions**

The total road length is distributed among arterial, sub-arterial, collector, and local roads as follows:

- Arterial Roads: No Arterial road in the ward
- Sub-Arterial Roads: No Sub-arterial road in the ward
- Collector Roads: 18,577 m
- Local Roads: 11,165 m

# Ward H/E

## **Demographics & Area Overview**

Ward H/E has a total population of 5,57,239, accounting for 4% of Mumbai's population. Spanning an area of 12 sq. km, the population density stands at 44,888 persons per sq. km. The ward is home to 1,20,266 households, along with a homeless population of 754.

#### **Slum & Non-Slum Distribution**

A significant share of the population resides in slum areas, with 3,88,923 individuals living in slums and 1,68,316 in non-slum settlements. Slums contribute to 6% of the total slum population in Mumbai and cover 70% of the ward's area. The remaining 30% of the ward is non-slum area.

## Parking Infrastructure

The ward provides a total of 108 on-street and 489 off-street parking slots. The road network consists of 28 roads with a combined length of 16,672 meters and an average width of 11.8 meters.

## **Road Classification & Restrictions**

The total road length is distributed among arterial, sub-arterial, collector, and local roads as follows:

- Arterial Roads: 8,886 m
- Sub-Arterial Roads: No sub-arterial roads
- Collector Roads: 4,471 m
- Local Roads: 3,315 m

## Ward H/W

## **Demographics & Area Overview**

Ward H/W has a total population of 3,07,581, accounting for 2% of Mumbai's population. Spanning an area of 9 sq. km, the population density stands at 34,081 persons per sq. km. The ward is home to 72,943 households, along with a homeless population of 1,204.

#### **Slum & Non-Slum Distribution**

A portion of the population resides in slum areas, with 82,552 individuals living in slums and 2,25,029 in non-slum settlements. Slums contribute to 1.3% of the total slum population in Mumbai and cover 26.8% of the ward's area. The remaining 73.2% of the ward is non-slum area.

#### **Parking Infrastructure**

The ward provides a total of 92 off-street parking slots. The road network consists of 60 roads with a combined length of 46,918 meters and an average width of 20.5 meters.

#### **Road Classification & Restrictions**

The total road length is distributed among arterial, sub-arterial, collector, and local roads as follows:

- Arterial Roads: No Arterial Roads
- Sub-Arterial Roads: 500 m, of which 500 m have no parking
- Collector Roads: 38,230 m, with 4,826 m restricted from parking
- Local Roads: 8,188 m, with no restrictions

## Ward K/E

#### **Demographics & Area Overview**

Ward K/E has a total population of 8,23,885, accounting for 7% of Mumbai's population. Spanning an area of 24 sq. km, the population density stands at 34,396 persons per sq. km. The ward is home to 1,68,076 households, along with a homeless population of 1,538.

#### **Slum & Non-Slum Distribution**

A significant share of the population resides in slum areas, with 5,72,818 individuals living in slums and 2,51,067 in non-slum settlements. Slums contribute to 8.8% of the total slum population in Mumbai and cover 69.5% of the ward's area. The remaining 30.5% of the ward is non-slum area.

#### **Parking Infrastructure**

The ward provides a total of 1,282 LMV off-street parking slots and a total of 1,517 off-street parking slots. The road network consists of 142 roads with a combined length of 84,997 meters and an average width of 18.1 meters.

#### **Road Classification & Restrictions**

The total road length is distributed among arterial, sub-arterial, collector, and local roads as follows:

- Arterial Roads: 14,730 m
- Sub-Arterial Roads: No Sub-Arterial Roads
- Collector Roads: 47,021 m

Local Roads: 23,246 m

# Ward K/W

## **Demographics & Area Overview**

Ward K/W has a total population of 7,48,688, accounting for 6% of Mumbai's population. Spanning an area of 24.5 sq. km, the population density stands at 30,508 persons per sq. km. The ward is home to 1,68,076 households, along with a homeless population of 1,538.

## **Slum & Non-Slum Distribution**

A portion of the population resides in slum areas, with 2,15,678 individuals living in slums and 5,33,010 in non-slum settlements. Slums contribute to 3.3% of the total slum population in Mumbai and cover 28.8% of the ward's area. The remaining 71.2% of the ward is non-slum area.

