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

NASHIK

Pre-Monsoon (April 2024 to June 2024)

Maharashtra Pollution Control Board

महाराष्ट्र प्रदूषण नियंत्रण मंडळ

Index

ABBREVIATION

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

The Nashik CEPI area including MIDC Ambad and MIDC Satpur was monitored for Ambient Air Quality, Ground and Surface Waters quality and CEPI Score was calculated based on the Latest directions 120 of Letter No. B-29012/ESS (CPA)/2015-16 dated 26th April 2016 of Central Pollution Control Board (CPCB). Maharashtra Pollution Control Board (MPCB) has carried out monitoring at CPCB location with the additional location of samplings for ambient air, surface and ground Water in consideration with the previous CEPI monitoring and covering the entire CEPI Impact Zone. Pre-monsoon monitoring was carried out during the period of April 2024 to June 2024 to verify the Ambient Air Quality, Surface water and Groundwater.

The Ambient Air Quality stations were identified considering the upwind and cross wind direction in the CEPI impact area. The concentration of all 12 Parameters is well within the limit prescribed by NAAQS at all locations. In surface water of Nashik, the level of BOD, Total Phosphate and Total Kjeldahl Nitrogen exceeds in some of samples are collected. In ground water, the concentrations of BOD, Iron and Fluoride exceeded in some of the samples collected.

The CEPI score is the combination of A (Source), B (Pathway), C (Impact on Human Health) and D (Additional High-Risk Element) factors. Maharashtra Pollution Control Board has worked on controlling and mitigating the air and water pollution with installation of CAAQMS, CETPs, online VOC analysers etc.

Maharashtra Pollution Control Board has taken various initiatives in reducing the CPCB CEPI Score of 69.49 of 2018 to 55.35 of June 2024. Based on the study results of April 2024 to June 2024 the CEPI score as per the revised CPCB 2016 guidelines, the CEPI index of Pre-Monsoon - Ambient Air is 10, Surface Water is 45.00, and Ground Water is 53.25. The overall CEPI score for Nashik area for the Pre Monsoon 2024 is 55.35.

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 feces, 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 behavioral 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 Nashik., Maharashtra. After Pune and Mumbai, Nashik is third industrial hub of the Maharashtra state, for the highly industrial development in Maharashtra. Existing industrial areas in Nashik district are Satpur, Ambad, Sinnar, Igatpuri, Dindori and Vinchur. The proposed areas are Additional Sinnar and Malegaon MIDC. Large-scale industries present in Nashik district are Mahindra & Mahindra, BOSCH, Epiroc Mining India Limited, CEAT Limited, CG Power and Industrial Solutions Ltd, Graphite India, ThyssenKrupp, TDK India Private Limited, Everest Industries, Gabriel India, GlaxoSmithKline, Hindustan Unilever Limited, Jindal Polyster, Kirlosker Oil Engines, KSB Pumps, Hindustan National Glass & Industries Ltd, Mahindra Sona, United Spirits Limited, Perfect Circle Industries, Samsonite, Shalimar Paints, Siemens, VIP Industries, Indian Oil Corporation, XLO India Limited and Jindal Saw.

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 action plan reports offer hope for addressing environmental concerns and fostering sustainable development in Nashik.

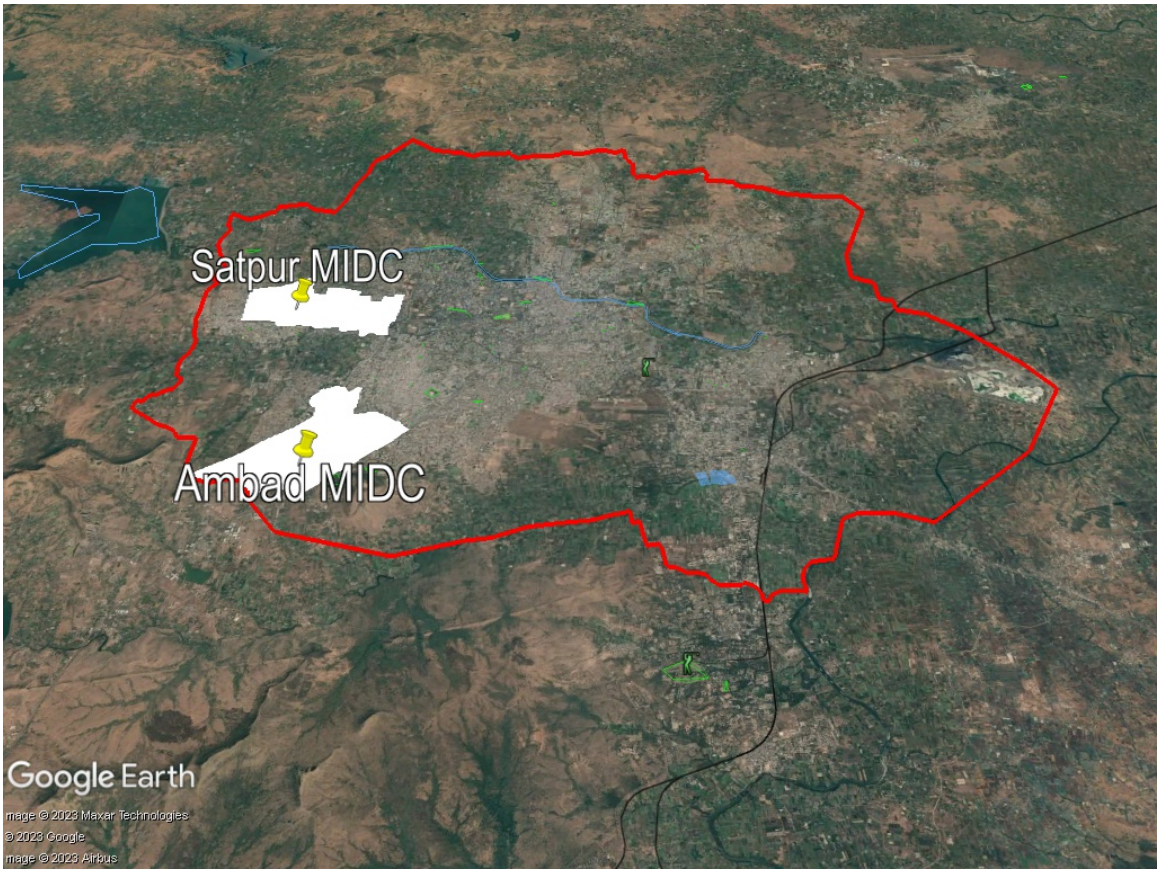


Fig. Nashik region CEPI monitoring zone

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 Nashik, 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 Nashik

Sampling Criteria	Number of sites	Total Sites	Monitoring Parameters
Ambient Air Quality	• MIDC Ambad -04 • MIDC Satpur -04	**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	• MIDC Ambad -02 • MIDC Satpur -02	**04**	Dichloromethane, Chloroform, Carbon Tetrachloride, Trichloroethylene, Bromodichloromethane, 1,3-Dichloropropane, 1,4-Dichlorobenzene, 1,3-Dichlorobenzene, 1,2-Dichlorobenzene, 1,2-Dibromo-3-Chloropropane, Napthalene, 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

Sampling Criteria	Number of sites	Total Sites	Monitoring Parameters
			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
Water Quality Monitoring	**Surface water** • MIDC Ambad -06 • MIDC Satpur -06	**12**	**(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 • MIDC Ambad -06 • MIDC Satpur -06	**12**	

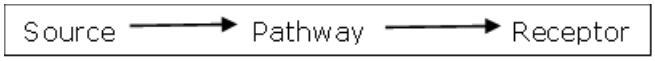
Table 3.2 Frequency of Sampling

	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

	Parameter	Round of Sampling	Frequency in Each Round
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
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:



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 potential 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.

Methodology for sampling, preservation and analysis have been done according to the CPCB/ EPA/ APHA/ IS/ ASTM standard methods for the samples.

AIR ENVIRONMENT

5. Air Environment

For studying the Air Environment of Nashik 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.*

1. **MIDC Ambad:** In MIDC Ambad four locations have been monitored of checking the Ambient Air Quality (AAQ). The concentration of all the ambient air parameters was found well within the limits prescribed by NAAQS at all locations.

Table 5.1 MIDC Ambad - Details of Sampling Location of Ambient Air Quality Monitoring

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	Near Koso India	$19^0$94'58.4"N	$73^0$72'81.8"E	26.06.2024	28.06.2024	30.06.2024
2.	Near Siemens India Ltd.	$19^0$95'70.1"N	$73^0$73'67.2"E	26.06.2024	28.06.2024	30.06.2024
3.	Near Gemini Instratech Ltd.	$19^0$95'32.5"N	$73^0$74'82.8"E	26.06.2024	28.06.2024	30.06.2024
4.	Near CG Power and Industrial Solutions Ltd.	19°94'62.4"N	73°74'23.6"E	26.06.2024	28.06.2024	30.06.2024

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

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	Near Rainbow Decoplus Pvt. Ltd.	$19^0$95'46.31"N	$73^0$74'97.71"E	26.06.2024	28.06.2024	30.06.2024
2.	Near Kirloskar oil India Ltd.	$19^0$95'72.27"N	$73^0$73'25.58"E	10.07.2024	12.07.2024	14.07.2024

Fig. Geographical Locations of Ambient Air Quality Monitoring MIDC Ambad

Fig. Geographical Locations of VOCs Monitoring MIDC Ambad

Table 5.3 MIDC Ambad - Ambient Air Quality Monitoring Results

Parameters	Unit	Results			
		Near Koso India	Near Siemens India Ltd.	Near Gemini Instratech Ltd.	Near CG Power and Industrial Solutions Ltd.
Sulphur Dioxide (SO_2)	µg/m³	6.43	11.6	11.8	8.07
Nitrogen Dioxide (NO_2)	µg/m³	BLQ	BLQ	BLQ	BLQ
Particulate Matter (size less than 10 µm) or PM_{10}	µg/m³	35	42	39	38
Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	µg/m³	10	12	11	12
Ozone (O_3)	µg/m³	BLQ	33.1	28.6	75.3
Lead (Pb)	µg/m³	0.05	0.05	0.05	0.06
Carbon Monoxide (CO) (1 h)	mg/m³	1.19	1.12	1.28	1.18
Carbon Monoxide (CO) (8 h)	mg/m³	1.52	1.49	1.48	1.51
Ammonia (NH_3)	µg/m³	74.50	57.05	116	40.3
Benzene (C_6H_6)	µg/m³	1.74	1.70	1.8	1.83
Benzo (a) Pyrene (BaP) – particulate phase only	ng/m³	BLQ	BLQ	BLQ	BLQ
Arsenic (As)	ng/m³	0.40	0.69	0.37	0.9
Nickel (Ni)	ng/m³	6.70	5.21	5.52	6.11

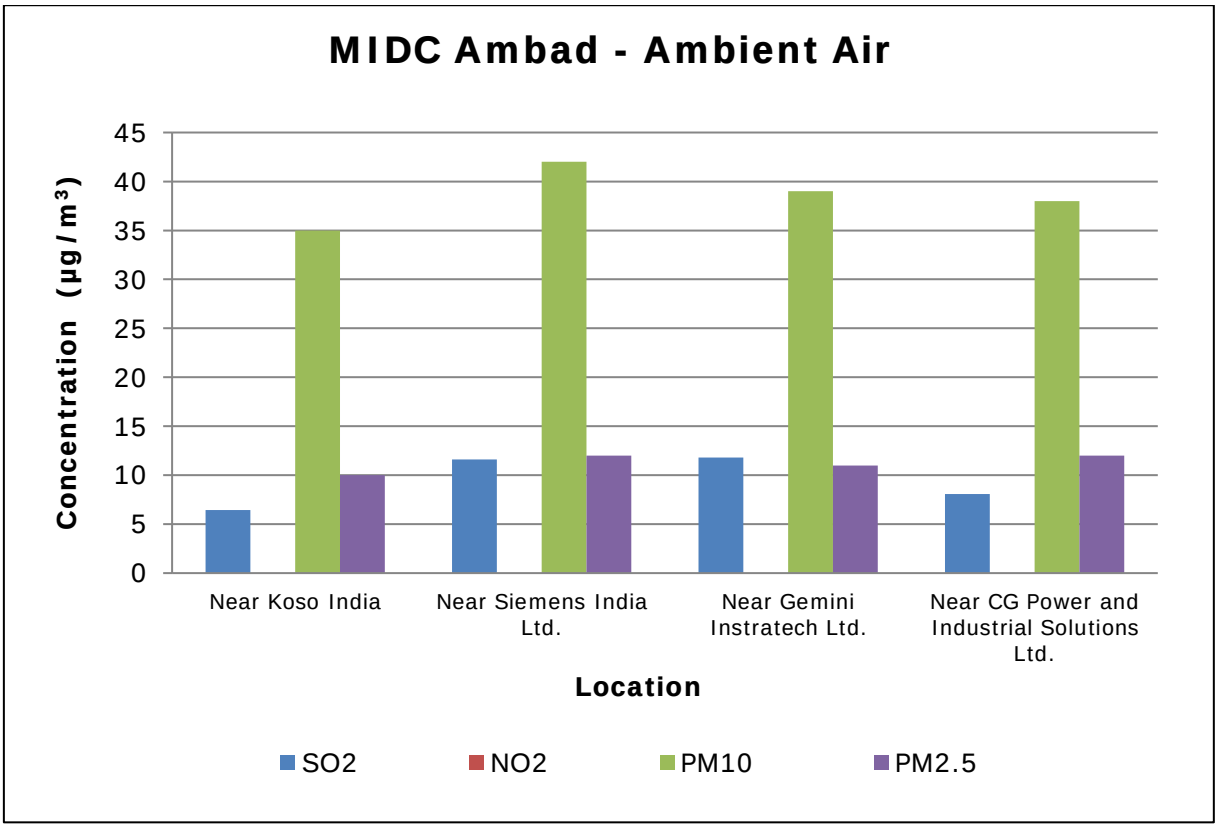
Table 5.4 MIDC Ambad - Volatile Organic Compounds (VOCs) in Ambient Air Results

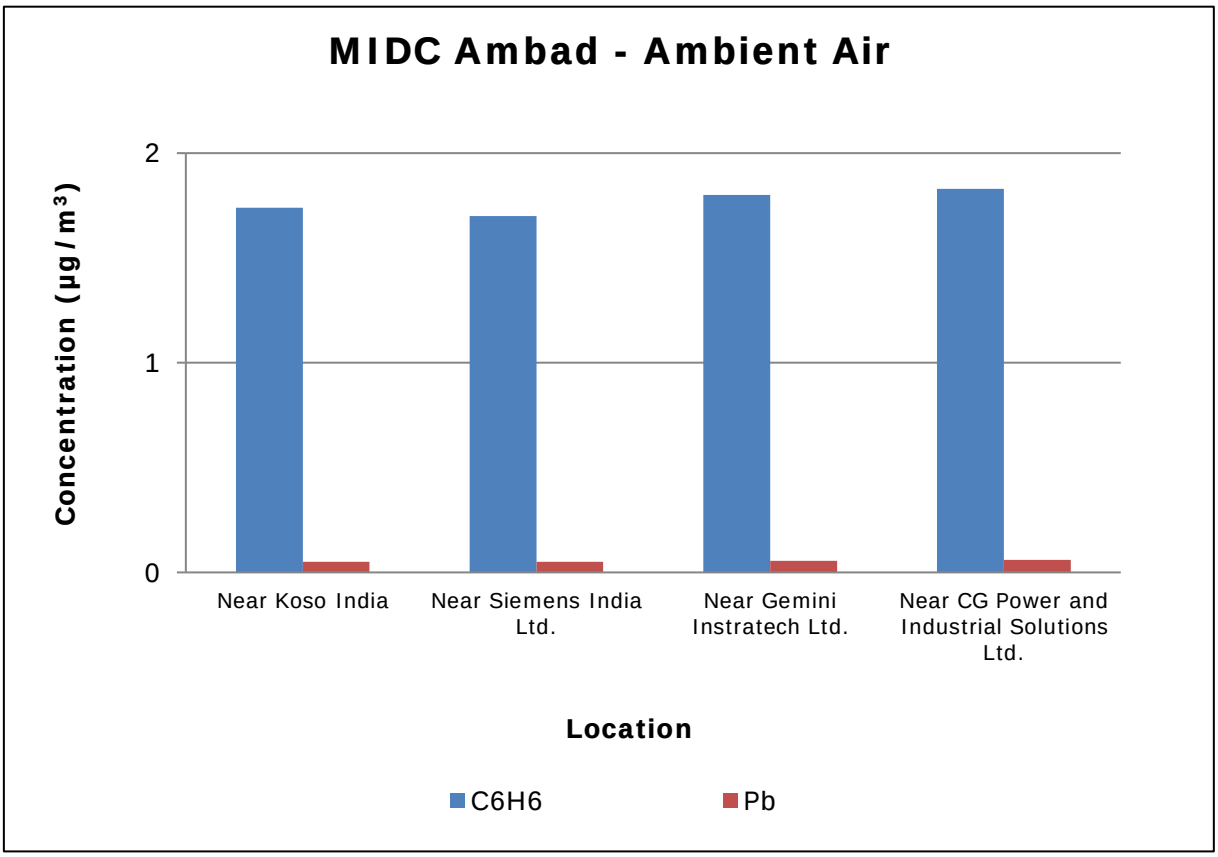
Parameters	Unit	Results	
		Near Rainbow Decoplus Pvt. Ltd.	Near Kirloskar oil India Ltd.
Dichloromethane	µg/m³	1.47	1.50
Chloroform	µg/m³	0.50	0.53
Carbon Tetrachloride	µg/m³	BLQ	BLQ
Trichloroethylene	µg/m³	BLQ	BLQ
Bromodichloromethane	µg/m³	BLQ	BLQ
1,3-Dichloropropane	µg/m³	BLQ	BLQ
1,4-Dichlorobenzene	µg/m³	BLQ	BLQ
1,3-Dichlorobenzene	µg/m³	BLQ	BLQ

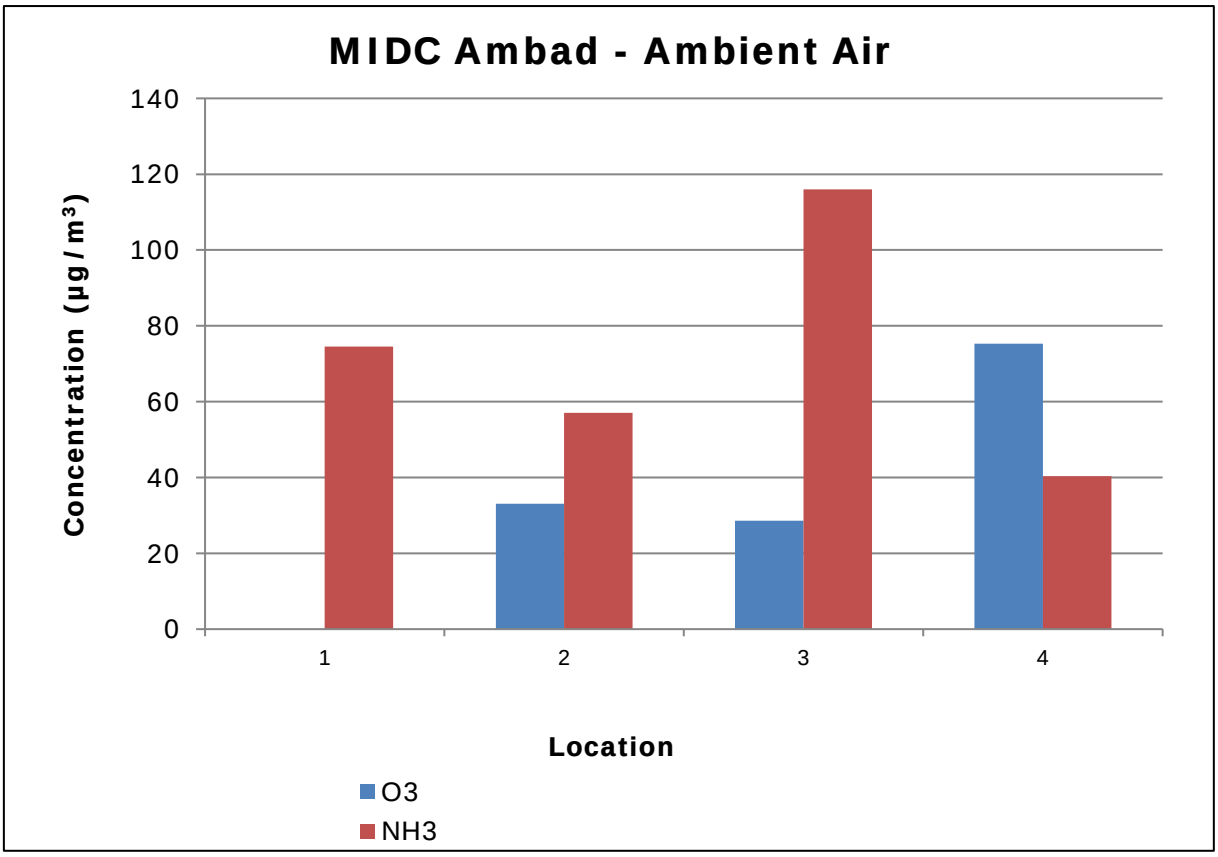
Parameters	Unit	Results	
		Near Rainbow Decoplus Pvt. Ltd.	Near Kirloskar oil India Ltd.
1,2-Dichlorobenzene	µg/m³	BLQ	BLQ
1,2-Dibromo-3-Chloropropane	µg/m³	BLQ	BLQ
Napthalene	µg/m³	BLQ	BLQ
Bromobenzene	µg/m³	BLQ	BLQ
1,2,4-Trimethylbenzene	µg/m³	BLQ	BLQ
2-Chlorotoluene	µg/m³	BLQ	BLQ
Tert-Butylbenzene	µg/m³	BLQ	BLQ
SEC-Butylbenzene	µg/m³	BLQ	BLQ
P-Isopropyltoluene	µg/m³	BLQ	BLQ
M-Xylene	µg/m³	BLQ	BLQ
P-Xylene	µg/m³	BLQ	BLQ
Styrene	µg/m³	BLQ	BLQ
Cumene	µg/m³	BLQ	BLQ
1,2,3-Trichloropropane	µg/m³	BLQ	BLQ
N-Propylbenzene	µg/m³	BLQ	BLQ
Dibromochloromethane	µg/m³	BLQ	BLQ
1,2-Dibromoethane	µg/m³	BLQ	BLQ
Chlorobenzene	µg/m³	0.682	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	0.52	BLQ
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

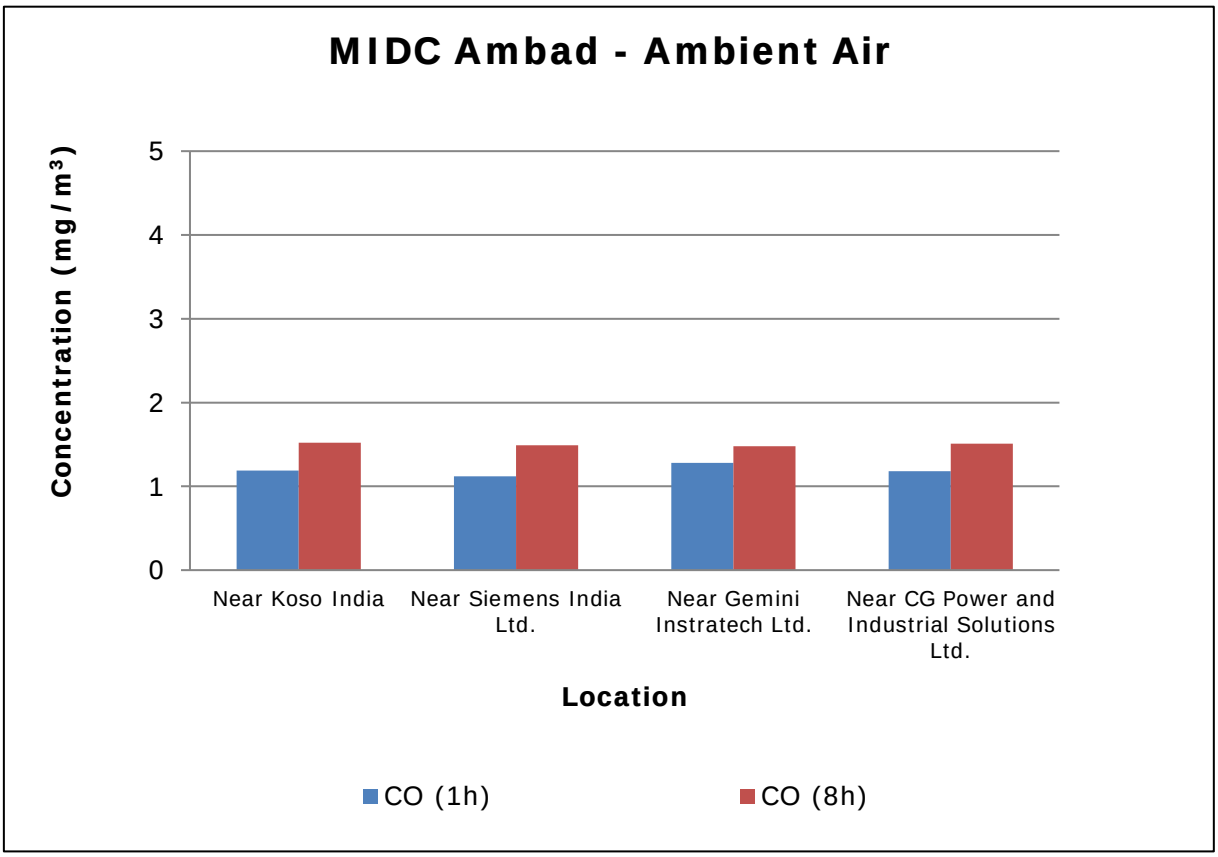
Parameters	Unit	Results	
		Near Rainbow Decoplus Pvt. Ltd.	Near Kirloskar oil India Ltd.
2,2-Dichloropropane	µg/m³	BLQ	BLQ
Dibromomethane	µg/m³	BLQ	BLQ
Toluene	µg/m³	BLQ	0.57
O-Xylene	µg/m³	2.03	1.58
Bromoform	µg/m³	BLQ	BLQ
1,1,2,2-Tetrachloroethane	µg/m³	BLQ	BLQ
4-Chlorotoluene	µg/m³	BLQ	BLQ
1,1-Dichloroethylene	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	BLQ	BLQ
1,1,1-Trichloroethane	µg/m³	BLQ	BLQ

