Monitoring, Sampling and Analysis for Ambient Air Quality, Surface Water Quality and Ground Water Quality in Critically/Severely/Other Polluted Areas

TARAPUR

Pre-Monsoon (April 2024 to June 2024)

Maharashtra Pollution Control Board

महाराष्ट्र प्रदूषण नियंत्रण मंडळ

Index

1. ABBREVIATIONS

APHA	American Public Health Association
ASTM	American Society for Testing and Materials
BIS	Bureau of Indian Standards
BLQ	Below the Limit of Quantification
CAAQMS	Continuous Ambient Air Quality Monitoring Station
CEMS	Continuous Emission Monitoring System
CEPI	Comprehensive Environmental Pollution Index
CETP	Common Effluent Treatment Plant
CPA	Critically Polluted Area
CPCB	Central Pollution Control Board
EPA	Environmental Protection Act, 1986
GDP	Gross Domestic Product
MIDC	Maharashtra Industrial Development Corporation
MPCB	Maharashtra Pollution Control Board
NAAQS	National Ambient Air Quality Standard
NWMP	National Water Quality Monitoring Program
SPA	Severely Polluted Area
VOCs	Volatile Organic Compounds
WHO	World Health Organisation
ZLD	Zero Liquid Discharge

1. Executive Summary

Tarapur was monitored for Ambient Air Quality, Ground and Surface Water quality. Based on the data collected by monitoring, a Comprehensive Environmental Pollution Index (CEPI) Score [as per latest directions 120 of Letter No. B-29012/ESS (CPA)/2015-16 dated 26th April 2016 of Central Pollution Control Board (CPCB)] was calculated. Maharashtra Pollution Control Board (MPCB) has carried out monitoring at CPCB location with the additional locations of sampling for ambient air, surface and ground water in consideration with the previous CEPI monitoring and covering the entire CEPI Impact Zone. The pre-monsoon monitoring was carried out during the period of April 2024 to June 2024 to assess the ambient air quality, surface water quality and ground water quality.

The Ambient Air Quality stations were identified considering the upwind and cross wind direction in the CEPI impact area. Ambient Air Quality was monitored at eight locations. The concentration of all the ambient air parameters was found well within the limits prescribed by NAAQS. Six locations each for surface water and groundwater were monitored for the study. Concentration values of Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Dissolved Solids (TDS) and Total Kjeldahl Nitrogen (TKN) were found above the standard limits in two surface water samples. Land index is represented by groundwater in the CEPI. Ground water parameters were observed within the permissible limits when compared with IS 10500:2012 drinking water standards.

Based on the study conducted by CPCB during the period of March 2018, the CEPI score of Tarapur region as per the revised guidelines of CEPI (2016) was 93.69 (Air Index–72, Water Index-89 and Land Index–59.25). However, in the present study, the aggregated CEPI score of the Tarapur region of the pre-monsoon season (June, 2024) was calculated as 60.5. Based on the study, the present CEPI score is calculated on the basis of the sub-index of Air-21.0, Water Index-57.25, and Land Index–35.50). The CEPI score is the combination of A, B, C, and D factors. Here, the C factor represents the health data and the D factor represents the initiatives taken by the regional office of MPCB in the past few years to mitigate pollution. The regional office of MPCB has taken various initiatives like the installation of CAAQMS, CETPs, online VOC analysers etc. in the past few years to control and mitigate air and water pollutants. This has contributed to factor D, hence reducing the CEPI score of the region over the years.

The analysis of the aggregated CEPI score shows that the pollution in the Tarapur industrial cluster has decreased from a critical level of pollution to a severe one. During the pre-monsoon season study, a decline in CEPI score of about 35% was seen, going from 93.69 in 2018 to 60.5 in June 2024.

2. Introduction

The industrial sector remains a pivotal force in driving a nation's economic growth, significantly contributing to increased production, fixed investment, exports, employment, and capacity utilization. Industries serve as engines of economic development, bolstering government revenue, international trade, social services, and job creation. The growth rate of the industrial sector directly impacts the overall economic growth of a country. Consequently, industries are essential for achieving economic goals and prosperity. According to the World GDP Ranking 2024, India stands as the fifth-largest economy globally. Several Sustainable Development Goals (SDGs) focus on growth, including Decent Work and Economic Growth (Goal 8) and Industry, Innovation, and Infrastructure (Goal 9).

Despite these economic benefits, industrial activities have a profound negative impact on the environment, affecting water, air, and soil quality. Industries discharging untreated wastewater have contaminated drinking water with hazardous substances, posing severe risks to human, animal, and aquatic life. Air pollution from industrial emissions is linked to a range of respiratory and cardiovascular diseases, particularly affecting children and leading to increased rates of infant mortality and chronic health issues in adulthood. According to the World Health Organization (WHO), environmental pollution is responsible for approximately 9 million premature deaths annually. Over 90% of the global population is exposed to air pollution levels exceeding WHO guidelines, posing serious health risks. Furthermore, around 2 billion people use drinking water contaminated with faeces, leading to infectious diseases such as cholera and dysentery.

The impact on flora and fauna is equally alarming. Industrial pollution has led to habitat destruction, loss of biodiversity, and the disruption of ecosystems. Toxic pollutants can cause genetic mutations, reproductive failures, and behavioural changes in wildlife, endangering entire species. Plants exposed to polluted air and water can experience stunted growth, reduced photosynthesis, and increased susceptibility to diseases, which ultimately affects food security and ecosystem stability.

To mitigate these adverse effects, robust environmental policies are essential. These policies set forth rules for industries and individuals, enforced by government agencies. Key aspects include monitoring pollution levels, imposing fines or penalties on violators, and conducting environmental impact assessments for proposed projects. Conservation measures are crucial for protecting biodiversity, and policies must be regularly updated to address emerging challenges. A comprehensive approach, including robust regulatory frameworks, international collaboration, advanced monitoring technologies, and a commitment to sustainable practices from industries and governments, is vital for safeguarding our natural resources and promoting sustainability.

Simultaneously, the Comprehensive Environmental Pollution Index (CEPI) has emerged as a beacon of assessment and action in India's environmental landscape. Introduced as a standardized methodology for evaluating and addressing pollution in industrial clusters across the nation, the CEPI represents a significant step towards achieving the delicate balance between economic growth and environmental sustainability. Developed through collaborative efforts between environmental

scientists, regulatory authorities, and community stakeholders, the CEPI serves as a vital instrument for identifying, prioritizing, and mitigating pollution in industrial areas. By systematically monitoring, sampling, and analyzing pollution parameters such as ambient air quality, surface water quality, and groundwater quality, the CEPI empowers policymakers and regulators to make informed decisions and allocate resources effectively.

In Maharashtra, where industrial activities drive economic growth and employment opportunities, the importance of the CEPI cannot be overstated. Through strategic monitoring, sampling, and analysis efforts, the CEPI aims to provide a comprehensive assessment of pollution levels and their impacts on environmental health in critically, severely, and other polluted industrial areas across the state.

Moreover, the application of the CEPI extends beyond mere assessment, serving as a catalyst for targeted interventions and regulatory enforcement in polluted industrial areas. By identifying pollution hotspots and vulnerable communities, the CEPI enables authorities to implement remedial measures, enforce pollution control norms, and monitor progress towards environmental sustainability.

In the following sections, we delve into the methodology, findings, and implications of both the CEPI assessment and the Monitoring, Sampling, and Analysis for Ambient Air Quality, Surface Water Quality, and Groundwater Quality in Polluted Industrial Areas of Tarapur in Mumbai, Maharashtra. The present CEPI study includes Tarapur region, which is an industrial town located some 45 km north of Virar, on the Western Railway line of Mumbai Suburban Division (Mumbai Suburban Railway). The important river flowing through the region are Surya. This river is important drinking water resources of the region. Unlike other industrial estates, this industrial estate has a pleasant look due to the roads crossing at right angles and lots of small gardens adjacent to the boundary walls of the industrial units. Tarapur accounts for about 23 highly polluting 17 category industries and 59 red category industries, 53 orange category industries and 66 green category industries of various category engaged in the manufacturing of chemicals, dyes, dye-intermediates, Bulk drugs, pharmaceuticals, Textile auxiliaries, Pesticides, Petrochemicals, Iron and steel, Textile processors, Engineering units etc. Besides the industries, there are other sources which are major contributors of pollution like emissions by transport and construction activities etc.

The present report is also based on the revised CEPI version 2016. The index captures the various dimensions of environment including air, water and land. Comprehensive Environmental Pollution Index (CEPI), which is a rational number to characterize the environmental quality at a given location following the algorithm of source, pathway and receptor have been developed. The CEPI reports serve as a roadmap for targeted interventions, regulatory enforcement, and community engagement aimed at mitigating pollution and safeguarding public health in the area. Despite the persistent challenges, ongoing initiatives guided by the CEPI reports offer hope for addressing environmental concerns and fostering sustainable development in Tarapur.

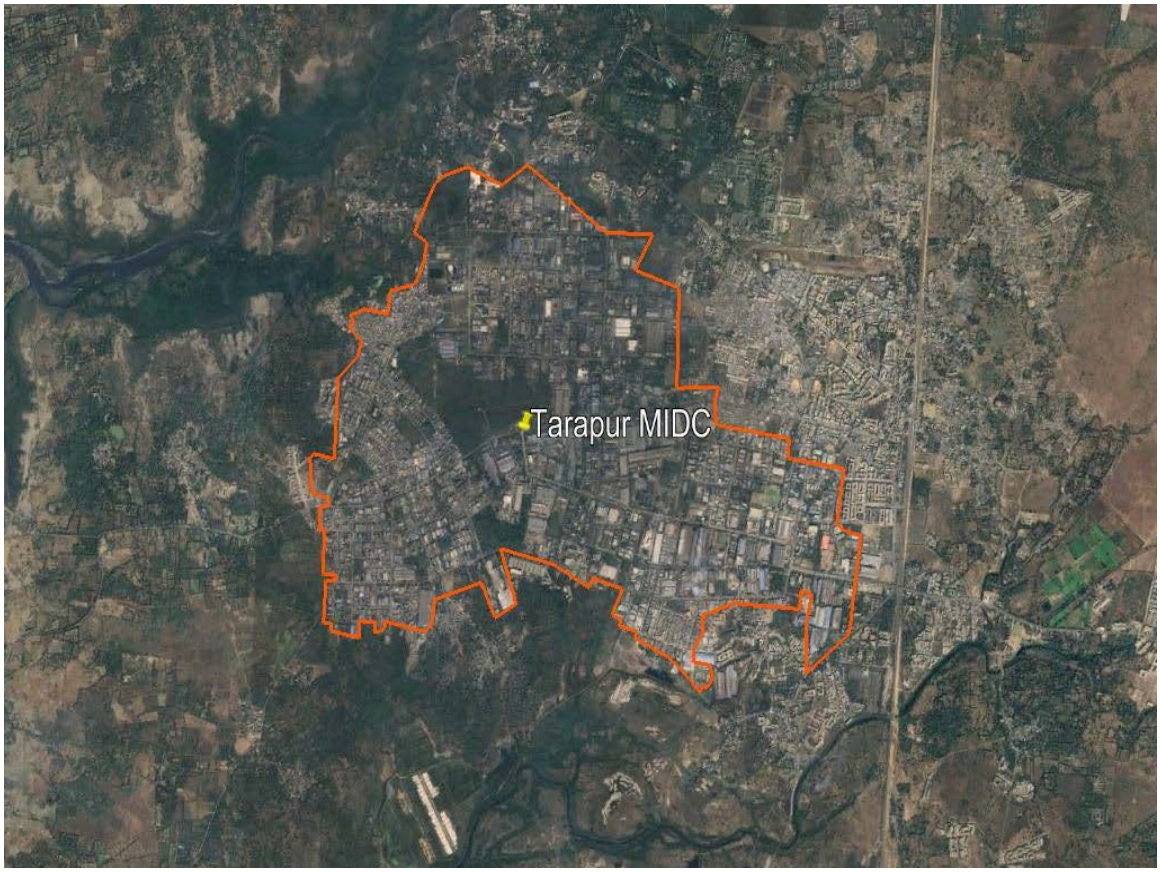


Fig. Tarapur Region CEPI Monitoring Zone

3. Scope of Work

The major scope of work includes:

I. The scope of the present study is to perform three (3) rounds of "Monitoring, Sampling and Analysis for Ambient Air Quality, VOCs in Ambient Air, Surface Water Quality & Ground Water Quality in selected Pollution Industrial Areas (PIAs) of Tarapur, Maharashtra" with a gap of one or two days. The analysis of the collected samples was carried out by the standard methods (CPCB, BIS, APHA, USEPA).

II. To Collect health-related data in the CEPI region.

III. To calculate the Comprehensive Environmental Pollution Index (CEPI) Score as per Revised CEPI-2016 issued by Central Pollution Control Board (CPCB).

The sampling details and frequency of sampling in Ambient Air, VOCs, Surface Water and Ground Water are given in Table 3.1 and Table 3.2 respectively.

