



Municipal Corporation of Greater Mumbai

DEVELOPMENT PLAN FOR GREATER MUMBAI 2014-2034

# PREPARATORY STUDIES

DP 2014 - 2034





# **PREPARATORY STUDIES**



**DEVELOPMENT PLAN FOR GREATER MUMBAI 2014-2034**

## Acknowledgements

The Consultant wishes to thank the Municipal Corporation of Greater Mumbai for their invaluable support in the preparation of the Development Plan for Greater Mumbai 2014-34.

The Consultant wishes to express gratitude to the following individuals from the Municipal Corporation of Greater Mumbai (MCGM) for their invaluable support, insights and contributions towards the 'Preparation of the Draft Development Plan for Greater Mumbai 2014 – 2034 (DP 2034)'.

1. Mr. Sitaram Kunte, IAS, Municipal Commissioner
2. Mr. Rajeev Kukunoor, Chief Engineer Development Plan
3. Mr. Sudhir Ghate, former Chief Engineer Development Plan
4. Mr. Marathe, former Deputy Chief Engineer Development Plan
5. Mr. R. Balachandran, Town Planning Officer, Development Plan

Our deepest gratitude to the following experts for their invaluable insights and support:

1. Mr. V.K. Phatak, Former Chief Planner, Mumbai Metropolitan Regional Development Authority (MMRDA)
2. Mr. A.N Kale, Former Director (E S &P), MCGM
3. Mr. A. S. Jain, Former Deputy Chief Engineer Development Plan, MCGM
4. Mr. Shrinivas G. Joshi, Former Deputy Chief Engineer (DP), MCGM
5. Mr. Rajan Athalye, Former Executive Engineer, MCGM

We wish to especially thank MCGM officers Mr. Sanjay Jadhav, Mr. Dinesh Naik, Mrs. Anita Naik and Mr. Hiren Daftardar for their continual support since the beginning of the project and at every stage of the process. Our particular thanks to all the officials of the MCGM at the Ward level in extending their time and cooperation in validating our inputs at various stages of the process. We also extend our gratitude to the heads and officers from all the departments of MCGM (especially Roads & Traffic, Shops and Establishment, Gardens, Health, Education, Storm Water Drainage, Solid Waste Management, and Water Supply Department) who have provided valuable inputs at various stages of this exercise.

We would also like to thank the heads and officers from Mumbai Metropolitan Region Development Authority (MMRDA), Maharashtra Housing and Area Development Authority (MHADA), the Slum Redevelopment Authority (SRA), Mumbai Rail Vikas Corporation (MVRC), Brihanmumbai Electric Supply and Transport (BEST), Mumbai Transformation Support Unit (MTSU). Further, we would like to thank all citizens groups that have actively contributed to this exercise.

We apologize if we have inadvertently omitted anyone to whom acknowledgement is due. We hope and anticipate the work's usefulness for the intended purpose.



## Consultant's Team

---

### PROJECT MANAGEMENT

- Contract Manager: Vivian Rai Borde
- Urban Planner Team Leader: Eric Huybrechts
- Urban Planner Deputy Team Leader: Champaka Rajagopal
- Project Coordinator 01: Makarand Salunke
- Project Coordinator 02: Hrydhal Damani
- GIS Coordinator: Arun Kumar

### SECTORAL EXPERTISE

- Urban Planner for Land Use Planning: Malini Krishnankutty
- Remote Sensing Cartography & GIS Expert: Frederic Jehan
- Development Control: Harshad Bhatia
- Urban Transportation Planner: R K Mehta
- Urban Economist: Dr. Abhay Pethe
- Financial Analyst: Gautam Patel
- Legal Expert: Pradeep Havnur
- Environmental Planner: Ulhas Rane



## Contents

---

Acknowledgements.....	1
1. Introduction .....	17
2. Legal Mandate: Preparation of the Draft Development Plan Greater Mumbai 2014-34 .....	18
3. Review of Past Experience.....	19
4. Approach and Methodology Adopted for Plan Preparation .....	20
5. Existing Situation Analysis.....	21
6. Projections .....	23
7. Assessing Space Demand for 2034.....	24
8. Vision 2034.....	25
9. Principles for Development: A Future Road Map .....	26
10. Framework for Local Area Planning.....	28
11. In Conclusion .....	28
12. Way Forward.....	29

### Part I: Existing Land Use Survey

1. Introduction .....	31
1.1 Review of Past Experience .....	31
1.2 Review of Past Plans:.....	33
1.3 Legal Mandate: Preparation of the Development Plan Greater Mumbai 2014- 2034.....	35
1.4 Process of Awarding Works to Consultants.....	35
2. Existing Land Use Survey .....	39
2.1 Mapping Existing Land Use.....	39
2.1.1 Base Map Preparation .....	39
2.1.2 Spatial Disaggregation .....	39
2.2 Existing Land Use Classification .....	41
2.3 Survey Methodology .....	58
2.4 Seeking Public Suggestions and Objections to Existing Land Use 2012 .....	58

### Part II: Assessment of Existing Situation

3. Delineation of Planning Sectors.....	61
4. Existing Land Use.....	73
4.1 Existing Land Use Distribution .....	73
4.2 Proposals of DP 1991 and Existing Land Use 2012.....	77



4.2.1 Residential Zone.....	77
4.2.2 Commercial Zone .....	78
4.2.3 Industrial Zone .....	78
4.2.4 No Development Zone.....	78
4.3 A Context of Mixed Land Use: Existing Land Use 2012 .....	79
<b>5. Population Growth Dynamics.....</b>	<b>83</b>
5.1 Population: Declining Decadal Growth Rate .....	83
5.2 Population Distribution in Greater Mumbai.....	85
5.3 Ward Wise Slum Population.....	86
5.4 Shrinking Household Size.....	90
<b>6. Economy.....</b>	<b>93</b>
6.1 Gross District Domestic Product .....	93
6.2 Sectoral Composition of Mumbai's GDDP .....	93
6.3 Employment Characteristics.....	95
6.3.1 Work Participation .....	96
6.4 Real Estate Prices and Household Income.....	99
<b>7. Floor Space Index .....</b>	<b>105</b>
7.1 Definitions of FSI .....	105
7.1.1 Development Control Regulations for Greater Mumbai 1991 (DCR 1991) .....	106
7.2 Assessing Existing Consumption of FSI .....	108
7.2.1 FSI Consumption Pattern .....	110
7.2.2 Areas with High FSI .....	113
7.2.3 Comparison of FSI distribution and per capita Employment.....	114
<b>8. Urban Fabrics .....</b>	<b>117</b>
<b>9. Transport.....</b>	<b>128</b>
9.1 Existing Transport Networks.....	129
9.1.1 Roadways .....	130
9.1.2 Railways .....	137
9.2 Intermediate Public Transport.....	142
9.3 Airport .....	142
9.4 Pedestrian Movement.....	143
9.5 Public Water Transport-Regional Services.....	143
9.6 Proposed Plans and Projects.....	143
9.6.1 Roads .....	143



9.6.2	Metro rail .....	144
9.6.3	Mono Rail .....	145
9.6.4	Western Railway .....	145
9.7	Integrated Land Use and Transport System .....	145
9.8	Parking .....	148
<b>10.</b>	<b>Physical Infrastructure .....</b>	<b>153</b>
10.1	Water Supply.....	153
10.1.1	Proposals and Status of Implementation of Projects .....	155
10.1.2	Ongoing and Proposed Projects .....	155
10.1.3	Comprehensive Water Supply Distribution Improvement Programme .....	156
10.2	Sewerage System .....	158
10.3	Storm Water Drainage.....	162
10.4	Solid Waste .....	165
<b>11.</b>	<b>Environment.....</b>	<b>171</b>
11.1	Evaluation of Environmental Considerations in DP 1991 .....	171
11.2	Status of Environment.....	173
11.2.1	Pollution Indicators .....	173
11.3	Health & Hygiene Impacts of Pollution and Current Infrastructure Management.....	175
11.3.1	Vulnerability .....	175
11.3.2	Proneness to Flooding: .....	176
<b>12.</b>	<b>Area Available for Social Infrastructure.....</b>	<b>180</b>
12.1	Existing Distribution and Provision of Amenities and Open Space .....	180
12.1.1	Per capita Provision of Amenities and Open Space.....	181
12.1.2	Levels of Amenity Provision .....	189
12.2	Assessment of Area Available for Amenities in Greater Mumbai.....	189
12.2.1	Assessment of Area Available for Amenities in the Island City .....	191
12.2.2	Assessment of Area Available for Amenities in Western Suburbs .....	192
12.2.3	Assessment of Area Available for Amenities in Eastern Suburbs.....	192
12.4	Accessibility to Amenities .....	198
12.4.1	Accessibility to Education Amenities .....	198
12.4.2	Accessibility to Medical Amenities .....	198
12.4.3	Accessibility to Open Spaces .....	198
12.5	Levels of Access to Open Spaces .....	202
12.5.1	Ward level Open Spaces .....	202

<b>13. Comparison of Reservations of DP 1991 and ELU 2012 .....</b>	<b>204</b>
<b>14. Orientations for Spatial Development.....</b>	<b>210</b>
<b><u>Part III: Visualising the Future</u></b>	
<b>15. Growth Scenarios and Objectives.....</b>	<b>214</b>
15.1 Economic Growth.....	214
15.1.1 Economic Growth Projections .....	214
15.2 Sectoral Composition of Mumbai's GDDP .....	215
15.3 Emerging Sectors of Growth and Spatial Clustering .....	215
15.4 The Risks and Uncertainties of Growth .....	216
<b>16. Population Projections .....</b>	<b>217</b>
16.1 Existing Growth and Distribution of Population in Greater Mumbai Urban Agglomeration .....	220
16.1.1 Regional dynamics of population dispersion from Greater Mumbai to the Greater Mumbai Urban Agglomeration.....	221
16.2 Greater Mumbai Population Projections Based on Past Trends .....	222
16.3 Population Projection by Ratio Method.....	223
16.4 Methodology .....	224
16.5 Population Projections for Wards within Greater Mumbai by 2034 .....	226
16.5.1 Projection of number of Households for Greater Mumbai .....	228
16.6 Employment.....	228
16.6.1 Employment Projections by Place of Work .....	228
<b>17. Vision for Greater Mumbai.....</b>	<b>231</b>
17.1 Vision DP 2014 - 2034 .....	232
17.1.1 Strategies for Attaining the Vision for DP 2014 – 2034.....	233
<b>18. Spatial Development Strategy for Greater Mumbai .....</b>	<b>235</b>
18.1 Promote Urban Renewal and Redevelopment.....	235
a) Polycentric Development .....	236
b) Transit Oriented Development .....	239
c) Encourage Urban Renewal of Specific Areas.....	242
18.4 Preserve Existing Environmental Networks.....	242
18.5 Increasing Supply of Land for Public Purpose.....	244
<b>19. Two Tiered Planning Strategy.....</b>	<b>246</b>
<b>20. Assessing Space Demand for 2034.....</b>	<b>248</b>
20.1 Provisioning for Amenity Spaces.....	248

20.1.1 Greater Mumbai: Review of DP 1991 Planning Standards .....	248
20.1.2 Contextualizing Planning Standards for Greater Mumbai.....	249
20.1.3 Review of Various Norms and Standards .....	250
20.1.4 Benchmarking Global and Local Amenity Space Provisions .....	252
20.2 Recommendations for Space Provision.....	255
20.2.1 Recreation/Open Spaces .....	255
20.2.2 Educational Amenities.....	256
20.2.3 Health Amenities.....	256
20.2.4 Social Amenities .....	257
20.3 Hierarchy of Development: .....	257
20.4 Estimating the Space Demand for 2034 .....	258
20.4.1 Computing Future Space Demand .....	258
20.4.2 Per Capita Demand for Amenity Space in MCGM Jurisdiction .....	260
20.4.3 Estimating Space Demand 2034.....	262
20.5 Obtaining Land for Public Purpose & Reservation Policy .....	263
20.5.1 Review of Tools .....	264
20.5.2 Reservation Policy Recommendations .....	266
20.5.3 Strategies for DP 2014 - 2034 for Obtaining Land for Public Purpose .....	266
<b>21. Strategy for Zoning and Development Controls .....</b>	<b>270</b>
21.1 A Mixed Land Use Zoning Strategy.....	271
21.2 Inclusive Housing .....	271
21.3 Conserving Eco-Sensitive Areas .....	272
21.4 Zoning for Comprehensive Development .....	272
21.5 Parking Strategy .....	273
21.6 External Regulations.....	274
<b>22. Challenges .....</b>	<b>275</b>
22.1 Competitive City.....	275
22.2 Inclusive City .....	276
22.3 Sustainable City.....	277
<b>23. Way Forward.....</b>	<b>279</b>

## List of Figures

---

Figure 1: Land Use Category Residential.....	42
Figure 2: Land Use Category Commercial.....	43
Figure 3: Land Use Category Offices.....	44
Figure 4: Land Use Category Industry.....	44
Figure 5: Land Use Category Urban Villages.....	45
Figure 6: Land Use Category Primary Activity.....	45
Figure 7: Land Use Category Natural Areas and Open Spaces.....	46
Figure 8: Land Use Category Vacant Land.....	47
Figure 9: Land Use Category Unclassified.....	47
Figure 10: Land Use Category Medical.....	48
Figure 11: Land Use Category Social Amenity.....	49
Figure 12: Land Use Category Education.....	50
Figure 13: Land Use Category Public Utility and Facility.....	50
Figure 14: Land Use Category Transport and Communication.....	51
Figure 15: Consolidated Land Use Categories: Residential, Urban Villages, Educational Amenities.....	52
Figure 16: Consolidated Land Use Categories: Medical Amenities, Commercial Activities.....	53
Figure 17: Consolidated Land Use Categories: Social Amenities, Natural Areas and Open Spaces.....	54
Figure 18: Consolidated Land Use Categories: Offices, Transport and Communication.....	55
Figure 19: Consolidated Land Use Categories: Industrial Use, Vacant Lands, Primary Activity.....	56
Figure 20: Consolidated Land Use Categories: Public Utility and Facility, Unclassified.....	57
Figure 21 Samples of Survey Tablet, Field Survey Sheets and Verification Notes.....	58
Figure22: Methodology for Computing Net Bulk FSI.....	109



