R3

REVISED ACTION PLAN FOR CONTROL OF AIR POLLUTION IN NON-ATTAINMENT CITIES OF MAHARASHTRA

Mumbai

Maharashtra Pollution Control Board
महाराष्ट्र प्रदूषण नियंत्रण मंडळ

MAHARASHTRA POLLUTION CONTROL BOARD

KALPATARU POINT, 3rd Floor,
Sion-Matunga Scheme Rd. No.8,
Opp. Sion Circle, Sion (East),
Mumbai-400 022.

Date: 18thSeptember, 2019

Action Plan for Control of Air Pollution in Mumbai

1. Preamble

There are many sources of particulate matter emission impacting the ambient air quality of the city of Mumbai; however the major ones are resuspended dusts and industries. The impact of the industrial sector is reducing due to various reasons such as closure of industries, shift to clean fuel, better compliances and discharge of emission at higher elevations. The emission inventory discussed earlier indicates that though point sources contribution is reasonably high particularly due to power plant in terms of total load; however its impact on the ambient air quality is low due to emissions at a higher elevation, providing high dilution and dispersion.

Vehicle activity in the city has shown tremendous increase over a period of last 10 years. The mobile (line) source emissions are not only dependent upon the number of vehicles registered but also on the actual number plying on the roads, speed of movement and the conditions of vehicles besides many other factors. Vehicle kilometer travelled for the city has been showing consistent increase; however, at some junctions the traffic congestion is so high that VKT rise is ironically not so high but emission is high. Saturation traffic situation where average speed goes on decreasing, the VKT may not increase as vehicles are not crossing a point for a long time. Increased levels of vehicular activity and resulting high levels of air pollution have led to active anti air pollution campaign by the nongovernmental organization (NGO) and judiciary.

The area sources which emit at ground level also have significant impact on the PM levels in the atmosphere; however it could be more localized, particularly from the sources such as bakeries, crematories, construction, garbage burning etc. Some of these sources can have significant local impact on the ambient air quality for a shorter duration. Overall a city growth pattern indicates that domestic fuel has become cleaner, bakeries /crematoria situation have not changed so much. Construction/ demolition related emission has gone up, refuse burning has increase and road dust related emissions have also shown increase.

Industrial emission has been consistently declining as many industries have closed down. Even small-scale industrial units are changing into commercial offices. Large industries are mainly located in limited areas and their compliances have improved.

The action plan presented later therefore, makes an attempt to delineate strategies on the basis of understanding of the PM and NOx sources and their possible contribution to the ambient and kerb side air quality. Each of the strategies will have to be looked at from the point of view of its impact

level in terms of reduction in PM and NOx emissions (low, medium, high); its feasibility from implementation and administrative point of view (easy, moderately difficult and difficult); financial viability (low, medium and high costs) besides issues relating to their long and short term impacts.

i. Area Source

As per emission inventory percent contribution from area source emissions are high particularly for PM when compared with emissions from vehicular emissions. Other area sources though called area sources, are limited to small regions (viz. Open eatouts, bakeries, crematoria and hotels) and therefore, their impact does not seem to be wide ranging and across the city. For example, open burning can be common all through the city with some variation based on locality; however landfill open burning is limited to Mulund and Kanjurmarg. Similarly diesel based railway emissions are limited to Mumbai Central in Western line and Byculla – Kurla in central line. Emission from Metro line development is also a time bound activity for at least 5 years. With the implementation of the short and long term scenarios, the total reduction in particulate matter from area sources would be more than 98%**.**

Measures Required

- Open refuse burning and landfill site burning are the most important issues for the degradation of ambient air quality. This needs very quick and credible solution to stop these emission.
- Road dust from paved and unpaved roads in the city is largely responsible for high PM. The code for road and pavement constructed should be written well and implemented.
- Large scale construction and demolition of buildings in the city give high local dust contribution leading to health impacts. These practices need adequate rules and compliance to reduce emissions.
- Bakeries and crematoria emissions can be reduced through implementation of fuel shift combined with awareness programmes.

ii. Point Source

The industrial sector has been steadily declining in the city due to shifting development priorities and market forces. The major industrial units are located in Chembur – Trombay area. As per emission inventory the percent emission contribution is around 33% form 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 fertilizers companies are shares 3.53% and all MSI & SSI (All Categories R,O,G) adds 6.60% percent of PM to the city. Tata Power Plant uses huge quantity of Coal, LSHS and NG, though the PM and NOx emissions from the power plant is within the city limit, as the impact is not felt due to its dispersal at the far end of the city through stacks.

Measures Required

- Industries decline in the city has led to large decrease in air pollution, however, fuel shift in existing industries will further improve the ambient air quality. With fuel change, it will be decisive to study the feasibility of adopting the new technology. The MSI and SSI also need to get larger share of the natural gas for combustion processes to shift from FO and LSHS.
- The only power plant within the city, if it shifts to Natural Gas, major reduction in emission shall be achievable.
- Industries should adopt stack emission norms beyond those prescribed by CPCB Industries with QA/QC, the increase of most of the stack by large emitters can affect the air quality substantially as the prominent wind direction of the city to eastern part of Mumbai will disperse the pollution load.
- The data for small scale and unauthorized industries is scanty and at this stage to suggest the levels of contribution from these are difficult. The source apportionment study and the data indicate large part of the PM from other sources, which also need further investigations. These investigations of sources should be undertaken by MPCB/ GoM.
- There are many air quality monitoring stations located in limited area of Chembur-Mahul region. All these are managed by industries. This resource should be well distributed with centralized data linkage with MPCB, which will provide very useful data base for city air quality management.

iii. Line Source

One of the major contributors to Particulate Matter (PM) and NOx emissions in Mumbai region is vehicular exhaust. Particulates present in vehicular emissions are especially harmful due to their small size (under PM_{10}) and even larger number below $PM_{2.5}$. The fine particles are also important due to their harmful chemical composition. The most prominent sources of vehicle particulate emissions are diesel driven and two-stroke petrol driven vehicles. Reduction strategies addressing both technical and non-technical issues presented here take into consideration the current ambient air quality standards; exhaust emission standards, emission inventory, vehicular population composition, infrastructure availability and the techno-economic feasibility in Greater Mumbai Region.

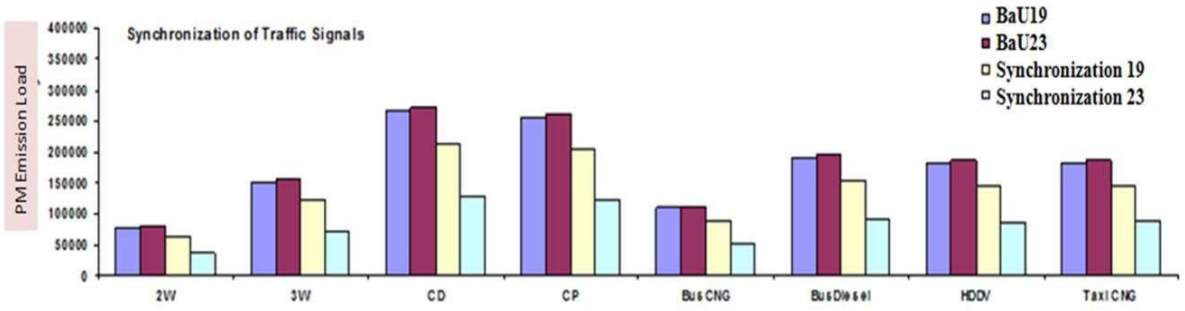
The discussion has been presented in following order:

- Improvement in fuel quality and alternate fuels
- Improvement in vehicle related components/technologies (After-exhaust treatment techniques and retrofitment)
- Synchronization of traffic signals
- Inspection & Maintenance programme
- Transport planning and traffic management

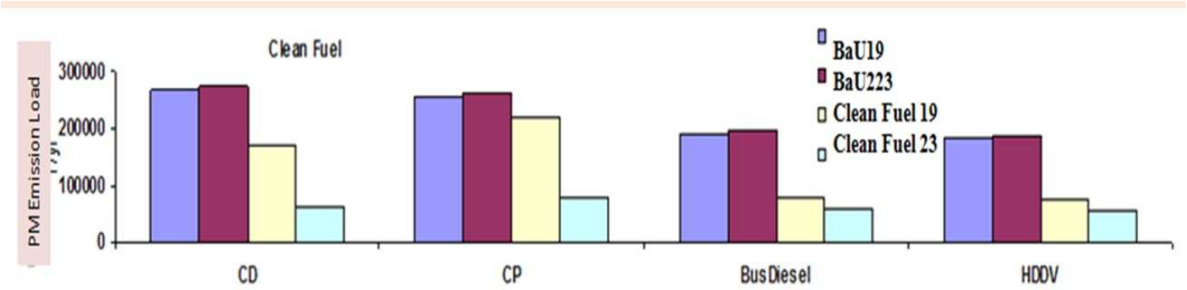
- Other options including phasing out old vehicles, revision of emission standards
- Encourage public transport, encourage non motorized transport and
- Reduce dust resuspension

Many potential emission reduction options have been considered based on viability in the city and the major issues are pertaining to the overall vehicular sector emission reduction have been discussed here.

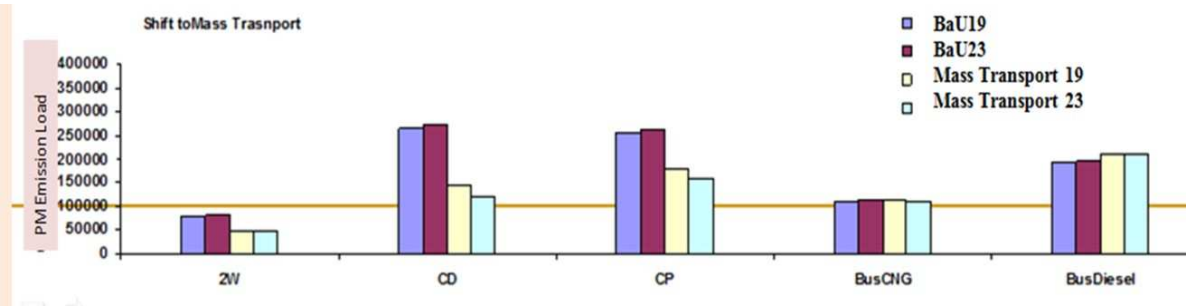
Synchronization of Traffic Signals
(35% improvement in 2019 and 80% Improvement in 2023)



Conversion of Commercial Vehicles to CNG/LPG –
(25% conversion in 2019 and 75% in 2023 (Taxi and 3W already converted to CNG)



Improvement of Public Transport : as per existing plan for the city (VKT of cars, 2 wheelers and buses) incorporated city specific proposals on public transport with respect to mass transport. Leading to percentage shift in VKT and off road personal transport 10% shift in VKT – in 2019 and 20% shifting VKT in 2023



Resuspension from the building and construction activity is one of the prominent sources of PM emission load. As there are various infrastructural and development project going vide across Mumbai region, the resuspension attributed to these activities within their construction phase is severe but time being. The construction of Colaba to SEEPZ corridor began last year and as per the EIA report prepared by RITES indicate that after the introduction of metro rail system the reduction of vehicles and shift of ridership from road vehicle to the proposed system for the years 2016, 2021, 2031 and 2041 is given in Table_. The reduction in number of vehicles gives benefits to economy by reduction in Vehicle Operating Cost (VOC), Fuel Consumption, Pollution Load.

Number of Vehicles Trips Kms With and Without Metro Corridor (Avg. Daily)

Mode	No of Vehicle Trip KMs without C-B-S Metro				No of Vehicles Trip KMs with C-B-S Metro			
	2016	2021	2031	2041	2016	2021	2031	2041
Car+ Taxi	55540150	64386256	78486486	95674589	54634509	63278060	77141050	94060065
2W	108595469	125891912	153461538	187068759	105910475	122606396	149472663	182282109
Bus	1609880	1866292	2275000	2773212	1516800	1752394	2136719	2607275
Auto	12082107	14006474	18823529	22945777	11206062	12934493	17522061	21384015
Total	177827607	206150934	253046554	308462338	173267846	200571344	246272493	300333465

Reduction In Vehicle Trip Kms With Metro Corridor (Avg. Daily)

Mode	2016	2021	2031	2041
Car+ Taxi	905641	1108196	1345437	1614524
2W	2684994	3285516	3988875	4786650
Bus	93080	113898	138281	165937
Auto	876045	1071980	1301468	1561762
Total	4559761	5579590	6774061	8128873

Low fuel Consumption Due to reduction in Vehicle

There will be a reduction in number of vehicle trips on implementation of this project. Therefore, it is estimated that both petrol and diesel consumption will also get reduced. Table___provides information about the savings in fuel consumption due to reduction of vehicles in Mumbai for the years 2016, 2021, 2031 and 2041. These fuel savings are valued at 2011 prices (Rs.67.00/L for petrol and Rs.41.00/L for diesel) the corresponding fuel savings for buses, Car + Taxi and 2/3 wheelers are as shown in Table_.

Savings In Fuel Consumption Due To Reduction of Vehicles (Avg. Daily)

Mode	Reduction in Vehicle Trips KMs with CBS Metro				Fuel Consumption Norm (Km/L)	Reduction in Fuel Consumption (litres)			
	2016	2021	2031	2041		2016	2021	2031	2041
Bus (Diesel)	93080	113898	138281	165937	6	15513	18983	23047	27656
Car +Taxi(Petrol)	905641	1108196	1345437	1614524	14	64689	79157	96103	115323
2-3Wheeler (Petrol)	3561039	4357496	5290343	6348412	30	118701	145250	176345	211614

Money Saving Due To Reduction Of Vehicles (Avg. Daily)

Mode	Monetary Value (Rs Lakh)			
	2016	2021	2031	2041
Bus (Diesel)	6.36	7.78	9.45	11.34
Car+Taxi(Petrol)	43.34	53.04	64.39	77.27
2-3Wheeler (Petrol)	79.53	97.32	118.15	141.78

Reduced Air Pollution

Reduction in traffic on Mumbai roads due to proposed metro rail could lead to reduce air pollution. The emission load was calculated in report is based on Emission factor of vehicles as per Euro-II norms the reduction level of different pollutants like PM, NOx, HC, CO and CO2 for the years 2016, 2021 and 2031 and 2041.

Mode	PM				NOx				HC			
	Bus	Car	2/3 Wh.	Total	Bus	Car	2/3 Wh.	Total	Bus	Car	2/3 Wh.	Total
2016	1.7	9.9	97.5	109.1	29.6	66.1	389.9	485.6	93.4	82.6	909.9	1085.9
2021	2.1	12.1	119.3	133.5	36.2	80.9	477.2	594.2	114.3	101.1	1113.3	1328.8
2031	2.5	14.7	144.8	162.1	43.9	98.2	579.3	721.4	138.8	122.8	1351.7	1613.3
2041	3.0	17.7	173.8	194.5	52.7	117.9	695.2	865.7	166.6	147.3	1622.0	1935.9

Mode	CO				CO2			
	Bus	Car	2/3 Wh.	Total	Bus	Car	2/3 Wh.	Total
2016	1.7	9.9	97.5	109.1	29.6	66.1	389.9	485.6
2021	2.1	12.1	119.3	133.5	36.2	80.9	477.2	594.2
2031	2.5	14.7	144.8	162.1	43.9	98.2	579.3	721.4
2041	3.0	17.7	173.8	194.5	52.7	117.9	695.2	865.7

Similarly estimated benefit of Metro Line 2A (Dahisar to DN Nagar) and Metro Line 7 (Dahisar to Andheri) is reported in their impact assessment study conducted by Delhi Metro Rail Corporation reflect the reduction in pollution after completion of mass proposed transportsystem.

