MUNICIPAL CORPORATION OF GREATER MUMBAI

ENVIRONMENT STATUS REPORT

2019 - 2020

Salute to Covid Warriors by Indian Air Force - Kasturba Hospital

Disaster Management Training Center

बृहन्मुंबई महानगरपालिका

ENVIRONMENT STATUS REPORT 2019 - 2020

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मनोगत

मुंबईकरांना नागरी सेवा-सुविधा पुरविण्यास कटीबद्ध असणाऱ्या बृहन्मुंबई महानगरपालिकेच्या कर्तव्यांमध्ये मुंबई महानगरपालिका कायदा 1888 मधील कलम 61(अब) नुसार पर्यावरण संरक्षण, परिसर संवर्धन तसेच शहरातील वनांचे संवर्धन करणे याचा समावेश आहे. मुंबई महानगरपालिका कायदा कलम 63ब नुसार बृहन्मुंबई महानगरपालिका क्षेत्रातील 'पर्यावरण स्थितीदर्शक अहवाल' महानगरपालिका सभागृहास दरवर्षी सादर करण्यात येत असतो. सदर अहवालात मुंबईतील पर्यावरणाचा मागील वर्षाचा चिकित्सक दृष्टिने आढावा घेण्यात आलेला आहे. त्यानुसार आर्थिक वर्ष 2019-2020 चा 'पर्यावरण स्थितीदर्शक अहवाल' सादर करण्यात येत आहे.

सन 2019-2020 या वर्षीचा 'बृहन्मुंबई पर्यावरण स्थितीदर्शक अहवाल' सभागृहापुढे सादर करताना मला अत्यंत आनंद होत आहे. बृहन्मुंबई महानगरपालिका ही देशातील सर्वात मोठी महानगरपालिका आहे आणि तिचा अर्थसंकल्प प्रचंड असून तिची विविध क्षेत्रातील कामेही आवाढव्य आहेत. शहरातील पर्यावरणाबाबत सर्वकाही सुरळीत आहे असे म्हणता येत नसले तरी शहराचे समतोल पर्यावरण राखण्यासाठी महानगरपालिका सतत प्रयत्नशील आहे.

बृहन्मुंबई महानगरपालिका क्षेत्रातील पर्यावरण संवर्धनासाठी महानगरपालिकेने विविध प्रकल्प हाती घेतले असून त्यांची कामे प्रगतीपथावर आहेत. यामध्ये घन कचरा व्यवस्थापन, पर्जन्य जलवाहीन्या मलनि:सारण प्रकल्प, मलजल वाहीन्या, वर्षा संचयन विनियोग, पाणीपुरवठा, शिक्षण, आरोग्य, आपत्कालीन व्यवस्थापन इत्यादी विभागातील माहिती सुध्दा या अहवालात नमूद करण्यात आलेली आहे. मला असे निदर्शनास आणून द्यावयाचे आहे की, घन कचऱ्याच्या समस्येवर मात करण्यासाठी बृहन्मुंबईत जमा होणाऱ्या 82% कचऱ्याचे वर्गीकरण होत असून 1696 बल्क वेस्ट जनरेटरच्या सहाय्याने शास्त्रोक्त पद्धतीचा वापर करुन उगमस्थानीच खत निर्मितीचे कामे केली जातात. त्याचबरोबर सुका व ओला कचरा याच्या तपशीलासह कचऱ्याचे विलगीकरण करण्यासाठी प्रोत्साहन करणारे पोस्टर, बॅनर आणि होर्डींग्स संपूर्ण शहरात लावण्यात आले. त्याचबरोबर आकाशवाणीवर रेडिओ जिंगल्सद्वारे जनजागृतीपर संदेश देण्यात आले. अशा प्रकारे घन कचरा व्यवस्थापन विभागामार्फत विविध उपाययोजनांची यशस्वी अमंलबजावणी करण्यात आल्याने सन 2015 मध्ये क्षेपणभूमीवर जाणाऱ्या 8500 मे. टन कचऱ्याचे प्रमाण हे चालू वर्षात 6500 ते 6800 मे. टन एवढे कमी करण्यात महापालिकेला यश आले आहे.

मुंबई महानगराला भेडसावणाऱ्या अनेक समस्यांपैकी एक म्हणजे वाढत जाणाऱ्या वाहनांची संख्या होय. आजमितीस मुंबईतील विविध वाहनांची संख्या 38,87,722 एवढी आहे. शहरातील वाहनांच्या संख्येत मागील वर्षाच्या तुलनेत 6.79% एवढी वाढ झाली आहे. रस्त्यावरील अनधिकृत पार्किंग व होणाऱ्या वाहतूक कोंडीमुळे शहरातील प्रदूषणात मोठ्या प्रमाणात वाढ होत असल्याने हवेतील प्रदूषण कमी करण्याच्या दृष्टीने शासनाने सद्या मुंबईत दि.01.04.2020 पासून भारत-IV (BS-IV) प्रमाणक पुर्तता करणाऱ्या उत्पादित वाहनांचीच नोंदणी करण्यात यावी तसेच उर्वरीत भागाकरिता भारत-III (BS-III) प्रमाणक पूर्तता करणारी वाहने नोंदविण्यात यावीत असे निर्देश दिले. सदर बाबतीत योग्य अंमलबजावणी झाल्यास भविष्यात शहरातील वायु प्रदूषण कमी होण्यास निश्चितच मदत होईल.

वायु प्रदूषणाचा प्रश्न दिवसागणिक जटील होत असून, यावरील उपाय योजनेकरिता म्हणजेच वायु प्रदूषणाला आळा घालण्यासाठी प्रदूषित शहरांनी कृती आराखडा सादर करण्यात यावा, असा आदेश राष्ट्रीय हरित लवादाने दिला. त्यानुसार महानगरपालिकेने 'मुंबई वायु प्रदूषण नियंत्रण कृती आराखडा' तयार करुन केंद्रीय प्रदूषण नियंत्रण मंडळाच्या मंजूरीकरिता सादर केला. सदर कृती आराखडा 9 ऑक्टोबर 2019 रोजी मंजूर झालेला आहे. कृती आराखड्यामध्ये वाहतूक कोंडी, हवा प्रदूषण आणि पर्यायाने ध्वनी प्रदूषण या बाबींवर विशेष भर देण्यात आलेला आहे. त्याचबरोबर रस्त्यांचे रुंदीकरण करणे, रस्ते सुव्यवस्थित ठेवणे, वाहतूक शिस्तबद्ध करणे, वाहतूक नियंत्रण प्रणाली विकसित करणे, वाहतूक मार्गालगत हरितपट्टे निर्माण करणे इत्यादी बाबींचा देखील अंतर्भाव करण्यात आलेला आहे. त्या अनुषंगाने महानगरपालिकेच्या पर्यावरण विभागामार्फत विविध खात्याशी समन्वय साधून शहरातील वाढते प्रदूषण कमी करण्यासाठी सर्वतोपरी प्रयत्न केले जात आहेत. यामध्ये महानगरपालिकेच्या विभागाबरोबरच महाराष्ट्र/ केंद्र शासनाशी संबंधीत आर.टी.ओ., वाहतूक पोलीस, मुंबई महानगर क्षेत्र विकास प्राधिकरण, मुंबई पोर्ट ट्रस्ट, रेल्वे, मेट्रो रेल्वे, महाराष्ट्र राज्य विद्युत मंडळ, रिलायन्स, महाराष्ट्र राज्य रस्ते विकास महामंडळ, म्हाडा, परिवहन मंत्रालय, पेट्रोलिअम मंत्रालय, खनन मंत्रालय इत्यादी विभागांना सूचना निर्गमित करण्यात आल्या आहेत. उद्दिष्टीत लक्ष्य पूर्ण होण्याच्या अनुषंगाने या सर्व विभागांनी एकत्रित प्रयत्न करणे अभिप्रेत आहे. यावरुन शहरी पर्यावरणाचे व्यवस्थापन करणे ही बाब किती गुंतागुतीची आहे याची सुस्पष्ट कल्पना येते. आराखड्यातील मार्गदर्शक सूचनानुसार सहभागी विभागाद्वारे योग्य अंमलबजावणी झाल्यास शहरातील वायु प्रदूषण निर्धारीत मानकापेक्षा निश्चितच कमी होईल असा मला विश्वास आहे.

पर्यावरणीय प्रदूषण हा दिवसेंदिवस जागतिक चर्चेचा व चिंतेचा विषय ठरत आहे. पर्यावरणाचे संरक्षण व संवर्धन हा विषय केवळ राष्ट्रीय व आंतरराष्ट्रीय पातळीवर महत्त्वाचा नसून तो स्थानिक पातळीवर देखील तेवढाच महत्त्वाचा विषय आहे. ही बाब लक्षात घेता बृहन्मुंबई महानगरपालिका विविध वायु घटकांच्या निश्चित प्रमाणाचे मापन करण्यासाठी सदैव प्रयत्नशील आहे. त्याचाच एक भाग म्हणून 'राष्ट्रीय स्वच्छ वायु कार्यक्रमांतर्गत' पर्यावरण विभागामार्फत सन 2020-2021 मध्ये बृहन्मुंबई महानगरपालिका क्षेत्रात 5 ठिकाणी स्वयंचलित वातावरणीय वायु सर्वेक्षण केंद्रे (CAAQMS) स्थापन करण्याचे प्रस्तावित आहे.

मुंबई शहरातील पर्यावरणाचे रक्षण व संवर्धन करण्यासाठी अनेक उपक्रम बृहन्मुंबई महानगरपालिका राबवित असते. या अंतर्गत एक महत्त्वाचा उपक्रम म्हणजे महानगरपालिकेद्वारे हाती घेण्यात येणारा वृक्ष रोपनाचा कार्यक्रम होय. या उपक्रमांतर्गत आर्थिक वर्ष 2019-2020 मध्ये रस्त्यालगत व महानगरपालिकेच्या अखत्यारीतील मोकळ्या जागावर 30,451 वृक्ष लागवड करण्यात आली आहेत. तसेच सन2020-2021 या वर्षात बृहन्मुंबई महानगरपालिका क्षेत्रात सुमारे 20,000 वृक्ष लागवडीचे उद्दिष्ट ठरविण्यात आले आहे.

मलनि:सारण प्रकल्प, मलजल वाहिन्या याबाबत हाती घेण्यात आलेल्या व पूर्ण झालेल्या कामांची माहिती या अहवालात नमूद आहे. यासंदर्भात मला एवढेच निदर्शनास आणून द्यावयाचे आहे की, भूमिगत पर्जन्य जलवाहिन्या तसेच खोल चेंबर्समध्ये मनुष्य प्रवेश करुन सफाई करता येणे अशक्य आहे. अशावेळी नाले सफाईकरिता अद्यावत यंत्रे वापरुन नाले सफाई केली जाते. रस्त्यालगतच्या पर्जन्य जलवाहिन्या रॉडींग व ड्रेजरर्सच्या सहाय्याने साफ केल्या जातात. तसेच उपनगरातील मोठ्या नाल्यांची सफाई जेसीबी, पोकलेन इत्यादी यंत्राद्वारे करण्यात येते.

बृहन्मुंबई महानगरपालिका शाळांमधून विविध उपक्रम हाती घेण्यात आलेले आहेत. यामध्ये बृहन्मुंबई महानगरपालिका शाळेतील 1214 वर्ग खोल्यामधून डिजिटल क्लासरुमच्या माध्यमातून विद्यार्थ्यांना दर्जेदार शिक्षण उपलब्ध करुन देण्यात येत आहे. तसेच महानगरपालिकेच्या शारीरिक शिक्षण विभागामार्फत कराटे, ज्युडो, तायक्वांदो इत्यादीचे इयत्ता 5 वी ते 10 वीच्या मुलींना स्वत:चा बचाव व मनोधैर्य वाढविण्यासाठी स्वसंरक्षणाचे प्रशिक्षण देण्यात येते, याचा मला अभिमान आहे.

बृहन्मुंबईतील आपत्कालीन परिस्थिती प्रभावीपणे हाताळण्याकरिता आपत्कालीन व्यवस्थापन कक्ष आधुनिक सेवा सुविधांनी सुसज्ज करण्यात आला आहे. आपत्कालीन व्यवस्थापन विभागामार्फत कोणत्याही आपत्ती दरम्यान जलद व प्रभावी प्रतिसाद देणे, प्रतिसाद देण्याऱ्या सर्व यंत्रणामध्ये समन्वये राखणे, आपत्तीशी संबंधीत माहिती नागरिकांना तात्काळ पुरविणे, सर्व स्तरांवर तयारी करिता प्रोत्साहन देणे, आपत्कालीन परिस्थितीत सर्व बाधितांना सहाय्य करणे, तसेच अपेक्षित व अनपेक्षित आणीबाणी संदर्भात नागरिकांना सतर्क करणे इत्यादी सेवा मुंबईकरांना तात्काळ उपलब्ध असल्याने आपत्कालीन परिस्थितीचा सामना करण्यासाठी महानगरपालिका समर्थ आहे असेच म्हणावे लागेल.

कोविड-19 या जागतिक विषाणूजन्य आजारावर भाष्य केले नाही तर पर्यावरण स्थितीदर्शक अहवालाचा संक्षिप्त आढावा घेण्याचा उद्देश पूर्ण होणार नाही असे येथे नमूद करावेसे वाटते. कोविड-19 या आजाराचा मुकाबला करण्यासाठी महानगरपालिका सर्वोतोपरी प्रयत्नांची पराकाष्टा करीत आहेत. याचाच एक भाग म्हणून महानगरपालिका कस्तुरबा रुग्णालयामार्फत सन 2019-2020 मध्ये कोविड-19 या कोरोना बाधित रुग्णांना बाह्यरुग्ण विभागातून तात्काळ आंतररुग्ण कक्षात दाखल करुन उपचार केले जात आहेत. अतिदक्षता विभागामध्ये 20 खाटांचे अद्यावत उपकरणे व्हेंटीलेटरसह रुग्णांच्या सेवेत सुसज्ज आहेत. रुग्णांसाठी स्क्रिनिंग ओपीडी, 125 खाटांचे विलिगीकरण कक्ष तसेच अति दक्षता विभाग सुरु करण्यात आले आहेत. त्याचबरोबर पी.सी.आर. प्रयोगशाळेमध्ये नवीन रुग्णाच्या तपासणीसाठी अद्यावत यंत्रसामुग्रीची सुसज्जता ठेवण्यात आलेली आहे. यासोबतच महानगरपालिकेच्या इतर रुग्णालयासोबत योग्य तो समन्वय साधून कोविड-19 संशयीत रुग्णांनासाठी तात्काळ निदान, उपचार व इतर सुविधेच्या दृष्टिने योग्य मार्गदर्शन उपलब्ध करुन देण्यात येत आहे. सार्वजनिक आरोग्याच्या दृष्टिने नागरिकांच्या आरोग्याची काळजी घेण्याचे काम मुख्यत: बृहन्मुंबई महानगरपालिका समर्थपणे पार पाडत आहे.

मला अशी खात्री आहे की, येणाऱ्या काही वर्षामध्ये महानगरपालिकेच्या विविध खात्याने हाती घेतलेले प्रकल्प व विविध योजना पूर्ण झाल्यावर, मुंबईकरांना स्वच्छ व आरोग्यदायी पर्यावरण निश्चितच उपलब्ध होईल. शेवटी नागरिकांचा पाठिंबा आणि सहकार्य यावर नागरिकांचेच कल्याण अवलंबून आहे, हे चैतन्यदायी शहर स्वच्छ आणि हरित राखण्यास सुजाण मुंबईकरांचा सहभाग सदैव राहील अशी मला आशा आहे.

धन्यवाद!

इ. सिं. चहल
महापालिका आयुक्त
बृहन्मुंबई महानगरपालिका

आभार / अभिस्विकृती

मुंबई विद्युत पुरवठा व परिवहन, महाराष्ट्र राज्य परिवहन खाते, राष्ट्रीय केमिकल्स एण्ड फर्टिलाइजर्स लिमिटेड, भारत पेट्रोलिअम कार्पेरेशन लि., टाटा पॉवर, मुंबई पोर्ट ट्रस्ट, महाराष्ट्र राज्य विद्युत वितरण कंपनी आणि महानगरपालिकेची विविध खाती या सर्वांकडून माहिती उपलब्ध झाली. त्याबद्दल उत्तम प्रतिसाद व मार्गदर्शन यासाठी आम्ही कृतज्ञता व्यक्त करीत आहोत.

सुरेश काकाणी
अतिरिक्त आयुक्त (प.उ.)
बृहन्मुंबई महानगरपालिका

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

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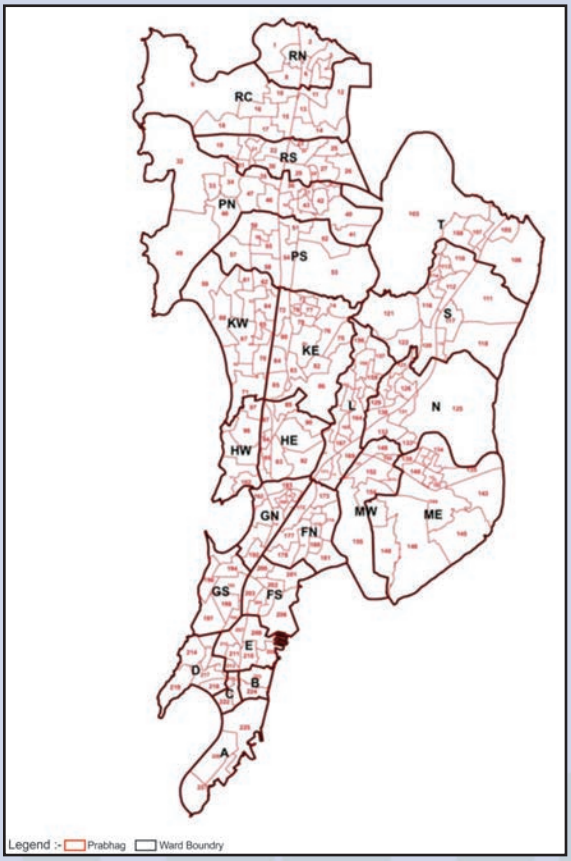
1I NTRODUCTION

The 75th 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 (a b) in the year 1994. The Environment Status Report (ESR) of the city of Mumbai for the period from April 2019 to March 2020 is prepared by Air Quality Monitoring and Research Laboratory of Environment section in 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 2020 to the corporation. This report is based on the factual and statical data generated using parameters affecting the environment by different departments of MCGM and various departments of state/central government and industries.

2D ESCRIPTION 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. The Municipal Corporation of Greater Mumbai (MCGM), however, was 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).Three such SPA exist in Greater Mumbai- MMRDA, SRA, MIDC. The EDDP therefore prepared a development plan for 434.55 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 Div sion Boundry



3C LIMATE 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 2019, Mumbai received a total rainfall measuring 2854.4 mm at Colaba & 3867.6 mm at Santacruz. The maximum rainfall of of 1175.1 mm was recorded during July 2019 at Colaba and it was 41.2% of total rainfall received. The maximum rainfall of of 1464.8 mm was recorded during July 2019 at Santacruz and it was 37.9% of total rainfall received. So it is observed that there was more rainfall as compared to previous year. (In the year 2018 total rainfall received 2243.4 mm at Santacruz and 1799.9 at Colaba). In the month of May 2019 the maximum temperature of 33.7^{0}C, and in the month of January 2020 minimum temperature of 19^{0}C was recorded at Colaba. In the month of May and November 2019 the maximum temperature of 33.8^{0}C and in the month of January 2020 minimum temperature of 17.8^{0}C was recorded at Santacruz.

At Colaba the maximum Wind Speed of 6.8 Km/hr and minimum 2.1 Km/hr was recorded. At Santacruz the maximum Wind Speed of 8.1 Km/hr and minimum 3.0 Km/hr was recorded. The Relative Humidity was recorded maximum 91% and minimum 65% at Colaba. The Relative Humidity was recorded maximum 88% and minimum 43% was recorded at Santacruz.

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

Table No. 3M eteorological Data ( )

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	Time	Time	Time		
April 2019	33.1	25.5	33.7	24.0	0.0	0.0	86	73	73	60	3.3	4.6
May 2019	33.7	26.6	33.8	26.0	0.0	0.0	87	80	68	63	3.3	5.2
June 2019	32.9	26.6	33.7	26.8	341.1	515.1	90	85	77	72	4.6	7.3
July 2019	29.9	24.8	30.8	25.1	1175.1	1464.8	91	88	85	83	6.3	7.1
August 2019	30.4	25.2	30.5	25.3	358.8	586.4	89	82	85	77	6.8	8.1
September 2019	29.3	23.8	30.3	24.5	855.8	1115.7	91	87	88	83	5.1	7.0
October 2019	32.0	24.5	32.9	24.2	103.2	75.0	86	75	81	69	2.6	3.7
November 2019	33.5	24.0	33.8	23.0	19.0	109.3	85	73	79	63	2.3	3.8
December 2019	32.4	22.4	32.7	21.4	1.2	1.3	83	71	76	59	2.1	3.0
January 2020	29.9	19.0	30.7	17.8	0.0	0.0	80	68	80	53	2.7	3.1
February 2020	21.7	20.6	33.4	19.1	0.0	0.0	77	65	70	43	3.0	3.5
March 2020	31.4	22.2	32.5	21.0	0.2	0.0	79	68	72	52	3.2	3.9

Source: Regional Meteorological Centre, Colaba

4M UMBAI 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.

As per data received from Health Department of MCGM the estimated population of Mumbai is 12.87 million. The population density of 26,645 person per sq.km (excluding no development area). Mumbai is the most densely populated city in India.

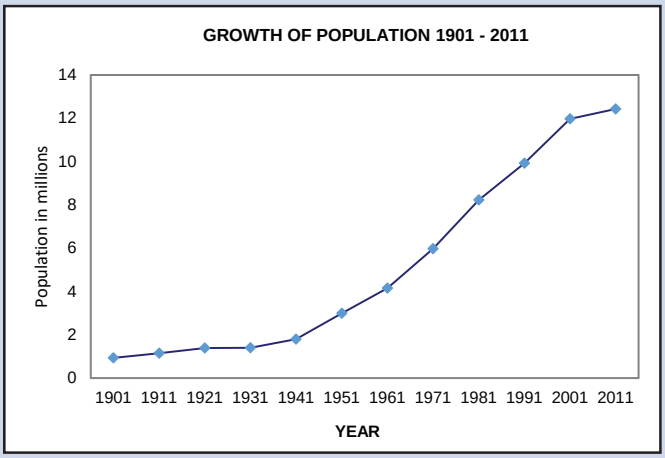
Administrative Ward-wise population indicates that 'P/North' ward has maximum population of 9,74,114 persons where as 'B' ward has minimum population of 1,31,718 persons (Table No. 4.1)

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

Graph 4.1



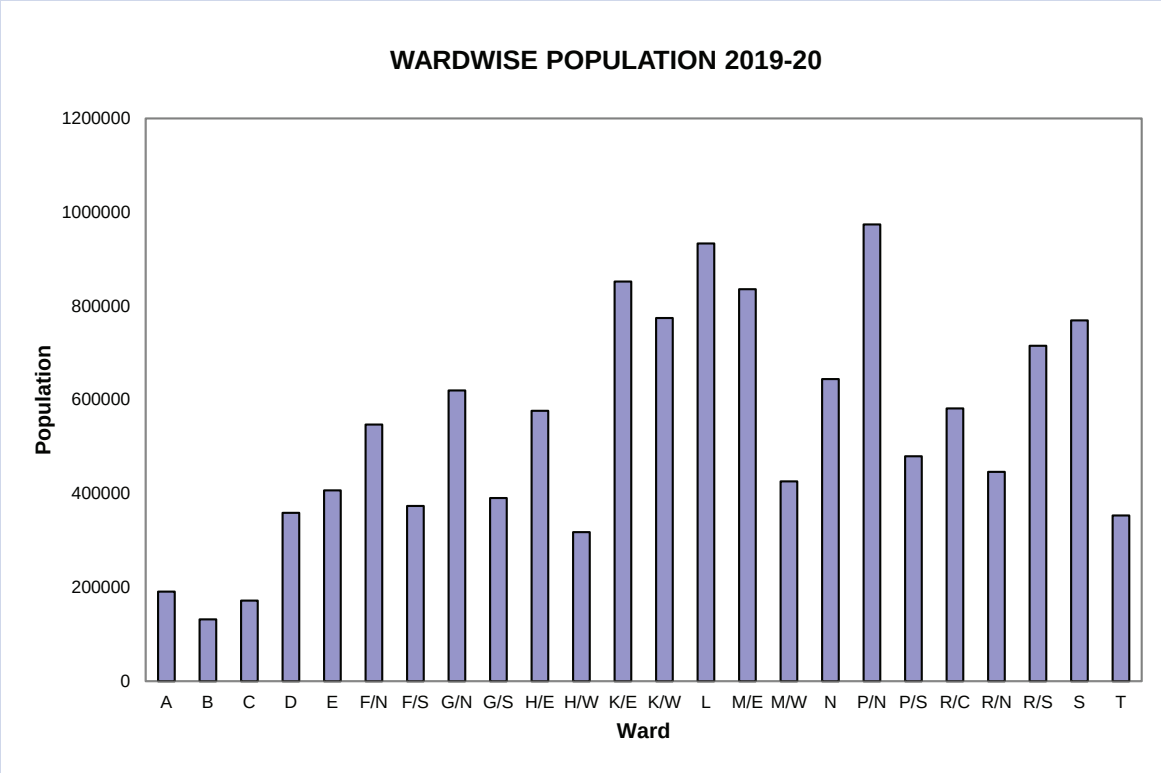
As per the mid-year election list of population in the year 2019, the wardwise area and population given by development planning and health shown in Table No. 4.2

Table No. 4.2 Wardwise Area & Population (2019)

Ward	Area in Sq.km.	Population	Ward	Area in Sq.km.	Population
A	11.20	191450	L	15.62	933611
B	2.65	131718	M/E	38.19	835819
C	1.91	171941	M/W	17.62	426222
D	8.30	358933	N	29.68	644521
E	7.27	406967	P/N	46.70	974114
F/N	12.85	547438	P/S	25.19	479631
F/S	9.87	373529	R/C	47.95	581718
G/N	8.31	619878	R/N	14.17	446374
G/S	9.74	390890	R/S	18.31	715275
H/E	12.40	576624	S	32.55	769657
H/W	18.65	318281	T	44.91	353343
K/E	24.00	852546	TOTAL	482	12838
K/W	25.18	774733			

Source: Development- Planning and Health Depts of MCGM

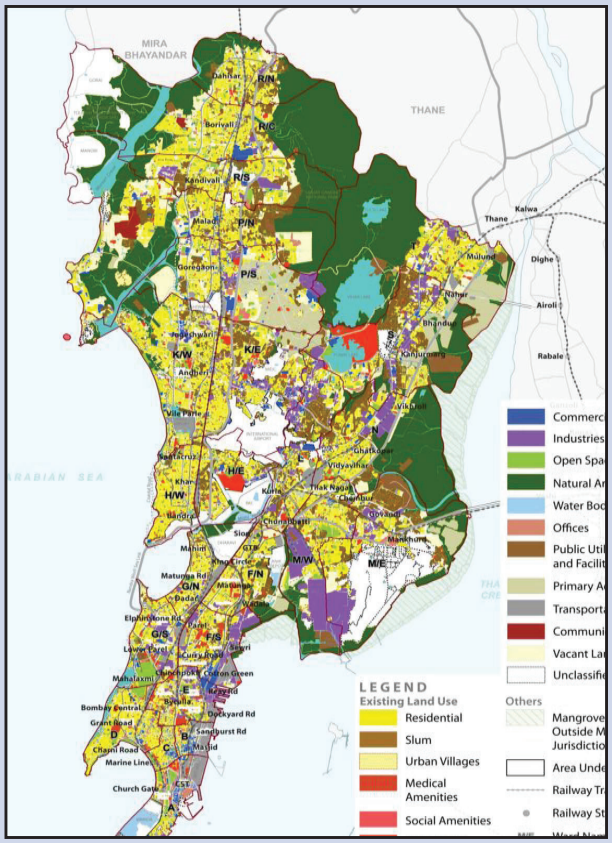
Graph 4.2


WARDWISE POPULATION 2019-20
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

5L AND USE

The Municipal Corporation of Greater Mumbai was the first Municipal Corporation to adopt the concept of a development plan. The first development plan was formulated in 1964 and was sanctioned in 1967. This development plan was revised as per the provisions of Maharashtra Regional and Town Planning Act, 1966. The Sanctioned Revised Development Plan 1991 came into force in 1991-94. This plan was valid up to 2014. MCGM revised the Sanctioned Revised Development Plan 1991 during the period 2014-2018. The 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.

