



Part II: Assessment of Existing Situation



3. Delineation of Planning Sectors

The purpose of delineation of Planning Sectors for Development Plan 2014 – 2034 is to have basic workable spatial units to plan for provisions of social amenities at the smallest level of disaggregation, appropriate to be addressed in the Development Plan.

For the purpose of delineating the Planning Sectors, the area within Greater Mumbai, 458.28 sqkm, has been first divided into 3 broad Zones, namely, the Island City, Western Suburbs and Eastern Suburbs. The Wards within these Zones have been further subdivided resulting in 151 Planning Sectors excluding areas under the Special Planning Authorities and the National Park.

The criteria established to arrive at delineation of each Planning Sector are as follows:

- a) Ward boundaries have been maintained as definitive limits. Thus, no Planning Sector spans across two Wards. Adhering to Ward boundaries ensures optimal use of secondary data.
- b) Physical boundaries defined by major transport networks including road and railway networks have been considered as boundaries for defining Planning Sectors;
- c) Major environmental features such as rivers, wetlands, salt pan lands have been taken cognizance of;
- d) Areas that are largely homogenous in character have been correlated;
- e) Planning Sector boundaries of the DP 1991 have been referred to and they form the basis of the new Planning Sectors wherever possible.

For ease of analysis and identification of the Planning Sectors, the three Zones, the Island City, the Western Suburbs and the Eastern Suburbs have been named Zone 1, Zone 2 and Zone 3 respectively. The number of Planning Sectors and their areas are given below in Table 3:

Table 2: Zone Wise Area and Number of Planning Sectors

District	Total area in ha (including SPA)	No. of Planning Sectors (excluding SPA and National Park)
Island City	7,140.71	50
Western Suburbs	22,239.29	63
Eastern Suburbs	16,448.48	38
Greater Mumbai	45,828.49	151

The nomenclature of the Planning Sectors starts with the Ward name (e.g. A, B, C...etc) followed by the Zone name series (e.g. All Island City wards will have the Ward name followed by the number 1 to denote the Zone, western Ward names will be followed by the number 2 and eastern Ward names will be followed by the number 3 to denote the Zone), further followed by the Planning Sector number (usually numbered starting from 01, 02 and so on). Examples of this nomenclature method have been illustrated here for Planning Sectors within one Ward for each Zone:

- Planning Sectors in the Ward A of Zone 1 have been numbered as: A 1.01, A 1.02, A 1.03 and so on up to A 1.09;
- Planning Sectors in the Ward H/E of Zone 2 have been numbered as: H/E 2.01, H/E 2.02 and so on up to H/E 2.05;
- Planning Sectors in the Ward L of Zone 3 have been numbered as: L 3.01, L 3.02, L 3.03 and so on up to L 3.08.

Table 3: Ward Wise Planning Sector Areas⁶

	Planning Sector	Localities ⁷	Area(ha)	
ISLAND CITY	A – WARD	A 1.01	Back Bay Reclamation, Colaba, Old Navy Nagar	231
		A 1.02	Apollo Bunder, Electric House BEST, Police Colony	137
		A 1.03	Gateway of India, Maharashtra Police Head Quarters	72
		A 1.04	Ballard Estate	9
		A 1.05	MbPT	95
		A 1.06	Bombay Stock Exchange, Bora Bazaar, Flora Fountain, Horniman Circle, Shahid Bhagat Singh Marg, St. Thomas Cathedral	61
		A 1.07	CST Railway Terminus, St. George Hospital	46
		A 1.08	Azad Maidan, Bombay Hospital, Cooperage Ground, Dhobi Talav, Elphinstone Technical Institute, MCGM Head Office, Oval Maidan, University of Mumbai	160
		A 1.09	Braborn Stadium, Churchgate Railway station, Mahindra Football Ground, Wankhede Stadium	73
		SPA (MMRDA)	Backbay Reclamation, Cuffe Parade, Nariman Point	237
		Total		1,121
	B – WARD	B 1.01	Chinch Bunder, Chippi Chawl, Dongri, Koliwada, Masjid Bunder West, Pydhonie, Umerkhadi, Vadgadi	106
B 1.02		Dana Bunder, Masjid Bunder East, Mazgaon, Mandvi	66	
B 1.03		Malet Bunder Road	93	
Total			266	
C – WARD	C 1.01	Hindu Gymkhana, Police Grounds, Tarapore Wala Aquarium	24	
	C 1.02	Anant Wadi, Bhang Wadi, Chandan Wadi, Chira Bazaar, Gai Wadi, Kalbadevi, Tad Wadi, Wagh Wadi	72	
	C 1.03	Badam Wadi, Bhuleshwar, Cawasji Patel Tank, Champa Wadi, Chor Bazaar, Gulal Wadi, Joshi Wadi, Kumbharwada, Lad Wadi, Lohar Chawl, Narottam Wadi, Null Bazaar, Panjarpole, Zaveri Bazaar	96	
	Total		191	

⁶Total Ward areas have been rounded up to the last digit. Areas under the sea, which are included in the ward boundaries and some other major water bodies are not included in the area statement.

⁷The locality names are mentioned here to describe the broad local context of the area.

D – WARD	D 1.01	Anand Nagar, Bane Compound, Cumballa Hill, Gowalia Tank, Tardeo, Zoroastrian Colony	311
	D 1.02	Bharat Nagar, Grant Road Post office	61
	D 1.03	Bhatwadi, Girgaon, Khetwadi, Mangal Wadi	122
	D 1.04	Banganga, Dadi Sheth Wadi, Girgaum Chowpatty, Kemp's Corner, Malabar Hill, Raj Bhavan, Tower of Silence	329
	Total		822
E – WARD	E 1.01	Agripada, Bombay YMCA, Mumbai Central Terminus	80
	E 1.02	Chinchpokli	125
	E 1.03	Dhaku Prabhuchi Wadi, Ghodapdeo	139
	E 1.04	Darukhana	135
	E 1.05	Rly Colony, Tadwadi, Wadi Bunder	148
	E 1.06	Kamathipura, Kazipura, Siddharth Nagar	100
	Total		727
F/N – WARD	F/N1.01	Five Gardens, Matunga East, UDCT, JTI	284
	F/N1.02	SIES College of Commerce, Shivaji Nagar, Sion Circle	139
	F/N1.03	Pratiksha Nagar	140
	F/N1.04	Kane Nagar	109
	F/N1.05	Nadkarni Park, Nana Phadanwis Bridge	37
	F/N1.06	Antop Hill, CGS Colony	180
	F/N1.07	Korba Mithagar, Panchsheel Nagar	219
	SPA (MMRDA)	Wadala Anik Depot, Wadala Mono Rail Workshop	120
	Total		1,228
F/S – WARD	F/S 1.01	Bharatmata	128
	F/S 1.02	Jerbai Wadi Road, Govindji Keni Road, Naigaon	55
	F/S 1.03	Bhoiwada, Kidwai Nagar	143
	F/S 1.04	Cotton Green Building, Gandhi Nagar, Sewree, Wadala	434
	F/S 1.05	Abhyudaya Nagar, Azad Nagar, Kala Chowky, Sindhu Nagar	93
	F/S 1.06	Gokuldas Morarji Mills, KEM Hospital, Lal Baug, Parel	127
	Total		979
G/N – WARD	G/N 1.01	Mayor's Bungalow, Purandare Wadi, Shivaji Park, Siddhivinayak Temple	211
	G/N 1.02	Dadar West, Juwekar Wadi, Our Lady of Salvation Church, Plaza Theatre, Ruparel College	231
	G/N 1.03	Tilak Bridge, Central Rail Workshop Matunga East	94
	G/N 1.04	Hanuman Nagar	10
	G/N 1.05	Mahim Railway Station	18
	G/N 1.06	Lal Bahadur Shastri Marg, Kala Qila	9
	SPA (MMRDA)	Bandra Kurla Complex	82

	SPA (SRA & MHADA)	Dharavi (Ambedkar Nagar, Kumbhar Wada Dharavi, Mahanagar Palika Vasahat)	222
	Total		876
G/S - WARD	G/S 1.01	Century Bazaar, Gopal Nagar, Hanuman Nagar, Kamgar Nagar, Worli Shivaji Nagar, Worli Village	250
	G/S 1.02	BDD Chawls, Peninsula Towers	134
	G/S 1.03	Jeejamata Nagar, Mahalaxmi Race Course, Nehru Planetarium, Poonam Chambers, Sardar Vallabhbhai Patel Indoor Stadium, Worli Dairy	298
	G/S 1.04	Pheonix Mills	121
	G/S 1.05	Arthur Road Jail, Mahalaxmi Station	77
	G/S 1.06	Dighe Nagar	50
	Total		929
H/E - WARD	H/E 2.01	Prabhat Colony	159
	H/E 2.02	Kherwadi	27
	H/E 2.03	Kala Nagar, MIG Club Bandra, Subhash Nagar	105
	H/E 2.04	University of Mumbai Kalina Campus	93
	H/E 2.05	Santacruz East, Vidya Nagari	274
	SPA (SRA & MHADA)	Dharavi	9
	SPA (MMRDA)	Bandra Kurla Complex	1
	SPA (MMRDA)	International Airport	424
	SPA (MMRDA)	Bairam Naupada, Bandra Kurla Complex, Bharat Nagar, Dnyaneshwar Nagar, Valmiki Nagar	150
	Total		1,242
H/W - WARD	H/W 2.01	Ranwar, Santosh Nagar Bandra, Taj Lands End	138
	H/W 2.02	Chuim, Danda, Hanuman Nagar Khar, Pali Hill	168
	H/W 2.03	Old Khar West	55
	H/W 2.04	Hasmukh Nagar, Podar Educational Complex, Vitthaldas Nagar Housing Colony	98
	H/W 2.05	Ambedkar Nagar Khar, Pali Village	192
	H/W 2.06	Bandra Talao, Patkat Blocks, Jaibharat Society, Ramkrishna Nagar	57
	H/W 2.07	Khar Subway, St. Teresa's Convent School	66
	H/W 2.08	Bandra Station, Naupada Bandra, Bandra Terminal	37
	SPA (MMRDA)	Bandra Kurla Complex (Vaidya Nagar)	92
	Total		903
WESTERN SUBURBS			

K/E WARD	K/E 2.01	Netaji Subhash Nagar, Paranjpe Nagar, Vile Parle	227
	K/E 2.02	Tarun Bharat Society, J B Nagar, Chakala, Sahid Bhagat Singh Colony, Mota Nagar	184
	K/E 2.03	Chimatpada, Marol Village	299
	K/E 2.04	Hanuman Nagar, Bhim Nagar	60
	K/E 2.05	Reliance Training Centre JVLR	166
	K/E 2.06	Gupha Tekdi, Jogeshwari East, Poonam Nagar, Sher E Punjab Colony, Sundar Nagar	456
	K/E 2.07	Hind Nagar, Subhash Nagar Jogeshwari East	274
	K/E 2.08	Air India Road, Santacruz East	11
	SPA (MMRDA)	International Airport	589
	SPA (MIDC)	SEEPZ, SEEPZ Colony, Shanti Nagar	131
	Total		2,396
K/W - WARD	K/W 2.01	Amrut Nagar, B R Nagar, Bhim Wada, Irla, Iskcon Temple, J W Marroit, JVPD Scheme, Janki Kutir, Juhu Koliwada, Kamala Nagar, Millenium Club, Momin Nagar, Vidyanidhi, Juhu Chowpatty	586
	K/W 2.02	Bhavans College, Cooper Hospital, Indira Nagar, Mithibai College, Munshi Nagar, Sagar City, Shree Ram Nagar, Yadav Nagar	244
	K/W 2.03	Aram Nagar, D N Nagar, Four Bungalows, Nana Nani Park Versova, Rutumbara College, Versova, Versova Village	515
	K/W 2.04	Central Institute of Fisheries Education, Versova Pumping Station	256
	K/W 2.05	Cinemax, Kokilaben Reliance Hospital, Lokhandwala Complex, Mudran Press Colony, S V P Nagar, Shastri Nagar, Suresh Nagar	236
	K/W 2.06	Milat Nagar, Yamuna Nagar	68
	K/W 2.07	Navneet Colony, Andheri Sports Club, Behram Baug, Jogeshwari Nagar, Kadam Nagar, MHADA Colony Jogeshwari	365
	K/W 2.08	Juhu Flying Club	126
	K/W 2.09	Husaini Peer	7
	SPA (MMRDA)	Oshiwara District Centre	52
	Total		2,455
P/N - WARD	P/N 2.01	Ambujwadi	1,754
	P/N 2.02	Bombay Transmitter Site, Malwani, St. Anthony School, Babrekar Nagar Kandivali, Ambedkar Nagar Kandivali	637
	P/N 2.03	Malad Mindspace	114
	P/N 2.04	Dominic Colony Kandivali, Kanchpada, Mamletdar Wadi, Mamletdar Wadi Kandivali, Chincholi Bunder, Nadiyawala Colony	313
	P/N 2.05	Malad East	220

	P/N 2.06	Dindoshi, Gokul Nagar Malad E, Kurar Village Malad E, Nagri Niwara Society Malad E, Pathan Wadi, Raheja Estate Malad E, Sankalp Colony Malad E	492
	P/N 2.07	Whistling Woods International Film School	5
	SPA (MMRDA)	Recreation and Tourism Development Zone	566
	Sanjay Gandhi National Park	-	569
	Total		4,672
P/S - WARD	P/S 2.01	Mega Mall Oshiwara	302
	P/S 2.02	BEST Nagar Oshiwara, Bangur Nagar, Bhagat Singh Nagar, Motilal Nagar	293
	P/S 2.03	Motilal Nagar 2& 3, Prem Nagar	125
	P/S 2.04	Hypercity Mall, Inorbit Mall Goregaon	151
	P/S 2.05	Cama Industrial Estate, Sonawala Industrial Estate, Goregaon Station, Dindoshipada	325
	P/S 2.06	Gokuldham, Yashodham	101
	P/S 2.07	Goregaon East	1,171
	SPA (MMRDA)	Oshiwara District Centre	47
	Sanjay Gandhi National Park	-	5
	Total		2,519
R/N - WARD	R/N 2.01	Anand Park Dahisar W, Ganpat Patil Nagar Dahisar W	409
	R/N 2.02	Kandarpada, LIC Colony, Mandapeshwar, Tawde Wadi	284
	R/N 2.03	Ambawadi, Anand Nagar Dahisar E, Maratha Colony, Shakti Nagar Dahisar E	295
	R/N 2.04	Chintamani Nagar Borivali E, Kajupada Borivali E, Ketkipada Dahisar E, Mahavir Nagar Borivali E, Vaishali Nagar	212
	Sanjay Gandhi National Park	-	217
	Total		1,418
R/C - WARD	R/C 2.01	MHADA Colony Borivali West	581
	R/C 2.02	Charkop Sector 3, 4, 5, & 6	225
	R/C 2.03	Ashtanayak Nagar, Gorai	209
	R/C 2.04	CKP Colony, Eksar, Prem Nagar, Roshan Nagar, Yogi Jayraj Nagar	159
	R/C 2.05	Babhai, Chiku Wadi, Hari Om Nagar, Saibaba Nagar	301
	R/C 2.06	Asara Colony, Chinchpada Borivali E, Daulat Nagar, Rajendra Nagar	140
	R/C 2.07	Jai Jawan Nagar	117
	R/C 2.08	Abhinav Nagar Borivali E, Krishna Nagar, Kulup Wadi Borivali E, Magathane	203
	SPA (MMRDA)	Recreation and Tourism Development Zone	1,441

EASTERN SUBURBS		Sanjay Gandhi National Park	-	1,428	
		Total		4,803	
	R/S - WARD	R/S 2.01	Charkop Village		147
		R/S 2.02	Charkop Sector 1&2		48
		R/S 2.03	Charkop Industrial Estate		45
		R/S 2.04	Gandhi Nagar Kandivali, Ganesh Nagar Kandivali		142
		R/S 2.05	Dahanukar Wadi Kandivali, Jethava Nagar, Kamala Nagar Kandivali, Mohan Nagar, Patel Nagar Kandivali, Tulaskar Wadi Kandivali		303
		R/S 2.06	Aarya Chanakya Nagar E, Janata Nagar Malad, Padmaba Nagar, Thakur Complex		259
		R/S 2.07	Lokhandwala Kandivali, Narsi Pada, Thakur Village		474
		Sanjay Gandhi National Park	-		412
	Total			1831	
	L - WARD	L 3.01	Saki Naka Junction, Police Training Ground		85
		L 3.02	Chandivali Sangharsh Nagar, Chandivali Lake, Tunga Village, Tunga, Chandivali		338
		L 3.03	Mittal Industrial Estate		40
		L 3.04	Asalfa, Ashoknagar, Jari Mari, Kaju Pada, Lokmanya Tilak Nagar Ghatkopar		288
L 3.05		Bail Bazaar, Wadia Colony		23	
L 3.06		Kurla West, Premier Colony, Sheetal Lake Kurla		196	
L 3.07		Ambedkar Nagar, Kasaiwada, Panchsheel Nagar, Tata Nagar		98	
L 3.08		Chunabhatti, Everard Nagar, Milan Nagar, Shiv Srishti		340	
SPA (MMRDA)		MMRDA		18	
SPA (SRA & MHADA)		Dharavi		4	
SPA (MMRDA)		Bandra Kurla Complex		41	
SPA (MMRDA)		International Airport		97	
SPA (MMRDA)		Narayan Nagar		85	
Total				1,568	
M/E - WARD	M/E 3.01	Anushakti Nagar, Cheeta Camp, Tata Institute of Social Sciences, Trombay Koliwada		2,390	
	M/E 3.02	Agarwadi, Dock Labour Board Colony, Govandi E		161	
	M/E 3.03	ACC Nagar, New Gautam Nagar, Sanjay Gandhi Nagar Sector 1& 2		160	
	M/E 3.04	Annabhau Sathe Nagar, Shivaji Nagar Chembur		597	
	Total			3,308	

	Total		3,308
M/W - WARD	M/W 3.01	HP Nagar West, Mahul Chembur, Priyadarshini Circle, Rashtriya Chemical Fertilizer, Vashi Gaon	989
	M/W 3.02	Chembur Golf Course, Collector's Colony, Diamond Garden, Sindhi Colony, Teen Talao	508
	M/W 3.03	Pestom Sagar Colony, Rajiv Gandhi Nagar, Tilak Nagar, Vatsalabai Naik Nagar	149
	M/W 3.04	Chedda Nagar, Jyothi Nagar	95
	Total		1,740
N - WARD	N 3.01	Amrut Nagar Ghatkopar West, Azad Nagar Ghatkopar, Barve Nagar, Vikhroli West	387
	N 3.02	Pant Nagar, Vidya Vihar West	172
	N 3.03	Adoni Compound	98
	N 3.04	Godrej Boyce, Laxmi Nagar	178
	N 3.05	BEST Colony Vidya Vihar, Rajawadi	293
	N 3.06	Godrej Creekside Colony, Ramabai Ambedkar Nagar	1,441
	SPA (MMRDA)	-	0.35
	Total		2,569
S - WARD	S 3.01	IIT Powai, Powai Lake	583
	S 3.02	Hiranandani Powai, Panchkutir Ganesh Nagar	168
	S 3.03	Godrej Colony, HMPL Surya Nagar, Ramabai Nagar Powai	241
	S 3.04	Kaju Tekdi, Kanjurmarg West, Kendriya Vidyala Kanjurmarg, Khindipada Bhandup, Panchsheel Nagar Bhandup, Pratap Nagar Kanjurmarg, Shivaji Nagar Bhandup, Sonapur Bhandup, Tembhipada Bhandup, Utkarsh Nagar Bhandup	464
	S 3.05	Bhandup Industrial Area, Govind Nagar Bhandup, Huma Theatre, Vasant Nagar	246
	S 3.06	Gandhi Nagar Powai, Lokmanya Nagar Powai	41
	S 3.07	Kannamwar Nagar, Tagore Nagar	209
	S 3.08	Adarsh Nagar, Friends Colony Nahur, Kanjurmarg E , Nahur E	404
	S 3.09	Kanjurmarg Municipal Dumping Ground	593
	Sanjay Gandhi National Park	-	25
	Total		2,975
T - WARD	T 3.01	Johnson & Johnson, Mulund Colony, Mulund ESIS Hospital, Runwal Mall Check Naka, Yogi Hills Mulund	274
	T 3.02	Mulund BEST Depot, Mulund Sonapur, Sarvoday Parshwanath Nagar Mulund, Vishwakarma Nagar	371
	T 3.03	Arunoday Nagar, Hanuman Chowk, LIC Colony Mulund, Neelam Nagar, Sajjan Wadi	289
	T 3.04	Damoji Patil Wadi, MHADA Colony Mulund E	614

T 3.05	Sahi Banguda	3
T 3.06	Part of National Park	0.07
T 3.07	Royal Palms Estate, Royal Palms Golf & Country Club	33
Tulsi Lake	-	115
Vihar Lake	-	497
National Park	-	2,091
Total		4,288

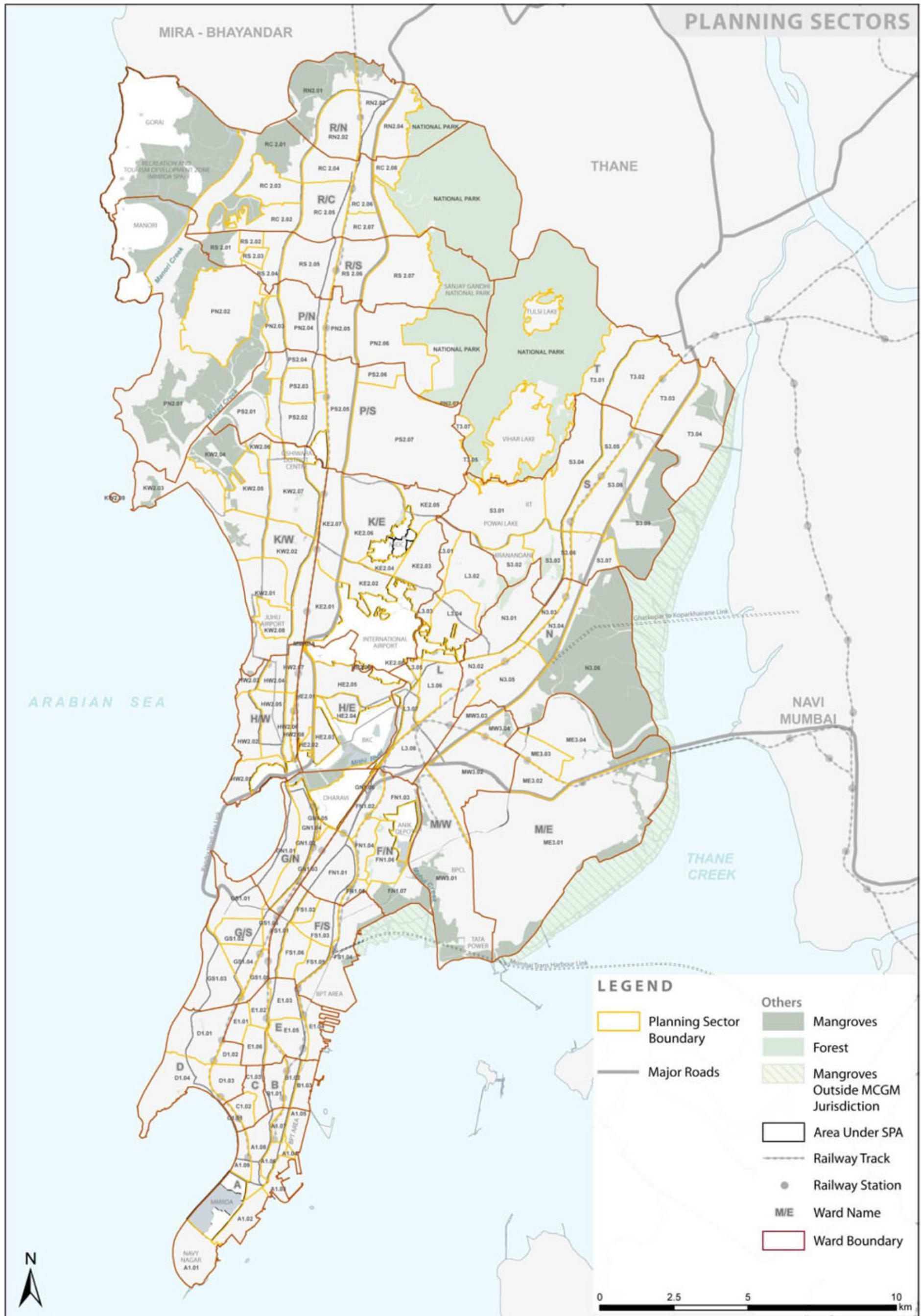
The Table 5 below provides details of the larger developments and natural areas which span (in parts) across different Planning Sectors.

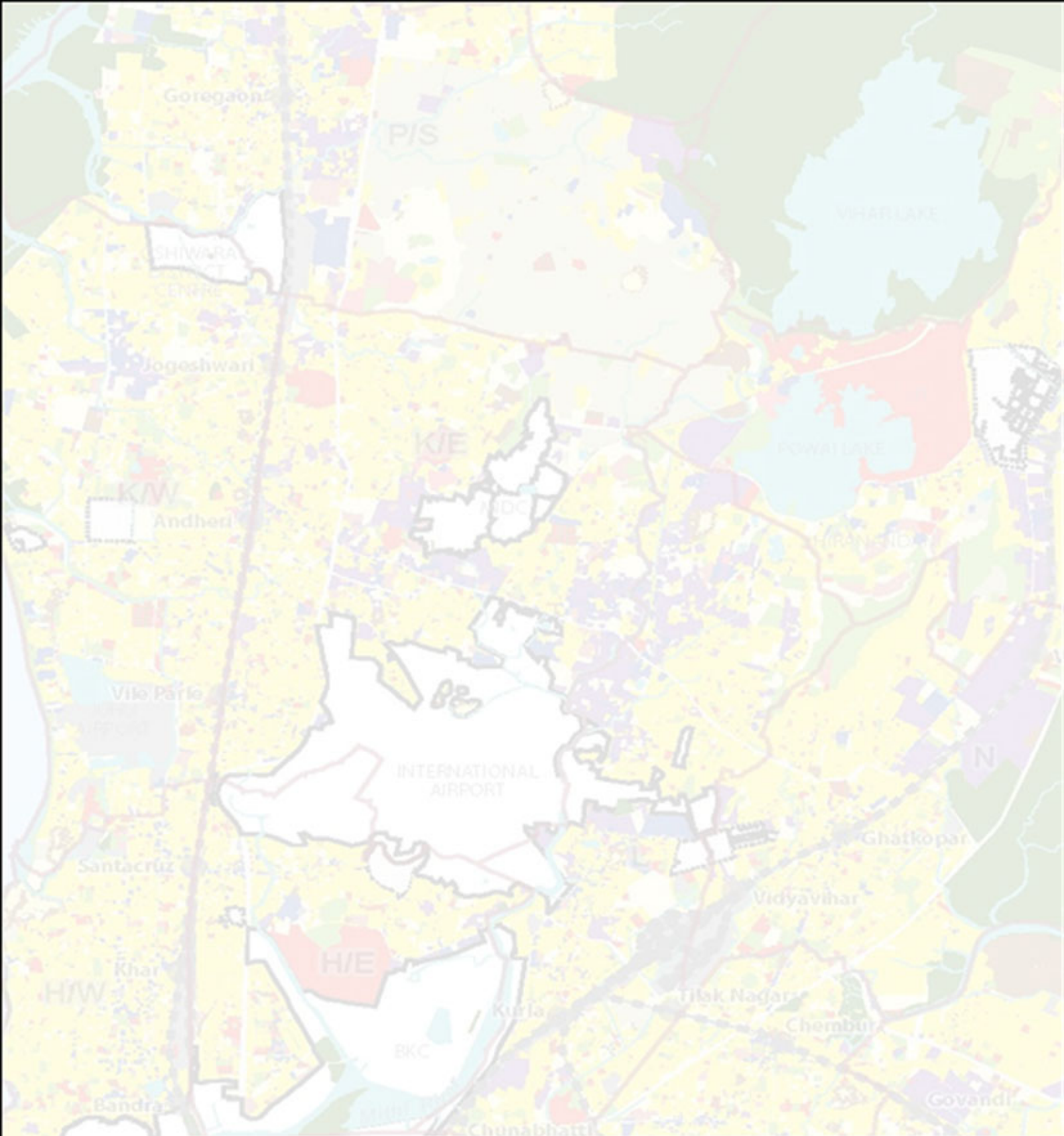
Table 4: Larger Developments and Natural Areas Spanning across Different Planning Sectors

Locality	Area (ha)	Planning Sector
Mumbai University (Kalina)	84	HE 2.05, HE2.04
Indian Institute of Technology	165	S3.01
National Park*	4467	PN, T, RN, RC, RS, PS, S
Aarey Milk Colony	735	PS2.07, S 3.01, KE 2.05
Total	5,451	

* National Park has not been divided into Planning Sector, only wards that it spans across are mentioned.

Map 1: Planning Sectors for Greater Mumbai





Existing Land Use 2012



458.28 sqkm

(100% of total area of GM)

Greater Mumbai Area

43.23 sqkm

(9% of total area of GM)

Area under Special Planning
Authorities (SPA's)

415.05 sqkm

(91% of total area of GM)

Planning Area for DP 2014-34
Greater Mumbai Plan

271.17 sqkm

(65% of Development Plan Area)

Developed Area

103.27

sqkm

(38% of
Developed
Area)

Area under
Residential
Use

12.72

sqkm

(5 % of
Developed Area)

Area under
Commercial
& Office
Use

22.43

sqkm

(8 % of
Developed
Area)

Area under
Industrial
Use

90.66

sqkm

(33 % of
Developed
Area)

Area under
Amenities,
Transport &
Utilities

42.09

sqkm

(16 % of
Developed
Area)

Area under
Other Uses

4. Existing Land Use

The total area under Greater Mumbai admeasures 458.28 sqkm. There are several pockets of mangroves, outside the MCGM limits, the area of which changes with the tide levels. These are not considered to be included in the MCGM boundary⁸ (see Map 2). Of the 458.28 sqkm, 43.23 sqkm is area under Special Planning Authorities. The jurisdiction of the MCGM as a Planning Authority comprises 415.05 sqkm and forms the area for which the Development Plan for Greater Mumbai 2014 – 2034 is being prepared.

4.1 Existing Land Use Distribution

The Existing Land Use distribution for Greater Mumbai reveals that only 65.34% (271.17 sqkm) of the Planning Area of Greater Mumbai is developed. While Natural Areas, Vacant Lands, Plantations & Salt Pans constitute the remaining 34.66%. Of this Developed Area, 24.88% is occupied by Residential uses, 5.40% by Industrial uses, 2.20% by Commercial uses & 0.87% by Offices.