Table 3.1 Sampling Details of Tarapur

Sampling Criteria	Total Sites	Monitoring Parameters
Ambient Air Quality	**08**	PM_{10}, $PM_{2.5}$, SO_2, NO_2, NH_3, O_3, C_6H_6, CO, BAP, Pb, Ni, As
Volatile Organic Compounds (VOCs)	**02**	Dichloromethane, Chloroform, Carbon Tetrachloride, Trichloroethylene, Bromodichloromethane, 1,3-Dichloropropane, 1,4-Dichlorobenzene, 1,3-Dichlorobenzene, 1,2-Dichlorobenzene, 1,2-Dibromo-3-Chloropropane, Naphthalene, Bromobenzene,1,2,4-Trimethylbenzene, 2-Chlorotoluene, Tert-Butylbenzene, SEC-Butylbenzene, P-Isopropyl toluene, M-Xylene, P-Xylene, Styrene, Cumene 1,2,3-Trichloropropane, N-Propyl benzene, Dibromochloromethane, 1,2-Dibromoethane, Chlorobenzene, 1,1,1,2-Tetrachloroethane, Ethylbenzene, 1,1-Dichloropropylene, 1,2-Dichloroethane, 1,2-Dichloropropane, Trans-1,3-Dichloropropene, CIS 1,3-Dichloropropene, 1,1,2-Trichloroethane, Tetrachloroethylene, 1,3,5-Trimethylbenzene, N-Butylbenzene, 1,2,3-Trichlorobenzene, Hexachlorobutadiene, 1,2,4-Trichlorobenzene, 2,2-Dichloropropane, Dibromo methane, Toluene, O-Xylene, Bromoform, 1,1,2,2-Tetrachloroethane, 4-Chlorotoluene, 1,1-Dichloroethylene, Trans-1,2-Dichloroethylene, 1,1-Dichloroethane, CIS-1,2-Dichloroethylene, Bromochloromethane, 1,1,1-Trichloroethane

Sampling Criteria	Total Sites	Monitoring Parameters
Water Quality Monitoring	**Surface water - 06**	**(i) Simple Parameters** Sanitary Survey, General Appearance, Colour, Smell, Transparency and Ecological **(ii) Regular Monitoring Parameters** pH, O & G, Suspended Solids, DO, COD, BOD, TDS, Electrical Conductivity, Total Dissolved Solids, Nitrite–Nitrogen, Nitrate-Nitrogen, (NO_2+NO_3) total nitrogen, Free Ammonia, Total Residual Chlorine, Cyanide, Fluoride, Chloride, Sulphate, Sulphides, Total Hardness, Dissolved Phosphates, SAR, Total Coliforms, Faecal Coliform **(iii) Special Parameters** Total Phosphorous, TKN, Total Ammonia (NH_4+NH_3)-Nitrogen, Phenols, Surface Active Agents, Anionic detergents, Organo-Chlorine Pesticides, PAH, PCB and PCT, Zinc, Nickel, Copper, Hexa-valent Chromium, Chromium (Total), Arsenic (Total), Lead, Cadmium, Mercury, Manganese, Iron, Vanadium, Selenium, Boron **(iv) Bio-assay (zebra Fish)** Test – For specified samples only.
	Ground water - 06	

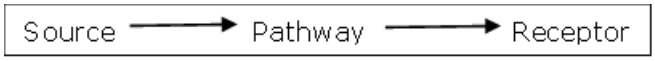
Table 3.2 Frequency of Sampling

	Parameter	Round of Sampling	Frequency in Each Round
A	**Ambient Air Quality Monitoring**		
1.	Particulate Matter (size less than 10 µm) or PM_{10}	03	3 Shifts of 8 hrs each
2.	Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	03	1 Shift of 24 hrs
3.	Sulphur Dioxide (SO_2)	03	6 Shifts of 4 hrs each
4.	Nitrogen Dioxide (NO_2)	03	6 Shifts of 4 hrs each
5.	Ammonia (NH_3)	03	6 Shifts of 4 hrs each
6.	Ozone (O_3)	03	24 Shifts of 1 hr each
7.	Benzene (C_6H_6)	03	1 Shifts of 24 hrs
8.	Carbon Monoxide (CO)	03	24 Shifts of 1 hr each
9.	Benzo (a) Pyrene (BaP) – particulate phase only	03	3 Shifts of 8 hrs each
10.	Lead (Pb)	03	3 Shifts of 8 hrs each
11.	Arsenic (As)	03	3 Shifts of 8 hrs each

	Parameter	Round of Sampling	Frequency in Each Round
12.	Nickel (Ni)	03	3 Shifts of 8 hrs each
B	**Volatile Organic Compounds (VOCs)**		
	As mentioned in Table 3.1	03	3 Shifts of 24 hrs each
C	**Ground Water**		
	As mentioned in Table 3.1	03	01 sample at each round
D	**Surface Water**		
	As mentioned in Table 3.1	03	01 sample at each round

4. Methodology

The present report is based on the revised Comprehensive Environmental Pollution Index (CEPI) version 2016. The index captures the various dimensions of the environment including air, water and land. Comprehensive Environmental Pollution Index (CEPI) is a rational number, which is used to characterize the environmental quality at a given location. It is three-step process based on the algorithm of Source, Pathway and Receptor.



Ambient air stations, Surface water locations and Ground water locations were decided by the respective regional officers. The sampling was done in 3 rounds with an interval of one or two days at each location. Sampling has been done at the potentially polluted areas so as to arrive at the CEPI. This will further help the authorities to monitor the areas in order to improve the current status of their environmental components such as air and water quality data, ecological damage and visual environmental conditions.

AIR ENVIRONMENT

5. Air Environment

For studying the Air Environment of the Tarapur area, monitoring stations were identified considering the upwind and cross wind direction and all 12 parameters as per the notification of National Ambient Air Quality Standards (NAAQS) were carried out.

**Kindly note: Volatile Organic Compounds (VOCs) concentration is not detected in most of the Air samples collected; hence it is not shown in the graphs.*

In Tarapur eight locations have been monitored of checking the Ambient Air Quality (AAQ) in triplicate from 26th June 2024 to 30th June 2024. The concentration of all the parameters at all the studied locations is observed well within the limits. Volatile Organic Compounds (VOCs) were monitored at 2 locations namely Kokuyo Camlin Ltd. and Lupin Ltd.

Table 5.1 Details of Sampling Location of Ambient Air Quality Monitoring

S.No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	Kokuyo Camlin Ltd.	19.798036°N	72.737654°E	26.06.2024	28.06.2024	30.06.2024
2.	D Docor Export Pvt. Ltd.	19.789417°N	72.752577°E	26.06.2024	28.06.2024	30.06.2024
3.	Sumitomo Chemical India Pvt. Ltd.	19.790828°N	72.718491°E	26.06.2024	28.06.2024	30.06.2024
4.	MPCB SRO Office	19.8098767°N	72.7435753°E	26.06.2024	28.06.2024	30.06.2024
5.	Loba Chemical Pvt Ltd	19.809545°N	72.734732°E	26.06.2024	28.06.2024	30.06.2024
6.	Unitec Fibres Pvt Ltd	19.804582°N	72.729414°E	26.06.2024	28.06.2024	30.06.2024
7.	Lupin Ltd	19.79615°N	72.720105°E	26.06.2024	28.06.2024	30.06.2024
8.	MPIL Steel Structure Ltd	19.797829°N	72.746503°E	26.06.2024	28.06.2024	30.06.2024

Table 5.2 Details of Sampling Location of Volatile Organic Compounds (VOCs) Monitoring

Sr.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	Kokuyo Camlin Ltd.	19.798036°N	72.737654°E	26.06.2024	28.06.2024	30.06.2024
2.	Lupin Ltd	19.79615°N	72.720105°E	26.06.2024	28.06.2024	30.06.2024

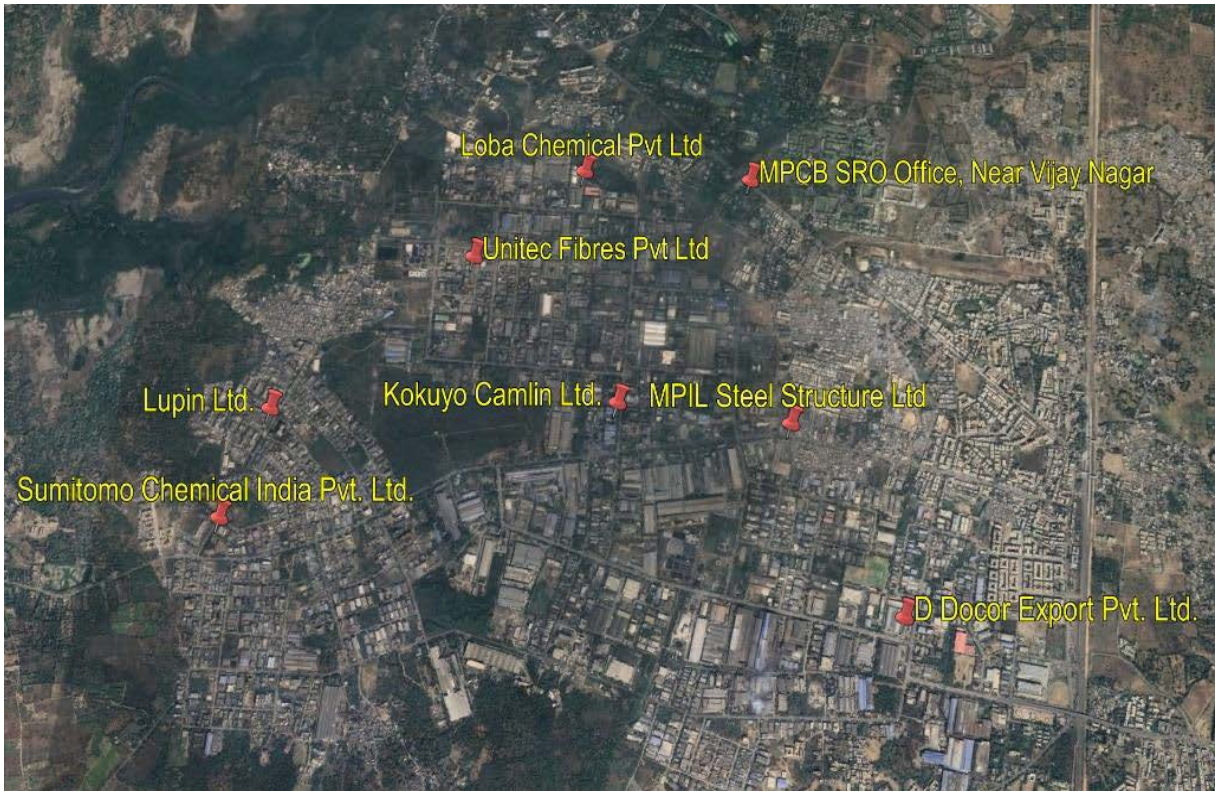


Fig: Geographical Locations of Ambient Air Quality Sampling

Fig: Geographical Locations of VOCs Monitoring

Table 5.3 Ambient Air Quality Monitoring Results

Parameters	Unit	Results			
		Kokuyo Camlin Ltd.	D Docor Export Pvt. Ltd.	Sumitomo Chemical India Pvt. Ltd	MPCB SRO Office
Sulphur Dioxide (SO2)	µg/m^3	56.90	8.76	26.40	11.60
Nitrogen Dioxide (NO2)	µg/m^3	6.82	8.80	BLQ	12.40
Particulate Matter (size less than 10 µm) or PM10	µg/m^3	31	31	30	33
Particulate Matter (size less than 2.5 µm) or PM2.5	µg/m^3	10	10	9	11
Ozone (O_3)	µg/m^3	43.03	42.90	37.70	41.10
Lead (Pb)	µg/m^3	0.09	0.05	0.09	0.05
Carbon Monoxide (CO) (1h)	mg/m^3	0.91	0.95	1.03	1.01
Carbon Monoxide (CO) (8 h)	mg/m^3	1.37	1.36	1.41	1.47
Ammonia (NH3)	µg/m^3	103.95	114.50	91.40	41.30
Benzene (C6H6)	µg/m^3	2.28	2.08	2.07	1.60
Benzo (a) Pyrene (BaP) – particulate phase only	ng/m^3	BLQ	BLQ	BLQ	BLQ
Arsenic (As)	ng/m^3	0.72	0.46	0.58	0.56
Nickel (Ni)	ng/m^3	5.36	4.81	4.91	5.06

Parameters	Unit	Results			
		Loba Chemical Pvt Ltd.	Unitec Fibres Pvt Ltd.	Lupin Ltd.	MPIL Steel Structure Ltd.
Sulphur Dioxide (SO2)	µg/m3	22.10	7.67	21.70	5.63
Nitrogen Dioxide (NO2)	µg/m3	BLQ	BLQ	BLQ	BLQ
Particulate Matter (size less than 10 µm) or PM10	µg/m3	31	31	33	30
Particulate Matter (size less than 2.5 µm) or PM2.5	µg/m3	10	10	12	9
Ozone (O3)	µg/m3	52.37	41.45	45.10	65.00
Lead (Pb)	µg/m3	0.03	0.04	BLQ	0.03
Carbon Monoxide (CO) (1h)	mg/m3	0.96	0.93	0.95	1.05

Parameters	Unit	Results			
		Loba Chemical Pvt Ltd.	Unitec Fibres Pvt Ltd.	Lupin Ltd.	MPIL Steel Structure Ltd.
Carbon Monoxide (CO) (8 h)	mg/m3	1.44	1.35	1.48	1.52
Ammonia (NH3)	µg/m3	88.80	125.85	125.80	141.35
Benzene (C6H6)	µg/m3	2.25	2.37	2.38	2.23
Benzo (a) Pyrene (BaP) – particulate phase only	ng/m3	BLQ	BLQ	BLQ	BLQ
Arsenic (As)	ng/m3	0.54	0.38	BLQ	BLQ
Nickel (Ni)	ng/m3	5.45	6.14	5.38	3.37

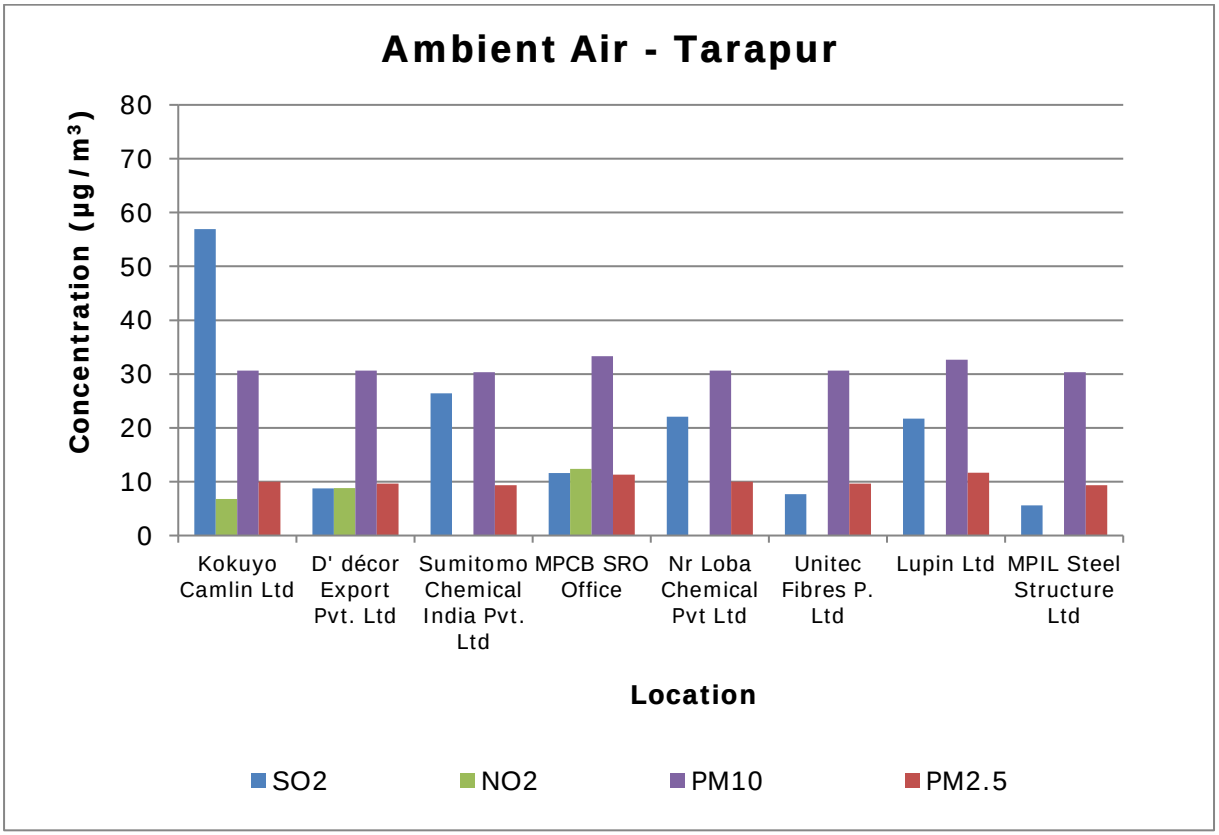
Table 5.4 Volatile Organic Compounds (VOCs) in Ambient Air Results

