BRIHANMUMBAI
MUNICIPAL CORPORATION

ENVIRONMENT STATUS REPORT
2020 - 2021

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Middle Vaitarna Dam

Veermata Jijabai Bhosale Udyan, Byculla

बृहन्मुंबई महानगरपालिका

ENVIRONMENT STATUS REPORT
2020 - 2021

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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. त्यानुसार मुंबई महानगरपालिका कायदा 1888 मधील कलम 63ब नुसार बृहन्मुंबई महानगरपालिका क्षेत्रातील 'पर्यावरण स्थितीदर्शक अहवाल' महानगरपालिका सभागृहास दरवर्षी सादर करण्यात येत असतो. सदर अहवालात बृहन्मुंबईतील पर्यावरणाचा मागील वर्षाचा चिकित्सक दृष्टिने सविस्तर आढावा घेण्यात आला असून भविष्यात शहराचे पर्यावरण सुधारण्यासाठी विविध विभागाच्या पर्यावरणस्नेही योजना व कार्यक्रमांचा परामर्श घेण्यात आलेला आहे.

सन 2020-21 या वर्षाचा '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 अवाढव्य आहेत. शहरातील पर्यावरणाबाबत सर्वकाही सुरळीत आहे असे म्हणता येत नसले तरी शहराचे समतोल पर्यावरण राखण्यासाठी महानगरपालिका सतत प्रयत्नशील आहे.

बृहन्मुंबई महानगरपालिकेने विविध प्रकल्प हाती घेतले असून त्यांची कामे प्रगतीपथावर आहेत. यामध्ये घन कचरा व्यवस्थापन, उद्यान, पर्जन्य जलवाहीन्या, मलनि:सारण प्रकल्प, वर्षा संचयन विनियोग, पाणीपुरवठा, शिक्षण, पर्यावरण, आरोग्य, आपत्कालीन व्यवस्थापन इत्यादी विभाग पर्यावरण संवर्धनासाठी कटिबद्ध आहेत.

मला असे निदर्शनास आणून द्यावयाचे आहे की, बृहन्मुंबई महानगरपालिकेच्या घन कचरा विभागाने मागील 5 वर्षापासून यशस्वीपणे राबविलेल्या विविध प्रकल्प व उपक्रमांमुळे सन 2016 मध्ये प्रतिदिन 8500 मे. टन क्षेपणभूमीवर जाणाऱ्या कचऱ्याचे प्रमाण हे मार्च 2021 पर्यंत प्रतिदिन 5500 मे. टन एवढे कमी करण्यात महापालिकेला यश आले आहे. प्रतिदिन निर्माण होणाऱ्या घन कचऱ्याचे निष्कासन हे प्रतिदिन वाहनांच्या 900 फेऱ्यांनी केले जाते. निर्माण होणाऱ्या कचऱ्याचे ओला व सूका असे वर्गीकरण करुन सदर कचरा स्वतंत्रपणे वाहून नेला जातो. त्या कचऱ्यावर बायोरिॲक्टर तंत्रज्ञान व विन्ड्रो कंपोस्टिंगद्वारे प्रक्रिया करुन मिश्रखत तयार करण्यात येते व महानगरपालिकेच्या उद्यानात खत म्हणून त्याचा मोठ्या प्रमाणात वापर केला जातो. 'स्वच्छ भारत अभियान' राबविण्यासाठी बृहन्मुंबई महानगरपालिका ही महत्त्वाची प्रशासकीय यंत्रणा असल्याने राज्य आणि केंद्र सरकार यांच्या एकत्रित सहकार्याने शहरातील स्वच्छता राखण्यासाठी निर्णायक असे प्रयत्न केले जात आहेत. या अभियानाअंतर्गत स्वच्छतेची आवश्यक पातळी

गाठण्यासाठी घन कचरा व्यवस्थापन विभागाच्या प्रयत्नांचे आणि कार्यक्रमांचे पुनर्विनीकरण करण्यात आले आहे.

मुंबई महानगरातील अनेक समस्यांपैकी महत्त्वाची समस्या म्हणजे वाढत जाणाऱ्या वाहनांची संख्या आणि पर्यायाने वाहतूकीची कोंडी होय. आजमितीस मुंबईतील विविध वाहनांची संख्या 40,33,497 एवढी असून शहरातील वाहनांच्या संख्येत मागील वर्षाच्या तुलनेत 3.75% ऐवढी झाली आहे. वाढत जाणारी वाहनांची संख्या ही शहरातील प्रदूषण वाढण्यास कारणीभूत ठरत आहे. मुंबई शहराचे वायु प्रदूषण कमी करण्यासाठी वाहनांचे नियमित पीयुसी करणे, शिसेविरहीत पेट्रोल, अल्पगंधक असलेले डिझेल, परिवर्तक (कॅटॅलिटिक कॅन्वर्टर्स्), सायकलसाठी वेगळी मार्गिका, वाहतूक सिग्नल्स् यामध्ये शिस्तबद्धता आणणे, इलेक्ट्रीक वाहनांना व नैसर्गिक उर्जेवर चालणाऱ्या वाहनांना प्रोत्साहन देणे या साधनांवर भर देऊन खाजगी गाड्यांचा कमीतकमी वापर तसेच रेल्वे, बसेस, मेट्रो, मोनो व लोकल ट्रेन इ. सार्वजनिक प्रवासाच्या साधणांना प्रोत्साहन देण्यात येत आहे. यामुळे भविष्यात शहरातील वायु प्रदूषण कमी होण्यास निश्चितच मदत होईल.

देशाची आर्थिक राजधानी असलेल्या या महानगरातील जनतेला करमणूकीच्या सुविधा उपलब्ध करुन देणे हे बृहन्मुंबई महानगरपालिकेचे प्रमुख कर्तव्य आहे. नागरिकांसाठी उद्याने परिरक्षित करणे, क्रिडांगणे पुरविणे, कारंजे, करमणूकीची केंद्रे उपलब्ध करुन देणे या मनोरंजनाच्या साधनाव्यतिरिक्त कला व सांस्कृतिक कार्यक्रमांना उत्तेजन देण्यात येत आहे. याचाच एक भाग म्हणून वीरमाता जिजाबाई भोसले उद्यान व प्राणीसंग्रहालयामार्फत दरवर्षी वन्यप्राणी, निसर्ग व पर्यावरण दरवर्षी याविषयी नागरिकांच्या व शालेय महाविद्यालयीन विद्यार्थ्यांच्या मनात आपुलकी व जागरुकता निर्माण होण्यासाठी विविध शैक्षणिक कार्यक्रमांचे आयोजन करण्यात येते. यामध्ये वन्यजीव सप्ताह, जागतिक वसुंधरा दिन, जागतिक पर्यावरण दिन, प्राणीपालन प्रशिक्षण व झू अवेअरनेस कार्यक्रम इ. कार्यक्रमांचा समावेश आहे. परंतु सद्याच्या कोविड-19 (साथीचे रोग) पार्श्वभूमीवर अशा कार्यक्रमांचे व्यापक दृष्टिकोनातून प्रत्यक्ष आयोजन करणे शक्य झाले नाही याची मला खंत आहे.

अलिकडच्या काही वर्षात मुंबईचा विकास अत्यंत झपाट्याने झाला आहे. देशातील अन्य भागातून मोठ्या प्रमाणावर लोक येऊन या शहरात स्थायिक झाल्यामुळे मुंबईची आजची लोकसंख्या अंदाजे जवळ जवळ एक कोटी तीस लाख एवढी प्रचंड आहे. अशा घनदाट वस्ती असलेल्या शहरात आरोग्याच्या दृष्टिने मलनि:सारणाला अत्यंत महत्त्व आहे. घरोघरच्या सांडपाण्याच्या विल्हेवाटीची व्यवस्था करण्याबरोबरच कारखाने, व्यापारी संकुले, उपहार गृहे, रुग्णालये आणि अन्य सार्वजनिक ठिकाणाचे सांडपाणी देखील संकलित करुन विल्हेवाट करण्याच्या अखेरच्या टप्प्यापर्यंत वाहून न्यावे लागते. सदर सेवेचे विस्तारीकरण करण्याच्या हेतूने बृहन्मुंबई महानगरपालिकेने मुंबई मलनि:सारण प्रकल्प- टप्पा 2 अंतर्गत आपल्या नागरिकांना स्वच्छ आणि आरोग्यदायी पर्यावरण उपलब्ध करुन देण्याकरिता मलजल प्रक्रिया क्रेंदाची बांधणी, पुनर्बांधणी आणि बोगद्यांचे योग्य बांधकाम यासारखे महत्त्वाचे प्रकल्प हाती घेण्यात आलेली आहेत. या प्रकल्पांअतर्गतचे पर्यावरणस्नेही कामे पूर्ण झाल्यावर पिण्यायोग्य पाण्याची बचत व संवर्धन, मुंबईकरांच्या आरोग्यामध्ये सुधारणा, समुद्राच्या पाण्याच्या दर्जात सुधारणा, पर्यायाने समुद्र जीवसृष्टीच्या पोषक वातावरणात सुधारण होऊन पर्यावरणाचे संवर्धन होण्यास खऱ्या अर्थाने मदत होईल. असे मला इथे आत्मविश्वासाने नमूद करावेसे वाटते.

प्राथमिक शिक्षणाची मुलभूत सुविधा उपलब्ध करुन देणे ही बृहन्मुंबई महानगरपालिकेचे बंधनकारक कर्तव्य

आहे. सद्याच्या कोविड-19 (साथरोग) प्रादुर्भाव कालावधीमध्ये प्राप्त प्रतिक्रीया आणि परिस्थितीशी शिक्षण विभागाने जुळवून घेतले आहे. कोविड-19 च्या प्रादुर्भावाने जीवनाच्या प्रत्येक स्तरावर आव्हान निर्माण केले असले तरी अशा प्रतीकुल परिस्थितीत देखील शिक्षण विभागाने शिक्षणाचा प्रवाह अंखडीतपणे सुरु ठेवण्यासाठी यु-ट्युब चॅनल्स, व्हिडीओ, टेलिफोन कॉल्स आणि स्वाध्याय पत्रिका यांचा प्रभावीपणे वापर या बरोबरच शैक्षणिक क्षेत्रात नि:शुल्क ऑनलाईन शिक्षण पद्धतीत झुम, गुगल मिट, मेसेंजर्स, गुगल क्लासरुम, व्हॉट्प्स ग्रुप इत्यादी नवीनोत्तम तंत्रज्ञान माध्यमांच्या मदतीने 'शिकणे व शिकविणे' ही प्रक्रिया अविरतपणे सुरु ठेवलेली आहे याचा मला अभिमान आहे.

बृहन्मुंबई महानगरपालिका आपल्या स्थापनेपासूनच सार्वजनिक आरोग्य क्षेत्रात समाधानकारक सुविधा पुरवित असून कोणत्याही आपत्तीच्यावेळी पालिकेची रुग्णालये सदैव सज्ज असतात. कोविड-19 या संसर्गजन्य आजाराचा यशस्वीपणे मुकाबला करण्यासाठी महानगरपालिका सन 2020 पासूनच सर्वोतोपरी प्रयत्न करीत आहे. महानगरपालिका रुग्णालये तसेच खाजगी रुग्णालय यांच्या समन्वयातून संशयीत रुग्णांसाठी तात्काळ निदान व उपचार, विलगीकरणाची व्यवस्था तसेच नागरिकांचे प्रभावी लसिकरणासह इतरही सुविधा व मार्गदर्शन उपलब्ध करुन देते. महानगरपालिकेच्या आरोग्य विभागाने कोविड-19 या जागतिक महामारी संदर्भातील सेवांचे निरंतर विस्तार आणि नावीन्यपूर्ण उपक्रम याबाबतचे आव्हान सक्षमपणे पेलले आहे आणि सदर उपक्रमाची दखल आंतरराष्ट्रीय स्तरावर घेण्यात आली ही बाब महानगरपालिकेस अभिमानास्पद आहे.

बृहन्मुंबईतील आपत्कालीन परिस्थिती प्रभावीपणे हाताळण्याकरिता महानगरपालिकेच्या आपत्कालीन व्यवस्थापन कक्ष आधुनिक सेवा सुविधांनी सुसज्ज करण्यात आला आहे. आपत्कालीन व्यवस्थापन विभागामार्फत बृहन्मुंबईत संभाव्य नैसर्गिक/ मानवनिर्मित आपत्तीच्या तक्रारीची जलद गतीने मुख्यत: लहानमोठ्या दुर्घटना, दरड कोसळणे, झाडे पडणे, अनधिकृत वृक्षतोड, पाणी तुंबणे, घर पडणे, सॉर्टसर्किट, आग लागणे, पूर परिस्थिती, भूकंप व बॉम्बस्फोट इत्यादी घटनांची नोंद घेऊन संबंधित यंत्रणांना घटनास्थळी जलद गतीने मदत यंत्रणा पोहचवण्याची व्यवस्था करण्यात येते. अशा आपत्तीच्यावेळी अपेक्षित व अनपेक्षित आणीबाणी संदर्भात आपत्काल सेवा मुंबईकरांना तात्काळ उपलब्ध असल्याने आपत्कालीन परिस्थितीचा सामना करण्यासाठी महानगरपालिका समर्थ आहे असेच म्हणावे लागेल.

मुंबई शहरातील पर्यावरणाचे रक्षण व संवर्धन करण्यासाठी महानगरपालिकेने सादर केलेला 'मुंबई वायु प्रदूषण कृती आराखडा' केंद्रीय प्रदूषण नियंत्रण मंडळाने मंजूर केलेला आहे. सदर कृती आराखड्यात 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 यामध्ये अंतर्भाव करण्यात आलेला आहे. मंजूर आराखड्यातील उद्दिष्टीत लक्ष्य पूर्ण होण्याच्या अनुषंगाने महानगरपालिकेचे विविध विभाग, महाराष्ट्र शासन व केंद्र शासनाच्या विभागांनी संयुक्तरित्या प्रयत्न करणे अभिप्रेत आहे. आराखड्यातील मार्गदर्शक सूचनानुसार सहभागी विभागांनी योग्य अंमलबजावणीस प्राधान्य देण्याच्या दृष्टिकोणातून महानगरपालिकेच्या पर्यावरण विभागामार्फत विविध खात्याशी समन्वय साधून शहरातील वाढते वायु प्रदूषण कमी करण्यासाठी सर्वतोपरी प्रयत्न केले जात आहेत.

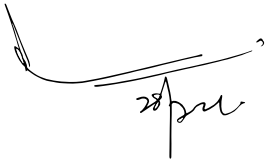
पर्यावरणीय प्रदूषण हा दिवसेंदिवस जागतिक चर्चेचा व चिंतेचा विषय ठरत आहे. पर्यावरणाचे संरक्षण व संवर्धन हा विषय केवळ राष्ट्रीय व आंतरराष्ट्रीय पातळीवर महत्त्वाचा नसून तो स्थानिक पातळीवर देखील

तेवढाच महत्त्वाचा विषय आहे. बृहन्मुंबई महानगरपालिका विविध वायु घटकांच्या निश्चित प्रमाणाचे मापन करण्यासाठी सदैव प्रयत्नशील आहे. त्याअनुषंगाने 'राष्ट्रीय स्वच्छ वायु कार्यक्रमांतर्गत' पर्यावरण विभागामार्फत सन 2021-22 मध्ये बृहन्मुंबई महानगरपालिका क्षेत्रात 5 ठिकाणी 'स्वयंचलित वातावरणीय वायु सर्वेक्षण केंद्रे' (CAAQMS) प्रस्तापित करण्याचे निश्चित असून सदर केंद्राद्वारे शहरातील प्रदूषित विविध वायु घटकांचे निश्चित प्रमाण उपलब्ध होण्यास मदत होईल.

सद्याच्या कोरोना संकटाने आपल्याला वैयक्तिक स्वच्छतेबरोबरच पर्यावरण स्वच्छता राखत निसर्गस्नेही जीवनशैलीचा अवलंब करुन निसर्ग संवर्धनाचे महत्त्व पटवून दिलेलेच आहे. वाढती लोकसंख्या, वाढते नागरिकरण, वाढते औद्योगिकरण त्यासाठी होणारा पर्यावरणाचा ऱ्हास पर्यायाने हवा, जल व जमिनीचे प्रदूषण ही आजची सर्वात मोठी समस्या असल्याने 'पर्यावरणाचे पुनरुज्जीवन' ही संकल्पना सन 2021 च्या जागतिक पर्यारण दिनानिमित्ताने घेण्यात आलेली आहे. सदर संकल्पनेस जागून अधिकाधिक वृक्षारोपनावर भर, प्लास्टिक वापरावर पूर्णत: बंदी किंवा कमीत कमी वापर व पुनरवापर करणे, कचरा न जाळणे, पाण्याचा जपून वापर करणे, सार्वजनिक प्रवासाची साधने वापरण्यावर भर अशा छोट्या छोट्या कृतीतून पर्यावरण संवर्धनासाठी निसर्गस्नेही जीवनशैलीचा अवलंब करण्यास बृहन्मुंबई महानगरपालिका आपल्या नागरिकांना आव्हान करित आहे.

मला अशी खात्री आहे की, पर्यावरण रक्षणात नागरिक आणि शासन यांच्या सह्योगातून निसर्ग संवर्धनाचे काम निश्चितपणे उभे राहील आणि हे चैतन्यदायी शहर स्वच्छ आणि हरीत राखण्यास सुजान 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 ॲण्ड फर्टिलाइजर्स लिमिटेड, अदानी इलेक्ट्रीसिटी, 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.

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बृहन्मुंबई महानगरपालिका

आद्याक्षरे

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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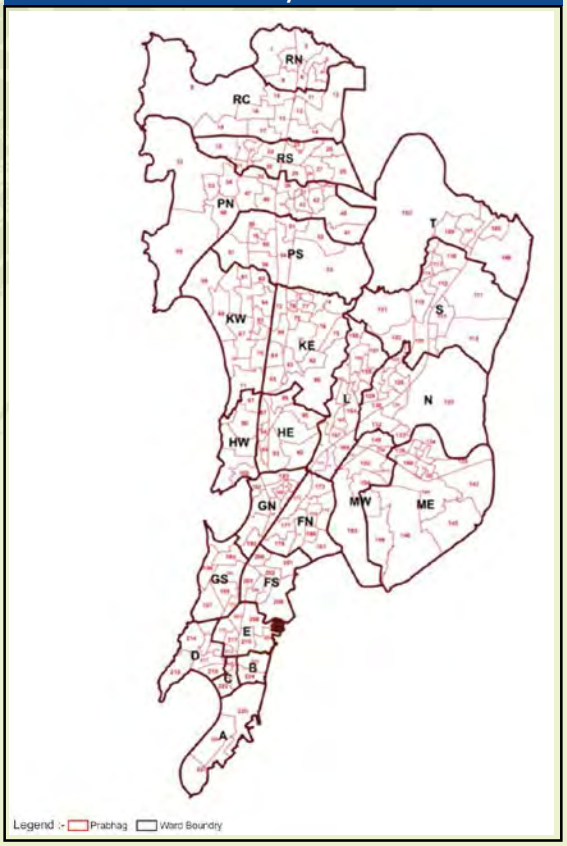
1. INTRODUCTION

The 74th amendment of the constitution of India in 1992 defines the role and duties of municipalities and municipal corporations. The 12th schedule to the amended constitution states the scope of the work. The scope includes environment protection, promotion of ecology and urban forestry. As a sequel to this, the Maharashtra state government issued an ordinance amend municipal act 1888, making "Environment Protection, Promotion of Ecology and 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 2020 to March 2021 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. 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.

2. DESCRIPTION OF THE AREA

Mumbai is located on the western sea coast of India from 18o 53' North to 19o 16' North Latitude and from 72o East to 72o 59' East Longitude. It was originally a cluster of seven islands. ater 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), the area fixed as per the present development plan is 476.24 sq. Km. (Map No.2.1). However, BMC is the planning authority for less than this area. This is because about 8.76% of this area has come under the jurisdiction of the Special Planning Authority (SPA). Therefore, in the pre-draft development plan, 434.55 sq. Km. Such an area has been considered. 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. The maximum width of the city is 17 km. (East to West) and length is 42 km. (North to South).

Map 2.1: Mumbai Election Division Boundry - 2018



3. CLIMATE OF MUMBAI

The city of Mumbai has Tropical Savanna climate. Generally South-West monsoon arrives in the city in the month of June and retreats in the month of September. As per data recorded by Department of Regional Meteorological Centre Santacruz, in the year 2020, Mumbai received a total rainfall measuring 3352.5 mm at Colaba & 3864.7 mm at Santacruz. The maximum rainfall of of 1502.6 mm was recorded during July 2020 at Santacruz and it was 38.9% of total rainfall received. The maximum rainfall of of 1229.3 mm was recorded during July 2020 at Colaba and it was 36.7% of total rainfall received. So it is observed that there was more rainfall as compared to previous year. (In the year 2019 total rainfall received 3867.6 mm at Santacruz and 2854.4 at Colaba). In the month of May 2020 the maximum temperature of 34.4^{0}C, and in the month of February 2020 minimum temperature of 20.7^{0}C was recorded at Colaba. In the month of March 2020 the maximum temperature of 35.4^{0}C and in the month of January 2020 minimum temperature of 19.0^{0}C was recorded at Santacruz.

At Colaba the maximum Wind Speed of 7.0 Km/hr and minimum 1.0 Km/hr was recorded. At Santacruz the maximum Wind Speed of 9.0 Km/hr and minimum 2.7 Km/hr was recorded. The Relative Humidity was recorded maximum 92% and minimum 62% at Colaba. The Relative Humidity was recorded maximum 89% and minimum 41% was recorded at Santacruz.

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

Table No. 3.1 Meteorological Data (2020-2021)

Month	Average Temp 0C				Rainfall in mm		Relative Humidity in %				Wind Speed Km/Hr	
	Colaba		Santacruz		Colaba	Santacruz	Colaba		Santacruz		Colaba	Santacruz
	Max	Min	Max	Min			Time 0830	Time 1730	Time 0830	Time 1730		
April 2020	33.4	25.5	34.2	25.0	0.0	0.0	88	77	73	62	3.4	4.9
May 2020	34.4	27.2	34.2	27.4	0.0	0.0	86	78	71	63	3.9	6.0
June 2020	31.9	25.7	33.0	25.8	524.5	395.0	89	83	82	73	4.0	6.8
July 2020	30.0	25.3	30.8	25.3	1229.3	1502.6	90	87	89	83	4.7	6.5
August 2020	29.3	25.4	29.8	24.9	1128.3	1240.1	90	87	88	84	7.0	9.0
September 2020	31.0	25.8	31.6	25.2	320.4	549.1	92	83	88	78	1.6	4.0
October 2020	32.2	25.8	32.9	25.0	124.0	170.1	89	81	85	72	1.0	3.6
November 2020	33.3	23.8	34.3	21.8	0.0	0.0	80	70	70	51	1.1	2.9
December 2020	31.3	21.8	32.7	19.7	25.4	7.3	79	67	74	53	1.4	2.7
January 2021	29.6	20.7	31.5	19.0	0.6	0.2	84	69	82	52	1.6	2.9
February 2021	31.9	21.5	33.6	20.3	0.0	0.3	80	66	71	45	2.4	3.7
March 2021	33.1	23.8	35.4	22.0	0.0	0.0	79	62	67	41	2.1	4.2

Source: Regional Meteorological Centre, Colaba

4. POPULATION OF MUMBAI

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 (2019). The population density of 26,645 person per sq.km (excluding no development area).

