

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

NASHIK

Post Monsoon (December 2022 to February 2023)



Maharashtra Pollution Control Board

Kalptaru Point, Sion East, Mumbai – 400 022

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ABBREVIATION

| | |
|---------------|---|
| CPCB | Central Pollution Control Board |
| MPCB | Maharashtra Pollution Control Board |
| CEPI | Comprehensive Environmental Pollution Index |
| EPA | Environmental Protection Act, 1986 |
| 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 |
| CETP | Common Effluent Treatment Plant |
| VOCs | Volatile Organic Compounds |
| MIDC | Maharashtra Industrial Development Corporation |
| NWMP | National Water Quality Monitoring Program |
| NAAQS | National Ambient Air Quality Standard |
| ZLD | Zero Liquid Discharge |
| CPA | Critically Polluted Area |
| SPA | Severely Polluted Area |

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. The Post-monsoon monitoring was carried out during the period of December 2022 to February 2023 to verify the Ambient Air Quality, Surface water and Ground water.

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 except Particulate Matter PM10 and Carbon Monoxide (CO) (8 h) at two locations. In surface water of Nashik the level of BOD exceed in three samples collected out of five samples are collected. In ground water, the concentrations of Total Phosphate and Total Kjeldahl Nitrogen have 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 59.10 of March 2023. Based on the study results of December 2022 to February 2023 the CEPI score as per the revised CPCB 2016 guidelines, the CEPI index of Post-Monsoon - Ambient Air is 32.50, Surface Water is 52.50, and Ground Water is 42.75. The overall CEPI score for Nashik area for the Post-monsoon 2023 is 59.10.

Conclusion: Though health is of great concern, it cannot be denied that a growing economy also requires industrial growth. For overall socio-economic growth and welfare, research is encouraged into the development of such techniques that can reduce the use of freshwater by industrial sectors as well in the development of efficient and effective water treatment methods. New developments and continuous monitoring of the execution strategies of various programmes and interventions related to industrial wastewater treatment are absolutely necessary for the amelioration of any toxic effects.

2. Introduction

Over the past few decades, environmental deterioration has become a "common concern" for humanity. The distinctive nature of the current environmental issues is that human activity contributes to them more than natural events. Economic expansion and mindless consumption are beginning to have negative impacts on Mother Nature. It's been studied and reported that the majority of industries (77% approximately) contribute to water pollution, 15% to air pollution, and the remaining 8% to both air and water pollution. Additionally, the most polluting businesses are those that depend on natural resources and are expanding quickly.

These human activities have an adverse effect on the environment by polluting the water we drink, the air we breathe, and the soil in which plants grow. Untreated wastewater from industries has affected the potability and hygiene of drinking water due to the presence of hazardous impurities in it, causing detrimental health effects to human, animal and aquatic life. Exposure to air pollutants is closely related to Pulmonary Diseases, wheezing, asthma, respiratory disease, cardiovascular diseases etc. Moreover, air pollution seems to have various malign health effects in early human life, such as respiratory, cardiovascular, mental, and perinatal disorders, leading to infant mortality or chronic disease in adult age. Therefore, it is crucial to identify and investigate the major sources of pollution to implement mitigation strategies for substantial environmental and health co-benefits.

In view of this, Central Pollution Control Board (CPCB) has evolved the concept of Comprehensive Environmental Pollution Index (CEPI) during 2009-10 as a tool for comprehensive environmental assessment of prominent industrial clusters and formulation of remedial Action Plans for the identified critically polluted areas. CEPI bridges the perceptive gap between experts, public, and government departments by simplifying the complexity of environmental issues. It aims at categorizing critically polluted industrial areas based on scientific criteria, so as to ascertain various dimensions of pollution. This is a combined framework used to evaluate the impacts caused by industrial clusters on the nearby environment, as a numerical value.

The present CEPI study includes areas under Nashik. 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 results of the application of the Comprehensive Environmental Pollution Index (CEPI) to selected industrial clusters or areas are presented in this report. The main objective of the study is to identify polluted industrial clusters or areas in order to take concerted action and to centrally monitor them at the national level

to improve the current status of their environmental components such as air and water quality data, ecological damage, and visual environmental conditions. 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.

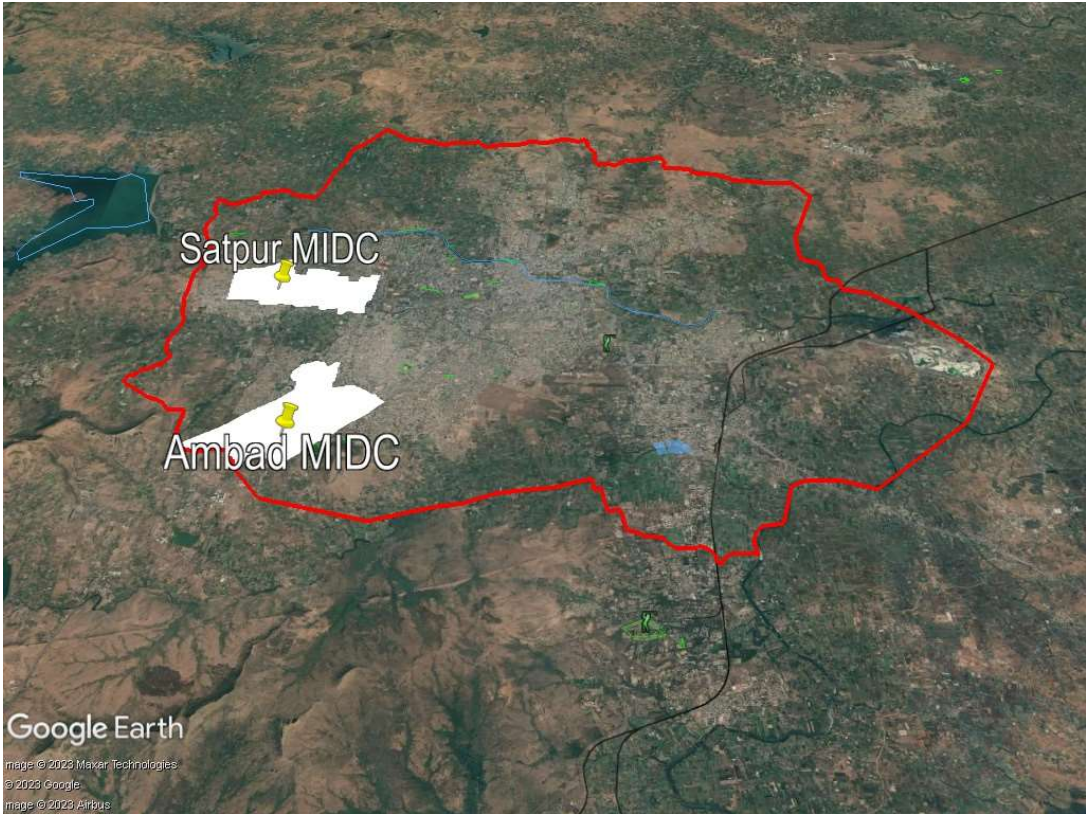


Fig. Nashik region CEPI monitoring zone

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 | <ul style="list-style-type: none"> • MIDC Ambad -04 • MIDC Satpur -04 | 08 | PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂ , NH ₃ , O ₃ , C ₆ H ₆ , CO, BAP, Pb, Ni, As |
| Volatile Organic Compounds | <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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 ₆ H 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 VIR Electro Engg. Pvt. Ltd. | 19°94'65.76"N | 73°73'90.28"E | 16.01.2023 | 18.01.2023 | 20.01.2023 |
| 2. | Near Mahindra CIE Automated Ltd. | 19°96'51.87"N | 73°73'84.38"E | 16.01.2023 | 18.01.2023 | 20.01.2023 |
| 3. | Near Isovolta India Ltd. | 19°95'67.06"N | 73°74'92.16"E | 16.01.2023 | 18.01.2023 | 20.01.2023 |
| 4. | Near Sudal Industries Ltd. | 19°94'95.62"N | 73°74'83.12"E | 16.01.2023 | 18.01.2023 | 20.01.2023 |

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°95'46.31"N | 73°74'97.71"E | 16.01.2023 | 18.01.2023 | 20.01.2023 |
| 2. | Near Kirloskar oil India Ltd. | 19°95'72.27"N | 73°73'25.58"E | 16.01.2023 | 18.01.2023 | 20.01.2023 |



Fig. Geographical Locations of Ambient Air Quality Monitoring MIDC Ambad

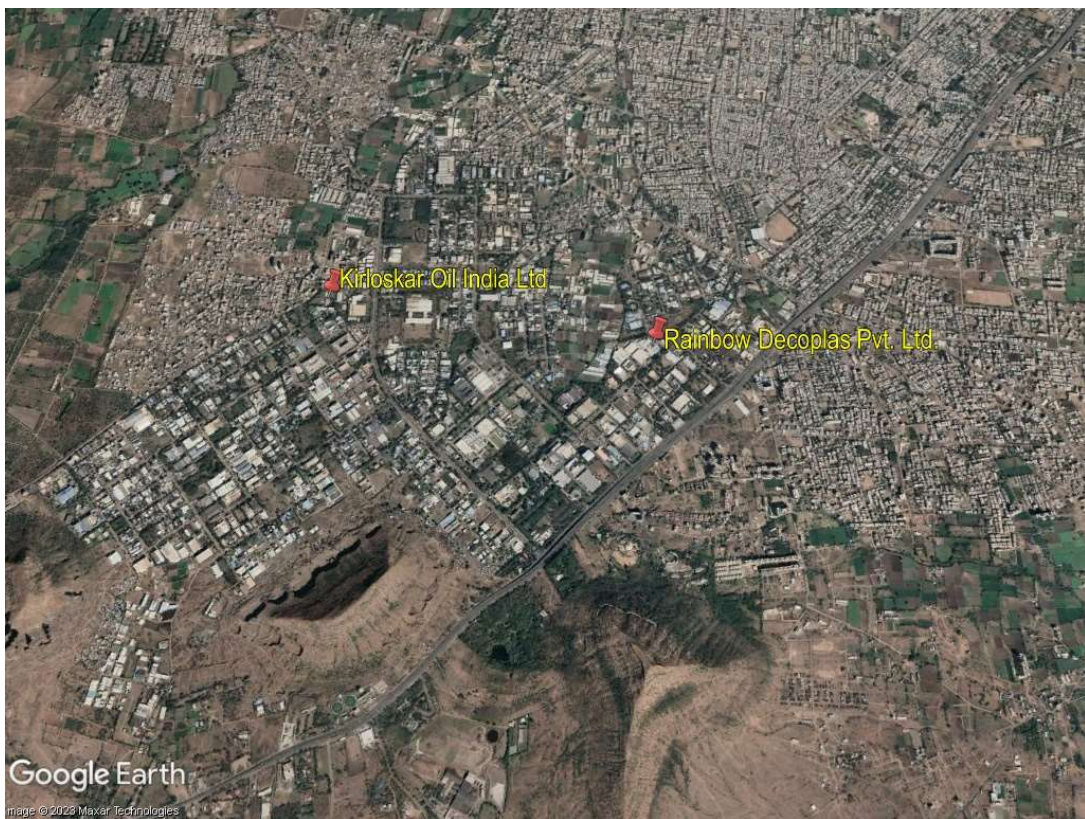


Fig. Geographical Locations of VOCs Monitoring MIDC Ambad

Table 5.3 MIDC Ambad - Ambient Air Quality Monitoring Results

| Parameters | Unit | Results | | | |
|---|-------------------|----------------------------------|----------------------------------|--------------------------|----------------------------|
| | | Near VIR Electro Engg. Pvt. Ltd. | Near Mahindra CIE Automated Ltd. | Near Isovolta India Ltd. | Near Sudal Industries Ltd. |
| Sulphur Dioxide (SO ₂) | µg/m ³ | BLQ | 6.61 | 6.14 | 8.03 |
| Nitrogen Dioxide (NO ₂) | µg/m ³ | 17.24 | 13.6 | 9.81 | 8.92 |
| Particulate Matter (size less than 10 µm) or PM ₁₀ | µg/m ³ | 83 | 56 | 72 | 96 |
| Particulate Matter (size less than 2.5 µm) or PM _{2.5} | µg/m ³ | 24 | 17 | 19 | 23 |
| Ozone (O ₃) | µg/m ³ | BLQ | BLQ | BLQ | 27.2 |
| Lead (Pb) | µg/m ³ | BLQ | BLQ | BLQ | 0.047 |
| Carbon Monoxide (CO) (1 h) | mg/m ³ | 1.44 | 1.4 | 1.61 | 1.42 |
| Carbon Monoxide (CO) (8 h) | mg/m ³ | 1.79 | 1.80 | 1.90 | 1.83 |
| Ammonia (NH ₃) | µg/m ³ | 125.0 | 123.8 | 108.4 | 90.5 |
| Benzene (C ₆ H ₆) | µg/m ³ | 2.96 | 2.79 | 3.00 | 3.05 |
| Benzo (a) Pyrene (BaP) - particulate phase only | ng/m ³ | BLQ | BLQ | BLQ | BLQ |
| Arsenic (As) | ng/m ³ | 0.591 | 0.984 | 0.347 | 0.392 |
| Nickel (Ni) | ng/m ³ | 3.77 | BLQ | BLQ | 4.01 |

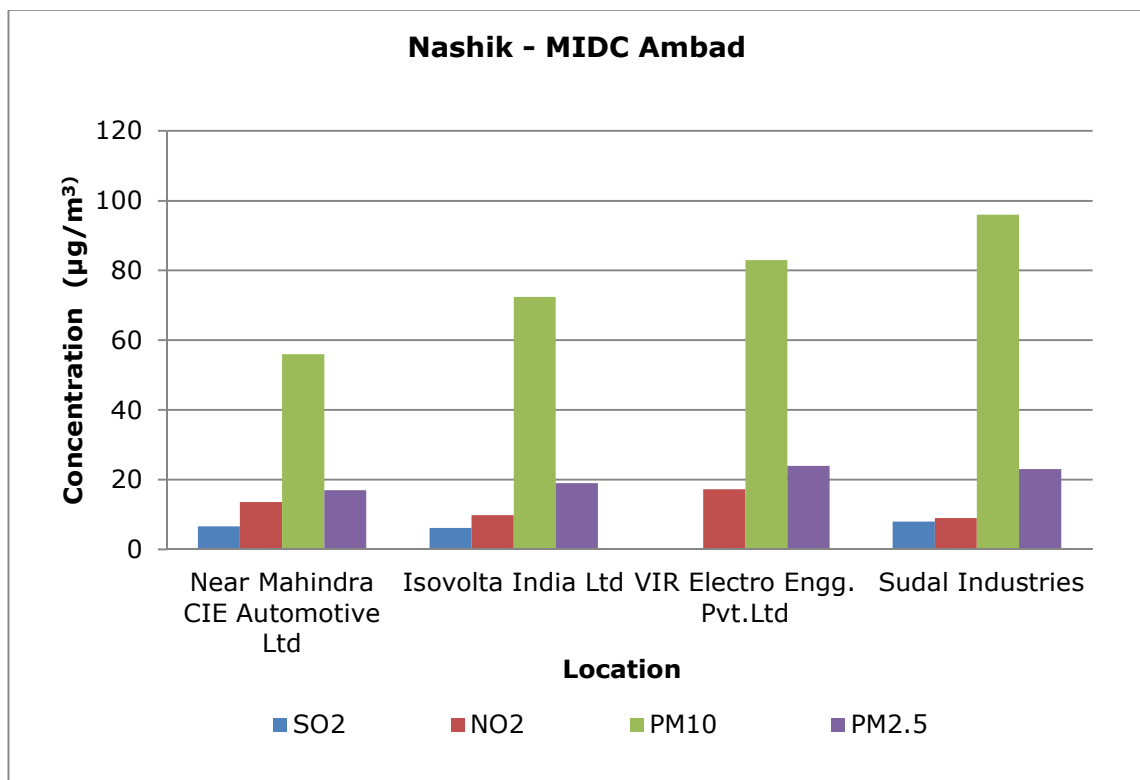
Table 5.4 MIDC Ambad - Volatile Organic Compounds (VOCs) in Ambient Air Results

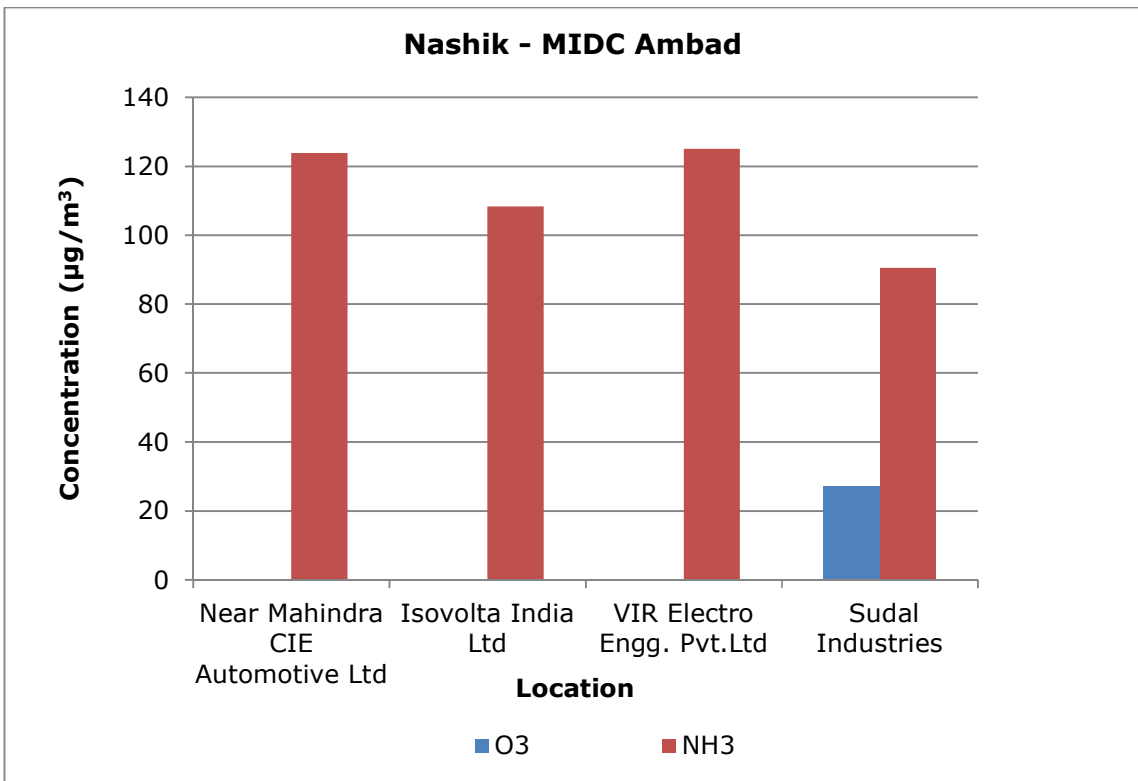
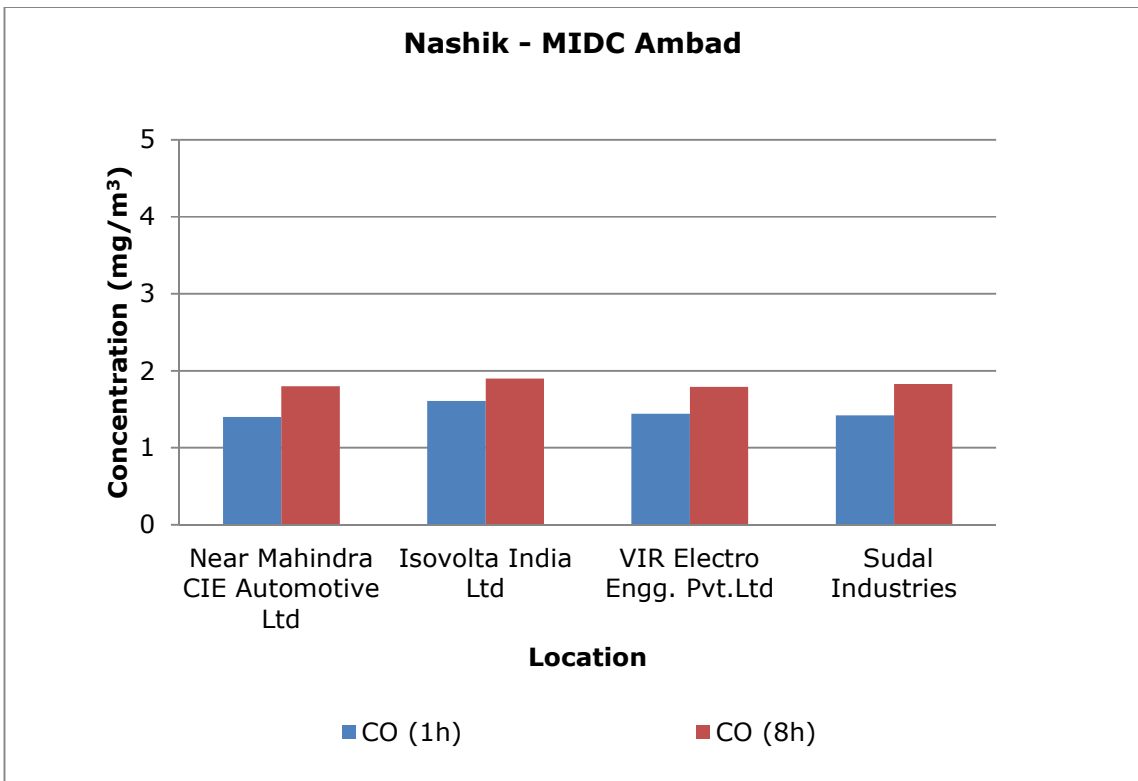
| Parameters | Unit | Results | |
|-----------------------------|-------------------|---------------------------------|-------------------------------|
| | | Near Rainbow Decoplus Pvt. Ltd. | Near Kirloskar oil India Ltd. |
| Dichloromethane | µg/m ³ | BLQ | BLQ |
| Chloroform | µg/m ³ | BLQ | BLQ |
| Carbon Tetrachloride | µg/m ³ | 7.29 | BLQ |
| Trichloroethylene | µg/m ³ | BLQ | BLQ |
| Bromodichloromethane | µg/m ³ | BLQ | BLQ |
| 1,3-Dichloropropane | µg/m ³ | BLQ | BLQ |
| 1,4-Dichlorobenzene | µg/m ³ | 1.29 | 2.00 |
| 1,3-Dichlorobenzene | µg/m ³ | 1.295 | 1.01 |
| 1,2-Dichlorobenzene | µg/m ³ | BLQ | BLQ |
| 1,2-Dibromo-3-Chloropropane | µg/m ³ | BLQ | BLQ |