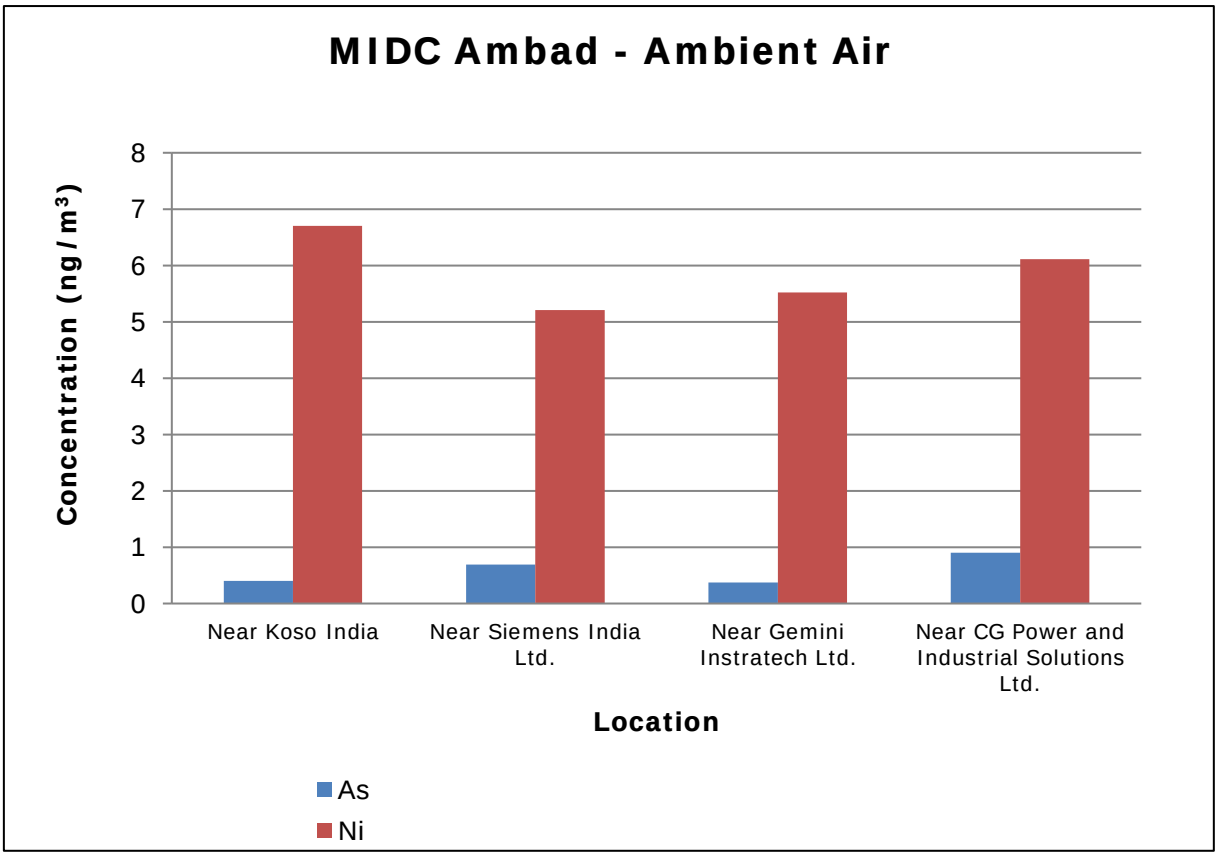
Graphs - Ambient Air Quality Monitoring of MIDC Ambad




MIDC Ambad - Ambient Air
Concentration (µg/m³)
2
1
0
Near Koso India
Near Siemens India Ltd.
Near Gemini Instratech Ltd.
Near CG Power and Industrial Solutions Ltd.
Location
C6H6
Pb


MIDC Ambad - Ambient Air
Concentration (µg/m³)
140
120
100
80
60
40
20
0
1
2
3
4
Location
O3
NH3


MIDC Ambad - Ambient Air
Concentration (mg/m³)
5
4
3
2
1
0
Near Koso India
Near Siemens India Ltd.
Near Gemini Instratech Ltd.
Near CG Power and Industrial Solutions Ltd.
Location
CO (1h)
CO (8h)


MIDC Ambad - Ambient Air
Concentration (ng/m³)
8
7
6
5
4
3
2
1
0
Near Koso India
Near Siemens India Ltd.
Near Gemini Instratech Ltd.
Near CG Power and Industrial Solutions Ltd.
Location
As
Ni

MIDC Satpur: In MIDC Satpur four locations have been monitored of checking the Ambient Air Quality (AAQ). The concentration of all the ambient air parameters was found well within the limits prescribed by NAAQS at all locations.

Table 5.5 MIDC Satpur - Details of Sampling Location of Ambient Air Quality Monitoring

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	Near Mahindra & Mahindra Plant-I	19°99'59.54"N	73°71'63.31"E	26.06.2024	28.06.2024	30.06.2024
2.	Near ABB India Pvt. Ltd.	20°00'04.91"N	73°71'72.53"E	26.06.2024	28.06.2024	30.06.2024
3.	Near ESDS Software Solution Ltd.	20°0'02.85"N	73°74'0.43"E	26.06.2024	28.06.2024	30.06.2024
4.	Near Bosch Ltd.	19°99'78.16"N	73°71'67.76"E	26.06.2024	28.06.2024	30.06.2024

Table 5.6 MIDC Satpur - Details of Sampling Location of Volatile Organic Compounds (VOCs) Monitoring

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
1.	Near Mahindra & Mahindra Plant-I	19°99'59.54"N	73°71'63.31"E	26.06.2024	28.06.2024	30.06.2024
2.	Near MSL Drive Line System	19°99'78.16"N	73°71'67.76"E	26.06.2024	28.06.2024	30.06.2024

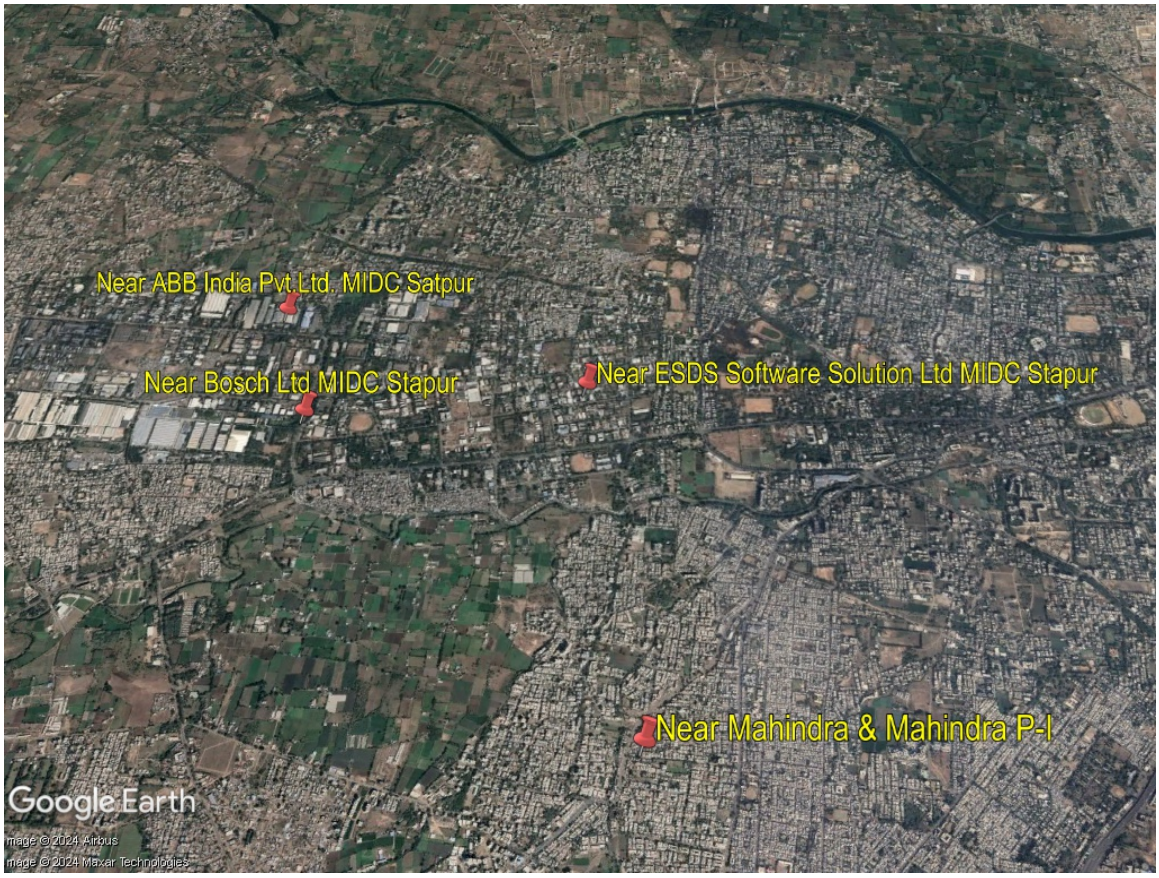


Fig. Geographical Locations of Ambient Air Quality Monitoring MIDC Satpur

Fig. Geographical Locations of VOCs Monitoring MIDC Satpur

Table 5.7 MIDC Satpur - Ambient Air Quality Monitoring Results

Parameters	Unit	Results			
		Near Mahindra & Mahindra Plant- I	Near ABB India Pvt. Ltd.	Near ESDS Software Solution Ltd.	Near Bosch Ltd.
Sulphur Dioxide (SO_2)	µg/m³	8.27	12.9	9.96	8.27
Nitrogen Dioxide (NO_2)	µg/m³	6.69	12.4	BLQ	7.03
Particulate Matter (size less than 10 µm) or PM_{10}	µg/m³	50	55	46	53
Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	µg/m³	13	14	12	14
Ozone (O_3)	µg/m³	BLQ	BLQ	BLQ	BLQ
Lead (Pb)	µg/m³	BLQ	0.05	0.061	0.05
Carbon Monoxide (CO) (1 h)	mg/m³	1.14	1.21	1.16	1.08
Carbon Monoxide (CO) (8 h)	mg/m³	1.51	1.45	1.48	1.50
Ammonia (NH_3)	µg/m³	65.8	82.4	55.95	51.3
Benzene (C_6H_6)	µg/m³	1.78	2.01	1.79	1.66
Benzo (a) Pyrene (BaP) – particulate phase only	ng/m³	BLQ	BLQ	BLQ	BLQ
Arsenic (As)	ng/m³	0.958	0.87	0.87	1.42
Nickel (Ni)	ng/m³	BLQ	4.4	3.84	3.64

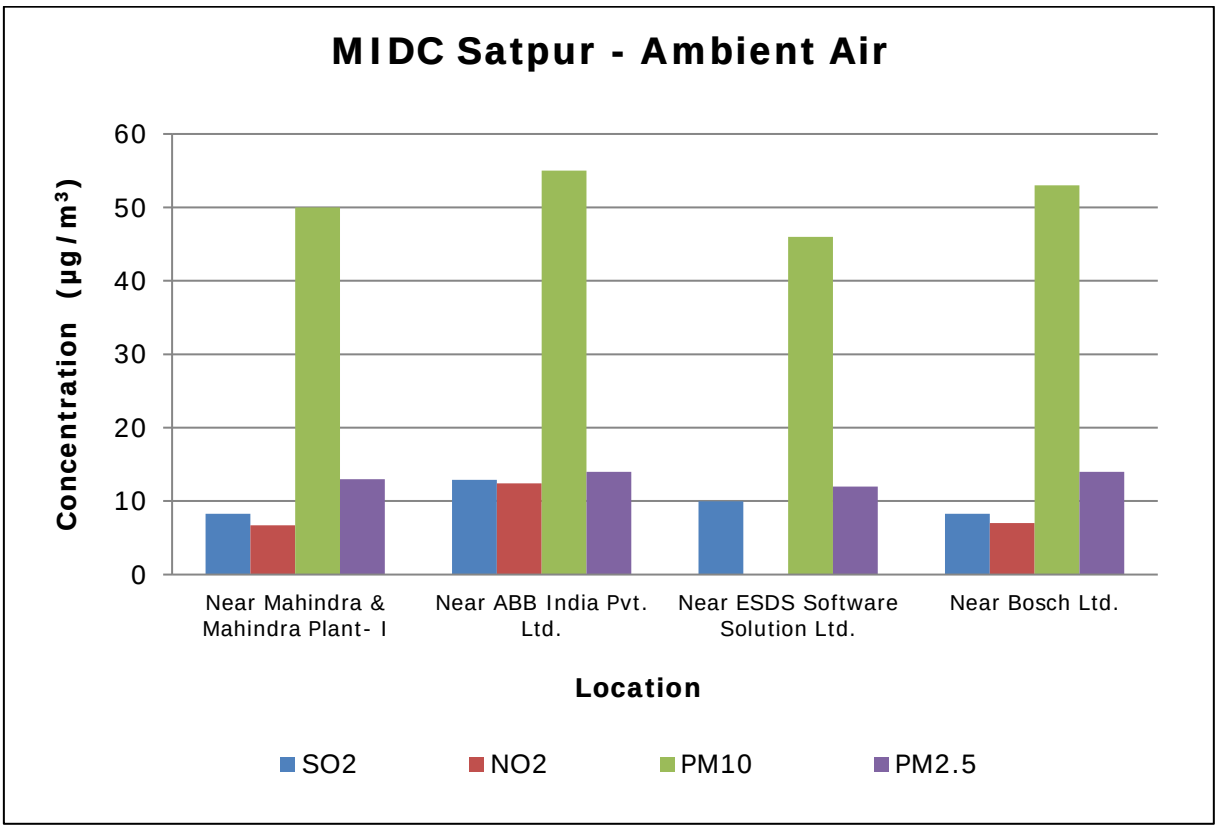
Table 5.8 MIDC Satpur - Volatile Organic Compounds (VOCs) in Ambient Air Results

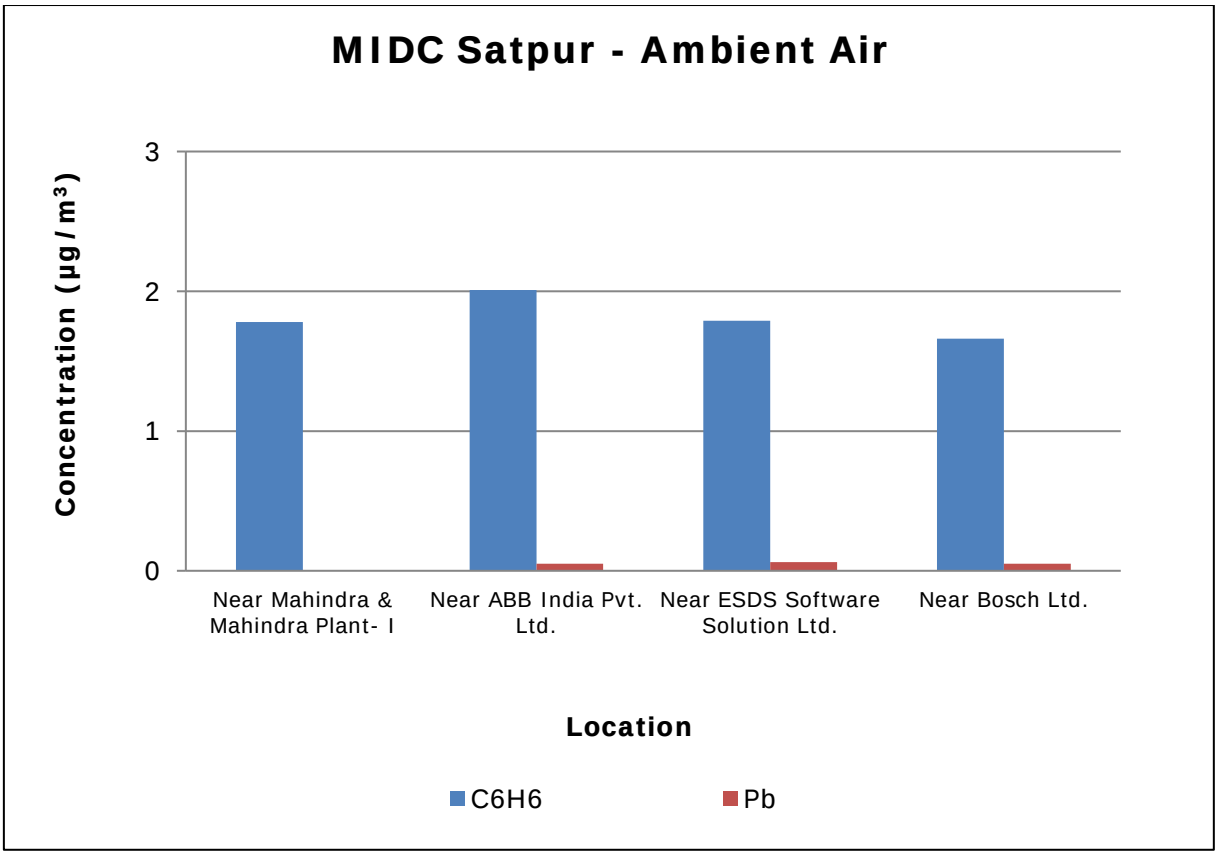
Parameters	Unit	Results	
		Near Mahindra & Mahindra Plant I	Near MSL Drive Line System
Dichloromethane	µg/m³	1.30	2.03
Chloroform	µg/m³	0.67	0.66
Carbon Tetrachloride	µg/m³	BLQ	BLQ
Trichloroethylene	µg/m³	BLQ	BLQ
Bromodichloromethane	µg/m³	BLQ	BLQ
1,3-Dichloropropane	µg/m³	BLQ	BLQ
1,4-Dichlorobenzene	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

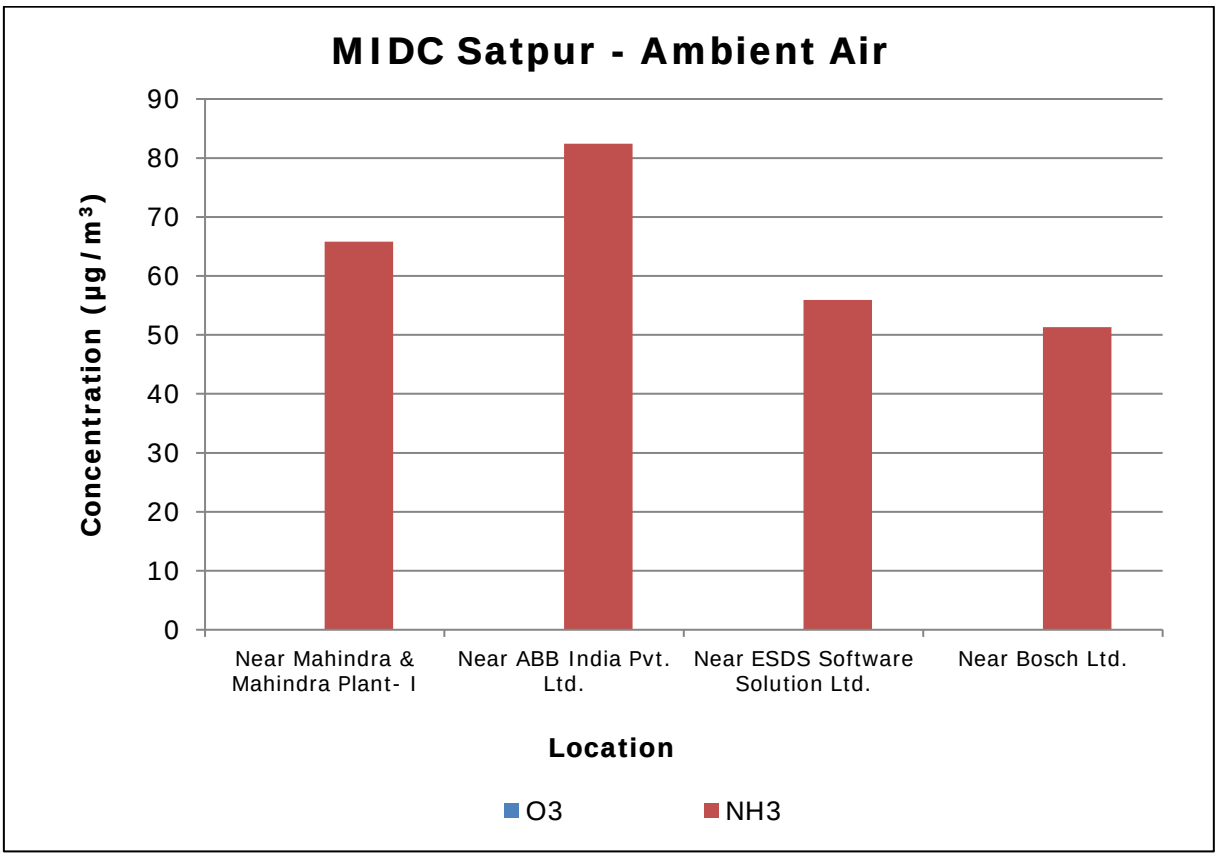
Parameters	Unit	Results	
		Near Mahindra & Mahindra Plant I	Near MSL Drive Line System
Napthalene	µg/m³	BLQ	BLQ
Bromobenzene	µg/m³	BLQ	BLQ
1,2,4-Trimethylbenzene	µg/m³	BLQ	BLQ
2-Chlorotoluene	µg/m³	BLQ	BLQ
Tert-Butylbenzene	µg/m³	BLQ	BLQ
SEC-Butylbenzene	µg/m³	BLQ	BLQ
P-Isopropyltoluene	µg/m³	BLQ	BLQ
M-Xylene	µg/m³	BLQ	BLQ
P-Xylene	µg/m³	BLQ	BLQ
Styrene	µg/m³	BLQ	BLQ
Cumene	µg/m³	BLQ	BLQ
1,2,3-Trichloropropane	µg/m³	BLQ	BLQ
N-Propylbenzene	µg/m³	BLQ	BLQ
Dibromochloromethane	µg/m³	BLQ	BLQ
1,2-Dibromoethane	µg/m³	BLQ	BLQ
Chlorobenzene	µg/m³	0.77	0.63
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	0.53	0.54
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
Dibromoethane	µg/m³	BLQ	BLQ

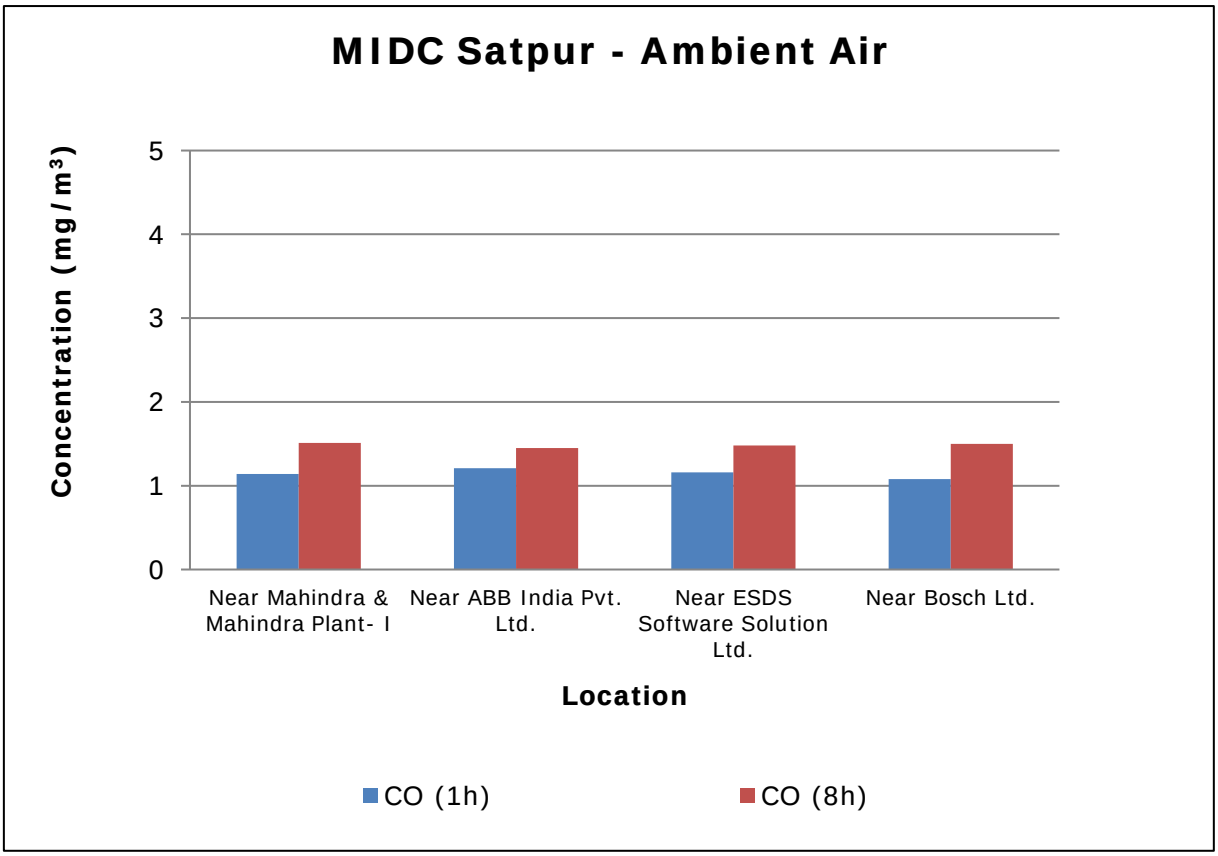
Parameters	Unit	Results	
		Near Mahindra & Mahindra Plant I	Near MSL Drive Line System
Toluene	µg/m³	1.65	0.58
O-Xylene	µg/m³	BLQ	BLQ
Bromoform	µg/m³	BLQ	BLQ
1,1,2,2-Tetrachloroethane	µg/m³	BLQ	BLQ
4-Chlorotoluene	µg/m³	BLQ	BLQ
1,1-Dichloroethylene	µg/m³	BLQ	BLQ
Trans-1,2-Dichloroethylene	µg/m³	BLQ	BLQ
1,1-Dichloroethane	µg/m³	BLQ	BLQ
CIS-1,2-Dichloroethylene	µg/m³	BLQ	BLQ
Bromochloromethane	µg/m³	BLQ	BLQ
1,1,1-Trichloroethane	µg/m³	BLQ	BLQ

