MUNICIPAL CORPORATION OF GREATER MUMBAI

ENVIRONMENT STATUS REPORT 2018 - 2019

Matoshri Meenatai Thackeray Shilpagram, Jogeshwari (East)

Baptista Garden, Mazgaon

बृहन्मुंबई महानगरपालिका

ENVIRONMENT STATUS REPORT 2018 - 2019

SCIENTIST IN-CHARGE,

AIR QUALITY MONITORING & RESEARCH LABORATORY,

Municipal Market Office Building,
New Paramount Chs, Tilak Road,
Santacruz (West), Mumbai - 400 054.

Telephone: 26497483/26498308
Email: aqmrldata@gmail.com.

बृहन्मुंबई महानगरपालिका

प्रवीण परदेशी
महापालिका आयुक्त
बृहन्मुंबई महानगरपालिका

मनोगत

मुंबईकरांना नागरी सेवा-सुविधा देण्यासाठी कटीबद्ध असणाऱ्या बृहन्मुंबई महानगरपालिकेच्या कर्तव्यांमध्ये पर्यावरण संरक्षण आणि निसर्गाच्या संवर्धनाचाही समावेश आहे. बृहन्मुंबई महानगरपालिका कायद्यातील 'कलम 61 (अ ब)' नुसार आपल्या क्षेत्रातील वनांचे व पर्यावरणाचे संरक्षण करणे आणि निसर्गाचे संवर्धन करणे, हे महानगरपालिकेचे कर्तव्य आहे. बृहन्मुंबई महानगरपालिका कायदा 'कलम 63ब' नुसार बृहन्मुंबई महानगरपालिका क्षेत्रातील पर्यावरणाबाबत 'पर्यावरण स्थितीदर्शक अहवाल' महानगरपालिका सभागृहामध्ये दरवर्षी सादर करण्यात येत असतो. त्यानुसार आर्थिक वर्ष 2018-19 चा 'पर्यावरण स्थितीदर्शक अहवाल' सादर करण्यात येत आहे.

'पर्यावरण' हा आपल्या सगळ्यांशीच थेटपणे संबंध असणारा जिव्हाळ्याचा आणि संवेदनशील विषय आहे. बृहन्मुंबई महानगरपालिका क्षेत्रातील पर्यावरण विषयक संवर्धनासाठी महागनरपालिकेने वेगवेगळे प्रकल्प हाती घेतले असून त्यांची कामे प्रगतीपथावर आहेत. यावर्षीच्या अहवालानुसार मागील दोन वर्षाच्या तुलनेत यावर्षी दूषित पाण्याच्या घटलेल्या टक्केवारीचा उल्लेख याठिकाणी करणे उचित ठरेल. सन 2016-17 व सन 2017-18 या दोन वर्षात महानगरपालिका क्षेत्रातील दूषित पाणी नमुन्यांची टक्केवारी ही अनुक्रमे 3% व 1% एवढी होती. याबाबत जल अभियंता खाते आणि सार्वजनिक आरोग्य विभाग यांनी वेळोवेळी केलेल्या कार्यवाहींच्या परिणामस्वरुप ही टक्केवारी आता 0.7 टक्क्यांपर्यंत घटली आहे. ही बाब मुंबईकरांच्या आरोग्याच्या दृष्टिने निश्चितच चांगली आहे.

मलनि:सारण प्रकल्प, मलजल वाहिन्या याबाबत हाती घेण्यात आलेल्या व पूर्ण झालेल्या कामांची माहिती या अहवालात आहे. त्याचबरोबर मुंबईतील पाणी पुरवठा, वर्षा जलसंचयन विनियोग, पर्जन्य जलवाहिन्या, घनकचरा व्यवस्थापन याबाबतची माहितीही या अहवालात नमूद करण्यात आली आहे. मला असे निदर्शनास आणून द्यावयाचे आहे की, मलनि:सारण प्रचालन खात्यांतर्गत मलजल उदंचन केंद्राचे यांत्रिकीकरण व स्काडा प्रणालीची यशस्वी अंमलबजावणी करण्यात आल्याने आता मलजलावर प्रक्रिया करुन समुद्रात सोडण्यात येणाऱ्या मजलजाचे रिअल टाईम परिक्षण करणे शक्य झाले आहे.

महानगरपालिकेतर्फे बृहन्मुंबईत निर्माण होणाऱ्या नागरी कचऱ्याची विल्हेवाट लावण्याबाबत विविध उपक्रम हाती घेण्यात आले आहेत. यामध्ये घन कचऱ्याचे संकलन, वहन व विल्हेवाट हे उपविधीनुसार करण्यात येते. उगम स्थानीच ओला व सुका कचरा वेगळा करुन इमारतीच्या आवारातच कचऱ्यावर शास्त्रोक्त पद्धतीने प्रक्रिया करुन खत निर्मिती करण्याचा व त्याचा पुनर्वापर करण्याचा आग्रह महानगरपालिकेतर्फे धरण्यात येत आहे.

बृहन्मुंबईतील नागरिकांनी आवश्यक ती स्वच्छतेची पातळी गाठण्यासाठी महागनरपालिकेचा घन कचरा व्यवस्थापन विभाग विविध अभियानाद्वारे प्रयत्न करीत असतो. अशाच एका अभियानांतर्गत गृहनिर्माण व शहरी व्यवहार मंत्रालयाने आयोजित केलेल्या 'स्वच्छ सर्वेक्षण 2019' या अभियानात महानगरपालिकेने सक्रियपणे भाग घेतला आणि नागरिकांना माहिती, शिक्षण व विविध माध्यमाद्वारे संपर्क साधून सुका कचरा व ओला कचरा यांच्या तपशीलासह कचऱ्याचे विलगीकरण करण्यासाठी जन जागृती करण्यात आली. महानगरपालिकेच्या या कार्याची दखल घेऊन गृहनिर्माण व शहरी व्यवहार मंत्रालयातर्फे मुंबई महागनरपालिकेला 'Innovation and Best Practices' पुरस्काराने सन्मानीत करण्यात आले.

पर्यावरणीय प्रदूषण हा दिवसेंदिवस जागतिक चर्चेचा व चिंतेचा विषय ठरत आहे. पर्यावरणाचे संरक्षण व संवर्धन हा विषय केवळ राष्ट्रीय वा आंतरराष्ट्रीय पातळीवर महत्त्वाचा नसून तो स्थानिक पातळीवर देखील तेवढाच महत्त्वाचा विषय आहे. ही बाब लक्षात घेता, बृहन्मुंबई महानगरपालिका विविध स्तरावर पर्यावरण विषयक कार्ये करीत आहे. या अंतर्गत सन 2015 पासून 'उष्णदेशीय मौसम विज्ञान संस्था' (आयआयटीएम, पुणे) व 'भारत मौसम विज्ञान' (आयएमडी) या केंद्र सरकारच्या पृथ्वी विज्ञान मंत्रालयाच्या अखत्यारितील संस्थांच्या पुढाकाराने 'सफर मुंबई' हा प्रकल्प बृहन्मुंबई महानगरपालिका क्षेत्रात राबविण्यात येत आहे. या प्रकल्पांतर्गत बृहन्मुंबई परिक्षेत्रात हवेच्या दर्जाचे सर्वेक्षण केंद्र (AQMS)-9, स्वयंचलित हवामान केंद्र (AWS)-16 तसेच एलईडी फलक (LED Boards)-11 कार्यान्वित करण्यात आलेली

आहेत. महत्त्वाच्या चौकात व वर्दळीच्या ठिकाणी एलईडी फलकाच्या माध्यमातून वायु गुणवत्ता निर्देशांक व आरोग्यविषयक सल्ला मुंबईकरांना आता सहज उपलब्ध होत आहे.

बृहन्मुंबई महानगरपालिका क्षेत्रातील पर्यावरण संवर्धन करण्यासाठी अनेक उपक्रम बृहन्मुंबई महानगरपालिका राबवित असते. या अंतर्गत एक महत्त्वाचा उपक्रम म्हणजे महानगरपालिकेद्वारे हाती घेण्यात येणारा वृक्षारोपणाचा कार्यक्रम. या कार्यक्रमांतर्गत आर्थिक वर्ष 2018-19 मध्ये रस्त्यालगत व महापालिकेच्या अखत्यारितील मोकळ्या जागांवर 9,721 झाडे लावण्यात आली आहेत. तसेच सन 2019-20 या वर्षात बृहन्मुंबई महानगरपालिका परिक्षेत्रात सुमारे 20,000 वृक्ष लागवडीचे व ते वृक्ष सुव्यवस्थितपणे जोपासण्याचे उद्दिष्ट महानगरपालिकेने ठेवले आहे.

पर्यावरण संवर्धनाचा एक महत्त्वाचा भाग म्हणून महापालिका वर्षा जलसंचयन व विनियोग याबाबत देखील काम करीत आहे. विशेष म्हणजे वर्षा जलसंचयन व विनियोग पद्धती सक्तीची करणारी बृहन्मुंबई महानगरपालिका ही राज्यातील पहिली महानगरपालिका आहे. विकास आराखडा 2034 नुसार मे 2018 पासून 500 चौ.मी. किंवा त्यापेक्षा अधिक आकाराच्या सर्व भूखंडांना विकासाकरिता वर्षा जलसंचयन व विनियोग पद्धती राबविणे सक्तीचे करण्यात आले आहे.

रस्ते ही मुख्य व पायाभूत सुविधा आहे. वाढत जाणारी वाहतुकीची घनता व भार या संदर्भात असलेल्या प्रमाणकांचा दर्जा उंचविण्यात आला आहे. प्रकल्प दृष्टिकोन अंगीकारतांना सदर रस्त्यांच्या कामामध्ये पदपथांची सुधारणा महानगरपालिकेच्या उपयोगिता सेवांचे आवर्धन उदा. जलवाहिन्या, मलनि:सारण वाहिन्या, पर्जन्य जलवाहिन्या इ. गोष्टी अंतर्भूत करण्यात आल्या आहेत.

बृहन्मुंबई महानगरपालिका क्षेत्रात मार्च 2019 पर्यंत 36 लाख 40 हजार 588 एवढी वाहने नोंदविली गेली आहेत. या व्यतिरिक्त मुंबई शहरामध्ये दररोज बाहेरुन येणारी वाहने आणि नवीन वाहन नोंदणीमुळे या संख्येत अधिकच भर पडत आहे. यामुळे महानगरपालिका क्षेत्रात वाहतूक कोंडी व वाहनतळाच्या समस्ये सोबतच वायु प्रदूषणाचा प्रश्न देखील बिकट होत चालला आहे. वाहनाच्या पार्कींग व्यवस्थेसाठी महानगरपालिकेने पुढाकार घेतला असून विकास आराखडा आणि विकास नियंत्रण व प्रोत्साहक नियमावली 2034 नुसार बृहन्मुंबई महानगरपालिकेतर्फे वाहनतळाचे नियमन व व्यवस्थापन यासाठी 'वाहनतळ प्राधिकरणाची' स्थापना करण्यात आली आहे.

बृहन्मुंबई महानगरपालिका शाळांमधून विविध उपक्रमांतर्गत स्वच्छता पंधरवाडा, स्वच्छतेची शपथ, हात धुणे दिन, प्रभातफेरी, जलसंधारण, सौर ऊर्जेच्या प्रसारावर भर व प्रश्नमंजुषा अशा अनेक कार्यक्रमाद्वारे विद्यार्थ्यांमध्ये पर्यावरण संवर्धनाबाबत जागृती करण्यात येते.

मला खात्री आहे की, येणाऱ्या काही वर्षांमध्ये महानगरपालिकेच्या विविध खांत्यांनी हाती घेतलेले प्रकल्प पूर्ण झाल्यावर, तसेच विविध उपाययोजना राबविल्याने मुंबईच्या नागरिकांना चांगले पर्यावरण उपलब्ध होईल. मला असेही निदर्शनास आणून द्यावयाचे आहे की, वैश्विक उष्म्याचे दुष्परिणाम लक्षात घेता पर्यावरणाबाबत आधिक गांभिर्याने विचार होणे गरजेचे आहे. मुंबईच्या पर्जन्यमानात होत असलेला बदल हा जागतिक वातावरणात वाढत असलेल्या तापमानाचा परिणाम म्हणावा लागेल. जर आपण आपल्या सभोवलताच्या नैसर्गिक वातावरणाची वेळीच काळजी घेतली नाही तर पुढील पिढीला निसर्गाचा प्रकोप टाळता येणार नाही.

महापालिकेच्या विविध खात्यांद्वारे व सर्व प्रशासकीय विभागांद्वारे राबविण्यात येणारे नवीन प्रकल्प व अनुषंगाने कार्यवाहीमध्ये पर्यावरणाचा विचार आवर्जुन केला जात आहे. यामध्ये प्रामुख्याने पर्जन्यजल संवर्धन, सांडपाण्याचे पुनर्चक्रीकरण व त्याचे योग्य नियोजन, ऊर्जा बचतीचे प्रकल्प, सार्वजनिक वाहतूक व्यवस्था सुधारणे, घन कचऱ्याची शास्त्रीय पद्धतीने विल्हेवाट लावणे इत्यादी बाबींचा समावेश आहे.

वरील प्रकारच्या विविध स्तरावरील प्रयत्नांद्वारे बृहन्मुंबई महानगरपालिका क्षेत्राच्या पर्यावरण समतोलासाठी, रक्षणासाठी व पर्यायाने संवर्धनासाठी महानगरपालिका कटिबध्द आहे. तसेच हरित मुंबई, सुंदर व स्वच्छ मुंबईचे स्वप्न साकार होण्यास सुजाण मुंबईकरांचा सहभाग नेहमीच राहील अशी मला आशा आहे.

धन्यवाद !

प्रवीण परदेशी
महापालिका आयुक्त
बृहन्मुंबई महानगरपालिका

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Add. Municipal Commissioner
(City) Municipal Corporation of Greater Mumbai

ACRONYMS

ALM Advanced Locality Management
AMR Automatic Meter Reading
ATC Area Traffic Control
BEST Brihanmumbai Electric Supply & Transport
BMP Best Management Practices
BRIMSTOWAD Brihanmumbai Storm Water Drain
BOD Bio-Chemical Oxygen Demand
CBO Community Based Organization
CCRS Central Control Redressal System
CCTV Closed Circuit Television
CNG Compressed Natural Gas
CPCB Central Pollution Control Board
CRZ Coastal Regulatory Zone
CTRIC Civil Training Institute And Research Centre
dB Decibels (Unit of Sound Measurement)
DCR Development Control Regulations
DO Dissolved Oxygen
DPR Detailed Project Report
EIA Environment Impact Assessment
ETP Effluent Treatment Plant
FC Fecal Coliform
FFC Fact Finding Committee
FSI Floor Space Index
GVW Gross Vehicle Weight
IEC Information Education And Communication
lcpd Liters Per Capita Per Day
LPG Liquidified Petroleum Gas
MbPT Mumbai Port Trust
MCGM Municipal Corporation Of Greater Mumbai
MHADA Maharashtra Housing And Area Development Authority
MIDC Maharashtra Industrial Development Corporation
MLD Million Liters Per Day
MMC ACT Mumbai Municipal Corporation Act
MMR Mumbai Metropolitan Region
MMRDA Mumbai Metropolitan Regional Development Authority
MoEF Ministry of Environment And Forest
MOU Memorandum of Understanding
MPCB Maharashtra Pollution Control Board
MRTS Mass Rapid Transport System
MRVC Mumbai Railway Vikas Corporation
MSDP Mumbai Sewage Disposal Project
MSEDCL Maharashtra State Electricity Distribution Company Ltd
MSRDC Maharashtra State Road Development Corporation
MSW Municipal Solid Waste
MU Million Units
MUIP Mumbai Urban Infrastructure Project
MUTP Mumbai Urban Transport Project
NEERI National Environment Engineering Research Institute
NGO Non Governmental Organization
NSS National Social Service
NWDA National Water Development Agency
PAH Polynuclear Aromatic Hydrocarbon
PAP Project Affected People
PG Play Ground
PSI Pollution Standard Indx
PUC Pollution Under Control
RCF Rashtrya Chemicals & Fertilizers
RE Road Engineer
RG Recreation Ground
RMMS Road Maintenance Management System
RSPM Respirable Suspended Particulate Matter
RTO Regional Transport Office
SCADA Supervisory Control & Data Acquisition
SSP Slum Sanitation Programme
SPM Suspended Particulate Matter
SRA Slum Rehabilitation Authority
STP Sewage Treatment Plant
SW I Sewage Water Criteria I
SW II Sewage Water Criteria II
SWD Storm Water Drainage
TC Total Coliform
TDR Transfer of Development Rights
TSPTotal Suspended Particulates
VJBUVeermata Jijabai Bhosale Udyan
WSSDWater Supply & Sewage Disposal
WWTFWaste Water Treatment Facility

CONTENTS

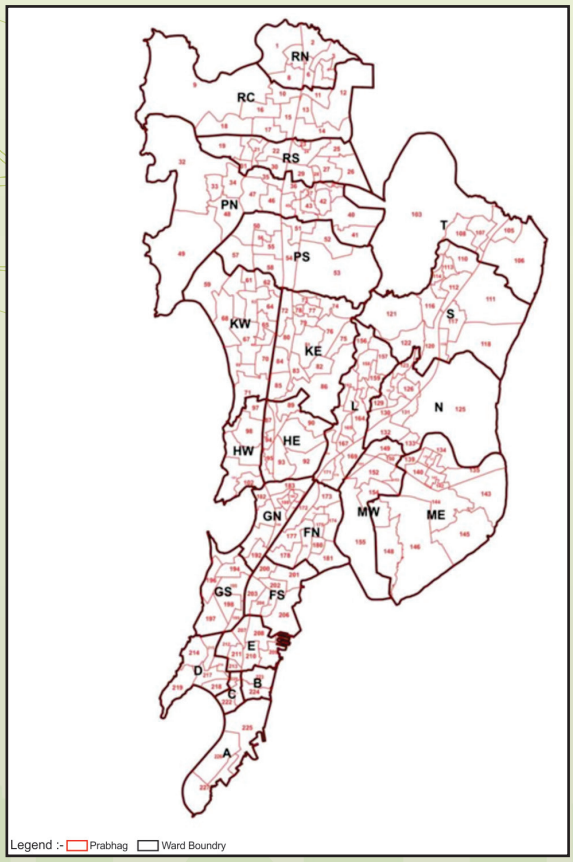
1. INTRODUCTION

The 74th amendment of the constitution of India in 1992 defines the role and duties of municipalities & municipal corporations. The 12th schedule to the amended constitution states the scope of the work. The scope includes environment protection, promotion of ecology & urban forestry. As a sequel to this, the Maharashtra state government issued an ordinance amend municipal act 1888, making "Environment Protection, Promotion of Ecology & Urban Forestry" as an obligatory duty vide section 61(ab) in the year 1994. The Environment Status Report (ESR) of the city of Mumbai for the period from April 2018 to March 2019 is prepared by Air Quality Monitoring and Research Laboratory of Environment section of Solid Waste Management department to fulfill the obligation under the clause 63-B of Mumbai Municipal Corporation (MMC) Act 1888. It is to be presented by the Commissioner of Municipal Corporation of Greater Mumbai (MCGM) before 31st July 2019 to the corporation. This report is based on the factual data generated using parameters affecting the environment by different departments of MCGM and various departments of state/central government and industries.

2. DESCRIPTION OF THE AREA

Mumbai is located on the western sea coast of India from 18o 53' North to 19o 16' North Latitude and from 72o East to 72o 59' East Longitude. It was originally a cluster of seven islands. Later on these islands were joined to form present Mumbai. The total land of Greater Mumbai identified in Earlier Draft Development Plan 2034 (EDDP)was 458.28 sq. km. But as per the present development planing the area of Brihanmumbai is 483.24 sq. km. The Municipal Corporation of Greater Mumbai (MCGM), however, was the Planning Authority of area that was more modest, since about 9.43% of the cited area fell under the jurisdiction of Special Planning Authorities (SPA).Three such SPA exist in Greater Mumbai- MMRDA, SRA, MIDC. The EDDP therefore prepared a development plan for 415.05 sq.km. Total area specified by Surveyor General is 603 sq.km., which includes territorial waters extended into sea up to 12 nautical miles measured from appropriate base line. Its maximum width is 17 km. (East to West) and length is 42 km. (North to South).

Mumbai Election Division Boundry - 2018



3. CLIMATE OF MUMBAI

The city of Mumbai has Tropical Savanna climate. Generally South-West monsoon arrives in the city in the month of June and retreats in the month of September. As per data recorded by Regional Meteorological centre, in the year 2018, Mumbai received a total rainfall measuring 1799.9 mm at Colaba & 2243.4 mm at Santacruz. The maximum rainfall of 1138.8 mm was recorded during July 2018 at Santacruz and it was 50.7% of total rainfall received. The maximum rainfall of of 787.7 mm was recorded during June 2018 at Colaba and it was 43.75% of total rainfall received. So it is observed that there was less rainfall as compared to previous year (in year 2017 rainfall 3109.4 mm at Santacruz and 2452.6 mm at Colaba).

In the month of October 2018 the maximum temperature is 34.80C, and in the month of January 2018 minimum temperature is 18.80C was recorded at Colaba. In the month of October 2018 the maximum temperature is 35.90C and in the month of January 2018 minimum temperature of 15.80C was recorded at Santacruz.

At Colaba the maximum Wind Speed of 7.9 Km/hr and minimum 2.3 Km/hr was recorded ans at Santacruz. The maximum Wind Speed of 6.1 Km/hr and minimum 0.7 Km/hr was recorded. The Relative Humidity was recorded maximum 90% and minimum 66% at Colaba. The Relative Humidity was recorded maximum 86% and minimum 45% was recorded at Santacruz.

Monthly data of temperature, rainfall and wind speed for Mumbai is shown in Table No 3.1

Table No. 3.1 Meteorological Data (2018-19)

Month	Average Temp ^{0}C				Rainfall in mm		Relative Humidity in %				Wind Speed Km/Hr	
	Colaba		Santacruz		Colaba	Santacruz	Colaba		Santacruz		Colaba	Santacruz
	Max	Min	Max	Min			Time 0830	Time 1730	Time 0830	Time 1730		
April18	33.2	25.3	33.7	23.7	0.0	0.0	86	73	74	58	3.4	3.6
May 18	34.2	27.5	34.3	26.5	0.0	0.0	83	76	69	63.4	4.0	4.4
June 18	31.8	25.9	32.4	24.9	787.7	792.5	88	82	82	76	5.4	5.6
July 18	29.3	24.8	30.9	25.2	743.4	1138.8	89	88	86	83	7.5	6.1
August 18	29.5	24.8	30.0	25.0	188.7	235.2	89	86	84	80	7.9	5.2
September 18	31.3	24.9	31.4	24.6	59.5	73.1	90	80	82	69	3.9	2.0
October 18	34.8	25.4	35.9	24.2	15.4	3.8	86	74	71	57	2.4	0.7
November 18	34.5	24	35.3	21.8	5.2	0.0	84	74	72	51	2.3	2.7
December 18	31.9	21.1	32.5	18.1	0.0	0.0	75	66	61	45	2.8	3.4
January 19	30.4	18.8	31.4	15.8	0.0	0.0	80	69	71	45	2.7	2.9
February 19	30.0	26.3	31.5	17.1	0.0	0.0	83	69	74	46	2.8	3.1
March 19	30.9	22.3	32.5	20.2	0.0	0.0	85	69	76	51	3.1	3.7

Source: Regional Meteorological Centre

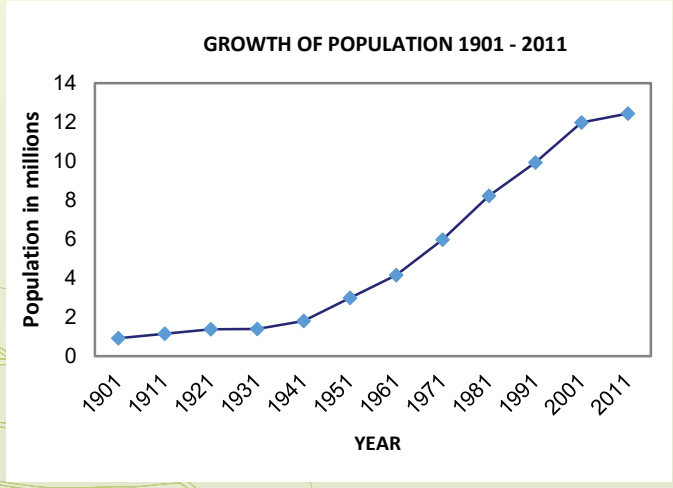
4. MUMBAI POPULATION

Mumbai is one of the important cities of the world, is also recognized as the most densely populated city. Inverse proportion of Area and Population causes serious impact on its environment.

Table No. 4.1: Growth of Population and rate of Increase during year 1901-2011

Year	Population in Million	% Growth
1901	0.93	-
1911	1.15	23.7
1921	1.38	20
1931	1.4	11.5
1941	1.8	28.6
1951	2.99	66.1
1961	4.15	38.8
1971	5.97	43.8
1981	8.22	38.0
1991	9.92	21.1
2001	11.97	20.6
2011	12.64	3.8

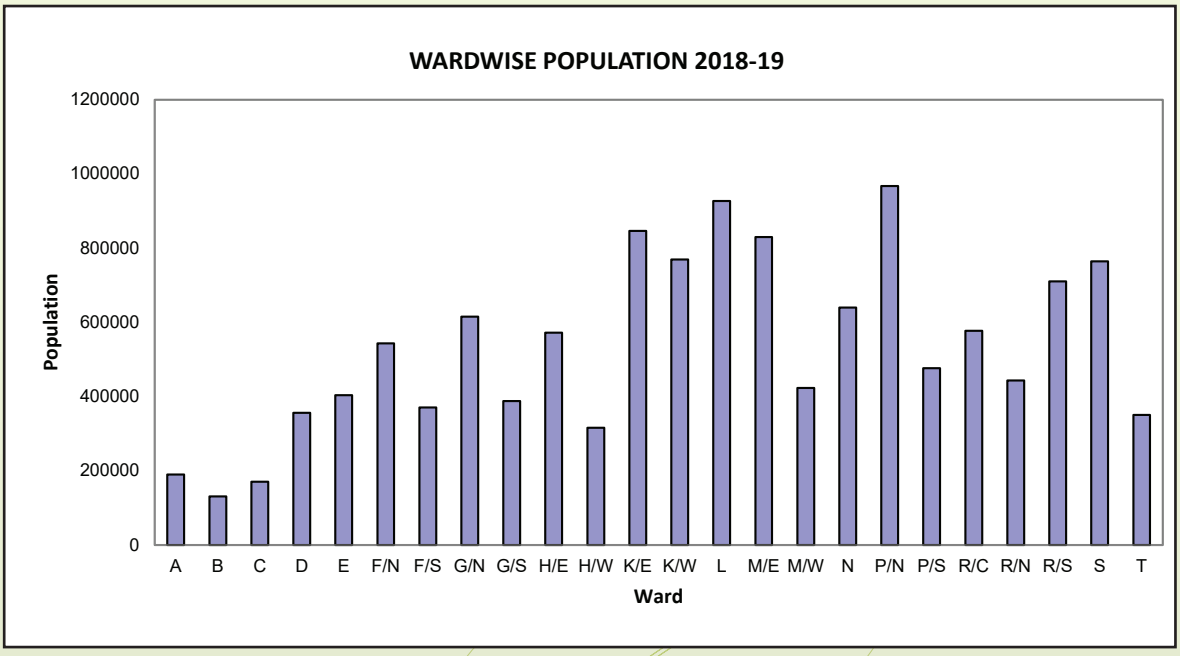
Source : Census Department of India



As per data received from Health Department of MCGM the estimated population of Mumbai is 12.78 million. The population density of 26453 person per sq.km (excluding no development area). Administrative Ward-wise population indicates that 'P/North' ward has maximum population of 9,67,094 persons where as 'B' ward has minimum population of 1,30,769 persons (Table No. 4.2)

Table No. 4.2: Wardwise Area & Population

Ward	Area in Sq.km.	Population	Ward	Area in Sq.km.	Population
A	11.20	190071	L	15.62	926883
B	2.65	130769	M/E	38.19	829795
C	1.91	170702	M/W	17.62	423150
D	8.30	356346	N	29.68	639876
E	7.27	404035	P/N	46.70	967094
F/N	12.85	543493	P/S	25.19	476175
F/S	9.87	370838	R/C	47.95	577526
G/N	8.31	615411	R/N	14.17	443157
G/S	9.74	388073	R/S	18.31	710121
H/E	12.41	572469	S	32.55	764111
H/W	18.65	315987	T	44.91	350795
K/E	24.00	846402	**TOTAL**	**483.23**	**12782429**
K/W	25.18	769150	Source: Development- Planning and Health Depts of MCGM		


WARDWISE POPULATION 2018-19
Population
1200000
1000000
800000
600000
400000
200000
0
A B C D E F/N F/S G/N G/S H/E H/W K/E K/W L M/E M/W N P/N P/S R/C R/N R/S S T
Ward

5. LAND USE

Mumbai was the first Municipal Corporation to adopt the concept of a development plan. The first development plan was formulated in 1964 was sanctioned in 1967. This development plan reformulated as per law of Maharashtra Regional and City development Act 1966, which came into force in 1991-94 and was valid upto 2014. Now new Development Plan for 2014-2034 was submitted to State Government under provision of section 31(1) of said Act on 02.08.2017 for sanction.