Amenities (Education, Medical, and Social Amenities) constitute 3.69%, Open Space 3.70% and Public Utilities & facilities 1.67%. Transport and Communication facilities constitute 12.79%. Together 21.85% of the developed area is under Amenities, Open Space, Public Utilities and Transport.

⁸ These areas also do not form a part of the per capita open space computation, which will be discussed in the subsequent chapters.

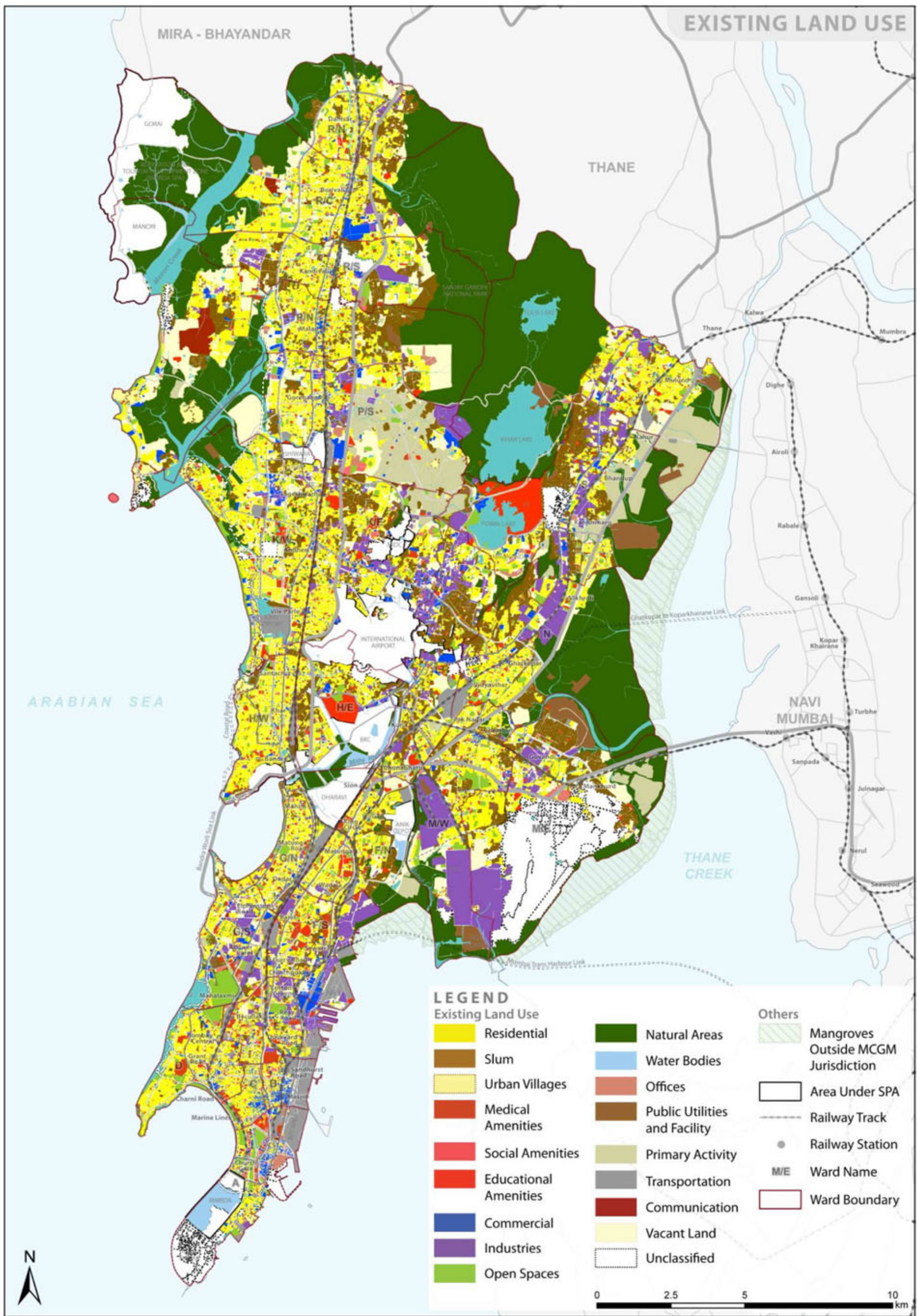
Table 5: Existing Land Use Distribution for Greater Mumbai 2012

Existing Land Use Categories (2012)	Greater Mumbai			
	Area (ha)	% of Total Area	Per Capita Area (sqm)	% of Developed Area
Residential	10,327.09	24.88	8.30	38.08
Commercial	911.46	2.20	0.73	3.36
Offices	360.96	0.87	0.29	1.33
Industrial	2,242.88	5.40	1.80	8.27
Open Spaces	1,537.78	3.70	1.24	5.67
Education Amenities	853.81	2.06	0.69	3.15
Medical Amenities	318.44	0.77	0.26	1.17
Social Amenities	355.81	0.86	0.29	1.31
Public Utilities and Facilities	693.43	1.67	0.56	2.56
Transport and Communication Facilities	5,306.92	12.79	4.27	19.57
Urban Villages	318.42	0.77	0.26	1.17
Primary Activity (P1, P3, P4, P5, P6, P7)	939.22	2.26	0.75	3.46
Unclassified	1,829.77	4.41	1.47	6.75
Vacant Land (only under Construction)	1,121.97	2.70	0.90	4.14
DEVELOPED AREA	27,117.95	65.34	21.79	100.00
Natural Areas	11,303.82	27.23	9.08	
Vacant Land (excluding under construction)	2,282.82	5.50	1.83	
Primary Activity (P2, P8)	801.11	1.93	0.64	
UNDEVELOPED AREA	14,387.75	34.66	11.56	
TOTAL PLANNING AREA	41,505.71	100.00	33.36	
Area under Special Planning Authority	4,322.79	9.43		
TOTAL MCGM AREA	45,828.49			

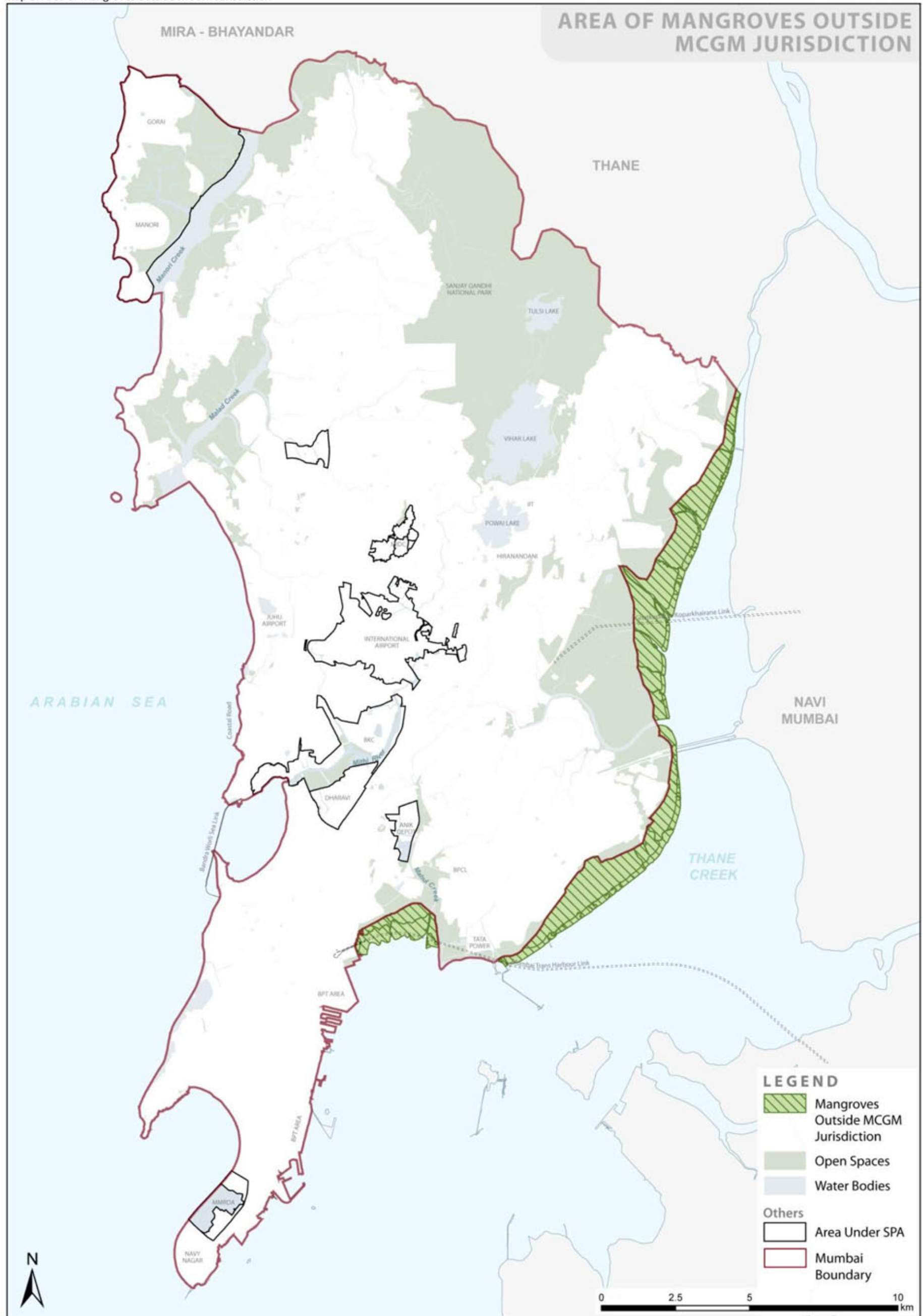
Source: ELU 2012

Note: Primary activities under the Developed Areas include – P1 (Fishing / Drying Yard), P3 (Dairy), P4 (Buffalo Stables), P5 (Cattle Pounds), P6 (Quarry), and, P7 (Dhoby Ghat). Primary activities under the Undeveloped Areas include – P2 (Plantation), and, P8 (Salt Pan Lands).

Map 2: Existing Land Use Map for Greater Mumbai



Map 3: Area of Mangroves outside MCGM Jurisdiction



Source: State Remote Sensing Agency, Nagpur

4.2 Proposals of DP 1991 and Existing Land Use 2012

A comparison of the ELU 2012 and the DP 1991 revealed that while many reservations of the DP 1991 have been realized, the manner in which they have manifested on the ground varies from the original intent. Greater Mumbai is also experiencing several new transformative development trends.

The salient features of DP 1991 were:

- a) Encouraging polycentric growth and de-densification of inner city areas;
- b) Creating 2 district centres and 2 commercial centres in the Suburbs;
- c) Encouraging corridor development along the main railway networks within 1.5 km of the railway lines;
- d) De-zoning of 800 ha of industrial land in keeping with the recommendations of Regional Plan, 1973;
- e) Enhancing transport networks – new arterials (East Island Freeway and West Island Freeway) along with E-W connectors;
- f) Creating four main zones – Residential, Commercial, Industrial and No Development Zone with several reservations for amenities;
- g) Introducing uniform FSI at 1.33 in the Island City and 1.0 in the Suburbs.

The current development patterns observed in the four distinctive Land Use Zones of DP 1991 as per ELU 2012 are detailed below:

4.2.1 Residential Zone

The northernmost Suburbs are more residential while the Island City has a comparatively smaller residential land allocation. Formal and informal markets co-exist and are concentrated especially around railway stations.

The ELU 2012 for Western Suburbs of Malad and Dahisar (wards P/N, R/N respectively) and in the Eastern Suburbs of Mulund, Ghatkopar and Chembur-Govandi (T, N and M wards respectively) indicates that these are predominantly residential in use. Industrial uses in these Wards have transformed into high income residential cum retail and entertainment hubs. In the Western Suburbs, the residential development is hemmed in by Natural Areas, and seems wedged in by the sea and the coastal zone on the west and the National Park on the east. In the Eastern Suburb of Govandi (M/E ward), there has been a significant introduction of slum resettlement projects.

As explained earlier, the ELU 2012 incorporates several sub categories for Residential uses, viz., single family dwelling, and multifamily apartments, chawls, Govt. Housing and slums. Of these, the Multi Family Apartments display predominance in occupancy of land in Greater Mumbai, followed by the slums. The ELU 2012 shows significant slum settlements in Malad, Kandivli, Andheri (E) and Bandra -Khar -Santacruz (E) (wards P/N, R/S, K/E, H/E respectively) in the Western Suburbs and in all the Eastern Suburbs – Kurla, Chembur, Govandi, Ghatkopar and Bhandup (Wards L, M/E, M/W, N and S with the exception of Mulund, the T ward). Chawls predominantly occupy the Island City. Urban Villages comprising Gaothans and Koliwadass, that are mainly Residential Areas, constitute 0.77% of the developed Area.

4.2.2 Commercial Zone

The spatial structure for Commercial Land Use reflects the growth strategy of the Regional Plan 1973 and the DP 1991 of promoting polycentric development. While Nariman Point-Fort, Worli and Bandra Kurla Complex are established centralities for Commercial-Office use, the cluster formed by Prabhadevi - Lower Parel, SEEPZ -Andheri –and Powai are also emerging as strong office areas with a mix of Residential uses. LBS Marg – Ghatkopar - Vikhroli areas are other emerging Commercial Areas. New office and commercial centres have developed (some in SPAs) in Bandra (E), Andheri (E), Lower Parel, Malad and Powai-Kanjurmarg-Bhandup (Wards H/E, K/E, G/S, P/N, S respectively). Large retail and entertainment hubs have also emerged in Andheri (W), Malad, Kurla, Ghatkopar (Wards K/W, P/N, L, N respectively). The mill areas around Parel (in Wards G/S, F/S) reflect a mix of office-commercial use forming a significant node. Areas originally defined as commercial land use in DP 1991 infact display a mixed land use context.

4.2.3 Industrial Zone

There is an increase of service sector activities in Greater Mumbai with a corresponding decrease in manufacturing and industry. This is due to market forces responding to taxes, labour laws, real estate prices, technological obsolescence and high costs of operating in Mumbai as compared to other locations. However, Industrial Land Use in Greater Mumbai has not transformed in significant quantum to non-industrial use. Industrial properties abutting major roads have transformed into commercial uses while inner streets persist in industrial activity. The Commercial use along the major roads may serve as catalysts to spawn Land Use change towards the interior. Supported by existing Suburban Rail linkages (Western and Central lines), proposed metro and mono rail alignments and road networks that link areas along the East-West alignment, these mixed use centres are posited to consolidate this character thereby permitting increased economy and freedom of location for commercial and residential use.

Transformation of Mill lands and industrial uses into retail and entertainment is observed in the Island City in Lower Parel, (Wards G/S, F/S, E) and in the Suburbs, along LBS Marg in Kurla, Ghatkopar, Powai, Mulund (Wards L, N, S, T) SV Road and Oshiwara Link Road. Conversion of Industrial Areas into commercial-office areas is very visible in case of Textile Mills or along Andheri Kurla Road. However quantitatively, transformations of Industrial Areas to non Industrial Areas do not appear to be substantial as observed from the ELU 2012.

4.2.4 No Development Zone

This Zone includes Natural Areas, which are ecologically sensitive, such as forests, mangrove forests, water bodies, etc). It also includes Natural areas, which are not necessarily ecologically sensitive, such as plantations and saltpans. Besides the natural areas, NDZ also includes areas where low density/low FSI development was permissible.

- **Natural Areas and Open Space**

The ELU 2012 shows the presence of 27.87% of Natural Areas, which include the protected forests and water bodies. These include the Sanjay Gandhi National Park, mangrove forests, mud flats and creeks. Almost all of this natural area is equally distributed between the Eastern and Western Suburbs. Only about 1% of the natural area is located in the Island City.

Other current uses as per the ELU 2012 (included within NDZ in DP 1991) include Primary Activities such as Plantations and Salt Pan Lands.



4.3 A Context of Mixed Land Use: Existing Land Use 2012

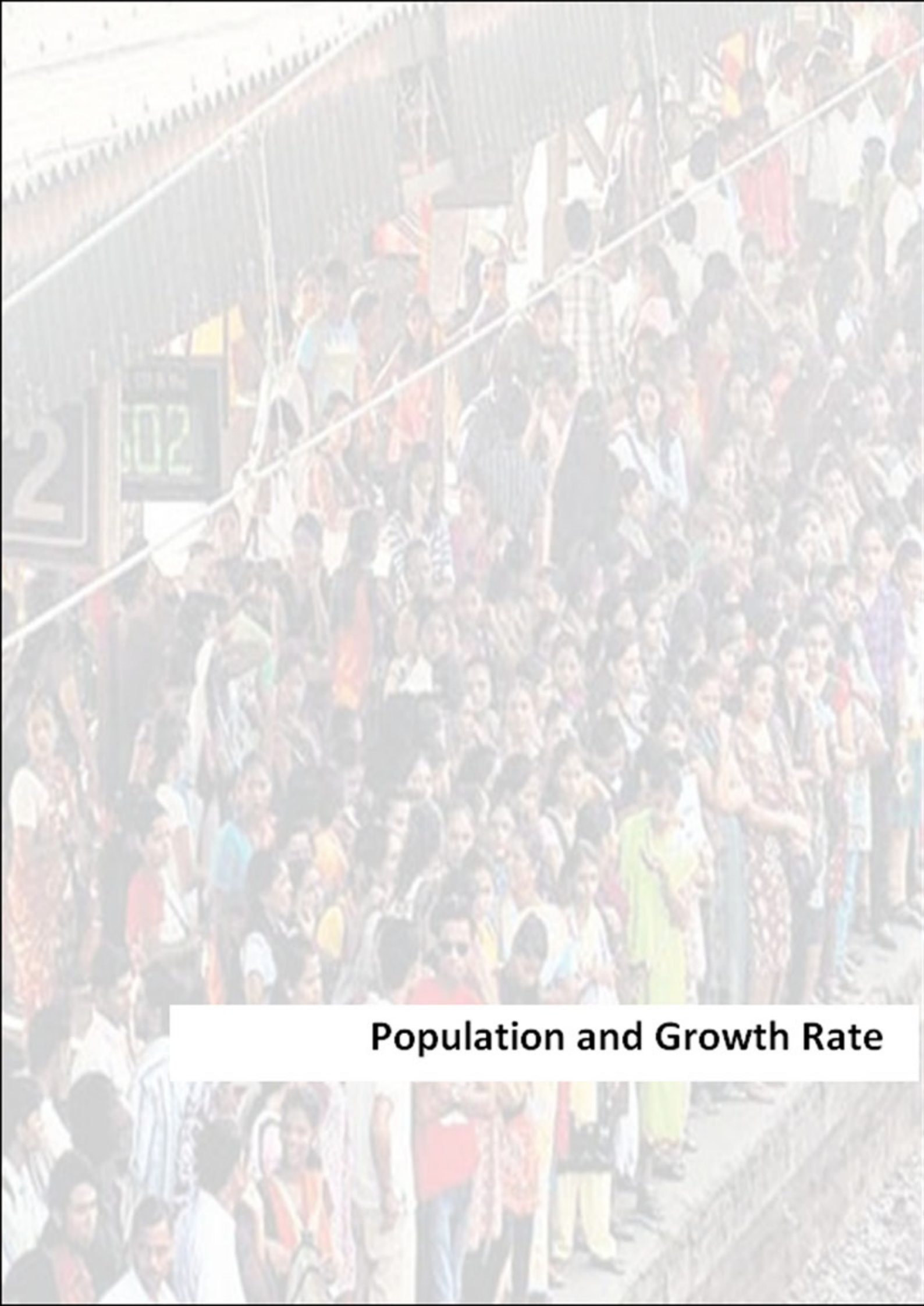
The current distribution of land uses as per the Existing Land Use 2012 indicates the following development patterns. Some of these are in accordance with proposals of DP 1991, while some others have not yet been actualised. New emerging patterns are also noticed.

- Of the total Development Plan Area (415.05 sqkm), 271.17 sqkm is developed area, accounting for about 65% of the total area;
- A more pronounced polycentric pattern has developed with multiple nuclei (several of these are now areas under SPAs and function as employment nodes compared to the erstwhile single CBD in South Mumbai);
- The Oshiwara District Centre has not acquired the intended status of a District Centre although MMRDA was appointed as the SPA. The other district centre, viz., Kanjurmarg District Centre in the Eastern Suburbs has not taken off at all;
- Development continues to be structured as corridors, largely along the railway lines. However, in the Western Suburbs, in Wards K/W, K/E, P/N, R/C, R/S, areas abutting railway corridors have developed into new mixed use centres, particularly areas in proximity to railway stations and around new commercial centres;
- Some of the major proposed transport networks have been realized. The Worli Sea-Link, the Jogeshwari-Vikhroli Link Road have been executed. Others such as the Santacruz- Chembur link and the Eastern Freeway are underway. Yet others, such as segments of the Western Freeway, are still pending approvals;
- Greater Mumbai appears to be in a transformative phase of 'redevelopment'. Areas around Lower Parel-Elphinstone Road have emerged as places with a new office concentration through redevelopment of erstwhile Textile Mills. Industrial Areas are transforming to residential and Commercial Areas (owing to the amendments to the Rule 58 of the DCR DP 1991 and the Industrial Location Policy). Andheri Kurla Road has emerged as a concentration of IT, ITES activities through transformation of Industrial Areas;
- Older Residential Areas are being more intensely redeveloped as mixed use areas;
- Greater Mumbai predominantly comprises a mixed land use, including residential, commercial office uses. Commercial and Office Land Use centralities are primarily located along road infrastructure and in proximity to existing transit stations. Several areas presently occupied by Industrial Land Use, areas occupied by old dilapidated structures in Cessed Areas and large slums demonstrate a potential for transformation.

Summary

- The Existing Land Use Map of Greater Mumbai predominantly shows a mixed land use, including residential, commercial office uses. Despite the intention of the DP 1991 to have segregated predominantly residential and commercial zones, the existing situation shows a far greater mix of uses.
- Commercial and Office Land Use centralities are primarily located along road infrastructure and in proximity to existing transit stations.
- Several areas presently occupied by Industrial Land Use, areas occupied by old dilapidated structures in Cessed Areas and large slums demonstrate a potential for transformation.
- Of the total Development Plan Area (415.05 sqkm), 271.17 sqkm is developed area, accounting for about 65% of the total area.





Population and Growth Rate

12.44 Million

Population of Greater Mumbai (Including SPA's)

20.68% **3.87%**

(1991-2001)

(2001-2011)

Decadal Growth Rate

5.14% **-7.57%** **27.9%** **8.29%**

(1991-2001)

(2001-2011)

(1991-2001)

(2001-2011)

Island City

Suburbs

Population Growth Rate in Greater Mumbai

25% Island City **75%** Suburbs

2011

Distribution of Population in Greater Mumbai

4.8 **4.5**

(2001)

(2011)

Household Size

5. Population Growth Dynamics

The population of Greater Mumbai (including the notified areas under SPAs), recorded in 2011 Census is 12.44 million as against the 11.97 million in 2001 indicating a net addition of nearly half a million over one decade. The population of Greater Mumbai has increased from 4.15 million in 1961 to 12.44 million in 2011. However, the decadal growth rate of Greater Mumbai for 2001-2011 is 3.87% which indicates a steep decline from the previous decadal growth rate of 20.68% for 1991-2001.

5.1 Population: Declining Decadal Growth Rate

The population of Greater Mumbai has been continuously growing in absolute numbers; however, the percentage decadal variation shows a steep decline from 43.80% during 1961-71 to 3.87% in 2001-2011.

Table 6: Decadal Population Variation, Greater Mumbai

Census Year	Population	Decadal Variation	Percentage Decadal Variation
1901	927,994	--	--
1911	1,148,757	220,763	23.79
1921	1,380,448	231,691	20.17
1931	1,397,812	17,364	1.26
1941	1,801,356	403,544	28.87
1951	2,994,444	1,193,088	66.23
1961	4,152,056	1,157,612	38.66
1971	5,970,575	1,818,519	43.80
1981	8,243,405	2,272,830	38.07
1991	9,925,891	1,682,486	20.41
2001	11,978,450	2,052,559	20.68
2011	12,442,373	463,923	3.87

Source: Census of India, 2001 and 2011

Graph 1 below, is the representation of the population trend in absolute numbers. The decadal growth rate of Greater Mumbai between 1911 and 2011 was at its peak in the decade 1941 – 1951 at 66.23% and decreased to 20.41% in 1981 – 1991, 20.68% in 1991 – 2001 and 3.87 % in 2001 – 2011.

Further, the population for the Island City and Suburban District indicate that the population of the Island City increased between 1901 and 1981 reaching near stability from 1981 - 2011. The Suburban District, on the other hand, has continually experienced population growth from 1911 - 2011 with the growth being more consistent during post Independence period.

Graph 1: Population and Decadal Growth Rate in Greater Mumbai: 1911 – 2011

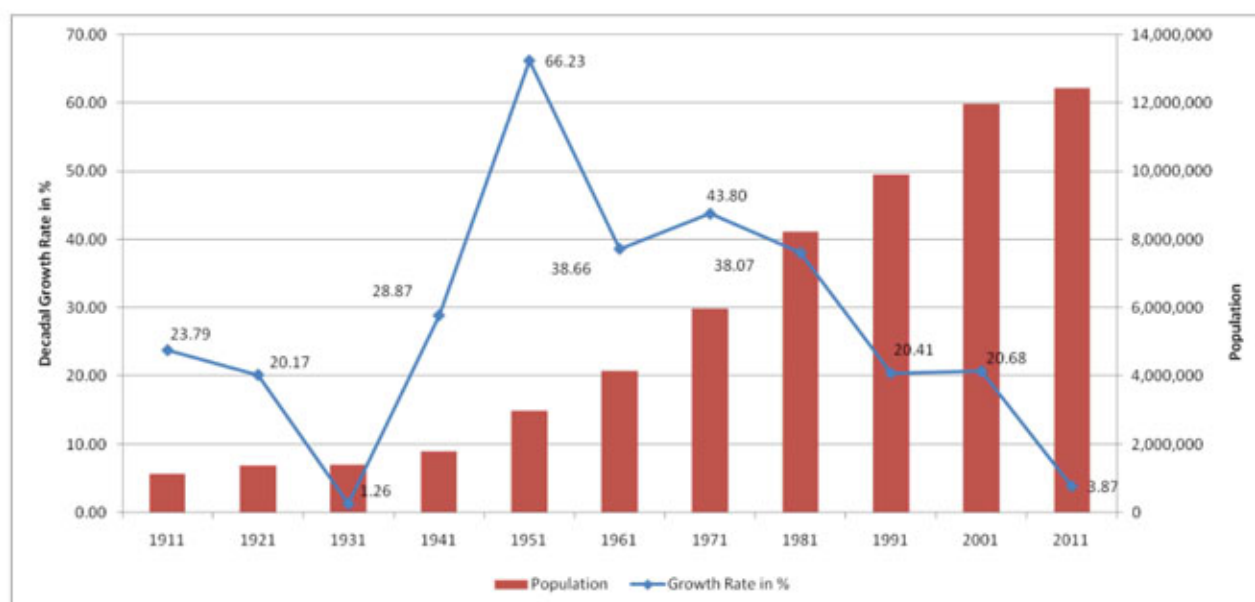


Table 7: Population and Decadal Percentage Variation of Island City: 1961 – 2011

Census Year	Island City	Decadal Variation	% Decadal Variation
1961	2,771,933	442,913	19.02
1971	3,070,378	298,445	10.77
1981	3,285,040	214,662	6.99
1991	3,174,889	-110,151	-3.35
2001	3,338,031	163,142	5.14
2011	30,85,411	-252,620	-7.57

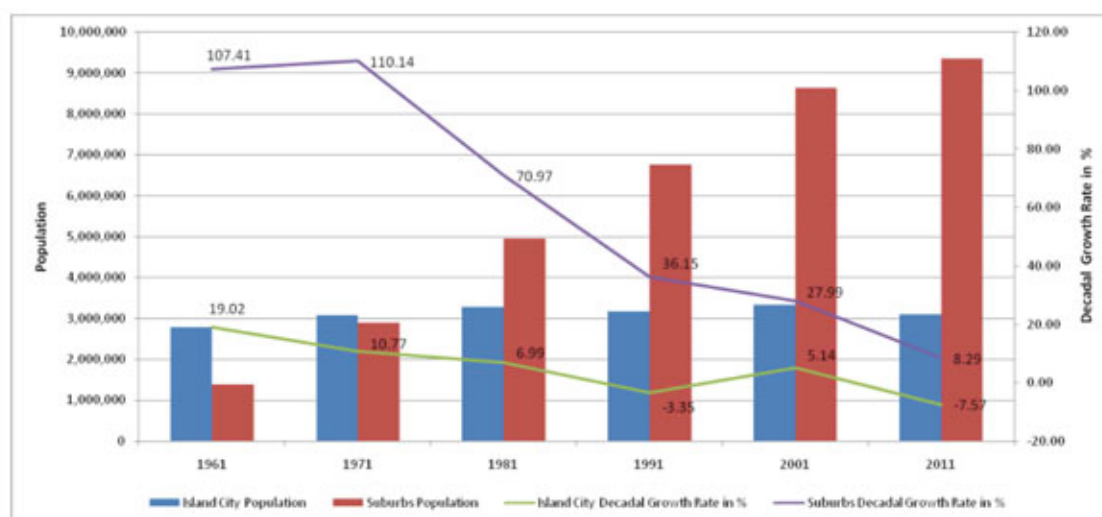
Source: Census of India, 2001 and 2011

Table 8: Population and Decadal Percentage Variation of Suburban District: 1961 – 2011

Census Year	Suburban District	Decadal Variation	% Decadal Variation
1961	1,380,123	714,699	107.41
1971	2,900,197	1,520,074	110.14
1981	4,958,365	2,058,168	70.97
1991	6,751,002	1,792,637	36.15
2001	8,640,419	1,889,417	27.99
2011	9,356,962	716,543	8.29

Source: Census of India, 2001 and 2011

Graph 2: Population and Decadal Growth Rate in Island City and Suburban District 1961 – 2011



The decadal population growth rate for the Suburban District increased between 1951 and 1961 to 107.41 % and between 1961 and 1971 to 110.14 %. Then onwards it experienced a decline until 2001 - 2011 to 8.29 % (see, Graph 2).

The decadal growth rate for Island City shows a continuous decline from 1951-1961 at 19.02% to -7.57% in the years 2001 – 2011 except for the decade 1991-2001 when it increased to 5.14% from -3.35% (see, Graph 2). Thus, currently, the variation in the decadal growth rate reveals that there is a declining trend both in the Island City and the Suburbs.