## List of Tables

Table 1: Notified Areas and SPAs .....	40
Table 2: Zone Wise Area and Number of Planning Sectors .....	61
Table 3: Ward Wise Planning Sector Areas .....	62
Table 4: Larger Developments and Natural Areas Spanning across Different Planning Sectors .....	69
Table 5: Existing Land Use Distribution for Greater Mumbai 2012 .....	74
Table 6: Decadal Population Variation, Greater Mumbai .....	83
Table 7: Population and Decadal Percentage Variation of Island City: 1961 – 2011 .....	84
Table 8: Population and Decadal Percentage Variation of Suburban District: 1961 – 2011 .....	84
Table 9: Percentage Share of Population Distribution in Greater Mumbai: 1981 – 2011 .....	85
Table 10: Ward wise Population of Greater Mumbai in 2001 and 2011 .....	86
Table 11: Ward wise Slum & Non-Slum Population .....	87
Table 12: Distribution of Number of Households in Greater Mumbai: 2001 - 2011 .....	90
Table 13: GDDP at Current Prices (In Rs. Lakhs) .....	93
Table 14: Worker Participation Rate in Mumbai .....	96
Table 15: Ward wise Estimated Number of Employees by Place of Work (in Thousands) .....	97
Table 16: Housing Stock for Greater Mumbai .....	99
Table 17: Resultant FSI at Site or Receiving Plot based on objective and incentives .....	105
Table 18: List of Architectural Features / Sheltered Areas Excluded from Computation of FSI .....	106
Table 19: List of Architectural Features / Sheltered Areas Included from Computation of FSI .....	107
Table 20: Road Network Inventory: Greater Mumbai .....	131
Table 21: Traffic Volumes in Greater Mumbai .....	132
Table 22: Main Arterial Roads with Traffic Volumes more than 60,000 PCU/16 hr in Greater Mumbai .	132
Table 23: Main Arterial Roads with Traffic Volumes 40,000 to 60,000 PCU/16 hr in Greater Mumbai...	133
Table 24: Requirements in Existing Bus Stations .....	136
Table 25: Proposed Metro Rail Routes in Greater Mumbai .....	145
Table 26 Existing Source of Water Supply for MCGM .....	154
Table 27: Major Water Treatment Plants .....	155
Table 28: Future Sources of Water Supply .....	156
Table 29: Existing Sewerage System details .....	158
Table 30: Zone wise Sewage Collection, Conveyance and Treatment System .....	159
Table 31: Storm Water Drainage System Outfall Details (in numbers) .....	162
Table 32: Summary on Storm Water Drainage .....	162
Table 33: Storm Water Drainage Projects Implementation Status .....	163
Table 34: of Solid Waste in MCGM .....	165
Table 35: Capacity of Dumping Sites in Mumbai .....	165
Table 36: Comparison with CPCB Standards (annual avg.) at fixed air monitoring sites in 2010-2011 ...	173
Table 37: Coastal Water Quality of Mumbai - 2010-2011 .....	174
Table 38: Range of Noise Levels Observed with Respect to the Standards, 2010-2011 .....	175
Table 39: Chronic Flooding Spots in Greater Mumbai .....	176
Table 40: DP 1991 Space Norms .....	180
Table 41: Area for Open Space as per Existing Land Use, 2012 .....	184



Table 42: Area for Medical Amenities as per Existing Land Use, 2012 .....	185
Table 43: Area for Educational Amenities as per Existing Land Use, 2012 .....	186
Table 44: Area for Social Amenities as per Existing Land Use, 2012 .....	187
Table 45: Distribution of Natural Areas and Open Spaces: Ward wise .....	202
Table 46: Categorization of DP 1991 Reservations.....	204
Table 47: Mumbai's GDDP Growth at Constant Price .....	214
Table 48: GDDP Projections at 13% Growth Rate .....	215
Table 49: Spatial Clustering.....	216
Table 50: Future Projected Population for MCGM by Past and Recent Planning Initiatives .....	217
Table 51: Decadal Growth Rate (in %) of Major Cities in India: 1981 – 2011 .....	218
Table 52: Decadal Growth Rate (in %) of Major Urban Agglomerations in India: 1981 – 2011.....	218
Table 53: Decadal Growth Rate of Major Asian Metropolitan Regions: 1981 – 2011.....	219
Table 54: Population distribution & decadal growth rate of Maharashtra, GMUA & Greater Mumbai ..	220
Table 55: Distribution of Share of Greater Mumbai in Maharashtra and GMUA: 1971 – 2011 .....	221
Table 56: Projected Population by Linear and Logarithmic Methods: 2021, 2031 and 2041 .....	222
Table 57: Distribution of Population of Maharashtra, Maharashtra Urban, GMUA, Greater Mumbai, Island City and Suburban District along with Share of area-wise population from 1971 - 2011 .....	224
Table 58: Projected Ratio of Population Computed across Different Levels of Disaggregation: 2021 – 2041 .....	225
Table 59: Projected Population (in thousands) of Greater Mumbai for 2021, 2031 and 2041 .....	225
Table 60: Projected Population (in thousands) of Greater Mumbai for 2014, 2024 and 2034 .....	226
Table 61: Population Projections for Wards (in thousands) .....	227
Table 62: Projected Households in Greater Mumbai for 2014, 2024 and 2034 .....	228
Table 63: Range of Employment Levels as per the Comprehensive Transportation Study for Mumbai Metropolitan Region, July 2008 (in Millions) .....	228
Table 64: The Visions Envisaged for Mumbai and its Region by Various Reports:.....	231
Table 65: National Amenity Space Norms in Comparison to Current Provision .....	252
Table 66: International Open Space .....	253
Table 67: Hierarchy of Urban Development .....	257
Table 68: Existing Built Up Area and Carpet Area for Projected Population .....	258
Table 69: Per capita average residential space (Built Up Area) required for the varying housing typologies in Greater Mumbai .....	259
Table 70: Per capita residential space (BUA) requirement benchmarks for Greater Mumbai .....	259
Table 71: Per capita employment space (BUA) requirement benchmark for Greater Mumbai .....	260
Table 72: Hierarchy of Urban Development, Amenities required, Per Capita Space Benchmarks-Cumulative at each level.....	261
Table 73: Requirement of Amenity Land in Greater Mumbai.....	262



## List of Maps

---

Map 1: Planning Sectors for Greater Mumbai .....	70
Map 2: Existing Land Use Map for Greater Mumbai .....	75
Map 3: Area of Mangroves outside MCGM Jurisdiction.....	76
Map 4: Ward wise Slum and Non Slum Population in Greater Mumbai .....	89
Map 5: Employment and Gross Population Density at Planning Sector level in Greater Mumbai .....	98
Map 6: Residential Land Price in Greater Mumbai.....	101
Map 7: Existing Net Bulk FSI in Greater Mumbai .....	112
Map 8: Floor Space Index and Employment. ....	116
Map 9: (following 6 slides) Examples of the Urban Fabrics Study for Mumbai .....	119
Map 10: Major Road Networks of Greater Mumbai .....	134
Map 11: Suburban Rail Network of Greater Mumbai.....	140
Map 12: Mass Transit Networks in Greater Mumbai .....	147
Map 13: Existing Sewage Treatment Plants, Pumping Stations and Public Sanitary Convenience.....	160
Map 14: Existing Sanitary Refuse Sheds and Solid Waste Disposal Sites.....	167
Map 15: Existing Natural Areas and Open Spaces.....	172
Map 16: Accessibility and Spatial Distribution of Primary Level Educational Amenities.....	199
Map 17: Accessibility and Spatial Distribution of Medical Amenities .....	200
Map 18: Accessibility and Spatial Distribution of Open Spaces .....	201
Map 19: Nodes for Polycentric Development.....	237
Map 20: Areas in Proximity to Existing and Emerging Business Center .....	238
Map 21: Transit Oriented Zones in Greater Mumbai .....	240
Map 22: Major Suburban Rail Station in Proximity to Employment Centres .....	241
Map 23: Environmental Networks of Greater Mumbai.....	243

## List of Graphs

---

Graph 1: Population and Decadal Growth Rate in Greater Mumbai: 1911 – 2011.....	84
Graph 2: Population and Decadal Growth Rate in Island City and Suburban District 1961 – 2011 .....	85
Graph 3: Ward wise Total Population and Slum Population (2011) (excluding Areas under SPAs).....	88
Graph 4: Household Income Distribution for Greater Mumbai (in 2005 Prices) .....	94
Graph 5: Distribution of Workers by Industrial Activity in Greater Mumbai .....	95
Graph 6: Household Income by Housing Type .....	100
Graph 7: Net Density and existing Net Bulk FSI.....	114
Graph 8: Per Capita Open Space Availability for Different types of Open Spaces .....	183
Graph 9: Existing Situation Assessment for Greater Mumbai: per capita areas compared with DP 1991 standards.....	191
Graph 10: Existing Situation Assessment for Island City: per capita areas compared with DP 1991 standards.....	192
Graph 11: Existing Situation Assessment for Western Suburb: per capita areas compared with DP 1991 standards.....	193
Graph 12: Existing Situation Assessment for Eastern Suburb: per capita areas compared with DP 1991 standards.....	193
Graph 13: Per capita Area Available for Amenities: Ward wise, Greater Mumbai .....	194
Graph 14: Per capita Area Available for Amenities: Planning Sector Wise, Island City.....	195
Graph 15: Per capita Area Available for Amenities: Planning Sector wise, Western Suburbs.....	196
Graph 16: Per capita Area Available for Amenities: Planning Sector wise, Eastern Suburbs .....	197
Graph 17: Decadal Growth Rate Trend of Major Asian Metropolitan Regions: 1981 – 2011.....	219
Graph 18: Growth Rate in the Maharashtra Urban, GMUA and Greater Mumbai: 1971 – 2011 .....	221
Graph 19: Population Trend in Greater Mumbai for the Horizon Period.....	223
Graph 20: Population Projection for Greater Mumbai using Ratio Method.....	226
Graph 21: Benchmarking per capita space for Amenities in Greater Mumbai .....	254
Graph 22: Open Space Provision - Comparable International Examples.....	254
Graph 23: Densities and per capita open space for International examples.....	255
Graph 24: Benchmarking Residential per capita space (BUA) in Greater Mumbai.....	260
Graph 25: Benchmarking Open Space per capita in Greater Mumbai .....	261
Graph 26: Requirement of Amenity Land in Greater Mumbai.....	263

## List of Abbreviations

<b>ACD</b>	Areas for Comprehensive Development
<b>ALM</b>	Advanced Locality Management
<b>APMC</b>	Agriculture Produce Market Committee
<b>AR</b>	Accommodation Reservation
<b>B(a)P</b>	Benzo(a)Pyrene
<b>BARC</b>	Bhabha Atomic Research Centre
<b>BBMP</b>	Bruhat Bangalore Mahanagara Palike
<b>BDD</b>	Bombay Development Department
<b>BEST</b>	Brihanmumbai Electric Supply and Transport
<b>BHK</b>	Bedroom, Hall, Kitchen
<b>BIT</b>	Bombay Improvement Trust
<b>BKC</b>	Bandra Kurla Complex
<b>BMC</b>	Brihanmumbai Municipal Corporation
<b>BOD</b>	Biochemical Oxygen Demand
<b>BPCL</b>	Bharat Petroleum Corporation Limited
<b>BPMC Act1949</b>	Bombay Provincial Municipal Corporation Act, 1949
<b>BTP Act</b>	Bombay Town Planning Act
<b>BUA</b>	Built Up Area
<b>CBD</b>	Central Business District
<b>CDP</b>	City Development Plan
<b>CIDCO</b>	City and Industrial Development Corporation
<b>CNG</b>	Compressed Natural Gas
<b>COI</b>	Census of India
<b>CRZ</b>	Coastal Regulation Zone
<b>CST</b>	Chhatrapati Shivaji Terminus
<b>CTS</b>	Comprehensive Transport Study
<b>DCR</b>	Development Control Regulations
<b>DDA</b>	Delhi Development Authority
<b>DG</b>	Diesel Generator
<b>DMA</b>	District Metered Area
<b>DP</b>	Development Plan
<b>DRP</b>	Dharavi Redevelopment Project
<b>DPR</b>	Detail Project Report
<b>DRMMP</b>	Disaster Risk Management Master Plan
<b>DU</b>	Dwelling Unit
<b>EEH</b>	Eastern Express Highway

<b>ELU</b>	Existing Land Use
<b>EMI</b>	Equated Monthly Instalment
<b>ESA</b>	Existing Situation Analysis
<b>EWS</b>	Economically Weaker Section
<b>FAO-UN</b>	Food and Agriculture Organization of the United Nations
<b>FBC</b>	Form Based Codes
<b>FCI</b>	Food Corporation of India
<b>FOB</b>	Foot Over Bridge
<b>FSI</b>	Floor Space Index
<b>GDDP</b>	Gross District Domestic Product
<b>GDP</b>	Gross Domestic Product
<b>GHMC</b>	Greater Hyderabad Municipal Corporation
<b>GIS</b>	Geographic Information System
<b>GMP</b>	Greater Mumbai Police
<b>GMUA</b>	Greater Mumbai Urban Agglomeration
<b>GoI</b>	Government of India
<b>GoM</b>	Government of Maharashtra
<b>HIG</b>	High Income Group
<b>HPEC</b>	High Powered Expert Committee
<b>HPCL</b>	Hindustan Petroleum Corporation Limited
<b>HTL</b>	High Tide Line
<b>IIT</b>	Indian Institute of Technology
<b>INR</b>	Indian National Rupee
<b>IOCL</b>	Indian Oil Corporation Ltd.
<b>IPT</b>	Intermediate Public Transport
<b>ISBT</b>	Inter-State Bus Terminal
<b>IT/ITES</b>	Information Technology/ Information Technology Enabled Services
<b>ITI</b>	Industrial Training Institute
<b>JnNUR M</b>	Jawaharlal Nehru National Urban Renewal Mission
<b>JTC</b>	Joint Technical Committee
<b>JNPT</b>	Jawaharlal Nehru Port Trust
<b>JVLR</b>	Jogeshwari-Vikhroli Link Road
<b>LAA</b>	Land Acquisition Act
<b>LBS</b>	Lal Bahadur Shastri
<b>LCA</b>	Land Capability Analysis
<b>LIG</b>	Lower Income Group
<b>LMV</b>	Light Motor Vehicle