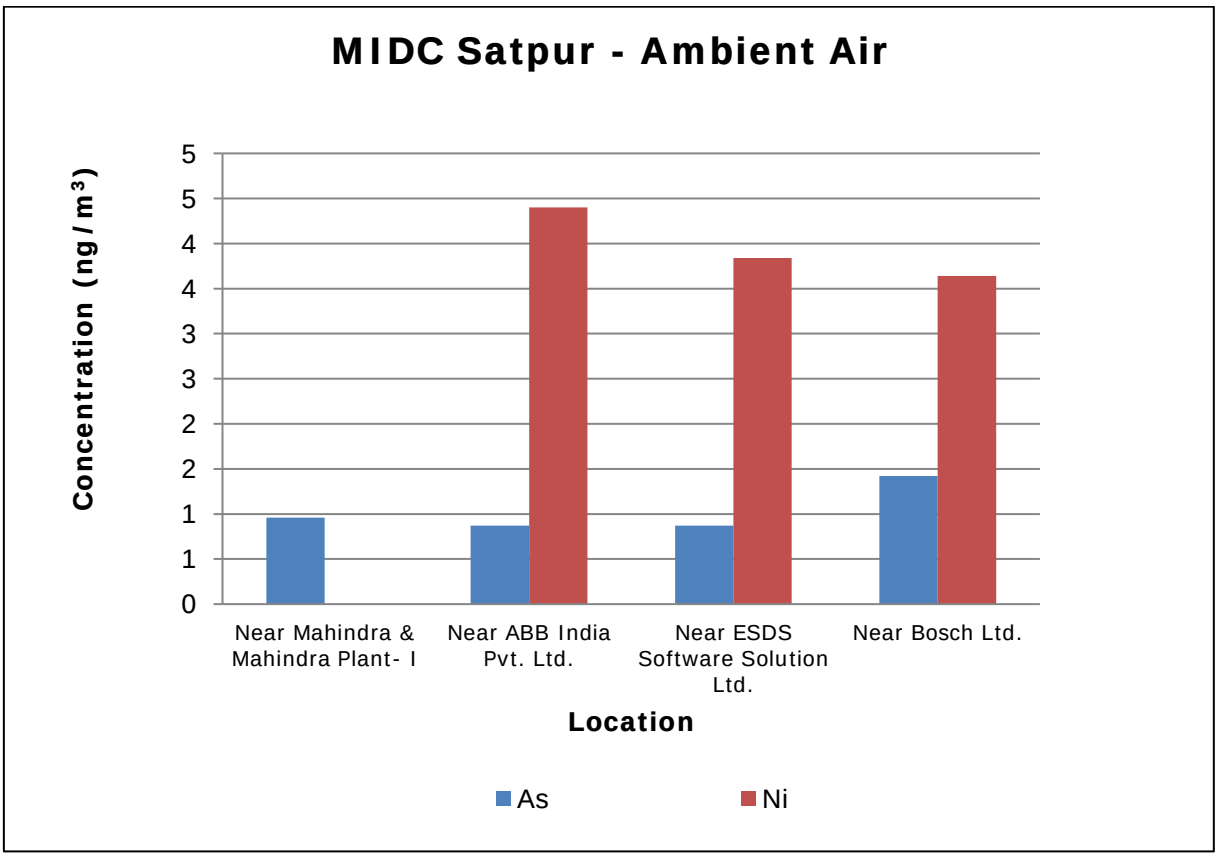
Graphs - Ambient Air Quality Monitoring of MIDC Satpur






MIDC Satpur - Ambient Air
Concentration (µg/m³)
90
80
70
60
50
40
30
20
10
0
Near Mahindra & Mahindra Plant- I
Near ABB India Pvt. Ltd.
Near ESDS Software Solution Ltd.
Near Bosch Ltd.
Location
O3
NH3


MIDC Satpur - Ambient Air
Concentration (mg/m³)
5
4
3
2
1
0
Near Mahindra & Mahindra Plant- I
Near ABB India Pvt. Ltd.
Near ESDS Software Solution Ltd.
Near Bosch Ltd.
Location
CO (1h)
CO (8h)


MIDC Satpur - Ambient Air
Concentration (ng/m³)
5
5
4
4
3
3
2
2
1
1
0
Near Mahindra & Mahindra Plant- I
Near ABB India Pvt. Ltd.
Near ESDS Software Solution Ltd.
Near Bosch Ltd.
Location
As
Ni

WATER ENVIRONMENT

6. Water Environment

For studying the water Environment of Nashik area, surface water was collected from MIDC Ambad and MIDC Satpur. Total 5 samples are collected.

1. **MIDC Ambad:** Two surface water samples are collected from MIDC Ambad region.

- All two samples are acceptable in sanitary survey and smell.
- pH, suspended solids, total dissolved solids are well within the limits in both samples collected.
- BOD, Total Phosphate and Total Kjeldahl Nitrogen exceeded in all the samples collected.
- 100% survival in Fish Bioassay was not observed in both the samples collected.
- Metals like Hexavalent Chromium (Cr^{6+}),Total Arsenic, Manganese, Lead, Cadmium, Mercury, etc. are observed either below limit of quantification or below their standard limits.
- Metals like Zinc, Nickel, Copper, Total Chromium and Iron are found above the standard limits.
- Parameters like Cyanide, Fluoride, Sulphide, Dissolved Phosphate, Total Ammonical Nitrogen and Phenolic compounds also meet the criteria as prescribed by CPCB.
- Polynuclear aromatic hydrocarbons (PAH) and Polychlorinated Biphenyls (PCB) are either below limit of quantification or below their standard limits
-
- Organo Chlorine Pesticides are also below the detectable limit in both samples collected.

Table 6.1 MIDC Ambad - 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.	Kirloskar Industry back side Nalla	19°95'9.05"N	73°73'2.37"E	26.06.2024	28.06.2024	30.06.2024
2.	Ambadgaon Nalla	19°96'0.91"N	73°74'5.36"E	26.06.2024	28.06.2024	30.06.2024

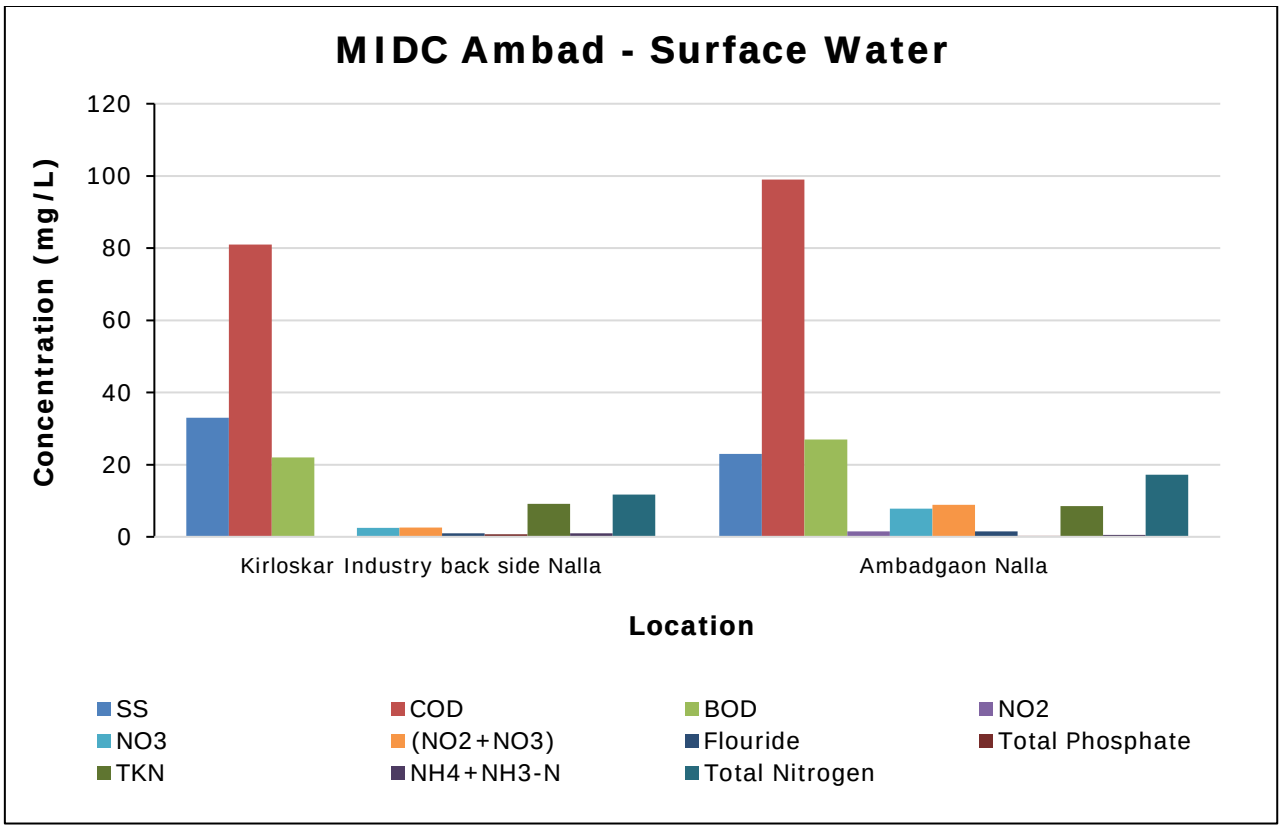
Fig. Geographical Locations of Surface Water Sampling MIDC Ambad

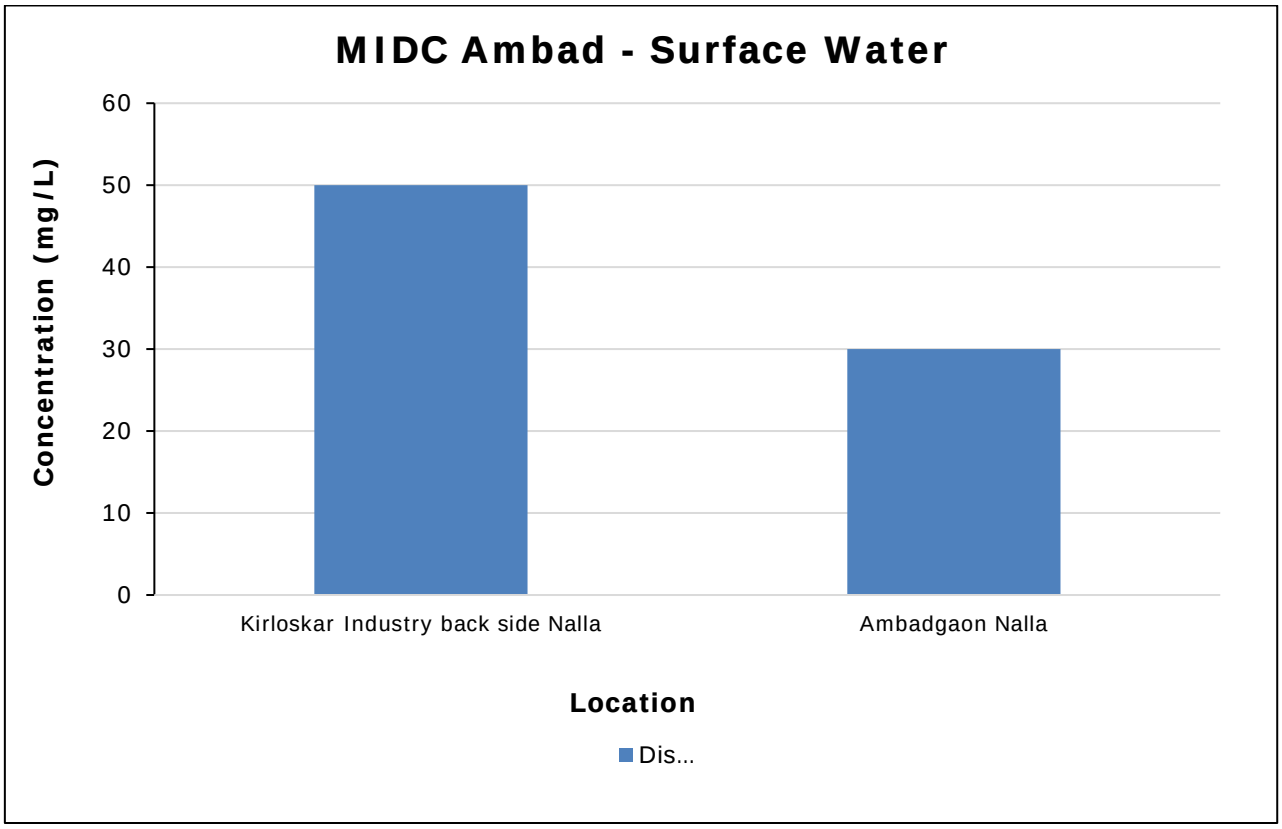
Table 6.2 MIDC Ambad - Results of Surface Water

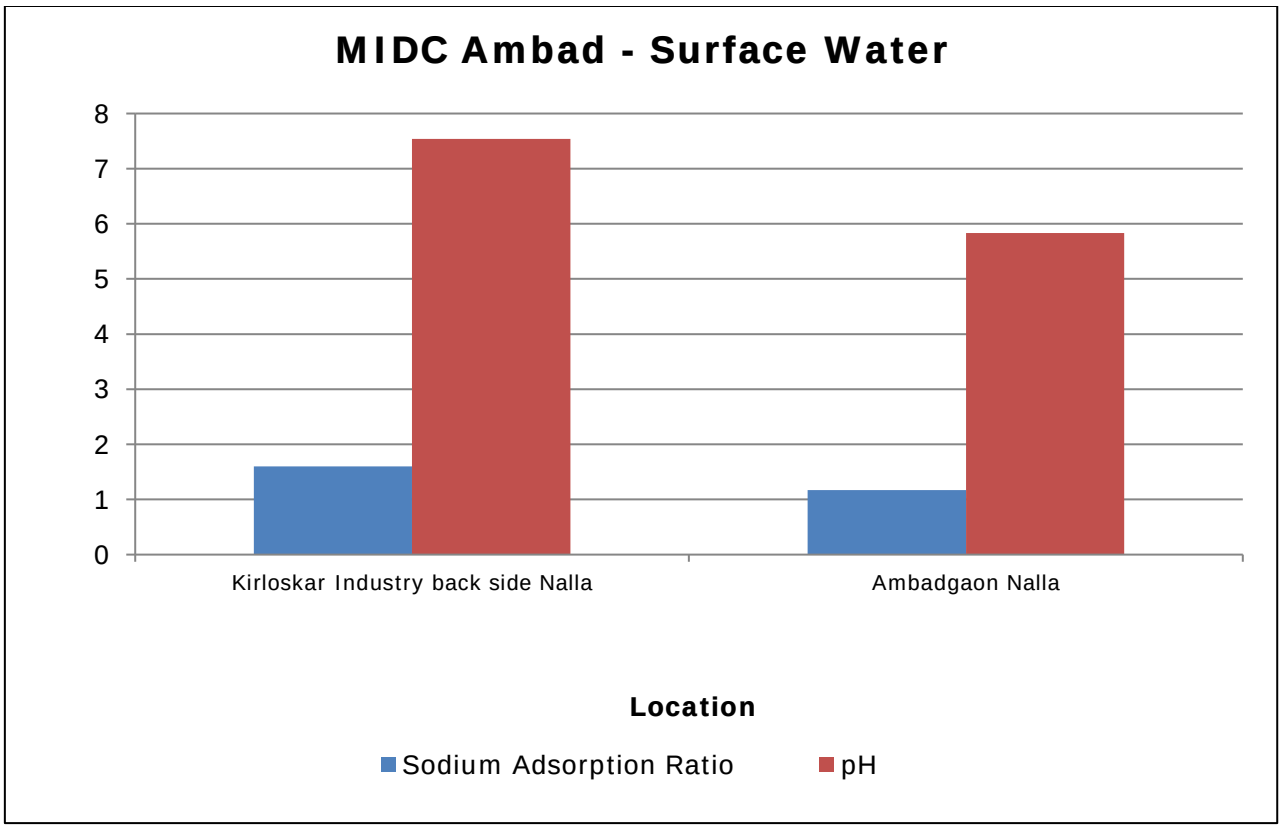
Parameters	Unit	Results	
		Kirloskar Industry back side Nalla	Ambadgaon Nalla
Sanitary Survey	-	Generally clean neighbourhood	Generally clean neighbourhood
General Appearance	-	Floating Matter Evident	Floating Matter Evident
Transparency	m	0.3	0.2
Temperature	^{o}C	25	25
Colour	Hazen	2	3
Smell	-	Agreeable	Agreeable
pH	-	7.54	5.83
Oil & Grease	mg/L	BLQ	BLQ
Total Suspended Solids	mg/L	33	23
Total Dissolved Solids	mg/L	715	995
Dissolved Oxygen (% Saturation)	%	50	30
Chemical Oxygen Demand	mg/L	81	99
Biochemical Oxygen Demand (3 days, 27^{o}C)	mg/L	22	27
Electrical Conductivity (at 25 ^{o}C)	µmho/cm	1276	1777
Nitrite Nitrogen (as NO_2)	mg/L	0.04	1.55
Nitrate Nitrogen (as NO_3)	mg/L	2.52	7.81

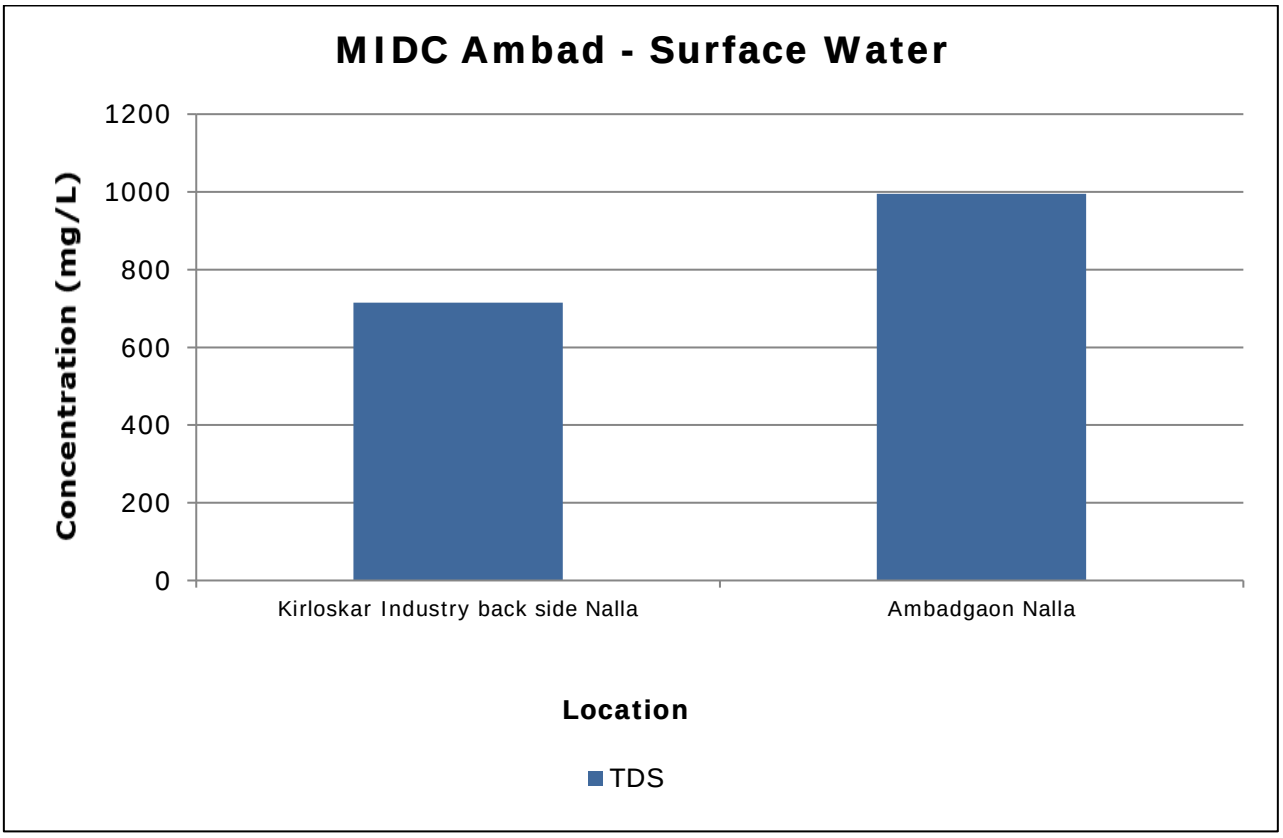
Parameters	Unit	Results	
		Kirloskar Industry back side Nalla	Ambadgaon Nalla
(NO_2 + NO_3)-Nitrogen	mg/L	2.55	8.84
Free Ammonia (as NH_3-N)	mg/L	BLQ	BLQ
Free Residual Chlorine	mg/L	BLQ	BLQ
Cyanide (as CN)	mg/L	BLQ	BLQ
Fluoride (as F)	mg/L	1.0	1.5
Sulphide (as H_2S)	mg/L	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	0.53	0.18
Sodium Adsorption Ratio	-	1.60	1.17
Total Coliforms	MPN Index/ 100 ml	1600	940
Faecal Coliforms	MPN Index/ 100 ml	717	<1.8
Total Phosphate (as P)	mg/L	0.7	0.3
Total Kjeldahl Nitrogen (as N)	mg/L	9.14	8.49
Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	0.99	0.53
Total Nitrogen	mg/L	11.68	17.19
Phenols (as C_6H_5OH)	mg/L	BLQ	BLQ
Anionic Detergents (as MBAS Calculated as LAS, mol.wt.288.38)	mg/L	BLQ	BLQ
Organo Chlorine Pesticides	µg/L	BLQ	BLQ
Polynuclear aromatic hydrocarbons (as PAH)	mg/L	0.00017	0.00016
Polychlorinated Biphenyls (PCB)	mg/L	BLQ	BLQ
Zinc (as Zn)	mg/L	0.4	2.62
Nickel (as Ni)	mg/L	0.301	2.18
Copper (as Cu)	mg/L	0.051	7.82
Hexavalent Chromium (as Cr^{6+})	mg/L	BLQ	BLQ
Total Chromium (as Cr)	mg/L	0.651	0.46
Total Arsenic (as As)	mg/L	BLQ	BLQ
Lead (as Pb)	mg/L	BLQ	BLQ
Cadmium (as Cd)	mg/L	0.005	0.002
Mercury (as Hg)	mg/L	BLQ	BLQ
Manganese (as Mn)	mg/L	0.26	0.273
Iron (as Fe)	mg/L	0.682	0.70
Vanadium (as V)	mg/L	0.01	0.026
Selenium (as Se)	mg/L	0.006	BLQ
Boron (as B)	mg/L	0.4	0.44
Bioassay Test on fish	% survival	27	0

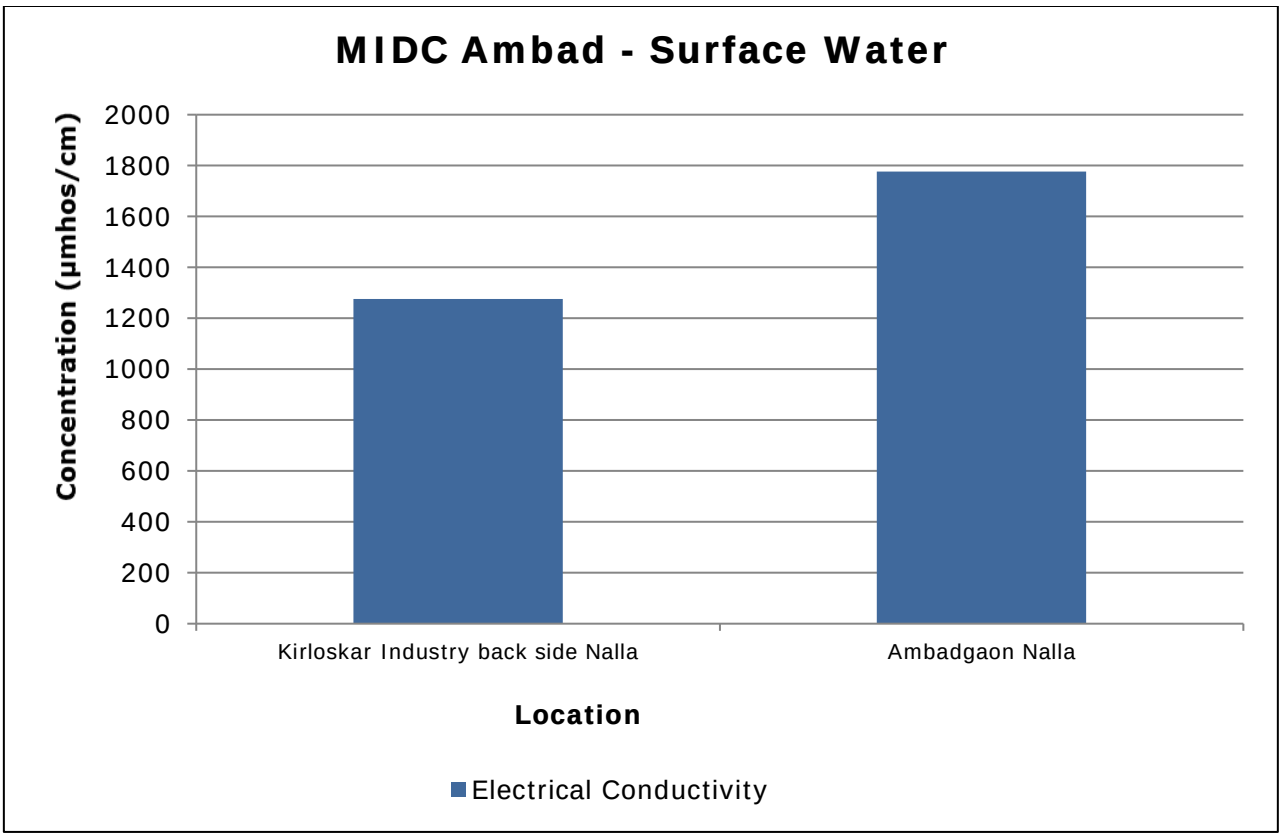
Graphs - Surface Water Quality of MIDC Ambad

