3. STRATEGY FOR TRANSPORTATION

The transportation in Mumbai is focused around travel between places of stay and work. The historical development of Greater Mumbai and scarcity of land had resulted in an upsurge in growth of satellite towns of Thane, Kalyan-Dombivili, Navi Mumbai and beyond along the rail and road transport corridors. The strategy for transportation features around the need to provide better linkages within Mumbai and with the hinterland, which would minimize travel time and costs as well as lead to decongestion. The facilities for transportation include widening of the arterial roads for transport, development of other connectivity linkages which are crucial for economic development and decongestion, strengthening of public transport and regulation of private transport.

With the predominant development of island city in the earlier decades, much of the workforce travels towards the island city in the N-W direction. Transportation corridors in Mumbai have also therefore evolved as a longitudinal routes traversing along the N-W direction. Very few E-W connectivity linkages were developed then as a result of which, after developments in the suburbs and rise in traffic, there was severe congestion at a number of places. With the potential growth in the suburbs, the need for development and strengthening of E-W linkages has been recognized and projects are being implemented. Sea-based water transport has also been proposed which is expected to be implemented shortly.

The strategic actions to be taken in the transportation sector include implementation of the planned and proposed projects. These are being discussed below. From a long term perspective there is also a felt need to evolve a transportation plan.

3.1. Action Plan for the Transportation sector

3.1.1. Overburdened transport system

Mumbai city due to its geographical constraints has extended in a linear manner. Due to the residential locations being pushed northwards, the city of Mumbai with its present population of over 12 million generates about 11 million trips in a day, with about 88% of the total trips catered by sub urban railway and the public transport bus services provided by BEST with the average lead being 22.15 kms for rail and 4.67 Kms for buses.

Figure illustrates share of passengers across the transportation facilities.
The rail and road network expansion failed to keep pace with the traffic growth resulting in heavy congestion. Inadequate road network, substandard maintenance of roads has slowed down traffic and added environment pollution. Suburban rail traffic increased by 6 times while the capacity increased by only 2.3 times. The trends of capital investment capacity of concerned organizations reveal that there is a huge shortfall in the capacity and demand to provide infrastructure and maintenance at acceptable level of service.

Hence, despite public transport system being the life line of Mumbai, the commuters are subjected to most severe over crowding in the world with 9 car rakes carrying over 4500 passengers at 11-13 persons per sq.m against normal capacity of about 1750 passengers.

In spite of higher inclination towards public transport, congestion on roads is a regular phenomenon in Mumbai. The vehicular growth in the last 4 decades (1961-2001) increased from 0.06 M to 1 million. Though the number of vehicles registered is less compared to other Metropolitan cities, due to its geographical constraint, the road network expansion could not keep pace with demand. Unless substantial investments to improve and develop the Mass Transit Systems are available, it would be very difficult to supply adequate road transport infrastructure to cater the needs of the private vehicle owners. Concurrently, a suitable policy should be prepared to arrest this kind of growth in private vehicle ownership.
3.1.2. Mumbai Region- Future scenario

As per the regional plan of MMR the population of the MMR is expected to grow 23 million by the year 2011 assuming the growth rate of 2.2% per annum. Similarly, the vehicular ownership is expected to grow at a faster rate of 6 to 8% per annum. The comprehensive Transportation Study carried out in 1992-94 has projected around 31 lakhs trips during peak hour by the year 2011. It is estimated that public transport share will decline from current 88% to 85% and share of private vehicle will increase from the present level of 7% to 9%. However, the 2% increase in private vehicle will result in more than 90% increase in private vehicles. Most of the traffic growth is expected to take place in the sub-urban and region in the next few decades.

![Graph showing projected increase in car ownership](image1)

The above figures illustrate projected increase in car ownership and rising population pressure affecting transportation.

A. Road Blocks to Development So far: Low levels of Investment

Till 1974, there was a high degree of concentration of investments in Mumbai Metropolitan Region. This spatial unit alone accounted for nearly two-thirds of the total investment in the state. However, from that time period, investment in MMR districts has reduced substantially from 64% to 33%.