<b>LPCD</b>	Litres Per Capita per Day
<b>LTMG</b>	Lokmanya Tilak Medical General (Hospital)
<b>MbPT</b>	Mumbai Port Trust
<b>MBR</b>	Master Balancing Reservoir
<b>MCH</b>	Municipal Corporation of Hyderabad
<b>MCGM</b>	Municipal Corporation of Greater Mumbai
<b>MCZMA</b>	Maharashtra Coastal Zone Management Authority
<b>MHADA</b>	Maharashtra Housing & Area Development Authority
<b>MIDC</b>	Maharashtra Industrial Development Corporation
<b>MIG</b>	Middle Income Group
<b>MLD</b>	Million Litres per Day
<b>MMB</b>	Maharashtra Maritime Board
<b>MMR</b>	Mumbai Metropolitan Region
<b>MMR-EIS</b>	Mumbai Metropolitan Region-Environment Improvement Society
<b>MMRDA</b>	Mumbai Metropolitan Region Development Authority
<b>MoEF</b>	Ministry of Environment and Forest
<b>MPCB</b>	Maharashtra Pollution Control Board
<b>MR&amp; TP Act 1966</b>	Maharashtra Regional and Town Planning Act 1966
<b>MRVC</b>	Mumbai Railway Vikas Corporation
<b>MSDP</b>	Mumbai Sewage Disposal Project
<b>MSRDC</b>	Maharashtra State Road Development Corporation
<b>MT</b>	Metric Tonnes
<b>MTHL</b>	Mumbai Trans Harbour Link
<b>MTNL</b>	Mahanagar Telephone Nigam Limited
<b>MTS</b>	Mass Transit System
<b>MTSU</b>	Mumbai Transformation Support Unit
<b>MUIP</b>	Mumbai Urban Infrastructure Project
<b>MUTP</b>	Mumbai Urban Transport Project
<b>NASVI</b>	National Alliance of Street Vendors of India
<b>NBC</b>	National Building Code
<b>NDZ</b>	No Development Zone
<b>NHAI</b>	National Highway Authority India
<b>NH</b>	National Highway
<b>NITIE</b>	National Institute of Industrial Engineering
<b>NIUA</b>	National Institute of Urban Affairs

<b>NOC</b>	No Objection Certificate
<b>NPA</b>	Net Plot Area
<b>NPFA</b>	National Playing Fields Association
<b>NRPA</b>	National Recreation and Park Association
<b>NUHHP</b>	National Urban Housing and Habitat Policy
<b>NUHM</b>	National Urban Health Mission
<b>NWDA</b>	National Water Development Authority
<b>P&amp;T</b>	Post & Telegraph
<b>PBC</b>	Place Based Codes
<b>PBX</b>	Private Branch Exchange
<b>PCU</b>	Passenger Car Unit
<b>PG</b>	Play Ground
<b>PH/HD</b>	Public Housing and Housing for Dishoused
<b>PHC</b>	Public Health Centre
<b>PIB</b>	Press Information Bureau
<b>PLU</b>	Proposed Land Use
<b>PPP</b>	Public Private Partnership
<b>PPH</b>	persons per hectare
<b>PSC</b>	Public Sanitary Convenience
<b>PSF</b>	Power Supply Facility
<b>PWC</b>	Price Waterhouse Cooper
<b>RG</b>	Recreation Ground
<b>ROW</b>	Right of Way
<b>RP</b>	Regional Plan
<b>RTE</b>	Right to Education
<b>RTO</b>	Regional Transport Office
<b>SCADA</b>	Supervisory Control and Data Acquisition
<b>SEEPZ</b>	Santacruz Electronics Export Processing Zone
<b>SEZ</b>	Special Economic Zone
<b>SGNP</b>	Sanjay Gandhi National Park
<b>SPA</b>	Special Planning Authority
<b>SRA</b>	Slum Rehabilitation Authority
<b>SRS</b>	Slum Rehabilitation Scheme
<b>STP</b>	Sewage Treatment Plan
<b>SV Road</b>	Swami Vivekanand Road
<b>SWM</b>	Solid Waste Management
<b>SWD</b>	Storm Water Drainage
<b>TAZ</b>	Traffic Analysis Zone
<b>TDR</b>	Transfer of Development Rights



<b>TOD</b>	Transit Oriented Development
<b>TPD</b>	Tonnes per Day
<b>TRC</b>	Trade Refuse Charges
<b>UDPFI</b>	Urban Development Plan Formulation and Implementation

<b>ULB</b>	Urban Local Body
<b>WEH</b>	Western Express Highway
<b>WHO</b>	World Health Organization
<b>WB</b>	World Bank



# Executive Summary

---



## 1. Introduction

Greater Mumbai, with a population of 12.44 million, is India's most populous city. The country's financial nerve centre, it serves as the core city of the Mumbai Metropolitan Region and is among the top ten largest urban agglomerations in the world. Greater Mumbai is, however, severely constrained by its geography and occupies a small land area of 458.28 sqkm<sup>1</sup>. With a limited supply of land it has one of the highest population densities amongst the large metropolises in the world. Formulating the Draft Development Plan for Greater Mumbai 2014-34 in this context is extremely challenging as it seeks to create a spatial framework that would facilitate seeking solutions to daunting problems of accommodating rising demand for floor space, increasing supply of affordable housing, securing land for various public purposes and sustaining efforts of improving quality of life in an inclusive and sustainable manner.

The preparation of the Draft Development Plan for Greater Mumbai 2014-34 as assigned to Consultants entails the following tasks:

### **Task 1: Familiarization and Inception Report**

### **Task 2: Preparation of Existing Land Use Map**

- Base map
- Land use survey
- Existing land use map

### **Task 3: Assessment of Existing Status**

- Defining Planning Sectors
- Carrying out analysis of availability of land for various public purposes
- Estimating existing consumption of Floor Space

### **Task 4: Growth Scenarios**

### **Task 5: Formulating Objectives of the Development Plan**

### **Task 6: Formulating Proposed Land Use Plan and DCRs**

- Evaluation of Zoning, FSI and Transfer of Development Rights (TDR) as Policy Instruments
- Strategy for obtaining land for public purpose
- Environmental considerations in Development Control Regulations
- Proposed Land Use and Development Control Regulations

### **Task 7: Phasing of Plan Implementation, Estimates Cost of Plan Implementation and Financing Plan**

### **Task 8: Monitoring and Evaluation System**

<sup>1</sup>Under Section 23 of the MR&TP Act, the MCGM has declared an intention of preparing the Development Plan for Greater Mumbai 2014-34. The map accompanying the declaration showed the 24 Municipal Wards including the creeks within the Ward boundaries. The area of Greater Mumbai shown in this map when measured, works out to 458.28 sqkm.

**Task 9: Preparation of Report on the Draft Development Plan****Task 10: Submission of Final Report on Draft Plan for Publication and Inviting Suggestions and Objections**

The above tasks will be presented in two volumes:

**Volume I, “Preparatory Studies”:** Preparation of the Development Plan 2014-34”. This volume includes assessment of the existing situation, population and employment projections for 2034, gaining an understanding of issues and challenges that Greater Mumbai is expected to face over the next two decades, establishing objectives for development plan, and establishing principles for the formulation of proposals. This volume, covering Tasks 01 to 05 and part of 06, would form the basis for consultation prior to formulation of Draft Development Plan.

**Volume II, “Proposals”:** This would include proposed land use plan and DCRs, phasing of implementation of the Development Plan, preparation of estimated costs of plan implementation and financing plan. Following this, frameworks for monitoring and evaluation of plan implementation shall be elaborated.

An integration of Volumes I and II shall form the Draft Development Plan for Greater Mumbai 2014-34.

Forming a part of the Draft Development Plan 2014 – 2034, Greater Mumbai, this Volume I – “Preparatory Studies” is structured in three parts.

- **Part I:** Existing Land Use
- **Part II:** Assessment of the Existing Situation
- **Part III:** Visualizing the Future

## 2. Legal Mandate: Preparation of the Draft Development Plan Greater Mumbai 2014-34

Section 38 of the Maharashtra Regional and Town Planning Act 1966 (MR&TP Act, 1966) stipulates Revision of Development Plan at least once in twenty years. As the last part of Development Plan currently in force, was sanctioned in 1994, revised Development Plan is required to be ready by 2014. Sections 23 to 31 pertain to the procedure to be followed in preparing and sanctioning Development Plans. Section 22 of the MR&TP Act defines the Contents of Development Plan.

The State Government has appointed Special Planning Authorities (SPAs) for areas within the jurisdiction of the Municipal Corporation of Greater Mumbai (MCGM) notified under Section 40 of the MR&TP Act. These include, the Back Bay Reclamation Area, Wadala Truck Terminal Area, Bandra Kurla Complex, Oshiwara District Centre, Gorai Manori Tourism Zone, and Airport under the MMRDA; Dharavi Redevelopment Project under the Slum Rehabilitation Authority; and Marol Industrial Area, SEEPZ SEZ under MIDC.

As provided in the MR&TP Act local authority ceases to be the ‘Planning Authority’ in the notified areas. The revision of the Development Plan therefore excludes these notified areas from its scope.



### 3. Review of Past Experience

The earliest legal instruments introduced in Mumbai date back to Bombay Municipal Corporation Act of 1888 and the Bombay Town Planning Act (BTP Act) of 1915. However, preparation of formal development plans commenced with the BTP Act 1954, coming into force in 1957. The first Development Plan (DP 1967) for Bombay was sanctioned in 1967. DP 1967 was revised as per the mandate of the MR&TP Act (1966) and sanctioned in parts from 1991 to 1994. A review of past Development Plans reveals that both, DP 1967 and DP 1991 followed similar approaches explained as under:

- Both DP 1967 and DP 1991 set a lower limit for the projected populations than what the trend suggested. Both plans had as a key premise the decongestion of the Island City and promotion of development in the Suburbs.
- Floor Space Index (FSI) was used as a tool to control developments in both Development Plans. However, the approach towards the use of FSI varied remarkably between the two Plans. While the DP 1967 prescribed differential FSIs in the Island City and in the Suburbs, (ranging from a high of 4.5 to a low of 1.0, varying across geographical locations and uses - residential, commercial and industrial), the DP 1991, prescribed low and uniform FSIs across the Island city and Suburbs (1.33 in the Island City and 1.0 in the Suburb) thus assuming FSI as a tool of restricting congestion.
- Both Development Plans used the 'reservation' as a primary tool for garnering lands for public purpose. In the DP 1991, two policy instruments, "Accommodation Reservation" (AR) and "Transfer of Development Rights" (TDR) were introduced with a view to incentivize private owners to provide built space for designated purpose or make available land for open public purpose respectively. Incentive FSI and TDR were also used for rehabilitation of slums and renewal of older housing stock in dense wards in the Island City, but these have not made sufficient headway. Incentive FSI has also been used to promote conservation of heritage buildings, promoting IT and ITES, hospitality industry, educational and health care facilities.
- Affordable housing was, (and continues to be) a challenge that both plans sought to address. Lands for public housing were reserved in both DP 1967 and DP 1991. However, DP 1991 permitted land owners to develop such lands at minimum prescribed densities with a view to increasing the supply of smaller dwelling units. Exemptions under the Urban Land Ceiling Act also attempted to increase supply of smaller dwelling units. However both these measures did not yield perceptible results.
- Guided by the goal of restraining population to 9.8 million, DP 1991-limited development to corridors along the railway networks to take advantage of existing public transport networks. Environmental considerations prevented development of coastal areas. As a result land and FSI remained as designed for population of 9.8 million while population itself has crossed 12 million. The resultant scarcity of development rights might have reflected in the housing prices and the affordability.

## 4. Approach and Methodology Adopted for Plan Preparation

Gaining an understanding of the existing situation is a key premise of the Development plan 2014-34. A realistic understanding of the existing situation would enable the formulation of land use zoning and regulatory conditions to meet with real demands for the horizon period of the Plan. Hence, the plan preparation exercise conducted primary and secondary surveys that would provide precise data at a fine level of disaggregation. Further, assessment of the existing situation also followed a place-based approach.

The six key approaches and methods adopted are listed here:

1. **Technology Enabled Decision Making:** A GIS Base Map has been prepared to serve as a reference for the integration of all spatial and non-spatial data for Greater Mumbai. This data base has in turn served as a base for conducting assessments and finally be a key resource in formulating proposals and monitoring the implementation of the Development Plan.
2. **Understanding the Existing Context through the Existing Land Use (ELU) Map:** ELU 2012 map captures data at the parcel level. Categories and sub-categories of land uses included in the ELU 2012 Map are delineated with substantial degree of detail in order to facilitate detailed analysis.
3. **Disaggregation of Greater Mumbai into 151 Planning Sectors at the Local Level:** The 24 administrative wards of Greater Mumbai are further disaggregated into 151 Planning Sectors. Assessment of the existing situation has been conducted at Greater Mumbai, Ward and Planning Sector levels. Assessment of land use distribution, population and employment distribution, existing FSI consumption patterns, accessibility to social and physical infrastructure have been addressed at Planning Sector levels. The understanding of key imperatives arising from this assessment serves as a base for formulation of proposed land use.
4. **A Place Based Approach:** With an objective to understand places that exhibit distinctive urban character in Greater Mumbai, a number of Urban Fabrics in Greater Mumbai were identified. These urban fabrics were studied in detail to understand and evaluate existing regulations, their impact and transformatory impulses.
5. **Parametric Urban Analysis:** Growth scenarios were generated through parametric assessments on the GIS platform.
6. **A Consultative Approach:** The MCGM will hold consultations with elected representatives, other Government organizations, NGOs, academic institutions and the citizens. This volume will form the basis of such consultation that would inform further work on the Draft Development Plan.