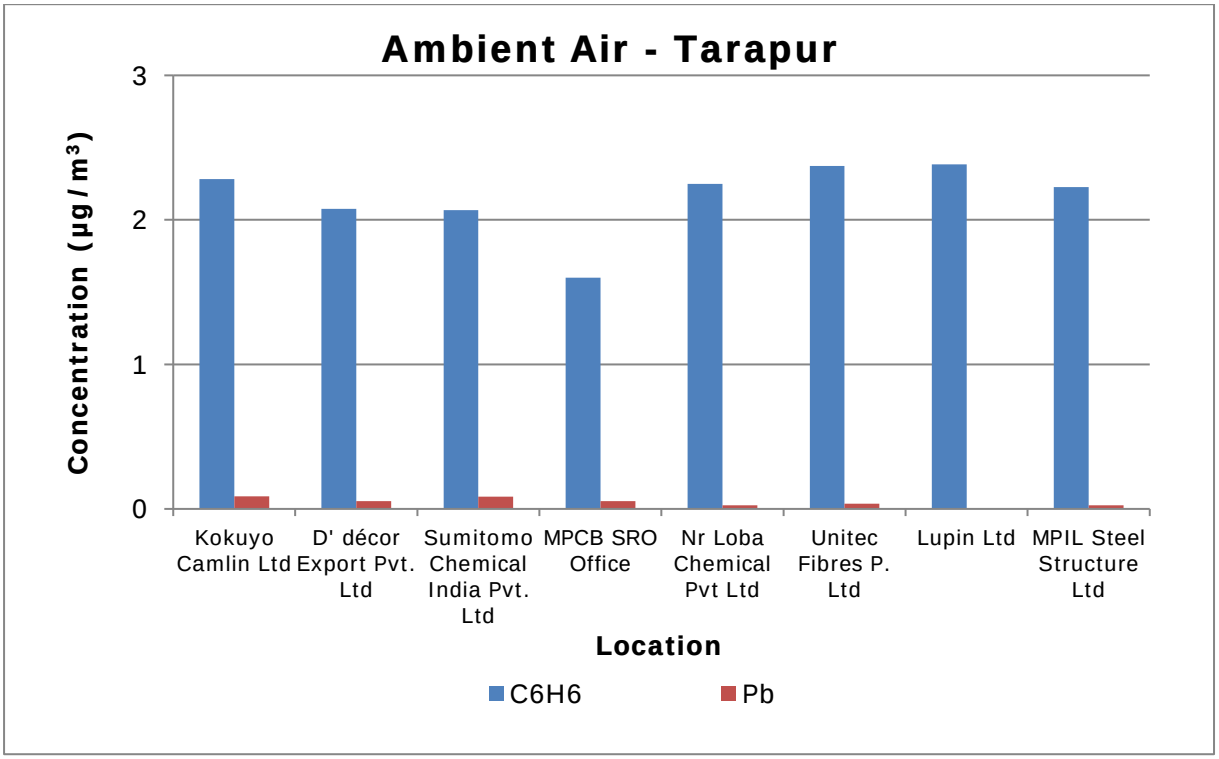
Parameters	Unit	Results	
		Kokuyo Camlin Ltd.	Lupin Ltd.
Dichloromethane	µg/m³	3.31	1.26
Chloroform	µg/m³	1.08	BLQ
Carbon Tetrachloride	µg/m³	0.60	BLQ
Trichloroethylene	µg/m³	BLQ	BLQ
Bromodichloromethane	µg/m³	BLQ	BLQ
1,3-Dichloropropane	µg/m³	BLQ	BLQ
1,4-Dichlorobenzene	µg/m³	BLQ	BLQ
1,3-Dichlorobenzene	µg/m³	BLQ	BLQ
1,2-Dichlorobenzene	µg/m³	BLQ	BLQ
1,2-Dibromo-3-Chloropropane	µg/m³	BLQ	BLQ
Naphthalene	µg/m³	BLQ	BLQ
Bromobenzene	µg/m³	BLQ	BLQ
1,2,4-Trimethylbenzene	µg/m³	BLQ	BLQ
2-Chlorotoluene	µg/m³	BLQ	BLQ
Tert-Butylbenzene	µg/m³	BLQ	BLQ
SEC-Butylbenzene	µg/m³	BLQ	BLQ
P-Isopropyl toluene	µg/m³	BLQ	BLQ
M-Xylene	µg/m³	BLQ	BLQ
P-Xylene	µg/m³	BLQ	BLQ
Styrene	µg/m³	BLQ	BLQ

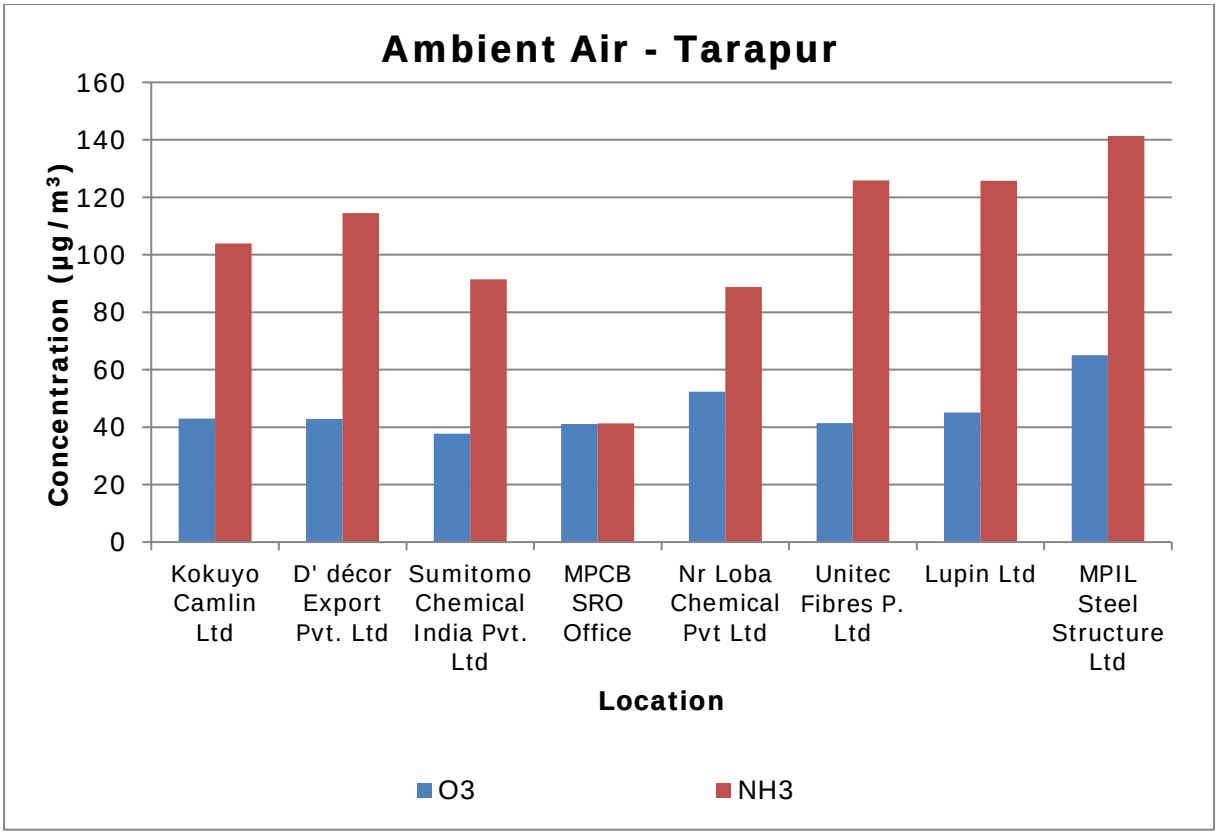
Parameters	Unit	Results	
		Kokuyo Camlin Ltd.	Lupin Ltd.
Cumene	µg/m³	BLQ	BLQ
1,2,3-Trichloropropane	µg/m³	BLQ	BLQ
N-Propyl benzene	µg/m³	BLQ	BLQ
Dibromochloromethane	µg/m³	BLQ	BLQ
1,2-Dibromoethane	µg/m³	BLQ	BLQ
Chlorobenzene	µg/m³	0.55	BLQ
1,1,1,2-Tetrachloroethane	µg/m³	BLQ	BLQ
Ethylbenzene	µg/m³	BLQ	BLQ
1,1-Dichloropropylene	µg/m³	BLQ	BLQ
1,2-Dichloroethane	µg/m³	1.61	0.57
1,2-Dichloropropane	µg/m³	BLQ	BLQ
Trans-1,3-Dichloropropene	µg/m³	BLQ	BLQ
CIS 1,3-Dichloropropene	µg/m³	BLQ	BLQ
1,1,2-Trichloroethane	µg/m³	BLQ	BLQ
Tetrachloroethylene	µg/m³	BLQ	BLQ
1,3,5-Trimethylbenzene	µg/m³	BLQ	BLQ
N-Butylbenzene	µg/m³	BLQ	BLQ
1,2,3-Trichlorobenzene	µg/m³	BLQ	BLQ
Hexachlorobutadiene	µg/m³	BLQ	BLQ
1,2,4-Trichlorobenzene	µg/m³	BLQ	BLQ
2,2-Dichloropropane	µg/m³	BLQ	BLQ
Dibromomethane	µg/m³	BLQ	BLQ
Toluene	µg/m³	2.62	0.68
O-Xylene	µg/m³	BLQ	BLQ
Bromoform	µg/m³	BLQ	BLQ
1,1,2,2-Tetrachloroethane	µg/m³	BLQ	BLQ
4-Chlorotoluene	µg/m³	BLQ	BLQ
1,1-Dichloroethylene	µg/m³	BLQ	BLQ
Trans-1,2-Dichloroethylene	µg/m³	BLQ	BLQ
1,1-Dichloroethane	µg/m³	BLQ	BLQ
CIS-1,2-Dichloroethylene	µg/m³	BLQ	BLQ
Bromochloromethane	µg/m³	0.51	BLQ

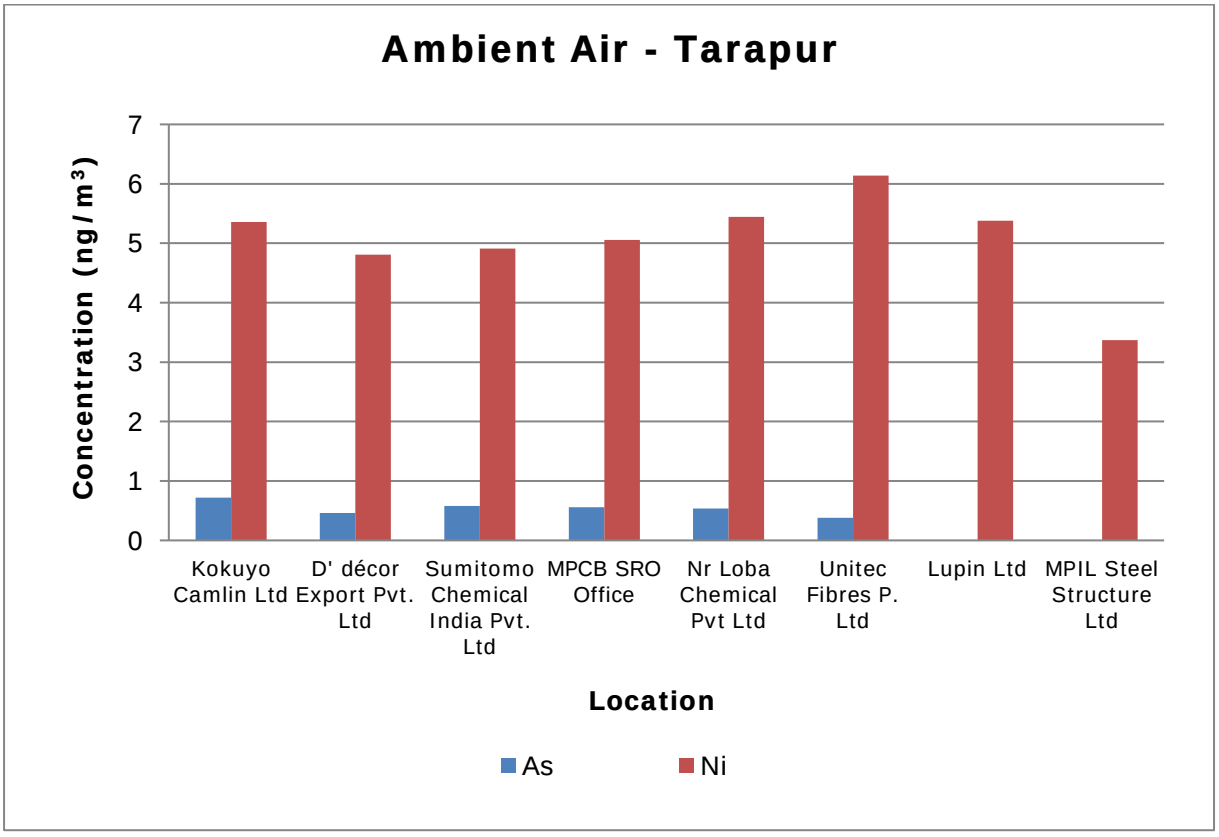
Parameters	Unit	Results	
		Kokuyo Camlin Ltd.	Lupin Ltd.
1,1,1-Trichloroethane	µg/m³	BLQ	BLQ