## **Parking Infrastructure**

The ward provides a total of 594 off-street parking slots. The road network consists of 104 roads with a combined length of 75,641 meters and an average width of 19.7 meters.

## **Road Classification & Restrictions**

The total road length is distributed among arterial, sub-arterial, collector, and local roads as follows:

- Arterial Roads: 1,940 m
- Sub-Arterial Roads: 11,016 m
- Collector Roads: 48,245 m
- Local Roads: 14,440 m

## Ward P/S

## **Demographics & Area Overview**

Ward P/S has a total population of 4,63,507, accounting for 4% of Mumbai's population. Spanning an area of 25.2 sq. km, the population density stands at 18,408 persons per sq. km. The ward is home to 1,06,922 households, along with a homeless population of 587.

## **Slum & Non-Slum Distribution**

A portion of the population resides in slum areas, with 2,30,829 individuals living in slums and 2,32,678 in non-slum settlements. Slums contribute to 3.5% of the total slum population in Mumbai and cover 49.8% of the ward's area. The remaining 50.2% of the ward is non-slum area.

#### **Parking Infrastructure**

The ward provides a total of 1,626 LMV off-street parking slots and a total of 1,678 off-street parking slots. The road network consists of 92 roads with a combined length of 43,058 meters and an average width of 16.9 meters.

## **Road Classification & Restrictions**

The total road length is distributed among arterial, sub-arterial, collector, and local roads as follows:

- Arterial Roads: 6,310 m
- Sub-Arterial Roads: 560 m
- Collector Roads: 14,213 m
- Local Roads: 21,975 m

## Ward P/N

#### **Demographics & Area Overview**

Ward P/N has a total population of 9,41,366, accounting for 8% of Mumbai's population. Spanning an area of 46.7 sq. km, the population density stands at 20,160 persons per sq. km. The ward is home to 2,11,642 households, along with a homeless population of 1,021.

## **Slum & Non-Slum Distribution**

A significant share of the population resides in slum areas, with 7,08,247 individuals living in slums and 2,33,119 in non-slum settlements. Slums contribute to 10.8% of the total slum population in Mumbai and cover 75.2% of the ward's area. The remaining 24.8% of the ward is non-slum area.

## **Parking Infrastructure**

The road network consists of 83 roads with a combined length of 55,627 meters and an average width of 17.8 meters.

## **Road Classification & Restrictions**

The total road length is distributed among arterial, sub-arterial, collector, and local roads as follows:

- Arterial Roads: No Arterial Roads
- Sub-Arterial Roads: 9,410 m
- Collector Roads: 27,690 m
- Local Roads: 18,527 m

## Ward R/S

## **Demographics & Area Overview**

Ward R/S has a total population of 6,91,229, accounting for 6% of Mumbai's population. Spanning an area of 18.3 sq. km, the population density stands at 37,762 persons per sq. km. The ward is home to 1,59,639 households, along with a homeless population of 704.

## **Slum & Non-Slum Distribution**

A significant share of the population resides in slum areas, with 4,14,395 individuals living in slums and 2,76,834 in non-slum settlements. Slums contribute to 6.3% of the total slum population in Mumbai and cover 60% of the ward's area. The remaining 40% of the ward is non-slum area.

## **Parking Infrastructure**

The road network consists of 110 roads with a combined length of 59,537 meters and an average width of 16.8 meters with no paid parking slots.

## **Road Classification & Restrictions**

The total road length is distributed among arterial, sub-arterial, collector, and local roads as follows:

- Arterial Roads: No Arterial Roads
- Sub-Arterial Roads: 3,364 m
- Collector Roads: 33,816 m
- Local Roads: 22,357 m

# Ward R/C

## Demographics & Area Overview

Ward R/C has a total population of 5,62,162, accounting for 5% of Mumbai's population. Spanning an area of 48 sq. km, the population density stands at 11,710 persons per sq. km. The ward is home to 1,34,795 households, along with a homeless population of 1,375.

## **Slum & Non-Slum Distribution**

A portion of the population resides in slum areas, with 1,72,849 individuals living in slums and 3,89,313 in non-slum settlements. Slums contribute to 2.6% of the total slum population in Mumbai and cover 30.7% of the ward's area. The remaining 69.3% of the ward is non-slum area.

## **Parking Infrastructure**

The road network consists of 122 roads with a combined length of 66,070 meters and an average width of 17.3 meters with no paid parking slots.