## 5. Existing Situation Analysis

### 1. Existing Land Use 2012

- The total area of Greater Mumbai is 458.28 sqkm. Of this, the area under the Special Planning Authorities (SPA's) is 43.22 sqkm, accounting for about 9.43% of the total area;
- The total area of Greater Mumbai within the purview of the Development Plan is, thus, 415.05 sqkm; Of this 271.17 sqkm is developed area, accounting for about 65%. Of the remaining area (i.e. 143.88 sqkm), 113.04 sqkm is under Natural Areas which includes Water Bodies, Forests and Mangroves, Beaches; followed by 22.83 sqkm of Vacant Land (excluding lands Under Construction for various purposes) and 8.01 sqkm of land under Primary Activities consisting of Plantation and Salt Pan Lands;
- Greater Mumbai entails a predominantly mixed land use including residential, commercial, and office uses;
- Particular attention has been paid to documentation of Existing Land Use categories and sub-categories of the various land uses of Greater Mumbai. For example, in order to capture the 'mixed' nature of uses in Greater Mumbai, Mixed Land Use Categories like RC (Residential-Commercial), RS (Residential-Shopping) and RI (Residential-Industrial) have been incorporated for the first time. Further, the Residential Land Use takes into account the wide range of housing typologies in use in Greater Mumbai from single-family houses to chawls and slums. Similarly, Existing Land Use categories and sub-categories have been included for Educational, Medical and Social Amenities to capture the complex uses present;
- Commercial and Office Land Use centralities are primarily located along major road and rail networks.

### 2. Population 2011

- The population of Greater Mumbai (including the notified areas under SPAs), recorded in 2011 Census is 12.44 million as against 11.97 million in 2001 indicating a net addition of nearly half a million over one decade;
- The population growth rate of Greater Mumbai has been experiencing a decline since 1961, however there has been a sharp decline in the last decade (20.68% between 1991-2001 and 3.87% between 2001 - 2011);
- The share of Island City's population in Greater Mumbai has been declining since 1991 whereas that of Suburbs has increased. Present population distribution between the Suburbs and the Island City is 75% and 25% respectively;
- Of the total population of Greater Mumbai, 41.85% lives in slums. 51.91% of the total population in the Eastern Suburbs resides in slums as compared to 42.69% of the total population in the Western Suburbs and 27.88% in the Island City;
- Household size indicates a decreasing trend and stands at 4.48 in 2011 for both the Island City and the Suburbs.

### 3. Economy

- Greater Mumbai's economy has undergone a significant transformation from manufacturing activity to tertiary activity. The share of manufacturing in Mumbai's Gross District Domestic



Product (GDDP) has been falling post 1990. The contribution of the tertiary sector on the other hand has been on the rise;

- Since 2000, Mumbai's GDDP has grown at an average of 8%. The per capita income has grown by 191% in between 2000-2001 and 2008-2009. Per capita NDDP of Mumbai in 2011-12 is Rs. 1,87,418.
- The total work participation rate for 2011 is 37.98%;
- The household income distribution for Greater Mumbai indicates that only 9% of the population earns more than Rs. 60,000 per month and the median household income is Rs. 20,000 per month. (Note: 2008 distribution at 2005 prices).

#### 4. Real Estate

- The median household income is only Rs. 20,000<sup>2</sup> per month, while the lowest price for even a single bedroom public housing unit commences at Rs. 14,00,000. Given that the cost of housing is much higher than the affordable range of 4-5 times a family's annual gross income, it is apparent that nearly half of the population is unable to afford to own a house, even of minimum standards. In addition to this, the supply of public housing is extremely limited.

#### 5. Floor Space Index

- Net bulk FSI<sup>3</sup> in the city ranges from a high of above 4.0 to a low of 1.0
- Areas with concentration of high Net Bulk FSI (4.00 and above) are located in the older core city areas of the Island City, in proximity to transit stations such as Churchgate, Chhatrapati Shivaji Terminus, Dadar; and employment centres such as Fort, Bora Bazaar, Nariman Point, Ballard Estate and Null Bazaar in the Island City. The predominant land use in these areas is Commercial and Offices. Slum Rehabilitation Schemes in the Eastern Suburbs also have high FSI consumption;
- Other areas with high and medium Net Bulk FSI (1.33 to 3.00) are predominantly residential such as Powai Hiranandani (Ward S), Thakur Complex (Ward R/S) etc.

#### 6. Transport Infrastructure

- The Suburban Rail network accounts for more than 7 million daily passenger trips;
- The bus transport system accounts for over 5.5 million daily passenger trips;
- Greater Mumbai displays a strong interconnectedness between distribution of Land Use and public transport networks;
- Pedestrian mobility is poor, despite the fact that around 51% of daily trips are by walk;
- Vehicle ownership is increasing at a very high rate, although currently vehicle ownership is lower than most other metros in the country. Private vehicle ownership has increased in Greater Mumbai from 52 per 1,000 to 82 per 1,000 between 1996 and 2005 and the forecast for 2031 is 197 per 1,000.

<sup>2</sup>Working with the Market - Approach to Reducing Urban Slums in India, WB Policy Research Working Paper 5475, Patricia Clarke Annez, Alain Bertaud, Bimal Patel, V. K. Phatak, 2010.

<sup>3</sup>FSI computed here is based on the total built up area of a building, including areas exempted from statutory computation of FSI, and hence termed as Net Bulk FSI.

## 7. Physical Infrastructure

- While the quantity of water supplied in Greater Mumbai is above established standards, coverage of water supply system to slum areas and inequitable distribution are of concern, with the unbilled supply and wastage totalling to around 38%;
- Not all sewage generated is collected. Very few slums are connected to the sewerage network leaving sewage from the un-serviced areas untreated and polluting the natural water courses;
- The storm water drainage system has surpassed its capacity due to increasing runoff caused by extensive paving;
- Only around 50% of the houses are covered under door-to-door solid waste collection system.

## 8. Environment

- Natural Areas and Open Spaces constitute about 31.50% of the total area (within administrative Ward boundaries) of Greater Mumbai. Of this 81.40% is Natural Areas such as forest, mangroves and water bodies. Open spaces available for active recreation, including parks and play ground, etc. occupy 17.70% of the total area. This indicates that a very low proportion of open space area is available for active public use.
- Greater Mumbai's environmental health is affected by increasing air pollution (caused by vehicular pollution and construction) and water pollution (caused by inadequacies in the sewerage system) while its coastal location makes the city vulnerable to flooding and landslides especially during the monsoons. There are clear public health impacts due to the prevalent environmental pollution and the current infrastructural inadequacies.

## 9. Social Infrastructure

- Analysis of Amenity and Open Space provision reveals that at Greater Mumbai level, the availability of area for medical amenities is sufficient followed by the provision of educational amenities (which is slightly lower than the planning standards of DP 1991). The availability of open space is much lower than the planning standards established in the DP 1991. It is also noted that the area available for amenities varies substantially across all Wards and Planning Sectors;
- The Island City presents the highest degree of provision of amenities followed by the Western Suburbs and Eastern Suburbs, in that order. Some wards like M/E and L, where more than three fourths of the population lives in slums, exhibit a major inadequacy of amenities in comparison with planning standards of the DP 1991.

## 6. Projections

1. **Population projections:** Given a 3.87% decadal growth rate, the population for Greater Mumbai 2034 has been projected at 13.95 million. Total projected population in the Island City is estimated at 2.81 million and that of the Suburbs is projected at 11.14 million, by 2034.
2. **Employment projections:** The employment for Greater Mumbai is projected to range between 6.25 and 7.55 million for 2034.

## 7. Assessing Space Demand for 2034

Greater Mumbai has experienced a stabilized population growth between 1991-2001 and 2001-2011. Considering that, this trend is expected to continue over the next two decades resulting in a projected population of approximately 13.95 million by 2034, provision of better quality of life through enhanced access to amenities and infrastructure becomes an imperative for the DP 2014-34.

A set of planning benchmarks were arrived through a bottom up approach for assessing future space demand through an assessment of the current per capita space provision for each amenity along with a review of various local, national and international planning standards. Given the severely constrained supply of land and high population density, obtaining land for public purpose in Greater Mumbai is extremely challenging. The benchmarks primarily serve as a useful starting point for estimating 'future space demand' and cannot be looked upon as rigid implementable goals in Greater Mumbai.

The Planning Benchmarks for Future Space Provision in DP 2014- 34 are:

- **Recreation/ Open Space:** 2 sqm pp;
- **Educational Amenities:** 1.37 sqm pp, including 0.4 sqm pp for primary, 0.5 sqm pp for secondary, and 0.47 sqm pp for higher education.
- **Health Amenities:** 0.39 sqm pp, for all levels of health care, including, primary, secondary and tertiary amenities.
- **Social Amenities:** The recommended per capita space requirement for various social amenities is 0.44 sqm pp, including space requirements for public sanitary convenience, markets, police, firestations, crematoria.

Further four population levels - Neighbourhood (up to 10,000 persons), Planning Sector (10,000+ to 1,00,000 persons), Ward (1,00,000 + to 5,00,000 persons) Sub-City (5,00,000+ up to 10,00,000 persons ) were considered for Greater Mumbai amenities and the planning benchmarks for each of the urban hierarchy levels were accordingly worked out. The planning benchmarks were then used to arrive at the total space requirement for the amenities in the city for a population of 13.95 million for 2034.

The spatial provision of physical infrastructure, viz., water supply, sewerage, solid waste and utility infrastructure including power supply planning, benchmarks/norms will be based on respective department's objectives.

### Space Demand for Amenities in Greater Mumbai in 2034<sup>4</sup>:

The space demand for amenities for 2034 as per the benchmarks is estimated to be an additional 46.65 sqkm as follows:

- Education Amenities: 15.94 sqkm ;
- Medical Amenities: 3.65 sqkm;
- Open Space: 23.57 sqkm;
- Social Amenities: 3.49 sqkm;

<sup>4</sup> The space demand projected here is subject to modification and further validation in the subsequent stages of the project.

### Strategies for Making Land Available for Public Purpose

A review of previous tools employed in Greater Mumbai for obtaining land for public purpose revealed that their implementation was not as effective as envisaged. Therefore, alternative strategies are suggested, such as, creating a pool of public land in each Ward/ Planning Sector through process of urban renewal and mandating exaction of land for public purpose for development/ redevelopment on large parcels.

## 8. Vision 2034

With increasing demand for better quality of life, Greater Mumbai needs a city-wide transformation towards improvement of its physical, social, economic and environmental parameters. Also, in view of the rapid global and national economic changes, Mumbai will need to be future-ready, by way of adopting a progressive and flexible development framework, which will simultaneously, be instrumental in City transformation.

Keeping this in mind, the DP 2014-34 for Greater Mumbai aims to enable the '*Transformation of Greater Mumbai into a Global City that is Inclusive, Sustainable, Liveable, and Efficient*'.

Keeping this vision in mind, the objective of the DP is to provide a planned spatial framework to transform Greater Mumbai into a City that is:

- a) **Competitive:** For Mumbai to retain, and further enhance its national and regional role as an economic hub, it needs to promote development that offers affordable real estate, efficient transport and infrastructure, and a better quality of life for its residents. To achieve this, some of the key strategies being adopted in the DP are:
  - A non-restrictive regulatory regime which promotes redevelopment and increases supply of new quality built spaces;
  - A flexible development framework that addresses the present mix of uses and current market operations, and promotes a holistic and collaborative transformation;
  - A transit led growth strategy that capitalizes on, as well as strengthens the current transport network;
  - A growth mechanism that enhances quality of life in the City, by augmenting supply and access to amenities, as well as improving space consumption, both qualitatively and quantitatively.
- b) **Inclusive:** Greater Mumbai has a large slum population and a sizeable informal economic sector. To address this, some of the key strategies being adopted in the DP are:
  - An inclusive policy regime that bring informal housing and markets under the fold of City transformation through a comprehensive redevelopment approach;
  - A growth strategy that improves access to public transport and amenities for all citizens;

- A development model that promotes streetscapes and public spaces that have better accessibility and mobility for people of all age groups and physical challenges;
  - A multi-level planning approach that is place based and allows for participatory local planning and decision making.
- c) **Environmentally Sustainable:** Greater Mumbai is caught between pressing urbanization demands and an urgent need to protect its fragile environmental assets. To address this, some of the key strategies being adopted in the DP are:
- A Development Plan that protects all environmentally sensitive areas and assets;
  - Transit oriented development which promotes mass transit using clean energy and reduces dependence on private transit with consumes non-renewable energy and contributes to air pollution;
  - A development control system which includes climate change mitigation measures to promote green buildings and neighbourhoods.

