

# Report on The Status of Civic Issues in Mumbai

With a Focus on



Solid Waste Management



Air Quality



Sewerage



Urban Green Cover



Centralised Complaint Registration System



Representational Images: Canva and BMC website

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## Abbreviations

ALM : Advanced Locality Management	MLD : Minimal Liquid Discharge
AMRUT : Atal Mission for Rejuvenation and Urban Transformation	MoHUA : Ministry of Housing and Urban Affairs
AQI : Air Quality Index	MPCB : Maharashtra Pollution Control Board
ATR : Action Taken Report	MPN : Most Probable Number
BLFT : Bioreactor Landfill Technology	MSW : Municipal Solid Waste
BMC : Brihanmumbai Municipal Corporation	NCAP : National Clean Air Programme
BOD : Biochemical Oxygen Demand	NCV : Net Calorific Value
BWG : Bulk Waste Generators	NCT : National Capital Territory
C&D : Construction and Demolition	NGT : National Green Tribunal
CAAQMS : Continuous Ambient Air Quality Monitoring Stations	PPP : Public-Private Partnership
CAA : Constitutional Amendment Act	RDF : Refuse derived fuel
CBO : Community Based Organization	RFID : Radio-Frequency Identification
CCRS : Centralised Complaint Registration System	RTI : Right to Information Act 2005
CO : Carbon Dioxide	SAFAR : System of Air Quality and Weather Forecasting And Research
CPCB : Central Pollution Control Board	SBM : Swachh Bharat Mission
CRZ : Coastal Regulation Zone	SDG : Sustainable Development Goal
DWSC : Dry Waste Segregation Centres	SFC : Segregated Combustible Fractions
ESR : Environment Status Report	SHG : Self Help Groups
FC : Faecal Coliform	SMPA : Swachh Mumbai Prabodhan Abhiyan
IEC : Information, Education & Communication	SO <sub>2</sub> : Sulfur dioxide
IITM : Indian Institute of Tropical Meteorology	STP : Sewerage Treatment Plant
IITM : The Indian Institute of Tropical Meteorology	SWM: Solid Waste Management
MCAP : Mumbai Climate Action Plan	TSS : Total Suspended Solids
MEDA : Maharashtra Energy Development Agency	ULB : Urban Local Bodies

## Metric Conversion Table

### VOLUME

m <sup>3</sup> or cu.m	Cubic metre	1 m <sup>3</sup> or cu.m = 10,00,000 cm <sup>3</sup>
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### MASS

MT or T	Metric tonne or tonne	1 MT or T = 1,000 kg
kg	Kilogram	1 kg = 1,000 g
Mg	Milligram	
L	Litre	
ml	Millilitre	

### ENERGY

MW	Megawatt	1 MW = 1,000 KW
kW	Kilowatt	1 KW = 1,000 W

## I. Foreword

Mumbai faces major issues due to rapid climate change such as air pollution, heat waves, and contaminated water bodies due to inefficient sanitation and waste management processes. As citizens' concerns on these issues have risen over the years, the report aims to understand the rising problems related to services such as solid waste management (SWM), sewerage, air and water quality in Mumbai.

This can be seen as citizens' complaints on air pollution increased by 237% (from 65 complaints in 2013 to 219 complaints in 2022), while complaints related to SWM increased by 124% (from 5,519 in 2013 to 12,351 in 2022) and drainage increased by 35% (12,708 in 2013 to 17,121 in 2022) in the same period. However, the average time taken to resolve these complaints was as high as 31 days in 2022.

Moreover, BMC has not been able to effectively manage and address these issues. In March 2022, BMC failed to achieve the Swachh Bharat Mission's (SBM) 5 Star Rating for "Garbage Free Cities" at the desktop assessment level. Although the SWM Rules 2016 mandates local governments to frame new SWM bye-laws within one year from the date of notification of the rule, BMC still follows its SWM bye-laws of 2006.

The National Institute of Urban Affairs (NIUA) recommends the Integrated Solid Waste Management (ISWM) system to reduce waste generation, process waste at source and reduce waste sent to landfill. BMC's Environment Status Report (ESR) 2021-22 reveals that 73% of 6,300 metric tonnes per day (MTD) of waste collected is wet waste and 12%<sup>1</sup> (700 MTD) is sent to Deonar dumping ground while 88% (5,500 MTD) to Kanjurmarg landfill as it has a waste-to-energy plant. Data received through RTI (Right to Information Act) shows that, in 2022, out of 2,065 MTD waste transported to Deonar, 58% included Construction and Demolition waste (C&D), hence it is possible data on waste collected per day as per ESR 2021-22 is less than the overall waste sent to dumping ground/landfills.

With decentralised waste management processes, BMC can reduce the cost to transport waste to landfills. For emphasis, an approximate calculation of the cost to collect and transport One MTD of waste to the landfill from all 24 wards is Rs. 3,840/day. Hence, to transport 6,300 MTD of waste, it costs BMC Rs. 2.42 crores/day and annually, this cost is as high as Rs. 883 crores. Furthermore, the approximate cost of operations and maintenance (O&M) of waste at Kanjurmarg landfill is Rs. 3,000/MTD. Thus, the O&M of 5,500 MTD of waste annually costs Rs. 602 crores. To reduce these costs, BMC should adopt decentralised SWM, which has successfully been done in the Councillor Ward No. 203 of F/S Ward through the SMPA model at the community level.

Effective decentralisation of SWM is the need of the hour to manage and process waste at source, which is also the focus of SBM. In 2022, an average of 6,385 MTD waste (data received via RTI) was collected by BMC from all 24 wards and the maximum waste collected per day was from wards L (491 MTD), G/N (459 MTD) and K/E (441 MTD). However, the ward-wise per capita<sup>2</sup> waste collection shows that the maximum per capita/day waste collected was from wards A, B and H/W – 0.90 kg, 0.84 kg and 0.76 kg respectively.

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<sup>1</sup> Figure taken from Environment Status Reports 2021-22 (Page no.40).

<sup>2</sup> Waste generated by per person (total waste/population).

Similarly, bulk waste generator (BWG) societies (societies generating more than 100kg waste per day) are required to process their waste, especially wet waste at source in accordance with the SWM Rules 2016. However, 50% (1,401) of the 2,825 BWG societies in Mumbai are not processing their wet waste at source.

Furthermore, a major focus is needed on the water pollution at Mumbai's major sea outlets and beaches from untreated sewerage and surface pollution including solid waste. The average maximum Biochemical Oxygen Demand (BOD) recorded in all major beach outlets was 22 mg/lit. in 2021, much higher than the prescribed norm by the CPCB<sup>3</sup> of <3 mg/lit. In addition, Mithi River is heavily polluted with faecal coliform (17000MPN<sup>4</sup>/100ml), beyond the prescribed limit<sup>5</sup>.

Additionally, Mumbai has faced severe air pollution in the recent past; the worst reordered Air Quality Level (AQI) occurred in December 2022 and January 2023, continuing for two consecutive months and this is the first time it has happened in the last 5 years.

In 2022, BMC's Mumbai Climate Action Plan (MCAP) included targeted interventions for improving the efficiency in SWM, sewerage treatment and measures to ensure good air quality. The MCAP provides a roadmap that can help BMC to move towards ensuring sustainable service deliveries and in turn improve the city's climate conditions.

In conclusion, the first step for effective waste management is for BMC to revise its SWM bye-laws of 2006 in accordance with the 2016 SWM Rules. For the same, there is a need for an elected council in BMC to prioritise, deliberate and formulate new SWM bye-laws. BMC should scale the SWM project in the F/S ward to all councillor wards, which can successfully achieve the goal of zero waste sent to landfills. Focus should also be given to restoring Mumbai's rivers and beaches and ensuring effective measures to curb water pollution. Improving AQI monitoring stations will provide accurate data for BMC to formulate better measures to improve air quality. The effective implementation of MCAP and robust monitoring can help tackle climate change in Mumbai, ensuring a better future for generations to come.

**Milind Mhaske**  
CEO, Praja Foundation

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<sup>3</sup> Central Pollution Control Board

<sup>4</sup> Most Probable Number (MPN) is a method to estimate concentration of microorganisms in liquid.

<sup>5</sup> Faecal Coliform norm: less than 2500 MPN/100ml (Most Probable Number – MPN)

## II. Acknowledgement

Praja has obtained the data used in compiling this whitepaper through Right to Information Act, 2005. Hence, it is very important to acknowledge the RTI Act and everyone involved, especially the officials who have provided us this information diligently.

We would like to appreciate our stakeholders; particularly, our Elected Representatives & government officials, the Civil Society Organisations (CSOs) and the journalists who utilise and publicise our data and, by doing so, ensure that awareness regarding various issues that we discuss is distributed to a wide-ranging population. We would like to take this opportunity to specifically extend our gratitude to all government officials for their continuous cooperation and support.

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The views and opinions expressed in this report are solely of Praja Foundation and not of our supporters. It does not imply an endorsement from them or any entity they represent.

### III. Introduction

Praja has published reports on various key service deliveries such as water supply, solid waste management (SWM), sewerage, air quality, etc. In addition, Praja also analyses the overall complaints registered by citizens on the Centralised Complaints Registration System (CCRS) to understand the rising concerns of citizens in Mumbai. Our reports provide a status of these service deliveries in Mumbai and recommendations for targeted interventions to improve these services.

Climate change is an urgent challenge that affects the environment, human health, and socio-economic systems. It is important to address climate change and aspects that contribute to it which can ensure protection to the ecosystems and ensure a sustainable future for generations to come. For the same, this year's report on 'Status of Civic Issues in Mumbai' aims to understand the impact of key services such as SWM, sewerage, air and water quality on Mumbai's climate. The report aims to show a correlation between the status of these services and its impact on climate change in the city and suggest effective recommendations to address these issues.

Waste management and sewerage treatment are some crucial services that affect the environment and public health. If not managed properly, they can contribute to climate change through greenhouse gas emissions and pollution of natural resources. Similarly, air quality is also an important factor in climate change as air pollutants can have a significant impact on the environment and citizens' health.

The report references the guidelines mentioned in the SWM Rules 2016 published by the Central Government, targeted actions prescribed in the Climate Action Plan for Mumbai, BMC's Vision 2030, CCRS citizen charter, etc. The paper correlates this information with data collected via the Right to Information Act (RTI), BMC's Environment Status Report (ESR), and BMC's website to provide a comprehensive overview of the state of these services in Mumbai.

## Section I: Climate Action Plan: Objectives, Goals, and Current Status

### Introduction to Mumbai Climate Action Plan (MCAP) 2022:

The Mumbai Climate Action Plan (MCAP) 2022 is a comprehensive plan published by Brihanmumbai Municipal Corporation (BMC) and Environment and Climate Change Ministry of Maharashtra State Government. Apart from city and state government various stakeholders, including experts, civil society organisations, and citizens contributed to the MCAP. The plan addresses climate change and its impact on the city of Mumbai. Mumbai is vulnerable to extreme weather events such as flooding and heatwaves. The plan sets out a roadmap to reduce greenhouse gas emissions, increase the city's resilience towards changing climate, and promote sustainable development.

MCAP is a key component of the city's efforts to achieve its sustainability goals and build a more resilient and sustainable future. It represents a significant step towards creating a more liveable, prosperous, and environmentally sustainable city for all its residents. The objectives and goals featured in the MCAP align to the Sustainable Development Goals (SDG's) and the Paris Climate Accords, which aim to limit global warming to well below 2°C above pre-industrial levels.

### The key objectives of the Mumbai Climate Action Plan include:

1. **Reducing greenhouse gas emissions:** The plan aims to reduce the city's greenhouse gas emissions by 35% by 2030. This will be achieved through various measures, such as promoting renewable energy, encouraging the use of public transport, and implementing energy-efficient building practices.
2. **Enhancing urban resilience:** The plan aims to enhance the city's resilience to the impacts of climate change, such as flooding and extreme heat. This will be achieved through measures such as improving drainage systems, increasing green cover, and promoting the use of green infrastructure.
3. **Promoting sustainable development:** The plan aims to promote sustainable development in the city by integrating climate considerations into urban planning, promoting sustainable transport, and encouraging the use of green technologies.
4. **Raising awareness:** The plan aims to raise awareness among citizens and stakeholders about the importance of taking action to address climate change and the role that they can play in this effort.

Overall, the MCAP represents a significant step towards building a more sustainable and resilient city that is better equipped to deal with the challenges posed by climate change.

Table 1: Specific MCAP Indicators and its Status in 2022

Sectors To Improve	Action Plan	Time Frame	Status
Sustainable Waste Management	<b>Designate ward-level waste management units/cells</b> to coordinate the handling of waste from households by ALMs, SMPA CBOs, BWGs, and other agencies.	2023	Although no information is available of ward level unit's, effective open data portal can ensure effective coordination. BMCs website has information on waste processes by ALMs only for 2015 and no latest information on the website.
			The BMC website previously provided SMPA data on waste collection, processing, and composting in 2019, but it was later removed and no updates have been made since.
			BWGs are not functioning effectively as only 50% of BWG societies process their wet waste on-site (refer table no.06).
Sustainable Waste Management	<b>Discourage dependence on landfills and waste-to-energy plants</b> by setting up new centralised waste processing units to reduce water and soil pollution.	2030/2032	Only 47 dry waste processing centers established by BMC. No information on other types waste processing units.
Sustainable Waste Management	<b>Levy on non-compliance</b> of waste segregation at households.	2023	For effective enforcement, BMC bye-laws need to be revised as per SWM rules 2016 for non-compliance of waste segregation at households.
Sustainable Waste Management	<b>Develop a waste dashboard on consolidated ward-level data</b> (daily generation, segregation, waste recycled, % of segregation, location of community collection/ recycling centers/vendors), thereby making information publicly available and increasing accountability.	2024	No information available on BMC's website.
Sustainable Waste Management	<b>Promote decentralised wet waste management</b> by composting through citizen participation, biogas plants in mandis and hotels, and composting in all parks and gardens.	2024	In 2022, only 50% BWG societies are managing waste at household level (refer table to.06).
			Only D ward has a Bio-methanation plant at Keshav Rao Khadye Marg with 2 MT capacity.
Sustainable Waste Management	<b>Strengthened enforcement of C&amp;D rules 2016</b> through amendment of building bye-laws to include rules on segregated collection systems, disposal sites, tipping fees, use of waste in roads and landfilling, etc.	2024	For effective enforcement, BMC bye-laws need to be revised as per C&D Rules 2016. As of December 2022, approximately 60% (4.34 lakh MT) of the total waste sent to the Deonar dumping ground consists of C&D (debris) waste.
Sustainable Waste Management	<b>Divert daily waste dumped at the Deonar dumpsite</b> to the Kanjurmarg site and mandate remediation at Deonar after scoping study including NCV, emissions and environmental impacts.	Scoping study (2023), implementation (2025)	Total waste transported to Deonar dumping ground increased from 6.92 lakh MT in 2020 to 7.53 lakh MT in 2022.

Sectors To Improve	Action Plan	Time Frame	Status
Urban Flooding and Water Resource Management	<b>Introduce nature-based sewerage treatment solutions</b> at outfalls of selected sewerage zones to treat 25% of the sewerage generated.	2022 -2030	In 2022, the BOD outlet quality of Versova, Ghatkopar and Bhandup STP did not meet the prescribed limit as per the CPCB and MPCB norm <sup>6</sup> . There is no mention of nature-based sewerage treatment methods used.
Urban Flooding and Water Resource Management	<b>Ensure restoration of riparian zone of rivers and other water bodies</b> to reduce pollution.	2022 -2030	The Mithi river is heavily polluted due to untreated sewerage and waste disposal, which is evident from the high levels of BOD (up to 3mg/L) and Faecal Coliform (up to 17,000 MPN/100ml).
Air Quality	<b>Create an online grievance redressal portal</b> for citizens to log complaints.	2022-2023	Air pollution complaints are registered on CCRS. Number of complaints related to air pollution increased by 30% from 2019 to 2022.
Air Quality	<b>Strengthen and ensure timely monitoring of data on air quality</b> and dissemination of information aligned with NCAP; improved co-ordination amongst the relevant departments within BMC for data dissemination and proper operation, <b>maintenance and functioning of the Air Quality Monitoring Stations.</b>	2022 and continue annually	In the year 2022, on average, 24% of daily data was not available or could not be mapped by 20 AQI stations.
Air Quality	<b>Identify the local causes of air pollution</b> and their spatial concentration within a ward.	2022 and continue annually	The K/E, L, M/E, P/N, and S wards have the highest number of complaints related to air pollution.
Air Quality	<b>Identify the local causes of air pollution</b> and their spatial concentration within a ward. <b>Increase the number of the monitoring stations</b> , such as CAAQMS, equipped with low -cost indigenous sensors and real-time monitoring technology, based on CPCB criterion for site location.	2022 and continue annually 2022- 2027	Chakala, Deonar, Kurla, Mazgaon, and Vile Parle AQI stations have recorded the highest number of days with poor air quality. The number of AQI monitoring stations has increased by 122% from 2019 to 2022, with the number of stations increasing from 9 in 2019 to 20 in 2022.
Urban Greening and Biodiversity	<b>Increase vegetation cover and permeable surface to 30-40%</b> of the city surface area by 2030 to tackle flood- and heat-related disaster risk.	2023	Number of gardens increased by 26% and tree plantations increased by 220% in Mumbai from 2017-18 to 2021-22.
Urban Greening and Biodiversity	<b>Update tree census</b> parameters to capture carbon sequestration and biodiversity aspect.	2022	Need for updated tree census as the numbers of trees remain same from 2017-18 to 2021-22 as per Environment Status Report (ESR).

<sup>6</sup> BOD (Prescribed limit is 20mg/lit. by CPCB and 10 mg/lit. by MPCB).

## Part I. Solid Waste Management (SWM)

Solid waste management is a pressing issue in most Indian cities. In Mumbai, the Brihanmumbai Municipal Corporation (BMC) is responsible for managing solid waste in the city. The BMC has prescribed 2006 bye-laws on the solid waste management (SWM) process, fines for violation, and other facilities required for effective waste management.

The Swachh Bharat Mission (SBM) was launched by the Central Government in 2014 to achieve a Clean India by October 2, 2019. SWM is one of the most important components of the mission, and the SBM Guidelines highlight the various strategies adopted to ensure the safe and scientific disposal of all kinds of waste.

The key strategies adopted for SWM under the SBM Guidelines are waste segregation at the source, collection and transportation, waste processing, and landfill management. Urban Local Bodies (ULBs) are responsible for implementing these strategies and ensuring that waste management is done efficiently.

The SBM 2.0, launched in 2020, aims to build on the successes of the first phase and further advance the mission of a clean and sustainable India. Effective and decentralised waste management is essential for the success of the SBM mission, and targeted reforms are needed to achieve this. The **below table highlights the status of certain indicators as mentioned in BMC's bye-laws 2006 and SWM rules from data received through RTIs, BMC Website and other government/agencies' websites.**

Indicators	Status as of 2022
Waste segregation at source, such as colour-coded bins, collection vehicles, and collection points.	According to the ESR 2021-22, 81% of waste is segregated. However, information from 47 dry waste segregation centers and landfill sites shows waste is not being effectively segregated at source, as prescribed by the SWM Rules, 2016.
Transportation systems with appropriate vehicles, equipment, and manpower for waste collection and transportation.	ESR 2021-22 claims 100% door-to-door waste collection. However, based on CCRS data, there were 4,356 complaints registered in 2022 for 'garbage not being lifted' from various locations.
Processing units including the establishment of composting units, biogas plants, and waste-to-energy plants.	As of December 2022, BMC has 47 working dry waste segregation centers at ward level. Wet waste processing is carried out at the Kanjurmarg landfill processing unit, while the SWM rules 2016 guidelines aim to reduce waste sent to landfills.
Scientific Landfill sites for appropriate infrastructure and facilities at the landfill sites, such as weighbridges, landfill liners, and leachate collection systems.	BMC has four landfills/dumping ground located in Deonar, Kanjurmarg, Gorai, and Mulund. At present, scientific waste processing is carried out only at Kanjurmarg landfill, while Deonar is used for waste dumping purposes.
Creating an information system for waste management. It includes the provision of a database of waste generators, collection routes, and processing units.	Information is unavailable on BMC website.
Screening of Nallahs	As per CCRS data, citizens registered 10,079 complaints for Drainage Chokes and Blockages in 2022.
On-Site wet waste processing by bulk waste generator.	In BMC total number of bulk waste generator (BWG) societies are 2,825, out of which 1,401 (50%) societies are not processing waste as per the BWG norms set by the SWM rules 2016 guidelines and BMC's BWG guidelines <sup>7</sup> (annexure 1, figure 9).

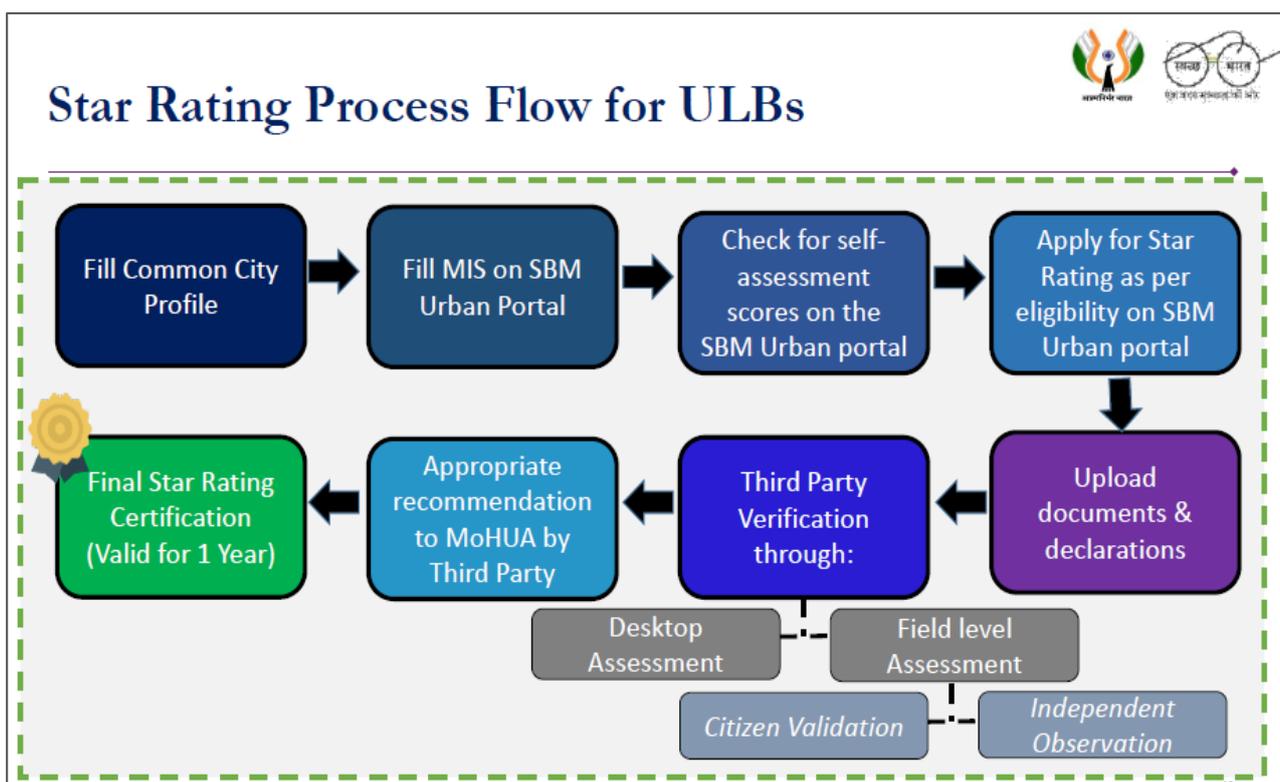
<sup>7</sup> <https://www.vermigold.com/resources-pdf/MCGM%20SWM%20Bulk%20Generator%20Circular.pdf>

## A. Third Party Inspection Report for Certification on ‘Garbage Free City’ for Mumbai

The SBM launched a protocol for Star Rating of Garbage Free cities. This rating consists of conditions designed to enable cities to evolve into a model (7-star) city, with progressive improvements in their overall cleanliness. It involves 25 key parameters (annexure 1, figure 7, 8) across the SWM spectrum to help cities self-assess their status and encourage them to progress towards improving their cities’ overall cleanliness and aesthetics.