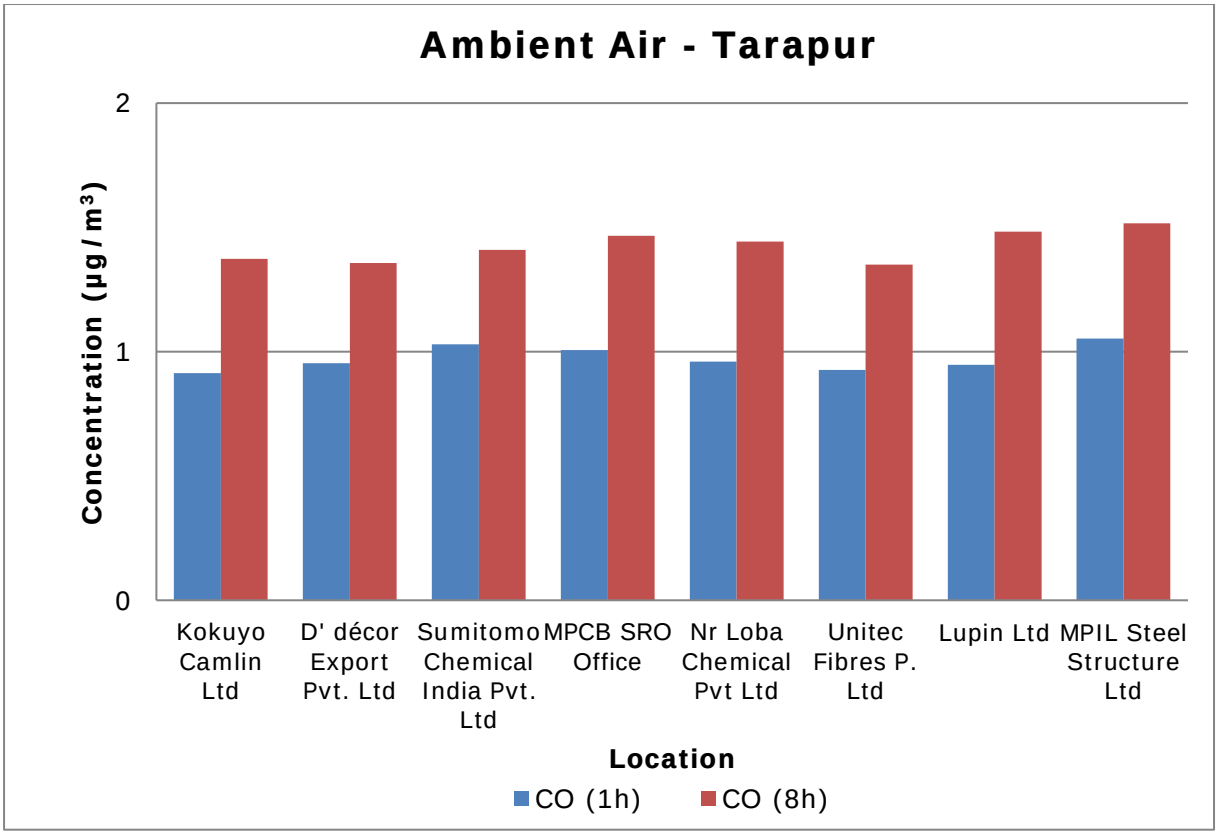
Graphs Ambient Air Quality Monitoring of Tarapur






Ambient Air - Tarapur
Concentration (µg/m³)
160
140
120
100
80
60
40
20
0
Kokuyo Camlin Ltd
D' décor Export Pvt. Ltd
Sumitomo Chemical India Pvt. Ltd
MPCB SRO Office
Nr Loba Chemical Pvt Ltd
Unitec Fibres P. Ltd
Lupin Ltd
MPIL Steel Structure Ltd
Location
O3
NH3


Ambient Air - Tarapur
Concentration (ng/m³)
7
6
5
4
3
2
1
0
Kokuyo Camlin Ltd
D' décor Export Pvt. Ltd
Sumitomo Chemical India Pvt. Ltd
MPCB SRO Office
Nr Loba Chemical Pvt Ltd
Unitec Fibres P. Ltd
Lupin Ltd
MPIL Steel Structure Ltd
Location
As
Ni


Ambient Air - Tarapur
Concentration (µg / m³)
2
1
0
Kokuyo Camlin Ltd
D' décor Export Pvt. Ltd
Sumitomo Chemical India Pvt. Ltd
MPCB SRO Office
Nr Loba Chemical Pvt Ltd
Unitec Fibres P. Ltd
Lupin Ltd
MPIL Steel Structure Ltd
Location
CO (1h)
CO (8h)

6. Water Environment

For studying the water environment of Tarapur area, surface water was collected from Nallah, Lake and River. To understand the quality of treated effluent, samples were collected from six locations.

- Except two (BPT Navapur out Fall and Nallah Near sump 2 Tarapur CETP), all other four water samples collected were found acceptable in general appearance, colour, smell and transparency.
- Similarly, general parameters like pH, electrical conductivity and suspended solids are also observed well within the limits in four water samples.
- Concentration of Biological Oxygen Demand (BOD), and Total Kjeldahl Nitrogen (TKN) is found to exceed the acceptable limits at two of the studied samples.
- In fish bioassay, 100% survival of fishes was achieved in four water samples.
- Metals like Arsenic, Nickel, Copper, Hexavalent Chromium (Cr^{6+}) etc. were also observed either below the limit of quantification.
- Parameters like Total Residual Chlorine, Nitrogen, Cyanide, Sulphide, Dissolved Phosphate, Total Ammonical Nitrogen and Phenolic compounds also met the criteria as prescribed by CPCB.
- Organo Chlorine Pesticides, Polynuclear aromatic hydrocarbons (PAH) and Polychlorinated Biphenyls (PCB) are also observed below the limit of quantification (BLQ) in all the studied samples.

Table 6.1 Details of Sampling Location of Surface Water

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	BPT Navapur out Fall	19.790747°N	72.743416°E	26.06.2024	28.06.2024	30.06.2024
2.	Over Flow of Sump No-1	19.785157°N	72.738008°E	26.06.2024	28.06.2024	30.06.2024
3.	Nallah Near sump 2 Tarapur CETP	19.805635°N	72.724122°E	26.06.2024	28.06.2024	30.06.2024
4.	Open Drain Near Sump 3 Node	19.782267°N	72.721677°E	26.06.2024	28.06.2024	30.06.2024
5.	Nallah to Dandi	19.79258°N	72.690175°E	26.06.2024	28.06.2024	30.06.2024
6.	Nallah Carrying Domestic Sewage at Saravali	19.770204°N	72.751514°E	26.06.2024	28.06.2024	30.06.2024

Fig: Geographical Locations of Surface Water Sampling

Table 6.2 Results of Surface Water

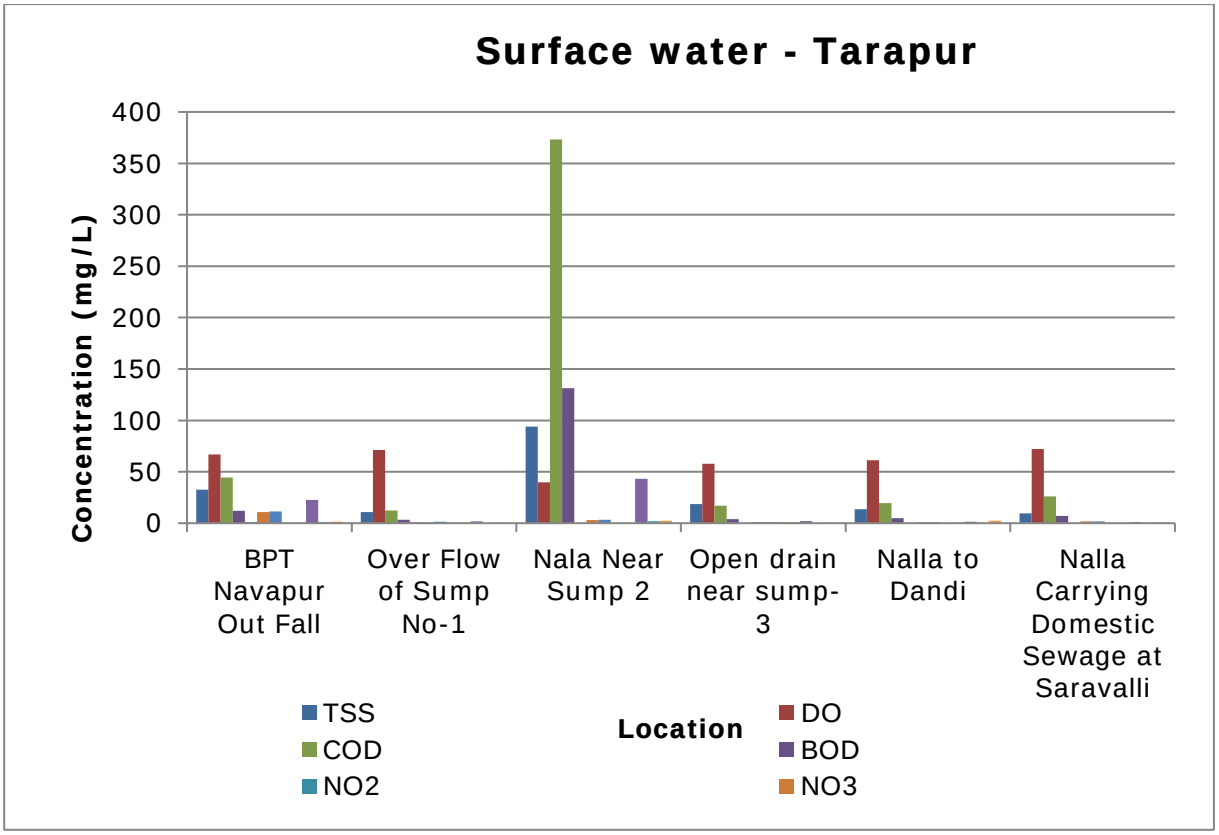
Parameters	Unit	Results					
		BPT Navapur Out Fall	Over Flow of Sump No-1	Nallah Near Sump- 2	Open drain near sump- 3	Nallah to Dandi	Nalla Carrying Domestic Sewage at Saravalli
Sanitary Survey	-	Reasonably clean neighbor hood	Reasonably clean neighbor hood	Reasonably clean neighbor hood	Very clean neighbor hood	Generally clean neighbor hood	Reasonably clean neighbor hood
General Appearance	-	Floating matter Evident	Floating matter Evident	Floating matter Evident	Floating matter Evident	Floating matter Evident	Floating matter Evident
Transparency	M	0.40	0.60	0.60	0.60	0.50	0.40
Temperature	^{o}C	28	27	26	26	26	26
Colour	Hazen	22	1	33	2	1	1
Smell	-	Not Agreeable	Agreeable	Not Agreeable	Agreeable	Agreeable	Agreeable
pH	-	7.67	7.79	7.14	7.76	7.81	7.73
Oil & Grease	mg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Suspended Solids	mg/L	32.67	10.67	94.00	18.67	13.67	9.67

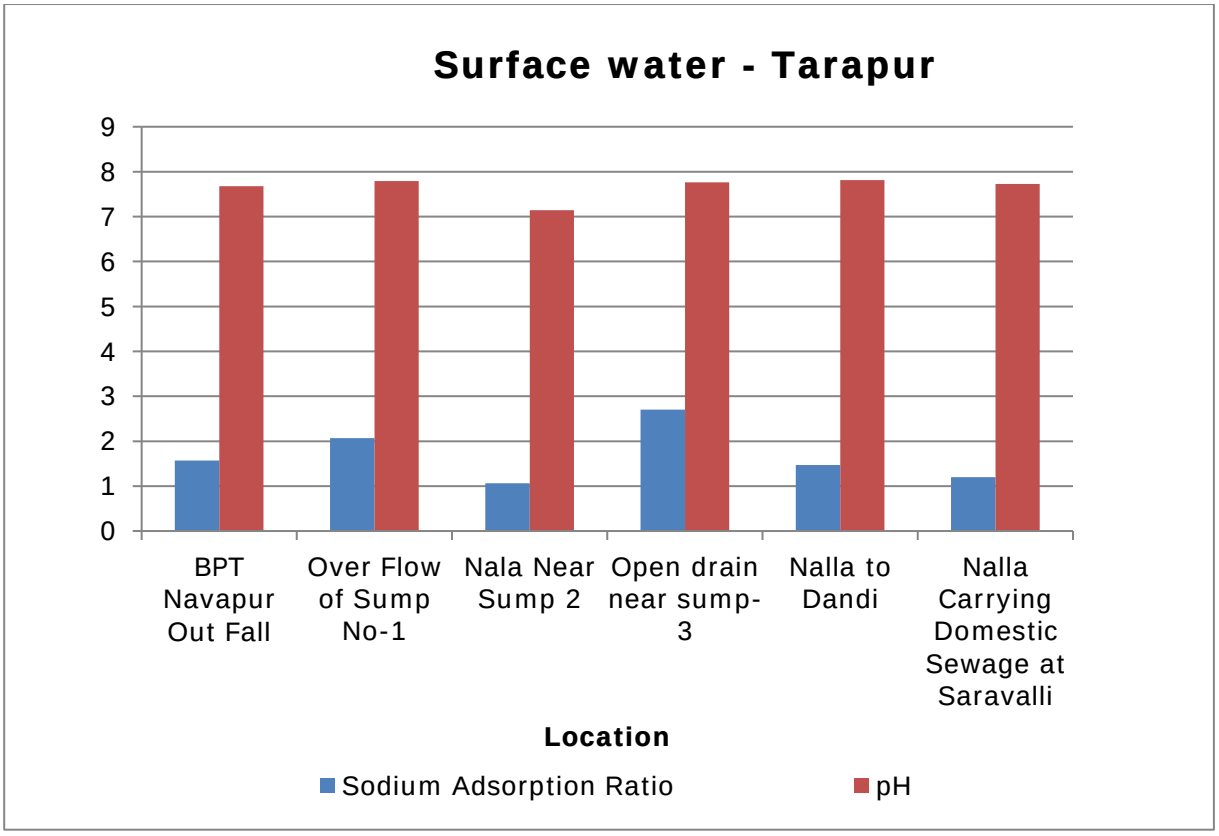
Parameters	Unit	Results					
		BPT Navapur Out Fall	Over Flow of Sump No-1	Nallah Near Sump- 2	Open drain near sump- 3	Nallah to Dandi	Nalla Carrying Domestic Sewage at Saravalli
Total Dissolved Solids	mg/L	3085	239	3132	301	1307	711
Dissolved Oxygen (% Saturation)	%	67.00	71.33	39.67	57.67	61.33	72.00
Chemical Oxygen Demand	mg/L	44	12	373	17	20	26
Biochemical Oxygen Demand (3 days,27°C)	mg/L	12	3	131	4	5	7
Electrical Conductivity (at 25 °C)	µmho/cm	5510	427	5593	537	2333	1271
Nitrite Nitrogen (as NO_2)	mg/L	1.03	0.73	0.04	0.05	0.17	0.15
Nitrate Nitrogen (as NO_3)	mg/L	10.84	0.89	2.94	1.16	0.74	1.66
(NO_2 + NO_3)-Nitrogen	mg/L	11.57	1.38	3.21	1.18	0.91	1.71
Free Ammonia (as NH_3-N)	mg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Total Residual Chlorine	mg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	1.53	0.40	2.37	0.60	2.33	0.70
Sulphide (as H_2S)	mg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	BLQ	0.6	BLQ	0.8	BLQ	BLQ
Sodium Adsorption Ratio	-	1.57	2.07	1.07	2.70	1.47	1.20
Total Coliforms	MPN Index/ 100 ml	1600	377	31733	770	621	727
Faecal Coliforms	MPN Index/ 100 ml	72	161	1404	64	154	55