![Graph showing investments in MMR districts and Rest of Maharashtra](image2)

Figure 3-4: Investments in MMR districts and Rest of Maharashtra

Most of the investments in MMR districts during 1980’s had gone to Raigarh district mostly due to agglomeration economy. Meanwhile, Mumbai’s share has reduced from 36% in 1974 to a meager 10% in 1999.

Mumbai region has attracted very less Foreign Direct Investments in comparison with the other world cities. In order to make Mumbai world class, FDI needs to be attracted in a huge amount. State of Art Infrastructure, especially Traffic and transportation is a pre-requisite for attracting such huge investments from both public and private institutional investors.

B. Road Blocks: Proliferation of Slums/Encroachments

Proliferation of slums, especially on sites reserved for essential infrastructure particularly of transport causing impediments in implementation. Most of these encroachments are on the land allocated to Public infrastructure projects.

C. Legal and Institutional issues

Currently the region’s Traffic and transportation is managed by different agencies in a fragmented approach. Though the ultimate aim is to provide improved level of service, there is no coherent integrated approach in providing the Transportation services. Further, the necessary investment in transport sector is not forthcoming due to financial constraints of respective organizations.

Issues, policies, projects related to urban transport are handled at different level by several departments and agencies in the region. Railways (Central and western) are a central subject where as public transport by bus/ferry are provided by Municipal Corporations as part of their mandate and in few places by MSRTC. However, the present Motor Vehicle Act enforces certain restrictions on state carriages. The passenger interrelation facilities are poor and seamless travel through integrated ticketing is still a dream.
3.1.3. **Vision statement 2015**

Having recognized the need for transforming Mumbai city into World Class city in the 10 – 15 years time frame, the vision statement shall aim to achieve its transformation in a phased manner-

- Accelerate economic growth to reach 8 to 10 percent in the coming decades
- Strengthening transport infrastructure to increase capacity.
- Reduce present level of congestion in the public transport network.
- Providing good quality frictionless arterial roads and highways.

The vision for next 15 years has to be reflected with investment programme to realize the dream in a phased and time bound manner.

3.1.4. **Development strategy for Traffic and transportation**

Transportation is an important component of the economy impacting on development and the welfare of populations. When transport systems are efficient, they provide economic and social opportunities and benefits that impact throughout the economy. Furthermore Transport is the major spine for regional economic growth and development.

In order to achieve comprehensive vision and mission, development strategies especially for Traffic and Transportation have been identified and are listed below:

- To ensure adequate levels of accessibility in the expanding urban areas of MMR
- To accelerate the economic development of the region
- To provide safe and environment sustainable transport system.
- Institutional format for coordinated planning and management
- Budgeting and financing Transportation infrastructure, operations and management
- Technology and legal issues in Urban Mass transit systems
- Access, land control, rehabilitation issues on Right of ways
- Incentives for long distance bus and goods operating terminals
- Traffic safety and incidence management
- Parking policy
- Policy on road side vending and Markets
- Fixing up responsibility and accountability for agencies
- Augmentation/Strengthening of Public Transport system.
- Development of critical transport infrastructure projects
- Pedestrian safety improvement measures
- Policy and pricing interventions for discouraging use of private vehicles.
The approach to above strategy is explained in following sections.

A. Augmentation/strengthening of public transport system

- Improvement to existing public transportation; network and fleet
- New Mass Transport Systems like LRT/MRT
- Promoting Dedicated bus corridors.
- Development of alternate modes; water transport etc.

B. Development of critical transport infrastructure projects

- Development of all north-south and east-west arterial roads and missing links
- Development of Truck Terminals, truck parking lots
- Development of Inter State Bus Terminal (ISBT)
- Development of freeways around Mumbai and connecting with the hinterland.