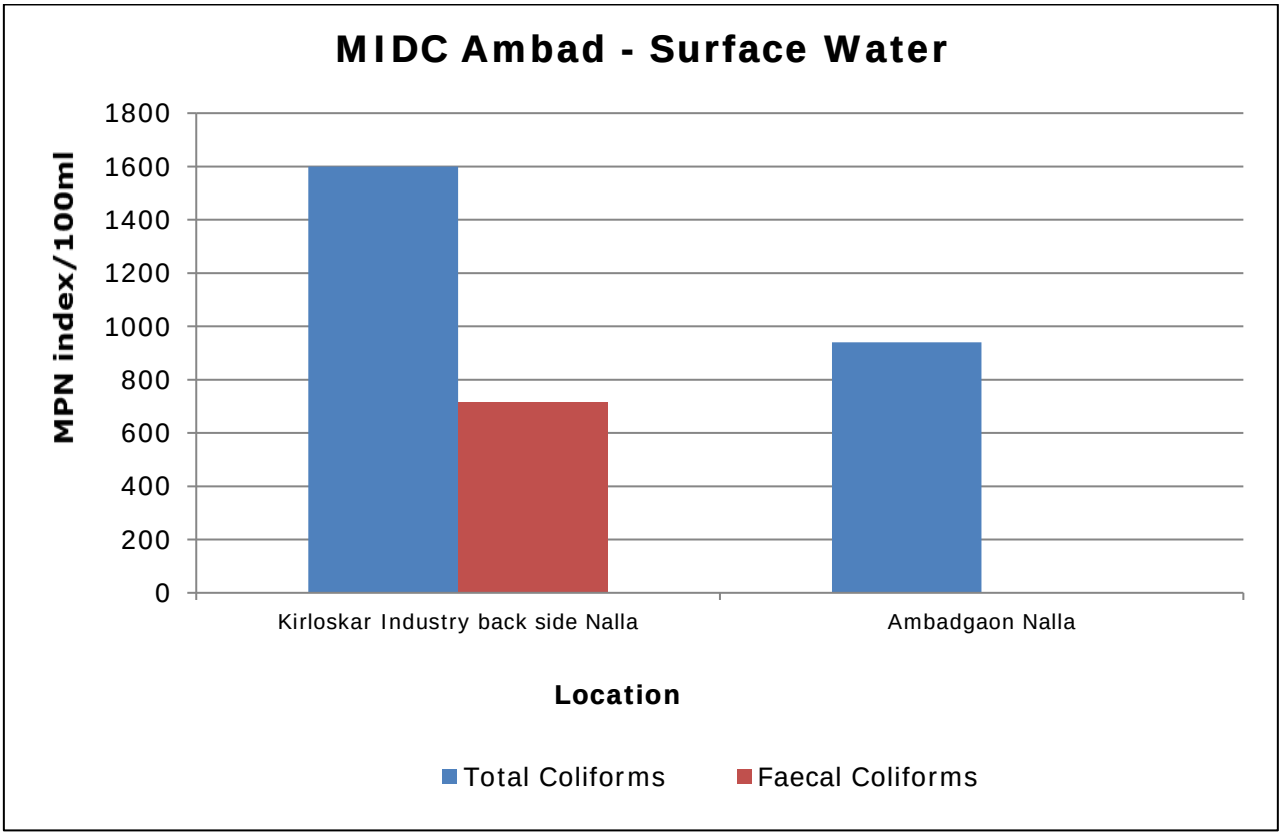


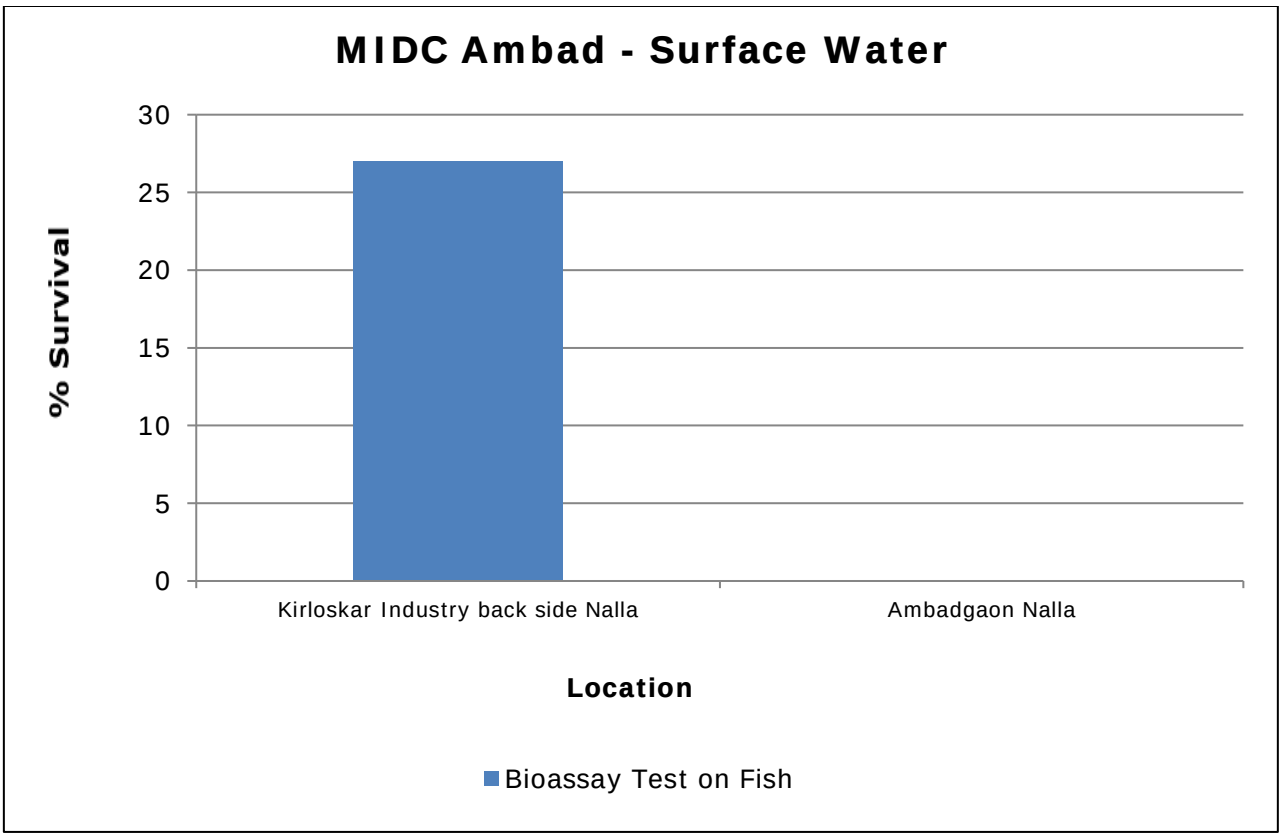



MIDC Ambad - Surface Water
8
7
6
5
4
3
2
1
0
Kirloskar Industry back side Nalla
Ambadgaon Nalla
Location
Sodium Adsorption Ratio
pH


MIDC Ambad - Surface Water
Concentration (mg/L)
1200
1000
800
600
400
200
0
Kirloskar Industry back side Nalla
Ambadgaon Nalla
Location
TDS


MIDC Ambad - Surface Water
Concentration (µmhos/cm)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Kirloskar Industry back side Nalla
Ambadgaon Nalla
Location
Electrical Conductivity


MIDC Ambad - Surface Water
MPN index/100ml
1800
1600
1400
1200
1000
800
600
400
200
0
Kirloskar Industry back side Nalla
Ambadgaon Nalla
Location
Total Coliforms
Faecal Coliforms


MIDC Ambad - Surface Water
% Survival
30
25
20
15
10
5
0
Kirloskar Industry back side Nalla
Ambadgaon Nalla
Location
Bioassay Test on Fish

2. **MIDC Satpur:** Three surface water samples are collected from MIDC Satpur region.

- All two samples are acceptable in sanitary survey and smell.
- pH, suspended solids, total dissolved solids are well within the limits in all three samples collected.
- BOD, Total Kjeldahl Nitrogen and Total Ammonia-Nitrogen are well within the limits in all three samples collected.
- Total Phosphate exceeded in all three samples collected.
- 100% survival in Fish Bioassay was in one of the sample out of three samples collected.
- Metals like Zinc, Hexavalent Chromium (Cr^{6+}), Total Arsenic, Lead, Mercury, Copper, Total Chromium, Cadmium, Iron and Selenium etc. are observed either below limit of quantification or below their standard limits.
- Metals like Zinc, Manganese and Iron are found above the standard limits.
- Parameters like Cyanide, Fluoride, Sulphide, Dissolved Phosphate and Phenolic compounds also meet the criteria as prescribed by CPCB.
- Polynuclear aromatic hydrocarbons (PAH) and Polychlorinated Biphenyls (PCB) are observed either below limit of quantification or below their standard limits.
- Organo Chlorine Pesticides are also below the detectable limit in both samples collected.

Table 6.3 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.	Sahid Arun Chittee Pool, Anandvalil Gangapur Road, Satpur	20°02'58.86"N	73°75'5.26"E	26.06.2024	28.06.2024	30.06.2024
2.	Nasardi Pool, Near EPF Office Satpur	19°98'8.99"N	73°75'01.85"E	26.06.2024	28.06.2024	30.06.2024
3.	ALF industry Opposite side Nalla	20°00'6.78"N	73°71'4.04"E	26.06.2024	28.06.2024	30.06.2024

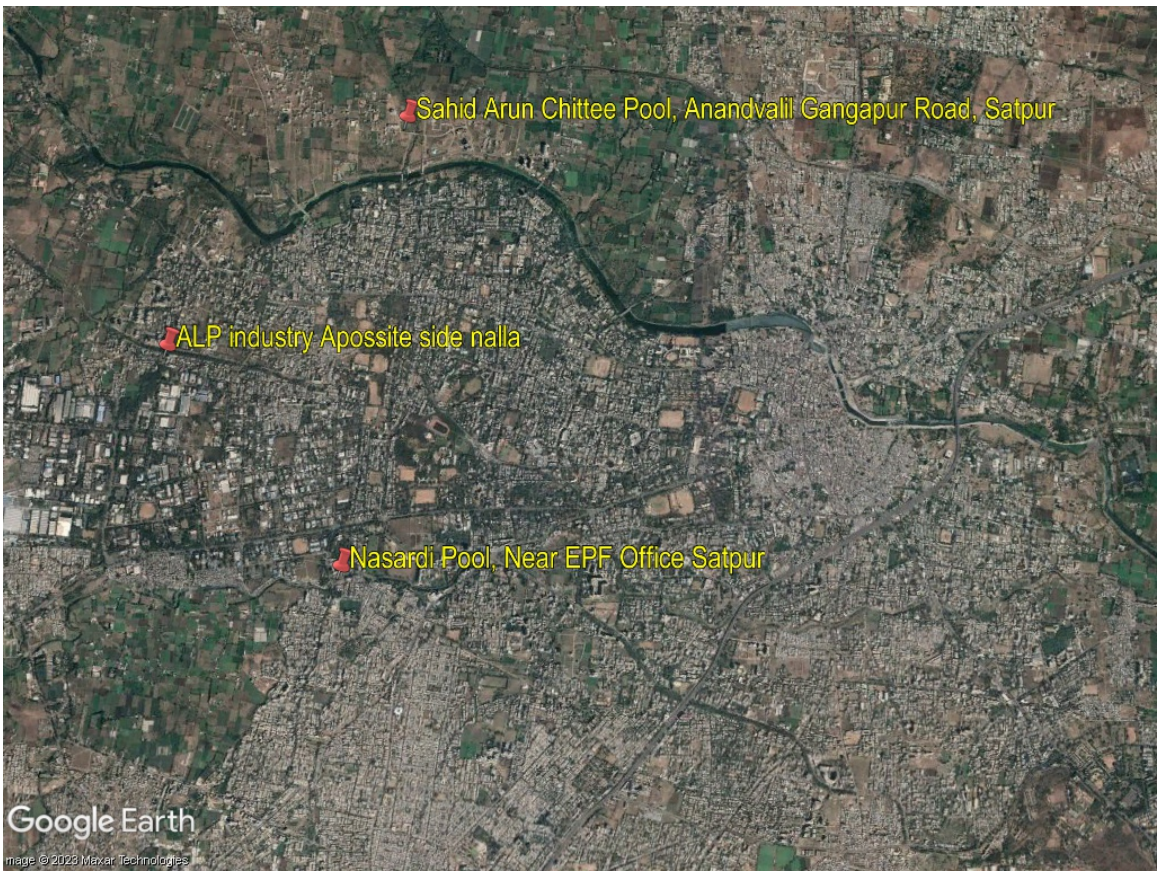


Fig. Geographical Locations of Surface Water Sampling MIDC Satpur

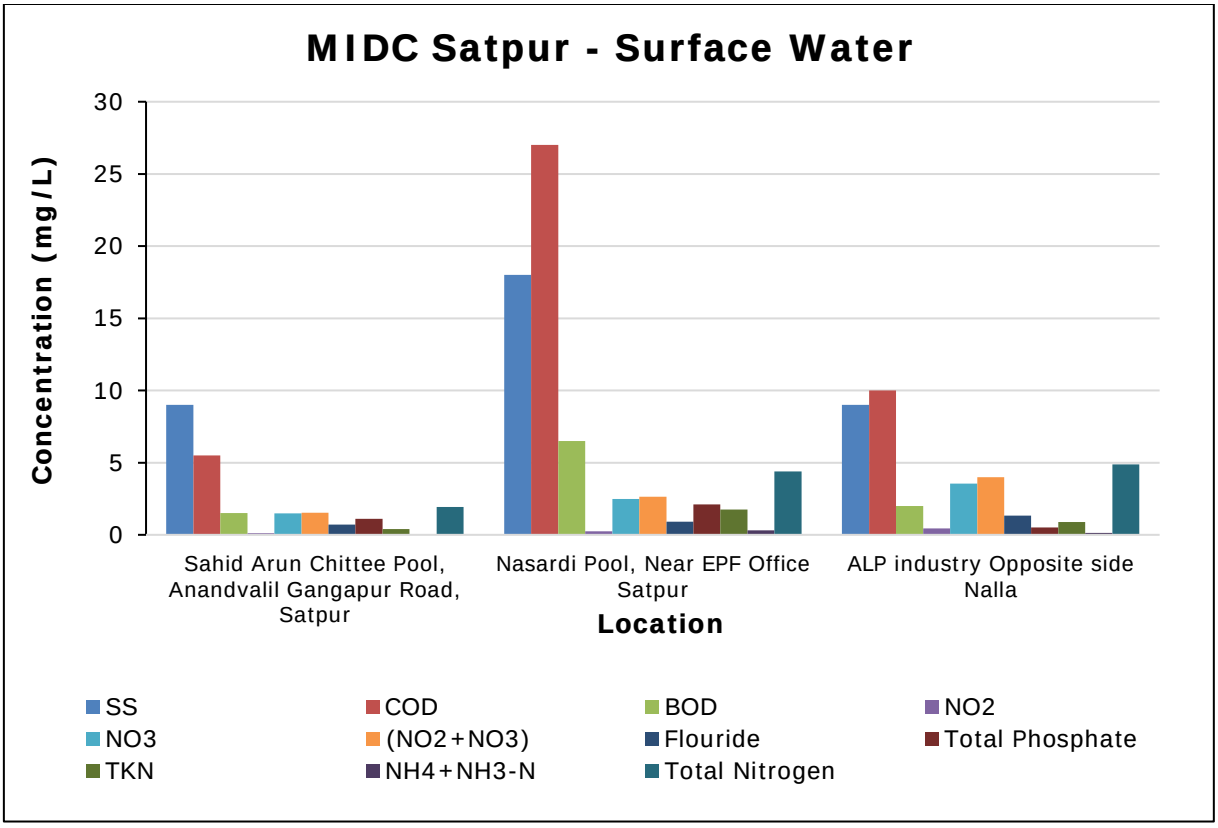
Table 6.4 MIDC Satpur Results of Surface Water

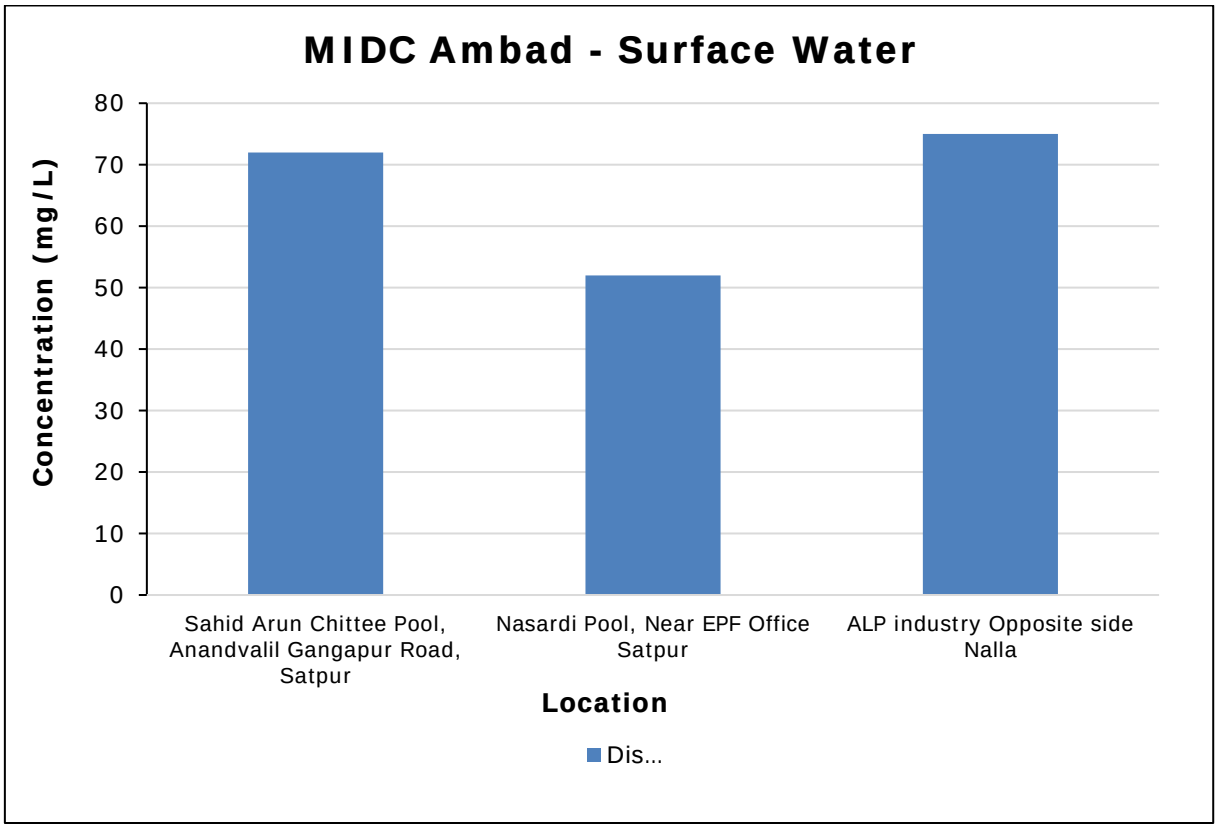
Parameters	Unit	Results		
		Sahid Arun Chittee Pool, Anandvalil Gangapur Road	Nasardi Pool, Near EPF Office Satpur	ALF industry Opposite side Nalla
Sanitary Survey	-	Generally clean neighbourhood	Generally clean neighbourhood	Generally clean neighbourhood
General Appearance	-	Floating Matter Evident	Floating Matter Evident	Floating Matter Evident
Transparency	m	0.3	0.2	0.1
Temperature	^{o}C	25	25	25
Colour	Hazen	1	2	1
Smell	-	Agreeable	Not Agreeable	Agreeable
pH	-	7.63	7.42	7.66
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Total Suspended Solids	mg/L	9	18	9
Total Dissolved Solids	mg/L	408	529	801
Dissolved Oxygen (% Saturation)	%	72	52	75
Chemical Oxygen Demand	mg/L	5.5	27	10

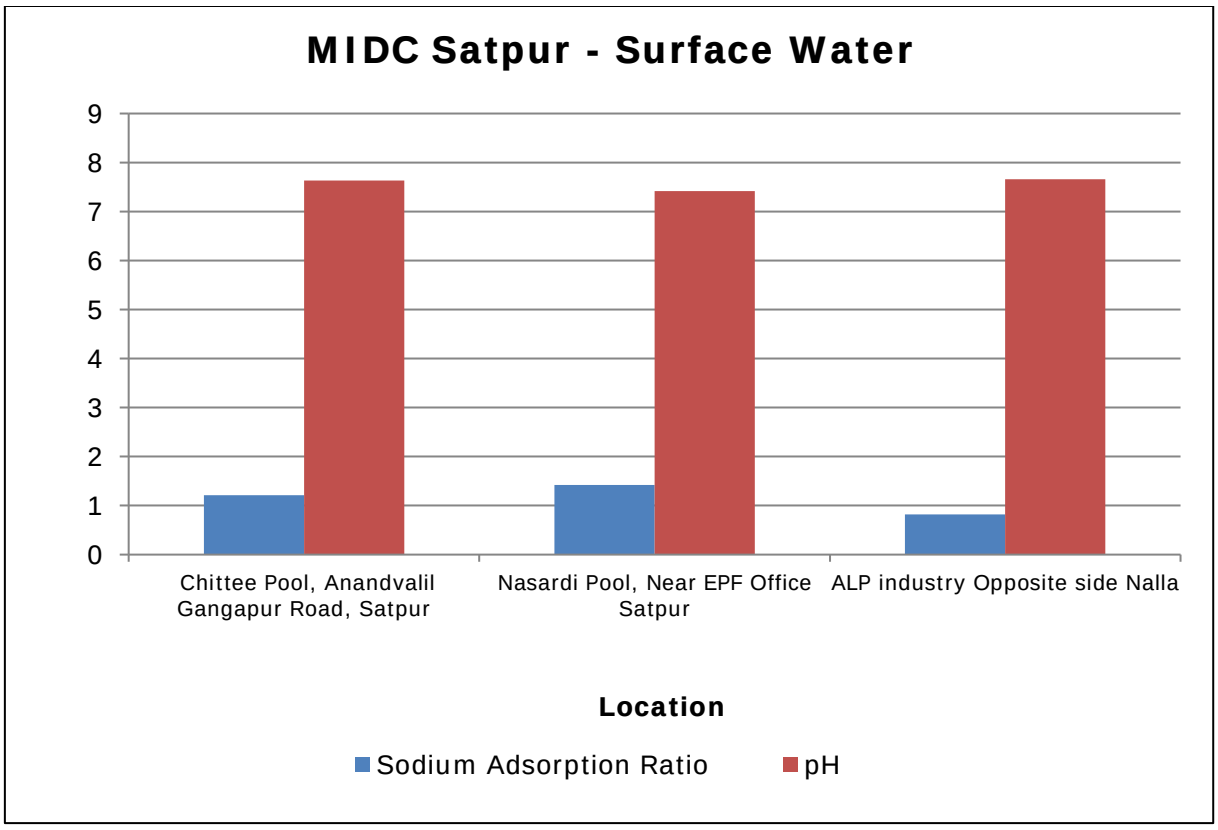
Parameters	Unit	Results		
		Sahid Arun Chittee Pool, Anandvalil Gangapur Road	Nasardi Pool, Near EPF Office Satpur	ALF industry Opposite side Nalla
Biochemical Oxygen Demand (3 days, 27°C)	mg/L	1.5	6.5	2
Electrical Conductivity (at 25 °C)	µmho/cm	728	945	1432
Nitrite Nitrogen (as NO_2)	mg/L	0.12	0.25	0.45
Nitrate Nitrogen (as NO_3)	mg/L	1.48	2.48	3.55
(NO_2 + NO_3)-Nitrogen	mg/L	1.52	2.64	4.00
Free Ammonia (as NH_3-N)	mg/L	BLQ	BLQ	BLQ
Free Residual Chlorine	mg/L	BLQ	BLQ	BLQ
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	0.7	0.9	1.33
Sulphide (as H_2S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	0.7	1.5	0.15
Sodium Adsorption Ratio	-	1.21	1.42	0.82
Total Coliforms	MPN Index/ 100 ml	847	1373	130
Faecal Coliforms	MPN Index/ 100 ml	25	612	97
Total Phosphate (as P)	mg/L	1.12	2.1	0.5
Total Kjeldahl Nitrogen (as N)	mg/L	0.41	1.75	0.89
Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	BLQ	0.31	0.14
Total Nitrogen	mg/L	1.92	4.40	4.89
Phenols (as C_6H_5OH)	mg/L	BLQ	BLQ	BLQ
Anionic Detergents (as MBAS Calculated as LAS, mol.wt.288.38)	µg/L	BLQ	BLQ	BLQ
Organo Chlorine Pesticides	mg/L	BLQ	BLQ	BLQ
Polynuclear aromatic hydrocarbons (as PAH)	mg/L	0.0001	BLQ	BLQ
Polychlorinated Biphenyls (PCB)	mg/L	BLQ	BLQ	BLQ
Zinc (as Zn)	mg/L	BLQ	0.19	0.8
Nickel (as Ni)	mg/L	0.016	0.021	0.014
Copper (as Cu)	mg/L	BLQ	0.022	BLQ
Hexavalent Chromium (as Cr^{6+})	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	BLQ	BLQ	BLQ
Total Arsenic (as As)	mg/L	BLQ	BLQ	BLQ
Lead (as Pb)	mg/L	0.013	BLQ	0.013