The State Government in accordance with the sub section (1) of section 31 of the Maharashtra Regional and Town Planning Act, 1966 have accorded sanction to the Draft Development Plan of Greater Mumbai with modification show in schedule A appended to the notification No.TPB-4317/629/CR-118/2017/ DP/UD-11 May-2018 excluding substantial modifications as shown in schedule B appended thereto. As per the notification dt.22.06.2019 the sanctioned D. P. 2034 is in effect from dt.01.09.2018. As per notification dt.21.09.2018 the sanctioned excluded part of Development Control and Promotion Regulation is in effect from dt.13.11.2018. The State Government has sanctioned some of the EP vide notification dt.22.01.2019, dt.25.01.2019 and dt.31.01.2019. The balance Eps will be sanctioned by State Government in the due course.

Planning Area

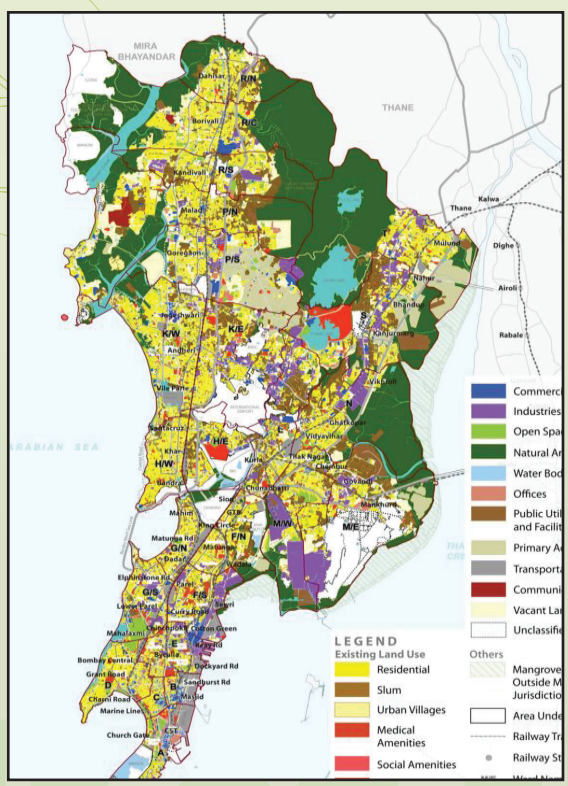
The total land of Greater Mumbai identified in Earlier Draft Development Plan 2034 (EDDP) was 458.28 Sq.km. However, the Municipal Corporation of Greater Mumbai (MCGM) is the Planning authority of area that was more modest. Since about 8.76% of the cited area fell under the jurisdiction of Special Planning authorities (SPA).

Following three such SPAs exist in Grater Mumbai–

1. Mumbai Metropolitan Region Development Authority(MMRDA).
2. Slum Rehabilitation Authority (SRA).
3. Maharashtra Industrial Development Corporation (MIDC).

The ELU 2012 located the emergence of an additional area of 14.96 Sq.km, probably due to siltation of mangroves in Thane creek. This area is outside the current MCGM limits which is shown as Natural Area in Development Plan 2034.

The Coastal Road approved by GoM adds a further



area of 1.80 sq.km through reclamation of the sea. The alignment of this Road is being marked on the Proposed Land Use (PLU). It is also proposed that any changes in the alignment of Coastal Road that would get necessitated during implementation would automatically become part of the DP-2034. Further, an area of 1.20 sq.km is proposed as green reclaimation. The addition of these land makes Greater Mumbai's total land area 476.24 sq.km.

Municipal Corporation of Greater Mumbai is Planning Authority for about 434.55 sq.m (91.24%) excluding the area coming under excluding Special Planning Authority.

Coastal Regulation Zone

Ministry of Environment & Forest (MoEF) has issued CRZ notification vide No. S.O. 19 (E) dated 06.01.2011, in supersession of the earlier notification S.O. 114 (E) of 19/02/1991.

The objectives of the new CRZ Notification includes (1) the need to ensure livelihood and security to the fisher communities, (2) to protect the Coastal environment, (3) to give impetus to economical undertakings in CRZ areas.

There is a specific provision under said notification for Mumbai, Sub para 5 (1) regarding the redevelopment of housing for local communities, slums existing and near the Coastal region, and redevelopment of dilapidated buildings.

The new notification had made it obligatory on state Authority to demarcate HTL and Hazardous line and also to prepare new CZMP to the scale of 1:4000 or to nearby scale by reference plans within 24 months through authorized agencies of Central Government.

The work of preparing new Coastal Zone Management Plan as per C.R.Z. Notification dated 6th January 2011 was entrusted by MCGM to the Institute of Remote Sensing Anna University, Chennai. Director (IRS) has prepared Draft CZMP with all relevant information using Remote Sensing, Globle Positioning System of Geographical Information System as per provision of Coastal Zone Regulation guideline 2011. This draft CZMP has been published by MCZMA on the website of MCZA on 29.03.2017 for inviting suggestions/ objections on all stake holders and the draft CZMP was submitted to MoEF, Central Government through State Government MCZMA.

The Competent Authority vide their letter dtd.16.08.2018 has informed that the Coastal Zone Management Plans (CZMPs) in respect of Karnataka, Odisha and 5 districts of Maharashtra viz. Mumbai City, Mumbai Sub-Urban, Raigarh, Ratnagiri and Sindhudurgh respectively has been approved and accordingly the siad approved CZMPs for Mumbai City, Mumbai Sub-Urban District are uploaded on the official website of Maharahstra Coastal Zone Management Authority(MCZMA) i.e. mczma.maharshtra.gov.in

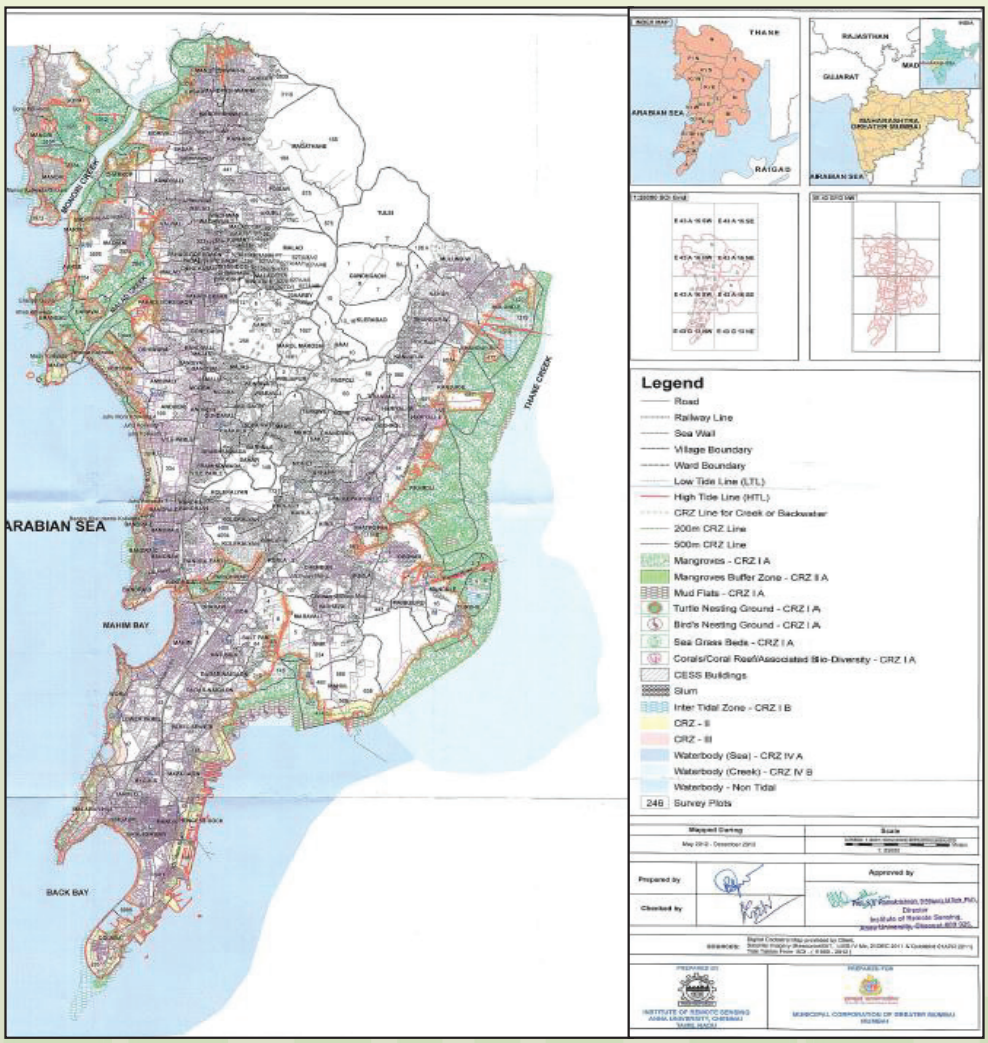
Further, Ministry of Environment, Forest and Climate change vide public notice dtd.18.04.2018 has also published new "Draft Coastal Regulation Zone notification, 2018", inviting suggestions/objections on the said draft notification by email or at their official address within sixty (60) days.

The Competent Authority has also recently approved the Coastal Regulation Zone notification, 2018 vide

Gazette notification dtd.18.01.2019, wherein, it is stipulated that the said CRZ notification will come into force only after the CZMP plans framed under CRZ notification-2011 will be revised/ updated by the State Government in Environment Department.

The Ministry in Environment and Forest (MoEF) vide their letter dtd.26.02.2019 has also issued clarification on implementation of the projects falling in CRZ area in Maharashtra stating therein that until the CZMPs of the Maharashtra prepared under the provisions of the CRZ Notification, 2011 are updated/ revised under the provisions of the CRZ Notification-2019, the provisions of this new notification shall not apply and the provisions of CRZ Notification-2011 shall continued to be followed for appraisal and CRZ clearance of projects in CRZ areas.

2: DRAFT CZMP GR. MUMBAI



6. MANGROVES IN MUMBAI

The zone between sea and land is quite an inhospitable place for life to thrive. The water is salty, substratum is anoxic and the soil is alternately exposed and submerged due to tidal action. The only species of trees that can thrive in this organic environment are mangroves, which have developed special adaptation for this purpose. Every mangrove species is an ecosystem in itself. Its roots act as substrate for sessile organisms like oysters and barnacles, its crown a rookery for swamp birds and the flowers are a good source of honey. The leaves are raw material for ants engaged in nest building and when they fall, they form the basis of food chain in the surrounding waters.

Mangroves confer a variety of benefits to mankind. They are natural barriers against sea intrusion, as demonstrated well during the Tsunami that hit our coast in 2004. By breaking up large storm surges and strong tidal currents they protect sea coast from erosion. They are important land builders which filter sediments from land and expand the extent of land towards sea. The enormous productivity of mangrove swamps enables them to support a rich fauna diversity. The unique habitat acts as nursery grounds for many species of fish and shell fish and offer protection to many juveniles against predators. This way, the lives of millions of fishermen in our country are linked directly to the existence of healthy mangroves. Scientific studies prove that the ability of mangrove forest to absorb Carbon dioxide from atmosphere is six times that of other forest. This shows how important mangroves are in our effort to fight climate change and sea level rise.

According to forest survey of India, the total extent of mangroves in Maharashtra is 186sq.km, distributed along its six coastal districts. The thickly populated city of Mumbai alone has about 6000 hectares of mangroves, which is perhaps the largest extent of mangroves for any metropolitan city in the world. Mangroves are the green lungs for the city, which ensures abundant supply of oxygen to us. They also maintain the stability of the shoreline and prevent the release of toxic wastes into the waters around Mumbai, thus playing a silent life supporting role. Their ability to absorb large volumes of water is a great boon to a city, which is prone to heavy rain and flooding from time to time.

Unfortunately, the mangrove ecosystem of Mumbai is under severe threat due to several factors. Land in the coastal areas is in great demand, for expansion of real estate, setting up of industries and public utilities. A lot of construction debris gets dumped in these lands and tons of pollutants are released here, chocking the mangroves to death. Many mangrove areas have been converted into salt pans and aquaculture ponds in the past. In rural areas, mangroves are also felled for fuel wood and small timber. The rate of mangrove cover is a matter of great concern and the alarm bells are loud and clear.

On 6th October 2005, the Hon'ble High Court of Bombay issued a landmark order to save the mangroves of Maharashtra coast. This judgment mandated that mangroves on government land be declared as Protected Forests and those on private lands as "Forests". The Hon'ble High Court prohibited any

construction within 50 m from the boundary of the mangroves and also put a ban on dumping of debris in the mangrove areas. Following this order, Mumbai was notified as Protected Forest. To improve the protection status of mangroves on government, the state has decided to notify all such areas as Reserved Forest.

To give further fillip to the mangrove conservation efforts in Mumbai region a **'Mumbai Mangrove Conservation Unit' (MMCU)** has been created on 17th May 2013. The Cell is headed by a Chief Conservator of forest and is functioning from its office in Bandra, Mumbai.

Chief Conservator, 'Mangrove Cell' carried out following works for conservation of mangroves:

- 3 lakh mangrove saplings were raised in nurseries.
- In Mumbai and New Mumbai areas 5 Mangrove nurseries have been formed on 56 Hectare land.
- Display of boards, signage etc. to create awareness for the need of mangrove conservation.
- Plantation programs in collaboration with NGO's.
- Promenades at the landward edge of mangrove areas being planned with the support MCGM and residential association.
- Legal action to evict encroachments on mangrove land will be initiated by Mumbai Mangrove Conservation Unit in Mumbai.
- Training awareness generation and publicity works will be scaled up.

7. URBAN RENEWAL SCHEME

MCGM and Maharashtra Housing & Area Development Authority (MHADA), a State Government agency have undertaken city renewal scheme as per development rules. This provision will enable redevelopment of old dilapidated municipal and other tenanted buildings and to make available vacant land for various civic amenities.

RECREATIONAL FACILITIES:

Providing recreational amenities to the public is a discretionary duty of the Corporation under section 63 of MMC Act 1888. For balanced environment, abatement of air pollution and Green Mumbai, beautiful and clean Mumbai, MCGM provides recreational amenities to the citizens of this city by way of maintaining gardens and providing playgrounds (PG), recreational centres, water fountains, etc. In addition to recreation, MCGM also encourages sports, art, cultural programs etc. For which provision of substantial amount in the budget has been made whereas health education and health promotion of citizens being its objective.(Table No.) These facilities are utilized by citizens as well as others from different places.

Table No. 7.1: Recreation Facilities Provided in the year 2018-19 (Up to 31.03.2019)

Sr. No.	Particulars	City	Western suburbs	Eastern Suburbs	Total
1	Garden (Except strip Gardens)/ Park	36	147	107	290
2	Recreation Grounds	165	205	92	462
3	Playgrounds	57	196	104	357
4	Fountains	16	015	07	38
5	Band stands	04	01	00	05
6	Nurseries	13	09	06	28
7	Plant Sale Counter	03	05	01	09
8	Statues	09	05	10	24
9	Tree Plantations	2322	4669	2730	9721
10	Distribution of tress	5471	13045	3014	21530
11	Total no. of tress	718589	1221737	1034957	2975283

Source: This information is received from Garden Department of MCGM.

8. UDYAN AND ZOO

Veermata Jijabai Bhosale Udyan & Zoo is one of the oldest zoos in the country established in the year 1862. This area was under the control of Agri-Horticultural Society of Western India. The management of this Udyan & Zoo was handed over to MCGM by the then state govt. in 1873. The total area of this Udyan & Zoo is approx. of 53 acres and is declared as "Heritage Grade II (B)" site.

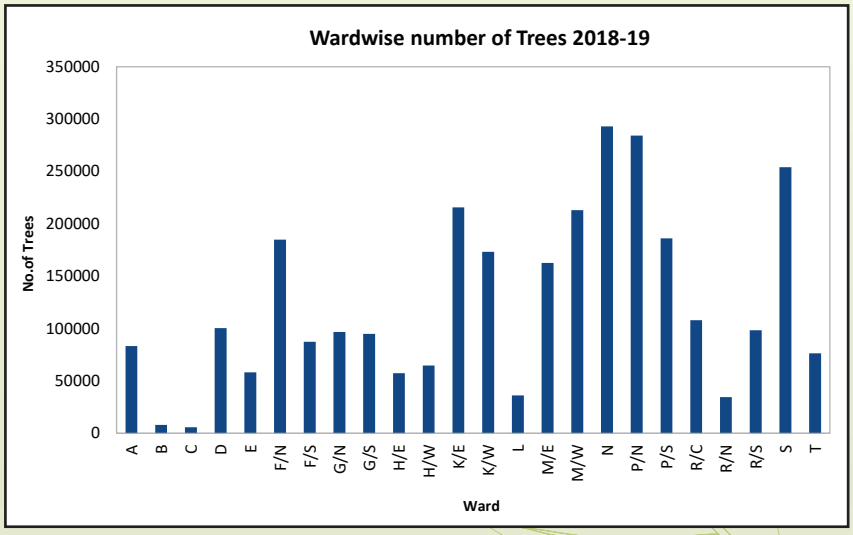


Table No. 8.1: Wardwise Number of Trees
(as per 2016-17 Tree Census)

Sr. No.	Ward	No. of Tress
1	A	83201
2	B	7816
3	C	5756
4	D	100317
5	E	58028
6	F/North	184837
7	F/South	87240
8	G/North	96620
9	G/South	94774
10	H/East	57314
11	H/West	64674
12	K/East	215728
13	K/West	173232
14	L	36023
15	M/East	162638
16	M/West	213084
17	N	292965
18	P/North	284271
19	P/South	186002
20	R/Central	107841
21	R /North	34370
22	R/South	98305
23	S	254038
24	T	76209
	Total	**2975283**

Source: Garden Department of MCGM.

Garden Department

For tree conservation, Garden department has done following work,

1. In year 2018-19, about 9721 no. of trees are planted on municipal roads and open spaces.
2. Removal of concrete and cement around 9822 no. of tress.
3. Spraying of insecticides and pesticides on infected tress.
4. Trimming of 96330 trees branches to balance the trees.
5. Formation of Tree basins around the tress.
6. Removal of 844 no. of dead and dangerous tress.
7. During 2018-19 the Municipal Corporation of Greater Mumbai And the Tree Authority has organised the 24rd exhibition of plants, flowers, fruits and vegetables from 1st to 3rd February 2019 at Veermata

Jijabai Bhosale Udyan. To create consciousness and awareness about environment among the citizens, the workshop on various horticultural subjects was also arranged during the same period.

8. In the year 2019-20 around 20000 trees are proposed to planed on roadside and on other places in MCGM jurisdiction.

9. As per the tree census total number of trees in 24 wards is 29,75,283.

Zoo:

Veermata Jijabai Bhosale Udyan & Zoo at present:

- As on 31st March 2018, there are in all 387 animals, which include 112 mammals of 12 Species, 244 Birds of 29 species and 31 Reptiles & aquatic animals of 6 species displayed in this Udyan & Zoo.
- As per the guidelines laid by the Central Zoo Authority, New Delhi, under the "National Zoo Policy 1998" the main objective of establishment of a Zoo is to protect, conserve & breed the rare and endangered animals
- Various educational activities like Wildlife week, World Earth Day, World Environment Day, Animal keepers training programs, Zoo Awareness Programs, etc. are conducted for creating empathy, interest and awareness about Wildlife, Nature & Environment in the minds of citizens and school/ college students.

Modernization Project of Veermata Jijabai Bhosale Udyan & Zoo:

1. The Municipal Corporation of Greater Mumbai administration have taken up a Project of modernisation of Veermata Jijabai Bhosale Udyan and Zoo. The Central Zoo Authority, New Delhi has given final approval to the Master plan for the said project on dt. 05.12.2012. The first phase development works as per the said master plan are completed.

2. The works of construction of 17 new animal enclosures, included in the second phase are in progress. Out of which the works for construction of enclosures for Chital, Sambar and Barking deer are completed and were made open to the visitors in the month of February 2019. Two Swamp deer have been brought in this zoo, from Kanpur Zoo, on exchange basis.

3. The new animal enclosures have viewing galleries. The acrylic panels are installed in the fron portion of the animal exhibits. In the interior of the enclosures, suitable landscaping is done as per the requirements of the respective animal/ birds. Which includes waterfalls, waterbodies, shades etc. Various suitable plants have also been planted inside the enclosures.

4. For expansion of this Udyan and Zoo, the revised master plan was prepared. The central zoo authority, New Delhi, has accorded approval to the said altered master plan prepared for

the development works to be carried out as included in the third and forth phase works on the twelve (12) acre plot of the Mafatlal Mill. Which includes construction of new modern enclosures for Exotic animals such as African White Lion, Zebra, Giraffe, Chimpanzee, Jaguar, Cheetah etc. The tender process for accomplishing the said works is done in February 2019.

5. The works for creating theme based landscape gardens on the total five (5) acre plots as per the designs/ plans prepared by Rachana Sansad, Prabhadevi, are in progress.

6. The Mumbai city's biggest vermicompost project has been functional from February 2019 at this Udyan and Zoo. The capacity of this Vermicompost project of converting fallen leaves and other organic mater into Vermicompost is two (2) tonnes per day.

9. WATER SUPPLY

Mumbai receives raw water from seven impounded water resources viz. Vihar and Tulsi within Mumbai and Tansa, Modak Sagar Upper Vaitarna, Bhatasa and Middle Vaitarna located at a distance of about 100 to 175 Kms from Mumbai.

Raw water available from these sources is conveyed with transmission main system ranging from 2235 mm to 5500 mm diameter pipe lines and tunnels to the state of the art water treatment facilities at Bhandup Complex (2810 MLD) and Panjrapor (1365 MLD). Water Treatment facilities for Tulsi (18 MLD) and Vihar (90 MLD) are located near to these sources. At these treatment plants, water is treated with processes such as coagulation, flocculation, settling, rapid sand filtration and post – chlorination and quality of the effluent water is maintained in accordance with IS 10500:2012 – Drinking Water- Specifications.

The treated water is stored in the Master Balancing Reservoirs (MBR) located near to treatment plants at Bhandup Complex (within Mumbai) and Yewai (Outside Mumbai). It is further distributed to 27 service reservoirs located throughout Mumbai City with complex water supply network of about 450 Kms this conveyance system remains charged for 24 hours and eliminates the chances of water quality deterioration because of intrusion of ground water / sewage etc. Presently 3850 MLD water is supplied to Mumbai City.

Population Projection, Demand and Augmentation of Water Supply:

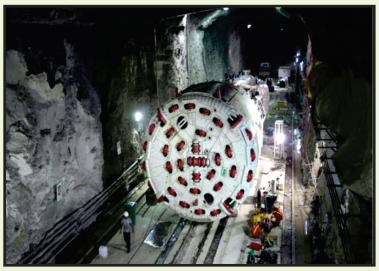
The population growth trend of Mumbai is continued. The projected population of Mumbai is anticipated 17.24 million by the year 2041. The projected water demand for 2041 is 6424 MLD (including enroute supply and transmission losses). The shortfall in Demand and Supply will be 2520 MLD by 2041 (Presuming 655 MLD Bhatsa water temporarily allocated to be surrendered to GoM). The gap will be met by developing the Gargai (440 MLD), Pinjal (865 MLD) and Damanganga-Pinjal River Link Project (1586 MLD) water supply sources allocated to Mumbai by the Government. On completion of these projects, the water supply will be augmented by 2891 MLD.

Table No. 9.1 :- Sources of Water Supply

Sr. No.	Source	Year	Yield in MLD		Distance from City in Kms	Remarks
				Cumulative		
1.	Vihar	1860	90	90	Within City	Present Sources
2.	Tulsi	1872	18	108	Within City	
3.	Tansa	1892 - 1945	500	608	106	
4.	Lower Vaitarna	1954	455	1063	119	
5.	Upper Vaitarna	1972	635	1698	163	
6.	Bhatsa	1980 - 2007	2020	3718	102	
7.	Middle Vaitarna	2014	455	4173	150	
8.	Gargai	2022 - 2023	440	4613	180	Future Sources
9.	Pinajal	2024 - 2025	865	5478	195	
10.	Damanganga	2029 - 2030	1586	7064		

Source: Hydrolic Engineers Dept.

Major Projects



1. **Construction of tunnel from Chembur to Wadala and further up to Parel (9.70 Km):**

   This tunnel is proposed for improvement to improve the water supply of F/North, F/South & E wards and proposed development in BPT land & Wadala Truck Terminus.

2. **Construction of tunnel from Amar Mahal (Chembur) to Trombay Reservoir (5.5 Km):**

   This tunnel is proposed to replace old inlets of Trombay eservoirs with enhanced carrying capacity. The M/East and M/West wards citizens will be benefited by this tunnel.

3. **Reconstruction of 90 MLD Vihar Water Treatment Plant:**

   The Vihar Treatment Plant was in need of urgent resurrection. The re-construction is planned at existing site in phased manner, keeping the old unit also in operation. The project is now 70% completed and balance work is expected to be completed soon.

4. **Rehabilitation, Replacement and New water mains:**

   a. To ensure the uninterrupted and assured raw water conveyance from Source to Water Treatment Plant, missing link of 3000 mm diameter Middle Vaitarna, between Chinchvali-ARVC-Yewai is taken up.

   b. Twin Tansa Mains (2-1800 mm diameter) are being replaced by single 3000 mm diameter main between Balkum to Saddle Tunnel as part of water security to ensure maximum possible water supply to the City in any eventuality.

   c. Rehabilitation of Vaitarna / Upper Vaitarna Main by cement mortar lining from Aghai to Saddle Tunnel in two sections.

   d. Replacement of existing Tansa (E) & (W) Mains (2- 1800 mm diameter) by 2400 mm diameter main between Bhandup Anchor Block to Maroshi gate.

5. **Water Distribution improvement Works:** Every year Hydraulic Engineer's Department undertakes various works for water distribution improvement within the city. We intend to continue our efforts to improve and strengthen the water distribution system. For this purpose works like replacement of old water mains, removal of bunch of connections & renewal of service connections etc. are taken up on regular basis.

Quality control in water supply:

Mumbai city and suburban areas are being supplied with 3850 million liters of water on a daily basis. This water is drawn from various lakes as well as river sources. Out of above 3850 MLD water, 2500 MLD is treated at Bhandup Complex and is supplied to city and western suburban wards.

Water is brought to Bhandup Complex by gravity mains originating from Tansa/ Vaitarna/ Upper Vaitarna lakes. This water is prechlorinated at Yewai upstream of Bhandup Complex.

Water received at Bhandup Complex is then treated using conventional treatment methods such as pretreatment, filtration, post chlorination and is then distributed through Master Balancing Reservoir (MBR) to consumers

During all these activities, water samples at each stages of treatment are collected and tested for various parameters. The Laboratory at Bhandup Complex was commissioned in the year 1980 is working round the clock for this purpose and quality of final water leaving Bhandup complex is always maintained within prescribed limits as per drinking water standards IS 10500:2012 for drinking water.

Activities:

Quality of water is checked for 24 hours to supply safe potable water to the Mumbai city. Samples of raw water, clarified water, filtered water and final water are tested for following parameters.

1) Turbidity – Per hour
2) pH – alternate hour (mg/L)
3) Residual Chlorine – alternate hour
4) Temperature – alternate hour (^{0}C)
5) Colour – alternate hours (Hazen Unit)

Jar test is conducted on raw water samples in every shift for prescribing optimum 'Poly Aluminum Chloride' (PAC) dose. Complete analysis of water samples – Raw, filter and final is carried out for Total Alkalinity, Total Hardness, Calcium Hardness, Chlorides, Suspended solids, Total solids and Manganese, Iron, Aluminum, Dissolved Oxygen and Bacteriological examination for Total coliform and E.coli once in a day.