## 9. Principles for Development: A Future Road Map

The long term vision proposed for Greater Mumbai comprises three key objectives –to enable Greater Mumbai as a ‘Competitive City’, ‘Inclusive City’ and ‘Sustainable City’. To guide the DP 2014 – 34, a set of development principles have been developed, which will help translate the vision and its objectives into a spatial, zoning & development control strategy. These guiding principles for each of the three goals are:

### Competitive City

In order to make Mumbai a City capable of being competitive in the national and global economy, the DP needs to suggest a spatial distribution and regulatory control strategy, which allows for holistic renewal of existing areas to meet the demands of the future. The key development principles adopted to achieve this goal are:

- **Facilitate Urban Renewal & Redevelopment:** Formulation of regulations that permit a process of holistic urban renewal, especially of areas that would benefit from comprehensive redevelopment such as large slums, areas with dilapidated older buildings in the Island City, defunct industrial lands, etc., so as to provide affordable, new built-up spaces for residential, commercial and public uses;
- **Encourage Polycentric Development:** Strengthening of existing and promotion of new employment hubs and growth nodes in the City, which provide new residential and office spaces for the changing demands;
- **Promote Transit Oriented Development:** Intensification of compact high density mixed-use developments along existing and planned public transit network and key nodes, to ensure that majority of the population have easy and affordable access to jobs and homes;



- **Augment Access to Amenities for all:** Creation of new amenity spaces to meet the changing aspirations of the people towards a better quality of life;
- **Adopt an Adaptive Development Control Regulations:** Formulation of simple, non-restrictive, anticipatory, Development Control Regulations that take cognizance of the existing space consumption, mix of uses, and character of places, and promote their transformation;
- **Promote a Variable FSI Regime:** Formulation of a FSI strategy that promotes urban renewal, polycentric growth, transit oriented development, and ensures efficiency in use of land, supply of affordable built spaces, and transit efficiency.

### Inclusive City

- **Promote Inclusionary Housing:** Formulation of policies which improve viability of the current in-situ slum rehabilitation scheme, and create an increased supply of affordable and rental housing;
- **Include Informal Markets:** Promotion of development strategies, which incorporate informal markets in the City renewal process;
- **Introduce Place Based Plans and Codes:** In addition to the General Development Control Regulations, introducing a second tier of planning that addresses place specific issues through a community-based participatory planning process;
- **Augment Access to Public Transport:** Promoting high density growth along transit lines, such that majority of people have access to public transit;
- **Support Heritage Conservation:** Elaborating specific regulatory conditions that support preservation of listed heritage buildings and precincts;
- **Set Priorities for Amenity Provisions:** Rationalizing the prevailing 'Reservation' categories and sub categories, allowing a mix of amenity uses in reservations, and creating a common pool of public land, which will provide amenity space in due course of time and in line with aspirations of the people.

### Sustainable City

- **Protect Preservation Zones:** Preservation of natural areas including forests and mangroves, and augmentation of existing system of green and blue networks, wherever possible;
- **Plan for Sustainable Development:** Adopt in the Development Control Regulations, internationally recognized practices for creating green buildings and localities such as greywater recycling, rainwater harvesting, solid waste segregation, reduction in energy consumption of buildings, etc.;
- **Emphasis on Public Transit:** Promoting a land use strategy that ensures optimization of the transit networks;
- **A Comprehensive Parking Strategy:** Specify parking policy that supports transit oriented development, and thus contributes to environmental sustainability.



## 10. Framework for Local Area Planning

The DP provides a broad spatial development framework for Greater Mumbai. In order to foster the diversity of urban fabrics and neighbourhoods in Greater Mumbai, place specific Development Control Regulations should be developed depending on the varying character of different localities.

While regulatory frameworks for spatial development and flexible zoning will be defined in the Plan, at the micro level, local area planning can be initiated under the provision for 'Areas for Comprehensive Development' as specified in Section 33 of the MR&TP Act. In addition to the General Zoning and Development Control Regulations, the DP will identify undertaking of detailed area-specific planning and regulations for significant areas, with a high transformation potential. MCGM will have to make planned efforts to undertake these plans.

Areas for urban renewal in older city areas, areas under slums, TOD areas, heritage precincts, employment centres, and large or even small-scale developments in neighbourhoods that need sensitive interventions, could be developed under the provisions of 'Areas for Comprehensive Development'. At the local levels, the second tier plans can address specific place-based requirements for amenities, open spaces, road and connectivity needs, demand for residential and commercial space etc. The broad Zoning and Regulations of the DP 2014-34 may be accordingly adapted to a local context.

## 11. In Conclusion

The Existing Land Use Map, Assessment of the Existing Status, and Growth projections have served as a basis to understand key challenges for Greater Mumbai's future development. Despite the current trends of declining population growth, it is anticipated that with decreasing household size, increasing per capita income and growing aspirations there will be an overall increase in the demand for residential space in the future. Further, with marginally increasing formalisation of employment, it is also anticipated that, there will be an increase in demand for commercial and office space. In a context ridden with environmental vulnerabilities, strategies for future development would require building on Greater Mumbai's strengths and overcoming its weaknesses, simultaneously. The DP 2014-34, therefore, needs to promote urban renewal and redevelopment, which frees up land for public uses, provides new and quality built-up spaces, and protects Greater Mumbai's ecological environment.

To achieve the long term vision for Greater Mumbai of 'a competitive, inclusive and sustainable city', possible approaches and strategies under consideration for the DP2014-34 have been outlined in the concluding section of this Report. The DP 2014-34 will provide a spatial development framework towards achieving the vision. This report actively solicits inputs and feedback of stakeholders and citizens to these possible approaches and strategies for formulating proposals for DP 2014-34, Greater Mumbai.



## 12. Way Forward

A spatial development strategy to guide the spatial distribution of land uses and development rights is being developed for Greater Mumbai, based on the principles for development postulated above. This will form the basis for the preparation of the Zoning Strategy and Development Control Regulations.

Future tasks of this project will include preparation of:

- Proposed Land Use and Development Control Regulations;
- Proposed Phasing, Cost of Plan Implementation and Financing Plan;
- Recommended Monitoring and Evaluation System; and
- Report on the Draft Development Plan.

# Part I: Existing Land Use Survey

---



## 1. Introduction

Greater Mumbai, India's financial nerve centre is the most populous city in India with 12.44 million people (Census 2011). Greater Mumbai serves as the core city for the Mumbai Metropolitan Region (MMR), which is among the top ten urban agglomerations of the world.

With an area of only 458.28<sup>5</sup>sqkm, Greater Mumbai is severely challenged by its constraining geography and limited land availability in its quest for solutions to address the problems related to the supply of developable space more particularly public space, high densities, an overburdened public transport system, lack of affordable housing, increasing demands for better infrastructure, and environmental degradation. Multiple governance mechanisms further complicate the current scenario. The Development Plan for Greater Mumbai 2014-2034 is being prepared within this context.

While retaining the economic primacy of Greater Mumbai is essential for the continued sustainability of MMR, inclusive development and environmental sustainability need foregrounding for the city to achieve better quality of life for its citizenry. Integrated information management systems and increased participatory planning interventions at the local level are envisaged for efficient planning solutions. Better governance and coordinated management across agencies combined with efficient monitoring and evaluation systems is essential for successful plan implementation.

### 1.1 Review of Past Experience

1. Formal controls on development began in Mumbai with the introduction of Building Regulations in the Bombay Municipal Corporation Act of 1888 (BMC Act 1888). The Bombay Town Planning Act enacted in 1915 (BTP Act 1915) initiated Town Planning Schemes but did not envisage a citywide comprehensive development plan. An outline Master Plan was prepared by the Bombay Municipal Corporation (former name for MCGM) in 1948 but it had no legal validity. Thereafter, the jurisdiction of Bombay Municipal Corporation was extended twice – in 1951 and in 1957.
2. Planned development in Mumbai commenced with revision of the BTP Act 1915 as the Bombay Town Planning Act 1954, which came into force in 1957. The first statutory Development Plan prepared under this Act was sanctioned in 1967 (DP 1967). The Maharashtra Regional & Town Planning Act came into being in 1966 (MR&TP Act 1966). As required by this Act, the Regional Plan for Mumbai Metropolitan Region was prepared and sanctioned in 1973. The revision of the DP 1967 was also carried out as required by the MR&TP Act 1966, and the revised DP 1991 was sanctioned in parts during 1991-1994. The Development Control Regulations (DCR), that form an integral part of the Development Plan (Section 22(m) of MR&TP Act 1966), have been revised several times since their initial sanction. The current version is available on the website of MCGM.
3. Significant planning and developmental initiatives have been undertaken since the sanction of the current DP, which have had significant impacts on the development scenario of Greater Mumbai. These are listed below:

<sup>5</sup>Under Section 23 of the MR&TP Act, the MCGM has declared an intention of preparing the Development Plan for Greater Mumbai 2014-34. The map accompanying the declaration showed the 24 Municipal Wards including the creeks within the Ward boundaries. The area of Greater Mumbai shown in this map when measured, works out to 458.28 sqkm.

- **1995:** Programme for the Rehabilitation of Slum Dwellers and Hutment Dwellers in Brihanmumbai, Report of the Study Group appointed by the Government of Maharashtra for the Rehabilitation of Slum and Hutment Dwellers through Reconstruction (Chairman: Dinesh K. Afzulpurkar), 1995. This led to establishing Slum Rehabilitation Authority (SRA) and introduction of DCR 33(10) and 33 (11) in 1997.
- **1996:** The Draft Regional Plan for Mumbai Metropolitan Region (MMR) 1996-2011 prepared by MMRDA, was sanctioned by GOM in 1999. According to Section 27 of the MR&TP Act it is obligatory to consider the provisions of the Regional Plan in formulating the Development Plan. Several proposals from this Regional Plan were also implemented in City. As recommended by the Regional Plan restriction on development for "Office" use in the Island City has already been relaxed. Since the planning horizon of Regional Plan is 2011 it is also due for revision.
- **1999:** Measures for Repairs and Reconstruction of Old and Dilapidated Tenanted Buildings – Report of Sukthankar Study Group: The Committee recommended incentivizing redevelopment of Cessed buildings through provision of additional FSI and TDR, in order to facilitate the process of reconstruction. This later led to the introduction of modified DCR 33 (7) in 1999.
- **2000:** Approval of Coastal Zone Management Plan prepared as required by the Coastal Regulation Zone Notification vide No. S.O.114 (E) dated 19<sup>th</sup> February 1991 of the Ministry of Environment & Forest (MoEF).
- **2003:** Vision Mumbai by Mumbai First and McKinsey & Company in 2003, envisioned the transformation of Mumbai into a world-class city. This highlights the future growth scenario of Mumbai City, identifies shortfalls in provision, and demonstrates financing and implementation mechanisms for city transformation.
- **2004:** Transforming Mumbai into a World-Class City, Report of the Chief Minister's Task Force, Government of Maharashtra.
- **2006:** City Development Plan 2005-2025, prepared by MCGM, as required by the Jawaharlal Nehru National Urban Renewal Mission (JNNURM), with an objective to identify and fund infrastructure development.
- **2006:** Economic Growth of The Mumbai Metropolitan Region, prepared by the Urban Institute of the USAID, under their India Urban Initiatives, gives the future growth and demand outlook for MMR.
- **2006:** Fact Finding Committee on Mumbai Floods, commissioned by GoM, under Chairmanship of Dr. Madhavrao Chitale, probed the causes of unprecedented floods witnessed by Mumbai during July 2005 and inter alia made recommendations about urban planning and governance.
- **2007:** The Business Plan for MMR 2021, commissioned by MMRDA on the behest of GoM, and prepared by LEA Associates in 2007, provides forecasts of economy, population, and employment for MMR, and details the associated infrastructure demand and investment needs. It provides a financing plan and highlights a multi-pronged implementation approach.



- **2008:** A Comprehensive Transportation Study (CTS) for MMR, was commissioned by MMRDA and prepared by LEA Associates in 2008, with a view to take a comprehensive approach toward transportation planning in the Region. The report includes findings of household survey covering 66,000 households carried out in 2005, forecasts of population and employment for 2016, 2021 and 2031 and scenario of geographic distribution of population and employment at various levels of geographical disaggregation (the finest being over 1,000 Traffic Analysis Zones) for MMR. Several proposals from this study are in the state of design and implementation.
- **2009:** Revised Development Control Regulation 33(9) formulated for reconstruction or development of cessed building/ urban renewal schemes on extensive area.
- **2010:** A Concept Plan with the planning horizons of 2034 and 2054 for MMR was prepared by MTSU on behalf of MMRDA, through Surbana International Consultants. It is a multi-sectoral plan which looks at comprehensive and integrated physical development of the entire region, and was formulated to inform the upcoming Regional Development Plan.

## 1.2 Review of Past Plans:

1. The DP 1967 as well as the DP 1991 sought to limit the population of Greater Mumbai. DP 1967 set a population limit of 7 million for 1981 while the 1991 Plan set a population limit of 9.87 million for 2001. However, in both 1981 and in 2001, the set population limit was exceeded by 1 million and 2 million, respectively, resulting in under provision of amenities, shelter and infrastructure.
2. Similar objectives of decongesting the Island City and promoting development in the Suburbs were adopted by both the DP 1967 as well as DP 1991. To this end, the DP 1967 sought to restrict industrial activity, trade and commerce along with shopping in the Island City. The Plan proposed industrial zones in the Suburbs. The Regional Plan for Mumbai Metropolitan Region sanctioned in 1973 proposed development of Navi Mumbai across the harbour. The Regional Plan proposed a population target of 2 million for Navi Mumbai by 1991. The Regional Plan further proposed reduction of industrial area by 800 ha in Greater Mumbai, the development of Bandra Kurla Complex (BKC) for internal restructuring of Greater Mumbai and limiting the area of Back Bay Reclamation. DP 1991 largely followed the proposals of the Regional Plan 1973 and proposed new commercial centres in the Suburbs at BKC, Oshiwara, Kanjurmarg, Malad and Vikhroli.
3. The concept of 'Floor Space Index' was first introduced in the DP 1967 as a 'modern yardstick to control volume of buildings'. The Plan addressed Greater Mumbai as a heterogeneous terrain and allocation of FSI was differential towards maintaining and shaping places of distinct character. FSI varied for residential, commercial and industrial zones and ranged from 4.5 at Back Bay Reclamation in the Island City to 0.5 in the distant Suburbs. Within this framework of differential FSIs, the area proposed for residential and employment related uses was 315.20 sqkm. DP 1991, on the contrary, sought to further restrict development in the City primarily by keeping the FSI low and uniform at 1.33 in the Island City and 1.00 in the Suburb, and stipulating maximum density standards. The proposed urban area occupied by residential and employment related uses were also further restricted through the introduction of No Development Zones (NDZ). Coastal zones and wetlands were also not included as developable areas in the DP 1991.