The trend of distribution of the total population of Greater Mumbai between the Island City and Suburbs reveals that the share of Island City's population with respect to Greater Mumbai's population has been decreasing consistently during the past four Census decades i.e. 1981 to 2011 and is further expected to decline. On the contrary, the share of Eastern and Western Suburbs' population with respect to Greater Mumbai has been steadily increasing.

Table 9: Percentage Share of Population Distribution in Greater Mumbai: 1981 – 2011

Area	% of Population to Total Population			
	1981	1991	2001	2011
Island City	39.85	31.99	27.87	24.79
Suburbs	60.15	68.01	72.13	75.21
Greater Mumbai	100	100	100	100

Source: Census 1981-2011

5.2 Population Distribution in Greater Mumbai

During the last decade, 2001 – 2011, Island City has shown a population decline of 252,620 whereas the Eastern and Western Suburbs have shown an increase of 321,841 and 394,702 respectively. The Ward P/N in the Western Suburbs has the highest population of nearly one million among all 24 wards, holding 7.5% of the total population. Ward B in Island City on the other hand, has the lowest population of 140,633 among all 24 Wards.

Table 10: Ward wise Population of Greater Mumbai in 2001 and 2011

Zones	Wards	Population 2001	Population 2011
ISLAND CITY	A	210,847	185,014
	B	140,633	127,290
	C	202,922	166,161
	D	382,841	346,866
	E	440,335	393,286
	F/N	524,393	529,034
	F/S	396,122	360,972
	G/N	582,007	599,039
	G/S	457,931	377,749
	Total	3,338,031	3,085,411
WESTERN SUBURBS	H/E	580,835	557,239
	H/W	337,391	307,581
	K/E	810,002	823,885
	K/W	700,680	748,688
	P/N	798,775	941,366
	P/S	437,849	463,507
	R/C	513,077	562,162
	R/N	363,827	431,368
	R/S	589,887	691,229
	Total	5,132,323	5,527,025
EASTERN SUBURBS	L	778,218	902,225
	M/E	674,850	807,720
	M/W	414,050	411,893
	N	619,556	622,853
	S	691,227	743,783
	T	330,195	341,463
	Total	3,508,096	3,829,937
Greater Mumbai		11,978,450	12,442,373

Source : Census 2001 – 2011.

5.3 Ward Wise Slum Population

Of the total population within MCGM jurisdiction in 2011, 41.85% live in slums including the notified areas under SPAs. However, slums are not uniformly distributed throughout the city. Slum pockets are generally found along water courses/creeks, on precarious hillsides prone to landslides, on the periphery of forests, in low-lying areas prone to flooding and along railway tracks. Ward wise slum population is given in the Table 13 below.

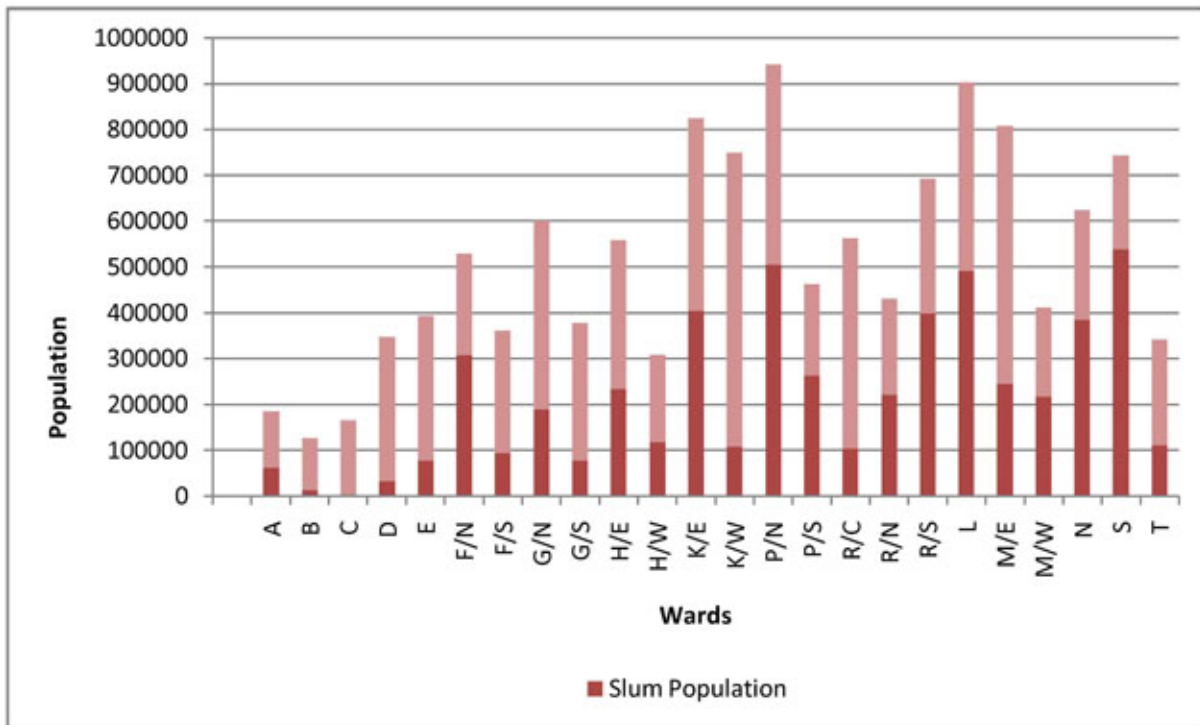
Table 11: Ward wise Slum & Non-Slum Population

	Ward	Census 2011 (including notified areas under SPAs)		
		Slum Population	Slum Population (%)	Total Population
ISLAND CITY	A	63,400	34.27	185,014
	B	14,400	11.31	127,290
	C	-	-	166,161
	D	33,000	9.51	346,866
	E	77,800	19.78	393,286
	F/N	308,400	58.29	529,034
	F/S	95,200	26.37	360,972
	G/N	189,600	31.65	599,039
	G/S	78,300	20.73	377,749
	Total	860,100	27.88	3,085,411
	Ward	Census 2011 (including notified areas under SPAs)		
		Slum Population	Slum Population (%)	Total Population
WESTERN SUBURBS	H/E	234,800	42.14	557,239
	H/W	118,500	38.53	307,581
	K/E	403,800	49.01	823,885
	K/W	108,800	14.53	748,688
	P/N	504,500	53.59	941,366
	P/S	264,000	56.96	463,507
	R/C	104,300	18.55	562,162
	R/N	221,500	51.35	431,368
	R/S	399,200	57.75	691,229
	Total	2,359,400	42.69	5,527,025
	Ward	Census 2011 (including notified areas under SPAs)		
		Slum Population	Slum Population(%)	Total Population
EASTERN SUBURBS	L	490,400	54.35	902,225
	M/E	245,300	30.37	807,720
	M/W	217,200	52.73	411,893
	N	385,600	61.91	622,853
	S	537,900	72.32	743,783
	T	111,800	32.74	341,463
	Total	1,988,200	51.91	3,829,937
Greater Mumbai	5,207,700	41.85	12,442,373	

Provisional Data



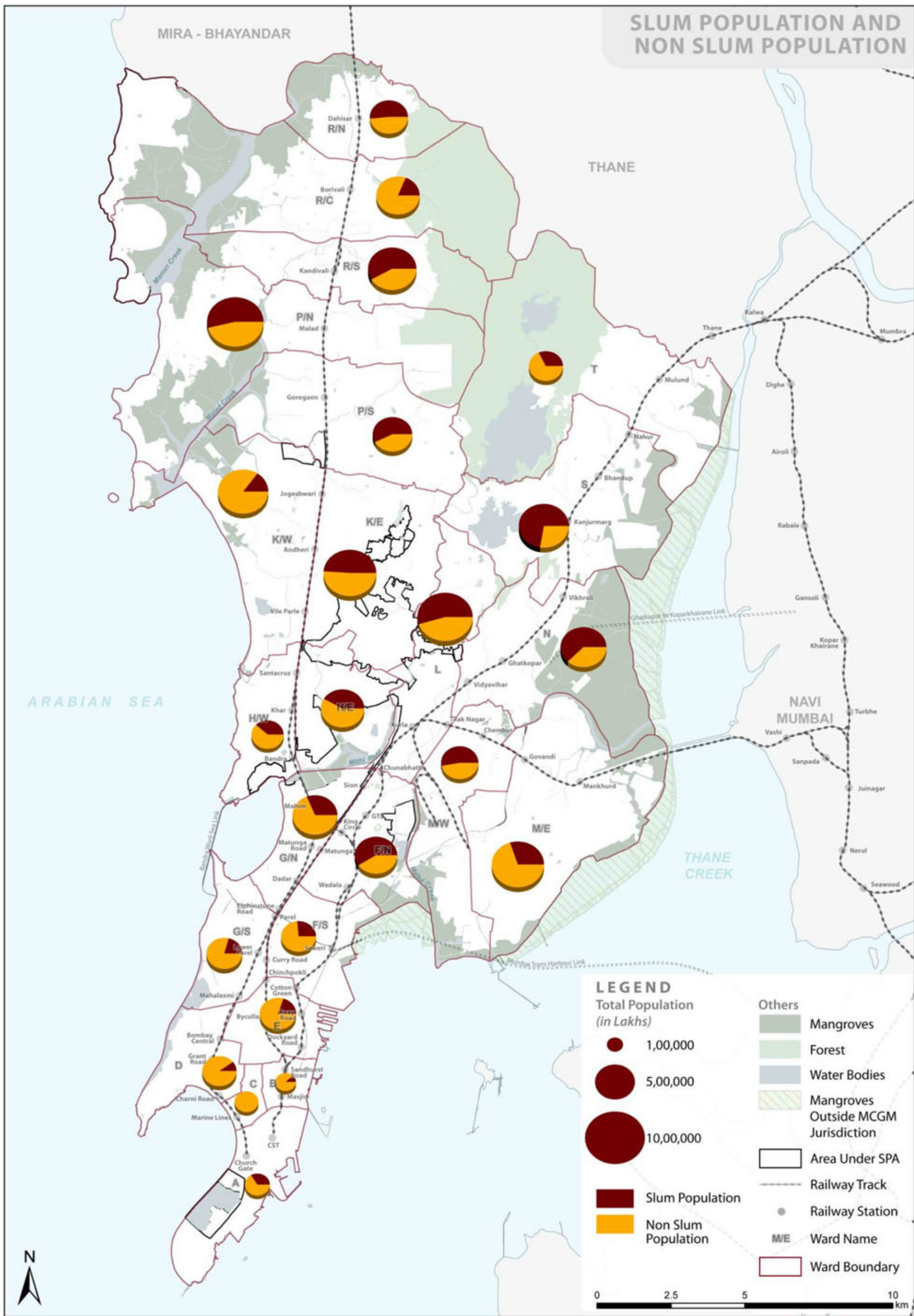
Graph 3: Ward wise Total Population and Slum Population (2011) (excluding Areas under SPAs)



Source: Provisional Data



Map 4: Ward wise Slum and Non Slum Population in Greater Mumbai



The data shows that geographically, there is a clear variation in the distribution of slums in Greater Mumbai. 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. Ward S in the Eastern Suburbs has the highest proportion of slums with 72.32% of its population residing in slums. It also has the highest slum population in numeric terms, 537,900, among all 24 wards.

At the Zonal level, the Eastern Suburbs particularly register a very high share of slum population across its Wards (more than 50%) except for M/E Ward and T Ward. In the Western Suburbs, majority of the slums are concentrated to the east of the Western Express Highway. However, there is a variation across wards ranging from 14.53% in K/W Ward to 57.75 in R/S Ward. The Island City comparatively fares better with a lesser share of slum population in the wards except Ward F/N, which has a slum population greater than 50% of the total Ward population.

5.4 Shrinking Household Size

The average household size in Greater Mumbai has reduced from 4.8 in 2001 to 4.5 in 2011. The average household size in Island City is greater at 4.6 than the Suburban District at 4.4 in 2011, as per Census 2011.

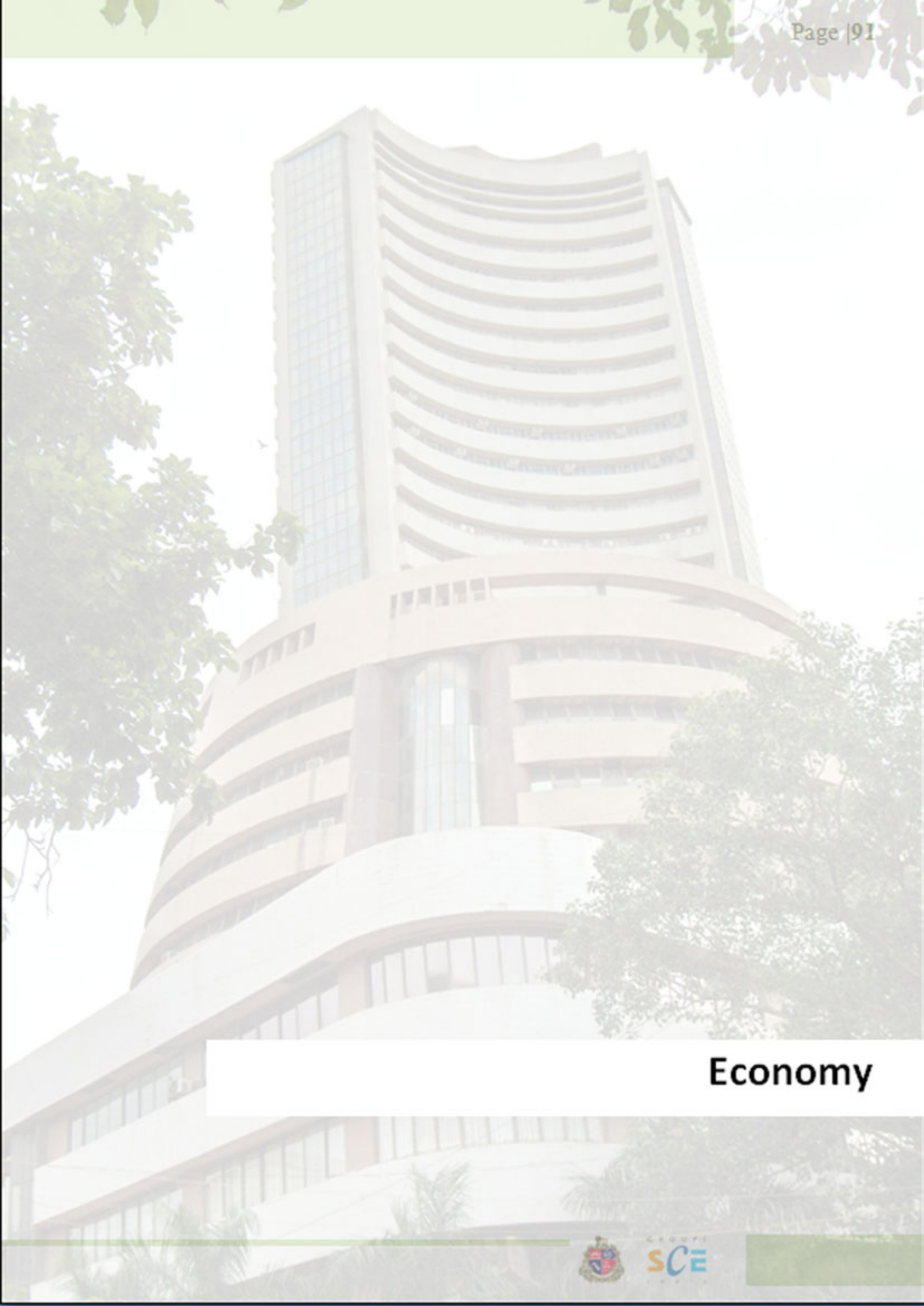
Table 12: Distribution of Number of Households in Greater Mumbai: 2001 - 2011

District / Ward	No. of Households (Census)		Average Household Size	
	2001	2011	2001	2011
Island City	677,163	706,595	4.9	4.6
Total Suburbs	1,838,426	2,130,451	4.7	4.4
Greater Mumbai	2,515,589	2,837,046	4.8	4.4

Source: Census of India, 2001 and 2011

Summary

- Greater Mumbai has experienced declining population growth rate since 1961 (growth rate 1951-61 was 43.80%). The decline in growth rate has been sharp between 1991 and 2011 at 20.68% between 1991-2001 to 3.87% between 2001 and 2011);
- The Island City's share in the population of Greater Mumbai has steadily decreased since 1981. In contrast, the share of population of the Suburbs has increased. Present population distribution for Greater Mumbai between the Suburbs and Island City is 75% and 25% respectively;
- 41.85% of the total population of Greater Mumbai lives in slums. 51.91% of the total population of Greater Mumbai in the Eastern Suburbs resides in slums as compared to 42.69% of the total population of Greater Mumbai, in the Western Suburbs and 27.88% in the Island City;
- Household size indicates a decreasing trend and stands at 4.5 in 2011, 4.6 for Island City and 4.4 for Suburbs;
- DP 2014-34 faces the challenge of addressing the need for housing units considering a growing population, a large slum population and a simultaneous declining household size.



Economy



8%

(Since 2000)

Annual Growth Rate at Constant Prices
Greater Mumbai GDDP

21-24%

(Since 2003-2004)

Greater Mumbai's Share in State GSDP

191%

(Between 2000-2001 & 2008-2009)

Per Capita GDDP
Greater Mumbai

3 Times

Per Capita National Income

9% Population

Household Income >
Rs. 60,000 per month
In 2005 prices

50% Population

Household Income <
Rs. 20,000 per month
In 2005 prices

58 lakhs

(2011)

Employment in Greater Mumbai



6. Economy

This chapter presents the important features and characteristics of the economy of Mumbai. The aim is to understand the important drivers of economic growth, the impact of policies on the structure of the economy and the distribution of the economic product in the city. The context is one of globalization that has brought with it the advantages of easy and rapid networking and sharing of technology together with perils of increasing exclusion and marginalization of local populations.

Greater Mumbai has always been India's economic capital. Mumbai's economy has undergone drastic changes over time. From being a major port in the British era, it was transformed into a manufacturing city, famous for its textile industry albeit, trade and commerce were equally important. Since the late 1980s, several factors such as textile mill strikes, industrial location and decongestion policies contributed to the decline of manufacturing activity. In 1991, India undertook the economic reforms that set the economy on the path towards liberalization, privatization, and globalization. This resulted in a significant restructuring of Mumbai's economy and further boosted the trade and service sectors. The State Industrial Location Policy, 1974 (revised 1991) and the Regional Plan advocated dispersal and decongestion of industrial activities. Besides these changes, the economy has also witnessed increasing informalization and a rise in informal employment.

In the last five years the real growth in Mumbai's economy has shown a remarkable rate of about 9%. The economic performance and characteristics of Mumbai can be discerned from the following indicators:

6.1 Gross District Domestic Product

Since 2000 Mumbai's Gross District Domestic Product (GDDP) has grown at an average of 8% at constant prices while per capita income has grown by 191% in between 2000-2001 and 2008-2009. The per capita NDDP is around Rs. 1,87,418. At constant prices in the year 2008-09, the Gross District Domestic Product of Mumbai is pegged at over Rs. 1,01,103 crores accounting for around 23% of Maharashtra's Gross State Domestic Product. Mumbai has always had a significant share in Maharashtra's Gross State Domestic Product with its proportion in Maharashtra's income, since 2003- 2004, consistently being around 21-24%.

6.2 Sectoral Composition of Mumbai's GDDP

Table 13: GDDP at Current Prices (In Rs. Lakhs)

Sectors	1993-1994	1997-98	2003-04	2009-10*
Primary	36,253	85,898	1,00,038	1,99,562
Secondary	11,24,222	19,46,740	25,42,215	49,05,603
Tertiary	17,14,758	30,97,612	52,54,096	1,44,83,139
Total	28,75,233	51,30,250	78,96,349	1,95,88,304
*Provisional				

Source: Maharashtra Annual Economic Review

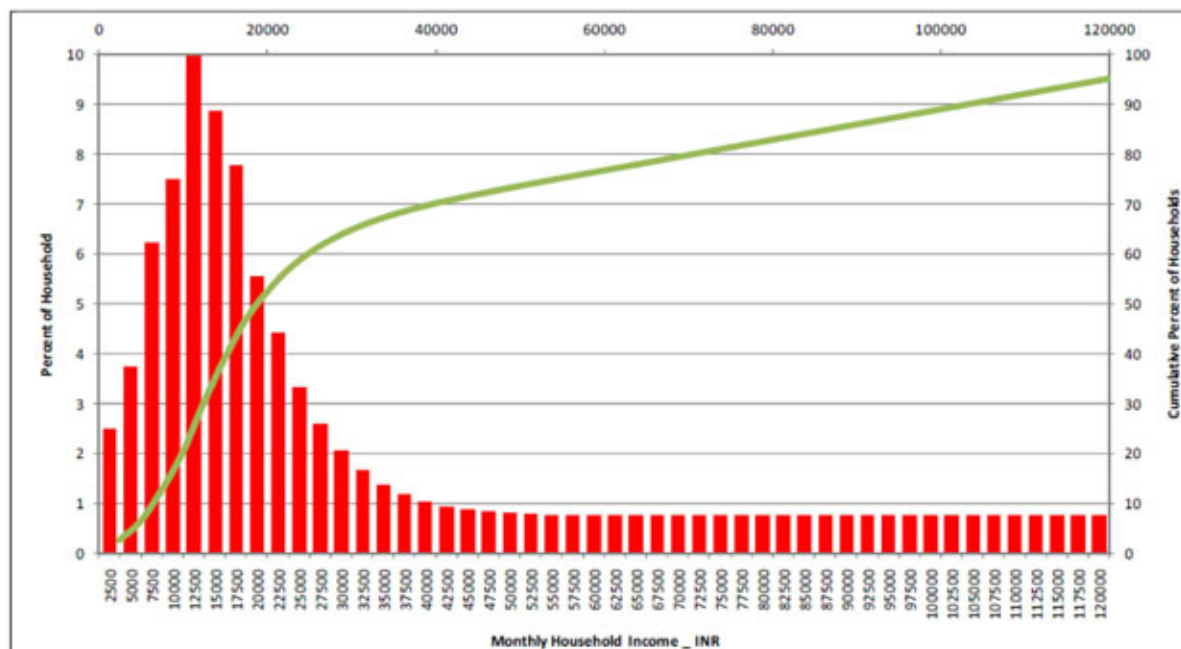


The GDP is composed of incomes from the primary, secondary and tertiary sectors. The primary sector comprises of agriculture and allied activities. The secondary sector has manufacturing and construction industries. The tertiary sector has all the service related activities such as communications, trade, hospitality, banking and finances, among others. The bifurcation in absolute values from 1993 to 2010 is shown in Table 15 above.

The share of primary sector has continued to be minimal over the years. The share of manufacturing in Mumbai's GDP has been falling post 1990. The contribution of tertiary sector on the other hand has been on the rise. The changing composition can be attributed to the different policies that have restricted new manufacturing units from being set up in the City and several local, national, and global factors that have provided impetus to services. This economic restructuring has implications both for the type of employment generated in the City as well as the type of land-use.

Distribution of Households According to Income: Household income is not regularly monitored in the official statistics. Consumption expenditure is covered by the National Sample Surveys but reported data is for the state Urban and not for individual cities. A 2010 study had estimated Greater Mumbai's distribution of households according to monthly household income in 2005 prices.

Graph 4: Household Income Distribution for Greater Mumbai (in 2005 Prices)



Source: 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

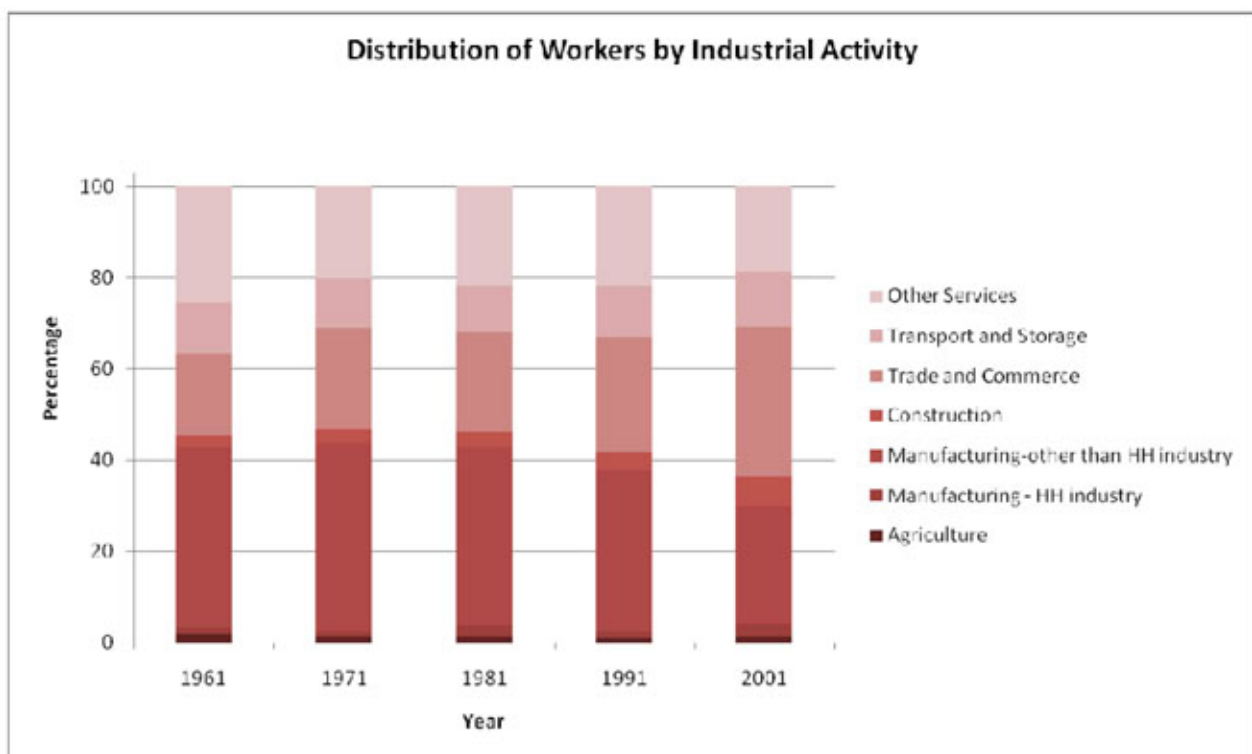
Note: In this Paper, the income distribution in 2007-08 was projected as per 2004-05 prices. National Council of Applied Economic Research (NCAER) furnished mean household annual income and number of household. Estimated, Total Household Income = Household X Mean Income.

According to this estimate 25% of households have a monthly income less than Rs. 12,500 median monthly income is Rs. 20,000 and only 9% of the households have income in excess of Rs. 60,000 per month.

6.3 Employment Characteristics

The employment patterns in Mumbai have witnessed significant restructuring especially since 1990. There has been a rise in service sector employment and a decline in manufacturing employment. The most significant change has been the increasing informalization of the labour force. The structure of production continues to show a deceleration in industrial activity with around 70% being contributed by the services sector. The share of manufacturing in Mumbai's GDDP has been falling post economic liberalisation policies in the early 1990s. Total manufacturing employment, including construction activity fell from 44% to 35% between 1961 and 2001. Total service employment has increased from 55% to 64% in the same period. The contribution of tertiary sector on the other hand has been on the rise. The graph below confirms that manufacturing employment has been falling over the years while that in services is increasing.

Graph 5: Distribution of Workers by Industrial Activity in Greater Mumbai



Source: Census 1961- 2001.

6.3.1 Work Participation

Employment rate of males in Mumbai has been higher in urban India for all years. The total participation rate has been consistent between 35-40% since 1961. The male participation rate fell from 61.73% in 1961 to 57.66% in 1971 and has since then been consistent. The female worker participation has been rising steadily, but, at 16.38% in 2011, is still considerable lower than the male participation rate. The large gap between worker participation rate between male and female is of concern.

Table 14: Worker Participation Rate in Mumbai

Census Year	Work Participation Rate		
	Male	Female	Total
1961	61.73	8.81	40.62
1971	57.66	7.72	36.82
1981*	55.45	8.97	35.21
	[0.59]	[0.41]	[0.51]
1991*	55.08	11.02	35.25
	[0.76]	[0.52]	[0.65]
2001*	56.87	13.06	37.27
	[2.59]	[1.32]	[2.02]
2011*	56.38	16.38	37.98
	[2.65]	[2.02]	[2.36]

*Main and marginal workers, figures in brackets show marginal workers to total population.

Source: Census of India 1961-2011

Note: Main workers are those workers who had worked for the major part of the reference period of one year (i.e. 6 months or more). Marginal workers are those workers who had not worked for the major part of the reference period of one year (i.e. 6 months or more).

Employment data from the Census 2011 indicates that there are 50,19,419 total workers in Greater Mumbai. Of this, the Island City has a total of 1,284,396 workers and the Mumbai Suburban District have a total of 3,735,021 workers. However, Census records employment at place of residence rather than the place of work. Therefore, in the absence of other data, The Comprehensive Transportation Study for Mumbai Metropolitan Region, July 2008 has been considered as a valid source for existing employment by place of work. The CTS 2008 estimates the total number of employees in Greater Mumbai for 2011 at 58,14,000 . For ward wise details, see Table 15.