The self-assessment is verified by an independent third-party agency, appointed by MoHUA (Ministry of Housing and Urban Affairs). “Garbage Free” status is awarded when at any point of time in the day, no garbage or litter is found in any public, commercial or residential locations (including storm drains and water bodies) in the city (except in litter bins or transfer stations), 100 percent of waste generated is scientifically managed, all legacy waste has been remediated and scientifically managing its municipal solid waste, plastic waste and construction & demolition waste.<sup>8</sup>

▪ Figure 1: Star Rating Process Flow for ULBs<sup>9</sup>



BMC applied for the 5-star Garbage Free City rating in March 2022 and **failed at the desktop assessment level**, which prevented it from proceeding to the field level assessment and ultimately resulted in **the failure to achieve a 5-star garbage free cities rating**.

<sup>8</sup> [SBM - Star Rating For Garbage Free Cities \(GFC\) \(sbmurban.org\)](https://sbmurban.org)

<sup>9</sup> <https://smmurban.com/uploads/files/f9i6rs85t17n0hd.pdf>

Figure 2: BMC's Application Copy for 5 Star Garbage Free Cities Rating<sup>10</sup>

**GFC APPLICATION** Home / G

Scorecard Details City Level Evidences Ward Level Evidences Upload Declarations

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**Applications**

State MAHARASHTRA	District MUMBAI	ULB Code 802794
City Profile GREATER MUMBAI	Application Submission Date 16-Mar-2022	
Scorecard GFC Application	Applied For 5 Star	Application Status DA FAIL
Pre-Qualifying Condition ODF+	Applied On 02-Mar-2022	Download Certificate

**City Level Evidences**

**15 C&D Waste - Collection \***

15A Number of ward, where a provision for collecting C&D waste through - mobile collection unit (on call basis facility and weekly schedule), and/or - designated collection points within re for generator to bring and deposit

15B Total number of C&D collection centre within the IIR

Figure 3: Status of Desktop Assessment Parameters in Mumbai<sup>11</sup>

**Third Party Inspection for Certification**

**Desktop Assessment**

- ❖ Verify wards
- ❖ Assess and verify the documents submitted by the cities for all components as per Level 1 requirements. The agency to validate the figures updated on MIS and the documents submitted by cities with corresponding minimum requirement (Level-1) for the following components:
  - Door to Door Collection,
  - Source Segregation,
  - Litter Bins,
  - Storage Bins,
  - Waste Processing and Capacity (Wet and Dry)
  - User Charges
  - Scientific Landfill - Waste Disposed,
  - Screening of Nallahs
  - On-site wet waste processing,
  - C&D Waste (Storage, Segregation, Processing & Recycling)
  - On-Site wet waste processing by Bulk Waste Generator
- ❖ Flag the Waste Processing Facilities, C&D facilities, landfills, dumpsites, drains, nallahs etc. if the city has claimed for these components but these are not available in city profile to ensure coverage during field assessment.

**Field Assessment**

- In addition to the Citizen validation, the agency will also assess the following components on the ground: door to door collection, segregated transportation, processing and sweeping as part of independent observation.
- In case of re-assessment of cities that failed in field assessment, the samples during re-assessment will also include failed samples (33% or more) from the earlier assessment in addition to the fresh samples.

<sup>10</sup> As per RTI response.

<sup>11</sup> <https://smmurban.com/uploads/files/f9i6rs85t17n0hd.pdf>

## B. Status of Waste Generation and Composition as per Environment Status Report

- Table 2: Percentage of Waste Generation and Waste Composition in Mumbai from 2017-18 to 2021-22<sup>12</sup>

Year	2017-18	2018-19	2019-20	2020-21	2021-22
<b>Waste Generation</b>					
Waste Generated (MTD)	7,350	7,450	6,650	5,500	6,300
% change year on year	-21.81%	1.36%	-10.74%	-17.29%	14.55%
<b>Domestic Waste Composition</b>					
Food Waste	72.60	72.60	72.60	72.60	72.60
Wood, Cloth	3.51	3.51	3.51	3.51	3.51
Sand, Stone, and Fine Earth	17.37	17.37	17.37	17.37	17.37
Plastic	3.24	3.24	3.24	3.24	3.24
Paper and other Recyclable Metals	3.28	3.28	3.28	3.28	3.28

**Note:** In 2017-18, to 2021-22, the figures indicate the average waste generated in MTD.

### Inference:

- As per BMC's Environment Status Report, waste generated has reduced from 7,350 Metric Tonnes per Day (MTD) in 2017-18 to 6,300 MTD in 2021-22.
- Despite a drop in waste generated, the composition of waste in Mumbai has remained constant from 2017-18 to 2021-22. This shows more focus is needed on tackling food waste through composting at the source to reduce the pressure on landfills and adopt a decentralised waste economy by incentivising by-products from waste processing.
- Moreover, in the ESR, there is a need to provide accurate information of waste composition and processing every year for effective tracking and monitoring of SWM in the city.

- Table 3: Status of Key Solid Waste Management (SWM) Indicators from 2017-18 to 2021-22<sup>13</sup>

Key SWM Indicators	2017-18	2018-19	2019-20	2020-21	2021-22
Collection door-to-door (%)	99%	100%	100%	100%	100%
Segregation (%)	65%	83%	82%	81%	81%
Number of bulk generators	3,364	3,380	3,367	3,367	2,825
Number of bulk generators composting at source	1,064	1,671	1,696	2,042*	1,500*
Extent of Municipal Solid Waste Recovered (80% target) <sup>14</sup>	35%	35%	35%	35%	35%
Extent of Scientific Disposal of Waste at Landfill Site (100% target)	32%	63%	75%	75%	88%
Number of transportation vehicles	5,369	4,379	5,946	5,126	7,759

\* Data taken from BMC Environment Status Report, 2020-21: Page no.40, Sr. no.4; 2021-22: Page no.44, Sr. no.4.

<sup>12</sup> & <sup>13</sup> BMC Environment Status Report 2017-18 to 2021-22.

<sup>14</sup> Waste recovered refers to amount of waste that is recovered to be used again for a productive purpose. Compost and waste to energy are examples of waste recovery.

**Inference:**

- As per BMC's Environment Status Report, 81% of the waste is being segregated as of 2021-22. However, this is not waste segregated at source, as prescribed in the SWM Rules 2016. The increase in segregation from 65% in 2017-18 to 81% in 2021-22 can be attributed to the establishment of 55 dry waste segregation centres in Mumbai.
- BMC Environment Status Report 2020-21 and 2021-22 does not mention number of bulk generators composting at source. In 2019-20, 50% of the bulk generators identified were composting waste at source.

▪ **Table 4: Type of Vehicles used for Solid Waste Management Services from 2017-18 to 2021-22<sup>15</sup>**

Type of Vehicle	Number of Vehicles				
	2017-18	2018-19	2019-20	2020-21	2021-22
Compactors	1,811	1,228	1,584	1,432	1,926
Skip Vehicles/Dumper Placers	11	11	1	0	0
Dumpers/Refuse Vehicle	192	100	126	192	315
Bulk Refuse Carriers	-	-	-	-	-
Tempo/Jeeps	3,238	2,933	4,092	3,358	5,294
JCB Machines	60	50	63	61	127
Stationary Compactors	57	57	80	83	97
<b>Total</b>	<b>5,369</b>	<b>4,379</b>	<b>5,946</b>	<b>5,126</b>	<b>7,759</b>

**Inference:**

- Tempo/Jeeps were most frequently used for waste management, with 5,294 vehicles in 2021-22. Compactor vehicles were the second most frequently used vehicles for waste management, with 1,926 in 2021-22.
- In 2017-18, 5,369 total vehicles were available for waste management and 7,350 MT of waste was generated. In 2021-22, the number of vehicles increased to 7,759, while the amount of waste generated decreased to 6,300 MT.
- This suggests that there has been an increase in the efforts and resources dedicated to waste management, as seen in the increase in the number of vehicles commissioned.
- There has been a decrease in waste generated by 14% from 2017-18 to 2021-22, however, the number of transportation vehicles has increased by 45%. This shows that the increase in vehicles is not compensating for a better collection of waste nor impact on complaints received for door-to-door collection, segregation and/or waste recovered.

<sup>15</sup> BMC Environment Status Report 2017-18 to 2021-22.

## C. Ward Wise Waste Generated and Processed as per RTI Data<sup>16</sup>

Table 5: Ward wise Garbage Lifted from January 2022 to December 2022

Region	Ward	Population 2022 <sup>17</sup>	% Slum Population 2011	Average Total Weight (MT)	Average Per Day (MT)	Per Capita Waste Generated (in Kg)	Proportion to total waste
Island City	A	1,92,830	34%	63,534	174	329	3%
	B	1,32,667	11%	40,794	112	307	2%
	C	1,73,180	0%	46,801	128	270	2%
	D	3,61,519	10%	74,023	203	205	3%
	E	4,09,900	20%	92,419	253	225	4%
	F/N	5,51,383	58%	96,843	265	176	4%
	F/S	3,76,221	26%	59,412	163	158	3%
	G/N	6,24,345	32%	1,67,410	459	268	7%
	G/S	3,93,707	21%	77,261	212	196	3%
Western Suburbs	H/E	5,80,779	42%	1,14,776	314	198	5%
	H/W	3,20,575	39%	88,853	243	277	4%
	K/E	8,58,690	49%	1,60,884	441	187	7%
	K/W	7,80,316	15%	1,47,774	405	189	6%
	P/N	9,81,134	54%	1,58,998	435	162	7%
	P/S	4,83,088	57%	97,422	267	202	4%
	R/C	5,85,910	19%	96,424	264	165	4%
	R/N	4,49,591	51%	59,366	163	132	3%
	R/S	7,20,430	58%	97,618	268	135	4%
Eastern Suburbs	L	9,40,339	54%	1,79,268	491	191	8%
	M/E	8,41,842	30%	1,17,790	323	140	5%
	M/W	4,29,293	53%	76,069	208	177	3%
	N	6,49,165	62%	66,536	182	102	3%
	S	7,75,204	72%	96,041	263	124	4%
	T	3,55,888	33%	55,225	151	155	2%
<b>Total</b>		<b>1,29,67,996</b>	<b>42%</b>	<b>23,31,541</b>	<b>6,385</b>	<b>180</b>	<b>100%</b>

MT - Metric tonnes

### Inference:

- In 2022, Average 23,31,541 MT of waste was collected from all 24 BMC wards and the average per day waste collected was 6,385 MT.
- From wards L (1,79,268) and G/N (1,67,410) maximum waste was collected in 2022.
- The information for garbage collected by BMC should also include garbage segregated at source, which can help BMC to understand and formulate targeted reforms to achieve effective waste management.

<sup>16</sup> As per RTI Response.

<sup>17</sup> Data taken from Environment Status Report 2021-22.

**Bulk Waste Generators (BWG)** produce a large amount of waste, which can have a significant impact on the environment if not managed properly. By identifying and regulating these generators, cities can ensure that the waste is disposed of in an environmentally responsible manner. Realising the importance of BWGs in management of solid waste, Government of India revamped the Municipal Solid Waste (Management and Handling) Rules 2000 and notified the Solid Waste Management Rules, 2016 on April 8, 2016<sup>18</sup>. The Rules mandate for effective waste management by bulk waste generators at source. Further, they lay emphasis on the duties and responsibilities of waste generators including bulk waste generators with timeframe for implementation and monitoring by the Government/ ULB.

However, despite effective guidelines laid down by MoHUA for the implementation of the guidelines and required modifications in the local government's SWM bye-laws, BMC bye-laws were not revised to include these necessary provisions to monitor the waste processing for BWGs. In 2017, the BMC passed a circular (annexure:1, figure 9) stating that all bulk generators i.e., units generating more than 100kg per day of waste will compulsorily set up biodegradable waste composting units and such waste will not be collected from bulk generators. However, the circular has not been effective in the management of BWG waste as seen in the data below.

▪ **Table 6: Ward wise BWG Societies from January 2022 to December 2022**

Ward	Population 2022	Total No. of BWG Societies	No. of Societies Processing Waste	No. of Societies Not Processing Waste	% Not Processing Waste	Wet Waste Generated (MT/Day)	Dry Waste Generated (MT/Day)	Quantum of Wet Waste Processed (MT/Day)	% of Wet Waste Processed
A	1,92,830	208	72	136	65%	57.0	7.0	15.0	26%
B	1,32,667	13	9	4	31%	2.0	0.3	1.3	65%
C	1,73,180	7	6	1	14%	0.8	0.2	0.7	88%
D	3,61,519	123	100	23	19%	18.3	1.7	16.0	87%
E	4,09,900	38	21	17	45%	9.3	1.5	7.8	84%
F/S	3,76,221	64	59	5	8%	8.0	2.0	7.3	91%
F/N	5,51,383	28	26	2	7%	5.8	2.8	5.5	95%
G/S	3,93,707	36	31	5	14%	10.5	2.0	10.0	95%
G/N	6,24,345	59	26	33	56%	6.6	2.3	3.0	45%
H/E	5,80,779	141	42	99	70%	16.8	5.5	6.3	38%
H/W	3,20,575	17	7	10	59%	3.5	0.8	1.5	43%
K/E	8,58,690	242	129	113	47%	38.0	2.0	14.0	37%
K/W	7,80,316	365	95	270	74%	37.0	4.0	10.0	27%
P/S	4,83,088	146	58	88	60%	30.9	7.6	16.0	52%
P/N	9,81,134	304	50	254	84%	43.7	5.5	10.0	23%
R/S	7,20,430	177	110	67	38%	31.2	6.0	20.0	64%
R/C	5,85,910	151	58	93	62%	48.0	1.0	5.8	12%
R/N	4,49,591	67	12	55	82%	8.5	1.2	1.4	16%
L	9,40,339	84	74	10	12%	28.0	6.3	25.5	91%
M/E	8,41,842	32	32	0	0%	20.4	8.8	20.4	100%
M/W	4,29,293	104	78	26	25%	15.6	7.0	13.0	83%
N	6,49,165	158	153	5	3%	30.5	4.0	30.0	98%
S	7,75,204	206	135	71	34%	22.0	4.4	16.8	76%
T	3,55,888	55	41	14	25%	14.9	5.7	13.5	91%
<b>Total</b>	<b>1,29,67,996</b>	<b>2,825</b>	<b>1,424</b>	<b>1,401</b>	<b>50%</b>	<b>507.3</b>	<b>89.6</b>	<b>270.8</b>	<b>53%</b>

<sup>18</sup> [https://smarnet.niua.org/sites/default/files/resources/bulk\\_waste\\_generator\\_book.pdf](https://smarnet.niua.org/sites/default/files/resources/bulk_waste_generator_book.pdf)

**Inference:**

- In 2022, total number of BWG societies was 2,825, out of which 1,424 societies were processing waste, and the remaining 1,401 societies were not processing waste. Out of total waste generated by BWG societies, 47% was not being processed.
- Wards P/N, R/N, and K/W had the highest percentages of non-processing BWG societies with 84%, 82%, and 74% respectively.
- Out of the total wet waste generated by societies, only 53% was processed, which suggests a significant gap in waste management practices and highlights the need for stringent strategies to improve waste processing and management in these societies.
- Ward M/E has the highest percentage (100%), followed by N Ward (98%) and G/S (95.2%), of wet waste processed, demonstrating effective wet waste management practices in these areas. Conversely, R/C has the lowest percentage (12%), followed by R/N (16%) and P/N (23%), thus a need for improvement in wet waste management in these wards.

▪ **Table 7: Status of Dry Waste Segregation Centres (DWSC) for the Year 2022 (MT)**

Ward	Number of Dry Waste Centre	Total Dry Waste Received at DWSC	Recyclable Dry Waste	Dry waste sent to Dumping Ground	% sent to Dumping Ground
A	1	1,523	1,370	153	10.04%
B	1	815	761	54	6.64%
C	2	2,382	2,245	136	5.72%
D	2	2,241	2,036	206	9.17%
E	1	59	52	7	12.56%
F/N	5	697	622	75	10.77%
F/S	7	4,072	3,866	206	5.05%
G/N	2	1,003	909	94	9.38%
G/S	2	1,342	1,142	199	14.85%
H/E	1	2,658	2,381	278	10.44%
H/W	1	3,494	3,043	451	12.90%
K/E	2	2,732	2,534	198	7.25%
K/W	3	3,404	3,118	287	8.42%
L	4	3,674	3,306	368	10.01%
M/E	1	431	355	76	17.64%
M/W	1	731	652	79	10.81%
N	1	4,583	4,076	507	11.07%
P/N	2	1,530	1,260	269	17.62%
P/S	3	1,820	1,653	167	9.19%
R/C	1	2,568	2,376	192	7.48%
R/N	1	1,914	1,740	174	9.08%
R/S	1	3,518	3,254	263	7.49%
S	1	1,001	950	51	5.10%
T	1	3,314	2,859	455	13.73%
<b>Total</b>	<b>47</b>	<b>51,505</b>	<b>46,559</b>	<b>4,946</b>	<b>9.60%</b>

### Inference:

- N Ward DWSC's received the highest amount of dry waste with 4,583, followed by F/S with 4,072 and L with 3,674. In terms of the highest number of dry waste centers available, F/S, F/N, and L wards had the most with 7, 5, and 4 centers respectively.
- The data shows that out of the total dry waste collected from the wards, 90% of the waste was recycled, while the remaining 10% was rejected and sent to the dumping ground.
- M/E, P/N, and G/S had the highest percentage of dry waste sent to dumping ground at 17.64%, 17.62%, and 14.85%, respectively.

Table 8 : Ward wise and Type wise Dry Waste Recyclable Data for the Year 2022

Ward	Number of Dry Waste Centres*	Types of Dry Waste (MT)								
		Plastic Bottles/ Other Plastic Recyclable	News Paper/ Mixed Papers/ Boxes/ Putta/Card Board	E-Waste	Thermocol	Glass (Bottle)	Tins	Clothes	Metal	Other Recyclable Dry Waste
A	1	996	58	28	27	27	26	27	27	154
B	1	362	322	0.0	0.5	28	1	21	26	0.0
C	2	156	1,983	0.0	0.0	83	11	11	1	0.0
D	2	297	447	10	0.1	217	24	23	60	959
E	1	26	16	0	3	6	0.0	0.0	0.3	0.0
F/N	5	120	215	17	17	147	10	13	12	70
F/S	7	801	1,943	1	0.0	318	215	195	111	283
G/N	2	266	320	6	1	61	19	47	7	183
G/S	2	274	614	7	3	4	8	6	8	219
H/E	1	406	678	74	110	254	179	124	277	280
H/W	1	1,881	757	2	11	374	1	4	8	6
K/E	2	604	1,476	9	8	165	46	52	57	117
K/W	3	1,276	493	90	1	320	150	318	135	334
L	4	944	1,077	0.0	2	156	126	258	102	641
M/E	1	34	175	5	11	37	8	16	22	48
M/W	1	179	232	1	0.1	65	1	4	14	156
N	1	970	1,865	67	68	896	69	7	67	68
P/N	2	219	344	0	101	117	108	121	0	251
P/S	3	424	438	58	7	169	76	100	66	316
R/C	1	530	1,138	19	1	283	30	176	30	170
R/N	1	390	9	0.1	1	3	1	0.1	0.1	1,335
R/S	1	827	1,247	23	2	304	275	49	303	224
S	1	124	432	7	2	254	3	68	6	54
T	1	296	1,117	2	33	438	40	47	34	853
<b>Total</b>	<b>47</b>	<b>12,402</b>	<b>17,397</b>	<b>425</b>	<b>408</b>	<b>4,725</b>	<b>1,424</b>	<b>1,685</b>	<b>1,374</b>	<b>6,719</b>

\* As of December 2022, there are 55 dry waste segregation centres of which 8 of them are not operational.

### Inferences:

- In 2022, highest amount of dry waste was generated from Newsprint/mixed papers/boxes/putta/cardboard, with a total of 17,397 MT, followed by Plastic bottles/other plastic recyclable with 12,402 MT.
- Thermocol and E-waste are the least generated dry waste types, with a total of 408 and 425 MT respectively.

## D. Best Practices of Solid Waste Management by other Indian Cities

### 1. Source Segregation and Door to Door Collection<sup>19</sup>

- a. **Indore Municipal Corporation (IMC):** The city achieved 100% door-to-door waste collection and segregation by conducting an identification study, preparing a route plan, and deploying staff and vehicles accordingly. It took nearly a year to accomplish this. Partitioned vehicles are used for collection, and a GPS-enabled tracking system is used to monitor the vehicles. Any deviations from the established routes are penalised, with multiple violations resulting in dismissal. IMC adopted various Information, Education and Communication (IEC) activities to make Swachh Bharat Mission successful. Municipal officials, public representatives, religious and community leaders participated in the campaign to convince citizens to segregate waste. IMC engaged more than 800 self-help groups (SHGs), comprising over 8,000 women, to spread awareness about source segregation and to provide workers for material recovery facilities.



b. **Vijayawada Municipal Corporation (VMC):** They city implemented technological measures such as QR code-enabled Radio Frequency Identification (RFID) tags for waste collection, resulting in 52 bin-free wards. Smart bins send alerts when full. VMC also enforced source segregation, door-to-door collection, home composting, vermicomposting, public and community toilets, and plastic vending machines. Rag pickers are employed to segregate and collect plastic waste.

- c. **Corporation of the City of Panaji (CCP):** The city of Panaji in India has implemented an innovative waste segregation system, as part of the HDFC-United Nations Development Programme Dry Waste Management project. Unlike most cities, which use a 2-way system, Panaji's 16-way segregation model allows for more efficient recycling and resource recovery, while eliminating the need for landfills. This system is not only cheaper, but also reduces the health risks for waste pickers who sort the waste at material recovery facilities. The model requires minimal manual or mechanical sorting and is environmentally friendly.<sup>20</sup>

### 16 WAYS TO SEGREGATE YOUR WASTE



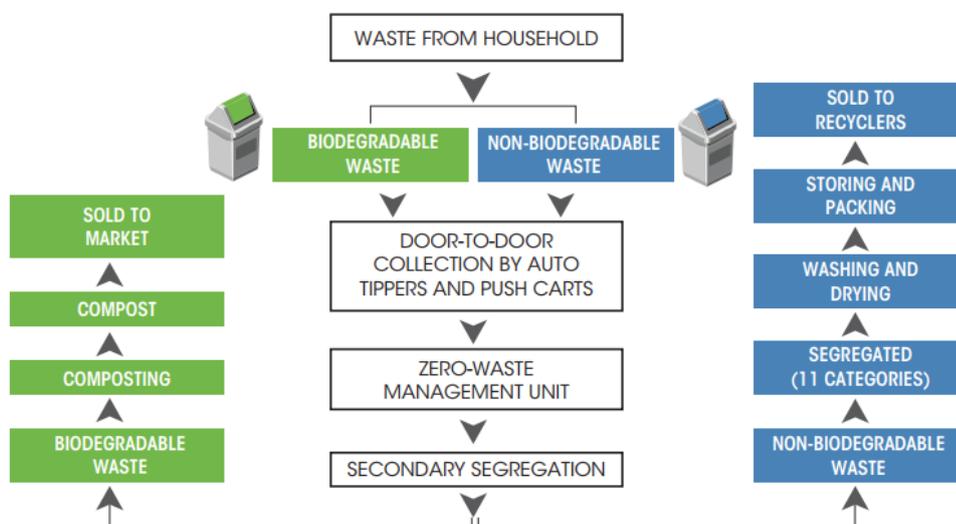
<sup>19</sup> [CSE and NITI Aayog release 'Waste-wise cities' – compendium of best practices in municipal solid waste management \(cseindia.org\)](https://www.cseindia.org/)

<sup>20</sup> [16-ways of segregating waste: Panaji's innovative model of solid waste management | United Nations Development Programme \(undp.org\)](https://www.undp.org/)

## 2. Decentralised Waste Processing

- a. **Mysuru City Corporation (MCC):** The city implemented nine Decentralised zero-waste management units for pit and vermicomposting. Each plant handles biodegradable waste from five wards, ensuring minimal load on the centralised compost unit. Compost is sold to farmers at Rs. 1,200/tonne, with 5% retained for horticultural purposes.