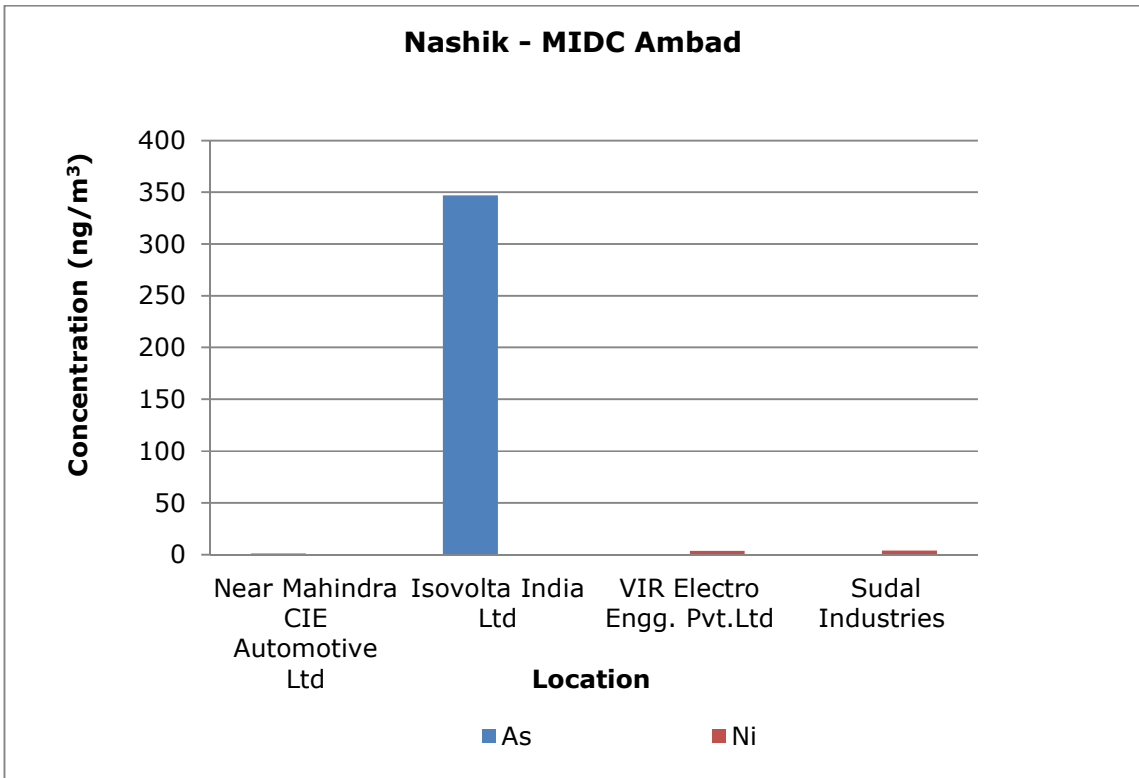
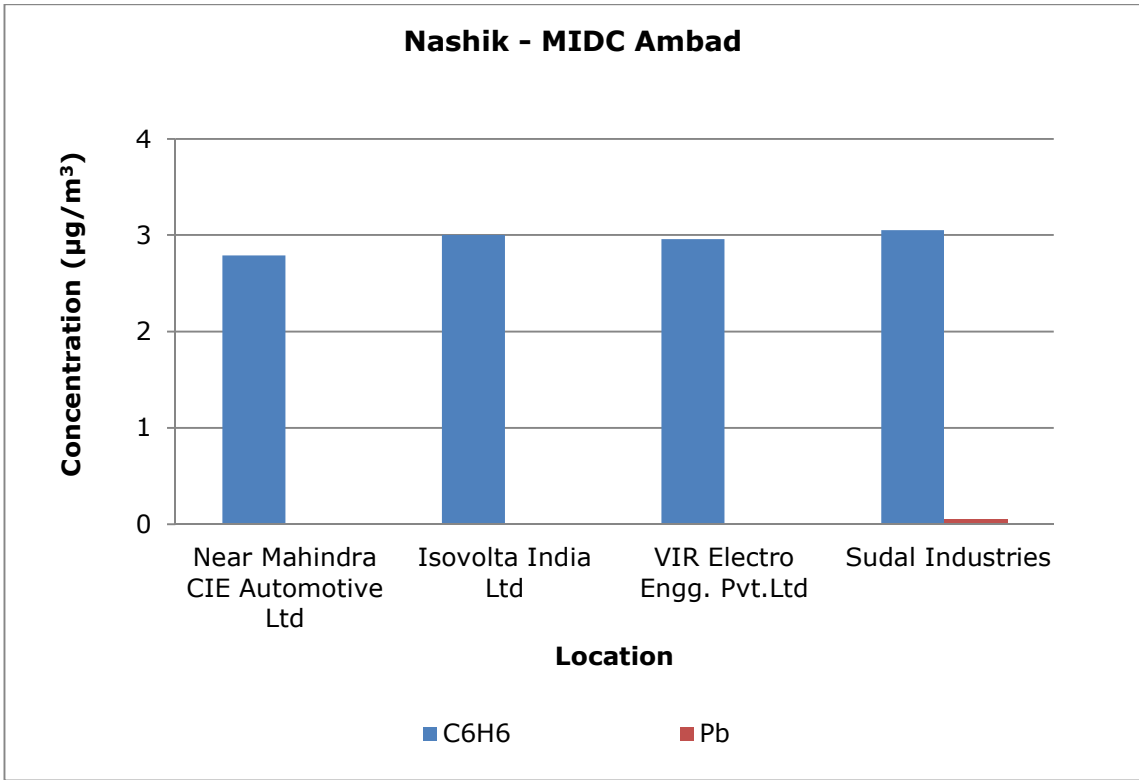
| Parameters | Unit | Results | |
|---------------------------|-------------------|---------------------------------|-------------------------------|
| | | Near Rainbow Decoplus Pvt. Ltd. | Near Kirloskar oil India Ltd. |
| Napthalene | µg/m ³ | 2.145 | 2.33 |
| Bromobenzene | µg/m ³ | BLQ | BLQ |
| 1,2,4-Trimethylbenzene | µg/m ³ | 0.62 | BLQ |
| 2-Chlorotoluene | µg/m ³ | BLQ | BLQ |
| Tert-Butylbenzene | µg/m ³ | BLQ | BLQ |
| SEC-Butylbenzene | µg/m ³ | BLQ | BLQ |
| P-Isopropyltoluene | µg/m ³ | 1.02 | 0.71 |
| M-Xylene | µg/m ³ | BLQ | BLQ |
| P-Xylene | µg/m ³ | BLQ | BLQ |
| Styrene | µg/m ³ | 0.75 | 0.58 |
| Cumene | µg/m ³ | BLQ | BLQ |
| 1,2,3-Trichloropropane | µg/m ³ | BLQ | BLQ |
| N-Propylbenzene | µg/m ³ | 0.655 | 0.54 |
| Dibromochloromethane | µg/m ³ | BLQ | BLQ |
| 1,2-Dibromoethane | µg/m ³ | BLQ | BLQ |
| Chlorobenzene | µg/m ³ | BLQ | BLQ |
| 1,1,1,2-Tetrachloroethane | µg/m ³ | BLQ | BLQ |
| Ethylbenzene | µg/m ³ | BLQ | BLQ |
| 1,1-Dichloropropylene | µg/m ³ | 7.3 | BLQ |
| 1,2-Dichloroethane | µg/m ³ | BLQ | BLQ |
| 1,2-Dichloropropane | µg/m ³ | BLQ | BLQ |
| Trans-1,3-Dichloropropene | µg/m ³ | BLQ | BLQ |
| CIS 1,3-Dichloropropene | µg/m ³ | BLQ | BLQ |
| 1,1,2-Trichloroethane | µg/m ³ | BLQ | BLQ |
| Tetrachloroethylene | µg/m ³ | 1.65 | 0.76 |
| 1,3,5-Trimethylbenzene | µg/m ³ | BLQ | BLQ |
| N-Butylbenzene | µg/m ³ | BLQ | BLQ |
| 1,2,3-Trichlorobenzene | µg/m ³ | BLQ | BLQ |
| Hexachlorobutadiene | µg/m ³ | BLQ | BLQ |
| 1,2,4-Trichlorobenzene | µg/m ³ | 1.53 | 1.55 |
| 2,2-Dichloropropane | µg/m ³ | BLQ | BLQ |
| Dibromomethane | µg/m ³ | BLQ | BLQ |

| Parameters | Unit | Results | |
|----------------------------|-------------------|---------------------------------|-------------------------------|
| | | Near Rainbow Decoplus Pvt. Ltd. | Near Kirloskar oil India Ltd. |
| Toluene | µg/m ³ | 2.90 | 1.87 |
| O-Xylene | µg/m ³ | BLQ | BLQ |
| Bromoform | µg/m ³ | BLQ | BLQ |
| 1,1,2,2-Tetrachloroethane | µg/m ³ | BLQ | BLQ |
| 4-Chlorotoluene | µg/m ³ | BLQ | BLQ |
| 1,1-Dichloroethylene | µg/m ³ | BLQ | BLQ |
| Trans-1,2-Dichloroethylene | µg/m ³ | BLQ | BLQ |
| 1,1-Dichloroethane | µg/m ³ | BLQ | BLQ |
| CIS-1,2-Dichloroethylene | µg/m ³ | BLQ | BLQ |
| Bromochloromethane | µg/m ³ | BLQ | BLQ |
| 1,1,1-Trichloroethane | µg/m ³ | BLQ | BLQ |

Graphs - Ambient Air Quality Monitoring of MIDC Ambad







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 except one location was found above the standard limit for the parameters Carbon Monoxide (CO) (8 h) and Particulate Matter PM10.

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 | 10.01.2023 | 12.01.2023 | 14.01.2023 |
| 2. | Near Graphite India Ltd. | 20°00'04.91"N | 73°71'72.53"E | 10.01.2023 | 12.01.2023 | 14.01.2023 |
| 3. | Near AATCO Food Ltd. | 20°0'02.85"N | 73°74'0.43"E | 10.01.2023 | 12.01.2023 | 14.01.2023 |
| 4. | Near MSL Drive Line System | 19°99'78.16"N | 73°71'67.76"E | 10.01.2023 | 12.01.2023 | 14.01.2023 |

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 | 10.01.2023 | 12.01.2023 | 14.01.2023 |
| 2. | Near MSL Drive Line System | 19°99'78.16"N | 73°71'67.76"E | 10.01.2023 | 12.01.2023 | 14.01.2023 |

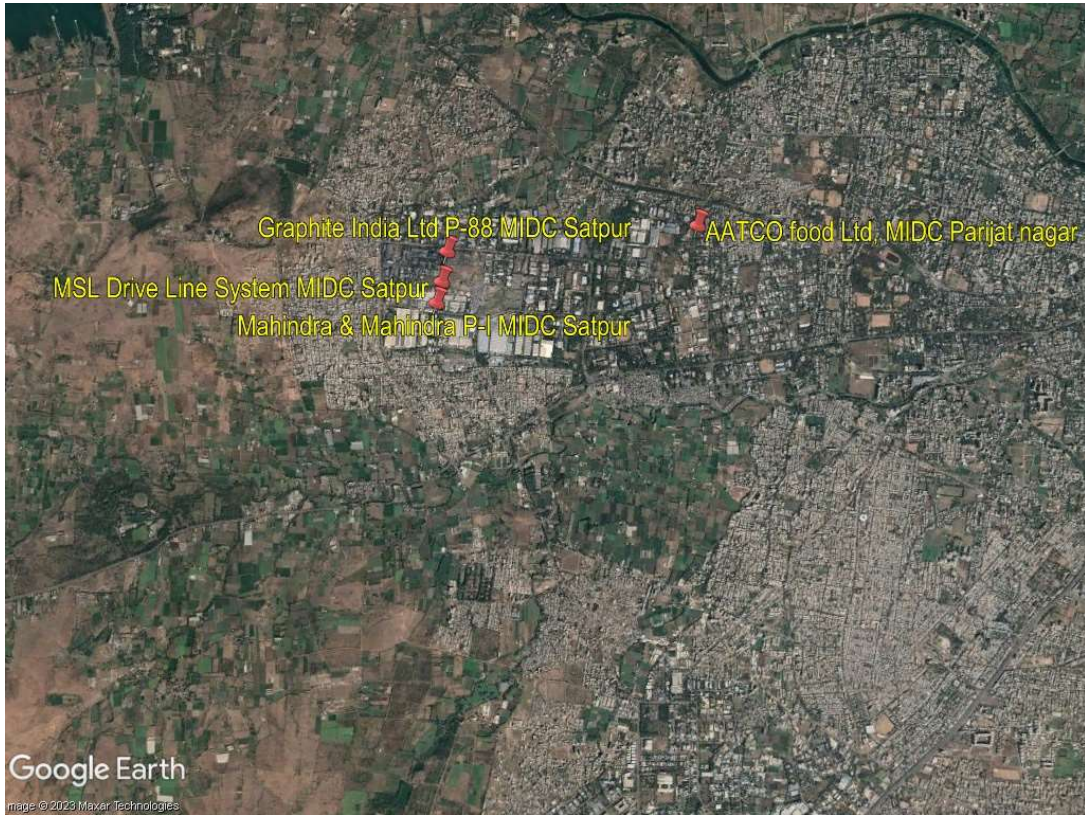


Fig. Geographical Locations of Ambient Air Quality Monitoring MIDC Satpur



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 Graphite India Ltd. | Near AATCO Food Ltd. | Near MSL Drive Line System |
| Sulphur Dioxide (SO ₂) | µg/m ³ | 36.4 | 46.05 | 38.10 | 46.67 |
| Nitrogen Dioxide (NO ₂) | µg/m ³ | 16.8 | 17.7 | 15.1 | 26.03 |
| Particulate Matter (size less than 10 µm) or PM ₁₀ | µg/m ³ | 72 | 129 | 62 | 88 |
| Particulate Matter (size less than 2.5 µm) or PM _{2.5} | µg/m ³ | 23 | 33 | 18 | 25 |
| Ozone (O ₃) | µg/m ³ | BLQ | BLQ | BLQ | BLQ |
| Lead (Pb) | µg/m ³ | BLQ | BLQ | BLQ | BLQ |
| Carbon Monoxide (CO) (1 h) | mg/m ³ | 1.21 | 1.20 | 1.35 | 1.58 |
| Carbon Monoxide (CO) (8 h) | mg/m ³ | 1.64 | 1.54 | 2.26 | 2.16 |
| Ammonia (NH ₃) | µg/m ³ | BLQ | BLQ | BLQ | BLQ |
| Benzene (C ₆ H ₆) | µg/m ³ | 3.58 | 3.42 | 3.24 | 3.54 |
| Benzo (a) Pyrene (BaP) – particulate phase only | ng/m ³ | BLQ | BLQ | BLQ | BLQ |
| Arsenic (As) | ng/m ³ | 0.73 | 0.5775 | 0.57 | 0.46 |
| Nickel (Ni) | ng/m ³ | 3.57 | 3.5 | BLQ | BLQ |

