AAQ MONITORING LOCATIONS

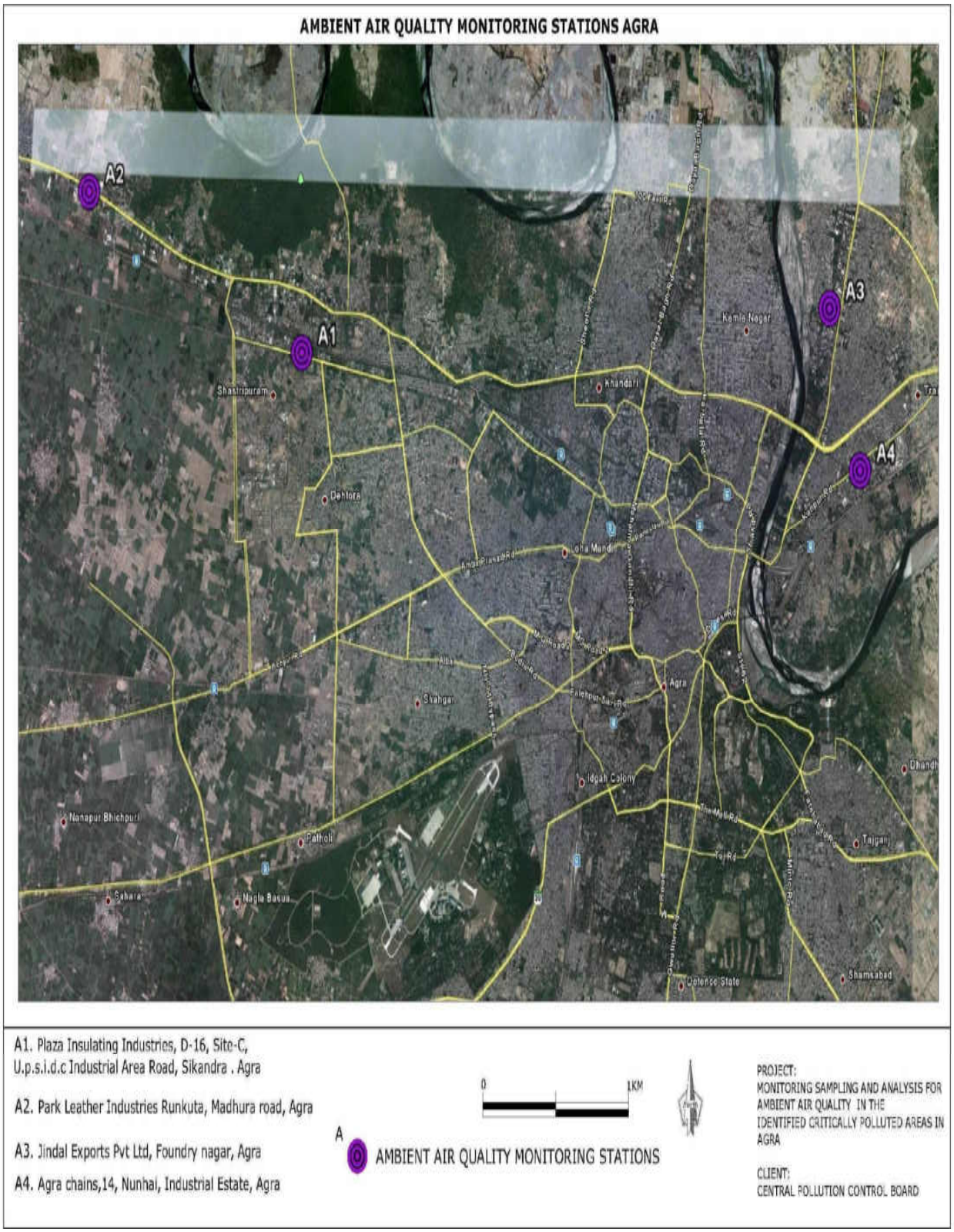
Sample Code	Name of the Monitoring Location	Date of Sampling	Latitude	Longitude
AAQ - 1	Plaza Insulating Industries, D-16, Site-C, U.P.S.I.D.C Industrial Area Road, Sikandra . Agra	14.02.2013 to 15.02.2013	N27°12'47.0"	E077°55'57.8"
AAQ - 2	Park Leather Industries Runkuta, Madhura road, Agra	14.02.2013 to 15.02.2013	N27°13'49.9"	E077°53'18.5"
AAQ – 3	Jindal Exports Pvt Ltd, Foundry nagar, Agra	14.02.2013 to 15.02.2013	N27°13'04.3"	E078°02'33.2"
AAQ - 4	Agra chains, 14, Nunhai, Industrial Estate, Agra	14.02.2013 to 15.02.2013	N27°12'00.7"	E078°02'56.0"

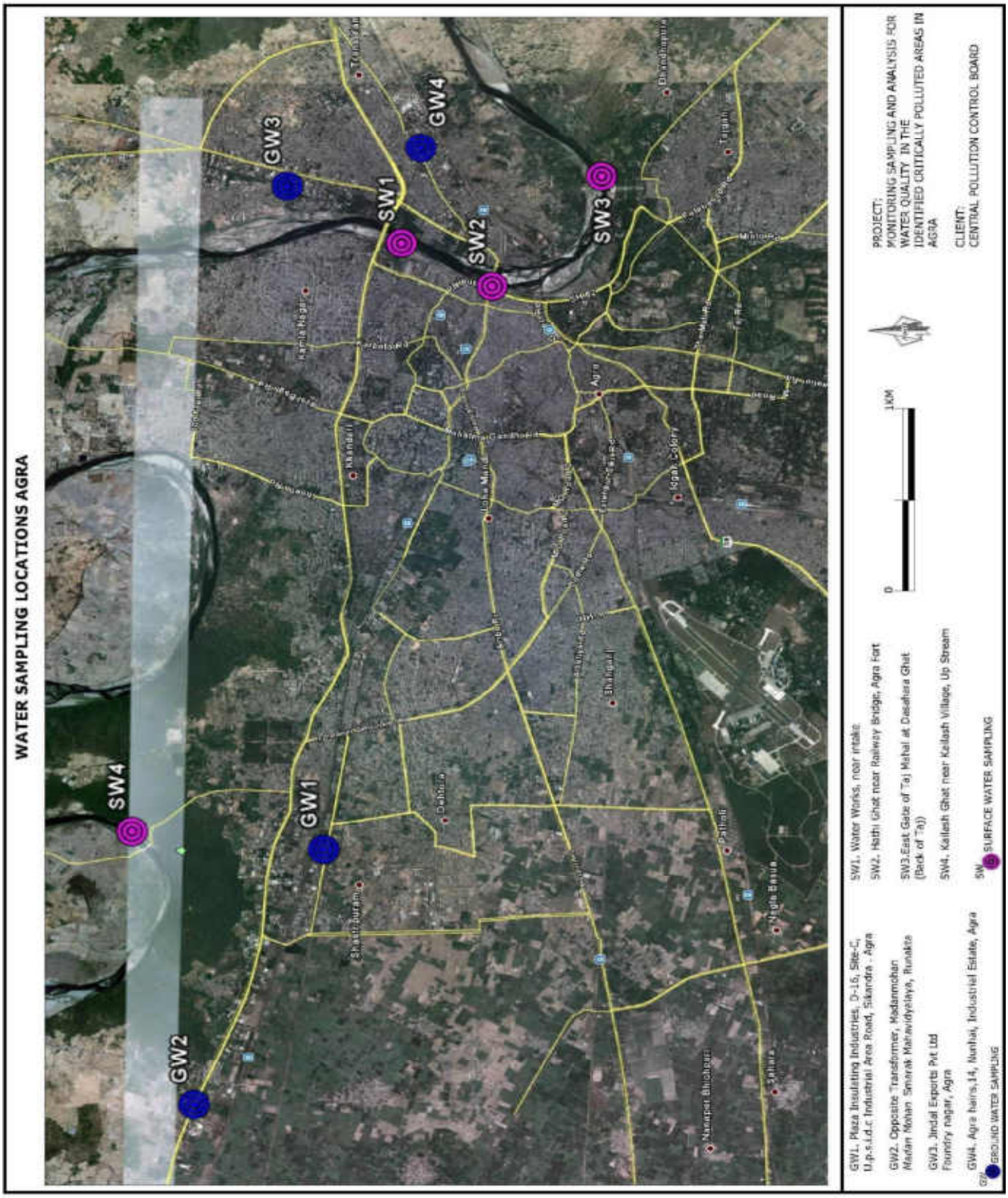
SURFACE WATER SAMPLING LOCATIONS

Sample Code	Name of the Sampling Location	Date of Sampling	Latitude	Longitude
SW – 1	Water Works, near intake	15.02.2013	N27°12'09.9"	E078°01'59.0"
SW – 2	Hathi Ghat near Railway Bridge, Agra Fort	15.02.2013	N27°11'26.8"	E078°01'33.7"
SW – 3	East Gate of Taj Mahal at Dasahara Ghat (Back of Taj)	15.02.2013	N27°10'34.5"	E078°02'38.9"
SW – 4	Kailash Ghat near Kailash Village, Up Stream	15.02.2013	N27°14'18.5"	E077°56'08.5"

GROUND WATER SAMPLING LOCATIONS

Sample Code	Name of the Sampling Location	Date of Sampling	Latitude	Longitude
GW – 1	Plaza Insulating Industries, D-16, Site-C, U.P.S.I.D.C Industrial Area Road, Sikandra . Agra	15.02.2013	N27°12'47.0"	E077°55'57.8"
GW – 2	Opposite Transformer, Madanmohan *Madan Mohan* Smarak Mahavidyalaya, Runakta	15.02.2013	N27°13'48.8"	E077°53'25.5"
GW – 3	Jindal Exports Pvt Ltd Foundry nagar, Agra	15.02.2013	N27°13'04.3"	E078°02'33.2"
GW – 4	Agra chains,14, Nunhai, Industrial Estate, Agra	15.02.2013	N27°12'00.7"	E078°02'56.0"


AMBIENT AIR QUALITY MONITORING STATIONS AGRA
A1
A2
A3
A4
Shastripuram
Dehtora
Khandari
Kamla Nagar
Loha Mandi
Shahganj
Agra
Idgah Colony
Nanapur Bhichpuri
Patholi
Sahara
Nagla Baksua
Defence State
Shamsabad
Tajganj
A1. Plaza Insulating Industries, D-16, Site-C,
U.p.s.i.d.c Industrial Area Road, Sikandra . Agra
A2. Park Leather Industries Runkuta, Madhura road, Agra
A3. Jindal Exports Pvt Ltd, Foundry nagar, Agra
A4. Agra chains,14, Nunhai, Industrial Estate, Agra
0
1KM
A
AMBIENT AIR QUALITY MONITORING STATIONS
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR
AMBIENT AIR QUALITY IN THE
IDENTIFIED CRITICALLY POLLUTED AREAS IN
AGRA
CLIENT:
CENTRAL POLLUTION CONTROL BOARD


WATER SAMPLING LOCATIONS AGRA
GW1
GW2
GW3
GW4
SW1
SW2
SW3
SW4
GW1. Plaza Insulating Industries, D-16, Site-C, U.p.s.i.d.c Industrial Area Road, Sikandra - Agra
GW2. Opposite Transformer, Madanmohan Madan Mohan Smarak Mahavidyalaya, Runakta
GW3. Jindal Exports Pvt Ltd Foundry nagar, Agra
GW4. Agra hairs,14, Nunhai, Industrial Estate, Agra
GW GROUND WATER SAMPLING
SW1. Water Works, near intake
SW2. Hathi Ghat near Railway Bridge, Agra Fort
SW3.East Gate of Taj Mahal at Dasehara Ghat (Back of Taj)
SW4. Kailash Ghat near Kailash Village, Up Stream
SW SURFACE WATER SAMPLING
0
1KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN AGRA
CLIENT:
CENTRAL POLLUTION CONTROL BOARD

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 Plaza Insulating Industries	**AAQ – 2** Park Leather Industries	**AAQ – 3** Jindal Exports Pvt Ltd	**AAQ – 4** Agra chains	
1	Lead	µg/m³	0.23	0.11	0.14	0.09	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	1.6	1.1	1.3	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	184.2	156.0	135.5	147.0	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	86.2	87.5	67.4	53.7	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	26.3	19.7	21.6	26.5	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	11.6	9.2	6.8	10.4	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	20.6	18.7	17.9	16.4	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	31.3	28.1	29.7	26.5	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	5.4	6.1	4.9	5.1	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	16.8	15.3	18.6	17.1	
		µg/m³	2.9	<2	3.7	2.4	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-1 Water Works, near intake	SW – 2 Hathi Ghat near Railway Bridge, Agra Fort	SW-3 East Gate of Taj Mahal at Dasahara Ghat	SW-4 Kailash Ghat near Kailash Village, Up Stream	
I	**Simple Parameters**						
1	Appearance	-	Pale Yellow	Pale Yellow	Grayish	Colour less	-
2	Colour (Hazen Units)	-	15	10	20	5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.47	6.92	6.98	7.50	IS 3025: Part – 11
2	E C	µS/cm	614	690	740	550	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	18	12	58	20	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	6.2	6.0	5.2	6.1	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	18	16	64	22	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	4	4	15	5	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.02	0.03	0.05	0.02	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	4.74	3.72	2.26	5.65	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	4.76	3.75	2.31	5.67	By Calculation
11	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.50	0.60	0.60	0.50	IS 3025: Part – 60
15	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	0.90	0.70	1.60	0.50	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	1.54	1.86	1.94	1.23	By Calculation
18	Total Coliforms	MPN/100ml	500	900	6000	1600	IS 1622
19	Fecal Coliforms	MPN/100ml	7	26	400	170	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	1.3	0.90	1.9	0.80	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	4.2	1.6	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	2.8	1.2	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.05	0.06	0.07	0.06	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.04	0.03	0.05	0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.28	0.20	0.48	0.18	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.08	0.09	0.10	0.07	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Plaza Insulating Industries	GW – 2 Madanmohan college, Runakta	GW-3 Jindal Exports Pvt . Ltd.,	GW-4 Agra chains	
I	**Simple Parameters**						
1	Appearance	-	Light Yellow	Pale Yellow	Pale Yellow	Colour less	-
2	Colour (Hazen Units)	-	15	10	10	< 5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.51	7.09	7.54	7.16	IS 3025: Part – 11
2	E C	µS/cm	720	3800	4100	7200	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	26	14	36	< 10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	10	8	12	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	< 2	< 2	< 2	< 2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.02	0.01	0.02	0.02	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	0.23	9.03	19.42	6.18	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.25	9.04	19.44	6.20	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.80	0.90	0.80	1.0	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	1.13	12.89	11.9	6.18	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	< 1	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	< 1	< 1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.01	0.01	< 0.01	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.20	0.18	0.20	0.18	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.10	0.48	0.52	0.70	IS 3025: Part – 57

AMBIENT AIR MONITORING PHOTOGRAPHS

Plaza Insulating Industries-Agra

Park Leather Industries- Agra

Jindal Exports Pvt Ltd-Agra

Agra chains-Agra

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Yamuna river,
Water works near Jawaharlal bridge ,

Yamuna river
East Gate of Taj Mahal at Dasahara Ghat

Yamuna river, Hathi Ghat near Railway Bridge, Agra Fort

Yamuna river, Kailash Ghat near Kailash Village, Up Stream

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Plaza Insulating Industries - Agra

Madanmohan college, Runakta

Jindal Exports Pvt Ltd - Agra

Agra chains - Agra

AAQ MONITORING LOCATIONS

SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	Naroda Enviro Project Ltd., (NEPL) CETP – GIDC, Naroda	07.02.2013 to 08.02.2013	N 23°04'54.9"	E 072°40'06.7''
AAQ – 2	M/s. Astropure Systems	07.02.2013 to 08.02.2013	N 23°06'00.5"	E0 72°40'31.3"
AAQ – 3	M/s. Bhumika Strips Private Ltd.,	07.02.2013 to 08.02.2013	N 23°01'13.4''	E072°40'46.5"
AAQ – 4	M/s. Odhav Bhikshuk Gruh Compound	07.02.2013 to 08.02.2013	N 23°01'08.2"	E 072°39'11.5"

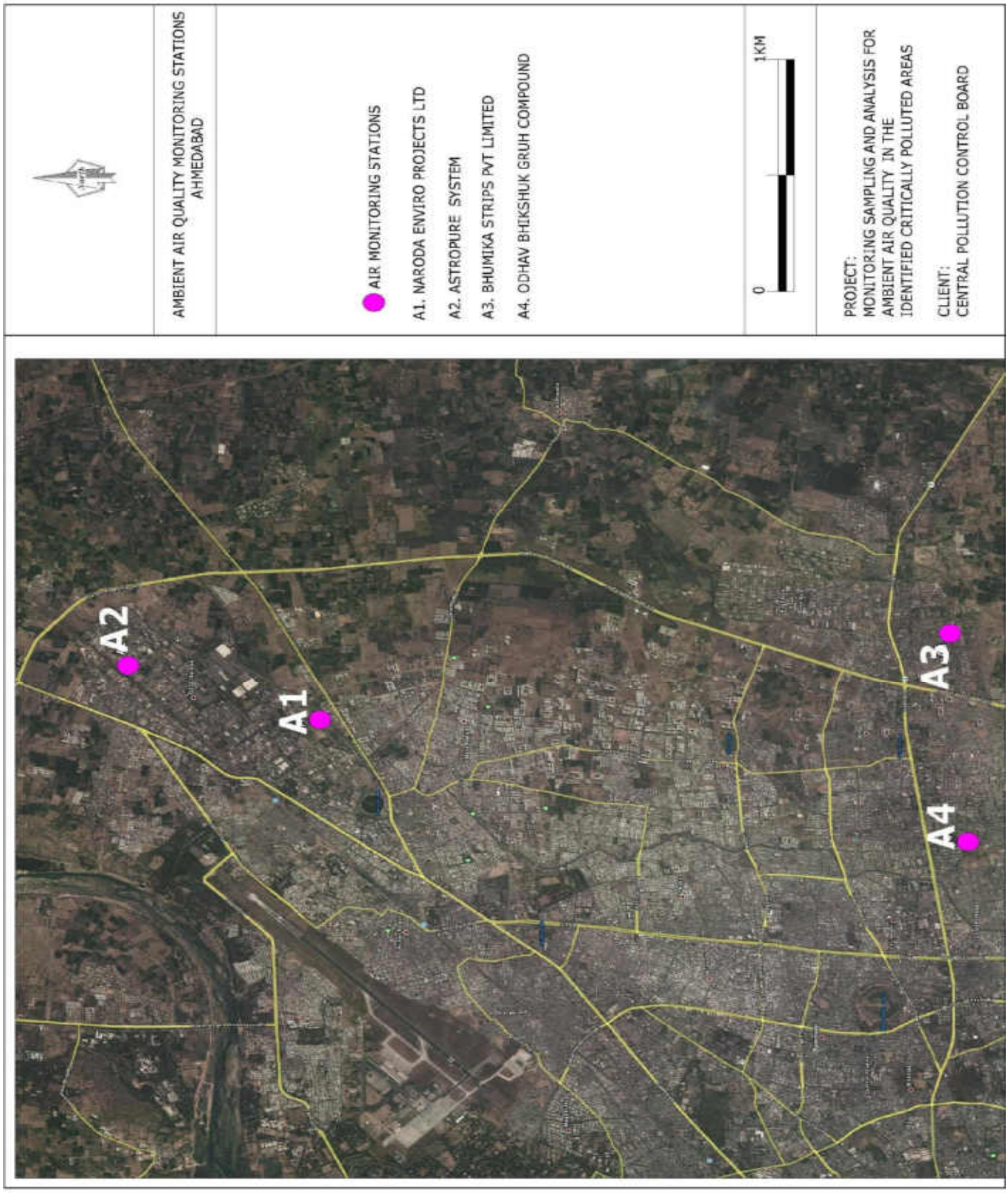
SURFACE WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	Naroda GIDC outlet to Mega Pipeline	07.02.2013	N 23°04'40.0"	E072°39'50.7"
SW – 2	Kharicut upstream near Naroda GIDC	07.02.2013	N 23°04'40.8"	E072°39'51.1''
SW – 3	Outlet of Odhav CETP, GIDC Odhav	07.02.2013	N 23°01'27.0"	E072°38'43.3"
SW – 4	Outlet of GVMM CETP, GVMM Industrial Area.	07.02.2013	N 23°01'19.0"	E072°40'47.5"

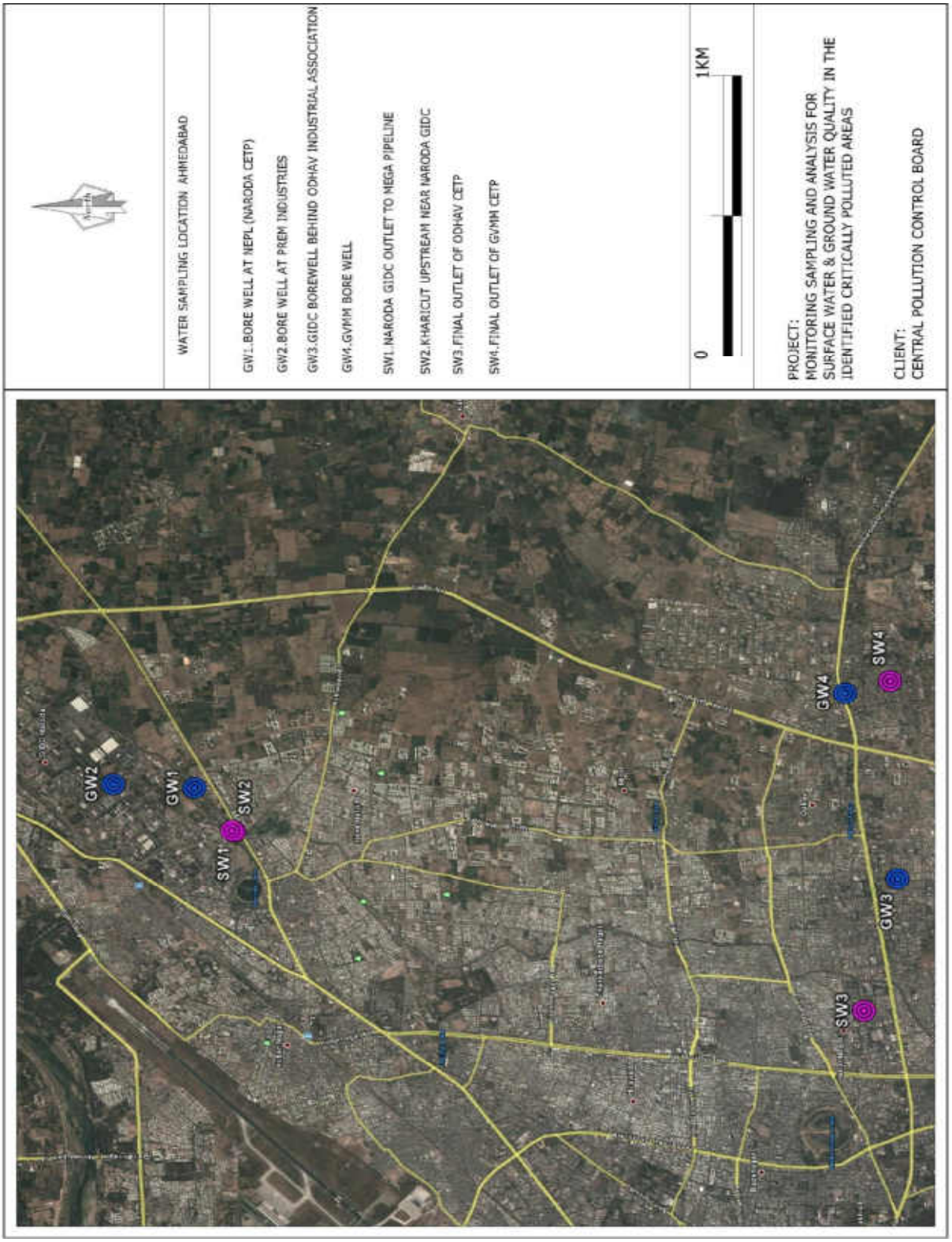
GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Borewell at Naroda Enviro Project Ltd., (NEPL) CETP – GIDC, Naroda	07.02.2013	N 23°04'52.3"	E 072°40'07.1"
GW – 2	Borewell at M/s. Prem Industries Phase – 1, GIDC, Naroda	07.02.2013	N 23°05'17.2"	E 072°40'08.5"
GW – 3	GIDC Borewell behind odhav industrial Association, GIDC Odhav	07.02.2013	N 23°01'16.7"'	E 072°39'33.0"
GW – 4	GVMM Borewell, GVMM Industrial Area	07.02.2013	N 23°01'32.8"	E 072°40'42.9"