Map 5.1 Development Plan



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 2034 is in effect from dt.13.11.2018. The State Government has sanctioned some of the EPs vide notification dt.22.01.2019, dt.25.01.2019 dt.31.01.2019 and on 17.9.2019. The balance Excluded Parts will be sanctioned by State Government in the due course.

Planning Area

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

The Coastal Road approved by GoM will add an additional area of 1.80 sq.km through reclamation of the sea. The alignment of this Road is marked on the Proposed Land Use (PLU). 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 reclamation.

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 various Special Planning Authority (SPA).

Following SPAs exist in Grater Mumbai :

1. Mumbai Metropolitan Region Development Authority (MMRDA).
2. Slum Rehabilitation Authority (SRA) – for approval of Slum Rehab projects.
3. Maharashtra Industrial Development Corporation (MIDC).
4. Mumbai Port Trust (MbPT)
5. Maharashtra Housing Area Development Authority (MHADA) – for approval of MHADA projects

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. This notification is superseded by the CRZ notification vide no. GSR 37(E) dt. 18.01.2019.

The objectives of the new CRZ Notification includes (1) ensure livelihood security to the fisher communities, (2) protect the Coastal environment, (3) promote sustainable development.

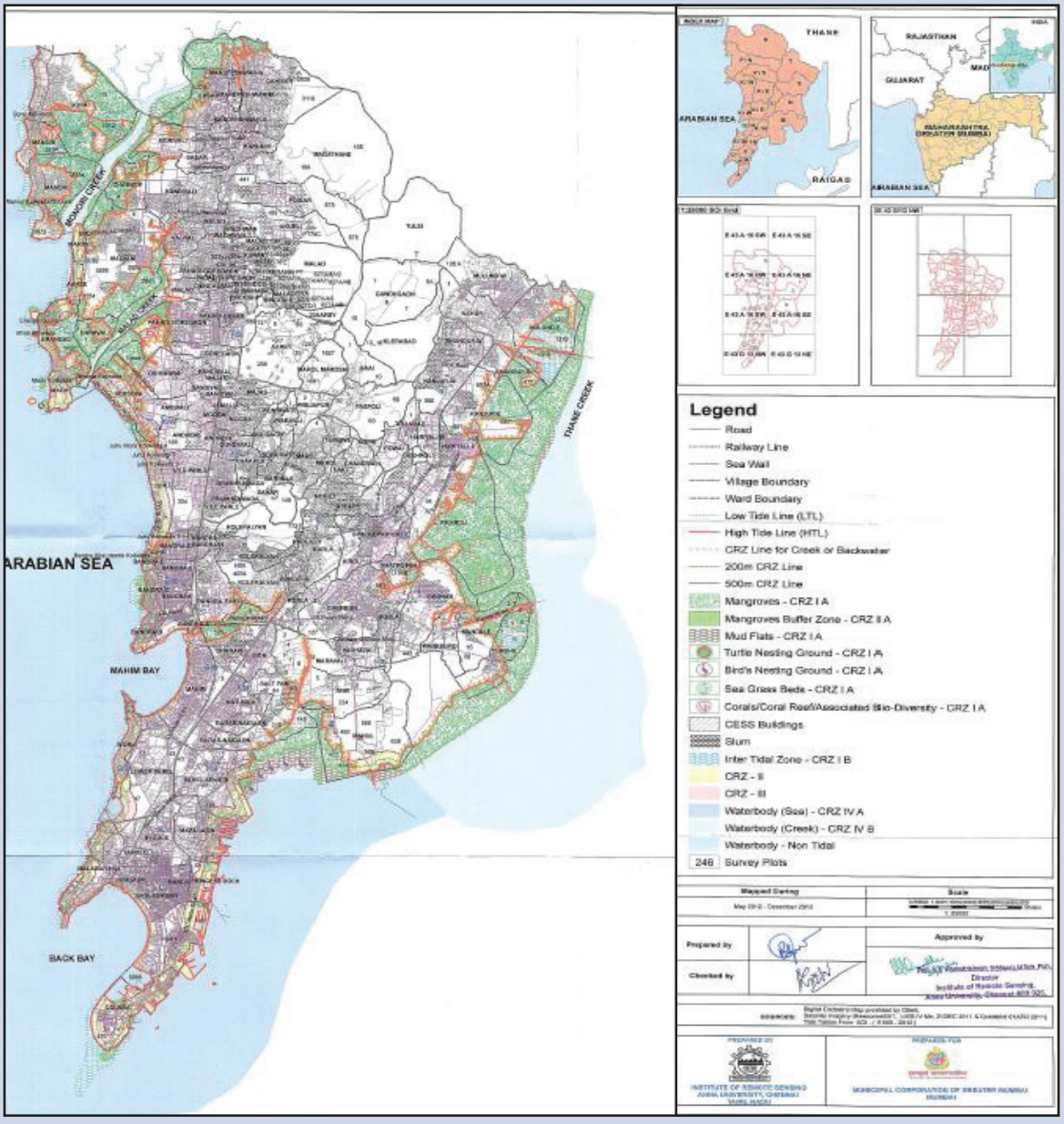
The new notification had made it obligatory on state Authority to demarcate HTL and Hazardous line and also to prepare new CZMP to the scale of 1:25000 through National Centre for Sustainable Coastal Management (NCSCM).

The work of preparing new Coastal Zone Management Plan as per C.R.Z. Notification dated 18th January 2019 was entrusted by GoM to the NCSCM, Chennai. NCSCM has prepared Draft CZMP with all relevant information using Satellite Imagery and Geographical Information System and as per provision of Coastal Zone Regulation guideline 2019. This draft CZMP has been published by MCZMA on the website of MCZA on 16/1/2020 for inviting suggestions/ objections from the stake holders.

As per the Coastal Regulation Zone notification vide Gazette notification dtd.18.01.2019, 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 or updated.

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 be followed for appraisal and CRZ clearance of projects in CRZ areas.

Map 5.2: DRAFT CZMP GR. MUMBAI



6M ANGROVES IN MUMBAI

Constitution of Mangrove cell:

Mangrove Cell was constituted by the Government of Maharashtra in the wake of serious public concerns about mangrove loss in the State, particularly in Mumbai and surrounding areas. The establishment of the Mangrove Cell in 2012, initiated a series of measures for conservation of mangroves in Maharashtra. The Cell is headed by the Additional Principal Chief Conservator of Forests (APCCF). A Deputy Conservator of Forests (DCF) has been appointed to boost mangrove protection efforts. This Cell is also responsible for the conservation of coastal biodiversity in Maharashtra.

In 2013, the State government ramped up efforts and elevated the status of mangrove forests on government land from 'Protected Forests' to 'Reserved Forests'. The Mangrove Cell also facilitated the establishment of Mumbai Mangrove Conservation Unit in 2014 to specifically check and prevent the destruction of mangroves in Mumbai and surrounding regions.

There was also an urgent need to promote research, education, ecotourism etc. to secure the biodiversity of our coastal and marine environment and to bring tangible benefits to the coastal communities. For this mission, creating an institution with the necessary skill set and the operational flexibility to address this complex task was under the consideration of the state government, that led to the establishment of a "Mangrove and Marine Biodiversity Conservation Foundation of Maharashtra" (Mangrove Foundation, in short). The Foundation was registered in the year 2015 under the Societies Registration Act, 1860

Functions of mangrove cell:

Mangrove Cell functioned extensively for mangrove conservation by taking block by block approach from raising mangroves in nurseries and organizing regular large-scale plantations in degraded mangrove areas to conducting Clean Mangrove Campaigns and awareness programmes.

The Cell also forged strong partnerships with many leading national institutions and agencies, facilitating the introduction of state-of-the-art technologies and best practices in sustainable livelihoods to the Maharashtra shores. National Institute of Oceanography (NIO), Central Marine Fisheries Research Institute (CMFRI), Central Institute of Fisheries Technology (CIFT), Central Institute of Brackish Water Aquaculture (CIBA), Marine Products Export Development Authority (MPEDA), Wildlife Institute of India (WII), Salim Ali Centre for Ornithology (SACON) and Bombay Natural History Society (BNHS) are just a few names in that long and illustrious list of partners. Mangrove Cell also works with several NGOs, Citizen's Groups, educational institutions and private research organizations.

Based on the 'International Climate Initiative' Agreement between Government of India and the Federal Republic of Germany, a bilateral project towards improving conservation of marine biodiversity called "Sustainable Management of Coastal and Marine Protected Areas" (SM-CMPA) was launched in Maharashtra with the help of the German development agency called GIZ. The project led to the notification of the Thane Creek Flamingo Sanctuary in 2015. Spread over an area of about 17 square kilometres with 896 Ha of Mangrove cover, it is home to over 200 species of birds, many of which are migratory like the splendidly-coloured flamingos which arrive in thousands in October-November. A

'Coastal and Marine Biodiversity Centre' was set up at Airoli, Navi Mumbai, in 2017 as a part of the GIZ Project. This interpretation and orientation centre for mangrove and marine biodiversity serves as a gateway to the Thane Creek Flamingo Sanctuary for tourists and environmentalists.

Activities of Mangrove Cell - Maharashtra Forest Department:

1. Mangrove Protection
2. Mangrove Conservation and Livelihood Generation Scheme
3. Mangrove Afforestation
4. Clean-up Campaign
5. Awareness generation

1 Mangrove Protection:

Mangrove Forests on Government land are declared either as 'Reserve Forest' as per the Indian Forest Act, 1927. Mangroves on private land are declared as 'Forest' hence provision of Forest Conservation Act 1980 is invoked for the diversion of these forests. In Maharashtra, a total of 15,088 hectors of land is declared as Reserve forest.

- A specialized unit, called Mumbai Mangrove Conservation Unit (MMCU), has been formed to diminish the increased pressure of development, waste dumping, pollution and encroachment in mangrove areas of the Mumbai Metropolitan Region.
- Patrolling is intensified in all mangrove areas.
- Considering the high vulnerability to encroachment and debris dumping in the mangrove areas of Mumbai and Mumbai Suburban region, the Mangrove Cell has employed the services of the Maharashtra State Security Corporation from December 2017 and a total of 117 Guards have been deployed for the protection of mangroves in Mumbai, Mumbai suburban and Navi Mumbai areas.
- Thousands of illegal shanties, which had cropped up on mangrove lands in various parts of Mumbai, have been given notices for evacuation and many of them have been removed.
- In an effort to closely monitor the status of mangroves in Maharashtra, satellite mapping of mangrove areas is carried out, district by district, on a 1:5000 scale and the areas in the possession of Forest Department were demarcated on the ground with a clear boundary.
- The Mangrove Cell has now engaged the Indian Institute of Space Science and Technology (IIST) which will monitor the health of mangroves in Maharashtra using near real time satellite remote sensing data.
- Implementation of 'Mangrove Conservation and Livelihood Generation Scheme' for providing livelihood associated with mangrove habitats in order to establish sustainable mangrove conservation by local communities and enabling them to receive tangible benefits from protecting this ecosystem is being undertaken. Total 120 villages are taking advantage of the scheme.

- Capacity Building of staff for effective conservation and protection measures

2 Mangrove Conservation and Livelihood Generation Scheme:

- The Scheme was initiated on 20th September 2017 by Government of Maharashtra in the coastal districts of Maharashtra, to conserve mangroves on both private and government lands. The Scheme aims to provide benefits to individuals and community members of selected villages.
- Based on the current mangrove cover, about 120 villages from coastal districts such as Palghar, Thane, Raigad, Ratnagiri and Sindhudurg have been selected for the implementation of the scheme activities by the Mangrove Cell, Maharashtra Forest Dept. and the Mangrove Foundation.
- To ensure participation of the local communities, the Scheme is being implemented through village-based Mangrove Co-Management Committees (MCMC). Through this Scheme a group activity is entitled to 90% of subsidy while an individual (land owners with more than 1 acre of mangroves) will get 75% subsidy.

  Through the scheme, the following activities are being implemented across various villages along the coastline of Maharashtra:

  i. Crab Farming
  ii. Fish Cage Culture (Asian Sea Bass)
  iii. Oyster and Mussel Farming
  iv. Ornamental Fish Culture
  v. Mangrove Ecotourism
  vi. Mangrove Seed Collection

3. Mangrove Afforestation

- Thousands of mangrove saplings have been raised in nurseries for establishing mangrove plantations in different coastal districts of the state.
- Presently 12 mangrove nurseries are being maintained in various coastal districts of the state.
- Since 2012-13 to 2019-20 a total area of 1663 hectares distributed over 118 locations across coastal Maharashtra has been covered under mangrove plantation programme and the a total of 76 lakh mangrove saplings have been planted.

4 Clean-up Campaigns

- Annual Mangrove clean-up programmes are conducted to create awareness
- The Clean Mangrove Campaign, a three-year joint initiative started in 2015, by the citizens of Mumbai city and Mangrove Cell, made it to the Limca Book of Records. This was one of the biggest government-citizen partnership projects. In this campaign 8,000 tonnes of garbage (mostly plastic) was cleared, covering 11.03 sq.km of mangroves across Mumbai.

5 Awareness Generation

- Development of 'Coastal and Marine Biodiversity Centre' (CMBC) at Airoli, Navi Mumbai
- Regular Environmental education and awareness talk for students and the public in general.
- Celebration of important Nature and Wildlife days to create awareness about the pressing subjects.
- Sensitizing young minds about the coastal and marine biodiversity of Maharashtra, through school programmes, at 'Coastal and Marine Biodiversity Centre' (CMBC), Airoli, Navi Mumbai.

6. Coastal and Marine Biodiversity Centre and Mangrove Parks in Mumbai

- The Mangrove Cell, Maharashtra Forest Dept. has developed a Coastal and Marine Biodiversity Centre (CMBC) at Airoli, Navi Mumbai in collaboration with the German agency GIZ under the Indo-German Biodiversity Programme.
- The major attractions at the centre are:
  i. Vibrant and colourful exhibits of the rich coastal and marine biodiversity observed in the Thane Creek Flamingo Sanctuary.
  ii. Sounds of various birds like flamingo, kingfisher etc. and marine animals like Indian Ocean Humpback Dolphin and Blue Whale.
  iii. Interactive computer screens and wide LED displays showcasing interesting information and photographs about the coastal and marine biodiversity.
  iv. A theatre room which shows documentary films on the biodiversity of Thane Creek Flamingo Sanctuary.
  v. A tourist boat for flamingo safari is also operated from this centre for the tourists.
- The Mangrove Cell will be establishing a Giants of the Sea museum at CMBC Airoli. This museum will house life sixe exhibits of giant sea animals such as Giant Squid, Whale Sharks and also skeletons of Blue whales and other dolphins.
- In the near future, the Mangrove Cell also plans to set up mangrove parks at Gorai, Dahisar and Mahul which will have various attractions for tourists such as mangrove trails, bird trials and watch tower, kayaking, mangrove museum, glass bridge over mangroves, etc.

Mangrove Plantations

Mangrove Nurseries

7U RBAN RENEWAL SCHEME

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. 7.1) These facilities are utilized by citizens as well as others from different places.

Table No. 7.1 Recreation Facilities Provided in the year 2019-20

Sr. No.	Particulars	City	Western suburbs	Eastern Suburbs	Total
1	Garden (Except strip Gardens)/ Park	35	147	109	291
2	Recreation Grounds	170	211	94	475
3	Playgrounds	58	192	105	355
4	Fountains	21	12	5	38
5	Band stands	7	0	0	7
6	Nurseries	14	8	6	28
7	Plant Sale Counter	1	4	0	5
8	Statues	14	6	10	30
9	Tree Plantations	14412	9655	6384	30451
10	Distribution of tress	1918	12635	3612	18165
11	Total no. of tress	718589	1221737	1034957	2975283

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

C.D. Deshmukh Udyan, Mulund

8. UDYAN AND ZOO

Veermata Jijabai Bhosale Udyan & Zoo is one of the oldest zoos in the country & was established in 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 "Herit-age Grade II (B)" site. This Udyan-Zoo has been recognized as 'Medium Zoo' up to year 2020 by Central Zoo Authority, New Delhi.

- This Udyan-Zoo is kept open for visitors from 9.30 am to 06.00 pm on all days of the year excluding Wednesday.
- As per Corporation Resolution no.1319 dated 30-11-2002, if there is a public holi-day on Wednesday, then this Udyan-Zoo is kept open for visitors on the said Wednesday and is kept closed for visitors on the next day i.e. Thursday, as weekly off.

Visitor data and rev nue -

Financial Year	No. of Visitors	Rev nue (Rs.)
2018-2019	12,57,065	5,42,46,353/-
2019-2020	10,57,215	4,40,14,695/-

Table No. 8.1 EntryF ee Chart

Visitors description	EntryF ees
Adult	Rs. 50/-
Child (below 12 years)	Rs. 25/-
Family [2 Adults + 2 Children (Below 12 years)]	Rs. 100/-
Foreign visitors	
Adult (Above 12 years)	Rs. 400/-
Child (Below 12 years)	Rs. 200/-
Private school students coming in group for educational trip (Below 12 years)	Rs. 15/- (Per head)
Private school students coming in group for educational trip (Above 12 years)	Rs. 25/- (Per head)
Accompanying adult	Rs. 50/- (Per head)
Still Camera	Rs. 100/-
Video Camera	Rs. 300/-

Garden Department:

For tree conserv t ion,G arden department has done following work:

- In year 2019-2020, about 30451 no. of trees are planted on municipal roads and open spaces.
- Removal of concrete and cement around 26934 tress.
- Spraying of insecticides and pesticides on infected tress.
- Trimming of branches of 112191 trees to balance them.
- Formation of Tree basins around the tress.

- Removal of 644 number of dead and dangerous tress.
- During 2019-2020 the Municipal Corporation of Greater Mumbai And the Tree Authority has organised the 25th exhibition of plants, flowers, fruits and vegetables from 31st January 2020 to 5th February 2020 at Veermata Jijabai Bhosale Udyan. The workshop on various horticultural subjects was also arranged to create consciousness and awareness about environment among the citizens.
- In the year 2020-2021 around 20000 trees are proposed to planted on roadside and on other places in MCGM jurisdiction.
- As per the Tree Census the total number of trees in 24 wards is 29,75,283.

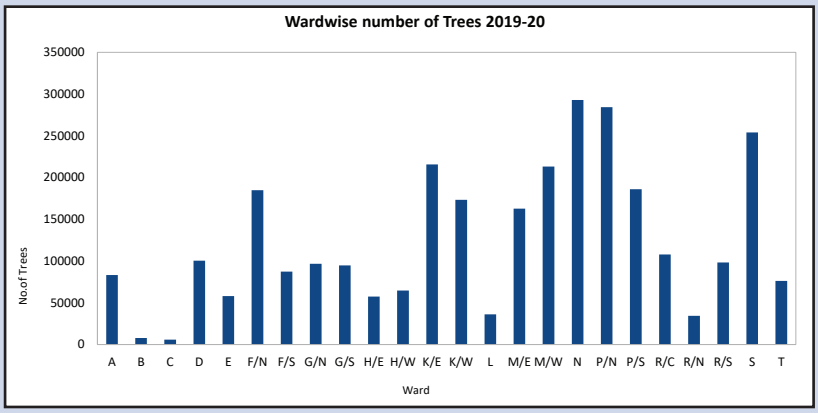
Maximum number of trees are found in 'N' Ward (292965) and minimum number of trees are found in 'C' Ward (5756). (Table No. 8.2)

Table No. 8.2 Wardwise Number of Trees

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	

Source: Garden Department of MCGM

Graph 8.1



Veermata Jijabai Bhosale Udyan & Zoo at present:

- As on 31st March 2020, there are in all 297 animals, which include 91 mammals of 13 Species, 172 Birds of 21 species and 34 Reptiles of 7 species & aquatic animals of 7 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 & teachers.

Modernization Project of Veermata Jijabai Bhosale Udyan & Zoo :

1. MCGM administration has taken up a Project of modernization of this Udyan & Zoo. A Master (layout) Plan of this Udyan & Zoo has been modified and the Central Zoo Authority has accorded final approval to the revised Master (layout) plan on 13-02-2019.

2. During the second phase of modernization project total 19 animal enclosures are being constructed amongst which enclosures for Leopard, Hyaena, Sloth bear, Jackal, Bird Aviary-1, Swamp deer, Spotted deer and Asiatic Tiger are already completed. The new animal enclosures have viewing galleries. The acrylic panels are installed in the front portion of the animal exhibits. In the interior of the enclosures, suitable landscaping is done as per the requirements of the respective animals/birds. It includes waterfalls, water bodies, shades, etc. Various suitable plants have also been planted inside the enclosures.

3. Tree plantations suitable to the respective animals and coinciding with the environment have been carried out inside animal enclosures. Some of the plantations are Pride of India (Tamhan), Neem, Golden shower (Bahava), Cotton tree, Kadamb, Gooseberry, Chikku, Guava, Black plum, etc. The naturalistic environment has been created inside animal enclosures without doing any harm to the animal health.

4. A small dense forest has been created besides Tiger enclosure, by planting various trees based on "Miyawaki" theme wherein native species are planted, close to each other, which ensures that the plants receive sunlight only from the top and grow upwards than sideways.The tree species under this method provide home and food to diverse species of insects, birds and small wildlife. It promotes the restoration and recovery of native forest and 10 times faster growth than conventional plantation. Around 2400 trees of various 66 species have been planted on the area of 450 Sq. Mtr. inside this Udyan & Zoo under Miyawaki plantation method.

5. The animals like Leopard, Hyaena, Sloth bear, Jackal, Swamp deer and Asiatic Tiger have been brought in on exchange basis from zoos like Kanpur, Mangalore and Aurangabad and displayed in the newly constructed animal exhibits.

6. A tendering procedure is being carried out for the expansion of zoo on the adjoining Mafatlal Mill compound (7 acre plot) in the third phase of project.

9 WATER SUPPLY

Mumbai receives raw water from seven impounded water resources viz. Vihar and Tulsi within Mumbai and Tansa, Modak Sagar, Upper Vaitarna, Middle Vaitarna and Bhatasa 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 pipelines and tunnels to the state of the art water treatment facilities at Bhandup Complex (2810 MLD) and Panjrapur (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 water supply network of about 450 Kms this conveyance system remains charged for 24 hours and eliminates the chances of water contamination because of intrusion of ground water/sewage etc

Population Projection,D emand and Augmentation of Water Supply

Mumbai City and Suburban areas are being supplied with 3850 MLD of water. 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 6535 MLD (including enroute supply and transmission losses). The process of developing Government allotted Gargai (440 MLD), Pinjal (865 MLD) and Damanganga-Pinjal River Link Project (1586 MLD) water supply sources to meet the future water demand. 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.	Vehar	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.	Pinjal	2024-2025	865	5478	195	
10.	Damanganga	2029-2030	1586	7064		

Source: Hydrolic Engineers Dept. *655 MLD water supply of Bhatsa dam will be stopped in future and that water can be utilised for Agriculture purpose.

Rehabilitation and Replacement of Water Supply Network

Secondary Network:

1. The work of Laying of 3000 mm dia. missing link of middle Vaitarna lane between chinchvali to Yewai is in progress.
2. The work of construction of Inlet from 4000 mm dia. Bhandup tunnel shaft to 1910 MLD Water Treatment Plant in Bhandup Complex is in progress.
3. The work of replacement of old 1450 mm dia twin Tansa Mains by laying single 2000 mm dia. pipeline from Maroshi to Sahar Village is proposed.
4. The work of replacement of 1800 mm dia twin Tansa Mains from Balkum to Saddle Tunnel by single 3000 mm dia pipeline and replacement of 1850 mm dia pipeline from Bhandup Anchor Block to Maroshi by single 2400 mm dia. Pipeline is in progress.

Water Distribution Improvement Works:

a) Replacement

In the year 2019-20 in City, Eastern Suburb & Western Suburb 42.94 kms of pipe lines have been replaced / laid new and it is proposed to undertake similar works for 68 Kms in 2020-21.

b) Renewal of Service connections in road improvement

To avoid frequent digging of roads and contamination problems 15789 No. of age old service connections have been renewed in 2019-20 and it is proposed to take up works for about 43800 connections in 2020-21.

c) Removal of Bunch of Connections

For the effective management and improvement of water supply in slum localities 131 bunch of connections have been removed in the year 2019-2020 and it is proposed to take up such works at 129 new locations in the year 2020-21.

d) Repairs and Reconstruction of Valve Chambers

The work of Repairs and Reconstruction of 782 valve chambers is completed in the year 2019-2020 and another Repairs and Reconstruction of 1053 valve chambers is to be undertaken in the year 2020-21.

Other notified works

Bhandup Complex–

1. Considering benefits reaped after commissioning of Solar Power Plants of capacity of 2.5 MW capacity at Bhandup Complex and 250 Kw capacity at Panjarapur treatment plant, it is proposed to take up another Solar Power Plant of 2.5 MW capacity at Bhandup Complex.

2. MCGM has achieved First Rank in the country in supplying best quality drinking water to its citizens as per the survey conducted by Bureau of Indian Standards (BIS).