Table 15: Ward wise Estimated Number of Employees by Place of Work (in Thousands)

Ward	No of Employees 2011
A	694
B	117
C	156
D	190
E	221
F/N	137
F/S	179
G/N	252
G/S	308
H/E	216
H/W	164
K/E	444
K/W	293
L	251
M/E	200
M/W	173
N	233
P/N	295
P/S	313
R/N	91
R/C	244
R/S	265
S	275
T	102
Greater Mumbai	5,814

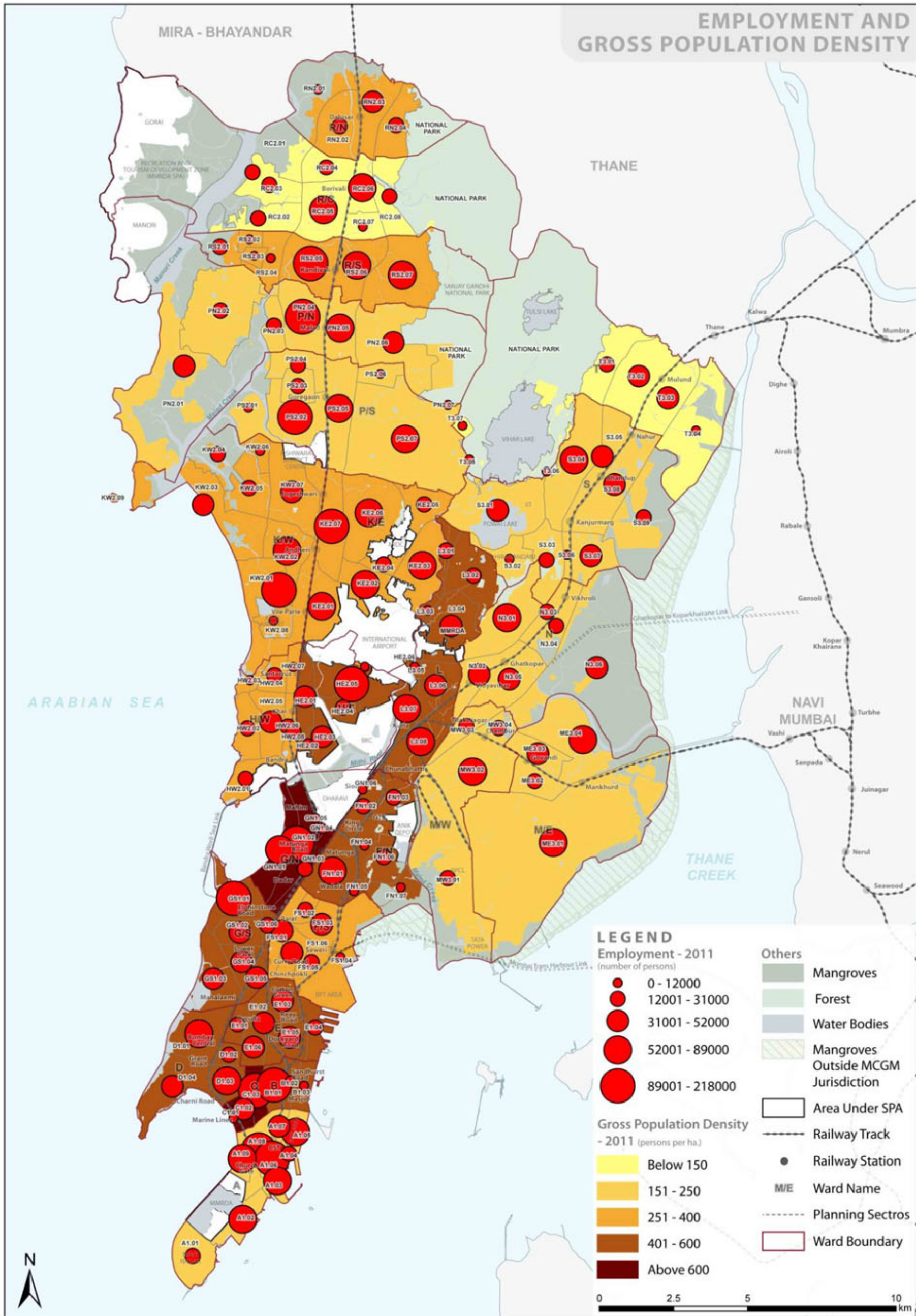
Source: The Comprehensive Transportation Study for Mumbai Metropolitan Region, July 2008

Greater Mumbai serves as the core city of the MMR with 63.79% of all the jobs in the Region. Further, 24.73% of all the jobs in the MMR are located in the Island City. As per the CTS, majority of the population walks to work and as many as 50% of all trips are by walk. Majority of the slum dwellers who constitute 41.85% of the population seek employment close to where they live. Employment in the informal sector (wage labour, hawkers) is reported to be growing at a faster rate than the formal sector⁹. Studies indicate there are about 2, 00,000¹⁰hawkers in Greater Mumbai.

⁹ S Parsuraman, Uncovering the Myth of Urban Development, November 2007, Conference proceedings of 'Urban India: Understanding the Maximum City'

¹⁰Sharit K. Bhowmik, Hawkers and The Urban Informal Sector: A Study Of Street Vending In Seven Cities, National Alliance of Street Vendors of India (NASVI), 2001

Map 5: Employment and Gross Population Density at Planning Sector level in Greater Mumbai



Source: (for employment) The Comprehensive Transportation Study for Mumbai Metropolitan Region, July 2008

6.4 Real Estate Prices and Household Income

Mumbai's real estate is one of the most expensive in the world. The real estate market through demand and supply factors is considerably influenced by regulatory regimes and financial markets. It is prone to intense speculative activity particularly when supply is constrained by regulations. Speculative activities, supply side constraints coupled with a strong interest group of real estate developers and builders have contributed to soaring real estate prices.

Residential property prices show clear geographical preference in Greater Mumbai with areas of the South and Western coast being considerably higher than areas in the East and North. Areas along the Western coastal edge experience highest residential property prices. Accessibility to transport is another significant determinant of real estate prices with areas in proximity to railway stations and along major road networks also experiencing higher residential land price than the surrounding areas.

The median household income is only Rs. 20,000¹¹ per month, while the lowest price for even a single bedroom public housing unit starts from Rs. 14,00,000 onwards. 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.

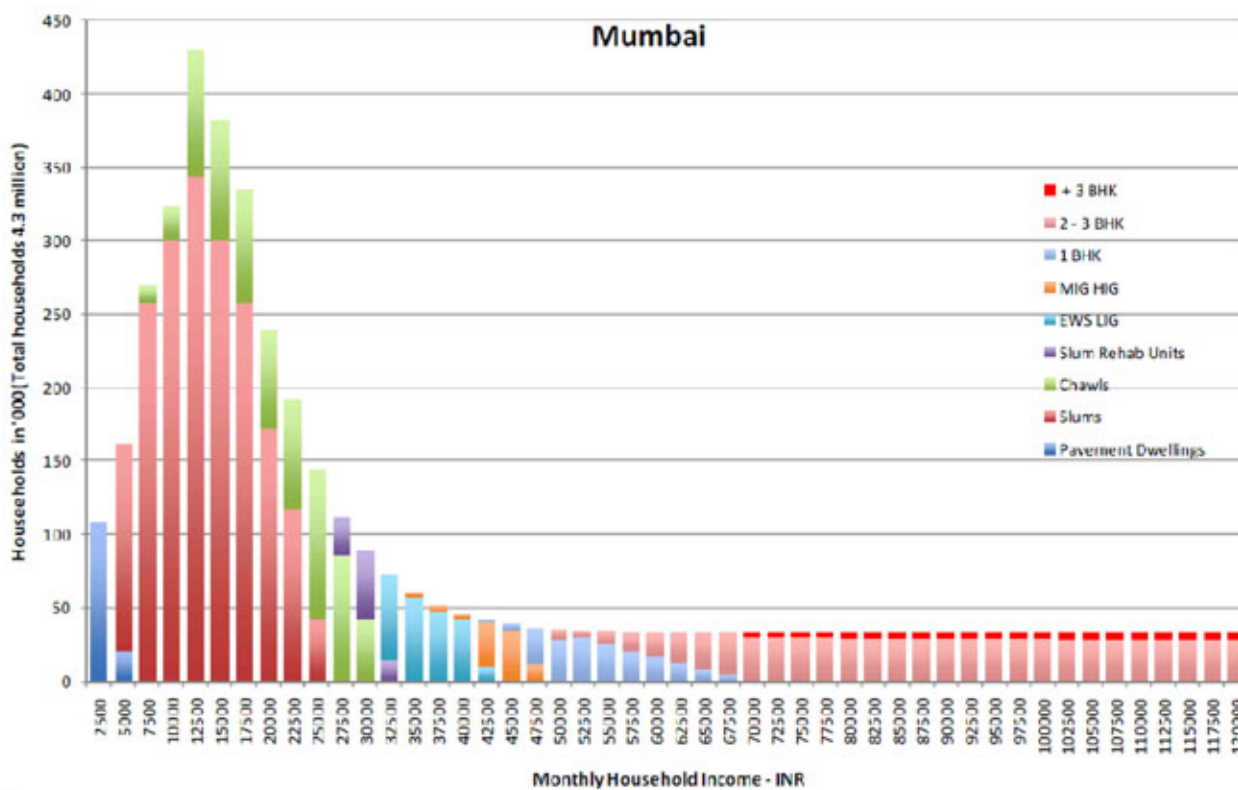
Table 16: Housing Stock for Greater Mumbai

Sr. No.	House type	Price range INR	%of Stock	Nature of Stock
1	Pavement Dwellers	3,00,000 – 23,50,0000	3	Informal
2	Slums		45	Informal
3	Chawls	20,00,000 – 40,00,000	15	Formal, but non compliant with present standards
4	Slum Rehabilitation		2	Formal initially free to slum dwellers
5	EWS LIG		5	Public Housing
6	MIG HIG	10,20,000 – 85,00,000	2	Public Housing
7	1 BHK Apartments		28	Formal
8	2 – 3 BHK Apartments			Formal
9	+ 3 BHK Apartments	Formal		
	Total		100	

Source: 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.

¹¹Working 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.

Graph 6: Household Income by Housing Type



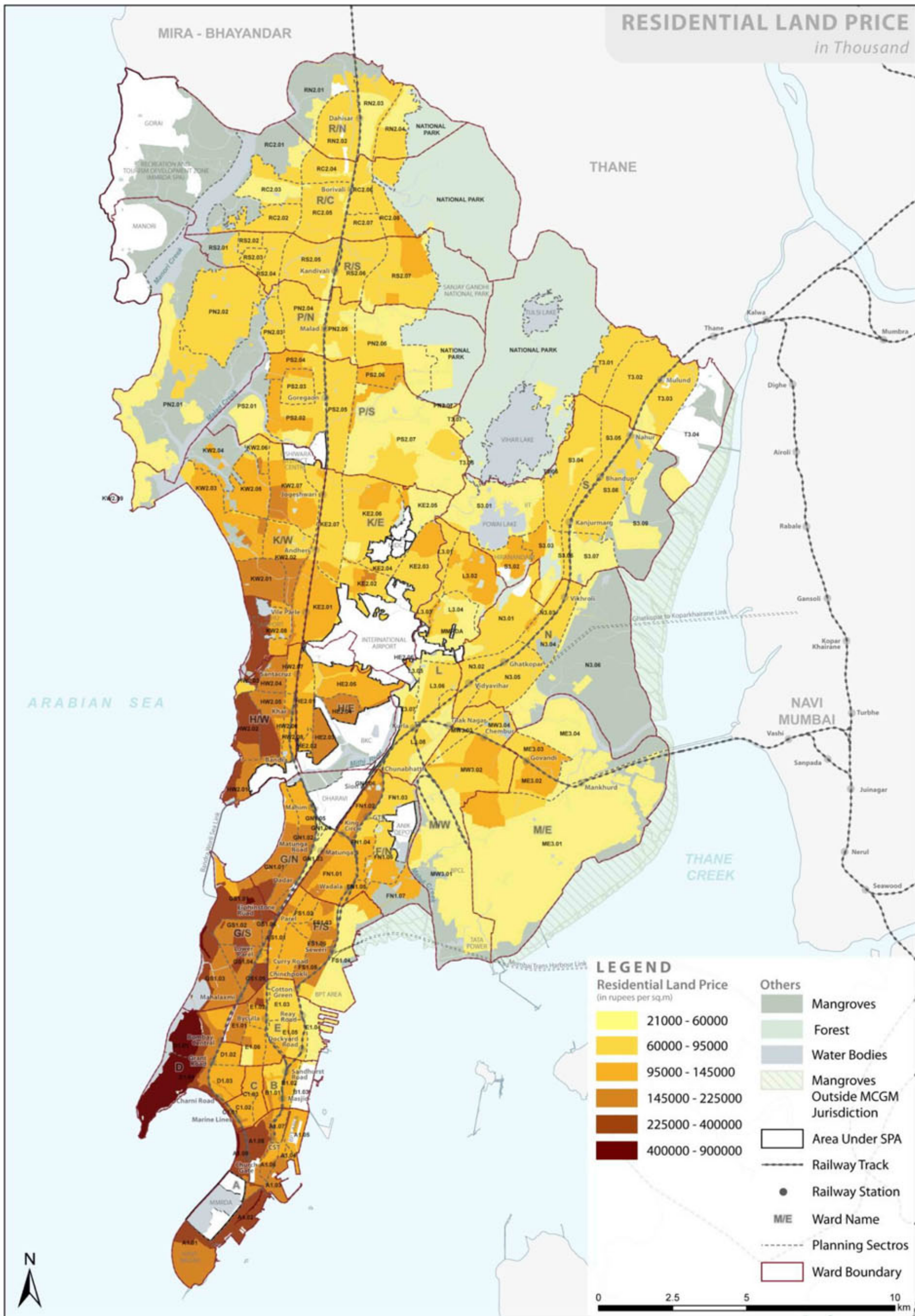
Source: Working with the Market - Approach to Reducing Urban Slums in India, WB Policy Research Working Paper 5475, Patricia Clarke Annez, Alain Bertaud, Bimal Patel, V. K. Phatak

The graph above illustrates the housing market equilibrium in Mumbai. Using house price indications, affordability estimates based on the income distribution data, and based on estimates of the stock of various types of housing, the distribution of income classes into various types of accommodation is demonstrated. It is to be noted that high proportion of the middle class and entire poor populations are living in substandard housing because of the high price of land and the highly inadequate supply of housing.

The city wide mapping of the Ready Reckoner rates (refer Map 6) reveals that the real estate prices are the highest along the western coast in the Island City and parts of the Western Suburbs, and begin to lower as one moves northeast in the City. The rates are also lower along the south-western periphery of the National Park and around Chembur and Trombay.



Map 6: Residential Land Price in Greater Mumbai



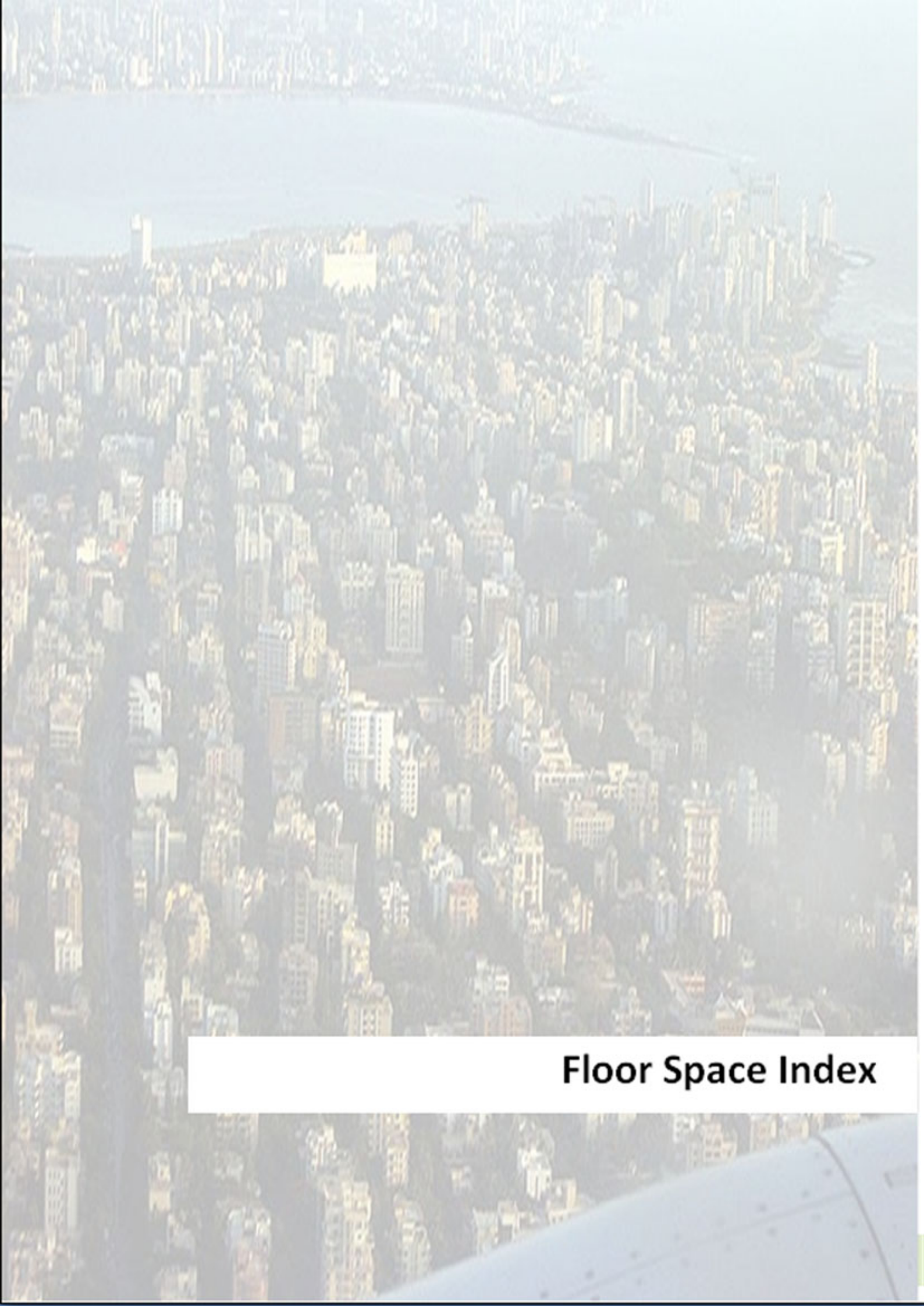
Summary:**Economy**

- Greater Mumbai's economy has undergone transformation from manufacturing activity to tertiary activity. Also, the employment in the service sector has increased and that in the manufacturing sector has decreased;
- Greater Mumbai's economy has grown at a remarkable rate of 9%. On the other hand the per capita income in Greater Mumbai has increased by 191% between 2000 - 2001 and 2008-2009, which is three times the national average;
- The sectoral composition of Greater Mumbai's GDDP shows that while the share of manufacturing sector has been declining post 1990, the share of tertiary sector is growing;
- The total work participation rate has been consistent between 35-40% since 1961. The female worker participation rate has been rising from 8.81% in 1961 to 16.38% in 2011 and the male participation rate has been steady between 55-58%. However, the large gap between male and female worker participation rate is of concern;
- The household income distribution for Greater Mumbai indicates that only 9% of the population earns more than Rs. 60,000 per month and 25% of the households earn less than Rs.12,500 per month. The median household income is Rs. 20,000 per month.

Real Estate

- The median household income is only Rs. 20,000 per month, while the lowest price for even a single bedroom public housing unit starts from Rs. 14,00,000 onwards. 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.





Floor Space Index



0.49 - 3.52

Island City Net Bulk FSI Range

0.07 – 7.35

Suburbs Net Bulk FSI Range

7. Floor Space Index

The physical extent of floor area on a given plot used to be controlled by ground coverage, number of storeys and light angles etc. DP 1967 for the first time introduced the concept of Floor Space Index (FSI) as a more flexible technique of controlling the extent of floor space permitted on a plot. The DP 1967 adopted a pattern of varied FSI. Newly reclaimed areas in Backbay had FSI ranging between 3.5 and 4.5. Areas that had planned layouts such as Colaba, Marine Drive and Ballard Estate had an FSI of 2.45 (which was marginally lower than what was already consumed). Unplanned areas that were already built like Kalbadevi, Mandvi, and Girgaon had a prescribed FSI of 1.66, well below the consumed FSI, with an objective of bringing down the densities over time. Malabar Hill, Worli, Dadar, Wadala got an FSI of 1.33 allowing for some increase in existing floor space. Suburbs were largely assigned FSI of 1.00.

The DP 1991 reduced the FSI of Island City to 1.33 mainly with a view to decongesting the Island City but retained FSI of 1.00 for most of Suburbs. However, DP 1991 and subsequent amendments used Transferable Development Rights (TDR) and incentive FSI as a technique of promoting economic and planning objectives. These are summarised in the Table below:

Table 17: Resultant FSI at Site or Receiving Plot based on objective and incentives

Sr. No.	Objective	Incentive	Resultant FSI at Site or Receiving Plot
1.	Obtain plots for open uses	TDR = Permissible FSI	Receiving plot – 2.00
2.	Obtain built reservation (Accommodation Reservation)	Consumption of permissible FSI + Reservation	Increased FSI on plot
3.	Schools/Hospitals	300% of the permissible FSI	Island City – 5.32 Suburbs – 4.00
4.	Hotels 1 to 3 starred category	Island City - additional 167% Suburbs – additional 200 % + .050 TDR	Island City – 3.00 Suburbs – 3.50
4a.	Hotels 4 starred category	Island City & Suburbs – additional 267%	Island City – 4.00 Suburbs – 3.50
4b.	Hotels 5 starred category	Island City & Suburbs – additional 367%	Island City – 5.00 Suburbs – 3.50
5.	IT/ITES	100% the permissible FSI	2.66-2.00
6.	Slum Rehabilitation	FSI 3.00 in situ	TDR resulting into FSI 2.00 on receiving plots
7.	Renewal of Cessed building	Incentive FSI of 50 to 80% of rehabilitation space	Unlimited FSI
8.	MHADA Redevelopment		2.50 on gross plot area with LIG component, (4.00 proposed)

Source: Development Control Regulations, MCGM

7.1 Definitions of FSI

The basic definition of FSI is given in the Maharashtra Regional and Town Planning Act 1966 (MR&TP Act 1966).

The Maharashtra Regional and Town Planning Act, 1966 (MR&TP 1966), in Chapter I, Section 2 Definitions, under Sub-section (13A), defined that "Floor Space Index" means the quotient or the ratio of the **combined gross floor area** to the total area of the plot, viz.: -

$$\text{Floor Space Index} = \frac{\text{Total covered area of all floors}}{\text{Plot}^{12} \text{ area}}$$

7.1.1 Development Control Regulations for Greater Mumbai 1991 (DCR 1991)

The Development Control Regulations for Greater Mumbai, 1991 (DCR 1991), in PART-I under Section 2 Definitions of Terms and Expressions, defined Floor Space Index (FSI) as:

"Floor space index (FSI)" means the quotient of the ratio of the combined gross floor area of all floors, **excepting areas specifically exempted under these Regulations**, to the total area of the plot, viz: -

$$\text{Floor Space Index (FSI)} = \frac{\text{Total covered area on all floors}}{\text{Plot}^{13} \text{ area}}$$

However, under the DCR of DP 1991 certain areas were exempt from computation of FSI. According to present prescriptions the following areas are exempted (Table 20):

Table 18: List of Architectural Features / Sheltered Areas Excluded from Computation of FSI

Staircases	Electrical sub-station	Mamti (structure on the roof at the head of staircase)
Staircase lobby	Electrical transformer space	Space under elevated overhead tank
Staircase landings	Electrical generator room	Space under lift machine room
Passenger elevator lift duct / shaft / pit	Pump room	Service floor
Car elevator lift duct / shaft / pit	Underground storage tanks (domestic / fire)	Garbage collection room
Service elevator lift duct / shaft / pit	Elevator lift machine room	A.C. Plant room
Stack parking (multiple level mechanized parking)	Mobile transmission tower	Air handling unit
Elevator lift lobby	Mobile transmission tower equipment room	Dry balcony
Elevator lift landing	Fire equipment room	

12 "Plot" means a portion of land held in one ownership and numbered and shown as one plot in a town planning scheme (MRTP Act, 1966).

13 "Plot" means a parcel or piece of land enclosed by definite boundaries (DCR 1991, PART-I under Section 2 Definitions of Terms and Expressions)

Verandah	Fire fighting duct / shaft	Flower bed / plant bed
Balcony upto 10% of floor area	Refuge area / space	Lily pond
Built in cupboard	Creche / Balwadi in SRA scheme	Entrance gateway
Built in storage below window	Gymnasium (if applied by housing society)	Covered car vehicle driveways
Built in storage above window	Car / vehicle parking spaces	Stilt
Void / space accessed under plinth	Basement used for parking, storage and utilities	Storage room
Entrance foyer	Watchman cabin / room	Driver's room
Servant toilet / room	Electric Meter cabin / room	Welfare centre in SRA scheme
Telephone room	Driver's toilet	Fire escape staircase
Generator room / store	Society office	
Fire escape staircase landings	Postal box room	

Source: Development Control Regulations, MCGM

Further, 35% extra floor area is permitted (as fungible FSI) for residential development and 20% for Industrial/Commercial development for the following areas which were earlier exempted.

Table 19: List of Architectural Features / Sheltered Areas Included from Computation of FSI

Covered parking spaces	Area of fire escape	Servants Toilet, other than at staircase mid-landing level, Stilt level, parking level
Part / Pocket / Intermediate covered terraces	Balconies	Air condition plant room / Air handling unit room, meter room, D.G. set room except provided in basement
Fire check floor / service floor of height exceeding 1.8 m	Ornamental projection	Niches below window sill
Area of one public telephone booth and one telephone exchange (PBX) room	Covered areas required on top terrace for utilities in excess of 20 sqm	Room for installation of telephone concentrators
Letter box room	Driver's room / sanitary block on podium and or parking floor	Parking floor in excess of required parking
Deck parking inclusive of Car lifts and passages there to on habitable floors		Covered swimming pool

Source: Development Control Regulations, MCGM

Since the built form displays a varied incorporation of these architectural features, included and excluded from computation of FSI consumption, it was considered essential to map the total existing FSI consumed, at the block level in Greater Mumbai.

7.2 Assessing Existing Consumption of FSI

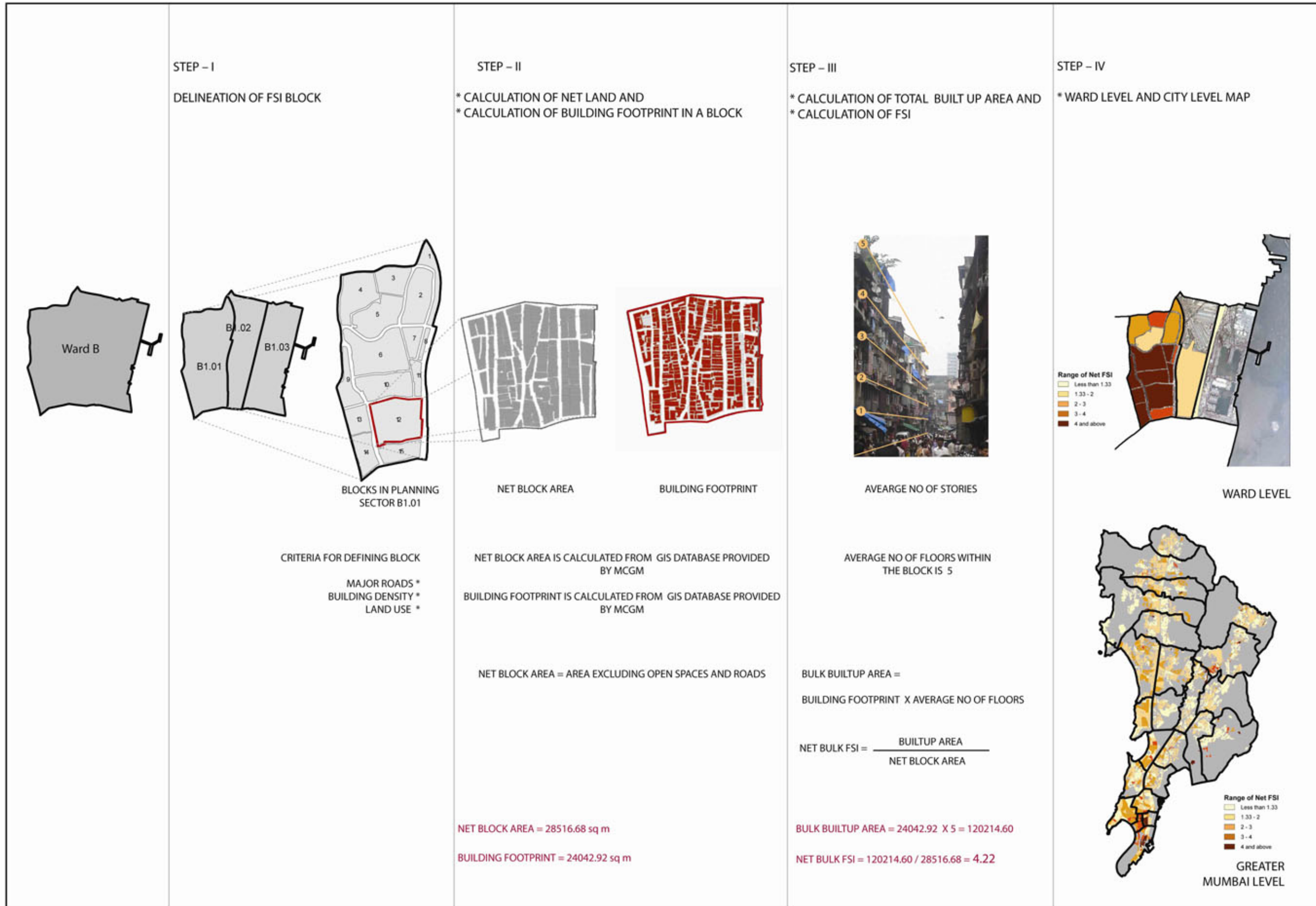
For arriving at the proposed FSI pattern for DP 2014-34, it is first necessary to assess the existing pattern of consumption of FSI. The Building Proposals and Development Plan Departments have not processed the data that can readily give plot wise information of net regulatory FSI and gross FSI including exempted FSI. It was therefore necessary to resort to following method of assessment.

- a. Blocks comprising number of plots and surrounded by streets were identified. Blocks also cover slum areas;
- b. Footprints of buildings in each block is calculated;
- c. An average of the number of storeys of the structures in the Block parcel is noted;
- d. The total of footprint area ('b' above) in the Block is then multiplied by the average number of storeys ('c' above) to obtain the total built up area;
- e. Bulk Built Up Area so acquired is then divided by block area to calculate FSI.

It may be noted that in this method, it is not possible to distinguish the floor area exempted from FSI computation. This FSI should always be in excess of statutorily permitted FSI and is therefore called as Bulk FSI and since it is calculated on net plot area it is called Net Bulk FSI.



Figure22: Methodology for Computing Net Bulk FSI



7.2.1 FSI Consumption Pattern

The following patterns of FSI consumption emerged:

Greater Mumbai displays a Net Bulk FSI consumption ranging from 0.93 to 7.35 and above.

FSI Consumption patterns are as under:

• Island City

In the Island City following is the pattern of consumption of Net Bulk FSI:

- Areas with FSI range between 1.33 and 2.00 are in Apollo Bunder (Ward A); Cumballa Hill, Tardeo (Ward D); Agripada, Chinchpokli, Siddharth Nagar (Ward E); Naigaon, Lalbaug, Parel (Ward F/S); Shivaji Park, Purandare Wadi, Juvekar Wadi (Ward G/N) and Phoenix Mills (Ward G/S). The predominant Land Use in these areas is commercial except Shivaji Park and Cumballa Hill which are predominantly residential;
- Areas with FSI range between 2.00 and 3.00 include areas near the MCGM Headquarter, Bombay Hospital, Churchgate Station (Ward A); Bhang Wadi, Wagh Wadi, Chira Bazaar, Kalbadevi (Ward C) and Gowalia Tank, Anand Nagar (Ward D). The predominant Land Use in these areas is commercial and residential;
- Areas with FSI range between 3.00 and 4.00 include Ballard Estate (Ward A); Masjid Bunder, Chinch Bunder, Chippi Chawl (Ward B) and areas near Chandan Wadi and Gai Wadi (Ward C). The predominant land Use in these areas is commercial, except Ballard Estate is predominantly office use;
- Areas with FSI of 4.00 and above are located in Ward A; these include the Bombay Stock Exchange, Horniman Circle, Flora Fountain, Bora Bazaar, areas around Shahid Bhagat Singh Marg. The predominant land use in these areas is commercial and office use, except Bora Bazaar, which is predominantly, mixed use. There are a few redeveloped Cessed buildings where FSI is substantially exceeds 4.00.