C. Pedestrian safety improvement measures

- Exclusive Right of Way for pedestrians
- Pedestrian grade separators
- Station Area Traffic Improvement Schemes (SATIS)

D. Policy and pricing interventions

- Integrated land use and transport planning
- Traffic planning and management measures
- Non-motorized transport
- Systematic control of use of private vehicles by providing attractive mass transport systems.
- Parking policy; development of off street parking, multi-storeyed mechanical, parking.
- Demand management and road user charges

E. Environmental measures

- Usage of cleaner fuels, improved automobile technology
- Improve vehicle maintenance and inspection, create awareness
- Encourage environment friendly transport

In line with proposed strategies and to provide a sustainable development in the Mumbai Metropolitan Region including Greater Mumbai and parts of Thane and Raigad Districts, the City Development Plan with respect to transport sector needs to be spelt out clearly. The transportation system improvements are a continuous process with the short term measures planned dovetailing into long term strategy.
3.1.5. **Strategy for Transportation**

**A. Short Term Measures:** The short term measures include -

- Well designed junctions and optimized signal timings
- Encroachment free footpaths
- Road signages and markings of International standards
- Safe and well designed pedestrian crossings
- Provision of bus shelters with reliable passenger information system
- Urban traffic control system such as demand responses, traffic signals, vehicle actuated signals etc.
- Pedestrians subways, FOBs, flyovers, ROBs
- Station Area Traffic Improvement Schemes (SATIS) around Suburban Railway Station
- Intelligent Transport Systems such as variable sign messages, Incident/Accident Management System
- Parking restrictions

Short-term of Traffic Engineering and Management measures are less expensive and provide immediate relief to traffic combined with efficient enforcement. These measures would utilize enhance the available system capacity in an efficient manner. In Mumbai, encroachments, vendors on the footpaths is scene of the day.

**B. Long Term Measures**: These include Projects such as Mass Rapid Transit Systems and Express Highways, water transport systems etc.

**C. Policy Measures**: In addition to the above measures, the Authorities also need to address various policy measures that will contain the demand and also ensure efficient mechanism and the network for the Disaster Management. In this context following are some of the policies which need to be incorporated under City Development Plan.

**D. Demand Management Measure**: Under Demand Management measures, various options such as area licensing system, congestion pricing parking policy etc. are available. The objective of Demand Management is to restrain in-efficient use of private vehicles to conserve scarce financial resources to conserve fuel to limit adverse environmental impact and to generate revenue through effective operation and enforcement. The demand management measures are internationally accepted and cities like Singapore and London have implemented traffic restraint measures successfully.

**E. Congestion pricing**: In the Central Business Districts (CBDs) these cities have shown successful results and it is reported that there has been reduction of traffic by 1- to 15% in the peak period. However, it is essential that such measures need to be coupled with improvement in public transport system without which the shift from private vehicle to the public transport cannot be accepted. Singapore and London have first improved the public
Transport System prior to implementation of demand management measures. In addition to this, premium on car ownership and proof of availability of car parking at residence and workplace will contain the increase in private vehicles on roads to a considerable extent.

**F. Parking Control Policy:** Land is valuable in all urban areas. Parking on roads occupies a large portion of road space required for movement of traffic causing inconvenience to the vehicular flow and reducing the road capacity.

As a policy measure on-street parking shall not be allowed on all major arterials. With respect to off-street parking, the present standard Development Control Regulation requires minimum levels of parking provision. These need to be amended so that provision of space standard for multi-storeyed complexes and other complexes be made as the primary responsibility of the developer.

Role of Local Authorities in relation to parking supply with demand, permitting malls, is to be examined by insisting Local Impact Studies and the developer should be made responsible for alleviating the problems.

In cities like Mumbai and surrounding Regions where the dependencies on different transport systems, all the stations need to be provided with adequate parking spaces for private vehicles, IPT and Public Transport Vehicle.

Though the regulation of road space involving charges and possibly the provision of off-street parking on a commercial basis in the longer term, conditions can be improved for pedestrians and traffic, most importantly for buses. Proper enforcement will be needed to ensure compliance by potential parkers and also to prevent hawkers taking over more spaces freed by the greater regulation of parking. Further, options such as differential parking charges during different periods of the day would function as demand management measure.