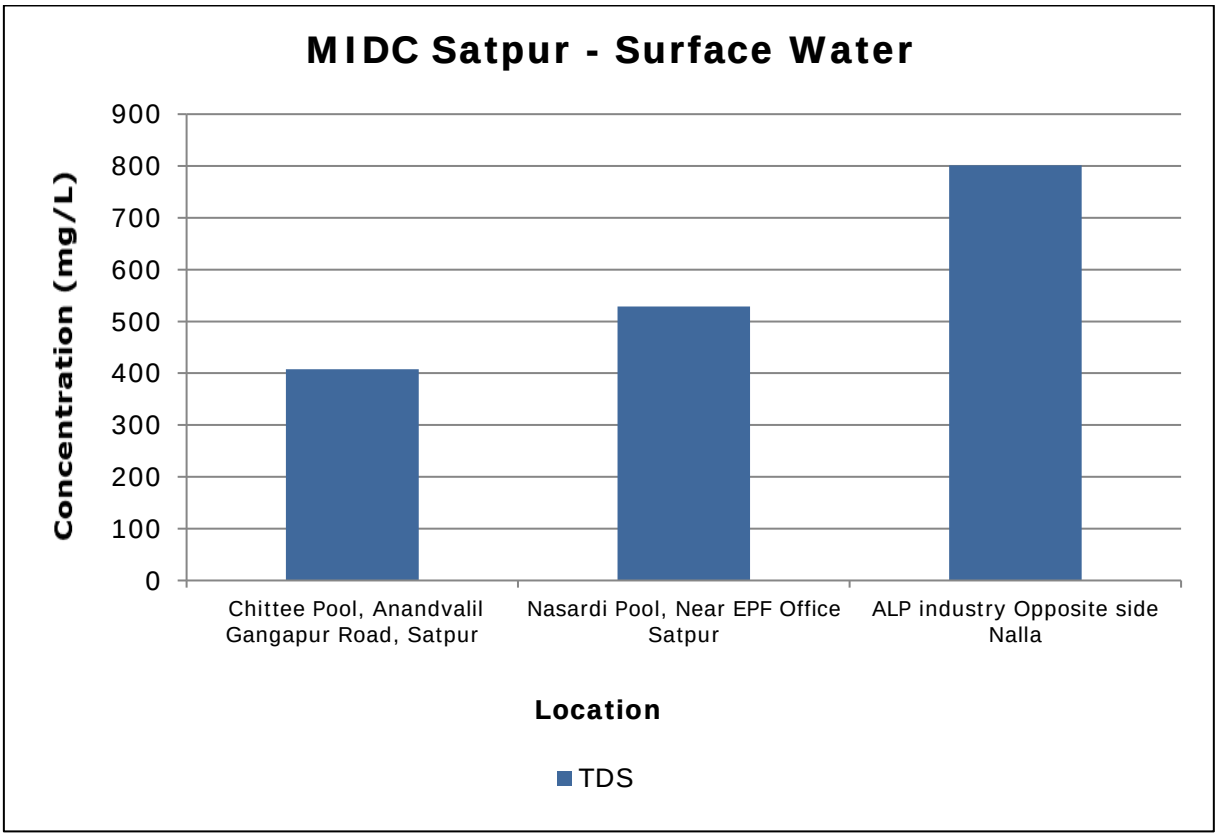
Parameters	Unit	Results		
		Sahid Arun Chittee Pool, Anandvalil Gangapur Road	Nasardi Pool, Near EPF Office Satpur	ALF industry Opposite side Nalla
Cadmium (as Cd)	mg/L	BLQ	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	0.25	0.094	0.04
Iron (as Fe)	mg/L	0.397	0.12	0.15
Vanadium (as V)	mg/L	0.029	0.032	0.01
Selenium (as Se)	mg/L	BLQ	BLQ	BLQ
Boron (as B)	mg/L	0.373	0.40	0.34
Bioassay Test on fish	% survival	100	53	67

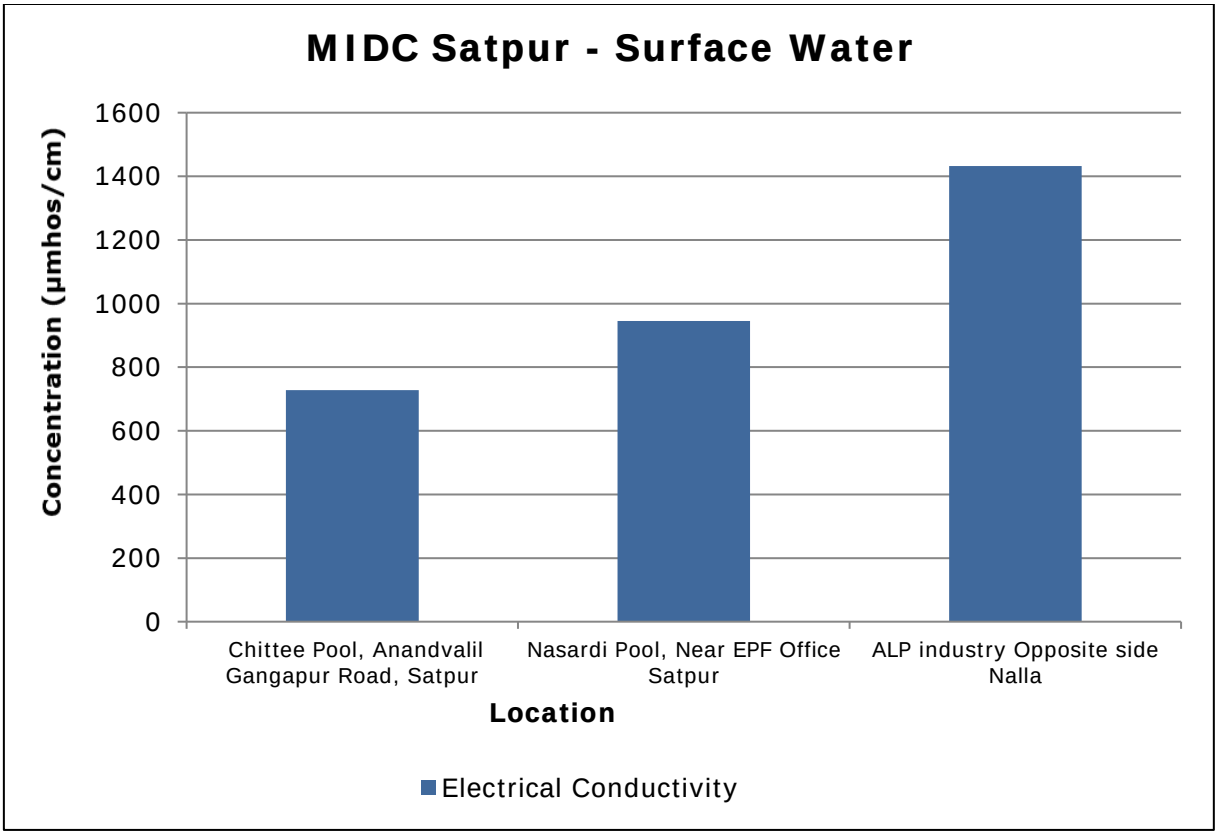
Graphs - Surface Water Quality of MIDC Satpur

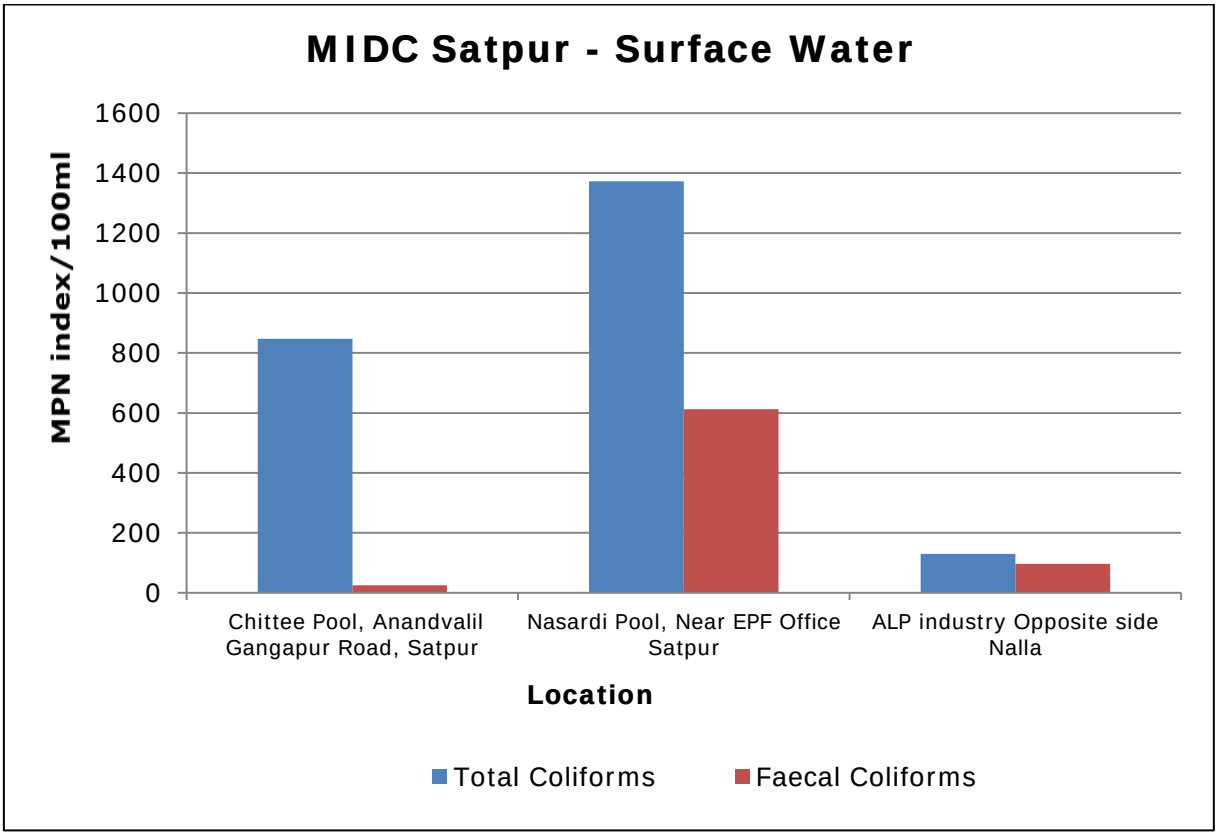


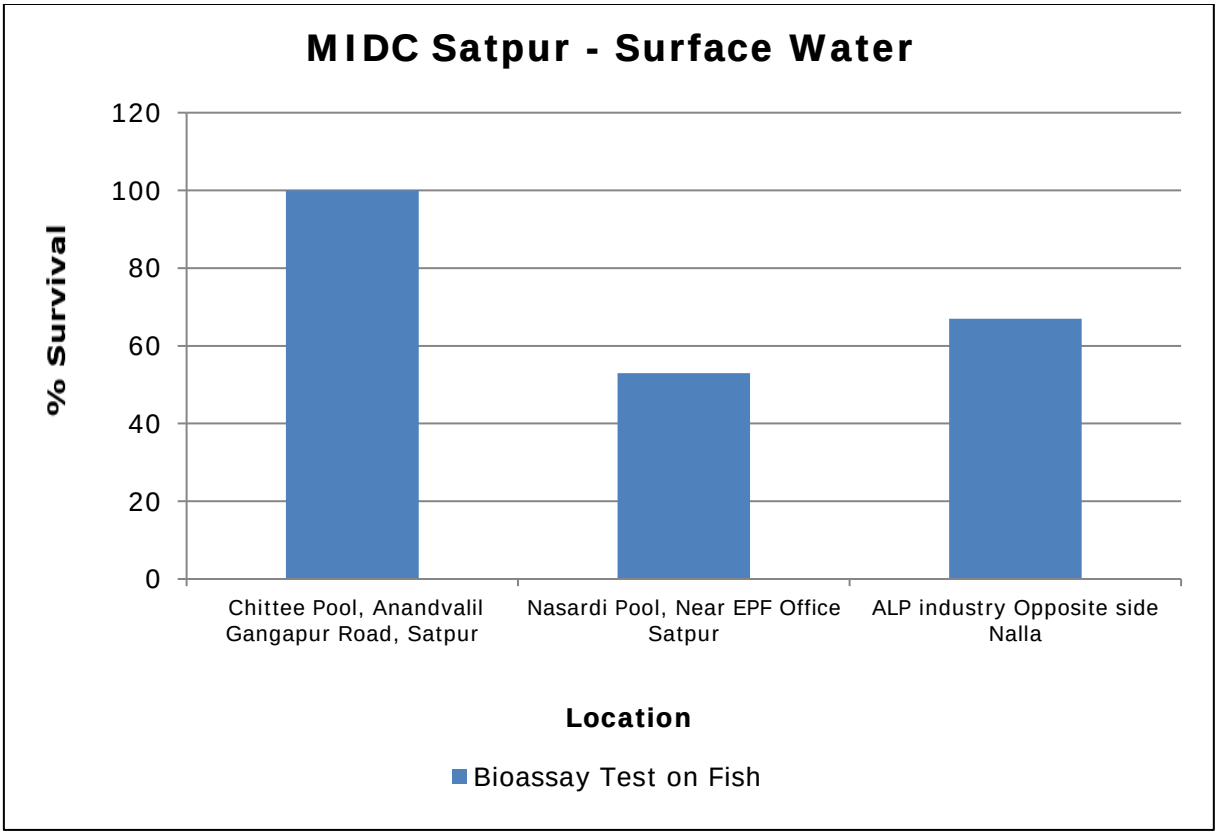



MIDC Satpur - Surface Water
9
8
7
6
5
4
3
2
1
0
Chittee Pool, Anandvalil Gangapur Road, Satpur
Nasardi Pool, Near EPF Office Satpur
ALP industry Opposite side Nalla
Location
Sodium Adsorption Ratio
pH


MIDC Satpur - Surface Water
Concentration (mg/L)
900
800
700
600
500
400
300
200
100
0
Chittee Pool, Anandvalil Gangapur Road, Satpur
Nasardi Pool, Near EPF Office Satpur
ALP industry Opposite side Nalla
Location
TDS


MIDC Satpur - Surface Water
Concentration (µmhos/cm)
1600
1400
1200
1000
800
600
400
200
0
Chittee Pool, Anandvalil Gangapur Road, Satpur
Nasardi Pool, Near EPF Office Satpur
ALP industry Opposite side Nalla
Location
Electrical Conductivity


MIDC Satpur - Surface Water
MPN index/100ml
1600
1400
1200
1000
800
600
400
200
0
Chittee Pool, Anandvalil Gangapur Road, Satpur
Nasardi Pool, Near EPF Office Satpur
ALP industry Opposite side Nalla
Location
Total Coliforms
Faecal Coliforms


MIDC Satpur - Surface Water
% Survival
120
100
80
60
40
20
0
Chittee Pool, Anandvalil Gangapur Road, Satpur
Nasardi Pool, Near EPF Office Satpur
ALP industry Opposite side Nalla
Location
Bioassay Test on Fish

LAND ENVIRONMENT

7. Land Environment

For studying the land Environment of Nashik area, ground water was collected from Bore well, open well and hand pumps. A total of 12 samples were collected.

1. **MIDC Ambad:**

- All six water samples collected are acceptable in general appearance, colour, smell and transparency.
- pH, suspended solids, Total Dissolved Solids and BOD are also well within the limits at all six samples collected.
- 100% survival was not achieved in Fish Bioassay in all 6 samples collected.
- Metals like Zinc, Copper, Hexavalent Chromium (Cr^{6+}), Total Arsenic, Lead, Cadmium, Mercury, Selenium etc. are observed either below limit of quantification or below their standard limits.
- Nickel, Total Chromium, Manganese and Iron are observed exceeded in few samples.
- Parameters like Free Residual Chlorine, Cyanide, Sulphide, Dissolved Phosphate, Total Ammonical Nitrogen and Phenolic compounds, also meet the criteria as prescribed by CPCB.
- Total Phosphate and Fluoride are exceeded in the few samples out of six samples collected.
- Polynuclear aromatic hydrocarbons (PAH) and Polychlorinated Biphenyls (PCB) are below the limit of quantification in all six samples collected.
- Organo Chlorine Pesticides are also below the limit of quantification in all six samples collected.

Table 7.1 MIDC Ambad - 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.	Hotel Tapovan Garvare Point (Bore well Water)	19°34'37.86"N	73°74'34.08"E	26.06.2024	28.06.2024	30.06.2024
2.	Shivaji Kachru Chavan, Gat No 154/3, Village Vilholi (Well Water)	19°95'75.31"N	73°75'45.12"E	26.06.2024	28.06.2024	30.06.2024
3.	Dashrath Pandit Nikam, Plot No. 4, Mauli Chowk, Datta Nagar, Village Chinchale (Bore well Water)	19°95'72.04"N	73°72'13.06"E	26.06.2024	28.06.2024	30.06.2024

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
4.	Pancharatna Farm, Maruti Sankul, Datta Nagar, Backside Kirloskar Oil India Pvt. Ltd. (Bore well Water)	19°95'14.02"N	73°72'88.58"E	26.06.2024	28.06.2024	30.06.2024
5.	Govind Vitthoba Shirsath, Sirshat Vasti, Ambad Gaon (Well Water)	19°95'31.15"N	73°73'89.06"E	26.06.2024	28.06.2024	30.06.2024
6.	Sai Eknath Park (Near Indoline Furniture) (Bore Well Water)	19°96'08.35"N	73°75'02.32"E	26.06.2024	28.06.2024	30.06.2024

Fig. Geographical Locations of Ground Water Sampling MIDC Ambad

Table 7.2 MIDC Ambad - Results of Ground Water

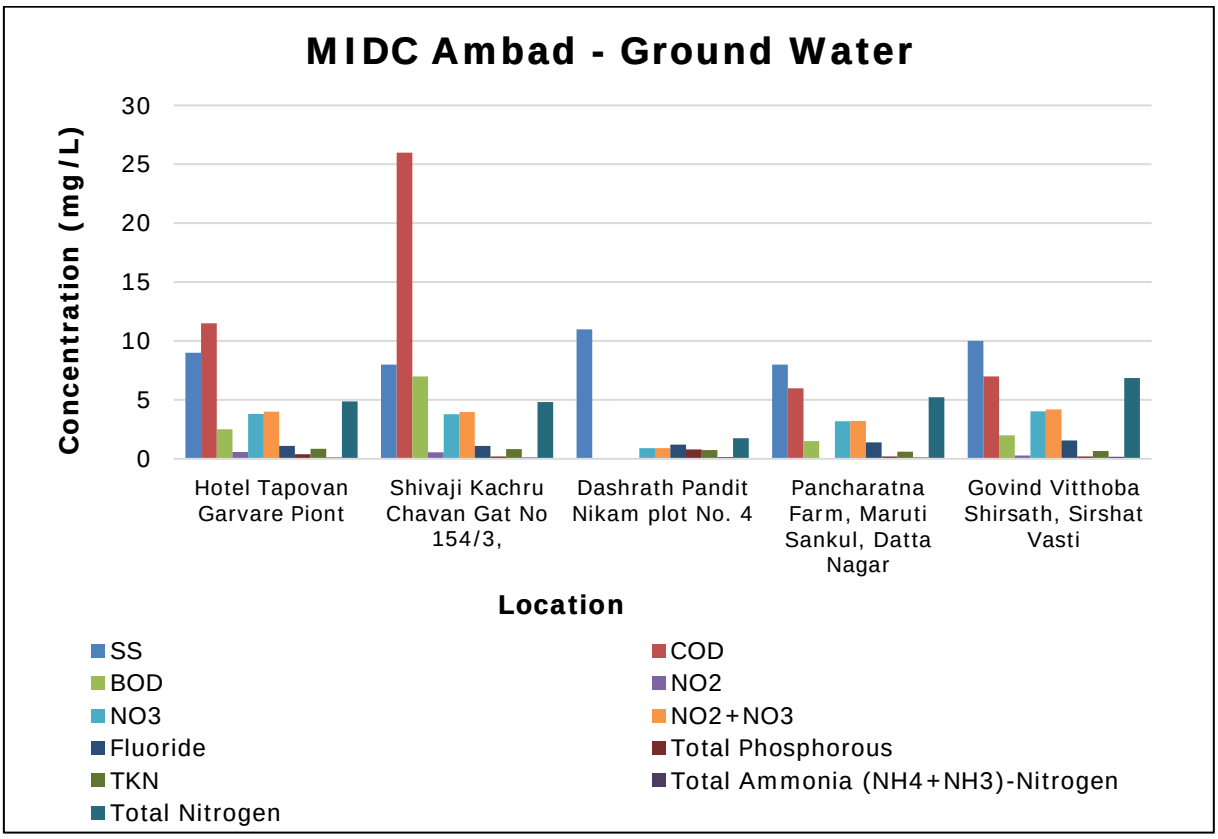
Parameters	Unit	Results		
		Hotel Tapovan Garvare Point (Bore well Water)	Shivaji Kachru Chavan, Gat No 154/3, Village Vilholi (Well Water)	Dashrath Pandit Nikam, Plot No. 4, Mauli Chowk, Datta Nagar, Village Chinchale (Bore well Water)
Sanitary Survey	-	Very Clean Neighbourhood and Catchment	Very Clean Neighbourhood and Catchment	Very Clean Neighbourhood and Catchment
General Appearance	-	Not Applicable	No Floating Matter	Not Applicable
Transparency	m	Not Applicable	0.3	Not Applicable
Temperature	^oC	25	25	25
Colour	Hazen	1	1	1
Odour	-	Agreeable	Agreeable	Agreeable
pH	-	7.81	7.76	7.79
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Suspended Solids	mg/L	9	8	11
Total Dissolved Solids	mg/L	672	685	715
Chemical Oxygen Demand	mg/L	11.5	26	BLQ
Biochemical Oxygen Demand (3 days, 27^oC)	mg/L	2.5	7	BLQ
Electrical Conductivity (at 25^oC)	µmhos/cm	1199	1223	1279
Nitrite Nitrogen (as NO_2)	mg/L	0.58	0.55	BLQ
Nitrate Nitrogen (as NO_3)	mg/L	3.81	3.80	0.905
(NO_2+ NO_3)-Nitrogen	mg/L	4.00	3.99	0.905
Free Ammonia (as NH_3-N)	mg/L	BLQ	BLQ	BLQ
Free Residual Chlorine	mg/L	BLQ	BLQ	BLQ
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	1.1	1.1	1.2
Sulphide (as H_2S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	0.14	0.2	0.2
Sodium Adsorption Ratio	-	1.07	1.41	0.68
Total Coliforms	MPN Index/ 100 ml	105	693	200
Faecal Coliforms	MPN Index/ 100 ml	17	120	176
Total Phosphate (as PO_4)	mg/L	0.4	0.2	0.8
Total Kjeldahl Nitrogen	mg/L	0.86	0.82	0.75
Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	0.13	0.13	0.15