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)

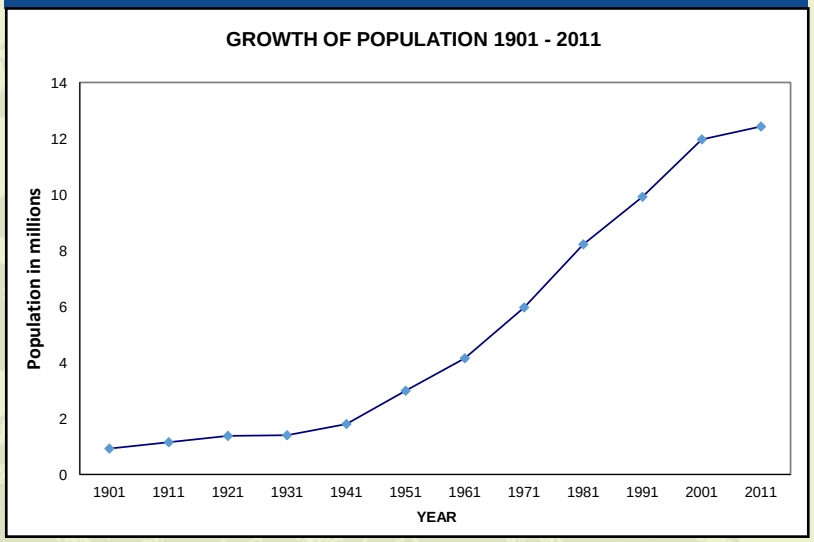
Table No.4.1 Growth of Population and rate of Increase during year 1901-2011

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: Growth of Population



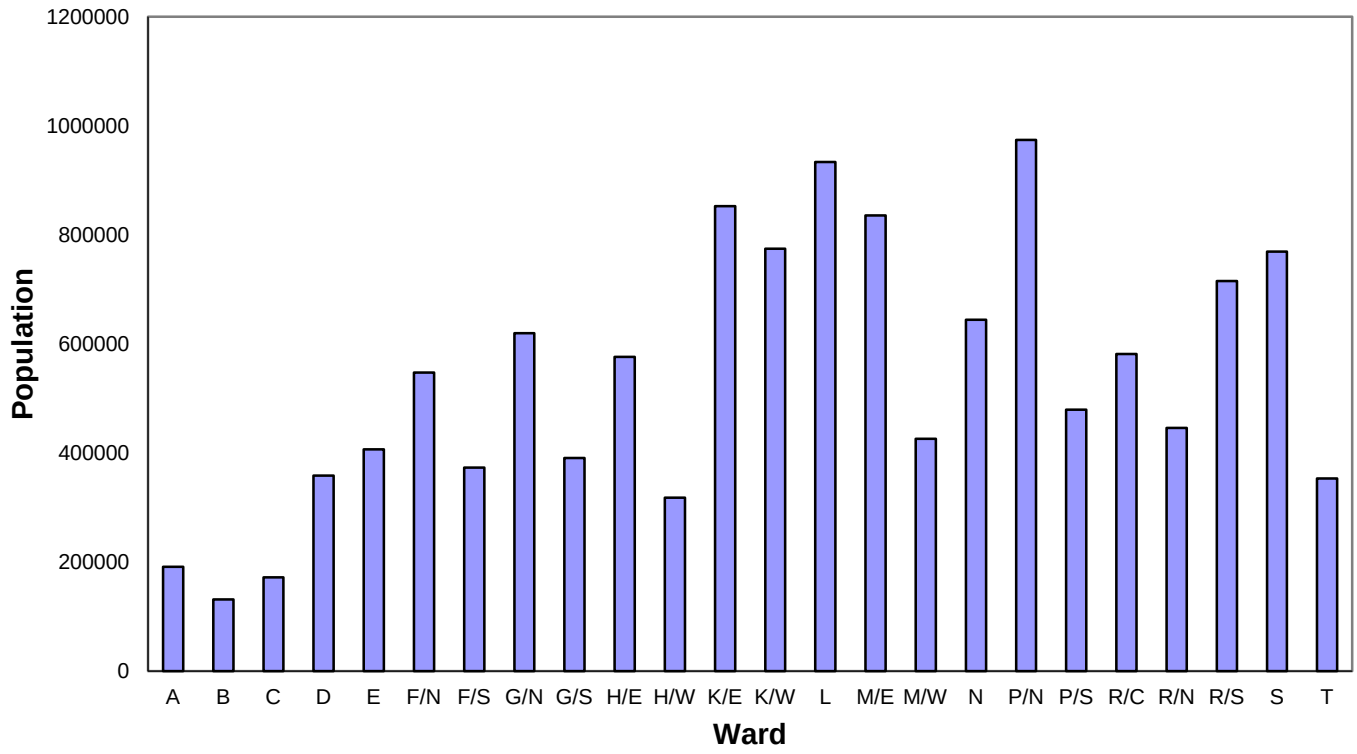
As per the mid-year election list of population in the year 2020, the wardwise area and population given by development planning and health shown in table no. 4.2

Table No 4.2: Wardwise Area and Population

Administrative Ward	Area in Sq.km.	Population	Administrative 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**	**483.22**	**12875213**
K/W	25.18	774733			

Source: Development- Planning and Health Depts of MCGM

Graph 4.2.: WARDWISE POPULATION (Approx)

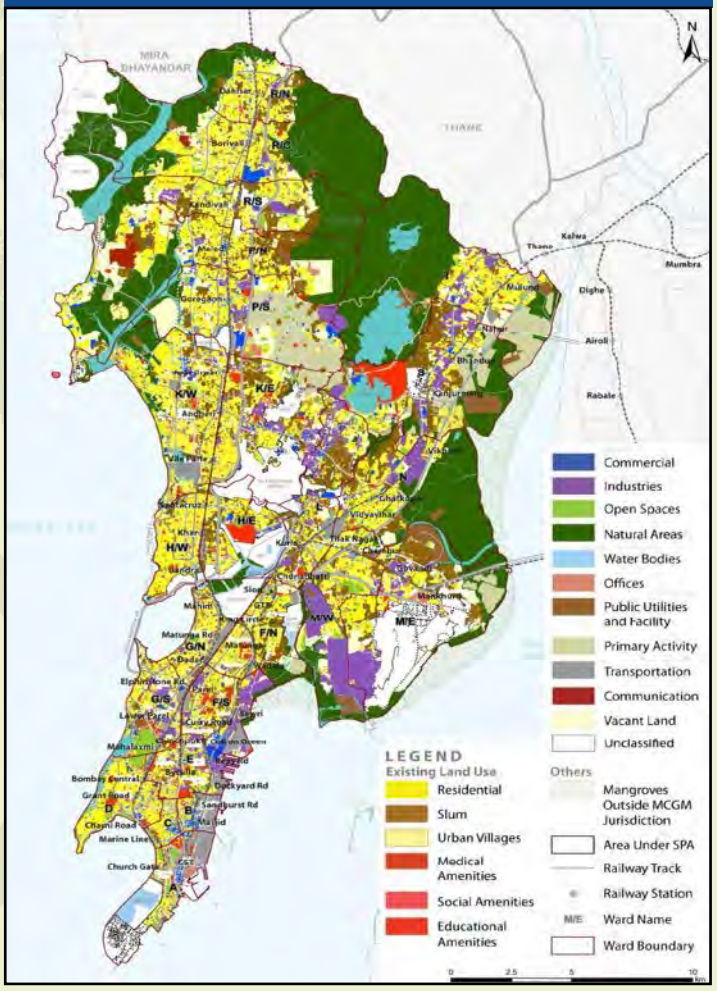


5. LAND USE

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.

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, 8 May-2018 excluding substantial modifications as shown in schedule-B appended thereto. As per the notification 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, dt.17.9.2019, dt.23.11.2020, dt.12.03.2021 and on dt.12.04.2021. The balance Excluded Parts will be sanctioned by State Government in the due course.

Map 5.1: Development Plan



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 in 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 High Tide Line (HTL) and Hazardous Line (HL) and also to prepare new CZMP to the scale of 1:25000 through National Centre for Sustainable Coastal Management (NCSCM).

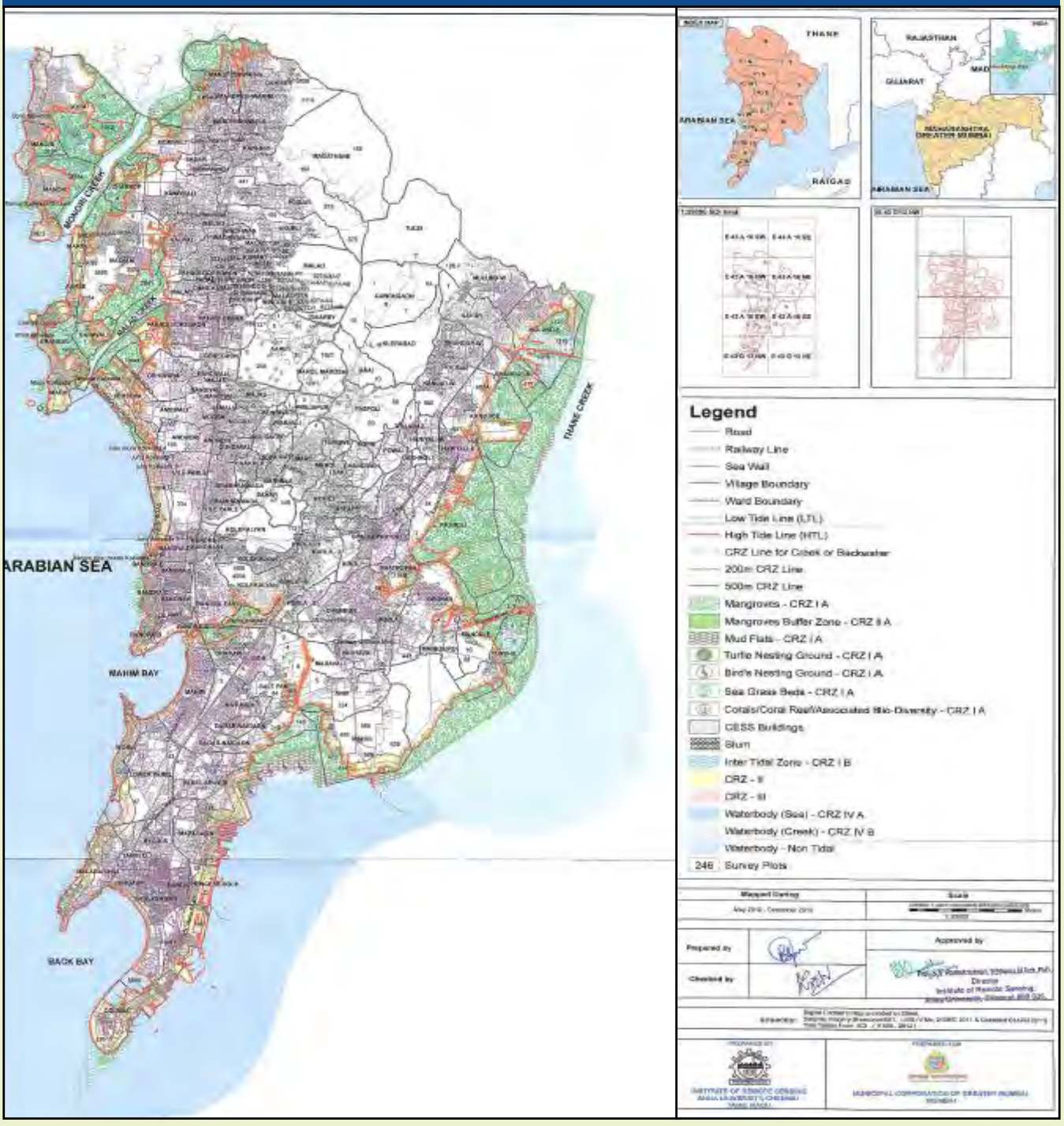
The work of preparing new Coastal Zone Management Plan as per C.R.Z. Notification dated 18th January 2019 was entrusted by GoM to the NCSCM, Chennai. NCSCM has prepared Draft CZMP with all relevant information using Satellite Imagery and Geographical Information System and as per provision of Coastal Zone Regulation guideline dt.19.01.2019. 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. The further process is being carried out by MCZMA.

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: Costal Regulation Zone



6. MANGROVES 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

Awareness and Outreach activities:

- The Mangrove Foundation conducted several awareness and outreach activities during the F.Y. 2020-21. Most of the events were conducted online keeping in mind the Covid-19 restrictions.
- Events such as online talks from the eminent personnel from the field, live quiz, story-telling virtual tour of Coastal and Marine Biodiversity Centre (CMBC), Airoli, Art workshops and many more.
- These events conducted on environmentally significant days viz. Earth Day (April 22), endangered pecies Day (May 15), International Whale Shark Day (Aug. 30), World Migratory Bird Day (Oct. 10), Wildlife Week (Oct. 1 – 8) and so on.
- The target audience for these events were common man college students.
- Total of 33 online events were conducted by Mangrove Foundation during the F.Y. 2020-21.
- Total of 16 talks have been delivered by 9 members of Mangrove Foundation.

- The Mangrove Foundation in association with the Coastal Conservation Foundation (earlier known as Marine Life of Mumbai) and WWF – India jointly organised a marine festival, 'Coastwise' in Mumbai which included a range of activities such as shore-walks, movie screenings, marine-art workshops, flamings festival (flamingo safari and a guided tour of CMBC, Airoli), photography workshop and competition and the festival received and over-whelming response from the general public in Mumbai.
- The Mangrove Foundation published and Integrated Annual Report of Mangrove Foundation: 2015-2016 to 2019-2020.
- The Mangrove Foundation also published its first ever Newsletter, SONNERATIA to showcase the work done by Mangrove Cell and Mangrove Foundation.
- Released a website of Mangrove Cell and Mangrove Foundation for better reach of information to the general public. Website: mangroves.maharashtra.gov.in
- Thematic wall painting on Mangrove Protection wall for awareness about Mangrove and marine biodiversity.
- The short film on flamingos titled 'the Fascinating World of the Flamingos' was developed showcasing the congregation of this migratory birds and various habits of the Flamingos in and around Mumbai.

Livelihood

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 Department 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 and Pearl Spot Fish)

iii. Sea Bass Fish Nursery

iv. Bivalve Farming (Oyster and Mussel)

v. Ornamental Fish Rearing

vi. Mangrove Ecotourism

vii. Mangrove Seed Collection

Capacity Building:

- Due to the Covid-19 pandemic, fewer capacity building programmes could be conducted on-field during the F.Y.2020-21.
- Two GIS workshops for staff of Mangrove Cell and mangrove Foundation, one ornamental fish rearing training workshop for beneficiaries of Sindhudurg and one catering workshop for women SHG from Ratnagiri. Total 79 participants were trained during the F.Y.2020-21.
- The Mangrove Foundation took nine interns from Dr. Balasaheb Sawant Konkan Krushi Vidyapeth, Dapoli and trained them in various livelihood activities viz. Seabass and Pearl spot fish cage culture, Mud crab farming, Oyster farming etc.

Mangroves:

Maharashtra Forest Department through Mangrove Cell is undertaking various measures for restoration, conservation and preservation of the mangrove habitat located in all seven coastal districts mainly Mumbai, Mumbai Suburbs, Thane, Palghar, Raigad, Ratnagiri, Sindhudurg.

Since 2012-13 to 2020-21, Mangrove cell has planted over 81 lakhs sapling distributed across 190 locations across the coastal district of Maharashtra and covered an area of 1831 hectares plantation. The area selected for plantation is usually degraded mangrove areas or areas that have sparse mangrove vegetation.

Ecotourism:

Mangrove Park and Interpretation Centre

1. Coastal and Marine Biodiversity Centre (CMBC), Airoli, Navi Mumbai.

A State-of-the-art interpretation facility are developed at the Thane Creek site by the Mangrove Cell, Maharashtra Forest Department in collaboration with the German agency GIZ under the Indo-German Biodiversity Programme, for conservation education and sensitize visitors about the coastal and marine biodiversity of Maharashtra, especially in and around Mumbai.

The major attraction at the Centre are:

- Vibrant and colourful exhibits of the rich and marine biodiversity observed in the Thane Creek Flamingo Sanctuary.
- Sounds of various birds like Flamingo, Kingfisher etc. and marine animals like Indian Ocean Humpback Dolphin and Blue Whale.
- Interactive computer screens and wide LED displays showcasing interesting information and photographs about coastal and marine biodiversity.
- A theater room that shows documentary films and on the biodiversity of Thane Creek Flamingo Sanctuary.
- Boat safari to witness thousands of Flamingos and other migratory birds at Thane Creek Flamingo Sanctuary.
- A Virtual online tour of the centre with 360 immersive sphere photos and sound.

2. The Mangrove Cell is establishing a Giants of the Sea museum at CMBC Airoli. This museum will house life-size exhibits of giants sea animals such as Giant Squid, Whale Sharks and also skeletons of Blue whales and other dolphins.
3. Development of Bhandup side area of Thane Creek Flamingo Sanctuary for birdwatching and ecotourism and installation of various informative boards and signages.
4. Publication of illustrated children's book titled 'Ishaan's Treasure' which narrates various interaction of a small boy with mangroves and marine biodiversity in intertidal areas of Mumbai city. The Book will be useful in generating awareness about intertidal biodiversity and the need for their conservation among readers of all ages, especially the youth.
5. The Mangorve Cell is also planning to set up mangrove parks at Gorai and Dahisar which will have various attractions for tourists such as mangrove trails, bird trials and watchtower, mangrove museum, glass bridge over mangroves etc.

7. URBAN RENEWAL SCHEME

In order to undertake the city renovation scheme, the Maharashtra Housing and Area Development Authority (MHADA), a government authority involved in the housing sector, will redevelop old dilapidated municipal buildings and rented buildings through development plan regulations and make such spaces available for various civic amenities.

Table No. 7.1: Recreation Facilities Provided in the year 2020-21.

Sr. No.	Particulars	City	Western suburbs	Eastern Suburbs	Total
1	Garden (Except strip Gardens)/ Park	35	159	109	303
2	Recreation Grounds	170	211	97	478
3	Playgrounds	58	192	115	365
4	Shilpgram	0	1	0	1
5	Fountains	21	12	6	39
6	Band stands	7	1	1	9
7	Nurseries	14	8	7	29
8	Plant Sale Counter	1	4	5	10
9	Statues	14	6	10	30
10	Tree Plantations	34689	37207	128299	200195
11	Distribution of tress	1603	6411	3229	11243
	Total no. of tress	718589	1221737	1034957	2975283

Source: Garden Department of MCGM

RECREATIONAL FACILITIES:

Providing recreational amenities to the public is a discretionary duty of the Corporation under section 63 of MMC Act1888. 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 centers, water fountains, etc. In addition to recreation, MCGM also encourages sports, art, cultural programs etc. 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.

8. UDYAN AND ZOO

Veermata Jijabai Bhosale Udyan & Zoo is one of the oldest zoos in the country & was es-tablished 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 government in 1873. The total area of this Udyan & Zoo is approx. of 53 acres and is de-clared as **Heritage Grade II (B)** site. This Udyan-Zoo has been recognized as 'Medium Zoo' up to dt.19.08.2022 by Central Zoo Authority, New Delhi.

Visitor data and revenue

Financial Year	No. of Visitors	Revenue (Rs.)
2019-20	10,57,215	4,40,14,695/-
2020-21 (dt.15.02.2021 onwards)	1,22,259	56,73,950/-

Table No.8.1: Entry Fee Chart

Visitors Description	Entry Fees
Adult	Rs. 50/-
Child (below 12 years)	Rs. 25/-
Family [2 Adults + 2 Children (below 12 years)]	Rs. 100/-
Foreign Visitors	
Adult	Rs. 400/-
Child (below 12 years)	Rs. 200/-
Private school students comming in group for educational trip (below 12 years)	Rs. 15/- (Per head)
Private school students comming 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 conservation, Garden department has done following work:

- In year 2020-2021, about 20,195 no. of trees are planted on municipal roads and open spaces.
- Removal of concrete and cement around 3112 no. of tress.
- Spraying of insecticides and pesticides on infected tress.
- Trimming of branches of 106731 trees branches to balance the trees.
- Formation of Tree basins around the tress.
- Removal of 584 no. of dead and dangerous tress.

Chart No. 8.1: Wardwise Number of Trees

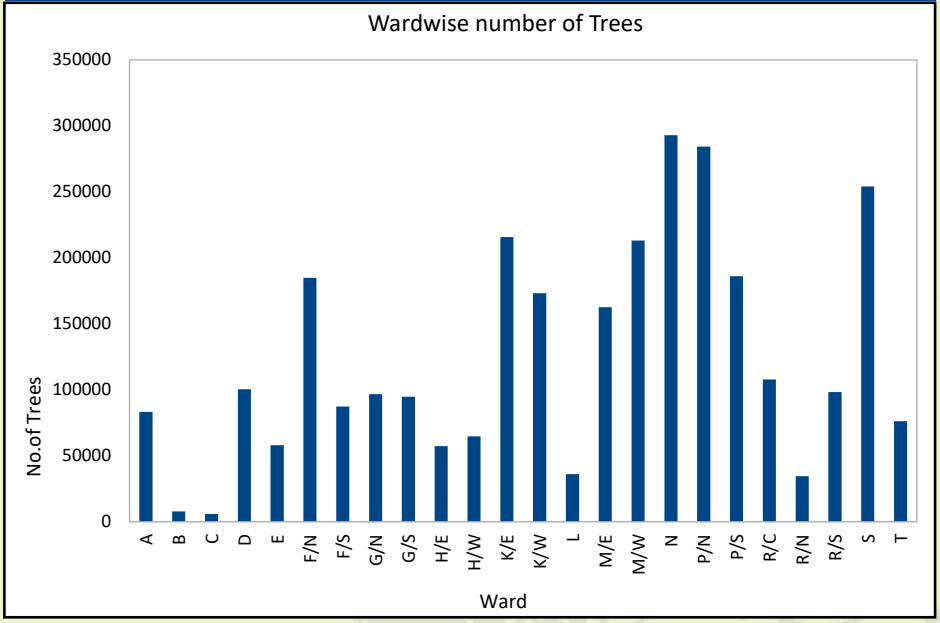


Table No. 8.1: Ward wise number of trees (2020-2021)

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

Source: Garden Department of MCGM.

- In the year 2021-22 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.

Veermata Jijabai Bhosale Udyan and Zoo at present:

- As on 31st March 2021, there are in all 273 animals, which include 84 mammals of 13 Species, 157 Birds of 19 species and 32 Reptiles & aquatic animals of 7 species displayed in this Udyan and 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 and teachers.

Modernization Project of Veermata Jijabai Bhosale Udyan and Zoo :

- MCGM administration has taken up a Project of modernization of this Udyan and Zoo. A Master (layout) Plan of this Udyan and Zoo has been modified and the Central Zoo Authority has accorded final approval to the revised Master (layout) plan on 13-02-2019.
- In second phase, construction of 10 animal exhibits has been completed and animals like Tiger, Leopard, Sloth bear, Hyaena, Jackal, Samber, Spotted deer, Swamp deer, Madras pond turtle and Bird Aviary-2 are displayed for public viewing. The construction of remaining 5 animal xhibits of Bird Aviary-1, Otter, Indian Wolf, Sambar and Barking deer and Nilgai and Four horned antelope is in progress.
- The Leopard, Hyaena, Sloth bear, Jackal, Swamp deer and Asiatic Tiger have been brought in on exchange basis from Kanpur, Mangalore and Aurangabad zoo and displayed in the newly constructed animal exhibits.
- Development of work of Landscape garden on the site of old offices of Zoo and Garden department and adjoining land is nearing completion.
- A new facility comprising of miniature models of various iconic places in Mumbai like Gateway of India, National Park, mangroves, beach etc. is developed at the first floor of Interpretation Centre building wherein the visitors can take a virtual tour of these places by way of video walls, 3D films etc.
- In third phase, it is proposed to develop a Zoo extension facility on the two adjacent plots (around 10 acres) wherein exhibits for various exotic species like Giraffe, Zebra, White Lion, Jaguar etc. will be developed for which Request For Proposals (RFPs) are being invited.
- The Memorandum of Understanding (MOU) has been signed between MCGM and Forest Department, Maharashtra for the proposal Zoo at the 120 acre plot in Aarey Colony, Goregaon. The procedure for transfer of land is pending at State level.

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 Panjrapor (1365 MLD). Water Treatment facilities for Tulsi (18 MLD) and Vihar (90 MLD) are located near to these sources. At these treatment plants, water is treated with processes such as coagulation, flocculation, settling, rapid sand filtration and post-Chlorination and quality of the effluent water is maintained in accordance with IS 10500 : 2012 (Drinking water – Quality Standard).

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. There is 3850 MLD water supply to Mumbai.

Population Projection, Demand and Augmentation of Water Supply

The population growth trend of Mumbai is continued. The projected population of Mumbai is anticipated 17.24 million by the year 2041. The projected water demand for 2041 is 6535 MLD (including enroute supply and transmission losses). The process of developing Government allotted

Table No. 9.1: Source of Water Supply

Sr. No.	Source	Year	Yield In MLD		Distance from city in KM	Remarks
				Commutative		
1.	Vehar	1860	90	90	Within City	Present Source
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	2022-2027	440	4613	180	Future Source
9.	Pinjal	2024-2025	865	5478	195	
10.	Damanganga	2029-2030	1586	7064		

[illegible] [illegible] [illegible] [illegible].

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.

Abhay Yojana

As apprised in last year's budget 'Abhay Yojana' is implemented from 15th February, 2020 which facilitated water connection holders to get relief from paying additional charges on the outstanding dues. Till March 2021, 1,06,267 connection holders have taken the benefit of 'Abhay Yojana' and the period of Abhay Yojana has been further extended till 30th June, 2021.

Water Distribution Improvement Works:

a) Replacement

In the year 2020-21 in City, Eastern Suburb & Western Suburb 28 Kms of pipe lines have been replaced / laid new and it is proposed to undertake similar works for 78 Kms in 2021-22.

b) Renewal of Service connections in road improvement

To avoid frequent digging of roads and contamination problems 17367 no. of age old service connections have been renewed in 2020-21 and it is proposed to take up works for about 13700 no. connections in 2021-22.

c) Removal of Bunch of Connections

For the effective management and improvement of water supply in slum localities 69 no. bunch of connections have been removed in the year 2020-2021 and it is proposed to take up such works at 41 no. new locations in the year 2021-22.

d) Repairs and Reconstruction of Valve Chambers

The work of Repairs and Reconstruction of 1327 no. valve chambers is completed in the year 2020-2021 and another Repairs and Reconstruction of 461 no. valve chambers is to be undertaken in the year 2021-22.