Table Estimated Benefit of Metro Line 2A (Dahisar to DN Nagar)

Quantified Benefits in Horizon Years	2019	2020	2021	2022	2023
Annual Time Saved by Metro Passengers in Cr. Hr.	14.01	15.45	17.04	17.66	18.30
Annual Fuel Saved by Metro Passengers in thousand Tons.	23.56	27.26	31.62	33.11	34.62
Daily vehicles reduced (off the road)	19234	22052	25283	26215	27183
CO2 reduced in thousand tons	50.54	57.95	66.44	68.89	71.43
Other gases reduced in thousand tons	1.31	1.20	1.38	1.43	1.48
Reduced No of Fatal Accidents in Year	9.56	11.64	14.17	15.59	17.16
Reduced No of Other Accidents in year	68.64	83.54	101.68	111.93	123.20
Annual Vehicle km Reduced in Cr. Km.	35.91	41.17	47.20	48.94	50.74

Table Estimated Benefit of Metro Line 7 (Andheri to Dahisar)

Quantified Benefits in Horizon Years	**2019**	**2020**	**2021**	**2022**	**2023**
Annual Time Saved by Metro Passengers in Cr. Hr.	7.20	7.44	7.69	7.95	8.22
Annual Fuel Saved by Metro Passengers in thousand Tons.	30.89	31.82	32.67	33.63	34.54
Daily vehicles reduced (off the road)	9922	10156	10396	10642	10893
CO2 reduced in thousand tons	26.07	26.69	27.32	27.96	28.62
Other gases reduced in thousand tons	0.81	0.83	0.84	0.72	0.59
Reduced No of Fatal Accidents in Year	4.12	4.22	4.32	4.42	4.53
Reduced No of Other Accidents in year	29.60	30.30	31.01	31.74	32.49
Annual Vehicle km Reduced in Cr. Km.	18.52	18.96	19.41	19.87	20.34

The Mumbai Coastal Road Project IS a 35-kilometre-long road from Nariman Point to Kandivali in north Mumbai - is expected to reduce traffic congestion in the western suburbs of Mumbai. The Western Express Highway carries over 60 per cent of the city's traffic currently .The draft report has estimated a fleet size of 600 high-capacity buses to run on the coastal road. A BRTS can use existing road systems or be built with dedicated pathways and station systems, depending on available resources. It takes about an hour to travel from Marine Drive to Worli, but the coastal road will reduce the time to 20 minutes. A car taking the road would save a third of the fuel daily and reduce the carbon footprint by 1,826 tonnes of carbon dioxide per year.

All these proposed development will definitely affect by direct and indirect benefits to the transportation sector. The mass transport and change of travel demand will reflect the VKT of vehicles and reduction of pollution load over a period of time.

Mumbai Demography base Control Measures for Mumbai

When it comes to the size and population of the city, Mumbai has an area of 603 sq km and population of 12.4 million making it the most populous city in the country. It has a density of 20,482 persons per km. The 62 flyovers and the Bandra-Worli Sea link that came up in the last decade carry more cars than pedestrians. The sea link carries 37,336 vehicles daily, including city buses, against the eventual projection of 1,20,000 vehicles. Poor public transport, increasing cars and traffic jams, coupled with more and more roads that facilitate cars instead of people have brought Mumbai to a standstill. The Energy and Research Institute (TERI) says that in 2012, nearly 80 percent road accidents were due to the fault of the drivers of motor vehicles; only 1.2 percent accidents occurred due to the fault of cyclists. As for the receiving end, 57 percent of those who die in road accidents in India are pedestrians.

These plots total 17 percent of the public open space left in the city. This appropriation of POS reduces per capita open space to a mere only 0.8 sq m. An that attempts have been made earlier to connect the three big grounds of south Mumbai, Azad Maidan, Oval Maidan and Cross Maidan, which are in close vicinity of both the Chhatrapati Shivaji Terminus (CST) and Churchgate stations of suburban rail. “Now with the Metro passing along the route, it is an excellent opportunity to

integrate and link these spaces and have a walk though from a garden into the metro or to the suburban railway stations and vice versa."

Thirty- five percent of the population that works within a distance of 7-8 km of the work place can walk or cycle to work, yet they commute by public transport or auto rickshaws, hire app-based taxis or take their own cars, adding to the traffic and increasing pollution.

Brihan-Mumbai municipal corporation (BMC) to create 85,891 hawking pitches in the city. "BMC must map each section of every ward and remove encroachments and hawkers wherever possible to make footpaths walkable,"

"Unlike in Singapore, our policymakers have not introduced congestion tax, carbon footprint tax, etc.,"

"Indian cities are designed on the basis of the Indian Road Congress Codes and therefore we are designing cities as per highway standards. We need city-specific urban design manual and codes for cities with the following agenda: complete the network, design for universal accessibility and multiple capacity. Parking and hawking are parallel economies that need to be tackled for holistic development of the city. Today it is acceptable to park cars on roads whereas it is public space and parking is allowed for free. Parking has to be off street, at public space and paid."

To turn Mumbai into green urbanity few suggestions are: (a) remove encroachments for unrestricted flow of city buses with more bus services and lanes, (b) have a bus stop within every kilometre, (c) two car-parking facilities should not be closer than a kilometre, (d) at least 50 percent space of each road must be used for city buses, as against 5-10 percent today, and (e) cycling should be promoted with safety, free parking lots for users, and free bicycle ride facilities stops outside all railway stations. Additionally, short-distance fare for autorickshaws and taxis should be higher and long distance should be cheaper.

"Having too much of asphalt, steel, cement and building roads is not good for a city. It causes cars to be driven and parked and becomes a mess," he says. "We need to de-facilitate cars and reduce parking spaces, increase road tax from 10 percent to 25 percent. As against Rs 10 crore revenue from parking fees at present, we should aim at revenue of Rs 1,000 crore from parking within two-three years. This will reduce the number of cars, and enable revenue for good quality roads,"

Mumbai has to move beyond greening one or two lanes and take the credit for it. "In Delhi they set up an authority [Delhi Parks and Gardens Society] headed by a senior IFS officer which is now managing 20,000-odd parks and 10,000 green localities with all agencies coming together to adopt the UTPITEC [Unified Traffic and Transportation Infrastructure (Planning and Engineering) Centre] guidelines on footpaths and greenery. Mumbai too needs micro planning right at the ward level. Green spaces and visitors corridors need to be created around spaces missing in Mumbai. A separate authority needs to be set up for greening Mumbai which cannot be done by the garden superintendent."

Less than 40' approach, which means no street should be wider than 40 metres and vehicles should not be moving faster than 40 km per hour. This can shift people to walking, bicycling and public transport. "If a footpath is absent or obstructed, people will walk on the vehicular carriage way. Maintaining a continuous footpath across the length of the street can not only help pedestrians but improve traffic efficiency as well capacity."

Working on the same lines, WRI has taken up a Junction Safety Improvement Programme along with MCGM and Mumbai Traffic Police on the busy SV Road- Linking Road junction and Nagpada junction. With small changes, junctions can be redesigned in two years.

He thinks the planned coastal road can include space for a jogging/ cycling track with green spaces. While spaces below flyovers are being converted into green spaces, more greenery can be created if we ensure open spaces are reserved for greenery, walking and cycle tracks during redevelopment.

Refocus policies to encourage public buses. “Convert BEST [BrihanMumbai Electric Supply and Transport Undertaking] buses into AC buses, encourage private players to ply from selected start points to end points, have a regulatory authority, make it a public corporation, list it on stock exchange and take it out of its [BMC’s] control,” he says. “Rather than giving priority to the Rs 1,500 crore costal road allocated in the current budget which will be used by 200,000 cars at its optimum level, the government can buy 1,000 AC solar-powered buses which will be used by a very large number of people.” He says that there must be a single transport authority for the entire Mumbai Metropolitan Region (MMR) and the BEST committee can be converted into a separate transport committee for the city.

A bus can carry 79 people and it would require 60 cars to move the same number. Approximately 30 percent trips are short trips that can be done on foot or bicycle and can reduce 30 percent traffic on road. If buses are rationalized another 20 percent traffic will reduce on roads.” The traffic problem can be solved overnight if on-street parking is stopped.

IPT systems often fill in a very important role in a city’s mobility system by acting as a bridge between the travel requirements of users that the conventional public transport system cannot fulfill such as last mile connectivity or point to point connectivity.

However, it is also important to know that the central government has issued notification to leap directly to Euro VI emissions standards in 2020. This has serious implications for the implementation and compliance strategies at city level. Bharat Stage VI will bring in new genre of technology and fuel that will be subjected to a new compliance regime for the first time in the country. Only at Bharat Stage VI that will be implemented in 2020 will witness narrowing down of gap between petrol and diesel emissions.

PUC centres with central servers for automatic data transfer and minimize manual interference. Authorities should take steps to integrate on-board-diagnostic system with vehicle inspection programme.

Public transport vehicles and non-motorized modes of transport be given preference in parking space allocation. The parking policy has to ensure that the city provides limited legal parking with a cap on further supply and prices it effectively and variably to reduce demand for parking and thus car ridership and ownership. City allows legal parking caps and it is regulated and priced. Some parking restraint like proof of parking is available. There has to be high penalty for illegal parking.

In Mumbai also green tax has been levied under Bombay Motor Vehicles Tax (Amendment) Ordinance, 2010. Public and private vehicles over eight and 15 years old pay a green tax every year. They should be revised and made co-herent with current situations

Fugitive dust from mismanaged construction and demolition (C&D) waste contribute to particulate

air pollution. On 29 March, 2016 MoEFCC has notified India's first ever rules construction and demolition waste management. The challenge now is to have these rules implemented and reduce generation of this waste to reduce fugitive dust in cities.

Clean air fund

Prioritization of Public Transport on Roads: Public transport and its importance in the city of Mumbai need to be maintained for one most important reason. Once, more and more people get used to personalized transport, it would be very difficult to bring them back into the fold of public transport users. The fact that personal vehicles are occupying more and more space on the road; it is felt necessary that disincentive mechanism should be developed for personal vehicle owners. There are many methods of carrying out this task, however, financial and space constraints can achieve the balance.

BUS Lanes: As the road space is limited in Mumbai, the efficiency of the public transport can be maintained only if priority is given to the public transport vehicles. The objectives of such a policy will be to give priority to the buses. Some of the suggestions are:

- Exclusive bus lanes should be identified. One of the major obstacles to this concept, which many suggest, is lack of road space for adopting dedicated bus lane system. However, as has been seen in many other countries even in a narrow two lane roads, public transport priority system has been seen to be effective. Therefore, there is a need to undertake a project to demonstrate effectiveness of such system in Mumbai at one or two road stretches.
- If one wishes to see higher bus utilization, it also has to see correspondingly higher service levels. This could be achieved by way of providing better frequency to reduce congestion during peak period, better bus quality in terms of sitting as well as standing space.
- Those vehicles which may travel in bus lanes will need to pay a sum to get the benefits

Cost of Bus Ride: The cost of the bus fare has been increasing at a steady pace. This is seen as a very common practice when there is an increase in the diesel cost announced by the Government. What it leads to is that the bus fare for two-four persons becomes almost equivalent to either the taxi fare or attractive enough to own a private two or four wheeler. In such a situation, it shows that increasing bus fare and purchasing power is becoming the main responsible agent for higher private vehicles purchase. The other reason, such as better roads with flyovers (faster travel) makes it attractive for private vehicle ownership.

Public transport fare pricing, therefore, should not only be dependent upon the actual cost, but on some other sources of income. In the case of BEST, cross subsidization from its own electric supply division was considered a good example; however, the same is changing and BEST has to fend for itself for its bus operation costs. Modalities and options which can be adopted for no increase in bus fares are presented below:

- Bus fare reduction can be achieved from various means, but not alone from improving its own efficiency (as is normally believed).
- The public transport should be cross-supported directly from the personalized vehicles either being purchased newly or older one running on the road.
- An Air Quality Fund could be created which will have sources of funds coming from measures such as higher car user charges, higher parking charges, high registration fees, higher taxes on private mode of transport etc. should be directly transferred to them to achieve the low cost, better comfort, better frequency and faster travel.
- Diesel or any fuel used for public transport should be sold at lower price to keep the bus fare lower. The losses can be recovered from car-users.

- Certain areas of business district or identified regions of high congestion, free bus services can be provided. The cost can be recovered from parking, congestion and high fuel costs charged to personal vehicles. (For example Pilot feasibility study may be carried out in **Hotspots)**
- All malls must be asked to provide their own free service to nearest train and bus routes so that congestion due to their activities is reduced further. Alternately, all cars must pay an additional fee besides parking charges as congestion fee when they enter the mall. All such charges should be pooled and shared with the public transport company.
- All malls and institutions attracting outside car visitors levy a Rs. 10 per hour charges. This can either go to BEST or the fund
- **Administration** : **Insurance cost** should be inclusive of congestion charge every six months, buy sticker worth congestion charges. Annual insurance time each vehicle can pay a sum of Rs.500 extra, which can go to the fund. Collection responsibility will be with the insurance company.
- Vehicle manufacturers selling vehicles in state of Maharashtra must pay a ONE TIME air pollution tax towards the CAF

The key is that all such charges thus collected should be managed as Clean Air Fund and should be passed on the public transport company, which could not only take care of its operational costs but also addresses other issues such as: Lower cost to passenger, Better bus quality, Faster services and Adequate growth in bus population for more people.

CLEAN AIR FUND (CAF)
Emission reduction from transport sector can also be achieved by forming a '**Clean Air Fund'** in co-operation with public private partnership which can operate on following guidelines:

Example of how a small levy can bring additional revenue as part of Clean Air Fund :

Vehicle Km Travel in a Day for Mumbai City (2016)

	2 Wheeler	3 Wheeler	Car Diesel	Car Petrol	HDDV	Taxies
VKT	3512886	5244740	4775819	7161046	2025342	3555128
Cost (Rs.)	17,56,443	26,22,370	47,75,819	71,61,046	20,25,342	17,77,564
Rate, Rs./km	0.5	0.5	1.0	1.0	1.0	0.5

Total collection : 2,01,18,584 about 2 crores per day

The current VKT growth of the city ranges between 2-5% depending upon the region of the city

Awareness programmes for policy makers, people, drivers-mechanic, traffic police, health professionals, academicians etc. will bring the importance of better air quality. Land use and transport planning need to be looked at seriously for future sustainability of the cities. In dense cities conglomerate of MMR, public transport saves valuable space and energy compared to private transport, and can make a healthy profit at the same time. But cities need to nurture their public transport by giving then some priority on the road over cars. If buses are always caught in traffic then a vicious cycle begins, with bus riders abandoning public transport and adding to the traffic jams. Various case studies from other places also indicate the importance of sustainable transportation. Strong leadership and governance brings radical change in achieving sustainable development of the city. The authorities responsible for the development of Mumbai Metropolitan Region (MMR) need to develop Integrated Environment Management Systems (IEMS). The goal of achieving a balanced development of the region through proper land use planning, strengthening

of infrastructure facilities and formulates policies and programmes that help in preserving the environment for sustainable development.

The prioritization of various options in all three categories have addressed mostly all the major reduction in the overall pollutants load reduction combined with ambient air quality improvement. However, many of these measures still may not lead to resolving very small area high concentration points which could be due to short term but high emission or high activity for a limited period and limited area. Such hot spots in the city of Mumbai could exists when a local road is dug up and/or being repaired, construction and demolition of buildings, biomass and refuse burning, industries short term emissions etc. All of such activities can be controlled and regulated through local efforts and constant vigil on the part of citizen, pollution control agency and respective responsible implementing agency.

One of the biggest issues for large metro city is land use pattern, which indirectly drives the growth pattern of the city and consequent vehicle increase. Frequent change in floor space index (allowing more built up per unit area) leads to large scale increase in vehicle ownership and their presence on road. Better air quality planning for the city also needs appropriate transport planning which is linked with land use.

All reductions planned will only reduce emissions from manmade sources; however, natural background and dust would continue to remain in the atmosphere. The benefits computed in the process described above will not only yield PM and NOx related pollution reduction but also co benefit of other pollutants (SO2, VOCs, HC, CO etc) reductions as well. One of the other major co-benefits of these options (adoption of mass transport, use of cleaner fuel, efficient combustion etc) will provide large scale green house gas reduction. Mumbai as a big metro city will provide the impetus of overall mitigation of GHG. The benefits of air quality improvement plan suggested and delineated above again will not yield desired results if the adjoining urban centers and states do not adopt measures suggested for Mumbai as the objectives of clean air cannot be kept limited to the political boundary of Mumbai when it is in close proximity of major urban centers.

2. Monitoring Mechanism

The aforesaid action plan shall be implemented by Maharashtra Pollution Control Board with co-ordination of Department of Environment, Govt. of Maharashtra, Urban Development & Housing Department, Govt. of Maharashtra, Transport Department, Mumbai Municipal Corporation, Traffic Police and District Administration. Maharashtra Pollution Control Board shall regularly review the implementation of aforesaid action plan.

Awareness programs for policy makers, people, drivers-mechanic, traffic police, health professionals, academicians etc. will bring the importance of better air quality. Land use and transport planning need to be looked at seriously for future sustainability of the cities. In dense cities conglomerate of MMR, public transport saves valuable space and energy compared to private transport and can make a healthy profit at the same time. But cities need to nurture their public transport by giving then some priority on the road over cars. If buses are always caught in traffic then a vicious cycle begins, with bus riders abandoning public transport and adding to the traffic jams. Various case studies from other places also indicate the importance of sustainable transportation.