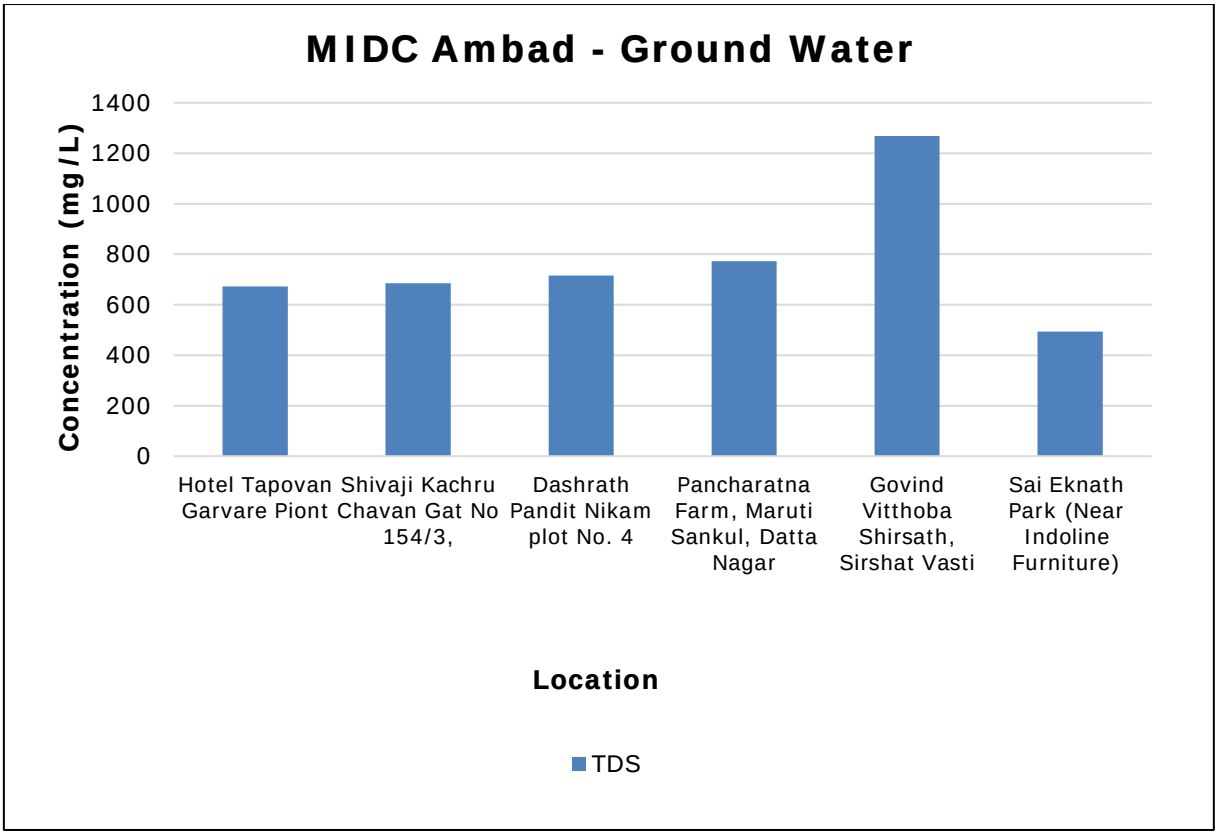
Parameters	Unit	Results		
		Hotel Tapovan Garvare Point (Bore well Water)	Shivaji Kachru Chavan, Gat No 154/3, Village Vilholi (Well Water)	Dashrath Pandit Nikam, Plot No. 4, Mauli Chowk, Datta Nagar, Village Chinchale (Bore well Water)
Total Nitrogen	mg/L	4.86	4.81	1.745
Phenols (as C_6H_5OH)	mg/L	BLQ	BLQ	BLQ
Anionic Detergents (as MBAS Calculated as LAS,mol.wt.288.38)	mg/L	BLQ	BLQ	BLQ
Organo Chlorine Pesticides	µg/L	BLQ	BLQ	BLQ
Polynuclear aromatic hydrocarbons (as PAH)	mg/L	BLQ	BLQ	BLQ
Polychlorinated Biphenyls (PCB)	mg/L	BLQ	BLQ	BLQ
Zinc (as Zn)	mg/L	0.146	0.144	0.083
Nickel (as Ni)	mg/L	0.037	0.217	0.023
Copper (as Cu)	mg/L	0.024	BLQ	BLQ
Hexavalent Chromium (as Cr^{6+})	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	BLQ	BLQ	BLQ
Total Arsenic (as As)	mg/L	BLQ	BLQ	0.005
Lead (as Pb)	mg/L	BLQ	BLQ	BLQ
Cadmium (as Cd)	mg/L	BLQ	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	0.07	1.27	0.05
Iron (as Fe)	mg/L	0.19	10.5	0.35
Vanadium (as V)	mg/L	0.03	0.03	0.02
Selenium (as Se)	mg/L	BLQ	0.006	0.005
Boron (as B)	mg/L	0.58	0.545	BLQ
Bioassay Test on fish	% survival	87	87	87

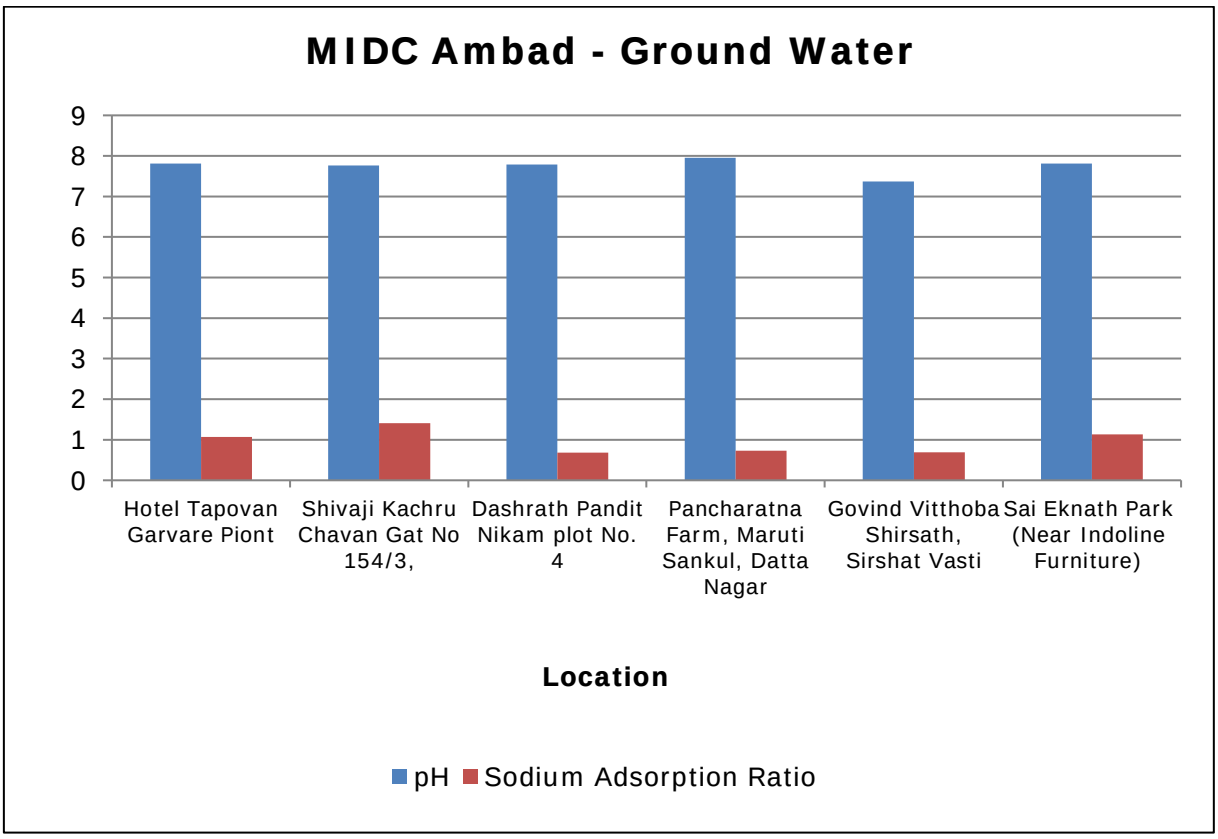
Parameters	Unit	Results		
		Pancharatna Farm, Maruti Sankul, Datta Nagar, Backside Kirloskar Oil India Pvt. Ltd. (Bore well Water)	Govind Vitthoba Shirsath, Sirshat Vasti, Ambad Gaon (Well Water)	Sai Eknath Park (Near Indoline Furniture) (Bore Well Water)
Sanitary Survey	-	Very Clean Neighbourhood and Catchment	Generally Clean Neighbourhood	Very Clean Neighbourhood and Catchment
General Appearance	-	Not Applicable	Floating Matter Evident	Not Applicable
Transparency	m	Not Applicable	0.1	Not Applicable
Temperature	^oC	24	25	25
Colour	Hazen	1	1	1
Odour	-	Agreeable	Agreeable	Agreeable
pH	-	7.95	7.37	7.81
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Suspended Solids	mg/L	8	10	8
Total Dissolved Solids	mg/L	772	1269	494
Chemical Oxygen Demand	mg/L	6	7	6
Biochemical Oxygen Demand (3 days, 27^oC)	mg/L	1.5	2	1.5
Electrical Conductivity (at 25^oC)	µmhos/cm	1379	2267	882
Nitrite Nitrogen (as NO_2)	mg/L	0.06	0.27	0.19
Nitrate Nitrogen (as NO_3)	mg/L	3.19	4.02	6.96
(NO_2+ NO_3)-Nitrogen	mg/L	3.21	4.20	7.07
Free Ammonia (as NH_3-N)	mg/L	BLQ	BLQ	BLQ
Free Residual Chlorine	mg/L	BLQ	BLQ	BLQ
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	1.4	1.57	1.1
Sulphide (as H_2S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	BLQ	0.16	0.4
Sodium Adsorption Ratio	-	0.73	0.69	1.13
Total Coliforms	MPN Index/ 100 ml	41	530	67
Faecal Coliforms	MPN Index/ 100 ml	6.8	127	130
Total Phosphate (as PO_4)	mg/L	0.2	0.2	0.8
Total Kjeldahl Nitrogen	mg/L	0.60	0.67	0.52
Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	0.13	0.16	BLQ

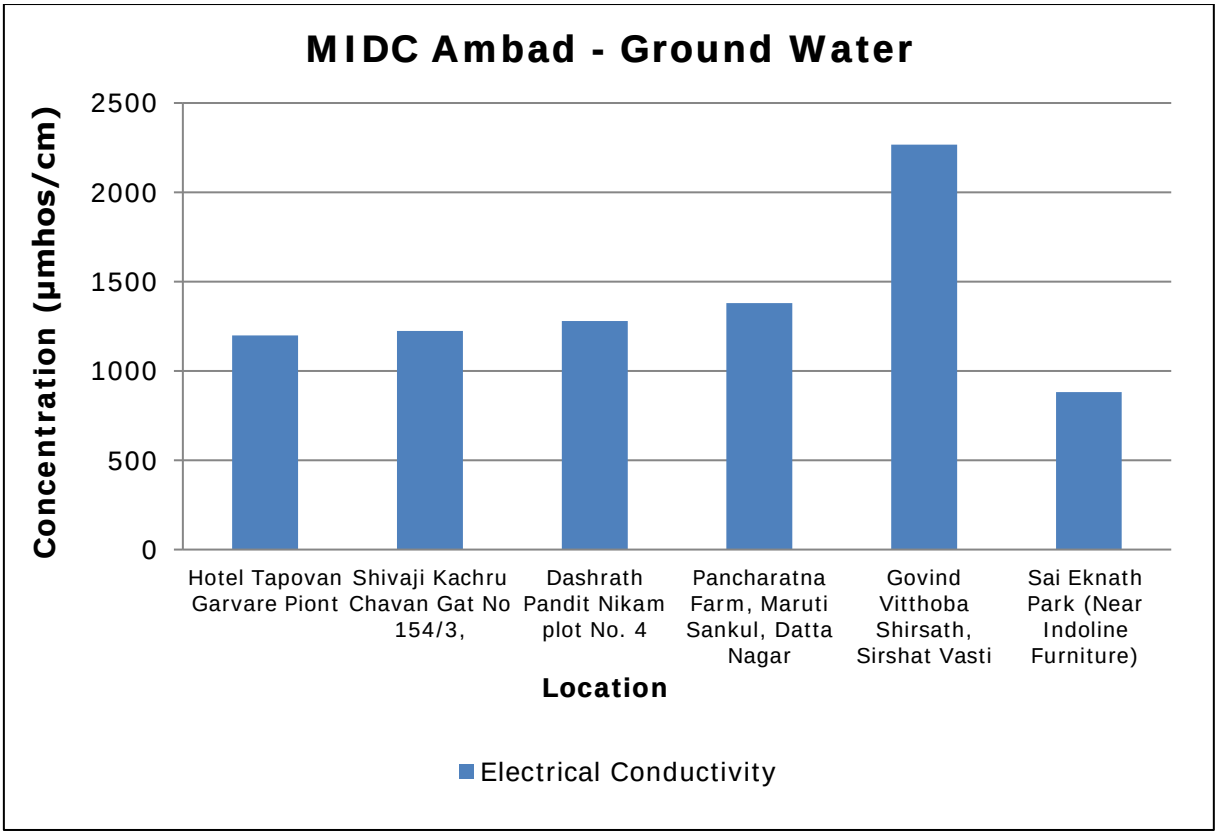
Parameters	Unit	Results		
		Pancharatna Farm, Maruti Sankul, Datta Nagar, Backside Kirloskar Oil India Pvt. Ltd. (Bore well Water)	Govind Vitthoba Shirsath, Sirshat Vasti, Ambad Gaon (Well Water)	Sai Eknath Park (Near Indoline Furniture) (Bore Well Water)
Total Nitrogen	mg/L	5.22	6.87	7.62
Phenols (as C_6H_5OH)	mg/L	BLQ	BLQ	BLQ
Anionic Detergents (as MBAS Calculated as LAS,mol.wt.288.38)	mg/L	BLQ	BLQ	BLQ
Organo Chlorine Pesticides	µg/L	BLQ	BLQ	BLQ
Polynuclear aromatic hydrocarbons (as PAH)	mg/L	0.00011	BLQ	BLQ
Polychlorinated Biphenyls (PCB)	mg/L	BLQ	BLQ	BLQ
Zinc (as Zn)	mg/L	BLQ	BLQ	BLQ
Nickel (as Ni)	mg/L	0.013	0.018	0.015
Copper (as Cu)	mg/L	BLQ	BLQ	BLQ
Hexavalent Chromium (as Cr^{6+})	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	0.514	BLQ	BLQ
Total Arsenic (as As)	mg/L	BLQ	BLQ	BLQ
Lead (as Pb)	mg/L	BLQ	BLQ	0.009
Cadmium (as Cd)	mg/L	BLQ	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	0.026	0.242	0.228
Iron (as Fe)	mg/L	0.116	0.507	0.47
Vanadium (as V)	mg/L	BLQ	0.028	0.026
Selenium (as Se)	mg/L	0.009	0.007	BLQ
Boron (as B)	mg/L	2.07	0.46	0.28
Bioassay Test on fish	% survival	73	67	87

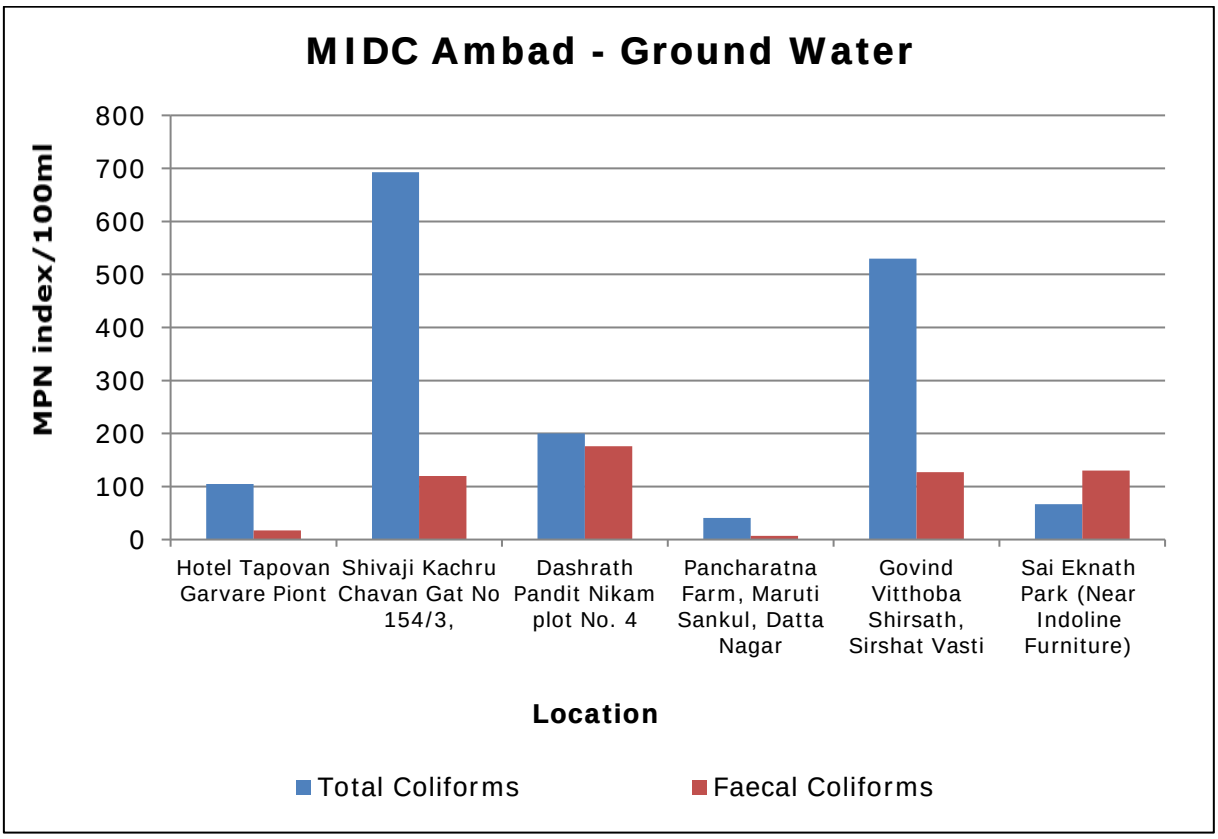
Graph - Ground Water Quality Monitoring for MIDC Ambad

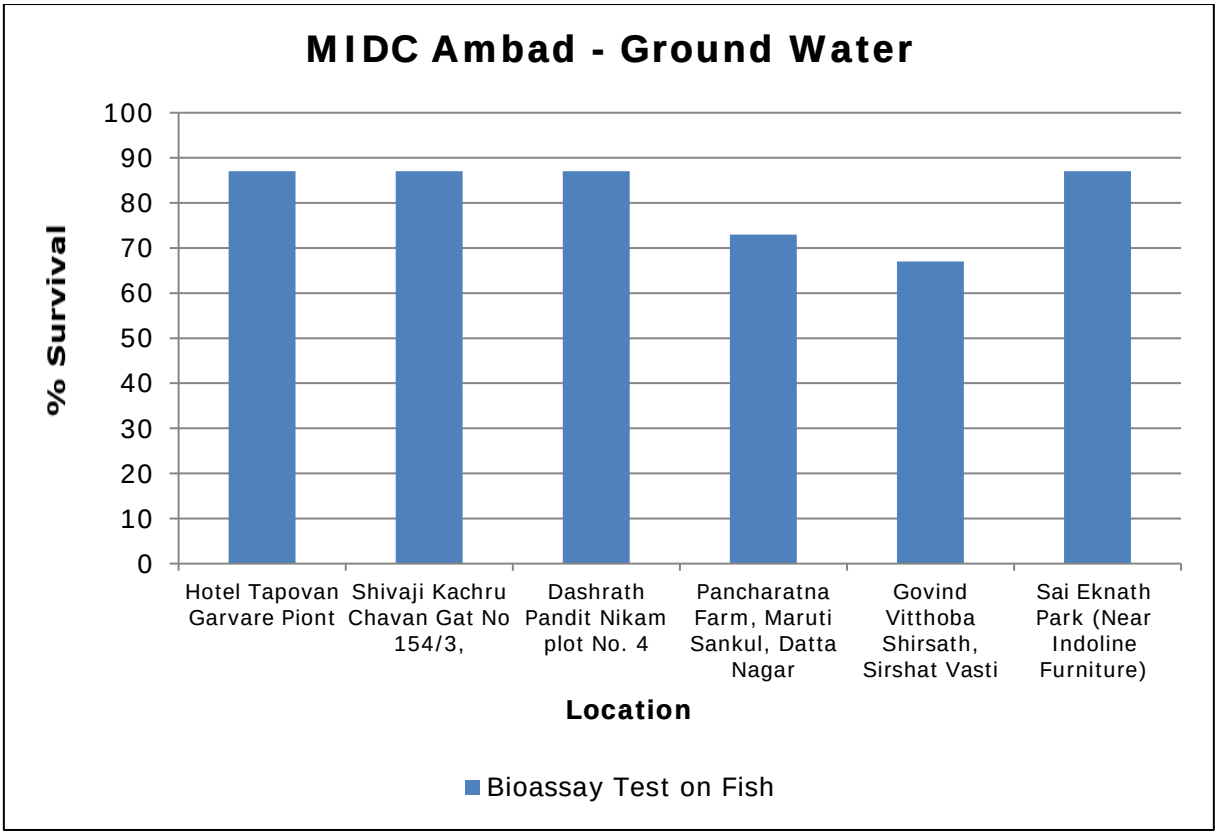





MIDC Ambad - Ground Water
9
8
7
6
5
4
3
2
1
0
Hotel Tapovan Garvare Piont
Shivaji Kachru Chavan Gat No 154/3,
Dashrath Pandit Nikam plot No. 4
Pancharatna Farm, Maruti Sankul, Datta Nagar
Govind Vitthoba Shirsath, Sirshat Vasti
Sai Eknath Park (Near Indoline Furniture)
Location
pH
Sodium Adsorption Ratio


MIDC Ambad - Ground Water
Concentration (µmhos/cm)
2500
2000
1500
1000
500
0
Hotel Tapovan Garvare Piont
Shivaji Kachru Chavan Gat No 154/3,
Dashrath Pandit Nikam plot No. 4
Pancharatna Farm, Maruti Sankul, Datta Nagar
Govind Vitthoba Shirsath, Sirshat Vasti
Sai Eknath Park (Near Indoline Furniture)
Location
Electrical Conductivity


MIDC Ambad - Ground Water
MPN index/100ml
800
700
600
500
400
300
200
100
0
Hotel Tapovan Garvare Piont
Shivaji Kachru Chavan Gat No 154/3,
Dashrath Pandit Nikam plot No. 4
Pancharatna Farm, Maruti Sankul, Datta Nagar
Govind Vitthoba Shirsath, Sirshat Vasti
Sai Eknath Park (Near Indoline Furniture)
Location
Total Coliforms
Faecal Coliforms


MIDC Ambad - Ground Water
% Survival
100
90
80
70
60
50
40
30
20
10
0
Hotel Tapovan Garvare Piont
Shivaji Kachru Chavan Gat No 154/3,
Dashrath Pandit Nikam plot No. 4
Pancharatna Farm, Maruti Sankul, Datta Nagar
Govind Vitthoba Shirsath, Sirshat Vasti
Sai Eknath Park (Near Indoline Furniture)
Location
Bioassay Test on Fish

2. MIDC Satpur:

- All six water samples collected are acceptable in general appearance, colour, smell and transparency.
- pH, suspended solids and total dissolved solids are also well within the limits at all six samples collected.
- BOD and Total Phosphate exceeds in one sample out of six samples.
- 100% survival was achieved in Fish Bioassay in one sample out of six samples collected.
- All metals like Zinc, Copper, Hexavalent Chromium (Cr^{6+}), Total Chromium, Total Arsenic, Lead, Cadmium, Mercury, etc. are observed either below limit of quantification or below their standard limits.
- Nickel, Manganese and Iron exceeds in few samples
- Parameters like Total Residual Chlorine, Cyanide, Fluoride, Sulphide, Dissolved Phosphate, Total Ammonical Nitrogen and Phenolic compounds also meet the criteria as prescribed by CPCB.
- Polynuclear aromatic hydrocarbons (PAH) and Polychlorinated Biphenyls (PCB) are below the limit of quantification in all six samples collected.
- Organo Chlorine Pesticides are also below the limit of quantification in all six samples collected.