Water Supply Quality Control:

Regarding activities at Bhandup Complex Water Treatment Plant:

Mumbai city and suburban areas are being supplied with @ 3911 million liters of water on a daily basis. This water is drawn from various lakes as well as river sources. Out of above 3911 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. The laboratory at Bhandup Complex is working round the clock for this purpose and quality of final water leaving Bhandup Complex is always maintained within prescribed limits as per drinking water standards IS 10500:2012.

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 : 2012 to the Mumbai city.

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

1. Turbidity – per hour
2. pH – alternate hour (mg/L)
3. Residual Chlorine – alternate hour
4. Temperature – alternate hour (ºC)
5. Colour – alternate hour (Hazen Unit)

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 and 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 at Source (Raw) and Treated (Final) during April 2020 to March 2021.									
Parameters	Tulsi		Vihar		Bhandup Complex		Panjrapur (Bhatsa)		BIS standards 10500:2012
	Raw	Final	Raw	Final	Raw	Final	Raw	Final	
Turbidity NTU	2.4-18	0.45-3.7	0.96-7.0	0.44-2.6	1.1-56	0.18-5.0*	3.5-238	0.24-3.9	1-5
pH	6.95-7.80	6.75-7.50	7.05-8.90	7.00-8.00	7.05-7.80	6.90-7.60	6.8-7.4	6.5-7.2	6.5-8.5
Chlorides (mg/l)	11-16	14-18	11-19	14-22	08-13	10-15	38-113	34-96	250-1000
Total Alkalanity (mg/l)	27-38	24-36	32-44	32-40	32-43	28-40	8-23	10-24	200-600
Total Hardness (mg/l)	32-48	30-45	39-50	37-48	35-52	33-50	32-78	27-76	200-600
Bacteriological examination (CFU/100ml)									
Total Coliform	0-0	0-0	0-0	0-0	0-380**	0-0	≥ 2400	0-0	-
E-Coli	0-0	0-0	0-0	0-0	0-0	0-0	≥ 2400	0-0	-

Source: This Information is received from Hydraulic Engineer Dept of MCGM

* On 07.10.2020, due to technical failure, turbidity was 5.00 NTU for 3 hours.

** Due to technical failure at Yevai deer breeding plant

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. In December 2020 the Laboratory has been accredited with International Standard ISO17025:2017 by National Accreditation Board For Testing and Calibration (NABL).

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 200-250 water samples and in monsoon or emergency up-to 300-350 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

Table No.9.3: Wardwise % of Unfit water Samples April 2018 – March 2021

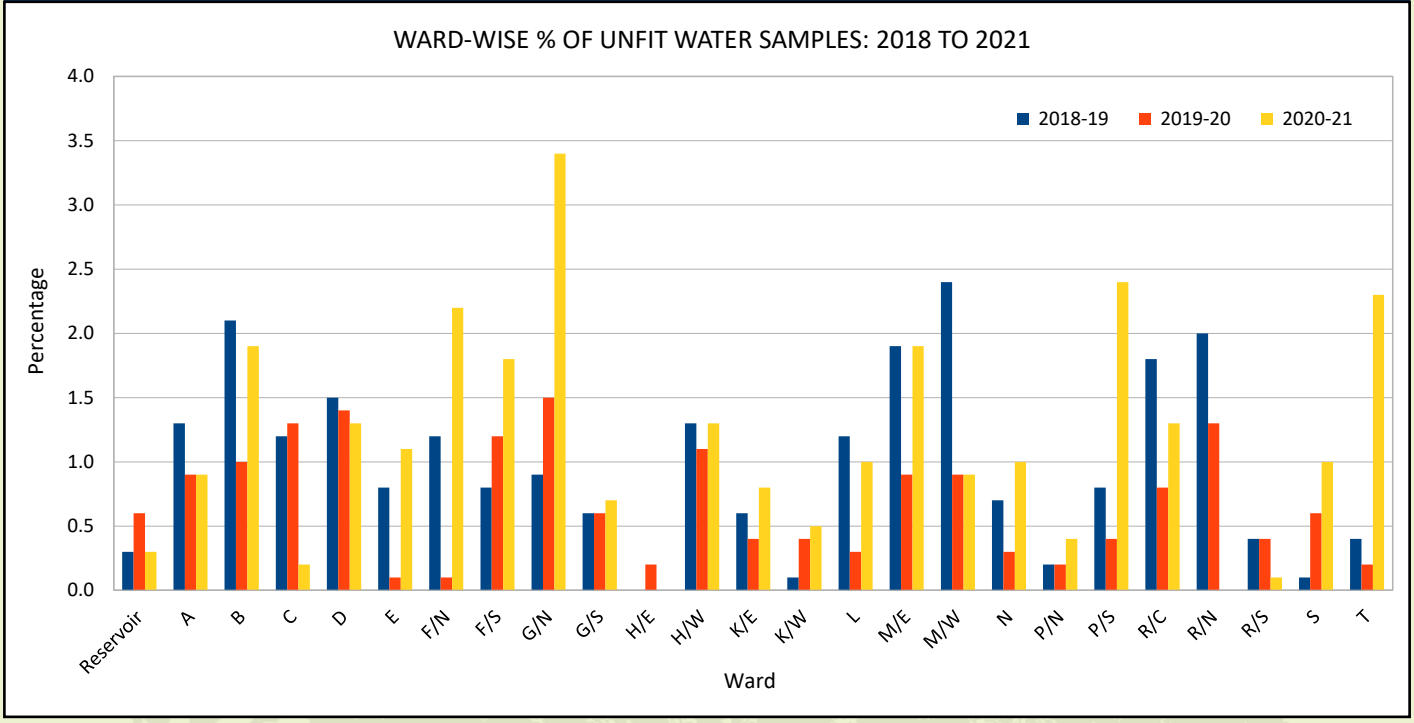
Sr. No.	Ward	% of Unfit Samples			Sr. No.	Ward	% of Unfit Samples		
		2018-2019	2019-2020	2020-2021			2018-2019	2019-2020	2020-2021
1	Service Reservoir	0.3	0.6	0.3	14	K/W	0.1	0.4	0.5
2	A	1.3	0.9	0.9	15	L	1.2	0.9	1.0
3	B	2.1	1.0	1.9	16	M/E	1.9	0.9	1.9
4	C	1.2	1.3	0.2	17	M/W	2.4	0.9	0.9
5	D	1.5	1.4	1.3	18	N	0.7	0.3	1.0
12	E	0.8	0.1	1.1	19	P/N	0.2	0.2	0.4
13	F/N	1.2	0.1	2.2	20	P/S	0.8	1.3	2.4
14	F/S	0.8	1.2	1.8	21	R/C	1.8	0.8	1.3
9	G/N	0.9	1.5	3.4	22	R/N	2.0	1.3	0.0
10	G/S	0.6	0.6	0.7	23	R/S	0.4	0.4	0.1
11	H/E	0.0	0.2	0.0	24	S	0.1	0.6	1.0
12	H/W	1.3	1.1	1.3	25	T	0.4	0.2	2.3
13	K/E	0.6	0.4	0.8	**Mumbai Average**		**0.7**	**0.7**	**0.9**

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

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.

In the year 2020-21, a total of 29,051 water samples were tested out of which 275 contaminated water samples were found. Corporation succeeds in reducing the percentage of contaminated water to 0.9%.

Chart No. 9.1: Ward-Wise % of Unfit Water Samples: 2018 to 2021



Membrane filtration plant at Bhandup Complex

Water Supply Projects

Middle Vaitarna Project is completed 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.

Future allotted sources of water are shown in following Table.

Table No. 9.4: Future sources of water supply

Sources	Yield in MLD	Ownership	Expected year of completion
Gargai	440	MCGM	2026
Pinjal	865	MCGM	2028
Damanganga-Pinjal River Link Project	1586	GoI /GoM / GoG	To be decided by GoI/ GoM/ GoG.
TOTAL	**2891**		

Source: MCGM Hydraulic Engineer.

Gargai Project is expected to start by end of this financial year 2022 and expected to be completed by 2026.

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.

Ongoing Projects in support for Improvement in Water Conveyance system:

Tunnels:

- **Construction of Tunnel Powai to Veravali and Powai to Ghatkopar**

1. Powai to Veravali tunnel drive of 2.2 KM length is commissioned on Nov.2018 and put in to

operation.

2. Powai to Ghatkopar tunnel drive work is kept on hold due to encounter of Adverse Geological Condition once the administration makes a dicision in this regards the next course of action can be decided.

- **Amar Mahal-Trombay reservoirs tunnel (2.5 mtrs dia, 5.5 kms length):** Tunneling activities form Hedgewar Udyan (Amar Mahal) towards TLLR are 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) completed and Tail and Assembly tunnelling activity has completed while shafting activities at Parel is in progress. Expected completion by April 2026 (Dy.Ch.E. (WSP) C.C.).
- **60 MLD Water Reclamation Plant in Panjrapur Complex:** The tender for getting balance work of Water Reclamation Plant in Panjrapur Complex at the risk and cost of M/s Pratibha Industries Ltd. is in progress.
- **Upgradation of Powai Lakefront:** In progress, expected completion by June 2021.
- **Consultancy work for development of Hydro Electric Power Plant Project at 'Hinduhridaysamrat Shivsenapramukh Balasaheb Thackerya Middle Vaitarna Dam':** Consultancy work completed, LOA is issued.
- **Development of Renewable Hybrid Energy Project Facilities of Hydro Electric Power Plant and Floating Solar PV Power Project at 'Hinduhridaysamrat Shivsenaprmukh Balasaheb Thackeray Middle Vaitarna Dam':** LOA is issued to lowest bidder M/s Shapoorji Pallonji and Company Private Limited – M/s. Mahalaxmi Konal Urja Private Ltd. (JV) [SPCL-MKUPL, (JV)] on dt.16.02.2021.
- **Replacement of valves and allied works at Trombay High Level Reservoir:** The plans have been approved and work is in Progress.

Pipelines Work:

- Missing link of MV main betn. Chinchawali to Yewai (3 mtrs dia., 4.5 km): 4.1km Pipe Laying work is completed. Expected work completion by September 2021.
- Replacement of twin Tansa main betn Balkum-Hazuri bridge (3 mtrs dia, 4.5 km): 3.9 km Pipe Laying work is 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): 4.07 km Pipe Laying work is completed. Expected completion by September 2021.
- Construction of Inter Connection by 4000 mm dia MS pipe from Bhandup tunnel shaft to 1910 MLD old WTP in Bhandup Complex and allied works (3 mtr dia and 4 mtrs dia, Total length 125 mtrs): 50 mtrs completed. Expected completion by September 2021.

Construction and reconstruction of RCC compound and retaining wall :

Construction of RCC retaining wall from Khindipada to Tulsi Gate, Rajaramwadi near Khindipada saddle tunnel and Construction of collapsed compound wall portion at superior staff quarters Bhandup Complex and allied road and drain work : 55% work completed expected completion by June 2022.

Structural repairs to existing reservoirs:

- Malad Hill Reservoir– I (50MLD): Work completed in February 2021.
- Trombay High Level Reservoir (55 MLD): 40% completed. Expected completion by May 2022.
- Trombay Low Level Reservoir (27MLD): 60% work completed. Expected completion by June 2022.
- Structural Repair Works to Bhandup MBR (246MLD): 27% completed. Expected completion by July 2021.
- Structural Repair Works to Yewai MBR (118 MLD): Work started recently. 5% work is 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. 20% work is completed. Expected completion by may 2022.

Water Supply Resources- Surface as well as Underground:

Gargai project (440 MLD):

Gargai project consist of construction of dam across Gargai River and construction of 2.1 Km long tunnel to convey water from Gargai dam to Modaksagar reservoir.

Vetting of Hydrological studies is completed & 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 completed for the affected villages while that at R & R site is in progress.

Gargai dam project expected to be commenced in 2022 and will be completed by 2026.

Pinjal Dam Project (865 MLD):

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' and work for preparation of ToR of EIA is in progress.

Pinjal Dam Project expected to be commenced by 2024 and will be completed by 2028.

Damanganga-Pinjal River link project (1586 MLD):

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.

Desalination:

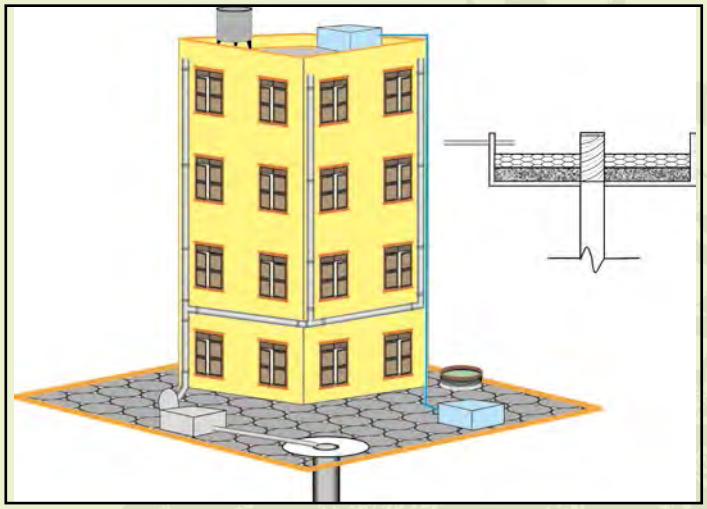
MCGM, has now also planned to augment water supply by 200 MLD by construction of a desalination planned water will provide climate change resilient and reliable sources of water for Mumbai.

Proposed Tunnels/ Projects:

- **Proposed Tunnel from Balkum to Mulund- 9.66 Km:** The consultant have been appointed for carrying out Feasibility studies and PMC services thereafter surveys and feasibility report preparation is under recent commencement.
- **Transfer of Excess Water from Vehar Lake to inlet bay of WTP at Bhandup Complex:** The consultants have been appointed for carrying out Feasibility studies and the same is in process.
- **Structural Repair to 1910 MLD old WTP, Bhandup Complex:** Tender for Consultancy for Feasibility study for repair/ rehabilitation has been invited in March-2021. The work will be undertaken after the feasibility study and recommendations from feasibility study consultant.
- **Reconstruction of Malabar Hill reservoir:** Draft Tender is processed for the approval of competent authority. Bids to be invited by May 2021.
- **Reconstruction of Bhandarwada Hill reservoir:** Consultant is appointed & pre-tendering work is in process.

10. RAIN WATER HARVESTING

MCGM 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 deployed for Rain Water Harvesting.

1) Storage in underground or above ground artificial tanks.

2) Direct recharging of the subsoil water strata (aquifer) through dug up wells or bore wells.

3) Recharging of the subsoil water by percolation.

4) Forcing rainwater in the ground through bore wells and thereby preventing entry of salty seawater in the subsoil strata.

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

Municipal Corporation of Greater Mumbai is the 1st Municipal Corporation in Maharashtra to make Rain Water Harvesting mandatory. Rain Water Harvesting had been made mandatory to new properties coming for development from 1st Oct. 2002 having plot area 1000 sq.mt and more. This condition was extended to the properties which had come for development prior to 1st Oct. 2002 but are coming for occupation / completion from 1.9.2003. As per Government directives u/no. TPB -4307/396/CR-124/2007/UD -11 dtd. 6.6.2007 the condition was binding to all developments having plot area 300 Sq. Mts. and more. From 8.05.2018 as per DP 2034 the condition is binding to all developments having plot area 500 Sq. Mts. and 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 department 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 continuous awareness campaign, advertisements in local newspapers were published appealing Mumbaikars to use water judiciously and to avoid wastage of water. Save water awareness posters, short videos were prepared with the help of Tata Trust. Save Water appeals / advertisements were also displayed on BEST buses, Bus Queue Shelters, TV in BEST buses & in local trains. Lectures on water conservation in various Municipal schools via virtual classroom were delivered through Marathi Vidnyan Parishad. A yearlong initiatives **'Water**

smart Mumbaikars – mass awareness for water conservation" has been initiated by **me2green** NGO as MCGM as concept partner.

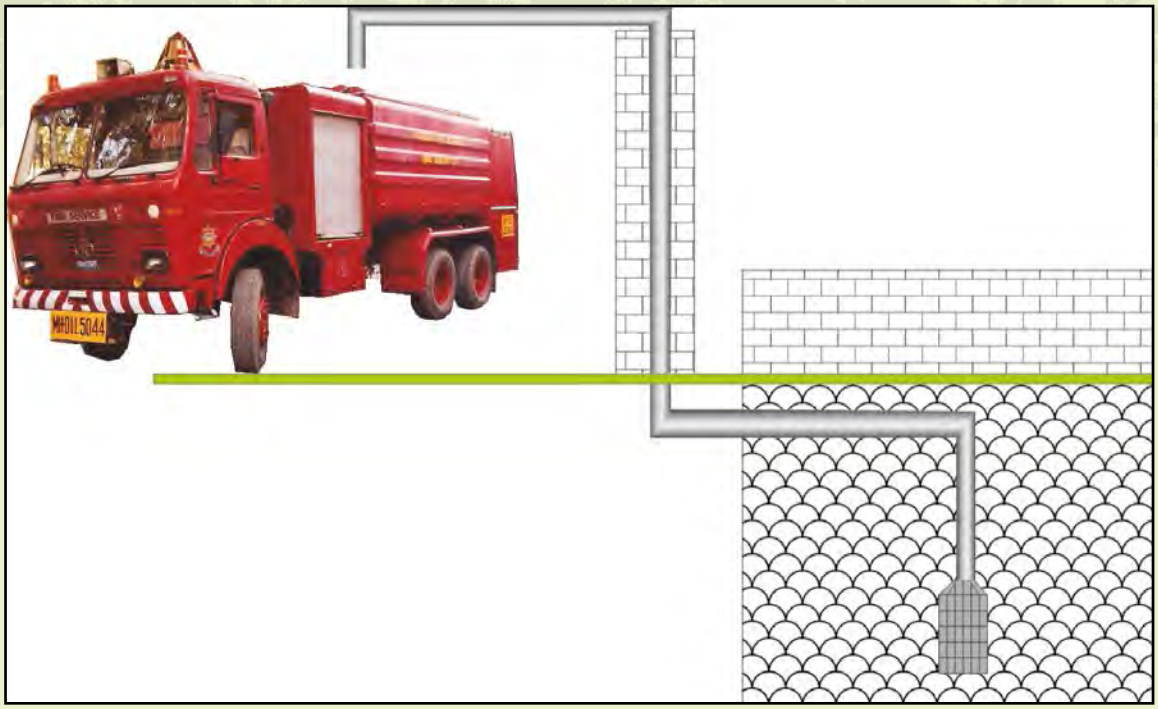
Due to late monsoon in 2019, with the help of Public Relation Dept., Hydraulic Engineer's dept. printed 1,92,000 Save water awareness posters in Marathi, English & Hindi appealing Mumbaikars to use water judiciously and to avoid wastage of water. These posters were pasted in all the Municipal offices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

There are in all 18911 identified wells (4638 dug up wells, 12561 tube wells & 1712 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 378 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 premises for fire Brigade to save fuel & precious time during emergencies.

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

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



11. SEWAGE DISPOSAL

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

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

Municipal Corporation of Greater Mumbai has prepared second sewerage master plan known as Mumbai Sewage Disposal Project (Stage II) in the year 2002. In order to provide safe and clean environment to citizens various projects such as Upgradation of existing Waste Water Treatment Facility (WwTFs), Construction of new WwTFs, Reconstruction of Sewage Pumping Station, construction of Sewer Tunnels are planned.

The projects of WwTFs are undertaken as per effluent discharge standard prescribed by Hon'ble NGT in their order dated 30.04.2020 (BOD<10 mg/Ltr, TSS<20 mg/Ltr, Fecal Colliform<100 MPN/100 ml).

Table No.11.1:The details of the WwTFs projects

Sr. No.	Name of WwTF	Plant capacity in MLD	Tertiary Treatment(Capacity in MLD for Reuse)	Design,Build Period in years	Expected date of Completion
1	Worli	500	250	5	31.05.2026
2	Bandra	360	180	5	31.05.2026
3	Dharavi	418	209	5	31.05.2026
4	Versova	180	90	4	31.05.2025
5	Malad	454	227	6	30.09.2027
6	Bhandup	215	108	4	31.05.2025
7	Ghatkopar	337	170	4	31.05.2025
	Total	**2464**	**1234**	-	-

The tenders for WwTFs at Worli, Bandra, Dharavi, Versova, Malad, Bhandup and Ghatkopar were invited on Design Build Operate (DBO) basis in which operation and maintenance of 15 years are included. Except Malad, bids are received for all other projects and evaluation is in progress. Due to non receipt of any bid, tender for Malad WwTF will be reinvited in due course of time.

The work of 37 MLD Colaba WwTF has been completed and same has been put in operation from

April 2020.

MCGM has emphasized the need of recycle and reuse of treated waste water for non potable and industrial purposes.

There is a provision of 50% of plant capacity for tertiary treatment in WwTF. This tertiary treated water will be made available for non potable purposes. At present 10 MLD of treated waste water is available at Colaba WwTF for reuse.

Works of construction of some tunnels are also in progress. The details of the same are as follows :

Table No.11.2: Works of construction of some tunnels in progress

Sr. No.	Name of the Tunnel	Size of Tunnel in mm	Length of Tunnel in Km	Remarks
1	Versova: From D.N. Nagar old Versova Pumping station To new Versova Influent Pumping station (near Versova Lagoon)	2000	3.1	Work in progress. 490 m Tunnel Boring completed
2	S V Road: From Jai Bharat Pumping station Khar (West) To Bandra IPS along S.V. Road Bandra (West)	2600	1.9	Work in progress. 240 m Tunnel Boring completed
3	PST-1: From Don Bosco school, Borivali (West) To New Malad IPS	3200	5.8	Draft Tender put up for sanction
4	PST-2: From Goregaon Pumping Station To new Malad IPS	2600	4.8	Draft Tender put up for anction
5	Mithi-IV: Construction of Sewer Tunnel From Bapat Nallah and Safed Pul Nallah To Dharavi WwTF	2600	6.8	Tender in Progress

The benefits of various MSDP - II projects to the environment are as follows:

1. Saving and Conservation of Drinking Water
2. Conservation of Environment
3. Improvement in Public Health of Mumbai City
4. Improvement in Sea aquatic Life

Sewage Operation (SO):

Laboratory at Dadar under Sewerage Operation department has carried out monitoring of marine outfalls at Colaba, Worli and Bandra (Table 11.3). 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 E-Coli are exceeding at all sites.

Table No.11.3: Water Quality at Marine Outfall 2020-21

Sr. No.	Place	PH		D.O. (mg/l)		Turbidity (in NTU)		F-Coli (CFU)		B.O.D. (mg/l)	
	Standard: SW-II	6.5-8.5		≥ 4 mg/l		≤ 30 NTU		≤ 100/100 ml		≤ 3 mg/l	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
1	Colaba	7.91	8.16	4.8	6.6	1.92	7.67	10	150	0.35	1.63
2	Bandra	7.89	8.32	4.9	8	1.44	3.25	40	164	0.75	2.8
3	Worli	7.97	8.28	5.3	7.7	1.1	5.14	23	400	0.85	2.9

D.O.: Dissolved Oxygen B.O.D.: Biochemical Oxygen Demand CFU: Colony Forming Unit

Source: This information is received from Sewerage Operation Department Dadar Laboratory.

Table No.11.4: Zonewise average dry weather flow capacity of sewage

Sr. No.	Name of Sewage Treatment Plant	Installed Capacity (In MLD)	Zonewise Avearage Dry Weather Flow Capacity of sewage (In MLD)
1	Colaba	37	26.65
2	Worli	757	270.65
3	Bandra	797	487.59
4	Versova	180	99.94
5	Malad	280	151.08
6	Bhandup	280	81.23
7	Ghatkopar	386	103.21
8	Charkop	6	4.57

12. STORM 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 waste water 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 84 major out-falls in the city area which drain to Arabian sea directly, also 7 at Mahim creek and 11 at Mahul creek. There are 30 out-falls in western suburbs draining directly into Arabian sea while 15 drain into Mithi river which ultimately joins Mahim creek. In eastern suburbs, 14 out-falls discharge in Thane creek, while 5 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.

As per the price index of the year 1992, total cost of the project was worked out to Rs.616.30 crores. It was proposed to carry out improvements in the time span of 12 years. However, due to the shortage of funds and others reasons, only the works amounting to Rs.260 crores were completed. As per the price index of year 2006, total cost of remaining work is approximately Rs.1200 crores. As it was not possible to complete these balance work with the budget provision of Municiapal/ Government of India has been requested for financial assistance.