Table No 9.2: Water Quality Before and After Filtration During 2018-19

Parameters	Tulsi		Vihar		Bhandup Complex (Tansa, Vaitarna & Upper Vaitarna)		Panjrapur (Bhatsa)		BIS standards 10500:2012
	Raw	Final	Raw	Final	#Raw	Final	Raw	Final	Permissible Range
Turbidity NTU	2.7-53	0.35-3.9	1.7-9.9	0.68-3.8	1.1-35	0.23-2.2	3.2-360	0.16-1.8	1-5
pH	6.5-8.5	6.5-7.8	7.05-9.1	6.9-8.4	7.05-7.75	6.75-7.55	7.0-7.6	6.7-7.4	6.5-8.5
Total Alkalanity (mg/l)	10-19	13-21	10-17	12-17	8-16	10-18	8-26	10-32	250-1000
Chlorides (mg/l)	30-45	26-42	32-49	30-49	24-46	23-43	34-93	30-89	200-600
Total Hardness (mg/l)	40-53	38-50	45-56	46-56	38-54	34-52	27-84	19-81	200-600
Bacteriological examination (CFU/100ml)									
Total Coliform	0-0	0-0	0-0	0-0	0-0	0-0	0->=1600	0-0	*
E-Coli	0-0	0-0	0-0	0-0	0-0	0-0	0->=1600	0-0	**

Source: Hydraulic Engineer Dept

Note :Raw water of Tulsi and Vihar lakes is untreated water
Unit : NTU= Nephelometric Turbidity Unit
mg/l = miligram per litre
CFU/100ml=Colony forming unit per 100 ml
NT:- Not tested
#Bhandup complex raw water denotes Quality of pre-chlorinated waterfrom sources Tansa, Modaksagar (Vaitarna), Middle Vaitarna Upper Vaitarna. Panjrapur raw water denotes Quality of pre-chlorinated water from Bhatsa.
* Coliform organism should not be detectable in 100 ml of any two consecutive samples for more than 50% of the samples collected for the year
** E Coli count in 100 ml of any sample should be zero

Municipal Water Testing Laboratory -:

Municipal analyst laboratory is a Public Health Laboratory of MCGM and a State Food Testing Laboratory recognised by the Food Safety and Standard Authority of India (FSSAI) located in G/North, Dadar. The chemical and microbiological analysis of food and water samples is done in the laboratory using advance techniques.

The treated drinking water is supplied all over Mumbai region through piped distribution system. Drinking water in distribution system may get contaminated by infectious micro-organisms present in the environment. In order to protect public health as per World Health Organization (WHO) guidelines it is necessary to verifying that safe drinking water is supplied till the consumer end, monitoring the drinking water supply throughout the distribution network is essential.

The municipal laboratory support the surveillance system of Public Heathe Department by testing drinking water sample for water quality surveillance. For this purpose daily around 200 water samples and in monsoon or emergency up-to 300 drinking water samples are collected from the service Medical Officer of Health (MOH), AEWW-QC and AEWW-LD department of MCGM. These water samples are sent to the municipal laboratory for routing bacteriological analysis.

In municipal laboratory to test the bacteriological quality of all the drinking water samples taken from the distribution system including consumers premises are tested in accordance of Indian Standard IS-1622. The analysis as per the Indian Standards IS 10500:2012 – Drinking Water Specification prescribes that E.coli and Total Coliform bacteria shall not be detectable in any 100 ml sample of treated water entering

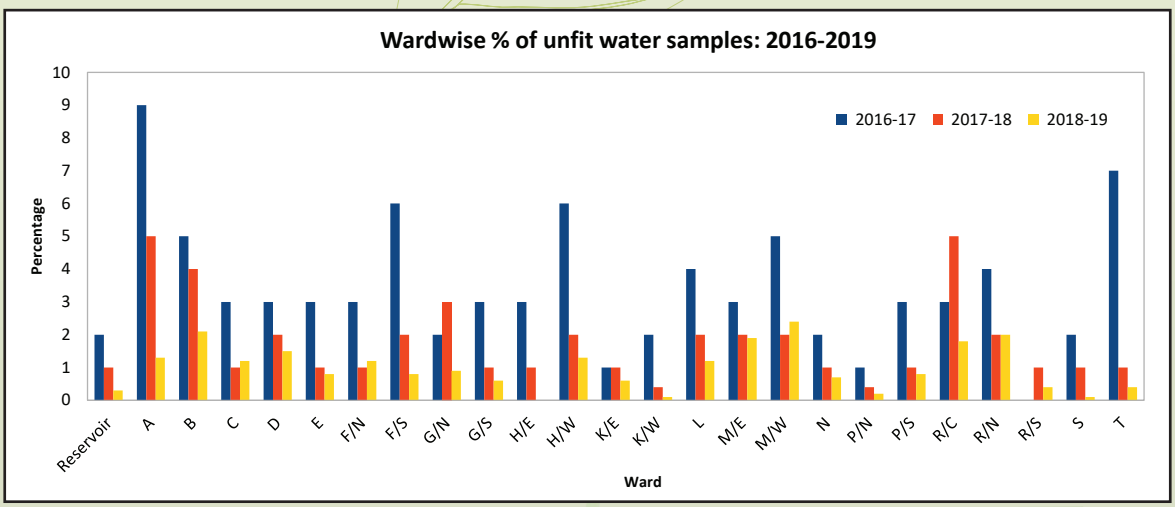
the distribution system and treated water in the distribution system.

The Membrane Filtration Technique (MFT) is used to detect these water quality indicator bacteria. The MFT technique is performed as per the BIS standards. The confirm results are obtained within 24 hours. These results are sent to the Medical Health Officer (MOH) of 24 wards, Deputy Executive Health Officer (Epidemiology Cell), AEWW-QC and AEWW-LD departments by E-mail within 24 hours for taking remedial measure on unsafe water sample location.

Table No. 9.3: Wardwise % of Unfit water Samples during April 2016 to March 2019

Sr. No.	Ward	% of Unfit Samples			Sr. No.	Ward	% of Unfit Samples		
		2016-17	2017-2018	2018-19			2016-17	2017-2018	2018-19
1	Reservoir	2	1	0.3	14	K/W	2	Less than 1	0.1
2	A	9	5	1.3	15	L	4	2	1.2
3	B	5	4	2.1	16	M/E	3	2	1.9
4	C	3	1	1.2	17	M/W	5	2	2.4
5	D	3	2	1.5	18	N	2	1	0.7
6	E	3	1	0.8	19	P/N	1	Less than 1	0.2
7	F/N	3	1	1.2	20	P/S	3	1	0.8
8	F/S	6	2	0.8	21	R/C	3	5	1.8
9	G/N	2	3	0.9	22	R/N	4	2	2.0
10	G/S	3	1	0.6	23	R/S	0	1	0.4
11	H/E	3	1	0.0	24	S	2	1	0.1
12	H/W	6	2	1.3	25	T	7	1	0.4
13	K/E	1	1	0.6	**Mumbai Average**		**3**	**1**	**0.7**

Source: This Information is received from G/N water testing Laboratory of MCGM



Water Supply projects

Middle Vaitarna Project is completed and the total 455 MLD water is made available in the year 2014, which is of full capacity of dam. Further, five sub-projects of Middle Vaitarna Project have also completed and hence Mumbai City & Suburbs receives additional 455 MLD of water supply since 2014.

Future sources of Water Supply to Mumbai:

The gap between demand and supply for the year 2041 is 2840 MLD. To meet the gap and to increase the water supply to Mumbai City and Suburbs, it is proposed to undertake development of following sources for augmenting water supply of Mumbai.

Gargai project is expected to start by end of this financial year 2019-20 and expected to be completed by 2023-2024.

Pinjal project consist of construction of dam across Pinjal River, 64 km long tunnel for water, conveyance system and allied works like water treatment plant, master balancing reservoir, pumping station etc. The work of preparation of Detailed Project Report (DPR) of Pinjal Project has been entrusted to M/s. WAPCOS Ltd. by Water Resources Department (WRD) of Government of Maharashtra (GoM). Meanwhile MCGM has started the tendering procedure for Appointment of 'Consultancy Services for obtaining Environmental, National Board of Wildlife, Forest clearances from Competent Authorities including social and environmental, National Board of impact assessment studies and enumeration of trees for Pinjal Project.

Under 'River Linking Programme' initiated by Government of India, it is proposed to link Damangangs and Pinjal rivers and thereby 1586 MLD water would be made available to MCGM and this water will be conveyed into Pinjal reservoir after its completion.

Future allotted sources of water are shown in following table.

Table No. 9.4: FUTURE SOURCES OF WATER SUPPLY

Sources	Yield in MLD	Ownership	Expected year of completion
Gargai	440	MCGM	2024
Pinjal	865	MCGM	2027
Damanganga-Pinjal River Link Project	1586	GoI /GoM / GoG	To be decided by GoI/ GoM/ GoG.
TOTAL	**2891**		

Source: Hydraulic Engineers Dept.

Ongoing projects in support for improvement in water conveyances system:

- Construction of tunnel from Powai to Veravali and Powai to Ghatkopar High Level Reservoir further up to Ghatkopar Low Level is in progress, for improvement of water supply distribution network system in K/East and 'N' ward area of MCGM. Presently tunnel from Powai to Veravali is completed with all respect and commissioned in November 2018 and put into operation for distribution of water

supply. However, tunnel between Powai to Ghatkopar is affected due to encounter of Adverse Geological condition during excavation of tunnel by Tunnel Boring Machine. Presently 1.1 Km tunnel excavation is completed out of 4.4 Km along Powai- Ghatkopar drive and further work is in progess with safety of manpower and Machinery along Powai-Ghatkopar drive.

- The work of water tunnel from Amar Mahl to Trombay (5.5 km) is started from 17.10.2018 and excavation of shaft at Hedgewar Udyan is in progress.
- Work of construction of Effluent Treatment Plant at Panjrapur for treating backwash water approximately 65 MLD generated after washing filters from existing water treatment plants thereby making it suitable to reuse, is in progress.
- Re-engineering of 90 MLD Vihar water treatment plant work is in progress. New technology for clarifier is adopted by using Aquadaf clarifier replacing old conventional clarifier technology. Phase i was commissioned in March 2018. The work is likely to be completed by September 2019.
- Structural repairs of Malad Hill Reservoir-I (49.50 ML)- Repair works of Compartment No.1 completed in April 2018 and Compartment No.II repair works will be taken up shortly.
- Structural repairs of Ghatkopar High Level Reservoir (31.00 ML)- Work is in progress and is likely to be completed by May 2019.
- Structural repairs to Trombay High Level Reservoir at BARC (54.55 ML)- Work is in progress and is likely to be completed by August 2020.
- Structural repairs to MBR at Bhandup (246.00 ML)- Work is in progress and is likely to be completed by July 2021.
- Rejuvenation of Powai Lake: Aeration System and DO monitoring system along with replacement of penstock is started in May 2018 and will be completed by November 2019.
- Work of design, supply, installation, testing and commissioning of 7 Nos. of existing Stage-II pumps with motors and H.T. Panels at Pise Pumping Station is in progress and is likely to be completed by March 2020.
- Design, Supply, Installation, Testing and Commissioning of 7 Nos. of existing Stage-II Pump with motors and H. T. Panels at Panjrapur Pumping Station and Work is in progress and likely to be completed by December 2019.
- Replacement of Valves and Allied Accessories at Ghatkopar High Level Reservoir- Work is in progress and likely to be completed by July 2019 and subject to isolation of reservoir compartment by user department.
- Work of Structural repairs to – (a) Veravali High Level Reservoir (4.45 M.L.)- The Work is commenced in August 2018 and is likely to be completed by August 2019. (b) Trombay Low Level Reservoir (27 M.L.) has commenced since September 2018 and is likely to be completed by April 2021.

- Work of providing and laying 3000 mm.dia.missing link of Middle Vaitarna lane between Chinchvali ARVC – Yewai with flow control valve at ARVC and mortar lining work is in progress and is likely to be completed by September 2021.
- The work of replacement of 'Twin Tansa main (2-1800 mm.dia.) by single 3000 mm.dia. main between Balkum to Saddle Tunnel is in progress and is likely to be completed by September 2021.
- Procurement, installation, testing and commissioning of flow Meter including Civil/ Mechanical and Electrical Work is in progress.

Recently Completed Projects:

- Work of beautification of Powai lake was started in January 2017 and completed in April 2018.
- The work of providing and laying of pipe line from Bhandup Complex tunnel shaft to water treatment plant at BPT has been completed on 31.12.2017.
- The work of pipeline along with 2 BFVs of state-I and stage-II sumps at Panjrapur Pumping station is competed on 30.04.2018.
- Replacement of Valves and Allied works at Trombay Low Level Reservoir- Work has been completed on 16.01.2019.
- Laying of 2235 mm.dia. single main across NH-3 by micro tunneling/ Jacking pushing. The work is completed in October 2018.

Proposed projects to be undertaken:

A- Proposed Tunnels/Projects:

Tunnel from Amarmahal to Wadal and further upto Parel (9.66 Km):

LoA has been issued to M/s. SOMA Enterprises Ltd. and Compliance of LoA conditions is in progress by M/s SOMA

Gargai project (440 MLD):

Gargai project consist of construction of dam across Gargai River and construction of 2.1 Km long tunnel to convey water from Gargai dam to Modaksagar reservoir. Vetting of Hydrological studies is completed and vetting of design component of DPR is in progress by Central Design Organisation (CDO), Nashik. CWC approval to the Hydrology of Gargai project has already been finalized by M/s. Central Water and power Research centre (CWPRS), Pune and the study report is expected shortly. Proposal for Wild Life, Forest and Environmental Clearance has been submitted to the respective authority and follow up action is in progress. R and R plan as per RFCTLARR, 2013 Act has been finalized. Formation of special land acquisition cell for acquisition of Private Land is being moved.

Gargai dam project expected to be commenced in 2019-20 and will be completed by 2023-24.

Pinjal project (865):

MCGM will undertake Pinjal project which consist of construction of dam across Pinjal River, 64 Km. Long water tunnel as conveyance system and allied works like Water treatment plant, Master balancing reservoir, pumping station etc. The work of preparation of Detailed Project Report (DPR) for Pinjal project was entrusted to M/s. WAPCOS Ltd. by Water Resource Department (WRD) of Government of Maharashtra (GoM). There has been no further progress on the work of DPR preparation hence, MCGM will complete the DPR on its own. Meanwhile MCGM has started tendering procedure for Appointment of 'Consultancy Service for obtaining Environmental, Forest/ National Board of Wildlife clearances from Competent Authorities including socio and environmental impact assessment studies and enumeration of trees for Pinjal Project'. Pinjal Dam Project expected to be commenced by 2021-22 and will be completed by 2026-27.

Damanganga Pinjal River link project (1586 MLD):

The projects comprises construction of dams at Bhugad and Khargihill and 2 nos. of tunnel for diverting additional 1586 MLD Damanganga waters into Pinjal dam reservoir. This project will be implemented by Government of India (GoI). Central Water Commission (CWC)'s approvals to DPR have been received. Proposal for MoTA clearance has been submitted and as suggested by Ministry of Tribal affair, preparation of revised R & R plan as per RFCTLARR Act 2013 is in progress by NWDA. Further modalities of water sharing and project execution will be decided by the WRD, GoM in co-ordination with GoI, GoM, Government of Gujrat (GoG).

B – Proposed Works:

- Rehabilitation of Upper Vaitarna Mains by some suitable technology form Aghai to Gundavali 44 Km.
- Construction of storage structure at 100KV Sub Station & Pumping Station at Panjrapur Mumbai IIIA.
- Structural repairs to Master Balancing Reservoir (MBR) at Yewai Panjrapur.– 116.50 ML.
- Construction of new administrative office building at Pise.
- Construction of new administrative building for the staff (900 MLD Middle Vaitarna WTP, Bhandup Complex).
- Work of Structural repairs to High Level Reservoir at Malbar Hill – 148 ML.
- Renovation / Modification of Vihar, Tulsi, Powai Dams as per the suggestions from "Dam Safety Organization".
- Replacement of existing Tansa (East & West) two 1800 mm dia. mains by 2400 mm dia. between Bhandup Anchor Block to Maroshi Anchor Block.

- Inter Connection of 4000 mm dia. MS pipe line at WTP, Bhandup Complex and other allied works.
- General & Structural repairs to Pre-treater tanks, sludge chambers, pump houses and open steams at Bhandup Complex.
- Replacement of valves and allied works at Trombay High Level Reservoir.
- Providing In-situ Internal cement mortar lining to inlet / outlets and allied works in city area.

Budget provision:

Budget provision for Capital work of the Water Supply projects Department:

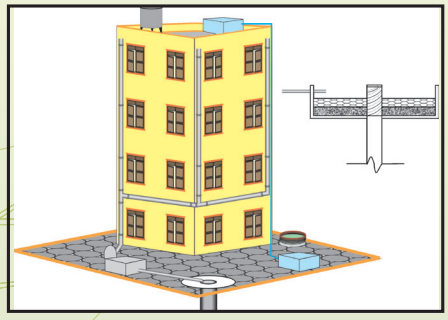
Year 2018-19 - Rs.408.72 Crs

Year 2018-19 - Rs.591.97 Crs.

10. RAIN WATER HARVESTING

M.C.G.M. supplies 3800 million litres of water every day, against a demand of 4505 million litres per day to Mumbai, the economic capital of our country. The purity of the water supplied to the citizens of Mumbai is very high on the International Quality Standards rating & considerable expenditure is incurred for this purification. Unfortunately this water is being used for all secondary requirements also such as flushing of latrines and washing of vehicles. In view of the indiscriminately rising population and comparatively limited resources there is an urgent need to search ways to save water and to put those to actual use. MCGM may not be able to supply water for secondary requirements such as flushing, gardening, vehicle washing swimming pools, air conditioning etc. & it is expected that Citizens have to generate the water for secondary requirements through rain water harvesting or recycling.

Rain Water Harvesting (RWH) is an ancient and convenient method. It implies storage of rainwater in, manmade tanks or recharging ground water and utilization as per requirement. Since, rainwater within our own compound is to be stored; anybody is entitled to do so. Most importantly, the capital expenditure and maintenance cost involved in this method is quite low. Rain Water Harvesting contributes in raising the ground water level. The quality of the ground water improves & Soil erosion is arrested. Entry of seawater in ground water can be prevented.



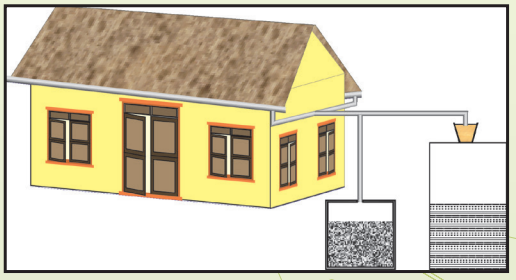
Following methods can be deployed for Rain Water Harvesting.

1. Storage in underground or above ground artificial tanks.
2. Direct recharging of the subsoil water strata (aquifer) through dug up wells or bore wells.
3. Recharging of the subsoil water by percolation.
4. Forcing rainwater in the ground through bore wells and thereby preventing entry of salty seawater in the subsoil strata.

Very large quantities of water can be stored because of the large roof areas of industrial buildings. Those who buy water in tankers can save on this expense by using rainwater. House owners or tenants can store rainwater with a little bit of effort. MCGM is making all-out efforts to actually practice Rain Water Harvesting / water conservation.

Municipal Corporation of Greater Mumbai is the 1st Municipal Corporation in Maharashtra to make Rain Water Harvesting mandatory. Rain Water Harvesting had been made mandatory to new properties coming for development from 1st Oct. 2002 having plot area 1000 sq.mt and more. This condition was extended to the properties which had come for development prior to 1st Oct. 2002 but are coming for occupation / completion from 1.9.2003. As per Government directives u/no. TPB -4307/396/CR-124/2007/UD -11

dtd. 6.6.2007 the condition was binding to all developments having plot area 300 Sq. Mts. & more. From 8.05.2019 as per DP 2034 the condition is binding to all developments having plot area 500 Sq. Mts. & more. The condition is applicable to the properties coming for addition alternation/use of balance FSI etc. The condition is imposed as one of the I.O.D. (Intimation of Disapproval) conditions for installation of RWH scheme and occupation certificate is granted only after compliance of the same. RWH scheme is being designed by the RWH consultant appointed by the Architect. The completion certificate for the implemented scheme is also being issued by the RWH Consultant. Building Proposal dept. verifies the completion certificate issued by the Consultant before issuing Occupation Certificate.



RWH is being implemented in all the new developments of Municipal Corporation where RWH is mandatory. In addition all the departmental heads of MCGM have already been directed to get RWH schemes implemented in their premises.

To encourage existing private Co-op Housing Societies / Owners to implement RWH schemes in their premise Rain Water Harvesting & Water Conservation Cell of MCGM designs RWH schemes free of cost.

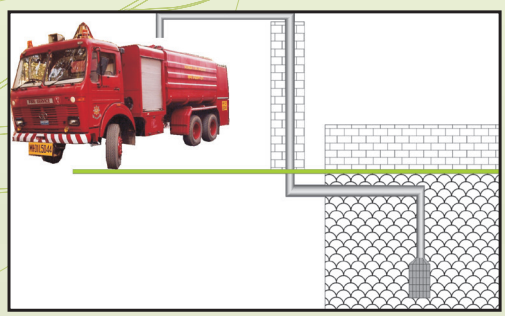
In addition MCGM while issuing new Bore well permissions in private premises, a condition is incorporated to recharge such bore well with roof top rain water.

Mumbai receives an average of 2000 mm of rainfall annually. Considering 458.53 sq. km. area of Mumbai, the rain water falling in the city works out to approximately 2512 MLD. Even if 20% of this rain water is saved & put to use, then 502 MLD of Municipal water can be saved.

As Rain Water Harvesting was not being practiced in the city prior to Oct. 2002, there was absolute ignorance amongst citizens including professionals like - Architects, Plumbers, Builders, Developers, etc. In order to provide proper guidance to all and set up examples M.C.G.M. formulated a technical cell - Rain Water Harvesting cell in Nov.2002 headed by Asstt. Engineer (Rain Water Harvesting) Cell. The Cell organised first 2 days technical seminar with A.I.I.L.S.G. and I.W.W.A. on 28th Feb. / 1st Mar. 2003. The seminar comprised of 17 lectures and 130 participants were apprised of various aspects of Rain Water Harvesting. The cell has participated in most of the major seminars in Mumbai & conducted many awareness programs to appraise various sections of society. To involve citizen Essay competition on “My way of Water Conservation” was organised in July 2003 in four groups and four languages. An information booklet on Rain Water Harvesting & water Conservation was released in its prize distribution ceremony by Hon. Mayor of Mumbai. The booklet is appreciated even by Government of Maharashtra & circulated to many Municipal Corporations / Councils. Municipal Calendar 2004 was dedicated to Rain Water Harvesting so that the message is conveyed to people at large. Drawing competition for Municipal school children was also conducted in Jan / Feb. 2004 to create awareness amongst teachers, students and their parents. N.S.S. students were involved in awareness campaigns to reach more citizens. Since 2005 awareness campaign is being conducted from 22nd March to draw specific attention of citizen. Techniques

like Jalmelas in each administrative ward & open grounds, training ward staff for dispersing basic information, painting BEST busses relaying messages through TV sets on Railway Stations, in BEST buses & private premises, putting message on Municipal bills, advertisement hoardings at prominent locations, informative documentaries in C.S.T. subway are being adopted to reach masses. N.G.O.s are also involved in this activity. TV channels & FM radios are also being used for communicating message. The all requisite information is also uploaded on website www.mcgm.gov.in for easy access by Citizen. As a part of awareness campaign, in 2012, MCGM has published a school book series in Marathi titled 'प... पाण्याचा' on water conservation & rain water harvesting for Std. I to X & distributed it to each student of Municipal marathi medium school. Moreover, another activity titled 'आजी आजोबांचे बोल' has been introduced to rope in senior citizen in this campaign. It is expected that senior citizen would use their energy in convincing people in their nearby locality to save water. They would also interact with school children and even read out books to them & explain the ideas incorporated thereat.

In view of the late monsoon in the year 2014, (RWH & Wat. Cons.) Cell has started Save Water Awareness Campaign to spread awareness amongst the citizen of Mumbai. As a part of the continuous awareness campaign, advertisements in local newspapers were published appealing Mumbaikars to use water judiciously and to avoid wastage of water. Save water awareness posters, short videos were prepared with the help of Tata Trust. Save Water appeals/ advertisements were also displayed on BEST buses, Bus Queue Shelters, TV in BEST buses & in local trains. Lectures on water conservation in various Municipal schools via virtual classroom were delivered through Marathi Vidnyan Parishad. A yearlong initiatives 'Water smart Mumbaikars – mass awareness for water conservation" has been initiated by me2green NGO as MCGM as concept partner.



Due to late monsoon in 2019, with the help of Public Relation Dept., Hydraulic Engineer's dept. printed 1,92,000 Save water awareness posters in Marathi, English & Hindi appealing Mumbaikars to use water judiciously and to avoid wastage of water. These posters were pasted in all the Municipal offices & some of the private premises all across Mumbai.

There are in all 17993 identified wells (6559 dug up wells, 10807 tube wells & 627 Ring wells) in Mumbai. Assuming average per day withdrawal of approx. 20,000 lit. (two tanker load) per well, it can be safely presumed that 359 MLD of ground water is being extracted every day in Mumbai.

Wells are known sources of ground water & can act as line of defense in case of emergency. Fire engines have to travel considerable distance for filling water before attending fire spot. Filling points are being set up on Municipal wells for fire Brigade to save fuel & precious time during emergencies.

Protecting wells in the city is very important considering future water crisis. M.C.G.M. has prohibited unauthorized burying of existing wells from Jan. 2003. The A.E. (B & F), A.E. (B.P.) as the case may be are required to take action under sec. 53 (1) of MRTP Act in case of unauthorized filling up of wells.

MCGM has decided to preserve existing ponds & a policy for the same is being formulated involving MMRDA, NEERI & NGO's.

Thus the Corporation makes efforts in all directions to support Rain Water Harvesting, which is one of the Best Management Practices (BMP) for a Corporation. It is the duty of all citizens to contribute their own efforts to this cause to help themselves.

11. SEWAGE DISPOSAL

It is an obligatory duty of MCGM to provide sanitation and waste water disposal facilities to the citizens of Mumbai. Proper and safe sewage disposal is essential, as 80% of diseases in India are caused by water borne pathogens. In addition to the health problems, inadequate sewage disposal causes severe environmental degradation.

Sewerage disposal work is carried out by three departments in following ways,

1. **Sewage Operation (SO):** It Operates & maintains Municipal sewage systems comprising of conveyance systems i.e. sewer lines, collection system i.e. Sewage Pumping Stations & Sewage Treatment Facility & disposal system.
2. **Sewage Projects (SP):** This department looks after the work of sewer planning, laying of new sewers, up-sizing the existing sewers and elimination of missing links in existing sewer network.
3. **Mumbai Sewerage Disposal Project (MSDP):** It carries out the work of sewerage treatment and disposal.

Sewerage Operation (S.O.):

It is an obligatory duty of M.C.G.M. to provide sanitation and waste water disposal facilities to the citizens of Mumbai. Proper and safe sewage disposal is essential, as 80% of diseases in India are caused by water borne pathogens. In addition to the health problems, inadequate sewage disposal causes severe environmental degradation.

Laboratory at Dadar under Sewerage Operation department has carried out monitoring of marine outfalls at Colaba, Worli and Bandra. Marine water samples are collected at 1 Km. peripheral area from outfall disposal point. The analytical reports are compared with the M.P.C.B. SWII Standards and it has been found that at Colaba, Bandra and Worli coastal area, levels of pH are within prescribed standards. Average D.O. levels are exceeding standards which are a good sign in terms of dissolved Oxygen. Levels of E-coli are exceeding at all sites.

Table No. 11.1: Coastal Sea water quality of Mumbai 2017-2018

Sr. No.	Place	PH		D.O. (mg/l)		Turbidity (in NTU)		E-Coli (CFU)		B.O.D. (mg/l)	
	Standard: SW-II	6.5-8.5		>4 mg/l		<30 NTU		<100/100 ml		<3 mg/l	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
1	Colaba	6.4	7.95	4	5.9	1.7	18.7	10	300	0.55	1.8
2	Bandra	7.14	7.96	3.8	6.4	0.98	4.79	10	400	0.85	2.5
3	Worli	7.3	7.89	4.2	6.1	0.9	2.46	20	540	0.8	2.7

D.O.: Dissolved Oxygen B.O.D.: Biological Oxygen Demand MPN : Most Probable Number CFU: Colony Forming Unit

Source: Sewage Operation Laboratory

The work of up-gradation and expansion of Dadar Sewerage Laboratory was successfully completed by Sewerage Operation department in the year 2017. Dadar Sewerage Laboratory is accredited by NABL (National Accreditation Board for testing and calibration Laboratories). Quality Council of India has issued Certificate of Accreditation under No. TC-7267 dated 18.05.2018 to Dadar laboratory.

The sewer network of entire Mumbai is now mapped and available on Geographic Information System (GIS) through Web Application on MCGM domain. Further, under G.P.S. an exercise of mapping the sewerage assets up to 1 meter accuracy with reference to two geographic location is undertaken by S.O. department using Hand Held Rovers.