### How MCC manages municipal solid waste



Source: Mysuru City Corporation

- b. **Bhopal Municipal Corporation (BMC):** Biodegradable waste is processed at two centralised windrow composting facilities (capacity 410 TPD) and two bio-gas plants (capacity 105 TPD). Apart from these, the BMC operates one decentralised processing facility at AIIMS. There are 69 bulk waste generators in the city who manage their waste at their own onsite facilities; so do 80 residential welfare associations and 102 public gardens.
- c. **Pimpri Chinchwad Municipal Corporation (PCMC):** Housing societies constructed after 2016 and fall under the bulk waste generator (BWG) category, producing at least 100 kg of wet waste per day, are required to comply with onsite composting norms. Failure to do so will result in the civic body refusing to collect their waste. BWGs built before 2016 must also have a composting unit or face consequences. For BWG societies that lack space for composting units, a third-party vendor solution is necessary, which the civic body may assist in regularising waste processing prices. This move promotes waste reduction and encourages responsible waste management practices within the housing society sector.<sup>21</sup>

<sup>21</sup> [Pune: Societies get chance to fix trash issues | Pune News - Times of India \(indiatimes.com\)](https://www.indiatimes.com/News/Pune/Societies-get-chance-to-fix-trash-issues-Pune-News-Times-of-India/indiatimes.com)

## E. Status of Landfills under BMC<sup>22</sup>

As of 2022, there are three landfill/dumping sites under the jurisdiction of BMC. They are Kanjurmarg Landfill Site, Deonar Dumping Ground, and Mulund Dumping Ground. Presently, waste generated within BMC is sent to the former two sites, while Mulund Dumping Ground has been closed and the process of bio-mining is being carried out. The predominant method of waste disposal followed until lately was the dumping and levelling of waste. With the inclusion of the bioreactor technology for generation of landfill gas and composting technology at Kanjurmarg since 2015, scientific treatment of waste has improved from 32% in 2017-18 to 88% in 2021-22.

Since Mulund (2018) and Gorai (2009) dumping grounds have been closed and Deonar is long due closure, it is important to focus on decentralised waste management practices that will reduce the waste going to a centralised landfill or dumping ground. This will be more sustainable since dumping grounds produce leachate that causes soil and marine pollution and emits methane into the atmosphere. Burning waste in dumping grounds to reduce the volume of waste is also a major cause of air pollution in the surrounding areas. This section aims to understand the method of waste processing carried out in each of these sites with the data received via an RTI.

▪ **Table 9: Disposal of Municipal Solid Waste in Mumbai<sup>23</sup>**

Name	Years of operation	Area (Ha)	Type of Waste Processing	Amount of waste disposed (MTD) <sup>24</sup>					Current Status
				2017-18	2018-19	2019-20	2020-21	2021-22	
Deonar	88	120	Dumping	2,200-2,500	2,500-3,100	1,200-1,700	500-700	500-700	Operational
Kanjurmarg	4	65.96	Bioreactor technology (3000-3500 MTD) and windrow composting technology (1000 MTD)	3,600	4,500	4,500-5,500	4500-5500	4500-5500	Operational
Mulund	47	24	Dumping	1,700-1,800	Closed	Closed	Closed	Closed	Closed

<sup>22</sup> As per the RTI response.

<sup>23</sup> BMC Environment Status Reports 2017-18 to 2021-22.

<sup>24</sup> Approximate values given in the BMC Environment Status Report.

## 1. Deonar Dumping Ground

Table 10: Ward wise Garbage Sent to Deonar Dumping Ground from 2020 to 2022 (in MT)

Ward	Population 2022	2020	Average Per day	2021	Average Per day	2022	Average Per day
A	1,92,830	14,063	39	16,325	45	12,216	33
B	1,32,667	7,547	21	7,498	21	6,505	18
C	1,73,180	7,816	21	7,537	21	5,276	14
D	3,61,519	13,159	36	15,197	42	14,329	39
E	4,09,900	21,462	59	22,619	62	20,047	55
F/N	5,51,383	26,852	74	21,757	60	19,280	53
F/S	3,76,221	16,304	45	15,958	44	11,935	33
G/N	6,24,345	30,386	83	29,675	81	33,842	93
G/S	3,93,707	15,967	44	15,925	44	12,834	35
H/E	5,80,779	33,496	92	28,226	77	34,153	94
H/W	3,20,575	15,136	41	20,091	55	19,359	53
K/E	8,58,690	39,903	109	31,934	87	30,540	84
K/W	7,80,316	22,468	62	24,242	66	30,515	84
L	9,40,339	70,833	194	53,414	146	42,046	115
M/E	8,41,842	1,49,964	411	1,33,914	367	1,43,555	393
M/W	4,29,293	53,538	147	94,502	259	99,008	271
N	6,49,165	17,483	48	32,524	89	25,735	71
P/N	9,81,134	5,404	15	5,750	16	8,186	22
P/S	4,83,088	5,310	15	4,225	12	4,107	11
R/C	5,85,910	3,756	10	1,864	5	6,035	17
R/N	4,49,591	2,883	8	1,655	5	3,246	9
R/S	7,20,430	1,847	5	3,975	11	13,187	36
S	7,75,204	17,806	49	36,982	101	29,339	80
T	3,55,888	1,635	4	6,820	19	5,250	14
Other <sup>25</sup>	-	97,144	266	65,954	181	1,23,236	338
<b>Grand Total</b>	<b>1,29,67,996</b>	<b>6,92,161</b>	<b>1,896</b>	<b>6,98,560</b>	<b>1,914</b>	<b>7,53,761</b>	<b>2,065</b>

### Inference:

- Total waste transported to the Deonar dumping ground increased from 6.92 lakh metric tonnes (MT) in 2020 to 7.53 lakh MT in 2022, an average per day increase from 1,896 MT to 2,065 MT.
- Among all the wards, M/E ward transported the highest amount of waste in all three years, with 1,49,964 MT in 2020, 1,33,914 MT in 2021, and 1,43,555 MT in 2022. This could be due to the close proximity of Deonar to M/E Ward.
- Ward R/S had a significant increase of 232% in waste transported from 2021 to 2022, from 3,975 MT to 13,187 MT.
- There are several wards where the waste transported has decreased over the years, such as Ward L, which sent 70,833 MT of waste in 2020 to 42,046 MT in 2022, suggesting that the measures implemented to manage waste at the ward level have been successful.

<sup>25</sup> For more details, refer to annexure 1, table no.50

## 2. Kanjurmarg Landfill

**Bioreactor Landfill Technology (BLFT)** is a waste management technique that enhances the degradation of organic waste in landfills by controlling moisture, temperature, and other environmental conditions to accelerate the microbial decomposition process. Bio-reactor technology is mainly anaerobic technology in principle. In bioreactor technology, leachate is re-circulated to enhance the decomposition of biodegradable material and recover landfill gas generated to generate electricity, which in turn reduces emission of Green House Gases<sup>26</sup>. Bioreactor landfill technology can help to reduce the volume of waste in landfills and enhance the recovery of recyclable materials.

Landfill gas refers to the gas that is produced during the decomposition of organic waste materials at a landfill site. The gas is a mixture of mostly methane and carbon dioxide, with smaller amounts of other gases such as nitrogen, oxygen, and hydrogen.

▪ **Table 11: MSW received in Bioreactor Landfill (BLF) Technology in Kanjur Landfill from 2020 to 2022**

Year	Type	BLF Cell -3	BLF Cell -4	BLF Cell -5	BLF Cell -6	BLF
		MSW received in MT	MSW received in (MT)	MSW received in (MT)	MSW received in (MT)	Total MSW received in (MT)
2020	Non –CRZ Area	-	11,31,379	2,24,464	-	13,55,842
	CRZ Area	-	1,04,399	17,445	-	1,21,844
	<b>Total</b>	-	<b>12,35,778</b>	<b>2,41,908</b>	-	<b>14,77,686</b>
2021	Non –CRZ Area	-	1,87,749	12,93,699	-	14,81,448
	CRZ Area	59,161	38,350	15,106	-	1,12,617
	<b>Total</b>	<b>59,161</b>	<b>2,26,099</b>	<b>13,08,805</b>	-	<b>15,94,065</b>
2022	Non –CRZ Area	-	-	9,03,864	6,61,876	15,65,740
	CRZ Area	72,559	29,520	5,836	2,400	1,10,315
	<b>Total</b>	<b>72,559</b>	<b>29,520</b>	<b>9,09,700</b>	<b>6,64,277</b>	<b>16,76,056</b>

### Inference:

- The total Municipal Solid Waste (MSW) received in non-CRZ (Coastal Regulation Zone) areas increased by 15% from 1,355,842 MT in 2020 to 1,565,740 MT in 2022.
- There was a significant increase in the amount of MSW received in BLF Cell -5 from 2,41,908 MT in 2020 to 1,308,805 MT in 2021, but it decreased to 9,09,700 MT in 2022 when the BLF Cell 6 was open for storage of waste.

<sup>26</sup> [https://portal.mcg.gov.in/iri/go/km/docs/documents/Circulars/01101506\\_Kanjur%20bioreactor%20project.pdf](https://portal.mcg.gov.in/iri/go/km/docs/documents/Circulars/01101506_Kanjur%20bioreactor%20project.pdf)

▪ **Table 12: MSW Received for Composting at Kanjurmarg landfill**

Years	MSW received (MT)	Generation of Compost (MT)	Sale of Compost
16 <sup>th</sup> March 2018 to 31 <sup>st</sup> December 2020 <sup>27</sup>	6,08,168	14,238	13,439
2021	3,52,339	17,257	14,720
2022	3,37,730	23,934	15,662

**Inference:**

- The amount of municipal solid waste (MSW) received in composting plant at Kanjur Landfill seems to have decreased from 3,52,339 MT from 2021 to 3,37,730 MT in 2022.
- Despite the decrease in MSW received, the generation of compost has increased from 14,238 MT in 2018-2020 to 23,934 MT in 2022. This suggests that the composting plant may have improved its composting process or increased the amount of organic waste being processed.
- The sale of compost has also increased steadily from 13,439 MT in 2018-2020 to 15,662 MT in 2022, which shows that there is a market demand for the compost produced by the composting plant.
- Overall, the composting plant seems to be making efforts to reduce the amount of waste going to landfills by diverting organic waste to composting and generating a valuable product that can be sold.

▪ **Table 13: Bio-mined Material received in Bioreactor Landfill Technology in Kanjurmarg Landfill (in MT)**

Months	Bio-mined Material	Compost	Soil Cover	Compostable Fraction (A+B)	RDF (Refuse Derived Fuel)	Boulders/Stones/ others
		(A)	(B)			
2020*	28,644	2,864	5,729	8,593	14,321	5,729
2021	82,664	8,274	16,535	24,798	41,332	16,533
2022	1,03,913	10,463	20,711	31,174	51,957	20,783
<b>Grant Total</b>	<b>2,15,221</b>	<b>21,601</b>	<b>42,975</b>	<b>64,565</b>	<b>1,07,610</b>	<b>43,045</b>

\* 2020: data from March to December

**Inference:**

- The bioreactor landfill technology effectively processes the bio-mined material, producing a significant amount of compostable fraction (A+B) and useful components such as soil cover, RDF, and boulders/stones/others.
- The compost produced can be used for various applications, such as soil improvement, agriculture, and landscaping. The data also suggests that there was a significant increase in the amount of bio-mined material received from February 2022 to May 2022, which led to a corresponding increase in the amount of compost and its components produced during those months.
- The quantity of bio-mined material received in the bioreactor landfill technology has significantly increased by 263% from 28,644 MT in 2020 to 1,03,913 MT in 2022.
- Additionally, the total quantity of bio-mined material received during the entire period of the data is 2,15,221 MT.

<sup>27</sup>Cumulative data for the period between March 2018 and February 2020 has been provided.

## Case Study on Kanjurmarg Landfill Gas Generation

Decentralised Waste Management is important to achieve effective SWM. These decentralised systems can help to alleviate the burden of handling large volumes of Municipal Solid Waste (MSW) at a centralised location such as landfills, which can result in lesser cost for transportation and intermediate storage.

Landfills are often large in Indian cities and according to experts' landfills emit noxious gases like sulphur dioxide, sulphur monoxide, hydrogen sulphide, methane, carbon monoxide and carbon dioxide. The inhalation of these gases can affect people's health with irritation, and rhinitis, and when inhaled for a longer period they can cause cough, and shortness of breath, and may lead to Chronic Obstructive Pulmonary Disease.

**Objective:** The objective of this case study is to understand various initiative of decentralised waste to energy projects. In addition, the study also aims to provide value and monetary impact of the energy generated in Mumbai's Kanjurmarg Landfill.

### Best Practice:

To understand the benefits of using landfill gas for electricity, an example from a study by Maharashtra Energy Development Agency (MEDA) for Pune Municipal Corporation (PMC) is considered for the study.<sup>28</sup>

To dispose organic waste in an environmentally efficient way, the PMC decided to set up decentralised bio methanation plants across the city. Under the Biogas-based Power Generation Programme (BPGP), Pune Municipal Corporation installed 25 biogas plants in different areas across the city. These biogas plants generate electricity and manure. The amount of electricity generated is around 1,65,500 kWh and this electricity is used to feed streetlights across the city as well as its operation during the daytime. The tariff rate of power consumption in Pune was around Rs. 5.5 per kWh (as per data from 2015). The savings due to electricity generation can be calculated from the formula below.

**Formula: Savings due to Electricity Generation = Amount of kWh X Rs. rate per kWh –**

Using the above formula, the Saving due to Electricity Generation by PMC can be calculated as follows:  
**1,65,500 kWh X 5.50 Rs. /kWh = Rs. 9.07 Lakhs**

PMC saves Rs. 9.07 Lakhs from electricity generation (based on 2015 data). Additionally, as there are 25 biogas plants that are decentralised, PMC saves around 50% of the transportation costs as the landfill site is 22 km away from the city. These savings are the direct benefits of utilising waste to generate energy and manure in a decentralised system. These saving can be revenue for PMC, which can be used for some other purposes. Some of the indirect benefits of generating electricity are these biogas plants can increase the operational life of the existing sanitary landfill in the long run. It will help avoid the release of methane gas (from uncontrolled open dumping at landfill sites) into the atmosphere, which can cause serious environmental damage.

### Data Analysis:

According to the data received via RTI from Kanjurmarg landfill, the below analysis highlights the volume of landfill gas collected and the amount of gas flared. The information also highlighted the amount of gas used to generate electricity (in units).

In this case study, analysing the amount of landfill gas flared can help estimate the potential electricity generation if the gas had been utilised instead. By determining the proportion of gas flared, we could estimate the amount of electricity generated from the flared gas. This analysis can provide insights into the landfill's energy recovery potential in decentralised waste management and renewable energy production.

<sup>28</sup>[https://www.mahaurja.com/meda/data/off\\_grid\\_bio\\_energy/Success%20Wealth%20from%20Organic%20Waste.pdf](https://www.mahaurja.com/meda/data/off_grid_bio_energy/Success%20Wealth%20from%20Organic%20Waste.pdf)

▪ **Table 14: Landfill Gas Flared and Electricity Generated in Bioreactor Landfill (BLF) Technology in Kanjur Landfill from 2020 to 2022**

Years	Landfill gas collected (Cu.M)	Landfill gas Flared (Cu.M)	% of Gas Flared	Electricity generated from landfill gas		Electricity Generation from Gas Flared (Units)	Quantity of Leachate generated (Cu.M)	Quantity of Leachate recirculated (Cu.M)
				(Units)	(Cu.M)			
2020	69,82,039	44,72,305	64%	12,54,867	25,09,734	22,36,153	82,760	72,140
2021	53,99,720	25,98,346	48%	14,00,664	28,01,328	12,99,152	95,310	51,020
2022	89,55,875	54,61,415	61%	17,47,230	34,94,460	27,30,708	93,280	41,920

Note: Cu.M. - Cubic Meters

The amount of landfill gas generated in 2022 is 89,55,875 Cu.M. From 2020 to 2022, the landfill gas collected has increased by 28.27%. Out of this, around 60% of gas is being flared, i.e., destroyed in a monitored way to avoid uncontrolled release in the atmosphere, and the rest 40% is being used to generate electricity. As the BLF system in Mumbai is centralised, only 40% of landfill gas is converted to electricity. The potential use of BLF technology can be scaled up and the amount of energy being flared can be used to generate electricity (see table no.14) below as it has many direct and indirect benefits.

If the practices of PMC such as the decentralised approach to waste disposal and effectively generating electricity from landfill gas are adopted by BMC, then as shown in table no.15 are the potential savings in electricity by the landfill gas. To calculate savings, the tariff considered is Rs. 7.64 as per Brihanmumbai Electric Supply & Transport for 2023-24.

▪ **Table 15: Potential Electricity Generated in Bioreactor Landfill (BLF) Technology from Landfill Gas Flared from 2020 to 2022**

Years	Electricity Generated from Gas Flared	Savings Calculation	Potential Savings (in Rs.)
2020	22,36,153 kWh	22,36,153 kWh X Rs. 7.64	1,70,84,209
2021	12,99,152 kWh	12,99,173 kWh X Rs. 7.64	99,25,521
2022	27,30,708 kWh	27,30,708 kWh X Rs. 7.64	2,08,62,609

According to the case study analysis, it shows that if the landfill gas that was flared had been used to generate electricity instead, significant savings in terms of monetary value could have been achieved. In 2020, the savings could have been approximately 171 lakhs of rupees, in 2021 it could have been 99 lakhs of rupees, and in 2022 it could have been 209 lakhs of rupees. These figures highlight the potential economic benefits of utilising landfill gas for electricity generation rather than flaring it.

### 3. Mulund Dumping Ground

- Table 16: Year wise and Material wise Disposal Quantity on Mulund Dumping Ground from 2020 to 2022

Year	C & D Disposal Quantity	Soil Disposal Quantity	Stone Disposal Quantity	SFC Kind Material	Total Disposal Quantity
2020	6,635	1,65,409	2,247	0	1,74,291
2021	146	2,17,140	2,960	0	2,20,246
2022	0	9,23,111	1,796	15,298	9,40,204

#### Inference:

- Total quantity of waste disposed in Mulund Dumping Ground from 2020 to 2022 was 13,34,742 MT which includes types of waste such as soil, stone, C&D waste, and SFC kind material.
- Soil disposal quantity was the highest in 2020 as 1,65,409, with a maximum of 9,23,111 in 2022.
- C & D (construction and demolition) disposal quantity was highest in the first half of 2020, with a quantity of 6,635. Stone disposal quantity was highest in 2021, with a quantity of 2,960.
- The year 2022 has seen a total disposal quantity of 9,40,204, with soil disposal quantity being the highest at 9,23,111.

- Table 17: Status of Bio-Mining process at Mulund Dumping Ground as of December 2022

<b>Total Legacy Waste</b>	<b>70,00,000 MT</b>
Waste Disposed from Jan 2020 to Dec 2022 (25 out of 36 months)*	13,34,742 MT
Avg. quantity disposed per month (Waste disposed/25 months)	53,390 MT/ Per Month
Avg. Quantity disposed from Oct 2019 to Dec 2019 (3 months)**	1,60,169 MT
<b>Total Waste Disposed from Oct 2019 to Dec 2022 (28 Month)</b>	<b>14,94,911 MT</b>
% of Waste Disposed till Dec 2022	21%
Remaining waste for bio-mining	55,05,089 MT
Target date for completion of bio mining	27-Jun-2025
Month Remaining to meet target date for completion of bio mining	30 Months
<b>Quantity to treat per month for achieved target date of bio-mining</b>	<b>1,83,503 MT/ Per Month</b>

\* In RTI data no information available of bio mining for 6 months in 2020, 3 months in 2021, and 2 months in 2022.

\*\* According to SWM annual report (Form IV – MPCB) bio-mining work commenced in October 2019

#### Inference:

- The total waste disposed of from 2019 to 2022 is 14,94,911 MT out of 70,00,000 MT which is only 21% of waste was disposed of till December 2022.
- It took 28 months to dispose of this waste, with an average quantity of 53,390 MT disposed of per month.
- The remaining waste for bio-mining at the Mulund dumping ground is 55,05,089 MT, and the target date for the completion of bio-mining is June 2025, which is 30 months from Jan 2023. To meet the **target date, 1,83,503 MT of waste needs to be treated per month.**
- To meet the target date of June 2025 for the completion of bio-mining at the Mulund dumping ground, the BMC needs to plan accordingly as the current treatment situation needs to work 3.4 times faster to achieve the goal.

## F. Community-Based Initiatives

The BMC started the Dattak Vasti Yojana for slums in 2001 so that community-based organisations are involved to ensure the collection of waste from slum households to collection points. The scheme was changed to Swachh Mumbai Prabodhan Abhiyan (SMPA). Under the scheme, SMPA unit is made of 150 families or 750 people. For the implementation of this scheme, a monthly allowance is provided on a per unit basis. Accordingly, for one unit an allowance of Rs. 5,400/- per month is provided and the organisation receives an additional allowance of Rs. 600/- per unit for carrying out activities like awareness, public participation and a conducive environment for the scheme. In this scheme, an eligible organisation is awarded an area of minimum of five units and maximum of 18 units.<sup>29</sup>

■ **Table 18: Details of Ward Wise SMPA (Swachh Mumbai Prabodhan Abhiyan) in Mumbai as of 2022<sup>30</sup>**

Ward	Total SMPA CBO*	No. of SMPA Unit* allotted	Population Estimated to be Covered	
A	56	568	4,26,000	<p>Previously in 2021, SMPA data of 2019 including ward-wise information on CBOs, units, waste collection, processing, and composting was available on the BMC website. However, following an update, this data was removed in and since then no information is updated on the website.</p> <p>The BMC created a website for the SMPA project, where only ward-wise numbers of CBOs and units are uploaded on the report tab for public access. However, as per the earlier data, the BMC has not uploaded or shared the data on waste collection, processing, and composting.</p>
B	0	0	0	
C	0	0	0	
D	24	272	2,04,000	
E	68	939	7,04,250	
F/S	70	966	7,24,500	
F/N	166	2,311	17,33,250	
G/S	43	589	4,41,750	
G/N	134	1,732	12,99,000	
H/E	141	2,007	15,05,250	
H/W	99	1,339	10,04,250	
K/E	222	2,871	21,53,250	
K/W	101	1,223	9,17,250	
P/S	77	756	5,67,000	
P/N	523	6,810	51,07,500	
R/S	170	2,175	16,31,250	
R/C	65	551	4,13,250	
R/N	259	2,840	21,30,000	
L	222	3,345	25,08,750	
M/E	68	835	6,26,250	
M/W	182	2,084	15,63,000	
N	261	3,649	27,36,750	
S	442	6,142	46,06,500	
T	80	852	6,39,000	
<b>Total</b>	<b>3,473</b>	<b>44,856</b>	<b>3,36,42,000</b>	

\*CBO: Community Based Organisations      1 Unit: 150 families of 750 people

### Inference:

- Wards B and C shows there are no SMPA units in these wards.
- As per the scheme if 44,856 SMPA units are allotted across all wards which means, total of 67,28,400 families and of 3,36,42,000 people are covered in Mumbai as of 2022.
- Highest number of SMPA units are being allotted to P/N ward (6,810) followed by S ward (6,142) and N ward (3,649).