The Government of India sanctioned a special grant of Rs.1200 crores as per detailed project report submitted to Government of India to implement BRIMSTOWAD Project in year 2007. Out of these, MCGM has received Rs.1000 crores till date. Fund received form Government of India is as follows:

Sr. No.	Date	Amount Received
1	23.08.2007	Rs.400 Crs.
2	17.02.2009	Rs.100 Crs.
3	31.03.2010	Rs.400 Crs.
4	31.03.2010	Rs.100 Crs.
	Total	**Rs.1000 Crs.**

Subsequently in the year 2005 Mumbai faced unprecedented rains on 26th and 27th July 2005 and 944 mm rainfall was recorded in one day. This resulted in the flooding, therefore, Government of Maharashtra had appointed a Fact Finding Committee to analyze the factors responsible for the situation that arose during July 26th and 27th, 2005 in Mumbai and to find out the remedial measures thereat, so as to avoid such incident in future. Based on the BRIMSTOWAD Master Plan Report and recommendations of Fact Finding Committee, the balance BRIMSTOWAD works for the improvement to the storm water drainage system are undertaken. As per suggestion of the Fact Finding Committee BRIMSTOWAD report is to be reviewed and upgraded for which MCGM has appointed M/s. MWH (I) Pvt. Ltd, as the consultant. The master plan is 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.12.1: Present status of the BRIMSTOWAD Projection								
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	5	6	7	18	14	4	6	24
No. of the works in progress	0	1	1	2	1	5	5	11
Tenders yet to be invited/ Tenders invited	0	0	0	0	1	1	1	3

Source: Storm Water Drain Dept of MCGM

Table No.12.2: Status of Strom Water 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 in May 2015
4	Lovegrove	Completed and commissioned in May 2015
5	Britannia	Completed and commissioned in the month of June 2016
6	Gazdarbund	Completed and commissioned in the month of June 2019
7	Mogra	NOC from Collector (MSD) for construction of Strom Water Pumping Station is pending.
8	Mahul	Land acquisition is in progress.

Source: Storm Water Drain Dept of MCGM

Total expenditure incurred till April 2021 is approx Rs.2439.85 Crores. However, due to increased width and depth of the drains due to change in design parameters, requirement of unconventional technology specially in tidal zone and passage of time – particularly due to encroachment issues, total financial requirement of the project has seen a substantial rise and additional funds to the extent of Rs.2700 Crores are required. For which, the revised DPR has been submitted to Government of India on dt.12.03.2012.

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 70% of the work is carried out before monsoon, 15% during monsoon and balance 15% post monsoon.

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.

Rivers reforestation works include widening of rivers, improvement of river water quality, rehabilitation of rivers. Prevention of river pollution from watershed areas, network of sewers, access roads for sewage treatment. These include construction, beautification of river banks and construction of sewage treatment plants. Not above Tenders have been invited for rehabilitation of rivers.

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. Out of the total length is 17.80km.of Mithi River, 11.84 km. is in the jurisdiction of Brihanmumbai Mahanagar Palika and the balance length of 6.00 km. is under jurisdiction of MMRDA. The work of widening and deepening work of Mithi River has been completed till date.

Out of 21.48 km. length of retaining wall to be constructed, construction work for the length admeasuring 16.49 km is completed by MCGM till date. The length of admeasuring 840 mtr. is to be constructed and maintained by MIAL for the balance length of 4.07 kms. the construction work is in progress.

13. SOLID WASTE MANAGEMENT

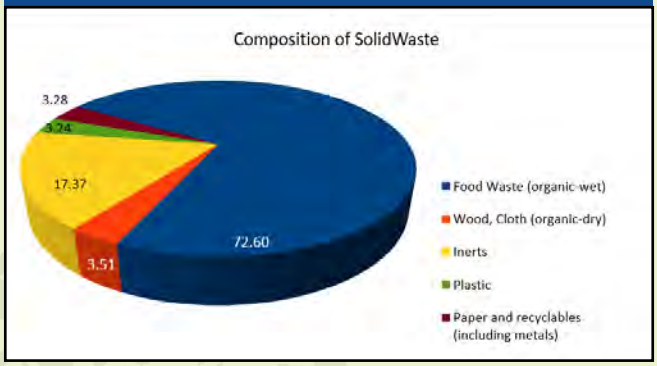
Due to various projects and programs arranged by MCGM in the last 5 years of the quantum of waste collected in the year 2021 has been approx 5500 MT per day. Of the 5500 MT transported to disposal sites by vehicles in over 900 trips/day. The waste can be broadly classified in various categories i.e. 72.60% Food waste (organic-wet), 3.51% wood, Cloth (organic-dry), 17.37% Sand, Stone and Fine earth, 3.24% Plastic, 3.28% Paper and recyclables (including metals).

Table 13.1: Composition Of Garbage 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 and Fine earth	17.37%
4	Plastic	3.24%
5	Paper and recyclables (including metals)	3.28%
	Total	**100.00%**

Source: Report of NEERI, 2016

Chart No. 13.1: Composition of SolidWaste



The waste from all over the city is collected and at present, it 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. Deonar dumping ground is the oldest one, receiving approximately 14% & Kanjur receiving remaining 86% of waste generated on daily basis. 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 waste with suitable technology is in progress. Scientific Closure Project of old site at Gorai has been completed in 2009 and operation and maintenance of the site is in progress. Area of different dumping grounds is given in table 13.2. Input loads of MSW at various dumping sites are given in Table 13.3.

Table 13.2: Capacity of Various Disposal Sites in Mumbai

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

** - Receiving of fresh MSW at Mulund Dumping Ground is stopped w.e.f. 21.12.2018

Table 13.3: Input Load of Waste

Sr. No.	Disposal Ground	Classification of Waste	Tonnes/day
1	Deonar	Municipal Solid Waste	Approx. 500-700 TPD (14%)
2	Mulund		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 waste with suitable technology is in progress.
3	Kanjur		Approx. 4500-5500 (86%)

There are 2059 no. of 1.1-cubic meter containers, 20415 nos. of 120 Ltrs. Litter bins, 10706 nos.of 240 Ltrs. Litter bins, 949 community collection points and 100% of total waste is collected through House-to-House collection. The daily Municipal Solid Waste (MSW) is collected and transported by deploying various types of vehicles. Salient features of transportation are given in Table 13.4.

Table 13.4: Salient Features of Transportation for Solid Waste

Sr. No.	Type of Vehicle	Number of Services			
		2017-18	2018-19	2019-20	2020-21
1	Compactors	1811	1228	1584	1432
2	Skip Vehicles/ Dumper Placers	11	11	1	0
3	Dumpers/Refuse Vehicle	192	100	126	192
4	Bulk Refuse Carriers	-	--	--	--
5	Tempo/Jeeps	3238	2933	4092	3358
6	JCB Machines	60	50	63	61
7	Stationary Compactors	57	57	80	83
	Total	5369	4379	5946	5126

13.1

Swaccha Bharat Mission:

In order to pay homage to Mahatma Gandhi on the occasion of his 150th birth anniversary on October 2, 2014, the Government of India had decided to make the country open defecation free and clean. Launched on October 2, 2014, this Swachh Bharat Abhiyan is being pursued steadily and consistently. MCGM being the prime administrative organization responsible for maintaining cleanliness in the city, a concerted and joint effort has been taken up along with the State and Central Govt. For achieving the desired level of cleanliness and sanitation under this Mission, the efforts and programs of Solid Waste Management department have been redesigned accordingly by MCGM.

Open Defecation Free:

The city of Mumbai was certified as Open Defecation Free (ODF) in the year 2017. During Swachh Survekshan 2021, Mumbai has been assessed and declared as an Open Defecation Free + (ODF +) City by the Quality Council of India (QCI) on 22nd December 2020.

Swachhata App:

Swachhata App developed by Ministry of Housing and Urban Affairs (MoUHA) and 24 X 7 app of MCGM were integrated to resolve complaints about 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 monitored regularly.

Segregation and Composting of wet waste at Source:

To reduce the waste coming from bulk waste generators, identification of 3367 residential, commercial, market premises etc (bulk waste generator) have been carried out and notices are issued to them to increase the level of "segregation at source". MCGM has provided guidance 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 any one of the method/ technology suitable for them.

Swachh Survekshan 2020:

MCGM has actively participated in Swachha Survekshan 2021 conducted by Ministry of Housing and Urban Affairs (MoUHA) to assess SWM progress between 1st January 2020 to 28th February 2021. As a part of Information Education & Communication (IEC) activities, hoardings and banners were put up to encourage citizens waste segregation in their own premises. Also, banners were put up at the bus stand for public awareness of Swachh Survey 2021.

Third party evaluation of cleanliness of hospitals, hotels, municipal and private schools, market places and Swachh Mumbai Prabodhan Sanstha, large scale waste generating residential institutions, community and public toilets was carried out as per the criteria prepared for Swachh Survekshan 2021 by the Ministry of Housing and Urban Development, Government of India. The winners will be honored with cash prizes and testimonials.

Safaimitra Suraksha Challenge (SSC-2021):

MCGM is implementing Safaimitra Suraksha Challenge initiated by Ministry of Housing & Urban Affairs. A training program was conducted at the Auditorium of Dadar Sewerage Pumping Station building on 17th to 19th February 2021 for manhole/septic tank workers to observe various safety precautions during the repairs and cleaning of Sewer lines.

MCGM has started a special helpline number '14420' allotted by Department of Telecommunications (DoT) for citizens to register complaints regarding unsafe practices being adopted by cleaning & maintenance of septic tanks & sewers.

Capacity Building:

MCGM officers from Solid Waste Management department were deputed for studying the working models of decentralized MSW processing at Bangalore with the help of machines based on plasma technology.

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.

Compactor with Additional Chamber of Dry Waste Garbage

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

SWM Rules, 2016 also deals with the duty of manufacturers or brand owners of disposal products and 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 and 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 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 is as below.

Sr. No	Activity	Time limit from the date of notification of rules.	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. 1888 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, 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 and Western Suburbs) is in progress and work is awarded for City division, while scrutiny of the same is in progress. Complied within the time stipulated.

Sr. No	Activity	Time limit from the date of notification of rules.	Action taken by MCGM
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 almost 100% house to house collection, 86% segregation. MCGM has floated new zonal contract for collection of garbage in line with SWM Rules 2016, in which 399 nos. of large compactors and 246 nos. of mini compactors vehicles having separate compartment for collection and transportation of dry waste, e-waste and 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 and 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 and D generated by bulk generator complying with C and D Rules 2016. Also as regards to small scale C and 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 Proccesing 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 and has been operational since 13.12.2011. Presently, around 5500 TPD is being processed and can be further enhance to 6000 TPD in near future, if needed. 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. Three bids were received. The award of project is done. Currently, process of receiving Environment Clearance for project is in 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.	3 years	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.	5 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 and 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 in-principally 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 and sorting centers in 24 wards. Other than these, MCGM has decided to set up 4 more dry waste collection and 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 and glass, 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 and 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:

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

Kanjur MSW Processing Site:

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

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

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. Renewed authorization from MPCB is received on Dt.19.08.2017.

At present, processing of about 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 tendering process for Waste to Energy project is completed and the work is awarded to the contractor. About 600 TPD MSW will be processed scientifically and 4 MW energy will be generated from this project.

   MCGM also has planned for 1200 TPD Waste to Energy project in second phase. Global Expression of Interest for the same have been received and further tendering process is underway.

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 the contractor. After obtaining required clearances and mobilization of equipment and machineries required for the project, commencement of the project is started from 01.10.2019 upto 31.03.2021 contractor has scientifically processed and disposed off about 3,35,150 MT of legacy waste. M/s MITCON Consultancy and Engineering Services Ltd. has been appointed as Project Management Consultant (PMC).

3. **Scientific processing and disposal of Waste at village Karavale, near Taloja:** GoM has allotted about 52.10 Ha land to MCGM at village Karavale (Kh.), Tal – Ambernath, Dist. – Thane, out of which about 39.90 Ha. is government land and 12.02 Ha. is private land. Out of the government land, the physical possession of about 12 Ha. of land has been given to MCGM on 16.02.2019. This land is used for Solid Waste Management Projects of MCGM. Acquisition of remaining government land and about 12.20 Ha. private land is being carried out by Collector, Thane. After receiving physical possession of the said land, MCGM will undertake works for development of scientific waste processing facilities.

4. **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.

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

Pelletisation Project:

M/s. Godrej Industries have started green waste processing Pelletisation plant in Ghatkopar (N Ward) through CSR. 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 this plant approx 3-4 MT per day green waste (from 24 wards) is processed and converted into pellets. The capacity of the plant is 10MT/Day.

Service Level Benchmarking:

1. To monitor the performance of any ULB regarding its Service Delivery to the Citizens, MoUD has devised benchmarks for each service delivered.
2. For Solid Waste Management Department 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%
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 and Handling) Rules, 2016:

Bio Medical Waste (Management and Handling) Rules, 2016 are notified by Ministry of Environment and Forest, Government 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 and 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 and 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 14000 nos. of health care establishments are registered with the centralized facility. Daily approx 20 M.T. of BMW is being collected and 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:

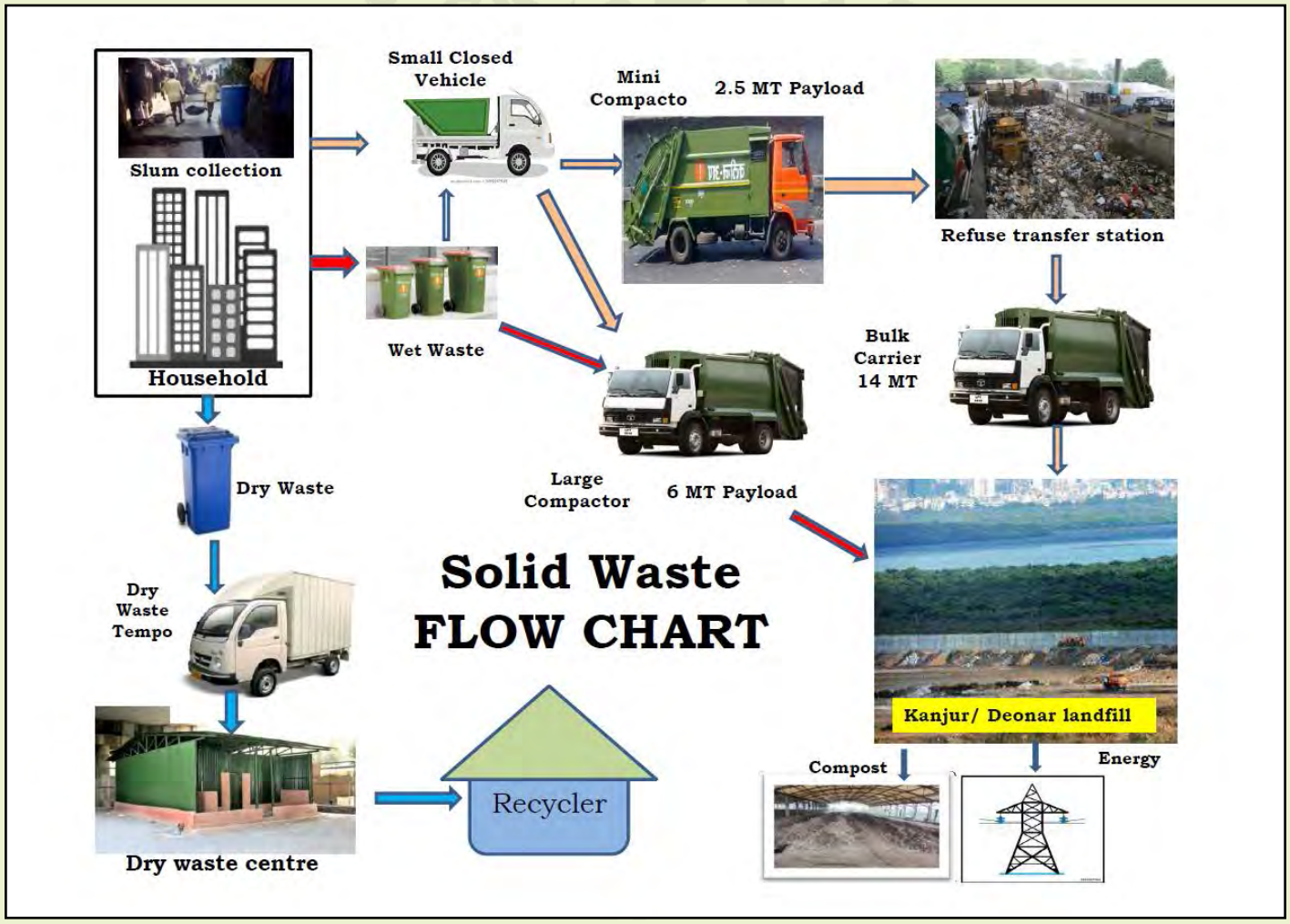
MCGM has set up 46 dry waste collection and sorting centers for segregation of collected dry waste. The plastic waste is segregated from collected dry waste and is sent to the recyclers directly by the engaged waste pickers' association. Plastic shredding machines are installed at few DWSC locations in the city. Under EPR, companies like Bisleri and 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. 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 and 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.



14. POWER 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 was 675 MW (the maximum demand of BEST Undertaking was 927 MW in F.Y. 2019-20. However due to COVID-19 lockdown, the maximum demand dipped to 675MW in F.Y.2020-21. Generally, the maximum demand of BEST Undertaking is in the range of 900 to 950 MW) and power purchased was around 3925 MUs in FY 2020-21. To meet this demand, power is purchased in major from Tata Power Company and remaining from 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 16% (Solar 4.50% and Non-Solar 11.50%) of total procurement of energy for FY 2020-21. BEST has procured total 31.5 MUs of solar energy BEST and also has achieved the RPO target for FY 2020-21.

As steps towards pollution control:

BEST has filed a petition before MERC on 25.02.2021 to approve the procurement of 400 MW Wind-Solar Hybrid Power from SECI for 25 years. It is expected that the RE power flow will start from December 2022. The Wind-Solar Hybrid power will be sufficient to fulfill Renewable Purchase Obligation of BEST up to FY 2028-29.

As per Roof Top Solar (RTS) Subsidy scheme introduced by MNRE for Residential Consumers, BEST conducted bidding for selection of vendors for empanelment and for installation of RTS project in BEST area. For executing the RTS scheme, BEST issued LOE in March 2021 to 3 successful bidders and developed On Line Portal for the benefit of consumers.

BEST has installed 4 nos of Electric Vehicle Charging Stations at 2 locations in its premises.

Under Faster Adoption and Manufacturing of Electric Vehicles (FAME India phase II) scheme. Dept. of Heavy Industries (DHI) has approved 340 nos, of Electric buses for BEST. For charging of these buses we have plan to install another 72 nos of Electric Chargers of 240kW/ 200kW at 4 locations namely Backbay, Shivaji Nagar, Malvani and Worli depots

Table No.14.1: BEST Consumers, Connected load and Consumption for the year 2020-21					
Sr. No.	Consumers Category	Mumbai City			
		Consumers #	Connected Load in kW	Consumption in Million Units (MUs)	Avg. Monthly Consumption (MUs) = e/12
1	HV Consumers	199	433961.09	540.65	45.05
2	LV Consumers	1044171	3922935.82	3297.76	274.81
	Total	**1044370**	**4356896.91**	**3838.41**	**319.87**

Table No.14.2: Category wise Consumers, Connected Load and Consumption (2020-21)					
Sr. No.	Consumers Category	Mumbai City			
		Consumers #	Connected Load in kW	Consumption in Million Units (MUs)	Avg. Monthly Consumption (MUs) = e/12
1	RESIDENTIAL	764336	2374640.19	1927.09	160.59
2	COMMERCIAL	270470	1777612.36	1600.20	133.35
3	INDUSTRIAL	9067	199674.02	295.21	24.60
4	Others	497	4970.34	15.92	1.33
	TOTAL	**1044370**	**4356896.91**	**3838.41**	**319.87**

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, BEST had completed the 97% of replacement work, the balance being majorly the flood lights, which are being replaced.

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. 14.3: MSEDCL's Consumers, Connected Load and Consumption in MU's for F.Y. 2020-21

Sr. No.	Category	Division Name					
		Bhandup			Mulund		
		Total Consumers	Connected load (KW)	Consumption (MU's)	Total Consumers	Connected load (KW)	Consumption (MU's)
1	High Voltage Consumers	94	153715	129	44	32591	36
2	Low Voltage Consumers	182532	395126	390	131390	401845	359
	Total	**182626**	**548840**	**518**	**131434**	**434436**	**395**

Table No. 14.4: MSEDCL Category wise Consumers, Connected Load and Consumption in MU's for F.Y. 2020-21

Sr. No.	Category	Division Name					
		Bhandup			Mulund		
		Total Consumers	Connected load (KW)	Consumption (MU's)	Total Consumers	Connected load (KW)	Consumption (MU's)
1.	Residential	158442	251101	267	113805	295145	274
2.	Commercial	18897	105160	91	15385	80712	62
3.	Industrial	4627	76870	108	1201	34638	43
4.	Others	596	115709	52	1014	23940	16
	Total	**182562**	**548840**	**518**	**131405**	**434436**	**395**

Table No. 14.5: MSEDCL's Consumers Average Consumption of energy in MU's for F.Y. 2020-21.

LT Categorywise consumers	Average Consumption in MU's		
	Bhandup Division	Mulund Division	Total Avg. Consumption
High Voltage Consumers	10.73	3.01	13.74
Low Voltage Consumers	32.47	29.90	62.38
Total	**43.20**	**32.91**	**76.11**

Table No. 14.4: MSEDCL's Categorywise Average Consumption of energy in MU's for F.Y. 2020-21

LT Categorywise consumers	Average Consumption in MU's		
	Bhandup Division	Mulund Division	Total Avg. Consumption
Residential	22.28	22.83	45.11
Commercial	7.59	5.17	12.77
Industrial	8.99	3.55	12.54
Others	4.34	1.36	5.69
Total	**43.20**	**32.91**	**76.11**

15. ROADS 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 and 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:

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.

TRAFFIC

1) Traffic Engineering:

The work of Traffic Planning and Traffic Co-Ordination department is carried out under the control of Dy.Ch.Eng. (Traffic) who works under Ch.Eng. (Roads and Traffic). This office look after the matters pertaining to prescription of Road regular line, design and construction of traffic islands, Providing and Fixing Signage works. Also, this office scrutinized and approves parking layout proposals on Government and private land through online system. Widening of new and public roads under MCGM jurisdiction by Prescribing Regular Line under MMC Act 1888. This office carries out various work in co-ordinatation with Traffic Police department for smooth traffic movement in MCGM limit.

This office prepares policy for providing street light on newly constructed roads as well as improvement of existing street lighting and making co-ordination with all Ward offices to get the above works done through three service provider electric companies viz. BEST, Adani Electricity and 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 73 pay and park schemes on roads contractors have been appointed for 44 sites to start pay and park scheme. Similarly contractors have been appointed of 29 Public Parking Lot and out of 32 Public Parking Lot which have been handed over Municipal Corporation of Greater Mumbai under DC Regulation no. 33 (24) of 1991 and Regulation no. 33 (18) of DCPR 2034. There are 29 nos. of amenity parking places handed over to Municipal Corporation of Greater Mumbai.

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 been formed to create the Parking Authority.

M/s. Tata Institute of Social Science (TISS) is appointed to collect the information and GIS mapping of various parking locations for this authority.

4) LED Lights:

MCGM has started the implementation of fixing LED street lights in 2020-21. There are about 1,40,595 Sodium vapor lamps in Mumbai out of which 1,36,211 conventional lamps have been replaced by LED. It is proposed to complete balance 5,080 LED lights in Mumbai for year 2021-22. 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.64 crore for the year 2021-22.

5) Traffic Signages:

MCGM has invited tender for modern signages with upgradation of signages for major road networks for 200 km. Further MCGM is planning to invite zonewise tender for singage work in all severn zones in the year 2021-22.

6) Initiative on Road Safety and 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 has been forwarded to concerned Dy.Ch.Eng. (Roads) department to take long term measures accordingly. Further the office informed the Dy.Ch.Eng. (Roads) Planning department has initiated 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 are working satisfactorily. The maintenance of remaining 388 conventional system and 216 flashing beckons are being carried out.

16. BRIDGES IN MUMBAI

List of Major works completed in the year 2020-21:

1. Demolition and Reconstruction of existing bridge over nalla at Juhu Tara Road near SNDT college on DBT basis in H/West Wards.
2. Demolition and Reconstruction of existing bridge over Dahisar River at Ratan Nagar on DBT basis in R/Central Wards.

List of Major projects undertaken in the year 2020-2021:

1. Reconstruction of Approaches of Himalaya FOB at CSTM Station Connecting Railway FOB on D. N. Road near Time of India Building in 'A' Ward.
2. The variation in construction of flyover acroos S. V. Road at Kora Kendra, Borivali (W), Mumbai in 'R/Central' Ward for further extention from General Kariappa Bridge to Western Express Highway.
3. Construction of R.O.B. at Vidyavihar Railway Station connecting LBS Marg to RC Marg in 'N' Ward.

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 2021 is 40,33,497. Their composition is 59.68% two-wheelers, 28.67% cars, jeeps and station wagons, 3.17% taxis/cabs, 5.52% auto rickshaws, 0.49% buses, 2.34% Goods vehicles, 0.01% tractors/ trailers and others 0.12%. As previous year increasing number of vehicles is 3.75% in Mumbai city. Table no. 16.1 shows number of different vehicle in Mumbai.