Awareness on Economic Use of Water

Various awareness programmes to increase public awareness on appropriate use of water and its impact on the environment have been taken. In 2019-2020, several advertisements has been published in various local news papers, BEST buses, etc. Students in municipal schools were appraised about appropriate use of water using Virtual Classrooms of the Corporation. In the current year, we intend to extend our reach through various modern media for spreading awareness including social networking, electronic media, in additional though the traditional modes.

Water Supply Quality Control:

Regarding activities at Bhandup Complex Water Treatment Plant:

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 50 Kms 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 through network of pipelines, tunnels, service reservoirs etc.

During all these activities, water samples at each stages of treatment are collected and tested for various parameters at Bhandup Complex laboratory.

Regarding working activities at Bhandup Complex Laboratory

Laboratory at Bhandup Complex was commissioned in the year 1980 for daily monitoring the quality of water having supplied to Mumbai.

Analysis of water for Physical, chemical and bacteriological parameters in order to supply safe potable water as per IS 10500 : 2012to the Mumbai city.

Samples of raw water, clarifier water, filtered water and final water are tested for following parameters hourly.

1. Turbidity
2. pH
3. Residual Chlorine
4. Temperature
5. Colour

Jar test is conducted on Raw water sample in every shift for prescribing optimum Poly Aluminium Chloride dose. Complete analysis of water samples – Raw, Filter & Final is carried out for Total Alkalinity, Total Hardness, Calcium Hardness, Chlorides, Suspended solids, Total solids, Manganese, Iron, Aluminium, 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 April 2019 to March 2020

Parameters	Tulsi		Vihar		Bhandup Complex (Tansa, Vaitarna & Upper Vaitarna)		Panjrapur (Bhatsa)		BIS standards
	Raw	Final	Raw	Final	Raw	Final	Raw	Final	Permissible Range
Turbidity NTU	2.2-30.0	0.40-4.7	2.5-17	0.24-1.6	1.2-138	0.17-3.3	3.2-610	0.20 2.5	1-5
pH	6.80-8.05	6.75-7.35	7.10-8.95	7.05-8.35	7.10-7.80	6.80-7.55	6.7-7.5	6.5-7.3	6.5-8.5
Chlorides (mg/l)	11-20	14.24	12-20	13-21	9-15	10-18	7-19	9-24	250-1000
Total Alkalanity (mg/l)	29-53	26-52	30-52	27-49	24-47	25-45	36-90	27-88	200-600
Total Hardness (mg/l)	33-55	30-53	38-57	24-55	34-52	32-49	27-80	20-78	200-600
Bacteriological examination (CFU/100ml)									
Total Coliform	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0
E-Coli	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0

Source: Hydraulic Engineer Dept of MCGM

Note : Raw water of Tulsi, Vihar and Bhandup complex plant is pre-chlorinated. Raw water Bhandup Complex contains water from sources Tansa, Modaksagar (Vaitarna), Middle Vaitarna and Upper dVaitarna. Results of all parameters for final water of Bhandup Complex, Tulsi Filtration Plant and Vihar Filtration Plant are within Permissible Limit as per IS 10500 : 2012.

Unit : NTU= Nephelometric Turbidity Unit mg/l = miligram per litre
CFU/100ml=Colony forming unit per 100 ml

Municipal Analyst Laboratory:

Municipal Analyst laboratory is a Public Health Laboratory of MCGM and a State Food Testing Laboratory recognized by the Food Safety And Standard Authority Of India (FSSAI) located in G/North, Dadar.

Activities of Municipal Analyst Laboratory:

- The laboratory provide testing service to MCGM and general public for Chemical and Microbiological analysis of food and water samples using advance techniques as per National and International Standards.
- The Municipal laboratory support the Public Health Department, Epidemiology cell by testing drinking water sample, Hawkers and Ice water samples for Water quality surveillance.

Testing of Drinking Water surveillance samples:

The treated drinking water is supplied all over Mumbai region through the 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 the World health organization (WHO) guidelines verifying that safe drinking water is supplied till the consumer end, monitoring the drinking water supply throughout the distribution network is essential.

For Water quality surveillance daily around 200 water samples and in monsoon or emergency up-to 300 drinking water samples are jointly collected by the Public Health Department (PHD) and Hydraulic Engineering (HE) Department. The water samples are collected from the service reservoirs and sampling

points throughout the distribution network across 24 wards of Mumbai by the Medical Officer Of Health (MOH) for PHD, Assistant Engineer Water Works- Quality Control and Leak Detection Department for HE Departments. These water samples are sent to the Municipal laboratory for Routine Bacteriological analysis.

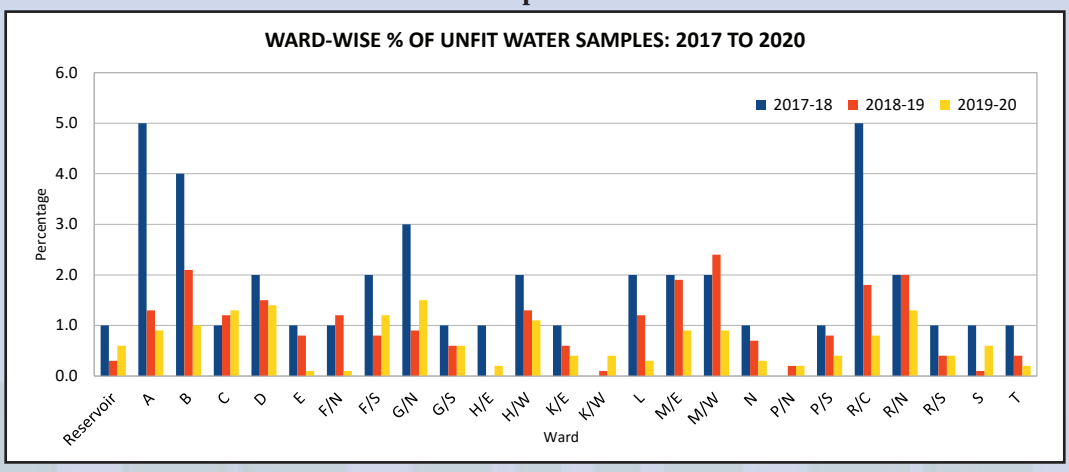
In Municipal laboratory to test the Bacteriological Quality of all the drinking water samples taken from the distribution system including consumers' premises are tested in accordance of Indian Standard IS-15185:2016 to test bacteriological requirements prescribed in Indian Standard Drinking Water - Specification IS: 10500:2012. 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. 9.8 Wardwise % of Unfit water Samples during April 2016 to March 2019

Sr. No.	Ward	% of Unfit Samples			Sr. No.	Ward	% of Unfit Samples		
1	Reservoir	1	0.3	0.6	14	K/W	Less than 1	0.1	0.4
2	A	5	1.3	0.9	15	L	2	1.2	0.9
3	B	4	2.1	1.0	16	M/E	2	1.9	0.9
4	C	1	1.2	1.3	17	M/W	2	2.4	0.9
5	D	2	1.5	1.4	18	N	1	0.7	0.3
6	E	1	0.8	0.1	19	P/N	Less than 1	0.2	0.2
7	F/N	1	1.2	0.1	20	P/S	1	0.8	1.3
8	F/S	2	0.8	1.2	21	R/C	5	1.8	0.8
9	G/N	3	0.9	1.5	22	R/N	2	2.0	1.3
10	G/S	1	0.6	0.6	23	R/S	1	0.4	0.4
11	H/E	1	0.0	0.2	24	S	1	0.1	0.6
12	H/W	2	1.3	1.1	25	T	1	0.4	0.2
13	K/E	1	0.6	0.4	**Mumbai Average**		**1**	**0.7**	**0.7**

Source: G/N water Analysis Laboratory of MCGM

Graph 9.1



Taking in to considaration the value of wardwise unfit sample for last two years that is April 2017 to March 2020. There is no remarkeble changes in the percentage of unfit water sample.

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 from the year 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 & 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 2020-2021 and expected to be completed by 2024- 2025.

Pinjal project consist of construction of dam across Pinjal River, 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 appointed Consultancy Services for obtaining Environmental, Forest/Wildlife clearances from Competent Authorities including socio and environmental impact assessment studies and enumeration of trees for Pinjal Project.

Under 'River Linking Programme' initiated by Government of India; it is proposed to link Damanganga & Pinjal rivers and thereby 1586 MLD water would be made available to M.C.G.M. and this water will be conveyed into Pinjal reservoir after its completion.

Future allotted sources of water are shown in following Table No. 9.4

Table No. 9.4 FUTURE SOURCES OF WATER SUPPLY

Sources	Yield in MLD	Ownership	Expected year of completion
Gargai	440	MCGM	2025
Pinjal	865	MCGM	2028
Damanganga-Pinjal River Link Project	1586	GoI /GoM / GoG	To be decided by GoI/ GoM/ GoG.
TOTAL			

Source: MCGM Hydraulic Engineer Dept.

Ongoing Projects in support for Improvement in Water Conveyance system:

Tunnels:

- Construction of Tunnel Powai to Veravali & Powai to Ghatkopar (2.2 mtrs dia, 6.36 kms length): Powai-Veravali arm commissioned in November 2018, Powai-Ghatkopar tunnel arm boring in progress, expected completion by March 2022.

- Amar Mahal-Trombay reservoirs tunnel (2.5 mtrs dia, 5.5 kms length): Shafting activities at Hedgewar Udyan (Amar Mahal) in progress. Expected completion by October 2024.
- Amar Mahal-Wadala-Parel tunnel (2.5 mtrs dia, 9.7 kms length): Shafting activities at Hedgewar Udyan (Amar Mahal) & Pratiksha Nagar (Wadala) in progress. Expected completion by April 2026.
- 60 MLD Water Reclamation Plant in Panjrapur Complex: Plant commissioning in progress.
- Upgradation of Powai Lakefront: In progress, expected completion by June 2020.

Pipelines Work:

- Missing link of MV main betn. Chinchawali to Yewai (3 mtrs dia., 4.5 km): 2.8km completed. Expected work completion by September 2021.
- Replacement of twin Tansa main betn Balkum-Hazuri bridge (3 mtrs dia, 4.5 km): 2.93km completed. Expected completion by September 2021.
- Replacement of twin Tansa main betn Hazuri Bridge to Saddle Tunnel Bhandup complex (3 mtrs dia, 4.9 km): 2.63km completed. Expected completion by September 2021.

Structural repairs to existing reservoirs:

- Malad Hill Reservoir– I (50ML): 75% completed. Expected completion by June 2020.
- Trombay High Level Reservoir (55 ML): 25% completed. Expected completion by August 2020
- Trombay Low Level Reservoir (27ML): 60% work completed. Expected completion by April 2021.
- Structural Repair Works to Bhandup MBR (246ML): 17% completed. Expected completion by July 2021.
- Structural Repair Works to Yewai MBR (118 ML): Work started recently. Only 1% completed. Expected completion by July 2023.
- Replacement of existing twin Tansa Mains (2x1800mm) from Bhandup to Maroshi by single 2400 mm dia, 6.3km length: Started in Nov 2019. only 4% completed. Expected completion by may 2022.

Water Supply Resources- Surface as well as Underground:

All the above mentioned sources of water are surface water sources.

Gargai project (4 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 & 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 received. The Site specific seismic study for Gargai project finalised by M/s Central Water & Power Research Centre (CWPRS), Pune have been approved by the National Committee on Seismic

Design Parameters (NCSDP). Proposal for Wild Life & Forest Clearance has been submitted to the respective authorities and follow up action is in progress. Environmental clearance has been received from the Environment Department, Govt. of Maharashtra, this being purely a water supply project. The R & R Plan as per RFCTLARR, 2013 Act has been finalized and received approval from all stakeholders. A special land acquisition cell for acquisition of Private Land is made functional for the same. Joint Measurement survey is being carried out for the affected villages.

Gargai dam project expected to be commenced in 2020-21 and will be completed by 2024-25.

Pinjal Dam Project (8M LD):

Pinjal project consist of construction of dam across Pinjal River, 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 appointed Consultants for obtaining Environmental, Forest/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 2022 -23 and will be completed by 2027-28.

Damanganga-Pinjal Riv r link project (8M LD):

The projects comprises construction of dams at Bhugad & Khargihill and 2 nos. of tunnels 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 affairs, preparation of revised R & R plan as per RFCTLARR act 2013 is in progress by NWDA. Further modalities of water sharing & project execution will be decided by the WRD, GoM in co-ordination with GoI, GoM, Government of Gujarat (GoG) & MCGM.

Proposed Tunnels/ Projects:

Proposed Tunnel from Balkum to Mulund .-9.66 Km : The process for appointing consultancy services for carrying out Feasibility studies and PMC services thereafter is in process. Bids have been received from 4 bidders. Commercial packets to be opened shortly.

Transfer of Excess Water from Vehar Lake to inlet bay of WTP at Bhandup Complex: The process for appointing consultancy services for carrying out Feasibility studies is in process. M/s TCE is the lowest evaluated successful bidder.

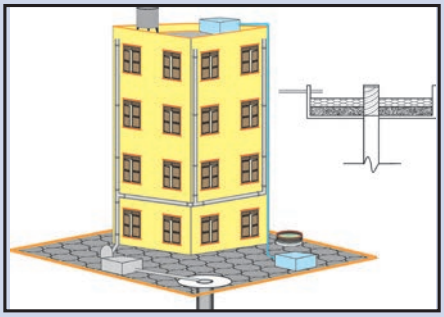
Structural Repair to 1910 MLD old WTP, Bhandup Complex: Draft tender for Consultant for Feasibility study, Detailed Engg. & PMC is in progress, bids to be invited by end of July 2020.

Reconstruction of Malabar Hill reservoir: Tender preparation in progress, bids to be invited by October 2020.

0R AIN WATER HARVESTING

M.C.G.M. supplies 3850 million liters of water every day, against a demand of 4505 million liters per day to the 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" and 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. and it is expected that Citizens have to generate the water for secondary requirements through rain water harvesting or recycling.

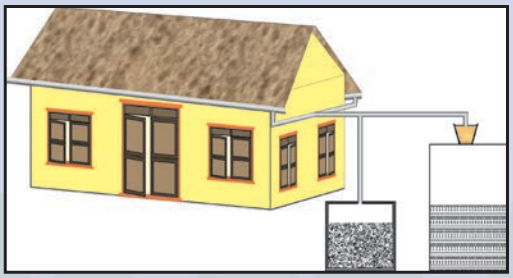
Rain Water Harvesting (RWH) is an ancient and convenient method. It implies storage of rainwater in man made tanks or recharging ground water and utilization as per requirements. Since, rainwater within our own compound is to be stored; anybody is entitled to do so. Most importantly, the capital expenditure 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 deploy d 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.

In view of the late monsoon in the year 2015, (RWH & Wat. Cons.) Cell has started Save Water Awareness Campaign to spread awareness amongst the citizen of Mumbai. As a part of the continous 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.

There are in all 18096 identified wells (4638 dug up wells, 1805 tube wells & 1653 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 available 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.

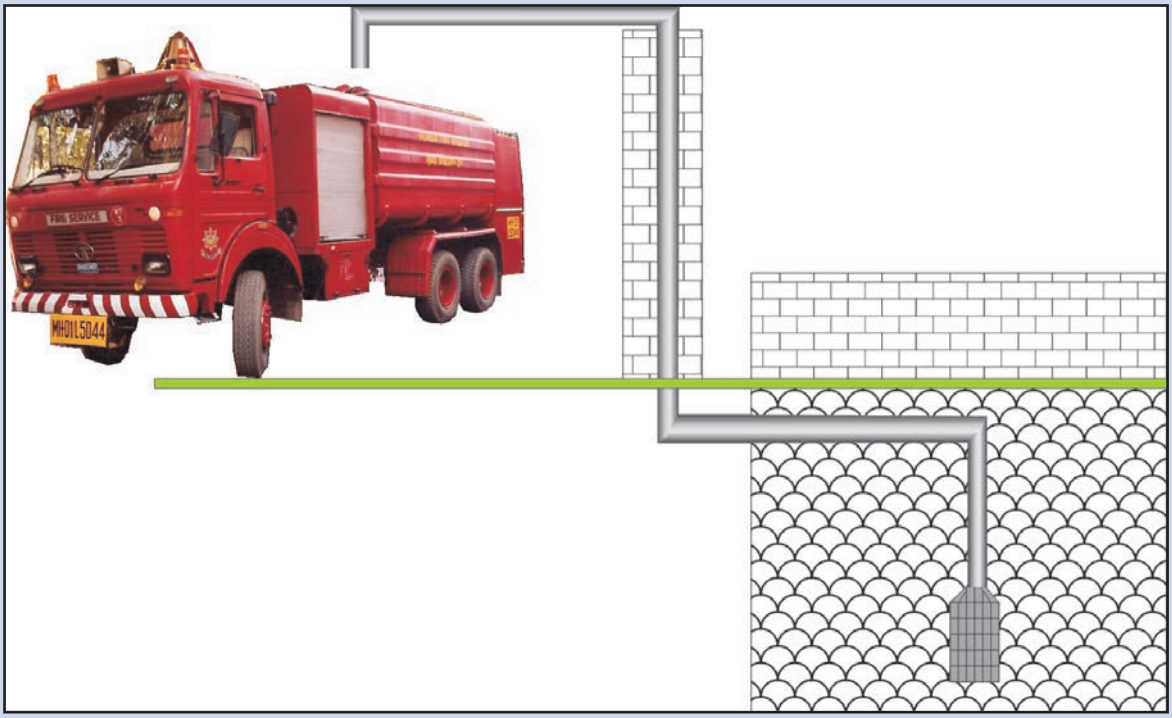
Protecting wells in the city is very important considering future water crisis. RWH cell with help of staff of Insecticide Officer has prepared list of wells & bore wells in Mumbai. The wells are now being digitized with available subsoil details to understand ground water scenario in each locality & identify the danger zones from ground water extraction considerations. M.C.G.M. has also 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.

In order to study the effects of ground water extraction, MCGM had taken up pilot impact analysis studies in M/E & P/S wards with the help of GSDA, Pune.

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.



11S EWAGE 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, p-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.

Sewage Operation (SO):

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.

Laboratory at Dadar under Sewerage Operation department has carried out monitoring of marine outfalls at Colaba, Worli and Bandra (Table –--). Marine water samples are collected at 1 Km. peripheral area from outfall disposal point. The analytical reports are compared with the MPCB stds. SW II and it has been found that at Colaba, Bandar and Worli levels of pH, BOD, DO and Turbidity are within the prescribed std. Levels of F. Coil are exceeding at all sites.

Table No. 11.1: Coastal Sea water quality of Mumbai 2019-2020

Sr. No.	Place	PH		D.O. (mg/l)		Turbidity (in NTU)		E-Coli (CFU)		B.O.D. (mg/l)	
	Standard: SW-II	6 8		>4n g/l		<8N TU		<0 0n l		<3n g/l	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
1	Colaba	7.37	7.65	5.2	6.0	1.37	19.7	60	150	0.85	2.8
2	Bandra	7.52	7.6	4.3	6.3	1.31	4.98	60	500	1.1	2.8
3	Worli	7.61	7.65	4.1	6.0	1.52	5.45	78	310	1.3	1.6

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

Source: Sewerage Operation Department Dadar Laboratory

The work of up-gradation and expansion of Dadar Sewage Laboratory was successfully completed by Sewerage Operation department in the year 2017. Dadar Sewage Laboratory is accredited by NABL (National Accreditation Board for Testing and Calibration Laboratories). Quality Council of India has issued the 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 locations 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 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.

Table No. 12 Zonewise Average Dry Weather Flow Capacity of Sewage

Sr. No.	Name of Sewage Treatment Plant	Installed Capacity (In MLD)	Zonewise Avearage Dry Weather Flow Capacityof sewage (In MLD)
1	Colaba	41	21.11
2	Worli	757	257.69
3	Bandra	797	490.58
4	Versova	186	98.82
5	Malad	280	184.32
6	Bhandup	280	102.96
7	Ghatkopar	386	96.42

Sewage Projects

The Sewerage System of Greater Mumbai is divided into seven Zones viz. Colaba, Worli, Bandra, Versova, Malad, Bhandup and Ghatkopar. The sewer lines leading to pumping stations & sewerage treatment plants are laid by this department by open cut method and trenchless 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.Eng. (SP) P & D, Dy.Ch.Eng. (SP) Construciton are working under Ch.Eng. (SP).

Dy.Ch.E. (Sewerage Project) Planning & Design section offers remarks on sewerage system for street connections or Septic tanks to the plots belonging to Govt., 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 auto generated. Architect/Consultants appointed by IOD holder are empowered to comply sewerage related remarks through online system.

Proposed works at various locations in the year 2019-20

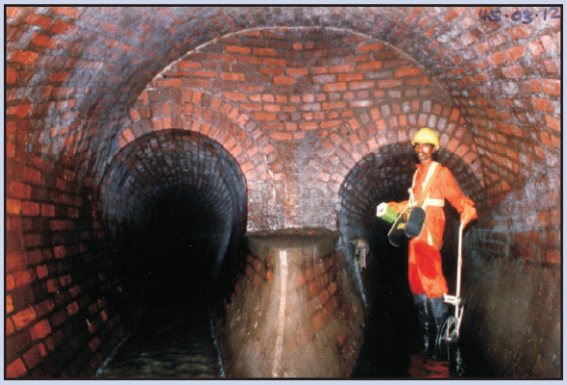
Total budget provision for the financial year 2019-20 is Rs. 244.36 crores which is proposed for laying of new sewer lines in un-sewered area and upsizing of existing sewer line in City/Eastern/Western suburban.

- Providing and Laying RC pipe (NP-4 class and above) sewer line of 1200 mm dia. pilot sewer line by microtunneling and pipe jacking method & HDPE pipes for cross connections by HDD method along Barister Nath Pai Road on east side of carriage way parallel to existing sewer line from Veer Tanaji Malusare Path Junction to Sant Savata pumping Station in E Ward.
- Providing and Laying RC pipe (NP-4 class and above) sewer line of 1200 mm dia by Micro tunneling and pipe jacking method for Upsizing of sewrline along Senapati Bapat marg, G/North Ward.
- Providing and Laying RC pipe (NP-4 class and above) sewer line of 1000 mm dia by Micro tunneling and pipe jacking method along Sahar road from Airport residential complex gate no. 1 to Sahar village K/E ward.
- Providing and Laying RC pipe (NP-4 class and above) sewer line of 1200 mm by Micro tunneling and pipe jacking method from west side of Andheri Subway along S. V. Road, Ceasor Road, Veera Desai Road, Jeevan Nagar Road, Relief Road upto Versova Pumping Station by Microtunneling method in K/west ward.
- P/L 300mm, 350mm & 400 mm dia RCNP3 class pipe sewer lines along Veera Desai Extension Road from St. Catherine's Home up to Country Club at Andheri (West) in K/West ward.
- P/L of sewer network along various road in F/North and M/West Ward as per Consultants Report. Part A) Providing and laying R.C. pipe sewer lines from Anik Wadala to CST Road Junction by micro tunnelling and pipe jacking method including ground improvement and allied work.
- P/L 300/400/600 mm dia RCNP3 class pipe sewer line along Sant Kakkaiya Road upto R.C. Marg, Chembur in M/East Ward.
- Providing and laying 300mm dia RC NP3 Class pipe sewer at Kokan nagar road & Jamil nagar road Bhandup (W) in S ward.
- Providing and laying 300mm dia RC NP3 Class pipe sewer at Pratap nagar road, Bhandup (W) in S ward.
- Providing and laying 300mm dia RC NP3 Class pipe sewer at Samarth nagar road, Bhandup (W) in S ward.
- P/L 600 mm dia RC(NP3 Class) pipe sewer along Mohan Gokhale Road from existing manhole near Electric Pole no. TCJ/093/004 upto the existing manhole at the junction of Mohan Gokhale Road with Arya Bhaskar Road, Goregaon, P/South ward.
- P/L 355mm dia (OD), 450mm dia (OD) HDPE pipe sewer (PN-6 Class- PE 80 grade : IS 14333) to correct grade and alignment along East side of Western Express Highway (Service Road) connecting to Daftary Road, Kurar Village, Malad (E) in P/North Ward (2/T22).

2S TORM WATER DRAINS

Mumbai is lined on the west by Arabian Sea and intercepted by number of creeks. The tidal variation is a major concern in the system of storm water drains (SWD) to release rainwater as well as wastewater into sea. The present SWD system in the city area is more than 100 years old and about 525 km long. This network consists of underground drains, laterals and water entrances built on the basis of area 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 exceeds more than 25 mm per hour during high tide, there is always possibility of water logging in low lying areas of the city.

In practice however, in addition to storm water, they also carry sewage overflow from septic tank, surface water, etc. Length of open SWD in Mumbai is about 1987 km. The flow from the 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, desilting is carried out through registered contractual agencies throughout the year.



There are 85 major out-falls in the city area 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 Arabian 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 of 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 Hawksley International Pvt. Ltd. and their Indian sister concern M/s AIC was appointed as a consultant for this project. The 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 Master Plan. This plan suggested improvements in SWD system with design criteria, of rainfall intensity of 50 mm/hr with runoff coefficient of 1.00.

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 finalized by the consultant and same is submitted on 30.04.2018.

BRIMSTOWAD project is proposed to be implemented in two phases. There are 20 works in Phase-I and 38 works in Phase-II. The scope of the BRIMSTOWAD project is as under.

1. Rehabilitation and augmentation of underground drains in city.
2. Construction of new drains in RCC.
3. Training of nallhas in RCC M-40.
4. Widening and deepening of nallhas.
5. Construction of access road along the nallha.
6. Construction of Strom Water Pumping Stations.

Table No. 21 Present Status of BRIMSTOWAD Project

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

Table No. 22 Status of Pumping Stations under BRIMSTOWAD

Sr. No.	Pumping Station	Status
1	Haji Ali	Completed and commissioned in the month of May 2011
2	Irla	Completed and commissioned in the month of May 2011
3	Cleaveland	Completed and commissioned.
4	Lovegrove	Completed and commissioned.
5	Britannia	Completed and commissioned in the month of June 2016
6	Gazdarbund	Completed and commissioned in the month of June 2019
7	Mogra	Land acquisition of private land is in progress.
8	Mahul	Land acquisition of private land is in progress.

Source: Storm Water Drain Dept of MCGM

To date, the Brimstowad project has cost Rs 2238.04 crore till April 2019. However, the increase in width and depth of the aqueducts due to changes in the conceptual standards, the need for unconventional technology to operate the aquifers mainly in the tidal zone and the substantial increase in the total financial requirement of the project due to encroachment, require additional funding of Rs.2700 crore.

Environmental Aspect:

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

The desilting of the underground storm water drains is carried out by deploying sufficient machineries such as firex, suction, Recycling machine, jetting, suction cum jetting machine in deep chambers, where man entries are prohibited. The road side drains are desilted by means of rodding and dredgers. JCB, poclain, pantoon mounted poclain, machineries are engaged for desilitng of major nallas in suburbs.