Strong leadership and governance brings radical change in achieving sustainable development of the city. The authorities responsible for the development of Mumbai Metropolitan Region (MMR) need to develop Integrated Environment Management Systems (IEMS). The goal of achieving a balanced development of the region through proper land use planning, strengthening of infrastructure facilities and formulates policies and programs that help in preserving the environment for sustainable development.

3. Implementation status

The Chief Secretary, Govt. of Maharashtra to convene the meetings with different concerned departments and direct for compliance of directions for implementation of air quality of Mumbai. The Principal Secretary, Environment, Govt. of Maharashtra to also convene the meeting for follow up of the directions. The Maharashtra Pollution control Board continuously conducted the meetings with all stakeholders for preparation of comprehensive action plan for city and its implementation.

Ambient Air Quality Monitoring Results

Mumbai - Bandra

Table No. 1: Data for Monthly average reading recorded at Bandra

Station Name	year	Month	Average of SO_2	Average of NOx	Average of RSPM
			50	***40***	***60***
Bandra	2017	Apr	13	40	102
		May	11	36	62
		Jun	10	51	53
		Jul	7	29	59
		Aug	9	26	48
		Sep	13	23	66
		Oct	17	39	105
		Nov	13	29	152
		Dec	12	75	164
	2018	Jan	17	93	179
		Feb	24	86	180
		Mar	24	65	116

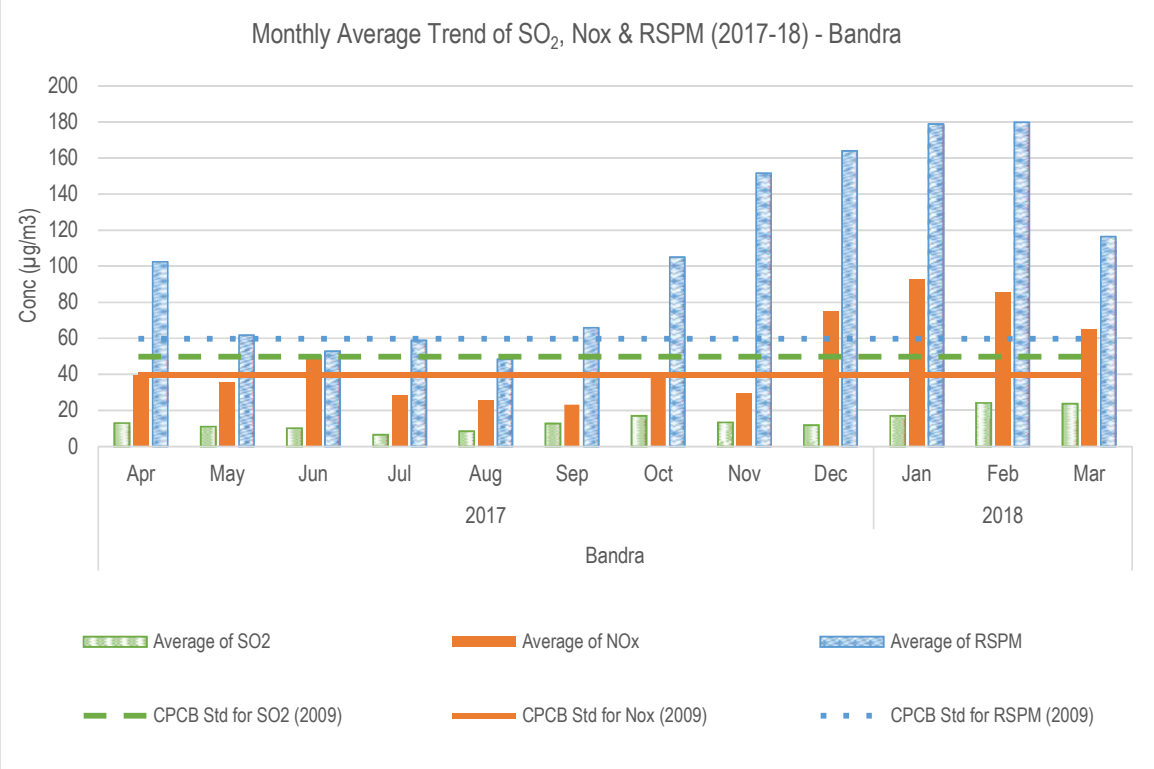


Figure No. 1: Monthly average reading recorded at Bandra

Table No. 2: Data for Annual average trend of SO_2, NOx, and RSPM at Bandra

Station Name	year	Average of SO_2	Average of NO_X	Average of RSPM
		50	***40***	***60***
Bandra	07-08	19	59	158
	08-09	19	60	137
	09-10	17	90	140
	10-11	19	48	116
	11-12	21	65	131
	12-13	18	48	116
	13-14	20	49	106
	14-15	16	52	114
	15-16	18	49	93
	16-17	13	40	122
	17-18	14	49	106

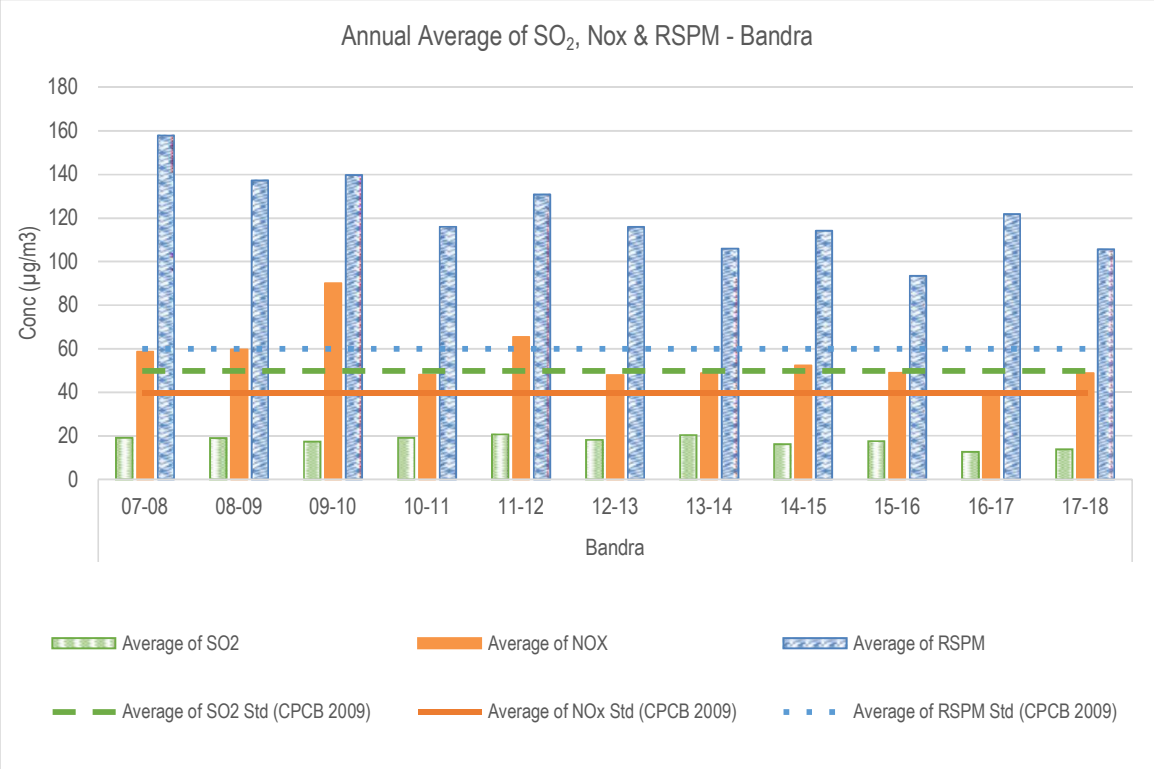


Figure No. 2: Annual average trend of SO_2, NOx, and RSPM at Bandra

Mumbai - Sion

Table No. 3: Data for Monthly average reading recorded at Sion

Station Name	year	Month	Average of SO_2	Average of NOx	Average of RSPM
			50	***40***	***60***
Sion	2017	Apr	7	71	187
		May	7	61	178
		Jun	6	64	114
		Jul	8	59	97
		Aug	10	63	112
		Sep	10	75	81
		Oct	3	90	103
		Nov	4	94	183
		Dec	4	92	159
	2018	Jan	4	97	171
		Feb	7	89	183
		Mar	4	64	168

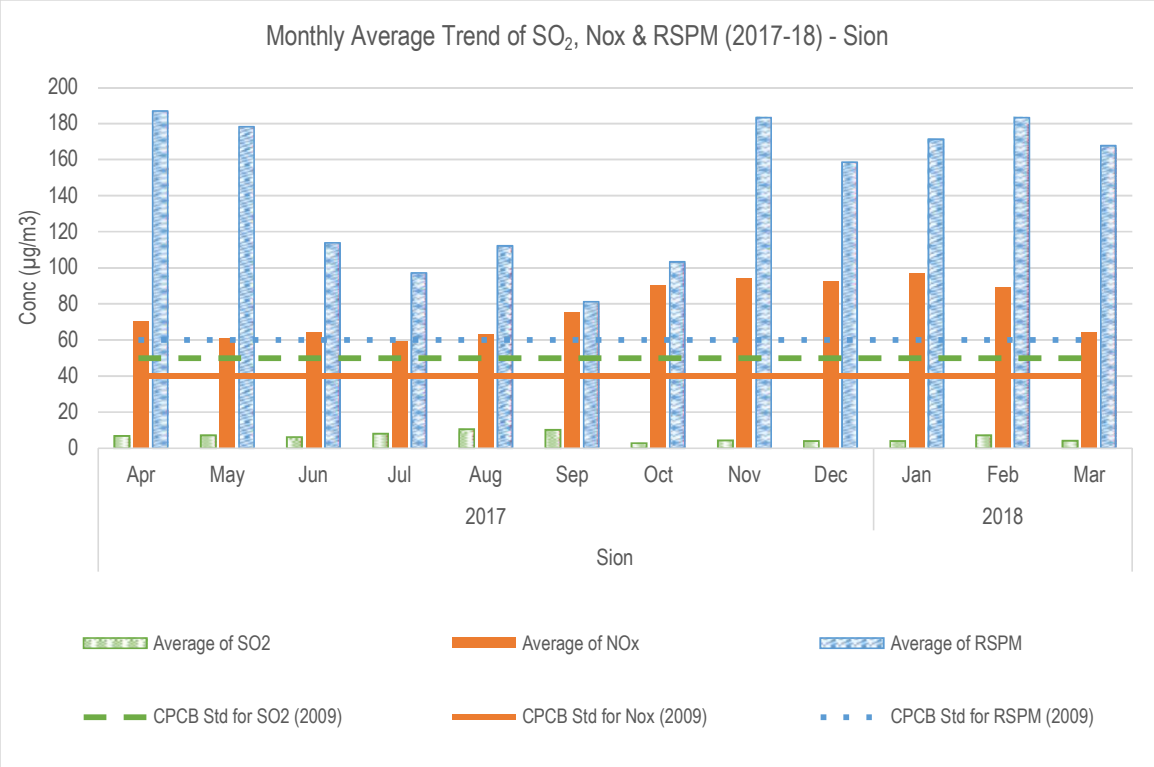


Figure No. 3: Monthly average reading recorded at Sion

Table No. 4: Data for Annual average trend of SO_2, NOx, and RSPM at Sion

Station Name	year	Average of SO_2	Average of NO_X	Average of RSPM
		50	***40***	***60***
Sion	04-05	21	67	197
	05-06	26	105	231
	06-07	30	91	255
	07-08	28	139	295
	08-09	24	97	202
	09-10	18	109	223
	10-11	14	116	181
	11-12	10	66	150
	12-13	11	106	136
	13-14	8	108	131
	14-15	8	91	117
	15-16	14	81	148
	16-17	8	83	149
	17-18	6	77	148

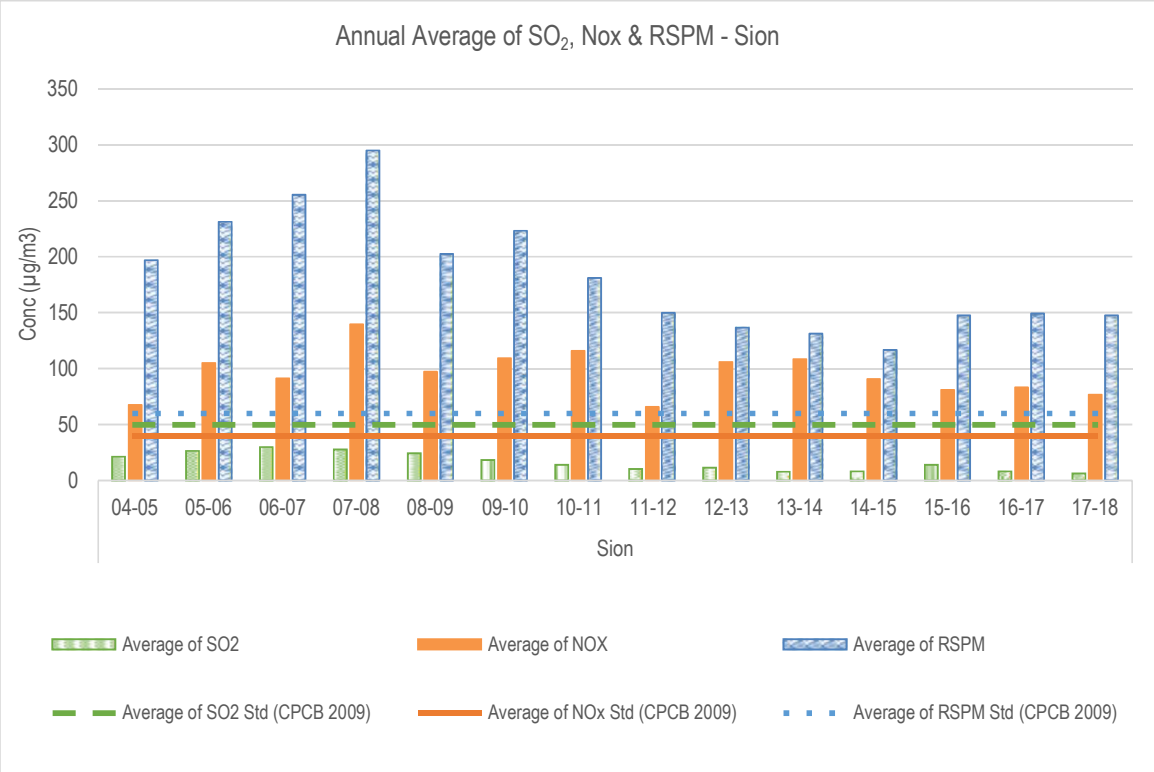


Figure No. 4: Annual average trend of SO_2, NOx, and RSPM at Sion

Table No. 5: Percentage exceedance of pollutants at Mumbai RO

Station Name	Total Observations	Number of Observations (Exceedence)			% Exceedence		
		So_2	Nox	RSPM	So_2	Nox	RSPM
Bandra	347	0	53	151	0	15	44
Sion	226	0	88	165	0	39	73

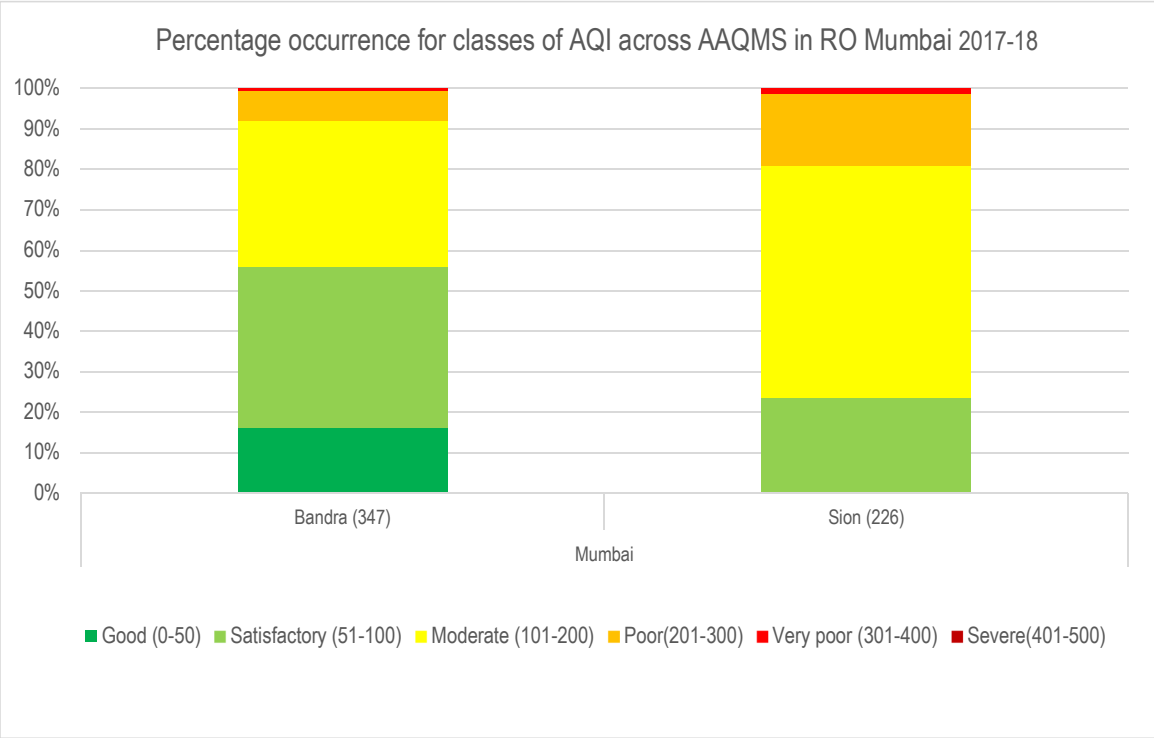


Figure No. 5 Percentage occurrence for classes of AQI across AAQMS at Mumbai RO

Action Plan for Mumbai Municipal Corporation prepared as per CPCB Standard Template