There are 1,27,993 metered taxis in Mumbai operating on petrol, diesel, CNG and LPG as on 31st March 2021. CNG and LPG which are regarded as clean fuel. More than 47% meter taxis and 97.47% rickshaws are running on clean fuel CNG and LPG.

Table No. 16.1 Category-wise comparison of vehicle with numbers 2019-21

Sr. No.	Category	As on 31st March		
		2019	2020	2021
1	Two Wheelers	2133833	2294599	2407016
2	Cars, Jeep, Station wagons	1080087	1128180	1156465
3	Taxi/Cabs	119477	126241	127993
4	Auto-rikshaws	212691	227054	222801
5	Buses	16051	19050	19682
6	Trucks & Lorries	74248	87481	94280
7	Tractor/ Trailors	818	840	354
8	Other	3383	4277	4906
	Total	**3637205**	**3887722**	**4033497**

Source : This information is received from RTO, GoM

Chart No. 16.1 (A): Category wise Vehicle Population in Mumbai

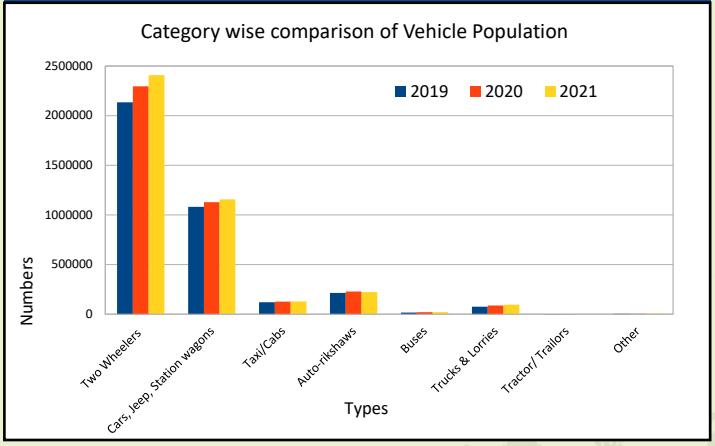


Chart No. 16.1 (B): Types of Vehicles

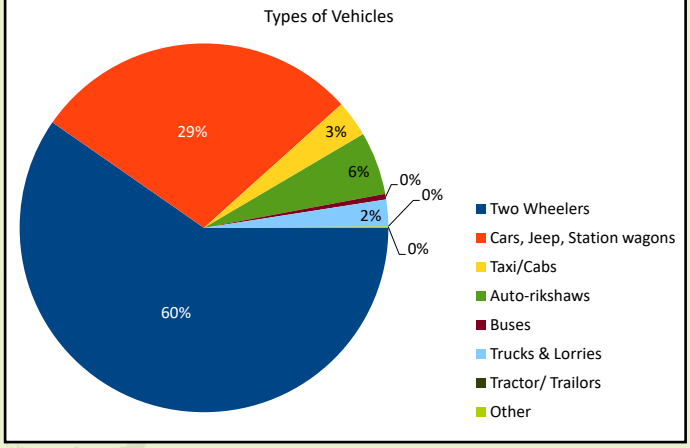


Table No 16.2 – Category-wise vehicles using various fuel types as on 31 March 2021

Sr. No.	Category	Disel	Petrol	LPG	CNG	Electric	Others	Total
1	Motor Cycles	0	1738874	0	4	1286	0	1740164
2	Scooters	0	635029	0	0	0	0	635029
3	Moped	0	31823	0	0	0	0	31823
	Total Two Wheelers	**0**	**2405726**	**0**	**4**	**1286**	**0**	**2407016**
4	Cars	288291	721855	15381	93624	639	3448	1123238
5	Jeeps	28940	482	4	87	0	0	29513
6	Stn. Wagons	2213	1501	0	0	0	0	3714
7(a)	Taxis meter fited	1529	1416	536	40946	0	80	44507
7(b)	Luxury/ Tourist Cabs	38583	24635	361	18629	319	959	83486
8	Auto-rikshaws	56	429	2	217168	0	5146	222801
9	Stage carriages	3812	502	0	1711	0	0	6025
10	Contract carriages/ Mini Bus	8024	173	2	596	194	328	9317
11	School Bus	2351	156	1	747	0	2	3257
12	Private Service Vehicle	987	7	1	88	0	0	1083
13	Ambulances	1371	304	0	120	0	1	1796
14	Articulated/ Multi	75	0	0	0	0	0	75
15	Truck and Lorries	10072	460	0	105	0	0	10637
16	Tanker	922	2	0	0	0	0	924
17	Delivery Van (4 wheelers)	48291	4568	9	2501	33	93	55495
18	Delivery Van (3 wheelers)	21625	4209	10	1145	54	106	27149
19	Tractors	201	4	0	0	0	0	205
20	Trailors	123	2	0	0	0	24	149
21	Others	2773	289	0	27	0	21	3110
	Total	**460239**	**3166720**	**16307**	**377498**	**2525**	**10208**	**4033497**

Source : RTO, GoM

In Mumbai region about 1,71,206 various types of vehicles are registered during April 2020 to March 2021. In this 68.22% of two wheelers, 25.78% of cars, jeeps and station wagons, 0.73% of taxi/cabs, 0.96% of Auto rikshwa's, 0.33% of buses, 3.61%, goods vehicles 0.01% of Tractors/ Trailors and 0.37% 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.

Chart No. 16.2: Fuelwise Vehicle Population in Greater Mumbai

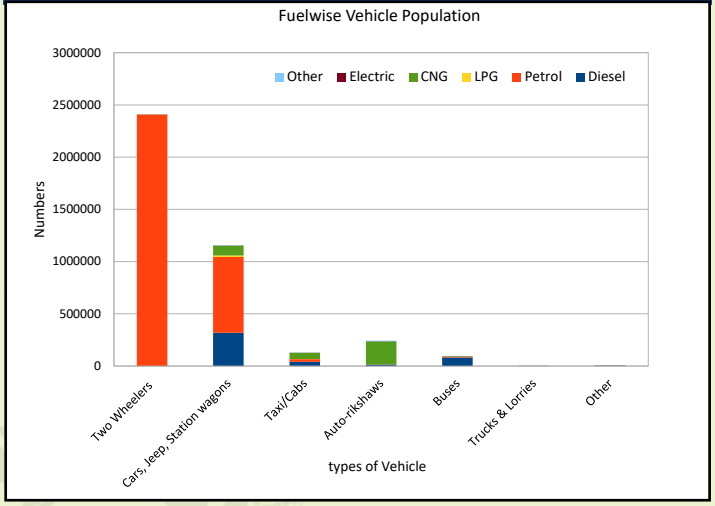
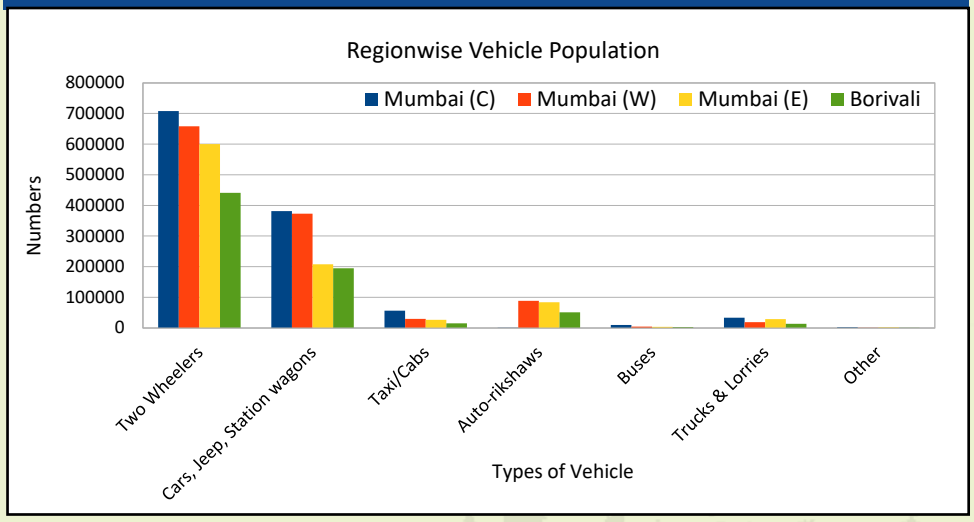


Table No 16.3 –-New Vehicles Registration during April 2020 to March 2021

Sr. No.	Category	Mumbai (C)	Mumbai (W)	Mumbai (E)	Borivali	Gr. Mumbai
1	Motor Cycles	31749	21032	34207	29679	116667
2	Scooters	0	24	0	2	26
3	Moped	17	52	22	10	101
	Total Two Wheelers	31766	21108	34229	29691	116794
4	Cars	11856	10116	10277	11894	44143
5	Jeeps	0	0	0	0	0
6	Stn. Wagons	0	0	0	0	0
7(a)	Taxis meter fited	0	0	44	0	44
7(b)	Luxury/ Turist Cabs	359	260	359	220	1198
8	Auto-rikshaws	0	531	498	613	1642
9	Stage carriages	0	0	9	0	9
10	Contract carriages/Mini Bus	402	0	40	63	505
11	School Bus	0	35	8	0	43
12	Private Service Vehicle	2	0	1	0	3
13	Ambulances	78	77	46	29	230
14	Articulated/ Multi	2	0	1	0	3
15	Truck and Lorries	0	0	282	560	842
16	Tanker	0	0	201	0	201
17	Delivery Van (4 wheelers)	1265	878	1323	765	4231
18	Delivery Van (3 wheelers)	121	162	226	395	904
19	Tractors	0	1	2	0	3
20	Trailors	6	1	0	0	7
21	Others	117	68	129	86	400
	Total	**45974**	**33237**	**47674**	**44321**	**171206**

Source : RTO, GoM

Chart No. 16.3: Regionwise Vehicle Population



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.

Note: As per 2019-2020 previous year data

17. MUMBAI COASTAL ROAD

Mumbai costal road (South) project:

The Mumbai costal road (South) project is one of the most prestigious projects undertaken by M.C.G.M. The Southern Costal Road Project of 10.58 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 noise 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 11.05.2017 and amendment on 18.05.2021. Also, the NOC's from other concerned departments of Central Government and State Government have been obtained for Mumbai Costal Road (South) Project.

The total Estimated Project Cost 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. and for Package II through the contractor M/s. H.C.C.-H.D.C. (Joint Venture). For each Package one Project Management Consultant (PMC) has been appointed as Employer's Personnel for supervisions and other allied works. Accordingly M/s. Yooshin 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

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

1.	Length	10.58 km
2.	Road on reclamation	4.35 km
3.	Tunnel (3 Lanes, 11m internal dia.) x 2 Tubes	2.07 km
4.	Bridges (4+4 Lanes)	2.19 km
5.	Interchanges (Amarson, Haji Ali and Worli)	3 nos.
6.	Seawall Length	7.47 km
7.	Reclamation area	111 hectare
8.	Reclamation area (Garden, Landscape, Parks etc.)	70 hectare
9.	Promenade (8 m to 20 m wide)	8.50 km
10.	Pedestrian Underpassess	16 nos.
11.	Underground Carparks	4 Locations (about 1865-Lots)
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 total length 1,650m.	

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 Employer's 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 2021-22.

Salient Feature of Site Environment Management Plan for the Project :

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 MoEF & CC 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 (Base – Line Data) and standards of MOEF and MPCB.
2. For controlling dust, contractors are doing water sprinkling on their sites during construction work on regular basis.
3. Noise barriers are being provided at all critical locations like near schools and hospitals etc. during construction.
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 noise and demarcate site from general public and road users.
6. Preventive Maintenance schedule for all construction machinery at site. All construction machinery is having PUC certificates. Preventive maintenance of machinery will also reduce noise from machinery.
7. All rotating parts of construction machineries have provided with canopies and grills to control rotating parts noise 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 during process of work and 2 years in operation phase.

18. EDUCATION

Under Section 61(q) of the Mumbai Municipal Corporation Act 1888 it is an obligatory duty of MCGM Education Department to provide primary education. Since 1907, MCGM Education Department has been carrying out this responsibility.

In compliance with the above, we were swift to react and adapt during the pandemic. COVID-19 created unprecedented challenges for us in every walk of life. The department planned extensively to ensure uninterrupted learning during this challenging period. A hybrid model of education consisting of YouTube channels, online classes, videos, telephone calls and worksheets was implemented across the city to ensure a seamless flow of education.

To elaborate further, we introduced our stakeholders across the education spectrum to online learning resources that were free of cost. Open-source platforms such as Zoom, Google Meets, Messenger, Telegram, Google Classroom, WhatsApp, etc. continue being used to conduct online classes. For students who face constraints during class hours, a repository of lectures has been created through 40 YouTube channels that are bifurcated grade and medium wise. With a subscribership of 1 lakh + viewers, our YouTube channels were well received and recognized by the Government of Maharashtra.

In the academic year 2020-21, our 963 primary schools catered to the educational needs of our 216450 students through eight medium of instructions. Our 7653 teachers reached out to all our students imparting quality education to them. We also cater to our 785 mentally challenged students from our 17 special schools for these students. Our 82 teachers help educating these children. In the year 2007-08, we started “Mumbai Public School” (MPS) English medium schools, the novelty of these schools is that it provides education right from Jr. K.G to std. Xth. And this concept is geeting a great response from the parents.

Since 1965, along with primary education MCGM is providing free secondary education through 49 Aided secondary schools. Our 175 Unaided secondary schools (+ MPS) are providing free secondary education. Thus, we are providing free secondary education to 41447 students through such 224 Aided and Unaided secondary schools and 1384 teachers are engaged in teaching.

MCGM also runs 2 D.Ed. colleges. Since the year 2009-10, MCGM has extended its educational facilities by starting 3 junior colleges (science stream) to support the education of our meritorious

SSC students.

Digital Classroom:

In the year 2019-20, we had set up 1214 Digital classroom with the help of projectors. We strive to keep evolving and updating ourselves to keep up with the times. In the year 2020-21, we are adding to our 1300 classrooms the interactive LED panels to provide an effective digital learning experience to our students.

After receiving administrative approval and completing the tender procedures now we are anticipating the approval of standing committee for the same and Dy.Chief Engineer (M& E) is looking after this process.

Virtual Classroom (VTC):

In the year 2011, MCGM education department started its Virtual classroom. Our 480 MCGM schools (360 Primary and 120 secondary), across 4 mediums - viz Marathi, Hindi, Urdu and English have a VTC set up.

During the pandemic, the expertise of our VTC teachers was utilized in uploading pre-recorded lessons on our 40 YouTube channels. These lessons are available in 4 mediums of instructions (Marathi, Hindi, Urdu and English) for students of Std. I to Std. X. Both, MCGM school students as well the students of other schools across Maharashtra too have subscribed to our channels.

The contract period of VTC project has expired. We are evolving to VSAT (Very Small Aperture Terminal) and tender procedure for the same is in process.

Various Competitive exams:

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.

District Training Center:

In the year 2020-21, NEP 2020 will be implemented Nationwide. DTC conducted online discussion session on the same.

Pehlay Akshar:

A total of 3000 teachers have been trained in English under the ‘Pehlay Akshar’ program so far. 500 Star Teachers from this pool continue to train their peers through Saathi Sessions across 12 wards. Further in Phase 2, our 606 teachers who have been identified as Star Teachers will implement the Saathi Sessions in the remaining 12 wards, starting July 2021. This will ensure a cadre of teachers that

are proficient in English and confident to train their students in the same.

Scout and Guide Section:

Scout-Guide is an 'International Movement'. Its foundation lays on the four pillars of scouting i.e. Character building, Service to Mankind, Intelligence and Health & Craftsmanship. "Creating Better Citizens" is the objective of Scout and Guide. Being an independent sub-section of Education (MCGM) Scout-Guide is working continuously since 1925 for 95 years. It works on Quality Education for all the MCGM students and 100% enrolment of all MCGM students.

In the year 2019-20, our 209 scout-guide students received State Award and 33 Cubs & Bulbuls received National Award i.e.'Golden Arrow Award'

In the year 2020-21, our 63 Scouts & Guides appeared for the State Award and 23 Cubs & Bulbuls received National Award i.e.'Golden Arrow Award'

Housekeeping:

In the year 2016-19, our 338 MCGM school buildings from our city, eastern and western zones were provided with housekeeping agencies. These agencies catered to our school cleanliness, security and maintainance services.

For the year 2021-24, the tender procedure for the appointment of housekeeping agencies is in process through our Dy. Chief Engineer (CPD)

Road Safety Patrol (RSP):

Traffic Police Cell imparted online training to our students. Students were introduced to road safety rules, traffic signals and precautionary measures in this pandemic situation.

Water purifiers:

To ensure safe drinking water for the students of our MCGM schools 1971 water purifiers are covered under (AMC) Annual Maintenance Contract. For the academic year 2021-22, the work order for purchasing of 326 new water purifiers is issued to the contractor by the Dy. Chief Engineer (E and Mech.) Maintenance.

Polymer Desk – Bench:

The number of Desk benches distributed in the year 2019-20 is 9754 (std.Ist to and std.IInd = 3031 (A size), std. IIIrd and std. IVth = 2174 (B size) , std. Vth and std. VIth = 2061 (C size) and std. VIIth and std. VIIIth = 2488 (D size)

The remaining 1040, std. Vth and std. VIth =332 (C size) and std. VIIth and std. VIIIth =708 (D size) desk and benches were supplied as per the emand recieved by the schools by the end of the year

2020-21. at present the procurrement process has been completed and the entire benches have been supplied to the schools.

Distribution of free Scholastic material:

Since the year 2007-08, Education Department is providing scholastic materials to all our MCGM school students. This was in view of a support to our parents and boost enrollment and attendance of our school students.

In the year 2019-20, we provided our school students with uniforms, shoes, socks, sandal, notebooks and school bag. Since March 2020, schools are closed due to the pandemic lockdown and as soon as the schools reopen in next academic year the scholastic materials will be distributed.

Welfare schems for the specially Able / Divyang students:

- Annual Scholarship: Rs.1000/- to Rs.2000/- is the annual scholarship amount. Our specially abled students studying in std. Ist to std. Xth are eligible for this scholarship, when they score ''B'' grade and above in both the semester school examinations. Our 4031 students will be awarded this scholarship in this academic year.
- Attendance allowance schemes- Students attendance allowance per day is Rs.10/- and escort allowance is Rs.10/-, thus Rs.20/- per day is calculated and annually this amount is deposited in the savings bank account of the specially abled students. Additional Rs.200/- is given to students with more than 80% attendance. In the year 2020-21, total 4,031 students will be given attendance allowance. The said project will be continued in the upcoming academic year.

Mid – Day Meal Scheme:

Owing to covid-19 pandemic situation students are not physically present in schools, but students were provided 34 days ration consisting of Rice, Moongdal and Harbhara for 2020 summer holidays. In addition to this, ration for the period June 2020 to April 2021 is being distributed to students. Under MDM we have invited Express of Interest (EOI) for appointment of new organizations to provide MDM to our school students (Mahila sansthas, Mahila Mandal, Bachat Gat, NGO's etc.).

Medical Officer (Schools) Section:

School Health services:

MO (S) conducts routine health check-up of all our MCGM school students (std. I to std. X). If need be students are referred to MCGM dispensaries or hospitals as per their health conditions. Every academic year, routine medical check-up is conducted.

Medical team consists of a medical officer, nurse and a peon. They visit every MCGM school to conduct

this routine medical check-up of our students. Health related awareness is created among students, parents and teachers by conducting meetings and workshops. Also. Virtual classes are held for the same.

On the National Deworming Day, twice in a year under the supervision of the class teacher, students are given deworming tablets. For prevention of anaemia among students from November 2017, National Iron Plus Initiative Programme has been started. Under this programme once in a week students are given Iron tablets under the supervision of class teacher.

This routine medical check-up did not happen this year due to Covid - 19 lockdown.

Balkotsav:

Annual Day Programme is organised every year across all our MCGM schools. Dance, Dramatisation and cultural programme competition are conducted in our MCGM school hall. Approximately 20,520 students participated in this Annual Day Programme / Balkostav and thus availed the opportunity to present their dance, music and dramatization skills.

The competition is conducted at ward level and from this the selected first rank dance groups are given opportunity at our MCGM schools city level. The final dance competition is organised in a huge auditorium and the first 3 winners are felicitated with Trophy, certificates and cash prizes, while all the participant students are given participation certificates.

Owing to covid-19, pandemic situation Online Annual Day Programmes were conducted at every school level / school complex level and we received overwhelming response for the same from parents and students.

Street-Play Competition:

Street Play competitions are conducted in the memory of Hindu Hriday Samrat Balasaheb Thackeray. Street Play Competitions are conducted in our 3 zones on 3 given topics based on Social Problems / issues. The street plays that are selected for first rank from every 3 topics are nominated for the final round of competition.

However, owing to the pandemic situation online street play presentation was conducted at every school level.

Secondary Education Section:

We provide Secondary Education through 49 Aided and 122 Unaided and 53 Mumbai Public schools (English Medium). At present total 224 schools are running.

The students strength of 224 schools in 2020-21 is as fallows. Aided-15430, Unaided-19893 and MPS-

6124. Thus, our secondary school cater to our 41447 students in following mediums of instructions viz: Marathi, Hindi, English, Urdu, Gujrathi, Telugu and Kannada.

In March 2020, is SSC board examination our 91 students secured 90 and above percentage.

Music and Art Academy:

Music:

After receiving overwhelming response to our 07 music academy, we are happy to set up music academy in our 17 remaining wards across MCGM Education Department jurisdiction. Thus, we are setting up a well-equipped, upgraded music academy in all 24 wards for all our students. Well qualified music teachers are being appointed on contract basis to impart Indian Classical music training to our students.

'Shala Bandha Pan Shikshan Suru' the slogan in pandemic situation depicts our transition to daily online teaching. Music teachers too adapted to the new normal. We extended our service to the State level students across the State of Maharashtra.

We conducted singing competition and music programme on the occasion of WORLD MUSIC DAY. Thus, an opportunity to our students to display their hidden talents in music.

Lt. M. V. Desai Memorial Day – In the memory of former Commissioner Lt. M. V. Desai and on the occasion of Desai's Memorial Day, Swaranjali and Chitranjali programs were organized live online on 05 August 2020. The students participated in this and created excellent painting and sculptures.

Art:

Online Syllabus:

In Alternative Academic Calender, syllabus of art subject has been incorporated by the Art section and the videos created by our Art Teachers have been uploaded on the YouTube channels and the links of the said YouTube channels are shared in the syllabus. And monthly PDF files of this course have been forwarded on various groups of students and schools, thus making it easily accessible to our students. Also, all the art teachers are conducting classes through zoom meetings and guiding the students to draw with the available materials. While the following programme were organized online: State Level Online Classes, Ganpati Clay Activity, Rangoli Activities, Gandgi Mukt Bharat Abhiyan, Salaam Rakshak wall painting, Nutrition Month Campaign, Kalagriha Chitrakriti and online gathering.

Work Experience:

Owing to pandemic lockdown, the schools are closed and activities like exhibition, competitions, workshops, prize distribution etc. could not be organized. However, some of the activities like Rakhi making, making of greeting cards, Diwali lanterns, students projects organized centrally like clay

molding, origami etc. in wooden carving – sitting plank, in tailoring – cushion making and mask making etc. were conducted online.

In summer holidays we have organized hobby classes for our students.

Scholarship Exam:

Pre-upper primary scholarship examination (PUP) (std. V) and (PSS) Pre-secondary scholarship Examination (Std. VIII) is an external competitive examination conducted by (MSCE), Maharashtra State Examination Council, Pune.

Students from MCGM school and all other aided and private schools appear for these scholarship examination.

The following number of students appeared for the State Scholarship Examination in the academic year 2019-20.

STD	Students appeared	No. of Successful students	No. of students achieved scholarship
5th	7125	1218	402
8th	6049	389	91

19. AIR QUALITY STATUS

Air Quality Monitoring and Research Laboratory:

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.

In view of fulfillment of the above Act, 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. Also 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. This laboratory established in the year 1976 this the only one environmental laboratory to monitored ambient air pollutant.

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

- Air Monitoring Unit: To collect the samples of various pollutants from 4 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 anthracene, Chrysene & Benzo Pyrene) extracted from suspended particulate matter are analysed with the help of Gas Chromatograph. The Benzo 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 is completed and put up for sanction to standing committe. In addition, in the year 2021-2022 Continous Ambient Air Quality Monitoring Stations is expected to be established at 5 places in the jurisdiction of MCGM.

Fixed Air Monitoring Sites of Environment Department		
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.

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 and Air Quality Index is now available to citizens on mobile app namely 'SAFAR-Air'.