<sup>29</sup> <https://smpamumbai.org/Image/PDF/AboutAbhiyanEng.pdf>

<sup>30</sup> <https://smpamumbai.org/AdminReport/MasterCount.aspx>

## G. Status of Complaints Registered and Resolution<sup>31</sup>

Table 19: Solid Waste Management Related Civic Complaints from 2013 to 2022

Sub Issue	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Collection point not attended properly	231	476	345	1,002	565	644	620	685	336	548
Garbage lorry not reported for service/ Lorry not covered	411	341	153	257	464	791	751	326	289	444
Garbage not lifted from House/Gully/ Municipal Market/ Road/Authorised collection point	2,085	2,819	1,593	2,109	3,597	5,157	6,086	3,943	3,319	4,356
Lifting of Tree Cutting	503	568	573	635	794	1,241	1,753	1,590	2,029	1,071
Non-attendance of nuisance Detector	423	480	548	523	1,242	1,571	1,947	1,168	1,218	1,139
Providing/removing/replacing dustbins	223	658	334	425	499	552	666	440	437	696
Removal of dead animals	51	33	53	61	70	636	1,105	1,164	909	703
Removal of Debris	889	1,001	953	1,241	1,625	2,122	2,371	1,395	1,550	1,899
Silt to be lifted from road	369	430	365	605	676	1,052	845	320	386	587
Sweeping of roads	334	525	296	472	612	728	972	564	583	908
<b>Total</b>	<b>5,519</b>	<b>7,331</b>	<b>5,213</b>	<b>7,330</b>	<b>10,144</b>	<b>14,494</b>	<b>17,116</b>	<b>11,595</b>	<b>11,056</b>	<b>12,351</b>

(For more refer table no. 42 to 45)

### Inference:

- The highest number of complaints in 2022 were related to 'garbage not lifted' (4,356) from house/gully/market/ road etc. followed by removal of debris (1,899) and non-attendance of nuisance detector (1,139).
- The total number of complaints has increased by 12% from 2021 to 2022.
- The highest percentage increase in complaints from 2021 to 2022 was for collection points not being attended properly (63%), followed by providing/removing/replacing dustbins (59%) and sweeping of roads (56%).
- Garbage not lifted from house/gully/market/road etc. and removal of debris have consistently been among the highest complaints in the last 10 years. This highlights the need for sustained efforts to address the root cause of these issues.

<sup>31</sup>As per RTI Response.

- Table 20: Analysis of Complaints Attended (Closed) in Comparison with Days Mentioned in BMC's Citizen Charter

Issues/Sub-issues	Days taken to resolve as per Citizens' Charter	Actual time taken to resolve					% Change from 2018 to 2022
		2018	2019	2020	2021	2022	
Garbage not lifted - Co-authorized Point	1	38	18	54	52	31	-18%
Collection point not attended properly	1	37	20	55	51	31	-16%
Garbage lorry not reported for service/ Lorry not covered	1	35	23	70	77	32	-9%
Providing/removing/replacing dustbins	8	40	23	55	48	28	-31%
Sweeping of roads	1	33	19	62	50	30	-8%
Removal of Dead Animals	1	33	20	63	47	29	-13%
No attendance at public toilets	2	39	22	58	52	31	-19%

**Inference:**

- The issue of collection points not being attended properly took the maximum number of days to be resolved, with an average of 28 days for complaints related to garbage vehicles not arriving, garbage not being lifted from co-authorized points, and sweeping of roads in 2022.

## H. Municipal Budget Related to SWM Department<sup>32</sup>

- Table 21: SWM Department Revenue Expenditure from 2019-20 to 2023-24 (In Crore)

Solid Waste Management Department	2019-20		2020-21		2021-22		2022-23		2023-24	
	Budget Estimate	% Share								
Establishment Expenses	1,213	51%	1,323	55%	1,516	60%	1,660	61%	1,905	62%
Administrative Expenses	22	1%	20	1%	17	1%	19	1%	42	1%
Operation And Maintenance Expenses	935	40%	871	36%	850	33%	905	33%	974	32%
Programme Expenses	187	8%	177	7%	154	6%	154	6%	140	5%
Revenue Grants, Contribution and Subsidies	0.10	0.004%	0.76	0.03%	0.47	0.02%	1.06	0.03%	1.00	0.03%
<b>Total SWM Budget</b>	<b>2,356</b>	<b>100%</b>	<b>2,391</b>	<b>100%</b>	<b>2,537</b>	<b>100%</b>	<b>2,739</b>	<b>100%</b>	<b>3,062</b>	<b>100%</b>
<b>Total BMC Budget</b>	<b>19,206</b>		<b>18,797</b>		<b>20,276</b>		<b>23,294</b>		<b>25,306</b>	
<b>% of Budget assign to SWM Dept.</b>	<b>12%</b>		<b>13%</b>		<b>13%</b>		<b>12%</b>		<b>12%</b>	

<sup>32</sup><https://www.mcgm.gov.in/irj/portal/anonymous/qlBudgetapp>

**Inference:**

- The budget estimate for Solid Waste Management Department has increased every year from 2019-20 to 2023-24, with a significant increase of 30% between 2019-20 and 2023-24.
- Establishment expenses of the department have consistently been the largest share of the budget estimate, with a gradual increase in percentage share from 51% in 2019-20 to 62% in 2023-24.
- Operation and maintenance expenses have decreased in percentage share from 40% in 2019-20 to 32% in 2023-24, even though the budget estimate has increased over the years.
- The percentage share of the BMC budget assigned to the Solid Waste Management Department has almost same as 12% in 2019-20 to 2023-24.

▪ **Table 22: Budget Estimates under SWM Various Schemes from 2017-18 to 2023-24 (in crores)**

Years	Budget Estimates	Actuals	Percentage Utilised
<b>Zero Garbage Public Awareness Programme</b>			
2017-18	5	7	134%
2018-19	7	6	89%
2019-20	8	6	70%
2020-21	10	8	80%
2021-22	8	6	69%
2022-23	8	-	-
2023-24	9	-	-
<b>Swachh Mumbai Vasti Prabodhan Abhiyan</b>			
2017-18	81	74	92%
2018-19	81	73	90%
2019-20	87	72	83%
2020-21	87	76	87%
2021-22	90	74	82%
2022-23	90	-	-
2023-24	85	-	-
<b>Clean Area Scheme (Cleansing of Roads &amp; Collection of Refuse)</b>			
2017-18	60	58	96%
2018-19	65	89	136%
2019-20	90	47	52%
2020-21	79	43	55%
2021-22	55	40	74%
2022-23	55	-	-
2023-24	45	-	-

**Inferences:**

- The "Mumbai Vasti Prabodhan Abhiyan" has witnessed a drop in budget utilisation from 92% in 2017-18 to 82% in 2021-22. The budget allocated to the program also decreased from 90 crores in 2021-22 to 85 crores in 2023-24.
- The "Clean Area Scheme" had very high budget utilisation in 2018-19. However, in the subsequent years, the program has not been able to achieve its budget estimates, with a low of 52% utilisation in 2019-20. The program has also seen a downwards trend in budget allocation from 90 crores in 2019-20 to 45 crores in 2023-24.

## I. Human Resources for SWM Department<sup>33</sup>

Table 23: Designation-wise Human Resources in SWM Department from 2020 to 2022

Designation	2020				2021				2022			
	S	A	V	%	S	A	V	%	S	A	V	%
<b>Engineer Post</b>												
Chief Engineer (SWM Account)	1	1	0	0%	1	0	1	100%	1	0	1	100%
Chief Engineer (SWM Project)	1	0	1	100%	1	0	1	100%	1	1	0	0%
Deputy Chief Engineer	5	4	1	20%	5	5	0	0%	5	3	2	40%
Assistant Engineer	66	51	15	23%	66	52	14	21%	66	52	14	21%
Executive Engineer	22	16	6	27%	22	17	5	23%	22	20	2	9%
Junior Engineer	36	26	10	28%	36	19	17	47%	36	18	18	50%
<b>Total Engineer</b>	<b>131</b>	<b>98</b>	<b>33</b>	<b>25%</b>	<b>131</b>	<b>93</b>	<b>38</b>	<b>29%</b>	<b>131</b>	<b>94</b>	<b>37</b>	<b>28%</b>
<b>Administrator Post</b>												
Asst. Executive Director	37	24	13	35%	37	14	23	62%	37	9	28	76%
Asst. Chief Supervisor	30	16	14	47%	30	27	3	10%	30	26	4	13%
Deputy Chief Supervisor	1	1	0	0%	8	4	4	50%	8	2	6	75%
Asst. Chief Staff Officer	1	1	0	0%	2	2	0	0%	2	2	0	0%
Deputy Special Duty Officer	1	0	1	100%	1	0	1	100%	1	0	1	100%
Administrative Officer	41	38	3	7%	41	40	1	2%	41	37	4	10%
Clerk	354	218	136	38%	354	215	139	39%	352	189	163	46%
Overseer	65	41	24	37%	65	35	30	46%	65	30	35	54%
Nuisance Detector	103	6	97	94%	103	5	98	95%	103	4	99	96%
Report Bearer	47	40	7	15%	47	40	7	15%	47	40	7	15%
Other Administrative	10,007	9,258	749	7%	10,425	9,784	641	6%	10,303	9668	635	6%
Technical/Electrician/ Mechanical	229	134	95	41%	229	149	80	35%	229	136	93	41%
<b>Total Admin.</b>	<b>10,916</b>	<b>9,777</b>	<b>1,139</b>	<b>10%</b>	<b>11,342</b>	<b>10,315</b>	<b>1,027</b>	<b>9%</b>	<b>11,218</b>	<b>10,143</b>	<b>1,075</b>	<b>10%</b>
<b>Other/Labour Post</b>												
<b>Other Labour</b>	<b>18,357</b>	<b>15,074</b>	<b>3,283</b>	<b>18%</b>	<b>23,738</b>	<b>20,115</b>	<b>3,623</b>	<b>15%</b>	<b>23,674</b>	<b>20,038</b>	<b>3,636</b>	<b>15%</b>
<b>Total SWM Dept</b>	<b>29,404</b>	<b>24,949</b>	<b>4,455</b>	<b>15%</b>	<b>35,211</b>	<b>30,523</b>	<b>4,688</b>	<b>13%</b>	<b>35,023</b>	<b>30,275</b>	<b>4,748</b>	<b>14%</b>

S- Sanction, A – Available and V – Vacant

### Inferences:

- High vacancy in Junior Engineer as 50% and 100% vacancy of Chief Engineer (SWM Account) as of 2022.
- The Assistant Executive Director position vacancy increased from 35% in 2020 to 76% in 2022.
- As of 2022, the deputy chief supervisor position has a 75% vacancy rate, while the clerk, overseer, and technical/electrician/mechanical positions have vacancy rates of 46%, 54%, and 41%, respectively.
- The nuisance detector position, has a high vacancy rate of 96%. BMC's bye-laws of 2006 describe the importance of nuisance detector in maintained of cleanliness in the city, however, the lack of human resources shows major need for improvement.

<sup>33</sup>As per RTI Response.

## Part II. Sewerage Treatment and Drainage

### • Sewerage Treatment Plant (STP)

Sewerage and sanitation systems are as important as the water supply systems in urban areas. They act as complements for enabling sustainable and healthy cities. All major national policies that focus on water, also deal with sewerage systems and in the near future, water demand can be met by effective treatment of wastewater.

There are various national level policies related to sewerage. The Atal Mission for Rejuvenation and Urban Transformation (**AMRUT**) policy<sup>34</sup> of the central government declares providing a sewerage connection to every household as one of its mission statements. Similarly, **National Water Mission**<sup>35</sup> aims at incentivising the recycling of water including wastewater and the development of an eco-friendly sanitation system. The **Jal Shakti Abhiyan**<sup>36</sup> of the ministry has increased the reuse of sewerage water as one of its targets.

According to norms of the Pollution Control Boards, the three major indicators used for measuring the quality of wastewater are as follows:

1. **Biochemical Oxygen Demand (BOD)**: Refers to the amount of dissolved oxygen in the water required to decompose the organic matter. The higher the organic matter (sewerage and pollutants) in the water, the more is the BOD; the more the BOD, the lesser is the available oxygen for aquatic life. CPCB norms for BOD from STP outlet are 20mg/lit. MPCB has adopted a stricter norm of 10mg/lit. The CPCB norm followed for BOD of waterbodies is 3mg/lit.
2. **Total Suspended Solids (TSS)**: Refers to the dry weight of undissolved solid particles in water. The prescribed limit for STP outlet is 50mg/lit. by CPCB and 20mg/lit. by MPCB.
3. **Faecal Coliform (FC)**: Faecal Coliform is bacteria found in the faeces of warm-blooded animals and humans, commonly found in human excreta and major cause of water-borne diseases. The CPCB's prescribed limit for faecal coliform in all waterbodies is 2500MPN<sup>37</sup>/100ml and for drinking water, detectable faecal coliform has to be nil.

### A. Key Highlights

- In 2022, Mumbai generated **1,972 MLD of sewage** of which 1,476 MLD was treated in BMC's **8 Sewerage Treatment Plants (STPs)** at Malad, Versova, Bhandup, Colaba, Bandra, Worli, Charkop, and Ghatkopar.
- **The Highest Outlet Biochemical Oxygen Demand (BOD) in 2022 was Malad STPs at 137.44 mg/lit**, It operates much higher than the prescribed limit of 20 mg/lit. by CPCB and 10 mg/lit. by MPCB.
- **Major sea outlets and beaches in Mumbai are polluted**<sup>38</sup> from untreated sewerage and/or surface pollution including solid waste. The average maximum BOD recorded in all the major beach outlets was 22 mg/lit. in 2021, much higher than the prescribed norm for beaches by the CPCB of <3 mg/lit.
- Similarly, the maximum quantity of BOD in **Mithi river** was 45mg/lit. (compared to the norm of <3mg/lit.) showing that it is highly polluted from untreated sewerage and waste disposal.

<sup>34</sup> <http://amrut.gov.in/content/innerpage/the-mission.php>

<sup>35</sup> <http://nwm.gov.in/>

<sup>36</sup> <http://geourbanmissions.gov.in/>

<sup>37</sup> Most Probable Number (MPN) is a method to estimate concentration of microorganisms in liquid.

<sup>38</sup> <https://cpcb.nic.in/nwmp-data/>

## B. Status of Mumbai's Sewerage Treatment Plant

Table 24: Status of Mumbai's Sewerage Treatment Plant's Waste Water Quality from April 2017 to Dec-2022

Criteria		2017-18	2018-19	2020 <sup>39</sup>	2021	2022	
BOD (Prescribed limit is 20mg/lit. by CPCB and 10 mg/lit. by MPCB)	Colaba	Inlet	59.14	124	135	97	92
		Outlet	42	89.6	<5	3.43	3.45
	Worli	Inlet	114	118	89	110	120
		Outlet	87.14	71.5	2.14	2.18	1.76
	Bandra	Inlet	NA	110	78	82	91
		Outlet	42	18	1.65	2.03	1.27
	Versova	Inlet	60	110	117	120	132
		Outlet	32	45	29.92	29.43	44.30
	Bhandup	Inlet	NA	NA	80	62	82
		Outlet	15	15	31.17	26.64	34.40
	Ghatkopar	Inlet	NA	NA	76	92	98
		Outlet	40	40	34.5	34.59	37.45
	Malad	Inlet	250	250	125	124	134
		Outlet	90	90	125.64	132	137
Charkop	Inlet	80	80	149	175	159	
	Outlet	78	78	<5	4.25	3.17	
TSS (Prescribed limit is 50mg/lit. by CPCB and 20mg/lit. by MPCB)	Colaba	Inlet	46	82	174	144	125
		Outlet	37.71	64	<5	5.10	7.28
	Worli	Inlet	142	65	119	163	243
		Outlet	98	41.6	-*	2.59	3.43
	Bandra	Inlet	NA	60	95	117	119
		Outlet	28	18	-*	3.04	3.17
	Versova	Inlet	55	90	153	171	177
		Outlet	31	28	17.7	20.12	47.83
	Bhandup	Inlet	NA	NA	90	94	89
		Outlet	22	22	23.88	43.26	31.06
	Ghatkopar	Inlet	NA	NA	115	126	129
		Outlet	30	30	33.5	40.03	39.51
	Malad	Inlet	35	35	164	162	173
		Outlet	18	18	155.71	179	186
Charkop	Inlet	115	115	155	204	213	
	Outlet	16	16	<5	3.04	3.83	

\*Discharge is through Marine Outfall, BO: Biochemical Oxygen Demand, TSS: Total Suspended Solids

### STP's Index

Colour	Remark
Green	CPCB criteria met
Yellow	MPCB criteria met
Red	Average outlet quality is worse than the inlet

### Inference:

- In 2022, Colaba, Bandra, Worli and Charkop STPs met the MPCB limit as these STPs were able to achieve the average BOD of lower than 10mg/lit., while Versova, Bhandup and Ghatkopar STPs did not meet the BOD outlet criteria as per the CPCB and MPCB norms.
- In Malad STP, the outlet quality was 137 mg/lit, which is higher than the inlet quality, showing a failure in the treatment of sewerage. If water is to be reused in the long run for the sustainability of the water-sewerage system, it is important to improve the treatment facilities.

<sup>39</sup>As per an RTI Response (For the year 2020, 2021 and 2022, Period Jan to December).

Table 25: Quality of Water Bodies in Mumbai in Accordance with CPCB norms (2021)<sup>40</sup>

Station name	Type of Water Body	B.O.D. (mg/l)		Faecal Coli form (MPN/100ml)	
	CPCB Norms	<3 mg/l		<2500MPN/100ml	
		Min	Max	Min	Max
<b>Source</b>					
Bhatsa U/S Of Liberty Oil Mills, Satnel, Shahapur, Thane	Minor River	3	4	2	21
Bhatsa D/S Of Liberty Oil Mills, Satnel, Shahapur, Thane	Minor River	3	4	2	23
Bhatsa D/S Of Pise Dam Near Pise Village (Ulhas)	Minor River	3	4	5	27
Tansa Near Road Bridge, Village Dakewali, Wada, Thane	Minor River	3.2	3.8	5	27
Vaitarna Near Road Bridge, Gandhare Village, Wada, Thane	Minor River	3.2	3.8	5	17
<b>Outlet</b>					
Sea Water at Nariman Point, Colaba, Mumbai	Marine	<b>9</b>	<b>18</b>	130	920
Sea Water at Malabar Hill, Walkeshwar, Mumbai	Marine	<b>9</b>	<b>17</b>	94	540
Sea Water at Haji Ali, Worli, Mumbai	Marine	<b>9</b>	<b>17</b>	33	540
Sea Water at Shivaji Park, Dadar, Mumbai	Marine	<b>10</b>	<b>16</b>	46	920
Sea Water at Juhu Beach, Juhugaon, Santacruz, Mumbai	Beach	<b>4.8</b>	<b>40</b>	22	540
Sea Water at Gateway of India, Colaba, Mumbai	Sea	<b>10</b>	<b>18</b>	130	920
Sea Water at Charni Road Choupathy, Girgaon, Mumbai	Sea	<b>9.4</b>	<b>17</b>	46	540
Sea Water at Worli Sea Face, Worli, Mumbai	Sea	<b>9.4</b>	<b>17</b>	110	540
Sea Water at Versova Beach, Andheri, Mumbai	Beach	<b>5.2</b>	<b>18</b>	79	920
Mithi	Minor River	3.2	<b>45</b>	5	<b>17,000</b>
Mahim Creek At Mahim Bay	Creek	<b>10</b>	<b>17</b>	34	540

**Inference:**

- The above table shows that Mumbai's water sources are highly polluted even in their natural status.
- Major sea outlets and beaches in Mumbai are however polluted from untreated sewerage or surface pollution including solid waste. The minimum BOD recorded in all the major beach outlets is much higher than the prescribed norm for beaches of less than 3mg/l. The Faecal Coli Form is high too, in most beaches it is within the maximum but at Nariman Point, Colaba it exceeds the maximum by a huge margin of 920MPN/100ml.
- Mithi river pollution from untreated sewerage and waste disposal is evident from the high BOD (maximum 3mg/l.) as well as the high Faecal Coli Form. (Maximum 17,000MPN/100ml)

<sup>40</sup> <https://cpcb.nic.in/nwmp-data/>; for CPCB norms : <https://cpcb.nic.in/water-quality-criteria/>

- **National Green Tribunal levies penalty on BMC for untreated sewerage in Mumbai's water bodies**

The National Green Tribunal (NGT) imposed a fine of Rs 29.75 crore on the BMC for releasing untreated effluents into water bodies. As compensation, the BMC is required to pay Rs 4.25 crore per month to the Central Pollution Control Board until remedial measures are taken. The city has seven sewerage treatment plants (STPs), but they are all around 17 years old and can treat only 1,500 MLD of the 2,200-2,400 MLD sewerage produced daily. The NGT has recommended bioremediation and phytoremediation as measures to tackle the issue, but the BMC has struggled to implement them due to cost escalations and poor response from bidders. The NGT has also asked the BMC to ensure that mangrove marshes remain plastic-free and to set up a "trash trap" to collect floating plastic and other waste. The BMC has been planning to add seven STPs along the coast, but the tenders for five of them have been scrapped twice due to cost escalations and allegations of rigging. The BMC plans to challenge the order in the Supreme Court and ensure compliance with the various directions given by the tribunal.<sup>41</sup>

- **Drainage related issues<sup>42</sup>**

▪ **Table 26: Drainage Related Civic Complaints from 2013 to 2022 Registered in CCRS**

Issues	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Cleaning of Septic Tank	452	484	407	565	570	519	583	575	448	583
Drainage Chokes and Blockages	8,264	4,612	5,591	7,199	9,256	12,403	14,077	9,649	8,064	10,079
Odour (Foul Smell) from Drains	115	233	168	276	307	333	391	367	349	393
Overflowing drains of manholes	2,679	2,787	2,807	3,107	4,346	4,290	5,645	3,488	3056	3,646
Raising of manhole (except in monsoon)	13	16	14	19	19	54	58	16	20	41
Repairs and reconstruction of drain line	0	0	35	56	0	0	1	0	0	0
Repairs to pipe sewers/ main sewers	253	273	207	390	485	573	656	447	513	490
Replacement of Missing/ Damaged Manhole	932	989	675	657	957	2,469	2,856	966	1,556	1,889
<b>Total</b>	<b>12,708</b>	<b>9,394</b>	<b>9,904</b>	<b>12,269</b>	<b>15,940</b>	<b>20,641</b>	<b>24,267</b>	<b>15,508</b>	<b>14,006</b>	<b>17,121</b>

(For more details, refer table no.46 to 49)

**Inference:**

- The data indicates that in 2022, the most common complaints were related to drainage chokes and blockages (10,079), followed by overflowing drains of manholes (3,646).
- Moreover, the total number of complaints increased by 22% from 2021 to 2022, and for the past decade, drainage chokes & blockages and overflowing drains of manholes have consistently been among the highest complaints.
- Additionally, in 2022 out of all the complaints, 59% were related to drainage chokes and blockages, there is a need for immediate measures to prevent issues and ensure proper maintenance of drainage systems.