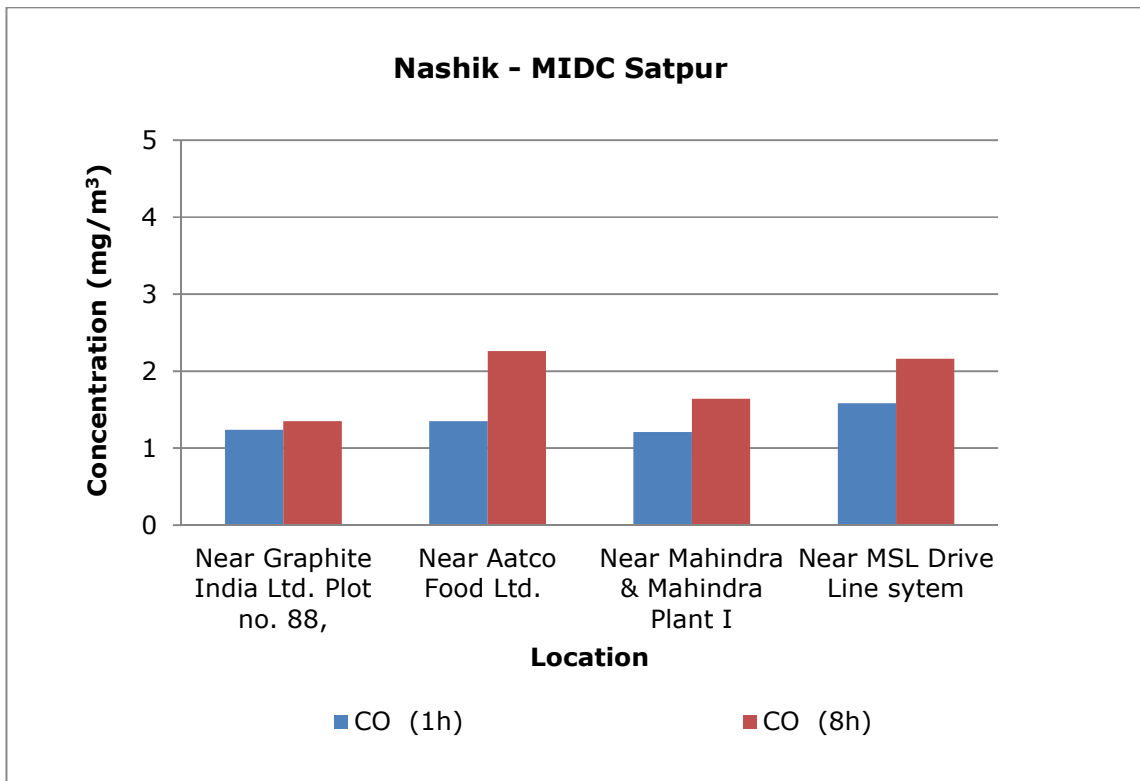
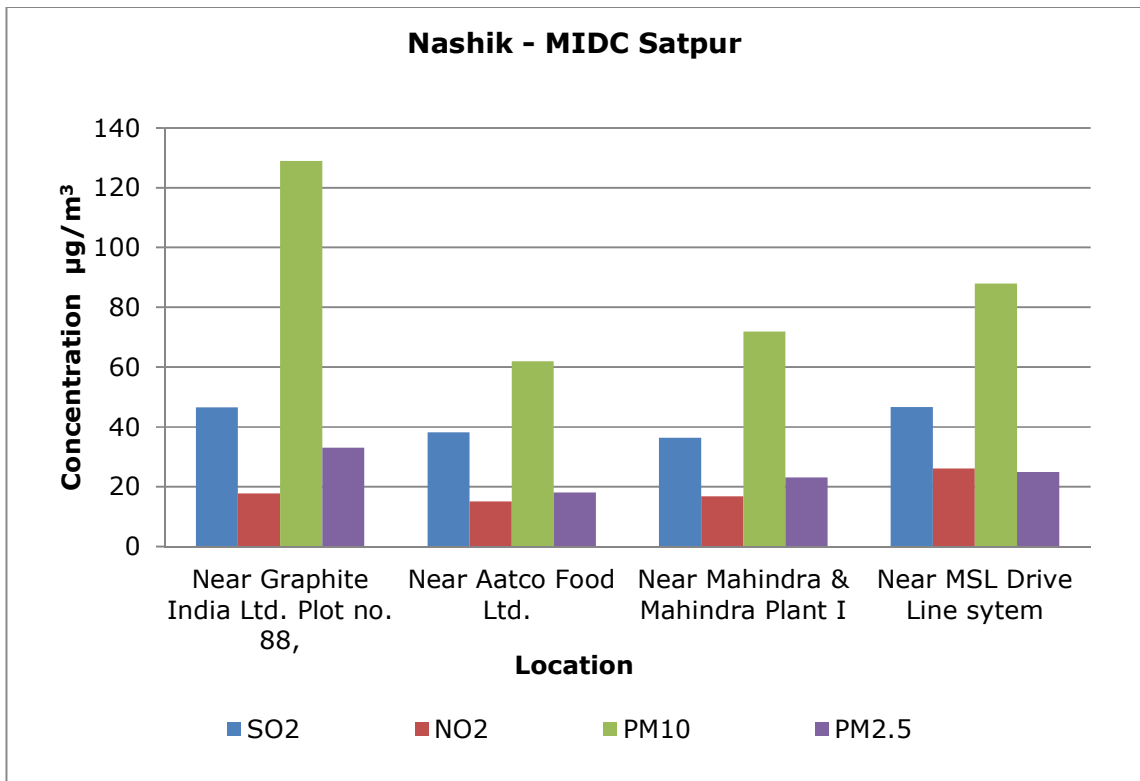
Table 5.8 MIDC Satpur - Volatile Organic Compounds (VOCs) in Ambient Air Results

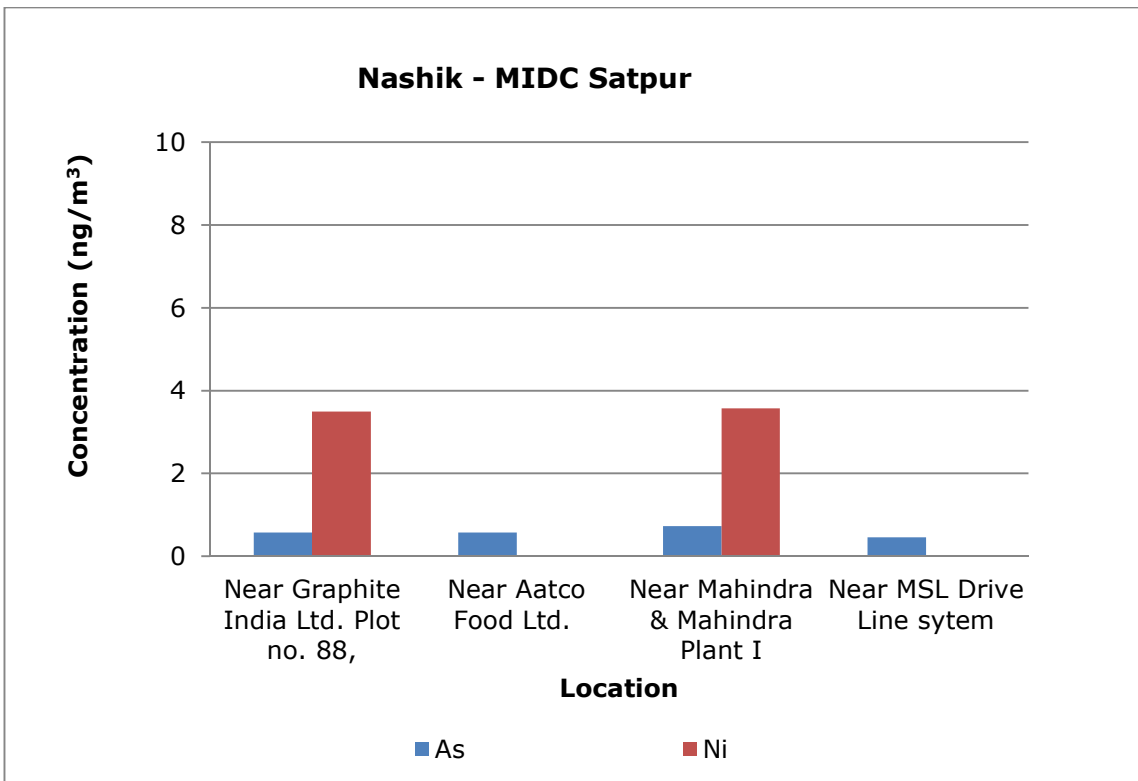
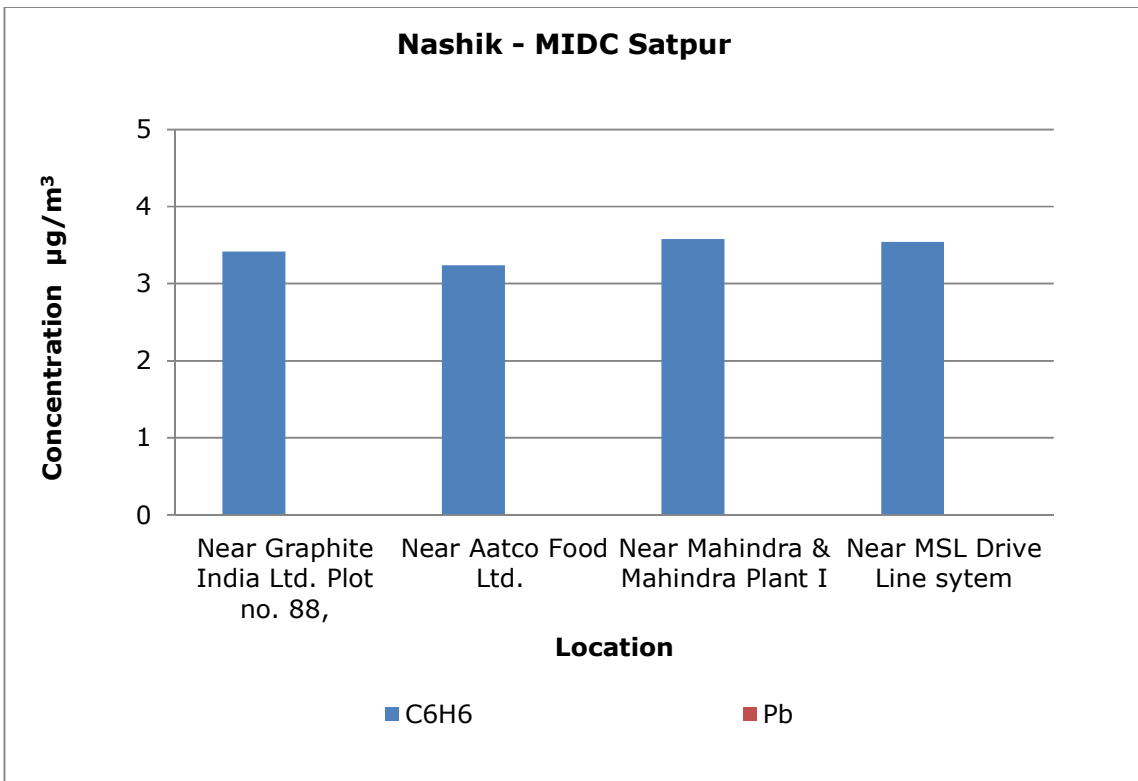
| Parameters | Unit | Results | |
|-----------------------------|-------------------|----------------------------------|----------------------------|
| | | Near Mahindra & Mahindra Plant I | Near MSL Drive Line System |
| Dichloromethane | µg/m ³ | BLQ | BLQ |
| Chloroform | µg/m ³ | BLQ | BLQ |
| Carbon Tetrachloride | µg/m ³ | BLQ | BLQ |
| Trichloroethylene | µg/m ³ | BLQ | BLQ |
| Bromodichloromethane | µg/m ³ | BLQ | BLQ |
| 1,3-Dichloropropane | µg/m ³ | BLQ | BLQ |
| 1,4-Dichlorobenzene | µg/m ³ | 3.63 | 3.28 |
| 1,3-Dichlorobenzene | µg/m ³ | 3.21 | 2.64 |
| 1,2-Dichlorobenzene | µg/m ³ | 2.74 | BLQ |
| 1,2-Dibromo-3-Chloropropane | µg/m ³ | BLQ | BLQ |

| Parameters | Unit | Results | |
|---------------------------|-------------------|----------------------------------|----------------------------|
| | | Near Mahindra & Mahindra Plant I | Near MSL Drive Line System |
| Napthalene | µg/m ³ | 3.68 | 3.37 |
| Bromobenzene | µg/m ³ | BLQ | BLQ |
| 1,2,4-Trimethylbenzene | µg/m ³ | BLQ | BLQ |
| 2-Chlorotoluene | µg/m ³ | BLQ | BLQ |
| Tert-Butylbenzene | µg/m ³ | BLQ | BLQ |
| SEC-Butylbenzene | µg/m ³ | BLQ | BLQ |
| P-Isopropyltoluene | µg/m ³ | 1.39 | 1.09 |
| M-Xylene | µg/m ³ | BLQ | BLQ |
| P-Xylene | µg/m ³ | BLQ | BLQ |
| Styrene | µg/m ³ | BLQ | BLQ |
| Cumene | µg/m ³ | BLQ | BLQ |
| 1,2,3-Trichloropropane | µg/m ³ | BLQ | BLQ |
| N-Propylbenzene | µg/m ³ | 0.69 | BLQ |
| Dibromochloromethane | µg/m ³ | BLQ | BLQ |
| 1,2-Dibromoethane | µg/m ³ | BLQ | BLQ |
| Chlorobenzene | µg/m ³ | BLQ | BLQ |
| 1,1,1,2-Tetrachloroethane | µg/m ³ | BLQ | BLQ |
| Ethylbenzene | µg/m ³ | BLQ | BLQ |
| 1,1-Dichloropropylene | µg/m ³ | BLQ | BLQ |
| 1,2-Dichloroethane | µg/m ³ | BLQ | BLQ |
| 1,2-Dichloropropane | µg/m ³ | BLQ | BLQ |
| Trans-1,3-Dichloropropene | µg/m ³ | BLQ | BLQ |
| CIS 1,3-Dichloropropene | µg/m ³ | BLQ | BLQ |
| 1,1,2-Trichloroethane | µg/m ³ | BLQ | BLQ |
| Tetrachloroethylene | µg/m ³ | BLQ | BLQ |
| 1,3,5-Trimethylbenzene | µg/m ³ | BLQ | BLQ |
| N-Butylbenzene | µg/m ³ | BLQ | BLQ |
| 1,2,3-Trichlorobenzene | µg/m ³ | BLQ | BLQ |
| Hexachlorobutadiene | µg/m ³ | BLQ | BLQ |
| 1,2,4-Trichlorobenzene | µg/m ³ | BLQ | BLQ |
| 2,2-Dichloropropane | µg/m ³ | BLQ | BLQ |
| Dibromomethane | µg/m ³ | BLQ | BLQ |

| Parameters | Unit | Results | |
|----------------------------|-------------------|----------------------------------|----------------------------|
| | | Near Mahindra & Mahindra Plant I | Near MSL Drive Line System |
| Toluene | µg/m ³ | 3.05 | 3.32 |
| O-Xylene | µg/m ³ | BLQ | BLQ |
| Bromoform | µg/m ³ | BLQ | BLQ |
| 1,1,2,2-Tetrachloroethane | µg/m ³ | BLQ | BLQ |
| 4-Chlorotoluene | µg/m ³ | BLQ | BLQ |
| 1,1-Dichloroethylene | µg/m ³ | BLQ | BLQ |
| Trans-1,2-Dichloroethylene | µg/m ³ | BLQ | BLQ |
| 1,1-Dichloroethane | µg/m ³ | BLQ | BLQ |
| CIS-1,2-Dichloroethylene | µg/m ³ | BLQ | BLQ |
| Bromochloromethane | µg/m ³ | BLQ | BLQ |
| 1,1,1-Trichloroethane | µg/m ³ | BLQ | BLQ |

Graphs - Ambient Air Quality Monitoring of MIDC Satpur





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 general appearance, colour, smell and transparency.
 - pH and suspended solids are well within the limits in both samples collected.
 - BOD exceeded at both samples collected.
 - 100% survival in Fish Bioassay was not observed at both locations.
 - Metals like Total Arsenic, Hexavalent Chromium (Cr^{6+}), Lead, Cadmium, etc. are observed either below limit of quantification or below their standard limits.
 - Metals like Zinc, Nickel, Copper, Total Chromium, Iron, etc. are found above the standard limits.
 - Parameters like Total Residual Chlorine, Cyanide, 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 both samples collected.
 - 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 | 16.01.2023 | 18.01.2023 | 20.01.2023 |
| 2. | Ambadgaon Nalla | 19°96'0.91"N | 73°74'5.36"E | 16.01.2023 | 18.01.2023 | 20.01.2023 |



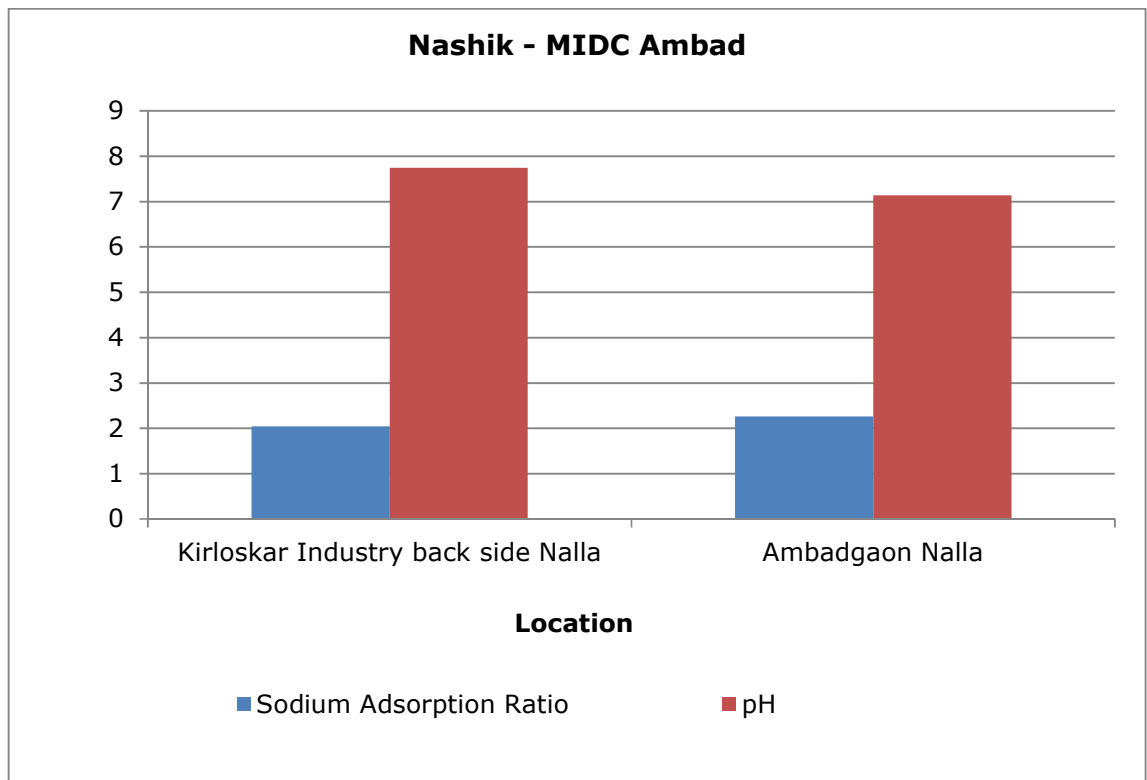
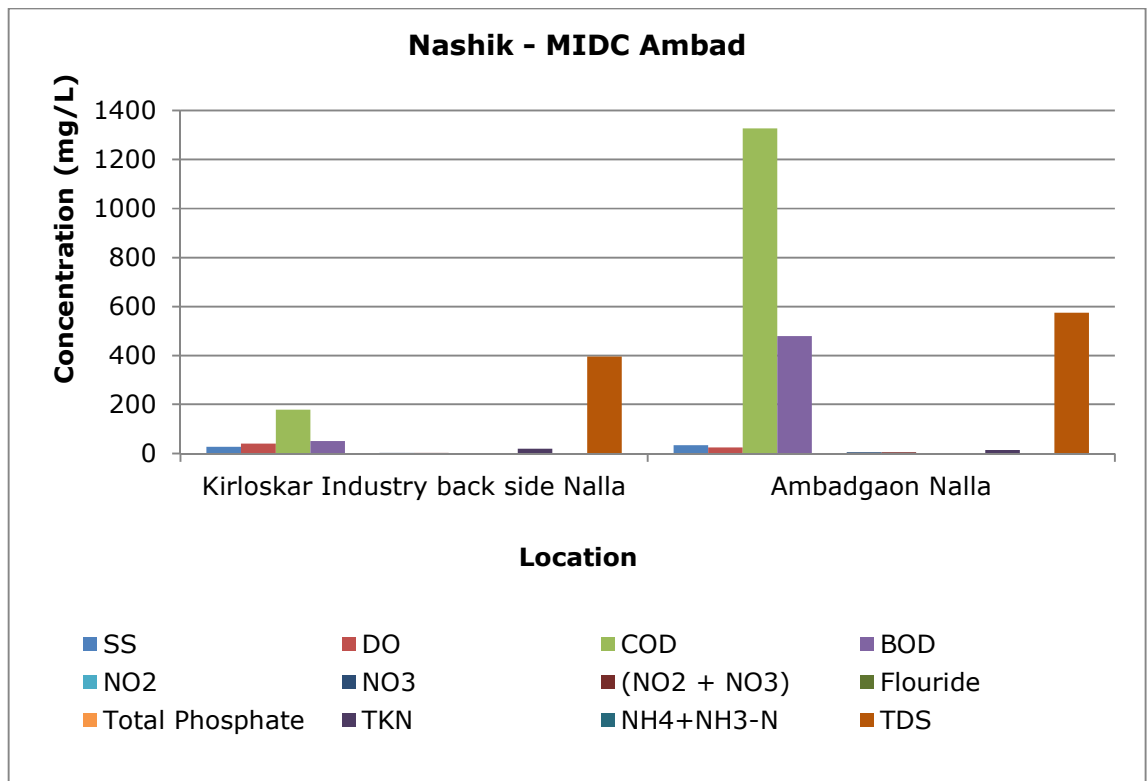
Fig. Geographical Locations of Surface Water Sampling MIDC Ambad