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 2020-2021 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 2018 to March 2021

Sr. No.	Site	Unit µg /m³								
		Sulphur dioxide			Nitrogen dioxide			Ammonia		
		2018-19	2019-20	2020-21	2018-19	2019-20	2020-21	2018-19	2019-20	2020-21
1	Worli	10	8	6	50	17	29	70	66	84
2	Andheri	10	7	6	69	28	37	75	80	106
3	Bhandup	11	9	7	55	29	26	79	84	93
4	Deonar	18	12	**	59	25	**	126	106	**
CPCB Standards µg /m³		50			40			100		

Note: ** Levels are not available due to technical problem.
Source: Air Quality Monitoring and Research Laboratory of MCGM

Chart No. 19.1 (A)

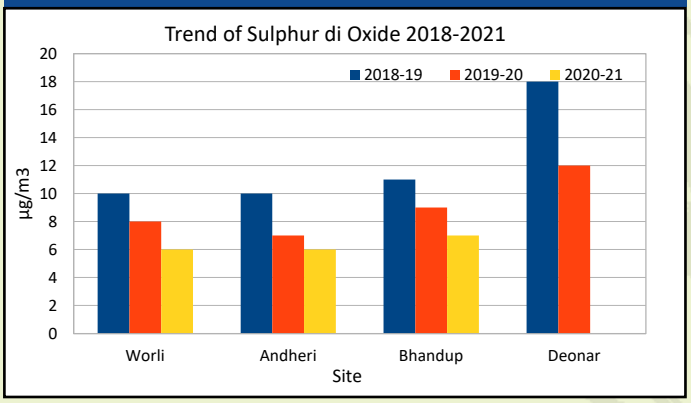


Chart No. 19.2 (B)

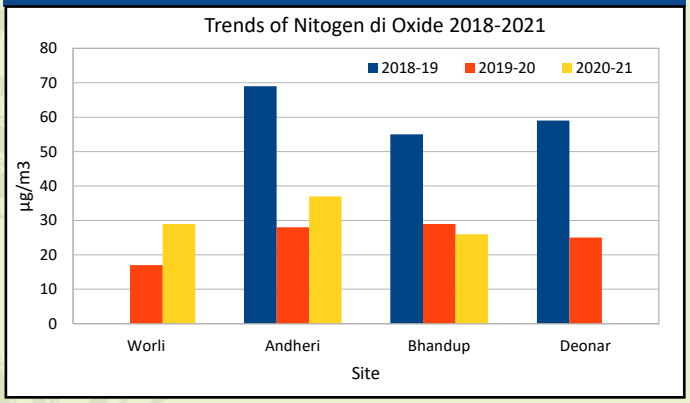
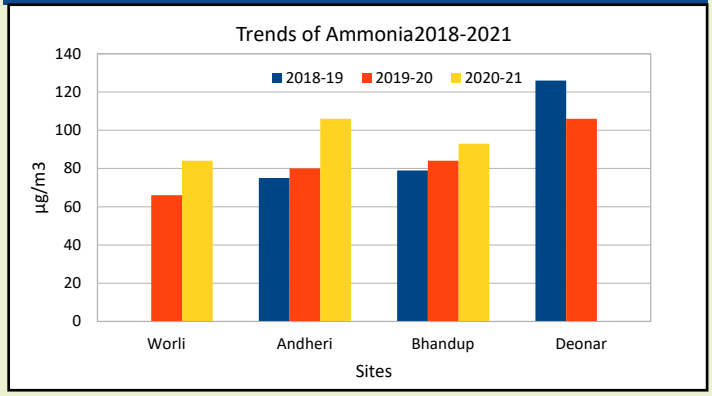


Chart No. 19.3 (C)



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

Levels of air pollutants SO_2, NO_2 and NH_3 measured during 2018-21 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 Andheri site; The levels of NH_3 is 106 µg/m^3 at Andheri site which is more than prescribed annual standards.

Table No.19.2: Range of the annual averages of pollutants at fix monitoring site (2020-2021)

Sr. No.	Unit µg /m^3	Sulphur dioxide	Nitrogen dioxide	Ammonia
1	Range	6-7	26-37	84-106
2	Maximum at	Bhandup.	Andheri	Andheri
3	CPCB standards	50	40	100
4	Comparison with CPCB standards	Not exceeded	Not exceeded	Not Exceeded at all sites except Andheri.

Source : Air Quality Monitoring & Research Laboratory

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 6-7 µg/m^3 and are below prescribed standard (50µg/m^3) at all sites. Maximum level found at Bhandup.

2) No_2 levels are found to be in the range of 26-37µg/m^3 and have exceeded standard (40µg/m^3) values at all sites. Maximum level found at Andheri.

3) NH_3 levels are found to be in the range of 84-106 µg/m^3 are below prescribed standard (100µg/m^3) at all sites except at Andheri site . Maximum level found at Andheri.

Table No.19.3: Percentage exceeding CPCB standards (24 hours average) from the year 2018 to 2021

Sr. No.	Site	Sulphur dioxide			Nitrogen dioxide			Ammonia		
	Year	2018-19	2019-20	2020-21	2018-19	2019-20	2020-21	2018-19	2019-20	2020-21
1	Worli	0	0	0	14	0	0	0	0	0
2	Andheri	0	0	0	36	0	1	1	0	0
3	Bhandup	0	0	0	23	0	0	0	0	0
4	Deonar	0	0	-	25	13	-	0	0	-

Source : Air Quality Monitoring & Research Laboratory.

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 Andheri site, at which 1% samples are exceeded the standard.

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

Table No.19.4: National Ambient Air Quality Standards central pollution control board, new Delhi (18th November, 2009)

Parameter	Exposure Period	Industrial, Residential, Rural & Other Area	Sensitive Area
Sulphur Dioxide, SO_2 µg/m³	Annual avg. *	50 µg/m³	20 µg/m³
	24 Hrs. avg.**	80 µg/m³	80 µg/m³
Nitrogen Dioxide, NO_2 µg/m³	Annual avg. *	40 µg/m³	30 µg/m³
	24 Hrs. avg.**	80 µg/m³	80 µg/m³
Particulate Matter (Size less than 10µm) PM_{10} µg/m³	Annual avg. *	60 µg/m³	60 µg/m³
	24 Hrs. avg.**	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
	24 Hrs. avg.**	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 µg/m³	2.0 µg/m³
	1 Hr.**	4.0 µg/m³	4.0 µg/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
Benzo alpha Pyrene, Particulate Phase only BaP, ng/m³	Annual avg. *	1.0 ng/m³	1.0 ng/m³
Arsenic, As, ng/m³	Annual avg. *	6.0 ng/m³	6.0 ng/m³
Nickel, Ni, ng/m³	Annual avg. *	20 ng/m³	2 ng/m³

Source: Central Pollution Control Board, New Delhi

* Annual arithmatic mean minimum 104 measurements in a year at a particular site taken twice a week 24 hrly at uniform interval.

** 24 hrly/ 8 hrly values should be met 98% of the time in a year, however, 2% of the time, it may exceed but not on two consecutive days.

NOTE:

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

SAFAR – Mumbai

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

Sr. No.	Types of Instruments	Nos.
1	Air Quality Monitoring Stations (AQMS)	09 nos.
2	Automatic Weather Stations (AWS)	16 nos.
3	LED, Digital Display Boards (DDS)	13 nos.

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.

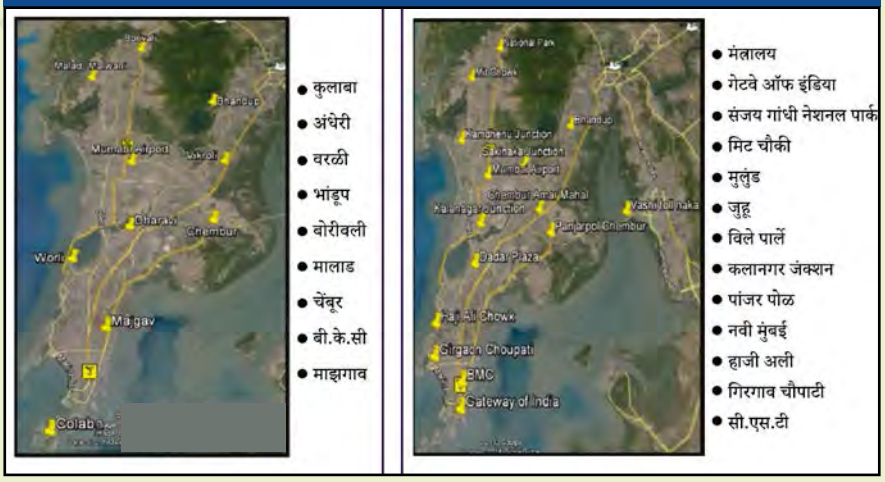
Air Quality Monitoring Stations (AQMS), Automatic Weather System (AWS) and LED Boards are installed at various locations in Mumbai to received information about current air quality and 1 to 3 days forecast.

SAFAR-Mumbai Information to Public:

Air pollutants namely $PM_{2.5}$, PM_{10}, Ozone (O3), Carbon monoxide (CO), Nitrogen dioxide (NO2) etc. are quantified and displayed on LED boards in terms Air Quality Index (AQI) along with health advisories. It is made available through LED's.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.

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.

Chart No.: 19.1



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 level of various pollutants, 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 real time 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.

Table No. 19.5: Air quality levels at "SAFAR-Mumbai" sites (2018 to 2021)

Sr. No.		2018-2019					2019-2020					2020-2021				
		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	90	41	21	0.6	34	99	42	16	0.7	17	94	54	22	0.6	17
2	Bhandup	80	45	33	0.9	23	59	31	26	0.8	14	63	32	24	0.6	12
3	BKC	128	86	7	0.8	23	114	67	9	0.8	10	122	57	6	0.7	18
4	Colaba	91	51	30	0.7	24	66	34	28	0.8	14	90	41	31	1.0	8
5	Andheri	120	79	18	0.9	28	110	51	13	0.8	26	110	51	13	0.8	26
6	Malad	98	66	14	1.1	15	95	58	14	0.9	12	115	57	12	0.6	18
7	Mazgaon	110	70	26	0.7	26	82	46	26	0.9	24	73	48	27	0.6	17
8	Worli	84	43	24	1.2	24	81	42	21	0.7	21	58	35	22	0.7	5
9	Borivali	113	62	16	1.0	15	86	42	14	0.6	11	97	39	13	0.5	8
	Average	**101**	**60**	**21**	**0.9**	**24**	**93**	**54**	**23**	**0.9**	**23**	**91**	**46**	**19**	**0.7**	**14**
CPCB Std. Annual Avg		60 (µg / m^3)	40 (µg / m^3)	51 (8Hrs) (ppb)	1.75 (8Hrs) (ppm)	21 (ppb)	60 (µg / m^3)	40 (µg / m^3)	51 (8Hrs) (ppb)	1.75 (8Hrs) (ppm)	21 (ppb)	60 (µg / m^3)	40 (µg / m^3)	51 (8Hrs) (ppb)	1.75 (8Hrs) (ppm)	21 (ppb)

Source: 'SAFAR-Mumbai'

Chart No. 19.6 (A)

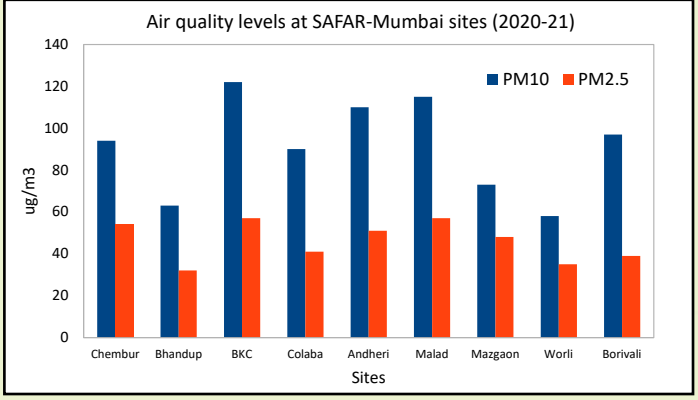


Chart No. 19.6 (B)

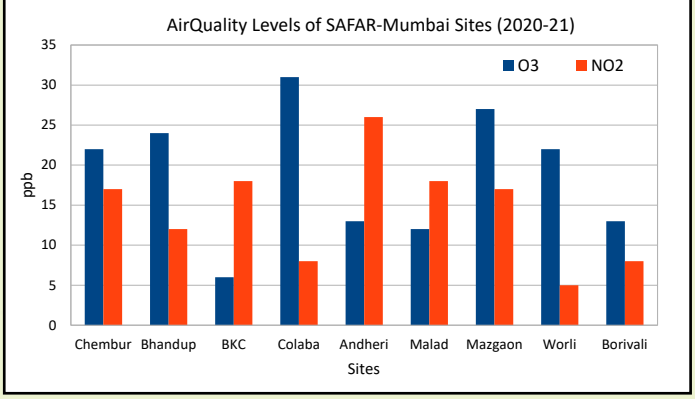
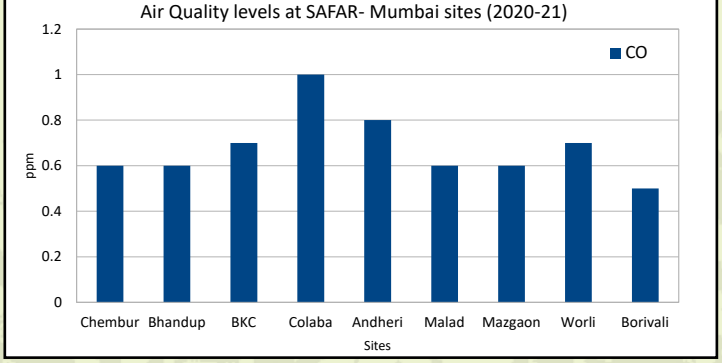


Chart No. 19.6 (C)



Annual Averages:

1. Levels of Suspended Particulates (PM_{10}) are found to be in the range of 58-122µg/m^3 during 2020-21. Maximum level of PM_{10} is observed at BKC (122µg/m^3). Looking at the last 3 years, there is not much difference in the levels of Suspended Particulates (PM_{10}).

2. Levels of Suspended Particulates ($PM_{2.5}$) are found to be in the range of 35-57µg/m^3 during 2020-21. Maximum level of $PM_{2.5}$ is observed at BKC (57µg/m^3). Looking at the last 3 years, it is seen that the level of Suspended Particulates ($PM_{2.5}$) has imporved in 2019-20 and 2020-21 as compared to 2018-19.

3. Levels of Ozone (O_3) are found to be in the range of 6-31ppb during 2020-21. Maximum level of Ozone (O_3) is observed at Colaba (31ppb). Looking at the last 3 years the level of Ozone (O_3) is lower than the CPCB Standards.

4. Levels of Carbon Monoxide (CO) are found to be in the range of 0.5-1.0 ppm for the year 2020-21. Maximum level of CO is observed at Borivali (1.0ppm). Looking at the last 3 years the level of Carbon Monoxide (CO) is lower than the CPCB Standards.

5. Levels of Nitrogen di-oxide (NO2)are found to be in the range of 05-26ppb during 2020-21. Maximum level of NO_2 is observed at Andheri (26ppb). Looking at the last 3 years the level of of Nitrogen di-oxide (NO_2) has improved in last 2 yers as compaired to 2018-19.

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

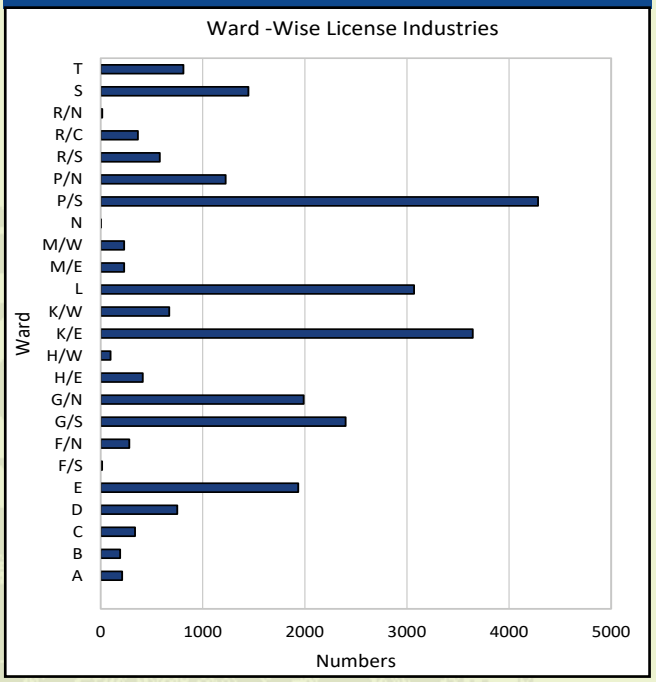
Environmental pollution is a by-product of industrialization. However, with the modern technologies, pollution potential of industries/factoroies are lowering. There are 25194 no. of industries are covered under section 390 of Mumbai Municipal Corporation Act 1888. These industries pay Air Pollution Prevention Fees on the basis of horsepower of the connected load. There are 8108 industries/factories are located in the city area, 11297 in Western Suburbs and 5789 in Eastern Suburbs. Maximum industries 4284 are in P-South ward. Ward-wise distribution of industries are shown in Table No.20.1.

Table No.20.1: Wardwise Licensed Industries

Sr. No.	Ward	upto 31.03.2018	Sr. No.	Ward	upto 31.03.2018
1	A	211	14	L	3069*
2	B	191	15	M/E	230*
3	C	337	16	M/W	230
4	D	750	17	N	02
5	E	1935*	18	P/S	4284
6	F/S	15	19	P/N	1225
7	F/N	281*	20	R/S	580
8	G/S	2399*	21	R/C	365
9	G/N	1989	22	R/N	16
10	H/E	413	23	S	1447*
11	H/W	97	24	T	811
12	K/E	3645*	**Total**		**25194**
13	E/W	672*			

Source : Environment Department of MCGM
* Data from previous ESR-2019-2020

Chart No.: 21.1 Ward wise Licensed Industries



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.

Rashtriya Chemicals and Fertilizers Limited

Rashtriya Chemicals and Fertilizers Limited (RCF) endeavors for excellence in environmental management and strives towards sustainable business development. RCF continues to be committed to develop and implement Environmental Management System (ISO 140001:2015), occupational health safety (ISO 45001:2018) and quality management system (ISO 9001:2015) throughout by measure, control and reduce environmental impact.

Adhering to the regulatory requirements and standards of the Maharashtra Pollution Control Boards, RCF incorporates appropriate ambient air quality monitoring, plant stack monitoring, effluent handling

and disposal systems through constant monitoring are as fallows:

1. Four nos. of continuous ambient air quality monitoring stations to monitor ammonia, NOx, SO_2, Particulate matter (PM_{10} and $PM_{2.5}$) and metrological parameters are installed at RCF Trombay unit.

2. Continuous online stack monitoring is being done for SO_2 form Sulphuric Acid plant, NOx from Nitric Acid plant and NH3 from Suphala plant and data is being transmitted to MPCB and CPCB server.

3. Continuous online monitoring of pH, Ammonical Nitrogen and Flow of treated effluent from Effluent treatment plant are monitored continuously and data is being transmitted to MPCB and CPCB server.

4. Various schemes with state of the are technologies and modernization schemes are implanted for environment protection also waste streams from the plants are recycled/ reused for useful purpose by 3-R strategy (Reduce, Reuse and Recycle).

Green Belt Development at RCF Trombay Unit:

1. In the year 2020-21 at factory premises planted total 550 nos. trees namely karanj, avala, palas, spethodium, taman, bottle palm, sitafal, Hemilia, Mahatma dressina, Pendenus, Grafted amla, Sontaka, Paan vel, Bottle brush, Rafis palm, Mussanda white etc.

2. Under the corporate social responsibility and create awareness regarding environment, RCF management have been arranged saplings distribution drive every year. This year total 1550 nos, of trees sapling were distributed in nearby school and societies.

Mumbai Port Trust

Mumbai Port has a long history of significant contribution to the economic development of Mumbai city and the nation. This Port Trust was established in 1873 and has been one of the premier major Port of India and has major contribution in development of the city of Mumbai as financial capital of the country. 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. Mumbai Port has its own dedicated Pollution Control Cell which monitors (i) Pollution in sea water (ii) Quality of Harbour water, Ambient Air Quality and Noise Pollution. Monitoring of water and air quality is carried out every month through third party MoEF approved laboratories as per EP Rules 1986 (iii) Providing reception facilities for safe disposal of Garbage and Hazardous Waste generated form ships (iv) Collection of floating debris from sea water.

2. Parameters analysed for harbour water samples are (i) PH (ii) Colour (iii) Odour (iv) Oil and Grease (v) Turbidity (vi) Total Suspended Solids (vii) DO (viii) BOD (ix) Nitrates (x) Nitrites (xi) Ammonia (xii) Phosphates (xiii) Petroleum Hydrocarbon (xiv) Polyaromatic Hydrocarbon (xv) Fecal Coliform (xvi) Bioassay Test (xvii) Phenol and Hg, Cd, Pb.

3. Ambient Air Quality is tested for (i) SO_2 (ii) NOx (iii) RSPM- PM_{10} (iv) RSPM- $PM_{2.5}$ (v) CO (vi) Benzene.
4. Port proudly feels to state that it has developed and maintained, one of the Botanical Gardens named 'Sagar Upvan' in the Port area near Colaba, which has received 'Best Garden Award' in its category for nine years successively. Apart from this several green patches are developed by the Port, thousands of trees have been planted and maintained by the Port.
5. Approximate quantity of solid waste generated in the MbPT estate is approximately 67000 m^3/ years. This waste is transported to MCGM Landfill Site for land filling and waste processing at their end.
6. 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 and Emission:

- Use of low sulphure (0.1 to 0.2%) low ash (5%) imported coal for power generation.
- Stringent SO_2 emission limit of 24 MT/Day from the entire station.

2. Air Pollution Control:

- Stack Height of 275 m for wider dispersion of pollutants.
- ESP for Unit # 5 and Unit # 8.
- FGD for Unit # 5 and Unit # 8.
- Low NOx burner fro Unit # 7, Over fired dampers for other units.
- Use of imported low Sulphur (0.1 to 0.2%) low ash coal (5%).

3. Fugitive dust control:

- 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:

- ETP for treatment of effluent generated from DM plant.
- STP (2x125 CMD) at station A and station B for treatment of domestic effluent.
- Coal Pile run off system at Coal Yard and Coal Berth.
- Cooling water channel and aerators to reduce the temp of discharge water.
- Online Effluent Monitoring (Temp)
- STP water reused for gardening.

5. Solid Waste and Hazardous Waste:

- Minimal Ash generation due to use of imported low Ash (5%) coal; 100% fly ash and bottom ash utilization.
- Used Oil is disposed to MPCB approved agency in accordance with HW Rules, 2016. Submission of HW Manifest.
- E-waste is disposed to MPCB approved recycler/ dismantler. Submission of form-2 and form-3
- Used batteries are disposed to MPCB approved agency.
- BMW is disposed to MPCB approved agency.

Adani Electricity

Adani Electricity Mumbai Limited (AEML) conducted energy conservation and energy efficiency (EC and EE) programs to create awareness in the society on the importance of energy conservation and smart usage of energy in order to reduce environmental damage due to Green House Gas (GHG) emission.

AEML has conducted more than 40 walk through energy audit and conducted energy conservation awareness sessions by reaching out to 150 consumers in financial year 2020-21. AEML has till date conducted more than 360 audits and 740 awareness sessions for consumers.

AEML has launched various MERC approved Demand Side Management programs for all consumer categories. The ongoing program include: Large Scale 5 Star Ceiling Fan Program and Large Scale 5 Star Refrigerator Program for residential consumers. These programs have resulted in estimated annual saving of 0.703 Million Units (MU) and cumulative saving on account of all DSM programs for financial year 2020-21 is 8.41 million units (MU).

AEML has implemented energy conservation / energy efficiency initiatives within the company offices this financial year by installation of 5 Star BLDC Ceiling fan, LED compound light, resulting into energy saving of 0.03 million units. In addition, Solar PV Plant installation of 7 kWp across company offices has generated 0.05 million units.

AEML has replaced of vehicles operating in its supply area with new fuel efficient vehicles.

21. HEALTH

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

MCGM largely takes care of citizen health through Health Care Services. The State Government, Private organizations and Private medical practitioners also contribute in providing the health care services. Health care is a primary responsibility of Municipal Corporation of Greater Mumbai. As shwon in the table no.21.1 there is a three-tiered division of health resources in MCGM.

Table No. 21.1: Health Infrastructure 3-Tier System in MCGM

PRIMARY	Health posts	211
	Dispensaries	187
	Maternity Homes	28
SECONDARY	Peripheral hospitals	17
	Specialty hospitals	5
TERTIARY	Major hospitals (Medical & Dental colleges) (5 main hospitals and 1 H.B.T. hospital joint with Cooper hospital.	5

Source: Health Dept.

Environment contributes to the health of human being both in positive and negative ways. Better nutrition and clean environment will help to increase life span whereas, polluted environment will cause deterioration of health. Environmental hazards are responsible for as much as a quarter of the total of diseases world wide and more than one third among children. Environment plays a major role in etiology of numerous diseases like water borne diseases (Gastroenteritis, Jaundice), vector borne diseases (Malaria, Dengue, 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 28 new health centers are started too. Objective of establishing health centers 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 and Death Rates and also Infant and Maternal mortality in the year 2018 to 2020. Birth rate in Mumbai was 9.33/1000 population and the Death rate was 8.69/1000 population in the year 2020. Infant mortality rate was 22.04/1000 Live Births and Maternal Mortality rate 1.64/1000 Live Births for mothers.