## **Road Classification & Restrictions**

The total road length is distributed among arterial, sub-arterial, collector, and local roads as follows:

- Arterial Roads: No Arterial Roads
- Sub-Arterial Roads: 3,950 m
- Collector Roads: 43,850 m
- Local Roads: 18,270 m

# Ward R/N

## **Demographics & Area Overview**

Ward R/N has a total population of 4,31,368, accounting for 3% of Mumbai's population. Spanning an area of 14.2 sq. km, the population density stands at 30,438 persons per sq. km. The ward is home to 1,04,091 households, along with a homeless population of 367.

## **Slum & Non-Slum Distribution**

A portion of the population resides in slum areas, with 2,81,151 individuals living in slums and 1,50,217 in non-slum settlements. Slums contribute to 4.3% of the total slum population in Mumbai and cover 65.2% of the ward's area. The remaining 34.8% of the ward is non-slum area.

#### **Parking Infrastructure**

The ward provides a total of 168 LMV off-street parking slots and a total of 194 off-street parking slots. The road network consists of 107 roads with a combined length of 50,307 meters and an average width of 16 meters.

#### **Road Classification & Restrictions**

The total road length is distributed among arterial, sub-arterial, collector, and local roads as follows:

- Arterial Roads: No Arterial Roads
- Sub-Arterial Roads: 3,385 m
- Collector Roads: 23,142 m
- Local Roads: 23,780 m

## Ward L

#### **Demographics & Area Overview**

Ward L has a total population of 9,02,225, accounting for 7.3% of Mumbai's population. Spanning an area of 15.7 sq. km, the population density stands at 57,558 persons per sq. km. The ward is home to 1,86,883 households, along with a homeless population of 907.

#### **Slum & Non-Slum Distribution**

A significant share of the population resides in slum areas, with 7,58,108 individuals living in slums and 1,44,117 in non-slum settlements. Slums contribute to 11.6% of the total slum population in Mumbai and cover 84% of the ward's area. The remaining 16% of the ward is non-slum area.

#### **Parking Infrastructure**

The ward provides a total of 346 LMV off-street parking slots. The road network consists of 55 roads with a combined length of 33,696 meters and an average width of 19.3 meters.

## **Road Classification & Restrictions**

The total road length is distributed among arterial, sub-arterial, collector, and local roads as follows:

- Arterial Roads: 1000 m, with no parking restrictions
- Sub-Arterial Roads: 8,700 m
- Collector Roads: 15,284 m
- Local Roads: 8,712 m

## Ward M/E

## **Demographics & Area Overview**

Ward M/E has a total population of 8,07,720, accounting for 6.5% of Mumbai's population. Spanning an area of 33.1 sq. km, the population density stands at 24,425 persons per sq. km. The ward is home to 1,66,400 households, along with a homeless population of 356.

## **Slum & Non-Slum Distribution**

A significant share of the population resides in slum areas, with 6,85,994 individuals living in slums and 1,21,726 in non-slum settlements. Slums contribute to 10.5% of the total slum population in Mumbai and cover 84.9% of the ward's area. The remaining 15.1% of the ward is non-slum area.

#### Parking Infrastructure

The ward provides a total of 136 HMV on-street parking slots. The road network consists of 27 roads with a combined length of 19,373 meters and an average width of 23.4 meters.

## **Road Classification & Restrictions**

The total road length is distributed among arterial, sub-arterial, collector, and local roads as follows:

- Arterial Roads: 2,425 m
- Sub-Arterial Roads: 2,510 m
- Collector Roads: 12,617 m
- Local Roads: 1,821 m

## Ward M/W

## **Demographics & Area Overview**

Ward M/W has a total population of 4,11,893, accounting for 3.3% of Mumbai's population. Spanning an area of 17.4 sq. km, the population density stands at 23,677 persons per sq. km. The ward is home to 93,607 households, along with a homeless population of 830.

## **Slum & Non-Slum Distribution**

A portion of the population resides in slum areas, with 1,64,992 individuals living in slums and 2,46,901 in non-slum settlements. Slums contribute to 2.5% of the total slum population in Mumbai and cover 40.1% of the ward's area. The remaining 59.9% of the ward is non-slum area.