Development of Mithi River:

Government of Maharashtra has formed 'Mithi River Development and Protection Authority' under the Chairmanship of Honorable Chief Minister of Maharashtra State on 19th August 2005 for improvement of the Mithi River. The total length of Mithi River is 17.8km., out of which a length of 11.84 km. is in the jurisdiction of Brihanmumbai Mahanagar Palika and the balance length of 6 km. is under jurisdiction of MMRDA. 95% widening and deepening of Mithi river has been completed till date.

Out of 18.96 km. length of retaining wall to be constructed, construction work for the length admeasuring 16.223 km is completed by MCGM till date. Length of 840 mtr. is to be constructed and maintained by MIAL. For balance length of 3325 mtr tenders will be invited shortly.

Storm Water Drain Machine

13 SOLID WASTE MANAGEMENT

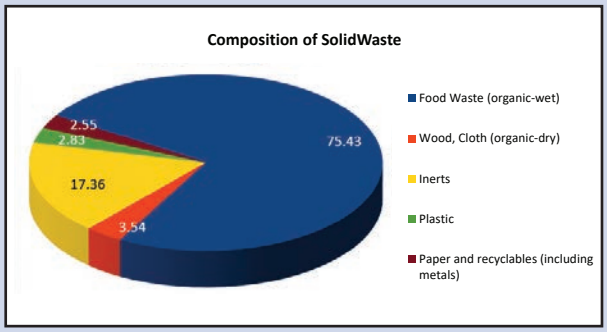
The approximate quantity of solid waste generated in Mumbai is over 6500-6800 metric tonnes per day (MTPD). Of the 6500-6800 tonnes transported to disposal sites by vehicles in 1676 trips/day, the categories of waste that are separately collected as dry and wet waste i.e. 72.6%- Food Waste (organic-wet), 3.51%- Wood, Cloth (organic-dry), 17.37%- Sand, Stone & Fine earth, 3.24%- Plastic, 3.28%- Paper and recyclables (including metals).

Table No. 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**

Source: Report of NEERI, 2016

Graph 13.1



The garbage from all over city is collected and at present, the garbage is treated at Kanjur processing site using Bio-Reactor Technology and Windrow Composting 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 25% & Kanjur receiving remaining 75% of waste generated daily. 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 with suitable technology is in progress.

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 stoped accepting garbage

There are 2110 no. of 1.1-cubic meter containers, 949 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.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. 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. 1200-1700
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 with suitable technology is in progress.
3	Kanjur	Municipal Solid Waste	Approx. 4500-5500

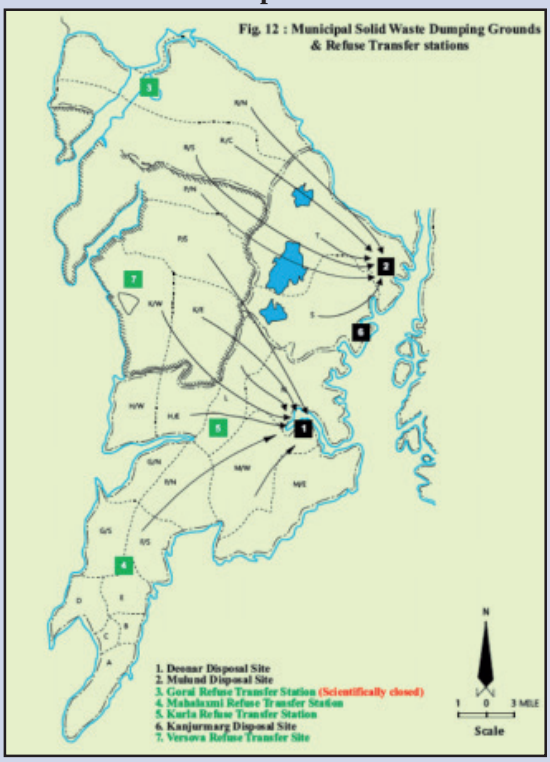
Source: Solid Waste Managment Dept.

Table No. 34 Salient Features of Transportation For Solid Waste

Sr. No.	Type of Vehicle	Number of Services 2018	Number of Services 2019	Number of Services 2020
1	Compactors	1811	1228	1584
2	Skip Vehicles/ Dumper Placers	11	11	1
3	Dumpers/ Refuse Vehicle	192	100	126
4	Bulk Refuse Carriers	-	--	--
5	Tempo/Jeeps	3238	2933	4092
6	JCB Machines	60	50	63
7	Stationary Compactors	57	57	80
	Total	**5**	**4**	**5**

Source: SWN

Map 31



Swaccha Bharat Mission:

In order to pay homage to Mahatma Gandhi on the occasion of his birth anniversary on October 2, 2014, the Government of India had decided to make the country open defecation free and clean. MCGM being the prime administrative organisation 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 effortsand programs of Solid Waste Management department have been redesigned accordingly by MCGM.

Open Defecation Free:

Mumbai was declared as Open defecation free (ODF) on 29.12.2016 & Quality Council of India (QCI) certified Mumbai as ODF on 07.01.2017. Now, Mumbai has been declared as an Open Defecation Free plus (ODF +) city by the Quality Council of India (QCI) on 22nd December 2019.

Swachhata App:

Swachhata App developed by Ministry of Housing and Urban Affairs (MoUHA) and 24 X 7 app of Mumbai Municipal Corporation were integrated to resolve complaints in solid waste management in time. The resolution rate in Swachhata App complaints in Mumbai is more than 99%. The Swachhata App complaints are also being regularly monitored.

Exhibition on cleanliness activities and prize distribution ceremony:

MCGM organized an exhibition on Home Composting, segregation of Waste at the Source and Composting for the citizens on 17th January, 2020 at the Emperor Hall of the National Sports Club of India. About 100 companies in the sector showcased segregation of waste at source and composting techniques and methods. Information and technology stalls were organized by the Mumbai Municipal

Corporation to provide property tax relief to the residential societies engaged in waste segregation and fertilizer production at the source site.

The exhibition was attended by about 100 different companies working in the field of substitution for plastic, waste segregation and composting and more than 1500 citizens. The exhibition was inaugurated by State Government's Hon'ble Minister for Tourism, Environment and Protocol and other dignitaries were present for the ceremony.

Also, hospitals, hotels, municipal and private schools, markets and Swachha Mumbai Prabodhan Sanstha, community and public toilets have been assessed through a third-party agency as per the criteria required for Swachha Survey 2020. The winners from the above categories were honored by giving cash prizes and testimonial through State Government's Hon'ble Minister for Tourism, Environment and Protocol.

Segregation & Composting of wet waste at Source:

To reduce the garbage coming from bulk waste generators, 3367 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.

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% & 1696 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 6500-6800 MT.

Swachha Surv kshan 0 :-

MCGM has actively participated in Swachha Survekshan 2020 conducted by Ministry of Housing & Urban Affairs (MoUHA) to assess SWM progress between 1st January 2019 to 31st December 2019. Films in English & Hindi language to promote segregation of waste were prepared & promoted during 16.12.2019 to 26.01.2020 in theatres in Mumbai as a part of IEC activity. Further radio jingles on radio channels were run for the period from 4th January 2020 to 31st January 2020.

Posters, banners and hoardings encouraging waste segregation with details of dry waste and wet waste were put-up all-over Mumbai in January 2020. The message of Swachha Bharat Abhiyan was given at the railway station and bus stand in Mumbai with the permission of the concerned authorities.

Pamphlets for promoting Segregation of waste were got printed through Municipal Printing Press of MCGM and circulated through the local newspapers of all the 24 administrative wards.

Solid Waste Management

New projects undertaken for scientific processing of MSW generated in Mumbai are as below:

1. Development of Waste to Energy (WTE) Project at Deonar: The tender for WTE was invited and evaluation of bids is completed. Further process of obtaining sanctions is under progress. About 600

TPD MSW will be processed scientifically and 4 MW energy will be generated from this project. Later on, MCGM is also planning to invite tenders for about 1200 TPD WTE project.

2. 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. After mobilization of equipment and machineries required for the project, commencement of the project is started from 01.10.2019. Till date contractor has processed and disposed off about 1,14,200 MT of legacy waste. M/s MITCON Consultancy & Engineering Services Ltd. is monitoring the project as Project Management Consultant (PMC).

3. 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.

4. Scientific processing and disposal of Waste at village Karvale, 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.

5. Collection, Transportation, Processing & Disposal of Construction & Demolition (C & D) Waste in Mumbai: The MCGM is planning to process scientifically 1200 tone per day, C & D waste. The tenders for Collection, Transportation, Processing & Disposal of C&D Waste were invited. However, due to no response, tender is being re-invited.

Solid Waste Management 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 is completed on16.02.2019. Complied within the time stipulated.
2	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.	1 year	Same as above
3	Procurement of suitable sites for setting up solid waste processing facility and sanitary landfill facilities.	2 years	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 52.10 ha. land at Village Karavale to Mumbai Municipal Corporation on or before 31st January 2019. Out of the 52.10 ha. land 30 acres of Govt. land at Karavale has been handed over to MCGM on 16.02.2019 after rehabilitation of 8 PAP families by giving temporary accommodation of 500 Sq.ft. and compensation of Rs. 50,000/- to each PAP family residing on this 30 acres of land. MCGM has also deposited Rs. 25,00,000/- on 12.06.2019 to state Govt. for acquisition process of private land at Karavale. Complied within the time stipulated.

4	Enforcing waste generators to practice segregation of bio degradable, recyclable, combustible, sanitary waste domestic hazardous and inert solid wastes at source.	2 years	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. MCGM, against 1325 defaulting bulk generators has taken action under section 368 of MMC Act. Out of 1325 cases, in which prosecution was launched, and fine of Rs. 42,93,500/- is recovered. Also under section 53 (1) of MRTP Act, out of 326 notices issued, in 44 cases prosecution is launched against non--compliance. Further appellSant MCGM has identified 207 Bulk generators having area more than 20,000 Sq.M. and in 7 cases Maharashtra Pollution Control Board (MPCB) has launched prosecution. MCGM has established 46 dry waste segregation centers 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 centers 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 centers (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.
5	Ensure door to door collection of segregated waste and its transportation in covered vehicles to processing or disposal facilities.	2 years	MCGM has taken various initiatives thereby and has achieved about 100% house to house collection, 82% 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.
6	Ensure separate storage, collection and transportation of construction and demolition wastes.	2 years	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.
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 5500 TPD is being processed and will further enhance to 6000 TPD in near future. 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 was invited and the same due on 17.05.2019. Three bids were received. At present further process of obtaining sanctions for award of project is under progress. 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 bio-mine the existing waste of around 7 Million tons at Mulund Dumping Ground. As regards to Deonar Dumping Ground, the existing dump thereat is about 18.35 million MT. The Hon'ble High Court, Mumbai vide Order dated 26th & 29th February 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,

Dry Waste Sorting Centers:

MCGM has set up 46 dry waste collection & sorting centers in 24 wards. Other than these, MCGM has decided to set up 4 more dry waste collection & sorting centers and at some places work of setting up of additional dry waste centers is in progress. 96 Nos. of separate vehicles are deployed for collection and transportation of dry waste to dry waste sorting centers, 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.

Scientific processing of MSW:

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 the 52.45 ha. of CRZ –III area.

At present, processing of about 4000 - 4500 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.

New Projects for scientific processing of MSW:

1. Development of Waste to Energy (WTE) Project at Deonar: The tender for WTE was invited and evaluation of bids is completed. Further process of obtaining sanctions is under progress. About 600 TPD MSW will be processed scientifically and 4 MW energy will be generated from this project. Later on, MCGM is also planning to invite tenders for about 1200 TPD WTE project.

2. 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. After mobilization of equipment and machineries required for the project, commencement of the project is started from 01.10.2019. Till date contractor has processed and disposed off about 1,14,200 MT of legacy waste. M/s MITCON Consultancy & Engineering Services Ltd. is monitoring the project as Project Management Consultant (PMC).

3. 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.

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5. 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 tenders for Collection, Transportation, Processing & Disposal of C&D Waste were invited. However, due to no response, tender is being re-invited.

Pelletisation Project:

Pelletisation 'Green Coal' Project of capacity 10 MT/Day 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, 10 MT/Day green waste collected from 24 wards of MCGM is processed in this project.

Service Level Benchmarking:

To monitor the performance of any ULB regarding its Service Delivery to the Citizens, MoUD has devised benchmarks for each service delivered.

For Solid Waste Management Dept. there are 08 such benchmarks.

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%	81.96%
Extent of Municipal Solid Waste Recovered	80%	35%
Extent of Scientific Disposal of Waste at Landfill site	100%	74.56%
Efficiency in Redressing Customer Complaints	85%	94.93%
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 MCGM 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 MCGM 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.

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.

As such, MCGM 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 collection and disposal by M/s. SMS Envoclean (P) Ltd. As of now 13032 nos. of health care establishments are registered with the centralized facility. Daily approx 20 M.T. of BMW is being collected & treated at Deonar BMW treatment facility.

E-Waste (Management) Rules 2016:

1. To avoid mixing of e-waste with municipal solid waste, MCGM has proposed to appoint MPCB authorized e-waste recycling agency to set up e-waste collection centers in wards.
2. The work of setting up of e-waste collection centers can be given to MPCB authorized electronic producers/ e-waste collectors/ dismantlers/ recyclers.

Plastic Waste (Management) Rules, 2016:

MCGM has set up 46 dry waste collection & sorting centers 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. Plastic shredding machines are installed at few DWSC locations in the city. Under EPR, companies like Bisleri & Coca Cola are setting up plastic processing units across city.

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. SWM dept has developed banned plastic collection and storage facilities for the convenience of citizens. A 10 digit toll free helpline has been activated for providing information about location of collection points. Use of media for spreading awareness about active public participation in minimizing use of banned plastic is being done. Around 325 MT of plastic waste has been collected since the ban has come into effect.

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.

Mechanical Power Sweeping

Solid Waste Cleaning Machine on Beach

Compactor with Additional Chamber of Dry Waste Garbage

Compactor with separate chamber for collection of Dry waste and E waste

4P OWER SUPPLY AND CONSUMPTION

Bombay Electric Supply and Transport (BEST), an undertaking of MCGM, supplies electric supply to city area while Reliance Infrastructure Limited 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 927 MW and power consumption was around 4791 Mus in FY 2019-2020. To meet this demand, power is purchased in major from Tata Power Company, bilateral sources, Power exchanges and environment friendly renewable source.

As per MERC (RPO-REC) Regulation 2016 BEST, as a distribution licensee has to procure Renewable energy of 15% (Solar 3.50% & Non-Solar 11.50%) of total procurement of energy for FY 2019-20. BEST has procured total 31.5 MUs of solar energy BEST and also has achieved the RPO target for FY 2019-20.

BEST Undertaking has 10.39 lakh consumers. Out of the total consumers, BEST is supplying electricity to about 73% residential consumers at a subsidized rate.

As a step towards pollution control BEST has installed 4 nos of Electric Vehicle Charging Stations at 3 locations in its premises.

Under Faster Adoption and Manufacturing of Electric Vehicles (FAME India phase II) scheme. Dept. of Heavy Industries (DHI) has approved 300 nos, of Electric buses for BEST. For charging of these buses another 150 nos of Electric Chargers of 80kW / 50kW will be installed at 5 to 6 locations in Mumbai.

Table No. 4.1 BEST Consumers,Connected load and Consumption for the year 2019-20

Sr. No.	Consumers Category	Mumbai City			
		Consumers #	Connected Load in kW	Consumption in Million Units (MUs)	Avg. Monthly Consumption (MUs)
1	HV Consumers	188	428979	680.80	56.73
2	LV Consumers	1039751	3849514	3888.54	324.05
	Total	[illegible]	[illegible]	[illegible]	[illegible]

Source: BEST # Meters installed on site

Table No. 4.2 Categorywise Consumers,Connected Load and Consumption (2019-20)

Sr. No.	Consumers Category	Mumbai City			
		Consumers #	Connected Load in kW	Consumption in Million Units (MUs)	Avg. Monthly Consumption (MUs)
1	Residential	760001	2312770	2064.75	172.06
2	Commercial	269953	1689859	2097.19	174.77
3	Industrial	8020	215127	355.23	29.60
4	Others	1965	60736	52.16	4.35
	TOTAL	1039939	4278493	4569.34	380.78

Source: BEST # Meters installed on site

Providing & Fixing LED Street Lights:

As per the Government of India policy regarding energy conservation it was proposed to convert all the conventional HPSV/ MH Street lights of Mumbai by energy efficient LED Street lights. This conversion of conventional HPSV/ MH Street lights by LED Street lights will result in savings of minimum 40% energy consumption in various wards of MCGM. As on 31.03.2020, a total 39441 nos of Street lights out of total 41424 nos have been converted into LED Street lights by BEST i.e. 95.22% conversion is completed. A majority of the HPSV/ MH flood lights installed on various MCGM high masts and on street light poles have also been converted into LED street lights and balance work is in progress.

Maharashtra State Electricity Distribution Company Limited

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. [illegible] MSEDCL's Consumers, Connected Load and Consumption in MU's for F.Y. [illegible]

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	83	163707	183.33	43	32707	41.32
2.	Low Voltage Consumers	178695	371796	445.92	130211	393844	389.18
	Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Source : Maharashtra State Electricity Distribution Company Limited

Table No. [illegible] MSEDCL Category wise Consumers, Connected Load and Consumption in MU's for F.Y. [illegible]

Sr. No.	Category	Division Name					
		Bhandup			Mulund		
		Total Consumers	Connected load (KW)	Consumption (Mus)	Total Consumers	Connected load (KW)	Consumption (Mus)
1	Residential	154790	225407	264.62	112791	286590	267.22
2	Commercial	18671	69308	81.19	15374	72539	81.783
3	Industrial	4569	69807	87.17	1047	25407	27.986
4	Others	665	7274	12.94	999	9311	12.19
	Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Source : Maharashtra State Electricity Distribution Company Limited

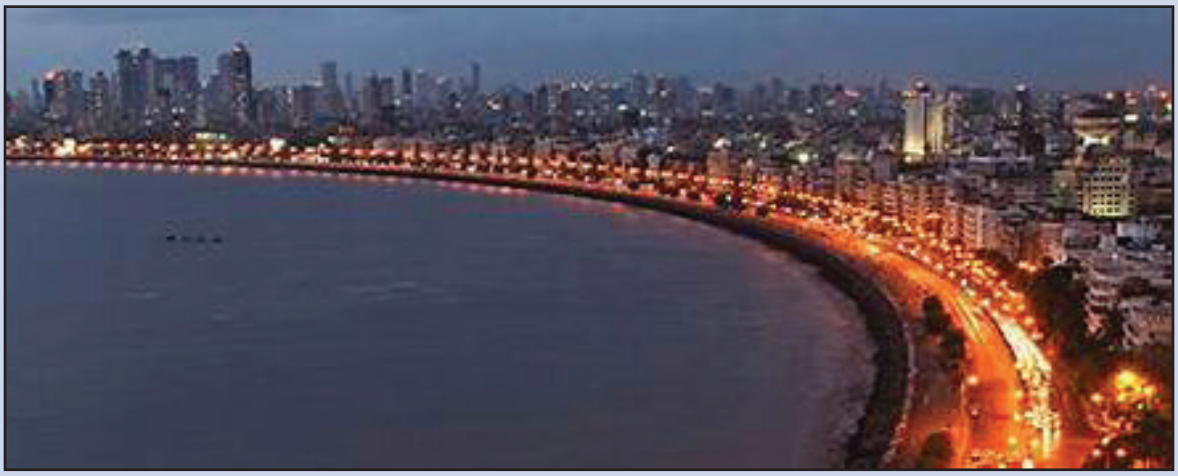
Table No. 1.5 MSEDCL's Consumers Average Consumption of energy in MU's for F.Y. 2019-20

	Average Consumption in MU's		
	Bhandup Division	Mulund Division	Total Avg. Consumption
High Voltage Consumers	15.278	3.443	18.720
Low Voltage Consumers	37.160	32.432	69.592
Total	**52.438**	**35.875**	**88.312**

Table No. 1.6 MSEDCL's Categorywise Average Consumption of energy in MU's for F.Y. 2019-20

LT Categorywise consumers	Average Consumption in MU's		
	Bhandup Division	Mulund Division	Total Avg. Consumption
Residential	22.052	22.268	44.320
Commercial	6.766	6.815	13.581
Industrial	7.264	2.332	9.596
Others	1.078	1.016	2.095
Total	**37.160**	**32.432**	**69.592**

Source: MSEDCL



5 ROADS, TRAFFIC AND TRANSPORT

Roads

1 Road Reforms:

About 1999 kilometres of roads is maintained by MCGM. As per provisions of D.P 2034, recommendations of Comprehensive Mobility Plan (CMP), the intensity of rain fall and compounding increase in vehicular traffic, the special emphasis has been given to improve roads in C.C & Road junctions in Mastic.

Tender conditions are upgraded, project approach has been adopted. In road improvement projects and the scope of works includes improvement of footpath, provision/augmentation of utilities like water-mains, sewer-lines, S.W. Drains etc. Further, the provision for traffic amenities, beautification etc. have also been integrated. Trenching condition are made stringent have to reduce frequent digging. MCGM produces in house coldmix to attend the pothole in rainy season. The Quality of cold-mix is recommended by Technical experts minimize chances of development of potholes. Footpath are being improved in stamped concrete from aesthetic and durability point of view.

2 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.

3 Information technology integrated with works:

All roads, underground utilities etc are integrated in GIS. This will facilitate to monitor:

a. Real time progress of work.

b. Avoid duplication of work.

c. Capital expenditure incurred can be viewed location wise.

Website/app helps to track the potholes and bad patches for which immediate remedial measures can be taken. Further, it provides a heatmap of most of potholes and badpatch prone roads. It help to precautions to be taken to improvement of such patches.

4 Performance based contract works.

In conventional tenders, the contractors do not respond to rectify defects during D.L.P periods. Hence, to keep a control over D.L.P period, the payment condition of differed payment to be applied in the new

tenders at the ratio of 80:20 (80% payment after construction and 20% differed over the D.L.P period). This will ensure work compliance from the contractor during D.L.P.

TRAFFIC

1) Traffic Engineering:

The work of Traffic Planning & Traffic Co-Ordination department is carried out under the control of Dy.Ch.Eng. (Traffic) who works under Ch.Eng. (Roads & Traffic). This office 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, beautification of roads. Also, this office scrutinized and approves parking layout proposals received from Building proposals 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 & making co-ordination with all Ward offices to get the above works done through three service provider electric companies viz. BEST, Adani Electricity & MSEB Co. Ltd. The budget provision for the same is made by traffic department.

2) 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 74 pay & park schemes on roads contractors have been appointed for 44 sites to start pay & park scheme. Similarly contractors have been appointed to operate of 22 Public Parking Lot and out of 30 Public Parking Lot which have been handed over Municipal Corporation of Greater Mumbai under DC Regulation no. 33 (24) of 19991 and Regulation no. 33 (18) of DCPR 2034. Similarly out of total nos. of 29 amenity parking places handed over to Municipal Corporation of Greater Mumbai contractors are appointed for 14 nos. of amenity parking places and same are open to public.

3) 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. This Parking Authority shall decide the Parking Charges in various regions / zones in Mumbai. Accordingly, committee has formed to create the Parking Authority.

M/s. AIILSG is appointed to collect the information for this authority. Also for the GIS mapping of various parking locations M/s. ESRI is appointed.

4) LED Lights:

MCGM has started the implementation of fixing LED street lights in 2019-20. There are about 1,40,595 Sodium vapor lamps in Mumbai out of which 1,24,602 conventional lamps have been replaced by LED. It is proposed to complete balance 15,993 LED lights in Mumbai for year 2020-21. This causes more savings in energy bill. This savings in energy will go up as more lights will be converted to LED. The budget provision for LED conversion is Rs.15 crore for the year 2020-21.

5) Traffic Signages:

MCGM has invited tender for modern signages with upgradation of signages for major road networks for 200 km.

6) Initiative on Road Safety& Black Spots:

There are 39 Black Spots in Mumbai, out of which 17 black spots are under MCGM jurisdiction. For long term measures in road accident prone MCGM road area, this office has appointed consultant M/s. Bloomberg Philanthropis for 11 Black Spot. Out of 11 Black Spots, M/s. Bloomberg has submitted the report of 10 Black Spots. This report forwarded to concerned Dy.Ch.Eng. (Roads) department to take long term measures accordingly. This office informed the Dy.Ch.Eng. (Roads) Planning department to appoint the consultant for the remaining 7 black spots.

7) Area Traffic Control (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 387 conventional system and 200 flashing beckons are carried out properly.

6B RIDGES IN MUMBAI

Major work completed in the year 2019-2020

1. Widening of bridge on Chlildren's Aid Nalla and PMGP Nalla along Ghatkopar Mankhurd Link in M/E Ward.
2. Reconstruction of FOB connecting Janta Nagar and Bihari Tekadi Road over Poiser River at Poiser in 'R/South' Ward.

List of Major projects undertaken in the year 2020-2021

1. Reconstruction of Approaches of Delisle ROB at Lower Parel Station in 'G/South' Ward.
2. Proposed Construction of ROB Connecting to Dr. E. Moses Road (Higher Level) and Dr. E. Moses Road (Lower Level) Near Dhobighat and Mahalaxami Railway Station in G/South Ward.
3. Construction of flyover connecting K. K. Khade marge and satrasta circle at mahalaxmi.

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 2020 is 38,87,722. Their composition is 59.09% two-wheelers, 29.05% cars, jeeps & station wagons, 3.25% taxis/cabs, 5.85% auto rickshaws, 0.49% buses, 2.25% Goods vehicles, 0.02% tractors/trailers and others 0.11%. As previous year increasing number of vehicles is 6.79% in Mumbai city.