Table 7.3 MIDC Satpur - 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.	Ramesh Chandra Kale, Near ESI Hospital Bore Well Water)	19°99'0.94"N	73°71'12.79"E	26.06.2024	28.06.2024	30.06.2024
2.	Seva Developers Pvt. Ltd. (Bore Well Water)	20°00'29.42"N	73°74'96.97"E	26.06.2024	28.06.2024	30.06.2024
3.	Shivaji Nagar, Shushila Hospital, Plot No 55/6 (Bore Well Water)	20°00'16.34"N	73°71'12.79"E	26.06.2024	28.06.2024	30.06.2024
4.	Shradha Farmhouse, Shardha Motors (Back Side) (Well Water)	20°00'5.16"N	73°72'69.48"E	26.06.2024	28.06.2024	30.06.2024

Sr. No.	Name of Monitoring Location	Latitude	Longitude	Date of Sampling		
				Round-1	Round-2	Round-3
5.	Amit Deelip Yadav, Plot No 50, Ganesh Nagar (Bore Well Water)	20°00'57.45"N	73°73'80.03"E	26.06.2024	28.06.2024	30.06.2024
6.	Virshab Industries Back Side, Vanvihar Colony (Bore Well Water)	20°00'57.45"N	73°73'80.03"E	26.06.2024	28.06.2024	30.06.2024

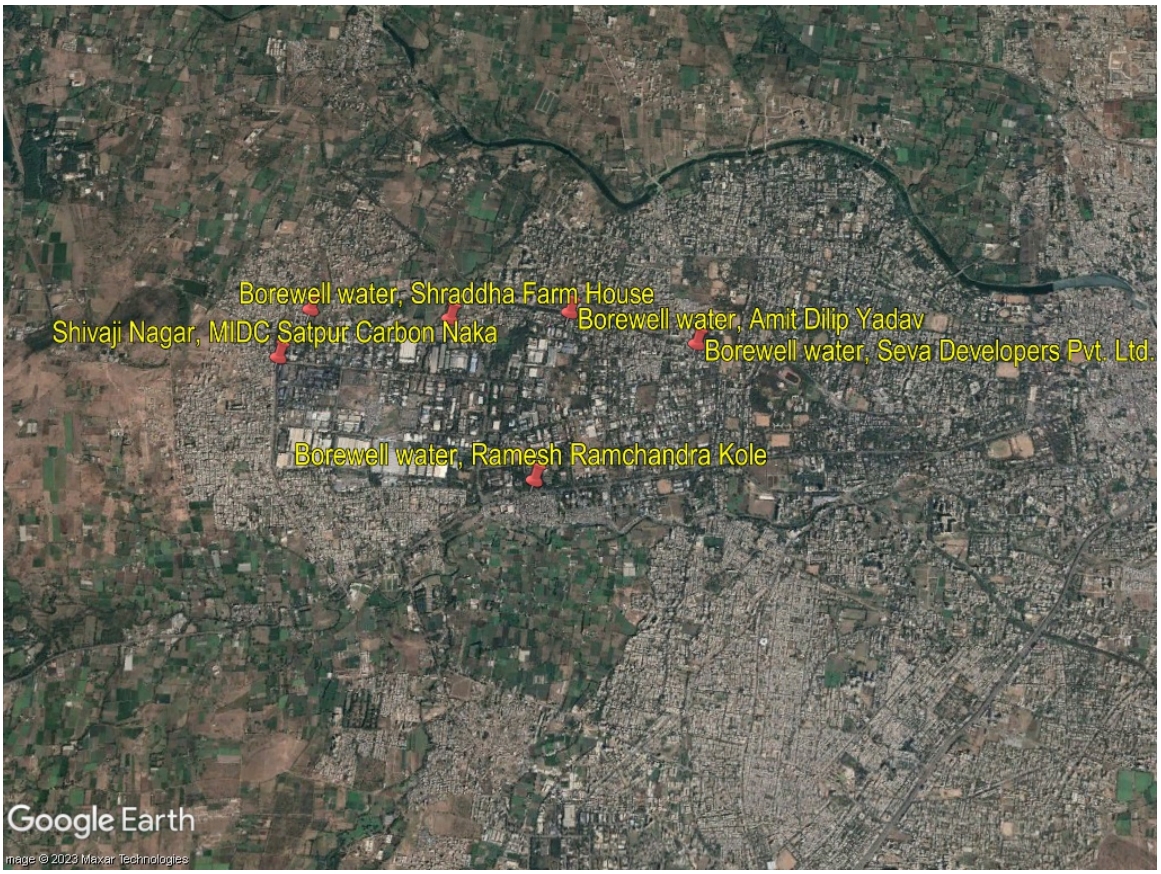


Fig. Geographical Locations of Ground Water Sampling MIDC Satpur

Table 7.4 MIDC Satpur - Results of Ground Water

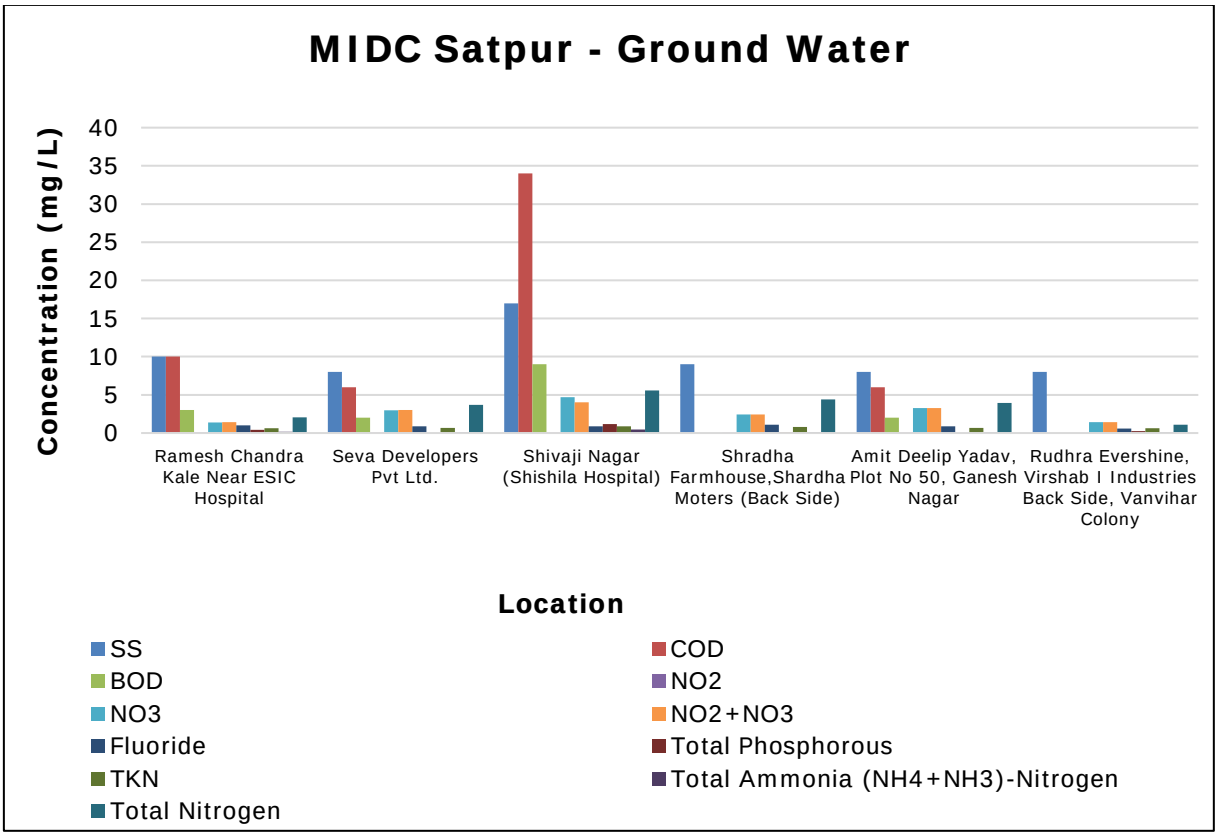
Parameters	Unit	Results		
		Ramesh Chandra Kale Near ESI Hospital, Satpur (Bore Well Water)	Seva Developers Pvt. Ltd., Satpur (Bore Well Water)	Shivaji Nagar (Shishila Hospital), Plot No 55/6, Satpur Carbon Naka) (Bore Well Water)
Sanitary Survey	-	Very Clean Neighbourhood and Catchment	Very Clean Neighbourhood and Catchment	Very Clean Neighbourhood and Catchment
General Appearance	-	Not Applicable	Not Applicable	Not Applicable
Transparency	M	Not Applicable	Not Applicable	Not Applicable
Temperature	^oC	25	26	25
Colour	Hazen	1	1	1
Odour	-	Agreeable	Agreeable	Agreeable
pH	-	7.92	7.03	7.82
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Suspended Solids	mg/L	10	8	17
Total Dissolved Solids	mg/L	621	444	487
Chemical Oxygen Demand	mg/L	10	6	34
Biochemical Oxygen Demand (3 days, 27^oC)	mg/L	3	2	9
Electrical Conductivity (at 25^oC)	µmhos/cm	1110	1060	870
Nitrite Nitrogen (as NO_2)	mg/L	0.09	0.045	0.06
Nitrate Nitrogen (as NO_3)	mg/L	1.37	2.99	4.68
(NO_2+ NO_3)-Nitrogen	mg/L	1.43	3.02	4.04
Free Ammonia (as NH_3-N)	mg/L	BLQ	BLQ	BLQ
Free Residual Chlorine	mg/L	0.1	BLQ	BLQ
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	1.0	0.9	0.9
Sulphide (as H_2S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	BLQ	BLQ	2.6
Sodium Adsorption Ratio	-	0.86	0.97	1.0
Total Coliforms	MPN Index/ 100 ml	271	380	214
Faecal Coliforms	MPN Index/ 100 ml	20	184	25
Total Phosphate (as PO_4)	mg/L	0.40	BLQ	1.17
Total Kjeldahl Nitrogen	mg/L	0.64	0.67	0.86
Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	0.16	0.13	0.47
Total Nitrogen	mg/L	2.06	3.69	5.56

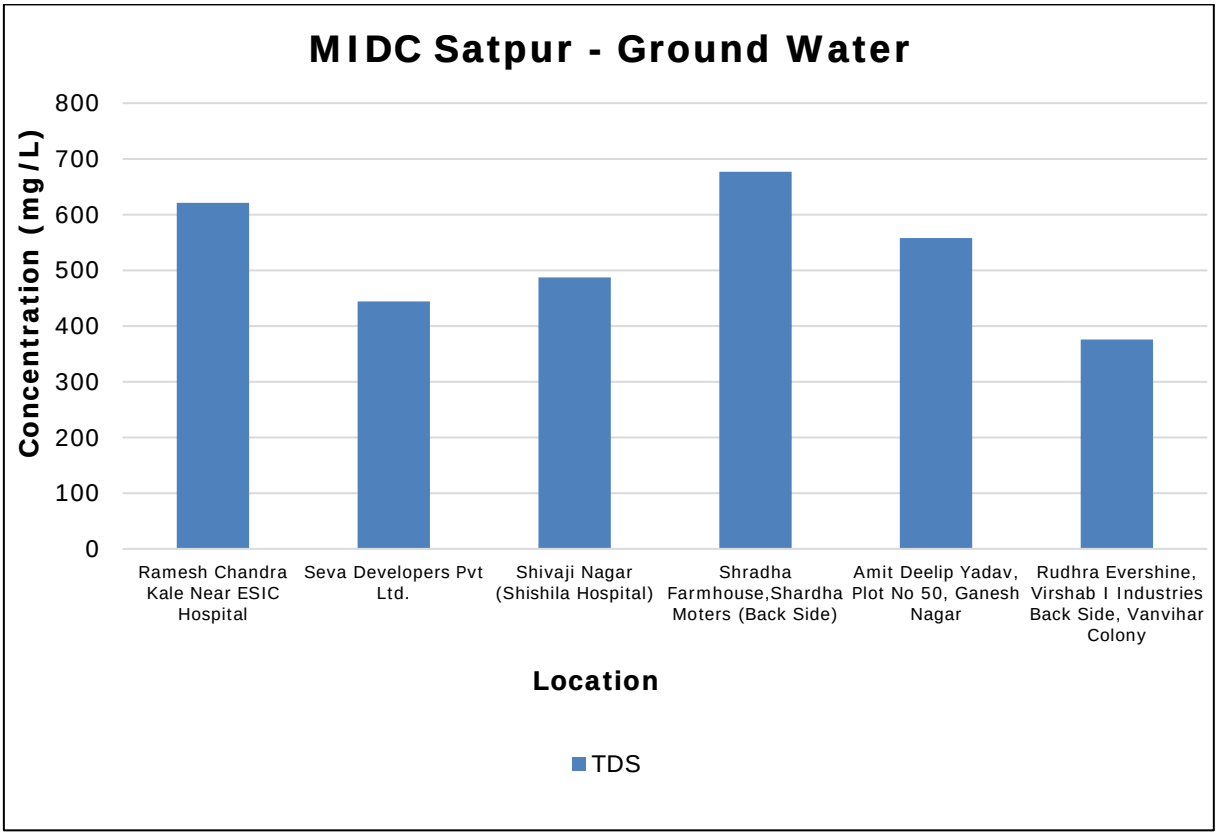
Parameters	Unit	Results		
		Ramesh Chandra Kale Near ESI Hospital, Satpur (Bore Well Water)	Seva Developers Pvt. Ltd., Satpur (Bore Well Water)	Shivaji Nagar (Shishila Hospital), Plot No 55/6, Satpur Carbon Naka) (Bore Well Water)
Phenols (as C_6H_5OH)	mg/L	BLQ	BLQ	BLQ
Anionic Detergents (as MBAS Calculated as LAS,mol.wt.288.38)	mg/L	BLQ	BLQ	BLQ
Organo Chlorine Pesticides	µg/L	BLQ	BLQ	BLQ
Polynuclear aromatic hydrocarbons (as PAH)	mg/L	BLQ	BLQ	BLQ
Polychlorinated Biphenyls (PCB)	mg/L	BLQ	BLQ	BLQ
Zinc (as Zn)	mg/L	0.11	BLQ	0.12
Nickel (as Ni)	mg/L	BLQ	BLQ	0.06
Copper (as Cu)	mg/L	BLQ	BLQ	0.03
Hexavalent Chromium (as Cr^{6+})	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	BLQ	BLQ	0.024
Total Arsenic (as As)	mg/L	BLQ	BLQ	BLQ
Lead (as Pb)	mg/L	BLQ	BLQ	0.009
Cadmium (as Cd)	mg/L	BLQ	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	0.03	BLQ	0.167
Iron (as Fe)	mg/L	0.37	0.284	0.23
Vanadium (as V)	mg/L	0.016	0.01	BLQ
Selenium (as Se)	mg/L	BLQ	BLQ	BLQ
Boron (as B)	mg/L	0.22	0.35	0.168
Bioassay Test on fish	% survival	73	73	67

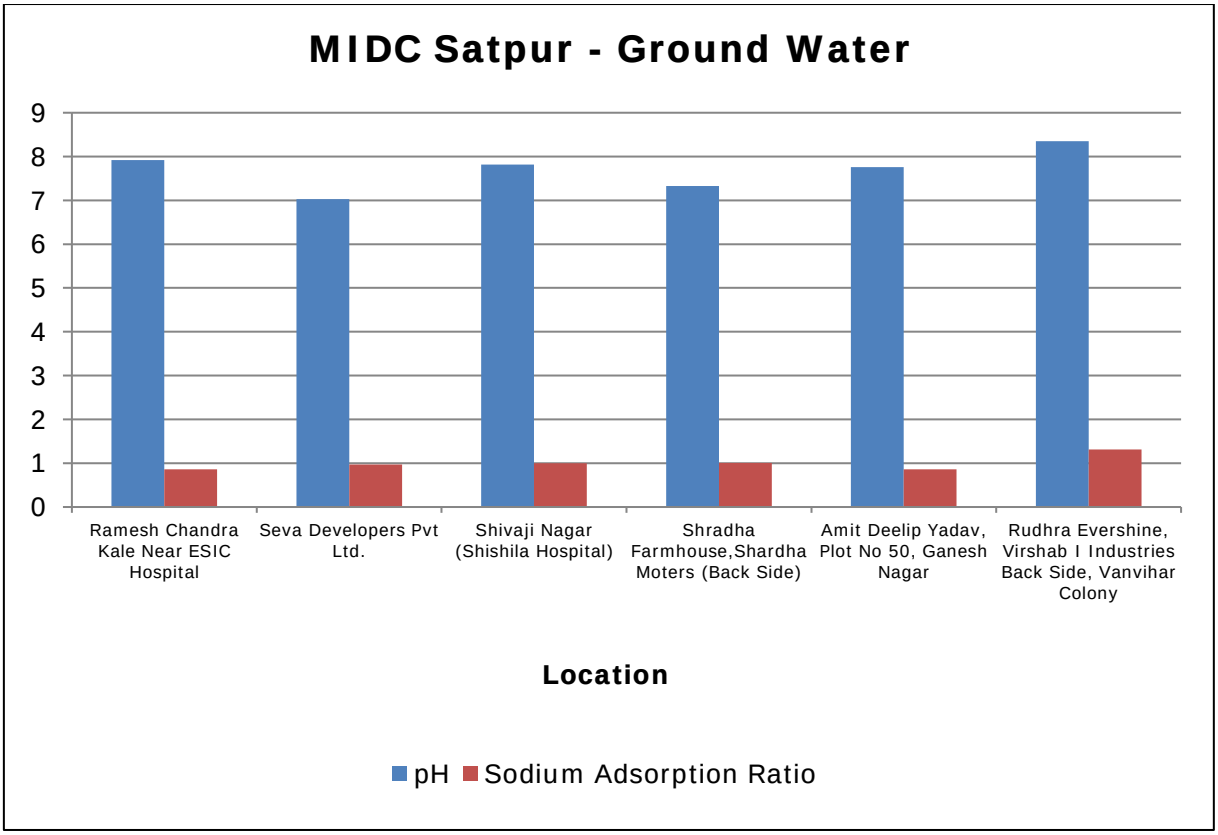
Parameters	Unit	Results		
		Shradha Farmhouse, Shardha Moters (Back Side) MIDC Satpur (Well Water)	Amit Deelip Yadav, Plot No 50, Ganesh Nagar, Satpur (Bore Well Water)	Rudhra Evershine, Virshab I Industries Back Side, Vanvihar Colony, Satpur (Bore Well Water)
Sanitary Survey	-	Very Clean Neighbourhood and Catchment	Very Clean Neighbourhood and Catchment	Very Clean Neighbourhood and Catchment

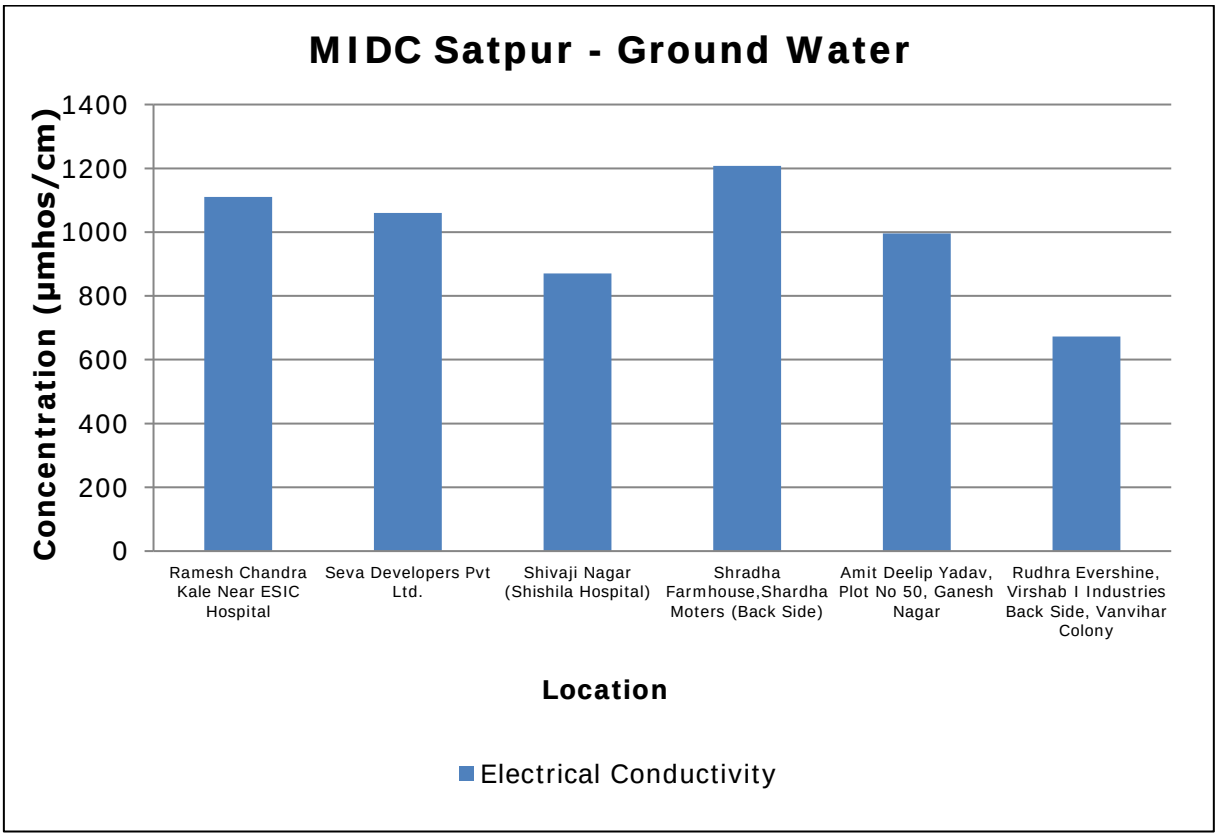
Parameters	Unit	Results		
		Shradha Farmhouse, Shardha Moters (Back Side) MIDC Satpur (Well Water)	Amit Deelip Yadav, Plot No 50, Ganesh Nagar, Satpur (Bore Well Water)	Rudhra Evershine, Virshab I Industries Back Side, Vanvihar Colony, Satpur (Bore Well Water)
General Appearance	-	Floating matter Evident	Not Applicable	Not Applicable
Transparency	M	0.3	Not Applicable	Not Applicable
Temperature	^{o}C	25	25	25
Colour	Hazen	1	1	1
Odour	-	Agreeable	Agreeable	Agreeable
pH	-	7.33	7.76	8.35
Oil & Grease	mg/L	BLQ	BLQ	BLQ
Suspended Solids	mg/L	9	8	8
Total Dissolved Solids	mg/L	677	558	376
Chemical Oxygen Demand	mg/L	BLQ	6	BLQ
Biochemical Oxygen Demand (3 days, 27^{o}C)	mg/L	BLQ	2	BLQ
Electrical Conductivity (at 25^{o}C)	µmhos/cm	1208	996	673
Nitrite Nitrogen (as NO_2)	mg/L	0.05	0.04	BLQ
Nitrate Nitrogen (as NO_3)	mg/L	2.42	3.25	1.42
(NO_2+ NO_3)-Nitrogen	mg/L	2.43	3.27	1.42
Free Ammonia (as NH_3-N)	mg/L	BLQ	BLQ	BLQ
Free Residual Chlorine	mg/L	BLQ	BLQ	BLQ
Cyanide (as CN)	mg/L	BLQ	BLQ	BLQ
Fluoride (as F)	mg/L	1.1	0.9	0.6
Sulphide (as H_2S)	mg/L	BLQ	BLQ	BLQ
Dissolved Phosphate (as P)	mg/L	0.1	BLQ	BLQ
Sodium Adsorption Ratio	-	1.01	0.86	1.31
Total Coliforms	MPN Index/ 100 ml	595	82	851
Faecal Coliforms	MPN Index/ 100 ml	806	18	326
Total Phosphate (as PO_4)	mg/L	0.12	BLQ	0.24
Total Kjeldahl Nitrogen	mg/L	0.78	0.67	0.63
Total Ammonia (NH_4+NH_3)-Nitrogen	mg/L	0.11	0.13	0.14
Total Nitrogen	mg/L	4.4	3.94	1.10
Phenols (as C_6H_5OH)	mg/L	BLQ	BLQ	BLQ

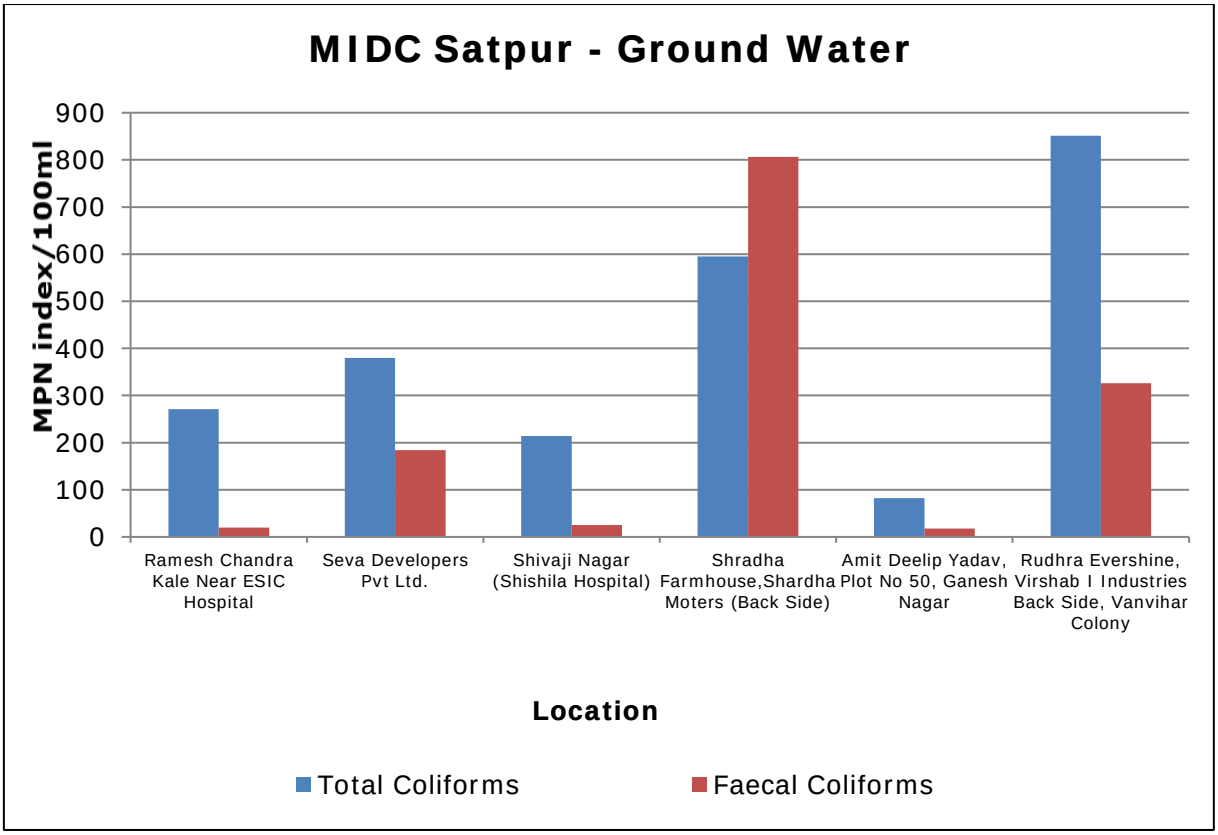
Parameters	Unit	Results		
		Shradha Farmhouse, Shardha Moters (Back Side) MIDC Satpur (Well Water)	Amit Deelip Yadav, Plot No 50, Ganesh Nagar, Satpur (Bore Well Water)	Rudhra Evershine, Virshab I Industries Back Side, Vanvihar Colony, Satpur (Bore Well Water)
Anionic Detergents (as MBAS Calculated as LAS,mol.wt.288.38)	mg/L	BLQ	BLQ	BLQ
Organo Chlorine Pesticides	µg/L	BLQ	BLQ	BLQ
Polynuclear aromatic hydrocarbons (as PAH)	mg/L	BLQ	BLQ	BLQ
Polychlorinated Biphenyls (PCB)	mg/L	BLQ	BLQ	BLQ
Zinc (as Zn)	mg/L	BLQ	BLQ	BLQ
Nickel (as Ni)	mg/L	0.013	0.012	BLQ
Copper (as Cu)	mg/L	BLQ	BLQ	BLQ
Hexavalent Chromium (as Cr^{6+})	mg/L	BLQ	BLQ	BLQ
Total Chromium (as Cr)	mg/L	BLQ	BLQ	BLQ
Total Arsenic (as As)	mg/L	BLQ	BLQ	BLQ
Lead (as Pb)	mg/L	BLQ	BLQ	BLQ
Cadmium (as Cd)	mg/L	BLQ	BLQ	BLQ
Mercury (as Hg)	mg/L	BLQ	BLQ	BLQ
Manganese (as Mn)	mg/L	0.302	0.33	BLQ
Iron (as Fe)	mg/L	0.281	0.321	0.203
Vanadium (as V)	mg/L	0.02	0.024	0.01
Selenium (as Se)	mg/L	BLQ	0.007	BLQ
Boron (as B)	mg/L	0.56	0.440	BLQ
Bioassay Test on fish	% survival	67	67	100