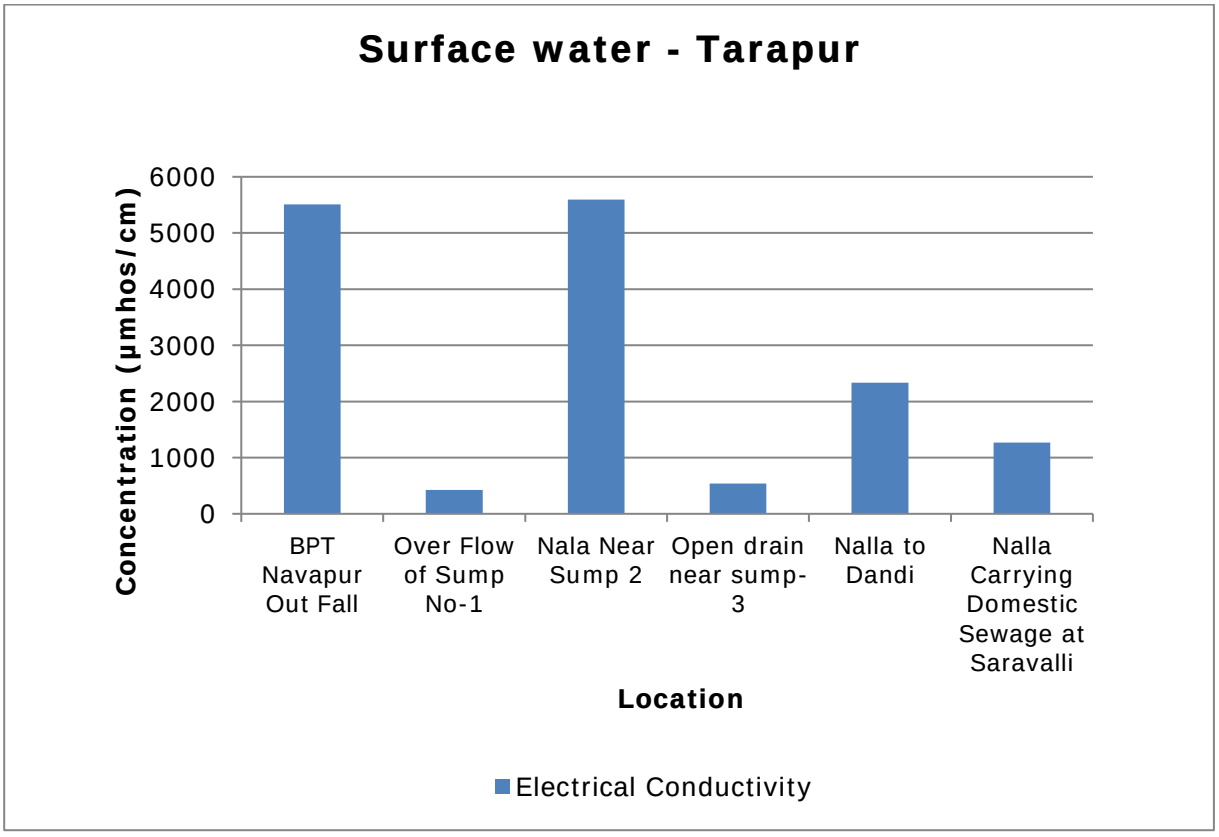
Parameters	Unit	Results					
		BPT Navapur Out Fall	Over Flow of Sump No-1	Nallah Near Sump- 2	Open drain near sump- 3	Nallah to Dandi	Nalla Carrying Domestic Sewage at Saravalli
Total Phosphate (as P)	mg/L	0.60	0.47	0.20	1.00	0.40	0.33
Total Kjeldahl Nitrogen (as N)	mg/L	22.63	1.64	43.07	2.20	1.49	1.27
Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	1.05	0.26	2.07	0.36	0.12	0.13
Total Nitrogen	mg/L	34.23	3.02	46.03	3.38	2.40	2.99
Phenols (as C_6H_5OH)	mg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Anionic Detergents (as MBAS Calculated as LAS, mol.wt.288.38)	mg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Organo Chlorine Pesticides	µg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Polynuclear aromatic hydrocarbons (as PAH)	mg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Polychlorinated Biphenyls (PCB)	mg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Zinc (as Zn)	mg/L	1.00	BLQ	0.13	BLQ	0.22	BLQ
Nickel (as Ni)	mg/L	0.08	BLQ	0.24	BLQ	BLQ	BLQ
Copper (as Cu)	mg/L	0.03	BLQ	0.03	BLQ	BLQ	BLQ
Hexavalent Chromium (as Cr^{6+})	mg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	BLQ	BLQ	0.04	BLQ	0.03	0.03
Total Arsenic (as As)	mg/L	0.02	BLQ	0.01	BLQ	BLQ	0.01
Lead (as Pb)	mg/L	0.12	BLQ	BLQ	0.01	0.01	0.01
Cadmium (as Cd)	mg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ

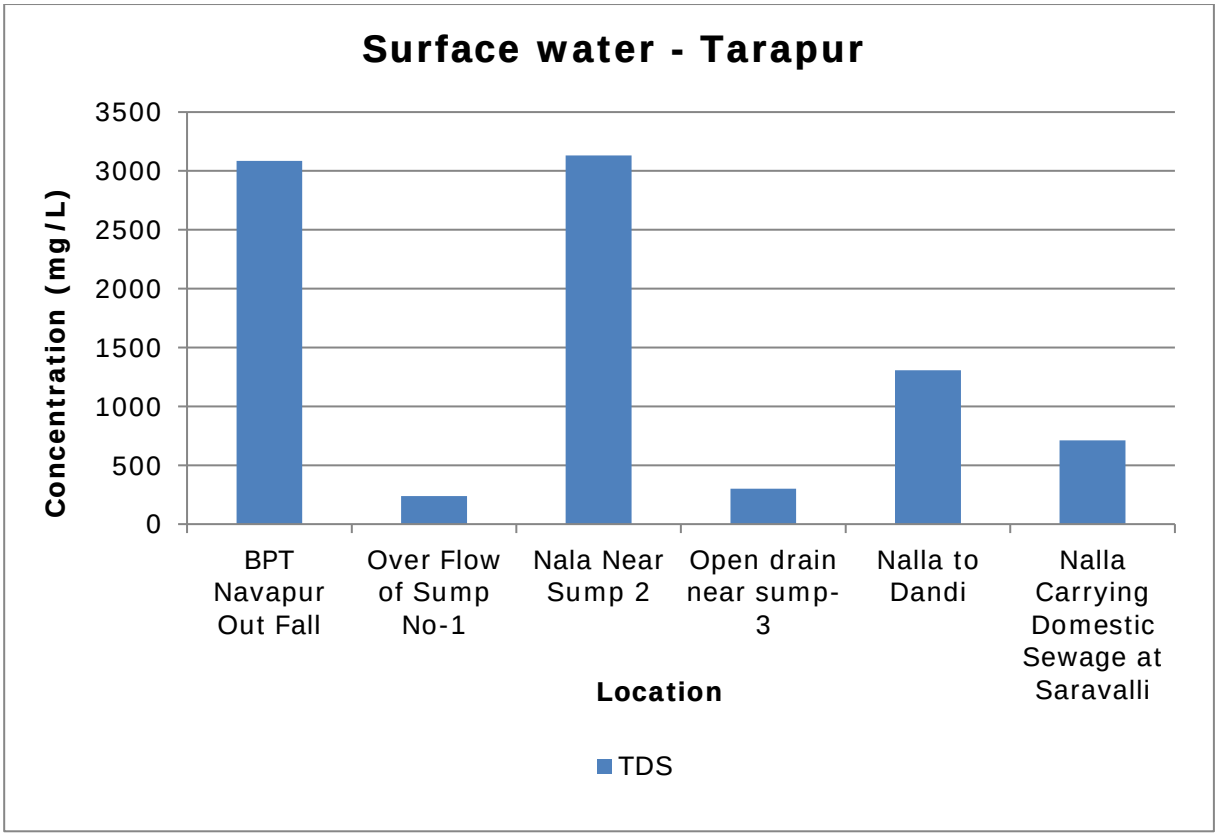
Parameters	Unit	Results					
		BPT Navapur Out Fall	Over Flow of Sump No-1	Nallah Near Sump- 2	Open drain near sump- 3	Nallah to Dandi	Nalla Carrying Domestic Sewage at Saravalli
Manganese (as Mn)	mg/L	0.22	0.09	1.24	0.10	BLQ	BLQ
Iron (as Fe)	mg/L	0.72	0.44	17.61	4.03	0.22	0.20
Vanadium (as V)	mg/L	BLQ	0.016	BLQ	0.02	BLQ	BLQ
Selenium (as Se)	mg/L	0.07	BLQ	0.02	BLQ	0.01	0.01
Boron (as B)	mg/L	0.77	1.45	0.73	0.62	1.59	0.59
Bioassay Test on fish	% survival	20	100	0	100	100	100

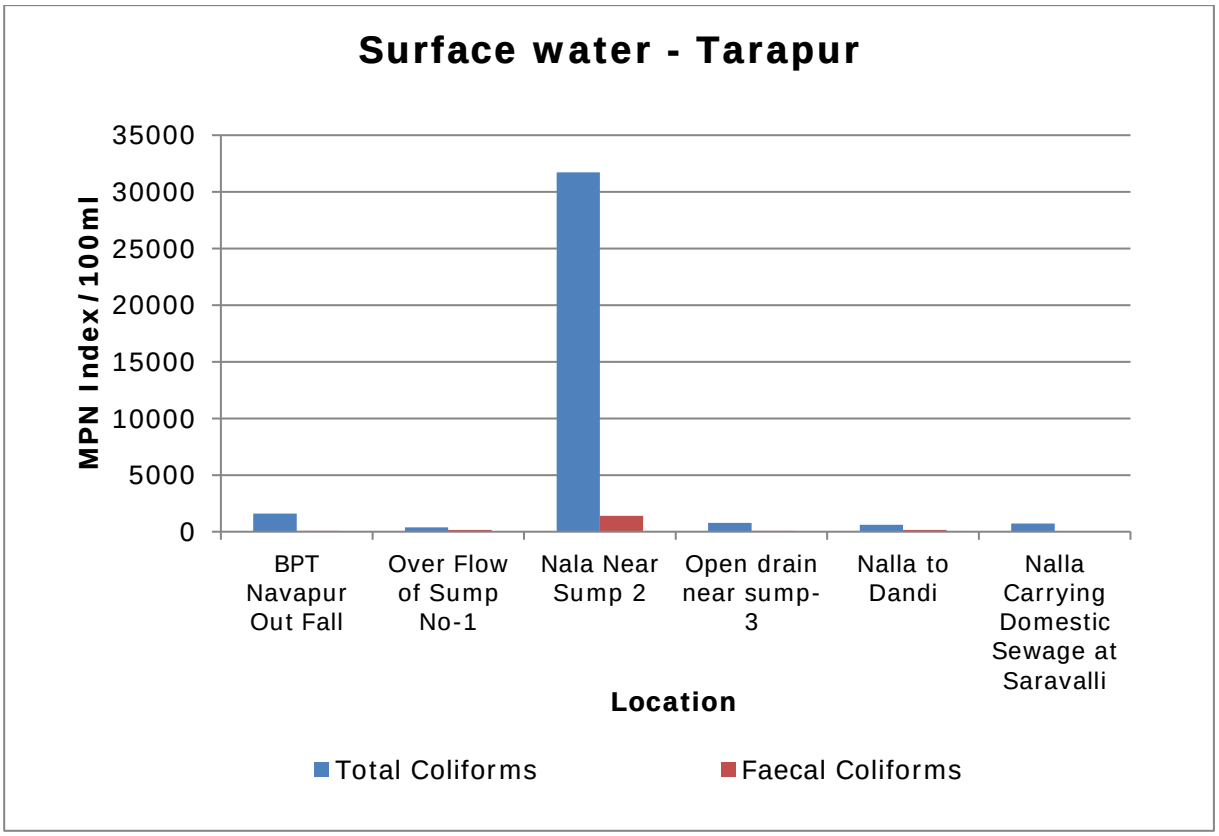
Graphs - Surface Water Quality of Tarapur

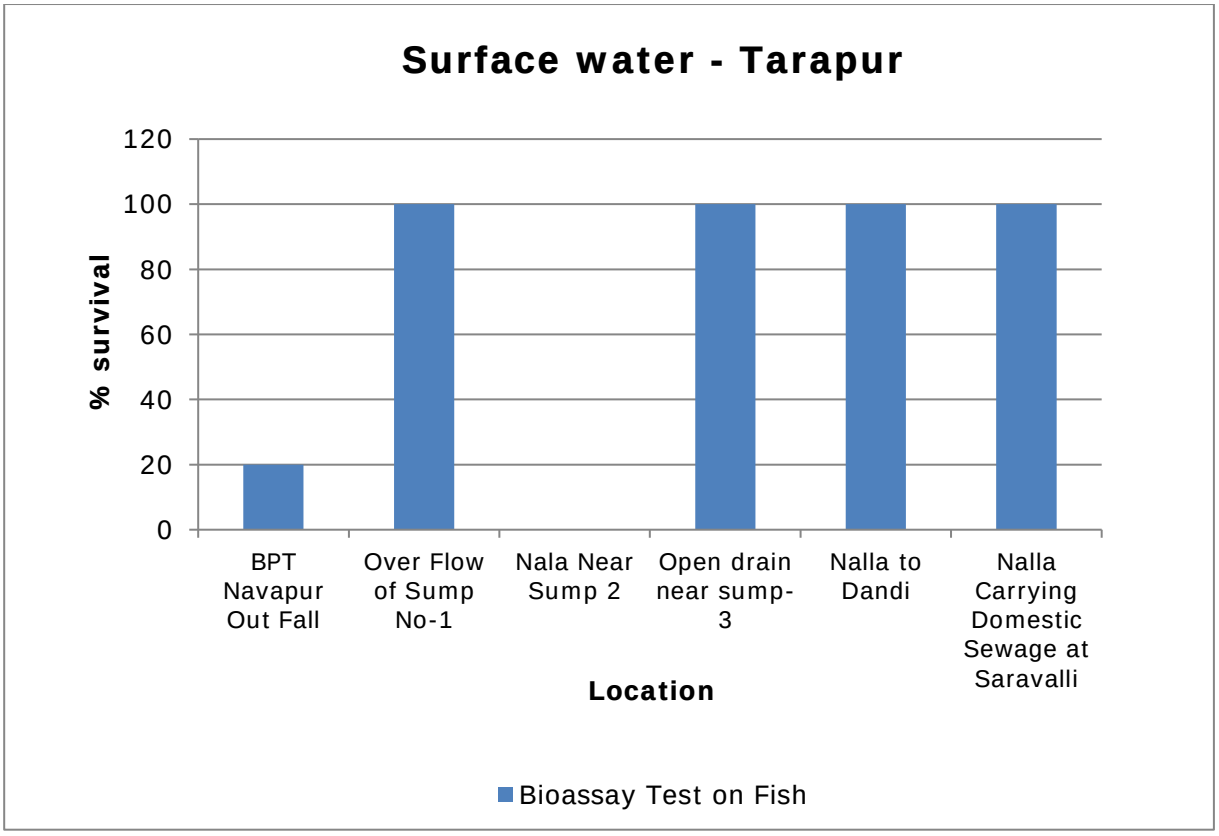



Surface water - Tarapur
9
8
7
6
5
4
3
2
1
0
BPT Navapur Out Fall
Over Flow of Sump No-1
Nala Near Sump 2
Open drain near sump-3
Nalla to Dandi
Nalla Carrying Domestic Sewage at Saravalli
Location
Sodium Adsorption Ratio
pH


Surface water - Tarapur
Concentration (µmhos/cm)
6000
5000
4000
3000
2000
1000
0
BPT Navapur Out Fall
Over Flow of Sump No-1
Nala Near Sump 2
Open drain near sump-3
Nalla to Dandi
Nalla Carrying Domestic Sewage at Saravalli
Location
Electrical Conductivity


Surface water - Tarapur
Concentration (mg/L)
3500
3000
2500
2000
1500
1000
500
0
BPT Navapur Out Fall
Over Flow of Sump No-1
Nala Near Sump 2
Open drain near sump-3
Nalla to Dandi
Nalla Carrying Domestic Sewage at Saravalli
Location
TDS


Surface water - Tarapur
MPN Index/100ml
35000
30000
25000
20000
15000
10000
5000
0
BPT Navapur Out Fall
Over Flow of Sump No-1
Nala Near Sump 2
Open drain near sump-3
Nalla to Dandi
Nalla Carrying Domestic Sewage at Saravalli
Location
Total Coliforms
Faecal Coliforms


Surface water - Tarapur
120
100
80
60
40
20
0
% survival
BPT Navapur Out Fall
Over Flow of Sump No-1
Nala Near Sump 2
Open drain near sump-3
Nalla to Dandi
Nalla Carrying Domestic Sewage at Saravalli
Location
Bioassay Test on Fish

7. Land Environment

For studying the land Environment of Tarapur area, ground water was collected from Bore well. Dug well, and Hand Pump. A total of 6 samples were collected and analysed to check the concentration of different parameters.