<sup>41</sup>[Mumbai: BMC fined Rs 34 cr for letting untreated sewage into the sea \(indiatimes.com\)](https://www.indiatimes.com)

<sup>42</sup>As per RTI response.

- Table 27: Analysis of Complaints Attended (Closed) in Comparison with Days Mentioned in BMC's Citizen Charter

Issues/Sub-issues	Days taken to resolve as per Citizens' Charter	Actual time taken to resolve					% Change from 2018 to 2022
		2018	2019	2020	2021	2022	
Drainage Chokes and Blockages	1	25	18	47	37	32	29%
Overflowing drains or manholes	1	53	27	71	57	52	-2%
Odour (Foul Smell) from Drains	1	49	40	76	58	56	15%
Replacement of Missing/Damaged Manhole	1	58	36	88	69	57	-2%
Raising of Manhole (except in Monsoon)	7	43	47	89	91	82	91%
Cleaning of septic tank	7	71	36	82	71	54	-24%
Repairs to pipe sewers/main sewers	7	56	38	97	69	63	12%

**Inference:**

- The issue of repairs to pipe sewers/main sewers (97 days) took the maximum number of days to be resolved, followed by Raising of Manhole (except in Monsoon) which took 91 days to be resolved.
- Moreover, raising of manhole (except in Monsoon) had the highest percentage increase in the number of days taken to resolve complaints from 2018 to 2022.

## Solid and Liquid Waste Management Recommendations

1. **Effective Segregation and Processing of Waste at the Source:** There is a need to create awareness among the public about the importance of waste segregation, reuse, and recycling. This can be done through public campaigns, awareness programs, and outreach activities. Encourage the implementation of decentralised waste management systems and waste processing at source to reduce the burden on centralised facilities. This can be achieved through incentives and support from the government.
2. **Zero Waste to Landfill:** Promote the circular economy model, where waste is treated as a resource and reused, recycled, or repurposed. Encourage government support for sustainable waste management practices and incentivise businesses and individuals to adopt zero waste practices.
  - a. **Composting:** Biodegradable waste processing units should be developed in each constituency. Different treatment methods used for waste segregation like Vermi-composting, Organic Composting for Biogas should also be carried out to ensure optimum recycling. For decentralised composting, Indore adopted mobile compost machines, for composting waste from markets. Vellore in Karnataka and Alappuzha in Kerala have adopted successful micro composting centres for composting biodegradable waste in every constituency. F/South Mumbai model has also aimed to make the constituency dustbin free through door-to-door collection and segregation and composting of biodegradable waste within the ward, through community involvement.
  - b. **Introducing Bio Gas plants:** Taking the example of Pune Municipal Corporation and the PPP, setting a bio-gas plant for the creation of electricity can help reduce conventional usage. Since a large portion of waste generated in BMC is food waste (73%), a similar practice can be carried out in Mumbai.
3. **Monitoring:** The process of monitoring SWM activities should be active to tackle issues. Firstly, there is a need to revise the BMC 2006 bye-laws in accordance to the SWM rules 2016 to ensure the duties of the waste generators and BMC is clearly mandated. In addition, with better implementation and data management of initiatives like ALMs and the SMPA can ensure effective measures to ensure proper waste management at the source. In addition, targeted solutions must be carried out to timely solve complaints received areas. A robust monitoring system can ensure a better ranking for Mumbai as well as amongst cities.
4. **Strengthening institutional capacity:** Build the capacity of SWM officials to manage waste effectively by providing them with training and resources. Adequate staff should be hired to ensure that all aspects of the SWM process are covered, including collection, transportation, processing, and disposal. Incentives should be provided to motivate SWM personnel to perform their duties efficiently and effectively
5. **Collaboration and partnerships:** Foster collaborations and partnerships among government agencies, NGOs, and private entities to promote sustainable waste management practices. In addition, map innovative learnings from other cities that can help BMC achieve effective waste management.
6. **Waste Water Treatment:** Treatment of sewerage generated needs to be 100% and tertiary treatment needs to be done in all the STPs to reduce marine pollution and prevent water and vector-borne diseases.
7. **Reuse of Waste Water:** BMC can use the treated wastewater for various purposes such as cleaning roads, watering gardens, traffic islands, road dividers etc. in the city. The corporation can also earn revenue by sale of treated waste water- Nagpur for example treats 90% of its sewerage and sells part of it to National Thermal Power Corporation and Maharashtra State Power Generation Company. Recycling of sewerage should also be incentivised where possible (for example: housing societies, large commercial establishments, industrial establishments) so that treatment of sewerage can be done locally and can reduce the water demand of that unit.

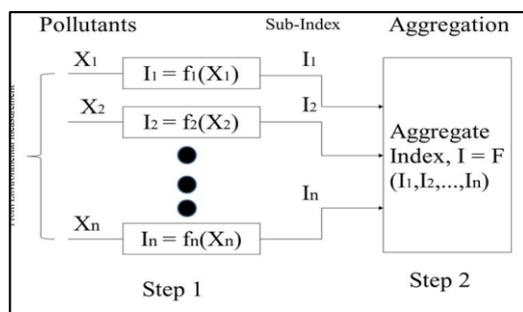
## Part III: Air Quality Index (AQI)

### A. Key Highlights

- In 2022, on an average, **13% days had Good Air Quality (47 Days), 22% days had satisfactory air quality (79 days), 30% days had moderate air quality (108 days) and 9% days had poor air quality (34 days), while there was 8 days had very poor quality and one day with sever air quality.**
- The best average monthly AQI in Mumbai was 61 in August & September 2022.
- The highest **average monthly AQI in 2022 was 210 in December.**
- Mumbai sees the **best air quality in the months of June to September, 2022** which can be explained by the presence of the monsoon season, which drastically helps abate poor air quality. Similarly, the worst AQI is in winter months.
- The **months of December 2022 and January 2023 have the worst AQI levels**, marking the first time in the past 5 years that the air quality has remained under the poor level for two consecutive months.

### B. Measuring AQI

An Air Quality Index (AQI) is defined as an overall scheme that transforms weighted values of individual air pollution related parameters (SO<sub>2</sub>, CO, visibility, etc.) into a single number or set of numbers. The result is a set of rules (i.e., set of equations) that translate parameter values into a simple form employing numerical manipulation:



Note: This image has been taken from the 'National Air Quality Index' Report released by the Central Pollution Control Board (2014)

### Air Quality Index Standards, According to the Central Pollution Control Board (CPCB)

Colour	AQI	AQI Range	Remark
Good	Good	0-50	Minimal Impact
Satisfactory	Satisfactory	51-100	May cause minor breathing discomfort in sensitive people
Moderate	Moderate	101-200	May make breathing difficult for people with lung diseases and cause discomfort in children, older adults and heart patients
Poor	Poor	201-300	May make breathing difficult after prolonged exposure, and cause discomfort to people with heart diseases
Very Poor	Very Poor	301-400	May cause respiratory illnesses in people on prolonged exposure. The effect may be more pronounced in those with lung and heart diseases.
Severe	Severe	>400	May cause respiratory problems even in healthy people, and seriously affect those with lung/heart diseases. Even increased breathing during light physical activity can affect health.

## C. AQI Status in Mumbai

Table 28: Average Month-wise AQI from January 2017 to December 2022<sup>43</sup>

Month	Average AQI					
	2018	2019	2020	2021	2022	Jan-23 to Mar-23
January	176	171	163	214	175	205
February	147	150	156	160	155	194
March	127	119	100	149	163	146
April	88	90	69	100	106	
May	80	85	55	74	120	
June	72	68	40	61	62	
July	65	53	40	59	63	
August	69	56	37	56	61	
September	81	45	59	56	61	
October	115	85	95	98	101	
November	137	132	144	148	183	
December	151	179	164	176	210	

(For more data, refer table no.52)

### Inference:

- The best Average Monthly AQI (Air Quality Index) was 61 in August and September 2022. This suggests that air quality during those months was relatively good.
- However, the highest Average Monthly AQI in 2022 was 210 in December. This shows that air quality was significantly worse in December than in August and September.
- When comparing the air quality in January and February 2021 and January & February 2022, there was an increase of 17% and 25%, respectively. This suggests that air quality has worsened over time during those months.
- The worst AQI occurred in December 2022 and January 2023, continuing for two consecutive months, and this is the first time it has happened in the last 5 years.
- The information provided also suggests that Mumbai sees the best air quality from June to September, which can be attributed to the monsoon season.

<sup>43</sup>All AQI data has been obtained from: <http://cpcb.nic.in/>, after approval from the Central Pollution Control Board (CPCB) through an RTI application.

Table 29: Station wise Number of Days with Air Quality Level for the Year 2022<sup>44</sup>

Air Quality Level	Good	Satisfactory	Moderate	Poor	Very Poor	Severe	NA	Total	%
Bandra Kurla Complex, Mumbai-IITM	22	63	132	56	6	1	85	365	23%
Bandra, Mumbai - MPCB	-	-	-	-	-	-	365	365	100%
Borivali East, Mumbai-IITM	33	34	80	13	1	-	204	365	56%
Borivali East, Mumbai-MPCB	115	96	102	16	3	-	33	365	9%
Chakala-Andheri, Mumbai-IITM	55	69	96	69	12	-	64	365	18%
Chhatrapati Shivaji Intl. Airport (T2), Mumbai-MPCB	54	90	166	46	-	1	8	365	2%
Colaba, Mumbai-MPCB	74	91	131	12	1	-	56	365	15%
Deonar, Mumbai-IITM	11	51	121	52	24	1	105	365	29%
Kandivali East, Mumbai-MPCB	49	76	91	14	2	-	133	365	36%
Khindipada-Bhandup West, Mumbai - IITM	27	80	118	30	1	-	109	365	30%
KURLA, MUMBAI MPCB	61	52	117	68	8	1	59	365	16%
Malad West, Mumbai-IITM	74	84	153	23	1	-	30	365	8%
Mazgaon, Mumbai-IITM	34	59	63	56	75	16	62	365	17%
Mulund West, Mumbai-MPCB	53	98	101	24	3	-	86	365	24%
Navy Nagar-Colaba, Mumbai-IITM	64	40	99	42	8	1	111	365	30%
Powai, Mumbai-MPCB	42	137	110	30	2	1	43	365	12%
Siddharth Nagar-Worli, Mumbai-IITM	61	134	108	14	1	-	47	365	13%
Sion, Mumbai, MPCB	49	130	118	32	5	-	31	365	8%
Vile Parle West Mumbai-MPCB	20	78	126	59	13	7	62	365	17%
Worli, Mumbai-MPCB	45	110	121	18	-	-	71	365	19%
<b>Average</b>	<b>47</b>	<b>79</b>	<b>108</b>	<b>34</b>	<b>8</b>	<b>1</b>	<b>88</b>	<b>365</b>	<b>24%</b>

NA – Data not Available/Insufficient data for computing AQI

#### Inference:

- The air quality in 2022 was measured to be good on 13% of the days (47 days), while 22% (79 days) and 30% (108 days) of the days had satisfactory and moderate air quality respectively. However, 09 days were categorised as very poor, and 1 days as severe.
- Unfortunately, no air quality data for the entire year is available on the website for the Bandra, Mumbai - MPCB station.
- It is possible that air quality data for certain days may not be available at every station.

<sup>44</sup>All AQI data has been obtained from: <http://cpcb.nic.in/>, after approval from the Central Pollution Control Board (CPCB) through an RTI application.

▪ **Table 30: Sub-Issue wise Pollution Complaints from 2018 to 2022**

Pollution Sub-Issues	2018	2019	2020	2021	2022	% Change from 2018 to 2022
Average Air Quality Index	113	92	97	115	125	10%
Air Pollution	193	169	151	343	219	13%
Pollution due to Chemical Effluents	84	92	58	67	57	-32%
Nuisance due to Masala Mills/ Flour Mills	9	7	11	14	16	78%
<b>Total complaints</b>	<b>286</b>	<b>269</b>	<b>220</b>	<b>424</b>	<b>292</b>	<b>2%</b>

**Inference:**

- The average Air Quality Index increased by 10% from 2018 to 2022.
- The number of complaints related to 'Pollution' Increased by 13% from 2018 to 2022.

**D. Recommendations**

- **Uniform Monitoring:** To improve the monitoring of AQI (Air Quality Index), CPCB and SAFAR (System of Air Quality, Weather Forecasting, and Research), which are separate agencies monitoring air quality in cities, should coordinate and calculate a single AQI using uniform stations to measure major pollutants.
- **AQI Stations:** Further, air quality stations need to be established in every administrative ward to correctly measure air quality, pollution is otherwise not reflected in the AQI, as seen from the complaints data. Moreover, all established air quality stations should work at full capacity to ensure the data on air quality is computed accurately.

## Part IV. Urban Green Cover

The MCAP proposes the creation of "green zones" in the city as a key measure to enhance the city's resilience to the impacts of climate change. The green zones are intended to increase the city's green cover, provide natural cooling, and reduce the urban heat island effect. Green zones refer to areas within the city that are designated for the purpose of promoting greenery and biodiversity. These areas can include parks, gardens, and other open spaces that are developed or conserved to enhance the city's natural environment.

The MCAP proposes several measures to create green zones in the city, including developing new parks and open spaces, conserving existing green spaces, and promoting the use of green roofs and walls. These measures are expected to help mitigate the impacts of climate change by reducing the urban heat island effect, improving air quality, and providing natural cooling.

▪ **Table 31: Recreation Facilities Provided from 2017-18 to 2021-22<sup>45</sup>**

Particulars	2017-18	2018-19	2019-20	2020-21	2021-22
Garden (Except strip Gardens)/Park	229	290	291	303	288
Recreation Grounds	432	462	475	478	468
Playgrounds	319	357	355	365	405
Park	25	0	0	0	0
Shilpgram	0	0	0	1	1
Fountains	26	38	38	39	38
Band stands	5	5	7	9	5
Nurseries	22	28	28	29	24
Plant Sale Counter	8	9	5	10	14
Statues	53	24	30	30	39
Tree Plantations	12,497	9,721	30,451	2,00,195	40,023
Tree Plantations (Miyawaki)	0	0	0	0	2,25,010
Distribution of Tress	32,380	21,530	18,165	11,243	34,432
Total No. of Trees	29,75,283	29,75,283	29,75,203	29,75,283	29,75,283

(For more information, refer table no.53)

Overall, the data suggests that there is a growing focus on promoting green spaces and sustainable landscaping practices, as evidenced by the increase in tree plantations and the addition of Miyawaki tree plantations. Additionally, the increase in plant sale counters and distribution of trees in 2021-22 suggests that there is a renewed effort towards promoting greenery and conservation.

However, number of trees (census) has not been updated, as the numbers have been constant over the years, while the MCAP mentions the need to update tree census parameters to capture carbon sequestration and biodiversity aspect.

<sup>45</sup>Environment Status Reports of 2017-18 to 2021-22, from section: URBAN RENEWAL SCHEME.

## Section II: Centralised Complaint Registration System (CCRS)<sup>46</sup>

### A. Key Highlights

For city governments to function effectively, collaboration and contact with citizens is essential, the most basic of which is a uniform complaint redressal mechanism where people can register complaints with the municipal corporation regarding civic issues in their locality and the city government is accountable to solve the same in a timely and structured manner.

#### Overall Complaints:

- In 2022, CCRS received a total **1,04,068 complaints**, of which the highest complaints were related to issues such as Drainage (17,121), followed by Buildings (16,883) and Licence (13,439).
- The total number of complaints increased by 15% from 2021 to 2022 and the percentage of the **number of complaints closed (i.e., solved) remained constant at 86% in 2021 and 2022.**
- In 2022, 86% of total complaints were solved at Level 0 in the escalation matrix of CCRS. However, out of the 13,552 (13%) complaints that were escalated, **97% of 13,552 complaints were escalated to the Municipal Commissioner (Level 4). Moreover, none of these complaints have been closed.**
- In 2022, **councillor code was not filled in 74% of the total complaints.**
- **Complaints escalation ratio** to Level I and above has **decreased from 17% in 2018 to 13% in 2022.**

#### Ward-wise Complaints:

- In 2022, the highest numbers of complaints were registered in **K/W (8,667), K/E (7,529) and P/N (6,910)** wards.
- **48% of total complaints in P/N ward were escalated to Level I and above.** In addition, of this, 54% (3,720) of complaints are still not resolved.
- **A, P/N and C wards took maximum days for solving complaints- 75, 72 and 61 days respectively.**

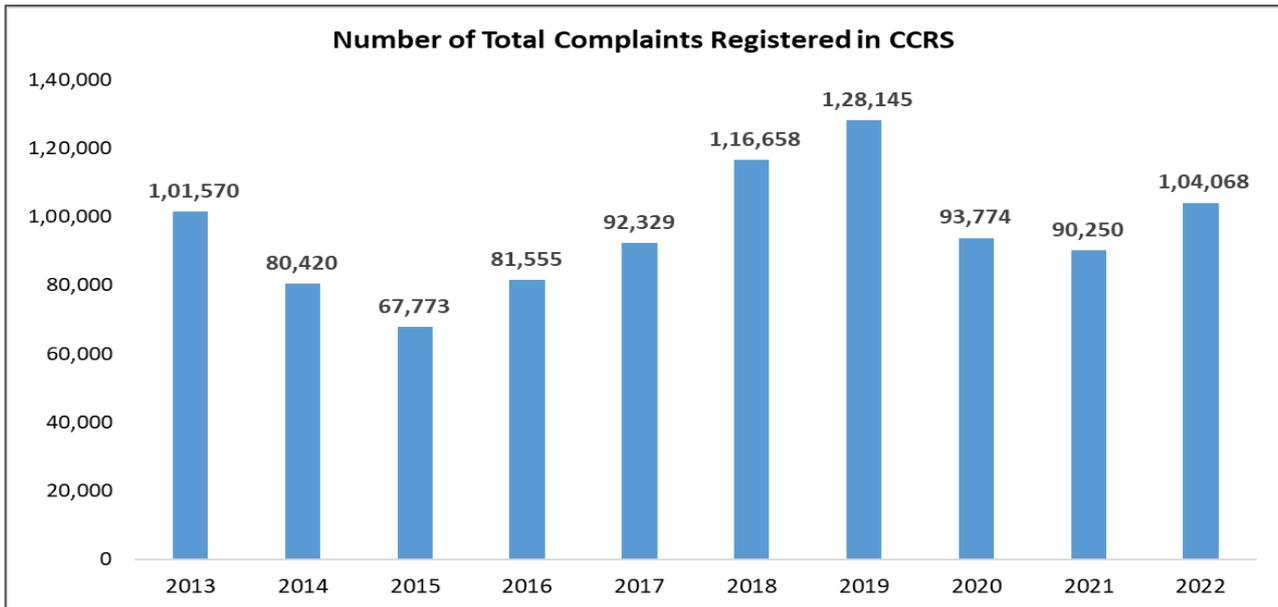
#### Issue-wise Complaints:

- The citizen's charter prescribes for **major complaints to be solved in one day.** However, on an average, BMC took **29 days to solve complaints** of drainage, water supply and solid waste management in 2022.
- Key civic service complaints such as, **toilets took an average of 30 days to resolve, followed by SWM – 28 days, drainage – 32 days and water supply – 26 days.**
- P/N ward took the maximum days to resolve almost all issues; with an average of **107 days to resolve a complaint related to water supply and 83 days for sanitation issues (Toilet).**

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<sup>46</sup>As per an RTI response.

■ **Figure 4: Overall Complaints Registered in CCRS from 2012 to 2022<sup>47</sup>**



■ **Table 32: Issue Wise Overall Complaints from 2013-2022**

Complaints	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	% Change from 2013 to 2022
Buildings	21,125	17,339	14,999	16,257	19,267	21,014	20,317	14,712	17,063	16,883	-20%
Colony Officer	1,292	1,023	881	1,954	1,245	1,437	1,196	1,045	1,305	981	-24%
Drainage	12,708	9,394	9,904	12,269	15,940	20,641	24,267	15,508	14,006	17,121	35%
Estate	249	216	112	560	407	588	623	645	538	661	165%
Garden	1,468	1,595	1,307	1,658	1,844	2,936	3,367	4,522	3,323	3,529	140%
License	5,660	6,123	7,145	8,368	10,372	14,203	14,465	9,694	10,814	13,439	137%
MCGM Related	431	504	451	862	889	877	1,103	760	647	735	71%
Medical Officer Health (MOH)	521	425	549	1,111	1,595	1,743	1,480	1,343	1,087	1,384	166%
Nuisance due to vagrants	-	-	-	1,856	2,849	2,653	2,057	952	1,383	1,599	-
Pest control	3,495	5,048	4,364	6,078	5,529	6,703	7,501	10,971	7,785	8,037	130%
Pollution	117	135	135	220	215	286	269	220	424	292	150%
Roads	41,469	21,777	13,539	13,475	11,606	13,458	15,239	6,908	7,475	11,161	-73%
School	22	25	56	74	42	58	78	31	43	70	218%
Shop and Establishment	347	423	401	561	1,478	878	778	986	763	647	86%
Solid Waste Management (SWM)	5,519	7,331	5,213	7,330	10,144	14,494	17,116	11,595	11,056	12,351	124%
Storm Water Drainage	895	1,160	830	1,386	1,532	1,548	2,155	1,409	1,068	1,550	73%
Toilet	177	257	159	290	416	494	627	618	489	531	200%
Water Supply	6,075	7,645	7,728	7,246	6,959	12,647	15,507	11,855	10,981	13,097	116%
<b>Grand Total</b>	<b>1,01,570</b>	<b>80,420</b>	<b>67,773</b>	<b>81,555</b>	<b>92,329</b>	<b>1,16,658</b>	<b>1,28,145</b>	<b>93,774</b>	<b>90,250</b>	<b>1,04,068</b>	<b>2%</b>

**Note (\*):** These complaints are generated in CCRS system by the above mentioned categories. (for ward wise information refer to table no.55)

<sup>47</sup>The complaints registered data is obtained through RTI from the Central Complaint Registration System (CCRS) of the BMC.

**Inferences:**

- From 2013 to 2019, total complaints registered increased by 25%, however after 2019, total complaints registered declined by 19% from 2019 to 2022.
- Over the past decade, the highest number of complaints registered in CCRS, such as solid waste management (1,02,149), licensing (1,00,283), water supply (99,740), and pest control (65,511), have consistently remained high in proportion, with the number of registered complaints more than doubling compared to other types of complaints.
- In 2022, the highest number of complaints registered were related to drainage (17,121), followed by building complaints (16,883) and license-related complaints (13,439).
- Additionally, in 2022, 12,351 complaints were registered for solid waste management, which shows a 124% increase in the last 10 years.