AHMEDABAD - GUJARAT



AHMEDABAD - GUJARAT



AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 Naroda Enviro Project Ltd., (NEPL) CETP – GIDC, Naroda	**AAQ – 2** M/s. Astropure Systems	**AAQ – 3** M/s. Bhumika Strips Private Ltd.,	**AAQ – 4** M/s. Odhav Bhikshuk Gruh Compound	
1	Lead	µg/m³	0.12	0.11	0.18	0.08	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	1.5	1.1	1.8	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	86	79	94	87	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	23.4	21.3	32.6	24.9	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	18.1	10.0	16.6	12.7	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	6.3	4.6	9.5	5.7	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	12.5	14.2	13.6	10.7	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	20.3	23.7	22.0	18.1	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	9	6	8.2	10.5	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	17.4	15.8	20.1	16.4	
		µg/m³	5.6	3.0	2.8	<2	

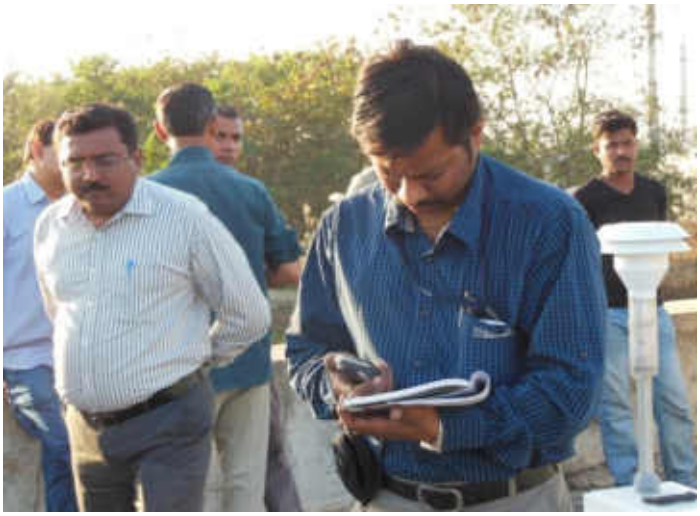
SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-1 Naroda GIDC outlet to Mega Pipeline	SW – 2 Kharicut upstream near Naroda GIDC	SW-3 Outlet of Odhav CETP, GIDC Odhav	SW-4 Outlet of GVMM CETP, GVMM Industrial Area.	
I	**Simple Parameters**						
1	Appearance		Brown	Colourless	Brown	Light Brown	-
2	Colour (Hazen Units)		110	5	140	60	IS 3025: Part – 4
3	Odour (Smell)		Un Agreeable	Agreeable	Un Agreeable	Un Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH		7.1	8.1	7.2	6.8	IS 3025: Part – 11
2	E C	µS/cm	3000	254	9500	7000	IS 3025: Part – 14
3	Oil & Grease	mg/l	2	<1	6	3	IS 3025: Part – 39
4	Suspended Solids	mg/l	84	12	72	86	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	<1	7.2	1.4	2.8	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	84	12	374	182	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	23	3	80	45	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.01	0.02	0.23	0.21	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	4.29	3.16	7.45	9.26	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	4.30	3.18	7.68	9.47	By Calculation
11	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.9	0.5	1.4	1.1	IS 3025: Part – 60
15	Sulphides as S	mg/l	1.92	<0.1	0.84	<0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	0.79	0.18	0.90	0.79	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	21.28	0.38	20.92	6.73	By Calculation
18	Total Coliforms	MPN/100ml	1600	50	22	14	IS 1622
19	Fecal Coliforms	MPN/100ml	300	30	17	2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	0.96	0.28	1.28	1.14	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	29	1.4	48	12	APHA 4500 – Norg.B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	17	<1	29	7	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH's	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.02	0.01	0.09	0.08	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	0.05	0.03	IS 3025: Part – 54
11	Copper as Cu	mg/l	0.06	<0.01	0.09	0.05	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	0.06	<0.01	0.12	0.09	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	0.01	<0.01	0.02	0.02	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.05	<0.01	0.18	0.14	APHA 3111 – B
19	Iron as Fe	mg/l	0.80	0.10	1.6	0.64	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.24	0.05	0.90	0.42	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW -1 Borewell at Naroda Enviro Project Ltd., (NEPL) CETP – GIDC, Naroda	GW – 2 Borewell at M/s. Prem Industries Phase – 1, GIDC, Naroda	GW-3 GIDC Borewell behind odhav industrial Association, GIDC Odhav	GW-4 GVMM Borewell, GVMM Industrial Area	
I	**Simple Parameters**						
1	Appearance		Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)		<5	<5	<5	<5	IS 3025: Part – 4
3	Odour (Smell)		Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH		7.64	7.48	7.84	7.76	IS 3025: Part – 11
2	E C	µS/cm	1440	1300	1410	1530	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	8	4	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	<0.01	<0.01	<0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	2.48	4.52	4.06	3.84	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	2.49	4.52	4.06	3.84	By Calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.70	0.60	0.60	0.50	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	8.23	6.28	6.47	7.57	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – Norg.B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH's	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.09	0.06	0.05	0.07	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.10	0.08	0.08	0.14	IS 3025: Part – 57

AMBIENT AIR MONITORING PHOTOGRAPHS



Odhav Bhikshuk Gruh Compound

Naroda Enviro Projects Ltd (Naroda CETP)

Astropure System Pvt. GIDC Naroda

Bhumika Strips Private Ltd

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Naroda GIDC Outlet to Mega Pipeline

Kharicut Upstream Near Naroda GIDC

Outlet of Odhav CETP, GIDC Odhav

Outlet of GVMM CETP, GVMM Industrial Area.

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Naroda Enviro Projects Limited, CETP GIDC Naroda

GIDC Borewell behind Odhav Industrial Associates

GVMM Borewell, GVMM Industrial Area

AAQ MONITORING LOCATIONS

SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	Angul Industrial Area	07.02.2013 to 08.02.2013	N 20°49.981'	E 85°06.250'
AAQ – 2	Nalco Nagar	07.02.2013 to 08.02.2013	N 20°50.718'	E 85°09.184'
AAQ – 3	Mahanandi Coal Field	09.02.2013 to 10.02.2013	N 20°47.992'	E 85°18.245'
AAQ – 4	NTPC Khaniha Township	08.02.2013 to 09.02.2013	N 21°06.170'	E 85°05.202'
AAQ – 5	Talcher Thermal Township	08.02.2013 to 09.02.2013	N20°49.631'	E85°15.488'
AAQ – 6	Meramundali Area	09.02.2013 to 10.02.2013	N20°47.992'	E85°18.295'
AAQ – 7	Talcher Township	07.02.2013 to 08.02.2013	N20°56.875'	E85°13.542'
AAQ – 8	Talcher Industrial Estate	07.02.2013 to 08.02.2013	N20°54.162'	E85°12.173'

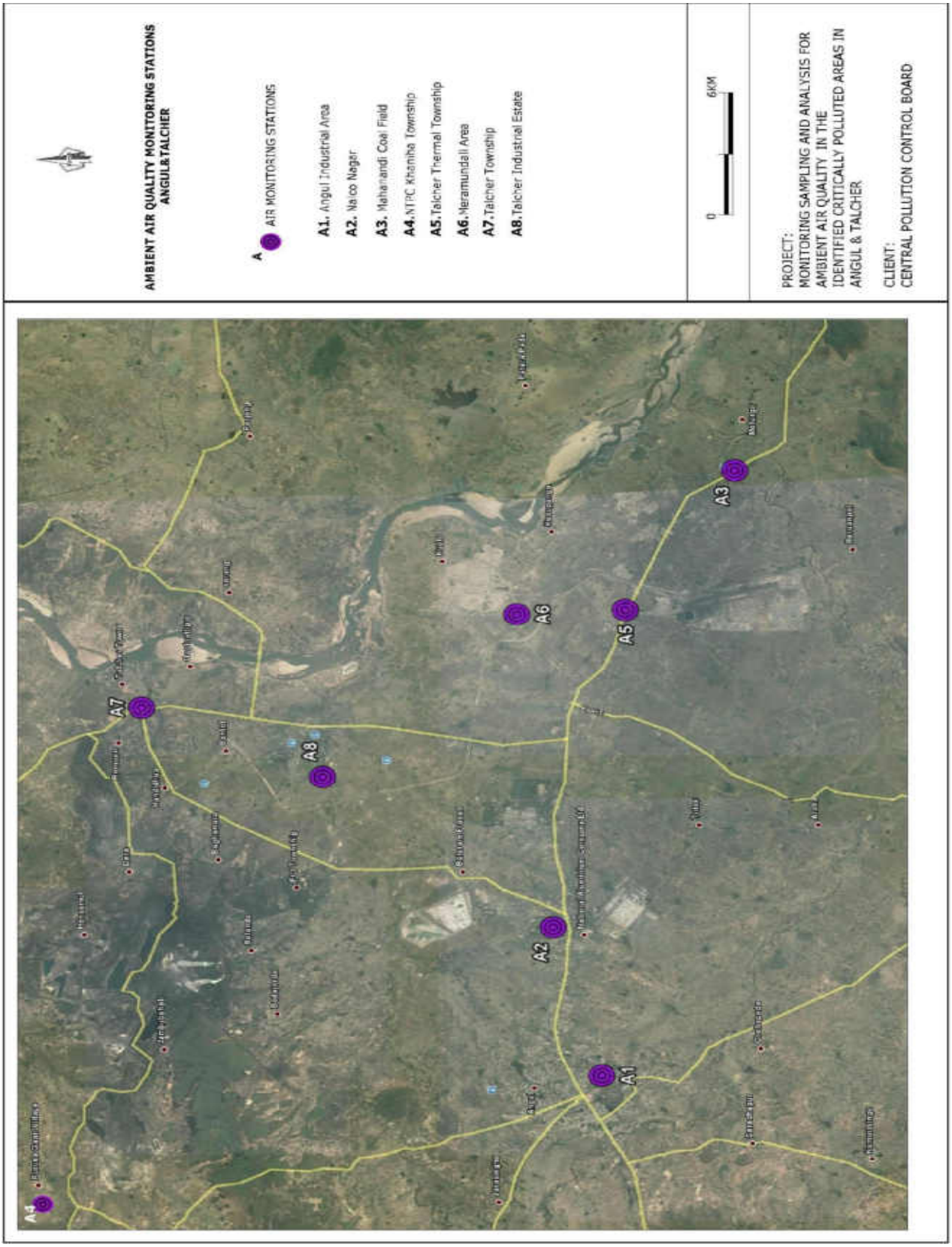
SURFACE WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	Lingra Nalla Upstream	10.02.2013	N 20°50.383'	E 85°04.631'
SW – 2	Lingra Nalla Downstream	10.02.2013	N 20°49.206'	E 85°05.343'
SW – 3	Bramhani River Upstream	09.02.2013	N 20°59.338'	E 85°15.313'
SW – 4	Bramhani River Downstream	09.02.2013	N 20°54.968'	E 85°14.306'
SW – 5	Nandira River	10.02.2013	N 20°55.873'	E 85°09.210'
SW – 6	NTPC Kaniha Tikra River	09.02.2013	N 21°05.887'	E 85°03.09.4'
SW – 7	Shingazort (Khaina)	09.02.2013	N 21°59.318'	E 85°10.026'
SW – 8	Ankura	10.02.2013	N 21°25.090'	E 85°04.105'

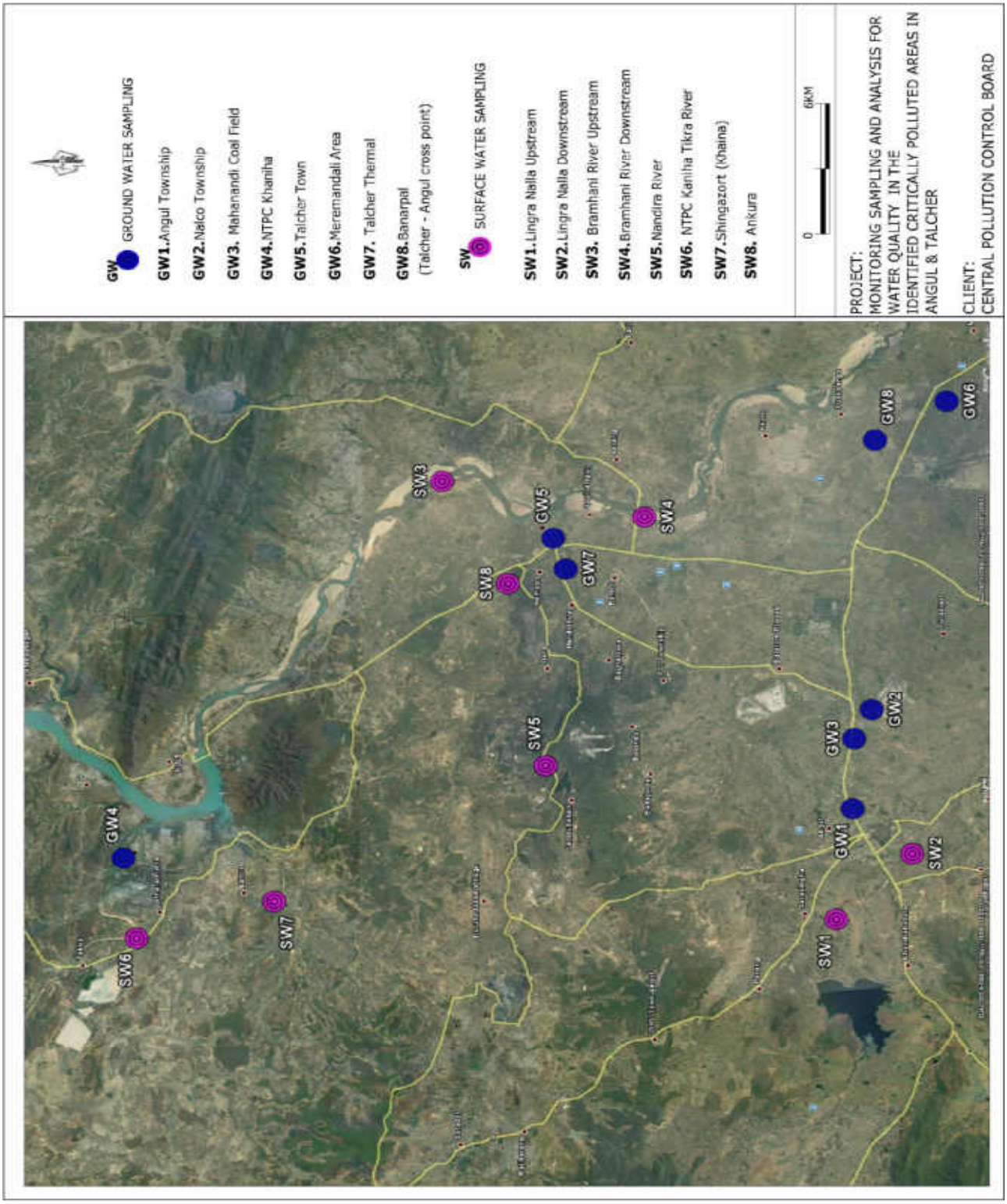
GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Angul Township	08.02.2013	N 20°50.355'	E 85°05.943'
GW – 2	Nalco Township	08.02.2013	N 20°50.076'	E 85°09.182'
GW – 3	Mahanandi Coal Field	10.02.2013	N 20°50.453'	E 85°08.413'
GW – 4	NTPC Khaniha	09.02.2013	N 20°06.168'	E 85°05.231'
GW – 5	Talcher Town	09.02.2013	N 20°54.246'	E 85°12.676'
GW – 6	Meremandali Area	10.02.2013	N 21°48.466'	E 85°17.373'
GW – 7	Talcher Thermal	09.02.2013	N 21°56.875'	E 85°13.528'
GW – 8	Banarpal (Talcher – Angul cross point)	09.02.2013	N 21°00.382'	E 85°10.933'

ANGUL TALCHER - ODISHA



ANGUL TALCHER - ODISHA



AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 Angul Industrial Area	**AAQ – 2** Nalco Nagar	**AAQ – 3** Mahanandi Coal Field	**AAQ – 4** NTPC Khaniha Township	
1	Lead	µg/m³	0.06	0.03	0.08	0.03	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	4.2	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	3.1	1.6	2.4	1.8	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	84.5	72.0	78.3	65.4	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	22.1	26.4	29.8	19.7	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	42	25	31	38	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	5.2	3.1	4.6	3.6	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	18.0	14.6	12.2	13.8	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	24.6	18.9	19.8	18.6	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	7.5	6.0	6.9	7.5	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	15.7	18.9	20.7	15.6	
		µg/m³	3.1	2.8	4.2	3.2	

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 5 Talcher Thermal Township	**AAQ – 6** Meramundali Area	**AAQ – 7** Talcher Township	**AAQ – 8** Talcher Industrial Estate	
1	Lead	µg/m³	0.08	0.04	0.04	0.06	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	0.9	1.6	1.2	2.3	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	78.3	85.7	72.1	68.8	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	24.6	29.0	25.8	22.9	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	48	34	24	40	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	7.6	5.8	8.1	11.2	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	14.0	12.8	12.5	12.8	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	17.2	19.1	16.8	17.9	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	7.9	6.0	5.6	7.6	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	18.1	16.6	14.5	17.2	
		µg/m³	2.8	4.3	<2	3.1	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-1 Lingra Nalla Upstream	SW – 2 Lingra Nalla Downstream	SW-3 Bramhani River UpStream	SW-4 Bramhani River DownStream	
I	**Simple Parameters**						
1	Appearance	-	Pale Brown	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	20	10	5	10	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.28	7.46	7.86	7.80	IS 3025: Part – 11
2	E C	µS/cm	700	720	132	130	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	16	14	12	14	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	5.6	6.0	6.2	6.1	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	32	20	12	10	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	8	4	3	2	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.05	0.04	0.02	0.02	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	3.61	2.26	0.23	0.23	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	3.66	2.30	0.25	0.25	By Calculation
11	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.60	0.80	0.30	0.40	IS 3025: Part – 60
15	Sulphides as S	mg/l	0.80	0.30	<0.1	<0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	2.94	1.64	0.23	0.23	By Calculation
18	Total Coliforms	MPN/100ml	4	12	4	6	IS 1622
19	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	4.2	2.1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	2.8	1.4	<1	<1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.02	0.02	0.02	0.07	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.04	0.03	<0.01	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.26	0.24	0.11	0.11	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.08	0.08	0.03	0.03	IS 3025: Part – 57

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-5 Nandira River	SW – 6 NTPC Kaniha Tikra River	SW-7 Shingazort (Khaina)	SW-8 Ankura	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	10	10	10	5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.93	7.99	8.13	7.95	IS 3025: Part – 11
2	E C	µS/cm	500	330	130	790	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	18	14	26	29	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	5.9	6.1	5.8	6.0	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	12	8	12	8	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	3	2	3	2	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	0.90	<0.23	0.23	0.23	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.90	0.23	0.23	0.23	By Calculation
11	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	1.00	1.30	0.90	0.70	IS 3025: Part – 60
15	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	0.11	0.21	0.15	<0.1	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	0.79	0.41	0.23	0.68	By Calculation
18	Total Coliforms	MPN/100ml	9	4	4	2	IS 1622
19	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	0.18	0.26	0.20	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	<0.01	0.02	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	<0.01	<0.01	0.01	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.10	0.09	0.14	0.08	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.12	0.10	0.05	0.09	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Angul Township	GW – 2 Nalco Township	GW-3 Mahanandi Coal Field	GW-4 NTPC Kaniha	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	<5	<5	<5	<5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.71	7.71	7.06	7.79	IS 3025: Part – 11
2	E C	µS/cm	1350	570	530	670	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	4	8	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.02	0.01	0.02	0.04	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	14.9	5.65	0.23	2.48	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	14.92	5.66	0.25	2.52	By calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.50	0.60	0.70	0.60	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	1.47	0.88	0.28	0.68	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.06	0.10	1.44	0.16	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	0.01	0.01	0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.10	0.01	0.09	0.05	APHA 3111 – B
19	Iron as Fe	mg/l	0.18	0.22	0.28	0.12	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.14	0.05	0.05	0.06	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-5 Talcher Town	GW – 6 Meremandali Area	GW-7 Talcher Thermal	GW-8 Banarpal (Talcher – Angul Cross point)	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	<5	<5	<5	<5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.79	7.83	7.70	7.10	IS 3025: Part – 11
2	E C	µS/cm	1160	978	1250	942	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	8	8	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	<0.01	0.02	0.01	0.07	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	0.23	3.61	0.23	10.16	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.23	3.63	0.24	10.23	By Calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.60	0.90	0.60	0.60	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	2.94	1.06	2.86	0.80	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.04	0.02	0.02	0.02	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.03	<0.01	<0.01	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.09	0.05	0.06	0.07	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.16	0.07	0.10	0.05	IS 3025: Part – 57

AMBIENT AIR MONITORING PHOTOGRAPHS

Regional office SPCB – Angul

Mahanandi Coal Fields – Angul

Muramandali – Angul

Nalconagar – Angul

AMBIENT AIR MONITORING PHOTOGRAPHS

NTPC Khaniya – Talcher

Talcher Industrial Estate – Talcher

Talcher Industrial Area – Talcher

Talcher Township – Talcher

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Bangura – Angul & Talcher

Brahmini river Downstream – Angul & Talcher

Brahmini river Upstream – Angul & Talcher

Lingranalla downstream – Angul & Talcher

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Lingranalla Upstream – Angul & Talcher

Nandira River – Angul & Talcher

Shingazort nalla – Angul & Talcher

Tikra River – Angul & Talcher

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Meramandali – Angul & Talcher

Mahanandi Coal Field – Angul & Talcher

NTPC Kahinya – Angul & Talcher

NALCO nagar – Angul & Talcher

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Talcher Thermal – Angul & Talcher

Talcher Thermal – Angul & Talcher

Banarpal – Angul & Talcher

Angul Township

AAQ MONITORING LOCATIONS

SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	Asian Paints Colony, SW direction to Industrial Area	04.02.2013 to 05.02.2013	N 21°36'29.2"	E 073°01'02.2"
AAQ – 2	BASF Unit –II	04.02.2013 to 05.02.2013	N 21°37'32.8"	E 073°02'50.8"
AAQ – 3	Meghamani Organics	04.02.2013 to 05.02.2013	N 21°36'54.9"	E 073°01'59.9"
AAQ – 4	Durga Traders	04.02.2013 to 05.02.2013	N 21°38'08.9"	E 073°01'01.2"
AAQ – 5	Solve Specialty Limited	05.02.2013 to 06.02.2013	N 21°21'50.5"	E 072°56'0.26"
AAQ – 6	Hikal Chemicals Limited	05.02.2013 to 06.02.2013	N 21°32'32.6"	E 072°59'03.3"