Six groundwater samples were collected from Tarapur region.

- All the water samples collected were acceptable in general appearance, colour, smell and transparency.
- General parameters like pH, suspended solids, BOD, and COD were also well within the limits in all six samples collected.
- Total dissolved solids are also observed within the acceptable limit of 2000mg/l in all the water samples.
- All six water samples achieved 100% survival in Fish Bioassay.
- Parameters like Total Residual Chlorine, Cyanide, Fluoride, Sulphide, Dissolved Phosphate, Total Ammonical Nitrogen and Phenolic compounds, also met the criteria as prescribed by CPCB.
- Organo Chlorine Pesticides, Polynuclear aromatic hydrocarbons (PAH) and Polychlorinated Biphenyls (PCB) are below the limit of quantification in all studied samples.

Table 7.1 Details of Sampling Location of Ground Water

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1	Handpump water, besides sai complex	19.80961°N	72.74466°E	26.06.2024	28.06.2024	30.06.2024
2	Dhodi Pooja Borewell Water	19.79777°N	72.752702° E	26.06.2024	28.06.2024	30.06.2024
3	Open well, near nalla Sump 1	19.785158° N	72.738027° E	26.06.2024	28.06.2024	30.06.2024
4	Borewell at Shivaji Nagar, Boisar Tarapur	19.804566° N	72.753556° E	26.06.2024	28.06.2024	30.06.2024
5	Borewell at Gharat Wadi	19.811848° N	72.740713° E	26.06.2024	28.06.2024	30.06.2024
6	Ramji Nagar, Tarapur	19.782236° N	72.723859° E	26.06.2024	28.06.2024	30.06.2024

Fig: Geographical Locations of Ground Water Sampling

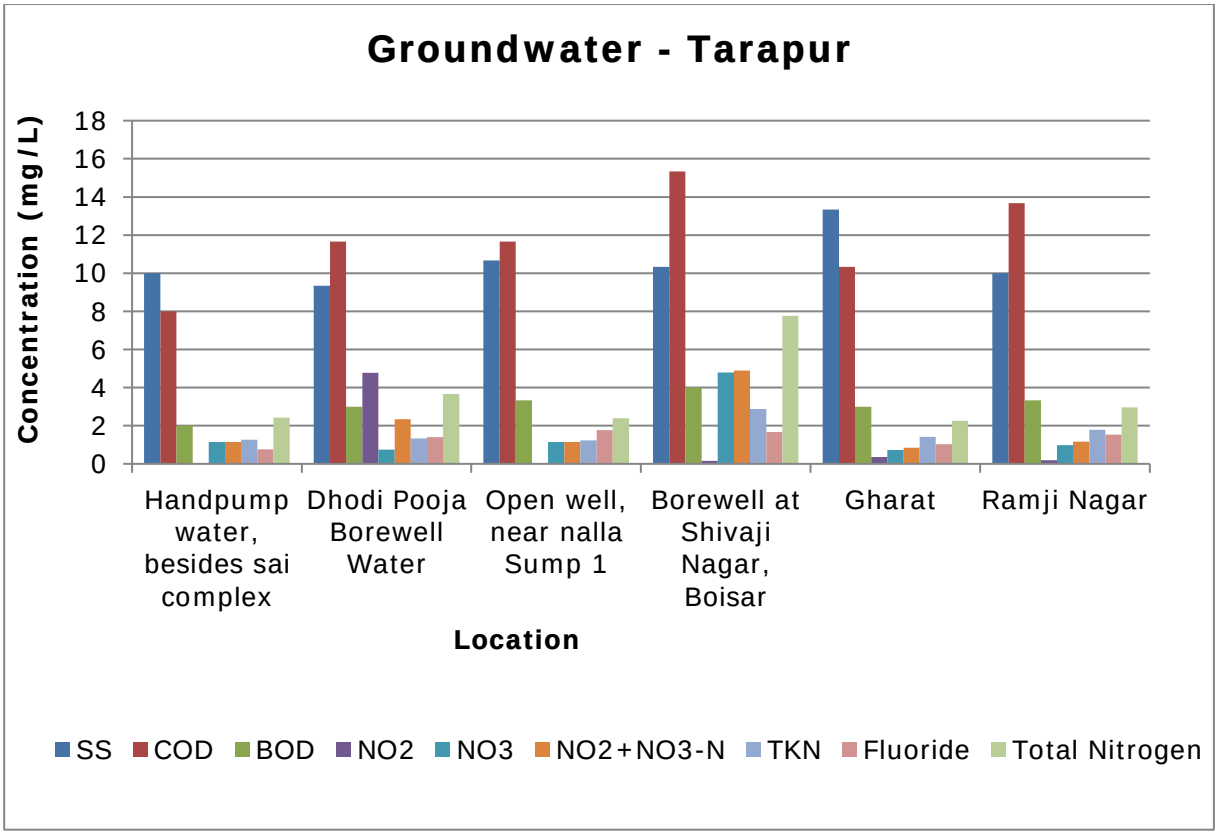
Table 7.2 Results of Groundwater

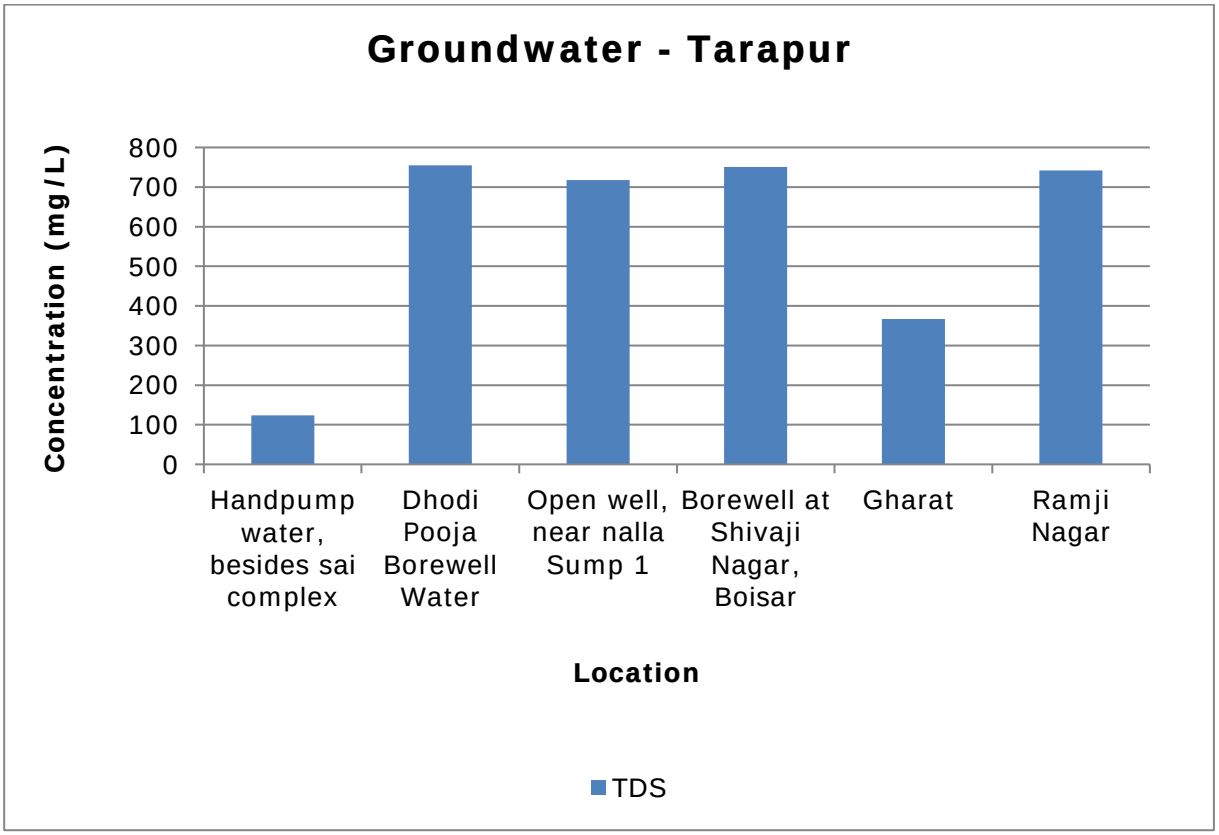
Parameters	Unit	Results					
		Handpump water, besides sai complex	Dhodi Pooja Borewell Water	Open well, near nallah Sump 1	Borewell at Shivaji Nagar, Boisar	Gharat	Ramji Nagar
Sanitary Survey	-	Generally clean neighbor hood	Generally clean neighbor hood	Generally clean neighbor hood	Generally clean neighbor hood	Generally clean neighbor hood	Generally clean neighbor hood
General Appearance	-	No floating matter	No floating matter	No floating matter	No floating matter	No floating matter	No floating matter
Transparency	m	NA	NA	0.3	NA	NA	NA
Temperature	^{o}C	26	26	26	26	26	26
Colour	Hazen	1	1	1	1	1	1
Smell	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
pH	-	8.09	7.58	8.29	7.72	7.87	7.73
Oil & Grease	mg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Suspended Solids	mg/L	10.00	9.33	10.67	10.33	13.33	10.00
Total Dissolved Solids	mg/L	124	755	718	751	367	742

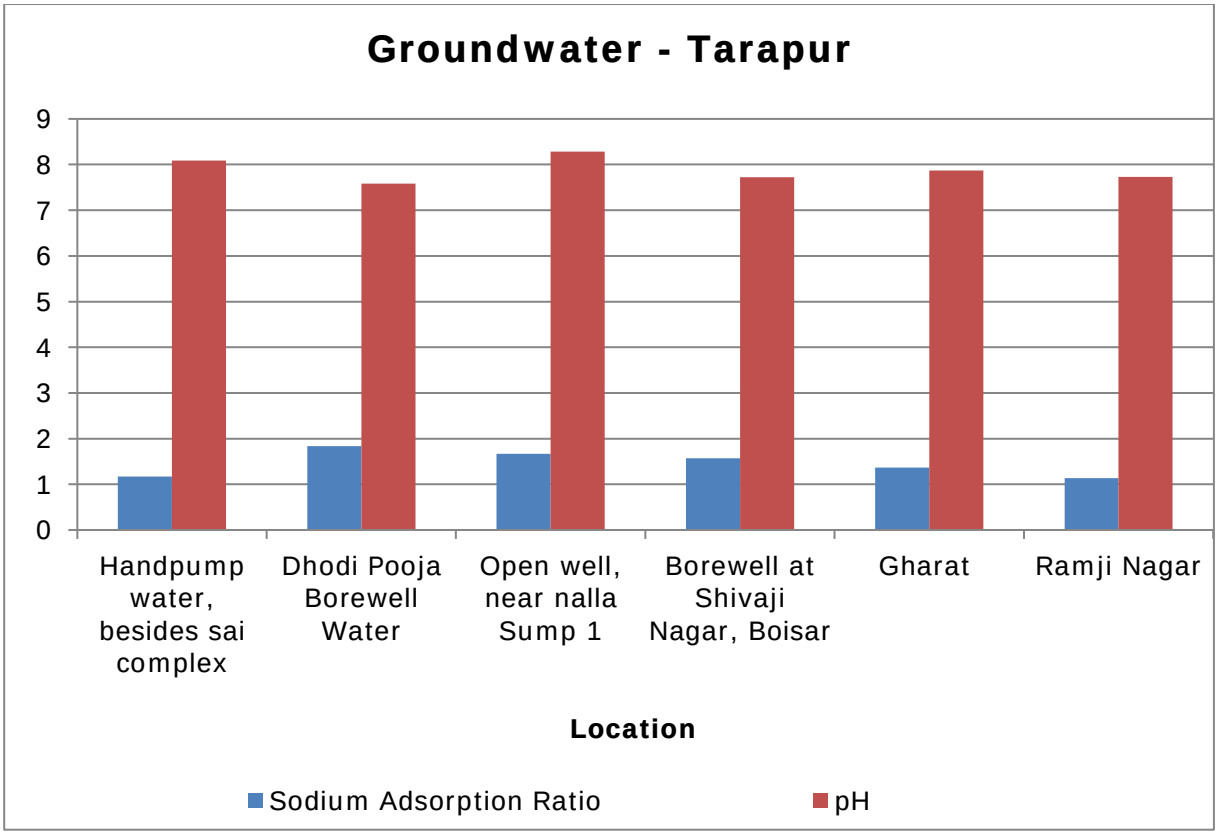
Parameters	Unit	Results					
		Handpump water, besides sai complex	Dhodi Pooja Borewell Water	Open well, near nallah Sump 1	Borewell at Shivaji Nagar, Boisar	Gharat	Ramji Nagar
Chemical Oxygen Demand	mg/L	8	12	12	15	10	14
Biochemical Oxygen Demand (3 days,27°C)	mg/L	2	3	3	4	3	3
Electrical Conductivity (at 25 °C)	µmho/ cm	222	1347	1283	1341	655	1326
Nitrite Nitrogen (as NO_2)	mg/L	BLQ	4.77	0.03	0.16	0.35	0.19
Nitrate Nitrogen (as NO_3)	mg/L	1.15	0.74	1.14	4.79	0.72	0.97
(NO_2 + NO_3)-Nitrogen	mg/L	1.15	2.33	1.15	4.89	0.84	1.17
Free Ammonia (as NH_3-N)	mg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Total Residual Chlorine	mg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	0.77	1.40	1.77	1.67	1.03	1.53
Sulphide (as H_2S)	mg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Sodium Adsorption Ratio	-	1.17	1.83	1.67	1.57	1.37	1.13
Total Coliforms	MPN Index/ 100 ml	67	558	28	588	9	32
Faecal Coliforms	MPN Index/ 100 ml	11	20	<1.8	102	4	20
Total Phosphate (as P)	mg/L	0.20	0.60	0.40	0.16	1.30	1.00
Total Kjeldahl Nitrogen (as N)	mg/L	1.27	1.34	1.23	2.88	1.42	1.79
Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	0.31	0.13	0.11	0.17	0.17	0.23
Total Nitrogen	mg/L	2.42	3.67	2.39	7.77	2.26	2.96