## B. Issue Wise Details of Complaints Registered and Closed in the CCRS<sup>48</sup>

The Complaint Management System of BMC provides for a complaint number (1916), MyBMC 24X7 mobile app, an online portal on the BMC website, or a written complaint to the complaint officer in the ward, where complaints can be registered. The complaint is referred to the respective department for taking necessary action and if not solved within the stipulated time, it is escalated to the next level of administration. This is based on the 'Escalation Matrix' which has been adopted by the BMC to address the problem of complaints remaining stuck at the lower level of the civic administration, with no way to enforce accountability. Through this system, the higher administration is mandated to take note of and address complaints if they are not solved within a stipulated time. Once the complaint is solved, the complainant is notified of the same.

▪ **Table 33: Issue-wise Comparison of Total Complaints and Complaints Closed in 2021 and 2022**

Complaint Type	Total complaints received		Closed Complaints				Average days to resolve a complaint	
	2021	2022	2021		2022		2021	2022
			In no.	In (%)	In no.	In (%)		
Buildings	17,063	16,883	11,429	67%	11,859	70%	75	64
Colony Officer	1,305	981	601	46%	781	80%	49	84
Drainage	14,006	17,121	12,662	90%	15,583	91%	44	32
Estate	538	661	385	72%	409	62%	84	76
Garden	3,323	3,529	3,172	95%	3,464	98%	24	24
License	10,814	13,439	9,933	92%	11,399	85%	43	41
BMC Related	647	735	514	79%	552	75%	82	57
Medical Officer Health (MOH)	1,087	1,384	929	85%	1,096	79%	76	50
Nuisance due to vagrants on municipal roads, footpaths, gardens	1,383	1,599	1,054	76%	1,129	71%	87	61
Pest control	7,785	8,037	7,651	98%	8,018	100%	21	17
Pollution	424	292	365	86%	153	52%	53	65
Roads	7,475	11,161	6,100	82%	8,616	77%	72	52
School	43	70	17	40%	47	67%	109	84
Shop and Establishment	763	647	738	97%	627	97%	24	23
Solid Waste Management (SWM)	11,056	12,351	10,262	93%	11,790	95%	40	28
Storm Water Drainage	1,068	1,550	902	84%	1,231	79%	77	51
Toilet	489	531	442	90%	489	92%	56	30
Water Supply	10,981	13,097	10,774	98%	12,310	94%	36	26
<b>Grant Total</b>	<b>90,250</b>	<b>1,04,068</b>	<b>77,930</b>	<b>86%</b>	<b>89,553</b>	<b>86%</b>	<b>48</b>	<b>38</b>

(for ward wise information refer to table no.56)

### Inference:

- Average number of days to resolve a complaint decreased from 48 days in 2021 to 38 days in 2022.
- Average time taken to resolve complaints decreased in almost all categories except for colony officer and pollution-related complaints from 2021 to 2022.
- Despite an increase of 1,295 SWM complaints from 11,056 in 2021 to 12,351 in 2022, the average time taken to resolve a complaint decreased from 40 days in 2021 to 28 days in 2022.
- In contrast, the average time taken to resolve a pollution related complaint increased from 53 days in 2021 to 65 days in 2022, while the number of complaints decreased from 424 in 2021 to 292 in 2022.
- In 2022, pest control had the highest rate of closed complaints at 100%, followed by garden at 98% and shop and establishments at 97%.

<sup>48</sup>The complaints registered data is obtained through RTI from the Central Complaint Registration System (CCRS) of the BMC.

### C. Status of Action Taken Report (ATR) and Time Taken to Resolve Complaints in CCRS

**Action Taken Report:** The process of generating an Action Taken Report in CCRS was initiated in 2017. After a complaint is filed in CCRS, they generate an Action Taken Report (ATR). The ATR is a complaint redressal form that is generated by the CCRS telephone operator with primary details of the complaint including the nature of complaint, location, etc. After this, the complaint along with the ATR is forwarded to the concerned department to resolve the issue. The ATR is to be filled by the official who attends to the complaint and visits the complaint site. The ATR is required to be filled in detail with information of the type of action taken to resolve the complaint before they can close the complaint in the system.

**Escalation Matrix:** The CCRS mechanism includes an escalation process for unresolved complaints. These complaints are escalated to different levels under the 'escalation matrix' which has been adopted by the BMC. The escalation matrix is a computerised mechanism by which complaints which are not resolved within a stipulated time (7 days) are automatically shown as being placed before a higher authority within the BMC. The escalation matrix was developed to address the problem of complaints remaining stuck at the lower level of the civic administration, with no way to enforce accountability.

<b>Level I</b> AMC/Chief Engineer	<b>Level II</b> DMC	<b>Level III</b> Additional Municipal Commissioner	<b>Level IV</b> Municipal Commissioner
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Through this system, the higher administration is mandated to take note of and address complaints if they are not solved within a stipulated time. If a complaint is solved at the level at which it is filed, it is treated as being solved at Level 0.

▪ **Figure 5: Overall ATR of Complaints and Closed Complaints from 2018 to 2022 (in %)**

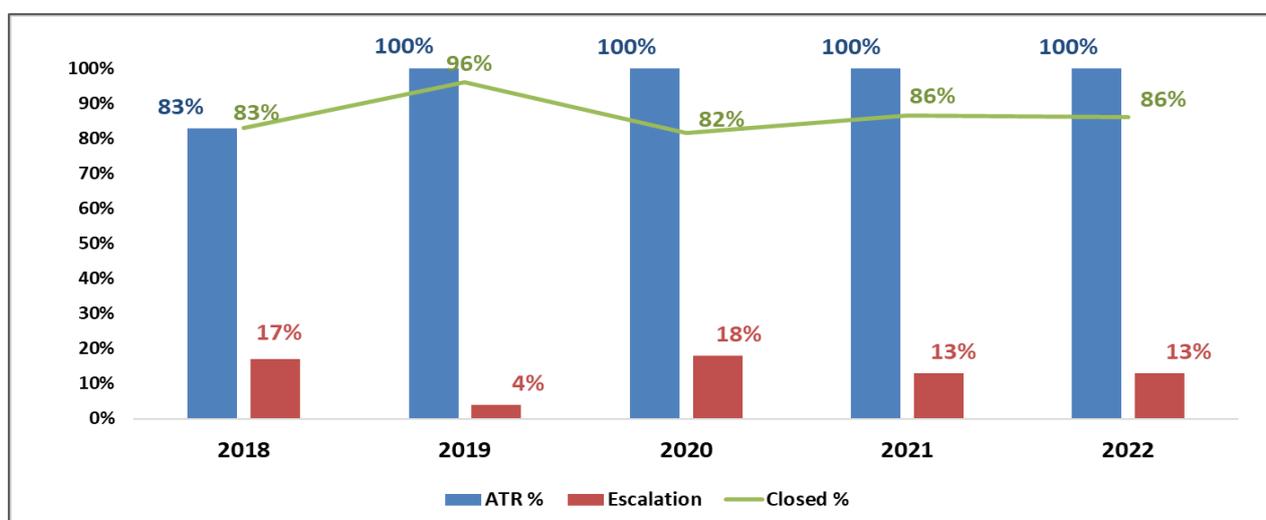


Table 34: Overall Civic Complaints Escalated from Level I to Level IV from 2018 to 2022

Year	Total Complaints Received	Level I (AMC/Chief Engineer)		Level IV (Add. MC)				Total Unresolved Escalated Complaints after Level IV	Total Complaint closed after escalated (%)
		Number of Complaints Escalated	In (%) of Overall Complaints	Number of Complaints Escalated	In (%) of Overall Complaints	Closed Complaints	Average Days to Resolve		
2018	1,16,658	19,772	17%	19,079	16%	563	73	19,209	3%
2019	1,28,145	4,738	4%	4,654	4%	256	49	4,482	5%
2020	93,774	16,813	18%	16,105	17%	493	93	16,320	3%
2021	90,250	11,848	13%	10,417	12%	299	37	11,549	3%
2022	1,04,068	13,552	13%	13,138	13%	0	-	13,552	0%

(For more information, refer to table no.57)

**Inferences:**

- The ATR generation for complaints have improved from 83% in 2018 to a 100% in 2022.
- In 2022, 13,138 complaints were escalated to the Municipal Commissioner (Level IV) and were not able to be resolved within the escalation matrix of CCRS.
- All 13,138 complaints escalated to the Commissioner remain unresolved due to which there is a need for urgent improvements in the organisation's complaint management system.
- Over the last five years, only 5% or fewer complaints have been resolved, while 95% or more have remained unresolved after escalation. Additionally, in 2022, no complaints were resolved after escalation.
- Although the percentage of escalated complaints decreased from 17% in 2018 to 13% in 2022, the percentage of unresolved complaints after escalation increased from 97% in 2018 to 100% in 2022, which shows no complaints were resolved after escalation in 2022.

Table 35: Analysis of Complaints Attended (Closed) in Comparison with Days Mentioned in BMC's Citizen Charter

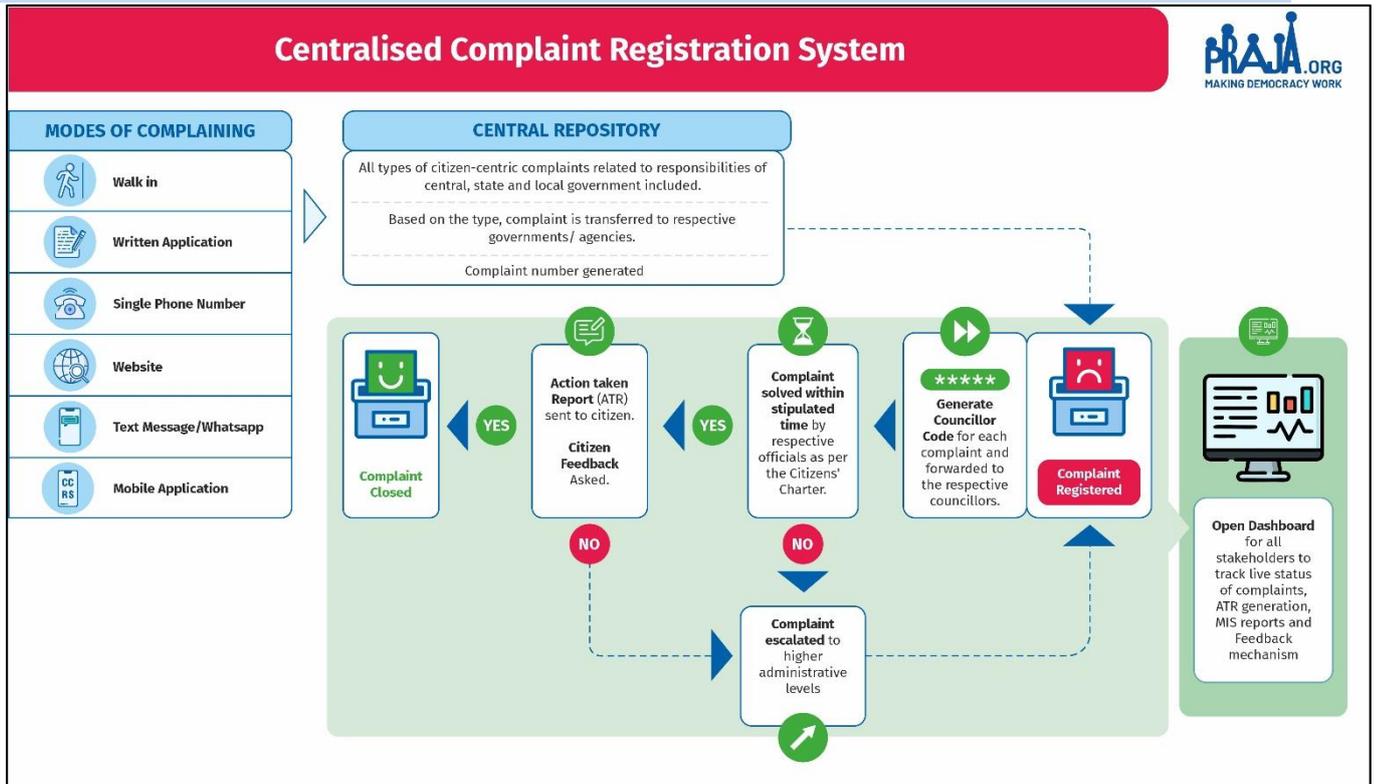
Issues/Sub-issues	Escalation to Level 1 (Working Days)	Actual time taken to resolve (Average Day)			
		2020	2021	2022	% Change from 2021 to 2022
<b>Pest control</b>					
Fogging	7	33	21	17	-47%
Mosquito Nuisance	7	29	22	17	-42%
Rat Nuisance	7	29	22	16	-44%
Unauthorised/ uncovered water storage tanks	7	34	27	19	-43%
<b>Roads/Footpath</b>					
Bad Patches/ Potholes on the Roads	7	72	62	64	-12%
Digging of roads	7	91	84	81	-11%
Fallen Tree on road	5	18	23	23	32%
Relaying and repairs of roads	7	75	88	69	-8%
Repair and reconstruction of footpath	7	69	99	63	-7%
<b>Water Supply</b>					
Contaminated Water Supply	2	33	36	31	-6%
Leakage near meter	7	30	48	26	-14%
Leaks in Water Lines	4	31	38	32	3%
Providing water by tankers	7	24	49	29	21%
Shortage of water supply	4	33	37	30	-8%

(For more information, refer to table no.58)

**Inference:**

- The citizen's charter prescribes for almost all major complaints escalated to Level 1 in 7 days and escalate to Municipal Commissioner in 28 Days. However, on an average, BMC took 32 days to solve complaints of drainage, Pest Control, Road/footpath and water supply in 2022.
- BMC took 64 days to resolve potholes related complaints and 63 days to repair footpaths, which is a delay in resolving issues within the prescribed timeline. These delays can cause accidents and inconvenience, especially for the elderly and disabled.
- It took 31 days to resolve the issue of contaminated water and 30 days to address the shortage of water states that people may resort to using water from unauthorised sources, which can cause water-borne diseases and negatively affect the health of citizens.

## D. Recommendations



a. **Open Dashboard:** For a government to take a step towards Open Government Data Portal to enable transparency, there should be, an openly available dashboard regarding complaints set up by the city government. This will increase citizen awareness, enable feedback, and allow elected representatives and administration officials to better monitor and evaluate the corporation's performance on a real-time basis.

b. **Councillor code:** Proper implementation of mandatory entry of councillor code for every complaint must be done for better accountability in the system. Recently, entering the name of the administrative ward in the online form has been made compulsory. However, instead of using the address entered by the complainant of the ward, the councillor code should be automatically detected in the CCRS (Annexure 3, table no.59).

c. **Citizen Feedback:** The complaint management system must incorporate a feedback and suggestion mechanism whereby complainants can express their satisfaction. This will also enable more accountability within the system so that the concerned officers can better perform their functions. Also, the Action Taken Report (a report generated by CCRS with details about the action taken to address a complaint) mechanism must be detailed for effective tracking and monitoring by citizens and then administration officials.

d. **Citizen Participation Forum:** A platform that allows citizens to express their needs and wants. The platform can be regularly monitored by all stakeholders to ensure citizen-centric approach when planning for service delivery and infrastructure provisions in cities. Adding this aspect will bring the citizen journey to completion.

## Section III: Analysis of Municipal Budget Related to Civic Issues<sup>49</sup>

### A. Key Highlights

The Budget allocations and actual expenditures of the Municipal Corporation reflect the priority areas of the local government and highlight whether revenue generated has been effectively spent on the development of the city and its people, especially on the core functions of local governments - provision of key civic services.

Moreover, in Mumbai, the budget is prepared and presented by the Municipal Commissioner, a bureaucrat and an executive official appointed by the Chief Minister through the Urban Development Ministry. The budget is presented to the Standing Committee on or before 5th of February, who then debates, makes necessary changes, and frames the budget on or before 1st of March. This budget is then tabled in the Council and deliberations are carried out for any required modifications. After approval of the Council (by 20th of March), the budget goes into effect for the financial year.

This year, the Brihanmumbai Municipal Corporation's (BMC) Municipal Commissioner not only framed the city budget but also presented and approved it in the capacity of a state-appointed administrator running the civic body. As the tenure of the elected representatives ended last March in 2022, and elections are yet to be held, there is no Council and the Corporation is currently functioning under an administrator. The budget making process should be participatory and inclusive such that wards committees should be able to make recommendations on project priorities, etc. However, due to the absence of a corporation, ward-level citizen needs were not represented during this budget process.

#### Budgetary Process:

- The **Revised Estimates (R.E.) have always been lower than Budget Estimates (B.E.) from 2017-18 to 2022-23. However, in 2021-22, the R.E. was higher than the B.E. by 1.50%** showing a larger expenditure during that year.
- Apart from the specifications of the budget, it is also important to look at the budgetary process, which should be **participatory and inclusive**. The national and state budgets are **prepared and presented** by their respective finance ministers, both of which fall in the deliberative (elected) wing of governments.
- The **chief auditor** of BMC is also an appointee of the state government and its report is not presented to the entire house but only the standing committee.

#### Department-wise Budgetary Allocation:

- Budget share allocation of **revised estimates for departments related to Civic issues** has remained almost same in the last four years **except for the water operations department**.
- The revised estimate of **Fire Brigade Department dropped by 16%** in 2021-22.
- The revised budget allocation for **Water Supply Project department has increased 75% from 536 crores in 2019-20 to 943 crores in 2022-23**. However, the revised estimate went down by 14% from budget estimate in 2022-23
- Of all the departments, water, sewerage and drainage, and solid waste management are the key civic issues faced by citizens and the primary duties of the local government. In 2021-22 the **revised estimates allocated to these were 21% and budget estimates for 2023-24 are 26%**.

<sup>49</sup>All figures are in crores unless specified otherwise. All figures have been taken from the Municipal Commissioner's speeches from 2015-16 to 2020-21, available on BMC website: [www.mcgm.gov.in](http://www.mcgm.gov.in).

Note: 'RE' stands for Revenue Expenditure and 'CE' stands for Capital Expenditure.

## B. Overall Budget Analysis

Table 36: Overall BMC Budget from 2017-18 to 2023-24 (in crores)

Overall BMC Budget			
Financial Year	Budget Estimates	Revised Estimate	Difference (in %)
2017-18	25,138.91	21,977.14	-13%
2018-19	27,251.05	23,515.39	-14%
2019-20	30,685.99	30,025.39	-2%
2020-21	33,434.50	31,168.16	-7%
2021-22	39,027.32	39,611.35	1%
2022-23	45,940.78	43,491.20	-5%
2023-24	52,553.74	-	-

### Inference:

The revised estimates have always been lower than budget estimates from 2017-18 to 2020-21 and in 2022-23. However, in 2021-22, the R.E. was higher than the B.E. by 1.47% showing larger expenditure during that year.

Table 37: Budget Estimates in Revenue Expenditure from 2017-18 to 2023-24 (in crores)

Revenue Expenditure			
Financial Year	Budget Estimates	Revised Estimates	Difference (in %)
2017-18	17,011.83	15,866.07	-7%
2018-19	17,723.25	15,717.83	-11%
2019-20	19,205.57	19,240.31	0%
2020-21	18,796.74	20,264.58	8%
2021-22	20,276.33	22,744.87	12%
2022-23	23,294.05	22,632.33	-3%
2023-24	25,305.94	-	-

### Inference:

The revised revenue expenditure estimates for the years 2017-18, 2018-19, and 2022-23 were lower than the corresponding budget estimates, while for the years 2019-20 to 2021-22, the revised revenue expenditure estimates exceeded the budget estimates.

Table 38: Budget Estimates Under Capital Expenditure from 2017-18 to 2023-24 (in crores)

Capital Expenditure			
Financial Year	Budget Estimates	Revised Estimates	Difference (in %)
2017-18	8,127.08	6,111.07	-25%
2018-19	9,527.80	7,797.56	-18%
2019-20	11,480.42	10,785.08	-6%
2020-21	14,637.76	10,903.58	-26%
2021-22	18,750.99	16,866.48	-10%
2022-23	22,646.73	20,858.87	-8%
2023-24	27,247.80	-	-

### Inference:

The revised estimates of capital expenditures from 2017-18 to 2022-23 are consistently lower than the budget estimates showing the required budget estimate amount has been over-estimated throughout these years. It also raises a question on budget making process and planned activities under capital expenditure for this significant difference in budget and revised estimates.

## C. Budget Analysis of Key Civic Departments

- Table 39: Budgetary Allocation of Departments Related to Civic Issues from 2019-20 to 2023-24 (in crores)

Department	Budget 19-20			Budget 20-21			Budget 21-22			Budget 22-23			Budget 23-24	
	B.E.	R.E	RE %	B.E.	R.E	RE %	B.E	R.E	RE %	B.E	R.E	RE %	B.E	RE %
Disaster Management Cell	33	23	0.08%	50	20	0.06%	39	32	0.08%	27	25	0.06%	52	0.10%
Fire Brigade Department	495	360	1%	374	374	1%	541	576	1%	746	628	1%	666	1%
Solid Waste Management Department	2,889	2,762	9%	3,291	2,791	9%	3,659	3,315	8%	4,531	3660	8%	4,710	9%
Storm Water Drains Department	1,303	1,491	5%	1,339	1,194	4%	1,699	1,941	5%	2,133	2783	6%	3,266	6%
Roads & Traffic Department	2,383	2,311	8%	2,280	2,080	7%	2,232	2,532	6%	2,869	3873	9%	3,631	7%
Water Operation Department	1,875	2,310	8%	1,713	2,197	7%	1,677	2,690	7%	2,044	3366	8%	2,336	4%
Water Supply Project Department	620	536	2%	1,185	456	1%	702	674	2%	1,094	943	2%	1,414	3%
Sewerage Operation Department	621	799	3%	611	768	2%	655	1,066	3%	735	1168	3%	1,048	2%
Sewerage Project Department	270	269	1%	347	210	1%	303	221	1%	270	387	1%	333	1%
Mumbai sewerage Disposal Project	489	219	1%	424	380	1%	1,974	490	1%	2,093	2052	5%	3,592	7%
<b>Total</b>	<b>10,978</b>	<b>11,080</b>	<b>37%</b>	<b>11,613</b>	<b>10,470</b>	<b>34%</b>	<b>13,481</b>	<b>13,537</b>	<b>34%</b>	<b>16,543</b>	<b>18,884</b>	<b>43%</b>	<b>21,048</b>	<b>40%</b>
Others Department	19,707	18,945	63%	21,822	20,698	66%	25,546	26,075	66%	29,398	24,607	57%	31,506	60%
<b>Overall</b>	<b>30,686</b>	<b>30,025</b>	<b>100%</b>	<b>33,435</b>	<b>31,168</b>	<b>100%</b>	<b>39,027</b>	<b>39,613</b>	<b>100%</b>	<b>45,941</b>	<b>43,491</b>	<b>100%</b>	<b>52,554</b>	<b>100%</b>

Note: R.E. is Revised Estimate and B.E. is Budget Estimate, RE %: Revenue Estimate share to total (R.E. Total)

### Inference:

- Solid Waste Management Department:** The budgetary share has almost remained same at 9% from 2019-20 to 2023-24. However, revised estimate went down by 8% in 2022-23. This is owed to the fact that the percentage of closed complaints in this department has increased from 93% in 2021 to 95% in 2022.
- Roads and Traffic Department:** The budget share has reduced from 8% of the total budget 2019-20 to 7% in the budget estimates of 2023-24. Despite an increase in road related complaints, the percentage of closed complaints decreased from 82% in 2021 to 77% in 2022.
- Water Operation Department:** The revised estimates increased by 60% from the budget in 2021-22. This could be attributed to the fact that the average days to solve a water related complaint went down from 36 to 26 days, despite complaints increasing from 10,981 in 2021 to 13,097 in 2022.
- The revised budget allocation for the Water Supply Project department has increased 128% from 620 in 2019-20 to 1,414 in 2023-24. However, the revised estimate went down by 14% from budget estimate in 2021-22.
- Of all the departments Disaster Management Cell, Fire Brigade Department water, sewerage and drainage, and solid waste management are the key civic issues faced by citizens and the primary duties of the local government.