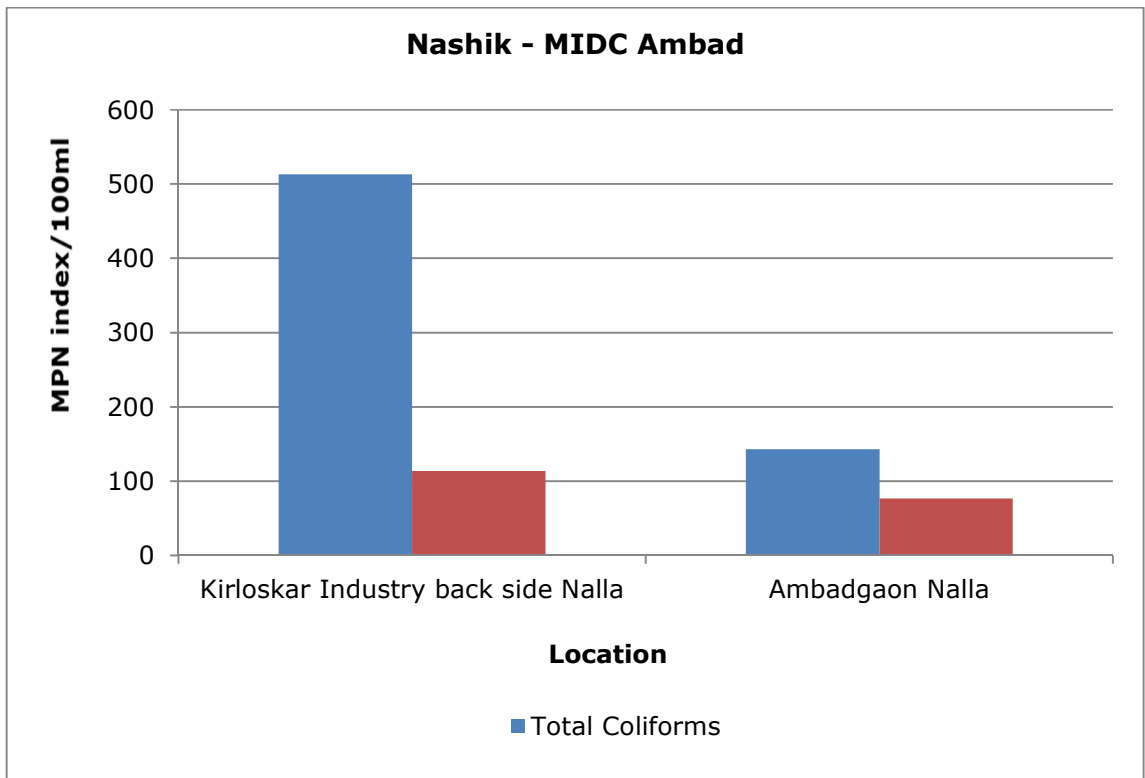
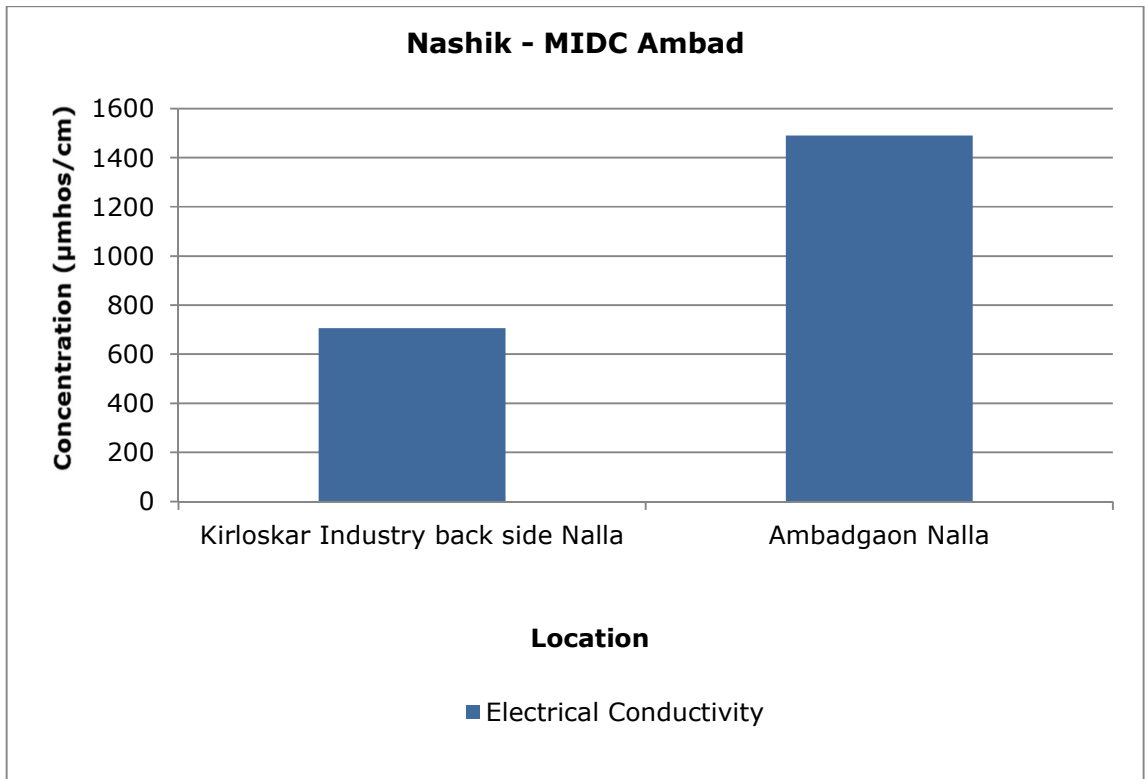
Table 6.2 MIDC Ambad - Results of Surface Water

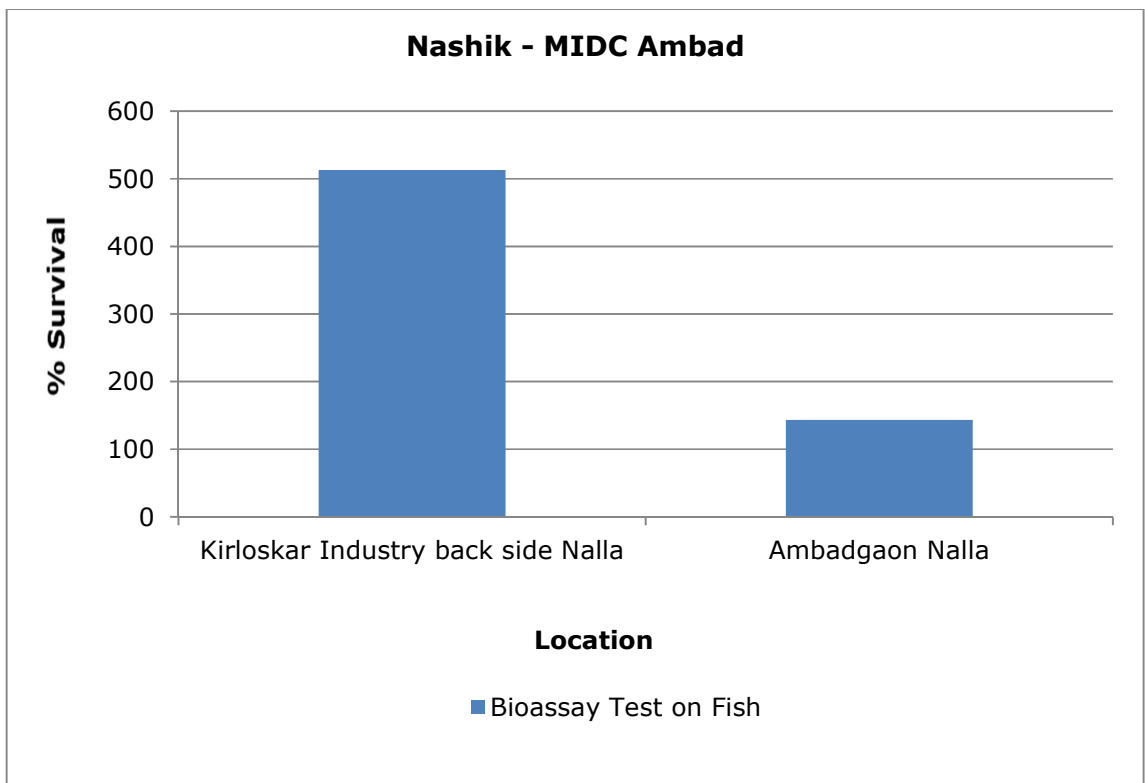
| Parameters | Unit | Results | |
|--|---------|------------------------------------|-------------------------------|
| | | Kirloskar Industry back side Nalla | Ambadgaon Nalla |
| Sanitary Survey | - | Generally clean neighbourhood | Generally clean neighbourhood |
| General Appearance | - | Floating Matter Evident | Floating Matter Evident |
| Transparency | m | 0.5 | 0.5 |
| Temperature | °C | 27 | 27 |
| Colour | Hazen | 2 | 3 |
| Smell | - | Agreeable | Not Agreeable |
| pH | - | 7.75 | 7.14 |
| Oil & Grease | mg/L | BLQ | BLQ |
| Suspended Solids | mg/L | 28 | 34 |
| Total Dissolved Solids | mg/L | 396 | 575 |
| Dissolved Oxygen (% Saturation) | % | 41 | 25 |
| Chemical Oxygen Demand | mg/L | 178 | 1327 |
| Biochemical Oxygen Demand (3 days, 27°C) | mg/L | 51 | 479 |
| Electrical Conductivity (at 25 °C) | µmho/cm | 705 | 1490 |
| Nitrite Nitrogen (as NO ₂) | mg/L | 0.02 | 0.17 |
| Nitrate Nitrogen (as NO ₃) | mg/L | 3.10 | 5.4 |

| Parameters | Unit | Results | |
|--|----------------------|---------------------------------------|-----------------|
| | | Kirloskar Industry back side Nalla | Ambadgaon Nalla |
| (NO ₂ + NO ₃)-Nitrogen | mg/L | 3.10 | 5.5 |
| Free Ammonia (as NH ₃ -N) | mg/L | BLQ | BLQ |
| Total Residual Chlorine | mg/L | 0.06 | 0.06 |
| Cyanide (as CN) | mg/L | BLQ | BLQ |
| Fluoride (as F) | mg/L | 0.7 | 1.1 |
| Sulphide (as H ₂ S) | mg/L | BLQ | BLQ |
| Dissolved Phosphate (as P) | mg/L | 0.2 | 0.25 |
| Sodium Adsorption Ratio | - | 2.04 | 2.26 |
| Total Coliforms | MPN Index/ 100 ml | 513 | 143 |
| Faecal Coliforms | MPN Index/ 100 ml | 114 | 77 |
| Total Phosphate (as P) | mg/L | 0.32 | 0.37 |
| Total Kjeldahl Nitrogen (as N) | mg/L | 20.4 | 13.7 |
| Total Ammonia (NH ₄ +NH ₃)-Nitrogen | mg/L | 0.89 | 0.5 |
| Phenols (as C ₆ H ₅ OH) | 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 | BLQ | BLQ |
| Polychlorinated Biphenyls (PCB) | mg/L | BLQ | BLQ |
| Zinc (as Zn) | mg/L | 0.299 | 14.6 |
| Nickel (as Ni) | mg/L | 0.353 | 0.128 |
| Copper (as Cu) | mg/L | 0.044 | 0.154 |
| Hexavalent Chromium (as Cr ⁶⁺) | mg/L | BLQ | BLQ |
| Total Chromium (as Cr) | mg/L | 1.35 | 0.27 |
| Total Arsenic (as As) | mg/L | 0.006 | BLQ |
| Lead (as Pb) | mg/L | 0.01 | BLQ |
| Cadmium (as Cd) | mg/L | BLQ | BLQ |
| Mercury (as Hg) | mg/L | BLQ | BLQ |
| Manganese (as Mn) | mg/L | 0.181 | 1.16 |
| Iron (as Fe) | mg/L | 1.319 | 1.91 |
| Vanadium (as V) | mg/L | 0.016 | 0.035 |
| Selenium (as Se) | mg/L | 0.006 | 0.006 |
| Boron (as B) | mg/L | 0.26 | 0.49 |
| Total Nitrogen | mg/L | 24 | 19 |
| Bioassay Test on fish | % survival | 83 | 67 |

Graphs - Surface Water Quality of MIDC Ambad







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

- Three surface water sample are acceptable in general appearance, colour, smell and transparency.
- pH and suspended solids are well within the limits in both samples collected.
- BOD exceeded at one sample collected.
- 100% survival in Fish Bioassay was observed only at Sahid Arun Chitte Pool Anandvadi, Gangapur Road.
- Metals like Hexavalent Chromium (Cr⁶⁺), Total Arsenic, Lead, Cadmium, Mercury, Vanadium, Selenium, etc. are observed either below limit of quantification or below their standard limits.
- Metals like Zinc, Nickel, Copper, Manganese, Iron and Total Chromium are found above the standard limits.
- Parameters like Total Residual Chlorine, 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 below the limit of quantification in all samples collected.
- Organo Chlorine Pesticides are also below the limit of quantification in all 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 | 10.01.2023 | 12.01.2023 | 14.01.2023 |
| 2. | Nasardi Pool, Near EPF Office Satpur | 19°98'8.99"N | 73°75'01.85"E | 10.01.2023 | 12.01.2023 | 14.01.2023 |
| 3. | ALP industry Opposite side Nalla | 20°00'6.78"N | 73°71'4.04"E | 10.01.2023 | 12.01.2023 | 14.01.2023 |

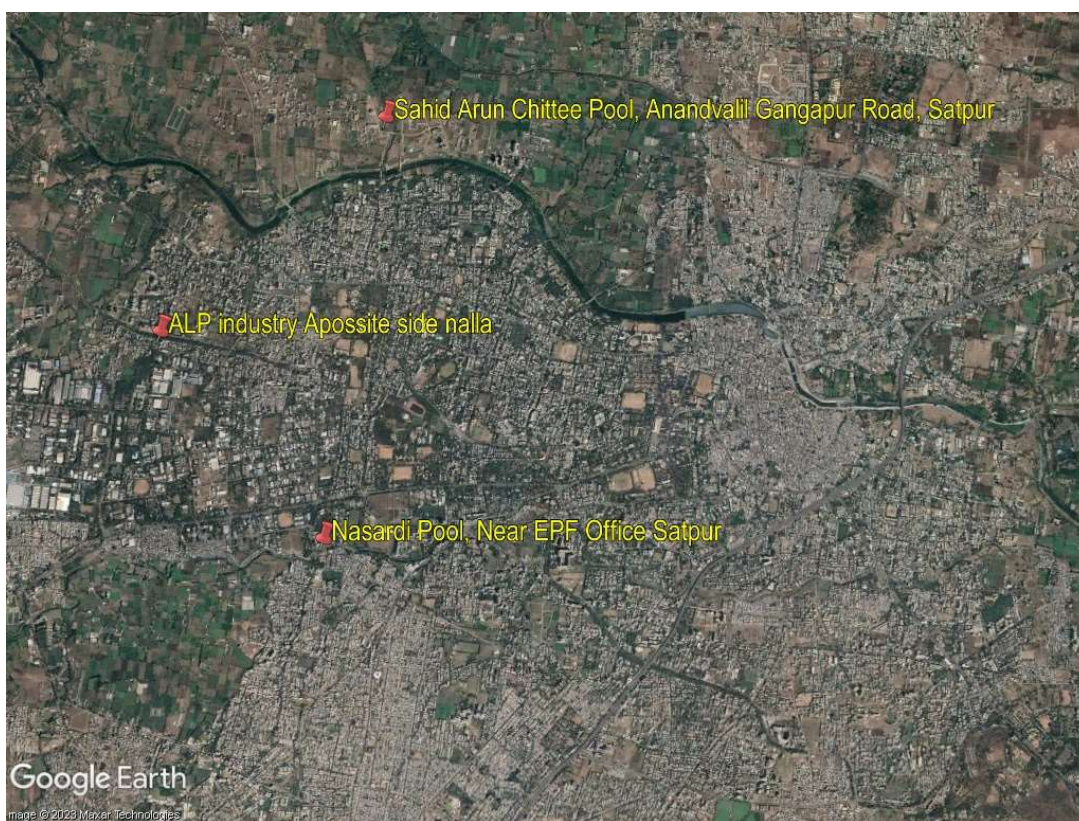


Fig. Geographical Locations of Surface Water Sampling MIDC Satpur

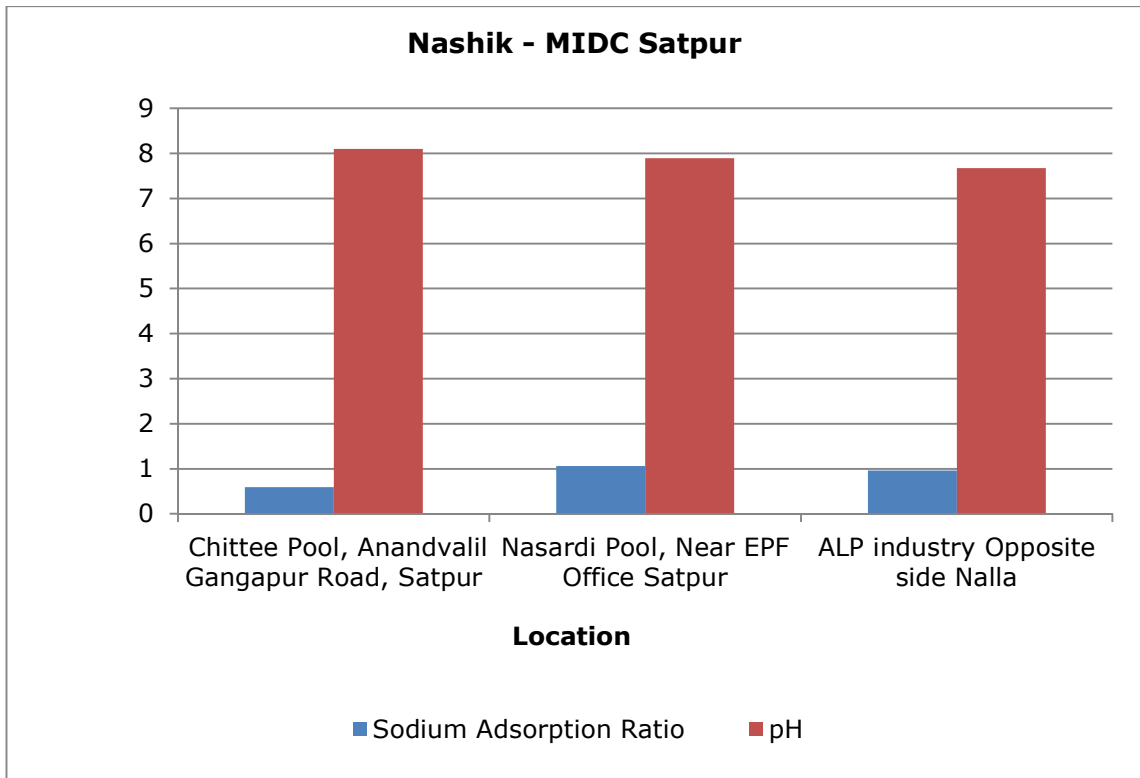
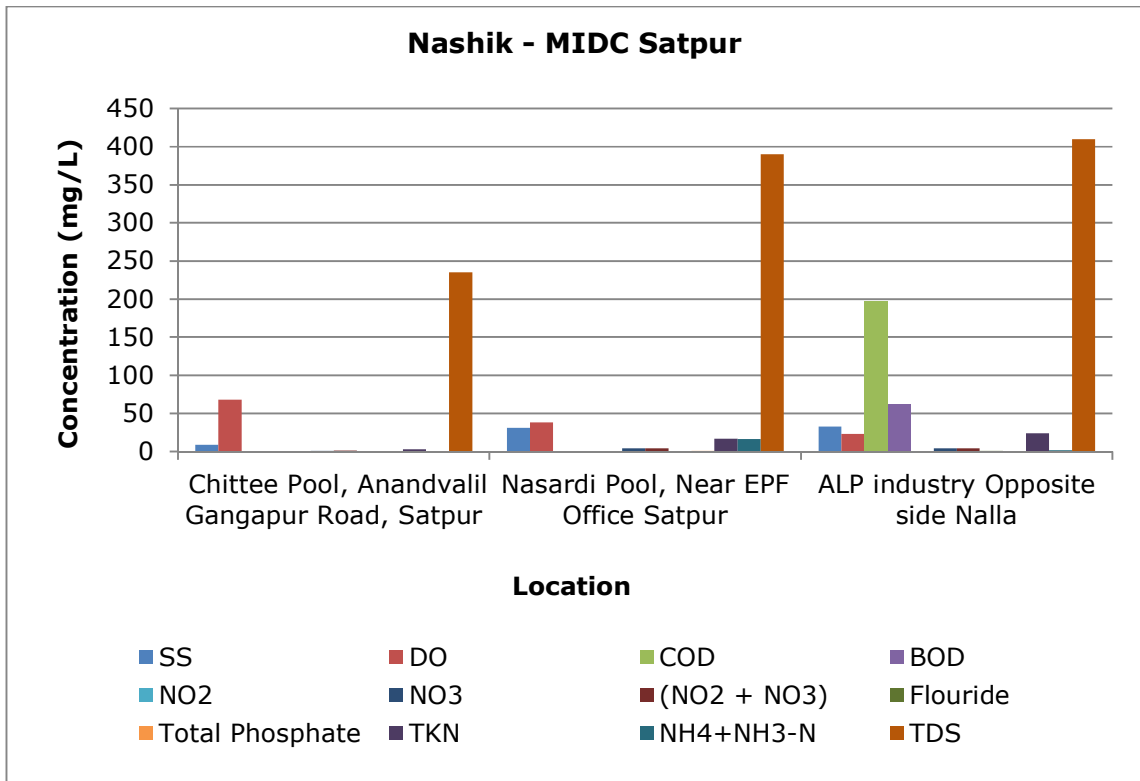
Table 6.4 MIDC Satpur Results of Surface Water