The introduction of Coastal Regulation Zones (CRZ) in DP 1991 prohibited development of wetlands that were considered available for development in DP 1967. Reduction in developable land, restriction on FSI and regulatory interventions like Urban Land (Ceiling and Regulation) Act 1976 interalia caused increased land and real estate prices. As a result of this restrictive regime, several modifications were effected to the DCR over the Plan Period where relaxation of FSI was used as an incentive to help achieve planning and growth objectives. Since larger floor space per household has been consumed post 1991, the prescribed densities have not been achieved in the planned areas. On the other hand, densities in slum areas have increased.

4. The DP 1967 sought to use 'reservations' as a tool to garner lands for public purpose. Land reserved had to be acquired by the Corporation for public purpose like open spaces, social amenities, roads and utilities. To combat the low success rate of the 'reservation' policy in garnering land for public purpose, DP 1991 introduced two new policy instruments, Accommodation Reservation (AR) and Transfer of Development Rights (TDR). AR was used to obtain built floor space for amenities where land owner was permitted full FSI if the owner agrees to provide required built up area for the amenity free of charge. TDR was used as a substitute for monetary compensation for acquiring reserved land. TDR generated was to be consumed only in the Suburbs with a view to restrain further congestion of the Island City. As a result, the Suburbs were permitted to utilize TDR generated in the Island City in addition to TDR of Suburban areas up to a limit of FSI of 1.00 over and above the permissible FSI of 1.00.
5. The DP 1967 had reserved land for Public Housing (PH). Though reservation of land for PH as provided in DP1967 was continued in the DP 1991, it was realized that compulsory acquisition of these areas would not be feasible. The landowners of such lands were therefore permitted to develop such lands at prescribed minimum densities. Thus, reservations for PH were effectively converted into zoning provisions. Non-availability of secure housing options for the majority of the population forced them to seek informal options to house themselves. This has been the single continuing challenge that every new Plan has faced. The mills lands presented a peculiar case for consideration in this light, wherein the DP 1967 marked the land of textile mills as retention cases, implying that it could not be used for any other purpose. DP 1991 also retained the Land Use of textile mills, as planners did not initially envisage the decline of textile mills as inevitable. However, with the liberalization of economy in the early 90's the value of urban lands increased and mill lands came to be seen as valuable assets. Thus, DCR 58 was introduced which allowed redevelopment of sick or closed textile mills. Amendments to the Regulation 58 of the Development Control Regulations in DP 1991 have ushered upscale private commercial and office use developments in the plots of erstwhile textile mills. However, in the absence of an area wide plan for the mill district, these large developments may have accentuated local level problems, including that of connectivity.
6. Several wards in the Island City with closely built up, dense urban fabric and high population densities have a large stock of older dilapidated buildings, which are in urgent need of holistic urban renewal. This is particularly the case with Cessed buildings in the Island City; these buildings have remained in a state of disrepair as a result of the Rent Control Act 1947. Provision for community open spaces, wider roads, adequate residential space allocation per household along with light and ventilation are lacking in these wards. Most of the developable areas in the

City are already built up, leaving little scope for green field expansion. Hence, achieving planning objectives through brown-field redevelopment would be the key challenge as well as strategy of this DP.

7. Ever increasing vehicular ownership and a severely overburdened railway transport network has resulted in increasing commute times, decreased efficiency and severe environmental pollution.

### 1.3 Legal Mandate: Preparation of the Development Plan Greater Mumbai 2014- 2034

Section 38 of the Maharashtra Regional and Town Planning Act 1966 (MR&TP Act, 1966) stipulates Revision of Development Plan at least once in twenty years. As the last part of Development Plan currently in force, viz., the M/W Ward, was sanctioned in 1994, revised Development Plan is required to be ready by 2014. Sections 23 to 31 pertain to the procedure to be followed in preparing and sanctioning Development Plans. Section 22 of the MR&TP Act defines the Contents of Development Plan and includes:

*“Details of proposals to be included in the Development Plan: for land use, designation of land for public purpose, flood control, preservation of natural and built heritage, transport and communication, reclamation or levelling up of low lying lands, provisions for controlling and regulating the use and development of land within jurisdiction including conditions and restrictions in regard to the open space to be maintained for a building, the percentage of building area to be maintained for a plot, number, size, number of stories, character of buildings, parking, area for loading and unloading, hoardings, advertisement signs”.*

### 1.4 Process of Awarding Works to Consultants

The provisions of Chapter III Sections 21 to 39, of the MR&TP Act, govern the process of preparing Development Plan.

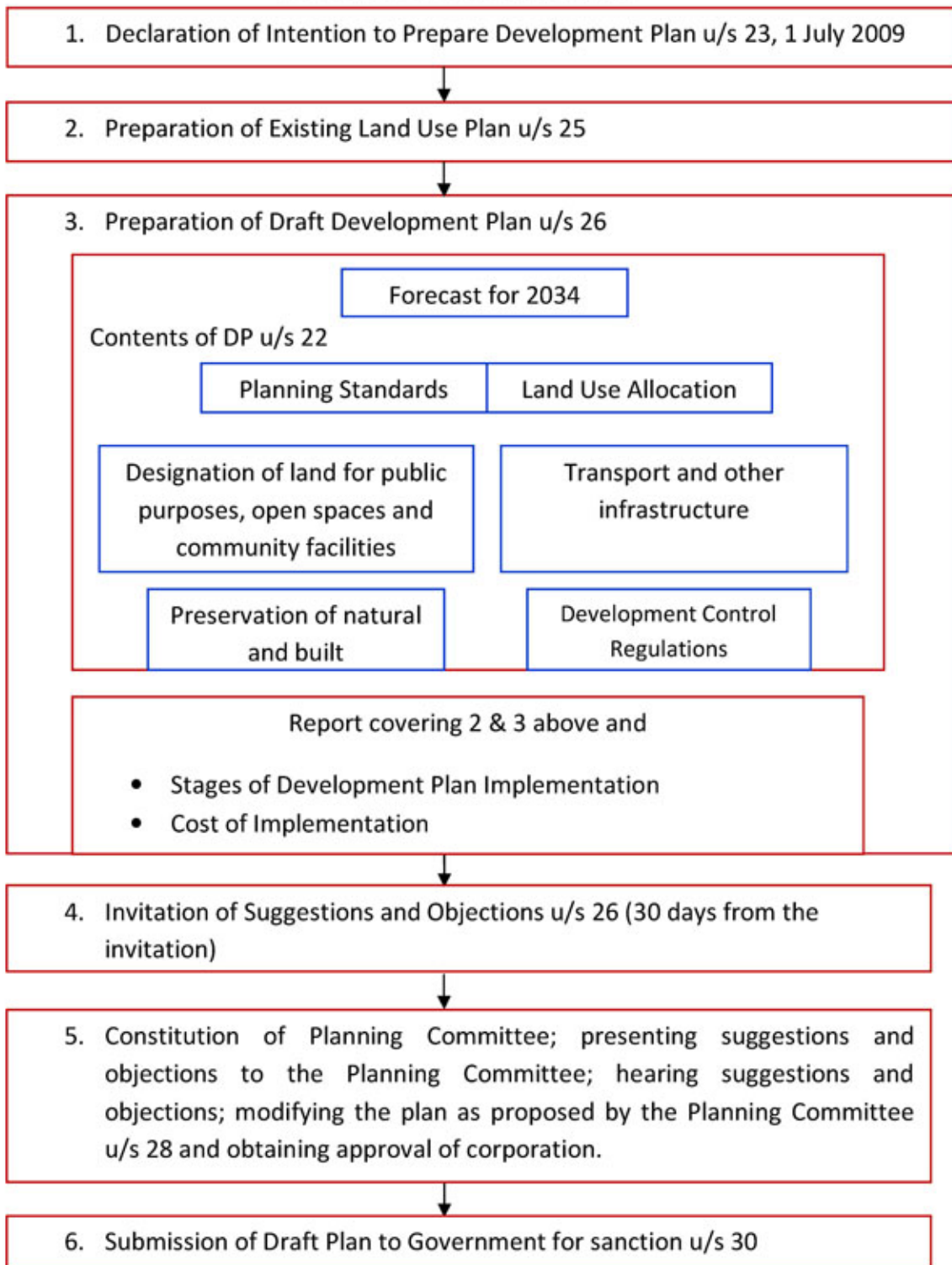
The Corporation have by their Resolution No. 767 dated 20/10/08 accorded sanction to declare the intention of revision of the Development Plan by following the process as laid down under Section 23 of the MR&TP Act. The MCGM has accordingly published a notice on 1st July 2009, declaring its intention to revise the Development Plan as provided under Section 23 of MR&TP Act.

The plan showing the boundaries of the Greater Mumbai limits, for which the Development Plan is proposed to be revised, has also been prepared and suggestions / objections have also been invited from the public as provided under Section 23 of the MR&TP Act.

The MCGM has undertaken the work of revision of the Development Plan for Greater Mumbai for the period 2014-2034 by commissioning the services of to M/s Groupe SCE India Pvt. Ltd.



**Development Plan Preparation**



The salient aspects of the Terms of Reference for the consulting assignment are listed below:

- Use technology for the preparation of the base map, the Existing Land Use Map;
- Conduct assessment of spatial and non-spatial dimensions of Greater Mumbai, and project growth scenario;
- Assess at a fine grain level, the existing situation in terms of Existing Land Use distribution, availability of Amenities, Open Spaces, the distribution of built up space and Floor Space Index in Greater Mumbai, population and density, economy and employment, transport networks, slums and their rehabilitation, environmental vulnerability and areas prone to flooding;
- Develop growth scenario in terms of population, economy and employment and their spatial distribution;
- Prepare norms for provision of Amenities, Open Spaces and Infrastructure and translate the demand into spatial requirement;
- Estimate demand for Residential and Commercial space and translate the demand into spatial requirements;
- Formulate Zoning Strategy, Proposed Land Use Plans at the Planning Sector level in conjunction with formulation of Development Control Regulations;
- Estimate the cost of implementation of development plan in stages and propose a financing plan that is sustainable;
- Propose a system of monitoring and evaluation of the implementation of the Development Plan and its outcomes;
- Articulate all the above in the form of a Report of the Draft Development Plan for the consideration of the Municipal Corporation and publishing it for inviting suggestions and objection;
- Assist MCGM in organizing consultation with the stakeholders, as an optional service, if called upon by M.C.G.M. to do so.

The sections of this report that follow, provide a detailed explanation of the planning process and salient features of the Development Plan. This document partially covering the Draft Development Plan 2014 – 2034, Greater Mumbai, is structured in four parts:

#### **Part I: Introduction and Existing Land Use Survey**

Key tasks include:

- Review of past experience;
- Taking cognizance of the legal mandate for the preparation of the Development Plan;
- Conducting the Existing Land Use Survey.

#### **Part II: Assessment of the Existing Situation**

Key tasks include:

- Delineation of Planning Sectors for Greater Mumbai;
- Mapping existing FSI consumption at Ward and Planning Sector level;
- Assessment of distribution of amenities and road infrastructure at Planning Sector, Ward and Greater Mumbai level against benchmarks;



- Sector wise analysis at Greater Mumbai level including Land Use distribution, distribution of Floor Space, Population, Economy and Employment, distribution of Educational, Health, Open Space, Social amenities and Infrastructure, Transport infrastructure and Environmental considerations.

### **Part III: Visualising the Future**

Key tasks include:

- Formulation of Growth Scenarios: Projecting population and employment for 2014,2024 and 2034;
- Estimating Demand for Land and Floor Space for Residential, Commercial, Educational, Health, Open Spaces and Social amenities;
- Formulation of Objectives of the Development Plan;
- Formulation of Strategies for proposed Zoning and DCR's.



## 2. Existing Land Use Survey

Analysis of Existing Land Use distribution is essential to understand the functional composition of the city and existing deficiencies in availability of land for social and physical infrastructure of the city. The analysis is based on the Existing Land Use map 2012 which was prepared on the basis of the Existing Land Use Survey (ELU Survey). The ELU Survey was one of the key initial stages towards ELU Plan preparation. It has two main objectives, one, to determine current land uses, and two, to assess the extent of implementation of the current DP.

### 2.1 Mapping Existing Land Use

The land uses were mapped using a GIS mapping platform so as to create an integrated database of existing spatial and non-spatial data. The creation of a Base Map and creating ELU categories were key steps undertaken before the commencement of the ELU survey. These steps are detailed below:

#### 2.1.1 Base Map Preparation

The Base map is formed through a series of overlays of spatial data layers as provided by MCGM on a base layer of the Quick Bird satellite image. The following is a description of the components used in the base map preparation:

**a) Base layer** - The Quick Bird high-resolution satellite image (0.61m accuracy) of the MCGM jurisdiction, provided by MCGM, has formed the base layer of the Base Map.

**b) Data layers** - Several layers available in the database provided by MCGM were used as overlays on the Quick Bird satellite image of the area under MCGM, to create the Base Map. These include:

- **Jurisdiction boundaries:** Ward boundaries, Special Planning Areas, TP Schemes, and other boundaries of spatial disaggregation (detailed later) ;
- **Physical features:** Street blocks, buildings, property (cadastral parcels as far as data is available);
- **Transportation:** highways, roads, road centrelines, railways, railway stations, airport boundary, water based transportation facilities, BEST bus depots/bus stations, and all other transportation infrastructure parcels and networks;
- **Utility infrastructure:** High tension lines, water pipelines (visible above ground), sewage and solid waste management facilities, etc.;
- **Environmentally sensitive areas:** National park, forests, hills, nallas, water bodies etc.
- **Heritage Conservation areas:** Designated heritage structures and precincts.