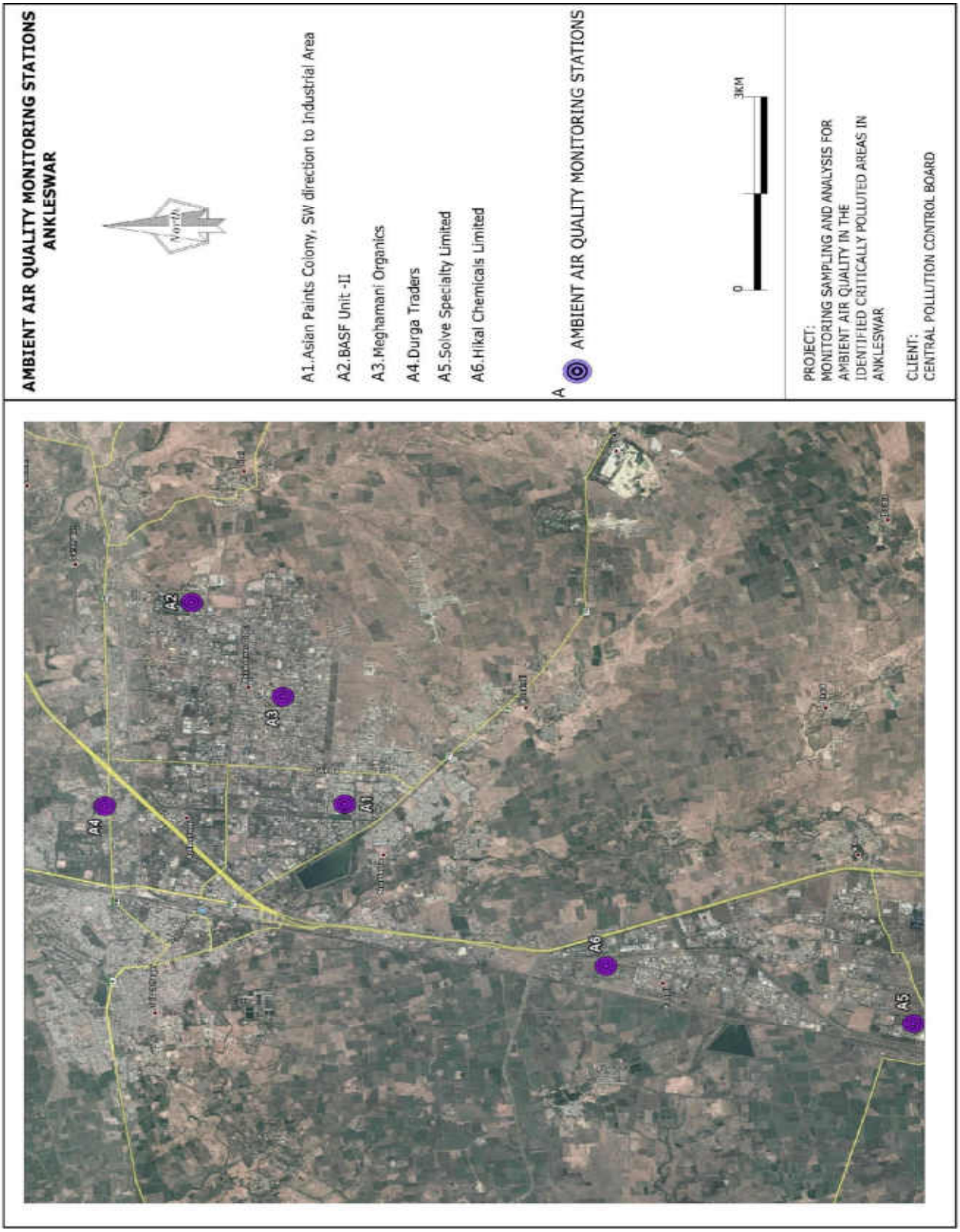
SURFACE WATER SAMPLING LOCATIONS

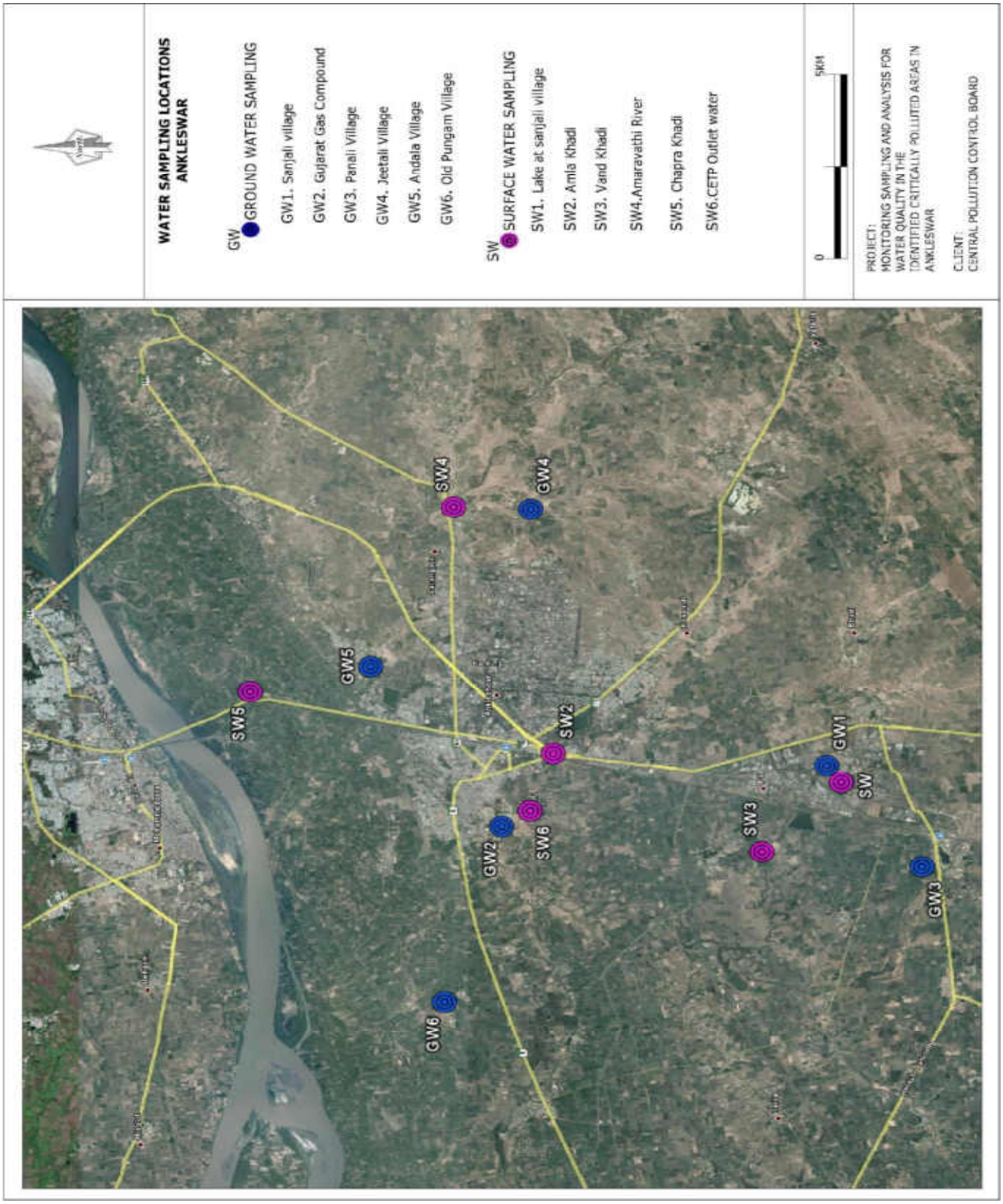
SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	Lake at Sanjali village	05.02.2013	N 21°33'18.70''	E 072°59'31.80''
SW – 2	Amla Khadi	04.02.2013	N 21°36'52.80''	E 072°59'59.09''
SW – 3	Vand Khadi	05.02.2013	N 21°34'17.70''	E 072°58'25.70'''
SW – 4	Amaravathi River	04.02.2013	N 21°38'48.32''	E 073°04'49.24''
SW - 5	Chapra Khadi	05.02.2013	N 21°40'38.10''	E 073°00'58.10''
SW - 6	CETP Outlet water	05.02.2013	N 21°37''10.06''	E 072°59'04.6''

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Sanjali village	05.02.2013	N 21°33'17.9''	E 072°59'37.8''
GW – 2	Gujarat Gas Compound	04.02.2013	N 21°37'27.7''	E 072°59'03.6''
GW – 3	Panali Village	04.02.2013	N 21°32'18.7''	E 072°58'11.2''
GW – 4	Jeetali Village	04.02.2013	N 21°37'9.57''	E 073°04'56.3'''
GW - 5	Andala Village	04.02.2013	N 21°39'9.42''	E 073°04'19.2''
GW - 6	Old Pungam Village	04.02.2013	N 21°38'13.6''	E 072°56'02.5''

ANKLESHWAR - GUJARAT




WATER SAMPLING LOCATIONS
ANKLESWAR
GW
GROUND WATER SAMPLING
GW1. Sanjali village
GW2. Gujarat Gas Compound
GW3. Panali Village
GW4. Jeetali Village
GW5. Andala Village
GW6. Old Pungam Village
SW
SURFACE WATER SAMPLING
SW1. Lake at sanjali village
SW2. Amla Khadi
SW3. Vand Khadi
SW4.Amaravathi River
SW5. Chapra Khadi
SW6.CETP Outlet water
0
5KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN ANKLESWAR
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
SW4
GW4
SW5
GW5
SW2
GW1
SW
SW6
GW2
SW3
GW3
GW6

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS			Test Methods
			AAQ – 1 Asian Paints Colony	**AAQ – 2** BASF Unit - II	**AAQ – 3** Meghmani Organics	
1	Lead	µg/m³	0.08	0.09	0.11	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	1.8	1.5	2.1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	70	81	123	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	28	32	38	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	17.5	9.0	8.3	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	7.8	8.6	11.2	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	12.8	14.2	16.5	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	20.3	26.0	28.7	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	
		mg/m³	<2	<2	<2	
12	O_3	µg/m³	12.6	8.4	10.8	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	58	36	38	
		µg/m³	4.6	<2	3.5	

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS			Test Methods
			AAQ – 4 Durga Traders	**AAQ – 5** Solve Speciality Limited	**AAQ – 6** Hikal Chemicals Limited	
1	Lead	µg/m³	0.14	0.09	0.11	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pvrene	ng/m³	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	2.6	1.9	1.3	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	161	89	77	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	49	31	26	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	14.0	12.0	15.2	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	12.7	9.6	7.8	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	15.6	11.3	10.4	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	23.8	18.7	16.8	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	
		mg/m³	<2	<2	<2	
12	O_3	µg/m³	7.6	10.4	8.1	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	24	26	34	
		µg/m³	2.5	3.0	<2	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results SW – 1* Lake at sanjali village	SW – 2 Amla Khadi	SW-3 Vand Khadi	Test Method
I	**Simple Parameters**					
1	Appearance	-	Sample were not collected due to dried of lake	Light Greenish	Light Brownish	-
2	Colour (Hazen Units)	-		10	20	IS 3025: Part – 4
3	Odour (Smell)	-		Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-		7.84	6.74	IS 3025: Part – 11
2	E C	µS/cm		1700	1200	IS 3025: Part – 14
3	Oil & Grease	mg/l		1	1	IS 3025: Part – 39
4	Suspended Solids	mg/l		26	32	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l		2.40	4.2	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l		28	20	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l		7	4	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l		0.03	0.02	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l		0.90	0.68	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l		0.93	0.70	By Calculation
11	Free Ammonia	mg/l		<0.1	<0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l		<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l		<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l		0.8	1.0	IS 3025: Part – 60
15	Sulphides as S	mg/l		<0.1	<0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l		0.23	<0.1	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-		4.59	2.14	By Calculation
18	Total Coliforms	MPN/100ml		5	20	IS 1622
19	Fecal Coliforms	MPN/100ml		<2	7	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l		0.50	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l		4.9	4.2	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l		3.5	2.8	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l		<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l		0.12	0.10	IS 13428
6	Organo-chlorine Pesticides	mg/l		Not Detected	Not Detected	EPA 508
7	PAH	mg/l		Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l		Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l		0.02	0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l		<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l		<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l		0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l		0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l		<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l		<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l		<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l		<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l		0.02	0.05	APHA 3111 – B
19	Iron as Fe	mg/l		0.45	0.58	IS 3025: Part – 53
20	Vanadium as V	mg/l		<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l		<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l		0.16	0.14	IS 3025: Part – 57

Note: * SW – 1: The pond was dried up, hence could not be collected.

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			SW-4 Amaravathi River	SW – 5 Chapra Khadi	SW-6 CETP Outlet water	
I	**Simple Parameters**					
1	Appearance	-	Colourless	Light Brownish	Brown	-
2	Colour (Hazen Units)	-	5	40	150	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Un-agreeable	Un-agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.65	7.46	7.13	IS 3025: Part – 11
2	E C	µS/cm	950	4880	5000	IS 3025: Part – 14
3	Oil & Grease	mg/l	1	3	6	IS 3025: Part – 39
4	Suspended Solids	mg/l	18	56	108	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	5.3	1.6	1.1	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	12	78	368	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	3	26	105	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.01	0.05	0.15	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	2.26	1.35	7.00	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	2.27	1.40	7.15	By Calculation
11	Free Ammonia	mg/l	<0.1	<0.1	2.10	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.7	1.4	1.0	IS 3025: Part – 60
15	Sulphides as S	mg/l	<0.1	0.80	3.6	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	0.17	0.29	1.80	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	2.60	10.43	8.62	By Calculation
18	Total Coliforms	MPN/100ml	50	21	140	IS 1622
19	Fecal Coliforms	MPN/100ml	8	5	30	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	0.20	0.50	2.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	2.1	11	126	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	1.4	7.0	82	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	0.10	0.14	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	0.02	0.03	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	0.01	0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	0.05	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.02	0.06	0.34	APHA 3111 – B
19	Iron as Fe	mg/l	0.15	0.50	0.92	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.06	0.42	0.48	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			GW-1 Sanjali Village	GW – 2 Gujarat Gas Compound	GW-3 Panali Village	
I	**Simple Parameters**					
1	Appearance	-	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	<5	<5	<5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.09	7.45	7.57	IS 3025: Part – 11
2	E C	µS/cm	2330	2890	2100	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	4	4	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	0.01	0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	8.58	4.06	1.13	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	8.59	4.07	1.14	APHA 4500 –N.C
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.7	0.7	1.0	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	5.98	6.53	3.18	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.02	<0.02	<0.02	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.01	0.02	0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.01	0.02	0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.07	0.09	0.06	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.18	0.24	0.16	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			GW-4 Jeetali Village	GW – 5 Andala village	GW-6 Old Pungam Village	
I	**Simple Parameters**					
1	Appearance	-	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	<5	<5	<5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.50	7.50	7.56	IS 3025: Part – 11
2	E C	µS/cm	1850	1900	1480	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	6	4	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	0.01	0.02	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	3.16	2.94	0.90	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	3.17	2.95	0.92	By Calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.6	0.5	0.6	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	2.02	3.07	2.76	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactant	mg/l	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	<0.01	<0.01	0.02	APHA 3111 – B
19	Iron as Fe	mg/l	0.08	0.07	0.10	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.12	0.14	0.08	IS 3025: Part – 57

AMBIENT AIR MONITORING PHOTOGRAPHS

Asian Paints Colony

BASF, Unit-02, GIDC Ankleshwar

Meghmani Organics Limited

Durga Traders, Near ONGC colony

Hikal Chemicals Limited, GIDC Panoli

Solve Speciality Limited, , GIDC Panoli

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Lake at Sanjali village (dried up hence could not collected)

Amla Khadi

Vand Khadi

Amravati River

Chapra Khadi

CETP Outlet

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Panoli Village

Gujarat Gas Compound

Andala village

Old Pungam village

AAQ MONITORING LOCATIONS

SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	Surya Nagar High School	26.02.2013 to 27.02.2013	N 23°39.670'	E 086°53.533'
AAQ – 2	Kulti Municipality	26.02.2013 to 27.02.2013	N 23°43.364'	E 086°52.756'
AAQ – 3	IISCO Town Office	26.02.2013 to 27.02.2013	N 23°39.903'	E 086°56.136'
AAQ – 4	PWD Executive Engg office	26.02.2013 to 27.02.2013	N 23.41.117'	E 086°56.666'

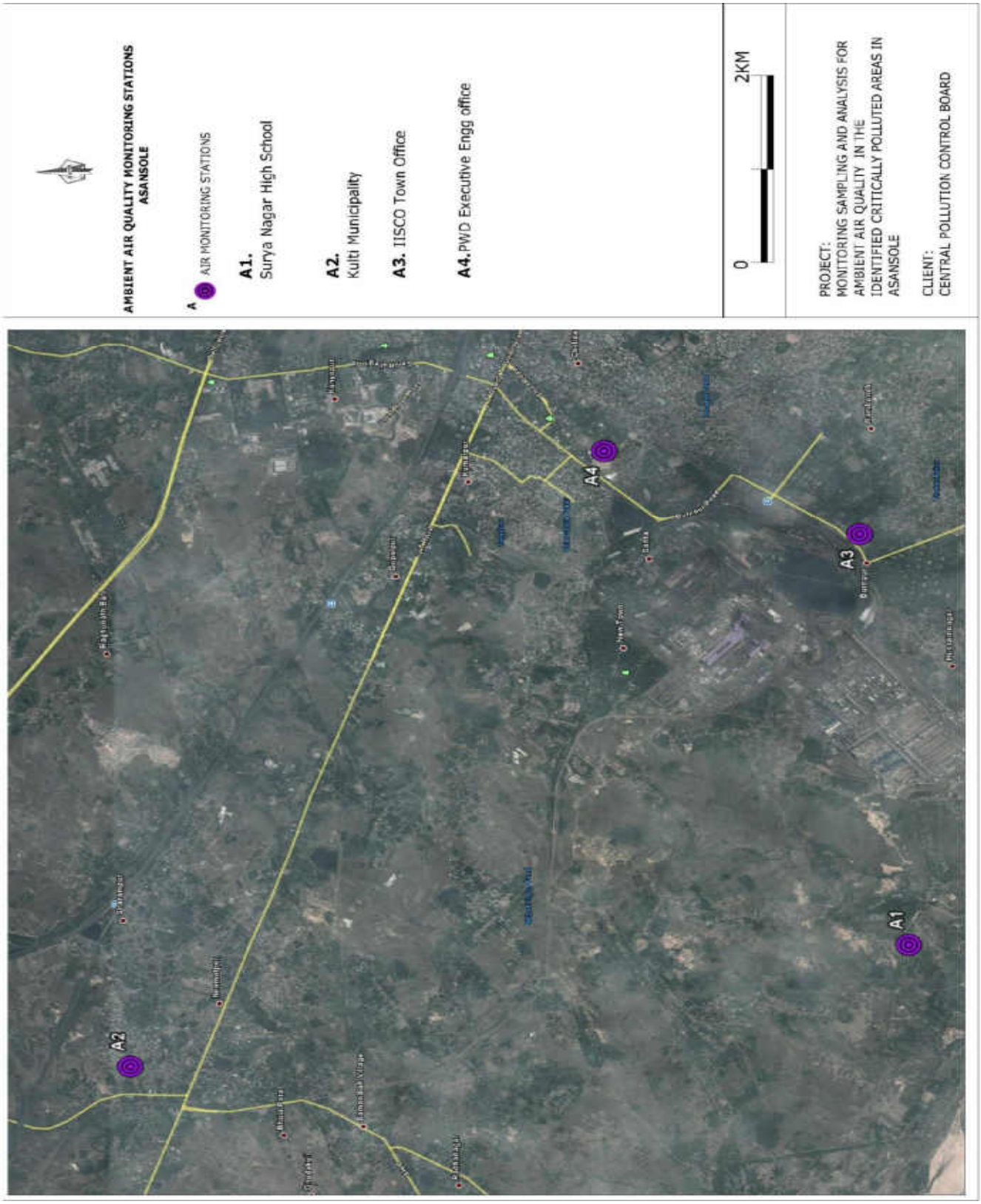
SURFACE WATER SAMPLING LOCATIONS

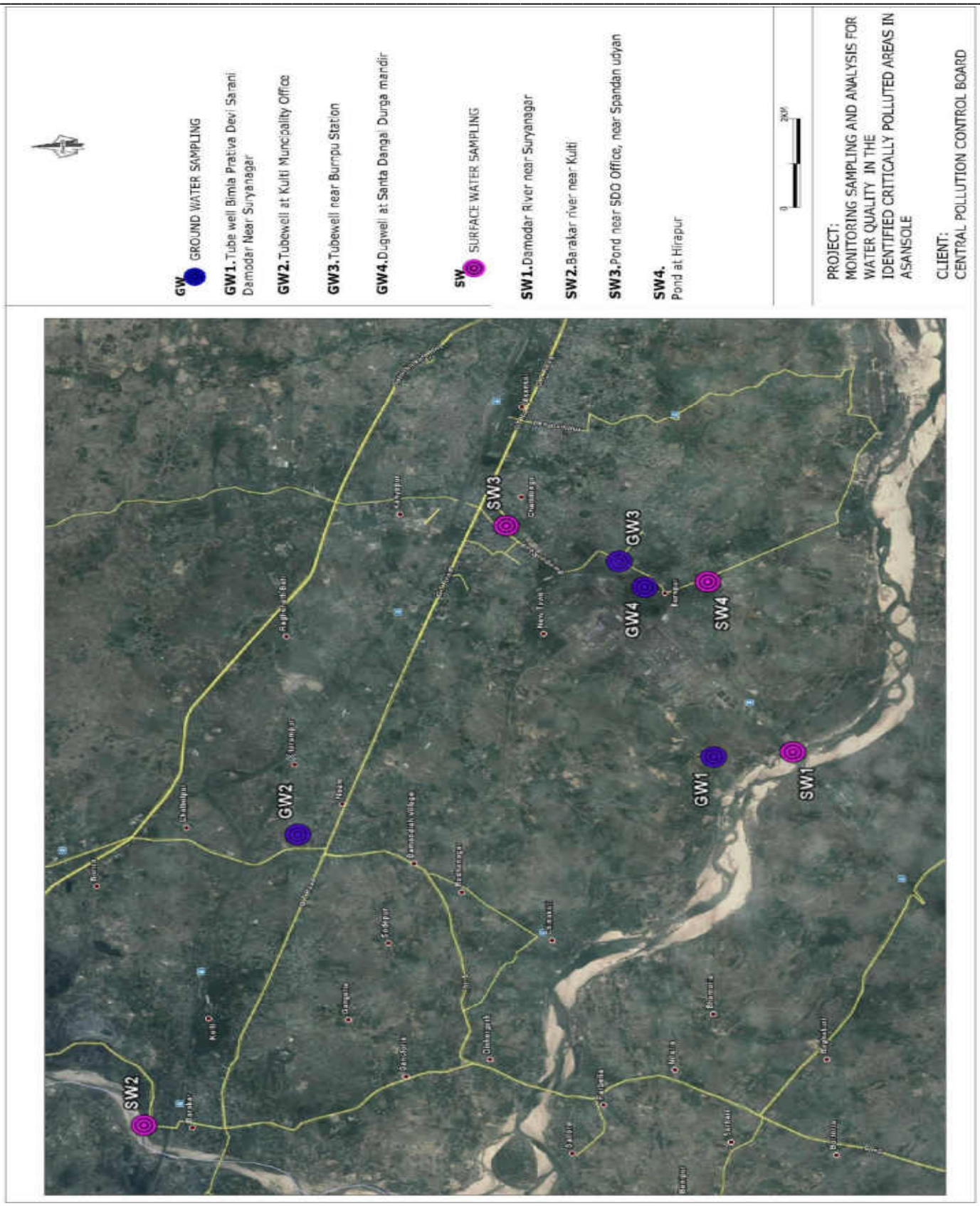
SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	Damodar River near Suryanagar	27.02.2013	N 23°38.647'	E 086°53.857'
SW – 2	Barakar river near Kulti	27.02.2013	N 23°44.830'	E 086°48.905'
SW – 3	Pond near SDO Office, near Spandan udyan	27.02.2013	N 23°41.379'	E 086°56.847'
SW – 4	Pond at Hirapur	27.02.2013	N 23°39.456'	E 086°56.108'

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Tube well Bimla Prativa Devi Sarani Damodar Near Suryanagar	27.02.2013	N 23°39.402'	E 086°53.791'
GW – 2	Tubewell at Kulti Muncipality Office	27.02.2013	N 23°43.364'	E 086°52.756'
GW – 3	Tubewell near Burnpur Station	27.02.2013	N 23°40.303'	E 086°56.378'
GW – 4	Dugwell at Santa Dangal Durga mandir	27.02.2013	N 23°40.059'	E 086°56.037'

ASANSOLE (WEST BENGAL)




GW GROUND WATER SAMPLING
GW1. Tube well Bimla Prativa Devi Sarani Damodar Near Suryanagar
GW2. Tubewell at Kulti Municipality Office
GW3. Tubewell near Burnpu Station
GW4. Dugwell at Santa Dangal Durga mandir
SW SURFACE WATER SAMPLING
SW1. Damodar River near Suryanagar
SW2. Barakar river nea- Kulti
SW3. Pond near SDO Office, near Spandan udyan
SW4. Pond at Hirapur
0
2KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN ASANSOLE
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
SW2
GW2
SW3
GW3
GW4
SW4
GW1
SW1