Table No. 6.1 Category Wise Comparison of Vehicle Population 2018 - 2020

Sr. No.	Category	As on 31st March		
		2018	2019	2020
1	Two Wheelers	1952955	2133833	2294599
2	Cars, Jeep, Station wagons	1011878	1080087	1128180
3	Taxi/Cabs	127892	119477	126241
4	Auto-rikshaws	182069	212691	227054
5	Buses	14839	16051	19050
6	Trucks & Lorries	61040	74248	87481
7	Tractor/ Trailors	304	818	840
8	Other	1663	3383	4277
	Total	3	3	4

Source : This information is received from RTO, GoM

Graph 6.1

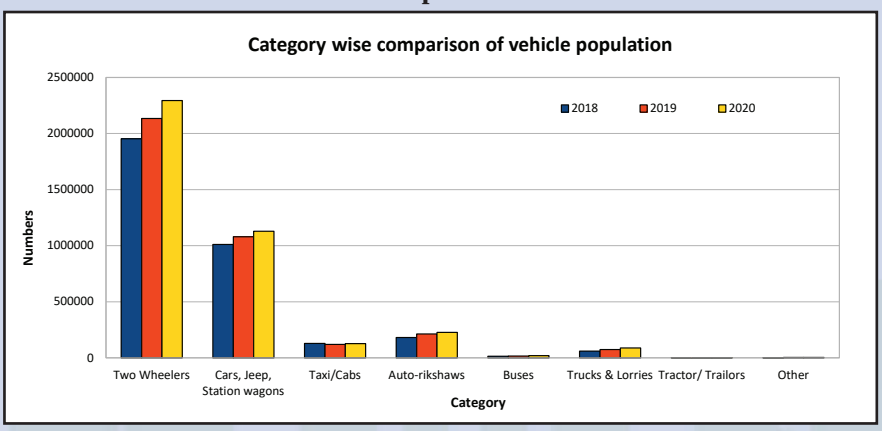
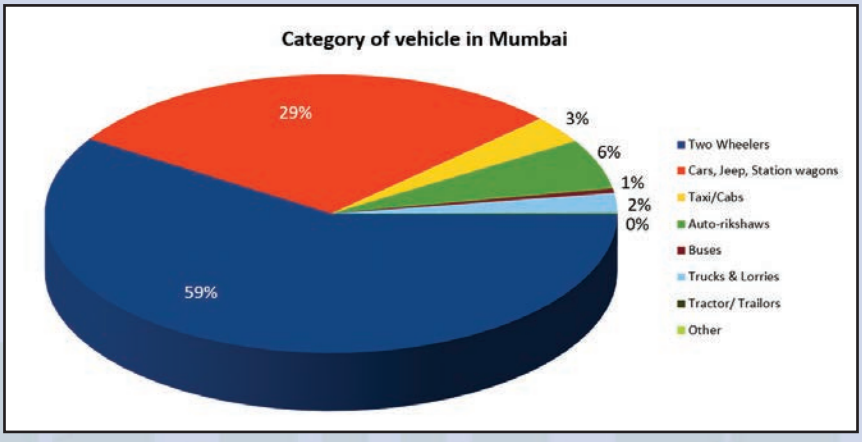


Table No. 16.2: New Vehicles Registration during April 2019 to March 2020

Sr. No.	Category	Mumbai (C)	Mumbai (W)	Mumbai (E)	Borivali	Gr. Mumbai	Total	TOTAL
1	Motor Cycles	43301	29876	43685	43542	160404	160404	2133833
2	Scooters	0	146	0	1	147	147	1080087
3	Moped	36	110	53	16	215	215	119477
	Total Two Wheelers	43337	30132	43738	43559	160766	160766	212691
4	Cars	13317	12627	10485	11664	48093	48093	5252
5	Jeeps	0	0	0	0	0	0	7059
6	Stn. Wagons	0	0	0	0	0	0	18256
7(a)	Taxis meter fited	24	17	42	0	83	83	1350
7(b)	Luxury/ Turist Cabs	2513	1638	1680	850	6681	6681	2708
8	Auto-rikshaws	0	4494	4921	4948	14363	14363	1032
9	Stage carriages	13	0	833	0	846	846	494
10	Contract carriages/Mini Bus	577	19	419	772	1787	1787	324
11	School Bus	44	258	50	0	352	352	30562
12	Private Service Vehicle	5	6	2	1	14	14	25393
13	Ambulances	61	21	51	17	150	150	37
14	Articulated/ Multi	13	0	26	2	41	41	25393
15	Truck and Lorries	418	0	196	6	620	620	37
16	Tanker	79	0	64	0	143	143	25393
17	Delivery Van (4 wheelers)	2191	2227	3655	2902	10975	10975	37
18	Delivery Van (3 wheelers)	212	249	467	526	1454	1454	25393
19	Tractors	2	2	1	0	5	5	37
20	Trailors	0	5	12	0	17	17	2033
21	Others	322	183	231	8	744	744	3640588
	Total							

Source : RTO, GoM

Graph 16.2



In Mumbai region about 2,47,134 various types of vehicles are registered during April 2019 to March 2020. In this 65.05% of two wheelers, 19.46% of cars, jeeps and station wagons, 2.74% of taxi/cabs, 5.81% of Auto rikshwa's, 1.21% of buses, 5.35%, goods vehicles 0.01% of Tractors/trailors and 0.36% of other vehicles.

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.

In Mumbai to reduce auto exhaust pollution central government has introduced registration of vehicles fulfilling Bharat-IV norms and in rest of areas vehicles fulfilling Bharat-III norms will be registered.

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 - Transport

Since 1984 BEST undertaking operates 3404 buses on 413 Routes, in the area of Mumbai and it's align cities like Navi Mumbai, Thane and Mira-Bhayander, commuting around 26 Lakhs passengers daily.

In order to reduce the pollution in the city, the Undertaking has implemented fleet up-gradation programme, under which buses operated on "Compressed Natural Gas" are being included in the fleet. At present 60% i.e. 2038 buses are operated on 'CNG'. The CNG pumps are made available in 15 Bus depotes to facilitate easy fueling of the buses. It is ensured that smoke emission of all diesel vehicles is kept below self imposed limit of 45 HSI (Hat-ridge Smoke unit). In the year 2017-18, Undertaking had included low polluting 185 Euro IV compliant buses in it's fleet.

In November 2017 for the first time in India, BEST Undertaking has included 4 new zero emission electric buses into it's fleet and also 2 more electric buses were put into operation from February 2018. As electric buses are zero emission vehicles, Undertaking has decided to induct more number of electric buses into it's fleet to reduce the vehicular pollution in Mumbai. Accordingly, BEST Undertaking has placed an order of 80 numbers of electric buses. In addition to this it intends to further increase the fleet of electric buses substantially in the year 2018-19.

Further BEST Undertaking in collaboration with Mumbai Mahanagar Region Development Authority (MMRDA) has introduced 25 Hybrid Buses in Bandra-Kurla Complex area. These buses are operated on Electric supply which is Environment friendly type of fuel. With this initiative, BEST is striving to achieve reduction in the air pollution in the city and improve the air quality.

The BEST undertaking have a well established a Workshop, equipped with latest techniques, where entire fleet is tested regularly for controlling the air pollution. Further, the buses of the Undertaking are regularly tested for PUC.

The Undertaking has an established a “Training Centre” where two separate vehicle are provided for importing training on Fuel conservation and Bus Driving to the drivers and technical staff of the Undertaking.

17 MUMBAI COASTAL ROAD

The Mumbai costal road project (South) is one of the most prestigious projects undertaken by M.C.G.M. The Southern Costal Road Project of 9.98 km from Princes Street Flyover to Worli End of Bandra Worli Sea Link is proposed to resolve the traffic congestion in proposed costal road is having eight lanes (4+4) configuration comprising road based on reclamation, Bridges, elevated roads and tunnels.

The Mumbai Costal Road Project will reduce the travel time, decongest existing roads, reduce the air and nose pollution levels, improve public transport facility due to proposed dedicated BRTS lane and also generate much needed additional green spaces which will also decrease CO2 emission.

The Ministry of Environment, Forest and Climate Changes (MoEFCC) has issued CRZ Clearance for the project on 17.05.2017. Also, the NOC's from other concerned departments of Central Government and State Government have been obtained for Mumbai Costal Road (South) Project.

Table No. 17.1: The salient feature of the Coastal Road Project

1.	Length	9.98 km
2.	Road on reclamation	4.35 km
3.	Tunnel (2 Lanes, 11m dia.) x 2 Nos.	3.45 km
4.	Bridges (4+4 Lanes)	2.18 km
5.	Interchanges (Amarson, Haji Ali and Worli)	3 nos.
6.	Seawall Length	7.46 km
7.	Reclamation area	90 hectare
8.	Reclamation area (Garden, Landscape, Parks etc.)	70 hectare
9.	Promenade (20 m width)	7.46 km
10.	Pedestrian Under passess	14 nos.
11.	Underground Carparks	4 Locations
12.	Generation of approximately employment opportunity due to proposed Coastal Road	1,00,000
13.	BRTS, dedicated lanes for Ambulance	
14.	Sophisticated Saccardo Nozzle Ventilation system and special fire protective coating in tunnel.	
15.	Flood risk minimizes due to better designed drainage system along with automate anti-flood gates and box culverts of 1,650m.	

Source :Costal Road Dept. MCGM

The Estimated total Project Cost for the Project is Rs.12,721 Cr. This project is divided into three packages viz. Package IV (From Princess Street Flyover to Priyadarshini Park), Package I (From Priyadarshini Park to Baroda Palace) and Package II (From Baroda Palace to Worli End of Bandra Worli Sea Link). The design and Build work for Package I and Package IV is under progress through the contractor M/s. Larsen and Toubro Ltd. The design and Toubro Ltd. The desing and Build work for Pacakge II is under progress through the contractor M/s. H.C.C.-H.D.C. (Joint Venture). For each Package of the Coastal Road Project, one Project Management Consultant (PMC) has been appointed as Employer's Personnel for supervisions and other allied works. Accordingly M/s. Yoosin Engineering Corporation + M/s Tec Cuatro S.A (JV), M/s. Louis Berger Consulting Pvt. Ltd. and M/s. Egis India Consulting Engineers Pvt. Ltd. + Cullen Grummit and Roe (UK) Ltd. JV have been appointed as PMCs for Package IV, I and II respectively. Also one general consultant M/s AECOM Asia Co. Ltd. is appointed as Employers representative for co-ordination and monitoring the entire project through all PMCs and other allied works.

This work is in progress since October 2018 and proposed to be completed within four years. The required Budget Provision of Rs.2,000 Cr. has been made; in the financial year 2020-2021.

Salient Feature of Site Environment Management Plan for the Projection

MCGM has awarded civil contracts of all the three packages of coastal road to recognized international contractors like L & T, HCC-HDC (JV).

The following compliance are done/ in progress though all contractors regarding environment compliance mentioned in site specific environment plan as well as requirements of MoEFCC applicable to them.

1. Air and noise monitoring is being done on sites to establish base line air and noise monitoring results. These results will establish air pollution levels and noise levels on coastal road project alignment before start of actual major construction activities. Actual air and noise monitoring results during major construction works will be compared with pre construction results and standards of MOEF and MPCB.
2. For controlling dust, contractors are doing water sprinkling on their sites during construction work. Wheel wash facilities is also provided at every main entrance and exit of site where vehicle movement is there.
3. Noise barriers are being provided at all critical locations like near schools and hospitals etc.
4. All construction vehicles are provided with noise mufflers, good silencers on sites.
5. All construction sites are barricaded by barricading boards in addition to noise barriers to control nose and demarcate site from general public and road users.
6. Preventive Maintenance schedule for all construction machinery at site are maintained. All construction machinery is having PUC certificates. Preventive maintenance of machinery will also reduce nose from machinery.
7. All rotating parts of construction machineries have provided with canopies and grills to control rotating parts nosed during construction phase.
8. Contractors have provided bio toilets on sites.

National Institute of Oceanography (NIO), Dona Paula, Goa is engaged for investigation on impact of coastal road project waves, water levels, seawater quality and related environmental aspects and work is in progress.

8 EDUCATION

As per the directives laid under section 61 (q), MMC Act 1888, MCGM has the obligation to provide free primary education to the citizens of Mumbai.

MCGM runs 8 medium schools, viz. Marathi, Hindi, Gujrathi, Urdu, English, Telugu, Tamil and Kannada along with MPS. We run 971 primary schools where 2,31,985 students are being taught by 7,377 teachers. We are also catering to 39,918 students in 223 secondary schools including MPS. There are 1,353 secondary school teachers working with us. We are catering to the educational needs of 815 especially abled students in 17 special schools and 82 teachers are teaching in these schools. 162 students are undergoing D.Ed. course in 2 MCGM, D.Ed colleges. We have 1,31,377 students from std. I to std. IV in 410 MCGM aided schools and 4,298 teaching and nonteaching staff is working in these schools. MCGM runs 848 preprimary (Balwadi) schools. Apart from education, music, painting, handicrafts and physical education are also being imparted to the students through the municipal corporation.

The Right to Free and Compulsory Education Act 2009 is being implemented as per the Maharashtra Government Act and Directions.

From the year 2009-10, 3 junior colleges of science have been started to facilitate the college education of the municipal students who get high marks in the examinations in secondary schools.

Further activities are being carried out by the Municipal Corporation with a view to reduce the use of books by the students, save the environment by reducing the use of paper and also enable them to experience the use of modern technology in school life.

- Digital Classrooms: BMC is imparting education to students through 1214 classrooms with the help of digital classes.
- VTC - Since 2011, Mumbai Municipal Corporation has been imparting education to students in a total of 480 schools in four mediums namely Marathi, Hindi, Urdu and English with the help of virtual classrooms.
- The municipal corporation conducts various types of competitive examinations such as Scholarship examination, Talent Search Examination, Mathematics, Science, English (IFO) to enhance the quality of students from the Municipal Schools.
- Various types of trainings are conducted by the District Training Center for the primary and secondary teachers of the Corporation. This year 12 types of trainings were conducted.
- 'Chala Shikuya Learning Level Program' was implemented for the quality development of students of Std. 1st to Std. 5th of MCGM.

- Students from all medium schools of Std. 1st to Std. 8th have a thorough knowledge of English. For this, training is being imparted to the teachers of the corporation through the social responsibility of the Pahile Akshar foundation.
- Self – Defense training is given to girl students studying in std. V to VIII and std. IX to X. Self-Defense training in Karate, Judo and Taekwondo raises their self-confidence. Our physical teachers proficient in self-defense skills are engaged in training our girl students.
- 12,000 student cadets of Brihanmumbai Municipal Corporation are actively engaged in 300 units of R.S.P.
- 28,612 students of Brihanmumbai Municipal Corporation participated in the Scout – Guide movement. 300 students qualified to participate in the State and President Award level, pre-test camp.
- Brihanmumbai Municipal Corporation had arranged the annual school picnic for std. IV and std. VII students to the Essel world, the amusement theme park. In which 56924 students were taken to this island of fun.
- 29,741 students of Std.I and 517 students from specially abled schools, such total 30,258 students were taken to the adorable Humboldt penguins in their excursion to the Veermata Jijabai Bhosale Udyan, Byculla zoo, Mumbai.
- Bidding procedures for appointment of housekeeping agencies is proposed. Previously 338 MCGM school buildings were availing the housekeeping facility. This year, it is proposed to implement this facility in all 467 school buildings.
- In the year 2013-14; 2028 water purifiers were purchased to avail safe purified drinking water to our school students. Dy. Chief Engineer (E & Mech.) south is working on the maintenance procedures of 1971 water purifiers.
- 10,794 polymer desks and benches were supplied to MCGM primary schools in the academic year 2019-2020.
- MCGM school students were provided with school uniform, rainy sandals, school bag, shoes-socks, raincoat, umbrella etc.
- As the internet is a must in the age of modern technology, the school is in the process of connecting new telephones with fast internet to 534 schools for office work.
- Scholarship and Attendance Allowance Scheme has been implemented for all the disabled students of Std. 1st to Std. 10th of the Brihanmumbai Municipal Corporation.
- Under the government sponsored scheme of school nutrition, mid-day meal is provided in schools of class 1st to 5th and 6th to 8th.
- Free medical check-up of students in municipal schools is done with the help of municipal health department and medical teams from National Child Health Program.
- Changing Moves, Changing Minds (CMCM) is the pilot project implemented in our schools. It is our Joint venture project with British Council, Royal Academy of Dance and Marylebone Cricket Clubs.

- Annual Balkotsav programme was conducted in every ward. Cultural programme, dramatization competition and folk dance competition were organized at ward level.
- Street play competitions were conducted at ward and Zone level.
- Total 12 students of our MCGM secondary schools have scored between 90 to 99.99% in March 2019 "SSC Board" examination.
- In the academic year 2018-19, total 170 students of std. V received scholarships in pre upper primary scholarship examination (PUP). Similarly, 69 of std. VIII received scholarships in pre secondary scholarship examination (PSS) conducted by Maharashtra State Council Examination Pune.
- The students from all the departments like Physical Education Department, Music-Arts Department, Scout-Guide Department and Road Safety Force have looted the prizes.
- Under the Corona Covid-19's preventive measures, during the lockdown period, all teachers and principals interact with every student in their school through mobile and internet, teaching and studying students online for at least 4 hours a day and are also evaluated accordingly. Case-wise question papers and component tests of all subjects are being prepared and distributed to the students using various social media apps to prepare them for evaluation. Students are regularly assessed by the teachers through Google Forms by giving multiple choice and short answer questions.
- The program "Rising Stars" was organized on 26.02.2020 to give space to the latent talents of music, sports, drama etc. in the children of BMC schools.
- Brihanmumbai Municipal Corporation (Education Department) - Music and Arts Academy Department conducted various competitions related to Swachhta Abhiyan in the year 2019-2020. The details of these competitions are as follows: -

1. Lord Shriganesha idol Pottery Workshop – Lord Shriganesha idol Creation Workshop was conducted from shadu clay for the students to create awareness among the citizens about the need to avoid

water pollution and plaster of Paris waste in beaches and lakes. It was attended by 360 students from 250 different schools of the corporation.

2. Brihanmumbai Municipal Corporation Education Department and Lions Club of Mumbai jointly organized a drawing competition and essay competition under Swachhta Abhiyan. Students from all the language schools of the corporation participated in this competition. The prize winning students of the competition were felicitated by the dignitaries at a grand function.

3. Based on the concept of 'My Mumbai' organized by the Hon'ble Mayor, topics related to 'How beautiful is my Mumbai' were given for 'Hindu Heart Emperor Shiv Sena Chief Mr. Balasaheb Thackeray Children's Painting Competition 2019-20'. About 59,621 participants from all over Mumbai participated in this competition. The award winning students were felicitated by dignitaries at a grand function with cash prizes and insignia.

9 AIR QUALITY STATUS

Air Quality Monitoring and Research Laboratory

Air Quality Monitoring and Research Laboratory working under environment department of Brihanmumbai Mahanagarpalika to measure the levels of air pollutants in MCGM jurisdiction has established a fixed air monitoring station in different location. Also measured air pollution level with the help of automatic van (Mobile Van) in dumping ground and traffic junctions. Whenever the complaints are received from citizens, special monitoring is carried out and the reports are submitted. This laboratory established in the year 1976 this the only one environmental laboratory to monitored ambient air pollutant.

As per 74th ammendment of the constitution of India in 1992 (12th schedule) the Maharashtra State Government issued an ordinance amend Municipal Corporation Act-1888 making "environment protection, promotion of ecology and urban forestry" as an obligatory duty vide section 61 (ab) in the year 1994. And under the section '63 B' of Mumbai Municipal Corporation (MMC) Act. 1888 Environmental Status Report is prepared and submitted every year before 31st July to the Corporation.

There are 4 working units in Air Quality Monitoring & Research Laboratory like Air Monitoring, Gaseous, Instrumentation & Mobile Monitoring Van.

- **Air Monitoring Unit:** To collect the samples of various pollutants from 5 fixed monitoring Sites with the help of High Volume Samplers by this unit like Sulpher dioxide (SO_2), Nitrogen dioxide (NO_2), Amonia (NH_3), temperature and relative humidity daily. The Air Quality monitoring is carried out as per the CPCB guidelines.
- **Gasesous Unit:** In this section samples of gasesous pollutants collected are analysed with the help of UV Spectrophotometer and result of pollutants are compared with standards set by Central Pollution Control Board (CPCB) and Monthly/Annual report is forwarded to Dy.Ch.Eng (Civil) Env/ Ch.Eng(SWM) and HOD EPRC department (KEM). The annual report is included in Environment Status Report (ESR) yearly.
- **Instrumentation Unit:** Analysis of Polynuclear Aromatic Hydrocabans (Phenanthrene, Anthracene, Fluoranthere, Pyrene, Benzo ($\mu g/m^3$) anthracene, Chrysene & Benzo ($\mu g/m^3$) Pyrene) extracted from suspended particulate matter are analysed with the help of Gas Chromatograph. The Benzo ($\mu g/m^3$) pyrene is one of the carcinogenic pollutant. The analysis of heavy metals [Arsenic (AS), Cadmium (Cd), Chromium (Cr), Copper (Cu), Iron (Fe), Nickel (Ni) & Lead (Pb)] extracted from suspended particulate matter are analysed with the help of Atomic Absorption Spectrophotometer. Pollution levels of Lead, Nickel & Arsenic are compared with standards prescribed by Central Pollution Control Board. This work has been stopped due to technical problems.
- **Mobile Van Monitoring Unit:** With the help of Mobile Van, monitoring is carried out at traffic junctions namely Wadala and Andheri. Similarly at the dumping grounds namely Deonar & Kanjur Marg. The pollutants analysed are SO_2, NO_2, CO, O_3, PM_{10}, $PM_{2.5}$, Hydrocarbans, VOC etc. Whenever the complains are received from citizens, special monitoring is carried out with the help of Mobile Van and the reports are submitted. Result of pollutants are compaired with standards set by

Central Pollution Control Board (CPCB) and Monthly/Annual report is forwarded to Dy.Ch.Eng (Civil) Env/ Ch.Eng(S.W.M.) and HOD EPRC department (KEM). The annual report is included in Environment Status Report (ESR) yearly. Monthly reports are published in local news papers.

The administrative sanction has been received from higher Authority for the installation of 5 Continous Ambient Air Quality Monitoring Stations in the jurisdiction of MCGM. The tendor process of the same is in progress The air quality data is made available to college students and researchers of concerned enviroment field by Air Quality Monitoring Research Laboratory.

Data received from 'SAFAR-Mumbai' is further analysed by Air Quality Monitoring and Research Laboratory for NO_2, CO, O_3, PM_{10}, $PM_{2.5}$ pollutants. Weather Forecast & Air Quality Index is now available to citizens on mobile app namely 'SAFAR-Air'.

Air Monitoring Sites

Sr. No.	Site	Located at
1	Worli	Transport building, E. Moses Road, Worli.
2	Andheri	Nityanand Marg Municipal School building, Koldongari, Andheri (W).
3	Bhandup	S Ward office building, L.B.S. Road, Bhandup (W).
4	Deonar	BEST Depot, Shivaji Nagar, Deonar.
5	Marvali	Marvali Municipal School, Kurla-Mahul Road, Near R.C.F. Marvali.

High Vallume Sampler

UV Spectrophotometer

Monitoring Chowki

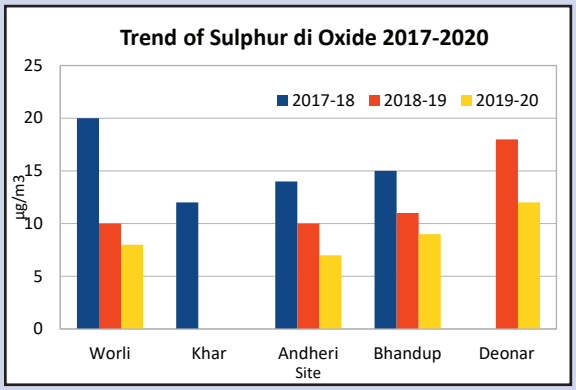
Air Quality Monitoring and Research Laboratory of Environment department monitors ambient air quality in Mumbai for criteria air pollutants namely; Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2), Ammonia (NH_3) etc. regularly. Air quality levels are evaluated in the year 2019-2020 for its compliance with ambient air quality standards set by Central Pollution Control Board (CPCB) for SO_2, NO_2 and NH_3.

Table No. 19.1: Ambient Air Quality Levels at fixed monitoring sites (Annual average)
April 1 to March 20

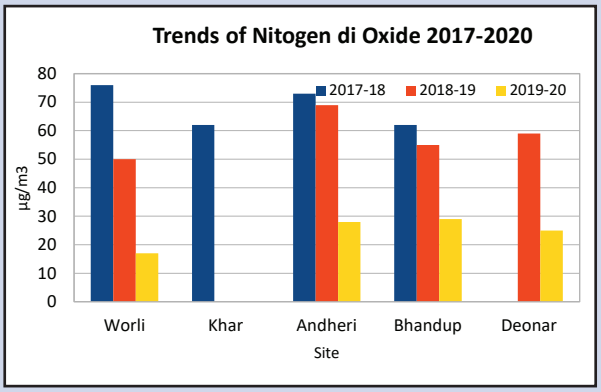
Sr. No.	Site	Unit µg/m³								
		Sulphur Dioxide			Nitrogen Dioxide			Ammonia		
		17-18	18-19	19-20	17-18	18-19	19-20	17-18	18-19	19-20
1	Worli	20	10	8	76	50	17	85	70	66
2	Khar	12	**	**	62	**	**	68	**	**
3	Andheri	14	10	7	73	69	28	73	75	80
4	Bhandup	15	11	9	62	55	29	72	79	84
5	Deonar	**	18	12	**	59	25	**	126	106
CPCB Standards g/m3		50			40			100		

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

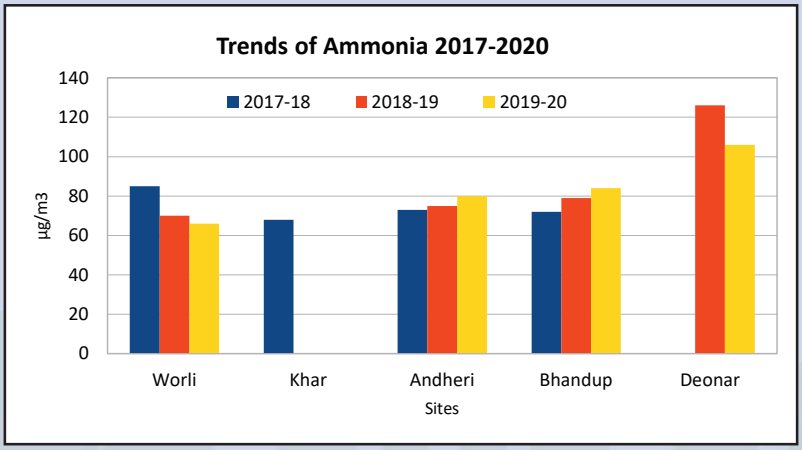
Graph 19.1



Graph 19.2



Graph 19.3



Comparison of Percentage exceeding 24 hours average with CPCB standards:

Levels of air pollutants SO_2, NO_2 and NH3 measured during 2017-18 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 less 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 at Deonar site; The levels of NH3 is 106 µg/m³ at Deonar site which is more than prescribed annual standards

Table No. 19.2: Range of the annual averages of pollutants at fix monitoring site (2019-2020)

Sr. No.	Unit µg/m³	Sulphur dioxide	Nitrogen dioxide	Ammonia
1	Range	7-12	17-29	66-106
2	Maximum at	Deonar	Bhandup	Deonar
3	CPCB standards	50	40	100
4	Comparison with CPCB standards	Not exceeded	Not exceeded	Not Exceeded at all sites except Deonar.

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 7-12 µg/m³ and are below prescribed standard (50µg/m³) at all sites. Maximum level found at Deonar.

2) NO_2 levels are found to be in the range of 17-29µg/m³ and have exceeded standard (40µg/m³) values at all sites. Maximum level found at Bhandup.