Sr. No	Sub No	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(ies)	Remarks
1. Source Group: Vehicle Emission									
1	(i)	Regular Checking of vehicular emission and issue of pollution under control (PUC) certificate.	Medium	Feasible	488 cr.	Short Term	Sep-19	RTO, Traffic Police	Refer Annexure B (1.4) • **PUC checking** in every 6 months for BEST buses. • RTO approved agency appointed for issuing the PUC certificate. Certificate displayed inside every bus. • Random PUC check planned by RTO. • 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.	Medium	Feasible		Short Term	Sep-19	MCGM	• **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.	Medium	Feasible	50 Lakhs	Short Term	Sep-19	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	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(ies)	Remarks
	(iv)	Public awareness campaigns, workshops, VMS boards, Auto Expo for promoting Eco friendly Mobility	Medium	Feasible	110 Cr	Long Term	Continuous & Regular Activity	RTO, Traffic Police, MPCB	Refer Annexure B (1.5) • MPC Board has organized "**Eco friendly Mobility for Clean Air**" workshop in collaboration with NEERI, Mumbai first where innovative solutions like commuter's choice program, retro fitment, introduction of Metro,etc.were discussed. With stakeholders including other government agencies, NGOs, expert from Industries, research institutes, • Public Awareness message to observe lane discipline and air pollution control have been displayed on **36 VMS boards** installed across the City. Similarly, various awareness programs are organized time to time especially during Road Safety Week.
	(v)	Providing pay & park, PPL (Public Private Lot), multilayer parking and amenity sites for parking of vehicles to avoid parking atNon designated areas	High	Feasible	As per DP reservation. No capital cost involved from MCGM.	Mid Term	Jun-22	Ch. E.(Roads & Traffic)_MCGM, MMRDA, RTO, Traffic Police,	Refer Annexure B (1.6-1.8)• **77 locations** across Mumbai identified for Pay and Park. It may provide parking for around 15000 vehicles. Details of the identified locations, vehicle type, operating agecy provided in the **Annexure B 1.8**.• Also, **26 PPL** (Public Private lot) and **29 amenity parking** sites are identified. Hon'ble M.C. has approved the proposal for initiation of Mumbai Parking Authority by appointing Parking Commissioner ,Mumbai along with support staff to enable the Parking Commissioner to lead the process of formation & operationalization of Mumbai Parking Authority. The work is commenced under the guidance of Shri 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 voilation regarding illegal parking.

Sr. No	Sub No	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(ies)	Remarks
	(vi)	Initiate steps for retrofitting of particulate filters in Diesel vehicles, when BS-VI fuels areavailable.	High	Under Evaluation	NA	Mid Term	Jun-22	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	Medium	Feasible	NA	Mid Term	Jun-22	Ministry of Petroleum& Natural Gas & Oil marketing Companies	•Government of India has formed **Anti-Adulteration Cell** headed by Director General. Having four deputy directors for four Zones of India. The authority is responsible for Prevention of adulteration & other malpractices in the sale. In a Auto fuel Policy report, the problem of Fuel Adulteration is taken into consideration. Directions are given to oil companies.

Sr. No	Sub No	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(ies)	Remarks
	viii	Widening of road and improvement of Infrastructure for decongestion of Roads.	High	Feasible	Total Cost= 905.8 Cr1.City- No. of roads= 177, Cost 385.62Cr 2. Eastern Suburb(E.S)- No. of roard=125, Cost 285.22Cr 3. Western Suburb (W.S)- No. of roads=137, Cost 234.96Cr	Mid Term	Jun-22	Ch. E. (DP)_MCGM, Assistant Commissioner (All wards)_MCGM	Refer Annexure B (1.1) .•Widening and Improvement of existing road of 2.8 km.from Oberoi Mall to Film City and 2.5 km. of 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 integrated development.The construction of bridges, subways, FOB's, ROB's, tunnels etc., are not shown separately in Draft DP.Any such road structures would be constructed wherever required by MCGM as per feasibility andtechnical requirement, and will automatically form part of DP.Apart from these roads shown in the Draft DP 2034, the MMC Act 1888 has robust provisions in regard to roads, the details of these roads are with Dy.Ch.E.(traffic).The above proposals are for the horizon period 2014-2034. The implementation of these proposals isto be carried out by Roads department after taking over the land from the landowners after paymentof compensation to the landowners.

Sr. No	Sub No	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(ies)	Remarks
	(ix)	Construction of expressways/bypass road to avoid congestion : a. Coastal Roadb. Gurgaon-Mulund link road	High	Feasible	12500 Cr	Mid Term	Jun-22	MMRDA, MSRDC	•The Coastal Road is an under construction 8-lane, 29.2-km long freeway that would to run along Mumbai's western coastline connecting Marine Lines in the south to Kandivali in the north. The Coastal Road is projected to be used by 130,000 vehicles daily and is expected to reduce travel time between South Mumbai and the Western Suburbs from 2 hours to 40 minutes.• Goregaon-Mulund link road project work is in process
	(x)	Promoting Battery operated vehicles by addition of new buses for public transport and providing tax exemption for encouraging use of E-buses.	High	Feasible	a) each CNG bus costs Rs. 55 lakhs b) each pure electric bus costs Rs. 1.7 crores c) each AC Hybrid Electric bus costs Rs. 2.3 crores	Mid Term	Jun-22	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.

Sr. No	Sub No	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(ies)	Remarks
	(xi)	Installation of weigh in Motion bridges at the Mumbai-Gujrat State border to prevent overloading of vehicles.	Low	Feasible	NA	Short Term	Jun-20	RTO, Transport Ministry	• There are 24 Check post with weigh bridges in Maharashtra. The eighteen (18) number are modernized & automated. The work of modernization of three is in process. •Out of 24 only one is in Mumbai at the border of Mumbai & Gujarat, located at Achad. It is automated & fully modernized.
	xii	Good traffic management with Synchronize Traffic movements by introducing Intelligent Traffic Management systems and installation of new signals.	High	Feasible	50 cr	Mid Term	Jun-22	Ch. E. (Roads and Traffic)_MCGM, Traffic Police, RTO	Refer Annexure B (1.1.3) •Installation of new traffic signals (48 Nos.) •Appointed consultant for preparation of Compressive Mobility plan. • Currently, Mumbai Traffic control branch using 256 ATC signals and 371 non ATS for synchronized traffic movement. •Installation of ATC (Area Traffic Control System) compatible signals planned (247 Nos.) • Proposal for Intelligent Management System (IMS) Implementations for the Mumbai city is sanctioned by GoM and procedure of selection of vendors for IMS installation is in process. •Addition of direction boards (70 Nos), Mandatory boards (11300 Nos) Mobility of vehicles increased by 20%. Thus resulting in reduced emission from vehicles.

Sr. No	Sub No	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(ies)	Remarks
	xiii	Installation of Remote Sensor based PUC systems	Low	Feasible	NA	Short Term	Jan-20	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.	Medium	Feasible	NA	Short Term	Implemented	Petroleum Industry, Transport Ministry	City is supplied with BS IV stage diesel which has low sulphur content.

Sr. No	Sub No	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(ies)	Remarks
	xv	Introduction of CNG, Hybrid Electric buses for public transport.Providing Metro and Monorail transport services.	High	Feasible	a) each CNG bus costs Rs. 55 lakhsb) each pure electric bus costs Rs. 1.7 croresc) each AC Hybrid Electric bus costs Rs. 2.3 croresd) Metro project 1 Lakh Cr.E) Monorail 3000 cr	Long Term	Replacement of existing buses with electric buses is a long term plan i.e. 12-15 years.	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 CNGa) 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 periodsg.) **Metro system** is designed to reduce traffic congestion in the city. Project is built in three phases over a 15-year period, with overall completion expected in 2025h.)**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.

Sr. No	Sub No	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(ies)	Remarks
	xvi	Implementing scrapping policy for old vehicles.	Medium	Feasible	NA	Mid Term	Jun-21	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.	Medium	Feasible	605 Cr	Mid Term	Jun-21	RTO, Transport Ministry	•Development of 600 TPD Waste to Energy project at Deonar, Mumbai on DBO basis is proposed. • Consultant is appointed for preparation of DPR and tender documents of Waste to Energy project. • 2.5 MW Solar Energy Installation commissioned by H.E.department in Bhandup Complex of M.C.G.M. & another 2.5mw is in process. Solar energy project executed by Building Construction department of M.C.G.M.is as follow 1) Cochin Street 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.

Sr. No	Sub No	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(ies)	Remarks
	xviii	Implementation of BS – VI norms for procurements of new buses	Medium	Feasible	25 Lakhs/ bus	Mid Term	Jun-21	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 commercial vehicles	Low	Feasible	46 Cr.	Long Term	Continuous & Regular Activity	RTO, Transport Ministry	•BEST having 27 Nos. of Depos and Central Workshops where high tech maintenance infra-structure is available.

	xx	Restrict commercial vehicles entering city by having ring roads.	Medium	Feasible	NA	Mid Term	Jun-22	Ch. E. (Roads& Traffic)_MCGM, MMRDA, MSRDC, Traffic Police	•MMRDA is taking efforts to make uninterrupted entry/exits to BKC. MMRDA has taken up Santacruz- Chembur Link Road Phase-II, Flyover from BKC-SCLR, BKC connector from EEH and Kalanagar flyover which will result into signal free entry/exit to BKC at all locations and will reduce the delay/queue length significantly which will further improve the air quality within BKC. •In order to overcome the congested Traffic flow within BKC during peak hours which is due to lot of side frictions and pedestrian movements thus reducing effective lane width; MMRDA is also implementing one-way Traffic system in G- Block BKC. •Mumbai Traffic police issued an order banning heavy vehicle from entering the city from 8am to 11 am and 5 pm to 9 pm. •In South Mumbai heavy vehicles are banned between 7am to 12 midnight. Heavy vehicles are also banned on eastern freeway.

Sr. No	Sub No	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(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.	High	Feasible	25 Cr	Mid	Jun-22	Superintendent of Garden_MCGM, Assistant Commissioner (Wards)_MCGM, Ch. E. (Roads and Traffic)_MCGM, MMRDA, MSRDC Ch. E. (DP)_MCGM	Refer Annexure B (2.3) •Garden Dept. has achieved the tree plantation target given by government time to time. In year 2016, 7800 trees have been planted in city and about 5000 sapling distributed free of cost. over 1000 garden, R.G. P.G. plots have been developed. •12 no. of spaces below flyover have been cleared of encroachments and developed by providing greenery (6cr) •23 number of spaces below flyover have been identified for beautification at the cost of ₹19 crore. This has resulted in providing additional area of around 35000 sq. Mtrs green space to Mumbai City •To mitigate the flood vulnerability of the city, the RDDP 2034, has demarcated buffers along rivers, creeks and nallas, on either side of the water courses, which are to be maintained as development free zones. This buffer zone will help reduce flooding risks by permitting water bodies to flood their banks without affecting people. These buffers, wherever possible, will be city wide open spaces that would be walkable along with their use for environment. •M.P.C.Board, IIT (B) and NEERI have come together to develop and install **WAYU (Wind Augmentation and Purifying Units)** to improve Ambient Air Quality at Urban traffic intersections. Initially, these (25 no) systems have been installed at 5 locations in Mumbai.

Sr. No	Sub No	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(ies)	Remarks
	II	Maintain Pothole Free Roads for Free Flow Traffic by implementing Road Maintenance management system (RMMS)	High	Feasible	budgetory provision shall be done by MCGM	Long Term	Continuous & Regular Activity	Ch. E. (Roads and Traffic)_MCGM,MMRDA, MSRDC, Assistant Commissioner(Wards)_MCGM	Refer Annexure B (2.1) •To ensure that the roads are regularly maintained and to achieve longevity of the roads with lesser expenditure, Road Maintenance Management System (RMMS) is implemented in MCGM where every road is numbered and a small group of these roads are formed. •Responsibility of each road is put under a Sub-Engineer designated as Road Engineer (RE). RE prepares estimates and look after the maintenance of each road under his jurisdiction. • Priority list of the roads to be repaired is prepared.1.City Division- No. of roads= 177, Cost 385.62Cr2. Eastern Suburb Division (E.S)- No. of 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).	NA	NA	NA	Mid Term	Jun-22	Ch. E. (Roads and Traffic)_MCGM,MMRDA, MSRDC, Assistant Commissioner (Wards)_MCGM, Superintendent 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.

Sr. No	Sub No	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(ies)	Remarks
	IV	Greening of open areas, garden, community places, schools and housing societies	High	Feasible	393 Cr	Mid	Jun-22	Ch. E. (DP)_MCGM, Assistant Commissioner (Wards)_MCGM, Ch. E. (Roads and Traffic)_MCGM, MMRDA, MSRDC	Refer Annexure B (2, 2.3) •An area of 300 acres at Cuff Parade is being developed as Green Park for which Tata 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
	V	Blacktopping of metaled Roads including pavement of Road shoulders	MediumZero potholes free roads for mumbai citizens.	Feasible	1520 cr	Long Term	Continuous & Regular Activity	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.

Sr. No	Sub No	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(ies)	Remarks
	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	Medium	Feasible	100 cr	Long Term	Continuous	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.

Sr. No	Sub No	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(ies)	Remarks
	VII	Road design improvement by using C & D waste, fly ash in road construction.	High	Feasible	Work will be carried under the budget head of M.C.G.M.	Mid Term	Jun-22	Ch. E. (Roads and Traffic)_MCGM, 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.	Medium	Feasible	Not Required	Long Term	Continuous & Regular activity	Ch. E. (SWM)_MCGM	Refer Annexure B (3) •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	Medium	Feasible	Not Required	Mid Term	Jun-22	Ch. E. (SWM)_MCGM	Refer Annexure B (3) •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

Sr. No	Sub No	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(ies)	Remarks
		Waste, dry waste collection 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.
	(iii)	Proper collection of Horticulture waste and its disposal following composting –cum –gardening approach	HighGreen waste generated in Municipal Gardens and Markets will be composted within premises. Compost will be used in garden.	Feasible	Self finance through annual budget provision.	Mid Term	Jun-22	Ch. E. (SWM)_MCGM	Refer Annexure B (3) •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	LowReduce SPM and improve air quality	Not required	Not Required	Long Term	Continuous and Regular activity	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	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(ies)	Remarks
4. Source Group: Industry									
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.	High	Feasible	NA	Long Term	Continuous and Regular activity	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.	Medium	Feasible	NA	Short Term	Dec-19	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 with 0.15 % of sulphur and 5% ash contain.

Sr. No	Sub No	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(ies)	Remarks
	iii	Improved Combustion technology	Medium	Feasible	NA	Short Term	Dec-19	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.	High	Feasible	NA	Mid Term	Jun-22	Industry (Hotels), MPCB	Most of the Hotel industry change fuel pattern from HSD to Natural Gas.
	v	Promoting cleaner industries	Medium	Feasible	NA	Mid Term	Jun-22	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.	High	Feasible	NA	Short Term	Dec-19	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.