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 Surya Nagar High School	**AAQ – 2** Kulti Municipality	**AAQ – 3** IISCO Town Office	**AAQ – 4** PWD Executive Engg office	
1	Lead	µg/m³	0.03	0.07	0.02	0.05	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	<1	<1	<1	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	141.8	130.8	89.6	110.5	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	47.8	58.5	37.2	66.5	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	18.1	21.6	20.9	17.6	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	10.5	8.4	6.5	4.9	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	16.1	11.6	10.9	12.8	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	26.4	18.4	22.9	19.3	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	3.1	5.7	4.2	2.9	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	16.3	14.7	17.8	12.3	
		µg/m³	2.5	4.1	3.7	<2	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-1 Damodar River near Suryanagar	SW – 2 Barakar river near Kulti	SW-3 Pond near SDO Office, near Spandan udyan	SW-4 Pond at Hirapur	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Light yellow	-
2	Colour (Hazen Units)	-	5	5	5	20	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	8.18	8.56	8.11	8.13	IS 3025: Part – 11
2	E C	µS/cm	205	164	884	796	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	1	2	2	IS 3025: Part – 39
4	Suspended Solids	mg/l	28	18	32	36	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	5.9	5.6	5.1	4.9	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	8	12	24	32	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	2	3	5	7	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.01	0.02	0.02	0.05	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	0.45	0.23	1.35	4.74	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.46	0.25	1.37	4.79	By Calculation
11	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.40	0.30	0.60	0.80	IS 3025: Part – 60
15	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	< 0.1	0.15	0.18	0.37	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	0.73	0.70	3.00	3.13	By Calculation
18	Total Coliforms	MPN/100ml	140	280	900	500	IS 1622
19	Fecal Coliforms	MPN/100ml	<2	7	11	4	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	0.25	0.32	0.54	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	3.5	4.2	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	1.4	1.9	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.21	0.05	0.04	0.03	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.02	< 0.01	< 0.01	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.15	0.12	0.13	0.11	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.09	0.05	0.12	0.09	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Tube well Bimla Prativa Devi Sarani Damodar Near Suryanagar	GW – 2 Tubewell at Kulti Muncipality Office	GW-3 Tubewell near Burnpur Station	GW-4 Dugwell at Santa Dangal Durga mandir	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	5	< 5	< 5	< 5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.80	7.75	7.76	7.01	IS 3025: Part – 11
2	E C	µS/cm	794	670	1210	680	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	16	12	< 10	< 10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	4	6	4	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.02	0.02	0.02	0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	0.23	1.13	3.39	5.65	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.25	1.15	3.41	5.66	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.60	0.50	0.70	0.80	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	< 0.1	< 0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	2.46	1.10	0.92	0.96	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.09	< 0.01	0.03	0.02	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.10	0.09	0.09	0.11	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.06	0.10	0.17	0.05	IS 3025: Part – 57

AMBIENT AIR MONITORING PHOTOGRAPHS

IISCO Township – Asansole

Kulti Municipality – Asansole

PWD Executive Engineering office – Asansole

Suryanagar High School – Asansole

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Barakar River – Asansole

Damodar River – Asansole

Hirapur Pond – Asansole

Near S.D.Office – Asansole

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Baranpur near Railway station – Asansole

Kulti Municipality – Asansole

Suryanagar – Asansole

AAQ MONITORING LOCATIONS

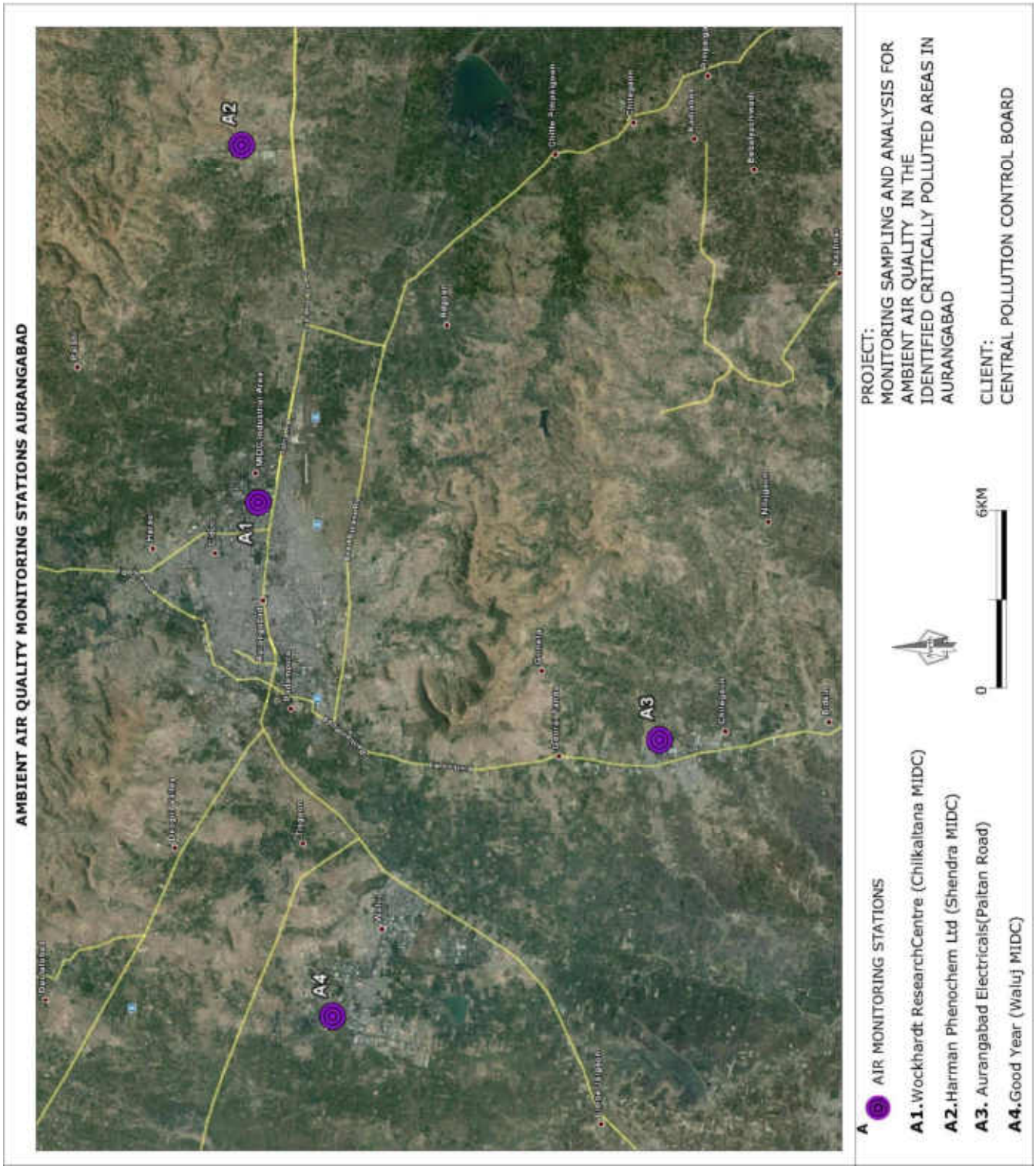
SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	Wockhardt Research Centre (Chilkaltana MIDC)	08.02.2013 to 09.02.2013	N 19°52'39.1''	E 075°22'31.2''
AAQ – 2	Harman Phenochem Ltd (Shendra MIDC)	08.02.2013 to 09.02.2013	N 19°52'57.4''	E 075°29'29.2''
AAQ – 3	Aurangabad Electricals (Paitan Road)	09.02.2013 to 10.02.2013	N 19°45'17.6''	E 075°17'51.8''
AAQ – 4	Good Year (Waluj MIDC)	09.02.2013 to 10.02.2013	N 19°51'17.2''	E 075°12'28.2''

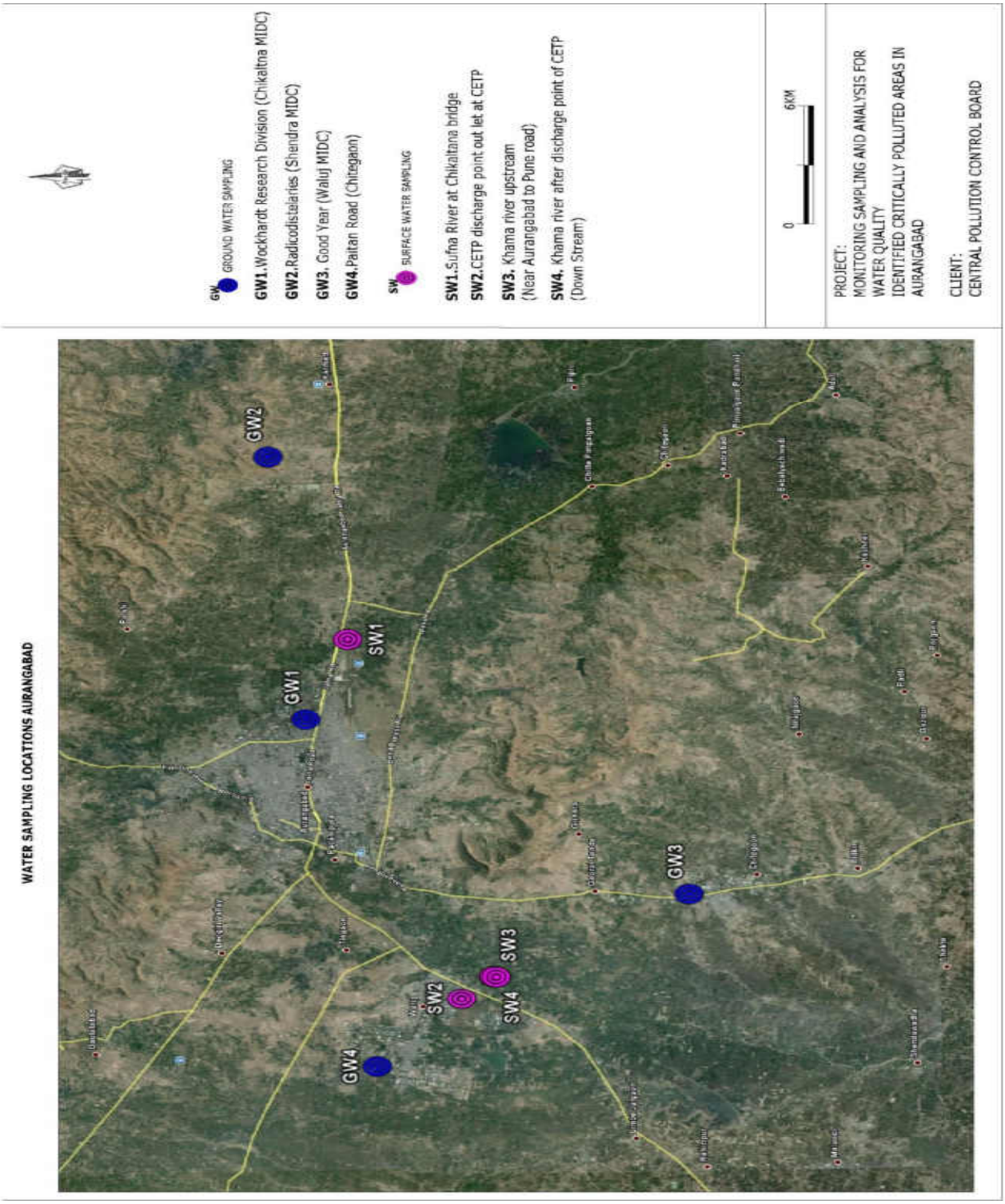
SURFACE WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	Sufna River at Chikaltana bridge	08.02.2013	N 19°51'54.3	E 75°24'48.6''
SW – 2	CETP discharge point out let at CETP	09.02.2013	N 19°49'38.1''	E 75°14'26.1''
SW – 3	Khama river upstream (Near Aurangabad to Pune road)	09.02.2013	N 19°49'03.6''	E 75°15'04.8''
SW – 4	Khama river after discharge point of CETP (Down Stream)	09.02.2013	N 19°49'02.8''	E 75°15'04.9''

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Wockhardt Research Division (Chikaltna MIDC)	08.02.2013	N 19°52'35.8''	E 075°22'33.5''
GW – 2	Radico distelaries (Shendra MIDC)	08.02.2013	N 19°53'18.7''	E 075°30'09.2''
GW – 3	Good Year (Waluj MIDC)	09.02.2013	N 19°45'22.1''	E 075°17'28.1''
GW – 4	Paitan Road (Chite gaon)	09.02.2013	N 19°51'14.9''	E 075°12'26.8''


AMBIENT AIR QUALITY MONITORING STATIONS AURANGABAD
A1
A2
A3
A4
A AIR MONITORING STATIONS
A1.Wockhardt ResearchCentre (Chilkaltana MIDC)
A2.Harman Phenochem Ltd (Shendra MIDC)
A3. Aurangabad Electricals(Paltan Road)
A4.Good Year (Waluj MIDC)
0
6KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR AMBIENT AIR QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN AURANGABAD
CLIENT:
CENTRAL POLLUTION CONTROL BOARD


WATER SAMPLING LOCATIONS AURANGABAD
GW1
GW2
GW3
GW4
SW1
SW2
SW3
SW4
GW GROUND WATER SAMPLING
GW1.Wockhardt Research Division (Chikaltna MIDC)
GW2.Radicodistelaries (Shendra MIDC)
GW3. Good Year (Waluj MIDC)
GW4.Paitan Road (Chitegaon)
SW SURFACE WATER SAMPLING
SW1.Sufna River at Chikaltana bridge
SW2.CETP discharge point out let at CETP
SW3. Khama river upstream
(Near Aurangabad to Pune road)
SW4. Khama river after discharge point of CETP
(Down Stream)
0
6KM
PROJECT:
MONITTORING SAMPLING AND ANALYSIS FOR
WATER QUALITY
IDENTIFIED CRITICALLY POLLUTED AREAS IN
AURANGABAD
CLIENT:
CENTRAL POLLUTION CONTROL BOARD

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 Wockhardt Research Centre (Chikaltana MIDC)	**AAQ – 2** Harman Phenochem Ltd., (Shendra MIDC)	**AAQ – 3** Aurangabad Electricals (Paitan Road)	**AAQ – 4** Good Year (Waluj MIDC)	
1	Lead	µg/m³	0.11	0.09	0.14	0.18	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	3.8	3.1	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	1.2	1.6	1.4	2.5	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	80.8	74.6	84.2	95.7	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	26.4	22.1	23.4	29.4	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	48	52	44	76	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	9.6	11.2	8.4	14.2	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	21.8	18.5	19.2	24.5	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	34.2	26.6	29.7	32.9	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	5.8	6.7	5.2	9.0	IS 5182 (Part 9), 1974, RA 209, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	17.6	15.4	18.6	16.4	
		µg/m³	3.4	2.8	<2	3.1	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-1 Sufna River at Chikaltana bridge	SW – 2 CETP Discharge point Outlet at CETP	SW-3 Khama river Up-stream (Near Dune Road)	SW-4 Khama River after discharge point of CETP (D/s)	
I	**Simple Parameters**						
1	Appearance	-	Greyish	Light Greyish	Greyish	Light Greyish	-
2	Colour (Hazen Units)	-	30	15	30	20	IS 3025: Part – 4
3	Odour (Smell)	-	Un-Agreeable	Un-Agreeable	Un-Agreeable	Un-Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.76	7.50	7.10	7.35	IS 3025: Part – 11
2	E C	µS/cm	1170	1814	1606	1732	IS 3025: Part – 14
3	Oil & Grease	mg/l	9	4	8	5	IS 3025: Part – 39
4	Suspended Solids	mg/l	146	78	248	82	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	<1	2.4	<1	2.5	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	436	108	272	128	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	170	40	105	50	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.03	0.04	0.06	0.02	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	6.10	2.26	4.29	1.35	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	6.13	2.30	4.35	1.37	By Calculation
11	Free Ammonia	mg/l	1.20	0.50	0.60	0.40	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.90	0.80	0.40	0.70	IS 3025: Part – 60
15	Sulphides as S	mg/l	20	12.64	12	10.4	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	3.07	4.26	4.18	5.0	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	5.64	3.55	2.77	3.52	By Calculation
18	Total Coliforms	MPN/100ml	220	70	140	110	IS 1622
19	Fecal Coliform	MPN/100ml	12	6	11	4	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	4.2	5.6	5.2	6.2	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	112	61	72	58	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	80	40	54	34	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	0.008	0.004	0.006	0.004	IS 3025: Part – 43
5	Surfactants	mg/l	0.20	0.12	0.18	0.15	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	0.01	0.09	0.04	IS 3025: Part – 49
10	Nickel as Ni	mg/l	0.03	0.02	0.02	0.02	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	0.03	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	0.03	0.02	0.03	0.05	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.18	0.23	0.27	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.25	0.28	2.28	0.20	IS 3025: Part – 53
20	Vanadium as V	mg/l	0.03	0.02	0.03	0.06	APHA 3111 – D
21	Selenium as Se	mg/l	0.06	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.81	0.33	0.32	0.20	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Wockhardt Research Centre	GW – 2 Radico Distilleries (Shendra MIDC)	GW-3 Good Year (Waluj MIDC)	GW-4 Paitan Road (Chite goan)	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	<5	<5	<5	<5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.10	7.61	7.10	7.07	IS 3025: Part – 11
2	E C	µS/cm	810	666	1000	1050	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	4	6	6	4	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.02	0.06	0.02	0.02	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	11.3	5.65	6.32	8.35	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	11.32	5.71	6.34	8.37	By calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.50	0.60	0.50	0.40	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	1.04	1.12	1.67	1.06	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliform	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.17	0.03	0.07	0.04	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	0.01	0.05	0.03	IS 3025: Part – 54
11	Copper as Cu	mg/l	0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	0.02	0.03	0.05	0.05	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	<0.01	<0.01	0.01	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.04	0.09	0.21	0.22	IS 3025: Part – 53
20	Vanadium as V	mg/l	0.24	0.09	0.08	0.07	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.07	0.03	0.15	0.21	IS 3025: Part – 57

AMBIENT AIR MONITORING PHOTOGRAPHS

WOCKHARDT RESEARCH CENTRE

HARMAN PHENOCHEM LTD

AMBIENT AIR MONITORING PHOTOGRAPHS

AURANBABAD ELECTRICALS

GOOD YEAR OFFICE

SAMPLING LOCATION PHOTOGRAPHS OF SURFACE WATER

SUFNA RIVER AT CHIKALTANA BRIDGE

CETP DISCHARGE POINT OUTLET

KHAMA RIVER UP STREAM

KHAMA RIVER DOWN STREAM

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

WOCKHARDT RESEARCH CENTRE

RADICO DISTILARIES (SHANDRA MIDC)

GOOD YEAR

PAITAN ROAD

AAQ MONITORING LOCATIONS

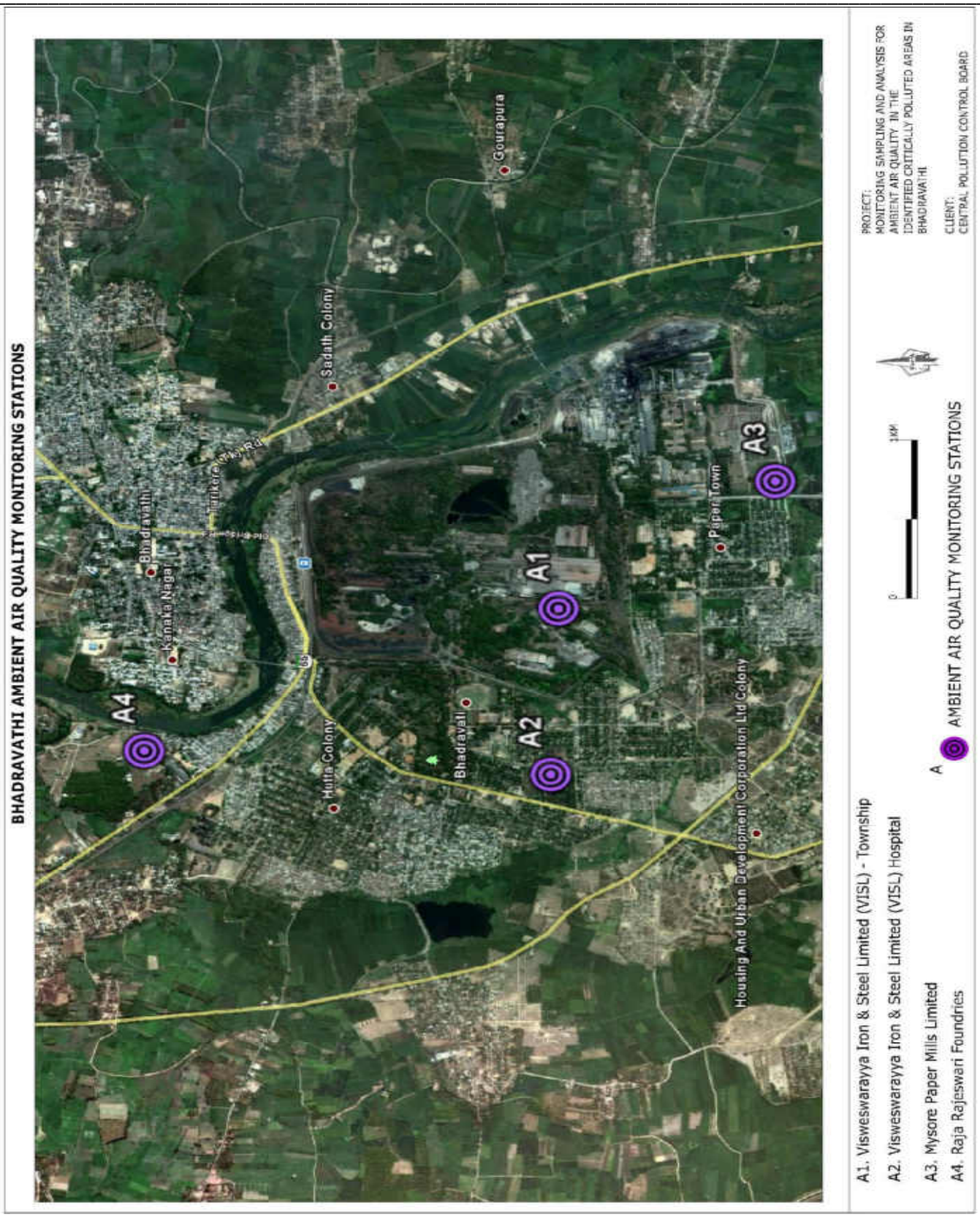
SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	Visweswarayya Iron & Steel Limited (VISL) - Township	21.02.2013 to 22.02.2013	N 13°49'49.5"	E 75°42'00.6"
AAQ – 2	Visweswarayya Iron & Steel Limited (VISL) Hospital	21.02.2013 to 22.02.2013	N 13°49'50.8"	E 75°41'25.6"
AAQ – 3	Mysore Paper Mills Limited	21.02.2013 to 22.02.2013	N 13°49'12.8"	E 75°42'27.5"
AAQ – 4	Raja Rajeswari Foundries	21.02.2013 to 22.02.2013	N 13°50'59.6"	E 75°41'30.6"