The repair work of sewer lines, manholes, vent shafts etc. are systematically being updated/recorded in GIS by following Data Updation Protocol. Also the yearly plan of Systematic Cleaning Programme of sewer lines and its progress is also regularly updated in GIS database and monitored through GIS Web application.

Under the initiatives of automation of Sewerage Pumping Stations, SCADA system is implemented in phased manner. In its Phase-I, total 10 pumping stations of Bandra Sewage Zone & 7 Waste Water Treatment Plants are commissioned in March 2018. With the help of this project Real Time online monitoring of discharged treated flow is now achieved. Online Monitoring of various parameters of pumping stations i.e. status of pumps, levels in wet wells, energy consumed is achieved.

Sewage Projects

Sewage disposal system of Mumbai City is divided into seven zones viz. Colaba, Worli, Bandra, Versova, Malad, Bhandup & Ghatkopar. The sewer lines leading to pumping stations & sewerage treatment plants are laid by this department by open cut method and trench-less method. The planning, designing & e-tendering of new sewer lines in un-sewered area and up-sizing existing sewer lines when required is done by Dy.Ch.E. (SP) P&D section. Work of laying of the sewer lines is carried out by Dy.Ch.E. (SP) Construction. Dy.Ch.E. (SP) P&D & Dy.Ch.E. (SP) Constructions are working under Ch.E. (SP).

Dy.Ch.E. (SP) Sewerage Project (Planning & Design) section offers remarks on sewerage systems for street connections or Septic tanks to the plots belonging to Govt., Semi Govt., Private Properties etc. Besides this, NOC for laying of sewer lines along proposed D.P. Roads are being issued to private developers and are being laid under supervision of construction department. After implementation of "Ease of Doing Business" by MCGM, all the remarks earlier issued by SP department to the project proponents are now become autogenerated. Architect/Consultants Appointed by IOD holder are empowered to comply sewerage related remarks through online system.

Proposed works at various locations in the year 2018-19:

Total budget provision for the financial year 2018-2019 is Rs. 25.32 Cr. which is proposed for laying of new sewer lines in un-sewered area and Up-sizing of existing sewer lines in City, Eastern and Western suburbs.

1. **R/South Ward:** P/L Pipe sewer line on 13.40mt. Wide D.P road from Neptune Building upto Bhoomi Hills Society, Thakur Complex, Kandivali (E).

2. **P/North Ward:** P/L Pipe sewer line along Mahalkari Road and 350 mm dia RCNP3 class Pipe sewer line along Shivaji Nagar road in Kurar Village, Malad (E).

3. **G/S Ward :** P/L Pipe sewer line in place of existing 230 mm dia. damages sewer line by Trenchless method i.e. Manual Pipe Jacking Method along Sakharam Balaji Pawar marg from Curry road station to Ovoid sewer on N. M .Joshi Low level raod.

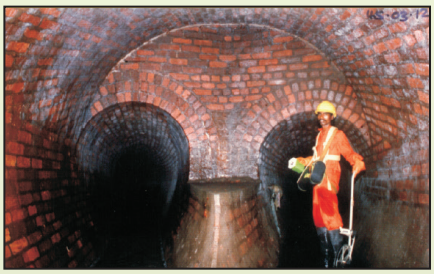
4. **K/W Ward:** P/L along 13.4 mtr. wide on D.P. road, Jogeshwari(W) from Global Chambers upto Parsi Colony.

5. **K/W Ward:** P/L along 36.6 mtr wide D.P. road, Jogeshwari (W) (Ext. of Jogeshwari Vikhroli express way) from Millat School to Vastu Shilpa Complex designers, SRA Project Scheme and from Global Chambers upto Aksa Masjid.

12. STORM WATER DRAINS

Mumbai is lined on the west by Arabian Sea and is intercepted by number of creeks. The tidal variation is a major consideration in the system of storm water drains (SWD) for releasing rainwater as well as waste water into sea. The present SWD system in the city is more than 100 years old and is about 525 km long. This network consists of underground drains and laterals built on the basis of population and weather conditions. The old SWD system is capable of handling rain intensity of 25 mm per hour at low tide with runoff coefficient of 0.50. If the rain intensity is more than 25 mm per hour during high tide, there is always a possibility of water logging.

In practice however, in addition to storm water, they carry sewage overflow from septic tank, surface water, etc. Length of open SWD in Mumbai is about 1987 km. The flow from this open SWD is discharged either into nallhas, culvert, creek or sea. This open SWD becomes an eyesore due to throwing of garbage by citizens especially in slum area and creates unhygienic conditions. Therefore, regular desilting is carried out through registered contractual agency throughout the year.



There are 85 major out-falls in city which drain to Arabian sea directly, 8 at Mahim creek and 12 at Mahul creek. There are 29 out-falls in western suburbs draining directly into sea while 14 drain into Mithi river which ultimately joins Mahim creek. In eastern suburbs, 14 out-falls discharge in Thane creek while 6 discharge in Mahul creek and 8 into Mahim creek. In suburbs and extended suburbs area, open SWD are constructed on both sides of road.

Heavy rain in Mumbai city in June 1985 had resulted into flood like situation, which paralyzed the roads and railway traffic and there was heavy economic loss. In view of this, corporation decided to carry out the study of the storm water drainage system in the city. A master project was planned to help to drain out Storm Water immediately and reduce floods. In the year 1989 M/s Watson Hoksaly International Pvt. Ltd. and their Indian sister concern M/s AIC was appointed as a consultant for this project. Consultants had inspected existing storm water drainage system and nallas, identified 121 catchments areas of the city and studied the deficiencies in cleaning and maintenance. They have also studied the preparation of map and its scale again. In year 1993, to improve the storm water drainage system, they prepared a master plan, which is known as BRIMSTOWAD project. This plan suggested improvements in SWD system with design criteria, of rainfall intensity of 50 mm/hr with runoff coefficient of 1.00.

As per the price index of the year 1992, total cost of the project was worked out to be Rs. 616.30 crores. It was proposed to carry out improvements in the span of 12 years. However, due to the shortage of funds and other reasons, only the works of approximately Rs. 260 crores were completed. According to the price index of year 2006, total cost of remaining work is approximately Rs.1200 crores. As it was not possible to complete these balance work with the budget provision of Municipal Corporation of Greater Mumbai within stipulated period, Government of Maharashtra/ Government of India had been requested for financial assistance.

Government of India sanctioned special grant of Rs. 1200 crores as per detail project report submitted to Government of India to implement BRIMSTOWAD Project in year 2007. Out of these, MCGM has received Rs. 1000 crores till date.

Fund received from Government of India is as follows.:

Sr. No.	Date	Amount Received
1	23.8.2007	Rs. 400 Crs.
2	17.2.2009	Rs. 100 Crs.
3	31.3.2010	Rs. 400 Crs.
4	31.3.2010	Rs. 100 Crs.
	Total	**Rs. 1000 Crs.**

Subsequently in the year 2005 Mumbai faced unprecedented rains on 26th and 27th July 2005 and 944 mm rainfall was recorded in one day. This resulted in the flooding, therefore, Government of Maharashtra had appointed a Fact Finding Committee to analyze the factors responsible for the situation that arose during July 26th and 27th, 2005 in Mumbai and to find out the remedial measures thereat, so as to avoid such incident in future. Based on the BRIMSTOWAD Master Plan Report and recommendations of Fact Finding Committee, the balance BRIMSTOWAD works for the improvement to the storm water drainage system are undertaken. As per suggestion of the Fact Finding Committee BRIMSTOWAD report is to be reviewed and upgraded for which MCGM has appointed M/s. MWH (I) Pvt. Ltd, as the consultant. The master plan is under preparation by the said consultant. Further, tenders for appointment of consultant is being invited to carry out survey and mapping of roadside drains and minor nalla.

Brimstowad Project is proposed to be implemented in 2 phases. There are 20 works in Phase-I and 38 works in Phase-II. The scope of the BRIMSTOWAD project is as under- Table No. 12.1

1. Rehabilitation and augmentation of underground drains in city.
2. Construction of new drains in RCC.
3. Training of nallas in RCC M-40.
4. Widening and Deepening of nallas and construction of access road along the nalla.
5. Construction of Storm Water Pumping Stations.

Table No. 12.1: Present Status of BRIMSTOWAD Project

Details	Phase I				Phase II			
	City	W.S.	E.S.	Total	City	W.S.	E.S.	Total
No. of the works	5	7	8	**20**	16	10	12	**38**
No. of Completed works	4	6	6	**16**	10	1	2	**12**
No. of the works in progress	1	1	2	**4**	5	9	9	**23**
Tenders yet to be invited	0	0	0	**0**	1	0	1	**3**

also the Present status is pumping stations under BRIMSTOWAD are shows in Table No. 12.2

Table No. 12.2: Status of Pumping Stations under BRIMSTOWAD

Sr. No.	Pumping Station	Status
1	Haji Ali and Irla	Completed and commissioned in the month of May 2011
2	Cleaveland Lovegrove	Completed and commissioned in the month of May 2015
3	Brittannia	Completed and commissioned in the month of May 2016
4	Gazdarbund	Construction work started. Expected to be completed by May 2019
5	Mogra & Mahul	Land acquisition in progress

Total expenditure incurred till Feb 2018 is Rs.2234.85 Crores. However, due to increased width and depth of the drains due to change in design parameters, requirement of unconventional technology specially in tidal zone and passage of time – particularly due to encroachment issues, total financial requirement of the project has seen a substantial rise and additional funds to the extent of Rs. 2700 Crores are required for which revised DPR was submitted to Govt. of India on 12.3.2012.

Environmental Aspect:

As regards cleaning of the nalla, desilting of the same is carried out every year, prior to commencement of monsoon within MCGM jurisdiction. The same are cleaned by specially appointed agencies. The work of desilting is carried out in phases. About 60% of the work is carried out before monsoon. 20% during monsoon and balance 30% post monsoon. Further, silt from all the water inlets are also removed. About 50% of the water inlets are cleaned departmentally by Wards Staff while balance 50% are cleaned by NGO Labourers.

Development of Mithi River:

Govt. of Maharashtra has formed "Mithi River Development and Protection Authority" under the Chairmanship of Hon'ble Chief Minister of Maharashtra State on 19th August 2005 for improvement of Mithi River. The total length of Mithi River is 17.8 kms, out of which, length of 11.8 kms is in the jurisdiction of Brihanmumbai Mahanagar Palika and the balance length of 6.00 kms is under jurisdiction of MMRDA.95% widening and deepening of Mithi River has been completed till date.

Till March, 2019 the retaining wall admeasuring 16.223 km. length is completed against 21.588 Km. length of retaining wall, which is to be constructed along both banks of 11.00 Km. long Mithi River in MCGM jurisdiction. The work orders for construction of retaining wall admeasuring 0.75 km. is already given and the work is in process. The length of 0.45 km. is affected by bridge / nalla widening, whereas the 0.84 km length of retaining wall of Mithi River will be constructed by Mumbai International Airport Ltd., (MIAL). The tenders for construction of balance 3.325 km. length of retaining wall of Mithi River will be invited shortly.

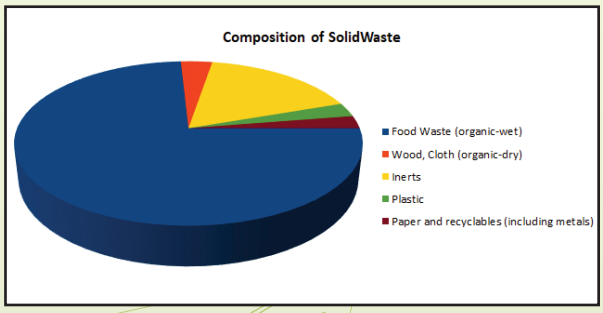
13. SOLID WASTE MANAGEMENT

The approximate quantity of solid waste collected and transported in Mumbai is over 7200-7700 metric tonnes per day (MTPD) by Municipal and Private vehicles in 1720 trips/day. The categories of waste that are separately collected in terms of types i.e. Food, vegetable & fruit waste 73%, Recyclable i.e. paper, plastic, metals and glasses 10 %, inert matter 17% and quantity of waste generated is as below (Table 13 .1).

TableNo. 13.1: Composition of Solid Waste In Mumbai

Sr. No.	Type of Solid Waste	Percentage
1	Food Waste (organic- wet)	72.6%
2	Wood, Cloth (organic-dry)	3.51%
3	Sand, Stone & Fine earth	17.37%
4	Plastic	3.24%
5	Paper and recyclables (including metals)	3.28%
	Total	**100.00**

Source: Report of NEERI, 2016



The garbage from all over city is collected and at present, the garbage is treated at Kanjur processing site using Bio-Reactor Technology and rest is disposed off at the Deonar dumping site by simple dumping and leveling. Scientific Closure Project at Gorai has been completed and operation and maintenance of the site is in progress. Deonar dumping ground is the oldest one, receiving approximately 35.72% (2500 TPD received of 7000TPD) & Kanjur receiving 64.28%.(4500 TPD received of 7000TPD). Deonar dumping ground has nearly exhausted its capacity to receive the garbage. The activity of receiving of fresh MSW at Mulund Dumping Ground is stopped w.e.f.21.12.2018 and the project work of recovering the land by processing the existing garbage is suitable technology is in progress. Area of different dumping grounds is given in (Table 13.2). Input loads of MSW at various dumping sites are given in (Table 13.3).

Table No. 13.2: Capacity of Various Dumping Sites in Mumbai

Sr. No.	Disposal Site	Area (Ha) Filling m*	No. of Years in Use
1	Deonar	120	88
2	Mulund	24	47★★
3	Kanjur	65.96	4

Source: Solid Waste Managment Dept.

★★From 21.12.2018 Mulund dumping ground sloped accepting garbage

There are around 2381 No. of 1.1-cubic meter containers, 1044 community collection points and 100% of total garbage is collected through House-to-House collection. The daily Municipal Solid Waste (MSW) is collected and transported by deploying various types of vehicles. Salient features of transportation are given in (Table 13.4).

Table No. 13.3: Input Load of Waste

Sr. No.	Dumping Ground	Classification of Waste	Tonnes/day
1	Deonar	Municipal Solid Waste	Approx. 3100
2	Mulund	Municipal Solid Waste	The activity of receiving of fresh MSW at Mulund Dumping Ground is stopped w.e.f.21.12.2018 and the project work of recovering the land by processing the existing garbage is suitable technology is in progress.
3	Kanjur	Debris	Approx. 4000

Source: Solid Waste Managment Dept.

Swaccha Bharat Mission:

In order to pay a tribute to Mahatma Gandhi on his 150th birth anniversary, India has pledged to become Open Defecation Free and clean by 2nd October 2019. It is under the mandate of the Swachh Bharat Mission (SBM), launched on 2nd October 2014, that this objective is slowly but steadily being pursued and achieved, while gradually evolving into a 'jan andolan' in the process. MCGM being the prime agency, responsible for maintaining cleanliness in the city, a concerted and joint effort has been taken up along with the State and Central Govt. for achieving the desired level of cleanliness and sanitation under this Mission, the efforts and programs of Solid Waste Management department have been redesigned accordingly by MCGM.

Table No. 13.4: Salient Features of Transportation For Solid Waste

Sr. No.	Type of Vehicle	Number of Services 2016-17	Number of Services 2017-18	Number of Services 2018-19
1	Compactors	1632	1811	1228
2	Skip Vehicles/ Dumper Placers	74	11	11
3	Dumpers/ Refuse Vehicle	146	192	100
4	Bulk Refuse Carriers	35	-	--
5	Tempo/Jeeps	1982	3238	2933
6	JCB Machines	59	60	50
7	Stationary Compactors	57	57	57
	Total	**3985**	**5369**	**4379**

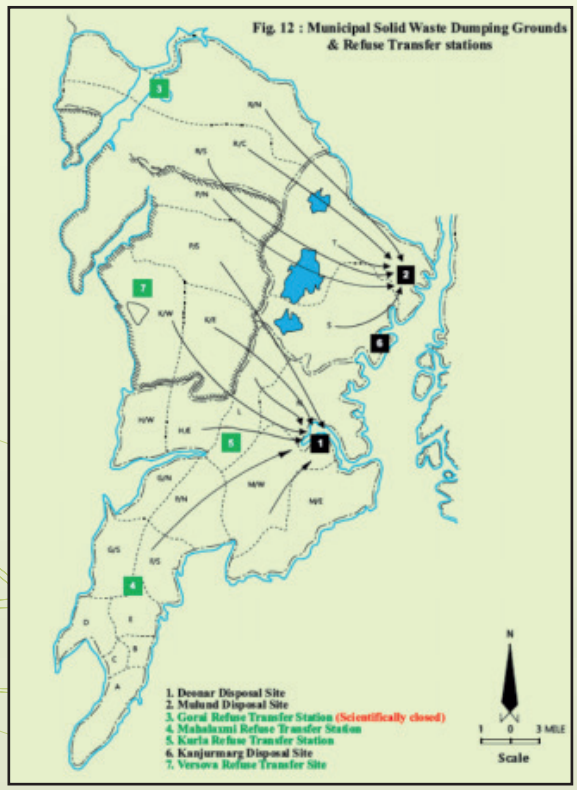


Fig. 12 : Municipal Solid Waste Dumping Grounds & Refuse Transfer stations

Open Defecation Free:

Mumbai is declared as Open defecation free (ODF) on 29.12.2016 & Quality Council of India (QCI) certified Mumbai as ODF on 07.01.2017. Subsequently, Mumbai was recertified as ODF city on 06.07.2017, 05.02.2018 and 18.08.2018.

Swachhata App:

Swachhata App-MoUHA is being promoted in Mumbai to facilitate SWM department to promptly address the complaints for SWM issue. The resolution rate for the same is above 99%. The Swachhata App complaints are also being regularly monitored.

Segregation & Composting of wet waste at Source:

1. To reduce the garbage coming from bulk waste generators, 3380 identification of all residential, commercial, market premises etc (bulk waste generator) have been carried out & notices are issued to them to increase the level of "segregation at source". But it was necessary to introduce methods, technology & processes to be followed for disposal of solid waste at source for the bulk waste generators, so that they can adopt one of the method/ technology suitable for them.

2. In view of above, MCGM had organized ward level exhibition for creating awarenss about the source segregation, waste processing at source & around societies/ bulk waste generators/ hotel representatives etc. having actively participated in the exhibition. Currently, segregation percentage in Mumbai is around 82.92% & 1671 (MC Review 01.05.2019) bulk waste generators have started composting at source. Waste going at dumping ground has been reduced from 8500MT in January 2015 to current level of 7200-7700 MT.

Swachh Survekshan 2019:

MCGM has actively participated in Swachh Survekshan 2019 conducted by Ministry of Housing & Urban Affairs (MoUHA) during 1st January, 2019 to 31st January 2019. Films to promote segregation of waste were prepared & promoted in theatres in Mumbai as a part of IEC activity. Posters, banners & hoardings were promoted intensely in the month of January 2019 promoting segregation of waste with details of dry waste & wet waste. Swachh Bharat messages were promoted on railway stations & bus queue shelters in Mumbai with the month of Dec. 18 showcasing SBM messages. Training of all sanitary inspectors & above was conducted in the month of December 2018 through All India Institute of Local Self Government (AIILSG). Mumbai has been awarded as the Best Capital in "Innovation and Best Practices

Pelletisation Project: (Gren Coal Project)

Pelletisation 'Green Coal' Project is in operation since May 2014 through Private Operator M/s. CIPL Resurge in N Ward. In this project, tree cuttings, green waste from gardens, coconut leaves and coconut shells are processed and converted into Briquettes/ Pellets i.e. 'Green Coal' by Pelletisation process. In addition, 2 new projects of M/s Godrej Industries of processing approximately, 65 MT/Day green waste collected from 24 wards of MCGM is processed in this project.

The scientific processing of MSW at Kanjur MSW Processing facility is in progress and the current status of Kanjur project is as follows:

Kanjur MSW Processing Site:

As per orders of Hon'ble High court and Hon. Supreme Court, the Government of Maharashtra handed over a plot admeasuring 141.77 hectares area at Kanjur to MCGM on 24.10.2005 for developing MSW disposal site. Out of said 141.77 Ha. area, mangroves area admeasuring 23.36 ha. was retained by the Government of Maharashtra vide notification dtd.02.04.2012.

Kanjur MSW Processing facility has received Environment Clearance from State Environment Impact Assessment Authority Maharashtra (SEIAA) on 05.12.2014 for 65.96 ha. non CRZ area. Renewed authorization from MPCB is received on Dt.19.08.2017

Further, Kanjur MSW Processing facility has received Environment Clearance from State Environment Impact Assessment Authority Maharashtra (SEIAA) on 29.10.2018 for Scientific processing of MSW in 52.45 ha. CRZ –III area.

At present, processing of about 3000-3500 TPD of MSW with bioreactor technology and about 1000 TPD of MSW with windrow composting technology is being carried out at Kanjur MSW Processing facility.

Intake of additional 1000 TPD of MSW for scientific processing by bioreactor technology is likely to be increased in near future.

New Projects undertaken for scientific processing of MSW generated in Mumbai is as below:-

- **Development of Waste to Energy (WTE) Project at Deonar:** The tender for WTE is invited. Around 600 TPD MSW will be processed scientifically and 4 MW electricity will be generated from this project. Later on, MCGM is planning to invite tenders for 1200 TPD WTE project.
- **Dumpsite Reclamation at Mulund Dumping Ground(MDG) in Mumbai by adopting suitable technology for existing garbage dump:** Work of Dumpsite Reclamation at Mulund Dumping Ground (MDG) is awarded to Joint Venture of M/s Prakash Constrowell Ltd., S2 Infotech International Ltd. and M/s EB Enviro Biotech Pvt Ltd. (SPV name M/s Biomining India Pvt. Ltd.). The actual physical possession of the MDG site is given to the contractor on 21.12.2018. At present excavation of legacy waste is being done and completion of preliminary project activates and mobilization/ purchase of equipment and machineries etc. is being done. M/s MITCON Consultancy & Engineering Services Ltd. has been appointed as Project Management Consultant (PMC).
- **Scientific processing of waste at Mulund (E) Near Airoli Bridge:** GoM has allotted about 32.77 Ha land to MCGM at Mulund (E) near Airoli Bridge for development of scientific waste processing facilities. However, physical possession of the land is not yet given. After receiving the actual physical possession of the said land, MCGM will undertake works of development of scientific waste processing facilities.
- **Scientific processing and disposal of Waste at village Karavale, near Taloja:** GoM has allotted about 52.10 Ha land to MCGM at village Karavale (Kh.), Tal – Ambernath, Dist – Thane. Out of which advance possession of Government land admeasuring about 38.87 Ha has been given by GoM to MCGM along with existing encroachment thereon. Out of this government land, the physical possession of about 30 Acres of land has been given to MCGM on 16.02.2019. This land will be used for inert disposal from project of Mulund Dumping Ground and as sanitary landfill for other MCGM's projects. Land admeasuring about 12.20 Ha is private land and acquisition of the same is being done by Collector, Thane. After receiving physical possession of the said land, MCGM will undertake works for development of scientific waste processing facilities.

- **Collection, Transportation, Processing & Disposal of Construction & Demolition (C & D) Waste in Mumbai:** The MCGM is planning to process scientifically 1200 TPD C & D waste. The tender is already invited and work is likely to commence by year end.

Municipal Solid Wastes (Management and Handling) Rules, 2016:

On 8th April, 2016, the new SWM Rules 2016 issued by Ministry of Environment, Forest and Climate Change have come into effect and the said rules applies to the entire Country of India.

SWM Rules, 2016 also deals with the duty of manufacturers or brand owners of disposal products & sanitary napkins and diapers. Such manufacturers have been directed to provide necessary financial assistance to local authorities for establishment of Waste Management System. They have been also directed to put in place a system to collect back the packaging waste generated due to their production. In addition to the above, such manufacturers have been directed to explore the possibility of using all recyclable materials in their products and to educate masses for wrapping and disposal of their product.

In addition to the above, SWM Rules 2016 deals with the duties of waste generator. All resident welfare & market association Gated communities and institutions with more than 5000 sq. meter area, all hotels and restaurants, shall within one year from date of Notification of these rules and in partnership with local bodies, ensure segregation of waste at source by the generators as prescribed in this rule, facilitate collection of segregated waste in separate streams, handover recyclable materials to either the authorized waste picker or the authorized recyclers. The bio-degradable waste shall be processed, treated and disposed off through composting or bio-methanation within the premises as far as possible. The residual waste shall be given to the waste collectors or agency as directed by the local body.

SWM Rules 2016 provides for responsibility on the generation of the MSW by imposing penalty, if the same is not complied with in accordance with the Solid Waste Management Rules, 2016.

SWM Rules 2016 provides for the various compliances to be carried out by the Municipal Bodies within time frame mentioned therein.

The below chart showing the various compliances to be carried out by MCGM alongwith the compliances already carried out and which are in process on behalf of the MCGM.

No.	Activity	Time limit	Action taken by MCGM
1	Identification of suitable sites for setting up solid waste processing facilities.	1 year	Already identified the land. MCGM, in January 2015 had requested Govt. of Maharashtra to allot the land at Mauje Karvale, near Taloja to MCGM for processing and disposal of Municipal Solid Waste (MSW) in compliance with SWM rules 2016. Also MCGM has identified land at Mulund East (near Airoli bridge) and requested GoM to handover the same. GoM accorded in principle approval to allot around 52.10 Ha. land at Karavale near Taloja. Out of this land 39.90 Ha. is Govt. land and 12.20 Ha. land is private land. Various meetings at the level of Collector, Thane, Divisional Commissioner, Kokan Division, Mantralaya, Hon'ble Chief Secretary and Hon'ble Chief Minister were held for allotment of land at Karavale to MCGM. At present handing over of around 30 Acres of Govt. land, Rehabilitation of PAPs, Acquisition of private land is under process. Complied within the time stipulated.

<table>
<tr><th>No.</th><th>Activity</th><th>Time limit</th><th>Action taken by MCGM</th></tr>
<tr><td>2</td><td>Identification of suitable sites for setting up common regional sanitary landfill facilities for suitable clusters of local authorities under 0.5 million population and for setting up common regional sanitary landfill facilities or stand alone sanitary landfill facilities by all local authorities having a population of 0.5 million or more.</td><td>1 year</td><td>Same as above</td></tr>
<tr><td>3</td><td>Procurement of suitable sites for setting up solid waste processing facility and sanitary landfill facilities.</td><td>2 years</td><td>Is in process.The Hon’ble Bombay High Court in order dtd. 02.11.2018 has directed Government to hand over the vacant possession of about 30 Acres out of the land at Village Karavale to Mumbai Municipal Corporation on or before 31st January 2019.

Complied within the time stipulated.</td></tr>
<tr><td>4</td><td>Enforcing waste generators to practice segregation of bio degradable, recyclable, combustible, sanitary waste domestic hazardous and inert solid wastes at source.</td><td>2 years</td><td>Notices are already issued. Enforcement is being implemented in phased manner. MCGM has taken various initiatives for encouraging the segregation by bulk generator and the action against the defaulter has been taken.

Action u/s 53 (1) of MRTP Act.
<table><tr><th>Total No. of Building constructed post 2007</th><th>No. of notices complied</th><th>Prosecution launched against non compliers</th></tr><tr><td>326</td><td>196</td><td>44</td></tr></table>
Action u/s 368 of MMC Act.
<table><tr><th>Prosecution launched against non processing bulk Gen. in March -19</th><th>Balance No. of Bulk Gen. against which prosection is to be lunched</th><th>Total fine imposed (Rs.)</th></tr><tr><td>97</td><td>459</td><td>3947000</td></tr></table>
Further appellant MCGM has identified 210 Bulk generators having area more than 20,000 Sq.M. and in 10 cases Maharashtra Pollution Control Board (MPCB) has launched prosecution.

MCGM has established 45 dry waste segregation centres in 24 wards for segregating collected dry waste from various establishments. MCGM has further proposed total 4 nos. of plots for setting up dry waste segregations centres to be developed under Development Plan – 2034.

For collection and transportation of dry waste, MCGM has deployed 96 vehicles in 24 wards, which carry the dry waste to segregation centres. Also Expression of Interest (EOI) for establishing three modern segregation centres (Each in City, Eastern Suburbs & Western Suburbs) is opened on 20.11.2018 and scrutiny of the same is in progress. MCGM has floated new zonal contract for collection of garbage in line with SWM Rules 2016, in which 399 nos. of large compactors & 246 nos. of mini compactors vehicles having separate compartment for collection & transportatation of dry waste, e-waste & wet waste are to be provided.

Complied within the time stipulated.</td></tr>
<tr><td>5</td><td>Ensure door to door collection of segregated waste and its transportation in covered vehicles to processing or disposal facilities.</td><td>2 years</td><td>MCGM has taken various initiatives thereby and has achieved about 100% house to house collection, 80% segregation.