Sr. No	Sub No	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(ies)	Remarks
	vii	RMC indusries directed for Fugitive emission control	High	Feasible	NA	Short Term	Dec-19	Industry (Petroleum Refinery, RMC), MPCB	MPCB had issued gazette notification regarding guidelines for RMC
	viii	Industries allowed with stringent Environmental norms only.	High	Feasible	NA	Short Term	Dec-19	MCGM,MIDC,MMRDA & Industries Dept.	Industries allowed with stringent Environmental norms only.
	viii	Installation/ up gradation of air pollution control systems in Thermal and Petrochemical industries.	High	Feasible	NA	Short Term	Dec-19	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.

Sr. No	Sub No	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(ies)	Remarks
	ix	Use of high grade coal made compulsory in Tata thermal power plant.	Medium	Feasible	NA	Short Term	Dec-19	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.
	x	Regular audit of stack emissionsfor QA/QC	High	Feasible	NA	Long Term	Continuous & Regular Activity	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	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(ies)	Remarks
5. Source Group: Construction and Demolition Activities									
5	(i)	Enforcement of construction & demolition rules. Setting up of C&D Waste processing facility.	High	Feasible	P-P-P model for setting up processing plant	Mid Term	Jun-22	Ch. E. (SWM)_MCGM	Refer Annexure B III •MCGM is already implementing C&D(M&H) Rules,2016 in city. Also C& D Rules 2016 is being complied w.r.t. provision of separate facilty for collection and storage, payment of charges. •A processing facility is to be set up. Tenders are invited. • C & D transport NOC is issued by Auto-DCR (web based system developed under Ease of Doing Business scheme). As regards to the Dust mitigation, the condition is incorporated in I. O. D. conditions, while approving the building construction permissions. As per the condition, the 'Debris Management Plan' shall not be get approval from Zonal Executive Engineer (SWM) if the conditions therein is not complied with.
	ii)	Control measures for fugitive emissions from material handling, conveying and screening operations through water sprinkling, curtains, barriers and suppression units	High	Feasible	NA	Mid Term	Jun-22	Ch. E. (SWM)_MCGM	Refer Annexure B III•MCGM is already implementing C&D(M&H) Rules,2016 in city, which insists on control measures at site, before work commences. The approved Debris Management Plan includes such control measures.•The construction permit is granted only after teh builder/developer obtains valid C & D waste management permission from Solid Waste Management department. The whole process is ONLINE, on 'Auto-DCR' portal.•Wheel washing facility has been provided for cleaning of vehicle tyres before entry and exit at various construction work sites except at few sites•Regular washing of carriageway, footpath within the construction sites and vicinity of the work area is being carried through the water sprinkling. •All soil and muck transportation trucks/dumpers covered by tarpaulin sheet during transportation.

Sr. No	Sub No	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(ies)	Remarks
	iii	Better construction practices with PM reduction for MMRCL construction.	High	Feasible	6.5 Cr	Long Term	Continuous & Regular Activity	Ch. E. (DP)_MCGM, Ch.E(Roads and Traffic)_MCGM, 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	Reduce SPM and improve air quality	Precautions to be taken while trasnporting C&Dwaste from site.	Developer/Builder's own funds	Being implemented. Activities monitored by ward staff	Being implemented	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.

Sr. No	Sub No	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(ies)	Remarks
6. Source Group: Domestic fuel burning									
6	i	Shift to LPG from solid fuel & kerosene for domestic applications	Low	Feasible	NA	Mid Term	Jun-22	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
7. Source Group: DG Sets									
7	(i)	Monitoring of DG sets and action against violations	Low	Feasible	NA	Short Term	Dec-19	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	Low BEST Undertaking is providiing uninterrupted power supply to the consumers of island city of Mumbai. Undertaking had maintained reliability index of 99% and above for last many years.	Feasible	NA	Short Term	Dec-19	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.

Sr. No	Sub No	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(ies)	Remarks
8. Source Group: Bakeries/crematoria									
8	i	Use of LPG in Hotels and “dhabas”	Low	Feasible	NA	Short Term	Dec-19	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	Low	Feasible	NA	Short Term	Dec-19	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.	Low	FeasibleNew models of PNG based Furnaces are in development phase.	For conversion of Electric Furnace in to PNG Furnace costs approximately 60 Lacs per furnace and Installation of New PNG Furnace costs approximately 70 Lacs per furnace. The Budget provision is made by MCGM Health department.	Mid term	Jun-22	Chief Engineer (Mechanical & Electrical)_ MCGM	Present Scenario:1) Total Number of Electric furnaces with Air Pollution control Mechanism = 23 Nos.;2) Number of Electric furnaces proposed for PNG conversion = 8 Nos. ; 3) New PNG Furnaces Proposed = 12 Nos.;4) Total No. Of Wood Pyres= 196 Nos.;5) Total Pyres with Air Pollution control mechanism installed = 167 Nos.Phase - I = March 2018 (08 Electric Furnaces to be converted in to PNG Furnace and 06 New PNG furnaces to be Installed at three New Locations)Phase - II = March 2019 (05 Electric Furnaces to be converted in to PNG Furnace and 06 New PNG furnaces to be Installed at three New Locations)Phase - III = March 2020 (10 Electric Furnaces to be converted in to PNG

Sr. No	Sub No	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(ies)	Remarks
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	High	Feasible	Approx. 1.2 cr/ station	Continuous	Continuous	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.	High	Feasible	75 Lakhs	Mid term	Dec-20	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)	Moderate	Feasible	NA	Long Term	Continuous & Regular Activity	Petroleum Industry, MPCB	enclosed ANNEXURE-A

Sr. No	Sub No	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(ies)	Remarks
	4	Source Apportionment (SA) and Emission Inventory (EI) MPCB awarded work order to IIT(B) and NEERI.	High	Feasible	75 Lakhs	Mid term	Dec-20	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 dut to proposed metro rail.
	5	Public Awarness and Complaint Redressal Mechanism developed by respective stakeholders.	High	Feasible	NA	Long Term	Continuous & Regular Activity	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).

Sr. No	Sub No	Actions	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period	Time target for implementation	Responsible agency(ies)	Remarks
	6	Citizen Access toTransportation(CAT), School Zone Traffic Improvment Programmee (szTIP), Quite KEM(Q KEM), Monitoring of air pollution byplanning authority in their jurisdiction	High	Feasible	NA	Special initiative of MCGM	Continuous & Regular Activity	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.

ANNEXURE - A

Action Points – Action plan to address Large Industries (e.g. Oil Refineries and Fertilizer units)

Sr. No.	Air polluting actions	Proposed Action
1	Storage of high volatiles is required to be done in tanks with floating roof only so that potential of emissions due to displacement/breathing can be prevented. This aspect is required to be streamlined as same compound is reportedly stored in fixed as well as floating roof tanks also.	a. Industry should Store and handle all A class petroleum products & Solvents in the tanks having floating roof. b. Industry should devise time bound plan, *to switch over* the existing A class solvent storage *from fixed roof to floating roof* & share the same with MPCB within next 15 days. c. Additionally, *Styrene, Xylene* (Class-B) should be stored and handled similar to class-A products considering their concentrations in the atmosphere. d. All Floating roof tanks should be provided with double seals with suitable preventive maintenance procedure in place for seals to maintain the sealing efficiency.
2	Major tanks/storage cleaning operations should be taken-up with due care to reduce the escape of VOCs and residues removed should be handled and disposed in scientific manner without causing exposure to the atmosphere in case of high volatiles.	a. Industry should evolve an internal monitoring system for cleaning of major tanks (Above 5 KL Capacity) of Class-A & others (Styrene and Xylene), which may include supervision of cleaning activity by representative of Environment dept. of respective industry. b. Industry may also evolve a system of work-zone VOC monitoring pre and post cleaning of tank. c. All records pertaining to cleaning shall be Preserved and submitted to MPCB on half yearly basis.
3	All venting locations should be identified, inventorized and provided with trap receiver and condensers.	a. Industry shall prepare plant wise inventory of vents and ensure that it is routed to vapour recovery system followed by flare system, wherever applicable. b. Suitable size Condenser, receiver may be provided for recoveries of high volatiles, wherever required.
4	Control of emissions from open-ended lines like pipes or hoses open to the atmosphere or surrounding environment. Sampling connections are used to obtain samples from storage tanks. Leaks from sampling connections usually occur at the outlet of the sampling valve. Reduction in tapping line and suitable control measures should be taken to minimize fugitive losses.	a. Industry should adopt “Recognized and Generally Accepted Good Engineering Practices" (RAGAGEP) based on established codes, standards, published technical reports or recommended practices (RP) or similar documents for effective control of fugitive emissions from sampling.
5	Tanker filling operations are required to be switched from top filling to bottom filling in a phased-wise manner in future to reduce displacement losses. All tanker filling operations should have manhole cover with provision of suction line for fumes routed to recovery system, gasket collar with pipes & dip-gauge to prevent escape of fumes while filling and measuring levels.	a. Industry should devise time bound plan, *to switch over* the existing tanker filling from top filling to bottom filling & share the same with MPCB within next 15 days. b. Industry should evaluate the existing facility or Design new facility for the suction of fumes/ solvents vapours during tanker filling operation from technically competent agency for efficient handling of fugitive emissions.

6	The LDAR programme should be integral part of operation and focus and frequency should be more intensified at the places where chemicals with high volatility and toxicity is stored and handled.	a. Refineries should revisit their existing LDAR programme to include the following, if not covered : i. Internal leak definition should as low as feasible to detect with the available technology of detection sensors { Many National Emission Standards for Hazardous Air Pollutants (NESHAP)} use a 500-ppm or 1,000-ppm leak definition (Ref. EPA-305-D-07-001 October 2007). ii. LDAR monitoring equipment to be calibrated and records to be maintained. iii. Risk Based Approach (Likely hood of leakages & consequences) to be taken into consideration while deciding the frequency of monitoring of components / plants. iv. Personnel conducting LDAR should be trained on USEPA method 21. v. LDAR data to be archived.
7	Hydrocarbon audit outcome should be shared by refineries with MPCB also on regular basis. Past trend data should also be made available since beginning of hydrocarbon audit by refineries.	a. Industry should share Hydrocarbon loss data within a month time audit completion along-with past trend data with clearly highlighting the increase or decrease in the Hydrocarbon emissions.
8	Sources with low potential emission rate should be equipped with adsorption and/or absorption system. It is equally important that spent media of adsorption/absorption should be replaced, stored and disposed/regenerated scientifically so that VOCs adsorbed/absorbed do not escape in environment while handling spent.	a. Industry should identify the sources of low potential emission rate and plan the suitable adsorption / absorption system for vapour treatment. b. Regeneration frequency of Adsorption / absorption system / Activated carbon bed should be clearly defined as per the trend data of previous cycles and should be documented. c. Appropriate inline sensor may be explored to gauge the efficiency of treatment system. d. In line monitoring may be explored to indicate the breakeven point of Activated carbon bed (Vapour recovery system), this will minimize the losses. a. Spent media of adsorption/absorption should be replaced, stored and disposed/regenerated scientifically & procedure should be well recorded.
9	Collection of fumes from strippers and recovery through condensers should be arranged inside battery limit so that emissions from ETP are minimized to great extent	a. Industry should arrange adequate facility for collection of vapours / fumes from Effluent streams which may consist upon fume suction / extraction system, condenser etc. b. Facility designe by technically competent agency.
11	Required training/awareness should be imparted to all workers, operators, drivers about the risk/hazard associated with spills and leaks of various chemicals to prevent accidental leaks/spills/fugitive emissions. Required to arrange awareness of tankers drivers on their own as well as through their clients regarding importance of safety, risk and importance of keeping even empty tankers closed while kept in parking.	a. Industry should include a special training module regarding “fugitive emissions and its health impacts on individual and surrounding communities” for its staff, operating personnel & Drivers to spread awareness about risk/hazard associated with spills and leaks of various chemicals. b. Industry may devise an internal system to increase the vigilance on tankers stationed / parked near the factory premise to ensure that even empty tankers closed properly.

Annexure B

Detailed Report on Action Plan:

1. Direction for Vehicle Emission Control:

Action Point:

1.1 Prepare plan for widening of road and improvement of infrastructure for de congestion of roads.

i. In Mumbai the total length of Roads is around 1950 Km. Out of which 506.46 Km length is in City division, 927.64 Km length is in Western Suburbs division and 507.06 Km length is in Eastern Suburbs. Most of the major Roads are of North-South direction viz. Dr. Babasaheb Ambedkar Road, Dr. Ahmed Kidwai Road, Eastern Free way, Western Express Highway, Swami Vivekanand Road, Link Road, Eastern Express Highway, Lal Bahaddur Shastri Marg etc. These Roads carries major traffic of Mumbai. All these major Roads have been already widened to full width and further widening is not possible as of now. Therefore, whenever revised development plan get published, internal Roads will be widened. In addition, MCGM has formulated the policy for the structures affected by set back adopting pragmatic approach which will facilitate to remove the bottlenecks with greater momentum and in systematic manner by way of incorporating the methodology, procedure aspect, complaint redressal etc. However, certain cases go into litigation and require considerable time to resolve.

In accordance with the recommendations of the Standing Technical Advisory Committee (STAC) for roads, major changes have been made in the approach to road constructions, improvement and maintenance. With increase in traffic intensity and loading, related norms have been upgraded and project approach have been adopted as per which road work also includes provision/improvement of footpath, provision/augmentation of municipal utilities such as water-mains, sewer lines, Strom Water Drains etc.

i. Considering the increasing volume of traffic & to avoid frequent maintenance of Roads, MCGM has continued cement concretization of major and adjoining roads. Since year 1989, concretization of approximately 651 Km of Road is completed and the work is still continued. In city area approximately 4.41

Km, in Eastern Suburbs approximately 10.08 km and in Western Suburb approximately 35.61 km of road were concretized in 2015-16.

ii. Regarding Asphalt Roads, in city section, around 28.17 Km of Asphalt Roads were improved/widened in the year 2015-16 which includes important roads such as Mahapalika Marg, Pandita Ramabai Marg, Pedder road. Similarly, in Eastern Suburbs section, around 55.03 Km of Asphalt Roads were improved/widened in the year 2015-16 which includes improvement of Sardar Pratap Singh road (S ward), JVLR road (S ward), Pravin Vichare marg (N ward), Road no.16, Shivaji Nagar (M/East), North Bombay School road (N Ward), Sindhi Society road (M/West) and in western suburbs section, around 47 Km of Asphalt Roads were improved/widened in the year 2015-16 which includes New English School Road (H/East ward), 2nd Hashnabad road (Khar west), MIDC 'A' cross road, Sant Muktabai Road (K/East), Sunder Nagar Road (P/South) Valnai internal road, Nadiadwala colony road no. (P/North) road. The work of improvement/ widening of Road is an outgoing activity of Roads department.

iv. A zonal bottleneck removal cell has been formed to carry out effective implementation of guidelines in connection with removal of bottlenecks in furtherance of goal of MCGM, to widen the corridors, major and arterial roads, link roads to full prescribed width/DP road width wherever balanced.

v. MCGM has decided case by case basis of removal of bottle neck by allowing horizontal expansion and vertical extension beyond regular line in categories such as Authorized structures, Tolerated structures, residential existing prior to 17.04.1964, commercial existing prior to 1.4.1962, Structures protected under state government policy existing prior to 1.1.2000 or the dates as per the notification/gazette issued by Government Of Maharashtra (GOM) from time to time under the Maharashtra slum Areas (Improvement, Clearance and Rehabilitation) Act 1971 as amended up to date.

vi. MCGM is also exploring certain options for removal of bottlenecks/missing links as success of this policy depends on availability of commercial/residential Project Affected People (PAPs) in the same locality or on North word side as per the policy of MCGM prevailing at particular point of time to rehabilitate the project affected occupants/structures.

Action Point:

12 Prepare plan for construction of express-ways/ bypasses to avoid congestion due to non-destined vehicles:

The constructions of express-ways/ bypasses are under the purview of MMRDA (Maharashtra Metropolitan Region and Development Authority) and MSRDC (Maharashtra State Road Development Corporation) and not under the control of MCGM.