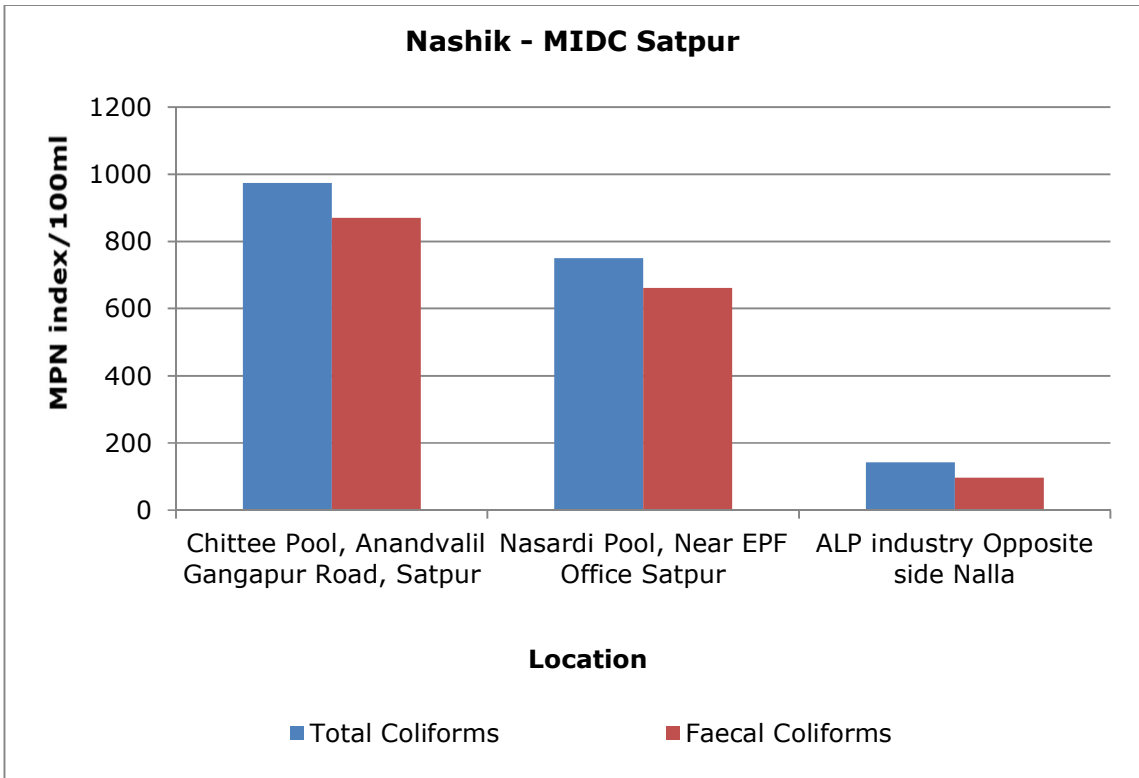
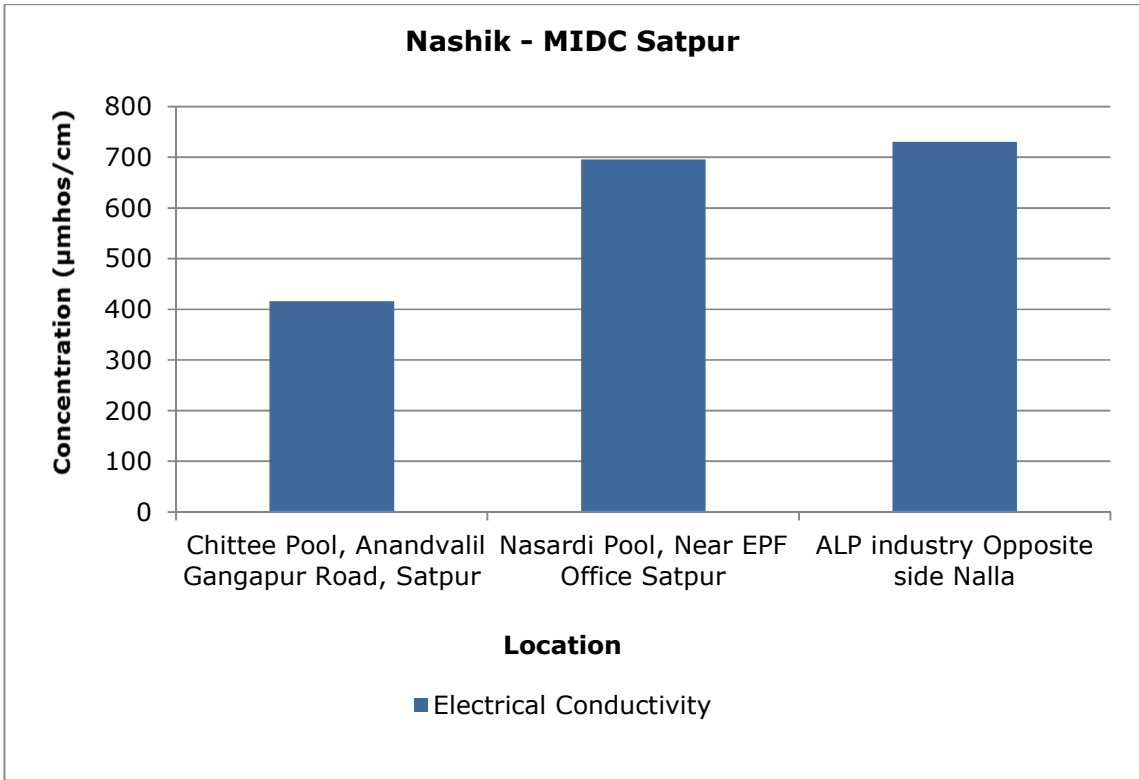
| Parameters | Unit | Results | | |
|---------------------------------|-------|---|--------------------------------------|----------------------------------|
| | | Sahid Arun Chittee Pool, Anandvalil Gangapur Road, Satpur | Nasardi Pool, Near EPF Office Satpur | ALP industry Opposite side Nalla |
| Sanitary Survey | - | Reasonably Clean neighbourhood | Generally clean neighbourhood | Generally clean neighbourhood |
| General Appearance | - | Floating Matter Evident | Floating Matter Evident | Floating Matter Evident |
| Transparency | m | 1.2 | 0.5 | 0.5 |
| Temperature | °C | 27 | 27 | 27 |
| Colour | Hazen | 1 | 1 | 1 |
| Smell | - | Agreeable | Agreeable | Not Agreeable |
| pH | - | 8.10 | 7.89 | 7.67 |
| Oil & Grease | mg/L | BLQ | BLQ | BLQ |
| Suspended Solids | mg/L | 9 | 31 | 33 |
| Total Dissolved Solids | mg/L | 235 | 390 | 410 |
| Dissolved Oxygen (% Saturation) | % | 68 | 38 | 23 |
| Chemical Oxygen Demand | mg/L | BLQ | BLQ | 198 |

| Parameters | Unit | Results | | |
|---|----------------------|---|--------------------------------------|----------------------------------|
| | | Sahid Arun Chittee Pool, Anandvalil Gangapur Road, Satpur | Nasardi Pool, Near EPF Office Satpur | ALP industry Opposite side Nalla |
| Biochemical Oxygen Demand (3 days, 27°C) | mg/L | BLQ | BLQ | 63 |
| Electrical Conductivity (at 25 °C) | µmho/cm | 416 | 695 | 730 |
| Nitrite Nitrogen (as NO ₂) | mg/L | 0.21 | 0.05 | 0.04 |
| Nitrate Nitrogen (as NO ₃) | mg/L | 1.01 | 3.9 | 3.96 |
| (NO ₂ + NO ₃)-Nitrogen | mg/L | 1.22 | 3.9 | 4.0 |
| Free Ammonia (as NH ₃ -N) | mg/L | BLQ | 0.12 | BLQ |
| Total Residual Chlorine | mg/L | 0.28 | 0.39 | 0.17 |
| Cyanide (as CN) | mg/L | BLQ | BLQ | BLQ |
| Fluoride (as F) | mg/L | 0.63 | 0.7 | 0.73 |
| Sulphide (as H ₂ S) | mg/L | BLQ | BLQ | BLQ |
| Dissolved Phosphate (as P) | mg/L | BLQ | 0.37 | 0.32 |
| Sodium Adsorption Ratio | - | 0.59 | 1.06 | 0.96 |
| Total Coliforms | MPN Index/ 100 ml | 975 | 750 | 143 |
| Faecal Coliforms | MPN Index/ 100 ml | 870 | 661 | 97 |
| Total Phosphate (as P) | mg/L | 0.3 | 0.79 | 0.54 |
| Total Kjeldahl Nitrogen (as N) | mg/L | 2.69 | 16.61 | 23.8 |
| Total Ammonia (NH ₄ +NH ₃)-Nitrogen | mg/L | 0.185 | 16.4 | 1.72 |
| Phenols (as C ₆ H ₅ OH) | 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 | BLQ | 0.968 | 0.671 |
| Nickel (as Ni) | mg/L | 0.01 | 0.1385 | 0.043 |
| Copper (as Cu) | mg/L | BLQ | 0.202 | 0.305 |
| Hexavalent Chromium (as Cr ⁶⁺) | mg/L | BLQ | BLQ | BLQ |
| Total Chromium (as Cr) | mg/L | BLQ | 0.3155 | 0.05 |
| Total Arsenic (as As) | mg/L | BLQ | BLQ | BLQ |
| Lead (as Pb) | mg/L | BLQ | 0.024 | BLQ |
| Cadmium (as Cd) | mg/L | 0.002 | 0.002 | BLQ |

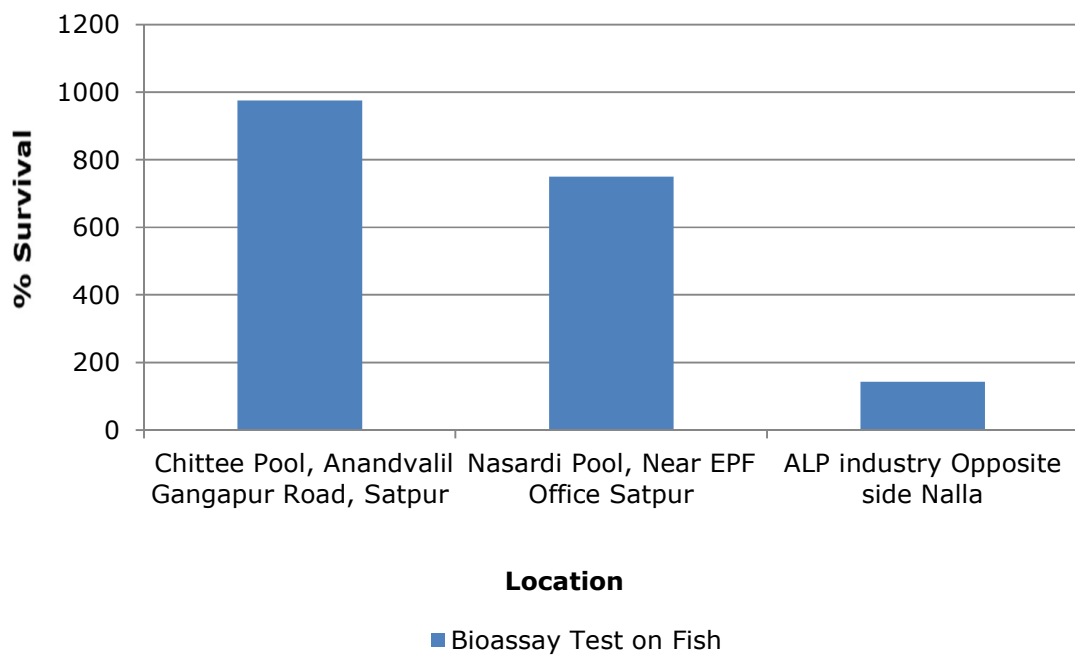
| Parameters | Unit | Results | | |
|-----------------------|------------|---|--------------------------------------|----------------------------------|
| | | Sahid Arun Chittee Pool, Anandvalil Gangapur Road, Satpur | Nasardi Pool, Near EPF Office Satpur | ALP industry Opposite side Nalla |
| Mercury (as Hg) | mg/L | BLQ | BLQ | BLQ |
| Manganese (as Mn) | mg/L | 0.096 | 0.276 | 0.248 |
| Iron (as Fe) | mg/L | 0.399 | 3.24 | 3.11 |
| Vanadium (as V) | mg/L | 0.017 | 0.066 | 0.022 |
| Selenium (as Se) | mg/L | BLQ | BLQ | BLQ |
| Boron (as B) | mg/L | 0.103 | 0.211 | 0.27 |
| Total Nitrogen | mg/L | 5 | 21 | 27.8 |
| Bioassay Test on fish | % survival | 100 | 80 | 73 |

Graphs - Surface Water Quality of MIDC Satpur





Nashik - MIDC Satpur



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 and BOD are also well within the limits at all six samples collected.
- 100% survival was achieved in Fish Bioassay in all samples collected other than well water from Hotel Tapovan Garvare Point, Shivaji Kachru Chavan, Gat No 154/3, Village Vilholi and Dashrath Pandit Nikam, Plot No. 4, Mauli Chowk, Datta Nagar, Village Chinchale.
- Total Kjeldahl Nitrogen exceeds in all six samples collected.
- Metals like Zinc, Nickel, Hexavalent Chromium (Cr⁶⁺), Total Chromium, Total Arsenic, Lead, Cadmium etc. are observed either below limit of quantification or below their standard limits.
- Parameters like Total Residual Chlorine, Cyanide, Sulphide, Dissolved Phosphate, Total Ammonical Nitrogen and Phenolic compounds, also meet the criteria as prescribed by CPCB.
- Total Phosphate exceeded in the five 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 | 17.01.2023 | 19.01.2023 | 21.01.2023 |
| 2. | Shivaji Kachru Chavan, Gat No 154/3, Village Vilholi (Well Water) | 19°95'75.31"N | 73°75'45.12"E | 17.01.2023 | 19.01.2023 | 21.01.2023 |
| 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 | 17.01.2023 | 19.01.2023 | 21.01.2023 |

| 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 | 17.01.2023 | 19.01.2023 | 21.01.2023 |
| 5. | Govind Vitthoba Shirsath, Sirshat Vasti, Ambad Gaon (Well Water) | 19°95'31.15"N | 73°73'89.06"E | 17.01.2023 | 19.01.2023 | 21.01.2023 |
| 6. | Sai Eknath Park (Near Indoline Furniture) (Bore Well Water) | 19°96'08.35"N | 73°75'02.32"E | 17.01.2023 | 19.01.2023 | 21.01.2023 |