MCGM has floated new zonal contract for collection of garbage in line with SWM Rules 2016, in which 399 nos. of large compactors & 246 nos. of mini compactors vehicles having separate compartment for collection & transportatation of dry waste, e-waste & wet waste are to be provided.

Complied within the time stipulated.</td></tr>
<tr><td>6</td><td>Ensure separate storage, collection and transportation of construction and demolition wastes.</td><td>2 years</td><td>As of date, MCGM collects and transports separately the construction and demolition waste. However, tender is being invited for processing C&D waste generated.

As per the direction in Hon’ble Supreme Court of India in Special Leave Petition (Civil) no. 23708 of 2017, MCGM has devised Special Software System to insure safe disposal of C&D generated by bulk generator complying with C&D Rules 2016. Also as regards to small scale C&D generators, MCGM has ‘debris on call’ services.

Complied within the time stipulated.</td></tr>
</table>

7	Setting up Solid waste precessing facilities by all local bodies having 100000 or more population.	2 years	MCGM has already setup Solid Waste Procesing facility at Kanjur Landfill site. The MSW processing facility has a capacity of processing 1000 TPD of MSW with composting technology and 3000-6500 TPD with bioreactor technology for period of 25 years & has been operational since 13.12.2011. Presently, around 3250 TPD per day is being processed and will further enhance to 6000 TPD by April 2019. Further, MCGM had floated tenders for development of waste energy project at Deonar Dumping Ground of capacity 3000TDP on 25.10.2016. However, no bidders submitted their bid on due date and time. Hence, the tender is restructured with smaller modules and now the tender for development of 600 TDP waste to energy project at Deonar based on open technology is invited and due on 28.01.2019. Further, on successful implementation of this module, another two modules of 600 TPD capacities each are proposed to be installed at the same location. In Process.
8	Setting up common or stand alone sanitary landfills by or for all local bodies having 0.5 million or more population of the disposal of only such residual wastes from the processing facilities as well as un--treatable inert wastes as permitted under the Rules.	3years	At Kanjur site, there is provision of sanitary landfill after commissioning of compost plant. As well as there is provision of sanitary landfill at Deonar Dumping Ground in Waste to Energy project. After getting possession of the land at Mauje Karavale, there is plan for sanitary landfill site also at Mauje Karavale. Timeline not expired, In process,
9	Bio-remediation or capping of old and abandoned dump sites.	2 years	The work of scientific closure of Dumping Ground at Gorai is completed in 2009 by MCGM. MCGM has issued the LOA of "Dumpsite Reclamation at Mulund Dumping Ground (MDG) in Mumbai by adopting suitable technology for existing garbage dump" to private operator. The operator of the Project has started the work on 24.12.2018. The project period is 6 years and will biomine the existing waste of around 7 Million tons at Mulund Dumping Ground. As regards to Deonar Dumping Ground, the existing dump therat is about 18.35 million MT. The Hon'ble High Court, Mumbai vide Order dated 26th & 29th Febryary 2016 directed MCGM to engage the services of IIT or NEERI as consultants to suggest the measures for properly maintaining the site till proper facility is created thereon as per MSW Rules. MCGM has appointed IIT Mumbai initially as per the Order of Hon'ble High Court, Bombay. However, report submitted by IIT Mumbai was not found feasible as it was not complying the Order of Hon'ble High Court, Bombay. Thereafter, NEERI is inprincipally appointed for closure plan at Deonar Dumping ground for the study to develop the closure plan for Deonar dumpsite, including advice on appropriate technologies to be used for the dumped waste at Deonar as per SWM Ruels 2016. Timeline not expired, In process,

Service Level Benchmarking:

1. To monitor the performance of any ULB regarding its Service Delivery to the Citizens, MoUD has devised benchmarks for each service delivered.
2. For Solid Waste Management Dept. there are 08 such benchmarks.
3. The benchmarks are elaborated below. (Current achieved values are mentioned in bracket)

Description of service	Target	Achieved
Coverage of SWM services through Door to Door collection	100%	100%
Efficiency of Collection	100%	100%
Extent of Segregation of Municipal Solid Waste	100%	82.98%
Extent of Municipal Solid Waste Recovered	80%	35%
Extent of Scientific Disposal of Waste at Landfill site	100%	62.5%
Efficiency in Redressing Customer Complaints	85%	88%
Extent of Cost Recovery in SWM Services	100%	100%
Efficiency in Collection of SWM Charges	90%	100%

Bio-Medical Waste (Management & Handling) Rules, 2016:

Bio Medical waste (Management and Handling) Rules, 2016 are notified by Ministry of Environment and Forest, Govt. of India, under Environment Protection Act 1986 vide Notification dated 28/03/2016. As per rules it is the duty of 'Occupier'/ 'Generator' to ensure that BMW is handled without any adverse effect to human health and environment by way of segregation, packing, transportation, storage, final treatment and disposal. An 'Occupier' is defined as an institutions like hospital, nursing home, clinic, dispensary, veterinary institution, animal house, pathological laboratory, blood bank etc. which generate BMW.

MCGM owns major hospitals, maternity homes, dispensaries and clinics. MCGM is therefore considered to be an 'Occupier' and is required to dispose of the BMW generated in these institutions as per BMW Rules 2016.

Moreover as per the BMW sub rule 6, it is not an obligatory duty of M.C.G.M. to collect & treat the BMW generated from private health care establishments.

However, as per amended BMW Rules 2016, sub Rule no. 7, Municipal Corporations should provide suitable sites to private medical institutions for installation of common treatment facility without prejudice to the duty of 'Occupier'. Accordingly M.C.G.M. has provided suitable land at Deonar dumping ground for installation of bio-medical waste treatment plant for disposal of bio-medical waste generated in Mumbai jurisdiction. .

As such, M.C.G.M. has installed integrated bio-medical waste treatment facility under the guidance of M.P.C.B. at Ghatkoper Mankhurd Link Road near Deonar dumping ground through M/s. SMS Envoclean (P) Ltd. The said facility has started its operation from May 2009. In all M/s. SMS Envoclean (P) Ltd has put 46 nos. of specialized vehicles for collection of bio-medical waste from all heath care establishments. Those Health Care Establishments who are registered with the BMW treatment facility are being provided the services of BMW disposal by M/s. SMS Envoclean (P) Ltd. As of now 12004 nos. of health care establishments are registered with the centralized facility. Daily 22 M.T. of BMW is being collected & treated at Deonar BMW treatment facility.

The provisions under BMW Rules, states that the prescribed authority is Maharashtra Pollution Control Board & they are supervising the operation of the plant. An 'Authorization' to the plant operator of BMW

treatment plant is issued by M.P.C.B. As per rule, it is also necessary to obtain an authorization from M.P.C.B. as a "Generator" who are generating the bio-medical waste.

E-Waste (Management) Rules 2016:

To avoid mixing of e-waste with municipal solid waste, MCGM has proposed to set up MPCB authorized e-waste recycling agency to set up e-waste collection centres in wards.

The work of setting up of e-waste collection centres can be given to MPCB authorized electronic producers/ e-waste collectors/ dismantlers/ recyclers.

Dry Waste Sorting centres:

MCGM has set up 45 dry waste collection & sorting centres in 24 wards. Other than these, MCGM has decided to set up 4 more dry waste collection & sorting centres and at some places work of setting up of additional dry waste centres is in progress. 96 Nos. of separate vehicles are deployed for collection and transportation of dry waste to dry waste sorting centres, in all the 24 wards of MCGM. Waste / Rag Pickers' Associations are appointed to carry out the collection and segregation of dry waste. Dry Waste is segregated into paper, cardboard, thermacol, plastic, metal & glass and then sent to the recyclers for recycling directly by the rag pickers' associations.

MCGM framed its own Bye-laws in 2006, named as "Greater Mumbai Cleanliness & Sanitation Bye-laws". These Bye-laws are applicable to every public place within the limits of Greater Mumbai, to every generator of Municipal solid waste and to every premise under the ownership or occupation of any person within the limits of MCGM.

Plastic Waste (Management) Rules, 2016:

MCGM has set up 45 dry waste collection & sorting centres for segregation of collected dry waste. The plastic waste is segregated from collected dry waste and is sent to the recyclers directly by the engaged waste pickers' association. MCGM has banned the use of plastic carry bags below 50 microns. The use and manufacturing of plastic carry bags below 50 microns is prohibited by law. The monitoring authority for the same is Maharashtra Pollution Control Board. The enforcement squads of MCGM under Shops & Establishment department conduct periodic raids and take penal actions against defaulters.

Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2016:

Hazardous Waste Management Rules are notified to ensure safe handling , generation, processing, treatment, package, storage, transportation, use reprocessing, collection, conversion, and offering for sale, destruction and disposal of Hazardous Waste. The Rules lay down corresponding duties of various authorities such as MoEF, CPCB, State/UT Govts., SPCBs/PCCs, DGFT, Port Authority and Custom Authority while State Pollution Control Boards/ Pollution Control Committees have been designated with wider responsibilities touching across almost every aspect of Hazardous wastes generation, handing and their disposal.

Underground Dustbins

14. POWER SUPPLY AND CONSUMPTION

Bombay Electric Supply and Transport (BEST), an undertaking of MCGM, supplies elecric supply to city area while Adani Electricity and Maharashtra State Electricity Distribution Company Limited (MSEDCL) supply to eastern and western subburbs. Tata Power Company Ltd. (TPC) supplies bulk power to some industrial units and railways.

Bombay Electric Supply and Transport (BEST)

BEST is the distribution licensee to supply electricity in the old city limits of Mumbai. It covers 69 sq. km area from Colaba to Sion and Mahim. The maximum demand of Mumbai City is 939 MW. To meet this demand, power is purchased in major from Tata Power Company and balance is met from other sources. BEST Undertaking has established 62 RSS, 2383 DSS, 8078 distribution pillars, 75857 services position, 41314 street lights and 110 bill collection counters at 44 centres.

BEST Undertaking has 10.36 lakh consumers. Out of the total consumers, BEST is supplying electricity to about 73% residential consumers at a subsidized rate. BEST has provided ECS facility for payment of bills. In addition to this consumers can pay the bills through 60 post offices, various branches of 5 banks, credit/debit cards, NEFT/RTGS and through various outlets of other service providers. From 7th August 2013, the facility of bill payment through mobile is also provided to the consumers.

Table No. 14.1: BEST Consumers, Connected load and Consumption for the year 2018-19

Sr. No.	Consumers Category	Mumbai City			
		Consumers #	Connected Load in kW	Consumption in Million Units (MUs)	Avg. Monthly Consumption (MUs)
1	HV Consumers	190	428979	681.24	56.77
2	LV Consumers	1036504	3734042	3890.76	324.23
	Total	**1036694**	**4163021**	**4572.01**	**381.00**

Meters installed on site

Source: BEST

Table No. 14.2: Category wise Consumers, Connected Load and Consumption (2018-19)

Sr. No.	Consumers Category	Mumbai City			
		Consumers #	Connected Load in kW	Consumption in Million Units (MUs)	Avg. Monthly Consumption (MUs)
1	RESIDENTIAL	755708	2218364	2051.34	170.95
2	COMMERCIAL	270851	1662064	2124.46	177.04
3	INDUSTRIAL	8241	214229	335.23	27.94
4	Others	1894	68364	60.97	5.08
	TOTAL	**1036694**	**4163021**	**4572.01**	**381.00**

Meters installed on site

Source: BEST

During interrupted power supply, various departments of BEST Undertaking functions round the clock in restoring same. For coordinating and supervising these departments, 3 supervisory controls, 4 fault controls and 8 fuse controls are working round the clock.

Providing and Fixing LED Street Lights:

As per Government of India policy, regarding energy conservation, it is proposed to convert conventional street lights of Mumbai into LEDs. The cost of the conversion of conventional street lights into LED street lights will result into savings in electricity bills. Till 31.03.2019, 85% of Street Lights has been converted into LED through BEST. In addition to this about 24 nos. of 400W HPSV / MH Flood lights are replaced by 250W LED Flood lights on various MCGM High Masts, Similarly 22 nos. of 250 HPSV / MH Flood lights are replaced by 150W LED Flood lights at various locations.

Maharashtra State Electricity Distribution Company Limited (MSEDCL):

Maharashtra State Electricity Distribution Company Limited Thane urban zone supplies electricity to Bhandup and Mulund area of MCGM. Bhandup and Mulund Zonewise information is as follows.

Table No. 14.3: MSEDCL Zonewise Consumers, and Consumption (2018-19)

Sr. No.	Category	Division Name					
		Bhandup			Mulund		
		Total Consumers	Connected load (KW)	Consumption (Mus)	Total Consumers	Connected load (KW)	Consumption (Mus)
1.	High Voltage Consumers	84	166322	196.33	45	54512	43.76
2.	Low Voltage Consumers (Domestic, Commercial, Industrial & Others	174858	360575.89	439.42	126235	200256.37	388.31
	Total	**174942**	**526897.89**	**635.75**	**126280**	**254768.37**	**432.07**

Source : Maharashtra State Electricity Distribution Company Limited

Table No. 14.4: Category wise Consumers, Connected Load and Consumption

Sr. No.	Category	Division Name					
		Bhandup			Mulund		
		Total Consumers	Connected load (KW)	Consumption (Mus)	Total Consumers	Connected load (KW)	Consumption (Mus)
1	Residential	151530	218236.19	255.79	110185	138943.6	264.680989
2	Commercial	18410	68479.7	78.8	14976	37108.03	81.796121
3	Industrial	4301	67498	92.59	1074	13283	30.417583
4	Others	617	6362	12.24	962	10921.74	11.415642
	Total	**174858**	**360575.89**	**439.42**	**127197**	**200256.37**	**388.310335**

Source : Maharashtra State Electricity Distribution Company Limited

Adani Electricity:

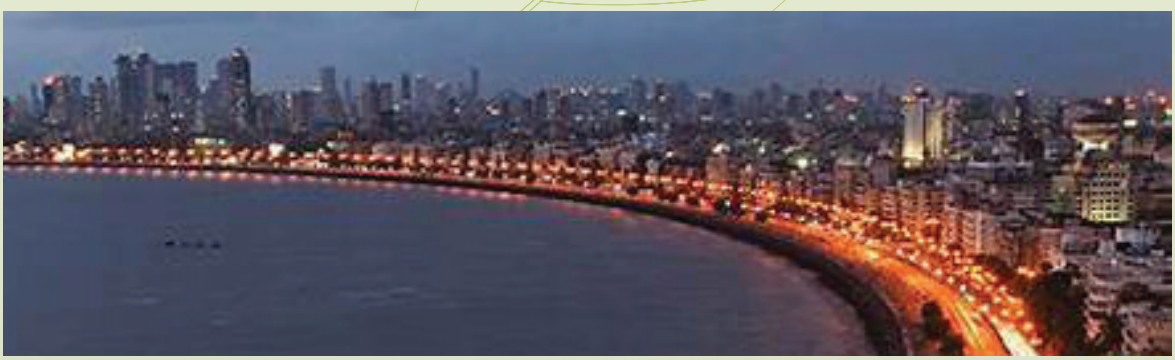
Adani Electricity Mumbai Ltd. (AEML) implements various energy efficiency and energy conservation measures across it's various offices. This includes installation of LED tube lights and fixtures as well as LED compound lights to replace the conventional lighting fixtures for energy conservation. This has resulted in saving of a 0.36 Million Units (KWh) approximately.

The company continues to pursue other programmes such as, walkthrough energy audit services at no cost to consumers, under which company has covered over 60 consumer numbers with potential saving of 0.6 million units. In order to utilise renewable energy source, company has installed solar rooftop PV systems of total capacity of 80 KWp at its various office locations resulting in annual power generation of around 80,000 units.

The company has launched various MERC approved DSM programs for all consumer categories. Under large scale ceiling fan programme for residential consumers, which is for 50000 numbers, company is replacing old ceiling fan by new BLDC technology 32 watts ceiling fans. In FY 2018-19, 440 ceiling fans have been replaced, resulting in a saving of 35000 Units.

Company has set up 7 no of electric vehicle charging stations (EVCS), out of which 2 charging stations are set up for general public's electric vehicles.

Replacement of petrol vehicles by electric vehicles on field, resulting in saving of petrol to the tune of 10000 liters per annum and also its reduced environmental impact.



15. Roads, Traffic and Transport

Roads

Road is an important and visible infrastructure. With the increase in traffic intensity & loading, related norms have been upgraded and project approach has been adopted. As per new approach road works also include the provision/improvement of footpath, provision/ augmentation of municipal utilities such as water mains, sewer lines, S.W. drains etc. as per necessity, provision of traffic amenities, beautification etc.

In Mumbai, the total length of the roads is 1941.15 Km. Out of which, 506.46 Km. length is in City division, 927.64 Km. length is in Western Suburbs division and 507.06 Km. length is in Eastern Suburbs.

Cement Concrete Roads:

1. In City section approximately 4.370 k.m. of roads were concretised in the year 2018-19. In city area, Major roads such as Boman Beharm Road and M.G. Road in 'A' Ward, G.D. Ambekar Road in 'F/ South' Ward, Road No.16 and Mukundrao Ambedkar Road in 'F/North' Ward, Fitwala Marg in 'G/ South' Ward, N. C. Kelkar Marg in 'G/North' Ward and other major roads have been concretised.

2. In Eastern Suburbs approximately 9.176 k.m. of roads were concreted in year 2018-19. It includes important roads such as LBS road in L, S, T and N ward, GMLR in M/W Ward, AGLR in N Ward, Chindi Bazar Road in T Ward etc.

3. In western suburbs approximately 7.215 k.m. of road were concretised in 2018-19. It includes important roads such as S.V. Road and Link Road in K/W and H/W Ward, MIDC Central road and AGRL in K/E ward have been concretised.

Asphalt Roads:

1. In City section 16.78 km of Asphalt roads were improved/ widened in the year 2018-19. In City area, important roads such as Bombay Hospital Road and Henery Road in 'A' Ward, Sant Tukdoji Maharaj Road and Ambekar Street in 'B' Ward, Dhus Wadi and Vijay Wadi Road in 'C' Ward, Babulnath Road and Khet Wadi 10th Lane in 'D' Ward, Chapsi Bhimji Marg and Seth Mothishah Cross Lane in 'E' Ward, Dahiwalkar Bua Road and Mahadeo Palav North side road in 'F/South' Ward, Anik-Wadala Road in 'F/North' Ward, Metal Box lane and H.L. Nagaokar Marg in 'G/South' Ward, Dr. Babasaheb Ambedkar Road and pal Wadi Road in 'G/North' Ward and other roads are completed.

2. In Roads Eastern Suburbs around 61.937 km of Asphalt roads were improved in the year 2018-19. In includes important roads such as BKC Road in L Ward, MG Road in N Ward, V.N. Purva Marg in M/E Ward and Kannamwar Nagar Road in S Ward etc.

3. In western Suburbs around 35.767 km of Asphalt roads were improved/widened in the year 2018-19. In includes important road such as Sant Kabir Road and 13.4 mt. Service road along Dahisar river in R/N ward and Mahim Causeway Junction and Mehboob Studio Junction in H/W are are completed.

Footpath Policy:

New footpath improvement policy has now been finalized with the aim to avoid illegal digging, focus on improvement of quality of footpath and increase their lifespan. Now onwards, all the footpaths will be improved with Stencil Concrete, CC with marble chips finishing or Plain CC instead of Paver Blocks.

Cold Mix:

After the success of imported cold mix, MCGM decided to manufacture it locally with reduce manufacturing cost in it's own plant. MCGM has produced about 1000 MT of Cold Mix for repairing potholes during last monsoon. During the last monsoon, 800 MT Cold Mix was utilised against approx. 10000 MT Hot Mix usded in previous years. The costing of production of cold mix has been reduced substantially to Rs.27/- as against Rs.170/- per kg of imported cold mix.

TRAFFIC

Traffic Engineering:

The work of Traffic Planning and Traffic Co-ordination department is carried out under the control of Dy.Ch.Eng. (Traffic) who works under Chief Engineer (Roads & Traffic). This department works in close co-ordination with Traffic Police Department and applied engineering techniques for effective control of road traffic and enforcement of traffic regulations. This office also look after the matters pertaining to prescription of Road regular line, design and construction of traffic islands and the traffic amenities i.e. providing & applying thermoplastic paint for painting of Zebra Crossings, Edge Lines, Stop Lines & Arrow markings & fixing Road studs before speed breakers, beautification of roads. Also, this office scrutinized and approves parking layout proposals received from Building Proposal department and Slum Rehabilitation Authority. This office also look after the work of the signal maintenance alongwith new signal installation work.

This office prepares policy to offer remarks for providing street light on newly constructed roads as well as improvement of existing street lighting & co-ordination with all Ward Offices to get the above works done through three service provider electric companies viz. BEST, Reliance Energy Ltd. and MSEDCL. The budget provision for the same is made by traffic department.

Parking Policy

In order to avoid traffic congestion due to unauthorized parking on roads tender procedure has been initiated for execution of on-street and off-street parking schemes. Out of 79 pay and park schemes on roads contractors have been appointed for 28 sites to start pay and park scheme. Similarly contractors have been appointed to operate of 13 Public Parking Lot and out of 24 Public Parking Lot which have been handed over Municipal Corporation of Greater Mumbai under DC Regulation no.33 (24) of 1991.

Similarly out of total nos. of 29 amenity parking places handed over to Municipal Corporation of Greater Mumbai contractors are appointed for 03 nos. of amenity parking places and same are open to public. Tender procedure is being carried out by other ward offices.

In order to avoid unauthorized parking and traffic congestion a list of 461 no. of parking places with capacity of 36,727 vehicles has been received form Traffic Police. After examining the feasibility of new amenity parking places the same will be operated on experimental basis by inviting e-tenders as such total capacity of above parking lot is 47,000.

Providing & Fixing Street Name Boards, Directional Boards / Zebra Crossing Marking / Lane marking / Dividers / Share-E-Taxi Stand and Share-E-Rikshaw stand boards:

Parking Authority:

As per the recommendations in DP and provision in DCPR-2034, creation of Parking Authority is initiated by MCGM for regulation and management of parking in Mumbai. A core committee is formed with an Addl. M.C. level officer as Parking Commissioner. All India Institute of Local Self Government staff is appointed for work related to data collection and mapping of parking spaces.

LED Lights:

MCGM has started the implementation of fixing LED street lights in 2018-19. There are about 1,40,480 Sodium vapor lamps in Mumbai out of which 54,120 conventional lamps have been replaced by LED. It is proposed to complete balance 86,360 LED lights in Mumbai for year 2019-20. The annual savings in energy bill is about 40% i.e. about Rs.26 crore. This savings in energy will go up as more lights will be converted to LED.

Traffic Signages:

MCGM has invited tender for modern signages with upgradation of signages for major road networks for 105 km at the cost of Rs.16.74/- crore.

For major road network of 75 km for City/ Eastern and Western Suburb area (25 km each) designing and placement of signages have been done through consultants as per international standard and the tenders are being submitted for administrative sanction.

Initiative on Road Safety and Black Spots:

Out of the identified 21 Block Spot, 9 Black Spots have been redesigned and attended at the cost of Rs.55/- lakh and balance Black Spots sites will be redesigned and tackled this year.

Area Traffic Control System (ATC):

At present 258 Signals in Greater Mumbai has already been converted into fully adaptive automated Signal System and they are working satisfactorily. The maintenance of remaining 368 conventional system and 223flashing beckons are carried out properly.

16. BRIDGES IN MUMBAI

Major work completed in the year 2018-19

1. On Veer Sawarkar bridge and S. V. Road junction over bridge work completed at P/South Ward Goregaon (w)

List of Major projects undertaken in the year 2018-19

1. Construction of public over bridge on R. A. Kidvai road near to Shivari bus depot and Fatema chowk in F/South ward.
2. Construction of public bridge on Dr. B. A. road near Union bank Sion hospital in F/North Ward.
3. Construction fly over bridge on S. V. Road at Kora Centre Borivali (West) in R/Central Ward.
4. Widening of Mrunaltai Gore fly over bridge form Ram mandir road to Relief road Goregoan (West).

Surface Transport

There are different types of vehicles plying on the roads of Mumbai every day. They consist of cars, taxis, trucks, buses, three-wheelers, two-wheelers etc. The total number of vehicles in Mumbai as on March 2019 is 36,40,588. Their composition is 58.61% two-wheelers, 29.67% cars, jeeps & station wagons, 3.28% taxis/cabs, 5.84% auto rickshaws, 0.44% buses, 2.04% Goods vehicles, 0.02% tractors/ trailers and others 0.10%.

As previous year increasing number of vehicles is 8.6% in Mumbai city.

Table No. 16.1: Category-Wise Comparison of Vehicle Population 2017-19

Sr. No.	Category	As on 31st March		
		2016	2017	2018
1	Two Wheelers	1968019	1952955	2133833
2	Cars, Jeep, Station wagons	1061395	1011878	1080087
3	Taxi/Cabs	115260	127892	119477
4	Auto-rikshaws	139065	182069	212691
5	Buses	14498	14839	16051
6	Trucks & Lorries	8307	61040	74248
7	Tractor/ Trailors	336	304	818
8	Other	3086	1663	3383
	Total	**3309966**	**3352640**	**3640588**

Source : This information is received from RTO, GoM

There are 119477 metered taxis in Mumbai operating on petrol, diesel, CNG and LPG as on 31st March 2019. CNG and LPG which are regarded as clean fuel. More than 55.90% meter taxis and 90% rickshaws are running on clean fuel CNG and LPG.

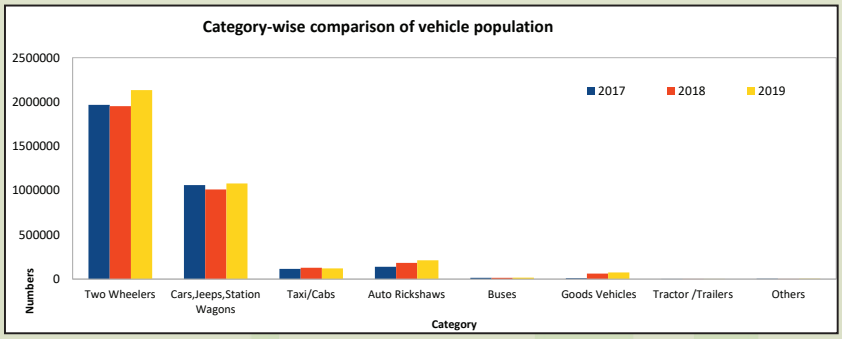
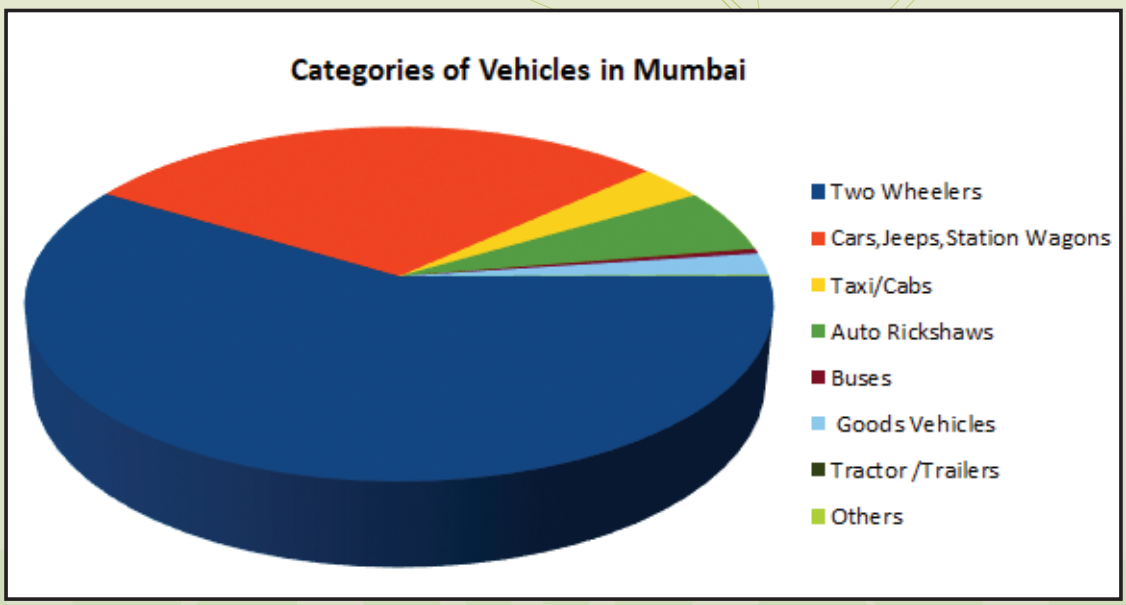


Table No. 16.2: Category-wise vehicles using various fuel types as on 31st March 2018

Sr. No.	CATEGORY	DIESEL	PETROL	LPG	CNG	OTHERS	TOTAL
1	Two Wheelers	0	2133735	0	0	98	2133833
2	Cars, Jeep, Station wagons	328837	665972	8452	75084	1742	1080087
3	Taxi/Cabs	34323	19645	871	64529	109	119477
4	Auto-rikshaws	0	38853	0	173838	0	212691
5	Stage carriages	2967	502	0	1783	0	5252
6	Contract carriages, Mini buses	6543	180	0	315	21	7059
7	Trucks, Lorries & Tankers	17381	635	0	238	2	18256
8	Ambulance	898	350	2	100	0	1350
9	School Buses	1799	219	1	687	2	2708
10	Private Service Vehicles	937	7	2	86	0	1032
11	Tractor	494	0	0	0	0	494
12	Trailors	310	0	0	0	14	324
13	Delivery Van (4-Wheelers)	25783	2776	5	1992	6	30562
14	Delivery Van (3-Wheelers)	19094	6009	9	281	0	25393
15	Ulti-Multi Vehicles	37	0	0	0	0	37
16	Others	1831	154	0	27	21	2033
	TOTAL	**441234**	**2869037**	**9342**	**318960**	**2015**	**3640588**

Source : RTO, GoM



To control the air pollution due to automobiles, various measures are initiated. One of them is to carry out "Pollution Under Control" (PUC) test. This is mandatory for vehicles every six months. Transport department of government of Maharashtra detects cases of violation of pollution laws and fines the defaulters.