Fig. Alignment of Mumbai Coastal Road Project

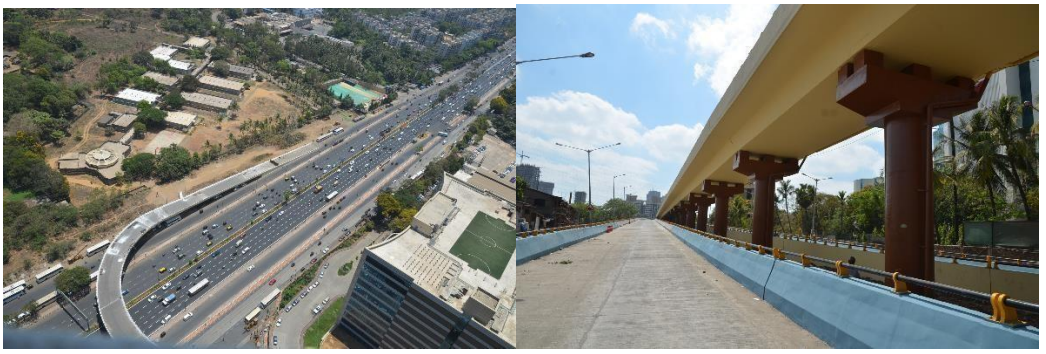


Fig. Development of Bypasses, fly overs

Action Point:

13 Synchronize traffic movement/introduce intelligent traffic systems for lane driving.

Traffic and Transportation Issues, proposed strategies and traffic & transportation measures:

Issues	Strategies	Proposed traffic & transportation measures
Congested intersections and Uncontrolled intersections	• Increasing the capacity of intersections	a) Intersection improvements b) Installation of traffic signals c) Installation of ATC compatible signals d) Grade separation facilities (Flyovers/ elevated roads)
Pedestrian footpaths and crossing, absence of cycle tracks and facilities	• NMT First Policy (Ref. Annexure 9-2)	a) Footpath improvements b) Development of adequate footpath facilities c) Mid-block at-grade pedestriancrossings (uncontrolled/ controlled) d) FOBs/ Subways/ Skywalks e) Provision of parking facilities for cycles f) Development of safe cycle tracks in select areas and promotion of "Cycle hire schemes"
On-street parking	• Parking policy (Ref. Annexure 9-3)	a) Development of off-street parking facilities (PPLs) b) Implementation of parking policy
Congested station areas	• Station Area Traffic Improvement Scheme (SATIS) (Ref. Annexure 9-4 on preliminary conceptual proposals)	a) Enhancing commuter movement facilities within the station areas b) Grade separated pedestrian facilities c) Removal of encroachments d) Development of footpath facilities e) Restriction of hawking activity in thestation areas f) Provision of parking facilities for cycles g) Provision of Bus bays near the landing pointsof FOBs/Skywalks
Congested roads	• Capacity enhancements	a) Strengthening and widening of roads h) Development of missing links/ new links i) Congestion pricing

Growing private vehicle use (Two wheeler and car)	• Traffic/ travel demand management measures	a) Regulate parking with higher parking charges b) Even/ Odd plan/ rule for four wheeler passenger vehicles c) Congestion pricing d) Impose restriction on new private vehicle (Two wheeler and car) registrations
Limited railway crossings	• Enhancing East-West connectivity	a) RoBs/ RUBs
Decreasing ridership on bus system	• Promotion of public transport	a) Development of Exclusive Bus Lanes (EBL)/ Bus Rapid Transit System (BRTS) b) Provision of Fare Integration with other public transport modes c) Bus route information at all major busstops, suburban and metro stations
Overcrowding on suburban system	• Promotion of public transport	a) Operation of 12/ 15 coach rakes b) Operation of 12 coach rakes on Harbour line c) Increasing frequency d) Doubling/ Quadrupling of railway lines e) Extension of harbor line from Goregaonto Borivali f) Development of premium corridors (Andheri and Virar, Kurla- Thane-Bhiwandi, CST Panvel Fast corridor)
Decreasing public transport share	• Promotion of public transport	a) Suburban system capacity enhancements b) Development of metro corridors c) Development of EBL/ BRTS d) Feeder services to Mass transit corridors
Environmental pollution	•	a) Promote car pooling b) Regulate parking with higher parking charges c) Even/ Odd plan/ rule for four wheeler passenger vehicles d) Congestion pricing e) Impose restriction on new private vehicle (Two wheeler and car) registrations f) Vehicle technologies with emission norms advancement
Road accidents	• Road safety initiatives	a) Mass media campaigns with a focus onattitude towards driving b) Schools to give kids Road Safety lessons c) Increasing police enforcement of laws toreduce drinking and driving d) Increasing police enforcement of laws to use of seat- belts e) Non usage of Mobiles by pedestrianswhile crossing at-grade f) ITS application in enforcement of traffic laws g) Comfortable Side Walks and Grade separated crossing facilities

		h) Traffic Calming Measures: Speed Table/ Raised crossings i) Safe Bicycle Tracks – School/ College areas
Independent fares – Suburban train, Bus, Metro, Monorail	• Integrated fare policy	

i. MCGM has appointed Consultant M/s. Lea and Associates South Asia Pvt. Ltd. to totally improve the traffic control at different places in Mumbai city, in future and for preparation of "Comprehensive Mobility Plan" (CPM). The said consultant after studying the various aspects of traffic in detail, has submitted final plan to MCGM so as to overcome traffic congestion in Mumbai. The main features of the work carried out by consultant are as follows.

a) To survey the number of citizens travelling through various vehicles size. Best bus, Railway, Car, Taxi, Auto Rickshaw, Motor Cycle, Cycle, Monorail, Metro etc. in Mumbai.

b) To gather and study the available information from various organizations such as MCGM, MMRDA, PWD, Railways, BEST, besides that to collect the new necessary information and study the same.

c) To collect the data regarding traffic in Mumbai & to digitized the same (simulation study).

d) To collect snapshots at various locations in Mumbai depiction the exact status of traffic situation.

e) Survey regarding Parking lots, direction boards, junctions and to study the incomplete roads.

f) To the traffic signal system at various places in Mumbai and to examine the requirement at new places.

In Comprehensive Mobility Plan (CMP) various options such as construction of new roads, road widening of existing roads, traffic management in the premises of Railway Station, Pedestrian bridge, Subways, Road over bridge, ATC signal system are suggested. The various short term, mediums and long

term options which are suggested in the said traffic and transportation infrastructure facilities plan shall be studied and policy decision will be taken.

Goals of the Study: The objectives set for "Comprehensive Mobility Plan for Greater Mumbai" are as follows:

a. Development of transportation network and comprehensive mobility plan for all modes including pedestrians, cyclists and IPT to achieve convenient and cost effective accessibility to places of employment and education; and
b. Optimal utilization of funds and human resources.

Objectives/ Scope of Work: The objectives/ scope of work for the study to achieve the said goals is as follows:

a. Study of existing and proposed land use pattern and transport network pattern;
b. Identify travel pattern of residents of the local planning area of Municipal Corporation of Greater Mumbai (MCGM);
c. Develop land use transport model to evolve a long-term strategy for urban structure and road network pattern;
d. Select, develop and operationalise an Urban Transport Planning (UTP) model using state of the art modeling techniques and software package, appropriate to the conditions and planning needs of the study area;
e. Assess the relevance of the existing strategy, identify the consequences of pursuing alternative transportation strategies and recommend/ update a short term, medium term and long term comprehensive transportation strategy for the study area up to 2034 based on cost benefit analysis of alternatives;
f. Strategies for transport policy and parking policy as an integrated part of urban planning;
g. Identify for all modes a phased program of appropriate and affordable investments and policy proposals and also integration of various modes of mass transit as well as public transport with Intermediate Public Transport (IPT);

h. Assess the existing infrastructure requirements and forecast short term and long term requirements;

i. Recommend institutional mechanism for inter-agency co-ordination;

j. Help strengthen transport planning skills and transfer all data, planning model/ tools and knowledge obtained through the study to agencies such as MCGM, MMRDA, BEST, Railway, Metro, Monorail, Traffic Police, etc.; and

k. Operationalise LUP Model, Transport Model and Transport Circulation model as decision tools for use by city planners, traffic police and public transport company.

Action plan proposed for implementation of CMP recommendation:

Infrastructure	**Short term measures**	**Medium term measures**	**Long term measures**	**Action taken till date**	**Concerned Dept/ Remarks**
	Yr. 2019	**Yr. 2024**	**Yr. 2034**		
Metro	11km	130 km	135 km	----	MMRDA
Monorail	20 Km	11 Km	11 Km	----	MMRDA
Recommended widening Links (≥18.30m) Km	197 Km	466 Km	710 Km	90 km completed	MCGM
Recommended missing /New Links (≥18.30m) Km	41 Km	125 Km	220 Km	Total station survey is being carried out at ward level	MCGM
Recommended Corridor for Exclusive Bus lanes (Km)	74.40 Km	153 Km	256 Km	2.5 km work completed by MCGM	MCGM / BEST/ Traffic Police/ MMRDA
Traffic Management Measures					
Inter-city Bus Terminals	1 No	2 No	4 No	The matter is dealt by DP dept	MCGM

Truck Terminal	1 No	2 No	2 No	The matter is dealt by DP dept	MCGM
Bus fleet	300 No	800 No	1,800 No	----	BEST
Intersection Improvements	30 No	80 No	200 No	15 Junctions developed by Roads dept	MCGM
Installation of Traffic Signals	48 No	48 No	48 No	New traffic signals of 30 nos has been installed	MCGM
Installation of ATC Compatible Traffic Signals	47 No	154 No	247 No	22 signal junction has been completed	MCGM
SATIS (Outside the Railway premises)	8 No	21 No	35 No	The matter is dealt by Bridge dept	MCGM
ROBs/RUBs	10 No	20 No	29 No	The matter is dealt by Bridge dept	MCGM/ Railways
Flyovers	9 No	19 No	19 No	The matter is dealt by Bridge dept	MCGM/MSRDC
Elevated Roads	2 No	4 No	6 No	The matter is dealt	MCGM/MSRDC

				by Bridge dept	
FOBs/ Subways	25 No	50 No	100 No	The matter is dealt by Bridge dept	MCGM
Cycle Tracks along the existing roads	90 No	240 No	540 No	11 km is in progres	MCGM
Road marking using Thermoplastic paint work	Major road network in MCGM limits			Tendering process is completed and work order will be issued shortly	MCGM
U turns and Divider	345 No	----	----	Proposal is in progress	MCGM
Traffic signage					
A) Directional boards	90 nos	----	-----	70 no of boards has been Installed	MCGM
B) Street name boards	4800 No	----	----	4800 no of boards has been installed	MCGM
C) Mandatory boards	11300 No	----	----	10,500 no of boards has been installed	MCGM

ii. The Area Traffic Control (ATC) System Project was completed with the help of World Bank, 253 traffic control systems have been improved under ATC project which is commissioned. Digital countdown system has been installed at all conventional traffic signal systems in Mumbai & the same are properly functioning. 240 CCTV cameras are installed at various junctions in Mumbai & the same are properly maintained. The two traffic control cells installed for ATC signal systems (Traffic police head quarter and MCGM office, Worli) are working properly.

iii. New guidelines have been framed for trenching work so that the trenching work is synchronized with the ongoing road works so as to minimize interrupted traffic movement.

iv. In addition to above action plan, the following measures are taken by MCGM which helps in reducing air pollution:

   a. As per necessity, provision of traffic amenities, beautification etc. Trenching and reinstatement procedures have been modified to reduce frequent digging.

   b. New Technologies are introduced to effectively attend to road repair and maintenance.

   c. A Joint Technical Committee was appointed, by Maharashtra Government under the Chairmanship of the then Hon. Municipal Commissioner. The said committee has recommended to construct coastal road expressway 33.77 Km. from Nariman point to Malad Marve. Recreational facilities can be made available along the long of said coastal road. MCGM has appointed M/s STUP consultants and E & Y consultants as technical consultants and they have submitted Draft project report to take peer review consultant M/s. Frischmann Prabhu has been appointed. Coastal Road will contribute major role in smooth mobility of North-South traffic in the city.

v. Further, MCGM has initiated the project as **"Citizen Access to Transportation (CAT)"** considering the growth of Mumbai as commercial city since last 20 years. There is increase in number of malls and multiplex,

inviting large citizen population, thereat, at specific interval of time, most of which falls in heavy traffic hours. Most of the malls have come in place of mills or industrial area, on major roads such as Senapati Bapat Marg, L.B.S. Marg, Western express and Linking Road etc. Mumbai is having un-directional growth and so the traffic flow is from north to south in the morning and from south to north in the evening. These malls or multiplexes become traffic congestion points. These structures have been provided with parking as per their built up area. However, these parking areas got converted into source of funding for management. The charges are collected for vehicles from citizens, but no services are provided to the citizens who come without personal vehicle. Their number is also quiet large. The citizens drop taxis, autos on the road whether main road or service road in case of highway, at the entrance of mall and once their shopping is over they again wait at the exit from mall for the taxi or auto.

Therefore, malls are known to be traffic congestion points. E.g Phoenix mall at Senapati Bapat Marg/LBS Marg, Hyper City Mall, Infinity Mall at Link Road, Malad or Oberoi mall at Goregaon highway, where 10 to 15 minutes is the normal time on road required to cross the mall location. Thus, causing traffic jam and vehicular and noise pollution, directly affecting the environment. The project can be implemented as a joint venture of MCGM and Traffic Police department.

The detailed proposal of **CAT Project** is as follows:

a. All the taxis/autos or public tourist vehicles carrying passengers for the mall will drop them into the mall at alighting point.
b. The vehicle shall go out of the mall from exit either through parking or through separate route which the mall management willdecide.
c. The mall management will provide helpdesk for booking the public conveyance i.e. for the public or tourist vehicle, whereby the services like Ola, Oober, Meru or nowadays yellow black taxis can be available. Once such a facility is started by the mall owners, the autos will also join for development of the new app. The mall will take number and destination of the citizen and communicate to the

Company of the choice of the citizen. The Company can call back the citizen and confirm the details.

d. When such booked vehicles come into premises of the mall, the message will be passed from alighting point to helpdesk and said citizen can come down to the boarding point which will be somewhere near exit gate of the mall. This will reduce traffic congestion on road causing inconvenience to the citizens travelling in peak hours. Also issues of non-availability of vehicles from malls will also be eliminated. The mall management can have a tie-up with the companies for this purpose.

e. Traffic Police shall fix the CCTV cameras at either end of the mall, and prohibit parking in that area. Rather Taxis, Autos, Public transport vehicles waiting for more than two minutes upto a distance of 50 meters from the mall will be automatically fined through footages of camera.

vi. MCGM has also considered the ambitious project of **"Q KEM"** which is one of the prime and recognised hospitals in India. KEM is about 90 years older hospital. However, being in old locality, KEM has got narrow access roads from either sides. Originally the hospital must have been small; however with the requirements of citizens it must have increased to manifolds. As on today, KEM has 1800 bed strength. There is 260 students medical college plus there are many post graduation activities. Every day about 7000-8000 out patients department (OPD) attended in KEM.

Objective of Project: The KEM's front road i.e. Dr. Ernest Borges Marg is about 18.3 meter wide road. There are ambulances parked on the one side. There are fruit stalls on the other side. There is huge pedestrian traffic moving in between; therefore the road portion between the circle of Khanolkar Chowk on Acharya Donde Marg to the end of KEM i.e. Parmar Guruji Marg is extremely crowded. The vehicles come in from either side and enter into the KEM and again go out on the either side of Dr. Ernest Borges Marg. There is always traffic congestion which leads to air pollution. Old patients find very difficult to cross the road.

Further, there is always honking and breaking sound of vehicles which is crossing the permissible limits of noise levels. KEM being an hospital is a silence zone and in 100 meters of periphery the noise levels should not be more than 50 dB in the day time i.e. (6 am to 10 pm) and 40 dB during night time i.e. (10 pm to 6 am). The MCGM consultant has studied the matter and recommended the installation of sound barriers along the periphery of KEM hospital.

Proposal: Therefore, it is proposed that the portion of Dr. Ernest Borges Marg between the circle of Khanolkar Chowk and end of KEM i.e. Parmar Guruji Marg should be made one way allowing the traffic flow only southwards. BEST buses and ambulances only go in the either directions. Therefore anybody who wants to enter in KEM hospital via gate no. 3 will come from the circle side, take a left turn, enter into the KEM and vehicle will automatically come out from gate no. 5. The vehicle will not be allowed to take a right turn when it comes out; otherwise it will take a left turn via Parmar Guruji Marg which will allow the vehicle to come to the circle of Khanolkar Chowk via S S Rao Road or if vehicle takes a right turn it will go to Dr. B A Road or it will come out near ITC hotel and will join Dr. B A Road; so that the traffic flowing towards southwards will not have any issues.

The traffic which has to go to northward will have 2 options i.e. Either it can go via S S Rao Road, Acharya Donde Marg and then joined to Dr. B A Road or the traffic may be diverted to Bhoiwada, Naigaon. It will help to get the circle of Khanolkar Chowk traffic congestion free and the normal problem not only in front of the KEM hospital but also near the circle will automatically drop down as one directional flow of the vehicle towards the circle will stop.