Fig. Geographical Locations of Ground Water Sampling MIDC Ambad

Table 7.2 MIDC Ambad - Results of Ground Water

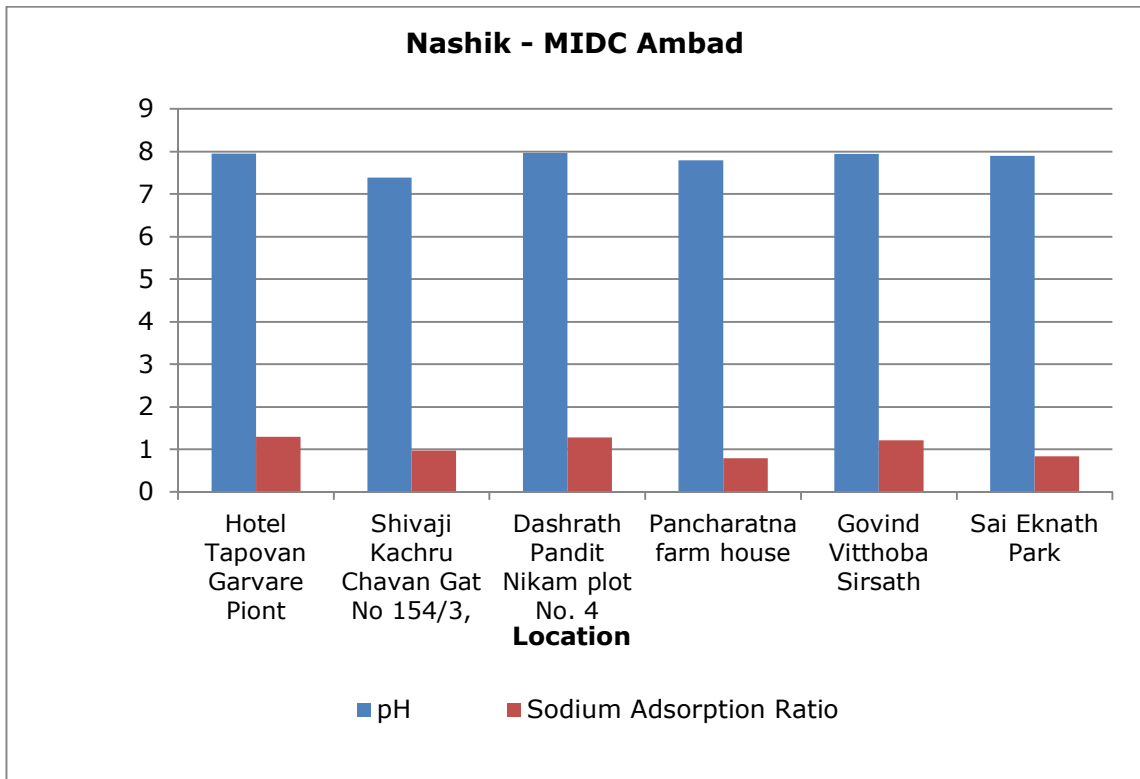
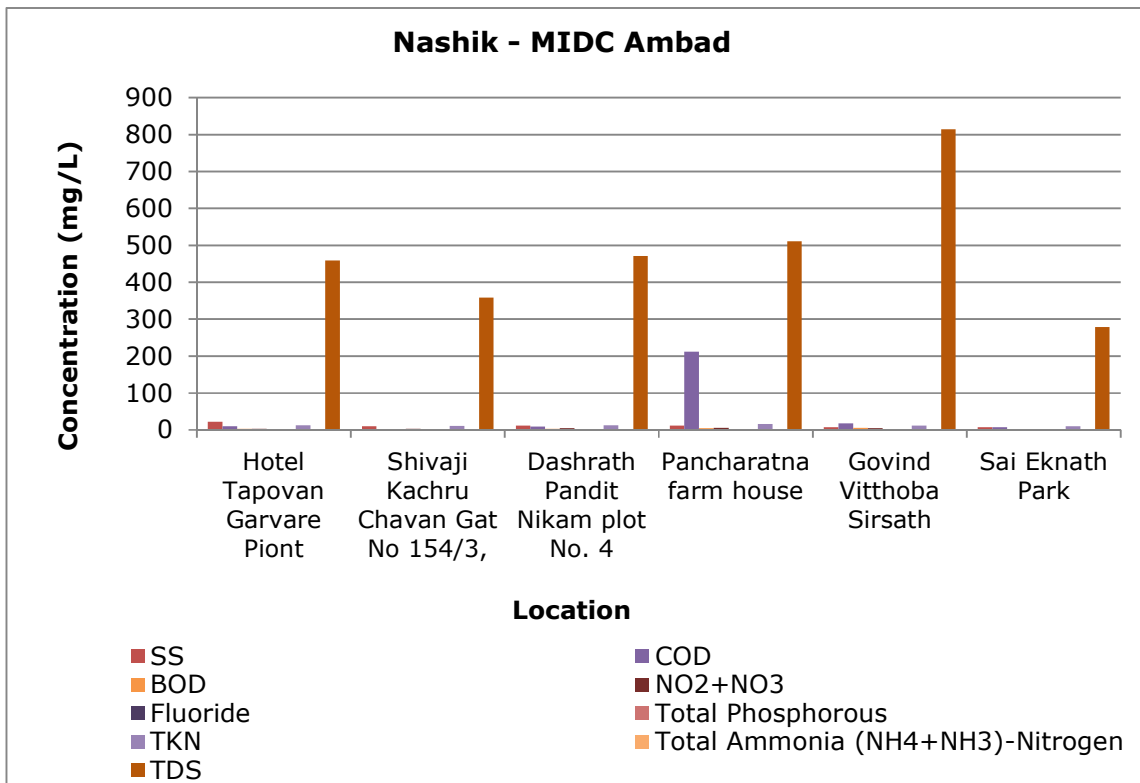
| Parameters | Unit | Results | | |
|---|------------------|---|---|--|
| | | Hotel Tapovan Garvare Point (Bore well Water) | Shivaji Kachru Chavan, Gat No 154/3, Village Vilholi (Well Water) | Dashrath Pandit Nikam, Plot No. 4, Mauli Chowk, Datta Nagar, Village Chinchale (Bore well Water) |
| Sanitary Survey | - | Very Clean Neighbourhood and Catchment | Reasonably clean neighbourhood | Generally Clean Neighbourhood |
| General Appearance | - | Not Applicable | Floating Matter Evident | Not Applicable |
| Transparency | m | Not Applicable | 1.4 | Not Applicable |
| Temperature | °C | 26 | 26 | 26 |
| Colour | Hazen | 1 | 2 | 2 |
| Odour | - | Agreeable | Agreeable | Agreeable |
| pH | - | 7.95 | 7.38 | 7.96 |
| Oil & Grease | mg/L | BLQ | BLQ | BLQ |
| Suspended Solids | mg/L | 22 | 10 | 12 |
| Total Dissolved Solids | mg/L | 459 | 359 | 471 |
| Chemical Oxygen Demand | mg/L | 10 | BLQ | 9 |
| Biochemical Oxygen Demand (3 days, 27°C) | mg/L | 3 | BLQ | 3 |
| Electrical Conductivity (at 25°C) | µmhos/cm | 813 | 640 | 840 |
| Nitrite Nitrogen (as NO ₂) | mg/L | BLQ | BLQ | 0.03 |
| Nitrate Nitrogen (as NO ₃) | mg/L | 2.73 | 2.52 | 4.23 |
| (NO ₂ + NO ₃)-Nitrogen | mg/L | 2.73 | 2.52 | 4.24 |
| Free Ammonia (as NH ₃ -N) | mg/L | BLQ | BLQ | BLQ |
| Total Residual Chlorine | mg/L | BLQ | 0.08 | 0.09 |
| Cyanide (as CN) | mg/L | BLQ | BLQ | BLQ |
| Fluoride (as F) | mg/L | 0.8 | 0.6 | 0.8 |
| Sulphide (as H ₂ S) | mg/L | BLQ | BLQ | BLQ |
| Dissolved Phosphate (as P) | mg/L | 0.21 | 0.21 | 0.21 |
| Sodium Adsorption Ratio | - | 1.3 | 0.97 | 1.28 |
| Total Coliforms | MPN Index/100 ml | 185 | 135 | 216 |
| Faecal Coliforms | MPN Index/100 ml | 130 | 56.5 | 126 |
| Total Phosphate (as PO ₄) | mg/L | 0.57 | 0.32 | 0.72 |

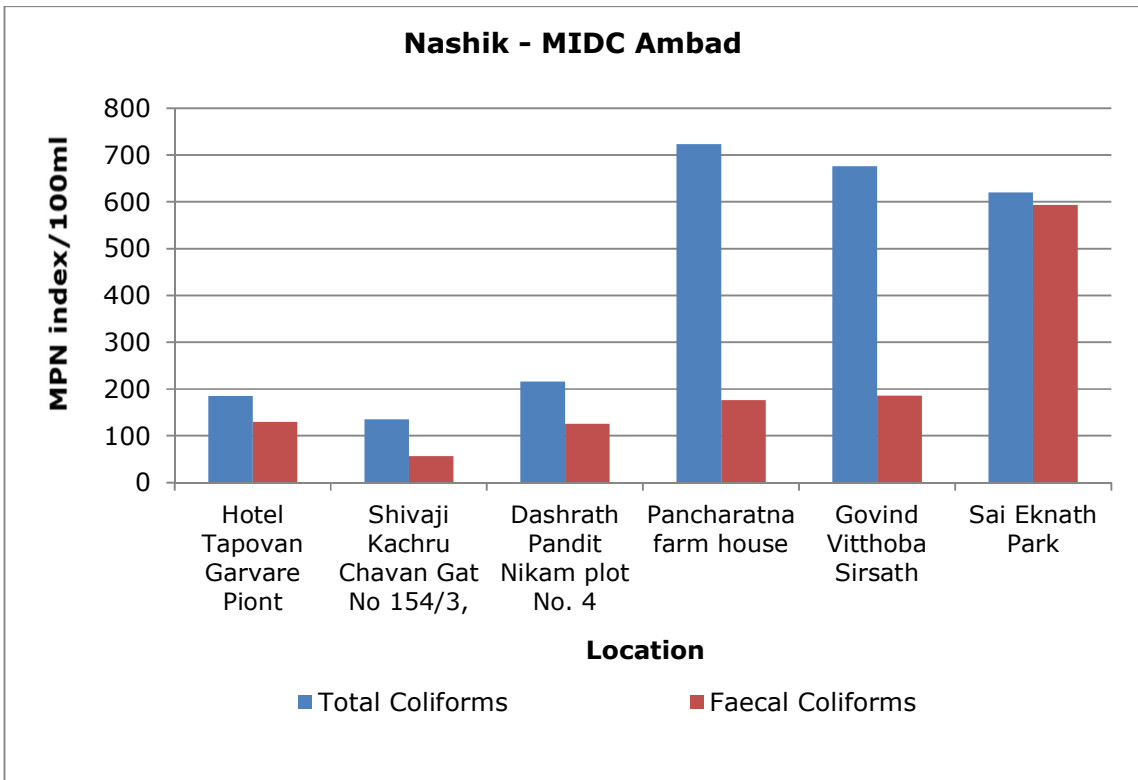
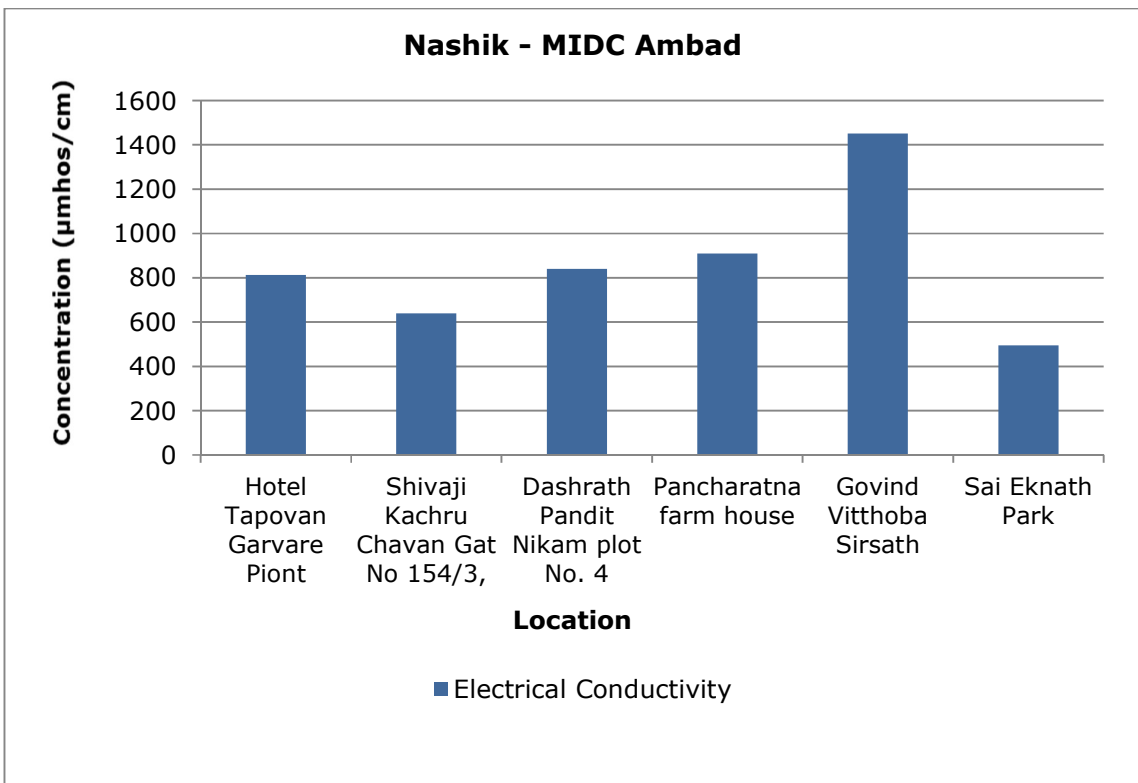
| Parameters | Unit | Results | | |
|---|------------|---|---|--|
| | | Hotel Tapovan Garvare Point (Bore well Water) | Shivaji Kachru Chavan, Gat No 154/3, Village Vilholi (Well Water) | Dashrath Pandit Nikam, Plot No. 4, Mauli Chowk, Datta Nagar, Village Chinchale (Bore well Water) |
| Total Kjeldahl Nitrogen | mg/L | 12.23 | 10.55 | 12.8 |
| Total Ammonia (NH ₄ +NH ₃)-Nitrogen | mg/L | 0.39 | 0.27 | 0.38 |
| Phenols (as C ₆ H ₅ OH) | 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 | 0.07 | BLQ | 0.11 |
| Nickel (as Ni) | mg/L | 0.015 | 0.017 | 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 | 0.165 | BLQ | BLQ |
| Iron (as Fe) | mg/L | 0.173 | 0.228 | 0.812 |
| Vanadium (as V) | mg/L | 0.04 | 0.069 | 0.02 |
| Selenium (as Se) | mg/L | 0.01 | 0.011 | 0.0075 |
| Total Nitrogen | mg/L | 14.97 | 13.05 | 17.1 |
| Boron (as B) | mg/L | 0.148 | 0.181 | 0.111 |
| Bioassay Test on fish | % survival | 100 | 100 | 100 |

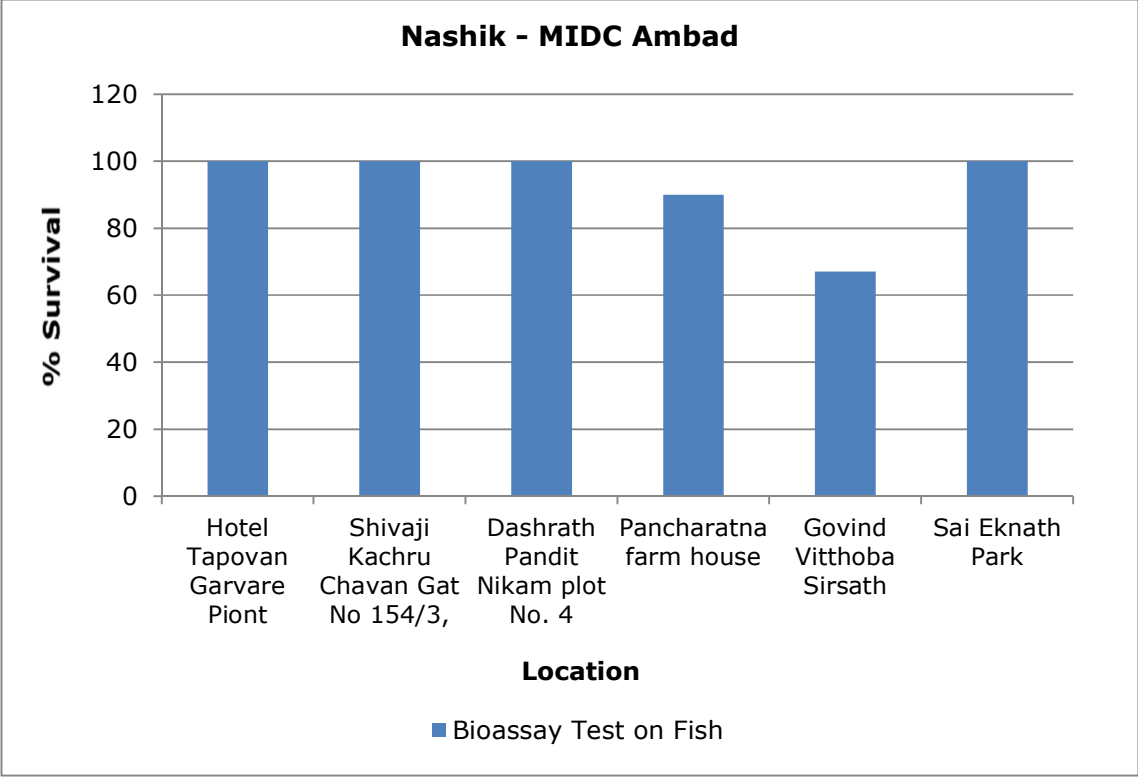
| Parameters | Unit | Results | | |
|---|------------------|--|---|---|
| | | Pancharatna Farm, Maruti Sankul, Datta Nagar, Backside Kirloskar Oil India Pvt. Ltd. (Bore well Water) | Govind Vitthoba Shirshath, Sirshat Vasti, Ambad Gaon (Well Water) | Sai Eknath Park (Near Indoline Furniture) (Bore Well Water) |
| Sanitary Survey | - | Very Clean Neighbourhood and Catchment | Reasonably Clean Neighbourhood | Very Clean Neighbourhood and Catchment |
| General Appearance | - | Not Applicable | Floating Matter Evident | Not Applicable |
| Transparency | m | Not Applicable | 1.3 | Not Applicable |
| Temperature | °C | 26 | 26 | 26 |
| Colour | Hazen | 1 | 1 | 1 |
| Odour | - | Agreeable | Agreeable | Agreeable |
| pH | - | 7.79 | 7.94 | 7.90 |
| Oil & Grease | mg/L | BLQ | BLQ | BLQ |
| Suspended Solids | mg/L | 12 | 8 | 8 |
| Total Dissolved Solids | mg/L | 511 | 814 | 279 |
| Chemical Oxygen Demand | mg/L | 212 | 17.5 | 7.5 |
| Biochemical Oxygen Demand (3 days, 27°C) | mg/L | 4 | 6 | 2 |
| Electrical Conductivity (at 25°C) | µmhos/cm | 909 | 1451 | 495 |
| Nitrite Nitrogen (as NO ₂) | mg/L | BLQ | 0.02 | BLQ |
| Nitrate Nitrogen (as NO ₃) | mg/L | 5.4 | 4.05 | 1.91 |
| (NO ₂ + NO ₃)-Nitrogen | mg/L | 5.4 | 4.05 | 1.91 |
| Free Ammonia (as NH ₃ -N) | mg/L | BLQ | 0.43 | BLQ |
| Total Residual Chlorine | mg/L | 0.06 | BLQ | 0.06 |
| Cyanide (as CN) | mg/L | BLQ | BLQ | BLQ |
| Fluoride (as F) | mg/L | 0.9 | 1.1 | 0.5 |
| Sulphide (as H ₂ S) | mg/L | BLQ | BLQ | BLQ |
| Dissolved Phosphate (as P) | mg/L | 0.19 | 0.23 | BLQ |
| Sodium Adsorption Ratio | - | 0.79 | 1.21 | 0.84 |
| Total Coliforms | MPN Index/100 ml | 723 | 676 | 620 |
| Faecal Coliforms | MPN Index/100 ml | 176 | 186 | 593 |
| Total Phosphate (as PO ₄) | mg/L | 0.54 | 0.65 | BLQ |
| Total Kjeldahl Nitrogen | mg/L | 15.58 | 12.05 | 10.36 |

| Parameters | Unit | Results | | |
|---|------------|--|---|---|
| | | Pancharatna Farm, Maruti Sankul, Datta Nagar, Backside Kirloskar Oil India Pvt. Ltd. (Bore well Water) | Govind Vitthoba Shirshath, Sirshat Vasti, Ambad Gaon (Well Water) | Sai Eknath Park (Near Indoline Furniture) (Bore Well Water) |
| Total Ammonia (NH ₄ +NH ₃)-Nitrogen | mg/L | 0.43 | 0.43 | 0.21 |
| Phenols (as C ₆ H ₅ OH) | 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 | BLQ | BLQ | BLQ |
| Nickel (as Ni) | mg/L | 0.013 | 0.018 | BLQ |
| Copper (as Cu) | mg/L | BLQ | 0.058 | BLQ |
| Hexavalent Chromium (as Cr ⁶⁺) | mg/L | 0.23 | BLQ | BLQ |
| Total Chromium (as Cr) | mg/L | 0.501 | 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 | BLQ | 0.033 | BLQ |
| Iron (as Fe) | mg/L | 0.079 | 0.130 | 0.184 |
| Vanadium (as V) | mg/L | 0.0415 | 0.033 | BLQ |
| Selenium (as Se) | mg/L | 0.012 | 0.020 | 0.008 |
| Total Nitrogen | mg/L | 20.9 | 16.13 | 12.26 |
| Boron (as B) | mg/L | 2.49 | 0.330 | BLQ |
| Bioassay Test on fish | % survival | 90 | 67 | 100 |

Graph - Ground Water Quality Monitoring for MIDC Ambad







2. MIDC Satpur:

- All six water samples collected are acceptable in general appearance, colour, smell and transparency.
- pH, suspended solids, BOD, and COD are also well within the limits at all three samples collected.
- 100% survival was achieved in Fish Bioassay except in bore well water Seva Developers Pvt. Ltd., Satpur and Amit Deelip Yadav, Plot No 50, Ganesh Nagar, Satpur.
- Total Kjeldahl Nitrogen exceeds in five locations out of six samples collected.
- Total Phosphate exceeds in two locations out of six samples collected.
- All metals like Zinc, Nickel, Copper, Hexavalent Chromium (Cr⁶⁺), Total Arsenic, Lead, Cadmium, etc. are observed either below limit of quantification or below their standard limits.
- 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, Satpur (Bore Well Water) | 19°99'0.94"N | 73°71'12.79"E | 10.01.2023 | 12.01.2023 | 14.01.2023 |
| 2. | Seva Developers Pvt. Ltd., Satpur (Bore Well Water) | 20°00'29.42"N | 73°74'96.97"E | 10.01.2023 | 12.01.2023 | 14.01.2023 |
| 3. | Shivaji Nagar (Shishila Hospital), Plot No 55/6, Satpur Carbon Naka) (Bore Well Water) | 20° 00'16.34"N | 73°71'12.79"E | 10.01.2023 | 12.01.2023 | 14.01.2023 |

| Sr. No. | Name of Monitoring Location | Latitude | Longitude | Date of Sampling | | |
|---------|---|---------------|---------------|------------------|------------|------------|
| | | | | Round-1 | Round-2 | Round-3 |
| 4. | Shradha Farmhouse, Shardha Moters Back Side) MIDC Satpur (Well Water) | 20°00'5.16"N | 73°72'69.48"E | 10.01.2023 | 12.01.2023 | 14.01.2023 |
| 5. | Amit Deelip Yadav, Plot No 50, Ganesh Nagar, Satpur (Bore Well Water) | 20°00'57.45"N | 73°73'80.03"E | 10.01.2023 | 12.01.2023 | 14.01.2023 |
| 6. | Rudhra Evershine, Virshab Industries Back Side, Vanvihar Colony, Satpur (Bore Well Water) | 20°00'57.45"N | 73°73'80.03"E | 10.01.2023 | 12.01.2023 | 14.01.2023 |