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

	Year 2018	Year 2019	Year 2020
Birth (Registered)	151187	148898	120188
Birth Rate/1000 population	11.83	11.61	9.33
Death (Registered)	88852	91223	11942
Death Rate/1000 population	6.95	7.11	8.69
Infant Mortality	3723	3430	2649
Infant Mortality Rate/1000 live birth	24.63	23.04	22.04
Maternal Death	218	257	197
Maternal Mortality Rate/1000 live birth	1.44	1.73	1.64

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, Measles, Mumps, Diphtheria and Covid 19 are isolated in different wards and treated.
2. In 2020-21 patients with Covid 19 are being treated on OPD basis as well as admitted in ward for treatment.
3. 10 Beds with advanced ventilators have been started in Ward No.14 (ICU) and Ward No. 30 (4 Ventilators) for life saving treatment of Covid 19 patients.
4. New Screening OPD at Ward No.9, Isolation wards with 200 beds and ICU for Covid 19 patients.

Table No. 21.3 : April 2020 to March 2021

Sr. No.		Cases	Death
1	Dengue	208	01
2	Swine Flu H1N1	–	–
3	Lepto	63	04
4	Malaria	1138	01
5	Covid 19	3543	330

5. New equipment purchased for Covid 19 to aid in the testing (RT-PCR) in PCR Lab at Kasturba Hospital.
6. An Antigen test has been started in the outpatient department in Ward No.9 for Covid 19 patients.
7. New Vaccination centre started for Covid 19 at Kasturba Hospital.

Tuberculosis (TB):

Group of TB Hospital and city 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.

In Mumbai city there are total 249 PHI treatment centers along with various other run by the teaching institutes and peripheral hospitals which are working primarily as the diagnostic and treatment centers in addition 7 DR.T.B. centers (Nodal), 35 gene expert, 3 LPA, 9 BDQ centers as total. GTB Hospital Lab up gradation has been started on 30 March, 2021 and likely to be completed in 01 year. 16 module CBNAAT machine has been procured to process more samples Lab upgrade is being done to increase testing capacity to thrice present work load, provide early and rapid diagnosis of T.B. with

universal DST to patients and thus early initiation of T.B. treatment to enable favorable outcome.

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) Nawab tank TB Clinic, Dockyard Road.

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

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

The Major lung thoracic surgeries are being carried out at this hospital by the surgeons on selected cases. Diploma course regarding Tuberculosis is started by 'College of Physician and Surgeon, Mumbai'.

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. TB patients and their relatives are given counseling of preventing of TB and side effects of medicines.

As per the guidelines of DOT-PLUS programme the separate ward of MDR Patients (Males and Females) have been started from 26th July 2010. Supra major thoracic surgery is started from March 2012 at G.T.B. Hospital. Till date 281 updated major surgeries and 18563 updated minor surgeries are carried out.

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

Infection Control Committee is framed in june, 2011 since then periodical medical checkup done every 3 months 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 separate hospital at 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. Rapid Culture (MGIT) and Liquid Culture machine is purchased and patients tests are done accordingly.

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 596 new patients started on new drug BDQ.

BEAT Trial/ ICMC – In 2019 new short term treatment was started jointly on experimental basis in T.B. Hospital, sewri.

In Covid 19 epidemic G.T.B. Hospital started Tuberculosis Covid Co-infection ward and treatment given to 184 patients.

Acworth Municipal Hospital for Leprosy:

Mr. H.A. Acworth founded Acworth Municipal Hospital for Leprosy on 7th November 1890 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) **Inpatient Service:** Total indoor capacity of the hospital is of 240 beds. At present average occupancy are around 91. Old, deformed and abandoned patients are provided shelter in the hospital. Majority of the patients living here more than 20 years almost on a permanent basis. Presently patients are admitted for ulcers and lepra reaction.

2) **Outpatient Services:** Out-patient services include physiotherapy, social service, laboratory, dressing and pharmacy. Daily average OPD attendance is about 45 patients per day.

3) **Field Work:** Under National Leprosy Elimination Programme, 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) **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 Government Medical Officers, Non-medical assistants.

5) **Medical Records:** The hospital maintains statistical records and generates various reports thereby assessing the progress of N.L.E.P. in entire Mumbai.

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

- Acworth Leprosy Museum: Provides scientific information about all aspects of leprosy.
- Footware Unit: MCR footwear, Splints are provided to the leprosy patients at concessional rates.

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 13th February, leprosy fortnight is arranged by this hospital every year. During this fortnight all active organizations effectively carry out public awareness and health education movement in their work premises.

Table No. 21.4: Mumbai District Statistics 2020-21	
Total Leprosy Patients	166
MB patients among total patients	123
PB patients among the total patients	43
PR for Mumbai (Per 10000 population)	0.12

Table No. 21.5: Acworth Hospital Statistics 2019-2020	
Total Leprosy Patients in the Project area (E, F/S & F/N Ward)	19
MB patients among total patients	13
PB patients among the total patients	06
PR for AMHL (Per 10000 population)	0.09

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).

Major responsibilities of MDACS are as follows:

1. Prevent the spread of HIV / AIDS
2. 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 during first trimester of pregnancy.
- Early Infant Diagnosis: All infants born to HIV infected mothers are screened at 6th week after birth and regularly till 18 months for HIV infection.

- There are 349 ICTCs which includes 45 stand-alone ICTCs, 5 mobile vans and 168 Facility Integrated ICTCs and 131 Public Private partnership (PPP) providing facilities of counseling and HIV testing to ensure the access and availability of HIV counseling and diagnosis services.

Anti Retroviral Therapy (ART):

Treatment for HIV positive patients is made available through ART Centres set up in various Hospitals in Mumbai. These centers are in 7 Medical Colleges, 6 Peripheral Hospitals, 5 are in public private partnership [Godrej, L & T, Wadia, K. J. Somiya and Mumbai Port Trust (MbPT)], 2 in MCGM special hospitals (STD Clinic and TB Hospital). ART center for pediatric patients is operated through LTMG, Sion Hospital. Total 36801 patients living with HIV / AIDS are registered in active of which 36694 patients are on lifelong treatment.

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 MDACS. 20 Government, Municipal and Trust blood banks in Mumbai are supported by provision of trained manpower, HIV testing kits and grants. All the blood units collected in the blood banks are tested for HIV, Hepatitis B, Hepatitis C and other blood born infections. Regular Voluntary Blood Donation Camps are organized in collaboration with Blood Banks and NGOs. Over the years, the number of voluntary blood donors has increased significantly reducing the risk of HIV infection through blood transfusion.

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. 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 at B.Y.L. Nair Hospital is set up for etiological diagnosis of STI.

Targeted Intervention (TI):

Targeted Interventions are aimed at offering prevention and care services to high-risk groups viz Female Sex Workers, Men having Sex with Men, Transgender and injecting Dug Users. The bridge population of slum migrants and long distance Truckers are also provided with the information, means and skills to minimize HIV transmission. 31 Targeted Intervention projects through NGOs/ CBOs provide prevention services including HIV/STI screening and treatment services to these high risk groups in the city.

Information, Education and Communication:

Various awareness campaigns are held using mass media and outdoor approach among slum migrants and high risk groups for reducing risk behavior. Events are organized to increase the awareness among general population, especially for women and youth on various days viz. National Voluntary Blood Donation Day, National and International Youth Day, World AIDS Day, Women's Day.

Achievements:

HIV/AIDS Present Status :

HIV prevalence trend has witnessed a significant decline among the general clients (from 5.4% in 2011 to 0.88% in 2020) and Pregnant Women (from 0.36% in 2011 to 0.08% in 2020) in Mumbai.

Table No. 21.3: HIV/AIDS Control Programme Report (March 2020)

HIV testing at Integrated Counseling and Testing Centers in Mumabi	Tested	Positive	Treatment for HIV positive patients at ART Centers in Mumbai	Adult	Children	Total
General Clients	236521	2070	Number of HIV Positive patients registered in active care	35269	1532	36801
Pregnant Women	113708	90	Number of HIV Positive patients on Anti-Retroviral Treatment (ART)	35163	1531	36694

Environmental Pollution Research Center (EPRC):

Sethe G. S. Medical College and KEM Hospital:

'Environment' is a term derived from a French word 'Environia' which means 'to surround'. Therefore, the word 'environment' means surroundings in which organisms live and includes indoor and outdoor surroundings.

With climate change, conditions favorable to spread of vector borne diseases like malaria and dengue have developed. We have observed greater emergence of infectious diseases in recent decades. A number of infectious diseases have an animal origin (Zoonotic disorders) e.g. Ebola epidemic in West Africa (2014). The virus was transmitted to people from wild animals (such as fruit bats) and then spread in human population through direct contact with blood, secretions, body fluids of infected people. It was observed that bats, which carried the disease, had been forced to move into newer habitats as the forests they used to inhabit had been cut down.

The health care – energy – environment nexus have increased demands. Changes in health care

systems have led to increased demand of personal protective equipment, ventilators, oxygen plants, uninterrupted power supply at source and trained manpower.

Healthcare sector's footprint is 4.4% - 15% of global net greenhouse gas emissions Impacts on other infectious diseases e.g. Co-epidemics-COVID-19-Dengue fever and COVID 19 and flu need an in-depth study of climate risks and health.

To avoid risk of transmission, personal behavior and disinfection of public environments is required. Health education regarding appropriate space utilization, proximity of interactions and risk mitigation in indoor spaces is carried out by EPRC team.

In the year April 2020 to March 2021, Environmental Pollution Research Centre has focused its activities towards COVID related clinical research & patient care and health education.

The COVID-19 pandemic was upon us by early 2020 and countries, including India, went into complete lockdowns. There were varying reports of improvement in air quality from all over the world as industries temporarily shut down, air traffic halted and transport was generally restricted to essential services. Air quality index (AQI) in Mumbai also showed an improving trend temporarily. At Environmental Pollution Research Centre (EPRC), we undertook an analysis to find a correlation, if any, between the number of COVID-19 cases in 9 different wards in Mumbai city and air quality indicator levels in the corresponding wards. Air quality indicators included were NO2, SO2, PM10, and PM2.5.

Air Quality and COVID -19 cases association in Mumbai December 2020 to February 2021:

As compared to year 2019-2020 air quality levels during December – February quarter show improvement in air quality. The number of COVID cases and oxides of nitrogen (NO_2) and SO_2 have a negative correlation, however PM_{10} and number of COVID cases has a weak but positive association.

Overall air quality has shown improvement which can be attributed to temporary reduction in traffic density. This is as a result of wide spread quarantines and travel restrictions, social distancing directives and Lockdowns.

During our study period from December 2020 to February 2021, a total of 21759 confirmed locally transmitted COVID-19 cases were identified from the study areas (9 areas with air quality levels available during study period).

The maximum number of COVID-19 cases were recorded in Central wards of Mumbai out of the study areas.

Andheri, Borivali, Vile Parle and Powai areas were affected the most. Lowest cases were recorded in Worli, Colaba and Bandra areas. The concentration of all the major indicators- NO_2, SO_2, PM_{10}

were maximum in Andheri, Parle and Sion area. Lowest concentrations were found in Bandra, Worli, Colaba areas.

Table No.21.4: Area (ward) wise case and Air Pollutants concentrations

	Covid 19 Cases			Mean SO_2			Mean NO_2			Mean PM_{10}			Mean $PM_{2.5}$		
	Dec.20	Jan. 21	Feb. 21	Dec. 20	Jan.21	Feb.21	Dec.20	Jan. 21	Feb. 21	Dec. 20	Jan. 21	Feb. 21	Dec. 20	Jan. 21	Feb. 21
Andheri	1165	872	1093	12.6	17.6	19.8	44.6	58.3	52.9	166	209	162	128.1	147.7	92.6
Bandra	693	593	877	19.8	18.8	18.1	1.8	1.0	1.5	51	51	44	20.0	17.3	18.6
Borivali	1485	974	950	5.3	5.0	6.1	3.9	5.5	5.1	89	118	94	147.3	187.3	94.5
Colaba	398	362	355	21.8	11.0	19.2	74.2	54.8	58.7	77	83	65	104.7	99.8	72.3
Kurla	664	604	663	25.1	48.7	58.5	69.6	78.6	99.9	177	226	178	212.3	251.0	143.5
Parle	1378	1069	1410	12.8	23.7	5.1	62.9	54.5	49.6	138	171	141	171.6	258.0	151.4
Powai	902	605	886	9.4	5.8	13.7	31.0	36.4	31.2	110	127	104	146.4	199.5	117.1
Sion	675	632	795	8.8	10.7	11.6	92.7	122.0	101.6	188	208	181	145.3	187.7	119.2
Worli	445	383	821	20.8	28.7	29.4	65.8	53.2	37.9	130	145	119	188.4	274.5	146.8

Mumbai wards shows a distinct association in the level of air pollutants and COVID-19 cases. To examine the relationship between environmental factors and daily COVID-19 confirmed cases, we conducted Spearman rank correlation test and Kendall rank correlation test.

We analyzed the effect air pollutants i.e. NO_2, SO_2, PM_{10}, $PM_{2.5}$ on the spread of SARA-CoV-2 and found weak but significant ($p<0.05$) correlation between SARS-CoV-2 transmission and air pollutants.

We observed negative correlation between SO2, NO2 and COVID-19 cases (Spearman's Rho = -0.285, -0.18, $p<0.001$). Nevertheless, weak positive correlation was found between levels of PM_{10}, $PM_{2.5}$ and COVID-19 cases (Spearman's Rho = 0.173, 0.073, $p<0.001$, 0.035).

	Spearman's rho		Kendall's tau b	
	Correlation Coefficient	P Value	Correlation Coefficient	P Value
SO2 Average	-0.285	<0.0001	-.194**	<0.0001
NO2 Average	-0.18	<0.0001	-.119**	<0.0001
PM10 Average	0.173	<0.0001	.107**	<0.0001
PM2.5 Average	0.074	0.035	0.050*	0.035

Similar results have been noted regarding air quality by National Aeronautics and Space Administrative (NASA). As a result of the COVID-19 pandemic, environment air quality has shown temporary improvement in megacity Mumbai.

Although it is logical to conclude that air quality improved due to lockdowns, the question of whether AQI impact number of COVID-19 cases shall have to be the subject of a controlled study.

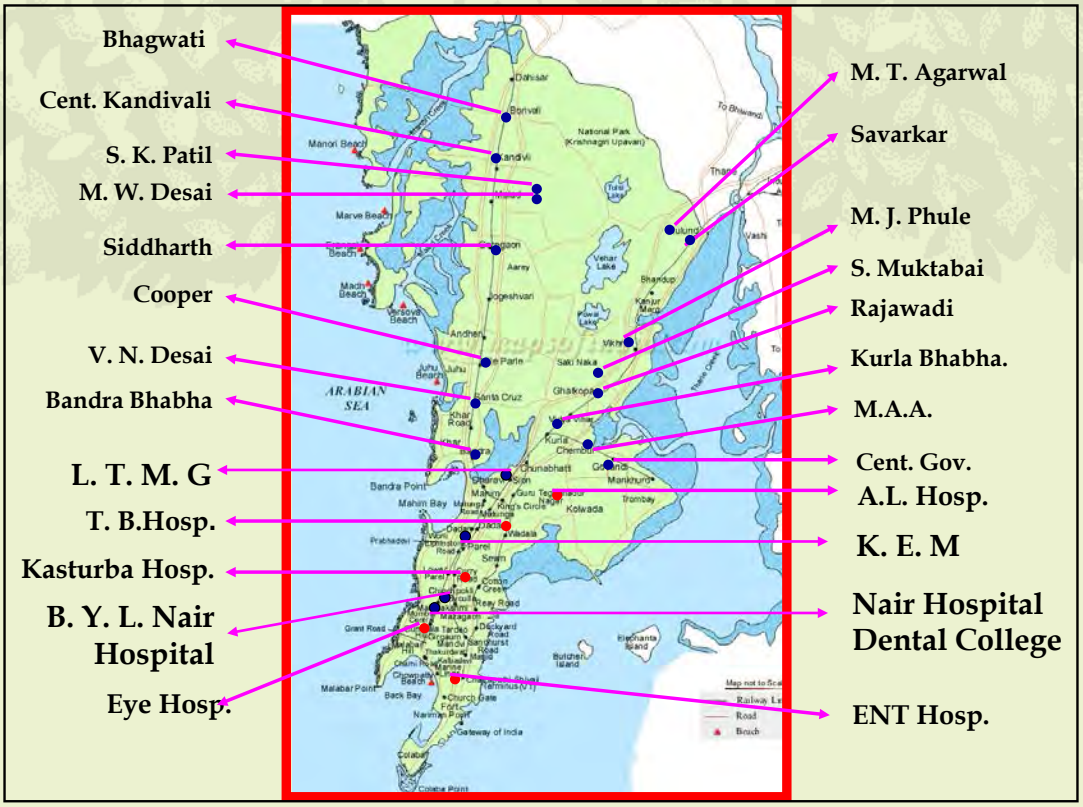
Indoor Air Quality & Health Effects:

As lockdowns were imposed the world over, people were driven indoors. The prevailing social situation also meant that a lot of people, hitherto unexposed to cleaning/ disinfecting agents rolled up their sleeves and got down to get household work done on their own without any help. Use of disinfectants and sanitizers is reported to have increased exponentially. At our Pulmonary Medicine Department, we had patients who complained of breathlessness on exposure to disinfectants.

Citizens presented with symptoms of airway disorders like wheezing & chest tightness following use of disinfectant & sanitizing agents. During domestic cleaning exposure to volatile organic compounds can lead to airway disorders. A variety of chemicals are pervasive in household disinfectant products. Many ingredients have established associations with acute & chronic human health conditions as well as with environmental damage. The application of a precautionary principle to the selection of active ingredients for a disinfectant will be a responsible approach for preventing health effects.

A study was undertaken for qualitative analysis of active ingredients in disinfectants in collaboration with Medical Research Unit, Seth G.S.M.C., by Environmental Pollution Research Centre. A scientific advisory will be prepared for use of cleaning solutions & disinfectants. Cleaning of mold & dust control is advised as a part of the Asthma education programme (Patient education initiative by EPRC).

Hospitals in Mumbai



22. DISASTER MANAGEMENT

DISASTER MANAGEMENT AND CENTRAL COMPLAINT REGISTRATION DEPARTMENT:

The Disaster Management Department (DMD) was set up in 1999 at the Municipal Head Office managed disaster in Mumbai. Department is upgraded with modern equipments situated on 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 and Risk Assessment
3. Prevention and Preparedness
4. Coordinate with relevant agencies for reducing the severity of damage.
5. Response
6. Coordinate with relevant agencies for help and rehabilitation.
7. Command and Control agency between administration and field units.
8. Coordinate for early warning to citizens.
9. Coordinate for arrangement of food and water during emergency situations.

10. Coordinate the transportation of stranded and injured people during disastrous situation.
11. Coordinate for the transportation of critically injured people on high priority.
12. Coordinate for setting up temporary shelters.
13. Coordinate with NGOs.

Objectives of Disaster Management Department:

1. Coordinate for rapid and effective response during any disaster.
2. Improve coordination among all the responding agencies.
3. To utilize social media through Public Relation Office for disseminating disaster related information to citizens.
4. To encourage preparedness at every level.
5. To encourage for helping disaster affected people.
6. Impart Training to the Citizens and stakeholders.

Emergency Operations Centre (EOC):

The Disaster Management Department works 365 days and 24 hours 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. Direct telephone line facility.
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. In case of interruption in communication system HAM radio is used as alternative communication system.
5. '1916' helpline with 30 hunting lines are available for Citizens registered complaints related to major/ minor accidents, fire, earthquakes, bomb blast etc.
6. 24 Administrative ward control rooms, 3 major and 2 peripheral hospitals and 25 outside agencies are connected with 55 hotlines provides regular updates about the situation in the Mumbai City and suburbs.

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.
8. **Library:** Equipped library facility is available here. Books related to disaster management, emergency planning, well-planned procedures, case studies, etc. are available for reference.
9. **Auditorium:** The auditorium is equipped with an audio-visual auditorium with 60 seats for providing information to the media and for meetings related to disaster management.

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

Various manmade and natural disasters are identified which are likely prone to Mumbai City and Suburbs which is categorized into 102 sub-major disasters like major/ minor accidents, landslides, falling of trees or unauthorized cutting of trees, water logging, house collapses, short circuits, floods, earthquakes, bomb explosions etc. On registration, these incidents are forwarded to the concerned agencies for providing necessary assistance.

Automatic Weather Stations (AWS):

- 60 Automatic Weather Stations have been installed in Mumbai.
- Weather Parameter data is refreshed after every 15 minutes and made available to the citizens by uploading on website and mobile app.
- The data is monitored, analyzed and the warnings are issued accordingly.

Flow Level Sensors:

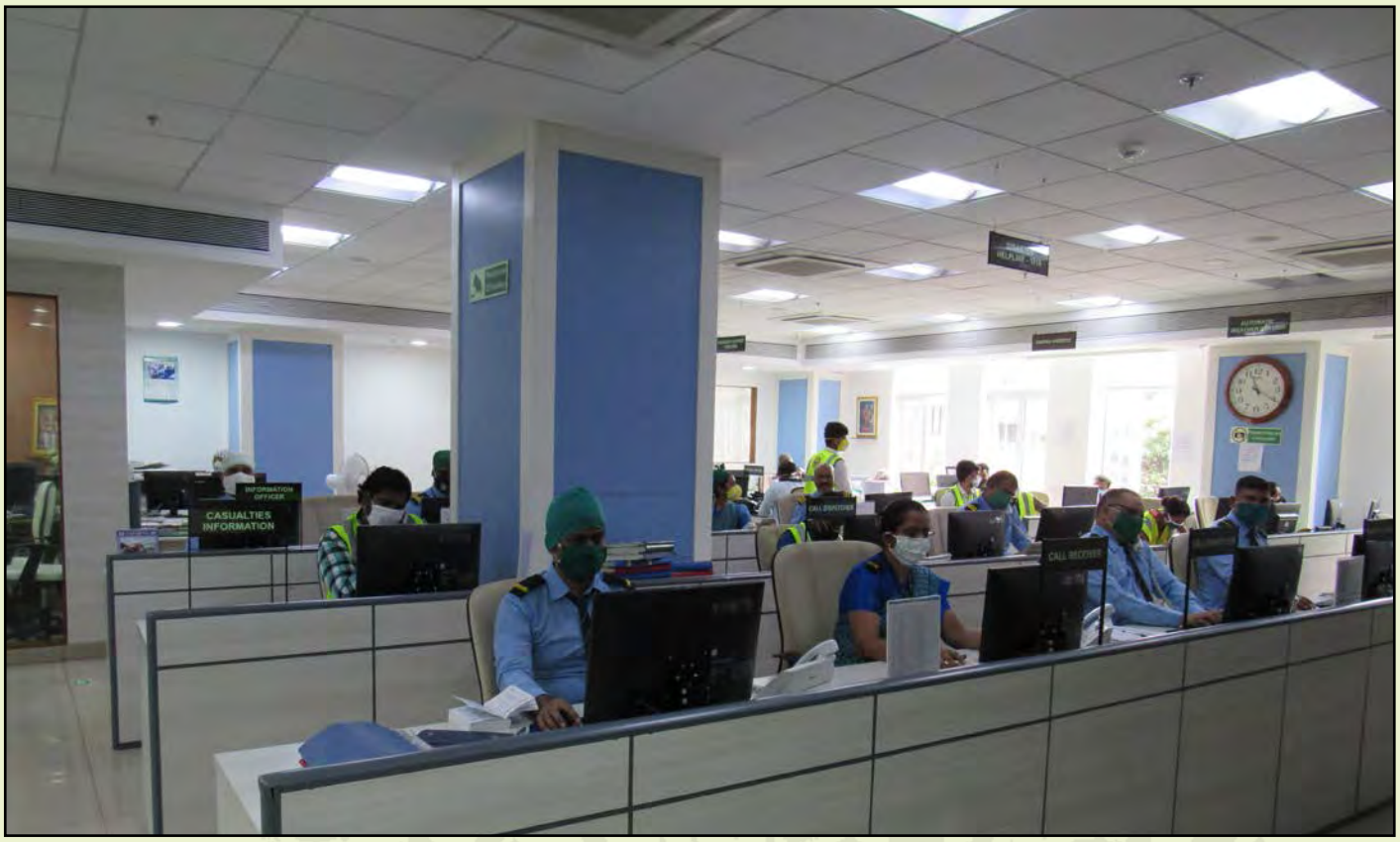
- Flow Level Sensors are installed to monitor water level in rivers and lakes. It gives real time information in Disaster Control Room.
- This helps in early evacuation of citizens from the vulnerable area. Flow Level Sensors are installed at Dahisar, Poiser, Wakola, Mithi, Oshiwara rivers and Powai, 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 Meteorological 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 and 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. Also nearby Hospitals, Police Stations, Fire Stations and Ward offices are Geo tagged and this information is 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):

- 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.
- In the events of major disaster or emergency where quick response is required, 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 in Mumbai.
- 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.
- Preparedness and planning activities are essentials to ensure adequate response and to identify areas of actions that would ultimately reduce disaster risk.