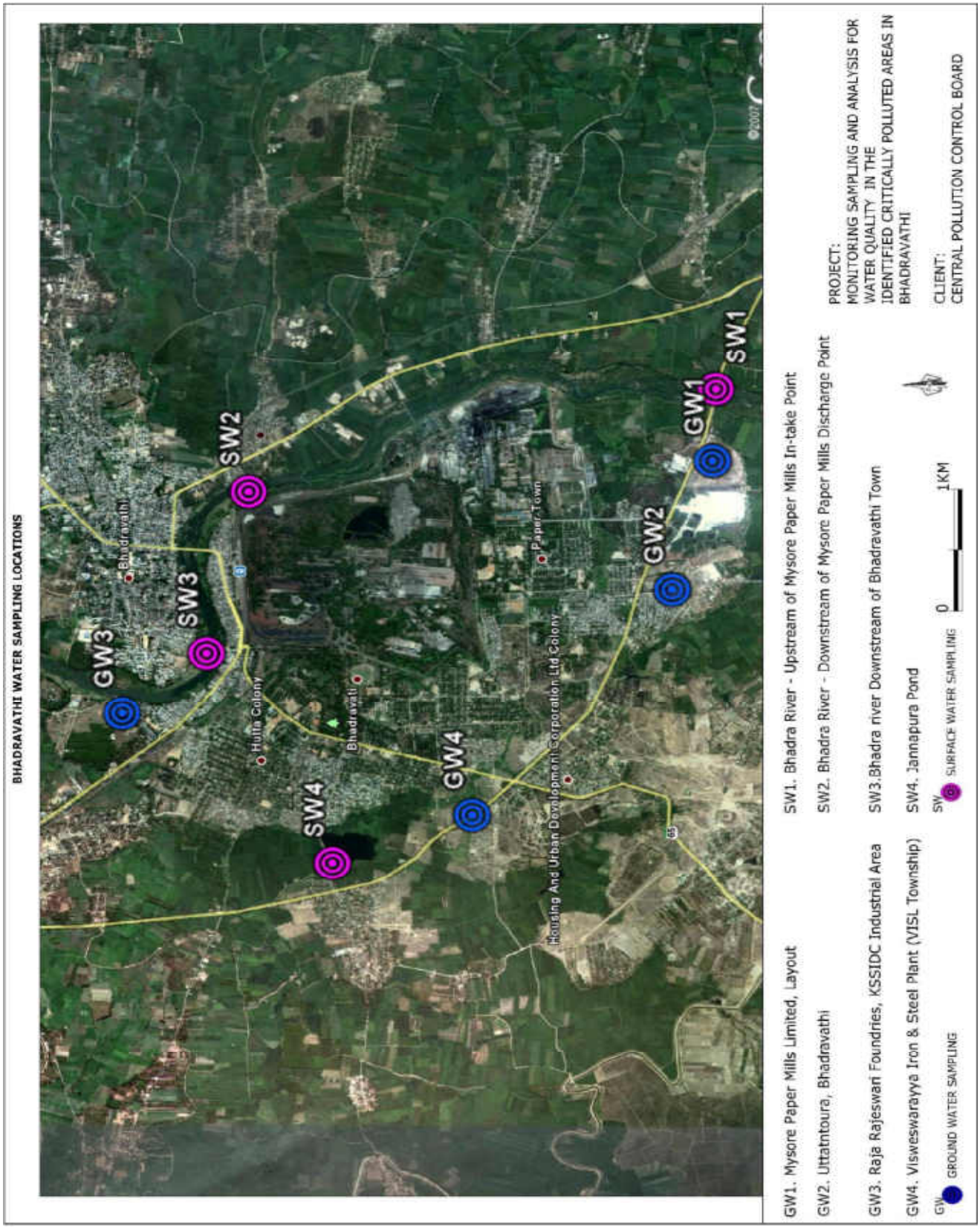
SURFACE WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	Bhadra River – Upstream of Mysore Paper Mills In-take Point	21.02.2013	N 13°48'41.4"	E 75°43'00.0"
SW – 2	Bhadra River – Downstream of Mysore Paper Mills Discharge Point	21.02.2013	N 13°50'30.5"	E 75°42'32.0"
SW – 3	Bhadra river Downstream of Bhadravathi Town	21.02.2013	N 13°50'40.3"	E 75°41'47.8"
SW – 4	Jannapura Pond	21.02.2013	N 13°50'11.7"	E 75°40'49.2"

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Mysore Paper Mills Limited, Layout	21.02.2013	N 13°48'42.2"	E 75°42'40.4"
GW – 2	Uttatntoura, Bhadravathi	21.02.2013	N 13°48'51.6"	E 75°42'05.1"
GW – 3	Raja Rajeswari Foundries, KSSIDC Industrial Area	21.02.2013	N 13°51'00.0"	E 75°41'31.4"
GW – 4	Visweswarayya Iron & Steel Plant (VISL Township)	21.02.2013	N 13°49'38.3"	E 75°41'03.6"


BHADRAVATHI AMBIENT AIR QUALITY MONITORING STATIONS
A4
Bhadravathi
Kanaka Nagar
Sadath Colony
Gourapura
A1
A2
A3
Hutta Colony
Bhadravati
Paper Town
Housing And Urban Development Corporation Ltd Colony
A1. Visweswarayya Iron & Steel Limited (VISL) - Township
A2. Visweswarayya Iron & Steel Limited (VISL) Hospital
A3. Mysore Paper Mills Limited
A4. Raja Rajeswari Foundries
0
1KM
A
AMBIENT AIR QUALITY MONITORING STATIONS
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR AMBIENT AIR QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN BHADRAVATHI
CLIENT:
CENTRAL POLLUTION CONTROL BOARD


BHADRAVATHI WATER SAMPLING LOCATIONS
GW3
SW3
SW2
SW4
GW4
GW2
GW1
SW1
Bhadravathi
Hutta Colony
Bhadravati
Housing And Urban Development Corporation Ltd Colony
Paper Town
GW1. Mysore Paper Mills Limited, Layout
GW2. Uttatntoura, Bhadravathi
GW3. Raja Rajeswari Foundries, KSSIDC Industrial Area
GW4. Visweswarayya Iron & Steel Plant (VISL Township)
GW GROUND WATER SAMPLING
SW1. Bhadra River - Upstream of Mysore Paper Mills In-take Point
SW2. Bhadra River - Downstream of Mysore Paper Mills Discharge Point
SW3.Bhadra river Downstream of Bhadravathi Town
SW4. Jannapura Pond
SW SURFACE WATER SAMPLING
0
1KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN BHADRAVATHI
CLIENT:
CENTRAL POLLUTION CONTROL BOARD

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 VISL	**AAQ – 2** VISL Hospital	**AAQ – 3** MPM Ltd.	**AAQ – 4** Raja Rajeswari Foundry	
1	Lead	µg/m³	0.04	0.02	0.06	0.10	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	<1	<1	1.2	1.6	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	89.1	83.4	95.6	118.6	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	31.3	28.6	31.8	38.4	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	26	31	27	18.6	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	4.8	2.1	6.4	8.3	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	12.1	13.6	17.3	11.6	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	21.9	19.3	22.7	17.1	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	6.8	5.6	10.2	8.0	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	18.3	17.5	16.1	21.6	
		µg/m³	3.6	2.8	<2	<2	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW -1 Bhadra River – U/s of MPM In-take Point	SW – 2 Bhadra River – D/s of MPM Discharge point	SW-3 Bhadra River D/s of Bhadravathi Town	SW-4 Jannapura Pond	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Light brown	Colourless	Colourless	-
2	Colour (Hazen Units)	-	5	5	5	5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH		7.47	7.77	7.53	7.42	IS 3025: Part – 11
2	E C	µS/cm	170	170	120	535	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	24	28	32	36	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	6.0	5.6	5.8	5.2	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	22	20	18	20	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	5	4	4	4	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.01	0.01	0.02	<0.01	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	0.68	0.90	0.90	2.0	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.69	0.91	0.92	2.0	By Calculation
11	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.30	0.20	0.20	0.40	IS 3025: Part – 60
15	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P D
17	Sodium Absorption Ratio (SAR)	-	0.28	0.42	0.24	1.01	By Calculation
18	Total Coliforms	MPN/100ml	14	21	22	17	IS 1622
19	Fecal Coliforms	MPN/100ml	<2	4	4	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P-D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – N org B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 508
7	PAH	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 525.2
8	PCB and PCT	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.09	0.10	0.12	0.14	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.02	0.02	0.02	0.04	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Mysore Paper Mills Ltd., Quarters Layout	GW – 2 Ujjainipura Bhadravathi	GW-3 RajaRajeswari Foundry KSSIDC Industrial Area	GW-4 Visweswarayya Iron & Steel Plant (VISL - Township)	
I	**Simple Parameters**						
1	Appearance	-	Light Brown	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	5	<5	<5	5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH		7.51	7.40	7.85	7.66	IS 3025: Part – 11
2	E C	µS/cm	1600	1226	1010	1000	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	4	8	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	<0.01	0.02	<0.01	0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	0.23	4.29	3.39	0.23	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.23	4.31	3.39	0.24	By Calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.80	0.60	0.70	0.60	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P D
16	Sodium Absorption Ratio (SAR)	-	1.32	1.91	0.95	1.03	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliform s	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – N org B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 508
7	PAH	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 525.2
8	PCB and PCT	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 508.E
9	Zinc as Zn	mg/l	0.12	0.02	<0.01	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.03	<0.01	<0.01	0.02	APHA 3111 – B
19	Iron as Fe	mg/l	0.12	0.06	0.05	0.10	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.09	0.08	0.05	0.06	IS 3025: Part – 57

AMBIENT AIR MONITORING LOCATIONS PHOTOGRAPHS

Mysore Paper Mills (MPM) Industry premises

Visweswara Iron & Steel Limited

MPM Hospital

Rajarajeswari Iron & Steel Foundry

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Mysore Paper Mill Industry Intake Point
Badra River

MPM Downstream
Badra River

Badra River at Downstream to Township

Jannapura Pond

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Rajarajeswari Iron & Steel Foundry

MPM Quarters Layout

Ujjanipur Village

Visweswarayya Iron & Steel Plant

AAQ MONITORING LOCATIONS

SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	Prince Care tech,	11.02.2013	N21°45'55.0"	E072°06'15.4"
AAQ – 2	Pashi Gujarat Vij Com Ltd., (PGVCL), Chitra, GIDC	11.02.2013	N21°45'39.4"	E072°06'09.5"

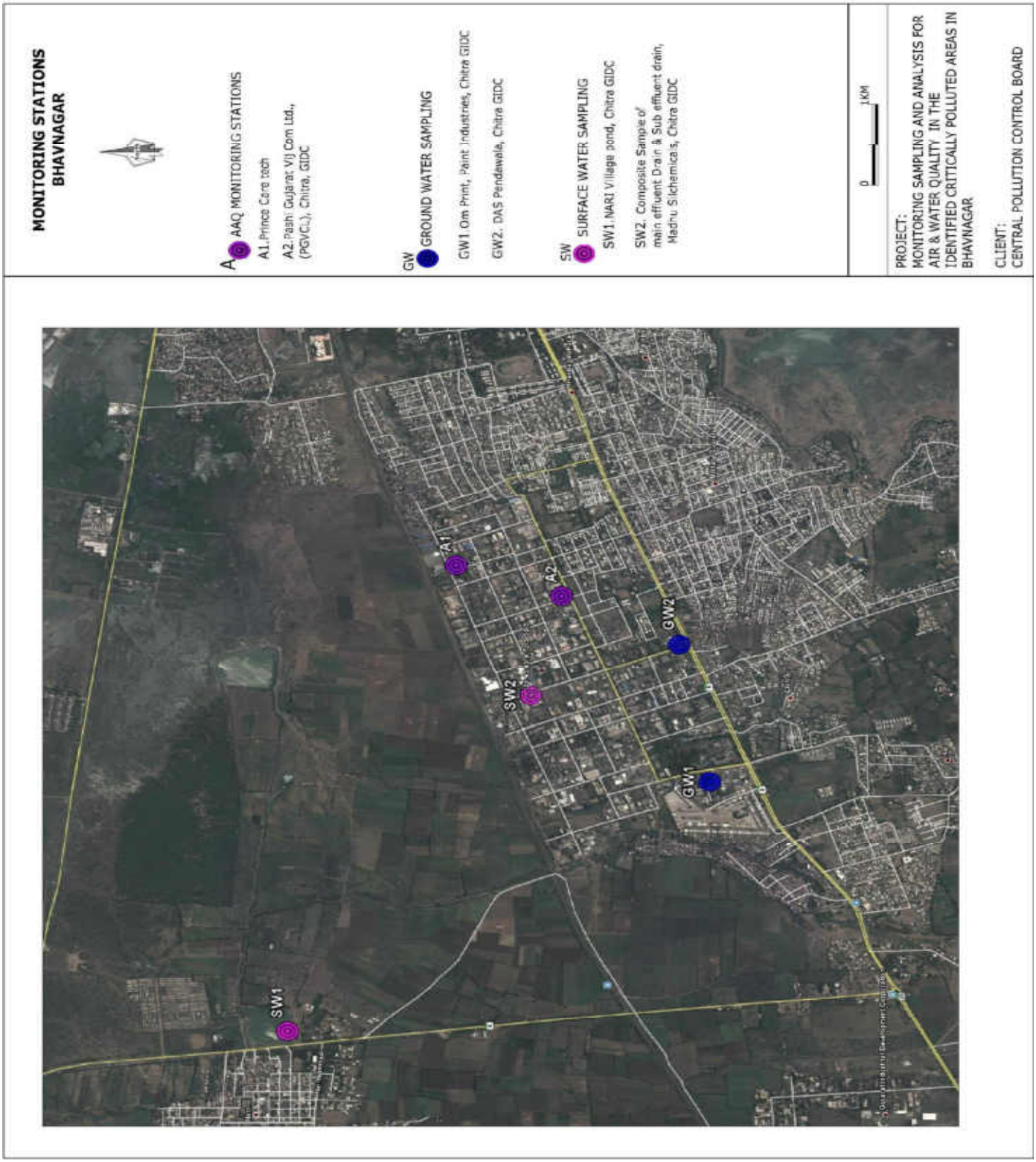
SURFACE WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	NARI Village pond, Chitra GIDC	11.02.2013	N21°46'20.1"	E072°04'45.7"
SW – 2*	Composite Sample of main effluent Drain & Sub effluent drain, Madhu Silchemicals, Chitra GIDC	11.02.2013	N21°45'43.9"	E072°05'50.5"

Note: SW-2 sample was not collected due to dried up.

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Om Print, Paint Industries, Chitra GIDC	11.02.2013	N21°45'17.5"	E072°05'33.8"
GW – 2	DAS Pendawala, Chitra GIDC	11.02.2013	N21°45'22.0"	E072°06'00.3"


MONITORING STATIONS
BHAVNAGAR
A
AAQ MONITORING STATIONS
A1.Prince Care tech
A2.Pashi Gujarat Vij Com Ltd., (PGVCL), Chitra, GIDC
GW
GROUND WATER SAMPLING
GW1.Om Print, Paint Industries, Chitra GIDC
GW2. DAS Pendawala, Chitra GIDC
SW
SURFACE WATER SAMPLING
SW1.NARI Village pond, Chitra GIDC
SW2. Composite Sample of main effluent Drain & Sub effluent drain, Madhu Silchemicals, Chitra GIDC
0
1KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR AIR & WATER QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN BHAVNAGAR
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
SW1
SW2
A1
A2
GW1
GW2

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS		Test Methods
			AAQ – 1 Prince Caretech, Chitra GIDC	**AAQ – 2** PGVCL, Chitra GIDC	
1	Lead	µg/m³	0.06	0.04	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	<1	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	79	67	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	21	24	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	22	14	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	4.8	3.1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	9.8	8.5	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	14.0	12.6	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	
		mg/m³	<2	<2	
12	O_3	µg/m³	6.2	10.8	IS 5182 (Part 9), 1974, RA 209, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	14.8	16.1	
		µg/m³	4.2	3.4	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results		Test Method
			SW-1 Nari Village Pond Bt. H Chitra GIDC	SW – 2* Composite of main effluent and Sub effluent drains – Madhu Silchemicals	
I	**Simple Parameters**				
1	Appearance	-	Light Brown	The drain was dried up, hence could not be collected.	-
2	Colour (Hazen Units)	-	25		IS 3025: Part – 4
3	Odour (Smell)	-	Un-Agreeable		IS 3025: Part – 5
II	**Regular Monitoring Parameters**				
1	pH	-	7.37		IS 3025: Part – 11
2	E C	µS/cm	930		IS 3025: Part – 14
3	Oil & Grease	mg/l	<1		IS 3025: Part – 39
4	Suspended Solids	mg/l	92		IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	6.4		IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	44		IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	10		IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	<0.01		APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	1.35		APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	1.35		APHA 4500 –N.C
11	Free Ammonia	mg/l	<0.1		APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1		IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02		IS 3025: Part – 27
14	Fluoride as F	mg/l	0.40		IS 3025: Part – 60
15	Sulphides as S	mg/l	1.44		IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	1.10		APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	5.70		By Calculation
18	Total Coliforms	MPN/100ml	20		IS 1622
19	Fecal Coliforms	MPN/100ml	4		IS 1622
III	**Special Parameters**				
1	Total Phosphorous as P	mg/l	1.30		APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	2.1		APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	1.4		APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	0.001		IS 3025: Part – 43
5	Surfactants	mg/l	<0.1		IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected		EPA 508
7	PAH's	mg/l	Not Detected		EPA 525.2
8	PCB and PCT	mg/l	Not Detected		EPA 508
9	Zinc as Zn	mg/l	0.05		IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01		IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01		IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05		APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01		IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01		IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01		IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01		IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001		IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.18		APHA 3111 – B
19	Iron as Fe	mg/l	0.90		IS 3025: Part – 53
20	Vanadium as V	mg/l	0.20		APHA 3111 – D
21	Selenium as Se	mg/l	<0.01		IS 3025: Part – 56
22	Boron as B	mg/l	0.18		IS 3025: Part – 57

Note: * SW – 2: The drain was dried up, hence could not be collected.

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results		Test Method
			GW-1 Om Prints Paint industries, Chitra GIDC	GW – 2 Das Pendawala Chitra GIDC	
I	**Simple Parameters**				
1	Appearance	-	Colourless	Colourless	-
2	Colour (Hazen Units)	-	<5	<5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**				
1	pH	-	7.85	7.10	IS 3025: Part – 11
2	E C	µS/cm	3500	1360	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	8	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	4.06	3.84	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	4.07	3.85	By Calculation
10	Free Ammonia	mg/l	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.60	0.60	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	13.55	2.75	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	IS 1622
III	**Special Parameters**				
1	Total Phosphorous as P	mg/l	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	<0.01	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.10	0.09	IS 3025: Part – 53
20	Vanadium as V	mg/l	0.18	0.11	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.28	0.12	IS 3025: Part – 57

AMBIENT AIR MONITORING LOCATIONS PHOTOGRAPHS

Prince Caretech, Chitra GIDC

PGVCL, Chitra GIDC

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Nari Village Pond Bt. H Chitra GIDC

Composite of main effluent and Sub effluent drains – Madhu Silchemicals (The drain was dried)

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Omprints Paint Industries

DAS Pendawala, Chitra

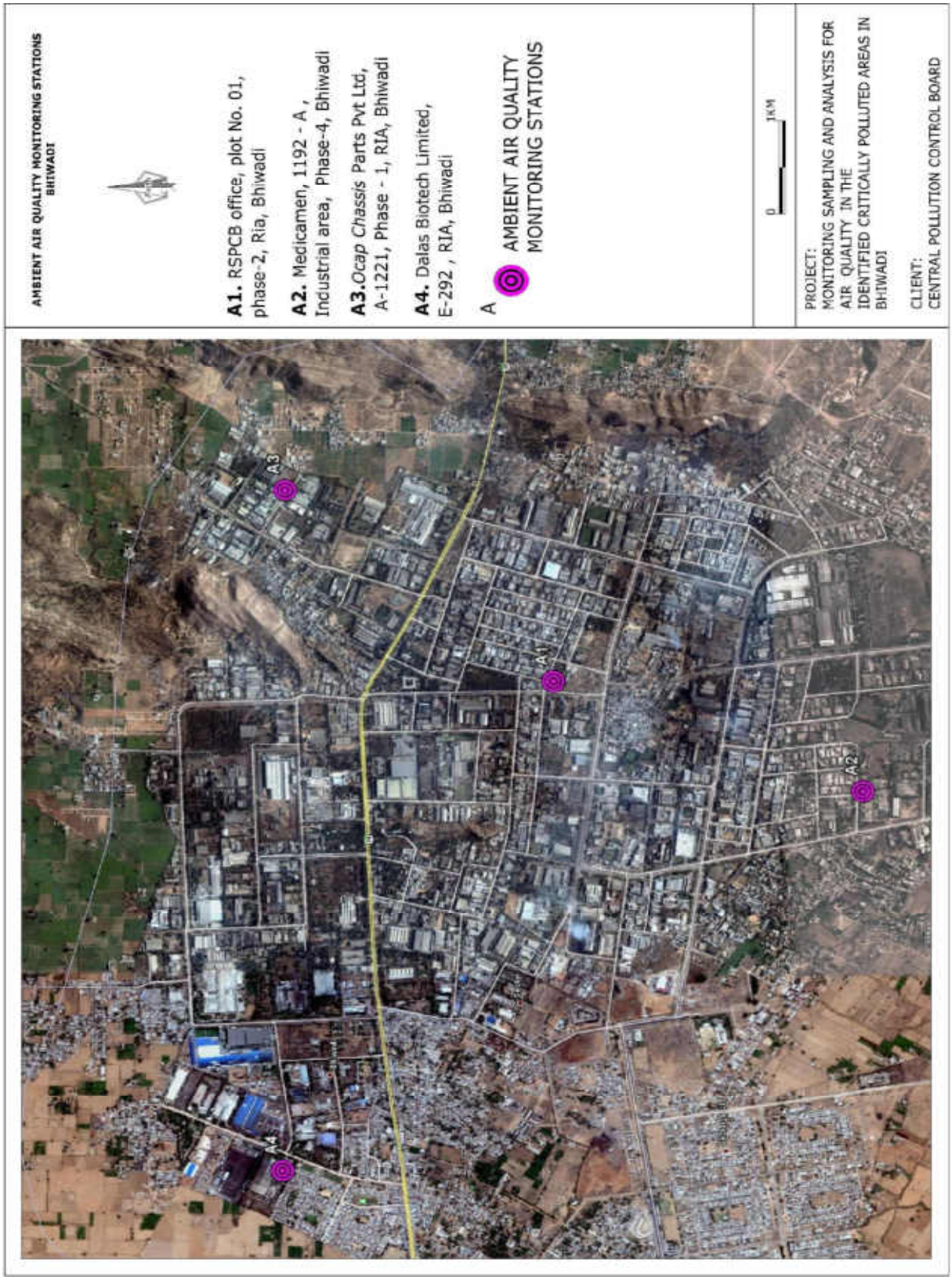
AAQ MONITORING LOCATIONS

Sample Code	Name of the Monitoring Location	Date of Sampling	Latitude	Longitude
AAQ - 1	RSPCB office, plot No. 01,phase-2, Ria, Bhiwadi	11.02.2013 to 12.02.2013	N 28°12'19.7''	E 076°51'45.3"
AAQ - 2	Medicamen, 1192 – A , Industrial area, Phase-4, Bhiwadi	11.02.2013 to 12.02.2013	N 28°11'37.0"	E 076°51'25.9"
AAQ – 3	Ocap Chassis Parts Pvt Ltd, A-1221, Phase – 1, RIA, Bhiwadi	11.02.2013 to 12.02.2013	N 28°12'56.7"	E 076°52'18.8"
AAQ - 4	Dalas Biotech Limited, E-292 , RIA, Bhiwadi	11.02.2013 to 12.02.2013	N 28°12'57.0"	E 076°50'19.4''