**G. Bus Transport Priority Measures:** Mumbai has the uniqueness of high dependency on public transport system including suburban rail services and BEST buses. With respect to the rail-based public transport, the projects like Mumbai Urban Transport Project and Mumbai Metro are considered by the Mumbai Authorities. With respect to road-based Public Transport, additional 500 buses are being provided under World Bank funded MUTP. Prior to introduction of any traffic restrain measure, it is essential that the efficiency of existing public transport system is improved. In this context, BEST and World Bank has shown interest in providing dedicated bus lanes on important North – South and East – West arterials in the city. Following arterials have been considered on pilot basis to introduce dedicated bus corridors –

- Jogeshwari – Vikhroli Link Road
- Western Express Highway
- Eastern Express Highway

Based on the success of pilot exercise, such kind of measures need to be extended to other
parts of Greater Mumbai and also other growing urban regions in MMR. Further other priority public transport priority measures at traffic signal junctions and / Transport System applications in operations to be explored in operation and introduced to enhance the efficiency of bus system.

The World Bank during recent Review Mission has appreciated the efforts being made by Mumbai Authorities and recommended to implement the scheme immediately.

H. Transit Oriented Development: Intensification of development along the transit corridors at railway stations will also reduce the road traffic considerably. Allowing higher FSI for such commercial developments will be explored on selective basis keeping in view the congestion levels and over crowding at Suburban Stations. However, in case of new transit systems urban renewal schemes on 500 m x 500 m area of each station shall be considered for higher FSI incentives. The BEST which is the public transport bus operator has several depots where vertical development is possible for multi-storeyed parking and commercial development so that the revenues generated can be utilized for significant improvements in bus operations which are otherwise incurring huge losses.

I. Institutional set up (UMTA): Currently the region’s traffic and transportation is managed by different agencies in a fragmented approach. Though the ultimate aim is to provide improved level of service, there is no coherent integrated approach in providing the transportation services. Further, the necessary investment in transport sector is not forthcoming due to financial constraints of respective organisations.

Issues, policies, projects related to urban transport are handled at different level by several departments and agencies in the region. Railways (Central and Western) are a central subject where as public transport by bus/ferry are provided by Municipal Corporation as part of their mandate and in few places by MSRTC. However, the present Motor Vehicle Act enforces certain restrictions on state carriages. The passenger interrelation facilities are poor and seamless travel through integrated ticketing is still a dream.

In this context the recommendation in the draft National Urban Transport Policy on the formation of Unified Metropolitan Transport Authority (UMTA) to facilitate integrated planning and implementation of transport project is a well step. While the need is recognized for such a coordinating agency, it would be more pragmatic and feasible approach to redefine and strengthen the coordinating powers of development authorities, instead of creating another Authority. The intention is not to take away the powers of existing bodies but to redefine the funding, implementation integration and monitoring mechanism. A board / coordinating committee may be created with in the Development Authorities who may be constituted with respective heads of the corporations, councils and departments supported.
**State Level**

**Organizational Structure**

- **State level Co-ordination Committee** headed by Minister, UD and coordinated by Chief Secretary of State.

- **UMTA / Board**
  - At Urban Development Authority headed by Commissioner/VC & MD and comprising heads of all concerned organizations supported by Transportation Planner / Engineer

- **Co-ordination Committee** under Municipal Commissioner comprising RTA, Police, State Transport, Municipal Transport, Utility Departments etc., The necessary technical support will be provided by Traffic & Transportation Department to be created in local Authority

**Functions**

- Financing capital intensive projects, inter-agency coordination, external funding, transport policies.

- Planning of projects of regional significance, integrated land use transport policy, land control, identification of projects of regional significance, preparing 5 year rolling program for transport infrastructure development, deciding financing and implementation (either through other agencies, PPP, SPV, external funding)

- Spot improvements, junctions, signals, markings, signs, parking, bus stops, road maintenance, public representations.
J. Use of Technology in Facilitating UMTA: Use of Information Technology (IT) and Intelligent Transportation System (ITS) applications can greatly help in realizing the goal of UMTA. Earlier the apportionment of fare box revenue was used to be done through periodic manual survey for identifying the market share of each concerned organization and the revenue sharing was used to be agreed upon based on the result of the survey. Now, the issues like toll management and fare integration can be solved easily using electronic ticketing and smart card techniques. Also, using the combination of Geographical Information System (GIS), Global Positioning System (GPS), and other ITS techniques, a good Traveler Information System (TIS) can be developed, which can give information to commuters about all public transport modes, their routes and schedules, the best route plan for a given origin and destination, the concerned fare and other related information. Such information can be provided at transit stations, stops, and also through internet.