3) NH_3 levels are found to be in the range of 66-106 µg/m³ are below prescribed standard (100µg/m³) at all sites. Maximum level found at Deonar.

Table No. 19.3: Percentage exceeding CPCB standards (24 hours average) from the year [illegible] to 2

Sr. No.	Site	Sulphur Dioxide			Nitrogen Dioxide			Ammonia		
	Year	[illegible] 8	[illegible] 9	[illegible] 2	[illegible] 8	[illegible] 9	[illegible] 2	[illegible] 8	[illegible] 9	[illegible] 2
1	Worli	0	0	0	26	14	0	0	0	0
2	Khar	0	-	-	41	-	-	0	-	-
3	Andheri	0	0	0	33	36	0	0	1	0
4	Bhandup	0	0	0	30	23	0	0	0	0
5	Deonar	-	0	0	-	25	13	-	0	0

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

Comparison of Percentage exceeding 24 hours average with CPCB standards:

Comparison of Percentage exceeding 24 hours average with CPCB standards shows that,

1) SO_2 levels: No percentage exceeding the 24 hrs standards at all monitoring sites.

2) NO_2 levels: No Percentage exceeding the 24 hrs standards at all monitoring sites except at deonar site, at which 13% samples are exceeded the standard.

3) NH_3 levels: No percentage exceeding the 24 hrs standards at all monitoring sites.

Table No. 9.4 National Ambient Air Quality Standards central pollution control board, New Delhi (18th November, 09)

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

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 in the year 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 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.

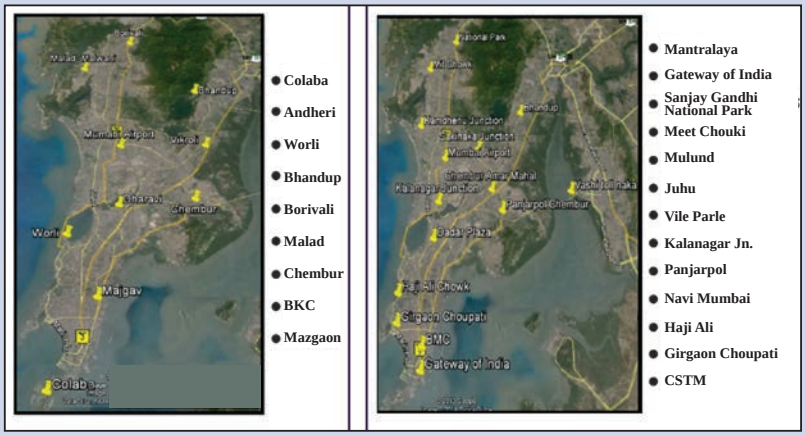
Table No. 15 SAFAR Mumbai Ccomprises of following products.

Sr. No.	Name of the Product	Nos.
1	Air Quality Monitoring Stations (AQMS)	10 nos.
2	Automatic Weather Stations (AWS)	16 nos.
3	LED, Digital Display Boards (DDS)	13 nos.

SAFAR-Mumbai Information to Public:

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

Map 11



Meteorological parameter like temperature, rainfall, relative humidity, wind speed and wind direction, high & low and alerts of severe weather conditions will be 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 System (Digital Display Boards)

1) 'SAFAR-AIR' (Mobile Application):

This "Mobile App" which can be downloaded free of cost. The "Mobile App" provides location specific current and forecaste 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 Digital Display Boards (DDB):

3 x 1.80 Meter LED digital display boards are installed at various sites for public viewing. The colour coded AQI, UVI and Health advisories and environmental slogans will educate the citizens of Mumbai.

Air quality levels are measured at various "SAFAR-Mumbai" sites during July 2015 to March 2018 for PM_{10}, $PM_{2.5}$, O_3, CO and NO_2 etc. as shown in Table No. 19.6

Table No. 19.6 Air quality levels at SAFAR-Mumbai's sites (Oct to Dec)

Sr. No.																
		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	78	44	19	0.7	26	90	41	21	0.6	34	99	42	16	0.7	17
2	Bhandup	82	43	30	0.9	23	80	45	33	0.9	23	59	31	26	0.8	14
3	BKC	111	67	12	1.0	18	128	86	7	0.8	23	114	67	9	0.8	10
4	Colaba	92	55	29	0.9	26	91	51	30	0.7	24	66	34	28	0.8	14
5	Andheri	109	63	17	1.1	30	120	79	18	0.9	28	110	51	13	0.8	26
6	Malad	81	49	24	1.1	26	98	66	14	1.1	15	95	58	14	0.9	12
7	Mazgaon	106	68	21	0.7	22	110	70	26	0.7	26	82	46	26	0.9	24
8	Worli	76	38	31	0.8	20	84	43	24	1.2	24	81	42	21	0.7	21
9	Borivali	99	61	20	0.7	12	113	62	16	1.0	15	86	42	14	0.6	11
	Average	93	54	23	0.9	23	101	60	21	0.9	24	93	54	23	0.9	23
	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)

Source: SAFAR Mumbai

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.

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.

Annual Averages:

1. Levels of Suspended Particulates (PM_{10}) are found to be in the range of 59-114µg/m3 during 2019-20. Maximum level of PM_{10} is observed at BKC. Annual average levels of Suspended Particulates (PM_{10}) are showing similar trend.
2. Levels of Suspended Particulates ($PM_{2.5}$) are found to be in the range of 31-67µg/m3 during 2019-20. Maximum level of $PM_{2.5}$ is observed at BKC. Annual average levels of Suspended Particulates ($PM_{2.5}$) are showing noticible difference .
3. Levels of Ozone (O_3) are found to be in the range of 9-28 ppb during 2019-20. Maximum level of O_3 is observed at Colaba. Annual average levels of Ozone (O_3) are showing noticible difference.

4. Levels of Carbon Monoxide (CO) are found to be in the range of 0.6-0.9 ppm for the year 2019-20. Maximum level of CO is observed at Mazgoan and Malad. Annual average levels of Carbon Monoxide (CO) are not showing noticible difference.

5. Levels of Nitrogen di-oxide (NO2)are found to be in the range of 10-26 ppb during 2019-20. Maximum level of NO2 is observed at Andheri. Annual avg levels of Nitrogen di-oxide (NO2) are not showing noticeable difference.

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 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 INDUSTRIES

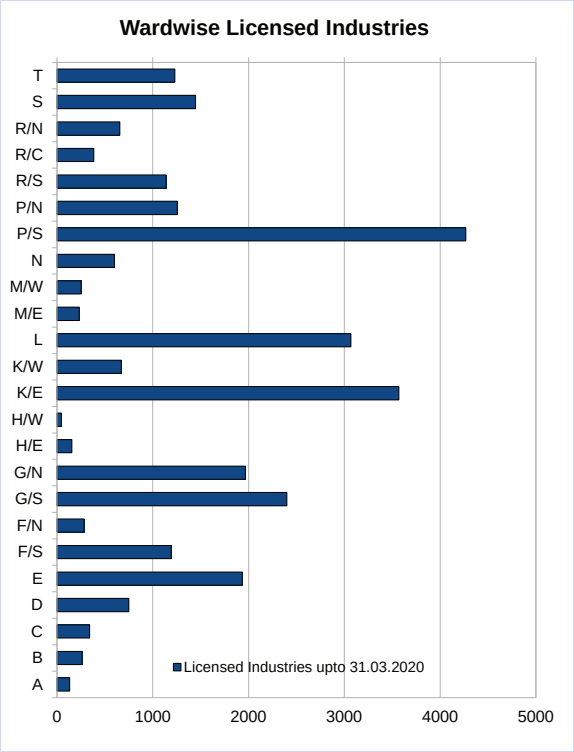
Environmental pollution is a by-product of industrialization. However, with the modern technologies, pollution potential of industries/factoroies are lowering. There are 28233 no. of industries are covered under section 390 of Mumbai Municipal Corporation Act 1888. These industries pay Air Pollution Prevention Fees on the basis of horsepower of the connected load. There are 9260 industries/factories are located in the city area, 12144 in Western Suburbs and 6829 in Eastern Suburbs. Maximum industries 4269 are in P-South ward. Ward-wise distribution of industries are shown in Table 20.1.

Table No. 20.1: Wardwise Licensed Industries

Sr. No.	Ward	Licensed industries upto 31.03.2020
1	A	133
2	B	*262
3	C	340
4	D	750
5	E	1935
6	F/S	1193
7	F/N	281
8	G/S	2399
9	G/N	1967
10	H/E	*156
11	H/W	46
12	K/E	3569
13	K/W	672
14	L	3069
15	M/E	230
16	M/W	252
17	N	*600
18	P/S	4269
19	P/N	1255
20	R/S	1139
21	R/C	*383
22	R/N	655
23	S	1447
24	T	1231
	Total	28233

Source : All Ward of MCGM *As per Data of the year 2017

Graph 20.1



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.

Generation of Electrical Energy From Wet Waste:

Environment section has proposed to generate about 800units per day of untraditional electricity from approximately 10Ton wet waste generated in Late Minatai Thakarey Flower Market. Generated electricity will be utilised for Late Promod Mahajan Udyan, Flower Market, Fisht Market, Dadar Garage and Dadar Sewerage Treatment Plant for illumination.

MCGM will get benefits as fallows:

- Segregation and disposal of waste at source,
- Saving in transportation cost,
- Generation of untraditional electricity.

Reuse of Tender Coconut Waste:

Environment section has proposed a pilot project of processing 1 ton tender coconut shells for manufacturing environment friendly products as office cubical partition walls, office trays, dry dust bins, biomedical dust bins, black board dusters etc. On success, the project will be augmented to cater about entire 4 ton tender coconut shells waste generated in Mumbai.

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 to be a role model for environment and has always focused on environment protection and creating awareness for sustaining these efforts. We are continuously innovating our processes and trying to improve operational efficiency towards energy conservation, reduction in water consumption and implementation of renewable energy initiatives every year as a part of green initiative.

Few major Initiative taken towards environment improvement during the year 2019-2020 are listed below:

1 Commissioning of Gasoline Treatment Unit (GTU):

As per Government mandate, BPCL is laready delivering BS IV compliant HSD & MS w.e.f. 1st April 2017 to the nation. In order to comply the new norms of BS VI grade fuel (Sulphur < 10 ppm) and delivering to the nation w.e.f. 1st April 2020, BPCL Mumbai Refinery commissioned Gasoline Treatment Unit in October 2019 with a capital investment of 544 Crores. By successfully commissioning this facility, sulphur in Motor Spirit (MS) was brought down to < 10 ppm.

2 Renewable Energy

As a part of environment Protection, BPCL MR has taken new initiatives in the area of sustainability and for generation of clean energy. In view of this initiative, BPCL MR had already installed solar panels

of capacity 1000 KwP. In 2019-2020, BPCL MR installed solar panels with capacity of 506 KwP at the rooftop of various control rooms, thus increasing total solar power generation capacity from BPCL MR to 1500 KwP. The objective of this project is to utilize renewable solar energy for electricity generation and use in refinery. The system is commissioned with SIM based remote data monitoring which is one of the component of digital journey of BPCL.

Also, in 2019-2020, BPCL MR has repalced 100% existing conventional light fitting with LED fittings, thus becoming 1st PSU refinery to achieve this milestone.

3 Water Conservation:

- Rain Water Harvesting: Water being a scarce but essential resource, it is necessary to conserve the same. 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 2019-2020 is 71,000 KL. An area of 3200 square meters was added during the year 2019-2020 with a potential to harvest 6,160 KL per year of rain water.

- Recycling of Sewage Treated Water from M/s RCF: BPCL MR has signed Memorandum of Understanding (MoU) with M/s RCF, Chembur for installing Sewage Treatment Plant (STP) at their premises with design capacity of 22 MLD and operating capacity of 15 MLD. This unit was commissioned on 10th September 2019 and since then BPCL MR is receiving around 6 MLD of treated sewage water form M/s RCF. Because of this water receipt, BMC water consumption to BPL MR has reduced by equivalent amount thus, making this much water quantity available for drinking purpose for public domain. This initiative embarks BPCL's efforts towards reduction in fresh water consumption and recycling/ reusing of waste water to strengthen for sustainability development.

4 Campaign Green Earth:

- Tree Plantation:

  In 2019-2020, BPCL MR planted 10400 number of trees at various locations such as Panvel, Titwala, Urban etc. As sustaining planted trees is very important along with plantation, BPCL MR has given contract for maintenance of the same for two years.

- Butterfly Garden:

  Butterfly garden and verticle garden was developed by BPCL in partnership with the Centre for Environmental Research Education (CERE)

Rashtriya Chemicals & Fertilizers Limited

Rashtriya Chemicals and Fertilizers (RCF) Ltd., conforms to a strong commitment towards Environment Conservation by minimizing the emissions including greenhouse gases and also improving on the standards laid down by Statutory Agencies.

RCF has received various awards and honors in appreciation of the Environment management, Safety and health standards and procedures that are maintained.

Environment Management System and Green Belt Development at RCF Trombay Unit:

Environment Management System:

1. RCF has the highest standards of Quality, Environment and Safety & Health with ISO 9001, ISO 14001 and ISO 45001 certification as well as certification for IFA Protect & Sustain Product Stewardship System.
2. The Systems are constantly upgraded and regular internal/external audits and Management Reviews are carried out to ensure compliance and continual improvement of the systems.

Online Monitoring Systems:

1. Online Stack Monitoring: SO2 from Sulphuric Acid Plant, NOx from Medium Pressure and High pressure Nitric Acid Plant, and NH3 from Suphala Plant are monitored continuously and data is being transmitted to MPCB & CPCB servers.
2. Online Effluent Monitoring: pH, flow and Ammonical Nitrogen of treated effluent from Effluent Treatment Plant are monitored continuously and data is being transmitted to MPCB & CPCB servers.
3. Ambient Air Monitoring: Four fixed ambient air quality monitoring stations are in place to monitor ammonia, NO_x, SO_2, Particulate matter (PM_{10} & $PM_{2.5}$) & metrological parameters.

Green Belt development:

Under Green belt development RCF Trombay Unit takes various initiatives like:

1. RCF Trombay Unit bagged First prize for Tree planation (Less than 100 nos. category) and Second prize for Landscape garden on the spot category in 25th Annual flower and Garden show organized by Brihanmumbai Mahanagar Palika (BMC) at Byculla on 31st January to 2nd February 2020.
2. RCF Trombay unit has taken up a massive plantation drive in factory premises, in residential colony and surrounding areas and planted numbers of trees.
3. In the year 2019-20 RCF Trombay Unit has planted 310 nos. of trees namely Ashoka, Karanj, Taman etc.
4. For increasing awareness regarding environment and safety, public awareness campaign programmes are arranged by RCF Trombay unit by providing demonstrations to local youth, college and school students, housing societies, ladies club members and household members in the adjoining localities.

Mumbai Port Trust

Mumbai Port Trust was established in 1873 and has been one of the premier major port of India. Mumbai Port Trust has continuous commitment to the issues related to the environmental concern and has strives to contribute its share. Few such efforts are listed here below.

1. Port has its own dedicated Pollution Control Cell and laboratory for collection and testing of harbour water and air samples. This include testing of RSPM- PM10, PM2.5, SO2, NO2 and CO etc. in air pollution and BOD, DO, TSS, Oil and Grease are tested for water pollution in harbour aera.

2. Approxmate quantity of solid waste generated in the MbPT estate is approximately 67000 m3/year. This waste is transported to MCGM dumping ground at Mulund for land filling and waste processing at their end.
3. Every year MbPT plants and maintains thousands of trees in its estate. MbPT has developed and maintains 13 acres of botanical garden called 'Sagar Upvan' at colaba in south Mumbai. The water used for this garden is from the sewage treatment plant constructed by the MbPT, in the garden. The capacity of sewage treatment plant is 250 cu.m./day. Like this, MbPT maintains many green patches/ belts in it's estate.
4. Bombay Natural History Society (BNHS) have started the project 'Saving Flamingoes, mangroves and mud flats of Sewree and adjoining areas'. In this connection, BNHS also organizes Flamingo festival every year.

Tata Pawers

The following measures are taken by Tata Power to maintain the balance of the environment.

1 Fuel Quality& Emission:

Use of low sulphure (0.1 to 0.2%) low ash(5%) imported coal for power generation.

2 Air Pollution Control:

i. Stack Height of 275 m for wider dispersion of pollutants.

ii. Electrostatic precipitator for Unit 5 and Unit 8.

iii. To remove sulphur from fuel and at Unit 5 and 8 Fuel Gas Desulphurization is used.

iv. To minimize emission of NOx burner is used.

v. Use of imported coal that contains low Sulphur (0.1 to 0.2%) low ash (5%).

3. Fugitive dust control:

Used Screw Unloader (State of Art) for unloading coal at coal berth.

Pipe conveyor for carrying coal from coal berth to boiler.

Stacker Reclaimer for handling of coal.

Green belt around coal yard and coal berth.

Water sprinkling system around coal yard for dust supperssion.

4 Pollution Control and Treatment:

Manage ETP & STP for treatment of effluent.

Coal Pile run off system at Coal Yard and Coal Berth.

Cooling water channel and aerators to reduce the temp of discharge water.

STP water reused for gardening.

5. Solid Waste and Hazardous Waste:

i. Minimal Ash generation due to use of imported low Ash (5%) coal; 100% fly ash and bottom ash utilization for gardening purpose.

ii. Used Oil is disposed to MPCB approved agency .

iii. E-waste, used batteries and biomedical waste is disposed to MPCB approved agency.

21H EALTH

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.

Table No. 21.1 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.

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.

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, Chikungunya, 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.21.2. It shows Birth & Death Rates and also Infant & Maternal mortality in the year 2018 to 2019. In Year 2019 Birth rate in Mumbai was 11.61/1000 population and the Death rate was 7.11/1000 population in the year 2019. Infant mortality rate was 23.04/1000 Live Births and Maternal Mortality rate 1.73/1000 Live Births for mothers.

(These rates are as per Central Government New CRS System- Provisional)

Table No. 21.2: Health Statistics- Birth & Death Rates

	Year [redacted]	Year [redacted]	Year [redacted]
Birth (Registered)	154642	151187	148898
Birth Rate/1000 population	12.14	11.83	11.61
Death (Registered)	88845	88852	91223
Death Rate/1000 population	6.98	6.95	7.11
Infant Mortality	4.71	3723	3430
Infant Mortality Rate/1000 live birth	26.33	24.63	23.04
Maternal Death	236	218	257
Maternal Mortality Rate/1000 live birth	1.53	1.44	1.73

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, Diphtheria are isolated in different wards & treated.

2. In 2019 – 20 patients with Covid – 19 are being treated on OPD basis as well as admitted in ward for treatment.
3. 20 Beds with advanced ventilators have been started in ICU for Life Saving Treatment of patients.
4. New Screening OPD ward no. 9, Isolation wards, 125 beds wards & ICU for COVID – 19 have been started for patients.
5. New equipment purchased for COIVD – 19 to aid in the diagnosis of COVID -19 in PCR Lab

Report of different diseases
April [illegible] o March [illegible]

Sr. No.	Disease	Number of Patient	Death
1	Malaria	1691	--
2	Dengue	3031	3
3	Lepto	298	2
4	H1N1	159	11
5	COVID-19	168	4

Tuberculosis (TB):

TB Control Programme:

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

There are total 267 PHI treatment centers 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, 3LPA, 9BDQ 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 diagnostics and treatment centres on OPD basis. 1) Shamaldas Gandhi Marg TB Clinic, 2) Balaram Street TB Clinic, 3) Ramkunwar Daftary TB Clinic, Dadar 4) Smt. & Shri. M. M. Munshi TB Clinic, Khar and 5) Nawabtank 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 Patients (Male & Female) have been started from 26th July 2010. Supra major thoracic surgery is started from March 2012 at G.T.B. Hospital. Till date 281 update surgeries and 17995 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 2011 since then periodical medical check up done every 3 month for G.T.B. Hospital employees. Personal protective equipments, 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. Hospital at sewree was selected as one of the six centre for Badaquiline CAP with two bedded ICU. New dedicated BDQ OPD started ;at G.T.B. hospital and nearly 363 new patients started on new drug BDQ.

In Covid 19 epidemic G.T.B. Hospital started Tuberculosis covid Co-infection ward and as of now treatment given to 21 patients.

Acworth Municipal Hospital for Leprosy

Mr. H.A. Acworth founded Acworth Municipal Hospital for Leprosy on 7th November1890 the then Municipal Commissioner of Mumbai.

Since 1st April 1991, the hospital has been taken over by Brihanmumbai Mahanagarpalika as one of the specialized hospitals under the administrative control of the Executive Health Officer.

Services provided by Acworth Municipal hospital for leprosy:

Acworth Hospital provides comprehensive care to the leprosy affected patients.

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 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:

Out-patient services include physiotherapy, social service, laboratory, dressing and pharmacy. Daily average OPD attendance is about 45 patients.

3 Field Work:

Under National Leprosy Elimination Programme, the hospital carries out IEC activities in its project area i.e. Municipal wards (E, F/South and F/North) covering about 16 lacs population.

4) Re-constructive Surgeries:

The hospital is a recognized centre for reconstructive surgeries by State Government where re-constructive surgeries are carried out for correction of deformities of hands and feet of leprosy patients.

5) Training:

The hospital provides training in leprosy to post-graduate and under-graduate allopathy and non-allopathy medical students as well as to student nurses, Social Science and O.T./ P.T. student. The hospital also offers training to Govt. Medical Officers, Non-medical assistants.

6) Medical Records:

The hospital maintains statistical records and generates various reports thereby assessing the progress of N.L.E.P. in entire Mumbai.

7) Collaborative Programme of Acworth Municipal Hospital and NGO's:

i. Acworth Leprosy Museum: Provides scientific information about all aspects of leprosy.

ii. Footware Unit: MCR footwear, Splints are provided to the leprosy patients at concessional rates.

iii. Central Registry: Help in planning the NLEP action plan for Mumbai district.

Mumbai District Statistics 2019-2020

New Leprosy Patients found	453
Contagious patients out of new Patients	386
Non-contagious patients out of new Patients	167
PR (per 1000 population)	0.2

Acworth Hospital Statistics 2019-2020

New Leprosy Patients found (E, F/S & F/N Wards)	48
Contagious patients out of new Patients	29
Non-contagious patients out of new Patients	19
PR (per 1000 population)	0.2

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 AIDS Control Society:

Mumbai District 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 district 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 woman 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 at the earliest during 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 333 ICTCs which includes 45 stand-alone ICTCs, 5 mobile vans and 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 Therapy (ART):

Treatment for HIV positive patients is made available through 19 ART Centres set up in various Hospitals in Mumbai. These centers are in 7 Medical Colleges, 6 Peripheral Hospitals, 3 are in public private partnership (Godrej, L&T & Wadia), 1 in Mumbai Port Trust Hospital & 2 in MCGM dispensary (STD Clinic & TB Hospital). Four Link ART centers are also functional in Mumbai city. Total 39949 patients are registered in active care with ART centers. Out of this, 39509 patients are on ART.

Blood Safety

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 Blood Safety Division.

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 borne 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.

Sexually and Reproductive Health Services:

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. Regional STI training Reference Laboratory in B.Y.L. Nair Hospital linked to these Suraksha Clinics for etiological diagnosis of STIs.

Targeted Interv ntion (TI):

Targeted interventions are aimed at offering prevention and care services to high risk populations of Female Sex Workers, Men having Sex with Men, Transgender and Injecting Drug 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 36 project are linked to appropriate HIV testing and Treatment services.

Information,E ducation & Communication:

IEC plays an important role in all prevention efforts. Various awareness campaigns are held using mass media and outdoor approach. 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 positivity trend has witnessed a significant decline among general clients (11% in 2007 to 0.96% in 2019), Pregnant Women (0.87% to 0.09% in 2020) in Mumbai.

Table No. 3 HIV/AIDS Control Programme Report (March)

HIV testing at Integrated Counseling and Testing Centers of Mumabi	Tested	Positiv		Treatment for HIV positiv patients at ART Centers in Mumbai	Adult	Children	Total
General Clients	465569	4473		Number of HIV Positive patients registered in active care	38274	1675	39949
Pregnant Women	172814	150		Number of HIV Positive patients on Anti-Retroviral Treatment (ART)	37843	1666	39509

Env ronmental Pollution Research Center (EPRC):

Seth G. S,M edical Collage and K.E.M. Hospital

Air pollution is defined as any substance excessive in the air that may harm humans, animals, vegetation, or materials.

Pollutants come from various sources, and each have differing characteristics depending on their composition, source, and conditions under which they were produced. The damage to human tissue by gases depends on their water solubility, concentration, ability to oxidize tissue and the affected person's

susceptibility.

PM is usually classified by its size or aerodynamic diameter. Beyond its size, the harm caused by PM relates to its structure and composition. PM, can also interact with airborne allergens as hapten carriers to trigger or even induce allergic asthma reactions in sensitized subjects. The efficiency of particulate clearance is a factor in how pollution affects the body. The immune and inflammatory responses to air pollutants may be genetically regulated.

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

Table No. 24 In the year 2019-20 following survey have been undertaken by EPRC team.