The PUC checks, unleaded petrol, low Sulphur diesel and catalytic converters have been found to be very effective in controlling air pollutants like particulates, Lead, Sulphur dioxide, Carbon Monoxide, Hydrocarbons, Oxides of Nitrogen, etc.

To reduce the air pollution in Mumbai, it is essential to encourage public transport like railways and buses, follow the system of car-pooling by car owners, introducing bicycle lane and regular checkup of vehicles for PUC.

BEST Undertaking Transport Department

Since 1984 BEST undertaking operates 3217 buses on 411 Routes, in the area of Mumbai and it's align cities like Navi Mumbai, Thane and Mira-Bhayander, commuting around 23 Lakhs passengers daily.

Best Undertaking is continuously making efforts through upgradation of bus maintenance technology so that pollution through emission of buses is within the permissible limit by law. Nearly 1861 no. of CNG buses are in operation. The CNG fueling infrastructure is built in 15 bus depots which facilitate then In-house fueling of CNG gas.

Special efforts ate taken to keep fuel system of diesel vehicles healthy. Injectors, fuel injection pump, filters, silencer mufflers are promptly changed. Full-fledged engine testing faciltiy is available at Central Workshop where overhauled engines are tested for performance and emission before commissioning on buses.

All buses are tested for PUC certificate after every six months as per CMVR Rules and Regulations and emissions of buses is kept within permissible limt.

At Anik depot vehicle testing track of 250 mtrs. Is newly built and is fully functional. Fitness certificate of buses is issued after testing of buses in presence of Regional Transport Authority of this track.

Six number of pure elctric ZERO EMISSION buses are in operation at Backbay depot. In addition to this, 25 no. of hybrid buses are also operated on 8 no. of various routes in Mumbai. These hybride buses complies BSIV norms. Procurement of 80 no. of electric buses is in finalization stage.

BEST Undertaking ensures disposal off dirty diesel filters, dirty used various oils are disposed off through centralized disposal system. These filters are disposed off through authorized disposal agencies as per the guideline of Maharashtra Pollution Control Board under Common Hazardous Waste Treatment, Storage and Disposal Facility.

Technical Training Centre at Wadala depot conducts various training programme regarding good maintenance practice, fuel conservation at depots through a dedicated diesel conservation bus named Dronacharya.

17. HOUSING AND SLUMS

The population of the city of Mumbai has crossed the 12.73 million mark, out of which more than 50% resides in the hutments. It creates problems to our health and the environment. Mumbai Slum Improvement Board provides amenities in various slums in Mumbai city and suburbs. Majority of the people residing in the hutments are from economically and socially weaker stratum. Span of slum redevelopment plan of State Government is extended to provide permanent residence and civic amenities. The main purpose of this project is to provide residence, basic amenities and other related civic amenities.

Mumbai Slum Development Board has construction program regarding basic amenities is as given below.

1) Construction of protection wall.
2) Improvement plan for civic backward colony.
3) Development plan for slum area.
4) Plan for beautification.
5) Development plan for crematorium.
6) To provide facilities to citizens in area under MCGM.
7) Development of tourist places.
8) New plans/ Ladies saving group/ Water tank protection/ Borewell.

18. EDUCATION

As per Section 61 (q) of the Mumbai Municipal Corporation Act 1888, primary education is an obligatory duty of Municipal Corporation.

Accordingly, Free education is provided to 2,46,294 students through 7830 techers in 1014 primary schools having eight medium viz. Marathi, Hindi, Urdu, Gurrjati, English, Telugu, Tamil and Kannada along with Mumbai Public School. Since 19965 the Municipal Corporation of Greater Mumbai is running secondary schools along with primary schools is provided. Similarly, 171 unaided secondary schools are working. Such 220 secondary schools are providing free education to 40,696 students and 1360 teachers are working for the same. For children with Special Needs (CWSN), Municipal Corporation runs 17 special schools in which 964 students are taking education. For these schools 78 teacher are working, MCGM runs 02 D. Ed. Colleges. Municipal Corporation also run 410 private primary aided shcools in which 4052 teachers and non-teaching staff are working. In these schools 1,18,249 students of std. I to IV are taking education.

Along with academics, students of Municipal Corporation are also given education in Music, Drawing, Craft, Physical education etc.

As per MRTE rule 2011, the Right of children to Free and compulsory Education Act, 2009 is being implemented.

Since 2009-10, MCGM started 3 junior colleges in Science stream to facilitate further education of MCGM students scoring excellent marks in SSC board examination.

For the students in MCGM Schools activities emphasizing the importance of heatlh and environment are included in day-to-day learning teaching process.

- The school staff and School Management Committee takes care to maintain healthy school atmosphere under the guidance of supervisor officers.
- Necessary items required for school children are provided by the MCGM free of cost. The tender process of such articles for the year 2019-22 is in progress through Direct Benefit Transfer (D.B.T.) scheme at CPD (Byculla).
- Education related to Environment and Health is given to students through school subjects.
- Drawing competition on the concept of 'My Mumbai' was organised to commemorate the birth anniversary of world's renowned cartoonist Hindu Hridaya Samrat Hon. Late Balasaheb Thackeray, in 42 MCGM recreation grounds/ gardens with 57,344 students participating in this competition.

- Every year 'Balakostav' programme is conducted in MCGM schools. Similarly this year too, during the month of November and December, at ward levels Balakotsav was organised. Thus fostering all round personality development skills of students.
- MCGM has appointed people on contractual basis for security provision and for maintenance of Cleanliness, Health and Hygiene. Thus, fostering healthy and secure atmosphere for MCGM school students in each MCGM school. For the year 2019-22 the tender process is in progress.
- Free Routine medical check-up of MCGM students is done by the doctors of MCGM health department. Students detected with ailments are referred to municipal clinics/ hospital for free medical treatment. To eradicate anaemia in school students NIPI (National Iron Plus Initiative) project has been undertaken since November 2017. Once in a week under teachers observation students from std. I to std X are given this iron tablets. Rashtriya Bal Swasthya Karyakram (RBSK) : RBSK is implemented in MCGM schools since December 2017. Government of India has laid an objective to eradicate measles and keep control on rubella disease by the year 2020. Under the scheme of Measles Rubela vaccination, ranging between 09 months to 15 years of age will be given MR vaccination. Amongst these, 60% to 65% beneficiaries (approximate 17 lakhs) are school students.
- From 30.10.2017, approximately 36473 MCGM school students wearing municipal school uniform, under 'Zero Ticket Scheme' are availing, to and fro, free BEST bus service, from nearest BEST bus stop from their residence, to their school.
- For more effective and efficient paperless work, information technology is been used in MCGM schools and offices.
- Since a long time scrap materials were laying in the MCGM schools, they have been picked up and disposed off.
- Organizing 'Swachata Pandharwada' in all schools falling under MCGM jurisdiction, Cleanliness pledge, awareness message and organizing various competition, propagating use of solar energy, quiz etc. programmes arranged whole year through.
- 172 sanitary napkin vending machines and sanitary incinerators are installed in 159 MCGM Secondary School buildings for Std.VIII to Std.X girl students.

19. AIR QUALITY STATUS

To measure the levels of pollutants in Mumbai, MCGM has established fixed air pollution monitoring sites at Worli, Andheri, Bhandup and Deonar. Monitoring at Worli, Wadala and Andheri Traffic Junctions are done by Automatic Mobile monitoring.

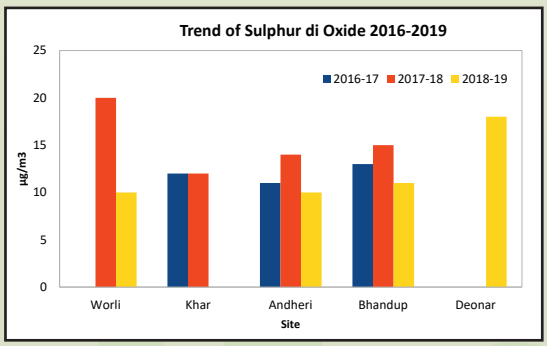
Air Monitoring Sites		
Sr. No.	**Site**	**Located at**
1	Worli	Transport building, E.Moses Rd, Worli.
2	Andheri	Nityanand Marg Municipal School building, Koldongari, Andheri (W).
3	Bhandup	S Ward office building, L.B.S. Rd, Bhandup (W).
4	Deonar	BEST Depto, Shivaji Nagar, Deonar.

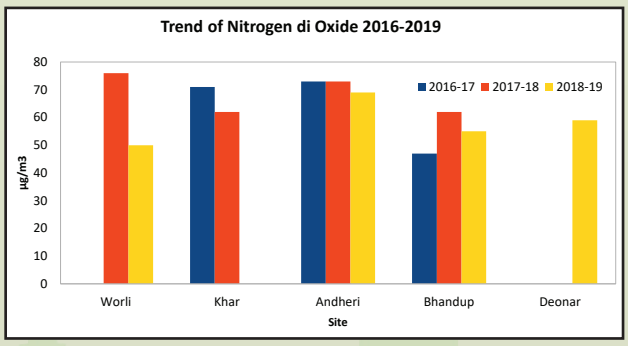
Air Quality Monitoring and Research Laboratory of Environment department monitors ambient air quality in Mumbai for criteria air pollutants namely; Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2), Ammonia (NH_3) etc. regularly. Air quality levels are evaluated in the year 2017-18 for its compliance with ambient air quality standards set by Central Pollution Control Board (CPCB) for SO_2, NO_2 and NH_3 (Table 19.1)

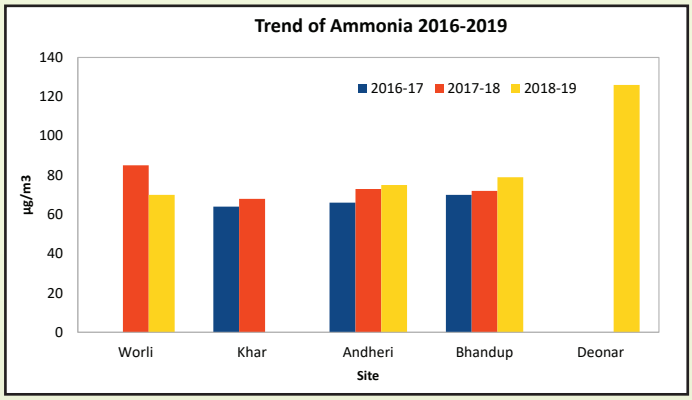
Table No. 19.1: Ambient Air Quality Levels at fixed monitoring sites (Annual average) April 2016 to March 2019

Sr. No.	Site	Unit µg/m³								
		Sulphur Dioxide			Nitrogen Dioxide			Ammonia		
		2016-17	2017-18	2018-19	2016-17	2017-18	2018-19	2016-17	2017-18	2018-19
1	Worli	-	20	10	-	76	50	-	85	70
2	Khar	12	12	-	71	62	-	64	68	-
3	Andheri	11	14	10	73	73	69	66	73	75
4	Bhandup	13	15	11	47	62	55	70	72	79
5	Deonar	-	-	18	-	-	59	-	-	126
CPCB Standards g/m3		50			40			100		

Source : Air Quality Monitoring & Research Laboratory of MCGM Note: Values of Maravali for the year 2016 -17 & 2017 - 18 not available







Comparison of annual levels with standards prescribed by Central Pollution Control Board:

Board: Levels of air pollutants SO_2, NO_2 and NH_3 measured during 2018-19 when compared with prescribed standards by Central Pollution Control Board (CPCB) observations are as follows,

1) SO_2 levels are found less than prescribed annual standards at all fixed monitoring stations.

2) NO_2 levels are found more than prescribed annual standards at all fixed monitoring stations.

3) NH_3 levels are found less than prescribed annual standards at all fixed monitoring stations except Deonar. The level (126µg/m^3) of NH_3 is more than prescribed standards levels at Deonar.

Table No. 19.2: Range of the annual averages of pollutants at fix monitoring site (2018-19)

Sr. No.	Unit µg/m^3	Sulphur dioxide	Nitrogen dioxide	Ammonia
1	Range	10 – 18	50 – 69	70 – 126
2	Maximum at	Deonar	Andheri	Deonar
3	CPCB standards	50	40	100
4	Comparison with CPCB standards	Not exceeded	Exceeded at all stations	Not Exceeded

Source : Air Quality Monitoring & Research Laboratory, Environment Department.

Observations of annual averages:

When compared with CPCB standards following observations are noted.

1) SO_2 levels are found to be in the range of 10-18 µg/m^3 and are below prescribed standard (50µg/m^3) at all sites. Maximum level found at Deonar.

2) NO_2 levels are found to be in the range of 50-69 µg/m^3 and have exceeded standard (40µg/m^3) values at all sites Maximum level found at Andheri.

3) NH_3 levels are found to be in the range of 70-126 µg/m^3 are below prescribed standard (100µg/m^3) at all sites except Deonar.

Table No. 19.3: Percentage exceeding CPCB standards (24 hours average) from the year 2016 to 2019

Sr. No.	Site	Sulphur Dioxide			Nitrogen Dioxide			Ammonia		
	Year	2016-17	2017-18	2018-19	2016-17	2017-18	2018-19	2016-17	2017-18	2018-19
1	Worli	-	0	0	-	26	14	-	0	0
2	Khar	2	0	-	36	41	-	12	0	-
3	Andheri	0	0	0	31	33	36	0	0	0
4	Bhandup	0	0	0	19	30	23	0	0	0
5	Deonar	-	-	0	-	-	25	-	-	0

Source : Air Quality Monitoring & Research Laboratory, Environment Dept.

Comparison of Percentage exceeding 24 hours average with CPCB standards:

In the year 2018-19 comparison of percentage exceeding 24 hours average with CPCB standards as follows,

1) Levels of SO2 is low as compaired to standards at all monitoring sites.

2) NO2 levels: Percentage exceeding the 24 hrs standards at all monitoring sites. At Worli 14%, Andheri 36%, Bhandup 23% and Deonar 25% samples are exceeded the standards in the year 2018-19.

3) NH3 levels: Is low as compaired to standards at all monitoring sites.

Table No. 19.4: NATIONAL AMBIENT AIR QUALITY STANDARDS CENTRAL POLLUTION CONTROL BOARD, NEW DELHI (18th November, 2009)

Parameter	Exposure Period	Industrial, Residential, Rural & Other Area	Sensitive Area
Sulphur Dioxide, SO_2 µg/m³	Annual avg. *	50 µg/m³	20 µg/m³
	24 Hrs. avg.**	80 µg/m³	80 µg/m³
Nitrogen Dioxide, NO_2 µg/m³	Annual avg. *	40 µg/m³	30 µg/m³
	24 Hrs. avg.**	80 µg/m³	80 µg/m³
Particulate Matter Size less than 2.5 µm) $PM_{2.5}$ µg/m³	Annual avg. *	60 µg/m³	60 µg/m³
	(Size less than 10µm) PM10 µg/m3	100 µg/m³	100 µg/m³
Particulate Matter (Size less than 2.5 µm) $PM_{2.5}$ µg/m³	Annual avg. *	40 µg/m³	40 µg/m³
	Particulate Matter	60 µg/m³	60 µg/m³
Ozone, O_3, µg/m³	8 Hrs.**	100 µg/m³	100 µg/m³
	1 Hr.**	180 µg/m³	180 µg/m³
Lead, Pb, µg/m³	Annual avg. *	0.5 µg/m³	0.5 µg/m³
	24 Hrs. avg.**	1 µg/m³	1 µg/m³
Carbon Monoxide, CO, µg/m³	8 Hrs.**	2.0 mg/m³	2.0 mg/m³
	1 Hr.**	4.0 mg/m³	4.0 mg/m³
Ammonia, NH_3, µg/m³	Annual avg. *	100 µg/m³	100 µg/m³
	24 Hrs. avg.**	400 µg/m³	400 µg/m³
Benzene, C_6H_6, µg/m³	Annual avg. *	5.0 µg/m³	5.0 µg/m³

Parameter	Exposure Period	Industrial, Residential, Rural & Other Area	Sensitive Area
Benzo alpha Pyrene, Particulate Phase only BaP, ng/m³	Annual avg. *	1.0 ng/m³	1.0 ng/m³
Arsenic, As, ng/m³	Annual avg. *	6.0 ng/m³	6.0 ng/m³
Nickel, Ni, ng/m³	Annual avg. *	20 ng/m³	20 ng/m³

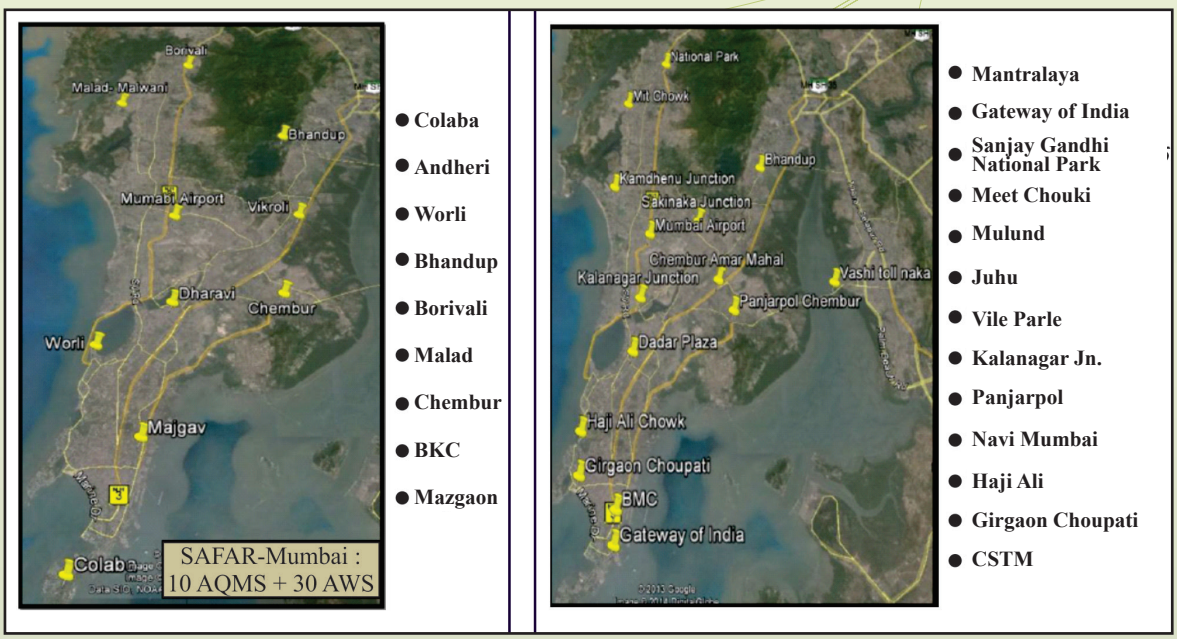
Source: Central Pollution Control Board, New Delhi

* Annual arithmatic mean minimum 104 measurements in a year at a particular site taken twice a week 24 hrly at uniform interval.
** 24 hrly/ 8 hrly values should be met 98% of the time in a year, however, 2% of the time, it may exceed but not on two consecutive days.

NOTE:
1. National Ambient Air Quality Standard: The levels of air quality necessary with an adequate margin of safety, to protect the public health, vegetation and property.
2. Whenever and wherever two consecutive values exceed the limit specified above for the respective category, it would be considered adequate reason to institute regular/ continuous monitoring and further investigations.
3. The State Government/ State Board shall notify the sensitive and other areas in the respective states within a period of six months from the date of Notification of National Ambient Air Quality Standard.

SAFAR – Mumbai

System of Air Quality and Weather Forecasting and Research - 'SAFAR' for Mumbai was launched and dedicated to country on 23.06.2015.



Background:

Air is a mixture of gases, is indispensable for survival of life on the earth. The imbalance of the constituents of this mixture results in deterioration of air quality and increases pollution. When the levels of pollutants exceed threshold limit, it affects human

Table No. 19.5: SAFAR Mumbai Ccomprises of following products.

Sr. No.	Name of the Product	Nos.
1	Air Quality Monitoring Stations (AQMS)	09 nos.
2	Automatic Weather Stations (AWS)	16 nos.
3	LED, Digital Display Boards (DDS)	11 nos.

health, plants and animals. Indian Institute of Tropical Meteorology (IITM) Pune designed a specialized system to monitor air quality and disseminate the information to public.

Earlier SAFAR was launched for metro cities in 2010 & 2012 in Delhi and Pune respectively, which is in operation. SAFAR-Mumbai was launched in June 2015, which is a joint venture of MCGM, IITM Pune and IMD. It provides location specific information on current and 1 to 3 days forecast for air quality and weather parameters along with UV index in a public friendly format along with health advisories.(Table 19.5)

Air Quality Monitoring Stations (AQMS), Automatic Weather System (AWS) and LED Boards are installed at various locations in Mumbai to received information about current air quality and 1 to 3 days forecast.

SAFAR-Mumbai Information to Public:

Air pollutants namely; $PM_{2.5}$, PM_{10}, Ozone (O_3), Carbon monoxide (CO), Nitrogen dioxide (NO_2), Sulphur dioxide (SO_2) Benzene, Toulene, Xylene, Mercury etc. are quantified and displayed on LED boards in terms Air Quality Index (AQI) along with health advisories. The mean objective of real time AQI and forecasted AQI will help people to plan their outdoor activities so that they can prevent themselves from its adverse effects.

Meteorological parameter like Temperature, Rainfall, Relative humidity, Wind speed and Wind direction, High & low and alerts of severe weather conditions like these useful information helpful to public, specially to fishermen.

Communication Media for benefit of society:

SAFAR-Mumbai communicates with the society via,

1) SAFAR AIR - Mobile App
2) SAFAR INDIA - (Website)
3) LED Display Boards

1) SAFAR-AIR (Mobile Application):

This is a “Mobile App” which can be downloaded free of cost. The “Mobile App” provides location specific current and forecast Air Quality Index (AQI) and UV-index. This “Mobile App” is user friendly and will benefit the common man.

2) SAFAR-India (Website):

This is a web portal (http://safar.tropmet.res.in) which can be accessed by people to collect location specific information.

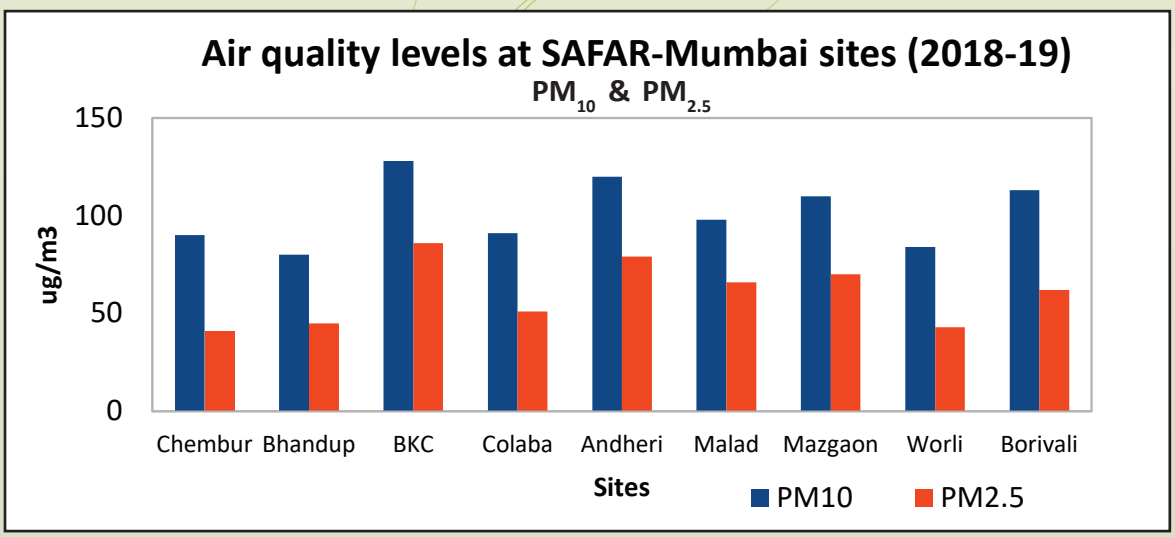
3) LED Display Boards:

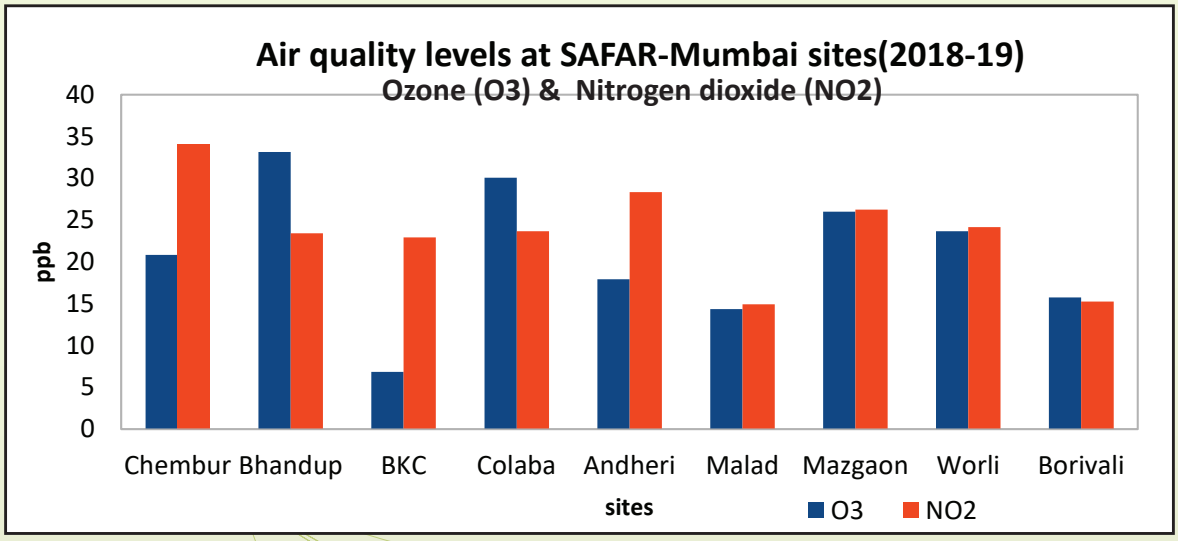
3 x 1.80 Meter LED digital display boards are installed at various sites for public viewing. To give information with environmental slogans like colour coded AQI, UVI and Health advisories to the citizens of Mumbai.

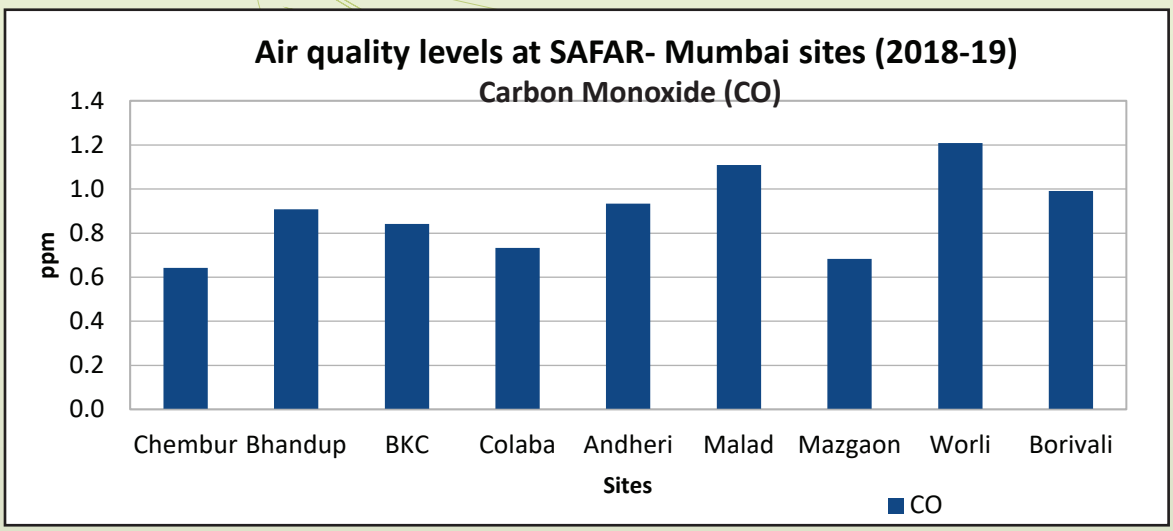
Air quality levels are measured at various "SAFAR-Mumbai" sites during July 2015 to March 2018 for PM_{10}, $PM_{2.5}$, O3, CO and NO_2 etc. as shown in table No.19.6.