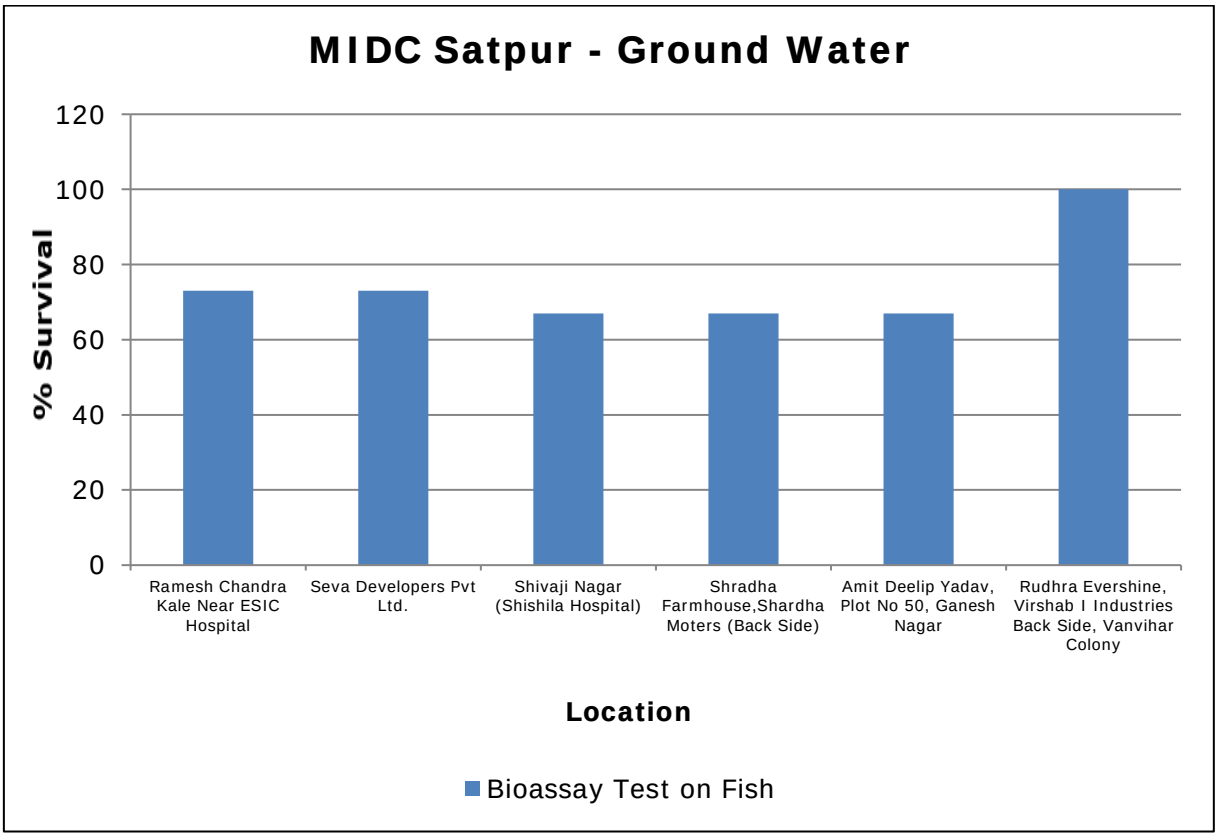

MIDC Satpur - Ground Water
Concentration (mg/L)
40
35
30
25
20
15
10
5
0
Ramesh Chandra Kale Near ESIC Hospital
Seva Developers Pvt Ltd.
Shivaji Nagar (Shishila Hospital)
Shradha Farmhouse,Shardha Moters (Back Side)
Amit Deelip Yadav, Plot No 50, Ganesh Nagar
Rudhra Evershine, Virshab I Industries Back Side, Vanvihar Colony
Location
SS
COD
BOD
NO2
NO3
NO2+NO3
Fluoride
Total Phosphorous
TKN
Total Ammonia (NH4+NH3)-Nitrogen
Total Nitrogen


MIDC Satpur - Ground Water
Concentration (mg/L)
800
700
600
500
400
300
200
100
0
Ramesh Chandra Kale Near ESIC Hospital
Seva Developers Pvt Ltd.
Shivaji Nagar (Shishila Hospital)
Shradha Farmhouse,Shardha Moters (Back Side)
Amit Deelip Yadav, Plot No 50, Ganesh Nagar
Rudhra Evershine, Virshab I Industries Back Side, Vanvihar Colony
Location
TDS


MIDC Satpur - Ground Water
9
8
7
6
5
4
3
2
1
0
Ramesh Chandra Kale Near ESIC Hospital
Seva Developers Pvt Ltd.
Shivaji Nagar (Shishila Hospital)
Shradha Farmhouse,Shardha Moters (Back Side)
Amit Deelip Yadav, Plot No 50, Ganesh Nagar
Rudhra Evershine, Virshab I Industries Back Side, Vanvihar Colony
Location
pH
Sodium Adsorption Ratio


MIDC Satpur - Ground Water
Concentration (µmhos/cm)
1400
1200
1000
800
600
400
200
0
Ramesh Chandra Kale Near ESIC Hospital
Seva Developers Pvt Ltd.
Shivaji Nagar (Shishila Hospital)
Shradha Farmhouse,Shardha Moters (Back Side)
Amit Deelip Yadav, Plot No 50, Ganesh Nagar
Rudhra Evershine, Virshab I Industries Back Side, Vanvihar Colony
Location
Electrical Conductivity


MIDC Satpur - Ground Water
MPN index/100ml
900
800
700
600
500
400
300
200
100
0
Ramesh Chandra Kale Near ESIC Hospital
Seva Developers Pvt Ltd.
Shivaji Nagar (Shishila Hospital)
Shradha Farmhouse,Shardha Moters (Back Side)
Amit Deelip Yadav, Plot No 50, Ganesh Nagar
Rudhra Evershine, Virshab I Industries Back Side, Vanvihar Colony
Location
Total Coliforms
Faecal Coliforms


MIDC Satpur - Ground Water
% Survival
120
100
80
60
40
20
0
Ramesh Chandra Kale Near ESIC Hospital
Seva Developers Pvt Ltd.
Shivaji Nagar (Shishila Hospital)
Shradha Farmhouse,Shardha Moters (Back Side)
Amit Deelip Yadav, Plot No 50, Ganesh Nagar
Rudhra Evershine, Virshab I Industries Back Side, Vanvihar Colony
Location
Bioassay Test on Fish

C: Receptor

Component C (Impact on Human Health)	
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 early warning tool which helps in 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	3.5	1	3.5	1.5	0	5	**10.00**
Water Index	2.75	1	2.75	45.5	0	5	**53.25**
Land Index	1.50	1	1.50	38.5	0	5	**45.00**
						Aggregated CEPI	**55.35**

Table 8.2 Comparison of CEPI Scores

	Air Index	Water Index	Land Index	CEPI
CEPI Score June 2024	10.00	53.25	45.00	**55.35**
CEPI Score March 2024	17.00	46.75	22.00	**48.74**
CEPI Score June 2023	22.75	52.50	44.25	**57.28**
CEPI Score March 2023	32.50	52.50	42.80	**59.10**
CEPI Score June 2021	20.00	46.00	48.30	**53.10**
CEPI Score March 2021	33.30	46.00	27.00	**50.90**
CEPI score March 2020	50.00	32.80	37.80	**56.20**
CEPI score June 2019	36.30	43.30	40.60	**47.49**
CEPI score March 2019	35.50	42.70	38.50	**46.10**

CEPI score June 2018	39.00	31.00	41.30	**46.80**
CEPI score March 2018	26.98	31.81	30.10	**33.96**
CPCB CEPI score March 2018	56.50	60.00	42.00	**69.49**

The result shows that CEPI score of present report is 55.35. The present study is the compilation of pre-monsoon season, which also affects the score value. This time CEPI score is observed lower than the CPCB CEPI score March 2018 which was 69.49.

CEPI score calculation:

Ambient Air Analysis Report

Pollutant	**Group**	**A1**	**A2**	**A (A1 X A2)**
CO	B	2	Limited	
PM10	B	0.5		
Benzene	C	1		
		3.5	**1**	**3.5**

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)**	
CO	1.49	2	0.75	0	8	0.00	L	1.5
PM10	44.75	100	0.45	0	8	0.00	L	0
Benzene	1.79	5	0.36	0	8	0.00	L	0
B score = (B1+B2+B3)							**B**	**1.5**

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

Air CEPI Score	**(A+B+C+D)**	**10.00**

Water Quality Analysis Report

Pollutant	**Group**	**A1**	**A2**	**A (A1 X A2)**
TP	B	2	Limited	
Zn	A	0.25		
BOD	B	0.5		
		2.75	**1**	**2.75**

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)	
TP	0.94	0.3	3.13	4	5	2.51	C	30
Zn	0.80	0.3	2.67	3	5	1.60	C	10
BOD	11.80	8	1.48	2	5	0.59	H	5.5
B score = (B1+B2+B3)							**B**	**45.5**

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

Water CEPI Score	**(A+B+C+D)**	**53.25**

Ground Water Quality Analysis Report

Pollutant	Group	A1	A2	A (A1 X A2)
Fe	A	1	Limited	
TP	A	0.25		
F	A	0.25		
		1.5	**1**	**1.5**

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)	
Fe	1.15	0.3	3.84	6	12	1.92	C	30
TP	0.43	0.3	1.43	5	12	0.60	M	5.5
F	1.07	1.5	0.71	1	12	0.06	M	3
B score = (B1+B2+B3)							**B**	**38.5**

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

Land CEPI Score	**(A+B+C+D)**	**45.0**

Water CEPI Score (im) **53.25**

Land CEPI Score (i2) **45.00**

Air CEPI Score (i3) **10.00**

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 = **55.35**

10. Conclusion

Ambient Air Quality

- The AAQ stations were identified in the CEPI impact area to cover both upwind and crosswind directions and AAQ survey was conducted.
- All parameters are well within the limits as per NAAQS at all locations of MIDC Ambad and Satpur.
- Concentration of PM10 is observed in the range of 35.00 to 55.0 µg/m^3 and PM2.5 in the range of 10.00 to 14.00 µg/m^3 at the studied locations.
- In the CEPI score calculated for Air Environment by CPCB in March 2018, the concentration of PM10 has exceeded at 22 location out of 24 studied locations and which contributed to higher air index (56.50). 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 (10.00).

Surface Water Quality

- Higher concentration of BOD and Total phosphates was observed in the surface water samples collected which may be due to increase in microbial activity, poor agricultural practices, leaking septic systems or discharges from sewage treatment plants.
- Total Kjeldahl Nitrogen also exceeded in two locations out of six locations were samples collected.
- All the industries in Nashik 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 total phosphorous were higher and exceeded at 3 location out of 6 studied locations as observed in the present study also.

Ground Water Quality

- 12 ground water samples were collected from different well and Borewell in the region.
- Iron and Manganese also exceeded in few of the samples collected.

CEPI Score

- The CEPI Score Pre-monsoon season is 55.35.
- In comparison with the CEPI Score of March 2024, a decrease in the Air Index and increase in Water Index and Land Index is observed in the present study.
- During calculation of CEPI score, water Index is calculated highest with 53.25, followed by the Land Index 45.00 and Air index is 10. The parameters of surface water and ground water in

Nashik region is well within the limits. Hence, aggregated CEPI score is calculated as 55.35, which is lower than the CPCB CEPI score 2018 i.e. 66.49.

- As per the CPCB CEPI calculation revised in 2016, Health statistics represented by Receptor C in CEPI Calculation, also plays an important role.
- For analysing the health data collected from hospitals, less than 5% increase in air and water borne disease cases is observed in the consecutive years of 2022-2023 and 2023-2024. Hence score for receptor C is considered as 0 for air, ground as well as surface water environments.
- Collective efforts of regional office of MPCB, NMC, administration and environmental organizations are resulting in significant reduction in pollution level.
- 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 dilution of environmental samples resulting in lower pollution load, hence also affects the total score.
- In conclusion, approximately 16.5 % decrease in CEPI score is observed from 66.32 in 2018 to 55.35 in June 2024.

11. Efforts taken by MPCB to control and reduce Environmental Pollution Index

- Drive against open burning of biomass, crop residue, garbage, leaves, etc.: Directions issued by Board to ULB for not to allow open burning.
- **Organic Waste Compost machines**: 08 machines are installed.
- **Waste collection and segregation centers**:
  - ✓ **Domestic Solid Waste**: NMC has provided on site waste collection and segregation facility for residential area.
  - ✓ **Industrial Non Hazardous waste**: Recyclable waste is sent to authorized waste recyclers and other waste collected by corporations.
  - ✓ **Hazardous Waste:** Industrial hazardous waste sent to common hazardous treatment and disposal facility by industries.
- **Construction of Common Effluent Treatment plant (CETP)**: Yet not established proposal under consideration.
- **Installation of CEMS installed for Air and Water in Large and Medium scale RED category industries**: 04 no.
- Arrangement of scientific collection and treatment of sewage generated: Nashik Municipal Corporation has provided Sewage network and collection system in residential area and provided Sewage 11 number of STP.
- Installation of CAAQMS station: 04 stations
- Establishment of Monitoring stations under National Water Quality Monitoring Programme (NWMP) are 10.
- Steps are taken for industrial area/other units to recycle 100% treated effluent to achieve zero liquid discharge (ZLD): Directions were issued to the unit to provide ZLD and use 100% treated water for the secondary purpose. About 110 units have been provided by ZLD system.
- Steps taken to reduce dust emission:
  1. Conservation of traditional crematorium to electric based technology and three are converted to electricity and solar power.
  2. Conversion 100% city transport bus in to CNG. At present 120 buses are in operation.
  3. Conversion of Auto into PNG and CNG based fuel.
  4. The industries have changed their fuel F.O. to low Sulphur fuel and Green fuel like LPG, PNG and Electricity.
  5. Regular cleaning of roads and traffic diversions and signals shall be installed by the corporation.
  6. Road swiping machine provided.
- Tree plantation in last one year (2021-2022): 8000 nos.
- Other initiatives taken to control and reduce pollution in air, surface water and ground water in last one year (2021-2022):
  a) Presently 04 CAAQM stations are installed at 1. KTHM College, Nashik 2. Guru Govind Singh Collage, Pathardi, Nashik 3. AIIMA Ambad, Nashik 4. Swargiya Sadashiv Gngaram Bhore Natyagruhu Hirawadi, Nashik and 4 manual stations at 1. Old NMC Building, Main Road, Nashik

2. RTO Office old, Sharanpur Road 3. VIP Industries Ltd. MIDC Satpur and 4. Udyog Bhavan, ITI Signal, Nashik. As per the population criteria proposed 4 locations of CAAQMS are installed and are in operation for monitoring of air quality.

b) The ZP has installed three STP (in-situ nalla) treatments at four village and waste work on other villages is in progress.

c) A clean up drive of Darna River back water and collection of plastic waste from river.

d) Public awareness campaign on the Godavari River pollution control.

e) Clean up drive in MIDC Satpur.

f) Tree Plantation drive in MIDC Ambad.

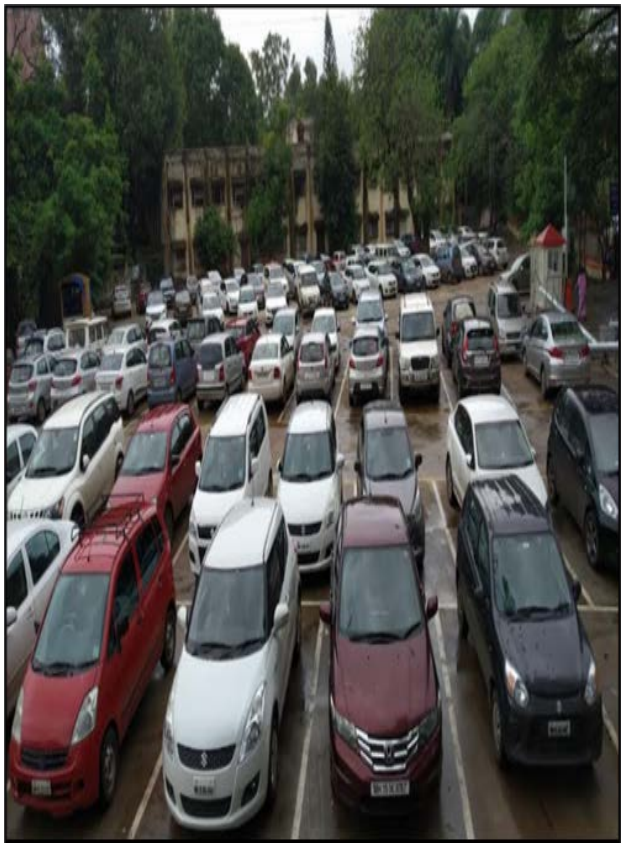
- Road cleaning and sweeping.
- Vehicles carrying muck/Debris covered with tarpaulin.
- Barricades around the construction sites and its extension with
- Sensor based air monitoring for AQI.
- CCTV installation at sites for different activities.
- AQI by 3rd party vendor.

Continuous Ambient Air Quality Monitoring Station

MPC Board: Mobile Monitoring Vans for Hotspot Monitoring

Advanced Waste Management Plant

C&D Waste Processing Facility: 50 TPD Capacity, 80 Ton Per Hour Process, Output is paving blocks & crushed sand

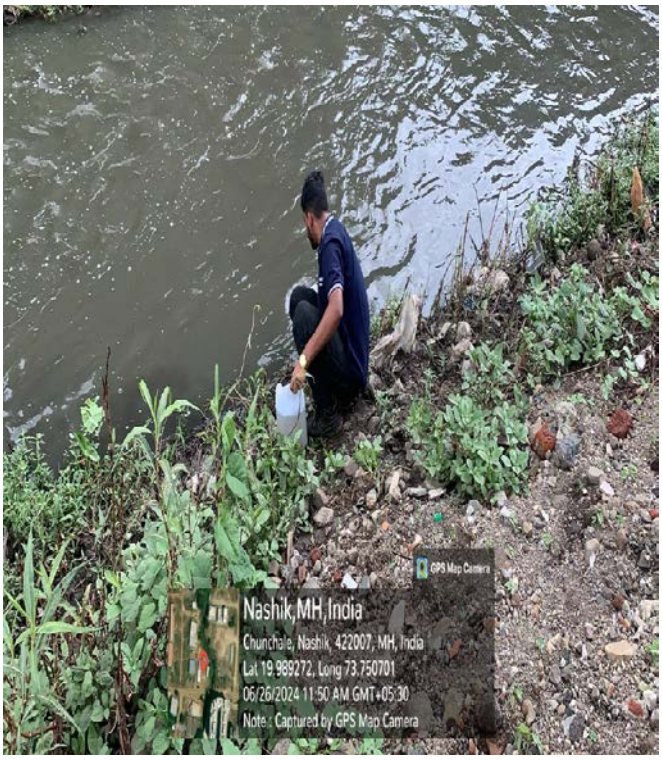


Smart Parking management - Total 35 smart parking locations (28 on street, 7 off street) for 6000 vehicles

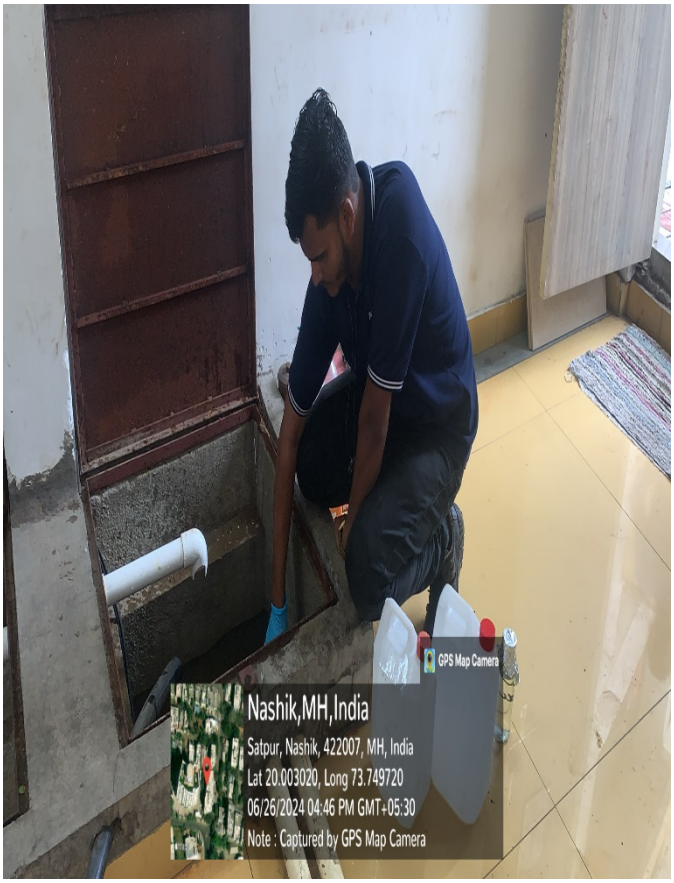
Public Awareness Activities

12. Photographs

MIDC Ambad - Ambient Air Sampling Near Koso India	**MIDC Ambad - Ambient Air Sampling Near Siemens India Limited**
MIDC Ambad - Ambient Air Sampling Near Gemini Instratech Ltd.	**MIDC Satpur - Ambient Air Sampling Near Mahindra & Mahindra Ltd. P-I**

MIDC Satpur - Ambient Air Sampling Near Bosch Ltd.	**MIDC Satpur - Ambient Air Sampling Near ESDS Software Solution Ltd.**
	
MIDC Satpur – Surface water Sampling Sahid Arun Chittee Pool, Anandvalil Gangapur Road	**MIDC Satpur – Surface water Sampling Nasardi Pool, Near EPF Office**

MIDC Satpur – Surface water Sampling ALP industry Opposite side Nalla	**MIDC Ambad – Ground water Sampling Dashrath Pandit Nikam, Plot No. 4, Mauli Chowk, Datta Nagar, Village Chinchale (Bore well Water)**
MIDC Ambad – Ground water Sampling Pancharatna Farm, Maruti Sankul, Datta Nagar, Backside Kirloskar Oil India Pvt. Ltd. (Bore well Water)	**MIDC Satpur – Ground water Sampling Ramesh Chandra Kale Near ESI Hospital, Satpur (Bore Well Water)**

	
MIDC Satpur – Ground water Sampling Seva Developers Pvt. Ltd., Satpur (Bore Well Water)	**MIDC Satpur – Ground water Sampling Shivaji Nagar (Shishila Hospital), Plot No 55/6, Satpur Carbon Naka) (Bore Well Water)**

Annexure – I Health Related Data

HEALTH STATISTICS

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

Name of the Polluted Industrial Area (PIA)	NASHIK
Name of the major health center/ organization	ESIC Hospital
Name and designation of the Contact person	
Address	City Place opp. Kalika Mandir Mumbai Naka Nashik

S No.	Diseases	No. of Patients Reported	
		Year 2022-2023 (Jan 2022 TO Dec 2023)	Year 2023-2024 (Jan 2023 TO June 2024)
AIRBORNE DISEASES			
1.	Asthma	42	48
2.	Acute Respiratory Infection	319	251
3.	Bronchitis	87	48
4.	Cancer	4	6
WATERBORNE DISEASES			
1.	Gastroenteritis	347	333
2.	Diarrhea	–	147
3.	Renal diseases	183	223
4.	Cancer	10	22

Date: 12/07/2024

Signature

वैद्यकीय अधिक्षक
महाराष्ट्र राज्य कामगार विमा सोसायटी
रुग्णालय नाशिक सातपुर-७

HEALTH STATISTICS

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

Name of the Polluted Industrial Area (PIA)	NASHIK
Name of the major health center/ organization	Civil Hospital
Name and designation of the Contact person	Asst.Civil Surgon
Address	Dist. Hospital Trimbak Road Nashik

S No.	Diseases	No. of Patients Reported	
		Year 2022-2023	Year 2023-2024
AIRBORNE DISEASES			
1.	Asthma	1772	1151
2.	Acute Respiratory Infection	1069	388
3.	Bronchitis	2141	955
4.	Cancer	Lung Ca - 11	Lung Ca - 8
WATERBORNE DISEASES			
1.	Gastroenteritis	766	471
2.	Diarrhea	810	502
3.	Renal diseases	168	187
4.	Cancer	0	0

Date: 18/7/24

CIVIL HOSPITAL NASHIK

Signature

Addl. Civil Surgeon, Nashik

HEALTH STATISTICS

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

Name of the Polluted Industrial Area (PIA)	NASHIK
Name of the major health center/ organization	Life Care Super Speciality Hospital
Name and designation of the Contact person	
Address	Lekha nagar, CIDCO -Nashik

S No.	Diseases	No. of Patients Reported	
		Year 2022-2023	Year 2023-2024
AIRBORNE DISEASES			
1.	Asthma	16	19
2.	Acute Respiratory Infection	19	21
3.	Bronchitis	14	17
4.	Cancer	0	0
WATERBORNE DISEASES			
1.	Gastroenteritis	17	23
2.	Diarrhea	21	32
3.	Renal diseases	04	05
4.	Cancer	0	0

Date: – 22/7/24

Signature

Life Care Hospital ★ Lekha Nagar, Nashik-9 ★ Reg. No.