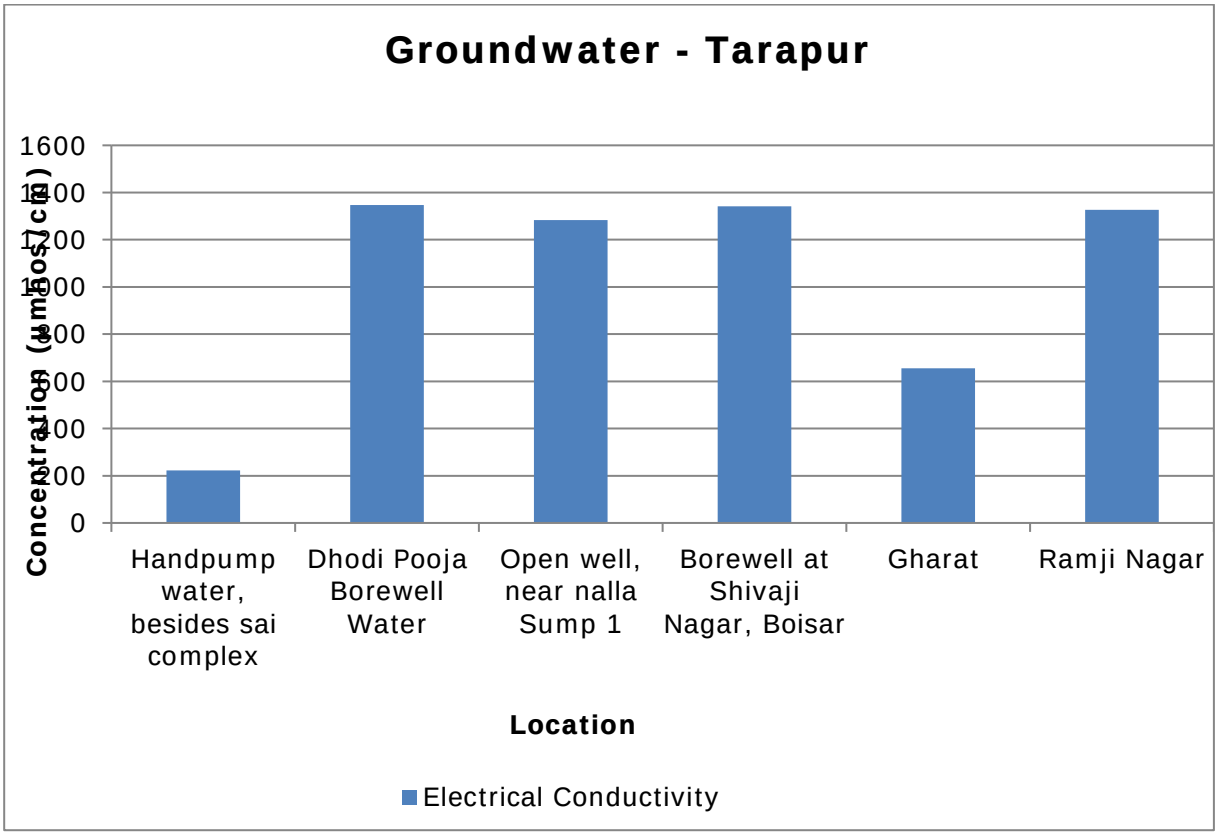
Parameters	Unit	Results					
		Handpump water, besides sai complex	Dhodi Pooja Borewell Water	Open well, near nallah Sump 1	Borewell at Shivaji Nagar, Boisar	Gharat	Ramji Nagar
Phenols (as C_6H_5OH)	mg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Anionic Detergents (as MBAS Calculated as LAS, mol.wt.288.38)	mg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Organo Chlorine Pesticides	µg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Polynuclear aromatic hydrocarbons (as PAH)	mg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Polychlorinated Biphenyls (PCB)	mg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Zinc (as Zn)	mg/L	BLQ	0.41	0.06	BLQ	BLQ	BLQ
Nickel (as Ni)	mg/L	BLQ	0.08	0.01	0.01	BLQ	0.01
Copper (as Cu)	mg/L	BLQ	0.05	BLQ	BLQ	BLQ	BLQ
Hexavalent Chromium (as Cr^{6+})	mg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	BLQ	BLQ	0.022	BLQ	BLQ	BLQ
Total Arsenic (as As)	mg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Lead (as Pb)	mg/L	0.01	0.01	BLQ	0.01	0.01	BLQ
Cadmium (as Cd)	mg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	0.10	0.43	BLQ	1.03	0.03	0.04
Iron (as Fe)	mg/L	0.54	0.28	0.18	0.12	0.26	0.20
Vanadium (as V)	mg/L	0.02	BLQ	0.03	0.02	0.03	BLQ
Selenium (as Se)	mg/L	BLQ	0.02	0.01	0.01	BLQ	0.01
Boron (as B)	mg/L	0.51	0.41	0.22	0.55	BLQ	0.37
Bioassay Test on fish	% survival	100	100	100	100	100	100

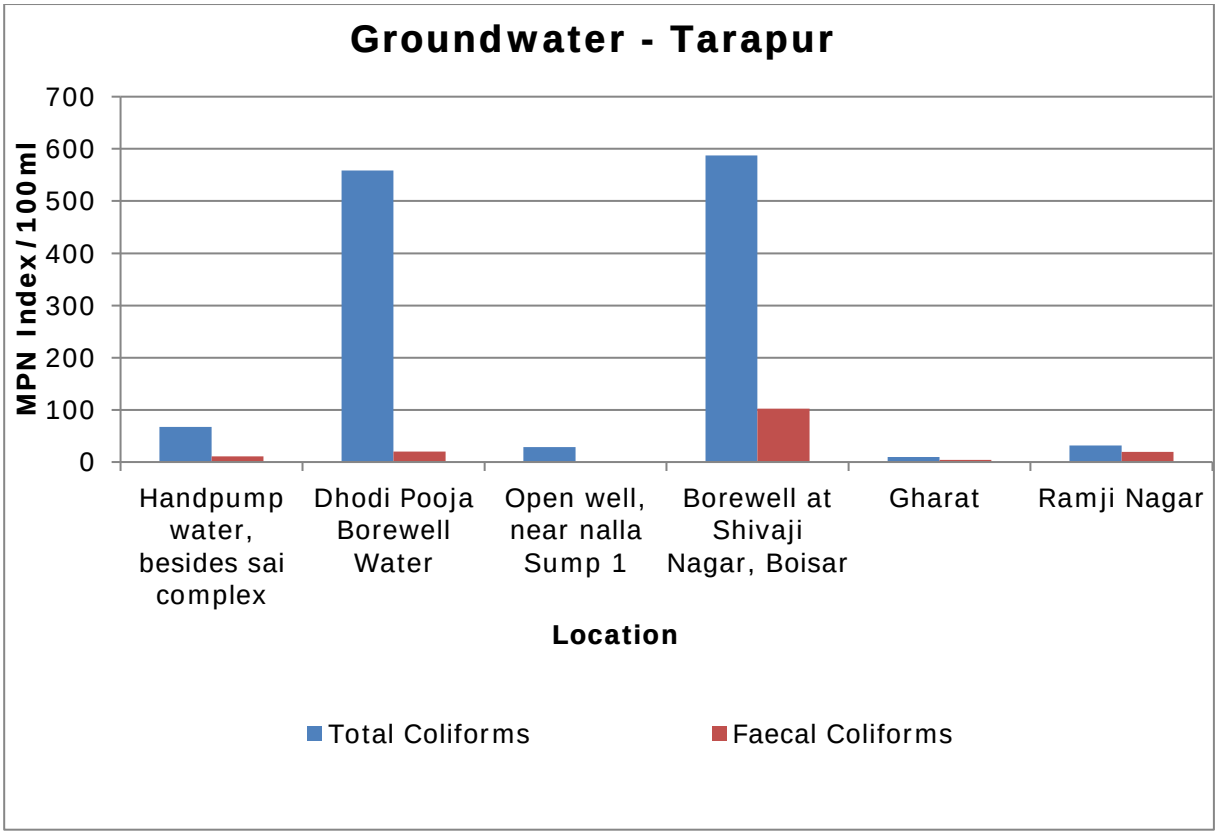
Graphs - Ground Water Quality of Tarapur

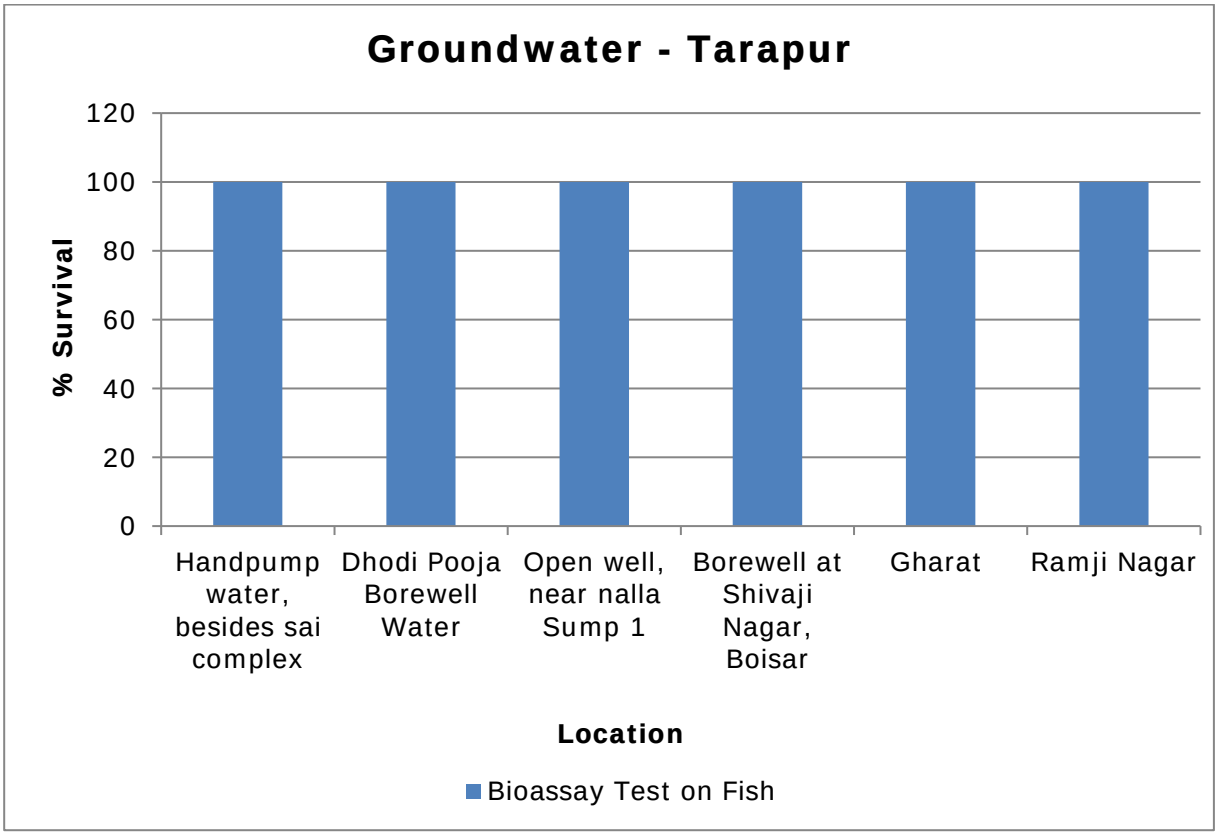

Groundwater - Tarapur
Concentration (mg/L)
18
16
14
12
10
8
6
4
2
0
Handpump water, besides sai complex
Dhodi Pooja Borewell Water
Open well, near nalla Sump 1
Borewell at Shivaji Nagar, Boisar
Gharat
Ramji Nagar
Location
SS
COD
BOD
NO2
NO3
NO2+NO3-N
TKN
Fluoride
Total Nitrogen


Groundwater - Tarapur
Concentration (mg/L)
800
700
600
500
400
300
200
100
0
Handpump water, besides sai complex
Dhodi Pooja Borewell Water
Open well, near nalla Sump 1
Borewell at Shivaji Nagar, Boisar
Gharat
Ramji Nagar
Location
TDS


Groundwater - Tarapur
9
8
7
6
5
4
3
2
1
0
Handpump water, besides sai complex
Dhodi Pooja Borewell Water
Open well, near nalla Sump 1
Borewell at Shivaji Nagar, Boisar
Gharat
Ramji Nagar
Location
Sodium Adsorption Ratio
pH


Groundwater - Tarapur
1600
1400
1200
1000
800
600
400
200
0
Concentration (µmhos/cm)
Handpump water, besides sai complex
Dhodi Pooja Borewell Water
Open well, near nalla Sump 1
Borewell at Shivaji Nagar, Boisar
Gharat
Ramji Nagar
Location
Electrical Conductivity


Groundwater - Tarapur
MPN Index/100ml
700
600
500
400
300
200
100
0
Handpump water, besides sai complex
Dhodi Pooja Borewell Water
Open well, near nalla Sump 1
Borewell at Shivaji Nagar, Boisar
Gharat
Ramji Nagar
Location
Total Coliforms
Faecal Coliforms


Groundwater - Tarapur
% Survival
120
100
80
60
40
20
0
Handpump water, besides sai complex
Dhodi Pooja Borewell Water
Open well, near nalla Sump 1
Borewell at Shivaji Nagar, Boisar
Gharat
Ramji Nagar
Location
Bioassay Test on Fish

C: Receptor

Component C (Impact on Human Health) 10	
Main - 10	
% increase in cases	**Marks**
<5%	**0**
5-10%	**5**
>10%	**10**

- % increase is evaluated based on the total no. of cases recorded during two consecutive years.
- For Air Environment, total no. of cases related to Asthma, Bronchitis, Cancer, Acute respiratory infections etc. are to be considered.
- For surface water/ ground water Environment, cases related to Gastroenteritis, Diarrhoea, renal (kidney) malfunction, cancer etc are to be considered.
- For the above evaluation, the previous 5 years records of 3-5 major hospitals of the area shall be considered.

Annexure – I Health Related Data enclosed.