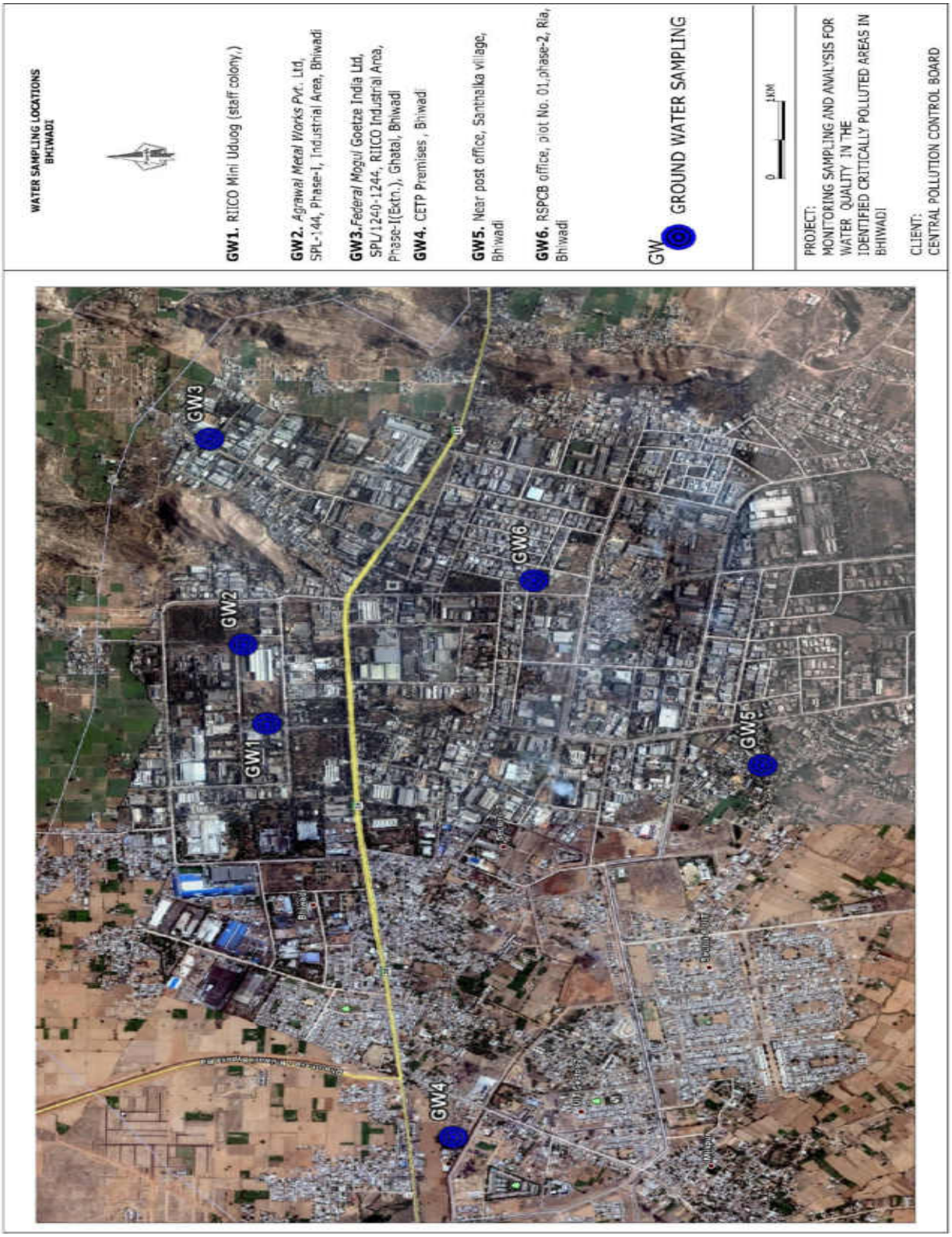
GROUND WATER SAMPLING LOCATIONS

Sample Code	Name of the Sampling Location	Date of Sampling	Latitude	Longitude
GW – 1	RIICO Mini Uduog (staff colony,) Bhiwadi	11.02.2013	N 28°12'56.9"	E 076°51'15.3"
GW – 2	Agrawal Metal Works *Pvt*. Ltd, SPL-144, Phase-I, Industrial Area, Bhiwadi	12.02.2013	N 28°13'00.2"	E 076°51'32.5"
GW – 3	Federal Mogul Goetze India Ltd, SPL/1240-1244, RIICO Industrial Area, Phase-I(Extn.), Ghatal, Bhiwadi	12.02.2013	N 28°13'04.8"	E 076°52'16.5"
GW – 4	CETP Premises , Bhiwadi	12.02.2013	N 28°12'31.2"	E 076°49'46.2"
GW – 5	Near post office, Santhalka village, Bhiwadi	12.02.2013	N 28°11'48.5"	E 076°51'06.4"
GW – 6	RSPCB office, plot No. 01,phase-2, Ria, Bhiwadi	12.02.2013	N 28°12'20.1"	E 076°51'46.2"

BHIWADI (RAJASTHAN)



BHIWADI (RAJASTHAN)



AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 RSPCB office Bhiwadi	**AAQ – 2** Medica Men. 1192 (A), Phase – IV, RIA, Bhiwadi	**AAQ – 3** OCAP Chesis part Pvt. Ltd.,	**AAQ – 4** Dalas Bio-tech Ltd., Near Housing Board,	
1	Lead	µg/m³	0.19	0.26	0.33	0.07	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	3.4	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	1.8	2.2	3.1	2.0	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	96.7	143.2	173.3	85.7	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	38.4	64.1	50.4	41.5	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	24.3	31.8	37.5	37.8	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	7.6	10.4	13.5	8.2	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	13.8	11.9	15.2	14.1	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	27.3	24.8	28.6	22.3	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	6.8	10.2	8.9	11.4	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	22.0	18.0	20.4	19.5	
		µg/m³	3.6	2.9	<2	3.1	

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			GW-1 RIICO Mini Uduog (staff colony,)	GW – 2 Agrawal Metal Works Pvt. Ltd,	GW-3 Federal Mogul Goetze India Ltd,	
I	**Simple Parameters**					
1	Appearance	-	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	<5	<5	<5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.57	7.77	8.12	IS 3025: Part – 11
2	E C	µS/cm	1130	1178	770	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	< 1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	36	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	4	6	4	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.02	0.02	0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	9.5	9.26	9.03	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	9.52	9.28	9.04	By Calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.50	0.50	0.40	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	1.81	1.30	2.14	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	< 0.01	< 0.01	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.09	0.09	0.07	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.09	0.10	0.08	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			GW-4 CETP Premises , Bhiwadi	GW-5 Near post office, Santhalka village,	GW –6 RSPCB office, plot No. 01,phase-2, Ria, Bhiwadi	
I	**Simple Parameters**					
1	Appearance	-	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	5	10	<5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	8.15	8.25	8.18	IS 3025: Part – 11
2	E C	µS/cm	2680	1450	1390	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	8	6	4	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.02	0.03	<0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	23.70	51.94	13.10	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	23.72	51.97	13.10	By Calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.50	0.50	0.60	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	4.48	1.68	2.74	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	< 0.01	< 0.01	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.10	0.16	0.09	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.18	0.10	0.09	IS 3025: Part – 57

AMBIENT AIR MONITORING LOCATIONS PHOTOGRAPHS

RSPCB office – Bhiwadi

Ocap Chassis Parts Pvt Ltd - Bhiwadi

Dalas Biotech Limited - Bhiwadi

Medicamen - Bhiwadi

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

RIICO Mini Uduog (staff colony,) Bhiwadi

Agrawal Metal Works Pvt. Ltd, Bhiwadi

Federal Mogul Goetze India Ltd, Bhiwadi

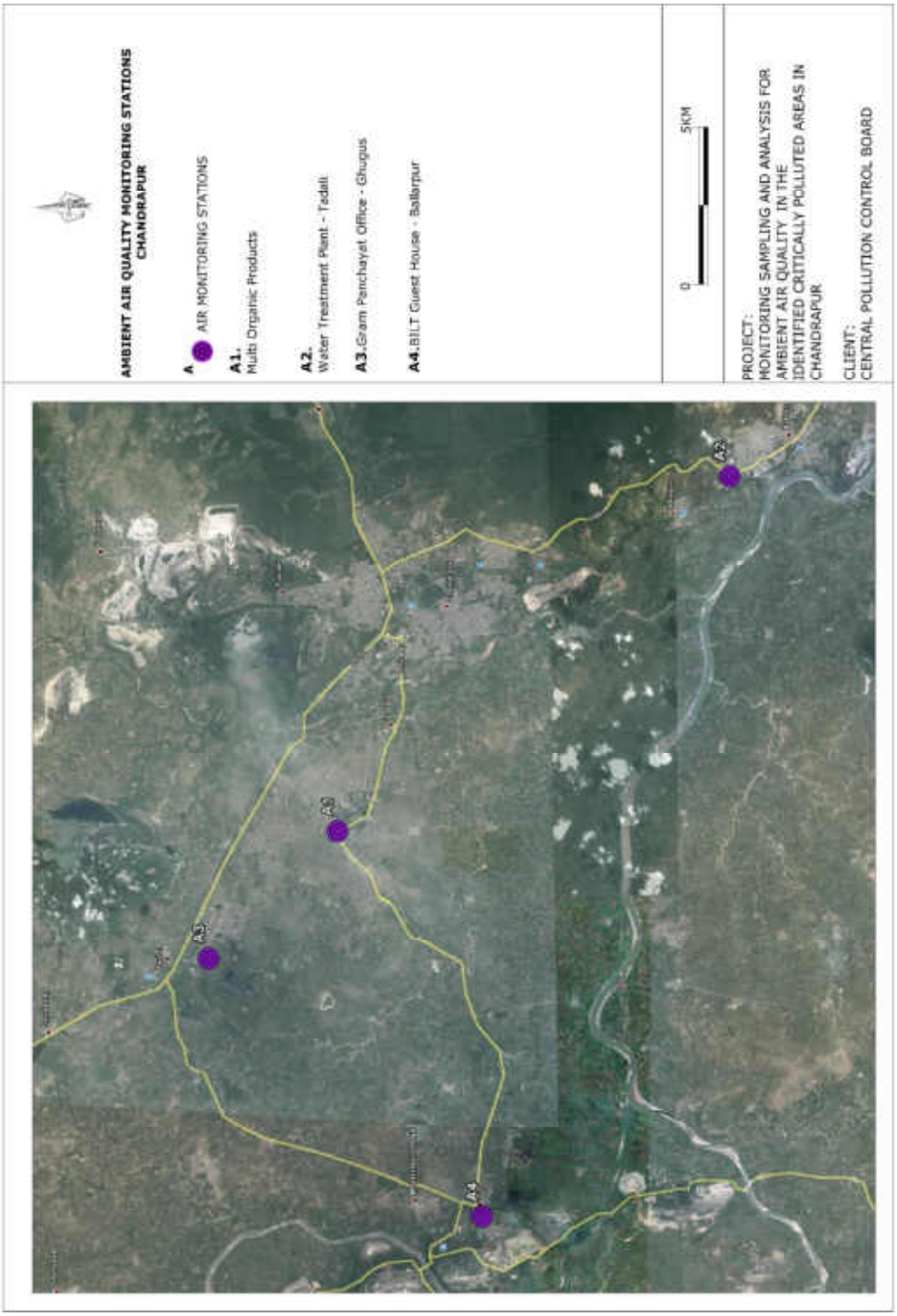
ETP Premises, Bhiwadi

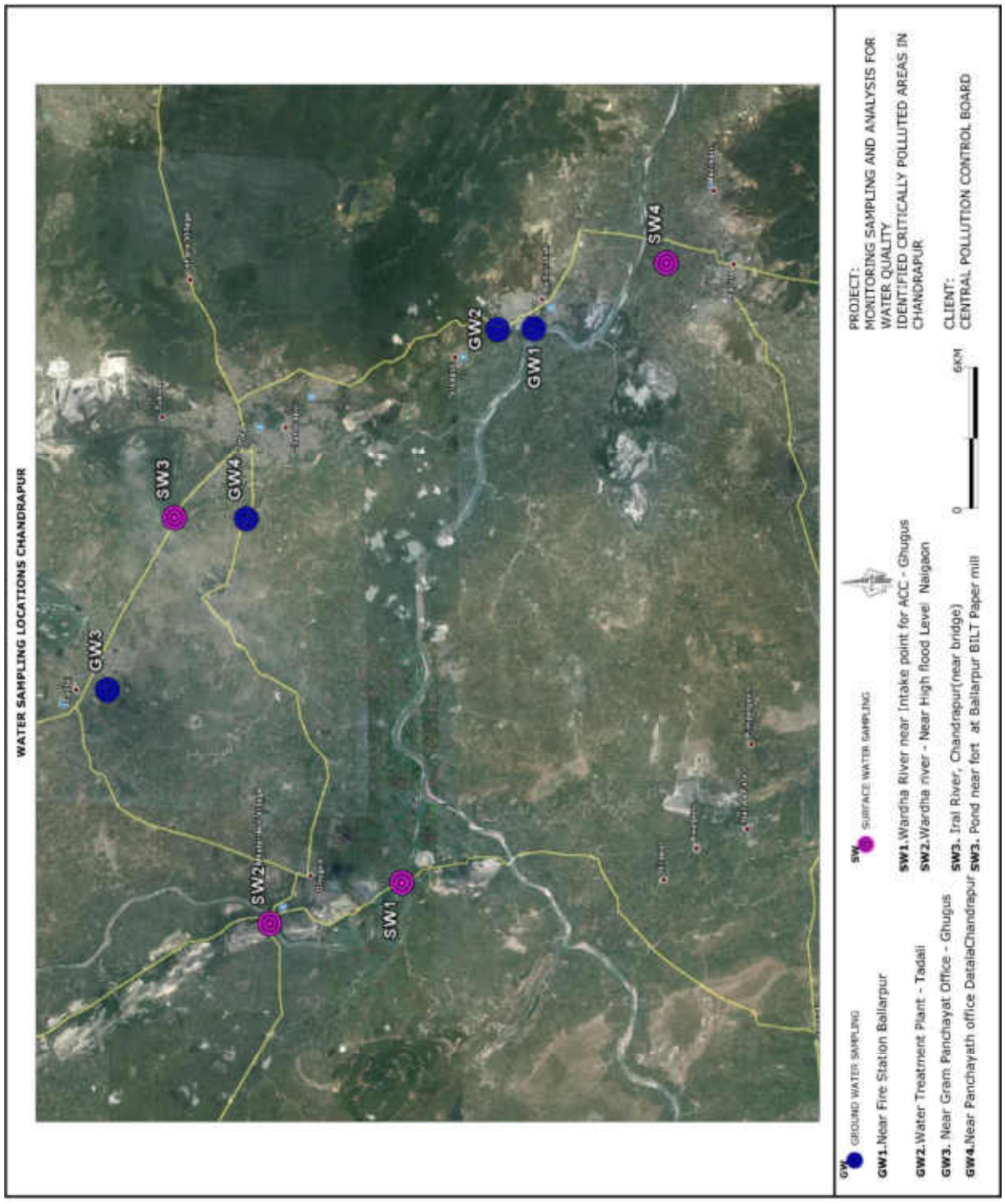
Near post office, Santhalka village, Bhiwadi

RSPCB office, Bhiwadi

AAQ MONITORING LOCATIONS

Sample Code	Name of the Monitoring Location	Date of Sampling	Latitude	Longitude
AAQ - 1	Multi Organic Products	15.04.2013 to 16.04.2013	N19°58	


AMBIENT AIR QUALITY MONITORING STATIONS
CHANDRAPUR
A. AIR MONITORING STATIONS
A1. Multi Organic Products
A2. Water Treatment Plant - Tadali
A3. Gram Panchayat Office - Ghugus
A4. BILT Guest House - Ballarpur
0
5KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR AMBIENT AIR QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN CHANDRAPUR
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
A1
A2
A3
A4


WATER SAMPLING LOCATIONS CHANDRAPUR
GW3
SW3
GW4
SW2
SW1
GW2
GW1
SW4
GW GROUND WATER SAMPLING
GW1.Near Fire Station Ballarpur
GW2.Water Treatment Plant - Tadali
GW3. Near Gram Panchayat Office - Ghugus
GW4.Near Panchayath office DatalaChandrapur
SW SURFACE WATER SAMPLING
SW1.Wardha River near Intake point for ACC - Ghugus
SW2.Wardha river - Near High flood Level Naigaon
SW3. Irai River, Chandrapur(near bridge)
SW3. Pond near fort at Ballarpur BILT Paper mill
0
6KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY IDENTIFIED CRITICALLY POLLUTED AREAS IN CHANDRAPUR
CLIENT:
CENTRAL POLLUTION CONTROL BOARD

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 Multi Organic Products	**AAQ – 2** Water Treatment Plant - Tadali	**AAQ – 3** Gram Panchayat office - Ghugus	**AAQ – 4** BILT Guest House - Ballarpur	
1	Lead	µg/m³	0.23	0.11	0.27	0.07	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	3.9	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	0.78	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	2.1	1.6	2.1	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	113.6	128.6	117.0	95.7	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	34.2	41.3	37.6	32.0	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	44.5	24.6	20.8	29.6	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	5.6	3.9	7.1	5.9	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	11.3	14.6	12.9	17.8	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	25.2	23.9	25.6	28.3	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	6.7	7.2	4.8	6.4	IS 5182 (Part 9), 1974, RA 209, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	17.2	14.8	19.6	13.6	
		µg/m³	3.4	<2	3.1	<2	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	Units of Measurement	Results				Test Method
			SW-1 Wardha River near Intake point for ACC - Ghugus	**SW – 2** Wardha river – Near High flood Level Naigaon	**SW-3** Iral River, Chandrapur (near bridge)	**SW-4** Pond near fort at Ballarpur BILT Paper mill	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Light Brownish	-
2	Colour (Hazen Units)	-	<5	<5	<5	50	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Un-agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	8.23	8.17	7.71	8.05	IS 3025: Part – 11
2	E C	µS/cm	536	532	864	826	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	16	26	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	6.2	5.8	4.2	4.8	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	10	12	18	48	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	3	3	4	11	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	<0.01	0.06	0.02	0.28	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	0.27	0.23	1.10	3.50	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.27	0.29	1.12	3.78	By Calculation
11	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.60	0.50	0.90	0.80	IS 3025: Part – 60
15	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	0.12	0.14	0.18	0.34	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	0.92	1.15	2.04	2.46	By Calculation
18	Total Coliforms	MPN/100ml	140	170	900	700	IS 1622
19	Fecal Coliform	MPN/100ml	7	9	240	110	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	0.16	0.18	0.24	0.48	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	2.6	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	1.8	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	0.02	<0.01	0.03	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.05	<0.05	<0.05	<0.05	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	<0.01	<0.01	<0.01	0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.05	0.04	0.06	0.09	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.05	0.06	0.32	0.09	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Near Fire Station Ballarpur	GW – 2 Water Treatment Plant - Tadali	GW-3 Near Gram Panchayat Office - Ghugus	GW-4 Near Panchayath office Datala Chandrapur	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	<5	5	<5	5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.42	7.96	7.40	7.73	IS 3025: Part – 11
2	E C	µS/cm	595	536	1530	2830	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	4	4	6	4	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.07	0.01	0.02	0.02	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	7.68	0.23	15.81	19.65	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	7.75	0.24	15.83	19.67	By Calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.40	0.50	0.70	0.60	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	0.91	0.92	0.74	4.54	By Calculation
17	Total Coliforms	MPN/100ml	<2	21	<2	110	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	<0.01	0.65	0.28	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	0.002	<0.001	0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.08	<0.01	0.09	0.03	APHA 3111 – B
19	Iron as Fe	mg/l	0.11	0.06	0.13	0.05	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.06	0.06	0.09	0.21	IS 3025: Part – 57

AMBIENT AIR MONITORING LOCATIONS PHOTOGRAPHS

Multi organic products

Water Treatment Plant - Tadali

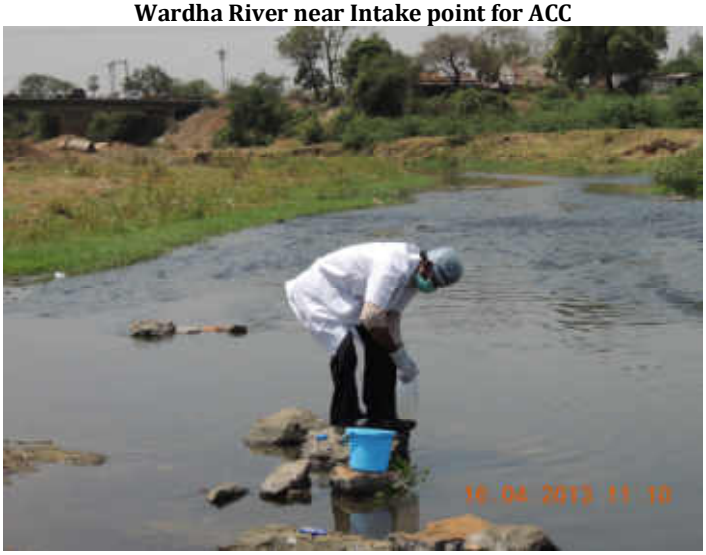
Gram Panchayath Office - Ghugus

BILT Guest House – Ballarpur (Ballarsha)

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Wardha River near Intake point for ACC

Wardha river – Near High flood Level Naigaon



Iral River, Chandrapur
(near bridge)

Pond near fort at Ballarpur (BILT Paper mill)

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Near Fire Station - Ballarpur

Water Treatment Plant - Tadali

Near Gram Panchayat Office - Ghugus

Near Panchayath office Datala Chandrapur

AAQ MONITORING LOCATIONS

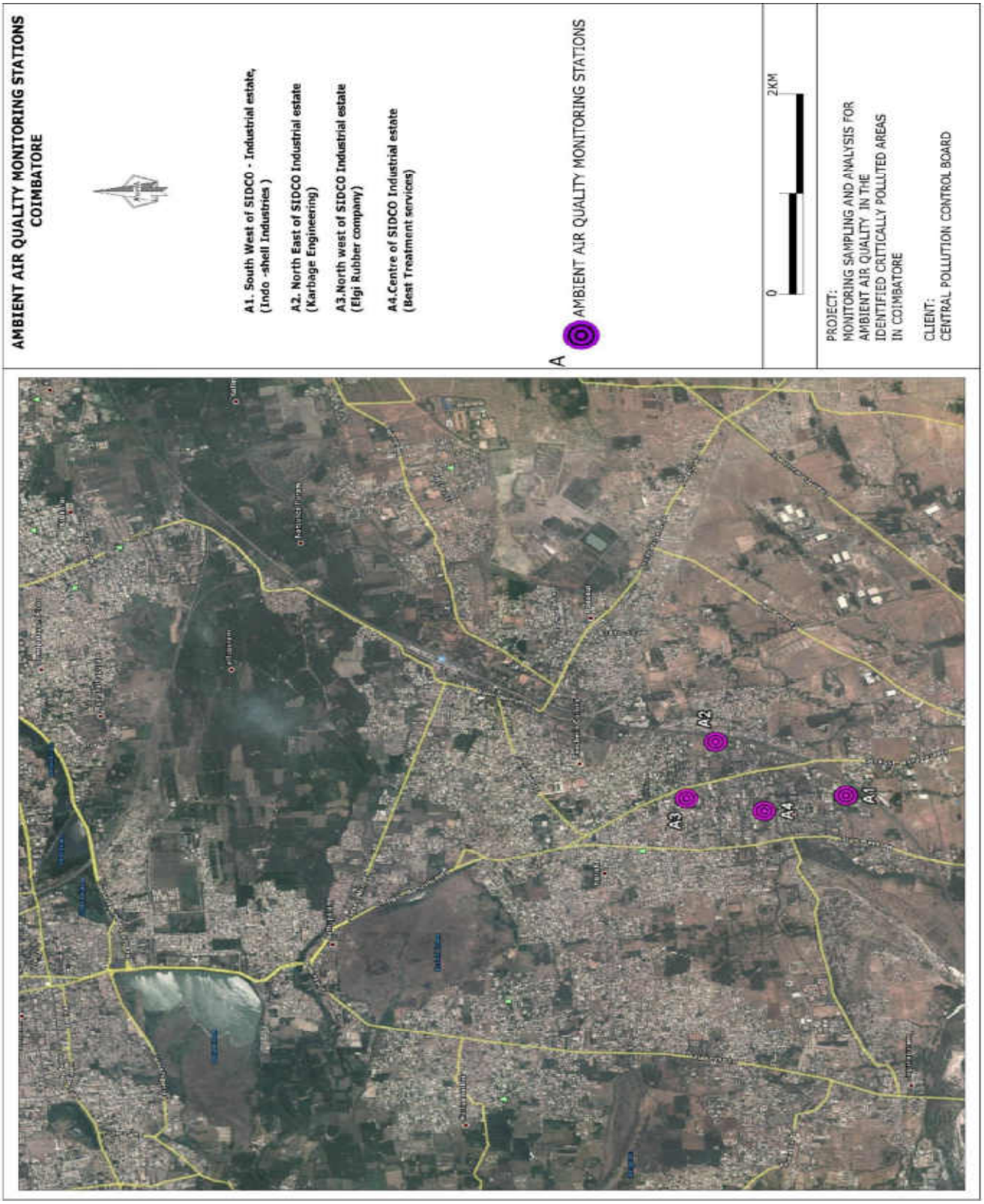
SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	South West of SIDCO – Industrial estate, (Indo –shell Industries)	08.02.2013 to 09.02.2013	N 10^{0}56’08.2’’	E076^{0}58’38.2’’
AAQ – 2	North East of SIDCO Industrial estate(Karbage Engineering)	08.02.2013 to 09.02.2013	N 10^{0}56’42.3’’	E076^{0}58’55.8’’
AAQ – 3	North west of SIDCO Industrial estate(Elgi Rubber company)	08.02.2013 to 09.02.2013	N 10^{0}56’49.8’’	E076^{0}58’37.1’’
AAQ – 4	Centre of SIDCO Industrial estate (Best Treatment services)	08.02.2013 to 09.02.2013	N 10^{0}56’29.6’’	E076^{0}58’33.1’’