Fig. Geographical Locations of Ground Water Sampling MIDC Satpur

Table 7.4 MIDC Satpur - Results of Ground Water

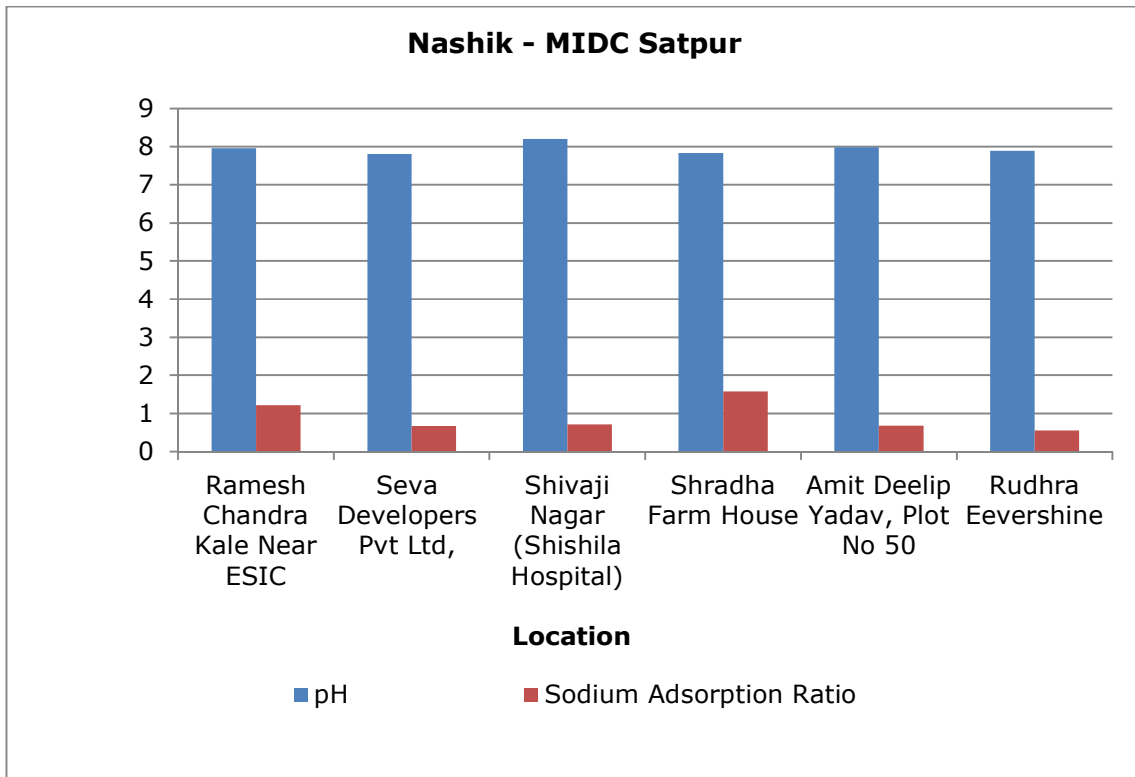
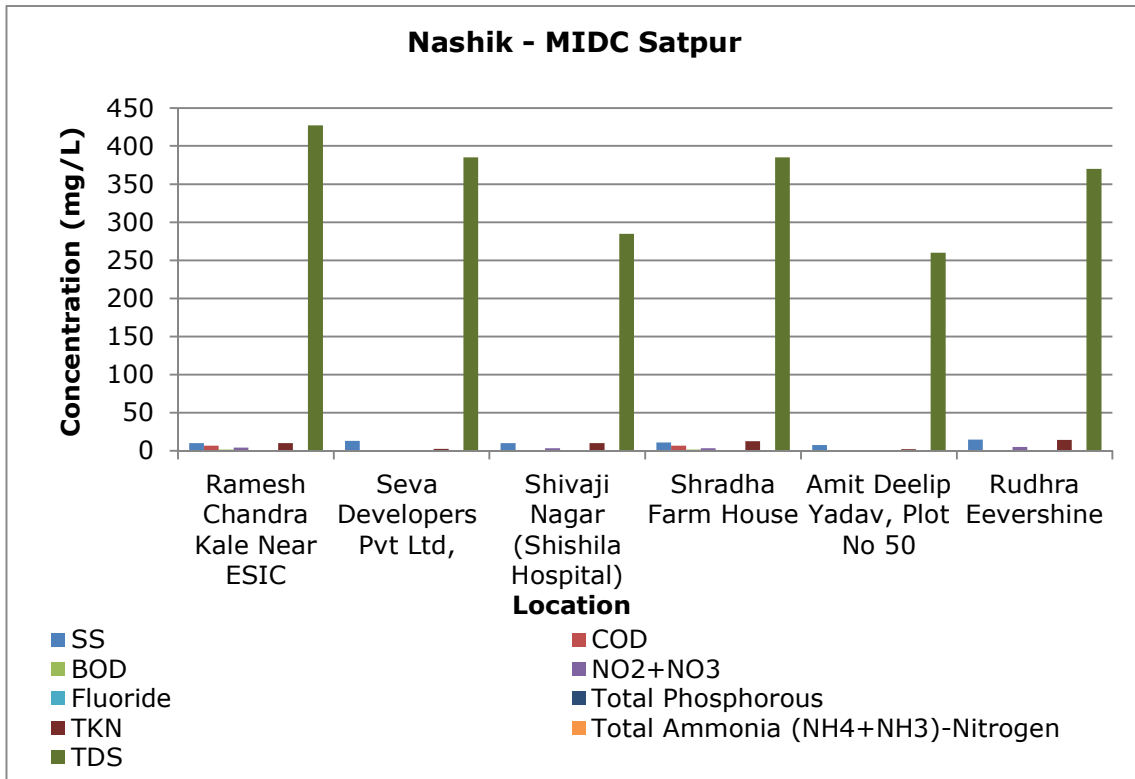
| Parameters | Unit | Results | | |
|---|------------------|---|---|--|
| | | Ramesh Chandra Kale Near ESI Hospital, Satpur (Bore Well Water) | Seva Developers Pvt. Ltd., Satpur (Bore Well Water) | Shivaji Nagar (Shishila Hospital), Plot No 55/6, Satpur Carbon Naka) (Bore Well Water) |
| Sanitary Survey | - | 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 | °C | 26 | 26 | 26 |
| Colour | Hazen | 1 | 2 | 2 |
| Odour | - | Agreeable | Agreeable | Agreeable |
| pH | - | 7.96 | 7.81 | 8.21 |
| Oil & Grease | mg/L | BLQ | BLQ | BLQ |
| Suspended Solids | mg/L | 10 | 13 | 10 |
| Total Dissolved Solids | mg/L | 427 | 385 | 285 |
| Chemical Oxygen Demand | mg/L | 7 | BLQ | BLQ |
| Biochemical Oxygen Demand (3 days, 27°C) | mg/L | 2 | BLQ | BLQ |
| Electrical Conductivity (at 25°C) | µmhos/cm | 762 | 687 | 507 |
| Nitrite Nitrogen (as NO ₂) | mg/L | BLQ | 0.02 | 0.02 |
| Nitrate Nitrogen (as NO ₃) | mg/L | 1.91 | 0.65 | 3.60 |
| (NO ₂ + NO ₃)-Nitrogen | mg/L | 1.91 | 0.66 | 3.60 |
| Free Ammonia (as NH ₃ -N) | mg/L | BLQ | BLQ | BLQ |
| Total Residual Chlorine | mg/L | BLQ | 0.08 | BLQ |
| Cyanide (as CN) | mg/L | BLQ | BLQ | BLQ |
| Fluoride (as F) | mg/L | 0.7 | 0.7 | 0.6 |
| Sulphide (as H ₂ S) | mg/L | BLQ | BLQ | BLQ |
| Dissolved Phosphate (as P) | mg/L | 0.175 | 0.12 | 0.15 |
| Sodium Adsorption Ratio | - | 1.21 | 0.67 | 0.71 |
| Total Coliforms | MPN Index/100 ml | 7.8 | 20.5 | 148 |
| Faecal Coliforms | MPN Index/100 ml | 4.5 | 10.9 | 132 |
| Total Phosphate (as PO ₄) | mg/L | 0.34 | 0.54 | 0.24 |
| Total Kjeldahl Nitrogen | mg/L | 10.08 | 2.87 | 10.27 |

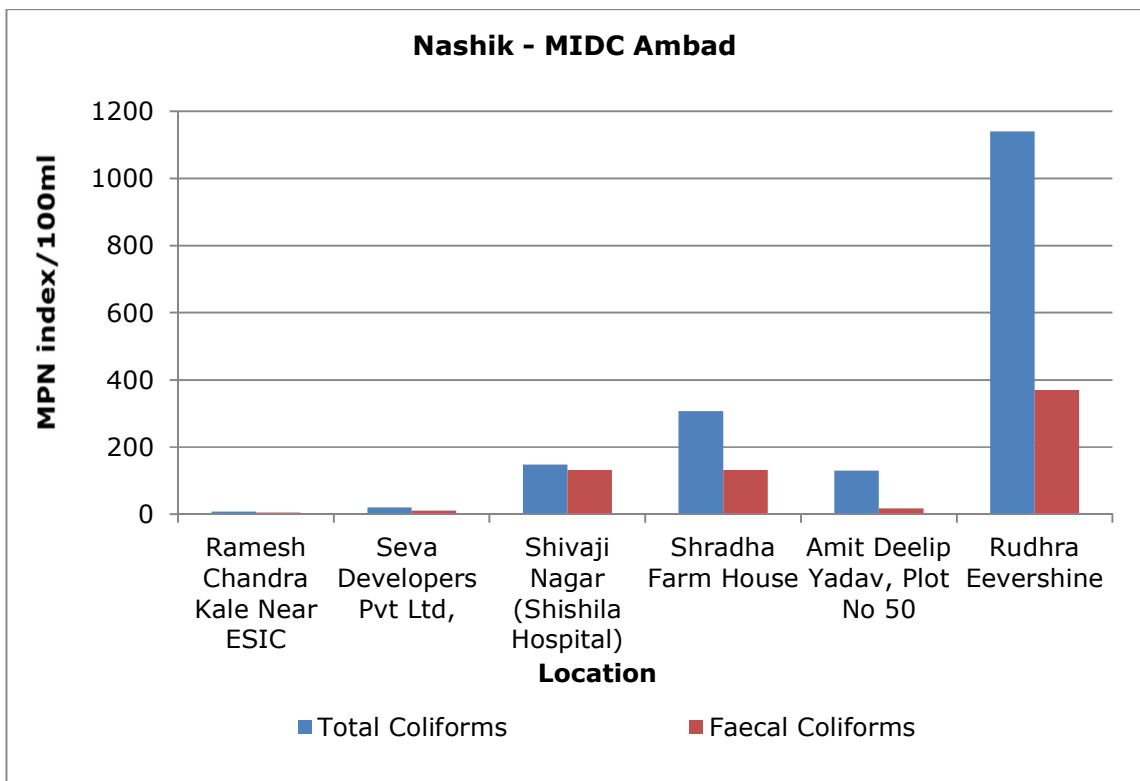
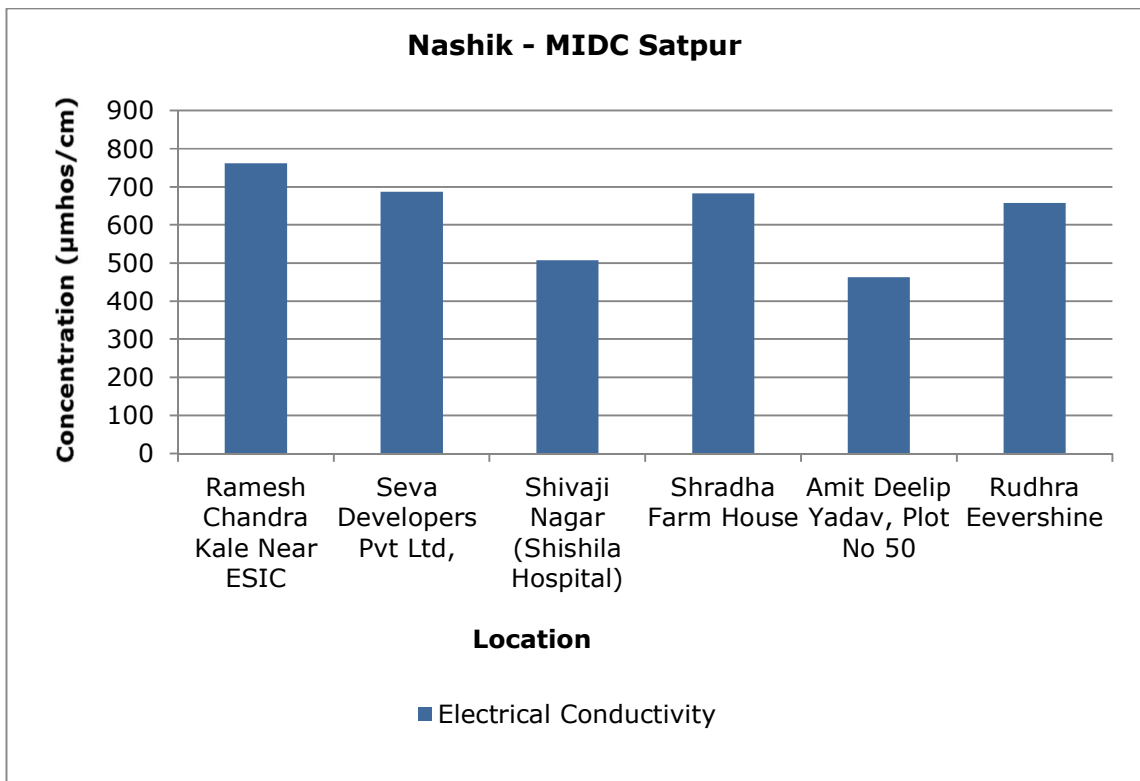
| Parameters | Unit | Results | | |
|---|------------|---|---|---|
| | | Ramesh Chandra Kale Near ESI Hospital, Satpur (Bore Well Water) | Seva Developers Pvt. Ltd., Satpur (Bore Well Water) | Shivaji Nagar (Shishila Hospital), Plot No 55/6, Satpur Carbon Naka (Bore Well Water) |
| Total Ammonia (NH ₄ +NH ₃)-Nitrogen | mg/L | 0.15 | 0.35 | 0.34 |
| Phenols (as C ₆ H ₅ OH) | 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 | 0.21 | BLQ | BLQ |
| Nickel (as Ni) | mg/L | 0.017 | BLQ | 0.013 |
| Copper (as Cu) | mg/L | BLQ | 0.034 | BLQ |
| Hexavalent Chromium (as Cr ⁶⁺) | mg/L | BLQ | BLQ | BLQ |
| Total Chromium (as Cr) | mg/L | 0.066 | BLQ | 0.034 |
| Total Arsenic (as As) | mg/L | BLQ | BLQ | BLQ |
| Lead (as Pb) | mg/L | BLQ | BLQ | BLQ |
| Cadmium (as Cd) | mg/L | BLQ | 0.002 | BLQ |
| Mercury (as Hg) | mg/L | BLQ | BLQ | BLQ |
| Manganese (as Mn) | mg/L | 0.029 | 0.902 | BLQ |
| Iron (as Fe) | mg/L | 0.529 | 2.803 | 0.193 |
| Vanadium (as V) | mg/L | 0.032 | 0.044 | 0.036 |
| Selenium (as Se) | mg/L | BLQ | 0.013 | BLQ |
| Total Nitrogen | mg/L | 14.24 | 3.53 | 13.9 |
| Boron (as B) | mg/L | 0.181 | 0.127 | 0.173 |
| Bioassay Test on fish | % survival | 100 | 87 | 100 |

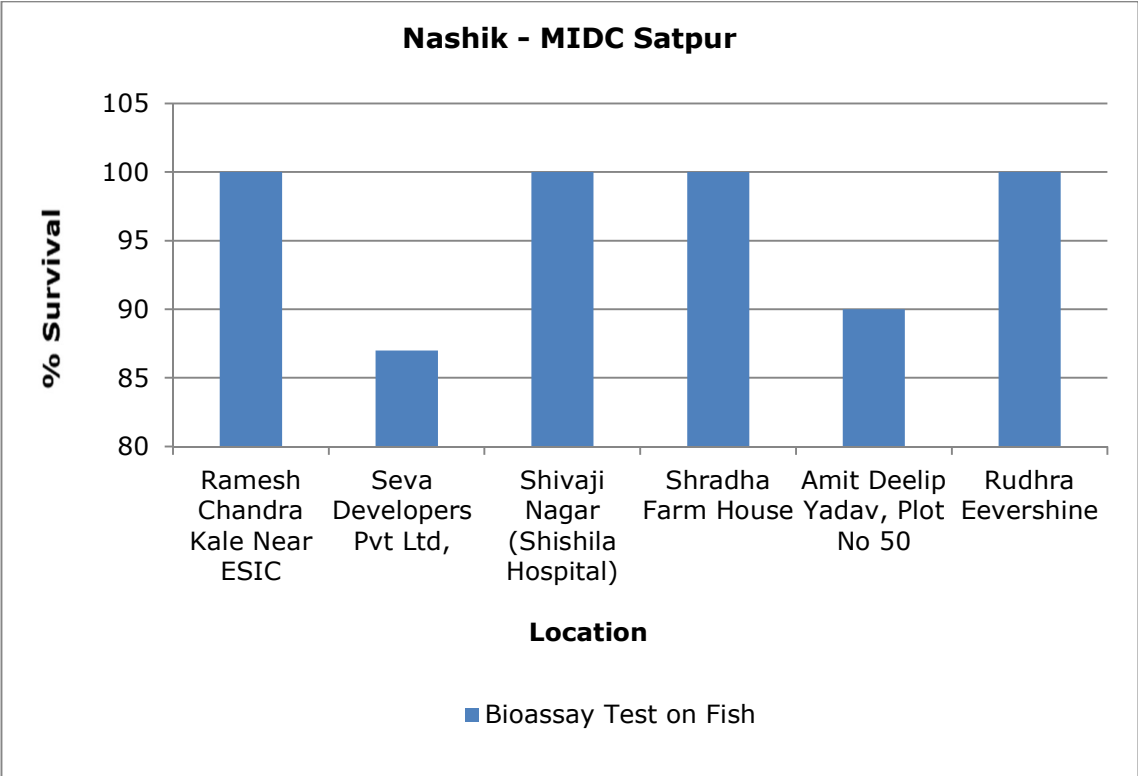
| Parameters | Unit | Results | | |
|--|------------------|---|---|---|
| | | Shradha Farmhouse, Shardha Moters Back Side) MIDC Satpur (Well Water) | Amit Deelip Yadav, Plot No 50, Ganesh Nagar, Satpur (Bore Well Water) | Rudhra Evershine, Virshab I Industries Back Side, Vanvihar Colony, Satpur (Bore Well Water) |
| Sanitary Survey | - | Very Clean Neighbourhood and Catchment | Very Clean Neighbourhood and Catchment | Very Clean Neighbourhood and Catchment |
| General Appearance | - | No Floating Matter | Not Applicable | Not Applicable |
| Transparency | M | 1.5 | Not Applicable | Not Applicable |
| Temperature | °C | 26 | 26 | 26 |
| Colour | Hazen | 1 | 1 | 2 |
| Odour | - | Agreeable | Agreeable | Agreeable |
| pH | - | 7.84 | 7.99 | 7.89 |
| Oil & Grease | mg/L | BLQ | BLQ | BLQ |
| Suspended Solids | mg/L | 11 | 8 | 15 |
| Total Dissolved Solids | mg/L | 385 | 260 | 370 |
| Chemical Oxygen Demand | mg/L | 7 | BLQ | BLQ |
| Biochemical Oxygen Demand (3 days, 27°C) | mg/L | 2 | BLQ | BLQ |
| Electrical Conductivity (at 25°C) | µmhos/cm | 683 | 463 | 658 |
| Nitrite Nitrogen (as NO ₂) | mg/L | 0.02 | BLQ | 0.045 |
| Nitrate Nitrogen (as NO ₃) | mg/L | 3.40 | 0.95 | 5.11 |
| (NO ₂ + NO ₃)-Nitrogen | mg/L | 3.41 | 0.95 | 5.14 |
| Free Ammonia (as NH ₃ -N) | mg/L | BLQ | BLQ | BLQ |
| Total Residual Chlorine | mg/L | BLQ | BLQ | 0.08 |
| Cyanide (as CN) | mg/L | BLQ | BLQ | BLQ |
| Fluoride (as F) | mg/L | 0.7 | 0.6 | 0.7 |
| Sulphide (as H ₂ S) | mg/L | BLQ | BLQ | BLQ |
| Dissolved Phosphate (as P) | mg/L | 0.24 | BLQ | BLQ |
| Sodium Adsorption Ratio | - | 1.58 | 0.68 | 0.55 |
| Total Coliforms | MPN Index/100 ml | 307 | 130 | 1140 |
| Faecal Coliforms | MPN Index/100 ml | 132 | 17 | 370 |
| Total Phosphate (as PO ₄) | mg/L | 0.60 | 0.14 | 0.37 |
| Total Kjeldahl Nitrogen | mg/L | 12.57 | 2.37 | 14.47 |
| Total Ammonia (NH ₄ +NH ₃)-Nitrogen | mg/L | 0.19 | 0.12 | 0.14 |