S. N.	Period	Area	Group Surveyed	Total Nos.
1	19/4/19 to 27/4/19	Varchiaali & Khalchiaali, Mahulgaon, Chembur	Census: 191 families	223
			Medical Camp: 32	
2	10-05-2019	Worli Traffic Police, Worli	Medical Camp: 18	18
3	4/6/19 to 14/6/19	Anikgaon Shankar Mandir, Chembur	Census: 47 families	188
			Questionnaire:116	
			Medical Camp:25	
4	3/7/19 to 10/7/19	Chereshwar CHS, Mahul, Chembur	Census:22 families	53
			Medical Camp: 31	
5	24/9/19 to 27/9/19	Asalpha Village, Kurla	Census:44 families	155
			Questionnaire:100	
			Medical Camp:11	
6	1/10/19 to 5/10/19	Ambedkarnagar, Marol pipeline, Andheri	Census:71 families	219
			Questionnaire:148	
7	7/10/19 to 9/10/19	Ambapada gaon, Mahul, Chembur	Census:65 families	195
			Questionnaire:130	
8	23/10/19 to 30/10/19 & 23-12-2019	Evershine PAP complex, MMRDA Vasahat, Building No 72, Mahul	Census: 125 families	156
			Medical Camp:31	
9	1/11/19 to till date	National Environmental Health Profile Project: Ongoing	Medical Camp:817	817
		Sarova Complex Kandivali (E),		
		Sai Smruti CHS Borivali (E),		
		Green View Complex Borivali(E),		
		Sai Ashish CHS Borivali(E),		
		Mahalaxmi CHS Borivali(E)		
10	15-01-2020	Traffic Police, Dadar	Medical Camp:30	30
11	1/4/2019 to 31/3/2020	Asthma Education	OPD	1779
12	1/4/2019 to 31/3/2020	Pulmonary Function Test	OPD	3463

Source: EPRC KEM

Educating patients regarding environmental triggers & control measures with appropriate treatment leads to better symptom control. In the year April 2019 to March 2020 total of 1779 patients were provided individualized and structured asthma education. 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, monitoring severity and training regarding use of appropriate inhaled medication. Health literacy regarding learning inhaler technique is assessed and appropriate technique is taught. More accurate exposure-effect relationships will help with the assessment of health benefits

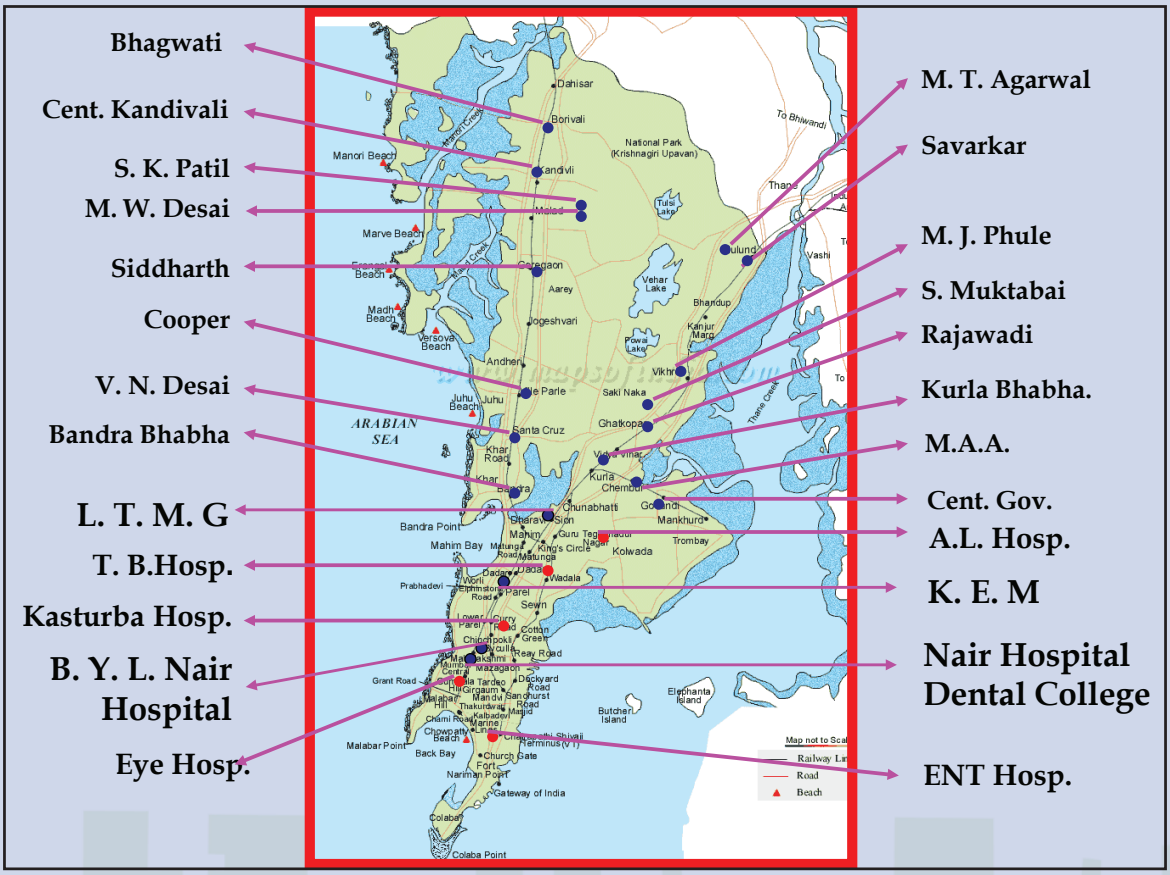
associated with various control measures.

Ministry of Environment & Forest & Climate change (GOI) has selected Environmental Pollution Research Centre, K.E.M. Hospital, as one of the centers for assessment of Health risk profile in a 20-city study over the country. National Environmental Health Profile: 20 City Multi-Site Study is being carried out for 3 years starting from year 2019. The objectives of this study are as follows:

1. To generate evidence through systematic review/metaanalysis using available studies
2. To compare the level of air pollution, health outcomes across twenty cities in the country.
3. To determine the effects of air pollution on health outcomes.
4. To generate a model to predict the health outcomes attributable to air pollution.

As a part of observance of "WORLD ASTHMA DAY", Asthma Education & Awareness Camp along with Lectures was conducted on 10/5/2019 at Traffic Police Head Quarters, Worli. It was attended by approximately 60 staff members from Traffic Police Department.18 people participated in Medical Camp.

Hosptlas in Mumbai



2D ISASTER MANAGEMENT

Disaster Management & Central Complaint Registration Department:

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 55 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 5308 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):

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

Installation of Radar Level Transmitter (Flow Level Sensors):

- Radar Level Transmitters are installed to monitor water level in rivers and lakes. It gives real time information in Disaster Control Room.
- 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.

Table No. 21 ESF Chart

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)

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 objectiv of dev loping 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 the year 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.

During this pandemic the work of management of ambulances, hearses & hospital bed allotment has been assigned to Disaster Management Department. For this “Covid-19 Helpline” for citizens of Mumbai has been started on existing Disaster Management short digit Helpline Number: 1916. On this helpline four IVR options are provided to address the respective queries of callers / Citizens as follows,

Option 1 : Consultation / Information on Covid-19 with MCGM doctors

Option 2 : Ambulance / Hearse requirement

Option 3 : Hospital bed availability / Management for Covid-19 Positive Patient

Option 4 : Other Complaint

3M UNICIPAL PUBLIC RELATIONS DEPARTMENT

The Public Relations Department provides information on various civic services, projects, important civic events and ceremonies. In addition, various civic events and ceremonies with protocol, of the corporation are organized and the information about this is provided by the department to the respective department. The department conducts campaigns on public health, community immunization, hygiene, environment, education and other civic issues. Sanitation, water scarcity, flooding of slums and other low lying areas in Greater Mumbai, flooding in monsoons, collapse of dangerous buildings as well as accidents such as landslides and various civic services are regularly disseminated by the department.

Main Functions of Public Relations Department:

1 Publications:

In this public guide, civic diary, information of various departments, list of names of corporators and officers, Brihanmumbai Municipal Corporation dairies, calendar, publications on important civic events and other civic matters, illustrated posters, pamphlets and brochures etc. The material is created. These publications are kept in the account for sale.

2 Competition:

Every year 'Shri Ganesh Gaurav Competition' is organized by the Public Relations Department in the Greater Mumbai area. In this, the social, educational, environmental, awareness enlightenment and services related to the corporation are examined by the examining boards and the prizes are given in a special ceremony.

3 Brihanmumbai Mahanagarpalika Patrika:

This department is responsible for publishing and distributing the magazine 'Brihanmumbai Mahanagarpalika Patrika' as the news letter of Brihanmumbai Mahanagarpalika. This Patrika Launched in a new format from 01 May 2013.

4 News letters and Photo graphs:

Information on various civic services and facilities provided by the Corporation, press releases on various activities of the Corporation as well as newsletters/ press releases sent by various departments and heads of various departments, newsletters of various programs of the Corporation's office bearers and officials, newspapers and media. The work is done by the public relations department. Coverage of every important event and function of the corporation is done by this department.Various photographs are stored through this section.

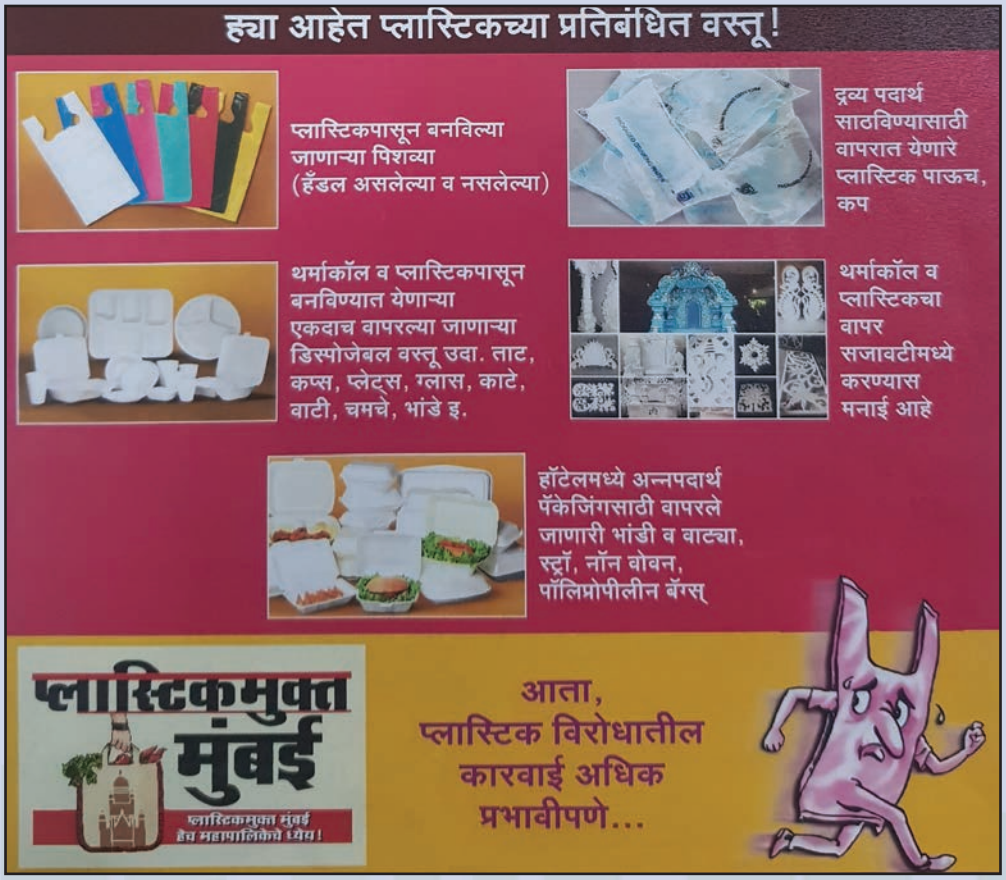
5 Adv rtisement:

In addition to publishing all types of advertisements and important awareness advertisements for the citizens of the Corporation, the Public Relations Department also takes the decision of making strategic decisions regarding advertisements as well as developing links with the media, newspapers and advertising agencies. The Public Relations Department has made the work of advertisements published by various departments of the Corporation easier and more efficient.

The following is a summary of the effective advertisements published by the Department of Public Relations in various linguistic newspapers in the year 2019-20.

- Public Relations Department organized by Shri.Ganesh Gaurav Award Competition-2019 Colorful advertisement with polite notice environment message for Ganesh devotees has been published in various linguistic newspapers.
- Colorful Advertisement on Plastic Free: On the occasion of the 150th birth anniversary of the Father of the Nation, Mahatma Gandhi, a colorful advertisement has been published in various linguistic newspapers conveying the environmental message that Mumbaikars should successfully get rid of plastic and permanent emancipation of Mumbaikars from 'plastic' slavery.
- Colorful advertisements have been published in various linguistic local newspapers to create environmental awareness among the people of Mumbai, including citizens, traders and peddlers, not to use/ ban plastics.

Apart from this, various programs are organized on exhibitions on various topics, newspaper revelations, grievances of citizens as well as dissemination of Marathi language.



2R EVISED ACTION PLAN FOR CONTROL OF AIR POLLUTION IN NON-ATTAINMENT CITIES OF MAHARASHTRA,M UMBAI

The issue of air pollution is becoming more complex day by day and the National Green Tribunal has directed the polluted cities to submit an action plan to bring the air pollution in the city within the prescribed standards. Also, instructions issued by the Maharashtra Pollution Control Board from time to time as per the Air Pollution (Control and Regulation) Act, 1981 and measures to control various changes in the environment due to pollution, as per the instructions sent to the Municipal Corporation by the Central Pollution Control Board and Maharashtra Pollution Control Board. The plan was prepared and sent to the Central Pollution Control Board for approval. The action plan has been approved by the Central Pollution Control Board on 9 October 2019 with some recommendations. The action plan places special emphasis on traffic congestion, air pollution and alternatively noise pollution. It also includes widening of roads, keeping roads in order, disciplining traffic, developing traffic control systems, developing green belts along to traffic routes, etc.

The various departments of the Corporation as well as the stakeholders of the Government of Maharashtra/ Central Government have been informed regarding the achievement of the target. These include Chief Engineer (Roads and Transport), Chief Engineer (S.W.M.), Chief Engineer (Development Planning), Chief Engineer (M&E), Executive Health Officer, Garden Superintendent and Assistant Commissioner of all wards, RTO, Traffic Police, Mumbai Metropolitan and Regional Development Authority, Mumbai Port Trust, BEST, Railways, Metro Railways, MSEDCL, Reliance, Maharashtra State Road Development Corporation, MHADA, Ministry of Transport , Ministry of Petroleum, Ministry of Mines etc.

The Action Plan for Control of Air Pollution of Mumbai the Stakeholders are to concentrate on the action to be taken as mention in the following table.

Sr. No.	Sub No.	Action	Responsible agency(ies)	Remarks
1. Source Group: Vehicle Emission				
1	(i)	Regula Checking of vehicula emission a d issue of pollution under control (PUC) certificate.	RTO, Traffic Police	Refer Annexure B (1.4) **PUC checking** in every 6 months for BEST buses. RTO approved agency appointed for issuing the PUC certificate. Certificate displayed inside every bus. Ra dom PUC check pla ned by RTO. As per the provision of Motor Vehicle Act 1988, 1379 ca es have been registered in yea 2017 a d 464 ca es have been registered in yea 2018 (up to 31st august) by the Traffic control Branch of Mumbai Police for non-compli a ce of PUC norms.
	(ii)	Promoting Green mode of tra sport by creating Cycle tra ks.	MCGM	**Promoting Cycle tracks** -To promote the green mode of tra sport, 36 Km Cycle Tra k Works a ong with wa kway a d other infra tructure have been initiated in three Phases. Work of the Pilot project for 2 Kms has been completed in Mulund & from NITIE gate to Vijay Nagar Bridge in Ma ol.

Sr. No.	Sub No.	Action	Responsible agency(ies)	Remarks
	(iii)	Minimizing use of personal vehicles with promotion of public transport by bus fare reduction policy, GPS bus tracking mobile application development.	BEST	BEST declared reduction in the bus fare to promote maximum use of public transport on 8th July, 2019. Intelligent Traffic Management System (ITMS) program launched by BEST. Under this program Mobile Application development is in progress for passengers to get information related about expected arrival of buses, route. It enables GPS tracking of the buses.
	(iv)	Public awareness campaigns, workshops, VMS boards, Auto Expo for promoting Eco friendly Mobility	RTO, Traffic Police, MPCB	Refer Annexure B (1.5) MPC Board has organized **"Eco friendly Mobility for Clean Air"** workshop in collaboration with NEERI, Mumbai first where innovative solutions like commuter's choice program, retro fitment, introduction of Metro,etc. were discussed. With stakeholders including other government agencies, NGOs, expert from Industries, research institutes, Public Awareness message to observe lane discipline and air pollution control have been displayed on **36 VMS boards** installed across the City. Similarly, various awareness programs are organized time to time especially during Road Safety Week.
	(v)	Providing pay & park, PPL (Public Private Lot), multilayer parking and amenity sites for parking of vehicles to avoid parking atNon designated area	Ch.E. (Roads & Traffic)_MC GM, MMRDA, RTO, Traffic Police,	Refer Annexure B (1.6-1.8) **77 locations** across Mumbai identified for Pay and Park. It may provide parking for around 15000 vehicles. Details of the identified locations, vehicle type, operating agecy provided in the **Annexure B 1.8.** Also, **26 PPL** (Public Private lot) and **29 amenity parking** sites are identified. Hon'ble M.C. has approved the proposal for initiation of Mumbai Parking Authority by appointing Parking Commissioner ,Mumbai along with support staff to enable the Parking Commissioner to lead the process of formation & operationalization of Mumbai Parking Authority. The work is commenced under the guidance of Shri Ranjit Thakur (OSD-MPA) To tackle the parking issues, MMRDA has identified **11 multi level parking** locations within BKC. Traffic Control Branch of Mumbai has taken action against 2,99,721 and 3,23,324 vehicles in the year 2018 from (1st Sept. 2018 to Dec. 2018) and 2019 (upto 19th Aug.) respectively for traffic voilation regarding illegal parking.
	(vi)	Initiate steps for retrofitting of particulate filters in Diesel vehicles, when BS-VI fuels are available.	RTO, Vehicle Mfg. Industries	Letter issued to NEERI for conducting feasibility study for retrofitement of ECD (Emission Control Devices) and to evaluate effect of temperature. Based on the outcome of the study, results will be implemented.
	(vii)	Checking fuel adulteration and random monitoring of fuel quality data	Ministry of Petroleum& Natural Gas & Oil marketing Companies	Government of India has formed Anti- Adulteration Cell headed by Director General . Having four deputy directors for four Zones of India The authority is responsible for Prevention of adulteration & other malpractices in the sale. In a Auto fuel Policy report, the problem of Fuel Adulteration is taken into consideration. Directions are given to oil companies.

Sr. No.	Sub No.	Action	Responsible agency(ies)	Remarks
	(viii)	Widening of road and improvement of Infrastructure for decongestion of Roads.	Ch. Eng(DP)_ MCGM, Assistant Commissioner (All wards)_MCGM	Refer Annexure B (1.1) . Widening and Improvement of existing road of 2.8 km.from Oberoi Mall to Film City and 2.5 km. of Tasa Pipe Widening and reconstruction of bridge across Mithi River at Mahim Causewayis awarded at the Contract Cost of ₹103.27 cr. As a part of the Transportation network, the Draft DP 2034 has provided the following roads on therevised Draft DP sheets:I. Newly proposed DP roads not in existence earlier,II. Sanctioned Revised Development Plan 1991 (SRDP1991) DP roads not developed till date and hence shown as proposed DP roadsIII. SRDP1991 DP roads partly developed and hence shown as existing roads with widening as per SRDP1991 road width, andIV. New DP roads proposed in NDZ and salt pan lands for better connectivity and integrated development.The construction of bridges, subways, FOB's, ROB's, tunnels etc., are not shown separately in Draft DP.Any such road structures would be constructed wherever required by MCGM as per feasibility andtechnical requirement, and will automatically form part of DP.Apart from these roads shown in the Draft DP 2034, the MMC Act 1888 has robust provisions in regard to roads, the details of these roads are with Dy.Ch.E.(traffic).The above proposals are for the horizon period 2014-2034. The implementation of these proposals isto be carried out by Roads department after taking over the land from the landowners after paymentof compensation to the landowners.
	(ix)	Construction of expressways/bypass road to avoid congestion : a Coastal Road b. Gurgaon-Mulund link road	MMRDA, MSRDC	The Coastal Road is an under construction 8-lane, 29.2-km long freeway that would to run along Mumbai's western coastline connecting Marine Lines in the south to Kandivali in the north. The Coastal Road is projected to be used by 130,000 vehicles daily and is expected to reduce travel time between South Mumbai and the Western Suburbs from 2 hours to 40 minutes. Goregaon-Mulund link road project work is in process
	(x)	Promoting Battery operated vehicles by addition of new buses for public transport and providing tax exemption for encouraging use of E-buses.	RTO, MMRDA, MCGM, BEST	Currently 6 buses are operated by BEST. Under FAME India program 80 new buses will be included. To improve air quality further BEST undertaking has made efforts to introduce buses with no emissions. With help of MMRDA shortly 25 Hybrid electric buses will be inducted into BEST fleet (15 Nos. buses already received) 4 Nos. of electric buses with zero emission are already in operation and 2 Nos. additional buses will be inducted shortly. To promote electric Vehicles 50% of Tax exemption is under consideration of the State Government.
	(xi)	Installation of weigh in Motion bridges at the Mumbai-Gujrat State border to prevent overloading of vehicles.	RTO, Transport Ministry	There are 24 Check post with weigh bridges in Maharashtra The eighteen (18) number are modernized & automated. The work of modernization of three is in process. Out of 24 only one is in Mumbai at the border of Mumbai & Gujarat, located at Achad . It is automated & fully modernized.
	(xii)	Good traffic management with Synchronize Traffic movements by introducing	Ch. E. (Roads and Traffic)_ MCGM, Traffic Police, RTO	Refer Annexure B (1.1.3) Installation of new traffic signals (48 Nos.) Appointed consultant for preparation of Compressive Mobility plan. Currently, Mumbai Traffic control branch using 256 ATC signals and 371 non ATS for synchronized traffic movement.

Sr. No.	Sub No.	Action	Responsible agency(ies)	Remarks
		Intelligent Traffic Ma g ement systems a d installation of new signa s.		Installation of ATC (Area Traffic Control System) compatible signals pla ned (247 Nos.) Proposal for Intelligent Management System (IMS) Implementations for the Mumbai city is sanctioned by GoM and procedure of selection of vendors for IMS installation is in process. Addition of direction boards (70 Nos), Mandatory boards (11300 Nos) Mobility of vehicles increased by 20%. Thus resulting in reduced emission from vehicles.
	(xiii)	Installation of Remote Sensor ba ed PUC systems	RTO	The Transport Commissioner office vide its letter dated 20.03.2019 informed all the head of the offices to start the PUC checking of the vehicles electronica ly a d online from 01.04.2019. However this order of Tra sport Commissioner is cha lenged in the High Court Bombay vide Writ Petition no 5704/2019, All PUC Owners Association V/s Union of India and ors. • In Mumbai total 20 PUC centers have been computerized
	(xiv)	Efforts for Sulphur reduction in diesel by providing low sulphur content Diesel.	Petroleum Industry, Tra sport Ministry	City is supplied with BS IV sta e diesel which ha low sulphur content.
	(xv)	Introduction of CNG, Hybrid Electric buses for public tra sport.Providi ng Metro a d Monora l tra sport services.	RTO, Tra port Ministry, Cha rma (BEST), Cha rma (Ra lway Authority), MRTS, MMRDA,	To improve the air quality BEST introduced CNG buses for the first time in India in 1997. The fleet of CNG was increased gradually and presently 62% of our fleet is operated on green fuel i.e. on CNG **a)** CNG buses of Nos. 1851 are already in BEST fleet since 1997. This technology ha a red y esta lished. **b)** Newly developed 25 Nos. of hybrid electric a d 6 Nos. of pure electric is ava la le. **c)** Commuter choice program is planned providing efficient public tra sport in the Mumba City. To improve the a r qua ity BEST Undertaking introduced CNG buses for the first time in India in 1997. The fleet of CNG was increased gradually and presently 62% of BEST fleet is operated on green fuel i.e. on CNG. **d)** To improve air quality further BEST Undertaking has made efforts to introduce buses with less / no emissions. With the help of MMRDA shortly 25 hybrid electric buses will be inducted into our fleet(15 buses a red y received) **e)** 4 nos. of electric buses with zero emission are already in operation and 2 nos. of more buses will be inducted shortly. **f)** AC buses procured by MMRDA a d operated by BEST a e in service from Ba dra Kurla to BKC throughout the pea periodsg.) **Metro system** is designed to reduce traffic congestion in the city. Project is built in three phases over a 15-year period, with overall completion expected in 2025 **h)Monorail** of 20.21 kilometres line is fully elevated, a d connects Ja ob Circle in South Mumba with Chembur in ea tern Mumba . **i)** MMRDA a so decided to a point India Port Ra l a d Ropeway Corporation Ltd to prepare a project report for ropeways from Malad to Marve and Gorai to Borivli, each of 4.5km. The projects can boost east--west connectivity, along with connectivity to Malad Metro station on Metro-2A corridor and Marve; and further, to Borivli station on Western Railway, Metro-2A and Gorai jetty.

Sr. No.	Sub No.	Action	Responsible agency(ies)	Remarks
	(xvi)	Implementing scrapping policy for old vehicles.	RTO, Transport Ministry,	BS II and BS III bus scrapping policy developed. Currently 425 BS II vehicles will be scrapped by 2021. As per Section 59 of the Motor Vehicle Act the Central Government empowered to fix the age limit of Motor Vehicles, having regard to public safety and convenience, after the expiry of which the registration is required to be cancelled. The Central Government has not issued any notification under this section till date. However, The State Transport Authority vide its resolution no 7/2013 has taken decision to restrict the age of taxies plying in the MMR for 20 years and 16 years for Auto rickshaws.
	(xvii)	Installation of Waste to Energy projects and promiting Solar energy/ alternative energy sources in the Mumbai City.	RTO, Transport Ministry,	Development of 600 TPD Waste to Energy project at Deonar, Mumbai on DBO basis is proposed. Consultant is appointed for preparation of DPR and tender documents of Waste to Energy project. 2.5 MW Solar Energy Installation commissioned by H.E.department in Bhadup Complex of M.C.G.M. & another 2.5mw is in process. Solar energy project executed by Building Construction department of M.C.G.M.is as follow 1) Cochin Street Awad 25kw commissioned, Hawker Plaza Dadar -100kw commissioning awaited, Khataw Maket Bldg.-25kw commissioning awaited, Engineering Hub Worli-360 kw work order issued. Byculla Fire Brigade 25KW in process for commissioning.
	(xviii)	Implementation of BS – VI norms for procurements of new buses	Transport Ministry	Directly procuring BS VI vehicles. For new 1500 no. of buses with BS VI norms procurement tenders floated. The Emission standards Bharat Stage VI will be applicable to passenger and goods vehicle having Gross Vehicle Weight not exceeding 3500 kgs, Two Wheelers, and Three Wheelers manufactured on or after 01.04.2020 for all models. The Emission standards Bharat Stage e-VI will be applicable to Two Wheelers Vehicle models manufactured on or after 01.04.2020 The Emission standards Bharat Stage e-VI will be applicable to Three Wheelers Vehicle models manufactured on or after 01.04.2020 New Motor vehicles conforming to Emission Standard Bharat Stage e-IV, manufactured before the 01.04.2020 will not be registered after the 30.06.2020 New Passenger and Goods Motor vehicles conforming to Emission Standard Bharat Stage e-IV, and sold in the form of Drive and Chasis will not be registered after 30.09.2020.
	(xix)	Providing good Inspection/ maintenance services to all BSII & BSIII commercial vehicles	RTO, Transport Ministry	BEST having 27 Nos. of Depos and Central Workshops where high tech maintenance infrastructure is available.