Table No. 19.6: Air quality levels at "SAFAR-Mumbai" sites (2016 to 2019)

Sr. No.		2016-17					2017-18					2018-19				
		PM_{10}	$PM_{2.5}$	O_3	CO	NO_2	PM_{10}	$PM_{2.5}$	O_3	CO	NO_2	PM_{10}	$PM_{2.5}$	O_3	CO	NO_2
1	Chembur	99	63	20	0.6	22	78	44	19	0.7	26	90	41	21	0.6	34
2	Bhandup	93	60	31	1.0	19	82	43	30	0.9	23	80	45	33	0.9	23
3	BKC	121	86	14	1.0	12	111	67	12	1.0	18	128	86	7	0.8	23
4	Colaba	85	54	32	0.9	14	92	55	29	0.9	26	91	51	30	0.7	24
5	Andheri	116	83	19	1.0	21	109	63	17	1.1	30	120	79	18	0.9	28
6	Malad	112	76	28	0.9	25	81	49	24	1.1	26	98	66	14	1.1	15
7	Mazgaon	127	82	21	0.7	25	106	68	21	0.7	22	110	70	26	0.7	26
8	Worli	89	58	37	0.7	20	76	38	31	0.8	20	84	43	24	1.2	24
9	Borivali	96	49	24	0.6	17	99	61	20	0.7	12	113	62	16	1.0	15
	Average	104	68	25	0.8	19	93	54	23	0.9	23	101	60	21	0.9	24
	CPCB Std. Annual Avg	60 (µg/m3)	40 (µg/m3)	51 (8 Hrs) (ppb)	1.75 (8 Hrs) (ppm)	21 (ppb)	60 (µg/m3)	40 (µg/m3)	51(8 Hrs) (ppb)	1.75(8 Hrs) (ppm)	21 (ppb)	60 (µg/m3)	40 (µg/ m3)	51(8 Hrs) (ppb)	1.75(8 Hrs) (ppm)	21 (ppb)







Annual Averages:

1. Levels of Suspended Particulates (PM10) are found to be in the range of 80-128µg/m3 during 2018-19. Maximum level of PM10 is observed at BKC.
2. Levels of Suspended Particulates (PM2.5) are found to be in the range of 41-86 µg/m3 during 2018-19. Maximum level of PM2.5 is observed at BKC.
3. Levels of Ozone (O3) are found to be in the range of 07-33 ppb during 2018-19. Maximum level of O3 is observed at Bhandup.

4. Levels of Carbon Monoxide (CO) are found to be in the range of 0.6-1.2 ppm for the year 2018-19. Maximum level of CO is observed at Worli.

5. Levels of Nitrogen di-oxide (NO2)are found to be in the range of 15-34 ppb during 2018-19. Maximum level of NO2 is observed at Chembur.

Air Quality Index (AQI) :

Honourable Minister for Environment, Forests and Climate change, launched the national Air Quality Index (AQI) in New Delhi, on 17th September 2014 under the 'Swachh Bharat Abhiyan'. It is outlined as 'One number-One colour-One description' for the common man to judge the air quality in his vicinity.

The current measurement of index is made comprehensive by the addition of 5 more parameters to the existing 3 parameters, i.e. in total 8 parameters are considered. AQI is a tool for effective dissemination of air quality of that area to common person. The information provided on air quality is in simple linguistic terms that is easily understood by people. The Air Quality Index (AQI) is calculated by comparing the measured ambient concentration of the pollutant to the National Ambient Air Quality Standards (NAAQS).

There are six AQI categories namely; Good, Satisfactory, Moderately polluted, Poor, Very poor and Severe. The categories are shown in following table.

Classification of AQI:

0-50	-	Green		-	Good
51-100	-	Light green		-	Satisfactory
101-200	-	Yellow		-	Moderately polluted
201-300	-	Orange		-	Poor
301-400	-	Red		-	Very poor
401-500	-	Brown		-	Severe

Control of Air Pollution-Legal Aspects:

Municipal Commissioner has been vested with power as per MMC Act 1888, under sections 381, 390, 471, 472 to discharge certain obligatory and discretionary duties. MPCB is empowered to enforce the provisions of different Acts like Water Act, Environment Act, etc. Both agencies co-ordinates with each other to control pollution using these powers.

20. NOISE POLLUTION

As per directions given by hon. High Court of Bombay dated 16-8-2016, in the Public Interest Litigation No. 173 of 2010, Dr. Mahesh Bedekar V/s. State of Maharashtra & others, complaint redress mechanism is created in all wards of M.C.G.M, for filing complaints regarding nuisance due to Noise Pollution. A facility is also made available to submit complaint by e-mail & on telephone. The Complaint Officers appointed in every ward office to receive complaint of Noise Pollution. The redress system & its operation is uploaded on the MCGM website. The complaint register is maintained for the complaint received from all modes & forwarded to respective Police Stations /Police control department. In every ward, Disaster Control Units are in operation. Noise Pollution Complaints can be filed at these units. The telephone numbers of respective Disaster Control Unit are uploaded on the MCGM website.

The Noise Pollution Complaints filed by Public are received by Disaster Control Unit of MCGM on toll free telephone number 1916. The complaint number is given to the complainant to track the progress. Anonymous complaint is also registered on this number.

MCGM has also made provision to lodge complaints on website. In addition to this, MCGM. has developed Mobile Application, 'MCGM 24 X 7' for public to lodge complaints, which is in operation for 24 Hours.

Before the commencement of every major festival like Ganeshotsav, all Ward Assistant Commissioners from MCGM convene the meeting of all major organizations holding such functions, officials of various Mandals, local political leaders, concerned police officers & appraise them of the provisions of Noise Pollution (Regulation & Prevention) Rules-2000 & provisions of law & consequences of breach of the Noise Pollution rules.

As per the Government of Maharashtra resolution ध्वनीप्र-२००९/प्र. क्र.९५/ तांक-१ दिनांक२१ एप्रिल २००९, Police Authorities are responsible for initiating further legal actions in respect of enforcement & violation of Noise Pollution (Regulation & Prevention) Rules-2000.

For enforcement of Noise Pollution (Prevention & Regulation) Rules-2000, for filing the complaint by public against noise pollution, Mumbai Police Commissioner & Police Commissioner of Railway has appointed officer not below the rank of Inspector of the respective police station as an authority for the purpose of control of noise pollution for all police station under them. The name, addresses, telephone numbers & e-mail of theses authorities are displayed on the Municipal website & notice board of the Ward offices.

21. INDUSTRIES

Environmental pollution is a by-product of industrialization. However, with the modern technologies, pollution potential of industries/factoroies are lowering. There are 28160 no. of industries are covered under section 390 of Mumbai Municipal Corporation Act 1888. These industries pay Air Pollution Prevention Fees on the basis of horsepower of the connected load. There are 8402 industries/factories are located in the city area, 13369 in Western Suburbs and 6449 in Eastern Suburbs. Maximum industries 5062 are in P-South ward. Ward-wise distribution of industries are shown in Table 21.1.

Industries are categorized by MPCB on the basis of emission levels. Heavily polluting industries are in "RED" category. "ORANGE" category industries are comparatively less polluting industries like Hotels and Restaurants, Fruit & Vegetable processing, Fish processing, Stone crushers etc. Industries which are not in above two categories are included in "GREEN" category. Some of the GREEN category industries are Mineral water, Salt mills, Ice cream, Handlooms, Candle industries, etc.

To control air pollution measures such as cyclones, scrubbers, filters, electrostatic precipitators, etc. are adopted by existing industries. They also use clean fuel and High end technology to produce the products. Treatment of effluent is carried out to control water pollution.

Table No. 21.1: Wardwise Licensed Industries

Sr. No.	Ward	Licensed industries upto 31.03.2018
1	A	128*
2	B	262*
3	C	430
4	D	746*
5	E	1940
6	F/S	1195
7	F/N	275*
8	G/S	2425
9	G/N	1001*
10	H/E	156
11	H/W	46
12	K/E	3645
13	E/W	694
14	L	3039*
15	M/E	421
16	M/W	252*
17	N	600
18	P/S	5062*
19	P/N	1257*
20	R/S	1143
21	R/C	383*
22	R/N	923*
23	S	1242*
24	T	895*
	Total	28160

Source : Environment Department
*As per Data of the year 2017-18

Ecofriendly Contribution of Industries

In addition to the efforts of Municipal Corporation of Greater Mumbai to reduced environmental pollution, other major industries in Mumbai also contribute in development of green cover in Mumbai and reduction in environmental pollution.

Bharat Petroleum Corporation Ltd. Mumbai Refinery, Chembur

BPCL Mumbai Refinery (MR) has a vision for environment and have always focused on environment protection and creating awareness for sustaining these efforts. They continuously innovate their processes and try to improve operational efficiency towards energy conservation, reduction in water consumption and tree plantation every year as a part of green initiative.

Few major Initiative taken towards environment during the year 2018-19 are listed below:

Auto Fuel Policy:

BPCL is delivering BS- IV compliant HSD &MS with effect from 1 st April 2017 as per Government mandate. For supplying BS-IV HSD to the Nation, Diesel Hydro-treator (DHT) unit was commissioned in June 2017. By successfully commissioning this facility, product sulphur was brought down to 10 ppm and thus "Mumbai Refinery" is in a position to produce 100% HSD meeting BS-IV standard (50 ppm).

To supply the nation with BS-IV grade petrol, BPCL MR has already taken actions and received consent to establish Gasolene Treatment Unit and the project is under implementation.

Rainwater Harvesting:

At Mumbai refinery, several projects have been implemented for rain water harvesting (RWH) for conservation of raw water during the Monsoon. Mumbai Refinery has installed rain water harvesting system for rooftops with over 67,000 square meters of catchments area. Total rainwater harvested during the year 2017-18 is more than 66,000 KL. An area of 3200 square meters will be added during the year 2018-19 with a potential to harvest 6,160 KL per year of rain water.

Rashtriya Chemicals & Fertilizers Limited

Rashtriya Chemicals and Fertilizers (RCF) Ltd., Trombay unit sets the objective to care and protect the environment by minimizing the emissions including greenhouse gases and also improving on the standards laid down by Statutory Agencies and taking action to meet the requirements of ISO 14001 Standards.

Green Belt Development:

Under green belt development RCF Trombay Unit takes various initiative like:

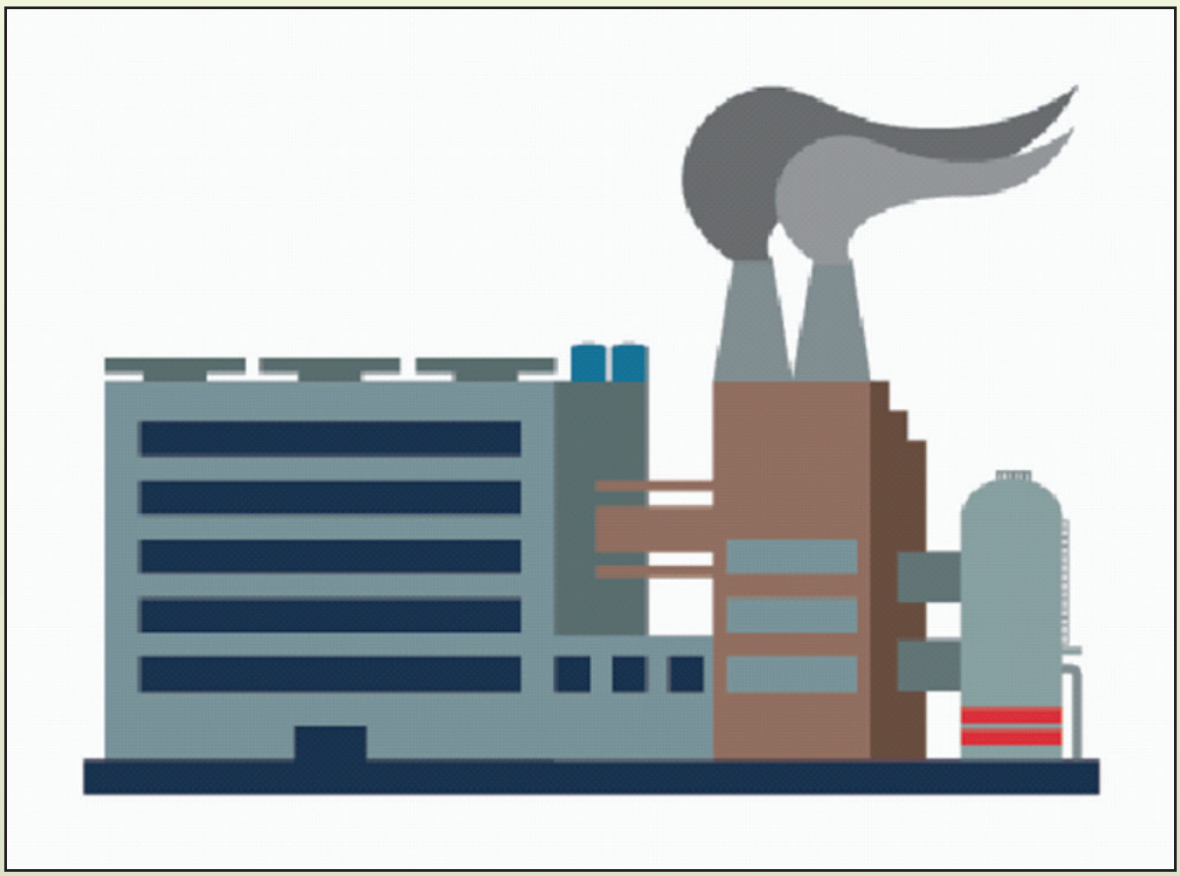
1. In the year 2018-19 RCF Trombay Unit has planted 1270 nos. of trees namely Ashoka, Karanj, Satvin.
2. RCF Trombay has distributed around 2400 number of saplings to nearby societies.
3. RCF Trombay has alos taken an initiative Under Green HR project, employees are planting a tree on their birthday inside the facotry.

As an acknowledgment of all around in Environment excellent performance, Trombay Unit has received many awards and accolades during 2018-19.

Adani Electricity

Adani Electricity Mumbai Ltd. (AEML) conducts energy conservation and energy efficiency (EC and EE) programmes to create awareness in the society about its importance and promotes smart usage of energy in order to reduce system demand and power purchase cost as also to achieve reduction in environmental damage by Green House Gas (CHG) emission. The ultimate goal is to make every citizen of Mumbai a part of programme and make this programme as citizen's movement.

The company through the "Urja Sanvardhan Upakaram Programme", conducted workshops in various academic institutions, offices, banks, hospitals, industrial estates, housing societies, slum areas etc. reaching out to more than 10,000 consumers and educated them on 'Why and how to conserve energy'. The ultimate goal is to make every citizen of Mumbai a part of the programme and make it a citizen's movement.



22. HEALTH

Health is the level of functional or metabolic efficiency of a living being. In layman terms, health usually means to be free from illness, injury or pain. The World Health Organization (WHO) defines health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. To lead and enjoy a wholesome life one must have sound health.

MCGM largely takes care of citizen health through Health Care Services. The State Government, Private organizations and Private medical practitioners also contribute in providing the health care services. Health care is a primary the responsibility of Municipal Corporation of Greater Mumbai.

MCGM's health infrastructure in Mumbai is a 3-tier system as shown in the table below.

Table No. 22.1 Health Infrastructure 3-Tier System in MCGM

PRIMARY	Health posts	208
	Dispensaries	185
	Maternity Homes	28
SECONDARY	Peripheral hospitals	17
	Speciality hospitals	5
TERTIARY	Major hospitals (Medical & Dental colleges) (5 main hospitals and 1 H.B.T. hospital joint with Cooper hospital.	5

Source: Health Dept.

Environment contributes to the health of human being both in positive and negative ways. Better nutrition and clean environment will help to increase life span whereas, polluted environment will cause deterioration of health. Environmental hazards are responsible for as much as a quarter of the total of diseases world wide and more than one third among children. Environment plays a major role in etiology of numerous diseases like water borne diseases (Gastroenteritis, Jaundice), vector borne diseases (Malaria, Dengue, Chikun gunya, Nipah) and non-communicable diseases like Hypertension, Diabetes, etc.

The health services are provided in two ways. There are hospitals, dispensaries and maternity homes all over the city catering to the medical needs of the people, while on the other hand there are Outreach Services. Under National Urban Health Mission 21 new health centres are started too. Objective of establishing health centres is to provide health service for implementation of family welfare program and outreach services for mother and child.

Table No. 22.2 shows Birth & Death Rates and Infant & Maternal mortality in the year 2016 to 2018.

In year 2018, Birth rate in Mumbai was 11.83/1000 population and the Death rate was 6.95/1000 population in the year 2018. Infant mortality was 24.63/1000 Live Births and Maternal Mortality rate 1.44/1000 Live Births for mothers.

Table No. 22.2: Health Statistics- Birth & Death Rates

	Year 2016	Year 2017	Year 2018
Birth (Registered)	152952	154642	151187
Birth Rate/1000 population	12.05	12.14	11.83
Death (Registered)	86642	88845	88852
Death Rate/1000 population	6.83	6.98	6.95
Infant Mortality	3998	4.71	3723
Infant Mortality Rate/1000 live birth	26.14	26.33	24.63
Maternal Death	305	236	218
Maternal Mortality Rate/1000 live birth	1.99	1.53	1.44

Source: Health Dept.

Function of Kasturba Hospital:

1. Kasturba Hospital is a Infectious Diseases hospital wherein, patients

suffering from Malaria, Dengue, Leptospirosis, Hepatitis, Rabies, Swine Flu, Ebola, Measles, Mumps, Diptheria are isolated in different wards and treated.

2. In 2018-19 patients with Swine Flu are being treated on OPD basis as well as admitted in ward for treatment.
3. For patients arrangement for blood testing isolation and treatment till the patient is completely being cured and discharged has been made in ward 30.

Report of different diseases April 2018 to March 2019

Sr. No.	Disease	Number of Patient	Death
1	Dengue	2451	00
2	H1N1	125	14
3	Lepto	142	00
4	Malaria	1674	01

4. Isolation ward and 10 bedded has been made available in ward 26 and cration of 10 bedded isolation ward is in process.

Epidemiology Cell

Epidemiology Cell is situated in the campus of Kasturba Hospital for Infectious Diseases in ward no.11. It started functioning from 25th April 2007.

Key activities of Epidemiology Cell:

- Reporting of communicable diseases is done on weekly and daily basis. Information of admitted patients is received from all Municipal hospitals, Government Hospitals and major Private Hospitals. The reports are analyzed for monitoring the diseases trend and feedback is given to respective MOH for preventive measures to be undertaken in the community.
- Regular drinking water quality surveillance is undertaken daily by Municipal laboratory by collecting samples from all 24 wards. Hawker's water and ice-water surveillance is also undertaken by Municipal labs.
- Continuous liaison with other departments like Insecticide Office, Municipal Analyst, IEC, Training and MIS as well as State and National authorities for prevention and control of communicable diseases.
- Training of the Health Staff working under MCGM and sensitization of Private Health care providers.
- During any outbreak of communicable disease the Mobile Health Unit (MHU) team is made available to control further spread and containment of disease in community.

Additional activities during monsoon:

1. Control room- In Monsoon, control room is activated from 1st of June every year for monitoring the disease surveillance activities.
2. Health Camps – "Special Sunday camps" are organized in collaboration with Secondary and Tertiary hospitals in high risk area of Mumbai. The reports of the same are analyzed and compiled to monitor the disease morbidity in the high risk pockets.

3. Medicines are made available for controlling the outbreak of communicable disease, as per need.
4. Co-ordination is established between Tertiary hospitals, Peripheral hospitals and major private hospitals for disease surveillance.

Preventive Measures for Monsoon related illness:

Five point program 'Mumbai Mantra' is implemented for prevention and control of Vector Borne Diseases:

1. Vector control measures – Source reduction, Engineering measures, Biological control, Chemical application and Legislative measures.
2. Early Diagnosis complete treatment: Finding out of Fever patients by observation and treatment as per 2013 National Medicine Work System.
3. Micro Mapping and Micro Planning.
4. Intersectoral and Intrasectoral coordination.
5. Public awareness.

In addition to already existing 5 point programme for vector borne disease control measures, following special 5 point programme is implemented since 2012 for prevention and control of Dengue.

1. Work place intervention.
2. Contact tracing.
3. Public awareness by coordination with housing societies and advance locality management groups.
4. Co-ordination with private health care providers.
5. Special awareness in non-slum areas.

Dengue Report 2015-2019 (till 31.03.2019)

Year	Cases	Deaths
2015	919	8
2016	1180	7
2017	1134	17
2018	1003	14
2019 (till 31.03.2019)	44	0

Under Mumbai Arogya Abhiyan, special 'Sunday Health Camps' are organized in high risk areas. In the year 2018, total 31 camps were held where 7683 beneficiaries attended the camp. At the camp site, IEC corner is established in which exhibition consisting of posters, live mosquito breeding, biological anti larval measures (Guppy fish) and models of mosquito breeding places are displayed for public awareness.

Water Borne Diseases:

Common water born diseases (Gastroenteritis, Typhoid and Hepatitis A, E) occurs due to contaminated

water and food. To avoid water and food contamination following measures are taken.

- The drinking water samples are tested on daily basis from all 24 Wards by MOH, Assistant Engineer (Water Work) QC & AEWW-LD.
- The Assistant Engineer Water Works at Ward level is informed about the unfit water samples and corrective steps for leak detection and repair is ensured by them and additional chlorination for water purification is carried out as per necessity.
- Areas reporting cases are surveyed by health post staff and following activities are carried out. Public awareness campaigns are carried out. Oral Rehydration Solution (ORS) & Chlorine tablets for additional chlorination is distributed. The patients detected during survey are refereed to nearby dispensary for treatment.
- To control water borne diseases adequate stock of medicines and packets of Oral Re-hydration Solution are available in MCGM hospitals and dispensaries.
- For the public awareness, publicity in newspaper about water borne diseases and their remedies. Unwholesome food, cut and open vegetables, fruits, sweets, liquids are destroyed as per section 412 of MCGM Act by Junior Overseas (Food).

H1N1 Influenza:

H1N1 is caused by its virus spreads through air. In 2015, two outbreaks of H1N1 Influenza were reported in Mumbai, from February, March, July and August.

Treatment facility such as Oseltamivir medicine, isolation ward, personal protective equipments and ventilators are available at MCGM Health Institutes and Public Sectors.

Testing facility available in P.C.R. Laboratory Kasturba Hospital, Haffkine Institute. Name of accredited private lab (SRL Lab, Suburban Diagnostics, Sunflower, Metropolis Lab, Hinduja Hospital Lab, Hoy Spirit Hospital Lab, Qualilifie Diagnostics-Mulund, Kokilaben Ambani Hospital Laboratory- Andheri, Dr. Jhankaria Imaging centre and Pathology – Mumbai, Sir H. N. Reliance Foundation Hospital Laboratory- Girgam, SRL Diagnositcs's Dr. Avinash Phadke Laboratory-Mahim, Dr. Jariwala Laboratory Borivali and Igeenetics Diagnositcs-Andheri).

H1N1 Report 2015-2019 (till 31.03.2019)

Year	Cases	Deaths
2015	3029	52
2016	3	0
2017	995	18
2018	25	0
2019 (till 31.03.2019)	124	0

H1N1Vaccination:

As per the Government of India guidelines H1N1 vaccine is made available free of cost to High Risk Groups which includes Pregnant females in 2nd and 3rd Trimester, patients with co morbidity and health Care Workers. H1N1 Vaccination facility for pregnant women of 2nd and 3rd trimester is made available at all 28 maternity homes and all 4 Medical Collages (Sion, KEM, Nair and J.J.). H1N1 vaccination for

high risk group of DM, HT patients is available at 7 MCGM dispensaries i.e. one each for 7 zone and this year 8 centres at Peripheral Hospitals have also been started.

In 2017, till 31.12.2017 H1N1 vaccination given to total 7596 beneficiaries, out of which 5985 are ANC of 2nd & 3rd trimester, 539 were patients having co-morbidities like DM and HT and 1072 were health care workers of BMC. In 2018 till 31.12.2018; 6908 ANC, 391 Health Care Workers and 1307 patients with co-morbidity are vaccinated.

Malaria Control Programme:

Surveillance Department works for prevention and control of Malaria in Mumbai.

Key activities of Surveillance Department:

1. Early detection of cases and correct treatment
2. Early and accurate diagnosis
3. Treatment of Cases and Follow up
4. Regular Review Meetings
5. Training
6. IEC activities
7. Joint action by MOH/PCO

Following the surge of cases in 2010 the surveillance department has strengthened control measures of malaria by implementing "Mumbai Mantra" Five Point Programme.

1. Effective vector control
2. Early diagnosis, correct and complete treatment
3. Micro-mapping and Micro Planning
4. Inter and Intra Sectoral Response
5. Community awareness and action.

1. Early detection of cases and correct treatment:

- Strengthening Active and Passive Surveillance by detecting suspected cases through House Survey, surveys at construction sites, surveys at suspected malaria death case area, dispensaries and hospitals.
- Special camps on Sunday for fever cases and Baseline surveys at construction sites.
- Establishment of Linkage between health post, dispensaries and surveillance staff for detecting cases to give prompt and correct treatment and verification of Radical treatment. This activity is supervised by Senior Officers.

- All Malaria patients get radical treatment with follow-up and verification of Radical treatment.

2. Early and accurate diagnosis of Malaria:

- For Diagnosis of Malaria, Laboratory facilities are available at 177 upgraded dispensaries, 17 peripheral hospitals, 5 medical college Hospitals, 5 Urban Health centres and 1 special Hospital Apart from this, at Central Malaria Laboratory approx. 3500 blood slides daily examined and if required pre designated private labs are identified for maintaining ZERO BACK LOG Policy and within 24 hours timely reporting to MOH and PCO.
- To ensure quality of slide examination, some percent of blood slides are cross checked at central malaria lab and at Regional Government Lab.

3. Regular review meetings:

- To give feedback and proper guidance to ground level staff.
- To take review of preventive and curative activities.

4. Training:

- Organized for lab technician, malaria inspectors and investigator, Medical, Para-Medical staff and Private Medical Practitioners.
- Public Representatives, Safety officers and Supervisors at construction sites are sensitized for prevention and control of malaria.

5. IEC activities:

- Public awareness is carried out through display of Hoardings, Banners, Poster distribution of leaflets in the community. Electronic media such as Television, Short films and digital electronics board are used for public awareness.

6. Joint action by MOH/PCO:

- Line list of malaria cases is informed to PCO for mosquito control activity.
- Breeding sites are reported by PCO to MOH for detecting suspected cases from there.
- Before monsoon, at construction sites distribution of mosquito nets and instructions are given for medical examination of all workers to Developers as well as Health cards distribution and IRS is done by PCO.

Tuberculosis Control Programme (TB):

To bring Tuberculosis under control is one of the main aim of the Brihanmumbai Mahanagarpalika and it works effectively with the association of various agencies including voluntary organization and with research work in the field as well as in the hospital area.

There are total 249 PHI treatment centres along with various others run by the teaching institutes and peripheral hospitals which are working primarily as the diagnostic and treatment centres in addition 7 DR. T.B. centres (Nodal), 35 gene expert, 3 LPA, 9 BDQ centres as total.

The Group of T. B. Hospitals at sewree is admitting and treating the emergency T. B. cases and the 5 T. B. Clinics attached to this hospital are working as diagnostic and treatment centres on OPD basis. (1) Shyamaldas Gandhi Marg TB Clinic, (2) Balaram Street TB Clinic, (3) Ramkunwar Daftary TB Clinic, Dadar (4) Smt.& Shri M. M. Munshi TB Clinic , Khar (5) Nawab Tank TB Clinic,Dockyard Road.

The non-TB Chest diseases department is functioning on OPD level. All the investigations such as Pulmonary function testing, Fiber optic bronchoscopy and E.C.G.are done.