## Section IV: Performance of Ward Committees

### A. Key Highlights

#### Overall Performance:

- **In 2022** (Jan 2022 to Mar 2022), **231 questions were raised by councillors in ward committees.**
- **53 questions were raised on issues other than key civic responsibilities** (such as on environment, crime, corporation management related, building, estate etc.). They were more than the questions on SWM (16), water (10) and drainage (4) put together.
- **92 questions were asked on naming and renaming** of roads/monuments/etc., reflecting a need for more deliberation on core civic services.
- The second most asked questions raised by councillors in ward committees were related **to roads (33).**

### B. Performance of Ward Committees

The 74th Constitutional Amendment Act (CAA), 1992 provides for the formation of ward(s) committees in municipalities with a population of more than three lakhs, intending to decentralise governance and strengthen grassroots democracy.

In 2020, Praja's pan-India study of 29 cities across 28 States and the National Capital Territory (NCT) of Delhi<sup>50</sup> shows that, as per the 74th Constitution Amendment Act, 1992 there is a provision for formation of ward(s) committee in the Municipal Corporation Act of all States except Meghalaya, Nagaland and Sikkim. But ward(s) committees are constituted only in 12 cities namely Agartala, Ahmedabad, Aizawl, Bhubaneswar, Bhopal, Delhi, Dharamshala, Imphal, Ranchi, Kochi, Mumbai, and Udaipur. Of these, ward(s) committees are functional in only 9 cities namely Ahmedabad, Aizawl, Bhubaneswar (functional until last term i.e., until January 2019), Agartala, Delhi, Dharamshala, Imphal, Kochi and Mumbai. Ward committees in Delhi, Mumbai, Panaji, Coimbatore, Vijayawada and Raipur are formed at zonal level while in other cities, ward committees are at councillor ward constituency level.

There are 17 Ward Committees in Mumbai at the administrative ward level, consisting of all the councillors within the administrative jurisdiction of the respective wards. Ward Committees are one of the most crucial mechanisms available to Municipal Councillors for conducting deliberations for delivering effective governance. Issues of prime significance to citizens' daily lives related to civic amenities such as roads, water supply, drainage, etc. including budgetary suggestions can be taken up and redressed effectively in this forum.

Questions and issues raised and debated in the ward committee show how the councillors have performed in bringing up and solving civic issues. There are various devices used in the ward committee including short-notice questions, notice of motion, adjournment motion, amendments, agenda and point of order.

<sup>50</sup>[https://praja.org/praja\\_docs/praja\\_downloads/UGI2020.pdf](https://praja.org/praja_docs/praja_downloads/UGI2020.pdf)

▪ **Table 40: Number of Questions Asked by Councillors in Ward Committees**

Year	2013	2014	2015	2016	2017	2018	2019	2020	2021	Jan'2022 to Mar'2022
No. of Questions	989	972	1,098	1,152	856	1,046	952	512	1,126	231

▪ **Table 41: Issues-wise Number of Questions Asked by Councillor in Ward Committees**

Issues	2013	2014	2015	2016	2017	2018	2019	2020	2021	Jan'2022 to Mar'2022
Drainage	35	42	39	68	42	43	45	17	33	4
Roads	141	138	194	190	151	208	203	115	203	33
Solid Waste Management (SWM)	85	112	86	97	76	86	101	40	78	16
License	50	61	89	67	47	79	65	40	62	12
Water Supply	44	71	65	57	56	66	62	29	73	10
Toilet	22	31	21	41	42	39	36	18	45	5
Garden	38	43	42	39	38	21	27	24	46	2
Pest control	13	25	9	21	7	10	26	5	19	4
Pollution	1	0	2	2	3	0	0	1	1	0
Naming/Renaming of Roads/Chowks/ Monuments/ Buildings	147	109	161	263	125	158	105	80	253	92
Other Issue	413	340	390	307	269	336	282	143	313	53
<b>Total</b>	<b>989</b>	<b>972</b>	<b>1098</b>	<b>1,152</b>	<b>856</b>	<b>1,046</b>	<b>952</b>	<b>512</b>	<b>1,126</b>	<b>231</b>

**Inference:**

- Due to the councillor's term ending in March 2022, only the first three months of 2022 were considered for data analysis.
- During this period, councillors raised a total of 231 questions in ward committees.
- The most questions raised (92) in 2022 on Naming/Renaming of Roads/Chowks/ Monuments/ Buildings.
- Questions were raised on key civic issues, drainage (4 questions), solid waste management (16 questions), water supply (10 questions), and public toilets (5 questions).

## Section V: Annexures

### Annexure 1: Solid Waste Management (SWM) section related data tables

- Figure 6: Scoring Matrix for star rating protocol for garbage free cities<sup>51</sup>




### Scoring matrix

#### Matrix- Star Rating Protocol for Garbage Free Cities

Indicator	1 Star	3 Star	5 Star	7 Star
<b>Mandatory</b>	At least 40%	At least 60%	At least 85%	At least 95%
<b>Essential</b>	At least 30%	At least 50%	At least 80%	At least 90%
<b>Desirable</b>	-Not Applicable-	At least 30%*	At least 60%	At least 80%

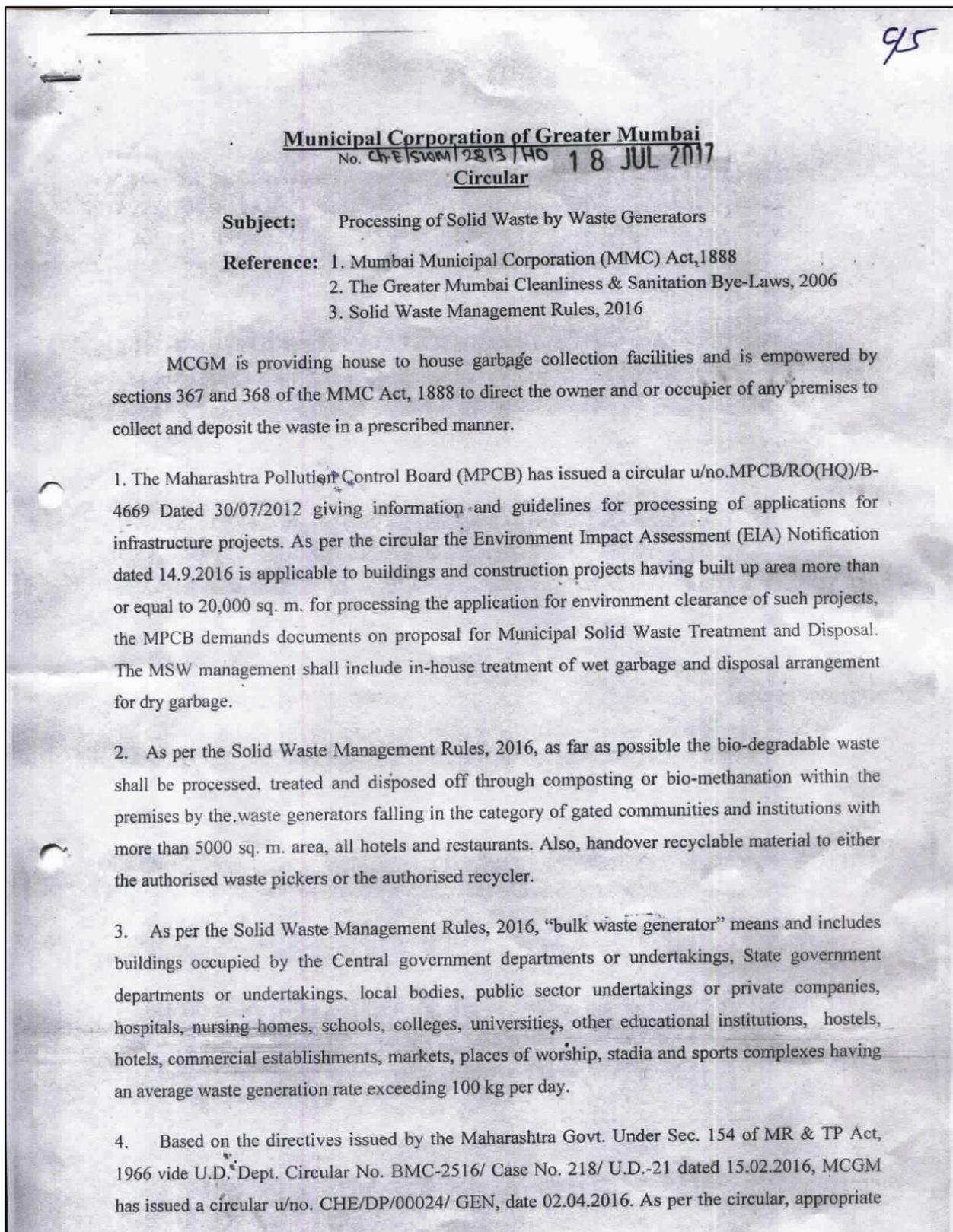
\* 30% in case of Desirable condition under 3-Star will be considered out of 5 Desirable parameters (D2, D3, D4, D5)

- Figure 7: Parameter for star rating protocol for garbage free cities<sup>52</sup>

Scoring- Star Rating Protocol for Garbage Free Cities								
Component/ Condition			Maximum Marks	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	Weightage
<b>MANDATORY</b>								
WARD LEVEL	M1	D2D	100	50	75	100	100	12%
	M2	Segregation at Ward Level	100	30	60	80	100	16%
	M3	Sweeping	100	50	75	100	100	12%
	M4	Litter Bins	100	35	50	75	100	8%
	M5	Storage Bins	100	50	75	100	100	8%
CITY LEVEL	M6	Waste Processing- Wet Waste	100	35	50	75	100	10%
	M7	Waste Processing Capacity- Wet Waste	100	35	50	100	100	8%
	M8	Waste Processing- Dry Waste	100	35	50	75	100	8%
	M9	Waste Processing Capacity- Dry Waste	100	35	50	100	100	8%
	M10	Grievance Redressal	100	50	75	90	100	10%
<b>100%</b>								
<b>ESSENTIAL</b>								
WARD LEVEL	E1	BWG	100	30	50	75	100	12%
	E2	Penalty/ Spot Fines	100	30	50	75	100	12%
CITY LEVEL	E3	Segregation at City Level	100	30	50	75	100	10%
	E4	User Charges	100	30	50	75	100	14%
	E5	Plastic Ban	100	30	50	100	100	12%
	E6	C&D Waste- Collection	100	30	75	100	100	10%
	E7	Scientific Landfill- Availability & Use	100	30	50	100	100	10%
	E8	Scientific Landfill- Waste disposed	100	30	50	75	100	10%
	E9 (A)	No visible solid waste in water bodies	100	30	50	100	100	5%
E9 (B)	Screening of Storm water drains/ Nallahs	100	30	50	100	100	5%	
<b>100%</b>								
<b>DESIRABLE</b>								
WARD LEVEL	D1	Sustainability <i>(Applicable only for 5 Star &amp; 7 Star)</i>	100	30	50	75	100	25%
CITY LEVEL	D2	On-site wet waste processing	100	25	50	75	100	20%
	D3	C&D waste- Storage, Segregation, Processing, Recycling	100	50	75	75	100	20%
	D4	C&D Waste- Use of materials	100	20	50	75	100	15%
	D5	Dumpsite Remediation	100	25	50	75	100	20%
<b>100%</b>								

<sup>51</sup> & <sup>52</sup> <https://smmurban.com/uploads/files/f9i6rs85t17n0hd.pdf>

▪ Figure 8: Circular of Bulk Waste Generator



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conditions are incorporated in the I.O.D. regarding the treatment of wet garbage generated in the building, on the same plot, having area more than 2000 sq. m. in the jurisdiction of Mumbai Municipal Corporation.

In view of above, as per approval of Hon. M.C. u/no. MGC/F/4032, Dtd. 14.07.2017, Assistant Commissioner of wards are directed to act on above points respectively as under.

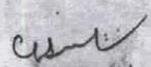
- 1) **For all complexes having built up area of 20,000 sq.mtr and above:-** All types of garbage is to be processed on site and is to be disposed in such cases. The garbage of all types shall not be lifted from such premises from 2<sup>nd</sup> October, 2017 and cases of non compliance shall be taken up with appropriate authority for taking penal action under the provisions of Environment (Protection) Act, 1986.
- 2) **For all complexes having built up area 5,000 sq.mtr and above:-** The waste generators must segregate waste at source and the dry waste generated by them shall not be lifted. It shall be ensured that the recyclable material is handed over to either the authorised waste pickers or the authorised recycler of dry waste. The wet waste as far as possible shall be processed in phased manner i.e. 99% bio-degradable waste processing like composting, bio-methanation, etc. by the end of three months at the rate of at least 33% waste processing per month for next three months.
- 3) Although, there is no provision for action to be taken by **bulk waste generators / housing complexes generating waste of average more than 100 kgs per day** elsewhere in the Rules, but, in view of limited capacity of dumping ground, the generators of waste shall be informed to segregate waste at source and the dry waste generated by them shall not be lifted. It shall be ensured that the recyclable material is handed over to either the authorised waste pickers or the authorised recycler of dry waste. The wet waste as far as possible shall be processed in phased manner i.e. 99% bio-degradable waste processing like composting, bio-methanation, etc. to comply with the provisions within three months period.
- 4) **For all complexes having built up area of 2,000 sq.mtr and above for building being constructed after 02.04.2016:-** Treat wet garbage in-situ, as per, the conditions incorporated in the I.O.D. regarding the treatment of wet garbage generated in the building

Against defaulting owners and occupiers, there wet waste will not be lifted 2<sup>nd</sup> October, 2017 onwards. Further the action should be taken for offences as following,

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A) Section 471 & 472 of the MMC Act provide for penalties punishable with fine for offences committed under various specified sections of MMC Act. Action for offences under section 368 of MMC Act is covered in these sections.

B) The Greater Mumbai Cleanliness & Sanitation Bye-Laws, 2006 prepared as per section 461 of the MMC Act specify various penalties under Schedule-I in it.

  
A.M.C. (E.S.)

All AC (A to T) Ward / Zonal DMC (Zone 1 to 7)

CC:

Hon. M.C., Sir

AMC (W.S.) ✓

AMC (City)

Table 42: Comparison of total complaints and SWM complaints in the year 2022

Ward	Population 2022	Total Complaints	SWM Complaints	%
A	1,92,830	2,061	294	14%
B	1,32,667	3,047	336	11%
C	1,73,180	2,826	473	17%
D	3,61,519	3,566	464	13%
E	4,09,900	3,792	602	16%
F/N	5,51,383	3,799	704	19%
F/S	3,76,221	3,102	314	10%
G/N	6,24,345	5,158	425	8%
G/S	3,93,707	2,847	412	14%
H/E	5,80,779	3,733	386	10%
H/W	3,20,575	4,713	464	10%
K/E	8,58,690	7,529	774	10%
K/W	7,80,316	8,667	1,105	13%
L	9,40,339	6,575	557	8%
M/E	8,41,842	4,023	543	13%
M/W	4,29,293	4,027	411	10%
N	6,49,165	4,400	517	12%
P/N	9,81,134	6,910	773	11%
P/S	4,83,088	3,471	450	13%
R/C	5,85,910	5,178	623	12%
R/N	4,49,591	2,367	338	14%
R/S	7,20,430	4,712	460	10%
S	7,75,204	5,351	702	13%
T	3,55,888	2,214	224	10%
<b>Total</b>	<b>1,29,67,996</b>	<b>1,04,068</b>	<b>12,351</b>	<b>12%</b>

Table 43: Issue-wise Status of Action Taken Report Generated on Complaints in 2022

Complaint Type	Total complaints received	Action Taken Report		Forwarded to Department		False Complaint		Action Taken/ Service Provided		Action Not Initiated	
		In no.	In (%)	In no.	In (%)	In no.	In (%)	In no.	In (%)	In no.	In (%)
Collection point not attended properly	548	548	100%	0	0%	7	1%	516	94%	25	5%
Garbage lorry not reported for Service/Lorry not covered	444	444	100%	0	0%	9	2%	410	92%	25	6%
Garbage not lifted from House/Gully/Municipal Market/Road/Authorised collection point	4,356	4,356	100%	0	0%	90	2%	4,055	93%	211	5%
Lifting of Tree Cutting	1,071	1,071	100%	18	2%	149	14%	888	83%	16	1%
Non-attendance of nuisance Detector	1,139	1,139	100%	0	0%	22	2%	1,063	93%	54	5%
Providing/Removing/ Replacing dustbins	696	696	100%	0	0%	17	2%	639	92%	40	6%
Removal of dead animals	703	703	100%	0	0%	8	1%	681	97%	14	2%
Removal of Debris	1,899	1,899	100%	0	0%	45	2%	1,780	94%	74	4%
Silt to be lifted from road	587	587	100%	0	0%	15	3%	547	93%	25	4%
Sweeping of roads	908	908	100%	0	0%	22	2%	837	92%	49	5%
<b>Total</b>	<b>12,351</b>	<b>12,351</b>	<b>100%</b>	<b>18</b>	<b>0%</b>	<b>384</b>	<b>3%</b>	<b>11,416</b>	<b>92%</b>	<b>533</b>	<b>4%</b>

▪ **Table 44: Ward-wise Solid Waste Management Complaints from 2013 to 2022**

Ward	Population 2022	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
A	1,92,830	189	302	124	256	228	265	361	258	216	294
B	1,32,667	156	202	124	182	205	312	391	332	314	336
C	1,73,180	235	306	219	270	498	730	687	602	461	473
D	3,61,519	628	643	450	478	524	675	605	548	404	464
E	4,09,900	164	298	202	551	474	830	840	560	479	602
F/N	5,51,383	148	402	225	212	397	531	871	755	562	704
F/S	3,76,221	111	188	113	139	213	268	409	349	249	314
G/N	6,24,345	271	314	281	310	506	542	661	389	364	425
G/S	3,93,707	159	219	117	186	320	399	401	291	268	412
H/E	5,80,779	111	255	197	228	307	429	540	364	321	386
H/W	3,20,575	166	298	289	381	501	661	659	380	467	464
K/E	8,58,690	431	411	247	409	588	934	1,019	774	718	774
K/W	7,80,316	517	420	249	441	691	960	1,680	983	918	1,105
L	9,40,339	274	420	385	454	513	596	827	459	608	557
M/E	8,41,842	178	237	125	217	332	463	597	367	616	543
M/W	4,29,293	149	247	97	288	306	459	507	438	458	411
N	6,49,165	249	306	288	350	551	890	801	520	468	517
P/N	9,81,134	269	369	257	328	557	880	1,106	622	636	773
P/S	4,83,088	243	295	212	327	439	845	842	428	498	450
R/C	5,85,910	265	348	250	477	672	788	997	640	712	623
R/N	4,49,591	63	106	72	96	142	247	345	294	290	338
R/S	7,20,430	281	377	323	336	478	721	922	546	460	460
S	7,75,204	183	259	290	284	482	762	737	474	390	702
T	3,55,888	79	109	77	130	220	307	311	222	179	224
<b>Total</b>	<b>1,29,67,996</b>	<b>5,519</b>	<b>7,331</b>	<b>5,213</b>	<b>7,330</b>	<b>10,144</b>	<b>14,494</b>	<b>17,116</b>	<b>11,595</b>	<b>11,056</b>	<b>12,351</b>

Table 45: Ward-wise Comparison of SWM Complaints and Complaints Closed in 2021 and 2022

Ward	Total complaints received		Closed Complaints				Average days to resolve a complaint	
	2021	2022	2021		2022		2021	2022
			In no.	In (%)	In no.	In (%)		
A	216	294	93	43%	280	95%	33	91
B	314	336	310	99%	299	89%	16	24
C	461	473	454	98%	444	94%	14	34
D	404	464	403	100%	464	100%	43	22
E	479	602	477	100%	529	88%	13	31
F/N	562	704	514	91%	698	99%	50	26
F/S	249	314	239	96%	297	95%	33	27
G/N	364	425	257	71%	412	97%	132	50
G/S	268	412	255	95%	411	100%	13	12
H/E	321	386	320	100%	386	100%	13	15
H/W	467	464	466	100%	372	80%	25	21
K/E	718	774	712	99%	774	100%	12	26
K/W	918	1,105	917	100%	1,105	100%	27	10
L	608	557	594	98%	556	100%	15	24
M/E	616	543	399	65%	380	70%	149	54
M/W	458	411	458	100%	409	100%	54	10
N	468	517	468	100%	517	100%	45	9
P/N	636	773	503	79%	703	91%	76	79
P/S	498	450	403	81%	409	91%	56	38
R/C	712	623	710	100%	623	100%	26	17
R/N	290	338	290	100%	337	100%	23	10
R/S	460	460	460	100%	460	100%	26	35
S	390	702	389	100%	701	100%	79	17
T	179	224	171	96%	224	100%	81	12
<b>Total</b>	<b>11,056</b>	<b>12,351</b>	<b>10,262</b>	<b>93%</b>	<b>11,790</b>	<b>95%</b>	<b>40</b>	<b>28</b>

Table 46: Comparison of Total Complaints and Drainage Complaints in the year 2022

Ward	Population 2022	Total Complaints	Drainage Complaints	%
A	1,92,830	2,061	474	23%
B	1,32,667	3,047	754	25%
C	1,73,180	2,826	552	20%
D	3,61,519	3,566	904	25%
E	4,09,900	3,792	552	15%
F/N	5,51,383	3,799	420	11%
F/S	3,76,221	3,102	724	23%
G/N	6,24,345	5,158	658	13%
G/S	3,93,707	2,847	401	14%
H/E	5,80,779	3,733	773	21%
H/W	3,20,575	4,713	840	18%
K/E	8,58,690	7,529	1,338	18%
K/W	7,80,316	8,667	1,698	20%
L	9,40,339	6,575	788	12%
M/E	8,41,842	4,023	576	14%
M/W	4,29,293	4,027	665	17%
N	6,49,165	4,400	575	13%
P/N	9,81,134	6,910	948	14%
P/S	4,83,088	3,471	588	17%
R/C	5,85,910	5,178	673	13%
R/N	4,49,591	2,367	386	16%
R/S	7,20,430	4,712	849	18%
S	7,75,204	5,351	675	13%
T	3,55,888	2,214	310	14%
<b>Total</b>	<b>1,29,67,996</b>	<b>1,04,068</b>	<b>17,121</b>	<b>16%</b>

Table 47: Issue-wise Status of Action Taken Report Generated on Complaints in 2022

Complaint Type	Total complaints received	Action Taken Report		Forwarded to Department		False Complaint		Action Taken/Service Provided		Action Not Initiated	
		In no.	In (%)	In no.	In (%)	In no.	In (%)	In no.	In (%)	In no.	In (%)
Cleaning of Septic Tank	583	583	100%	3	1%	30	5%	458	79%	92	16%
Drainage Chokes and Blockages	10,079	10,079	100%	48	0%	1,025	10%	8,403	83%	603	6%
Odour (Foul Smell) from Drains	393	393	100%	9	2%	36	9%	298	76%	50	13%
Overflowing drains of manholes	3,646	3,646	100%	1	0%	178	5%	3,072	84%	395	11%
Raising of manhole (except in monsoon)	41	41	100%	1	2%	9	22%	29	71%	2	5%
Repairs to pipe sewers/main sewers	490	490	100%	4	1%	30	6%	383	78%	73	15%
Replacement of Missing/Damaged Manhole	1,889	1,889	100%	57	3%	35	2%	1,499	79%	298	16%
<b>Total</b>	<b>17,121</b>	<b>17,121</b>	<b>100%</b>	<b>123</b>	<b>1%</b>	<b>1,343</b>	<b>8%</b>	<b>14,142</b>	<b>83%</b>	<b>1,513</b>	<b>9%</b>