#### 2.1.2 Spatial Disaggregation

To form the base map, various levels of disaggregation present within MCGM area were considered viz.:

- 2 District boundaries (Island City and Suburban)
- 3 Zones (Island City, Eastern and Western Suburbs)
- 24 Administrative Ward boundaries,

Apart from the above, several other spatial divisions exist within MCGM area, which include Census Sections, Electoral Wards, Traffic Analysis Zones, Zones and Sub-zones of the Ready Reckoner as well as the Areas under Special Planning Authorities (SPAs).

- The **88 Census Sections** are delineated by the Office of Registrar General and Census Commissioner, Government of India (GoI), Ministry of Home Affairs for the purpose of Census data. The data from this level have been effectively used as reference for verifying distribution of population across various levels of disaggregation (i.e., Zones, administrative Wards, Planning Sectors).
- The **227 Electoral Wards** are created by the Election Commission of Maharashtra for conducting general elections and election of corporators through municipal elections. The electoral Ward boundaries have been superimposed on the Ward boundaries to check for conformity issues. However, these have not been directly used for analysis since the boundaries are subject to change based on population parameters.
- The **577 Traffic Analysis Zone Sections (TAZ)** within MCGM (out of total 1030 in MMR) as conceived by the Comprehensive Transport Study (CTS) for the Mumbai Metropolitan Region (MMR) for assessment of travel demand. The data from these TAZ have been used in situation analysis for population, employment and transport systems at the Ward and Planning Sector levels for 2005 and 2011.
- The **Ready Reckoner** has 124 subzones based on village boundaries for land and property price data. This data will be used as reference to derive the cost of DP implementation and revenue mobilization.
- The State Government has appointed Special Planning Authorities (SPAs) for areas within the jurisdiction of the MCGM, notified under Section 40 of the MR&TP Act. The **Notified Areas under Special Planning Authorities (SPAs)** exist as pockets under MMRDA and other agencies, and are not under the purview of the DP 2014-34. These areas account for an area of 43.22 ha as per the Existing Land Use report. Population and area under SPAs have been computed and discounted for the purposes of analysis and further projection for the DP 2014-34. However, the DP does address connectivity to these areas from the rest of the City. Tabulation and map generation has been undertaken for these areas based on data availability.

These are listed in the Table 2 below:

Table 1: Notified Areas and SPAs

Sr. No.	Notified Area	SPA
1	Back Bay Reclamation Area	MMRDA
2	Wadala Truck Terminal	MMRDA
3	Bandra Kurla Complex	MMRDA
4	Oshiwara District Centre	MMRDA
5	Dharavi Redevelopment Project	Slum Rehabilitation Authority
6	Gorai Manori Tourism Zone	MMRDA
7	Marol Industrial Area, SEEPZ SEZ	Maharashtra Industrial Development Corporation (MIDC)
8	Airport	MMRDA

Source: MCGM

As provided in the MR&TP Act local authority ceases to be the 'Planning Authority' in the notified areas.

The information on the multiple jurisdictions mentioned above has helped in gaining a clearer understanding of the multiplicity of authorities within MCGM. For the purpose of conducting assessment of existing status, data has been collected from various authorities that impact development in Greater Mumbai, at various levels of disaggregation. The data collected has been sifted and systematically structured in order to avoid data gaps and overlaps to the extent possible.

## 2.2 Existing Land Use Classification

The process of listing the categories and sub-categories for Existing Land Use entailed an intensive approach taking into consideration typical and specific typologies of developments and diverse cases of land use. Several categories of land uses have been listed along with utilities and amenities that are to be recorded and mapped during the ELU survey. In addition, colour codes for representation during the mapping of these land use categories have also been finalized with reference to the DP 1991. These are detailed out below.

**Main Land Uses:** There are significant changes since the DP 1991 in both, the categories as well as the nature of classification. To capture the current Existing Land Uses accurately, some new categories have been created (for e.g. Environmentally Sensitive Areas, Urban Villages and Offices) and in addition each land use has also subdivided into several new sub categories so as to capture the full range of land use types in Greater Mumbai.

The Main Land Use Categories have been illustrated below along with the respective codes and sub codes that have been used to denote them in the Existing Land Use Map.

### 1. Residential



These include 5 sub categories from R1 to R5 covering single family houses, apartments, all Government provided housing, chawls and slums. Residential uses are also further classified to include the largely mixed use character of Mumbai's Residential Areas that coexist with local shopping and commercial or industrial uses. Accordingly, each category is further subdivided into Residential-Commercial or Residential-Shopping or Residential-Industrial where the predominant use is residential with a significant presence of the secondary use.

Figure 1: Land Use Category Residential

RESIDENTIAL			
Main Code	Sub Code	Subject Category	Type (For Identification on Field)
R	R1	Individual Housing	R1.1 Primary Residential Zone R1C Residential with Commercial
	R2	Apartments / Multifamily	R2.1 Primary Residential Zone
			R2S Residential with Shopping
			R2C Residential with Commercial
	R3	Government / Municipal Staff / Quarters / Housing	R3.1 Primary Residential Zone R3S Residential with Shopping
	R4	Chawls	R4.1 Chawls Predominantly Residential
			R4S Chawls with Shopping
			R4C Chawls with Commercial
			R4I Chawls with Industry
	R5	Slums/ Clusters	R5.1 Slum Predominantly Residential
			R5C Slum with Commercial
			R5I Slum with Industrial

## 2. Commercial



In general, this category covers business and retail activities. It is subdivided to include Markets (both wholesale and retail), Hotels (lodges and star categories) and other commercial uses along with the formal Municipal Markets, Shopping Centres and Malls. Warehouses, godowns, and cold storages are included in this category but their largely industrial nature is shown through the use of a different colour code that matches the 'Industry' category.

Figure 2: Land Use Category Commercial

COMMERCIAL ACTIVITIES				
Main Code	Sub Code	Subject Category	Type (For Identification on Field)	
C	C1	Retail Markets	C1.1	Municipal Market
			C1.2	Shopping Centre
			C1.3	Mall
			C1.4	Informal Market
			C1.5	Weekly Market
			C2	Wholesale Market
	C2	Wholesale Market	C2	Wholesale Market
	C3	Hotels	C3.1	Hotels/Boarding/ Lodges
			C3.2	Star Category Hotels
	C4	Storages & Warehouses	C4.1	Godowns
			C4.2	Warehouses
			C4.3	Cold Storages
	C5	Other Commercial Activity	C5	Other Commercial Activity
				Shop Line

### 3. Offices



Offices are usually included under the Commercial category. However, due to their significant presence in Mumbai, and considering several new types of offices that have emerged over the last decade, a new separate land use category called "Offices" has been created. Offices have been further categorized to demarcate Municipal offices, all offices belonging to Government- Centre or State, Municipal Chowkies, Octroi Offices, IT and IT Enabled Offices, and all other offices. Though offices have been a main code 'O', in order to capture the commercial nature of offices in general they share the same colour code as the commercial category. However, the Government Offices included in this category are represented by a different colour code to denote their non – commercial nature.

Figure 3: Land Use Category Offices

OFFICES				
Main Code	Sub Code	Subject Category	Type (For Identification on Field)	
O	O1	Offices	O1.1	Municipal Offices
			O1.2	Government Offices
	O1.3		Municipal Chowkies	
	O1.4		Town Duty/ Octroi Offices	
	O1.5		I.T & I.T. Enabled Offices	
	O1.6		Other Offices	

#### 4. Industrial



All general industries, both heavy and light industries and industrial estates are included under Industrial Category. This category also includes the film industry (with its studios and processing units) as a separate industry.

Figure 4: Land Use Category Industry

INDUSTRIAL USE				
Main Code	Sub Code	Subject Category	Type (For Identification on Field)	
I	I1	Industry	I1	Industry
			I1.1	Industrial Estate
	I2	Film Industry	I2.1	Film City
			I2.2	Film Studio
			I2.3	Processing Units
	I3	Other Industrial Use	I3	Other Industrial Use

## 5. Urban Villages



These include all older traditional settlements in the city-villages or *gaothans* as well as fishing villages or *koliwad*s. Some of these are also included under the heritage list as 'heritage precincts'.

Figure 5: Land Use Category Urban Villages

URBAN VILLAGES			
Main Code	Sub Code	Subject Category	Type (For Identification on Field)
RU	RU	Urban Villages	RU1 Gaothan RU2 Koliwada

## 6. Primary Activity



Primary sector activities such as fishing/drying yards, plantation, dairy, cattle shed, *tabelas*, cattle pounds and saltpans are included in this category. Quarrying and *dhobi ghats* are also included.

Figure 6: Land Use Category Primary Activity

PRIMARY ACTIVITY			
Main Code	Sub Code	Subject Category	Type (For Identification on Field)
P	P	Primary Activities	P1 Fishing/ Drying Yards P2 Plantation P3 Dairy P4 Buffalo Stables P5 Cattle Pounds P6 Quarry P7 Dhobi Ghat P8 Salt Pan Lands

### 7. Natural Areas and Open Spaces



These include National Parks, forests including mangrove forests (as identified by the Forest Department), salt pans, mud flats, hills and all water bodies (including natural water courses, lakes, tanks and ponds). All Open Spaces are included in this category and is further subdivided to include the entire range of Open Spaces from small playgrounds, to promenades and beaches and recreational grounds.

Figure 7: Land Use Category Natural Areas and Open Spaces

NATURAL AREAS AND OPEN SPACES			
Main Code	Sub Code	Subject Category	Type (For Identification on Field)
N	N1	Natural Areas	N1.1 Forest
			N1.2 Mangrove Forest
			N1.3 Mud Flats
			N1.4 Hills
	N2	Waterbody	N2.1 River/ Creeks/ Natural Water Courses
			N2.2 Lakes
			N2.3 Tanks/ Ponds
	N3	Open Spaces	N3.1 Playground
			N3.2 Recreation Ground
			N3.3 Parks and Garden
			N3.4 Clubs & Gymkhanas
			N3.5 Promenade
			N3.6 Beach
			N3.7 Swimming Pool

### 8. Vacant Land



These include vacant lands, which are lying undeveloped.

Figure 8: Land Use Category Vacant Land

VACANT LANDS			
Main Code	Sub Code	Subject Category	Type (For Identification on Field)
VL	VL		VL Vacant
	UC		UC Under Construction

### 9. Unclassified Land

Restricted land use is classified under this category.

Figure 9: Land Use Category Unclassified

UNCLASSIFIED		
Main Code	Sub Code	Subject Category
x	X	Unclassified

### 10. Amenities and Public Utilities

Usually amenities are included under 'Public or Semi-Public' use. In the current DP 1991, social amenities and public utilities were included as reservations and amenities such as hospitals and schools are permitted to be developed by private owners. Hence, in the Land Use categories amenities and public utilities are not classified under Public-Semi-Public use. Instead, all Amenities and utilities are classified according to their respective uses, along with several sub-categories, with the primary intention of capturing all the obligatory functions of the MCGM. They are categorized as follows:

#### 10.1 Medical Amenities



These include dispensaries, maternity homes, hospitals and other medical services. These amenities are further sub divided to differentiate between municipal and private facilities. In addition, all cemeteries, crematoriums and burial grounds for all faiths are classified under Medical Amenities since they are managed by the Health Department.

Note: private dispensaries, maternity homes, consulting clinics, etc. forming part of a building used for residential / commercial use are not captured.

Figure 10: Land Use Category Medical

MEDICAL AMENITIES				
Main Code	Sub Code	Subject Category	Type (For Identification on Field)	
M	M1	Dispensary	M1.1	Municipal Dispensary
			M1.2	Community Dispensary
			M1.3	Veterinary Dispensary
	M2	Maternity Home	M2.1	Municipal Maternity Home
			M3	Hospital
	M3.2	Private Hospital		
	M3.3	Government Hospital		
	M4	Other Medical Services	M4	Other Medical Services
	M5	Cemetery	M5.1	Hindu Traditional or Electric
			M5.2	Muslim Cemetery
			M5.3	Christian Cemetery
			M5.4	Buddhist Cemetery
			M5.5	Composite Cemetery
			M5.6	Jewish Cemetery
			M5.7	Tower of Silence
			M5.8	Other Cemetery

### 10.2 Social Amenities



These include social and cultural centres such as public halls, welfare centres, auditoriums, art galleries, theatres, libraries and museums. Religious spaces and law keeping facilities like police stations, chowkies, courts and prisons are also included in this category.

Figure 11: Land Use Category Social Amenity

SOCIAL AMENITIES			
Main Code	Sub Code	Subject Category	Type (For Identification on Field)
S	S1	Welfare Activities	S1.1 Welfare Centre
			S1.2 Public Hall
	S2	Entertainment Centres	S2.1 Auditorium/ Theater
			S2.2 Cinema/ Multiplex
			S2.3 Open Air Theatre
			S2.4 Cultural Centre
	S3	Recreational Activities	S3.1 Art Gallery
			S3.2 Museum
			S3.3 Aquarium
	S4	Religious Spaces	S4.1 Temple
			S4.2 Church
			S4.3 Mosque
			S4.4 Gurudwara
			S4.5 Parsi Agiary
			S4.6 Jain Temple
			S4.7 Synagogue
			S4.8 Buddhist Temple
			S4.9 Other Religious
	S5	Law & Order	S5.1 Police Station
			S5.2 Police Chowky
			S5.3 Court
			S5.4 Prison
	S6	Other Social Amenities	S6 Other Social Amenities

### 10.3 Educational Amenities



These include all educational institutions. Sub categories cover municipal and private schools, special schools, colleges, polytechnics, all institutions of higher learning like professional colleges, IIT, NITIE, all research institutes and universities.