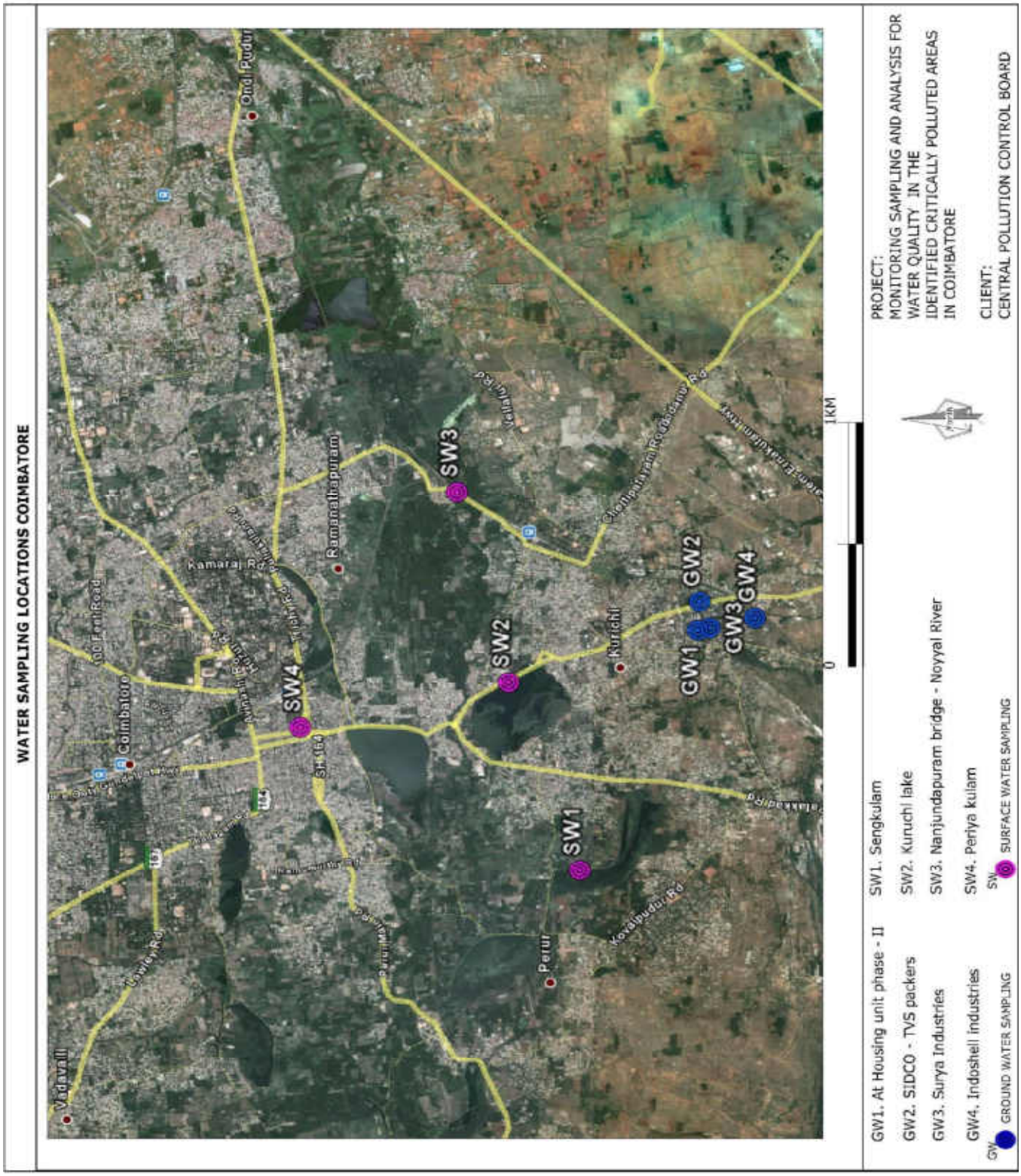
SURFACE WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	Ukkadam big tank near bus stand	09.02.2013	N 10 ^{0}59’40.8’’	E076^0 57’ 40.6’’
SW – 2	Kuruchi lake	09.02.2013	N 10 ^{0}58’03.4’’	E076^{0}58’04.4’’
SW – 3	Sengkulam	09.02.2013	N 10 ^{0}57’30.2’’	E076^{0}56’25.6’’
SW – 4	Nanjundapuram bridge – Noyyal River	09.02.2013	N 10 ^{0}58’27.5’’	E076^{0}59’44.5’’

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Indoshell industries	08.02.2013	N 10^{0}56’08.4’’	E076^{0}58’38.3’’
GW – 2	Surya Industries	08.02.2013	N 10^{0}56’29.5’	E076^{0}58’33.1’’
GW – 3	Kuruchi at Housing unit phase - II	08.02.2013	N 10^{0}56’35.1’’	E076^{0}18’31.9’’
GW – 4	SIDCO – TVS packers	08.02.2013	N 10^{0}56’34.2’’	E076^{0}58’46.9’’


AMBIENT AIR QUALITY MONITORING STATIONS
COIMBATORE
A1. South West of SIDCO - Industrial estate, (Indo -shell Industries)
A2. North East of SIDCO Industrial estate (Karbage Engineering)
A3.North west of SIDCO Industrial estate (Elgi Rubber company)
A4.Centre of SIDCO Industrial estate (Best Treatment services)
AMBIENT AIR QUALITY MONITORING STATIONS
0
2KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR AMBIENT AIR QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN COIMBATORE
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
A1
A2
A3
A4


WATER SAMPLING LOCATIONS COIMBATORE
Vadavalli
Coimbatore
Ondi Pudur
Ramanathapuram
Kuruchi
Perur
Kovaipudur Rd
SW1
SW2
SW3
SW4
GW1
GW2
GW3
GW4
0
1KM
GW1. At Housing unit phase - II
GW2. SIDCO - TVS packers
GW3. Surya Industries
GW4. Indoshell industries
GW GROUND WATER SAMPLING
SW1. Sengkulam
SW2. Kuruchi lake
SW3. Nanjundapuram bridge - Noyyal River
SW4. Periya kulam
SW SURFACE WATER SAMPLING
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN COIMBATORE
CLIENT:
CENTRAL POLLUTION CONTROL BOARD

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 Indoshell (Southwest)	**AAQ – 2** Karbage Engg. (East Side)	**AAQ – 3** Elgi Rubber (NorthWest)	**AAQ – 4** Best Heat Treatment Services Centre	
1	Lead	µg/m³	0.18	0.21	0.29	0.14	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	3.9	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	4.7	3.8	7.2	3.6	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	94.6	107.0	154.2	89.7	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	34.8	29.4	46.2	38.3	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	53.2	26.0	31.7	22.5	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	9.6	7.8	11.4	13.7	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	16.0	14.3	21.5	13.6	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	22.1	23.6	28.7	28.3	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	5.3	4.4	4.7	4.1	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	11.6	13.4	18.2	16.7	
		µg/m³	2.1	<2	3.2	<2	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW -1 Ukkadam big tank near bus stand	SW – 2 Kurichi lake near temple	SW-3 Sangullam lake	SW-4 Near Railway Bridge Noyal River	
I	**Simple Parameters**						
1	Appearance	-	Light Grey	Light Grey	Lightgreen	Colourless	-
2	Colour (Hazen Units)	-	50	20	60	10	IS 3025: Part – 4
3	Odour (Smell)	-	Un-Agreeable	Agreeable	Un-Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH		8.41	8.36	8.32	8.40	IS 3025: Part – 11
2	E C	µS/cm	2850	2500	2100	2900	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	4	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	360	184	216	32	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	2.7	3.6	3.2	5.8	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	164	228	256	20	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	45	60	65	4	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	1.03	0.31	0.26	0.02	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	3.34	1.58	2.26	0.45	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	4.42	1.89	2.52	0.47	By calculation
11	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	1.20	0.90	0.80	0.90	IS 3025: Part – 60
15	Sulphides as S	mg/l	2.6	8.2	3.5	<0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	0.44	0.52	<0.1	0.35	APHA 4500 – P D
17	Sodium Absorption Ratio (SAR)	-	9.42	7.99	4.70	3.20	By Calculation
18	Total Coliforms	MPN/100ml	7	4	2	6	IS 1622
19	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	0.62	0.70	<0.1	0.48	APHA 4500 – P-D
2	Total Kjeldal Nitrogen	mg/l	40	15	12	<1	APHA 4500 – N org B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	28	7	6	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 508
7	PAH	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 525.2
8	PCB and PCT	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 508
9	Zinc as Zn	mg/l	0.08	0.12	0.05	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	0.05	0.03	0.02	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	0.04	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	0.02	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.05	0.09	0.06	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	3.95	0.06	0.09	0.01	IS 3025: Part – 53
20	Vanadium as V	mg/l	0.06	0.01	<0.01	0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.61	0.25	0.27	0.32	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Indoshell Mould Industries	GW – 2 Surya Industries SIDCO	GW-3 Kurichi Housing Unit Phase - II	GW-4 TVS Packers - SIDCO	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	<5	<5	<5	<5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH		7.87	7.93	7.98	7.84	IS 3025: Part – 11
2	E C	µS/cm	2300	1600	1700	1740	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	4	6	4	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	<0.01	0.01	0.02	<0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	29.0	35.4	24.4	42.23	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	29.0	36.0	24.42	42.23	By calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.90	0.70	0.70	0.80	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	0.19	<0.1	<0.1	0.10	APHA 4500 – P D
16	Sodium Absorption Ratio (SAR)	-	2.38	13.48	2.34	3.51	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	0.28	<0.1	<0.1	0.16	APHA 4500 – P D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – N org B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 508
7	PAH	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 525.2
8	PCB and PCT	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 508.E
9	Zinc as Zn	mg/l	0.13	0.04	0.05	0.03	IS 3025: Part – 49
10	Nickel as Ni	mg/l	0.03	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	0.02	0.01	<0.01	0.02	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.01	<0.01	<0.01	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.02	0.05	<0.01	0.05	IS 3025: Part – 53
20	Vanadium as V	mg/l	0.05	0.04	0.02	0.05	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.72	0.19	0.23	0.20	IS 3025: Part – 57

AMBIENT AIR MONITORING LOCATIONS PHOTOGRAPHS

Karbage Engg

Best Heat Treatment Services Centre

Elgi Rubber Industries

Indo Shell Industries

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Senkulam

Kuruchi Lake

Noyyal River

Ukkadam big tank near bus stand

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

TVS Packers

Housing Unit Phase - II

Indoshell Industries

Surya Industries

AAQ MONITORING LOCATIONS

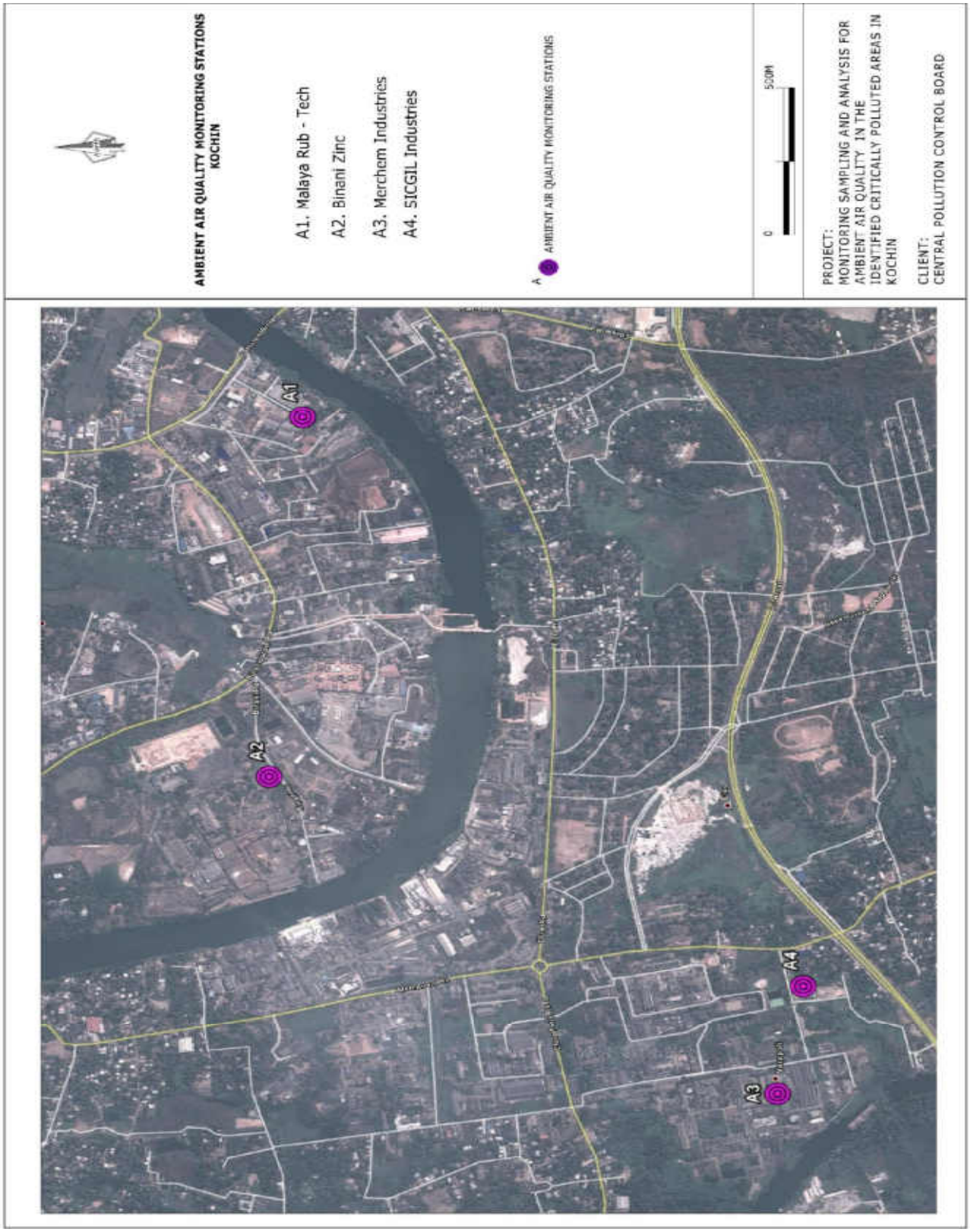
SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	North East of Eloor Edayar (Binani Zinc)	05.02.2013 to 06.02.2013	N 10⁰04'52.0''	E076⁰18'13.8''
AAQ – 2	South West of Eloor – Edayar (Malayabio-tech)	05.02.2013 to 06.02.2013	N 10⁰04'49.0''	E076⁰18'54.0''
AAQ – 3	East Side of Eloor Edayar (SICGIL Industries)	05.02.2013 to 06.02.2013	N 10⁰04'04.3''	E076⁰17'50.5''
AAQ – 4	West side of Eloor Edayar (Merchem Industries)	05.02.2013 to 06.02.2013	N 10⁰04'06.6''	E 076⁰17'38.3''

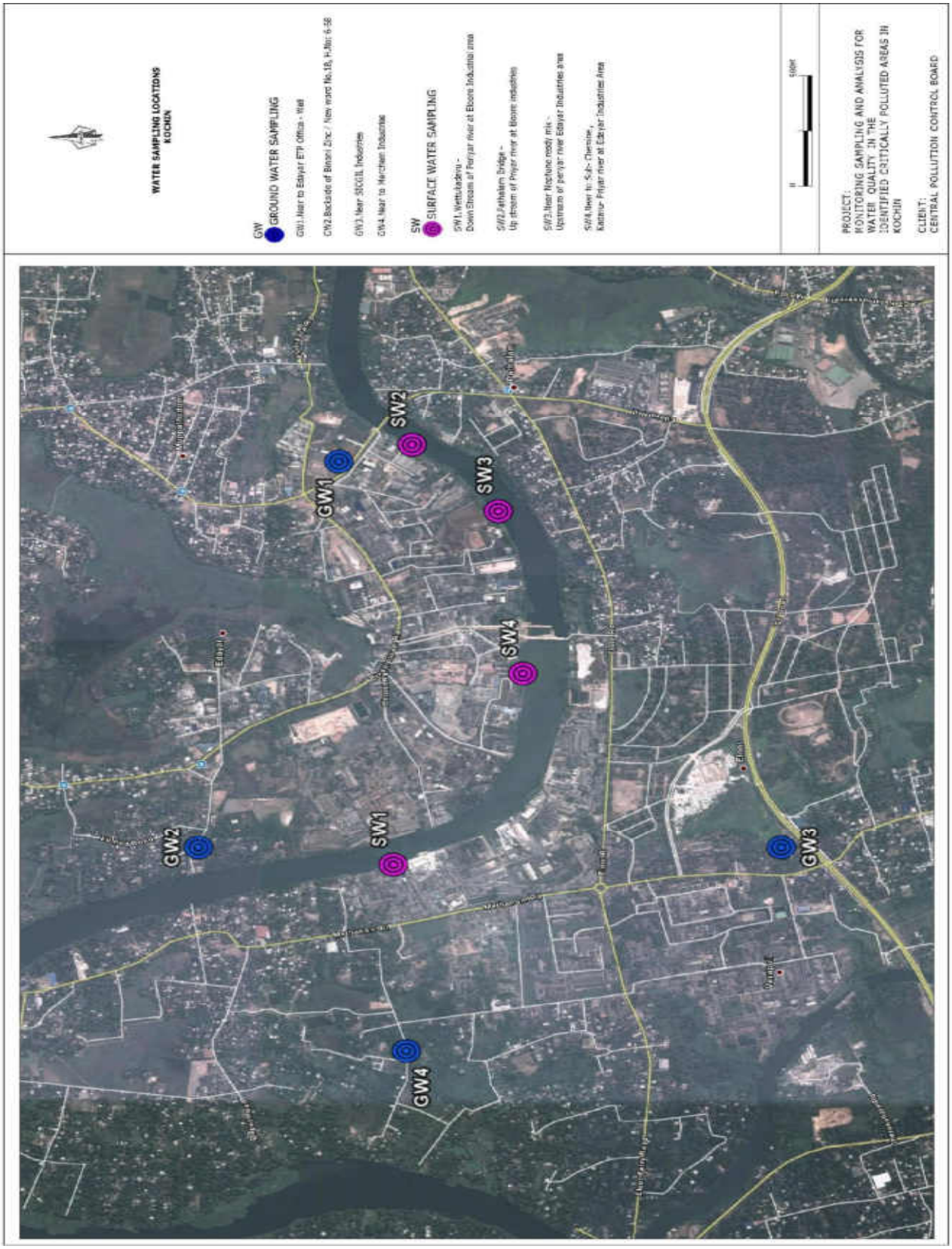
SURFACE WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	Wettukadavu-Down Stream of Periyar River at Eloore Indust.	06.02.2013	N 10 ⁰48'86.2''	E076⁰22'44.7''
SW – 2	Pathalam Bridge-Upstream of Periyar River at Eloore Indust.	06.02.2013	N 10 ⁰54'27.9''	E076⁰06'91.0''
SW – 3	Near Neptune Readymix-Upstream of Periyar at Edayar Industrial Belt.	06.02.2013	N 10 ⁰54'27.1''	E076⁰06'93.2''
SW – 4	Sudhachem Kadal-Down Stream of Periyar River at Edayar Industsrial Belt.	06.02.2013	N 10 ⁰57'77.8''	E076⁰ 16' 59.9''

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Edayar ETP Office	06.02.2013	N 10⁰04'58.6''	E076⁰18'56.7''
GW – 2	Back Side of Binani Zinc Ward No.17,H.No:6-68	06.02.2013	N 10⁰05'15.1''	E076⁰17'58.7''
GW – 3	Near Sicgil Industries H.NO:55	06.02.2013	N 10⁰04'06.6''	E076⁰17'58.7''
GW – 4	Near Merchem, Industries	06.02.2013	N 10⁰04'50.7''	E076⁰17'28.1''


AMBIENT AIR QUALITY MONITORING STATIONS
KOCHIN
A1. Malaya Rub - Tech
A2. Binani Zinc
A3. Merchem Industries
A4. SICGIL Industries
AMBIENT AIR QUALITY MONITORING STATIONS
0
500M
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR AMBIENT AIR QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN KOCHIN
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
A1
A2
A3
A4


WATER SAMPLING LOCATIONS
KOCHIN
GW
GROUND WATER SAMPLING
GW1.Near to Edayar ETP Office - Well
GW2.Backside of Binani Zinc / New ward No.18, P.No: 6-58
GW3.Near SICCIL Industries
GW4 Near to Merchem Industries
SW
SURFACE WATER SAMPLING
SW1.Wettukadavu - Down Stream of Periyar river at Eloors Industrial area
SW2.Pathalam Bridge - Up stream of Pryar river at Eloors industries
SW3.Near Neptune ready mix - Upstream of periyar river Edayar Industries area
SW4.Near to S.A.I- Chemsive, Kalamur-Pryar river at Edayar Industries Area
Slider
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN KOCHIN
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
GW1
GW2
GW3
GW4
SW1
SW2
SW3
SW4

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 North East of Eloor Edayar (Binani Zinc)	**AAQ – 2** South West of Eloor – Edayar (Malayabio-tech)	**AAQ – 3** East Side of Eloor Edayar (SICGIL Industries)	**AAQ – 4** West side of Eloor Edayar (Merchem Industries)	
1	Lead	µg/m³	0.42	0.18	0.09	0.15	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	2.6	2.1	1.7	1.9	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	87.6	94.7	98.8	89.0	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	30.4	36.8	31.6	38.7	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	40.6	32.4	22.0	30.6	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	10.8	5.6	6.5	4.6	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	34.2	25.5	14.6	19.6	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	26.4	28.1	19.7	27.3	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	9.6	7.1	10.0	7.0	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	18.2	16.2	21	12.6	
		µg/m³	4.6	3.7	3.2	2.9	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW -1 Wettukaday – D/s of Periyar River	SW – 2 Pathalam Bridge – U/s of Periyar River	SW-3 Near Neptune Ready mix U/s. of Periyar River	SW-4 Sub-chemie Kadaya – Periyar River at Edayar Industries Area	
I	**Simple Parameters**						
1	Appearance	-	Light Brown	Colourless	Colourless	Light Brownish	-
2	Colour (Hazen Units)	-	10	10	10	20	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH		6.88	7.25	6.84	6.84	IS 3025: Part – 11
2	E C	µS/cm	12460	273	354	14550	IS 3025: Part – 14
3	Oil & Grease	mg/l	1	1	1	2	IS 3025: Part – 39
4	Suspended Solids	mg/l	26	18	16	28	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	5.4	5.6	5.2	5.1	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	38	24	20	34	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	9	5	4	8	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.02	<0.01	<0.01	<0.01	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	1.13	0.23	0.23	0.45	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	1.15	0.23	0.23	0.45	By Calculation
11	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	1.0	0.60	0.80	1.1	IS 3025: Part – 60
15	Sulphides as S	mg/l	0.4	0.3	<0.1	0.8	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	<0.1	0.12	0.22	0.16	APHA 4500 – P D
17	Sodium Absorption Ratio (SAR)	-	23.48	1.20	1.11	19.32	By Calculation
18	Total Coliforms	MPN/100ml	22	23	30	50	IS 1622
19	Fecal Coliforms	MPN/100ml	<2	<2	4	8	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	0.15	0.18	0.30	0.25	APHA 4500 – P-D
2	Total Kjeldal Nitrogen	mg/l	4.8	4.5	1.4	6.7	APHA 4500 – N org B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	2.7	1.4	<1	3.1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH's	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.28	0.03	0.02	0.17	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	0.03	0.02	0.10	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	0.10	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	0.03	<0.01	0.08	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.01	0.01	0.01	0.04	APHA 3111 – B
19	Iron as Fe	mg/l	0.30	0.31	0.20	0.50	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	1.29	0.12	0.13	0.76	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Edayar ETP Office	GW – 2 Back Side of Binani Zinc Industries	GW-3 Near SICGIL Industries	GW-4 Near Merchem Industries	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Brownish	-
2	Colour (Hazen Units)	-	5	5	5	20	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	6.78	6.67	6.62	6.83	IS 3025: Part – 11
2	E C	µS/cm	90	214	754	755	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	36	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	4	4	6	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	<0.01	<0.01	<0.01	0.02	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	3.16	1.13	4.06	0.45	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	3.16	1.13	4.06	0.47	By calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.60	0.80	1.00	1.00	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	0.28	APHA 4500 – P D
16	Sodium Absorption Ratio (SAR)	-	0.40	1.21	2.7	1.62	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	0.32	APHA 4500 – P D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – N org B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH's	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508.E
9	Zinc as Zn	mg/l	0.04	0.03	0.02	0.02	IS 3025: Part – 49
10	Nickel as Ni	mg/l	0.03	0.02	0.03	0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	0.06	0.03	0.01	0.03	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.01	0.01	0.05	0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.16	0.18	0.24	0.20	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.03	0.06	0.10	0.11	IS 3025: Part – 57