Table 48: Ward-wise Drainage Complaints from 2013 to 2022

Ward	Population 2022	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
A	1,92,830	323	371	241	320	373	469	622	344	387	474
B	1,32,667	280	225	294	315	379	710	751	420	523	754
C	1,73,180	357	284	198	287	521	552	630	482	473	552
D	3,61,519	499	411	663	995	989	1,296	1,514	816	642	904
E	4,09,900	496	345	512	295	439	465	595	530	372	552
F/N	5,51,383	425	372	395	245	278	530	674	336	305	420
F/S	3,76,221	253	159	264	191	235	360	645	382	389	724
G/N	6,24,345	455	392	335	471	640	834	969	564	518	658
G/S	3,93,707	555	230	341	252	319	547	608	361	304	401
H/E	5,80,779	599	323	459	603	662	856	985	742	540	773
H/W	3,20,575	655	434	512	664	736	1,027	1,102	752	622	840
K/E	8,58,690	850	759	604	903	1,057	1,353	1,730	1,103	993	1,338
K/W	7,80,316	1,317	659	829	1,477	1,732	2,072	2,357	1,424	1,320	1,698
L	9,40,339	1,147	992	866	1,184	1,457	1,620	1,649	953	798	788
M/E	8,41,842	392	410	261	325	484	691	774	552	639	576
M/W	4,29,293	593	491	358	514	923	1,164	1,103	744	673	665
N	6,49,165	624	368	386	376	999	1,161	1,314	789	567	575
P/N	9,81,134	591	417	496	585	683	871	1,230	943	952	948
P/S	4,83,088	501	344	380	411	440	792	910	552	501	588
R/C	5,85,910	633	377	398	597	742	983	1,309	788	704	673
R/N	4,49,591	228	125	228	203	242	330	453	333	320	386
R/S	7,20,430	394	431	427	540	547	627	927	692	671	849
S	7,75,204	291	317	321	318	631	820	934	600	510	675
T	3,55,888	250	158	136	198	432	511	482	306	283	310
<b>Total</b>	<b>1,29,67,996</b>	<b>12,708</b>	<b>9,394</b>	<b>9,904</b>	<b>12,269</b>	<b>15,940</b>	<b>20,641</b>	<b>24,267</b>	<b>15,508</b>	<b>14,006</b>	<b>17,121</b>

Table 49: Ward-wise Comparison of Drainage Complaints and Complaints Closed in 2021 and 2022

Ward	Total complaints received		Closed Complaints				Average days to resolve a complaint	
	2021	2022	2021		2022		2021	2022
			In no.	In (%)	In no.	In (%)		
A	387	474	202	52%	353	74%	53	66
B	523	754	523	100%	703	93%	13	18
C	473	552	466	99%	548	99%	8	9
D	642	904	515	80%	904	100%	48	69
E	372	552	371	100%	542	98%	10	17
F/N	305	420	295	97%	407	97%	15	25
F/S	389	724	378	97%	704	97%	10	9
G/N	518	658	476	92%	619	94%	178	40
G/S	304	401	302	99%	381	95%	24	8
H/E	540	773	528	98%	773	100%	14	22
H/W	622	840	584	94%	824	98%	28	23
K/E	993	1,338	834	84%	1,064	80%	75	62
K/W	1,320	1,698	1,203	91%	1,538	91%	39	39
L	798	788	764	96%	771	98%	39	30
M/E	639	576	467	73%	525	91%	53	54
M/W	673	665	671	100%	656	99%	60	19
N	567	575	555	98%	575	100%	50	21
P/N	952	948	724	76%	490	52%	37	70
P/S	501	588	390	78%	550	94%	61	23
R/C	704	673	691	98%	673	100%	37	17
R/N	320	386	319	100%	386	100%	33	8
R/S	671	849	633	94%	849	100%	25	16
S	510	675	496	97%	452	67%	50	50
T	283	310	275	97%	296	95%	80	29
<b>Total</b>	<b>14,006</b>	<b>17,121</b>	<b>12,662</b>	<b>90%</b>	<b>15,583</b>	<b>91%</b>	<b>44</b>	<b>32</b>

Table 50: Other category garbage sent to Deonar landfill from 2020 to 2022 (in MT)

Ward*	2020	Average Per day	2021	Average Per day	2022	Average Per day
G.R.T.S.	34	0	13	0	220	1
DEONAR	7,508	21	5,947	16	9,674	27
K.R.T.S.	0	0	0	0	5,136	14
KTS(TORAS)	20	0	25	0	24,683	68
M.R.T.S.	72,344	198	44,711	122	59,275	162
MARKET	0	0	0	0	0	0
MKT	44	0	64	0	26	0
MRTS(DIR)	0	0	142	0	11,545	32
K.T.S(DIR)	9,245	25	26	0	1,360	4
DEONAR ABATTOIR	0	0	0	0	611	2
DISPOSAL	0	0	0	0	18	0
PAID	7,949	22	9,580	26	7,083	19
V.L.R.T.S	0	0	5,445	15	3,605	10
<b>Grand Total</b>	<b>97,144</b>	<b>266</b>	<b>65,954</b>	<b>181</b>	<b>1,23,236</b>	<b>338</b>

\* G.R.T.S: Gorai Refuse Transfer Station, K.R.T.S: Kurla Refuse Transfer Station, KTS(TORAS): Kurla Transfer Station Toras, M.R.T.S: Mahalaxmi Refuse Transfer Station, MKT: Market, M.R.T.S (DIR): Mahalaxmi Refuse Transfer Station Direct, K.T.S(DIR): Kurla Transfer Station Direct, V.L.R.T.S: Versova Lagoon Refuse Transfer Station.

■ Table 51: Budget Revenue Estimates under Dumping Ground from 2017-18 to 2023-24 (in crores)

Years	Budget Revenue Estimates	Actuals	Percentage Utilised	% of assign from total SWM Budget
<b>Gorai Borivali Dumping Ground</b>				
2017-18	11	4	35%	0.58%
2018-19	5	4	85%	0.23%
2019-20	5	4	84%	0.21%
2020-21	5	4	82%	0.21%
2021-22	6	4	75%	0.24%
2022-23	8	-	-	0.29%
2023-24	8	-	-	0.28%
<b>Deonar Dumping Ground</b>				
2017-18	26	13	51%	1.36%
2018-19	25	16	62%	1.24%
2019-20	25	15	61%	1.09%
2020-21	25	12	46%	1.09%
2021-22	23	14	62%	0.93%
2022-23	26	-	-	0.98%
2023-24	25	-	-	0.84%
<b>Kanjurmarg Dumping Ground</b>				
2017-18	109	76	70%	5.67%
2018-19	108	89	82%	5.35%
2019-20	148	128	86%	6.54%
2020-21	151	143	94%	6.53%
2021-22	141	134	95%	5.69%
2022-23	163	-	-	6.08%
2023-24	175	-	-	5.85%
<b>Mulund Dumping Ground</b>				
2017-18	6	2	37%	0.31%
2018-19	5	2	44%	0.24%
2019-20	1	-0.07	-7%	0.05%
2020-21	0.14	0.01	9%	0.01%
2021-22	0.10	-	0%	0.00%
2022-23	-	-	-	-
2023-24	0.24	-	-	0.01%
<b>Maintenance of Dumping Ground &amp; Refuse Transport Station</b>				
2017-18	177	148	84%	9.22%
2018-19	160	124	77%	7.91%
2019-20	197	161	82%	8.68%
2020-21	198	168	85%	8.56%
2021-22	188	163	87%	7.57%
2022-23	213			7.95%
2023-24	230			7.69%

## Annexure 2: Air Quality and Urban Green Cover data table

Table 52: AQI of Year-wise Best and Worst Days from 2021 to 2023<sup>53</sup>

Year	Best AQIs		Worst AQIs	
2021	12-06-2021	35	07-01-2021	283
	13-06-2021	39	08-01-2021	278
	09-06-2021	39	06-01-2021	268
	16-07-2021	40	03-01-2021	254
	14-07-2021	41	23-01-2021	251
	15-07-2021	41	02-01-2021	245
	21-08-2021	41	09-01-2021	244
	12-07-2021	41	10-01-2021	241
	16-06-2021	42	17-12-2021	241
	17-07-2021	42	18-12-2021	237
	18-05-2021	42	28-01-2021	237
2022	18-09-2022	34	24-01-2022	390
	20-06-2022	40	26-01-2022	275
	25-07-2022	40	06-12-2022	274
	11-08-2022	40	25-01-2022	273
	17-09-2022	40	05-02-2022	269
	24-07-2022	41	05-12-2022	269
	22-09-2022	41	07-12-2022	268
	26-07-2022	42	04-12-2022	258
	09-08-2022	42	27-11-2022	252
19-09-2022	42	26-11-2022	251	
Jan-23 to Mar-23	31-03-2023	63	18-01-2023	238
	23-03-2023	64	19-01-2023	220
	24-03-2023	68	27-01-2023	219
	25-03-2023	68	05-03-2023	215
	19-03-2023	72	26-01-2023	213
	21-03-2023	74	08-02-2023	211
	27-03-2023	77	28-01-2023	210
	22-03-2023	80	03-03-2023	208
	30-03-2023	80	06-01-2023	205
	20-03-2023	81	01-02-2023	203

<sup>53</sup>2023: January 2023 to March 2023.

Table 53: Ward-wise number of trees from 2017-18 to 2021-2022

Ward	2017-18	2018-19	2019-20	2020-21	2021-2022
A	83,201	83,201	83,201	83,201	83,201
B	7,816	7,816	7,816	7,816	7,816
C	5,756	5,756	5,756	5,756	5,756
D	1,00,317	1,00,317	1,00,317	1,00,317	1,00,317
E	58,028	58,028	58,028	58,028	58,028
F/N	1,84,837	1,84,837	1,84,837	1,84,837	1,84,837
F/S	87,240	87,240	87,240	87,240	87,240
G/N	96,620	96,620	96,620	96,620	96,620
G/S	94,774	94,774	94,774	94,774	94,774
H/E	57,314	57,314	57,314	57,314	57,314
H/W	64,674	64,674	64,674	64,674	64,674
K/E	2,15,728	2,15,728	2,15,728	2,15,728	2,15,728
K/W	1,73,232	1,73,232	1,73,232	1,73,232	1,73,232
L	36,023	36,023	36,023	36,023	36,023
M/E	1,62,638	1,62,638	1,62,638	1,62,638	1,62,638
M/W	2,13,084	2,13,084	2,13,084	2,13,084	2,13,084
N	2,92,965	2,92,965	2,92,965	2,92,965	2,92,965
P/N	2,84,271	2,84,271	2,84,271	2,84,271	2,84,271
P/S	1,86,002	1,86,002	1,86,002	1,86,002	1,86,002
R/C	1,07,841	1,07,841	1,07,841	1,07,841	1,07,841
R/N	34,370	34,370	34,370	34,370	34,370
R/S	98,305	98,305	98,305	98,305	98,305
S	2,54,038	2,54,038	2,54,038	2,54,038	2,54,038
T	76,209	76,209	76,209	76,209	76,209
<b>Total</b>	<b>29,75,283</b>	<b>29,75,283</b>	<b>29,75,283</b>	<b>29,75,283</b>	<b>29,75,283</b>

## Annexure 3: Centralised Complaint Registration System (CCRS) related data tables

▪ **Table 54: Number of Days for Resolving Complaint According to Citizen's Charter**

Sr. No.	Complaint	To be resolved (in days)
1	Drainage Chokes and Blockages	1
2	Overflowing drains or manholes	1
3	Odour (Foul Smell) from Drains	1
4	Replacement of Missing / Damaged Manhole	1
5	Raising of Manhole (except in Monsoon)	7
6	Cleaning of septic tank	7
7	Repairs to pipe sewers/main sewers	7
8	Contaminated Water Supply	1
9	Leaks in Water Lines	7
10	Shortage of Water Supply	2
11	Burst Water Main	1
12	Garbage not lifted - Co-authorised Point	1
13	Collection point not attended properly	1
14	Garbage lorry not reported for service/ Lorry not covered	1
15	Providing/removing/replacing dustbins	8
16	Sweeping of road	1
17	Removal of Dead Animals	1
18	No attendance at public toilets	2

▪ **Table 55: Ward-wise Total Complaints from 2013 to 2022**

Ward	Population 2022	Total Complaints									
		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
A	1,92,830	2,646	1,960	1,418	1,972	1,840	2,474	2,896	1,763	1,764	2,061
B	1,32,667	2,571	1,761	1,326	1,916	2,341	3,972	3,959	2,461	2,901	3,047
C	1,73,180	2,483	1,908	1,525	1,899	2,895	3,696	3,596	2,888	2,632	2,826
D	3,61,519	4,983	3,395	3,282	4,081	4,053	4,815	5,159	3,730	3,191	3,566
E	4,09,900	3,299	2,688	2,414	2,992	3,183	4,337	4,642	3,660	3,438	3,792
F/N	5,51,383	3,088	2,558	2,318	2,765	2,944	4,425	5,304	3,597	3,094	3,799
F/S	3,76,221	1,980	1,561	1,305	1,628	1,624	2,369	2,857	2,444	2,270	3,102
G/N	6,24,345	4,441	3,007	3,094	4,416	4,840	6,241	5,954	4,657	4,859	5,158
G/S	3,93,707	2,612	1,674	1,495	1,983	2,471	3,160	4,192	2,658	2,264	2,847
H/E	5,80,779	3,383	2,323	2,245	2,774	2,937	3,518	4,397	3,519	2,851	3,733
H/W	3,20,575	4,014	3,172	2,715	3,093	3,430	4,763	4,774	3,481	3,623	4,713
K/E	8,58,690	6,844	5,060	4,323	5,901	6,725	8,146	9,724	6,847	6,667	7,529
K/W	7,80,316	8,412	4,957	4,328	6,374	8,349	9,465	10,399	7,456	6,845	8,667
L	9,40,339	9,136	8,085	7,799	7,498	7,282	7,242	7,560	5,862	6,310	6,575
M/E	8,41,842	5,615	4,869	3,338	3,468	3,391	4,232	4,334	3,525	3,807	4,023
M/W	4,29,293	3,618	2,886	1,966	2,709	3,123	4,331	4,387	3,438	4,086	4,027
N	6,49,165	4,013	3,701	2,966	3,559	6,088	6,570	6,843	4,981	4,045	4,400
P/N	9,81,134	6,120	5,061	4,702	4,955	5,374	6,586	8,019	6,073	6,177	6,910
P/S	4,83,088	3,995	3,511	3,095	3,450	3,227	4,855	5,133	3,168	3,133	3,471
R/C	5,85,910	4,534	3,674	3,088	4,092	4,368	5,315	6,398	4,506	4,641	5,178
R/N	4,49,591	2,791	1,770	1,339	1,542	1,792	2,171	2,729	2,185	2,017	2,367
R/S	7,20,430	4,261	4,841	3,290	3,855	4,079	6,249	6,008	4,341	4,064	4,712
S	7,75,204	4,014	3,340	2,936	3,040	3,923	5,115	6,144	4,480	3,820	5,351
T	3,55,888	2,717	2,658	1,466	1,593	2,050	2,611	2,737	2,054	1,751	2,214
<b>Total</b>	<b>1,29,67,996</b>	<b>1,01,570</b>	<b>80,420</b>	<b>67,773</b>	<b>81,555</b>	<b>92,329</b>	<b>1,16,658</b>	<b>1,28,145</b>	<b>93,774</b>	<b>90,250</b>	<b>1,04,068</b>

Table 56: Ward-wise Comparison of Total Complaints and Complaints Closed in 2021 and 2022

Ward	Total complaints received		Closed Complaints				Average days to resolve a complaint	
	2021	2022	2021		2022		2021	2022
			In no.	In (%)	In no.	In (%)		
A	1,764	2,061	1,265	72%	1,567	76%	46	75
B	2,901	3,047	2,600	90%	2,427	80%	40	47
C	2,632	2,826	2,153	82%	2,384	84%	51	61
D	3,191	3,566	2,466	77%	3,555	100%	42	58
E	3,438	3,792	3,375	98%	3,581	94%	17	31
F/N	3,094	3,799	2,886	93%	3,530	93%	32	30
F/S	2,270	3,102	2,194	97%	2,803	90%	22	23
G/N	4,859	5,158	2,825	58%	4,662	90%	110	57
G/S	2,264	2,847	2,203	97%	2,705	95%	21	12
H/E	2,851	3,733	2,798	98%	3,623	97%	19	25
H/W	3,623	4,713	3,224	89%	4,036	86%	38	36
K/E	6,667	7,529	6,172	93%	6,393	85%	35	44
K/W	6,845	8,667	6,217	91%	6,692	77%	47	44
L	6,310	6,575	4,276	68%	5,093	77%	49	40
M/E	3,807	4,023	2,558	67%	3,327	83%	72	54
M/W	4,086	4,027	4,045	99%	3,941	98%	49	16
N	4,045	4,400	3,962	98%	4,354	99%	47	21
P/N	6,177	6,910	4,731	77%	3,190	46%	67	72
P/S	3,133	3,471	2,359	75%	3,216	93%	64	42
R/C	4,641	5,178	4,586	99%	5,173	100%	47	25
R/N	2,017	2,367	1,937	96%	2,360	100%	44	14
R/S	4,064	4,712	3,920	96%	4,707	100%	43	24
S	3,820	5,351	3,491	91%	4,112	77%	78	45
T	1,751	2,214	1,687	96%	2,122	96%	73	30
<b>Total</b>	<b>90,250</b>	<b>1,04,068</b>	<b>77,930</b>	<b>86%</b>	<b>89,553</b>	<b>86%</b>	<b>48</b>	<b>38</b>

Table 57: Issue-wise and ward-wise status of complaints escalated in 2022

Complaint Type	Total Complaints Received	Escalated Complaints			
		Level I (AMC/Chief Engineer)	Level II (DMC)	Level III (Add. MC)	Level IV (MC)
Buildings	16,883	5,013	4,891	4,766	4,628
Colony Officer	981	199	199	199	199
Drainage	17,121	1,512	1,510	1,509	1,490
Estate	661	204	204	203	203
Garden	3,529	64	64	64	64
License	13,439	2,036	2,036	2,036	2,036
BMC Related	735	183	183	183	183
Medical Officer Health (MOH)	1,384	285	285	285	285
Nuisance due to vagrants	1,599	468	468	468	468
Pest control	8,037	16	16	16	16
Pollution	292	139	139	139	139
Roads	11,161	2,504	2,504	2,504	2,503
School	70	23	23	23	23
Shop and Establishment	647	20	20	20	20
Solid Waste Management (SWM)	12,351	532	532	532	532
Storm Water Drainage	1,550	313	313	313	308
Toilet	531	41	41	41	41
Water Supply	13,097	-	-	-	-
<b>Total</b>	<b>1,04,068</b>	<b>13,552</b>	<b>13,428</b>	<b>13,301</b>	<b>13,138</b>
<b>In (%)</b>		<b>13%</b>	<b>13%</b>	<b>13%</b>	<b>13%</b>

Complaint Type	Total Complaints Received	Escalated Complaints			
		Level I (AMC/Chief Engineer)	Level II (DMC)	Level III (Add. MC)	Level IV (MC)
A	2,061	455	453	451	449
B	3,047	585	576	565	557
C	2,826	433	426	423	420
D	3,566	11	11	10	10
E	3,792	211	209	208	206
F/N	3,799	265	261	258	257
F/S	3,102	297	296	296	289
G/N	5,158	495	493	492	485
G/S	2,847	115	115	115	112
H/E	3,733	93	89	86	82
H/W	4,713	673	669	661	650
K/E	7,529	1,078	1,077	1,077	1,069
K/W	8,667	1,857	1,846	1,834	1,811
L	6,575	1,473	1,437	1,415	1,385
M/E	4,023	623	615	604	594
M/W	4,027	86	86	82	74
N	4,400	44	42	38	33
P/N	6,910	3,305	3,284	3,253	3,232
P/S	3,471	241	238	236	233
R/C	5,178	5	5	5	5
R/N	2,367	3	3	3	3
R/S	4,712	4	4	4	4
S	5,351	1,109	1,102	1,094	1,087
T	2,214	91	91	91	91
<b>Total</b>	<b>1,04,068</b>	<b>13,552</b>	<b>13,428</b>	<b>13,301</b>	<b>13,138</b>
<b>In (%)</b>		<b>13</b>	<b>13</b>	<b>13</b>	<b>13</b>

Table 58: Issue-wise Comparison of Total Complaints and Action taken on Complaints in 2021 and 2022

Complaint Type	Total complaints received		Action Taken Report*			
	2021	2022	2021		2022	
			In no.	In (%)	In no.	In (%)
Buildings	17,063	16,883	17,062	99.99%	16,881	99.99%
Colony Officer	1,305	981	1,305	100.00%	980	99.90%
Drainage	14,006	17,121	14,006	100.00%	17,121	100.00%
Estate	538	661	538	100.00%	661	100.00%
Garden	3,323	3,529	3,323	100.00%	3,529	100.00%
License	10,814	13,439	10,814	100.00%	13,439	100.00%
BMC Related	647	735	647	100.00%	735	100.00%
Medical Officer Health (MOH)	1,087	1,384	1,086	99.91%	1,384	100.00%
Nuisance due to vagrants on municipal roads, footpaths, gardens	1,383	1,559	1,383	100.00%	1,599	100.00%
Pest control	7,785	8,037	7,785	100.00%	8,037	100.00%
Pollution	424	292	424	100.00%	292	100.00%
Roads	7,475	11,161	7,472	99.96%	11,160	99.99%
School	43	70	43	100.00%	70	100.00%
Shop and Establishment	763	647	762	99.87%	647	100.00%
Solid Waste Management (SWM)	11,056	12,351	11,056	100.00%	12,351	100.00%
Storm Water Drainage	1,068	1,550	1,068	100.00%	1,549	99.94%
Toilet	489	531	489	100.00%	531	100.00%
Water Supply	10,981	13,097	10,981	100.00%	13,097	100.00%
<b>Grand Total</b>	<b>90,250</b>	<b>1,04,068</b>	<b>90,244</b>	<b>99.99%</b>	<b>1,04,063</b>	<b>100.00%</b>

\*differs from 'Complaints Closed'

Table 59: Ward-wise Number and Percentage of Complaints with Councillor Code filled in 2022

Ward	Total Complaints	Complaints where Councillor code was filled	
		No.	In (%)
A	2,061	468	23%
B	3,047	924	30%
C	2,826	896	32%
D	3,566	744	21%
E	3,792	1,084	29%
F/N	3,799	850	22%
F/S	3,102	656	21%
G/N	5,158	1,926	37%
G/S	2,847	561	20%
H/E	3,733	787	21%
H/W	4,713	1,374	29%
K/E	7,529	1,735	23%
K/W	8,667	1,589	18%
L	6,575	1,662	25%
M/E	4,023	1,108	28%
M/W	4,027	1,132	28%
N	4,400	1,183	27%
P/N	6,910	1,660	24%
P/S	3,471	714	21%
R/C	5,178	1,496	29%
R/N	2,367	700	30%
R/S	4,712	1,192	25%
S	5,351	1,561	29%
T	2,214	548	25%
<b>Total</b>	<b>1,04,068</b>	<b>26,550</b>	<b>26%</b>