| 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) |
| Phenols (as C ₆ H ₅ OH) | 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 | BLQ | BLQ | BLQ |
| Nickel (as Ni) | mg/L | 0.014 | 0.016 | 0.0125 |
| Copper (as Cu) | mg/L | BLQ | BLQ | BLQ |
| Hexavalent Chromium (as Cr ⁶⁺) | mg/L | BLQ | BLQ | BLQ |
| Total Chromium (as Cr) | mg/L | 0.032 | BLQ | 0.049 |
| Total Arsenic (as As) | mg/L | BLQ | BLQ | BLQ |
| Lead (as Pb) | mg/L | BLQ | BLQ | BLQ |
| Cadmium (as Cd) | mg/L | BLQ | BLQ | 0.002 |
| Mercury (as Hg) | mg/L | BLQ | 0.001 | 0.006 |
| Manganese (as Mn) | mg/L | 0.278 | BLQ | 0.067 |
| Iron (as Fe) | mg/L | 0.353 | 0.167 | 1.680 |
| Vanadium (as V) | mg/L | 0.0375 | 0.03 | 0.079 |
| Selenium (as Se) | mg/L | 0.028 | 0.0125 | 0.008 |
| Total Nitrogen | mg/L | 16.0 | 3.32 | 19.63 |
| Boron (as B) | mg/L | 1.011 | BLQ | BLQ |
| Bioassay Test on fish | % survival | 100 | 90 | 100 |

Ground - Ground Water Quality Monitoring for MIDC Satpur







8. Health Related Data

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 Post monsoon season 2023

| | A1 | A2 | A | B | C | D | CEPI |
|------------------------|-----------|-----------|----------|----------|----------|----------|--------------|
| Air Index | 2.75 | 1 | 2.75 | 9.75 | 10 | 10 | 32.50 |
| Water Index | 2.5 | 1 | 2.5 | 30 | 10 | 10 | 52.50 |
| Land Index | 1.75 | 1 | 1.75 | 21 | 10 | 10 | 42.75 |
| Aggregated CEPI | | | | | | | 59.10 |

Table 8.2 Comparison of CEPI Scores

| | Air Index | Water Index | Land Index | CEPI |
|-----------------------------------|------------------|--------------------|-------------------|--------------|
| CEPI Score March 2023 | 32.5 | 52.5 | 42.8 | 59.10 |
| CEPI Score June 2021 | 20 | 46 | 48.3 | 53.1 |
| CEPI Score March 2021 | 33.3 | 46 | 27 | 50.9 |
| CEPI score March 2020 | 50 | 32.8 | 37.8 | 56.2 |
| CEPI score June 2019 | 36.3 | 43.3 | 40.6 | 47.49 |
| CEPI score March 2019 | 35.5 | 42.7 | 38.5 | 46.1 |
| CEPI score June 2018 | 39 | 31 | 41.3 | 46.8 |
| CEPI score March 2018 | 26.98 | 31.81 | 30.1 | 33.96 |
| CPCB CEPI score March 2018 | 56.5 | 60 | 42 | 69.49 |

The result shows that CEPI score of present report is 59.10. The present study is the compilation of post-monsoon season, which also affects the score value. This time CEPI is observed lower than the CPCB CEPI score March 2018 which was 69.49.

CEPI score calculation:

Nashik

Ambient Air Analysis Report

| Pollutant | Group | A1 | A2 | A (A1 X A2) |
|-----------------|-------|-------------|----------|----------------|
| PM10 | B | 2 | Limited | |
| PM2.5 | B | 0.5 | | |
| SO ₂ | A | 0.25 | | |
| | | 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) | | |
|-----------------------------|---------|---------|-------------------------|------------------------------|--------------------------|-------------------------------------|----------------|----------|-------------|
| PM10 | 82.25 | 100 | 0.82 | 1 | 8 | 0.10 | M | 9.75 | |
| PM2.5 | 22.75 | 60 | 0.38 | 0 | 8 | 0.00 | L | 0 | |
| SO ₂ | 23.50 | 80 | 0.29 | 0 | 8 | 0.00 | L | 0 | |
| B score = (B1+B2+B3) | | | | | | | | B | 9.75 |

| | | |
|----------|-----------|-----------------|
| C | 10 | >10 % |
| D | 10 | A-IA-A |

| | | |
|-----------------------|------------------|--------------|
| Air CEPI Score | (A+B+C+D) | 32.50 |
|-----------------------|------------------|--------------|

Water Quality Analysis Report

| Pollutant | Group | A1 | A2 | A (A1 X A2) |
|---------------------------------------|-------|------------|----------|----------------|
| BOD | B | 2 | Limited | |
| TSS | A | 0.25 | | |
| (NO ₂ +NO ₃)-N | A | 0.25 | | |
| | | 2.5 | 1 | 2.5 |

| 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) | | |
|---------------------------------------|---------|---------|-------------------------|------------------------------|--------------------------|-------------------------------------|----------------|----------|-----------|
| BOD | 118.60 | 8 | 14.83 | 3 | 5 | 8.90 | C | 30 | |
| TSS | 27.00 | 0.3 | 90.00 | 0 | 5 | 0.00 | L | 0 | |
| (NO ₂ +NO ₃)-N | 3.54 | 0.3 | 11.81 | 0 | 5 | 0.00 | L | 0 | |
| B score = (B1+B2+B3) | | | | | | | | B | 30 |

| | | |
|----------|-----------|----------------|
| C | 10 | >10% |
| D | 10 | A-IA-A |

| | | |
|-------------------------|------------------|--------------|
| Water CEPI Score | (A+B+C+D) | 52.50 |
|-------------------------|------------------|--------------|

Ground Water Quality Analysis Report

| Pollutant | Group | A1 | A2 | A (A1 X A2) |
|------------------|--------------|-------------|-----------|------------------------|
| Fe | A | 1 | Limited | |
| F | A | 0.5 | | |
| BOD | B | 0.25 | | |
| | | 1.75 | 1 | 1.75 |

| 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) | |
|-----------------------------|----------------|----------------|---------------------------------|-------------------------------------|---------------------------------|---|-----------------------|-----------|
| Fe | 0.61 | 0.3 | 2.04 | 4 | 12 | 0.68 | H | 18 |
| F | 0.73 | 1 | 0.73 | 1 | 12 | 0.06 | M | 3 |
| BOD | 1.83 | 8 | 0.23 | 0 | 12 | 0.00 | L | 0 |
| B score = (B1+B2+B3) | | | | | | | B | 21 |

| | | |
|----------|-----------|----------------|
| C | 10 | >10% |
| D | 10 | A-IA-A |

| | | |
|------------------------|------------------|--------------|
| Land CEPI Score | (A+B+C+D) | 42.75 |
|------------------------|------------------|--------------|

Water CEPI Score (im) 52.50

Land CEPI Score (i2) 42.75

Air CEPI Score (i3) 32.50

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 = 59.10

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 except two locations of MIDC Satpur.

Surface Water Quality

- Higher concentration of 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 most of the samples collected.
- All the industries in Nashik region are either reusing the treated trade effluent as sewage in their process or gardening or are disposed into Sea.

Ground Water Quality

- Ground water samples were collected from different Bore well in the region.
- Total Kjeldahl Nitrogen also exceeded in most of the samples collected.

CEPI Score

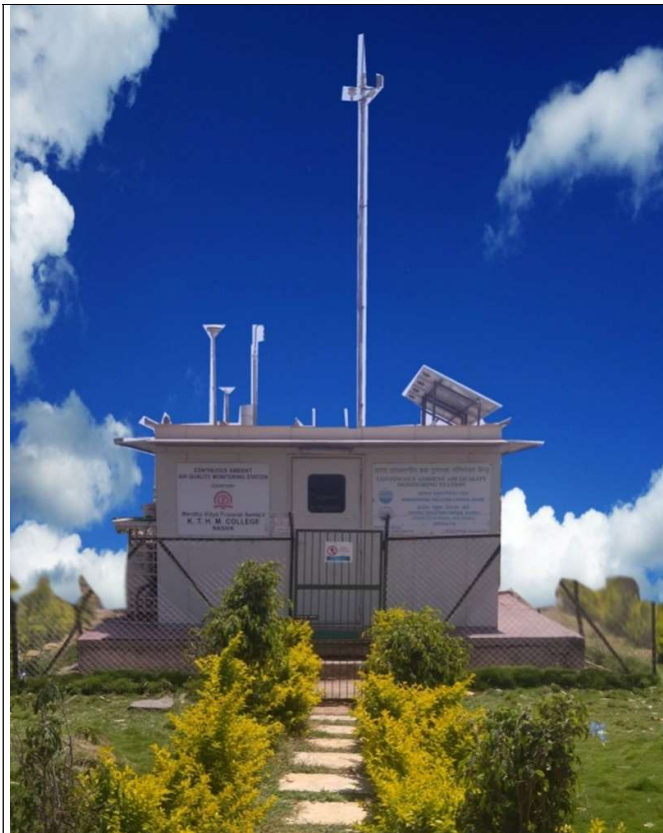
- The CEPI Score Post-monsoon season is 59.10.
- In comparison with the CEPI Score of March 2021, a decrease in the land Index and a slight increase in the Air Index and Water Index is observed in the present study.
- The present study is the compilation of Post-monsoon season, which shows an increase in health impact, hence resulted in higher CEPI score in comparison to the previous year.

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 Bhole 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.



Continuous Ambient Air Quality Monitoring Station



Ambient Air Quality Monitoring Van

12. Photographs



**MIDC Ambad - Ambient Air Sampling nearby
VIR Electro**



**MIDC Ambad - Ambient Air Sampling nearby
Isovolta India Ltd.**



**MIDC Ambad - Ambient Air Sampling nearby
Sudal Industries Ltd.**



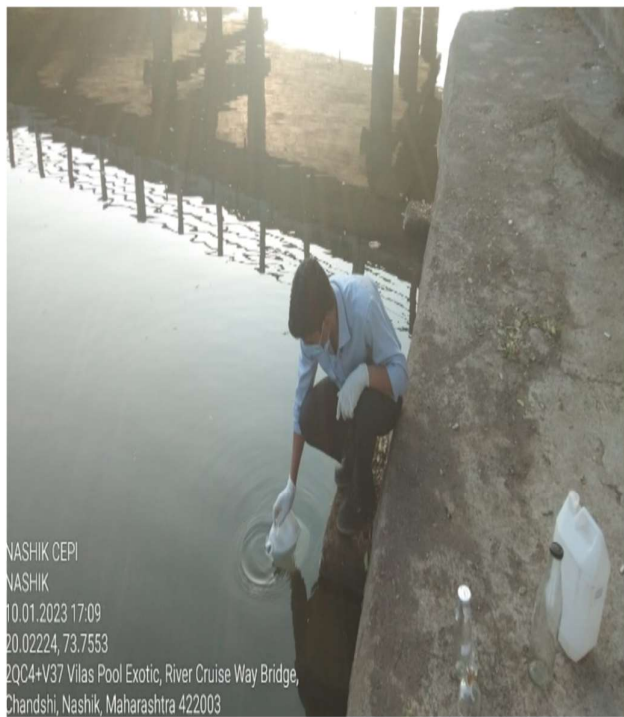
**MIDC Satpur - Ambient Air Sampling nearby
Graphite India Ltd.**



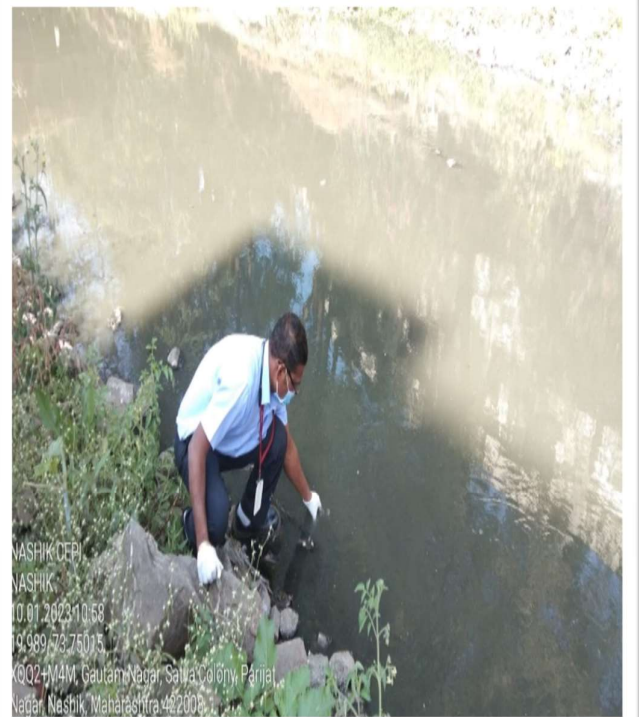
MIDC Satpur - Ambient Air Sampling nearby AATCO Food Ltd.



MIDC Satpur - Ambient Air Sampling nearby MSL Drive Line System



MIDC Satpur – Surface water Sampling Sahid Arun Chittee Pool, Anandvilil Gangapur Road



MIDC Ambad – Surface water Sampling Nasardi Pool, Near EPF Office



NASHIK CEPI
NASHIK
10.01.2023 16:41
20.00667, 73.73483
2P4M+MVJ, Sadguru Nagar, Satpur Colony, Nashik,
Maharashtra 422007

MIDC Satpur – Surface water Sampling ALP industry Opposite side Nalla



NASHIK CEPI
NASHIK
17.01.2023 11:22
19.95386, 73.72525
XP3G+92P, Ambedkar Nagar, Chunchale, Nashik,
Maharashtra 422007

MIDC Ambad – Ground water Sampling Dashrath Pandit Nikam, Plot No. 4, Mauli Chowk, Datta Nagar, Village Chinchale (Bore well Water)



NASHIK CEPI
NASHIK
17.01.2023 11:33
19.95918, 73.73159
XP5J+HG8, Aanand Vatika Rd, Ambedkar Nagar,
Chunchale, Nashik, Maharashtra 422007

MIDC Ambad – Ground water Sampling Pancharatna Farm, Maruti Sankul, Datta Nagar, Backside Kirloskar Oil India Pvt. Ltd. (Bore well Water)



NASHIK CEPI
NASHIK
10.01.2023 17:39
19.99094, 73.7349
Plot No-53, Survey No-484, Lahoti Nagar,
Tambakeshwar Rd, Satpur Gaon, Satpur Colony, Nashik,
Maharashtra 422007

MIDC Satpur – Ground water Sampling Ramesh Chandra Kale Near ESI Hospital, Satpur (Bore Well Water)



NASHIK CEPI
NASHIK
10.01.2023 12:31
20.00164, 73.74969

MIDC Satpur – Ground water Sampling Seva Developers Pvt. Ltd., Satpur (Bore Well Water)



NASHIK CEPI
NASHIK
10.01.2023 15:48
20.00164, 73.71126
Shree Hans Park, NH 50, Shramik Nagar, Nashik,
Maharashtra 422007

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) Study by
Maharashtra Pollution Control Board (MPCB)

| | |
|---|---|
| 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 surgeon |
| Address | District hospital Trimbak Road Nashik |

| S No. | Diseases | No. of Patients Reported | |
|----------------------------|--|--------------------------|----------------|
| | | 2022 (Jan-Dec) | 2021 (Jan-Dec) |
| AIRBORNE DISEASES | | | |
| 1. | Asthma | 164 | 122 |
| 2. | Acute Respiratory Infection | 186 | 1135 |
| 3. | Bronchitis | 325 | 196 |
| 4. | Cancer | - | - |
| WATERBORNE DISEASES | | | |
| 1. | Gastroenteritis | 75 | 19 |
| 2. | Diarrhea | 136 | 76 |
| 3. | Renal diseases | 157 | 283 |
| 4. | Cancer ^{way of} (other) includes | 30 | 12 |

Date: 06-02-2023

Signature

ADDL. CIVIL SURGEON
CIVIL HOSPITAL, NASHIK


HEALTH STATISTICS

Required for Comprehensive Environmental Pollution Index (CEPI) Study by
Maharashtra Pollution Control Board (MPCB)

| | |
|---|---|
| Name of the Polluted Industrial Area (PIA) | NASHIK |
| Name of the major health center/ organization | Indira Gandhi Rugnalaya |
| Name and designation of the Contact person | |
| Address | Panchavali ^o karanja, panchavati - nashik |

| S No. | Diseases | No. of Patients Reported | |
|----------------------------|-----------------------------|--------------------------|----------------|
| | | 2022 (Jan-Dec) | 2021 (Jan-Dec) |
| AIRBORNE DISEASES | | | |
| 1. | Asthma | 67 | 72 |
| 2. | Acute Respiratory Infection | 8366 | 5934 |
| 3. | Bronchitis | - | - |
| 4. | Cancer | - | - |
| WATERBORNE DISEASES | | | |
| 1. | Gastroenteritis | - | - |
| 2. | Diarrhea | 595 | 492 |
| 3. | Renal diseases | - | - |
| 4. | Cancer | - | - |

Date: 23/01/23


वेदिका इंदिरा गंधी
Signature
इंदिरा गंधी, इंदिरा गंधी रुग्णालय, पंचवटी,
नाशिक महानगरपालिका, नाशिक.

HEALTH STATISTICS

Required for Comprehensive Environmental Pollution Index (CEPI) Study by
Maharashtra Pollution Control Board (MPCB)

| | |
|--|---|
| Name of the Polluted Industrial Area (PIA) | NASHIK |
| Name of the major health center/ organization | Sudarshan Hospital |
| Name and designation of the Contact person | Dr. Suresh Dhanraj MBBS MD. |
| Address | Chy place, opp. Kalkar mandir Old Azga Road, Mumbai near |

| S No. | Diseases | No. of Patients Reported | |
|----------------------------|-----------------------------|--------------------------|----------------|
| | | 2022 (Jan-Dec) | 2021 (Jan-Dec) |
| AIRBORNE DISEASES | | | |
| 1. | Asthma | 02 | 03 |
| 2. | Acute Respiratory Infection | 04 | 02 |
| 3. | Bronchitis | 05 | 03 |
| 4. | Cancer | - | - |
| WATERBORNE DISEASES | | | |
| 1. | Gastroenteritis | 02 | 01 |
| 2. | Diarrhea | 06 | 04 |
| 3. | Renal diseases | 04 | 02 |
| 4. | Cancer | - | - |

Date:

Signature