Further it is to be mentioned that this will not increase the travel time of ambulances or vehicles coming to the KEM hospital. If somebody is coming from south they will normally come via ITC hotel Road, take right turn via Parmar Guruji Marg and can come via S S Rao road and Acharya Donde Marg to Circle of Khanolkar Chowk. The traffic coming directly from North side can directly enter in to the KEM hospital. The distance

taken from Parmar Guruji Marg to Khanolkar Chowk is approximately 600 meters so it will not affect the emergency. The ambulances parked near the KEM can also be later on parked in the Kamgar Maidan.

Action Point:

14 Launch extensive drives against polluting vehicles for ensuring strict compliance:

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 (upto 31st august) by the Traffic control Branch of Mumbai Police for non compliance of PUC norms.

Action Point:

15 Launch public awareness campaigns for air pollution control, vehicle maintenance, minimising use of personal vehicles, lane discipline etc: Awareness message to observe lane discipline and air pollution control have been displayed on 36 VMS boards installed across the City. Similarly, various awareness programmes are organised time to time especially during Road Safety Week.

"Eco Friendly Mobility for Clean Air" workshop arranged by MPC Board, NEERI, Mumbai First at Taj Mahal Palace, Mumbai dated 15th June, 2019

Action Point:

16 Prevent parking of Vehicles at non-designated areas:

Traffic Control branch of Mumbai has taken action against 9, 77,249 and 514987

vehicles in the year 2017 and 2018 (upto 31st August) respectively for Traffic violations regarding illegal parking.

Action Point:

17 Noise pollution:

Traffic Control branch of Mumbai Police has taken action on 459 vehicles against Honking as per provisions under sections 177 and 190 (2) of Motor Vehicle Act 1988.

18 Different type of Pay and Park location in Mumbai

Different Type of Pay & Park for which tender is under process

DETAILS OF 77 PAY & PARK SITES								
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	9
Sr. No.	**Name of Location of Pay & Park**	**Reserve For**	**Category A ,B,C.**	**Vehicles**				
				4 Wheeler	**2 Wheeler**	**Bus/Truck/Tempo/ Lorry**	**Work Order Issue**	**Site Started Date**
1	P. J. Ramchandani Road in 'A' Ward	Mahila Bachat Gat	A	99	44	0		
2	Mahakavi Bhushan Marg & Bye Lanes in 'A' Ward	Open Cat.	A	295	132	0	NOT STARTED	
3	Fort Bye Lanes, Area I & II in 'A' Ward	Educated Unemployed Youth	A	610	272	0		
4	Walchand Hirachand Marg (Part-I) in 'A' Ward	Open Cat.	B	55	24	0	NOT STARTED	
5	Shiv Sagar Ram Gulam Marg in 'A' Ward	Mahila Bachat Gat	A	69	31	0		
6	Mumbai Samachar Marg in 'A' Ward	Educated Unemployed Youth	A	123	55	0		
7	Mudranna Shetty Marg & Tamarind Lane in 'A' Ward	Mahila Bachat Gat	A	60	27	0	Asst.C/A/947/OD/maint.dt. 30.01.2019	01.02.2019

8	Badruddin Tayyabji Marg in 'A' Ward	Mahila Bachat Gat	B	41	18	0	NOT STARTED	
9	Madam Kama Road, off M.G. Road, Near Museaum in 'A' Ward	Educated Unemplo yed Youth	A	19	8	0		
10	M. J. P. Market Location No 1 in 'A' Ward	Mahila Bachat Gat	A	223	100	0		
11	Dorabji Tata (N.S) Road in 'A' Ward	Mahila Bachat Gat	A	202	90	0	Asst.C./A/090/OD/Mai nt dt. 24.04.2018	01.05.20 18
12	I.M.C.A. Road, churchgate in 'A' Ward	Educated Unemplo yed Youth	B	17	8	0	Asst.C/A/0079/ OD/maint.dt. 21.08.2019	01.09.20 19
13	Veer Nariman Road in 'A' Ward	Mahila Bachat Gat	A	55	25	0	Asst.C/A/28850/OD/m aint.dt. 19.11.2018	01.12.20 18
14	Adi Marzban Road in 'A' Ward	Mahila Bachat Gat	A	45	43	0		
15	Vinay K. Shah & Goenka Marg in 'A' Ward	Educated Unemplo yed Youth	A	98	44	0	Asst.C/A/090/ OD/maint.dt. 29.08.2019	01.09.20 19
16	Vidhan Bhavan Marg in 'A' Ward	Mahila Bachat Gat	A	87	39	0	NOT STARTED	
17	Ramjibhai kamani marg (East Side) in 'A' Ward	Open Cat.	A	247	110	0	NOT STARTED	
18	Sahid Bhagat singh Marg from Sunderlal Behel Marg to Lion Gate in 'A' Ward	Mahila Bachat Gat	B	66	29	0	Asst.C/A/945/OD/main t.dt. 30.01.2019	01.02.20 19
19	Sir. P. M. Road in 'A' Ward	Open Cat.	A	121	54	0	Asst.C/A/0167/ OD/maint.dt. 14.06.2019	01.07.20 19

20	Green Street Marg in 'A' Ward	Open Cat.	A	47	21	0	Asst.C./A/753/OD/Maint dt. 03.02.2018	10.02.2018
21	Maharshri Karve Marg from Eros Cinema Jn to Madam Cama Road in 'A' Ward	Mahila Bachat Gat	B	42	19	0		
22	Jahangir Art Gallery & V.B. Gandhi Marg in 'A' Ward	Educated Unemployed Youth	A	100	45	0	Asst.C./A/660/OD/Maint dt. 06.01.2018	16.01.2018
23	Horniman Circle, V. N. Road & Homaji Street in 'A' Ward	Mahila Bachat Gat	A	441	197	0	Asst.C/A/946/OD/maint.dt. 30.01.2019	01.02.2019
24	Kaikushru Dubhsh Road in 'A' Ward	Mahila Bachat Gat	A	132	59	0	NOT STARTED	
25	University Road in 'A' Ward	Mahila Bachat Gat	A	77	34	0	Asst.C/A/724/OD/maint.dt. 27.11.2018	01.12.2018
26	Ramjibhai Kamani Marg (West) in 'A' Ward	Educated Unemployed Youth	A	207	93	0		
27	Narottam Morarji Road, Ballard Estate in 'A' Ward	Mahila Bachat Gat	A	118	53	0		
28	Walchand Hirachand Road (Part II) from Grand Hotel to Scindia House Ballard Estate in 'A' Ward	Educated Unemployed Youth	A	124	55	0		
29	Free Press Journal Marg & V.V. Rao Marg in 'A' Ward	Mahila Bachat Gat	A	140	63	0	NOT STARTED	

30	Best Road from P. J. Ramchandani Road Jn. To M. B. Road Jn. & Mandalik Road in 'A' Ward	Mahila Bachat Gat	B	45	20	0	Asst.C./A/656/OD/Maint dt. 06.01.2018	16.01.2018
31	Hutatma Chowk – 3 in 'A' Ward	Educated Unemployed Youth	A	56	25	0	NOT STARTED	
32	Hutatma Chowk – 4 in 'A' Ward	Open Cat.	A	78	35	0	Asst.C/A/723/OD/maint.dt. 27.11.2018	01.12.2018
33	N.C.P.A. Road in 'A' Ward	Open Cat.	A	71	32	0	Asst.C/A/0699/OD/maint.dt. 20.11.2018	01.12.2018
34	Regal Cinema Island in 'A' Ward	Open Cat.	B	25	11	0	Asst.C/A/0253/ OD/maint.dt. 03.07.2019	03.07.2019
35	Jamnalal Bajaj Marg in 'A' Ward	Educated Unemployed Youth	A	117	52	0		
36	J .N. Hardia Marg in 'A' Ward	Mahila Bachat Gat	A	223	100	0		
37	G N Vaidya Marg in 'A' Ward	Educated Unemployed Youth	A	89	40	0	Asst.C/A/949/OD/maint.dt. 30.01.2019	01.02.2019
38	Jivan Bima Marg Opp. L. I. C. Bldg. in 'A' Ward	Open Cat.	A	66	30	0		
39	Dinshaw waccha Marg in 'A' Ward	Open Cat.	A	85	38	0	NOT STARTED	
40	Sai Baba Marg, Rutherfield Marg, M. K. Road in 'A' Ward	Mahila Bachat Gat	A	68	30	0		
41	S A Brelvi Marg in 'A' Ward	Mahila Bachat Gat	A	70	31	0	Asst.C/A/948/OD/maint.dt. 30.01.2019	01.02.2019
42	Bomanji Cawasji Behram Marg, Barrow Road, Walton	Open Cat.	A	270	120	0	NOT STARTED	

	Road, Oliver Street, & Garden Road , Henry Road in 'A' Ward							
43	M.G. Road (West Side) & Bombay Hospital Lane in 'A' ward	Educated Unemplo yed Youth	A	88	39	0		
44	Nathibai Thakarshi Road, Dinshaw Mulla Road, Nashikrao Tirpude road, Gyan Samrat Hussain Dilrang Marg in 'A' ward	Mahila Bachat Gat	A	98	44	0		
45	Ambalal Doshi Marg in 'A' Ward	Open Cat.	B	24	0	0	Asst.C./A/752/OD/Mai nt dt. 03.02.2018	10.02.20 18
46	Store Lane in 'A' Ward	Mahila Bachat Gat	B	21	0	0	Asst.C./A/655/OD/Mai nt dt. 06.01.2018	16.01.20 18
47	J. T. Siphai Malani Marg in 'A' Ward	Open Cat.	B	19	0	0	Asst.C/A/0691/OD/mai nt.dt. 20.11.2018	01.12.20 18
48	Nagindas Master Lane in 'A' Ward	Mahila Bachat Gat	B	17	0	0		
49	Ash Lane in 'A' Ward	Mahila Bachat Gat	B	7	0	0	Asst.C./A/658/OD/Mai nt dt. 06.01.2018	16.01.20 18
50	Abdul Razzak Allana Road (oak Lane) in 'A' Ward	Open Cat.	B	7	0	0	Asst.C./A/751/OD/Mai nt dt. 03.02.2018	10.02.20 18
51	Babubhai Chinoy Marg in 'A' Ward	Educated Unemplo yed Youth	B	18	0	0		

52	N.S.Road (Parsi Gymkhana) in 'C ' Ward	Educated Unemployed Youth	B	107	48	0	GEN/404/AE(M)C dt. 01.12.2018	01.12.2018
53	N.S.Road (East Side) Police Gymkhana to Hindu Gymkhana in ' C ' Ward	Open Cat.	B	152	68	0	NOT STARTED	
54	Everest Bldg. Near Tardeo Bus Depot in 'D ' Ward	Open Cat.	A	24	11	6	OACD/2903/AEM(west)dt. 19.10.2018	01.12.2018
55	Air Conditioned Market, Tardeo in 'D ' Ward	Mahila Bachat Gat	A	48	4	9	NOT STARTED	
56	Mathew Street in 'D ' Ward	Mahila Bachat Gat	A	72	32	0		
57	Sophia College Lane in 'D ' Ward	Mahila Bachat Gat	A	63	28	0	OACD/2902/AEM(west)dt. 19.10.2018	01.11.2018
58	J. D. Bhatia Hospital in 'D ' Ward	Educated Unemployed Youth	B	15	7	0		
59	Atmaram Rangnekar Marg in 'D ' Ward	Mahila Bachat Gat	B	43	19	0		
60	B. D. Mazda Apartamen in 'D ' Ward	Educated Unemployed Youth	C	8	3	0		
61	N. S. Road Near Mafatlal Swimming Pool in 'D ' Ward	Educated Unemployed Youth	A	21	10	0		
62	S. K. Rathod Marg in 'D ' Ward	Educated Unemployed Youth	A	36	16	8	NOT STARTED	
63	Near Matunga Rly Station (Central Matunga) in ' F/North ' Ward	Mahila Bachat Gat	A	31	14	0		

64	Seth Motilal G. Sanghavi Marg in ' G/South ' Ward	Mahila Bachat Gat	A	87	39	0		
65	Kashinath Dhuru Marg in ' G/South ' Ward	Mahila Bachat Gat	B	72	32	0	NOT STARTED	
66	Jairam Bajaj Temkar Marg in ' G/South ' Ward	Open Cat.	B	23	10	0	NOT STARTED	
67	New Prabhadevi Road. From D. Bandekar Chowk to Jn. A. M. Marg in ' G/South ' Ward	Educated Unemplo yed Youth	B	22	10	0	NOT STARTED	
68	B. G. Kher Road (North Sode Carriage way) in ' G/South ' Ward	Open Cat.	B	53	24	0	NOT STARTED	
69	Akshikar Path, Dadar (W) in ' G/North ' Ward	Mahila Bachat Gat	A	5	39	0		
70	Nanasaheb Dharmadhi kari Marg in ' H/East ' Ward	Open Cat.	A	108	48	0		
71	Datta Bhatt Marg, Near Dinanath Mangeshka r Natyagriha in ' K/East ' Ward	Mahila Bachat Gat	A	39	17	0	ACKE/7178/AEM-I/ Gen.dt. 31.01.18	01.02.20 18
72	Vaikuntlal Mehta Marg in ' K/West ' Ward	Mahila Bachat Gat	A	99	44	0		

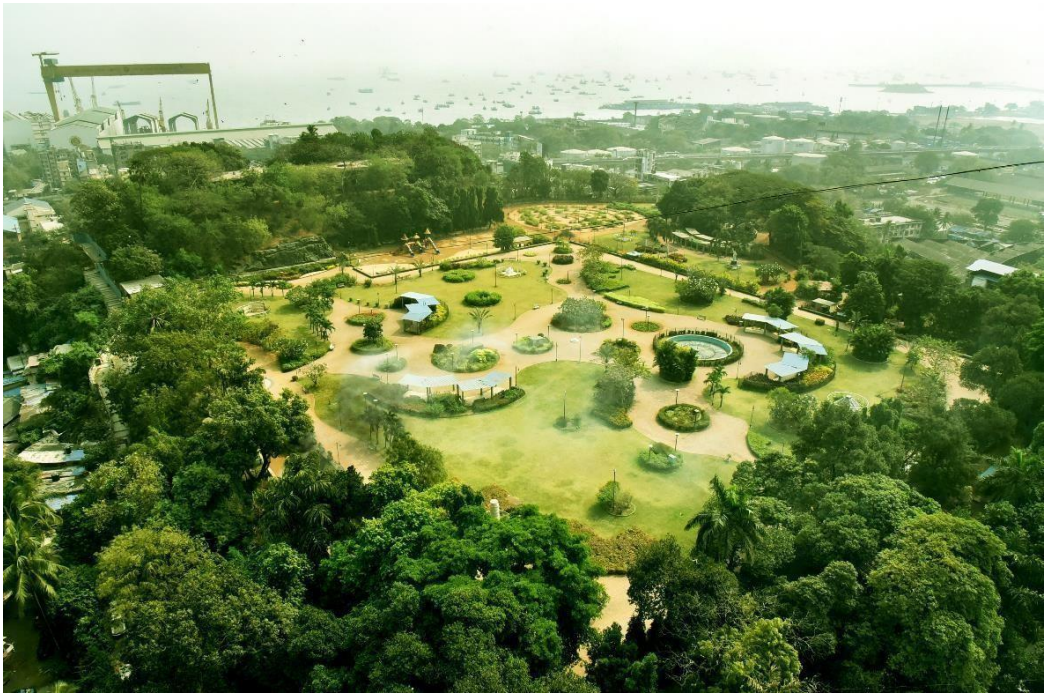
73	Balraj Sahani Marg Near Hotel Holiday In in ' K/West ' Ward	Mahila Bachat Gat	A	70	32	0	KW/48864/AEM dt. 30.11.2018	01.12.2018
74	Rasraj Nalla Road Between R. G. Gadkari Marg in ' K/West ' Ward	Mahila Bachat Gat	A	104	46	0		
75	Ghatkoper Mankhurd Link Road, Near Zakir Hussain Nagar in 'M/East ' Ward	Open Cat.	A	0	0	136		
76	Ghatkoper Mahul Road, Near Shoppers Stop in ' M/West ' Ward	Open Cat.	C	36	16	0	NOT STARTED	
77	21 st & 22 nd Road, Chembur in ' M/West' Ward	Open Cat.	A	51	23	0	NOT STARTED	

2. Direction for Re-suspension of road dust and other fugitive emissions control:

Action Point:

Prepare plan for creation of green buffers along the traffic corridors. Superintendent of Garden department of MCGM has developed and is maintaining greenery & plantation at traffic islands & central dividers all over in vicinity of traffic corridors, departmentally as well as through appointed agencies. Total no. of traffic islands are 364. Out of which 151 are maintained by private sponsors and 213 are maintained by MCGM. There are total 211 central median all over Mumbai. Out of which 89 are maintained by private

sponsors and 122 are maintained by MCGM.