K. Disaster Management System: The concerned Authorities currently approach or address the problems of infrastructure as a Crisis Management rather than the perspective planning. Presently, the city lacks any Disaster Management and evacuation mechanism. This has been proved in recent disaster of floods on 26th July 2005 due to unprecedented rainfall when the transport and communication system totally collapsed and brought the city to a halt for almost two days. In order to ensure that city is geared up for any such eventualities, a disaster management including an evacuation system should be well developed. For this purpose, in terms of transport infrastructure, efficient and access control Freeway system with proper interchange facilities at different locations surrounding the city like Western Freeway, Eastern Freeway, Mumbai Trans Harbour Link (MTHL) and similar for outer region multi-modal road and rail corridor shall be considered on priority.

3.1.6. Urban Transport Projects under City Development plan

The following Urban Transport projects are proposed to be implemented under JNNURM which are critical for sustainable development in and around Mumbai. These are detailed in subsequent sections:

- Mumbai Urban Transport Project (MUTP)
- Mumbai Urban Infrastructure Project (MUIP)
- Mass Rapid Transit System (Mumbai Metro)
- Bandra-Worli-Nariman Point Sea Link (BWNSL)
- Mumbai Trans Harbour Sea Link (MTHSL)
- Inland Water Transport
- Thane Ring Railway
All the above projects have been initiated based on the comprehensive studies carried out keeping in view the future population, employment and landuse scenarios projected in the regional plan of MMR and Development plans of the Local authorities till 2011. These projects are evolved in line with the overall transport strategy for MMR. Besides, these ongoing/proposed projects, the projects covering all modes to be taken in future to cater to demand up to 2031 will be identified and prioritized based on the outcome of “Comprehensive Transportation Study for MMR”, which is currently in progress through M/s Lea Intl. Ltd. Canada.

3.1.6 Financing Requirements for the Projects Proposed under Urban Transport

The summary of the overall financial requirements for the projects proposed under City development plan under Urban transport Improvement are as follows;

<table>
<thead>
<tr>
<th>Project Details</th>
<th>Duration</th>
<th>Project Cost</th>
<th>Fin. Asst.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUIP</td>
<td>2004-07</td>
<td>2647</td>
<td></td>
</tr>
<tr>
<td>Metro Rail (Phase 1-3 lines incl. VAG corridor)</td>
<td>2005-11</td>
<td>10,500</td>
<td>3500</td>
</tr>
<tr>
<td>MUTP – II (Rail)</td>
<td>2005-09</td>
<td>3700</td>
<td>1850</td>
</tr>
<tr>
<td>Western Freeway</td>
<td>2005-8</td>
<td>3900</td>
<td>1580</td>
</tr>
<tr>
<td>MTHL</td>
<td>2006-08</td>
<td>4028</td>
<td>1200</td>
</tr>
<tr>
<td>Thane Ring railway</td>
<td>2006-08</td>
<td>852</td>
<td>425</td>
</tr>
<tr>
<td>Assistance required</td>
<td></td>
<td>25,627</td>
<td>8,555</td>
</tr>
</tbody>
</table>

Most of these projects are proposed to be implemented on PPP basis. Extent of support expected under the JNNURM is viability gap support from GoI and equity investment from GoM. Individual project proposals shall be submitted for this purpose. Annexure A provides a summary of the proposed projects, current status and envisaged means of financing.

3.2. Action Plan for Parking Infrastructure

Provision of facilities for parking is being looked into by the MCGM. The strategy for developing parking facilities is as follows:

- to develop reserved areas wither through acquisition or through TDR
- explore the framework of Accommodation Reservation for getting such facilities developed through private sector
- in accordance with the DCR develop underground parking below parks

Requirements for parking are expected to rise and there would be a greater need to impose requirements as a part of the building permission to include provisions for parking.

In this backdrop, MCGM has already implemented state of the art parking facility are Nariman Point and proposes to take up parking projects in the short term to meet this need.