Table No. 22.1: ESF Identified		
Sr. No.	ESF	Lead Agency
1	Communication	Disaster Management Department, MCGM
2	Public Safety, Law and Order	Mumbai Police
3	Fire Fighting	Mumbai Fire Brigade
4	Search and Rescue	Mumbai Fire Brigade
5	Transport	Transport Commissioner
6	Public Health and Sanitation	Executive Health Officer, MCGM
7	Resource management	Disaster Management Department, MCGM
8	Information Management	Public Relations Officer, MCGM
9	Mass Care, Housing and Human Services	Education Officer, MCGM
10	Relief Supplies	Collectors
11	Energy (Power, Gas and Fuel)	Brihanmumbai Electric Supply and Transport Undertaking
12	Utility Services	Dy.Municipal Commissioner (Special Engineering) MCGM
13	Public Works and Infrastructure	Director, Engineering Services and Projects, MCGM
14	Oil and Hazardous Material	Director, Industrial Safety and 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 support system and in handling a disasters in scientific manner.

Prime objective of developing GIS is to help DMD for:

1. Pre-disaster Planning and Preparedness
2. Prediction and Early Warning
3. Decision Support System
4. Damage Assessment and 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 macro and micro level indicating vulnerability at 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 for continuous coordination. 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. The art gallery has interactive dioramas, display, photographs and information boards for awareness generation of various disasters.

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

Considering the importance of Disaster Management and ever increasing impacts of Disasters in future, 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 for Mumbai. The objective of formulating CDRF for Mumbai is to develop self sustainability for responding disasters like major fire, collapse structure, Chemical-Biological-Radiological-Nuclear 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 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 online system. Citizen can lodged their complaints online on MCGM portal i.e. http://portal.mcgm.gov.in and mobile app.

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.

Role of Disaster Management in COVID-19:

COVID-19 has become a full-blown pandemic in India and Mumbai was initially one of the hardest hit metropolitan regions. Though initially, all COVID-19 related queries from citizens who were concerned about the infection and diagnosis were handled by the central EOC by deploying around 40 doctors and other paramedical staff. Considering the load of calls can management of beds, ambulances and hearse on Central Control Room it was decided to activate Ward War Rooms and decentralized the Covid related activities.

According, ward-level war rooms were set up across the 24 wards. Each war room is equipped with a 24x7 dedicated telephone numbers and manned by around 15 staffs. Each ward-level war room also has doctors to provide tele-consultation to the callers.

Meanwhile, EOC was also expanded and equipped with additional phone lines to deal with the increasing number of calls from citizens. The main control room was also put in the service for handling COVID-19 related queries apart from the usual other emergencies. For the convenience of the citizens, the department also set up an IVRS (Interactive Voice Response System) by which the callers can choose the category of their complaints.

The EOC has handled over 5.22 lakh calls on the 1916 helpline till April 2021. There are 675 ambulances under the control of EOC and Ward War Rooms.

Bed Management:

MCGM has initially designated Kasturba Hospital for handling Covid patient with 125 beds. Subsequently other municipal hospital like Seven Hills, Nair, BDBA etc. are used for handling Covid patients.

Dash Board:

In order to streamline bed allotment Disaster Management department has developed in house bed management software by using Arc GIS platform. The same is regularly updated by Government, MCGM and Private hospital administration.

Ambulance Management:

Initially 23 ambulances (108 ambulance service) were provided by State Government for Covid-19 patients which is subsequently increased up to 675. These ambulances are being used for carrying critical Covid-19 patients along with high risk and low risk contacts.

Hears Management:

Initially only 4 MCGM hearse vans were assigned for transporting dead bodies form hospital to crematorium. The numbers of hearses were inadequate and were difficult to manage the dead bodies transportation in the hospital. At present 35 hearse vans are operational.

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

23. BRIHANMUMBAI MAHANARPALIKA PUBLIC RELATIONS DEPARTMENT

Newsletters provide information on various civic services, projects and important civic events through the Public Relations Department. The account also provides daily observation and preservation of news published in various media, especially daily newspapers. Besides, Municipal Calendar, Citizen Daily, Ganeshotsav Information Booklet, Bharat Ratna Dr. Babasaheb Ambedkar Mahaparinirvana Day brochure are published. It also publishes various occasional publications, brochures, posters, etc., as required by this department.

The Public Relations Department also carries out various public awareness campaigns as per the relevant requirements, prepares appropriate releases for the publication of information, publishes, advertises, implements public awareness etc.

Main Functions of Public Relations Department:

1. Publications:

In this, public relations department publishes civic guides, civic diaries, information of various departments, publications on important civic events and other civic matters, illustrated posters, clockletters and information booklets etc. and famous literature is produced. These publications are for sale rather than stock.

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, enlightenment and services related to the corporation are reviewed by the examining boards and the prizes are given in a special ceremony. However, the competition was not held in the year 2020 on the background of Covid-19 epidemic disease.

3. Newsletters and photographs:

Important daily activities of public relations department to disseminate various civic services and facilities provided by the corporation, information of projects, press releases regarding various activities of the corporation as well as newsletters / press releases sent by various departments and heads of various departments. Are performed.

Every important event and function of the corporation is photographed through this department. Accordingly various photographs are saved through this section.

From time to time leaflets were circulated containing information on various environmental issues

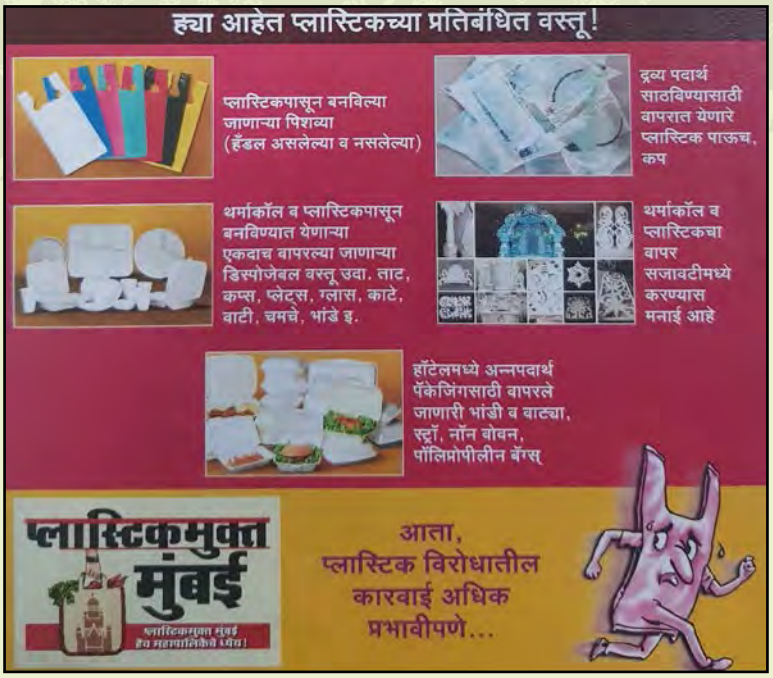
implemented by various departments of MCGM as well as environmental issues in the juridiction of MCGM.

4. Advertisements:

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. This department coordinates the publication of texts sent for publication by various departments of the Corporation in the form of advertisements.

The following is a summary of the effective advertisements published by the Public Relations Department in various linguistic newspapers in the report year 2020-21.

- Like every year in the year 2020 also during the public Ganeshotsav advertisements on polite instructions for Ganesha devotees were published in various linguistic newspapers along with environmental messages during the period of Shri Ganeshotsav.
- Proceedings on the sponsorship of the Ganesha Mayor Awards organized by the initiative of the Daily Free Press Journal.
- Participate in the domestic Ganeshotsav awareness campaign initiated by Radio City.
- Awareness advertisements were published in various newspapers on noise pollution prevention.
- Apart from this, various programs are organized on various topics such as exhibitions, newspaper announcements, citizens' grievances as well as the spread of the Marathi language.



24. THE ACTION PLAN FOR CONTROL OF AIR POLLUTION OF MUMBAI

The issue of air pollution in Brihanmumbai is becoming more and more complex and the National Green Tribunal has directed the polluted cities to submit an Air Action Plan to bring the air pollution in the city within the prescribed standards. The Corporation prepared an Air Action Plan to control air pollution in the Mumbai city and submitted it to the Central Pollution Control Board for approval. The Air Action Plan has been approved by the Central Pollution Control Board on 9th October 2019 with some recommendations.

The Mumbai Air Pollution Control 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, creating green belts along traffic routes, etc. It is intended that various departments of the Corporation, Government of Maharashtra and Central Government will make joint efforts to achieve the objectives set out in the approved Air Action Plan. Every effort is being made to reduce the rising air pollution in the city by coordinating with various departments through the Environment Department of the Corporation with a view to prioritizing proper implementation by the Stake holders as per the guidelines in the plan.

It is important for the Stake holders Department of the Mumbai Air Pollution Control Action Plan to focus on the following issues and give priority to reducing air pollution within a specified period.

Sr. No.	Sub No.	Action	Responsibl eagency (ies)	Remarks
1. Source Group: Vehicle Emission				
1	(i)	Regular Checking of vehicular emission and issue of pollution under control (PUC) certificate.	RTO,	UC checking in every 6 months for BEST buses. 2. RTO approved agency appointed for issuing the PUC certificate. Certificate displayed inside every bus. 3.Random PUC check planned by RTO. 4. As per the provision of Motor Vehicle Act 1988, 1379 cases have been registered in year 2017 and 464 cases have been registered in year 2018 (up to 31st august) by the Traffic control Branch of Mumbai Police for non-compliance of PUC norms.
	(ii)	Promoting Green mode of transport by creating Cycle tracks.	MCGM	1. Promoting Cycle tracks -To promote the green mode of transport, 36 Km Cycle Track Works along with walkway and other infrastructure 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 Marol.
	(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.

Sr. No.	Sub No.	Action	Responsibl eagency (ies)	Remarks
	(iv)	Public awareness campaigns, workshops, VMS boards, Auto Expo for promoting Eco friendly Mobility	RTO, Traffic Police, MPCB	1. 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, 2. 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 areas	Ch.E.(Roads & Traffic)_MC GM, MMRDA, RTO, Traffic Police,	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 Ramakant Zhasir)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 voilationregarding illegal parking.
	(vi)	Initiate steps for retrofitting of particulate filters in Diesel vehicles, when BS-VI fuels areavailable.	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.
	(viii)	Widening of road and improvement of Infrastructure for decongestion of Roads.	Ch. Eng(DP)_ MCGM, Assistant Commissio ner (All wards)_MC GM	• Widening and Improvement of existing road of 2.8 km.from Oberoi Mall to Film City and 2.5 km. of Tansa 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 integrateddevelopment.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/ byp ass road to avoid congestion : a. Coastal Roadb. 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

Sr. No.	Sub No.	Action	Responsibl eagency (ies)	Remarks
	(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	5) 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 Intelligent Traffic Management systems and installation of new signals.	Ch. E. (Roads and Traffic)_MC GM, Traffic Police, RTO	Installation of new traffic signals (48 Nos.) 1. Appointed consultant for preparation of Compressive Mobility plan. 2. Currently, Mumbai Traffic control branch using 256 ATC signals and 371 non ATS for synchronized traffic movement. •Installation of ATC (Area Traffic Control System) compatible signals planned (247 Nos.) 3. 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 based 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 electronically and online from 01.04.2019. However this order of Transport Commissioner is challenged 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, Transport Ministry	City is supplied with BS IV stage diesel which has low sulphur content.
	(xv)	Introduction of CNG, Hybrid Electric buses for public transport.Providi ng Metro and Monorail transport services.	RTO, Tranport Ministry, Chairman (BEST), Chairman (Railway 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 has already established. b) Newly developed 25 Nos. of hybrid electric and 6 Nos. of pure electric is available. c) Commuter choice program is planned providing efficient public transport in the Mumbai City. To improve the air quality 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 already 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 and operated by BEST are in service from Bandra/ Kurla to BKC throughout the peak periods

Sr. No.	Sub No.	Action	Responsibl eagency (ies)	Remarks
				g.) 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, and connects Jacob Circle in South Mumbai with Chembur in eastern Mumbai. i) MMRDA also decided to appoint Indian Port Rail and 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.
	(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. a) 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 Bhandup Complex ofM.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 Award 25kw commissioned, Hawker Plaza Dadar-100kw commissioning awaited, Khataw Market 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-VI will be applicable to Two Wheelers Vehicle models manufactured on or after 01.04.2020 • The Emission standards Bharat Stage-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-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-IV, and sold in the form of Drive and Chassis will not be registered after 30.09.2020.
	(xix)	Providing good Inspection/ maintenance services to all BSII & BSIII	RTO, Transport Ministry	•BEST having 27 Nos. of Depos and Central Workshops where high tech maintenance infra- structure is available.

Sr. No.	Sub No.	Action	Responsibl eagency (ies)	Remarks
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.	Superinten dent of Garden_MCGM, Assistant Commissio ner (Wards)_M CGM, Ch. E. (Roads and Traffic)_MC GM, MMRDA, MSRDC Ch. E. (DP)_MCG M	•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. (Roads and Traffic)_MC GM, MMRD A, MSRDC,Assistant Commissio ner(Wards) _MCGM	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 roard=125, Cost 285.22Cr3. Western Suburb Division (W.S)- No. of roads=137, Cost 234.96Cr
	III	Introduce water fountains at Major Traffic intersection, wherever feasible by establishing Garden Infrasture Cell (GIC).	Ch. E.(Roads and Traffic)_MC GM,MMRDA, MSRDC,Assistant Commissio ner (Wards)_MCGM, Superinten dent of Garden_MCGM	Regarding installation of fountains; Garden Infrastructure Cell (GIC) of MCGM is established. However, it is to state that it is not feasible as it could need additional area which may result in reduction of space for vehicles.
	IV	Greening of open areas, garden, community places, schools and housing societies	Ch. E. (DP)_ MCGM, Assistant Commissio ner (Wards)_M CGM, Ch. E. (Roads and Traffic)_MCGM, MMRDA, MSRDC	An area of 300 acres at Cuff Parade is being developed as Green Park for which Tata Consultancy Engineering (TCE) has been appointed as Consultants •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 Spaces viz. RGs, PGs, public/semi- community spaces, 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 Industrial lands 117.64Proposed Coastal Road Promenade 88

Sr. No.	Sub No.	Action	Responsibl eagency (ies)	Remarks
	V	Blacktopping of metaled Roads including pavement of Road shoulders	Ch. E. (Roads and Traffic)_MCGM, MMRDA, MSRDC	•Asphalt and resurfacing of roads of 98 km. has beencompleted at the cost of ₹1148 crore •In the year 2019-20 about 370 kms roads are proposed to be improved. Of this, about 106 kms roads are proposed in CC and 172 kms in Asphalt and resurfacing of about 92 kms roads is proposed.
	VI	Providing Wall to wall paving (brick) by finalizing footpath improvement policy under which footpaths will be improved with Stencil Concrete, CC with marble chips finishing or Plain CC instead of Paver Blocks	Ch. E. (Roads and Traffic), MMRDA, MSRDC	•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. •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 and technology.
	VII	Road design improvement by using C & D waste, fly ash in road construction.	Ch. E. (Roads and Traffic), 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.
3. Source Group: Biomass/trash burning, landfill waste burning				
3	(i)	Launch extensive drive against open burning of biomas,s crop residue, garbage, leaves by appointing Nuisance Detectors and Clean-up Marshals are appointed. Providing door to door garbage collecting services.	Ch. E. (SWM)_ MCGM	•As majorly Door to Door collection is being practiced, no occurrences are reported. Moreover to monitor and control these kinds of lapses, Nuisance Detectors and Clean-up Marshals are appointed.
	(ii)	Providing Organic Waste Compost machines , decentralization of processing of Waste, dry waste collection centers.	Ch. E. (SWM)_ MCGM	The system of separate collection is in place. Organic Waste Compost machines are proposed to be installed in all Municipal markets. •Efforts are being taken to motivate decentralization of processing of waste.Dry waste is segregated at 32 dry waste centers operated by NGOs. •Bulk waste Generators are encouraged to install compost pits/OWC machines. Total 247 compost pits are developed all over Mumbai. • Nuisance Detectors and Clean-up Marshals are appointed. The horticultural waste generated at plots with garden department is collected regularly and converted into compost within plot or nearby plot. The compost generated through this is utilized as manure in MCGM gardens. Total 247 compost pits are developed all over Mumbai. •Development of 600 TPD Waste to Energy project at Deonar, Mumbai on DBO basis. •Tenders are floated for installing OWC machines in Markets. Composting pits are being erected in Gardens.
	(iv)	Strict compliance of ban on open burning	Ch. E. (SWM)_ MCGM	•Ban on burning of waste on land, littering/throwing of waste is imposed in MCGM limits and the provisions are enforced through Bye-Laws and Nuisance detectors, clean-Up Marshals appointed specially 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 against the nuisance creators/defaulters •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	Responsibl eagency (ies)	Remarks
4. Source Group: Industries				
4	i	MPC Board has issued appropriate direction to the defaulting industries time to time for non complying industrial units. Regular survilance performed based on randomized sampling plan.	MPCB	Board has issued appropriate direction to the defaulting industries time to time.
	ii	Sulphur reduction in fuel by using low sulhur content Imported coal in Thermal Power plant. Installation of FGD to reduce SO2 emission from TPP.	Industry (Thermal Power Plant), MPCB	Already FGD were provided at M/s. TATA power company ltd. For reduction of sulphur as well as they are using 100% imported coal wit 0.15 % of sulphur and 5% ash contain.
	iii	Improved Combustion technology	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.
	iv	Alternate fuel- Hotel industry directed to change fuel patten from HSD to Natural Gas.	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. Petrochemical Industries are 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 details.
	vii	RMC indusries directed for Fugitive emission control	Industry (Petroleum Refinery, RMC), MPCB	MPCB had issued gazette notification regarding guidelines for RMC
	viii	Industries allowed with stringent Environmental norms only.	MCGM,MI DC, MMRD & Industries Dept.	Industries allowed with stringent Environmental norms only.
	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 contain. 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.

Sr. No.	Sub No.	Action	Responsibl eagency (ies)	Remarks
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)_ MCGM	•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. 1) 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	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 mucktransportation trucks/dumpers covered by tarpaulin sheet during transportation.
	(iii)	Better construction practices with PM reduction for MMRCL construction.	Ch. E. (DP)_MCG M, Ch.E(Road s and Traffic)_MC GM, MMRDA, MSRDC, MPCB, SIC_MCGM	MMRCL Construction Policy: •Regular water sprinkling carried out at all raw material /muck storage and on internal/ affected public roads at all construction work sites (1Cr) •Storage silo of cement are equipped with dust catcher (0.5 CR) •Raw material storage at the batching plant covered by close shed and provided with roof top sprinkling and fogging system. (0.6 CR) •All conveyer belts at batching plant covered with claddings. Material transfer points are covered with GI tin sheets and water sprinkling arrangement. (0.3 CR) • Strengthening of water sprinkling system for control of air pollution control. (0.2 CR) Regular air monitoring of RSPM, PM2.5, NOx, SOx and CO is being carried out by MoEF and NABL approved third party at construction and RMC/ casting yard sites as per CPCB guidelines. •The Draft Development Promotion & Control Regulation 2034 has proposed that the DCRs should grant permissions consistent with the policies and objectives of the Draft DP.
	(iv)	Ensure carriage of construction material in closed /covered Vessels	Ch. E. (SWM)_ MCGM	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.
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 families in the State

Sr. No.	Sub No.	Action	Responsibl eagency (ies)	Remarks
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 rare use of DG set as well as most of the DG set as provided with necessary control equipment and enclosures.
	(ii)	Reduction in DG set operation/ Un-interrupted power supply	Power Generation and Supply Companies -Reliance, BEST	•As mumbai and mumbai suburban city very rare electricity interruption due to which very rare use of DG set as well as most of the DG set as provided with necessary and enclosures.
8. Source Group: Bakeries/crematoria				
8	i	Use of LPG in Hotels and "dhabas"	Petroleum Ministry, Ch. E. (M & E)_ MCGM, EHO_ MCGM, MPCB	•Commonly used fuel is either LPG gas or Electricity for preparation of eatable, which does not create much air pollution
	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 (Mechanica l & 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	1	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.
	2	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) adds 6.6% of PM to the city
	3	Action plan to address large industries (e.g. oil refinery and fertilizer)	Petroleum Industry, MPCB	enclosed ANNEXURE-A

Sr. No.	Sub No.	Action	Responsibl eagency (ies)	Remarks
	4	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.
	5	Public Awarness 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).
	6	Citizen Access toTransportation (CAT), School Zone Traffic Improvment Programmee (szTIP), Quite KEM (Q KEM), Monitoring of air pollution byplanning authority in their jurisdiction	MCGM	• 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.

OBJECTIVES OF MUMBAI'S ENVIRONMENT

1. Day to day from megacity Mumbai to villages various problems generated due to solid waste are becoming terrible/terrific. The quantity of solid waste will be reduced, if separation of waste into dry/wep is done at source and fertilizer will be generated. Every citizen should take this responsibility.

2. We should not depend on government for everything but should discharge our responsibility taking into account the best example of tolerant nature and wild life. All wild lives are struggling to survive with changing climate.

3. The nature provides us lot of things. Therefore it is our duty to keep nature flourishing and protect its conservation. It is our social responsibility to take care for proper use of natural resources, tree plantation and maintenance, protection and conservation of wildlife and aquatic animals.

4. Whole state from city to village is facing problems like solid waste, plastic bags, e-waste, cutting down trees, shortage of water, discharge of sewage water in nalla etc.

5. In future, if “Green Environment of Global” is managed properly challenge warming can be solved definitely.

6. NGO’s working on social levels for problems regarding environment and pollution or obeying laws passed on government levels and public awareness program. Participation of general public is very important.

7. In future, today’s students are our strong and healthy citizens. It is necessary to develop culture in their school. Life for management of green environment. The public awareness is necessary for saving water, proper management and planning.

8. If dry and wet solid waste is segregated at source only 20% solid waste will be carried dumping ground. Then it is easy for MCGM to dispose off such solid waste properly.

9. Along with the development of cities, there is sheer negligence of nature which causes environmental problems. Even though laws are existing for controlling pollution protection of environment through law is becoming impossible. So it is necessary to change the mentality of every citizen.

10. Due to the various development works, constructions and industries started in the last few year's 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 spryaing of water at the construction site, washing of wheels of vehicles going out of the site,

preventive maintainance of all the machines is 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.

11. 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. These ater conservation objectives can only be achieved with the cooperation of citizens.

SALIENT FEATURES OF MUMBAI'S ENVIRONMENT

1. In year 2020-2021, about 20,195 no. of trees are planted on municipal roads and open spaces. In the year 2021-22 around 20000 trees are proposed to planted on roadside and on other places in MCGM jurisdiction.
2. Municipal Analyst laboratory is a Public Health Laboratory of MCGM (G/North). In December 2020 the Laboratory has been accredited with International Standard ISO17025:2017 by National Accreditation Board For Testing and Calibration (NABL).
3. In the year 2020-21, a total of 29,051 water samples were tested out of which 275 contaminated water samples were found. Corporation succeeds in reducing the percentage of contaminated water to 0.9%.
4. To provide safe and clean environment to citizens of Mumbai Sewage Disposal Project-Stage II Upgradation of existing Waste Water Treatment Facility (WwTFs), Construction of new WwTFs, Reconstruction of Sewage Pumping Station, construction of Sewer Tunnels are planned.
5. Rivers reforestation proposed works include widening of rivers, improvement of river water quality, rehabilitation of rivers. Prevention of river pollution from watershed areas, network of sewers, access roads for sewage treatment. These include construction, beautification of river banks and construction of sewage treatment plants.
6. Mumbai has been assessed and declared as an Open Defecation Free + (ODF +) City by the Quality Council of India (QCI) on 22nd December 2020.
7. Solid Waste Management Department has developed banned plastic collection and storage facilities for the convenience of citizens. Use of media for spreading awareness about active public participation in minimizing use of banned plastic is being done.
8. The total number of vehicles in Mumbai as on March 2021 is 40,33,497. As per the previous year the total number of vehicles (38,87,722) increased near about 3.75%.
9. The Southern Costal Road Project of 10.58 km from Princes Street Flyover to Worli End of Bandra Worli Sea Link is proposed to resolve the traffic congestion.
10. Accelerate the 'Teaching-Learning Process' of digital classrooms with the help of projectors in 1214 classrooms of municipal primary and secondary schools through Brihanmumbai Municipal Corporation Education Department to enhance the educational quality of students.
11. 'Mumbai Air Pollution Control Action Plan' approved by Central Pollution Control Board in October 2019. The action plan includes special emphasis on reducing traffic congestion, air pollution and noise pollution, as well as widening of roads, keeping roads in order, disciplining traffic, developing traffic control systems, developing green belts along traffic routes, etc.

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