This Institute is recognized for degree courses in M.D.(Tuberculosis and Chest Diseases) by the Maharashtra University Health Science Nashik under G.S.M. Collage, so also clinical experience is given for Nursing and undergraduate students from the Municipal Medical Colleges.

The Major lung thoracic surgeries are being carried out at this hospital by the surgeons on selected cases.

As per suggestion of the Mumbai Districts AIDs Control Society (MDACS), the Voluntary Counseling and Testing Centre (VCTC) has been started from January, 2002 at this hospital for the testing of Indoor and OPD Patients.

As per the guidelines of DOT-PLUS programme the separate ward of MDR Patient (Males & Females) have been started from 26th July 2010. Supra major thoracic surgery is started from March 2012 at G.T.B. Hospital. Till date 275 updated major surgeries and 17429 updated minor surgeries are carried out.

From May 2012 protein diet is started daily for all on duty employees working under G.T.B. Hospital in three shifts.

Infection Control Committee is framed in June, 2011 since then periodical medical check up done every 3 month for G.T.B. hospital employees, Personal protective equipment N-95 masks are given to all employees with 12 point preventive measures to prevent the Tuberculosis infection.

In November 2013, 200 bedded Bahadurji Block under G.T.B.Hospital was started for MDR , XDR and XXDR patients. Services of advance technology of L.P.A. machine, Gene expert and Liquid culture laboratory were started for early diagnosis of MDR TB patients.

A new medicine, Bedaquiline was started in August 2016, through Conditional Access Programme under Public health department, Municipal Corporation of Greater Mumbai and Government of India. Group of T.B. Hospitals at sewree was selected as one of the six centre for Bedaquiline CAP with two bedded ICU. Now dedicated BDQ OPD started at GTB hospital and nearly 100 new patients started on new drug BDQ .

Acworth Municipal Hospital for Leprosy:

It was founded by the then Municipal Commissioner Mr. H. A. Acworth and is located at R. A. Kidwai

road, Wadala (West) on 7th November 1890. It is under MCGM since 1st April 1991 as one of the specialized hospitals under the administrative control of Executive Health Officer.

Services provided by Acworth Municipal hospital for leprosy:

Services provided by Acworth Hospital for comprehensive care to the leprosy affected patients are as follows,

1. **In Patient Service:** Total indoor capacity of the hospital is of 240 beds. At present average occupancy are around 91. The most of the patients are admitted in the hospital due to the old Leper Act. Old deformed and abandoned patients are provided shelter in the hospital. Majority of the patients living here more than 20 years almost on a permanent basis. Presently patients are admitted for ulcers and lepra reaction.
2. **Out Patient Services:** Outpatient services include physiotherapy, social service, laboratory, dressing and pharmacy. Daily average O.P.D. attendance is about 45 patients per day.
3. **Field Work:** Under National Leprosy Elimination Programme, Hospital carries out IEC Activities in its projects area i.e. Municipal wards ('E', 'F/South' & 'F/North') covering about 16 lakh population.
4. **Reconstructive Surgeries:** The hospital is a recognized centre for reconstructive surgeries by state government where reconstructive surgeries are carried out for correction of deformities of hands and feet of leprosy patient.
5. **Training:** The hospital provides training in leprosy to post graduates and under-graduate allophathy and non-allopathy medical students as well as to student nurses, Social Science and O.T./P.T. students. The hospital also offers training to Government Medical Officers, Non-medical assistants.
6. **Medical Records:** The hospital maintains statistical records and generate various report thereby assessing the progress of N.L.E.P. in entire Mumbai.
7. **Collaborative Programme of Acworth Municipal Hospital and NGO's:**
    - Acworth Leprosy Museum : Provides scientific information about all aspects of leprosy.
    - Footware Unit: MCR footweare, Splints are provided to the leprosy patients at concessional rates.
    - Central Registry: Help in planning the NLEP action plan for Mumbai district.

Health Education:

Acworth Municipal Hospital provide health education at E. F/S and F/N Wards. Which helps to eradicate misconceptions about leprosy. On the occasion of death anniversary of Mahatma Ghandhiji from 31st January to 5th February, leprosy education week is arranged by this hospital every year. During this week all active organizations effectively carry out public awareness and health education movement in their work premises.

Mumbai District Statistics 2018-19

New Leprosy Patients	474
MB patients among total patients	312
PB patients among total patients	162
PR for Mumbai	0.2 (per 10000 population)

Acworth Hospital Statistics 2017-18

Total Leprosy Patients in the project area (E, F/S & F/N Wards)	46
MB patients among total patients	33
PB patients among total patients	13
PR for AMHL	0.2 (per 10000 population)

Mumbai District AIDS Control Society:

Mumbai Districts AIDS Control Society (MDACS), an Autonomous body registered under Charitable Trust Act was established on 27th July 1998 by Municipal Corporation of Greater Mumbai (MCGM), under the guiding principles of National AIDS Control Organization for prevention and control of HIV / AIDS in Mumbai. Major responsibilities of MDACS are as follows:

1. Prevent the spread of HIV/ AIDS.
2. Reduce the vulnerability of People living with HIV/AIDS.
3. To provide care, support and treatment services to people living with HIV / AIDS (Infected and affected).

Mumbai Districts AIDS Control Society provides services free of cost through below mentioned divisions.

Basic Services :

- Integrated Counseling and HIV Testing Centres (ICTCs) are established across the city in all Government / Municipal Hospitals / Maternity Homes. These services are freely available to all Walk-in / referred clients. Trained Counselors and Laboratory Technicians perform HIV Counseling and testing using standardized testing protocols with robust quality control.
- Early detection of HIV infection in pregnant women is the mainstay of the program for preventing the transmission of infection from infected mother to baby. For this, Multi Drug Antiretroviral Treatment is initiated from 4th month of pregnancy.
- Early Infant Diagnosis - All infants born to HIV infected mothers are screened early and periodically, till 18 months of age for HIV infection.
- There are 336 ICTCs which includes 48 stand-alone ICTCs, 5 Mobile Vans & 166 Facility Integrated ICTCs & 117 Public Private partnership (PPP) providing facilities of counseling and HIV testing and reach out to the downtrodden people in the City.

Anti-Retroviral Treatment (ART):

Treatment for HIV positive patients is made available through 17 ART Centres set up in various Hospitals in Mumbai. These centres are in 7 Medical Colleges, 6 Peripheral Hospitals, 2 are in public private partnership (Godrej & L&T), 1 in Mumbai Port Trust Hospital & 1 in MCGM dispensary (STD Clinic). Four Link ART centres are also functional in Mumbai city. Total 38922 patients are registered in active care with ART centres. Out of this, 38254 patients are on ART.

Blood Safety Programme:

Preventing HIV transmission through infected blood by ensuring access to safe and adequate blood for the needy patients is one of the important services of MDACS. 21 Government, Municipal and Trust blood banks in Mumbai are supported by provision of trained manpower, HIV testing kits and grants. All the blood units collected in the blood banks are tested for HIV, Hepatitis B, Hepatitis C and other blood born infections. Regular Voluntary Blood Donation Camps are organized in collaboration with Blood Banks and NGOs. Over the years, the number of voluntary blood donors has increased, significantly reducing the risk of HIV infection through blood transfusion.

Sexual and Reproductive Health Facility:

Unsafe sexual behavior leads to transmission of Sexually Transmitted Diseases (STDs) and infection including HIV. STDs can be easily diagnosed and effectively treated by 'syndromic treatment' approach. For this, 27 designated STI/RTI clinics (DSRC) are set up in public health hospitals throughout the city with trained doctors and counselors who educate the clients about complete treatment, condom promotion, partner notification and partner treatment. The patients are also referred to ICTC (Shakti Clinics) for blood testing for HVI and STDs. Effective management of STDs and counseling on responsible sexual behavior at STI clinics helps in prevention of HIV transmission. One Regional STI training Reference Laboratory in B.Y.L. Nair Hospital linked to these Suraksha Clinics for etiological diagnosis of STI in complicated patients for providing effective treatment in these patients.

Targeted Interventions:

Targeted Interventions are aimed at offering prevention and care services to high-risk population of Female Sex Workers, Men having Sex with Men, Transgender and injecting Dug Users. The bridge population of slum migrants and long distance Truckers are also provided with the information, means and skills to minimize HIV transmission. These high-risk groups through their NGOs/CBOs having 34 projects are linked to appropriate testing and Treatment Services.

Information, Education & Communication (I.E.C.):

IEC plays and important role in all prevention efforts. Various awareness campaigns are held using mass media and outdoor approach. Specially designed street plays and musical drama (infotainment) activities are organized for slum migrants and high risk groups for reducing risk behavior. Events are organized to increase the awareness among general population, especially for women and youth on various days viz. National Voluntary Blood Donation Day, National and International Youth Day, World AIDS Day, Women's Day. Saadhan Helpline – Confidential Tele-Counseling is provided on phone No. 022-24114000

HIV/AIDS Present Status:

HIV prevalence trend has witnessed a significant decline among general clients (11% in 2007 to 1.11 % in 2018), Pregnant women (0.87% to 0.09% in 2018) in Mumbai.(Table No. 22.3)

Table No. 22.3: HIV/AIDS Control Programme Report, (Feb 2018)

HIV testing at Integrated Counseling and Testing Centers of Mumabi	Tested	Positive		Treatment for HIV positive patients at ART Centers in Mumbai	Adult	Children	Total
General Clients	406231	4521		Number of HIV Positive patients registered in active care	37200	1722	38922
Pregnant Women	153140	135		Number of HIV Positive patients on Anti-Retroviral Treatment (ART)	36565	1689	38254

Environmental Pollution Research centre (EPRC):

Seth GSMC and KEM Hospital:

Human activity in Megacities is the main driving factor intensifying a range of environmental issues. Prevalence of respiratory disorders like asthma has shown an increase in international studies (1). Much scholarly attention has been directed towards air pollution from a range of perspectives, and urban form is increasingly being identified as a key determinant of air pollution in developed countries (2).

Under the umbrella of K.E.M. Hospital, Environmental Pollution Research Centre carries out community based Respiratory Morbidity survey and offers comprehensive management for various Respiratory disorders. On site pulmonary Function tests are carried out during survey for objective assessment.

Educating patients regarding environmental control measures & use of appropriate treatment leads to better symptom control. A review of 'Asthma Education Service' conducted by the department shows a decrease in number of emergency room visits and hospital admissions related to asthma. Asthma education initiative was started in the year 2008. In the year April 2018 to March 2019 total of 1326 patients were provided individualized and structured education. (Table No. 22.4) Considering the importance of each patient's socioeconomic background, controller and reliever medication for asthma is provided by MCGM free of cost. Asthma education includes teaching techniques to identify & avoid common asthma triggers and assessing inhaler technique. Health literacy regarding learning inhaler technique is assessed and appropriate technique is taught. Number of patients requiring emergency room visits or hospital admissions amongst asthma educated patients is 0.226%.

To further goal of Medical Education as proposed last year, an application was made by Dean (K) to Maharashtra University of Health Sciences (MUHS) for grant of affiliation for development of superspeciality degree DM in pulmonary Medicine & preliminary affiliation has been granted for the same by MUHS.

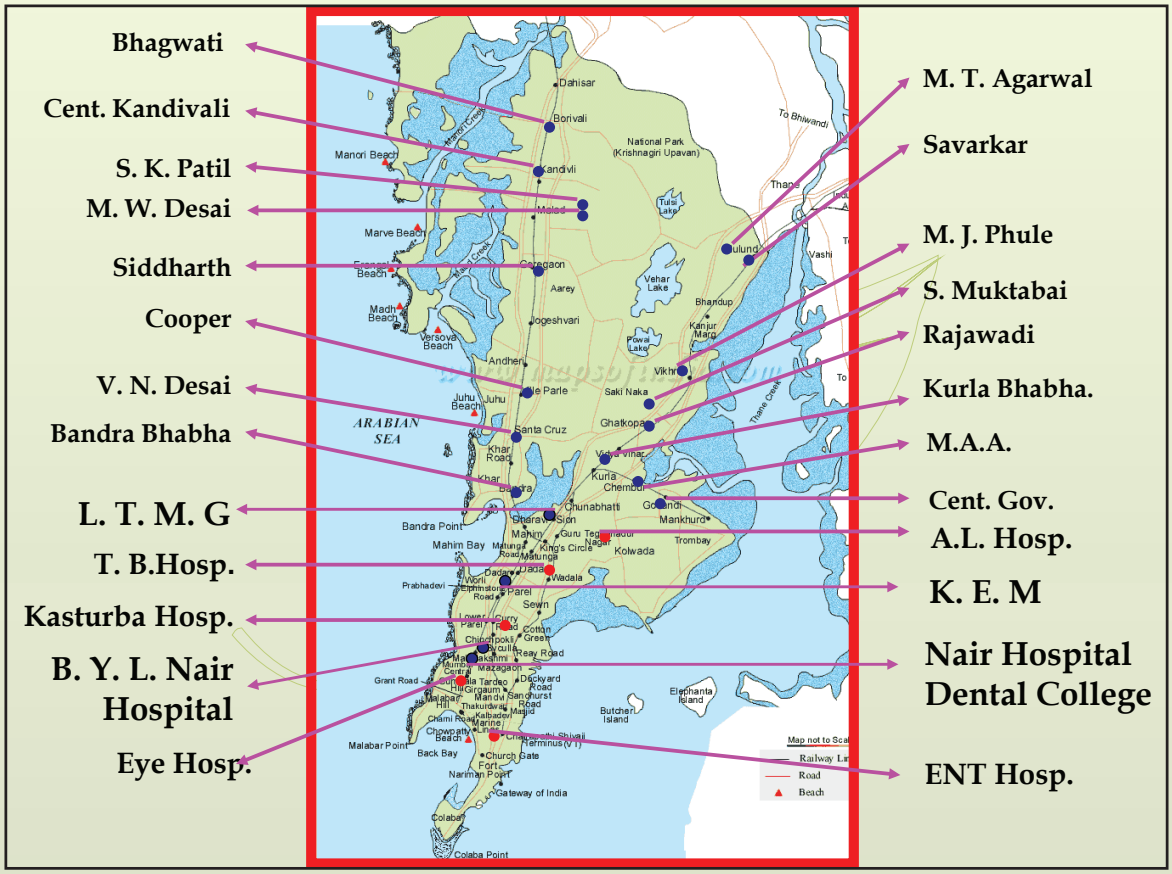
Table No. 22.4
In the year 2018-19 following surveys have been undertaken by EPRC team.

Area	Group Surveyed	Total
Chereshwar Society, Mahulgaon	Medical Camp-15	15
National Park, Borivali	Census- 116 Residents	227
	Questionnaire-91	
	Medical Camp-20	
Yashwant Building, Parel	Census- 129 Residents	207
	Questionnaire-36	
	Medical Camp-42	
Versova pumping Station, Versova	Medical Camp-92	92
	Total	**541**
Asthma Education	OPD	1326
Pulmonary Function Test	OPD	2829
	Grand Total	**4696**

Source: Dept of Chest Medicine and Environmental Pollution Research Centre

Ministry of Environment & Forest & Climate change (GOI) has selected Environmental Pollution Research Centre, K.E.M. Hospital, as one of the centres for assessment of Health risk profile in a 20 city study over the country & this study will be carried out from 2019 onwards after Ethics Committee approval.

Hosptlas in Mumbai



23. DISASTER MANAGEMENT

The Disaster Management Department (DMD) was set up in 1999 at the Municipal Head Office to tackle disasters in Mumbai. After the July 2005 deluge it was upgraded with modern equipment to handle emergency situations effectively. Control Room further upgraded with various ultra modern facilities and shifted to second floor in MCGM Head Office.

District Disaster Management Authority:

In the year 2011 Greater Mumbai Disaster Management Authority was constituted in exercise of the powers conferred by Sub-sections (1), (2) and (4) of section 25 of the Disaster Management Act, 2005 (53 of 2005) and rule 2 of the Maharashtra District Disaster Management, by appointing Municipal Commissioner of Municipal Corporation of Greater Mumbai as ex-officio Chairman of the Authority.

In the year 2018 as per the Government Resolution followed by the orders of the Hon'ble High Court the Districts Disaster Management Authority for the Mumbai City and Mumbai Suburban are constituted. Senior Most Additional Municipal Commissioner for Mumbai City and Mumbai of Suburban of Municipal Corporation of Greater Mumbai are appointed as ex-officio Chairman of the District Disaster Management Authorities.

Functions of Disaster Management Department:

1. Single –point source for all issues related to disaster management.
2. Hazard Vulnerability & Risk Assessment
3. Prevention & Preparedness
4. Mitigation
5. Response
6. Recovery & Reconstruction
7. Command & Control agency between administration & field units.
8. Provide early warning to citizens
9. Arrange for emergency supplies of water and food.
10. Arrange for transfer of stranded and marooned persons.

11. Arrange for emergency transport for the seriously injured.
12. Coordinate for setting up temporary shelters.
13. Coordinate with NGOs

Objectives of Disaster Management Department:

1. Ensure quick and effective response any disaster.
2. Improve coordination among all the responding agencies.
3. Disseminate information related to disasters to the citizens.
4. Encourage preparedness at all levels.
5. Provide assistance to all affected in the event of a disaster.
6. Alert citizens for probable emergencies.
7. Impart Training to the Citizens & stakeholders

Emergency Operations Centre (EOC):

The Disaster Management Department works round the clock throughout the year. It serves as a Command & Control agency between the administration and field units. It is a single-point source for all issues related to disaster management. It coordinates with various stakeholders for quick and effective response during a disaster.

1. Land lines
2. A Very High Frequency (VHF) wireless communication system which is connected to 53 installations for effective communication with key stakeholders.
3. Television sets which are tuned to major news channels to keep abreast of the latest news.
4. Arrangements of HAM radio available on call.
5. A '1916' helpline through which Citizens can inform the MCGM about major / minor accidents, fire, earthquakes, bomb blast etc.
6. Hotlines with 52 vital agencies, 3 major & 2 peripheral hospitals & 24 administrative wards. Each agency provides regular updates about the situation in the city.
7. For monitoring disaster management activities a video wall of size 6200 mm long and 1744mm height has been installed. Video wall receives feed from 4961 CCTV cameras installed by Mumbai Police, 231 by Traffic Police and 7 by SWD department.
8. Library: A library facility is available with the books related to Disaster Management, Emergency Plans, SOPs, Case Studies etc.

9. Conference Hall: Conference hall having seating capacity of 60 for media briefing and Disaster Management related meetings.

The following types of complaints are registered in Disaster Management Department:

The 32 emergency and man-made disasters that have been categorized by the Department of Disaster Management of Greater Mumbai are further classified into 102 sub-major disasters like landslides, trees or unauthorized trees, water scarcity, housing, short circuits, floods, earthquakes, explosions etc. on registration, these incidents are forwarded to the concerned agencies and to provide them with assistance.

Automatic Weather Stations (AWS):

1. 60 Automatic Weather stations have been installed throughout Mumbai to get real time weather parameters.
2. Weather Parameter data is refreshed after every 15 minutes.
3. The data is monitored, analyzed and the warnings are issued accordingly.

Installation of Radar Level Transmitter:

1. Radar Level Transmitters are installed to monitor water level in rivers and lakes. It gives real time information in Disaster Control Room.
2. This helps in early evacuation of citizens from the vulnerable area. Radar level transmitters are installed at Dahisar, Poisser, Wakola, Mithi, Oshiwara rivers and Powai, Vihar Lake.

Disaster Management Website:

The website 'dm.mcgm.gov.in shows following information: High Tide-Low Tide time table, Weather forecast obtained from India Metrological Department, Live weather parameters updated every 15 minutes, Traffic updates, Status of Local Trains, Status of Air Traffic etc.

Disaster Management App:

MCGM launched Disaster Management App available on Android & IOS. Live rainfall data along with other weather parameters like Temperature, Pressure, Humidity, Wind speed, Traffic diversions and Weather forecast from IMD etc. are available which is refreshed in every 15mins. Also nearby Hospitals, Police Stations, Fire Stations and Ward offices are geo tagged and available for citizens. SOS button is provided for tracking distress victim. 20 video clips are available on mobile app for awareness of citizens.

Emergency Support Functions (ESF):

1. 14 Emergency Support Functions have been identified as an integral part to carry out emergency response activities, including preparedness, response during the event, and immediate recovery.
2. In the events of major disaster or emergency, the lead agency will take action as per SOPs and work in coordination with the support agencies and other ESF's to mobilize and deploy resources to the affected area.

3. In peace time, each ESF Plan and prepare for emergencies through review of the planning assumptions, drills, table top exercises and preparation and reviews of the Standard Operating Procedures.

4. Preparedness and planning activities are essentials to ensure adequate response and to identify areas of actions that would ultimately reduce disaster risk

ESF Identified are as follows:-

Table No. 23.1: Wardwise Licensed Industries

Sr. No.	ESF	Lead Agency
1	Communication	Disaster Management Department, MCGM
2	Public Safety, Law & Order	Mumbai Police
3	Fire Fighting	Mumbai Fire Brigade
4	Search & Rescue	Mumbai Fire Brigade
5	Transport	Transport Commissioner
6	Public Health & Sanitation	Ex. Health Officer, MCGM
7	Resource management	Disaster Management Department, MCGM
8	Information Management	Public Relations Officer, MCGM
9	Mass Care, Housing & Human Services	Education Officer, MCGM
10	Relief Supplies	Collectors
11	Energy (Power, Gas & Fuel)	Brihanmumbai Electric Supply & Transport Undertaking
12	Utility Services	Dy. Municipal Commissioner (Special Engineering) MCGM
13	Public Works & Infrastructure	Director, Engineering Services & Projects, MCGM
14	Oil & Hazardous Material	Director, Industrial Safety & Health (DISH)
	Total	28994

GIS based Command and Control System:

For quick and quality response and for developing decision support tool Disaster Management Department (DMD) had developed a computer based application of technology involving spatial and attribute information. The relevant baseline data is collected from various stakeholders. GIS has emerged as an effective tool in Disaster Management some geo spatial data and socio economic information is amalgamated for the better decision making and in handling a disaster or to plan for tackling disasters in scientific manner.

Prime objective of developing GIS is to help DMD for:

1. Pre-disaster Planning & Preparedness

2. Prediction and Early Warning

3. Decision Support System

4. Damage Assessment & Relief Management

GIS combines layer of information on various themes to enable DMD to take the most appropriate decisions under given circumstances.

1. DMD generate maps both at micro and macro level indicating vulnerability to different extends under different threats perception.
2. Locations likely to remain unaffected or remains comparatively safe could be identified.
3. Alternated routes to relief camps and important locations in the event of disruptions of normal surface communication could be worked out.
4. Smooth rescue and evacuations operation can be properly planned.

City Institute of Disaster Management & Research Centre (CIDM):

If main EOC at MHO is breaks down due to any reason, a backup control room has been setup at CIDM, Parel. This backup control is equipped with Hotlines, Wireless communication, HAM Radio, Video Wall, ESF etc. similar to EOC at MHO. CIDM provides comprehensive training on disaster management and first responder to employee of MCGM/ Government / Private companies, School and College students, Medical practitioners, Police etc to aware them about scientific methods of disaster management.

3D Auditorium and an Art gallery is developed to show realistic information about of various disasters. The major objective of these facilities is to make visitors aware of disaster and its preparedness. Art gallery has interactive dioramas, display, photographs and information boards for awareness generation of various disasters.

Post Graduate Diploma in Disaster, Fire & Industrial Safety Management (PGDDFISM):

Considering the importance of Disaster Management and ever increasing impacts of Disasters, CIDM has commenced a one year PGDDFISM course in coordination with GICED and Mumbai University. This course offers scientific learning of concepts of natural and manmade disaster and techniques of every stage in DM. The Primary aim of this course is to educate personal from Government agencies, industries regarding appropriate response to the impending disaster and reduce the impact on mortality and economy.

City Disaster Response Force (CDRF):

On the basis of National Disaster Response Force (NDRF) at National level and State Disaster Response Force (SDRF) at State level, a City Disaster Response Force (CDRF) is establish at City level. The objective of formulating CDRF for Mumbai is to develop self sustainability for responding disasters like major fire, collapse structure, CBRN etc. The personnel appointed for CDRF are from existing Security Force, Mumbai Fire Brigade, Doctors & Paramedics of MCGM are trained by National Disaster Response Force (NDRF).

Central Complaint Registration System(CCRS):

On-line complaint management system (CPWM Module) has been started from 2000 to register civic

complaints. Central Complaint Registration System is working 24X7. Civic Complaints pertains to MCGM are registered on phone no.1916 in the central control room and sent to the concerned department through on line system. Citizen can lodged their complaints on line on MCGM portal i.e. http://portal.mcgm.gov.in

Un-attempted complaints are automatically escalated to higher authorities such as Assistant Commissioner- Dy. Municipal Commissioner to Additional Municipal Commissioner and finally to Municipal Commissioner in a time bound manner.

Disaster Management Control Room

CHALLENGES BEFORE US

1) Day to day from megacities and villages facing dreadful problems due to solid waste, plastics, e-waste etc. The quantity of solid waste reaching dumping grounds will be reduced, if segregation of dry/wet waste is done at source and wet waste is used for generating fertilizers. Every citizen should take this responsibility.

2) Plastic bags and wrappers are thrown on the street carelessly; consequently chocking sewer lines and storm water drainage arteries. Every body should think and co-operate with MCGM.

3) It is our social responsibility to take care for proper use of natural resources, tree plantation and maintenance, protection and conservation of wildlife and aquatic animals.

4) In future, if "Green Environment of Global" is managed properly, challenge warming can be solved definitely.

5) Students are our strong and healthy citizens of future. It is necessary to develop culture in their school life for management of green environment. Proper awareness is necessary for saving water, management and planning.

6) With the coordination of government and NGO's working on social levels and with participation of common man, the environmental pollution problems can be resolved effectively.

7) For protection of nature lot of things can be done on domestic levels such as preventing wastage of water and saving electricity.

8) Along with the development of cities, there is sheer negligence of nature which causes environmental problems. Laws are existing for controlling pollution protection of environment. It is necessary to change the mentality of every citizen.

SALIENT FEATURES OF MUMBAI'S ENVIRONMENT

1. Providing recreational amenities to the public is a discretionary duty of the Municipal Corporation are balanced environment, abatement of air pollution and Green Mumbai beautiful and clean Mumbai. MCGM provides recreational amenities to the citizens of this city by way of maintaining gardens and providing playgrounds, water fountains and recreational centres etc. For which provision of substantial funds is been made in the budget of corporation.
2. Veermata Jijabai Bhosale Udyan and Zoo has been reconised 'Medium Zoo' by Central Zoo Authority New Delhi upto 2020.
3. It is proposed to planted and taking care around 20,000 trees in the year 2019-20 along road side and on the other places in MCGM jurisdiction.
4. Presently 3850 MLD water is supplied to Mumbai. The population increasing in trend is continued and projected water demand is expected. Gargai project (440 MLD), Pinjal project (865 MLD) and Damanganga Pinjal river link project (1586 MLD) these project are propose to develop. The shortfall in the demand and supply of water will be taken care and icrease by 2891 MLD water supply to the city and suburbans after the completion of these projects.
5. MCGM successfuly decreased the percentage of unfit water samples during the year 2018-19 as compaired to the last two years (2016-17 and 2017-18).
6. As per the development plan 2034 the 'Rain Water Haversting' system from is mandatory to all developments having plot area 5000 Sq.Mts. and more from the year 2018.
7. MCGM has been awarded as the best capital in 'Innovative and Best Practices' in 'Swacha Survekshan 2019' programme conducted by Ministry of Housing and Urban Affairs (MoUHA).
8. Processing has been carried out of about 3000-3500 tonne per day of municiapal solid waste with bioreactor technology and about 1000 tonne per day of municiapal solid waste with windrow composting technology is being carried out at Kanjur dumping ground.
9. As per the development planning and provision in DCPR-2034, established a 'Parking Authority' of regulation and management of parking places by MCGM.
10. ZERO EMISSION and Eco Friendly 6 number of pure electric buses and 25 number of hybrid buses are in operations on defferent routes of Mumbai. Procurement of 80 number of electric buses is in finalization stage.
11. Organizing 'Swachata Pandharwada' in all schools falling under MCGM jurisdiction, Cleanliness pledge, awareness message and organizing various competition, propagating use of solar energy, quiz etc. programmes arranged whole year through.

12. System of Air Quality Forcasting and Research (SAFAR)- 'SAFAR-Mumbai facilitated all citizens of Mumbai by providing levels of pollutants, Air Quality Index (AQI) and health related advices through the LED boards installed at dfifferent sites in all over Mumbai.

13. In natrual and manmade disaster to given fast relief established a 'District Disaster Managemnt Authority' for the Mumbai city and Mumbai suburban in 2018 by MCGM.

Sant Namdeo Maharaj Chauk, Andheri (E)

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