• Western Suburbs

In the Western Suburbs following is the pattern of consumption of Net Bulk FSI:

- Areas with FSI range between 1.33 and 2.00 include Hanuman Nagar, Bhim Nagar (Ward K/E); Kamala Nagar, JVPD Scheme, Vidyanidhi (Ward K/W); Chincholi Bunder, Mamletdar Wadi, Kanchpada (Ward P/N); Saibaba Nagar, Chiku Wadi, Babhai Naka (Ward R/C) and Charkop Village (Ward R/S). The predominant Land Use in these areas is residential;
- Areas with FSI range between 2.00 and 3.00 include Vithaldas Nagar Housing Colony, Podar Educational Complex, Hasmukh Nagar (Ward K/E); Dahisar Ganpat Patil Nagar and Anand Park (Ward R/N) and Jai Jawan Nagar (Ward R/C). The predominant Land Use in these areas is residential, except the Podar Educational Complex, which is an Educational Land Use.

• Eastern Suburbs

In the Eastern Suburbs following is the pattern of consumption of Net Bulk FSI:

- Areas with FSI range between 1.33 and 2.00 include Saki Naka Junction (Ward L) and Mulund Colony, Johnson and Johnson, Mulund Bus Depot, Mulund Sonapur (Ward T). The predominant

Land Use in these areas is residential, except Johnson and Johnson, which is an Industrial Land Use.

- Areas with FSI range between 2.00 and 3.00 include Annabhau Sathe Nagar and Shivaji Nagar Chembur in Ward M/E and Hiranandani Powai and Panchkutir Ganesh Nagar in Ward S. The predominant Land Use in these areas is residential. Areas with the highest Net Bulk FSI ranging between 2.00 and 3.00, with the exception of Powai and Panchkutir Ganesh Nagar, are all Slum Rehabilitation Schemes.

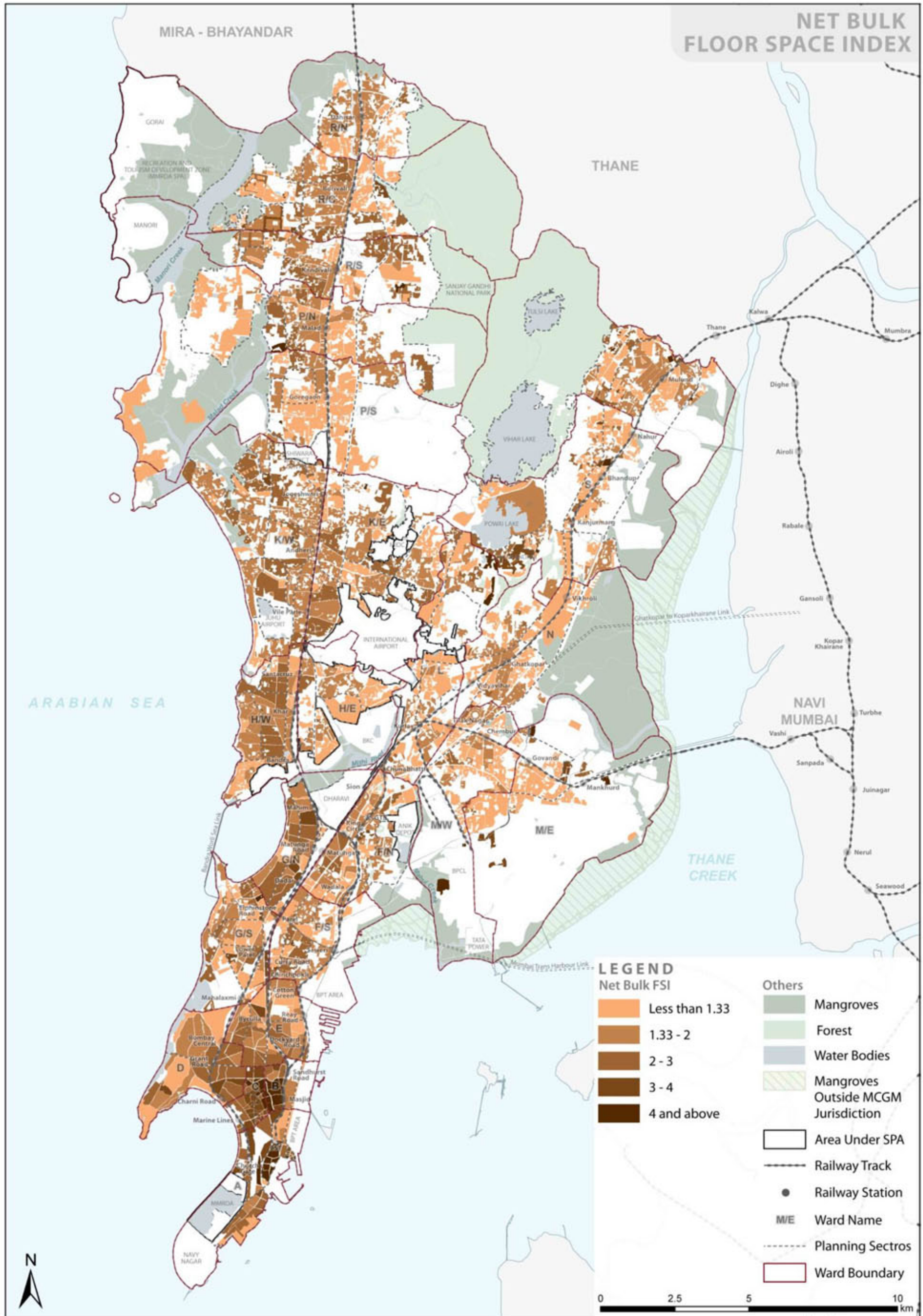
Summary

Island City has a very high consumption of Net Bulk FSI due to concentration of both commercial and office land use. The population density in these Wards is also significantly higher than Western and Eastern Suburbs.

Western Suburbs has Net Bulk FSI consumption lower than the Island City due to predominant residential land use. Population density is also lower than in the Island City.

Eastern Suburbs have a very low and uniform consumption of Net Bulk FSI due to large areas occupied by slums. Although the Net Bulk FSI consumption is low, the population density is high. While most of the Eastern edge of the Eastern Suburbs is occupied by Natural Areas such as mangroves, mudflats, saltpans etc., the Bhabha Atomic Research Centre (BARC) and mangrove forests occupy the Southern edge.

Map 7: Existing Net Bulk FSI in Greater Mumbai



Source: Existing Land Use Survey, 2012

7.2.2 Areas with High FSI

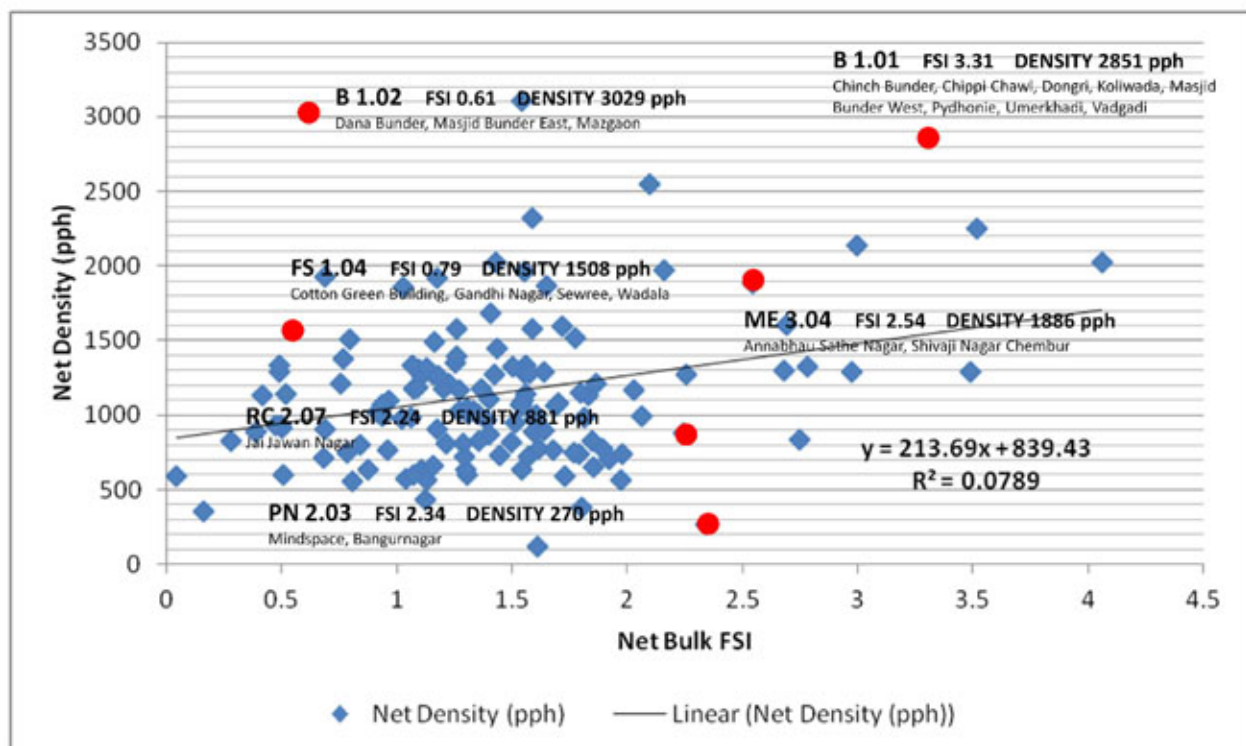
There are several areas in Greater Mumbai that display relatively high consumption of FSI. These include:

- Development Nodes:** A study of the ELU 2012 and the Existing FSI Consumption maps reveal that there is a direct relation between location of employment nodes and higher consumption of FSI. The distribution of FSI in Greater Mumbai makes clear the structure of existing and emerging employment centres. In the Island City, the highest concentration of FSI is centred around Nariman Point and in areas close to Dadar railway interchange. The areas with the highest consumption of FSI in the Island City are located in Wards A, B and C which house the Central Business District (CBD) of Greater Mumbai. These are areas, which are easily accessible from CST and Churchgate, which are major Suburban rail terminals. A number of Wards in the Island City, Wards E, F/S, G/N and G/S also show relatively high Net Bulk FSI and correspond to the transforming textile mill areas of the city that are now emerging as new hubs for commerce, offices and entertainment.
- The Western Suburbs also display employment nodes and/ or commercial centres of high FSI consumption along the major railway stations. Higher FSIs are also concentrated at intersections of major roads such as S.V Road and Linking Road at nodes that are in proximity to railway stations. The Eastern Suburbs indicate relatively high FSI at the Bhandup-Mulund cluster.
- Road and Transport Networks:** Transport (both rail and arterial road) networks have a major role in determining the FSI distribution pattern in Greater Mumbai. Most of the areas which have Net Bulk FSI in the range of 1.5 and 3.0 are located near or along the major road and rail corridors (Refer Net Bulk FSI map). In general, the Western Suburbs and the areas along the transportation corridor of the Western Express Highway and the major arterial S.V. Road display pockets of higher FSI ranging from 1.33 to 2. Along the Western Suburb the areas along the railway lines and main road network have higher FSI in the form intermittent nodes such as Andheri, Jogeshwari, Goregaon, Kandivali and Borivali. Areas adjoining the Western Express Highway in the wards of R/S, R/C and P/N have high FSI pockets.
- Slum Rehabilitation Schemes:** In the Eastern Suburbs the pockets that have very high FSI are not directly connected to the railway corridors. These largely correlate to the slum rehabilitation areas around BPCL (Ward M/W), Govandi and Mankhurd (Ward M/E).
- Policies such as rehabilitation of slum areas cause concentration of high FSI, which in turn is related to policies granting incentive FSIs and land availability with Government agencies to plan resettlements.

The Graph below indicates relation between existing Net Densities and existing Net Bulk FSI of Planning Sectors of Greater Mumbai. It reveals that majority of Planning Sectors that have a Net Density of 500 to 1,500 pph span a wide range of Net Bulk FSI from 1.00 to 2.00. A range of equations between FSI and densities is observed. On one hand, there are areas with high FSI and high density (old areas in the Island City and slum rehabilitation schemes) on the other hand there are areas with high FSI and low density (areas which are predominantly commercial or have low household sizes) and low FSI and high density (chawls, slums) as well. The graph clearly shows that there is no consistent co-relation between FSI and density.

- Areas with high density and high FSI (2.00 to 4.00) include Annabhau Sathe Nagar and Shivaji Nagar Chembur in M/E 3.04 with net densities between 1,500 pph and 2,000 pph. Also, Chira Bazaar, Null Bazaar and Bhuleshwar in Planning Sector C 1.03 have high net density ranging between 2,000 pph and 2,500 pph;
- Areas with high density and low FSI (1.33 to 2.00) include areas near Apollo Bunder in Planning Sector A1.02 and Kurar Village, Pathan Wadi, Dindoshi in P/N 2.06 with net densities between 1,000 pph to 1,500 pph. In addition, Indian Oil Nagar in M/E 3.04 (1887 pph) and ACC Nagar in the M/E 3.03 (1,854 pph) have high net densities;
- Areas with low density and high FSI (2.00 to 4.00) include area in proximity to the Hindu Gymkhana, Police Grounds in Planning Sector C 1.01 with Net Densities between below 1,000 pph. Prem Nagar slums and Prem Nagar in Planning Sector P/N 2.03 have net densities below 500 pph;
- Areas with low density and low FSI (1.33 to 2.00) include Cumballa Hill, Zoroastrian Colony in D 1.01 with net density below 1000 pph; Juhu, Danda, Pali Hill, Pali Village in Ward H/W have net densities between 500 and 600 pph; Saibaba Nagar, Vazira Naka in Planning Sector R/C 2.05 and Spenta Residency near Chimatpada in Planning Sector L 3.03 have net densities between below 500 pph.

Graph 7: Net Density and existing Net Bulk FSI



Source: Existing Land Use Survey, 2012

7.2.3 Comparison of FSI distribution and per capita Employment

The Map 8 reveals the following:

- Areas with high FSI (2.31 and above) and high per capita Employment include Ballard Estate, Fort, Bora Bazaar in Ward A, Masjid Bunder in Ward B and Kalbadevi in Ward C;

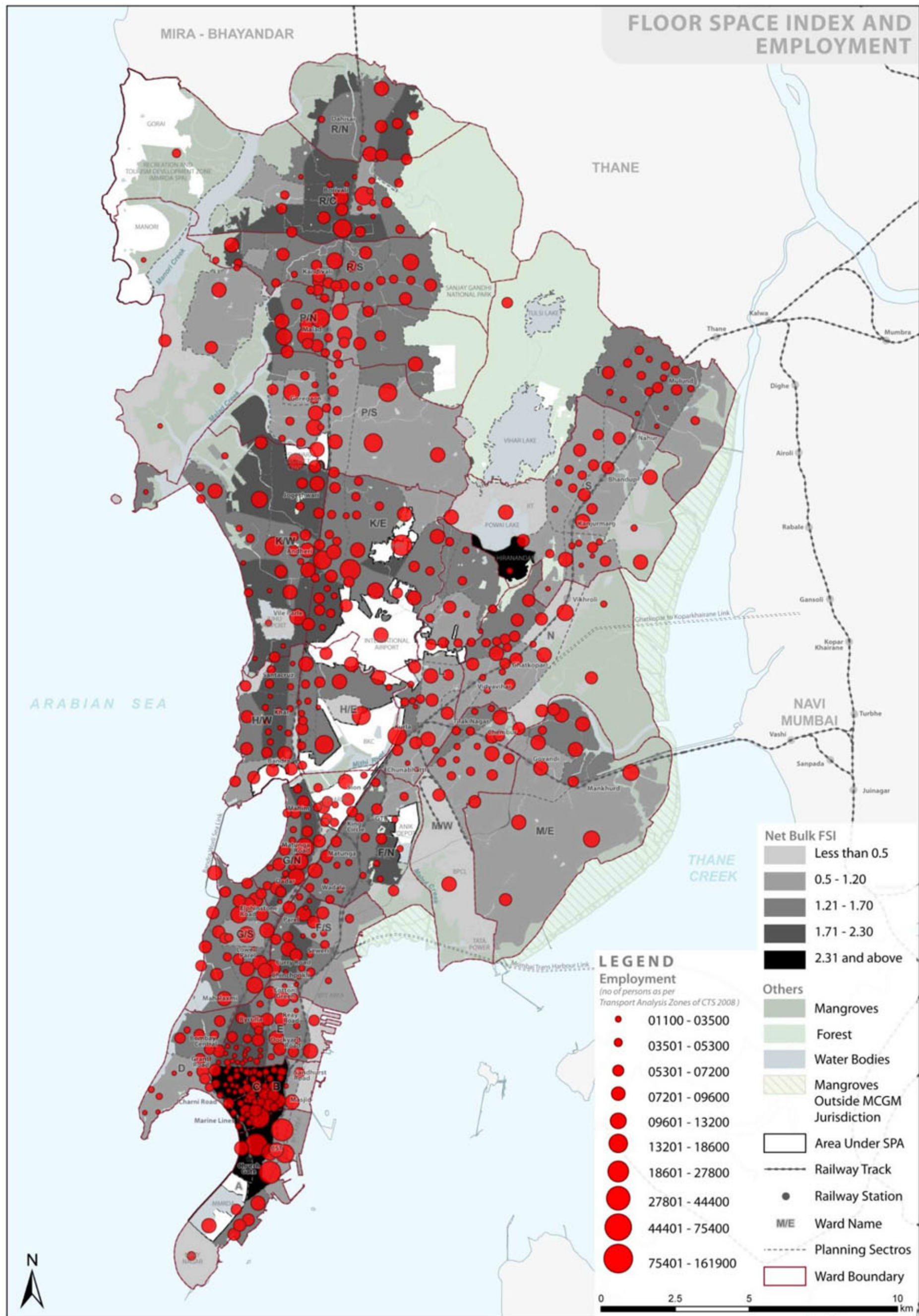
- Areas with high FSI (2.31 and above) and low per capita Employment include Powai in Ward S and Shivaji Nagar in Ward M/E;
- Areas with medium FSI (1.21 to 2.30) and high per capita Employment include Dadar in G/N, Andheri in Ward K/W and Malad Mindspace in Ward in Ward P/N;
- Areas with medium FSI (1.21 to 2.30) and low per capita employment include Antop Hill, CGS Colony in Ward F/N; Khar and Bandra in Ward H/W and Sarvodaya Parshwanath Nagar Mulund, Vishwakarma Nagar in Ward T;
- Areas with low FSI (less than 0.50 to 1.20) and high per capita employment include MbPT in Ward A, Lower Parel and Elphinstone in Ward G/S, University of Mumbai Kalina Campus in Ward H/E, Rajendra Nagar in Ward R/C and Aarey Colony in Ward P/S;
- Areas with low FSI (less than 0.50 to 1.20) and low per capita employment include Malabar Hill in Ward D, Vidyavihar in Ward N and Gorai in Ward R/C;

Island City has a very high concentration of employment in the high and medium FSI zone and along the movement corridors in the Western Suburb. Easter Suburbs have many areas of low and medium FSI supporting substantial employment.

Per capita consumption of employment space is higher in Planning Sectors that are in proximity to Suburban Rail stations and along major infrastructure.



Map 8: Floor Space Index and Employment.



Source: Existing Land Use Survey, 2012 and the Comprehensive Transportation Study for Mumbai Metropolitan Region, July 2008

8. Urban Fabrics

Section 25 of the MR&TP Act mandates mapping of existing land use as a first step towards understanding the existing context. A detailed block level mapping of the existing FSI consumption patterns of Greater Mumbai is also included in the terms of reference.

While these exercises provide an understanding of the distribution of the type of use and the development rights they appropriate, it does not convey an understanding of the relationships between the physical, human, political, historical, economic, and cultural factors that affect people and natural environments in these areas. The City has various character-based built assets and precincts, which need to be maintained for the future. In order to address these relations, the DP 2014-34 therefore has adopted an approach towards 'place-making', which is a multi-faceted approach to urban planning. Place-making capitalizes on a local community's assets, inspiration, and potential, towards formulation of proposals for future development, ultimately creating 'places' that promote local quality of life. This 'geography based' method addresses both development and preservation. Place-making as adapted for DP2014-34 appropriates both a legal and a social process.

The DP 2014-34, therefore, transcends statutory requirements and maps the various places in Greater Mumbai that harness special and particular characteristics. These are places that attribute immense value to Greater Mumbai. Some urban fabrics with common characteristics include:

- Colaba, Marine Drive with regular plots and buildings with setbacks on all sides;
- Bhuleshwar, Kalbadevi with hardly any setbacks, but *chowks* for ventilation and light;
- Hindu colony, Parsi Colony with regular plots, with 1/3 ground coverage and 4 storeyed buildings;

The objective of this exercise is to explore formulation of place specific Zoning strategies and Development Control Regulations.

The following section illustrates characteristics of various urban fabrics in Mumbai. Null Bazaar, Dadar Parsi Colony, Ballard Estate, Nariman Point (part of area under SPA and appropriate for this exercise), Kannamwar Nagar layout (developed by MHADA) and a slum rehabilitation scheme at Tilak Nagar have been included here as examples. Three main findings, somewhat paradoxical, emerge.

- Greater Mumbai comprises of 'places' of distinctive character, each displaying differential land uses and FSI consumption levels. For example, the Null Bazaar, as a mixed use predominantly commercial area, has an FSI that is higher than 4.0. At the same time, commercial centres in Andheri and Jogeshwari have FSIs of 2.5.
- There are several 'places', which have the same land use and levels of consumption of FSI, but demonstrate varying configurations of the built form (setbacks, podium step backs, building line). For example, FSI consumption levels in the historical business district of Ballard Estate, which is characterised by buildings that abut the street, are in tandem with those in the Lower Parel area, which are more recent developments with large setbacks.
- It is also noteworthy that a few newer developments have intelligently interpreted the prevailing Development Control Regulations, resulting in built form that resembles urban fabrics in other

parts of the City. For example, an arcaded building in Vile Parle (opposite Pawan Hans Helicopter Service), emulates arcaded building typologies of the Island City, demonstrating the potential for reproduction as an urban fabric.

The uniform FSI norms of DP 1991 inhibited renewal. Modifications introduced to the DCRs have thereafter resulted in new forms of developments, often less appropriate, within older distinctive urban fabrics.

The distinctive character of these places is a reflection of their occupational, historical, social, economic and cultural geographies. People and places are adaptive to change and maintain and discard practices with time. The DP 2014-34 recognises these dimensions, coupled with their aspirations to transform in exploring formulation of place-based codes, elaborated in Part III of this report.



Map 9: (following 6 slides) Examples of the Urban Fabrics Study for Mumbai

UF Type A : Bazaar

Null Bazaar

Fabric Level



Location Map



Photo Collage



Site
source : google earth 2010

Overview

Location: Island City
Ward: C
Planning Sector: C 1.03
Year of Origin: < 1947

Statistics

Area under study	218077.00	21.80 ha
Built Area (Ground Coverage)	139505.68 sq m	63.97 %
Greens	691.51 sq m	0.03 %
Roads	61225.95 sq m	24.07 %
Plots	156851.05 sq m	



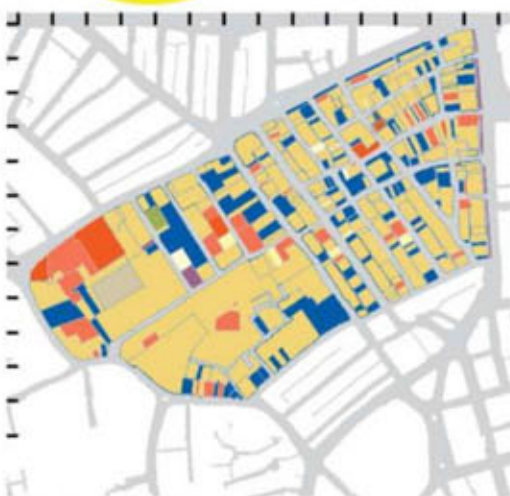
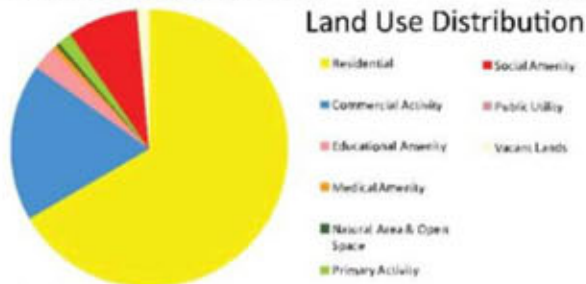
Road Hierarchy
Arterial, Sub-Arterial, Major, Minor



Figure Ground

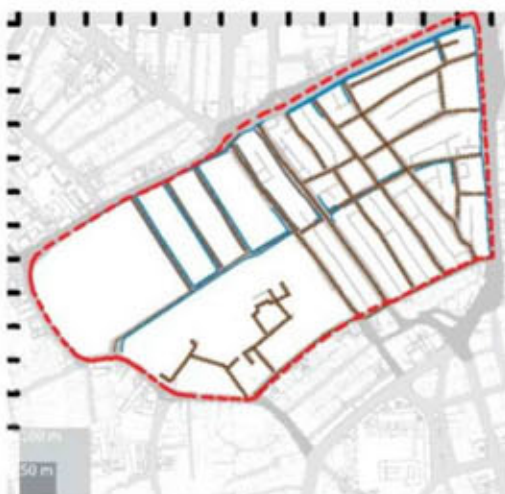
Landuse*

	Area	%
R2 Primary Residential Zone / R2C Residential with Commercial / R2S Residential with Shopping	105870.21	51.54
M1.1 Municipal Dispensary / M3.2 Private Hospital	907.65	0.44
E2.1 Secondary School	4466.05	2.17
C1.2 Shopping Centre / CL4 Informal Market / C3.1 Residential Hotel, Boarding, Lodges / C4.1 Godowns / C5 Other Commercial Activity	29202.94	14.22
N3.3 Parks & Garden	691.51	0.34
P4 Buffalo Stables	2623.78	1.28
S4.1 Temple / S4.3 Mosque / S1.1 Welfare Centre / S1.2 Public Hall	12989.25	6.32
U1.1 Electric Power Plant / U1.2 Electric Transmission Station	55.51	0.03
UC Under Construction / VL Vacant Land	2152.26	1.05

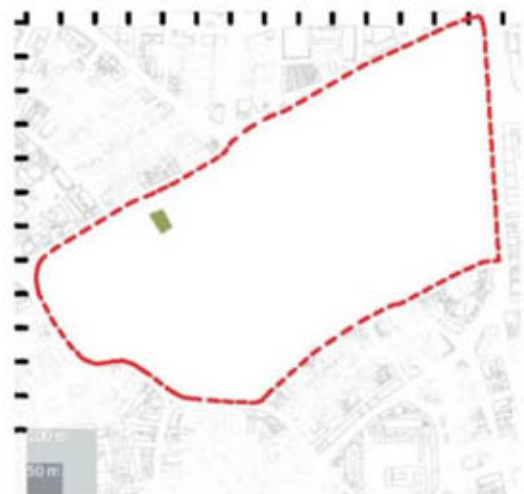


Existing Land Use*

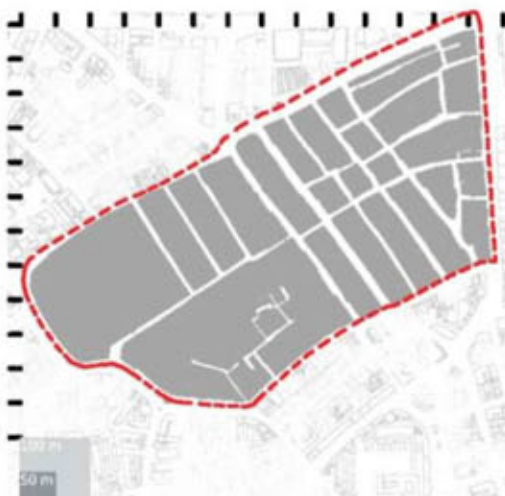
* from Existing Land Use survey 2011



Roads
Pedestrian, Parking, Hawking



Parks & Gardens



Blocks



Plots

UF Type A : Bazaar

Null Bazaar

Block Level

Observation -

Null Bazaar fabric shows a diversity, by offering mix type of land uses, tenures, plot size, with visible social enclaves. The fabric is dominated by three to five storied buildings with commercial/godown activities on the ground floor. Proximity to the Railway on the East and West side of the ward and commercial activities in Ward 'A' have a big impact on the fabric. Major trading activities and presence of contract labor on narrow streets causes major traffic obstructions. The buildings are placed extremely close to each other hardly any space between them. These spaces were commonly known as house gullies, which are used for drainage and water system. These have become places of refuse dump today creating an unhygienic living conditions.