Sr. No.	Sub No.	Action	Responsible agency(ies)	Remarks
	(xx)	Restrict commercial vehicles entering city by having ring roads.	RTO, Transport Ministry	MMRDA is taking efforts to make uniterrupted entry/exits to BKC, MMRDA has taken up Santacruz- Chembur Link Road Phase-II, Flyover from BKC-SCLR, BKC connectro from EEH and kalanagar flyover which will result into singal free entry/exit to BKC at all locations and will reduce the delay/ queue length significantly which will further imporve the air quality within BKC. In order to overcome the congested Traffic flow within BKC during peak hours which is due to lot of side frictions and pedestrian movement thus reducing effective lane width; MMRDA is also implementing one-way Traffic system in G- Block BKC. Mumbai Traffic police issued an order banning heavy vehicle from entering the city from 8 am to 11 am and 5 am to 9 pm. In South Mumbai heavy vehicles are banned between 7 am to 12 midnight. Heavy vehicles are also banned on eastern freeway.
2. Source Group: Re-Suspension Dust				
2	(i)	Creation of green buffers along the Traffic corridors & installation of WAYU (Wind Augmentation and Purifying Units) at urban traffic intersection.	Superintendent of Garden_MCGM, Assistant Commissioner (Wards)_MCGM, Ch. E. (Road & Traffic)_MCGM, MMRDA, MSRDC Ch. E. (DP)_MCGM	Refer Annexure B (2.3) Garden Dept. has achieved the tree plantation target given by government time to time. In year 2016, 7800 trees have been planted in city and about 5000 sapling distributed free of cost. over 1000 garden, R.G. P.G. plots have been developed. 12 no. of spaces below flyover have been cleared of encroachments and developed by providing greenery (6cr) 23 number of spaces below flyover have been identified for beautification at the cost of ₹19 crore. This has resulted in providing additional area of around 35000 sq. Mtrs green space to Mumbai City To mitigate the flood vulnerability of the city, the RDDP 2034, has demarcated buffers along rivers, creeks and nallas, on either side of the water courses, which are to be maintained as development free zones. This buffer zone will help reduce flooding risks by permitting water bodies to flood their banks without affecting people. These buffers, wherever possible, will be city wide open spaces that would be walkable along with their use for environment. M.P.C.Board, IIT (B) and NEERI have come together to develop and install **WAYU (Wind Augmentation and Purifying Units)** to improve Ambient Air Quality at Urban traffic intersections. Initially, these (25 no) systems have been installed at 5 locations in Mumbai.
	(ii)	Maintain Pothole Free Roads for Free Flow Traffic by implementing Road Maintenance management system (RMMS)	Ch. E. (Road s and Traffic)_MCGM,MMRDA, MSRDC, Assistant Commissioner(Wards)_MCGM	Refer Annexure B (2.1) To ensure that the roads are regularly maintained and to achieve longevity of the roads with lesser expenditure, Road Maintenance Management System (RMMS) is implemented in MCGM where every road is numbered and a small group of these roads are formed. Responsibility of each road is put under a Sub-Engineer designated as Road Engineer (RE). RE prepares estimates and look after the maintenance of each road under his jurisdiction. Priority list of the roads to be repaired is prepared.1.City Division- No. of roads= 177, Cost 385.62Cr2. Eastern Suburb Division (E.S)- No. of road=125, Cost 285.22Cr3. Western Suburb Division (W.S)- No. of roads=137, Cost 234.96Cr

Sr. No.	Sub No.	Action	Responsible agency(ies)	Remarks
	(iii)	Introduce water fountains at Major Traffic intersection, wherever fea ible by esta lishing Ga den Infra ture Cell (GIC).	Ch. E. (Roa s and Traffic)_MC GM,MMRDA, MSRDC, Assista t Commissio ner Wards)_M CGM, Superintendent of Garden_M CGM	Regarding installation of fountains; Garden Infrastructure Cell (GIC) of MCGM is esta lished. However, it is to state that it is not fea ible a it could need additional area which may result in reduction of space for vehicles.
	(iv)	Greening of open a ea , ga den, community pla es, schools a d housing societies	Ch. E. (DP)_ MCGM, Assista t Commissio ner (Wards)_M CGM, Ch.E. (Roa s a d Traffic)_MC GM, MMRDA, MSRDC	Refer Annexure B (2, 2.3) An area of 300 acres at Cuff Parade is being developed as Green Park for which Tata Consulta cy Engineering (TCE) ha been p pointed a Consulta ts Special emphasis been paid to implementation of D.P.under which 29 plots have been developed as garden and parks at the cost of ₹11 crore. The Draft DP 2034 has proposed following to be counted as Public Open Spa es viz. RGs, PGs, public/semi- community spa es, layout RGs, designated public open spaces, open spaces in educational institutions and other public institutions. The quantum of existing open spaces and proposed open spaces proposed in the Draft DP 2034 is as follows:- Reservations of PG/Garden/Green Belt etc. 1892.22 Designations of RG/PG/Garden etc. 1633.67 Layout RG's which will be available after development of lands under layout. 964.78 NDZ +Tourism Development Area +Salt Pan 850 Aarey POS 800 Sanjay Gandhi National Park RG 588 Buffer for the Rivers/nallas 472.05 Open Spaces in the jurisdiction of Special Planning Authorities Viz. MIDC/MMRDA 428.05Out of proposed Conversion of Industria la ds 117.64Proposed Coa ta Roa Promena e 88
	(v)	Bla ktopping of meta ed Roa s including pavement of Roa shoulders	Ch. E.(Roa s and Traffic)_ MCGM, MMRDA, MSRDC	Aspha t a d resurfa ing of roa s of 98 km. ha beencompleted at the cost of ₹1148 crore In the yea 2019-20 a out 370 kms roa s a e proposed to be improved. Of this, a out 106 kms roa s a e proposed in CC a d 172 kms in Aspha t a d resurfa ing of a out 92 kms roa s is proposed.
	(vi)	Providing Wa l to wa l paving (brick) by ina izing footpath improvement policy under which footpaths will be improved with Stencil Concrete, CC with ma ble chips finishing or Plain CC insta d of Paver Blocks	Ch. E. (Roa s a d Traffic), MMRDA, MSRDC	• New footpath improvement policy has now been finalized with the aim to avoid illega digging, focus on improvement of qua ity of footpath a d increa e their lifespan. Now onwa ds, a l the footpaths will be improved with Stencil Concrete, CC with marble chips finishing or Plain CC instead of Paver Blocks. • To minimize excavation of footpath, carriage way for maintaining underground utilities. The necessary actions for the same is made by providing online trenching permissions and adopting advance machinery a d technology.
	(vii)	Roa design improvement by using C & D wa te, fly ash in road construction.	Ch. E. (Roa s and Traffic)_MC GM, MMRDA, MSRDC	Use of C & D waste, fly ash in road construction project is under evaluatation. The policy of resurfacing, change in design, change in tender condition and registration rules has resulted in a major improvement in road conditions.

Sr. No.	Sub No.	Action	Responsible agency(ies)	Remarks
3. Source Group: Biomass/trash burning, landfill waste burning				
3	(i)	La nch extensive drive g à nst open burning of bioma ,s crop residue, ga bg e, leaves by appointing Nuisance Detectors a d Clea -up Ma sha s a e p pointed. Providing door to door ga bg e collecting services.	Ch. E. (SWM)_ MCGM	Refer Annexure B (3) As majorly Door to Door collection is being practiced, no occurrences a e reported. Moreover to monitor a d control these kinds of lp ses, Nuisa ce Detectors a d Clea -up Ma sha s a e p pointed.
	(ii)	Providing Orga ic Wa te Compost ma hines , decentralization of processing of Wa te, dry wa te collection centers.	Ch. E. (SWM)_ MCGM	Refer Annexure B (3) The system of separate collection is in place. Organic Waste Compost ma hines a e proposed to be insta led in a l Municipa ma kets. Efforts are being taken to motivate decentralization of processing of waste. Dry wa te is segregated at 32 dry wa te centers operated by NGOs. Bulk wa te Generators a e encourg ed to insta l compost pits/OWC ma hines. Tota 247 compost pits a e developed a l over Mumba . Nuisa ce Detectors a d Clea -up Ma sha s a e p pointed.
	(iii)	Proper collection of Horticulture wa te a d its disposa following composting – cum – ga dening p proa h	Ch. E. (SWM)_ MCGM	Refer Annexure B (3) The horticultural waste generated at plots with garden department is collected regula ly and converted into compost within plot or nea by plot. The compost generated through this is utilized as manure in MCGM ga dens. Tota 247 compost pits a e developed a l over Mumba . Development of 600 TPD Waste to Energy project at Deonar, Mumbai on DBO ba is. Tenders are floated for installing OWC machines in Markets. Composting pits a e being erected in Ga dens.
	(iv)	Strict complia ce of ba on open burning	Ch. E. (SWM)_ MCGM	Ban on burning of waste on land, littering/throwing of waste is imposed in MCGM limits a d the provisions a e enforced through Bye-Laws a d Nuisa ce detectors, clea -Up Ma sha s p pointed specia ly for that. Burning of garbage is prohibited in the jurisdiction of MCGM, as per provisions of Greater Mumbai Cleanliness and Sanitation Bye- Laws, 2006 under clause no. 5.10. For violation of above clause, the fine upto Rs. 100/- is imposed g à nst the nuisa ce creators/defa lters For effective implementation of Greater Mumbai Cleanliness and Sanitation MCGM has also authorized the section Junior Overseer to impose the fine for nuisance creators/defaulters.

Sr. No.	Sub No.	Action	Responsible agency(ies)	Remarks
4. Source Group: Industries				
4	(i)	MPC Boa d ha issued pa propriate direction to the defaulting industries time to time for non complying industria units. Regula survila ce performed ba ed on ra domized sa n pling pla .	MPCB	Board has issued appropriate direction to the defaulting industries time to time.
	(ii)	Sulphur reduction in fuel by using low sulhur content Imported coa in Therma Power plant. Installation of FGD to reduce SO2 emission from TPP.	Industry (Therma Power Pla t), MPCB	Alrea y FGD were provided at M/s. TATA power compa y ltd. For reduction of sulphur as well as they are using 100% imported coal with 0.15 % of sulphur a d 5% a h conta n.
	(iii)	Improved Combustion technology	Industry (Therma Power Pla t), MPCB	M/s. TATA power compa y insta led a d operated a state of a t technology for coa ha dling i.e. Screw conveyer with closed the pipeline system.
	(iv)	Alternate fuel- Hotel industry directed to change fuel patten from HSD to Natura Ga .	Industry (Hotels), MPCB	Most of the Hotel industry change fuel pattern from HSD to Natural Gas.
	(v)	Promoting cleaner industries	MPCB, Industries Dept	MPCB promoting use cleaner fuel in various hotel industries. Accordingly consents to be prescribed with condition to change to cleaner fuel pattern to industries & new proposed industries to opt cleaner fuel.
	(vi)	Location specific Emission reduction. Petrochemica Industries a e directed for VOC emission control.	Industry (Petroleum Refinery), MPCB	MPCB directed to all industries in Mahul area to provide continuous VOC monitoring stations as well as provider advance VOC control measures. Refer Annexure A for deta ls.
	(vii)	RMC indusries directed for Fugitive emission control	Industry (Petroleum Refinery, RMC), MPCB	MPCB had issued gazette notification regarding guidelines for RMC
	(viii)	Industries a lowed with stringent Environmenta norms only.	MCGM, MIDC, MMRDA & Industries Dept.	Industries a lowed with stringent Environmenta norms only.

Sr. No.	Sub No.	Action	Responsible agency(ies)	Remarks
	(ix)	Installation/ up gradation of air pollution control systems in Thermal and Petrochemical industries.	Industry (Thermal Power Plant, Petroleum Industry, Hotels,etc.), MPCB	1. MPCB had issued gazette notification regarding guidelines for RMC 2. M/s. TATA power company installed and operated a state of art technology for coal handling i.e. Screw conveyer with closed the pipeline system. 3. Already FGD were provided at M/s. TATA power company ltd. For reduction of sulphur as well as they are using 100% imported coal with 0.15 % of sulphur and 5% ash content. 4. All refinery and petrochemical handling industries in Mahul area had improved there VOC handling process with necessary control measures to reduce VOC. 5. Most of the Hotel industry change fuel pattern from HSD to Natural Gas.
	(x)	Use of high grade coal made compulsory in Tata thermal power plant.	Industry (Thermal Power Plant), MPCB	M/s. TATA power company installed and operated a state of art technology for coal handling i.e. screw conveyer with closed the pipeline system.
	(xi)	Regular audit of stack emissions for QA/QC	MPCB	All 17 category industries in suburban area has provided continues source monitoring and ambient air monitoring system. Real time data conceded to MPCB & CPCB server.The Maharashtra Pollution Control Board (MPCB) launched India's first **star- rating programme** for industries in 2017. The Star-rating programme is a distinctive transparency initiative which leverages existing regulatory data on emissions to increase industrial compliance towards norms. At least one stack monitoring performed per quarter.
5. Source Group: Construction and Demolition Activities				
5	(i)	Enforcement of construction & demolition rules. Setting up of C&D Waste processing facility.	Ch. E. (SWM)_ MC GM	Refer Annexure B III MCGM is already implementing C&D(M&H) Rules,2016 in city. Also C& D Rules 2016 is being complied w.r.t. provision of separate facilty for collection and storage, payment of charges. A processing facility is to be set up. Tenders are invited. C & D transport NOC is issued by Auto-DCR (web based system developed under Ease of Doing Business scheme). As regards to the Dust mitigation, the condition is incorporated in I. O. D. conditions, while approving the building construction permissions. As per the condition, the 'Debris Management Plan' shall not be get approval from Zonal Executive Engineer (SWM) if the conditions therein is not complied with.
	(ii)	Control measures for fugitive emissions from material handling, conveying and screening operations through water sprinkling, curtains, barriers and suppression units	Ch. E. (SWM)_ MCGM	Refer Annexure B III MCGM is already implementing C&D(M&H) Rules,2016 in city, which insists on control measures at site, before work commences. The approved Debris Management Plan includes such control measures. The construction permit is granted only after teh builder/developer obtains valid C & D waste management permission from Solid Waste Management department. The whole process is ONLINE, on 'Auto--DCR' portal. Wheel washing facility has been provided for cleaning of vehicle tyres before entry and exit at various construction work sites except at few sites Regular washing of carriageway, footpath within the construction sites and vicinity of the work area is being carried through the water sprinkling. All soil and muck transportation trucks/dumpers covered by tarpaulin sheet during transportation.

Sr. No.	Sub No.	Action	Responsible agency(ies)	Remarks
	(iii)	Better construction practices with PM reduction for MMRCL construction.	Ch. E. (DP)_ MCGM, Ch.E(Road s and Traffic)_MC GM, MMRDA, MSRDC, MPCB, SIC_MCG M	**MMRCL Construction Policy:** Regula water sprinkling ca ried out at a l raw materia /muck storg e and on internal/ affected public roads at all construction work sites (1Cr) Storg e silo of cement a e equipped with dust catcher (0.5 CR) Raw materia storg e at the batching pla t covered by close shed a d provided with roof top sprinkling a d fogging system. (0.6 CR) All conveyer belts at batching pla t covered with cla dings. Materia transfer points are covered with GI tin sheets and water sprinkling a ra gement. (0.3 CR) Strengthening of water sprinkling system for control of air pollution control. (0.2 CR)Regula a r monitoring of RSPM, PM2.5, NOx, SOx a d CO is being ca ried out by MoEF a d NABL p proved third pa ty at construction and RMC/ casting yard sites as per CPCB guidelines. The Draft Development Promotion & Control Regulation 2034 has proposed that the DCRs should gra t permissions consistent with the policies and objectives of the Draft DP.
	(iv)	Ensure ca rig e of construction materia in closed / covered Vessels	Ch. E. (SWM)_ MCGM	MCGM is already implementing C&D(M&H) Rules,2016 in city, which insists on control mea ures at site, before work commences. The p proved Debris Ma g ement Pla includes such control mea ures.
6. Source Group: Domestic fuel burning				
6	(i)	Shift to LPG from solid fuel & kerosene for domestic applications	Petroleum Ministry, MNGL, MCGM	Pradhan Mantri Ujjwala Yojana was launched in Mumbai, Maharashtra 10 Lakh LPG connections will be released in Mumbai covering all APL/BPL fa ilies in the State
7. Source Group: DG Sets				
7	(i)	Monitoring of DG sets and action against violations	MPCb	As mumbai and mumbai suburban city very rare electricity interruption due to which very ra e use of DG set a well a most of the DG set a provided with necessa y control equipment a d enclosures.
	(ii)	Reduction in DG set operation/ Un- -interrupted power supply	Power Generation a d Supply Compa ies- -Relia ce, BEST	As mumbai and mumbai suburban city very rare electricity interruption due to which very ra e use of DG set a well a most of the DG set a provided with necessa y a d enclosures.
8. Source Group: Bakeries/crematoria				
8	(i)	Use of LPG in Hotels a d “dha a ”	Petroleum Ministry, Ch. E. (M & E)_MCGM, EHO_MCG M, MPCB	Commonly used fuel is either LPG gas or Electricity for preparation of eatable, which does not create much air pollution

Sr. No.	Sub No.	Action	Responsible agency(ies)	Remarks
	(ii)	Use of LPG in Bakeries	Petroleum Ministry, Ch. E. (M & E)_MCGM, EHO_MCGM, MPCB	Fuel such as LPG gas, Electricity, diesel is used for preparation of bakery products. There is no air pollution due to use of LPG gas or Electricity. As per the DC Regulation 1991 vide sr. no. 55 named as "Services Industries Zone (I-1 Zone)" vide Table 23 - Manufacture of bakery products the special conditions mentioned are : (i) Fuel used for bakery products shall be electricity, gas or smokeless fuel. (ii) No floor above the furnace portion (iii) Where only electric oven is used, an additional heating load of 24 KVA permitted per establishment.
	(iii)	Use of Piped Natural Gas (PNG) for Human cremation.	Chief Engineer (Mechanical & Electrical)_ MCGM	Present Scenario: 1) Total Number of Electric furnaces with Air Pollution control Mechanism = 23 Nos.; 2) Number of Electric furnaces proposed for PNG conversion = 8 Nos. ; 3) New PNG Furnaces Proposed = 12 Nos.; 4) Total No. Of Wood Pyres= 196 Nos.; 5) Total Pyres with Air Pollution control mechanism installed = 167 Nos. Phase - I = March 2018 (08 Electric Furnaces to be converted in to PNG Furnace and 06 New PNG furnaces to be Installed at three New Locations)Phase - II = March 2019 (05 Electric Furnaces to be converted in to PNG Furnace and 06 New PNG furnaces to be Installed at three New Locations)Phase - III = March 2020 (10 Electric Furnaces to be converted in to PNG
9. Source Group: Other (City Specific)				
9	(i)	Sampling at many more locations on grid pattern Study and analysis of hourly data to understand contribution of different pollutants	MCGM, MPCB	Forming joint committee with concerned stakeholders for combined action plan. Monitoring and review mechanism at every quarter to decide modifications in the monitoring mechanism. All planning to install monitoring stations and data to be forwarded fortnightly to MCGM for consolidation and analysis in joint committee which is expected to meet monthly. At present there are SAFAR stations and MCGM is monitoring at 5 stations. MPCB already provided 11 CAAQMS station and proposal for additional 4 CAAQMS stations.
	(ii)	Source Identifications per emission inventory the percent emission contribution is around 33% from Industrial sector to the whole of Mumbai .	MCGM, MPCB	MPCB awarded work order to IIT(B) and NEERI. Work is in final stage of completion. As per emission inventory the percent emission contribution is around 33% from Industrial sector to the whole of Mumbai . Among the industries Tata power fuel contribution of PM is about 22.84% the Red LSI i.e. refineries, chemical and fertilizer companies are shares 3.53% All MSI & SSI (R, O, G) add 6.6% of PM to the city

Sr. No.	Sub No.	Action	Responsible agency(ies)	Remarks
	(iii)	Action plan to address large industries (e.g. oil refinery and fertilizer)	Petroleum Industry, MPCB	enclosed ANNEXURE-A
	(iv)	Source Apportionment (SA) and Emission Inventory (EI) MPCB awarded work order to IIT(B) and NEERI.	MPCB, MCGM	MPCB awarded work order to IIT(B) and NEERI. Work is in final stage of completion. As per emission inventory other area sources though called area sources, are limited to small regions (viz. Open eat outs, bakeries, crematoria and hotels) and therefore, their impact does not seem to be wide ranging and across the city. Emission from Metro line development is time bound activity for at least 5 years. For point source, outcome of EI and SA study explained in above pt. 9(2) For line source i.e. Vehicular pollution, study presented for emission load reduction based on emission factor calculation. Reduction in emission load predicted due to proposed metro rail.
	(v)	Public Awareness and Complaint Redressal Mechanism developed by respective stakeholders.	MPCB, MCGM	Concerned stakeholders will be informed to take care of public awareness and to establish Complaint Redressal Mechanism for the complaints under their control. Complaint Redressal Mechanism for the complaints under control of MCGM is already in operation on MCGM portal (https://portal.mcgm.gov.in) under Complaint Complaint Registration for receiving all types of complaints. MPCB has conducted awareness program above mitigation of NOx and particular matter and SO2 at Bandra while installing WAYU (Air purification machine at heavy traffic signals like bandra area).
	(vi)	Citizen Access toTransportation(CAT), School Zone Traffic Improvment Programme (szTIP), Quite KEM(Q KEM), Monitoring of air pollution byplanning authority in their jurisdiction	Traffic Police & Traffic Department of M.C.G.M.	This is the proposed special initiative of MCGM. The one of the reason for the traffic jam is the stopping of the vehicles for dropping and pick up of the passengers outside malls, multiplex schools etc The School bus should allowed to drops the children inside the school ground if the school ground is located inside the school. Parking should be on the nearby ground in consultation with local authorities i.e. Ward and Traffic Police. Parking of school buses on roads should not be allowed.

CHALLENGES BEFORE US

Mumbai is one of the most important cities in the world and is known as a very densely populated city. At the same time, Mumbai is also known as the financial capital of the country. There is a odd proportion of aera and population of the city. Lack of living space, increasing number of vehicles, inadequate sewerage facilities, solid waste dumping space and increasing encroachment on slums and mangroves are causing air pollution in the city.

1. The Central Pollution Control Board (CPCB) has approved an action plan for air pollution control in Greater Mumbai in October 2019. Rising levels of suspended particulate matter (PM_{10}, $PM_{2.5}$, PM_{1}) as well as oxide of nitrogen due to the growing traffic congestion in the city. Accordingly, it is intended to reduce air pollution by focusing on the following aspects of transportation.
    - Improving fuel quality by reducing the use of fossil fuels as well as adopting alternative fuels.
    - Improving vehicle related technology (after-exhaust treatment techniques and retrofitment)
    - Observing discipline in traffic signals.
    - Regular inspection and maintainance of the vehicle.
    - Proper planning and management of transportation.
    - Dephasing of old vehicles, improvement of vehicle emissions parameters.
    - Strengthening and promoting public transport system.
    - Promoting vehicles running on natural energy.
    - Reducing increasing air pollution in the city.
2. Due to the various development works, constructions and industries started in the last few years in the Greater Mumbai area, the dust is spreading in the air. The increasing amount of suspended particulate matter (PM_{10}, $PM_{2.5}$, PM_{1}) the air in the city is getting more polluted. Frequent spraying of water at the construction site, washing of wheels of vehicles going out of the site, preventive maintenance of all the machines in use at the site as well as regular PUC of all vehicles etc. will definitely help in controlling the increasing air pollution in the city.
3. Today, smoking is believed to be the leading cause of death for heart attacks/ other heart ailments, paralysis, high blood pressure, etc. However, studies have shown that the average human life expectancy is reduced due to the combination of autoexhaust, factory fumes and toxic substances in agricultural products. Smoking can be avoided for a while, but it will not be possible to avoid respiratory air pollutants. This gives an idea of how harmful air pollution to human life as well as other factors.
4. Possibility of the illnesses like headaches, skin disorder, high blood pressure and eyes deseases etc. cannot be ruled out due to emmission of Methane, carbon monoxide, sulfur dioxide, oxides of nitrogen as well as other toxic gases etc. by burning biological and other wastes in to air.

5. In order to create awareness among the people about the wastage water and its adverse effects on the environment, the Corporation has tried to spread the message of safe use of water by using the latest media like electronic and social networking in addition to tratinal media. Awareness messages about the prudent use of water were also given from various newspapers from time to time. Water conservation objective can only be achieved with the cooperation of citizens.

SALIENT FEATURES OF MUMBAI'S ENVIRONMENT

1 Mumbai Mangrove Conservation Unit has been formed to diminish the increase pressure of development, waste dumping, pollution and encroachment in mangroves area at the Mumbai metro pollutant region.

2 In the year 2019-2020 corporation planted 30451 tress on the road side as well as on the available space under the jurisdiction of MCGM.

3 Municipal Corporation of Greater Mumbai has achieved first rank in the country in supplying best quality drinking water to its citizens as per the survey conducted by Bureau of Indian Standard (BIS).

4 Municipal Corporation of Greater Mumbai is the first corporation in Maharashtra to make Rain Water Harvesting mandatory.

5 Arrangement of high pressure lifting system for drainage of water accumulated in low lying areas due to excess rainfall during high tide. This helps in a rapid drainage of rain water.

6 Mumbai has been declared as an Open Defecation Free Plus (ODF+) city by the Quality Council of India (QCI)- New Delhi on December 2019.

7 Currently segregation percentage in Mumbai is around 82% and 1619 bulk waste generators have started composting at source therefore waste going at dumping ground has been reduced from 8500 MT in 2015 to current level of 6500-6800 MT.

8 The Southern Coastal Road Project of 9.98 km from Princess Street Flyover to Worli End of Bandra Worli Sea Link with several environmental friendly features is proposed under Mumbai coastal road project (South).

9 From 1 April 2020 onwards manufacture of certified vehicles with BS-IV only are getting registered to reduce the air pollution in ambient air.

10 Bombay Electric and State Transport (BEST) started running 1829 buses and 278 A/c Mini buses on clean CNG to help the minimize Ambient Air Pollution in City.

11 MCGM is imparting education to students through 1214 classrooms with the help of digital classes.

12 The girls studying in Std. V to Std. X in municipal schools of MCGM are given self defense training in Karate, Judo and Taekwondo, which helps in raising self defense and boost their morale.

13 Under National Clean Air programme the Environment Department has proposed to set up 5 No's of Continuous Ambient Air Quality Monitoring Station (CAAQMS) in the jurisdiction of MCGM.

14 Citizens in case of emergency - quick and effective response, coordination with all agencies, speedy availability of information, incentives for preparedness at all levels, immediate assistance to the victims and constant alerting etc. Services available through the Disaster Management Department.

15 Ensure quick and effective response, improve coordination among responding agencies. Disseminate information related to disaster to the citizens, encourage preparedness at all levels provide assistance to all affected in the event of a disaster and impart training to the citizens and stakeholders are the main function of Disaster Management cell of MCGM.

16 In year 2019-2020 patients with Covid-19 are being treated on OPD basis as well as admitted in ward for treatment. 20 beds with advance ventilators have been started in ICU for Life Saving Treatment of patients. New screening OPD, Isolation wards, 125 beds wards and ICU for COVID-19 have been started for patients.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Covid 19 - Sanitization By Mumbai Fire Brigade

Air Pollution Monitoring Van

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Modak Sagar - Vaitarna Dam