Figure 12: Land Use Category Education

EDUCATIONAL AMENITIES			
Main Code	Sub Code	Subject Category	Type (For Identification on Field)
E	E1	Primary School	E1.1 Municipal Primary School
	E2	Integrated School	E2.1 Secondary School
			E2.2 Primary cum Secondary School
			E2.3 Special School
	E3	Colleges	E3.1 College
			E3.2 Polytechnic
			E3.3 Professional College
			E3.4 University/ IIT
			E3.5 Civic Training Institute
E3.6 Other Educational Amenities			

#### 10.4 Public Utilities and Facilities



These include all basic utilities such as power generation and supply, water supply, sewage collection and disposal, solid waste disposal, storm water disposal and fire brigade. Each utility is further subdivided into sub-categories. Power includes electric power plants, transmission stations, and HTL/transmission lines and receiving stations; Water includes aqueducts, water treatment plants, water reservoirs and water pumping stations; Sewage treatment plants/aerated lagoons, sewage pumping stations and public sanitary conveniences are the subcategories under Sewage; Solid Waste includes Solid Waste Disposal sites and refuse stations.

Figure 13: Land Use Category Public Utility and Facility

#### 11. Transport and Communication Facilities



These include all bus depots; railway terminals, railway stations, yards and siding; airports; metro and mono rail stations; truck terminals and freight complexes; sea ports and jetties; public parking facilities and RTOs.

Figure 14: Land Use Category Transport and Communication

TRANSPORT AND COMMUNICATION				
Main Code	Sub Code	Subject Category	Type (For Identification on Field)	
T	T1	Transport	T1.1	Bus Depot
			T1.2	Bus Stations
			T1.3	Railway Stations
			T1.4	Railway Yards/ Siding
			T1.5	Railway Terminal
			T1.6	Airport
			T1.13	Public Parking
			T1.14	Public Parking Building
			T1.16	Municipal Transport Garage/ Workshop
			T1.17	Sea Port/ Dockyards/ Jetties
			T1.18	Truck Terminals, Check Post & Freight Complexes
			T1.19	Petrol Pump, Gas Stations
			T2	Communication
	T2.2	Telephone Exchange		
	T2.3	Television Stations		
	T2.4	Radio Station		
	T2.5	RadioTransmission		

The Land Use Classification and Codes explained above have been mapped in the Existing Land Use Survey for Greater Mumbai.

Figure 15: Consolidated Land Use Categories: Residential, Urban Villages, Educational Amenities

<b>RESIDENTIAL</b>			
Main Code	Sub Code	Subject Category	Type (For Identification on Field)
R	R1	Individual Housing	R1.1 Primary Residential Zone
			R1C Residential with Commercial
	R2	Apartments / Multifamily	R2.1 Primary Residential Zone
			R2S Residential with Shopping
			R2C Residential with Commercial
	R3	Government / Municipal Staff / Quarters / Housing	R3.1 Primary Residential Zone
			R3S Residential with Shopping
	R4	Chawls	R4.1 Chawls Predominantly Residential
			R4S Chawls with Shopping
			R4C Chawls with Commercial
			R4I Chawls with Industry
	R5	Slums/ Clusters	R5.1 Slum Predominantly Residential
			R5C Slum with Commercial
			R5I Slum with Industrial

<b>URBAN VILLAGES</b>			
Main Code	Sub Code	Subject Category	Type (For Identification on Field)
RU	RU	Urban Villages	RU1 Gaothan
			RU2 Koliwada

<b>EDUCATIONAL AMENITIES</b>			
Main Code	Sub Code	Subject Category	Type (For Identification on Field)
E	E1	Primary School	E1.1 Municipal Primary School
	E2	Integrated School	E2.1 Secondary School
			E2.2 Primary cum Secondary School
			E2.3 Special School
	E3	Colleges	E3.1 College
			E3.2 Polytechnic
			E3.3 Professional College
			E3.4 University/ IIT
			E3.5 Civic Training Institute
			E3.6 Other Educational Amenities

Figure 16: Consolidated Land Use Categories: Medical Amenities, Commercial Activities

<b>MEDICAL AMENITIES</b>										
<b>Main Code</b>	<b>Sub Code</b>	<b>Subject Category</b>	<b>Type (For Identification on Field)</b>							
<b>M</b>	<b>M1</b>	Dispensary	<b>M1.1</b> Municipal Dispensary <b>M1.2</b> Community Dispensary <b>M1.3</b> Veterinary Dispensary							
	<b>M2</b>	Maternity Home	<b>M2.1</b> Municipal Maternity Home							
	<b>M3</b>	Hospital	<b>M3.1</b> Municipal Hospital <b>M3.2</b> Private Hospital <b>M3.3</b> Government Hospital							
			<b>M4</b> Other Medical Services							
			<b>M5</b>	Cemetery	<b>M5.1</b> Hindu Traditional or Electric <b>M5.2</b> Muslim Cemetery <b>M5.3</b> Christian Cemetery <b>M5.4</b> Buddhist Cemetery <b>M5.5</b> Composite Cemetery <b>M5.6</b> Jewish Cemetery <b>M5.7</b> Tower of Silence <b>M5.8</b> Other Cemetery					
	<b>COMMERCIAL ACTIVITIES</b>									
	<b>Main Code</b>	<b>Sub Code</b>			<b>Subject Category</b>	<b>Type (For Identification on Field)</b>				
	<b>C</b>	<b>C1</b>			Retail Markets	<b>C1.1</b> Municipal Market <b>C1.2</b> Shopping Centre <b>C1.3</b> Mall <b>C1.4</b> Informal Market <b>C1.5</b> Weekly Market				
						<b>C2</b>	Wholesale Market	<b>C2</b> Wholesale Market		
								<b>C3</b>	Hotels	<b>C3.1</b> Hotels/Boarding/ Lodges <b>C3.2</b> Star Category Hotels
						<b>C4</b>	Storages & Warehouses			<b>C4.1</b> Godowns <b>C4.2</b> Warehouses <b>C4.3</b> Cold Storages
										<b>C5</b> Other Commercial Activity
		<b>C5</b> Other Commercial Activity Shop Line								

Figure 17: Consolidated Land Use Categories: Social Amenities, Natural Areas and Open Spaces

<b>SOCIAL AMENITIES</b>			
<b>Main Code</b>	<b>Sub Code</b>	<b>Subject Category</b>	<b>Type (For Identification on Field)</b>
<b>S</b>	<b>S1</b>	Welfare Activities	<b>S1.1</b> Welfare Centre
			<b>S1.2</b> Public Hall
	<b>S2</b>	Entertainment Centres	<b>S2.1</b> Auditorium/ Theater
			<b>S2.2</b> Cinema/ Multiplex
			<b>S2.3</b> Open Air Theatre
			<b>S2.4</b> Cultural Centre
			<b>S3.1</b> Art Gallery
	<b>S3</b>	Recreational Activities	<b>S3.2</b> Museum
			<b>S3.3</b> Aquarium
			<b>S4.1</b> Temple
	<b>S4</b>	Religious Spaces	<b>S4.2</b> Church
			<b>S4.3</b> Mosque
			<b>S4.4</b> Gurudwara
			<b>S4.5</b> Parsi Agiary
			<b>S4.6</b> Jain Temple
			<b>S4.7</b> Synagogue
			<b>S4.8</b> Buddhist Temple
			<b>S4.9</b> Other Religious
			<b>S5</b>
	<b>S5.2</b> Police Chowky		
	<b>S5.3</b> Court		
<b>S5.4</b> Prison			
<b>S6</b>	Other Social Amenities	<b>S6</b> Other Social Amenities	

<b>NATURAL AREAS AND OPEN SPACES</b>			
<b>Main Code</b>	<b>Sub Code</b>	<b>Subject Category</b>	<b>Type (For Identification on Field)</b>
<b>N</b>	<b>N1</b>	Natural Areas	<b>N1.1</b> Forest
			<b>N1.2</b> Mangrove Forest
			<b>N1.3</b> Mud Flats
			<b>N1.4</b> Hills
	<b>N2</b>	Waterbody	<b>N2.1</b> River/ Creeks/ Natural Water Courses
			<b>N2.2</b> Lakes
			<b>N2.3</b> Tanks/ Ponds
	<b>N3</b>	Open Spaces	<b>N3.1</b> Playground
			<b>N3.2</b> Recreation Ground
			<b>N3.3</b> Parks and Garden
			<b>N3.4</b> Clubs & Gymkhanas
			<b>N3.5</b> Promenade
			<b>N3.6</b> Beach
			<b>N3.7</b> Swimming Pool

Figure 18: Consolidated Land Use Categories: Offices, Transport and Communication

<b>OFFICES</b>						
Main Code	Sub Code	Subject Category	Type (For Identification on Field)			
O	O1	Offices	O1.1	Municipal Offices		
			O1.2	Government Offices		
			O1.3	Municipal Chowkies		
			O1.4	Town Duty/ Octroi Offices		
			O1.5	I.T & I.T. Enabled Offices		
			O1.6	Other Offices		
<b>TRANSPORT AND COMMUNICATION</b>						
Main Code	Sub Code	Subject Category	Type (For Identification on Field)			
T	T1	Transport	T1.1	Bus Depot		
			T1.2	Bus Stations		
			T1.3	Railway Stations		
			T1.4	Railway Yards/ Siding		
			T1.5	Railway Terminal		
			T1.6	Airport		
			T1.13	Public Parking		
			T1.14	Public Parking Building		
			T1.16	Municipal Transport Garage/ Workshop		
			T1.17	Sea Port/ Dockyards/ Jetties		
			T1.18	Truck Terminals, Check Post & Freight Complexes		
			T1.19	Petrol Pump, Gas Stations		
			T2	Communication	T2.1	Post and Telegraph Office
					T2.2	Telephone Exchange
					T2.3	Television Stations
					T2.4	Radio Station
					T2.5	RadioTransmission

Figure 19: Consolidated Land Use Categories: Industrial Use, Vacant Lands, Primary Activity

INDUSTRIAL USE			
Main Code	Sub Code	Subject Category	Type (For Identification on Field)
I	I1	Industry	I1 Industry
			I1.1 Industrial Estate
	I2	Film Industry	I2.1 Film City
			I2.2 Film Studio
			I2.3 Processing Units
	I3	Other Industrial Use	I3 Other Industrial Use

VACANT LANDS			
Main Code	Sub Code	Subject Category	Type (For Identification on Field)
VL	VL		VL Vacant
	UC		UC Under Construction

PRIMARY ACTIVITY			
Main Code	Sub Code	Subject Category	Type (For Identification on Field)
P	P	Primary Activities	P1 Fishing/ Drying Yards
			P2 Plantation
			P3 Dairy
			P4 Buffalo Stables
			P5 Cattle Pounds
			P6 Quarry
			P7 Dhobi Ghat
			P8 Salt Pan Lands

Figure 20: Consolidated Land Use Categories: Public Utility and Facility, Unclassified

PUBLIC UTILITY AND FACILITY			
Main Code	Sub Code	Subject Category	Type (For Identification on Field)
U	U1	Power	U1.1 Electric Power Plant
			U1.2 Electric Transmission Station
			U1.3 Transmission Lines/ HT Lines
			U1.4 Receiving Station
	U2	Water	U2.1 Water Trunk Mains/ Aqueducts
			U2.2 Water Treatment Plant
			U2.3 Water Reservoirs
			U2.4 Water Pumping Station
	U3	Sewage	U3.1 Sewage Treatment Plant/ Aerated Lagoons
			U3.2 Sewage Pumping Stations
			U3.3 Public Sanitary Convenience
	U4	SWM	U4.1 Solid Waste Disposal
	U5	Fire Brigade	U5 Fire Brigade Station/ Command Center
	U6	Storm Water Pumping Stations	U6 Storm Water Pumping Stations
U7	Other Utilities	U7 Other Utilities	

UNCLASSIFIED		
Main Code	Sub Code	Subject Category
x	X	Unclassified

### 2.3 Survey Methodology

The entire area under MCGM, comprising of 24 wards, was divided into zones, and surveyed in 6 stages over 6 months. The existing clustering of the 24 wards under 16 Ward Committee groups viz., (A & B & E; C & D; F/S & F/N; G/S; G/N; H/E & H/W; K/E; K/W; P/S; P/N; R/N & R/C & R/S; M/E & M/W; L; N; S; T) was considered while creating the zones for the 6 survey stages, so as to prevent issues related to dissemination later. The entire area of Greater Mumbai was divided with a grid each measuring 3.2 sqkm.

Surveyors visited each property to ascertain the Land Use of each property as per ELU categories provided. Main Land Uses were accordingly mapped as per the categories and the codes defined. Since each of the categories is further detailed out into sub-categories, an accurate mapping of the Existing Land Use has been possible.

Figure 21 Samples of Survey Tablet, Field Survey Sheets and Verification Notes



### 2.4 Seeking Public Suggestions and Objections to Existing Land Use 2012

The MCGM, as a part of Development Plan process, has displayed the Existing Land Use 2012 maps on its website: <http://portal.mcgm.gov.in/iri/portal/anonymous/qLELUSurveyData> for involving the general public to verify the Land Use and give their comments and suggestions to improve the accuracy of the same. Up to 31<sup>st</sup> May 2013, 4,043 suggestions and comments have been received out of which the number of relevant comments were 569. Upon verification of queries by MCGM, corrections have been incorporated in the Existing Land Use 2012.

**Summary:**

- A Base Map was created through a series of overlays of spatial data as provided by MCGM on a base layer of the Quick Bird satellite image. The Base Map delineates various levels of spatial disaggregation in Greater Mumbai.
- Categories and sub-categories created for capturing the existing land uses for the preparation of the Existing Land Use 2012 took cognizance of the mixed-use character, the predominance of offices and the various housing typologies present in the City.
- The Existing Land Use Map 2012, created using the GIS Base Map, based on an Existing Land Use Survey, was a key first stage of the preparation of the DP 2014-34.