Ratio	Length (meters)			Width (meters)		
	< 50	50 - 100	> 100	< 50	50 - 100	> 100
< 1:1	3	5	1	8	-	1
1:1 - 1:2	-	2	2	2	1	1
1:2 - 1:4	-	1	7	6	2	-
> 1:4	-	-	-	4	4	-

- A < 1:1
- B 1:1 - 1:2
- C 1:2 - 1:4
- D > 1:4



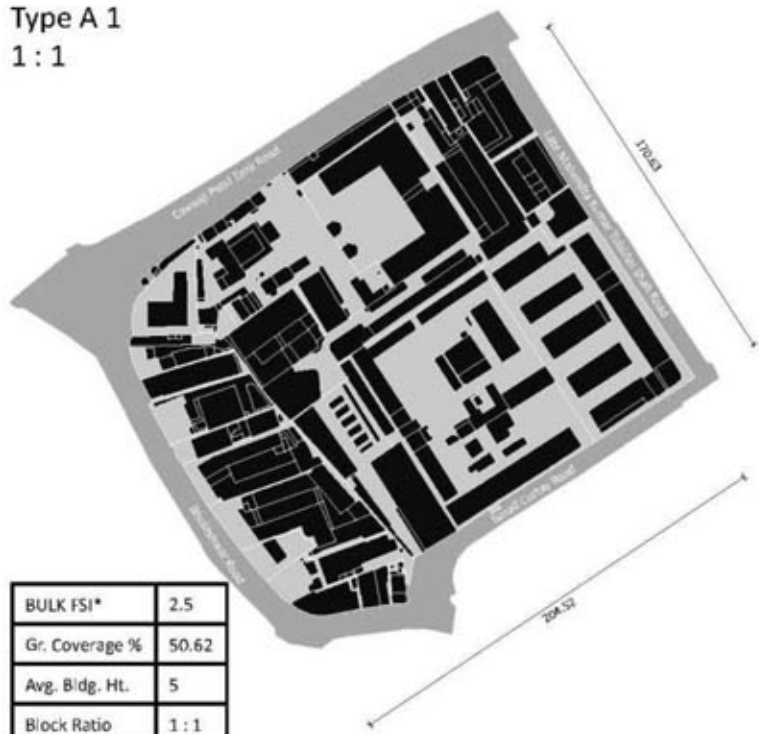
Block ratio (length : width)



Location Map for Block Type

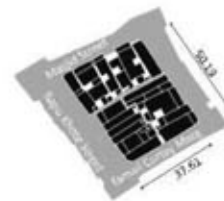
Type	Area (sq m)	Length (m)	Width (m)	Ground Coverage	Internal Roads Right Of Way (ROW)
1	34897.24	204.52	170.63	17667.39	-
2	1474.08	50.19	37.61	1376.82	-
3	5645.96	153.59	39.21	3788.35	1.2 m

Type A 1
1 : 1



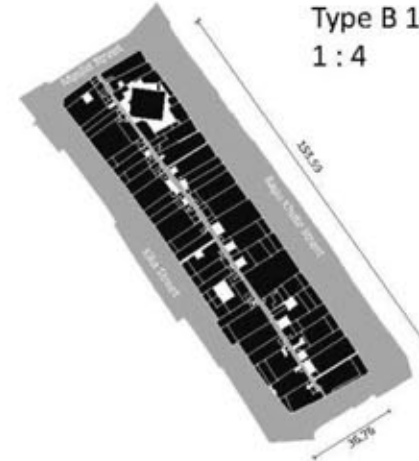
BULK FSI*	2.5
Gr. Coverage %	50.62
Avg. Bldg. Ht.	5
Block Ratio	1 : 1

Type A 2
1 : 1

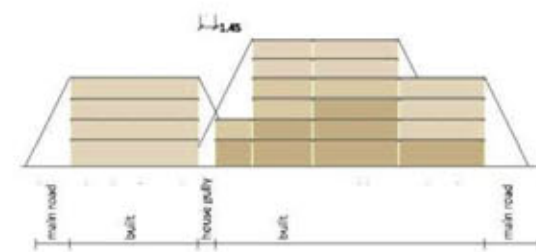
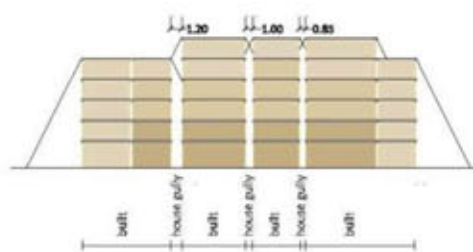
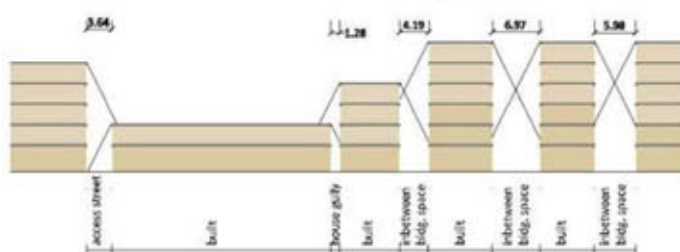
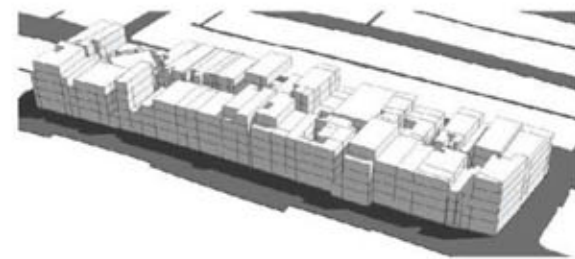


BULK FSI*	3.7
Gr. Coverage %	93.40
Avg. Bldg. Ht.	4
Block Ratio	1 : 1

Type B 1
1 : 4



BULK FSI*	2.6
Gr. Coverage %	67.09
Avg. Bldg. Ht.	4
Block Ratio	1 : 4



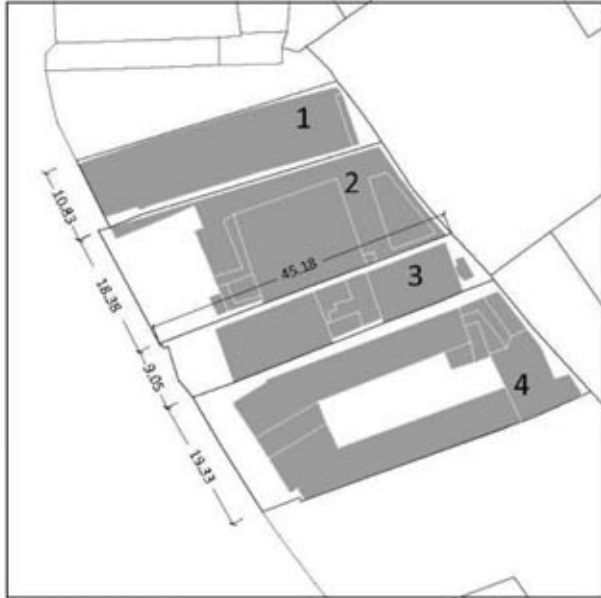
Inference -

Type A1 and Type A2 have same (length : width) ratio, but Type A2 is 24 times the size of Type A1 and having a BULK FSI of 3.7. The ground coverage % shows that Type A2 has the highest of 93% where as Type A1 is at 50%. Type A2 and Type B1 are compact with similar average floor height of 4 floors.

UF Type A : Bazaar

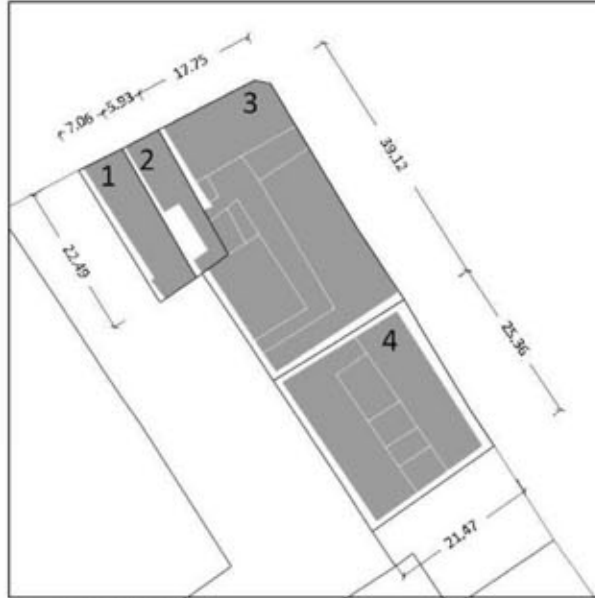
Null Bazaar

Plot Level



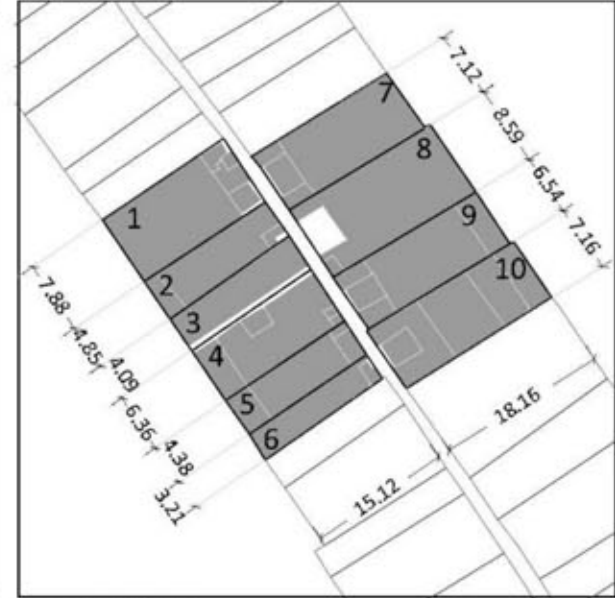
Sample Plot 1

Bldg no.	Area (sq m)	Plot Ratio	Frontage (in meters)	BULK* FSI
1	416.49	1:4	10.83	4.25
2	755.28	1:3	18.38	1.39
3	407.55	1:5	9.05	2.81
4	974.99	1:2	19.33	1.88



Sample Plot 2

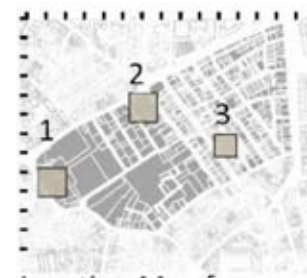
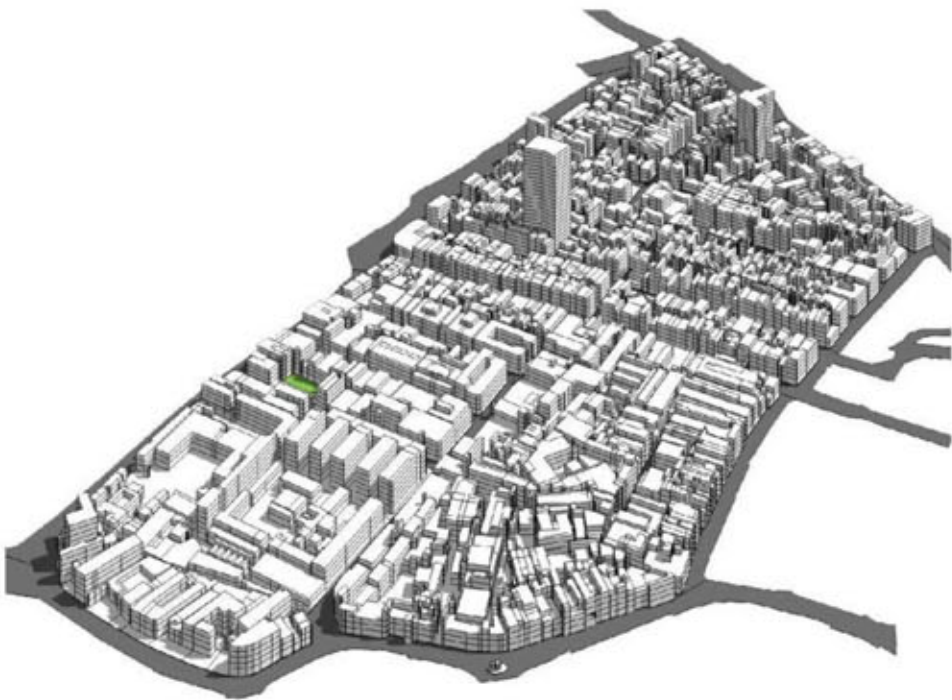
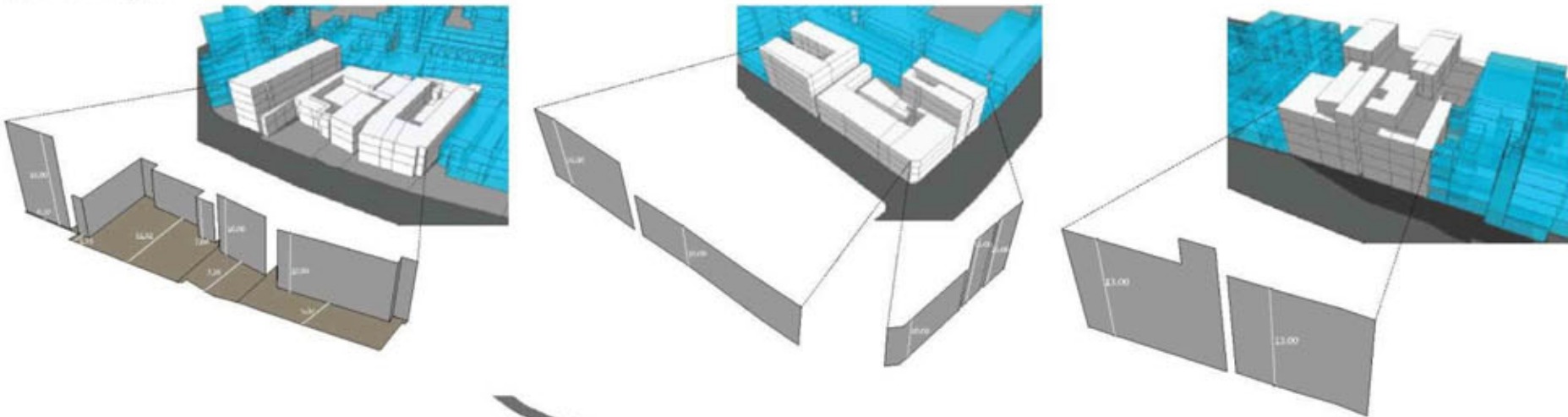
Bldg no.	Area (sq m)	Plot Ratio	Frontage (in meters)	BULK* FSI
1	147.58	1:3	7.06	3.45
2	122.83	1:4	5.93	2.62
3	777.08	1:2	17.75	2.79
4	555.03	1:1	25.36	4.11



Sample Plot 3

Bldg no.	Area (sq m)	Plot Ratio	Frontage (in meters)	BULK* FSI
1	122.81	1:2	7.88	4.83
2	70.95	1:3	4.85	4.96
3	64.08	1:4	4.09	3.49
4	98.28	1:2	6.36	4.68
5	65.20	1:4	4.38	3.87
6	47.02	1:5	3.21	4.06
7	117.75	1:3	7.12	3.94
8	150.11	1:2	8.59	4.51
9	115.71	1:3	6.54	5.02
10	133.08	1:3	7.16	4.93

road frontages



Location Map for Sample Plots

UF Type B : Planned Layouts

Dadar Parsi Colony

Fabric Level



Location Map



Photo Collage



Site
source : google earth 2010

Overview

Location: Island City
Ward: F/N
Planning Sector: FN 1.01
Year of Origin: < 1947

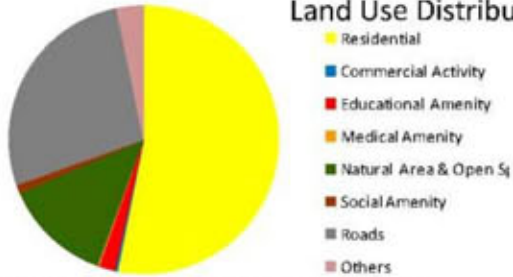
Statistics

Area under study	525753.58	52.57 ha
Built Area (Ground Coverage)	117530.61 sq m	22.35 %
Greens	67928.16 sq m	12.92 %
Roads	142994.92 sq m	27.19 %
Plots	373095.27 sq m	70.96 %

Landuse*

	Area	%
R1,R2,R3 Primary Residential Zone / R2C Residential with Commercial / R2S Residential with Shopping / R4 Chawls Residential / R4S Chawls with Shopping / R5 Slums / R5C Slums with Commercial	279345.61	53.13
M3.1 Municipal Hospital	971.48	0.18
S1.2 Public Hall / S4.1 Temple / S4.5 Parsi Agiary	5336.40	1.02
E2.1 Secondary School / E2.2 Primary cum Secondary School	10334.18	1.97
C1.4 Informal Market / C3.1 Residential Hotel, Boarding, Lodge / C5 Other Commercial Activity	1719.43	0.33
N3.1 Playground / N3.2 Recreational Ground / N3.3 Parks & Garden / N3.4 Clubs & Gymkhana	67928.16	12.92
O1.3 Government Office / UC Under Construction	17123.40	3.26
T1.13 Public Parking / T1.19 Petrol Pump	142994.90	27.20

Land Use Distribution



Walkability

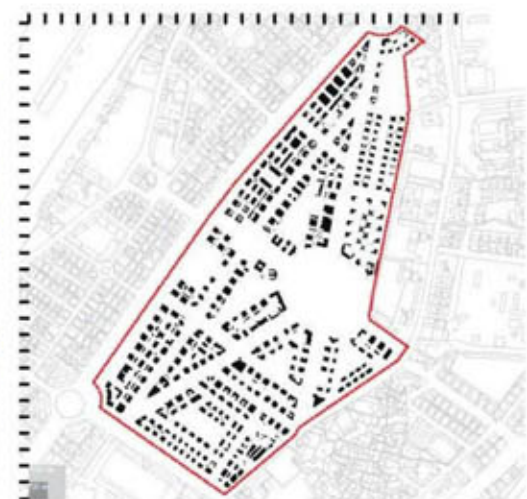
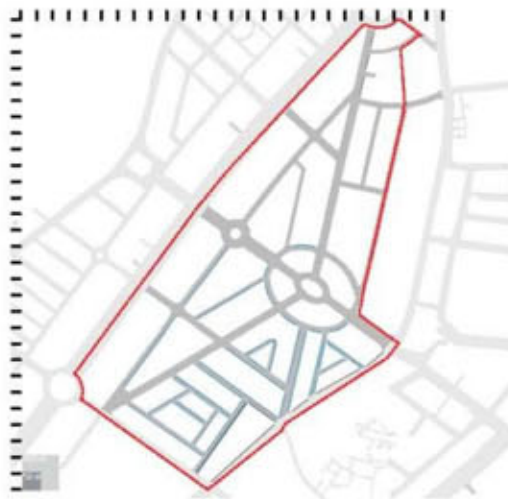
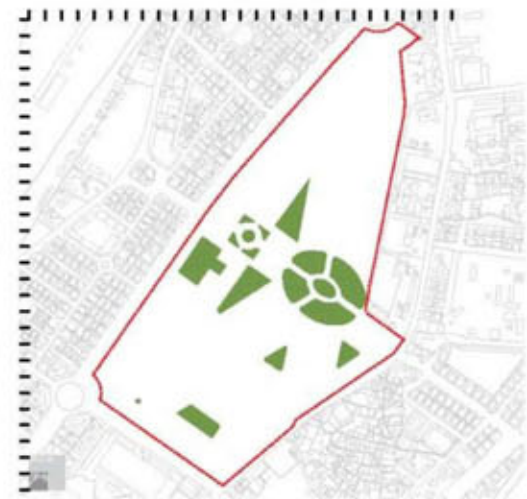


Figure Ground



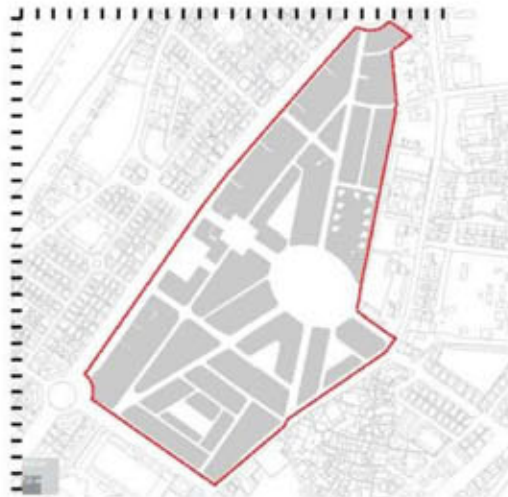
Roads
— Hawking
— Parking



Parks & Gardens



Existing Land Use*



Blocks



Plots

* from Existing Land Use survey 2011



Type B : Planned Layouts

Dadar Parsi Colony

Block Level

Observation -

Dadar Parsi Colony fabric is a planned layout with well laid out street dominated by three to five storied buildings. With a mono-rail alignment to its eastern side and main arterial road Dr. Ambedkar road has made it accessible with other parts of the city. With well spaced buildings and wide roads the buildings derive good light and ventilation from surrounding. Original built form consisted of 1/3rd ground coverage with three storied buildings consuming FSI of 1, in 1964 when the FSI was raised to 1.33 floors got added on the same footprint. DCR 33(7) allowed 50-70% extra FSI and has shown its effects with high rise buildings coming up rapidly destroying the fabric.

Ratio	Length (meters)			Width (meters)		
	< 50	50 - 100	> 100	< 50	50 - 100	> 100
< 1:1	-	1	1	-	1	1
1:1 - 1:2	-	-	5	2	2	1
1:2 - 1:4	-	-	15	2	8	5
> 1:4	-	1	4	-	4	1

- A ■ < 1:1
- B ■ 1:1 - 1:2
- C ■ 1:2 - 1:4
- D ■ > 1:4

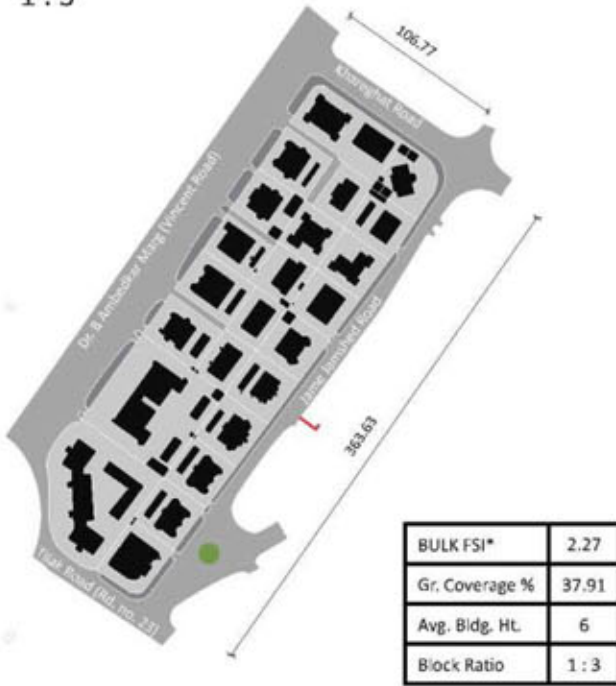
Block ratio (length : width)



Location Map for Block Type

Type	Area (sq m)	Length (m)	Width (m)	Ground Coverage	Internal Roads Right Of Way (ROW)
1	37427.56	366.35	109.74	14188.01	5.13
2	34855.42	352.14	107.24	14658.48	7.10
3	13177.64	237.27	58.5	7158.93	-

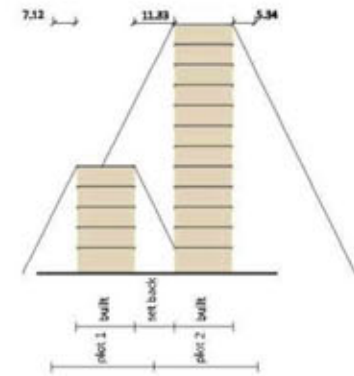
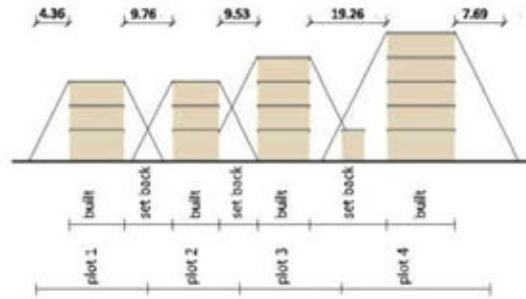
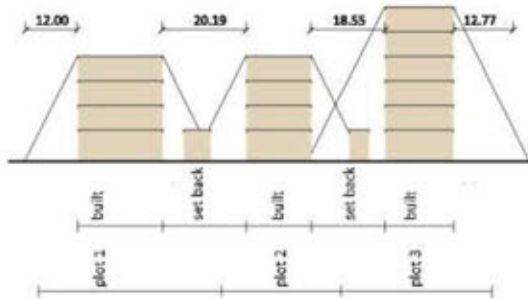
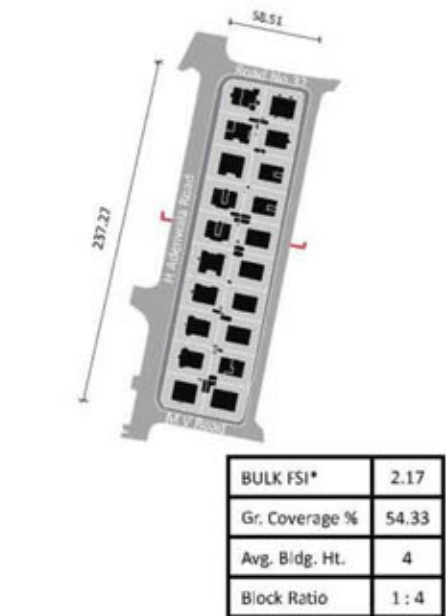
Type C 1
1 : 3



Type C 2
1 : 3



Type D 1
1 : 4



Inference -

Type C1 and Type C2 have same (length : width) ratio, but Type C1 has a BULK FSI of 2.27 as compared to Type C2 having 1.68. Type C1 has larger plots, 3 rows of plots compared to Type C2 which has 4 rows of plots. The ground coverage % shows that Type D1 has the highest of 54% where as Type C1 is at 37%. Type C2 and Type D1 are compact with similar average floor height of 4 floors.

UF Type B : Planned Layouts

Dadar Parsi Colony Plot Level



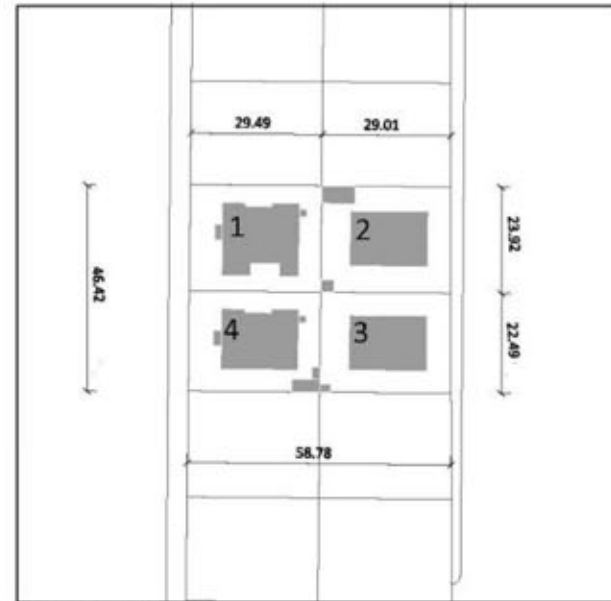
Sample Plot 1

Bldg no.	Area (sq m) total built up	Plot Area (sq m)	Plot Ratio	Frontage (in meters)	BULK* FSI
1	3612.78	5092.83	1 : 1	105.77	4.82
2	21244.86			49.22	
3	125.82	1276.95	1 : 1	-	1.00
	1146.18			22.33	
4	7.81	1467.12	1 : 1	-	1.40
	2113.44			298.47	



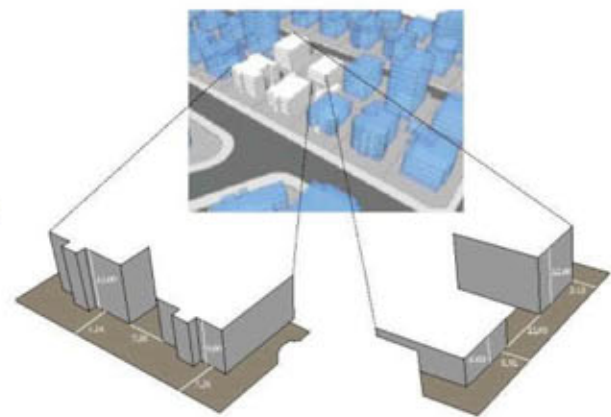
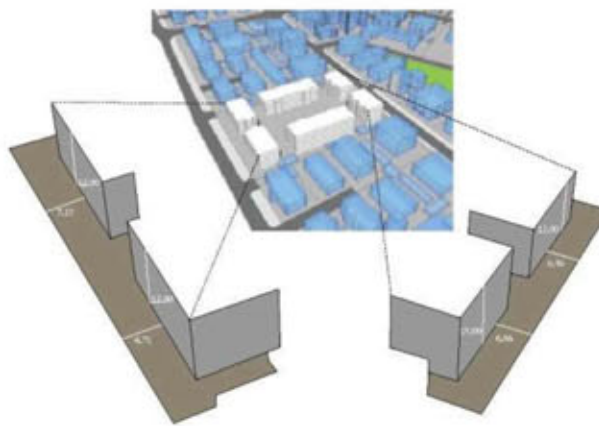
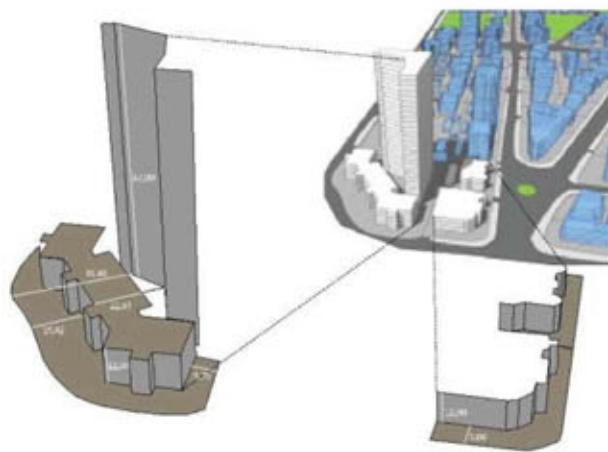
Sample Plot 2

Bldg no.	Area (sq m) total built up	Plot Area (sq m)	Plot Ratio	Frontage (in meters)	BULK* FSI
1	1353.68	7655.21	1 : 1	24.58	1.40
2	2408.16			-	
3	1580.60			23.31	
4	1580.60			23.31	
5	2408.16			-	
6	1353.68			24.58	
extra	354.60			-	



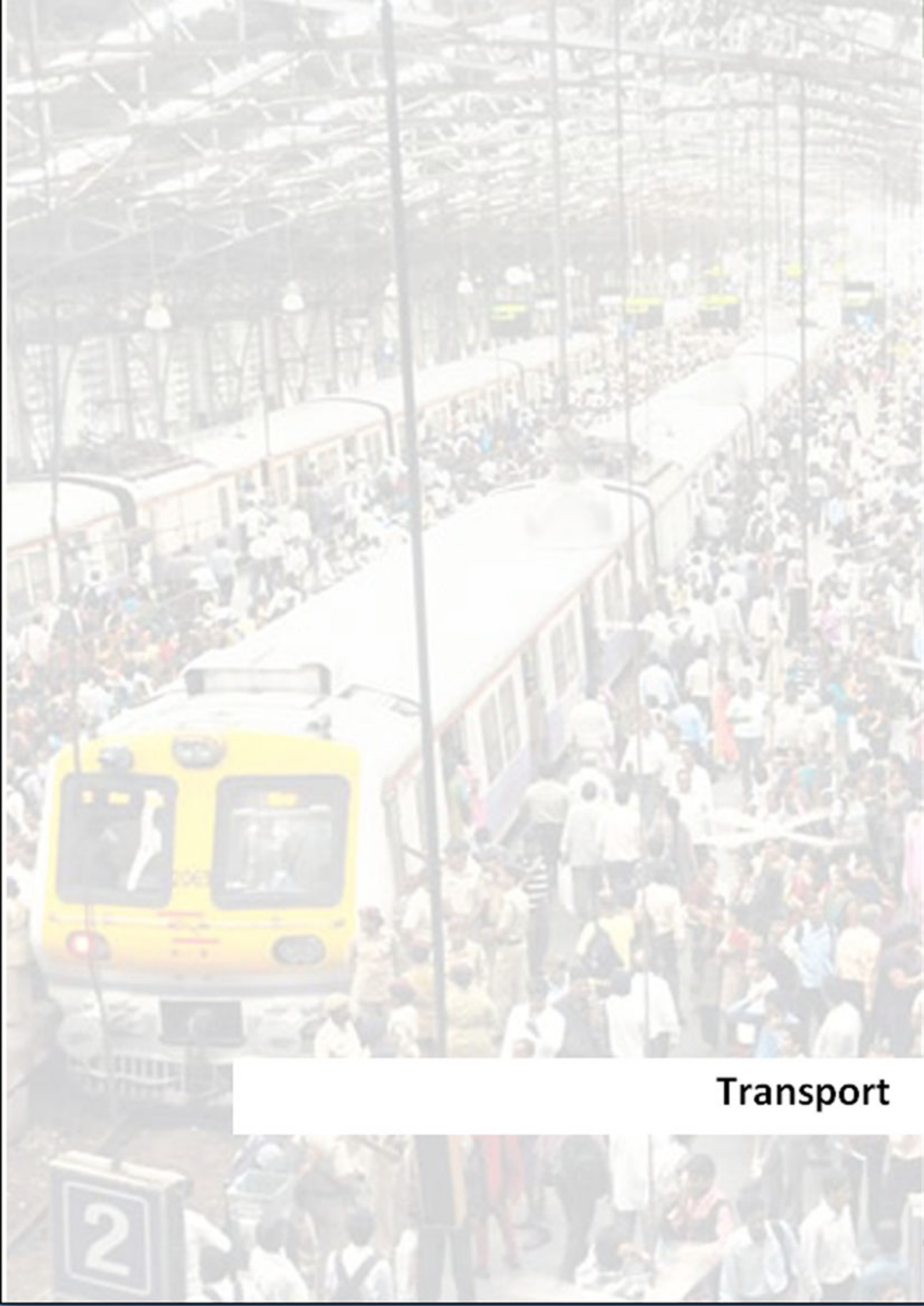
Sample Plot 3

Bldg no.	Area (sq m) total built up	Plot Area (sq m)	Plot Ratio	Frontage (in meters)	BULK* FSI
1	1053.08	706.07	1 : 1	16.46	0.65
	12.04			-	
	23.28			-	
2	119.84	697.24	1 : 1	12.39	0.68
	32.44			-	
	870.00			-	
3	435.00	661.05	1 : 1	12.39	1.49
	8.70			-	
4	697.53	664.41	1 : 1	13.65	0.92
	17.46			-	
	9.03			-	



Summary:

- Areas with concentration of high Net Bulk FSI are located 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.
- In the Eastern Suburbs the pockets that have high FSI are not directly connected to the railway corridors. These largely correlate to the slum rehabilitation areas around BPCL (Ward M/W), Govandi and Mankhurd (Ward M/E) which have a high ground coverage hence high FSI consumption;
- Other areas with high and medium Net Bulk FSI are predominantly residential such as Powai Hiranandani, Vazira Naka in Ward R/C;
- Areas with high density and high FSI are predominantly located in the Island City. Whereas areas with medium to low FSI consumption are located in the Suburbs. However a wide range of densities is found in the Suburbs. In addition to this, it is observed that there is no correlation between FSI consumption and density;
- For the first time, DP 2014-34 has undertaken a mapping of urban fabrics, viz., areas with distinct characteristics (social, physical, cultural, economic) in Greater Mumbai. This exercise revealed that localities with dissimilar built form characteristics in fact display similar range of FSI.