9. CEPI Score

Comprehensive Environmental Pollution Index (CEPI) is intended to act as an early warning tool which helps in the categorization of industrial clusters/ areas in terms of priority of needing attention. The CEPI score have been calculated based on CPCB Letter No. B-29012/ESS (CPA)/2015-16 dated 26th April 2016. The scoring system involves an algorithm that considers the basic selection criteria. It is proposed to develop the CEPI based on sources of pollution, real time observed values of the pollutants in the ambient air, surface water and ground water in & around the industrial cluster and health related statistics.

Table 8.1 CEPI score of the Pre-monsoon season 2024

	A1	A2	A	B	C	D	CEPI
Air Index	2.75	4	11	0	0	10	**21.00**
Water Index	2.5	4	10	37.25	0	10	**57.25**
Land Index	1.75	4	7	18.5	0	10	**35.5**
						Aggregated CEPI	**60.40**

Table 8.2 Comparison of CEPI Scores

	Air Index	Water Index	Land Index	CEPI
CEPI score June 2024	21.00	57.25	35.50	**60.40**
CEPI score March 2024	21.00	53.00	54.80	**59.80**
CEPI score June 2023	24.00	56.50	56.00	**62.30**
CEPI Score March 2023	21.00	63.00	50.75	**66.94**
CEPI score June 2021	31.00	61.50	60.00	**68.66**
CEPI Score March 2021	31.00	65.00	30.75	**68.34**
CEPI score March 2020	47.00	65.30	36.50	**71.30**
CEPI score June 2019	37.07	51.10	54.40	**54.56**
CEPI score March 2019	34.75	45.00	45.00	**53.60**
CEPI score June 2018	26.00	39.25	45.00	**50.61**
CEPI score March 2018	32.50	38.50	45.00	**51.88**

	Air Index	Water Index	Land Index	CEPI
CPCB CEPI score March 2018	72.00	89.00	59.25	**93.69**

CEPI Score Calculation:

Tarapur, Maharashtra - CEPI - JUNE 2024

Ambient Air Analysis Report

Pollutant	Group	A1	A2	A (A1 X A2)
PM10	B	2	Large	
NO2	A	0.25		
PM2.5	B	0.5		
		2.75	**4**	**11**

Pollutant	Avg (1)	Std (2)	EF (3) [(3)=(1)/(2)]	No. of samples Exceeding (4)	Total no. of samples (5)	SNLF Value (6) [(6)=(4)/(5)x(3)]	SNLF score (B)	
PM10	31.17	100	0.31	0	8	0.00	L	0
NO2	9.34	80	0.12	0	8	0.00	L	0
PM2.5	10.13	60	0.17	0	8	0.00	L	0
B score = (B1+B2+B3)							**B**	**0**

C	**0**	**<5%**
D	**10**	**A-A-IA**

	(A+B+C+D)	**21.0**

Water Quality Analysis Report

Pollutant	Group	A1	A2	A (A1 X A2)
BOD	B	2	Large	
Total Ammonia	A	0.25		
TN	A	0.25		
		2.5	**4**	**10**

Pollutant	Avg (1)	Std (2)	EF (3) [(3)=(1)/(2)]	No. of samples Exceeding (4)	Total no. of samples (5)	SNLF Value (6) [(6)=(4)/(5)x(3)]	SNLF score (B)	
BOD	27.11	8	3.39	2	6	1.13	C	30
Total Ammonia	0.66	1.5	0.44	1	6	0.07	M	3
TN	15.34	15	1.02	2	6	0.34	M	4.25
B score = (B1+B2+B3)							**B**	**37.25**

C	**0**	**<5%**
D	**10**	**A-A-IA**

Water CEPI	**(A+B+C+D)**	**57.3**

Ground Water Quality Analysis Report

Pollutant	Group	A1	A2	A (A1 X A2)
F	A	1	Large	
TDS	A	0.25		
Se	B	0.5		
		1.75	**4**	**7**

Pollutant	Avg (1)	Std (2)	EF (3) [(3)=(1)/(2)]	No. of samples Exceeding (4)	Total no. of samples (5)	SNLF Value (6) [(6)=(4)/(5)x(3)]	SNLF score (B)	
F	1.36	1.5	0.91	3	6	0.45	M	15
TDS	576.00	2000	0.29	0	6	0.00	L	0
Se	0.01	0.01	1.00	1	6	0.17	M	3.5
B score = (B1+B2+B3)							**B**	**18.5**

C	**0**	**<5%**
D	**10**	**A-A-IA**

Land CEPI	**(A+B+C+D)**	**35.5**

Water CEPI Score (im)	**57.3**
Land CEPI Score (i2)	**35.5**
Air CEPI Score (i3)	**21.0**
Aggregated CEPI Score =	**im + {(100-im)*i2/100)*i3/100)}**

	where, im = maximum sub index; and i2 and i3 are sub indices for other media
CEPI Score	**60.5**

10. Conclusion

Ambient Air Quality

- In the present study, 08 AAQ stations were identified in the CEPI impact area to cover both upwind and cross wind directions and AAQ survey was conducted.
- All air quality parameters were observed well within the limits as per NAAQS.
- Concentration of PM10 was observed in the range of 30.33µg/m^3 to 33.33µg/m^3 and PM2.5 in the range of 9.33 to 11.67µg/m^3 at the studied locations.
- In the CEPI score calculated for Air Environment by CPCB in March 2018, the concentration of PM_{10} has exceeded at all the studied locations and $PM_{2.5}$ has exceeded at 10 locations out of 12, which contributed to higher air index (72.00). However, in the present report, concentration of both PM10 and PM2.5 are found below permissible levels resulted in less exceedance factor, hence lower air index (21.00).

Surface Water Quality

- To understand the quality of treated effluent, samples were collected from six industries
- Higher concentration of BOD, COD and Total Kjeldahl Nitrogen (TKN) was observed in the two surface water samples collected which may be due to domestic wastewater, sewage, other localized activities.
- All the industries in the Tarapur region are either reusing the treated trade effluent as sewage in their process or gardening.
- In the CEPI score calculated for Water Environment by CPCB in March 2018, concentration values of TKN were higher and exceeded at all the studied locations as observed in the present study also.

Ground Water Quality

- Six ground water samples were collected from different Dug well, well and Bore well in the region.
- All the parameters of ground water analysis were found within the permissible limits.
- In the CEPI score calculated for Land Environment by CPCB in March 2018, concentration of TKN and Total hardness was found to exceed in most of the water sample.

CEPI Score

- The CEPI Score pre-monsoon season is 60.5.
- During calculation of CEPI score, Water Index is calculated highest with a score of 57.3, followed by the Land index as 35.5 and the Air Index 21.0. The parameters of air and groundwater in

Tarapur region are observed well within the limits. Hence, aggregated CEPI score is calculated as 60.5, which is lower than the CPCB CEPI score March 2018 which was 93.69.

- In CEPI score of CPCB 2018, all the indices i.e. Air index, water index and land index were higher as compared to the present (June, 2024) indices.
- In comparison with the CEPI Score of June 2021, a decrease in all the three indices is observed.
- As per the CPCB CEPI calculation revised in 2016, Health statistics represented by Receptor C in CEPI Calculation, also play an important role.
- For the analysis of health data collected from hospitals, there was a decrease of less than 5% in cases of both air and water-borne diseases in 2023 compared to 2022. As a result, the score for receptor C is considered 0 for air, water, and land environments. However, in the CEPI score calculated by CPCB in 2018, the receptor C score for the water and land environment was 10.
- Collective efforts of the regional office of MPCB, NMMC, administration and environmental organizations are resulting in a significant reduction in pollution levels.
- Efforts taken to reduce the pollution level is represents factor D in CEPI Calculation, which also affects the overall CEPI score.
- The present study is the compilation of pre-monsoon season, which results in the dilution of environmental samples resulting in lower pollution load, hence also affecting the total score.
- In conclusion, an approximately a 35% decrease in CEPI score is observed from 93.69 (critically polluted) in 2018 to 60.5 in June 2024.

11. Efforts Taken by MPCB to Control and Reduce Environmental Pollution Index

Efforts Taken to Control Water Pollution

- Issued closure direction to Old 25 MLD CETP towards continuous non-performance.
- Commissioned New CETP Diversion of the entire effluent of old CETP to new CETP of 50 MLD (25 MLD partly in operation).
- Improved CETP Inlet Standards which resulted in improved outlet standards
- As per MPC Board directives positive discharge system, 2-way SCADA, NRV & Autosampler installed by CETP members.
- Chamber numbering helps to identify defaulter areas and industries.
- Industry-wise Segregation of high COD/TDS effluent stream.
- Persuasion towards commissioning of common High COD Treatment Facility.1st on-site common HCOD/TDS reduction Facility in Maharashtra (300 CMD) established in MIDC Tarapur & in operation.
- Establishment of eight monitoring stations under the National Water Quality Monitoring Program (NWMP).
- Steps are taken for industrial area/other units to recycle 100% treated effluent to achieve zero liquid discharge (ZLD) -120
- Installation of CEMS installed for Air and Water in Large and Medium scale RED category industries: Two-way SCADA installed by industries

Efforts Taken to Control Air Pollution

- Introduction of Cleaner fuel PNG instead of Coal. 130 industries switched fuel from Cola to PNG. The use of clean fuel (PNG) will reduce dust emissions by industries.
- Which improves air quality in the vicinity.
- Increase Air monitoring vigilance to verify the Air pollution Control system.
- Establishment of three Continuous Ambient Air Quality Monitoring (CAAQM) with meteorological data in the Tarapur industrial area is also proposed by the regional office.
- M/s JSW Steel Ltd has installed a CAAQM station with an AQI display to be aware of Air Quality
- Established 3 manual Air monitoring stations.
- Procurement of electric buses.
- Installation of public charging stations.
- Retrofitment of auto-rickshaws
- Procurement of electric vehicles for transportation of MSW/C&D waste

Efforts Taken to Control Land Pollution

- Persuasion with CHWTSDF to increase the frequency of collecting HW and its transportation.
- Removed and disposed of Sludge lying in Sump No.2 during the COVID period.
- Repeated directives to CETP for Sludge removal and disposal at CHWTSDF which resulted in CETP having disposed of more than 25000 MT of Sludge from 2019 to till date.
- Increase HW disposal quantum

Other Efforts taken to Control Pollution:

- Total 978 trees are planted in last one year.
- Action taken against non-complied industries as mentioned in the below table:

YEAR	2019	2020	2021	2022
SCN	169	70	328	230
PD	22	36	6	3
CD	30	78	280	16
Total	221	184	614	249

- Procurement of Dust Suppression Vehicles with Multi-Purpose Sprayer.
- Installation of Stationary/Movable Cannon Dust Suppression Systems.
- The average monthly Air Quality Index (AQI) of last six months from January 2024 to June 2024 is reported in the range of 79-187 in the Tarapur region of Thane District, which indicates satisfactory to moderate level of air pollution in that area.

Tyre Washing

Sensor Based Air Pollution Monitoring on Sites

Covering of Debris with Tarpaulin

Procurement of Electric Buses & EV Charging Stations

Continuous Ambient Air Quality Monitoring Station (CAAQMS)

Ambient Air Quality Monitoring (AAQM) Van

12. Photographs

Ambient Air Sampling at D Décor Export Pvt Ltd.

Ambient Air Sampling at AAQM-MPCB SRO Office

Ambient Air Quality Monitoring at Loba Chemicals

Ambient Air Sampling at AAQM- Sumitomo Chemical India Pvt. Ltd.

Surface water sampling at Khairpada Nallah

Surface water sampling at Banganga River Parnali Village

Groundwater sampling at Ramji Nagar

Groundwater sampling at sai complex

HEALTH STATISTICS

Required for Comprehensive Environmental Pollution Index (CEPI)
Pre-monsoon Season (April 2024 - June 2024) Study by
Maharashtra Pollution Control Board (MPCB), MAHARASHTRA

Name of the Polluted Industrial Area (PIA)	TARAPUR
Name of the major health center/ organization	Gramin Mantralaya
Name and designation of the Contact person	Mrs. Savita S. Bagul, Staff Nurse / 9861446897
Address	R.H Boisar

S No.	Diseases	No. of Patients Reported	
		Year 2022-2023	Year 2023-2024
AIRBORNE DISEASES			
1.	Asthma	04	01
2.	Acute Respiratory Infection	176	152
3.	Bronchitis	0	0
4.	Cancer	3	1
WATERBORNE DISEASES			
1.	Gastroenteritis	47	06
2.	Diarrhea	56	16
3.	Renal diseases	0	0
4.	Cancer	3	1

Date:

S.V.Bagul

Signature

HEALTH STATISTICS

Required for Comprehensive Environmental Pollution Index (CEPI) Pre-monsoon Season (April 2024 - June 2024) Study by Maharashtra Pollution Control Board (MPCB), MAHARASHTRA

Name of the Polluted Industrial Area (PIA)	**TARAPUR**
Name of the major health center/ organization	**Shaileela Hospital**
Name and designation of the Contact person	Dr Jintendra Patil
Address	Boiser, palghar

S No.	Diseases	No. of Patients Reported	
		Year 2022-2023	Year 2023-2024
AIRBORNE DISEASES			
1.	Asthma	4-5 OPD	7-8 OPD
2.	Acute Respiratory Infection	10-15 OPD	15-16 OPD
3.	Bronchitis	1-2 OPD	2-3 OPD
4.	Cancer	Nil	Nil
WATERBORNE DISEASES			
1.	Gastroenteritis	8-10 OPD (Gastroenteritis and Diarrhea combined)	9-10 OPD (Gastroenteritis and Diarrhea combined)
2.	Diarrhea		
3.	Renal diseases	Nil (Renal diseases and Cancer combined)	Nil (Renal diseases and Cancer combined)
4.	Cancer		

Date: 5/7/24.

Signature

SAILEELA HOSPITAL
FRACTURE, ACCIDENT & GENERAL

HEALTH STATISTICS

Required for Comprehensive Environmental Pollution Index (CEPI)
Pre-monsoon Season (April 2024 - June 2024) Study by
Maharashtra Pollution Control Board (MPCB), MAHARASHTRA

Name of the Polluted Industrial Area (PIA)	**TARAPUR**
Name of the major health center/ organization	**Thunga HOSPITAL**
Name and designation of the Contact person	SANTHOSHA SHETTY 8380005944
Address	**AM-32, Tarapur M.I.D.C., Boisar, Maharashtra 401506**

S No.	Diseases	No. of Patients Reported	
		Year 2022-2023	Year 2023-2024 Jan-24 to June-24
AIRBORNE DISEASES			
1.	Asthma	345	148
2.	Acute Respiratory Infection	3	2
3.	Bronchitis	21	14
4.	Cancer	3	4
WATERBORNE DISEASES			
1.	Gastroenteritis	160	84
2.	Diarrhea	12	28
3.	Renal diseases	43	52
4.	Cancer	—	1

Date:

Signature

THUNGA HOSPITAL PVT. LTD. TMRC BOISAR 401 506