Baptista Garden, Mumbai

Action Point:

21 Maintain potholes free roads for free flow of traffic.

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). It is expected that RE will prepare estimates and look after the maintenance of each road under his jurisdiction. This will bring in accountability. The system will prepare priority list of the roads to be repaired and also will furnish report on present condition of the road. During monsoon season the R.E works on war footing to immediately reinstate newly develop potholes.

Action Point:

22 Introduce water fountain at major traffic intersection, wherever feasible. 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.

Action Point:

23 Greening of open areas, gardens, community places, schools and housing societies.

i. Garden department has also developed and is maintaining greenery & plantation at various plots of gardens all over Mumbai departmentally as well as through appointed agencies. Total 1068 plots are developed and maintained. Out of which 216 are given on adoption basis, 9 are given on caretaker basis, 843 are with MCGM.

ii. In the year 2016-17 about 16336 no. of trees are planted on Municipal roads and open spaces by Garden department of MCGM.

3. Direction for Control of emissions from bio-mass/crop residue/ garbage/ municipal solid waste:

Action Points: 3.1. Launch extensive drive against open burning of bio-mass, crop residue, garbage, leaves etc.

3.2. Regular check and control of burning of municipal solid waste.

3.3 Proper collection of horticulture waste (bio-mass) and its disposal following composting–cum-gardening approach.

i. 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.

ii. 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.

iii. For effective implementation of Greater Mumbai Cleanliness and Sanitation Bye-Laws, 2006 the MCGM has appointed the nuisance detectors and clean up marshals across Mumbai. MCGM has also authorized the section Junior Overseer to impose the fine for nuisance creators/defaulters.

iv. The dry waste and wet garbage are collected separately. Separate vehicles are provided for collection of dry waste, wet waste, hotel waste, market waste, green waste etc.

v. Dry waste is segregated at 32 dry waste segregation centre which are operated by NGO's formed by Rag pickers association.

vi. The tree trimming waste/garden waste is collected separately and converted into pellets/briquettes. The plant is installed at Ghatkopar (E) with h the help of M/s CIPL Resurge. 20 MT of garden waste/green waste is converted into pellets/briquettes daily.

Action Point:

3.4 Ensure ban on burning of agriculture waste and crop residues and its implementation.

Crop residue and agriculture waste, as mentioned in action point, does not generate in Mumbai.

Side Loading Compactor- introduced for first time in India

Compactor with separate collection chamber for Dry waste and E waste

Underground Bins- introduced for first time in Mumbai

Kanjur MSW processing facility: Material Recovery Facility, Landfill Gas Based Power Generation Unit

4. Direction for Control of air pollution from construction and demolition activities:

Action Points: 4.1 Enforcement of constructions and demolition rules.

4.2 Control measures for fugitive emissions from material handling, conveying and screening operations through water sprinkling, curtains, barriers and dust suppression units.

4.3 Ensure carriage of construction material in closed/covered vessels.

a. Construction and demolition waste generated by developers is being disposed off as per the debris management plan submitted by them and in consonance with "Construction Demolition Waste (Management & Disposal) Rules 2016".

b. The concerned agency/developer is enforced to keep working site (construction site) properly barricaded/enclosed (minimum 20ft.) to avoid escape of fugitive dust into the atmosphere, as well as its deposits to spread on street/footpaths/drains etc.

c. The vehicles deployed for transportation of C & D waste are enforced for conforming to RTO rules and regulations, pollution control norms and the vehicles are to be properly covered with tarpaulin or any other suitable material firmly on the vehicle to avoid any escape and fall of waste on road. Transportation of C & D waste shall be done in day time only.

d. Further, MCGM has also introduced the "Debris on Call" scheme for the minor repairs/individual household debris generator, who are generating debris by the way of minor repairs of their flats/rooms. The generator shall have to pay the applicable charges to MCGM for collection, transportation and disposal of the debris at the disposal site. The unclaimed debris is collected and disposed off at the municipal disposal site by ward authorities by following the properprocedure.

e. At disposal sites, debris is used for creating infrastructure at site and used as cover material on working area. Water tankers are provided to

spray the waters on debris disposal as well as the daily disposal of garbage to avoid dust into the atmosphere.

f. MCGM has also informed various associations of Architects and Real Estate Developers to take preventive measures to control the pollution in Mumbai city at their end and also requested them to inform all the stake holders/architects in their organizations so as to achieve and implement time frame as prescribed by Maharashtra Pollution Control Board (MPCB).

g. MCGM has also decided to modify the condition in IOD considering the directives from MPCB.

h. In order to control measures for Enforcement of construction and demolition rules the monitoring committee is formed and as per the directives of Hon'ble Supreme Court dt. 15.03.2018 in the S.L.P. (C) no. D23708 of 2017, it was expected that Developer/Architect to comply the directions of Hon'ble Supreme Court. Therefore measures are taken while granting the I.O.D./C.C. for building proposal of Development Plan department of MCGM.

i. The major conditions as regards to the C & D waste management plan are listed below. Adequate safeguards are employed by builders.

    a. All the conditions and directions specified in the Hon'ble Supreme Court order i.e. as per SLP (Civil) no. D23708/2017 dt. 15.03.2018 in the case of dumping ground shall not be complied with before starting demolition of structures and/or starting any construction work.

    b. Adequate safeguards shall not be employed in consultation with Solid Waste Management department of MCGM for preventing dispersal of particles through air and the construction debris generated shall not be deposited in specific sites inspected and approved by MCGM.

    c. The construction and demolition waste shall not be handled and transported to the designated unloading site as per NOC issued by Executive Engineer (Solid Waste Management) andcomply

with the conditions mentioned in the said NOC and as per the Hon'ble Supreme Court directives dt. 15.03.2018.

d. The Solid Waste Management NOC and bank guarantee shall not be revalidated from time to time.

e. The record of C & D waste generated, transported and unloaded at designated unloading site shall not be maintained at construction site and shall not submit record monthly on AutoDCR system.

f. The builder developer shall not keep record (at construction site) of C & D waste generated, transported and unloaded at designated unloading site. The builder/ developer shall not submit record monthly on MCGM AutoDCR system.

g. Any breach of condition regarding debris disposal will not entail the cancellation of the building permission or IOD and the work will not be liable to be stopped immediately.

j. As per directives of Hon'ble Supreme Court, a circular was issued on 10.05.2018 regarding bank guarantee amount i.e. of 5 to 50 Lakhs to be recovered from the developer which is based on the balance built up potential for which C.C. is yet to be issued out of total permissible build up area OR net plot area whichever is minimum.

k. As per the suggestion of monitoring committee a "Stage wise approval to C & D Waste Management Plan" (WMP) was circulated by SWM department. The copy of same is enclosed herewith as **Annexure III.**

5. Reduction in DG set operation/ Un-interrupted power supply:

Action Point: Prepare action plan for improvement of power distribution network and installation of distribution management system (DMS) for reduction of power interruptions.

Reliance Infrastructure, Mumbai distribution, provides power supply to 30 Lacs customers at reliability of 99.97%, interruption duration 56 Minutes/Customers/Year, in Mumbai suburbs and Mira Bhayander Municipal Corporation area through 4500 Km underground cable network, 6500 distribution sub stations and 85 receiving stations.

100% of Receiving Stations of M/s Reliance are fully automated and operated through Supervisory Control and Data Acquisitions (SCADA) system which helps to minimise power supply interruption durations. Further to reduce interruptions of supply, implementation of Distribution Automation System (DMS) and already about 2200 nos. of substations are monitored and controlled through DMS. Further to improve reliability of supply, Reliance Infrastructure has planned to replace conventional oil type switchgear with DMS at all remaining sub-station in phase manner with approval from MERC.

Similarly Reliance Infrastructure has plan for replacement of old high tension/low tension PILC underground cable in phased manner with modern TR-XLPE cables with approval from MERC. Underground cable replacement and improvement and augmentation of associated network will help to reduce breakdown events and improve reliability of supply and hence reduction in DG set operation.

Annexure B-I

The summary of the various roads is as follows: -

Wards	**Existing Road in Ha**	**Proposed Roads in Ha**	**Proposed Road Widening in Ha**	**Total Proposed Roads in Ha**	**Total Roads in Ha**
City	1032.74	91.28	57.85	149.13	181.87
Western Suburbs	1740.32	513.33	379.48	892.81	633.13
Eastern Suburbs	1057.38	445.52	364.19	809.71	867.09
Suburbs	2797.70	958.85	743.67	1702.52	4500.21
Total (City + Suburbs)	3830.43	1050.13	801.52	1851.65	682.08

Annexure B-II

Sr. No	TYPE OF POS	AREA (HA)	PP M²
1	Reservations of PG/Garden/Green Belt etc.	1892.22	1.48
2	Designations of RG/PG/Garden etc.	1633.67	1.28
3	Layout RG's which will be available after development of lands under layout.	964.78	0.75
4	NDZ +Tourism Development Area +Salt Pan	850	0.66
5	Aarey POS	800	0.63
6	Sanjay Gandhi National Park RG	588	0.46
7	Buffer for the Rivers/nallas	472.05	0.37
8	Open Spaces in the jurisdiction of Special Planning Authorities Viz. MIDC/MMRDA	428.05	0.17
9	Out of proposed Conversion of Industrial lands	117.64	0.33
10	Proposed Coastal Road Promenade	88	0.07
		7834.41	**6.13**

Annexure B-III

MUNICIPAL CORPORATION OF GREATER MUMBAI			
Solid Waste Management Department			
Sr No	**Stage of Approval**	**Process**	**Requirement from Architect / Developer**
1	a) At the time of approval of IOD b) At the time of approval of CC for preexisting IODs	Online	Submit Total Estimated quantity of C and D waste expected to be generated in whole project as certified by Architect along with WMP and auto generated permission of SWM .On Submission of same IOD can be Issued. However for issue of CC, Sr No 3 shall be followed as mentioned hereunder.
2	**Application for Miscellaneous works**		
	a) Quantity of C & D waste generated is Nil or consumed insitu	Online	a) Undertaking stating C & D waste generated is Nil or Consumed insitu. (As certified by Architect) No SWM remarks required
	b) Quantity of C & D waste generated is less than 300 MT in whole project	b) For quantity less than 300 MT , then online debris on call EE (SWM) to issue of date on which C & D waste shall be collected and transported .	b) If the C & D waste generation is less than 300 MT , then application to MCGM for 'Debris on Call' system.
	c) Quantity of C and D waste generated is more than 300 MT in whole project.	Online	C) i) NOC from owner of the designated unloading site. ii) Name of Transporter Agency. Iii) Quantity to be transported. iv) Collector's permission for the quantity of excavation of C & D waste , if required.
	Application for New Building & Redevelopment proposal		
	a) Quantity of C & D waste generated is Nil or Consumed	Online	a) Undertaking stating C & D waste generated is Nil or Consumed insitu. (As certified by Architect) No SWM remarks required

3	b) Quantity of C and D waste generated is Less than 300 MT in whole project .	b) For quantity less than 300 MT , then as per 'debris on call' Zonal E.E(S.W.M) to issue NOC & date on which C & D waste	b) If the C & D waste generation is less than 300 MT (As certified by architect) , then Application to MCGM for ' Debris on Call ' System.

		shall be collected and transported till online process is developed by M/s Softech.	
	c) Quantity of C and D waste generated is more than 300 MT in whole project.	Online 1) C1) Approval at the time of demolition activity of existing structure. 2) C2) Approval at the time of start of construction activity of excavation work. 3) C3) Approval at the time of completion of plinth level construction if required. 4) C4) Approval at the time of vertical construction as and when C & D waste is required to be transported.	C1) i) NOC from owner of the designated unloading site. ii) Name of Transporter Agency. Iii) Quantity to be transported. C2) As per C1) above and Collector's permission for the quantity of excavation of C & D waste. For C3), C4) , all documents as per C1) above.

Note :

1) If any information submitted by Applicant/ Architect / Builder / Developer / Licence Surveyor / Licence Town Planner is Found to be false / wrong, then the work will be stopped by MCGM and penal action shall be initiated against them.

2) Builder / Developer to keep the record (at construction site) of C & D waste generated, transported and unloaded at designated unloading site . Builder/ Developer shall submit record monthly on MCGM duto dcr system.

3) C and D WMP shall be amended whenever required as stipulated in the Hon Supreme Courts order.

4) Bank Guarantee as stipulated in the circular shall be insisted.

Annexure C-1

CPCB direction letter dtd. 25th June, 2019 regarding preparation of action plan for non-attainment cities as per Hob'ble NGT order.

- **State:** Maharashtra
- **City:** Mumbai (Revised Plan)
- **Plan received on date:** 24-04-2019

Key Component	Observations	Remarks	Comments on Revised Plan
Air Quality Monitoring Network	Expansion plan not provided	Include monitoring network	Included
Source Identification	Road Dust, Vehicles, Open Burning, Construction Activities, Industries, Domestic Fuel	Major sources identified except Large Industries (e.g. Oil Refineries and Fertilizer units)	Included
Source Apportionment (SA) and Emission Inventory (EI)	EI & SA not quantified	Carryout EI & SA estimates	Included
Action Points	Addresses all major sources	Action plan to address Large Industries (e.g. Oil Refineries and Fertilizer units)	• The plan provides general information for most of the action points and lacks specific action plan related to source group. The detail comments are at Annexure I(b).
Long-term Strategy	Long-term actions proposed	-	-
Timeframe	Timelines proposed for various actions (up to three years)	-	• Timelines proposed for various actions (up to fifteen years) • Specify time period for Long/Mid/Short term measures • Most of the action point lackstime targets. The detail comments are at Annexure I(b).
Executing Agencies	Not Identified	Identify executing agencies in Section – 2 (Page No. 6-17)	Identify appropriate executive agencies in Section 4 - SCS-1 to SCS-3, SCS-5, SCS-6, SCS-8 and SCS-9
Public Awareness and Complaint Redressal Mechanism	Specific plans and public complaints redressal mechanism not outlined	Detail proposal to be worked out	Included
Budget Support	Not given	Broad estimates be made for financial layout	Provided
Overall Recommendation	**Not Recommended (See Comments on Revised Plan).**		

Annexure C-2

CPCB direction letter dtd. 16th April, 2019 regarding preparation of action plan for non-attainment cities as per Hob'ble NGT order.

Mumbai

Action plans with general information that requires specific action plan related to source group:

- Point 1 : (ii) to (v), (vii) to (xi), SCS-2, SCS-3, SCS-11 to 13, SCS-15
- Point 2: (III), (V), SCS-1, SCS-2
- Point 3: (i) to (iv) and SCS-1 (No details on Waste to energy plant/landfill sites provided)
- Point 6: SCS-1 and SCS-2
- Point 9: SCS-1 (Action to ban wood in bakeries not given)

Timelines:

- Short-term measures are targeted till June 2020 in action point numbers: 1(ix), 4. SCS-(5, 6, 7, 8) but for point no 1(viii) till June 2020 it is long term measure & for 2(i) till June 2020 it is mid-term measure.
- Time target missing: (1)SCS-11 to 13, SCS-15, (2)III to V, (2)SCS-1, (2)SCS-2, (5)SCS-1, (6)SCS-1, (6)SCS-2, (8)i, (8)SCS-1, (9)SCS-1,:

Typo Error:

- (1)SCS-6: BS-VI instead of BS-V
- (5)SCS-3: 2016 instead of 2006

Annexure C-3

CPCB direction letter dtd. 2nd Sept., 2019 regarding preparation of action plan for non-attainment cities as per Hob'ble NGT order

Comments on city action plans for cities of Mumbai, Nashik and Solapur

Following points to be incorporated in the plans:

Mumbai

1. The revised plan is to be submitted after approval of AQMC.
2. There is lack of clarity in specific actions, the plan should include focused actions.
3. Some control options are overlapping/repeated (e.g. vehicle source group point no. SCS-2 and SCS- 3, Point iv & SCS-11 etc.)
4. Provide time target for different type of parking facility (vehicle point iii)
5. Type error: BS-V in place of BS-VI (vehicle point iv)
6. Action point no. v, of vehicle; Petrochemical Authority-PCRA need clarification.
7. Action plan should not mention 'the plans will be prepared'. (e.g. vehicle point v, vi, vii etc.)
8. Mention entry point in figures in vehicle point ix.