Transport

2

7 Million

Railway Trips per Day
Greater Mumbai

5.5 Million

Bus Trips per Day
Greater Mumbai

51% Pedestrian

25% Trains

12% Bus

5% Rickshaw/ Taxi

2% Cars

5% Other modes

Greater Mumbai Modal Share (CTS, 2008)

9. Transport

Over the past few decades, several proposals have been formulated for the Mumbai Metropolitan Region and Greater Mumbai. Many of these proposals have been approved and some are being implemented. This chapter includes proposals included in the CTS, 2008 and projects thereafter. An assessment of the existing status of the transport sector in Greater Mumbai is also presented here. Previous proposals are also recorded with a view to understand their significance for Greater Mumbai and anticipate transformations that would ensue to the structure of the City's growth dynamic.

Greater Mumbai has a distinct advantage of a high modal share of 76% (excluding pedestrian)¹⁴ in favour of public transport system. It has multiple modes of transport that primarily includes road and rail based transport. The existing Suburban Rail Services, which include the Western Railway and the Central Railway, carry an estimated 7 million passengers every day while the public bus transport system accounts for 5.5 million passengers.

Increasing real estate prices have meant increasing time for commuting, with people having no choice but to live farther away from the city centre. A good system of feeder services is available to many of the railway stations. Mumbai also has a very high percentage of pedestrian traffic, which accounts for 51% of all modes of travel. This can be attributed to a large informal employment base, where workers live within a walkable distance to their work places. Also, a large volume of commuter traffic also undertakes one part of their journey, to reach the public transport node, on foot.

Regional level transportation within the City is largely under the purview of state and central agencies. While the DP may not suggest any major regional trunk links, it will address local level transportation demands through transit-oriented growth, multi-modal transport integration, improved connectivity, enhanced road networks, and creation of a safe pedestrian environment.

Greater Mumbai's roads and public transport system have not kept pace with the City's growth as it is currently witnessing acute road congestion and overcrowding in trains and buses (*Source: CTS, Transform Report, 2008*). Since the last DP 1991, vehicular traffic volumes and automobile ownership have risen dramatically, resulting in a continuous effort of providing more flyovers and undertaking many road widening schemes. These in turn have led to more congestion and pollution. Such road improvements are often undertaken at the cost of valuable pedestrian space. Air pollution is at an all time high with levels exceeding prescribed limits all over the City. Provision of safe facilities for pedestrians is a major issue in the city where walking is the dominant mode of travel.

¹⁴Greater Mumbai City Development Plan (2005-2025)

Major highlights from the CTS study (2008) of special relevance to Greater Mumbai are given below:

- a) 63% of all passenger-vehicle trips in MMR originate or terminate in Greater Mumbai. In addition, nearly 40,000 bus passengers arrive or depart from Greater Mumbai daily.
- b) Mumbai produces 47,300 tonnes of freight and attracts 40,700 tonnes on an average day.
- c) Private vehicle ownership 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.
- d) Between 1991 and 2005, there has been a 137% increase in vehicular traffic and 306% increase in two-wheelers, 420% in autos, and 128% increase in taxis resulting in severe congestion in Greater Mumbai and the region.
- e) Suburban Rail makes 7 million journeys daily on an average weekday. Average distance of commute is 26 km.
- f) 5.5 million trips are made daily by buses of these 1.5 million-2 million use buses to reach the railway station from their place of residence/ work.
- g) The Mumbai Port is experiencing severe evacuation problems due to the slow progress on a dedicated container terminal. Despite having its own railway infrastructure, most evacuation is by road, which causes delays due to the Port being surrounded by intense commercial activities, and the roads being shared with local traffic.
- h) Maximum trips are made by walking, followed by rail and then bus.
- i) Intermediate Public Transport (ITP) play a major role in meeting citizens' unstructured travel demands in city. There were nearly 1, 18,000 autos and 56,500 taxis in Greater Mumbai in 2005.
- j) Mumbai Domestic Airport handles around 685 flights per day and 30.2 million passengers and 0.63 MT of freight annually (2012-13).

9.1 Existing Transport Networks

Greater Mumbai dominates all movement systems in Mumbai Metropolitan Region. Every day on an average around 4.5 million people come into Greater Mumbai and 4.47 million people move out of Greater Mumbai. Linkages of Greater Mumbai with MMR have a major role in retaining the primacy of Greater Mumbai.

Transport Linkages with the Region: With increasing urbanization in areas outside Greater Mumbai within the MMR and with Greater Mumbai still being the most important centre for employment, facilities and residential functions, the inter linkages between Greater Mumbai and MMR are vital for the future. Road and Rail are the major existing networks that structure Greater Mumbai and extend to MMR and beyond. Concept Plan for MMR has conceived a grid of highways with an intermediate spacing of around 3 to 4 km in the region connected with Greater Mumbai by means of multiple trans-harbour links and through landward highways along north and north east of Greater Mumbai.

Public Transport: Greater Mumbai has an advantage of public transport system contributing to the highest number of trips. Considering the limited space available for roads in inner city areas where there is limited space available for roads and widening is not viable due to high cost of land and livelihood issues, public transport remains the only option to address the future transport demand.

Roadways and railways are the most important transport systems of Greater Mumbai. New modes such as metro rail and monorail are in their initial phases of construction. It is expected that these modes would bridge the existing deficiencies of rail network. Bus transport system is an important feeder network to railways. Intermediate Public Transport, such as auto rickshaws and taxis, also serve an important role providing flexible feeder services to mass transit. Mumbai Airport though not under

MCGM jurisdiction, impacts its surrounding transport networks in terms of congestion. The share of Public Water Transport is considerably low in the present public transport context in Greater Mumbai.

Physical infrastructure especially transport infrastructure has a major role in determining the competitiveness of Greater Mumbai. Public transport has always been the strength of Mumbai. The following sections analyses the existing transport networks.

9.1.1 Roadways

Major North-South arterial road networks in Greater Mumbai are the Western Express Highway, Eastern Express Highway and Sion-Panvel Highway. They extend and connect to important centres in the MMR and are therefore also considered as backbones of the MMR's road transport system. In general there are insufficient East-West cross road links in Greater Mumbai. Street networks in Greater Mumbai are largely narrow in their Right of Way, and their capacity is seriously reduced by lack of appropriate management of traffic and parking.

Main expressways in Greater Mumbai are:

- Western Express Highway connecting Bandra to Dahisar;
- Eastern Express Highway connecting Sion to Thane;
- Sion-Panvel Highway; and
- Eastern Freeway connecting Mankhurd to P. D'Mello Road.

Main arterial roads in Island City are:

- Western corridor (Netaji Subhash Marg, Peddar Road, Anne Besant Road);
- Central corridor (Baba Saheb Ambedkar Road, Senapati Bapat Marg and Maulana Azad Marg); and
- Eastern Corridor (P.D.Mello Road and RafiAhmedKidwai Marg).

Main roads in the Suburban District are:

- Swami Vivekananda Road;
- Linking Road and the New Link Road (Western Relief Road); and
- Lalbahadur Shastri Marg.

Major East-West cross-links in Suburban District are:

- Jogeshwari -Vikhroli Road (JVLR);
- Andheri-Ghatkopar Link road;
- Santacruz Chembur Link Road;
- Sion-Mahim Link Road.

Existing Road Network

Roads constitute 8.16% of the total area of Greater Mumbai and 14% of the developed areas in Greater Mumbai as per the ELU 2012. In the Island City roads constitute 16% of the developed area as compared to 13% in Suburbs.

Street networks in most of Greater Mumbai are old, narrow and their capacity is reduced considerably due to on-street parking, pedestrians walking on the streets due to inadequate footpaths, and hawkers

and other encroachments on roads and footpaths. There is lack of traffic and parking management and as a result road network capacity is reduced¹⁵.

Station Areas throughout the city are typically congested. Located in close proximity to Commercial Areas and markets, and surrounded by informal markets; they experience increasing number of vehicles and pedestrians, all competing for limited available road space. Station areas which are neighbourhood downtowns, usually have bus routes leading up to them. With increasing population pressures they usually experience bad traffic snarls during peak hours.

Bazaar areas in the Island city also experience traffic conflicts due to their narrow streets, bazaar activity and high pedestrian movements. Gaothans and Koliwadass face similar issues arising out of narrow pedestrian road networks.

East-West connectivity across the Western and Eastern Suburbs continues to be insufficient despite the Jogeshwari Vikhroli Link Road and the Andheri-Ghatkopar Link Road. Hampered by presence of the Sanjay Gandhi National Park in the North forging new East-West linkages is not easy. Additionally, it is observed that within Western Suburbs to the North, like Borivali and Kandivli, East and West connectivity across the Western Express Highway and railway corridor is poor leading to heavy congestion especially along main roads leading to and from the stations.

Due to inadequate road density and due to several missing road links in the overall road network structure, the general mobility and efficiency of flow of traffic in Greater Mumbai is reduced. This is particularly so in the Western Suburbs. While the need for major arterials and highways are addressed comprehensively at the larger scale, there are several areas that need to be addressed at the scale of the locality. Road network inventory of Greater Mumbai shows that 79% of the roads are below a width of 30m and almost half of the roads have two or three lanes only.

Table 20: Road Network Inventory: Greater Mumbai

Traffic Lanes Distribution	
Lanes	%
Single and Intermediate Lane	1.7
Two Lane undivided	26.7
Three Lane and above undivided	21.8
Two Lane divided	7.9
Four Lane divided	12.2
Six Lane divided	19.1
Eight Lane divided and above	10.7
Total	100

Source: MCGM GIS Database

Percentage of Right Of Way (ROW)	
ROW	%
ROW (0-15m)	25
ROW (15-30m)	54
ROW (>30m)	21
Total	100

¹⁵Source: The Comprehensive Transportation Study for Mumbai Metropolitan Region, July 2008

External Road Traffic Entering Greater Mumbai

Greater Mumbai experiences a large volume of entry and egress of passengers and goods traffic on a daily basis. They have a considerable impact on traffic along the main arteries. The traffic survey by CTS along major entrances to Greater Mumbai shows high volumes of traffic exchanges along the connection to Vasai Virar towards North and along connections towards Navi Mumbai.

Table 21: Traffic Volumes in Greater Mumbai

Location Name	Daily Traffic (Vehicles)	(PCUs)	Bus (%)	Goods (%)	Cars (%)	2-W (%)	Others (%)
NH-8: Near Dahisar Toll Plaza	87,067	90,284	3.61	11.62	26.91	28.16	29.7
LBS Marg: Mulund Toll Plaza	40,153	33,254	4.21	4.33	16.60	44.23	30.63
Old NH-3: Near Kasheli Bridge	25,713	39,292	3.54	39.41	18.09	20.22	18.74
Airoli Toll Plaza	46,892	55,127	3.50	16.11	39.31	35.23	5.85
Vashi Toll Plaza	83,039	1,29,223	8.40	25.30	42.10	16.70	7.5

Source: The Comprehensive Transportation Study for Mumbai Metropolitan Region, July 2008

Traffic Volumes on Major Roads of Greater Mumbai

Traffic volumes are important indicators to ascertain levels of traffic congestion in various areas. Modal split explains the traffic characteristics in the particular corridors. This not only helps gain an understanding of the transport network but also informs its relation with Land Use configurations.

As per the CTS, 2008, all the main arterial roads have a high percentage of private vehicle traffic (cars) ranging 24% to 51% of total transport volume whereas percentage of bus traffic is very low. This is one of the major reasons for traffic congestion along the corridors.

Goods vehicles ply highest on Sion – Panvel highway from and towards Navi Mumbai (42% of total traffic volume) due to presence of JNPT and other goods that are handled in the area. Eastern Express Highway also has a considerable proportion of goods traffic.

Table 22: Main Arterial Roads with Traffic Volumes more than 60,000 PCU/16 hr in Greater Mumbai

1	Netaji Subhash Marg	71,906 PCU/16Hr: Two wheelers, taxi, Car /Jeep constitute 97.8%, buses at 0.7%
2	Palton Road	67,062 PCU/16Hr: Taxis constitute 42% and cars 25%,two wheelers 18.7%
3	Lajpatrai Road	65,087 PCU/16Hr: Cars constitute 51% of the total vehicular traffic
4	Baba Saheb Ambedkar Marg	59,367 PCU/16Hr: Cars and Two wheelers constitute 34% and 30% respectively
5	Sion - Bandra Link Road	1,08,158 PCU/16Hr: Cars 34%, Two wheelers 24% and Goods vehicles 13%,buses at 2.8%
6	Eastern Express Highway	1,01,586 PCU/16 Hr : Cars 33%, Good vehicles 24%, Two wheelers 14%

7	Western Express Highway	66,403 PCU/16 Hr : Cars 29%, Two wheelers 24%, auto rickshaw 14%, Buses 2.6%
8	Sion - Panvel Highway	1,04,714 PCU/16 Hr: Goods vehicles 42%, Cars 29%, Two wheelers 15% and Buses 10.4%

Source: The Comprehensive Transportation Study for Mumbai Metropolitan Region, July 2008

The CTS 2008 also indicates that traffic volumes along the next hierarchy of road networks, shows comparatively higher proportion of IPT traffic, personal vehicles and buses.

Table 23: Main Arterial Roads with Traffic Volumes 40,000 to 60,000 PCU/16 hr in Greater Mumbai

1	Maharshi Karve Marg	46,150 PCU/16 Hr : Taxi 42%, Buses 4.2%
2	E Moses Road	54,909 PCU/16 Hr: Cars and Taxis 63%, Buses 2.6%
3	S.G Barve Marg	55,810 PCU/16 Hr: Cars 23%, auto-rickshaw 20%, Goods vehicles 16% Two wheelers 12%, Buses 11% and non motorized vehicles at 2.5%
4	BKS Devashi Marg	57,211 PCU/16Hr: cars 40%, auto rickshaws 17%, Two wheelers 17%, goods vehicle 10.5% ,buses 8.9%
5	Link Road (Oshiwara)	41,800 PCU/16 Hr: Cars 25%, auto- rickshaws 25 %, Buses 9% and cycles 8%
6	Approach Road to Domestic Airport	42,026 PCU/16 Hr: Passenger cars constitute the maximum share of traffic
7	Tilak Bridge	57,721 PCU/Hr: cars 38%, Taxis 36% and Two wheelers 16 %, Buses 5.7% and non motorized traffic at 3.7%
8	Mathuradas Vasanji Road	58,503 PCU/16 Hr: Auto Rickshaw 31%, Cars+ Two wheelers 21% and Buses 10%

Source: The Comprehensive Transportation Study for Mumbai Metropolitan Region, July 2008

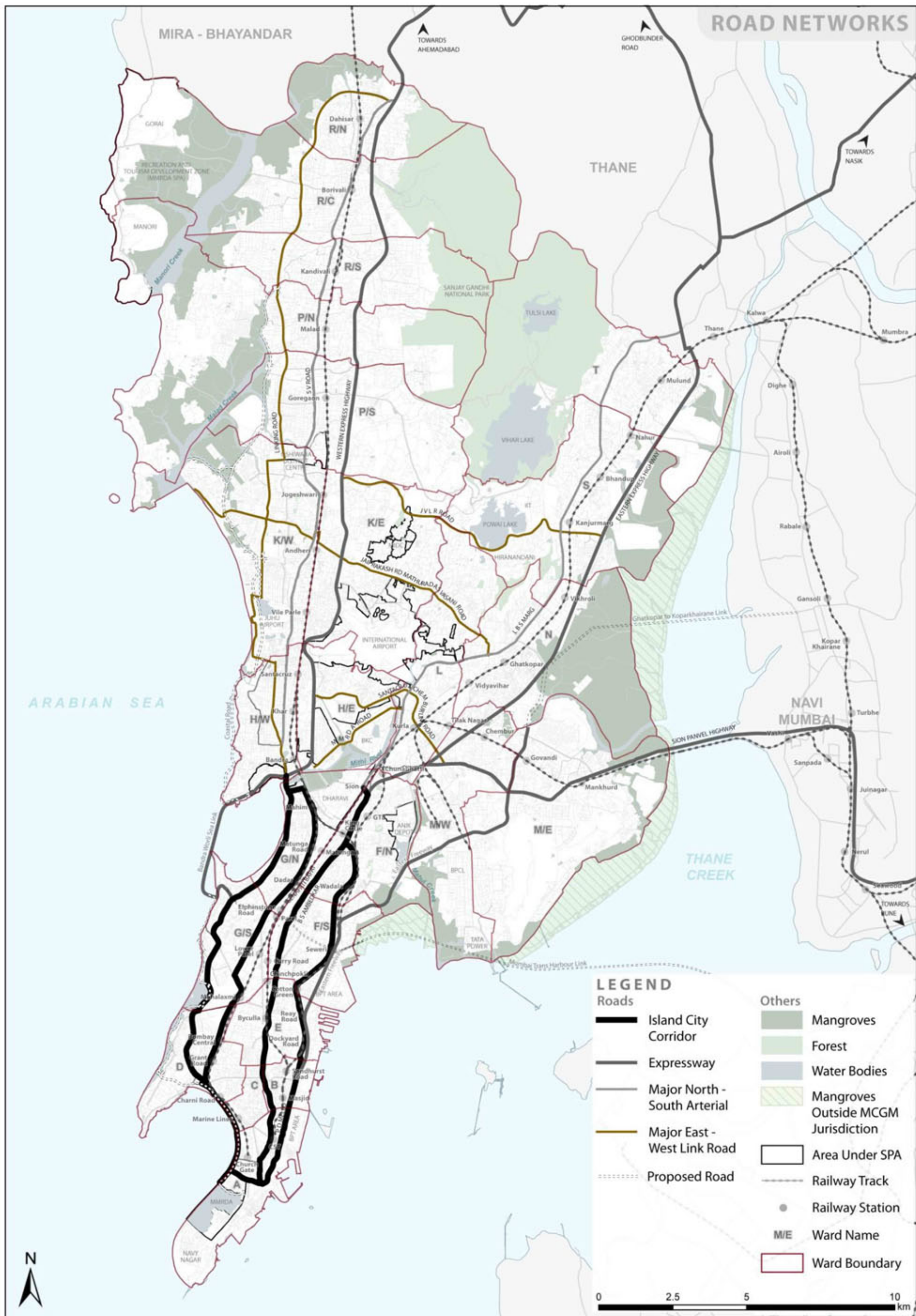
Local Level Street Network

In terms of standards for requirements of roads at (neighbourhood levels) local levels, Delhi Development Authority (DDA), in the Master Plan for Delhi 2021, suggests that 12% of planning area is required as allocation for local roads in order to achieve desirable level of connectivity in terms of providing access to each land parcel. An analysis of proportion of roads available vis-a-vis total area at the Planning Sector level revealed that most of the Planning Sectors in Greater Mumbai require more road area to achieve a reasonable level of connectivity at the local level. Missing road links in the Suburbs and large land parcels without public thoroughfares (erstwhile industrial lands) in the Island City, create traffic bottlenecks and inconvenience for movement of traffic.

Missing Links along Roads, Railway Crossings and Railway Stations

Lack of connectivity between important roads, presence of at grade railway lines and other obstructions also contribute to longer trip lengths by road. This affects smooth flow of traffic and causes bottlenecks along the main road networks. Lack of connectivity in areas that are in proximity to railway stations exacerbate congestion. There is a need for enhanced connectivity across railway lines, expressways in the form of new links, bridges and crossovers not only along main roads but also at local levels across railway lines, highways and at other locations that lack linkages.

Map 10: Major Road Networks of Greater Mumbai



Bus Network

In Greater Mumbai, Brihanmumbai Electric Supply and Transport Undertaking (BEST) is the largest public bus transport service provider with a fleet strength of 4,699 and operating on 506 routes. BEST operates services within Greater Mumbai, and to major destinations outside Greater Mumbai. Ferry services between Manori and Malad are also run by the organisation. Bus transport is an important feeder system for rail based mass transit, and contributes 25% of total trips (excluding pedestrian). However, the system is ageing and losing popularity due to general traffic congestion¹⁶. As per 2011 data there are a total of 4,699 buses in service, including 3,799 non-AC buses accounting to 80% of the total fleet and 412 AC buses. Of the total number of buses 2,985 buses run by CNG accounting to 63.5% of the total buses¹⁷.

The CTS projected that the importance of bus transport would face major threat due to growth of personal vehicles and increase of rail based transport such as Metro and Monorail. The study projected that the modal split of bus transport would decline from existing 25% to around 9% in the coming two decades. However, the advantage that bus public transport offers is that it entails lesser operational cost and offers more flexibility.

Bus Terminals

Major regional bus terminals in Greater Mumbai are Mumbai Central, Parel, and Dadar, located within the Island City. These locations are the major hubs of transit, commercial and institutional activities. Bus terminals such as Kurla, Borivali and Nancy Colony connect to Residential Areas in the Suburbs. Bus Terminals are generally located near suburban railway stations and inter-city railway stations so that public bus transport can also effectively act as feeders to the rail network.

New Bus Terminals and Augmenting Infrastructure in Existing Terminals

On analysing the location of existing terminals and accessibility to areas that are under served, CTS notes that new inter-city bus terminals are required between Bandra and Borivali in the Western Suburbs and between Kurla and Mulund in the Eastern Suburbs. It proposes to develop on priority, a dedicated interstate bus terminus near the Wadala Truck Terminal in Greater Mumbai. Parking facilities for private vehicles at the terminals are either nonexistent or needs augmentation. Existing terminals in Dadar, Sion, Kurla-Nehru Nagar, Borivali and Borivali-Nancy Colony bus stations lack basic infrastructure facilities such as waiting hall, drinking water facility, toilets etc.

Bus Depots

There are 41 existing bus depots in Greater Mumbai. Presently, they lack basic infrastructure facilities and require augmentation of capacity. It is observed that the areas occupied by bus depots lack adequate space for primary and secondary depot activities. As per the Traffic Planning Department, MCGM bus depots are required at Mulund East, Dahisar East and at Trombay.

As per Traffic Planning Department of MCGM, several bus stations need improvement in terms of more space for buses, chowkeys and basic amenities; the details are provided in Table below.

¹⁶Data received from BEST in 2011

¹⁷Ibid

Table 24: Requirements in Existing Bus Stations

	Requirement of Bus stations	Remarks
1	Mulund station West	There are 10 routes functioning whereas there is only a two seat chowkey and temporary shelter are available on road
2	Vikhroli station West	Lack of dedicated space for buses
3	Nahur station East	Bus station requires to be planned near the new railway station
4	Kurla station East	Lack of space for manoeuvring of buses whereas the area faces heavy traffic
5	Kurla station East	Lack of dedicated space for buses and operations control are on road
6	Andheri station East	Lack of dedicated space for buses and operations control are on road
7	Jogeshwari station East	Lack of dedicated space for buses and operations control are on road
8	Shivshahi Prkalp or Santhosh Nagar	Off loading of Dindoshi bus station and to cater new developments up to Santosh Nagar
9	Malad Railway station West	Operations are controlled from 3 different chowkeys and lack of dedicated space for buses
10	Borivali station West	There are 12 routes controlled from the chowkeys whereas there is lack of space
11	Borivali station East	There are 24 routes controlled from the chowkeys whereas there is lack of space
12	Dahisar station East	There is no chowkey at the vicinity
13	Oshiwara station East or West	Bus station requires to be planned near the new railway station
14	Bandra station East	The operations control point is on road and lack of dedicated space
15	Byculla station West	The operations control point is on road and lack of dedicated space
16	Mahul	The operations control point is on road and lack of dedicated space
17	Refineries	The operations control point is on road and lack of dedicated space
18	Sewri station West	Bus station requires to be planned near the new monorail station and to serve the new linkage planned in BPT premises.

Source:Traffic Planning Department, MCGM.

Facilities for Private Bus Stops/Terminals

Private buses also play a major role in intercity movement. At present the places of pickup and drop-off by private buses are informally organised. Lack of dedicated space and facilities at these points causes obstruction to general traffic movement and inconvenience to passengers.

Meeting the existing gaps in the road based public bus transport network and providing support towards the sustenance of bus based transport in the future is a challenge the DP 2014-34 needs to address

9.1.2 Railways

The Railway system has been considered as the lifeline of Mumbai: connecting people, businesses and goods of not only Greater Mumbai but also of the MMR. Cost of travel by Suburban rail is highly subsidized and reliable; therefore, it serves the highest modal share.

Indian Railways, the national intercity passenger and freight operator of India, plays the crucial role of providing urban railway connectivity in Greater Mumbai and the MMR. The Western Railways and Central Railways serve Greater Mumbai and the MMR. The Western Railway lines connects Churchgate Terminus in the Island City to Dahisar running along the western coast. It extends beyond the MMR to link Greater Mumbai to Ahmedabad and Delhi. The Central Railway lines connect the Chhatrapati Shivaji Terminus in the Island City to Mulund. It extends beyond the MMR to link Greater Mumbai to a large part of Central India. The Central and Western Railway Zones supported by three main railway lines connect the suburban rail in Greater Mumbai to long distance rail and freight traffic services.

Western Line: The Western line runs from Churchgate station in the Island City and exclusively serves suburban passengers. Its operation extends to Dahanu Road, 124 km to the North from Churchgate. Western Railway Suburban line has 36 suburban stations including long distance train terminals such as Mumbai Central, Dadar and Bandra and the other important stations such as Andheri and Borivali.

Central Line: The Central Railway line runs from Chhatrapati Shivaji Terminus (CST) to Kalyan and further to Khopoli (61 km) and Kasara (67 km) to the east of Mumbai. The Central Railway within Mumbai region has 62 suburban stations and in two lines namely main line and harbour line. The important stations on the Main line of Central Railway are CST, Dadar, Kurla, Ghatkopar, and Thane. Central line also carries long distance passenger trains that terminate at Mumbai CST or at Kurla terminal; with intermittent stops at Dadar, Ghatkopar, Thane and Kalyan.

Harbour Line: Harbour line services extend from Mumbai CST station. One branch runs north-west to join the Western Railway line at Bandra and further continues till Andheri, whereas other line continues northwards to Kurla, where a connection is made with CR main line, before turning East to serve Mankhurd, and across the Thane creek to provide access to the Navi Mumbai area till Panvel. Between Mumbai CST and Wadala Road the line is exclusively used for suburban traffic. However, north of Wadala the lines are shared with freight traffic to and from Mumbai docks.

Railway Passenger Movement from MMR in to Greater Mumbai

Commuters from various parts of MMR travel long distances by train to Greater Mumbai for everyday activities such as work, recreation, education and health facilities. Highest daily average passenger movement into Greater Mumbai is along the Central line, at 6,24,000, whereas outgoing passenger traffic is at 5,33,000. Movement in to Greater Mumbai from the Western line is 2,50,000 and-outgoing movement is 2,09,000. The Harbour line entails an inward movement of 4,50,000 passengers. Its outgoing passenger volumes stand at 3,08,000. Rail passenger movement from Thane, Bhiwandi, Kalyan and Navi Mumbai towards Greater Mumbai have a major contribution to commuter traffic volumes in the Western, Central and Harbour lines.