## Parking Infrastructure

The ward provides a total of 51 LMV on-street paid parking slots. The road network consists of 63 roads with a combined length of 39,201 meters and an average width of 18.9 meters.

## **Road Classification & Restrictions**

The total road length is distributed among arterial, sub-arterial, collector, and local roads as follows:

- Arterial Roads: 4,920 m
- Sub-Arterial Roads: 2,500 m
- Collector Roads: 22,902 m
- Local Roads: 8,879 m

## Ward N

## **Demographics & Area Overview**

Ward N has a total population of 6,22,853, accounting for 5% of Mumbai's population. Spanning an area of 25.7 sq. km, the population density stands at 24,254 persons per sq. km. The ward is home to 1,37,885 households, along with a homeless population of 1,167.

#### **Slum & Non-Slum Distribution**

A portion of the population resides in slum areas, with 2,49,229 individuals living in slums and 3,73,624 in non-slum settlements. Slums contribute to 3.8% of the total slum population in Mumbai and cover 40% of the ward's area. The remaining 60% of the ward is non-slum area.

## **Parking Infrastructure**

The ward provides a total of 873 off-street parking slots majorly for LCVs. The road network consists of 43 roads with a combined length of 25,386 meters and an average width of 18.1 meters.

## **Road Classification & Restrictions**

The total road length is distributed among arterial, sub-arterial, collector, and local roads as follows:

- Arterial Roads: 5,950 m
- Sub-Arterial Roads: 4,555 m
- Collector Roads: 9,708 m
- Local Roads: 5,173 m

## Ward S

## **Demographics & Area Overview**

Ward S has a total population of 7,43,783, accounting for 6% of Mumbai's population. Spanning an area of 29.7 sq. km, the population density stands at 25,009 persons per sq. km. The ward is home to 1,69,962 households, along with a homeless population of 394.

## **Slum & Non-Slum Distribution**

A significant share of the population resides in slum areas, with 4,08,442 individuals living in slums and 3,35,341 in non-slum settlements. Slums contribute to 6.3% of the total slum population in Mumbai and cover 54.9% of the ward's area. The remaining 45.1% of the ward is non-slum area.

#### Parking Infrastructure

The ward provides a total of 1,809 LMV and 152 HMV off-street parking slots. The road network consists of 36 roads with a combined length of 25,084 meters and an average width of 18 meters.

#### **Road Classification & Restrictions**

The total road length is distributed among arterial, sub-arterial, collector, and local roads as follows:

- Arterial Roads: There are no arterial roads in this ward
- Sub-Arterial Roads: 11,400 m
- Collector Roads: 6,364 m
- Local Roads: 7,320 m

## Ward T

## **Demographics & Area Overview**

Ward T has a total population of 3,41,463, accounting for 2.7% of Mumbai's population. Spanning an area of 42.9 sq. km, the population density stands at 7,967 persons per sq. km. The ward is home to 81,698 households, along with a homeless population of 685.

## **Slum & Non-Slum Distribution**

A share of the population resides in slum areas, with 85,560 individuals living in slums and 2,55,903 in non-slum settlements. Slums contribute to 1.3% of the total slum population in Mumbai and cover 25.1% of the ward's area. The remaining 74.9% of the ward is non-slum area.

## **Parking Infrastructure**

The ward provides a total of 943 LMV and 30 LCV off-street parking slots. The road network consists of 83 roads with a combined length of 49,799 meters and an average width of 18 meters.

#### **Road Classification & Restrictions**

The total road length is distributed among arterial, sub-arterial, collector, and local roads as follows:

- Arterial Roads: 6,230 m
- Sub-arterial Roads: There are no sub-arterial roads in this ward
- Collector Roads: 30,210 m
- Local Roads: 2,710 m

Maharashtra economic survey २०२५

i https://cdnbbsr.s3waas.gov.in/s38%d8b?faeb8bbb%eb840040%3989e?b?/uploads/?o?4/o9/?o?4o3obcC0030&%.pdf -

<sup>&</sup>lt;sup>ii</sup> <u>https://transport.maharashtra.gov.in/Site/Upload/Pdf/२०२३-२४-DURING-NEW-REG.pdf</u> - Vehicles registered in FY२४ in Maharashtra - MVD

iii Based on 3.90 crore vehicles as per Vaahan (April २०२५) and an area of 3,00,093 sq km