Railway Passenger Movement within Island City in Greater Mumbai

The survey conducted by the CTS, 2008, reveals that rail passenger trips for the year 2003-04 were 6,15,000 per day and for 2004-05 were 6,34,000 per day. Survey of Island City cordon shows movement of 2.02 million passengers entering in to the Island city and 2.07 million passengers moving out of the Island City on a daily basis. However, the stations in the central part of Greater Mumbai, such as Dadar, Mahim, Bandra, Andheri, Kurla and Ghatkopar face the highest concentration of passenger movement. Most of these stations are also served by more than one railway line. While Dadar is served by the Western and the Central Railway lines, stations from Mahim to Andheri are served by the Western and Harbour lines. Kurla is served by Central line and Harbour line. These stations act as interchanges between the Western, Central and Harbour lines and hence have major impact on the surrounding Land Uses and transport in the areas.

Intercity Rail Network

A number of intercity trains originate from Greater Mumbai, these include regular (trains that run on all days/weekdays) and staggered trains (trains that run on alternate days or few days in a week). The Western Railway operates 72 intercity trains and the Central Railway in Greater Mumbai operates 152 trains. The inter-city rail passenger terminal stations in Greater Mumbai under the jurisdiction of Western Railway are Mumbai Central, Dadar, Bandra, Andheri and Borivali stations are significant as halt stations. On Central Railway, terminal stations are Chhatrapati Shivaji Terminus, Lokmanya Tilak Terminus and Dadar. These stations form nodes of multiple modes of rail based transit networks.

Gaps in the Existing System

The rail-based transport system predominantly caters to the North-South traffic and has longer trips than the bus system (average trip length of 15-20 km). Passenger traffic in the suburban railway system has increased six times since its inception, but its capacity has been augmented by only about 2.3 times. Hence the system is under immense pressure during peak hours, on an average each train carries about 4500 passengers against its capacity of 1,750 passengers¹⁸. East-West railway connectivity has been a major need to disperse the concentration of passenger movement, it is expected that this would be addressed by proposed and under construction Metro Rail and Mono Rail projects.

Goods Movement

Interaction analysis of movement of goods in the MMR by CTS for Mumbai Metropolitan Region reveals that Greater Mumbai attracts the maximum quantum of goods amounting to 46.3% in terms of tonnage recorded in the MMR. Greater Mumbai also attracts 29.8% of movement of goods vehicles in the MMR. A high proportion of goods attracted to Greater Mumbai are from Navi Mumbai contributing to 48.3% of total tonnage. Correspondingly 43.0% of goods vehicles coming into Greater Mumbai are originated Navi Mumbai. This is due to the location of Jawaharlal Nehru Port, APMC, steel markets and other goods handling in Navi Mumbai.

Therefore in terms of movement of goods vehicles connectivity to Navi Mumbai is of major importance. Other important origin-destinations with respect to goods related connections to Greater Mumbai are Kalyan, Vasai, Virar, and rural areas of MMR and Thane.

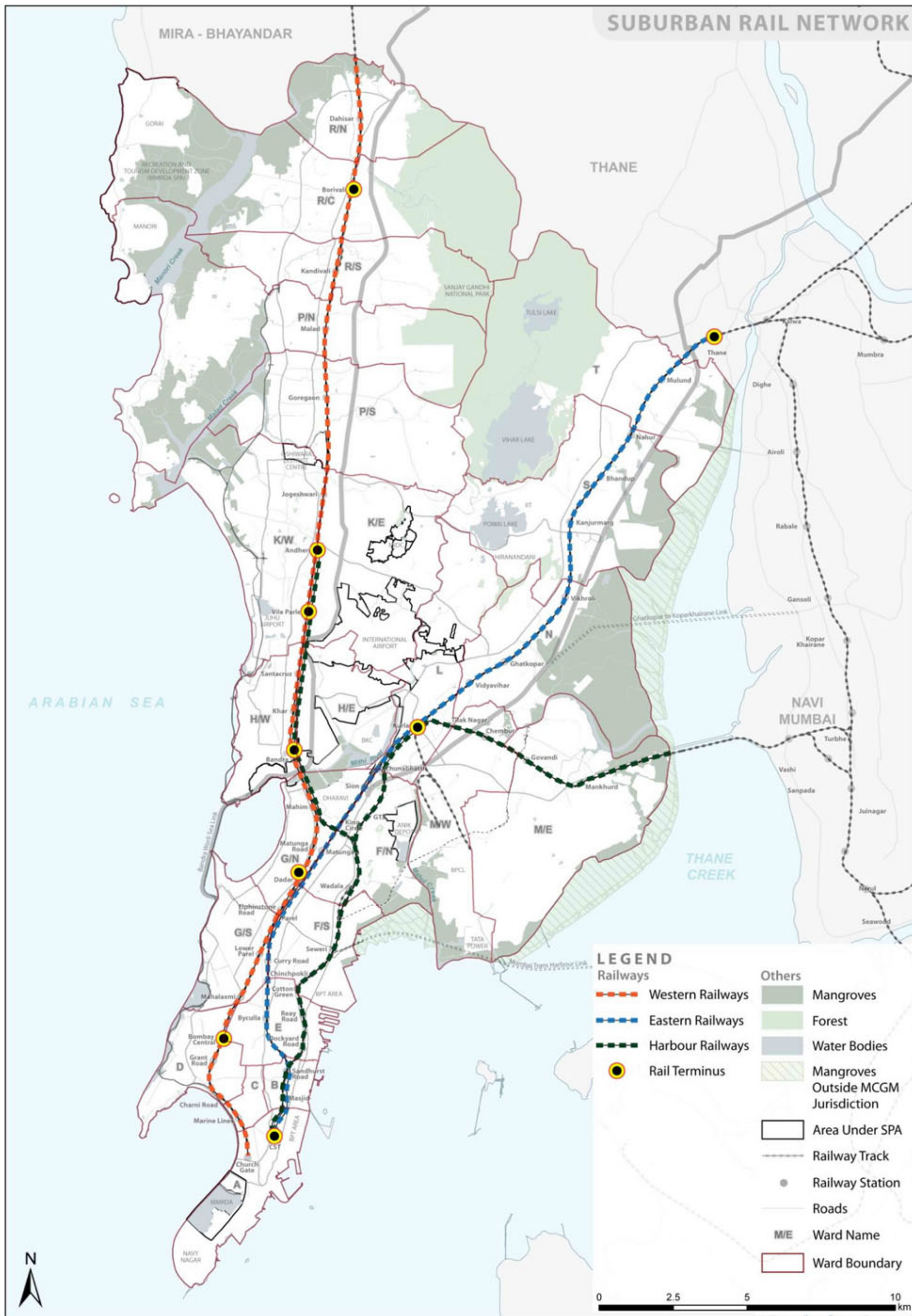
¹⁸ Greater Mumbai City Development Plan (2005-2025)

Goods Terminals

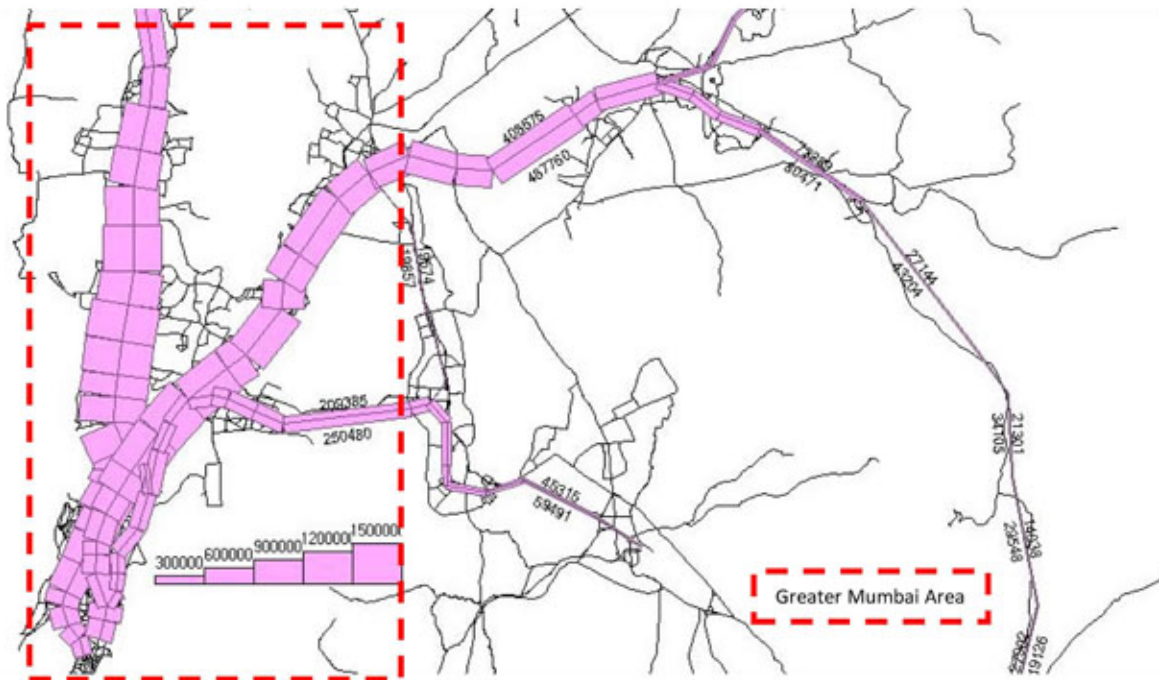
There are 14 goods terminals located in Greater Mumbai including the Wadala Truck Terminal, Railway Yard Mulund, Railway Yard Goregaon, Reay Road terminal yards, FCI godowns, Borivali, Wadi Bandar Railway Yard, BPCL Sewri Oil Depots, HPCL Sewri Oil Depots, BPCL Sewri Oil Depots, IOCL Sewri Oil Depots, HPCL Terminal II Sewri, HPCL, Terminal I, Wadala, and FCI Godowns Wadala. The CTS has projected a 5.7% growth of goods traffic in MMR and have proposed additional truck terminals at strategic locations in the region. However, none of the proposals in the CTS for additional goods terminals fall within Greater Mumbai.



Map 11: Suburban Rail Network of Greater Mumbai

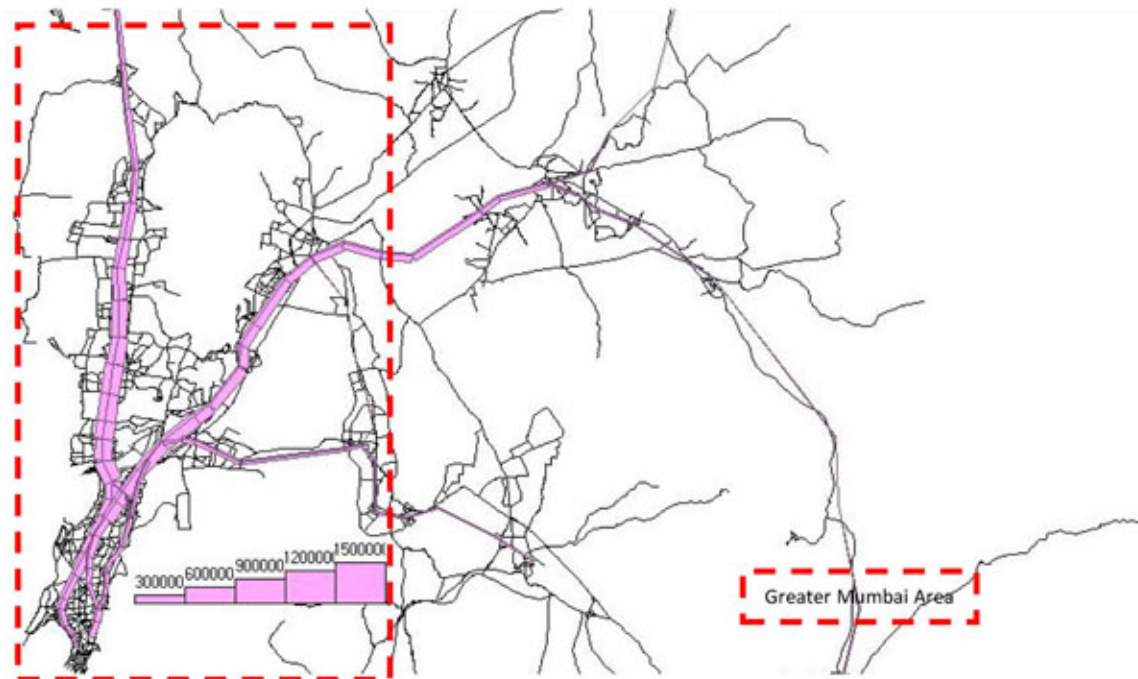


Daily Link Loadings on MMR Rail Network



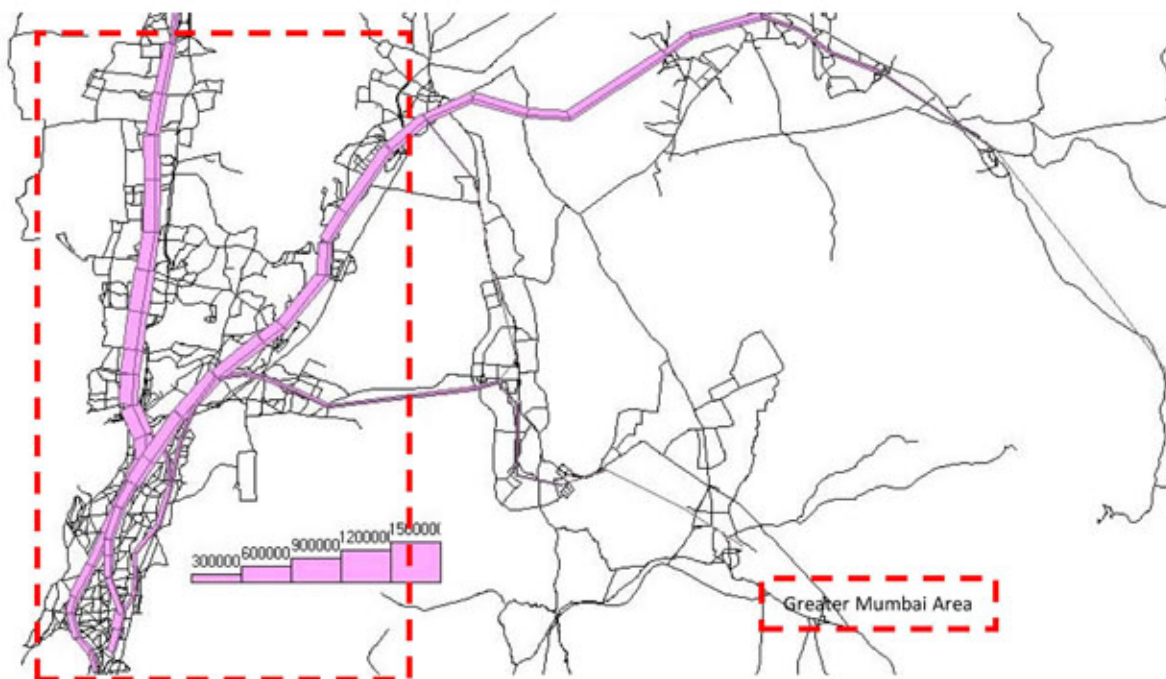
Source: The Comprehensive Transportation Study for Mumbai Metropolitan Region, July 2008

Loadings on MMR Rail Network: Morning Peak Period (6:00 to 11:00 Hrs.)



Source: The Comprehensive Transportation Study for Mumbai Metropolitan Region, July 2008

Loadings on MMR Rail Network: Evening Peak Period (17:00 to 23:00 Hrs.)



Source: The Comprehensive Transportation Study for Mumbai Metropolitan Region, July 2008

9.2 Intermediate Public Transport

Intermediate Public Transport (IPT) includes transport by auto-rickshaws and taxis. They play a vital role as feeders in the transportation system of Greater Mumbai. IPT provides point-to-point service and is often used as a feeder service to the main mass transportation systems and terminals. IPT travel is usually preferred for shorter distances with average trip length 5.1 km for taxis and 2.9 km for autos.

As per CTS survey growth of IPT numbers is almost stagnant in Greater Mumbai, due to growth of personal vehicles. It is projected that while the share of IPT modal split is expected to reduce due to availability of Metro rail services and increase of personalised vehicles, the actual number of trips by IPT is expected to increase in the future in Greater Mumbai.

9.3 Airport

Mumbai Airport (with International and Domestic terminals) is an important air traffic node of the country. Air travel projections for the Airport indicate 9% growth of domestic traffic and 6.5% of international traffic. This implies air transport demand for 2031 would be domestic travel increase to 54 million against 9.6 million in 2003-04 and international transport increase to 21 million from 6.1 million.

Currently, Mumbai Airport handles 30.2 million passengers and 0.63 million tons of freight annually. (2012-13). The Mumbai Domestic Airport handles about 685 flights per day. This translates into approximately 1 flight operating (either landing or take off) every two minutes¹⁹.

At Greater Mumbai level, the connectivity between the Airport and existing terminals at Santa Cruz and Sahar is weak. Various key destinations in the City are also not well linked to the Mumbai Airport.

¹⁹ Source: Press Information Bureau, Government of India 2012-13

Specific road projects are being developed to address this demand, such as the Sahar Elevated Road and the 2nd phase of the metro rail connectivity (connecting Western and Eastern parts of Greater Mumbai to Mumbai Airport).

9.4 Pedestrian Movement

Presently, 51% of the total trips made in Greater Mumbai are by walking. 72.5% trips for education are also by walking. Workers of economically weaker sections, especially women and children, who often do not afford motorised modes of transport, constitute a significant proportion of pedestrians. In addition, most of the public transport journeys (60%) necessarily start and end as walk trips. The walk trips are also considerably short in length: more than 80% of walk trips to work places or schools are less than 15 minutes.

Presently, several conditions discourage pedestrian movement. These include several permanent and semi-permanent structures located along edges of the right of way of streets; haphazard parking of vehicles in the absence of footpath; lack of designated hawking area especially around the railway stations; discontinuous footpaths with changing levels at every property entrance and intersections. Moreover, the pedestrian footpaths and facilities are not equipped to serve universal accessibility for differently abled people.

Undesirable and unsafe pedestrian walk environments force commuters to switch to other mechanized modes. Longer North-South rail trips and distances greater than 1 km between places of work/residential areas and stations (especially in the northern part of the Western Suburbs, for example, at Malad, Kandivali) discourage walking as a mode of travel. The lack of adequate pedestrian footpaths, inadequate traffic management solutions around transit nodes and lack of pedestrian cross over facilities at strategic locations increase pedestrian and vehicular traffic conflict.

9.5 Public Water Transport-Regional Services

Given that Greater Mumbai is facing a rapid increase in demand for transport, the main systems of rail and road are under immense pressure. Considering the vast coast line of Greater Mumbai and the Region, public water transport is one of the alternative modes that may marginally augment other modes of public transport systems. Currently, Manori and Versova handle the maximum passengers by ferry launches in the MMR. Accessibility to public water transport terminals, uncertainty of schedules due to weather conditions, restricted period of operation and need for reliable disaster management systems are prime reasons that have interfered with water transport systems getting underway.

9.6 Proposed Plans and Projects

There are several transport projects under planning and implementation within Greater Mumbai. In general these projects are planned with a view of serving transport demand for the next two decades. Major projects such as Metro rail, Monorail, and new expressways/freeways have a major role in shaping the transport scenario for the future. The Development Plan needs to consider the proposals, anticipate their impacts on the overall movement systems and integrate them with Land Use proposals for the future.

9.6.1 Roads

- **Eastern Freeway:** This is a controlled-access freeway that connects the Eastern Suburbs with South Mumbai. It links P. D'Mello Road in South Mumbai to the Eastern Express Highway (EEH)

at Ghatkopar. It is 16.8 km long and has been initiated by MMRDA. A 13.59 km stretch of the freeway, comprising two of three segments (from Orange Gate on P D'Mello Road up to Panjarpol, near RK Studios in Chembur) is currently operational, with the remaining stretch under construction. It reduces travel time from 90 minutes to a mere 15 minutes.

- **Santacruz - Chembur link:** the 6.5 –km double deck flyover is under construction, would reduce journey from Santacruz to Chembur to 17 minutes.
- **Andheri-Ghatkopar link:** the 7.9 km road connects the Western Express Highway in Andheri to Ghatkopar via Saki Naka and Asalpha.
- **Mumbai Trans Harbour Link (MTHL):** The proposed link will improve connectivity between Greater Mumbai Island city and main land (Navi Mumbai) and would accelerate development of Navi Mumbai area as envisaged about 30 years ago. The connection includes a 22.5 km long 6-lane bridge connecting Sewri on the island city to Nhava on the mainland with interchanges at Sewri and near Chirle village on NH4B. The road includes a 16.5 km long sea link and 5.5 km viaducts on land. The project is expected to be commissioned in the next 5 years.
- **Elevated Link from Sewri to Worli Sea Link:** The proposed elevated road link intends to connect the areas between MTHL interchange and Worli Sea Link and is expected to ensure rapid connectivity between the main land and the Western Suburbs.
- **Coastal Road (West):** Joint Technical Committee (JTC), Govt. of Maharashtra has proposed access controlled Coastal Road along the western coast from Nariman point to Malad 35.60 km long, with interchanges at 18 locations connecting to other major roads. The JTC proposes two options. The first involves reclaimed roads in the mangrove areas, while allowing free movement of water in the mangroves by bridges. The second option is to replace the reclaimed roads by stilted or elevated roads in a length of about 8 km. The proposed coastal road is expected to provide high-speed connectivity to Western Suburbs and South Mumbai.
- **Sahar Elevated Road connecting to Airport:** The elevated road connecting Mumbai International Airport to Western Express Highway connection of 2 km length is under construction.

9.6.2 Metro rail

Historically, the East-West linkages in Greater Mumbai have been weak, due to geographical constraints. There are also several constraints in expanding the capacities of existing rail and road networks, and many areas in the Island City and the Suburban District are not served efficiently, by rail based mass transport system. In order to provide a rail based mass transit connectivity within a convenient walking distance for each of the areas of Greater Mumbai, Metro Rail System is proposed for a total length of 146km²⁰ (within MCGM limits). The following Metro lines are under various stages of implementation and planning.

²⁰ Source: MMRDA

Table 25: Proposed Metro Rail Routes in Greater Mumbai

Metro Line	Route	Length (km)	Status
Phase- 1			
Line 1	Versova – Andheri – Ghatkopar corridor	12	Under Construction/ partly complete
Line 2	Charkop – Bandra-Mankhurd	39.2	Committed
Line 3	Colaba-BKC-SEEPZ	33	Committed
Phase- 2			
Line 4	Dahisar - Charkop	7.5	DPR Completed
Line 5	Wadala- Ghatkopar – Teen Hath Naka	20	DPR Completed
Line 6	BKC –Airport- Kanjurmarg	19.5	DPR Completed
Line 7	Andheri (E)- Dahisar (E)	18	DPR Completed
Line 8	Wadala – Carnac Bundar	13.3	DPR Completed
Line 9	Sewri - Prabhadevi	3.5	DPR Completed

Source: The Comprehensive Transportation Study for Mumbai Metropolitan Region, July 2008

Of the Metro Rail alignments that have been committed, Lines 1 and 2 are above grade and Line 03 runs underground. The CTS underlines the need to extend the Metro rail network to important centres of MMR to ensure balanced development in the Region.

9.6.3 Mono Rail

Monorail is envisaged as a feeder network to mass transit system; it occupies very limited space on ground; can negotiate sharp turns and can climb up and down steep gradients easily. Implementation of about 20km stretch from Sant Gadge Maharaj Chowk (Jacob circle)-Wadala - Chembur with 18 stations as pilot project is under construction.

9.6.4 Western Railway

Additional elevated rail corridor from Oval Maidan to Virar has been proposed by the Western Railway to be implemented in the PPP mode, in order to cater to the large passenger volumes in this route.

9.7 Integrated Land Use and Transport System

Greater Mumbai has a strong interconnectedness between transport networks and commercial and residential uses. The proposed metro and monorail networks need to be considered as important Land Use structuring elements for future development. Identifying current and future station hubs are a necessary step in establishing a hierarchy within the transportation network, which would then inform future Land Use planning. An assessment of both current and future station hubs based on the

confluence of rail networks show that the following stations on the Suburban lines will gain greater significance:

- Churchgate, Dadar, Bandra, Andheri and Borivali stations along the Western Railway line;
- CST and Kurla, Ghatkopar station of the Central Railway Line;
- Wadala station along the Harbour Line and Dadar station on the Main Line: these stations are already well established intercity and intracity transport hubs, with good connectivity to the City.

Since all these stations have more than one transportation network or utility, they would act as the key potential nodes for Transit Oriented Development in the future in addition to the other stations on the transit corridors. Strengthening the existing significance of these hubs would mean planning for their enhancement as integrated multi-modal transport hubs.



Map 12: Mass Transit Networks in Greater Mumbai



Source: Monorail & Metro alignments as per MMRDA

9.8 Parking

Parking is a vital link between transportation and land use. While major public investments are being made on improving public transport, ownership of private vehicles is increasing rapidly in Greater Mumbai. As per the CTS 2008, it is expected that number of private vehicles in 2005 would get nearly doubled by 2031. The on-plot parking requirements in Greater Mumbai have been periodically increased in response to ever increasing demand for vehicle ownership. While increasing private car ownership is a result of increasing income, provision of parking is seen as a public responsibility. Consequently, 'parking lot' is included as a reservation for public purpose in the development plan. Various concessions are being granted to increase supply of 'parking places' though there are severe space constraints on increasing the networks capacity that can facilitate 'movement' of cars. The apprehension is that if adequate off street parking is not provided cars will be parked on the street further limiting the street capacity for movement of cars.

However, major Asian cities such as Singapore, Seoul and Hong Kong are undergoing a paradigm shift from conventional auto centric approaches towards parking to multi-objective demand management approach to parking. Studies²¹ show that for Asian Cities, which have high density, low car ownership and relatively better patronage of public transport, a 'parking demand management' approach, through a market oriented parking policy is more suitable than the conventional approaches.

Providing road for 'movement' of cars is a 'public good' as it meets the essential criterion of non-excludability. In contrast, space for a parked car is a 'private good'. In principle, public goods are justifiably provided by public agencies and private goods are best provided by the market. However, cars easily use up roads for parking making it necessary to control such private use of a public good. This could be achieved through enforcement and pricing.

A summary of existing parking regulations in Greater Mumbai is provided here:

- **Off-street Parking Requirements:**

- 1) Despite having lower levels of car ownership and high dependency on public transport, off street parking requirements within plots in Greater Mumbai, in general, are much higher than that of corresponding parking requirements of cities such as Hong Kong, Singapore and Delhi.

For every 100 sqm of offices floor space, in Singapore parking space requirement ranges from 0.22 to 0.5 based on the location. In Hong Kong it varies between 0.33 to 0.5 car spaces per 100 sqm and in Delhi it is 2 to 2.4 cars. In Greater Mumbai it is 2.66 for first 1,500 sqm and above 1,500 sqm additional 1.33 car space for every additional 100 sqm.

For every 100 sqm of residential floor space, in Singapore 1 car space is required for every residential unit, in Hong Kong the requirement ranges from 0.16 to 0.63 based on the location and in Delhi 2 car spaces are required. In Greater Mumbai the requirement ranges from 0.71 to 4.44 based on size of the unit and location.

For every 100 sqm of commercial shops floor space, in Singapore car space requirement ranges from 0.25 to 0.66 based on location, in Hong Kong the requirement ranges from 0.33 to 2.5 based on location and in Delhi at 2 to 2.4. In Greater Mumbai it is 2.5 car spaces per 100 sqm up to 800 sqm area and for every 100 sqm exceeding it 1.25 additional car spaces are required.

²¹ Parking as a Mobility Management Tool, Parking Policy in Asian Cities, Asian Development Bank, 2011

- 2) Parking regulations in Greater Mumbai permit a very high provision of parking. The current regulations in Greater Mumbai, stipulate minimum off street parking requirements that are not counted in FSI for various types of land uses. Additionally 25% of total parking space is exempt from FSI without paying premium, 25% for visitors parking is exempt from computation of permissible FSI in case of residential uses and 10% of total parking space for using mechanical means for parking in non-residential buildings is also exempt from FSI calculation.
- 3) The parking requirements initially stipulated by the parking regulations of DP 1991, at the parcel level, also have been increased time to time to meet the demand for parking space.
- 4) The current requirements apply to new developments. However, requirements of already developed areas are not catered through these permissions.
- 5) Often parking spaces are sold bundled with floor space by developers. Therefore, cost of development of parking also tends to be loaded on the floor space. This denies the option of not buying parking space for those who do not want to own cars thus affecting the housing affordability.

- **Multi Storied Parking:**

Under the Regulation 33 (24) of current DCR, FSI incentives are provided for development of multi storied parking in private plots, which are not reserved as parking lots, the parking so developed is handed over to MCGM free of cost.

- **Underground Parking:**

As per Regulation 68 of current DCR, with exceptions of some of the major open spaces, development of underground parking is allowed on lands reserved for recreational ground / play ground/ gardens/ parks and open spaces and DP Roads.

- **On-street Parking:**

Although considerable attention is paid to off-street parking of cars, parking of taxis, auto-rickshaws, tempos, trucks and private buses happens on streets - some of it during non-peak hours without affecting the general traffic. However such parking also needs to be properly regulated.

Summary :

- The Suburban Rail accounts for more than 7 million daily trips;
- Road based transport along with the bus transport system accounts for over 5.5 million daily trips;
- According to the Greater Mumbai, City Development Plan (2005-2025), the rail-based transport system caters to the North-South traffic and has longer trips than the bus system (average trip length of 15-20 km). The passenger traffic in the suburban system has increased six times since its inception, but its capacity has been augmented by only about 2.3 times. On an average, each train carries about 4,500 passengers as against its capacity of 1,750 passengers.
- Daily trips by walking account to 51% in Greater Mumbai whereas car trips account to only 2%. However, ease of pedestrian movement is weak despite the high percentage of walking trips;
- Greater Mumbai displays a strong interconnectedness between distribution of Land Use and public transport networks.
- While Churchgate , CST, Dadar, Lower Parel form significant multi-modal transit nodes in the Island City; Andheri, Ghatkopar, Borivali and Mulund are major transit nodes in the Suburbs;
- Large investments are being made in multiple modes of public transport, viz., mono, metro and suburban rail, and bus based transport systems to support demand for increased mobility for work and education based trips;
- The lack of a parking demand management approach coupled with efficient street network structure and street standards that enhance walkability reduce street capacity in Greater Mumbai today.