AMBIENT AIR MONITORING LOCATIONS PHOTOGRAPHS

SICGIL

Binani Zinc

Malaya Bio-tech

Merchem Industries

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Near Sub Chemine Kadavu
Periyar river

Wettukadavu - Periyar downstream
Periyar river

Edayar – Neptune Ready mix
Downstream of Periyar River

Pathalam Bridge
Upstream of Periyar River

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Ward No.18 – Binani Zinc

Mechem near

Near ETP Office

SICGIL

AAQ MONITORING LOCATIONS

SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	North side of SIPCOT Phase I & II (Spended Udyog)	15.02.2013 to16.02.2013	N 11^0 41'43.0''	E 079^0 45'39.9''
AAQ – 2	Centre of SIPCOT Phase I & II (SIPCOT office)	15.02.2013 to16.02.2013	N 11^0 40' 24.9''	E 079^0'4459.8''
AAQ – 3	West side of SIPCOT Phase I & II (Kirikadu Village)	15.02.2013 to16.02.2013	N 11^0 40'40.2''	E 079^0 44'53.4''
AAQ – 4	South side of SIPCOT Phase I & II (Semmanguppam Village)	15.02.2013 to16.02.2013	N 11^0 39'06.0''	E 079^0'4408.9''

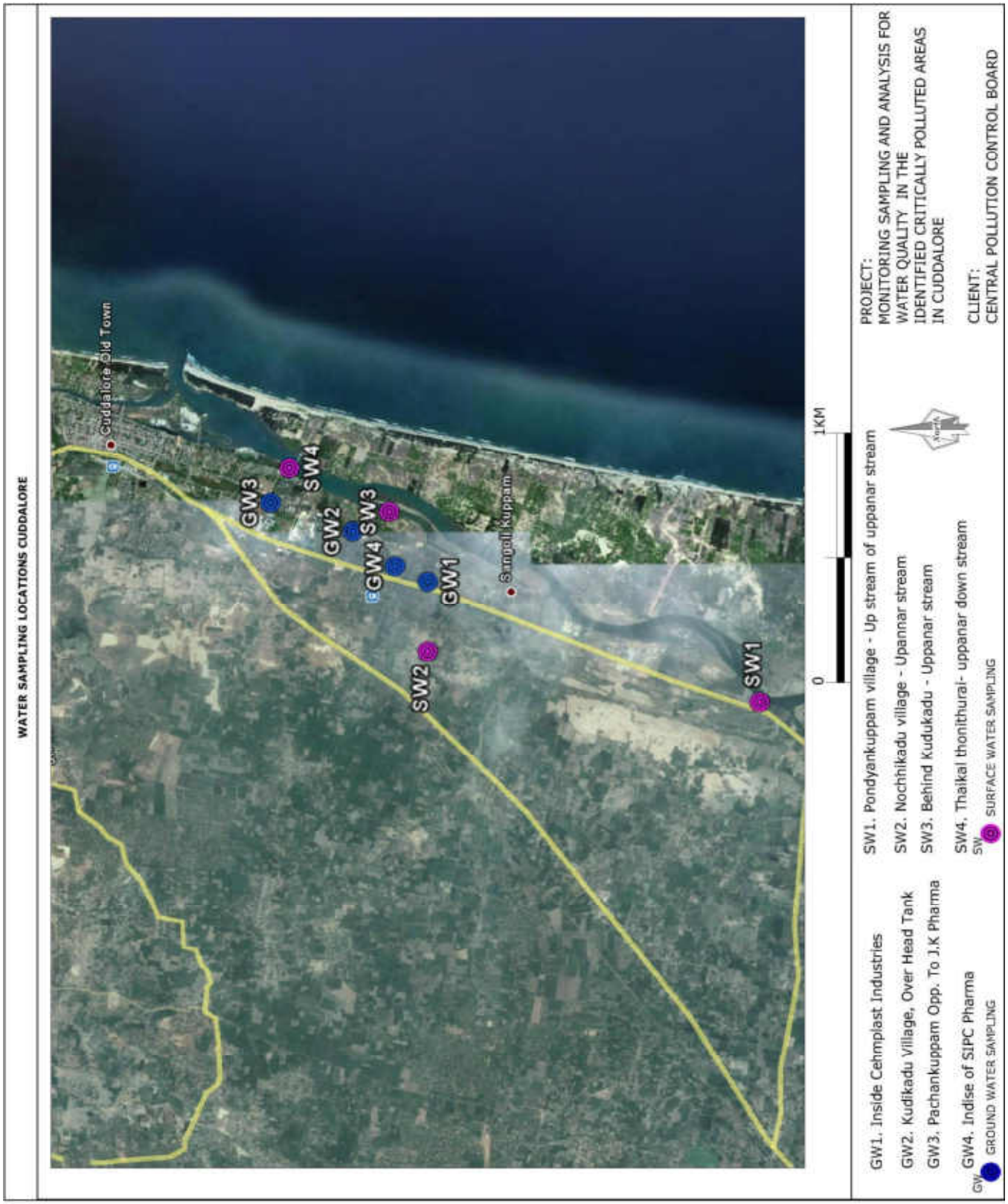
SURFACE WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	Pondyankuppam village U/s of Uppanar River	15.02.2013	N 11^0 37.782'	E079^{0}43.959'
SW – 2	Nochikadu Village U/s of Uppanar River	15.02.2013	N 11^0 40.408'	E079^{0}44.391'
SW – 3	Behind Kudikadu Village	15.02.2013	N 11^0 40.712'	E079^{0}45.591'
SW – 4	Thikal Thouithy Village D/s of SIPCOT	15.02.2013	N 11^0 41.501'	E079^{0}45.966'

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Inside of Chemplast Industries	15.02.2013	N 11^0 40.408'	E079^{0}44.991'
GW – 2	Kadikadu Village – Overhead tank	15.02.2013	N 11^0 40.999'	E079^{0}45.423'
GW – 3	Pachangappam Opp. to J,K,Pharma	15.02.2013	N 11^0 41.650'	E079^{0}45.669'
GW – 4	Inside of SPIC Pharma	15.02.2013	N 11^0 40.665'	E079^{0}45.125'

AMBIENT AIR QUALITY MONITORING STATIONS CUDDALORE
Cuddalore Old Town
Raasapettai
A1
A3
A4
A2
11 40 24 9, 79 44 59.8
Sangoli Kuppam
Semmankuppam
T.Chathiram
Periya Karaikadu
Sedapalayam
Odhiyadikuppam
West Ramapuram
V Kattupalayam
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR AMBIENT AIR QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN CUDDALORE
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
A1. North side of SIPCOT - Spended Udyog
A2. South Side of SIPCOT Semmamkuppam
A3. West side of SIPCOT - Karaikadu village
A4. Center of SIPCOT - SIPCOT Office
AMBIENT AIR QUALITY MONITORING STATIONS


WATER SAMPLING LOCATIONS CUDDALORE
Cuddalore Old Town
Sangoli Kuppam
GW1
GW2
GW3
GW4
SW1
SW2
SW3
SW4
0
1KM
North
GW1. Inside Cehmplast Industries
GW2. Kudikadu Village, Over Head Tank
GW3. Pachankuppam Opp. To J.K Pharma
GW4. Indise of SIPC Pharma
GW GROUND WATER SAMPLING
SW1. Pondyankuppam village - Up stream of uppanar stream
SW2. Nochhikadu village - Upannar stream
SW3. Behind Kudukadu - Uppanar stream
SW4. Thaikal thonithurai- uppanar down stream
SW SURFACE WATER SAMPLING
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN CUDDALORE
CLIENT:
CENTRAL POLLUTION CONTROL BOARD

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 North side of SIPCOT Phase I & II (Spended Udyog)	**AAQ – 2** Centre of SIPCOT Phase I & II (SIPCOT office)	**AAQ – 3** West side of SIPCOT Phase I & II (Kirikadu Village)	**AAQ – 4** South side of SIPCOT Phase I & II (Semmanguppam Village)	
1	Lead	µg/m³	0.08	0.06	0.11	0.14	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	3.4	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	1.8	2.1	2.7	3.2	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	78.9	90	97	106	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	29.2	32	25.6	35.9	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	48.0	46.5	62.0	59.0	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	7.6	6.4	4.2	8.8	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	9.2	11.3	12.5	11.8	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	17.4	18.4	23.6	19.7	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	14.4	6.5	7.8	4.5	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	16.8	13.6	18.1	12.8	
		µg/m³	5.0	3.4	4.2	<2	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW -1 Pondyankuppam village U/s of Uppanar River	SW – 2 Nochikadu Village U/s of Uppanar River	SW-3 Behind Kudikadu Village	SW-4 Thikal Thouithy Village D/s of SIPCOT	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourlesss	-
2	Colour (Hazen Units)	-	5	5	10	5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH		7.84	7.62	7.74	7.89	IS 3025: Part – 11
2	E C	µS/cm	16000	18600	39000	39000	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	14	12	14	12	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	4.8	4.6	4.4	4.8	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	18	20	24	22	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	3	3	4	4	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.01	0.02	0.01	0.02	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	0.90	0.90	0.68	0.68	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.91	0.92	0.69	0.70	APHA 4500 –N.C
11	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	1.00	1.20	1.20	1.20	IS 3025: Part – 60
15	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P D
17	Sodium Absorption Ratio (SAR)	-	25.56	42.59	42.77	46.72	By Calculation
18	Total Coliforms	MPN/100ml	8	4	<2	<2	IS 1622
19	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P-D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	1.01	1.0	APHA 4500 – N org B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 508
7	PAH's	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 525.2
8	PCB and PCT	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 508
9	Zinc as Zn	mg/l	0.02	0.02	0.06	0.06	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	0.02	0.04	0.04	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.01	0.01	0.01	0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.02	0.09	0.04	0.02	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	0.01	0.01	APHA 3111 – D
21	Selenium as Se	mg/l	0.05	0.03	0.12	0.11	IS 3025: Part – 56
22	Boron as B	mg/l	1.46	1.92	2.79	2.68	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Inside of Chemplast Industries	GW – 2 Kadikadu Village – Overhead tank	GW-3 Pachangappam Opp. to J,K,Pharma	GW-4 Inside of SPIC Pharma	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Light brown	Colourless	-
2	Colour (Hazen Units)	-	<5	<5	80	<5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Un-Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH		7.40	7.24	3.10	7.65	IS 3025: Part – 11
2	E C	µS/cm	300	532	1000	900	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	4	6	8	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	<0.01	<0.01	<0.01	0.02	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	0.23	0.23	2.03	4.97	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.23	0.23	2.03	4.99	APHA 4500 –N.C
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.30	0.40	0.50	0.60	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P D
16	Sodium Absorption Ratio (SAR)	-	0.67	3.83	1.65	2.11	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – N org B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 508
7	PAH's	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 525.2
8	PCB and PCT	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 508.E
9	Zinc as Zn	mg/l	0.10	0.01	0.28	0.26	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	0.08	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	<0.01	<0.01	3.80	0.35	APHA 3111 – B
19	Iron as Fe	mg/l	0.10	<0.01	11.0	0.04	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.04	0.15	0.55	0.08	IS 3025: Part – 57

AMBIENT AIR MONITORING LOCATIONS PHOTOGRAPHS

SIPCOT office

Spendid Udyog

Semmanguppam

Kirikadu Village

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Uppanar river
Thaikal Thoni Thurai Downstream

Nochchikadu Uppanar

Pondayakuppam – Uppanar Upstream

Near Kudikadu - Uppanar

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

SPIC

Chemplast

Kudikadu

Pachakuppam

AAQ MONITORING LOCATIONS

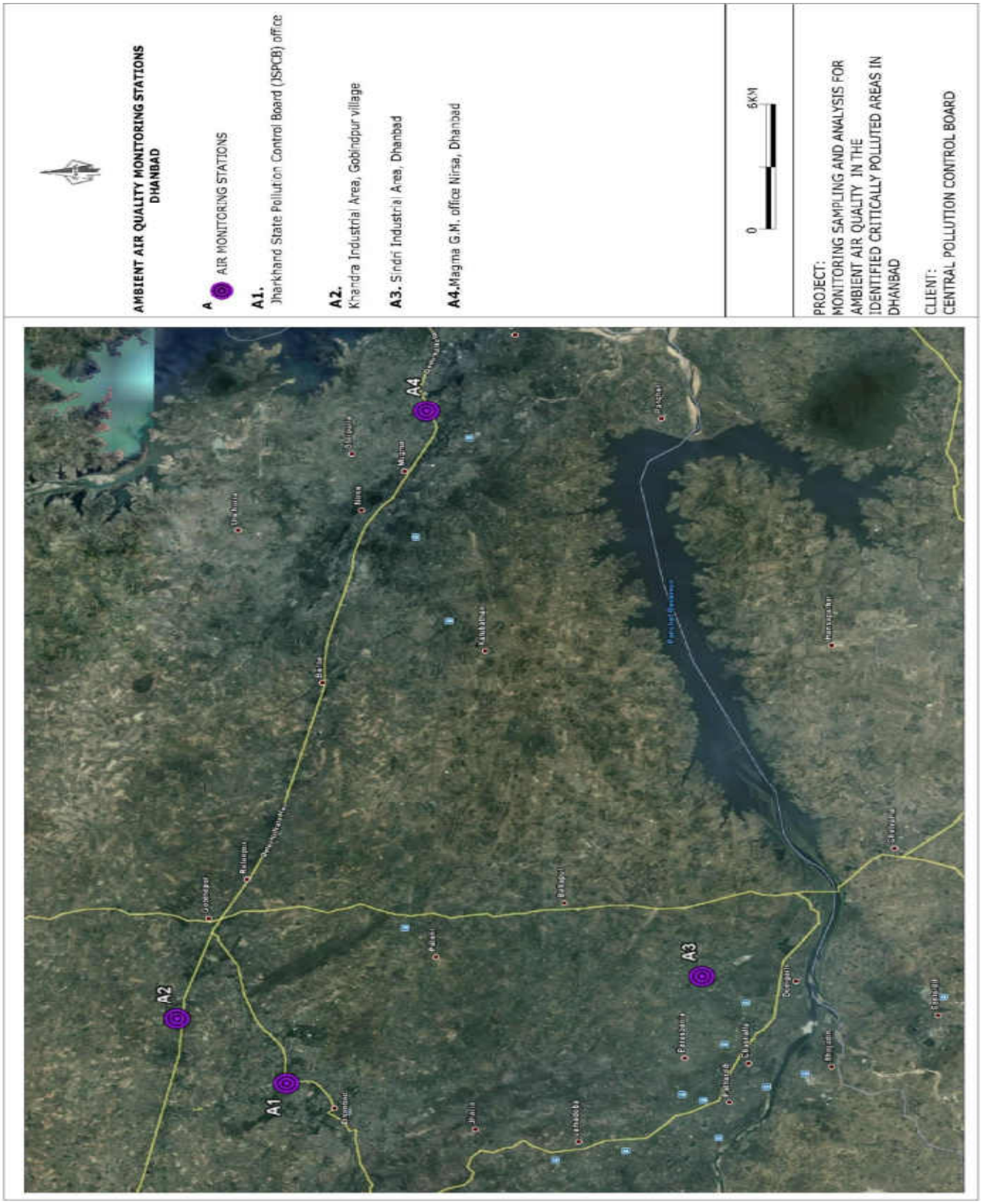
SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	Jharkhand State Pollution Control Board (JSPCB) office	28.02.2013 to 01.03.2013	N 23°48.670'	E 86°26.533'
AAQ – 2	Khandra Industrial Area, Gobindpur village	28.02.2013 to 01.03.2013	N 23°50.819'	E 86°28.372'
AAQ – 3	Sindri Industrial Area, Dhanbad	28.02.2013 to 01.03.2013	N 23°38.683'	E 86°30.133'
AAQ – 4	Magma G.M. office Nirsa, Dhanbad	28.02.2013 to 01.03.2013	N 23°45.927'	E 86°45.650'

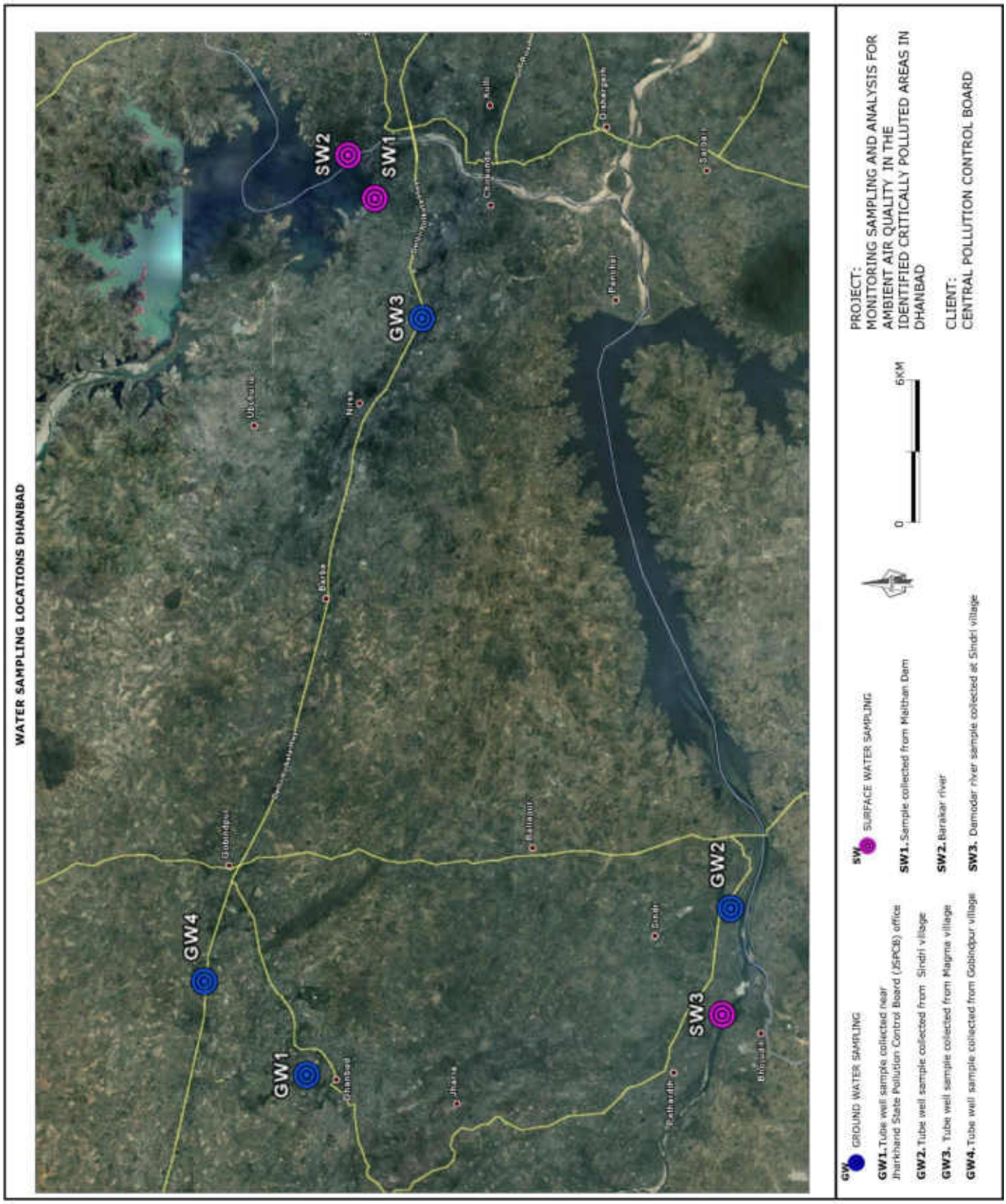
SURFACE WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	Sample collected from Maithan Dam	01.03.2013	N 23°46.850'	E 86°47.977'
SW – 2	Barakar river	01.03.2013	N 23°47.459'	E 86°49.081'
SW – 3	Damodar river sample collected at Sindri village	01.03.2013	N 23°38.878'	E 86°27.466'

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Tube well sample collected near Jharkhand State Pollution Control Board (JSPCB) office	01.03.2013	N 23°48.410'	E 86°25.940'
GW – 2	Tube well sample collected from Sindri village	01.03.2013	N 23°38.689'	E 86°30.133'
GW – 3	Tube well sample collected from Magma village	01.03.2013	N 23°45.766'	E 86°44.972'
GW – 4	Tube well sample collected from Gobindpur village	01.03.2013	N 23°50.758'	E 86°28.310'


AMBIENT AIR QUALITY MONITORING STATIONS
DHANBAD
A AIR MONITORING STATIONS
A1. Jharkhand State Pollution Control Board (JSPCB) office
A2. Khandra Industrial Area, Gobindpur village
A3. Sindri Industrial Area, Dhanbad
A4. Magma G.M. office Nirsa, Dhanbad
0
6KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR AMBIENT AIR QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN DHANBAD
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
A1
A2
A3
A4


WATER SAMPLING LOCATIONS DHANBAD
GW1
GW2
GW3
GW4
SW1
SW2
SW3
Dhanbad
Jharia
Gobindpur
Barka
Nirsa
Ukhra
Kalu
Chasunda
Dabagarh
Sarpai
Panchai
Bhaganidih
Rajapur
Bindri
Rajhandh
GW GROUND WATER SAMPLING
GW1. Tube well sample collected near Jharkhand State Pollution Control Board (JSPCB) office
GW2. Tube well sample collected from Sindri village
GW3. Tube well sample collected from Magma village
GW4. Tube well sample collected from Gobindpur village
SW SURFACE WATER SAMPLING
SW1. Sample collected from Maithan Dam
SW2. Barakar river
SW3. Damodar river sample collected at Sindri village
0
6KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR AMBIENT AIR QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN DHANBAD
CLIENT:
CENTRAL POLLUTION CONTROL BOARD

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 Roof Top of JSPCB Dhanbad	**AAQ – 2** Kandra Industrial Area, Gobinpur	**AAQ – 3** Sindri Industrial Area	**AAQ – 4** Magma G.M.Office ,Nirsa	
1	Lead	µg/m³	0.07	0.13	0.21	0.09	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	<1	1.2	1.6	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	94.5	111.6	92.1	80.1	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	36.1	42.3	52.6	37.3	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	18.9	27.1	53.4	19.7	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	4.6	8.1	10.4	3.7	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	12.7	14.1	16.9	10.5	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	26.9	23.4	29.5	22.4	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	2.7	4.5	6.1	5.3	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	15.8	16.3	17.7	19.1	
		µg/m³	<2	3.0	4.6	3.5	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			SW-1 Maithan Dam	SW – 2 Barakar River	SW-3 Damodar River at Sindri	
I	**Simple Parameters**					
1	Appearance	-	Pale Yellow	Colourless	Colour less	-
2	Colour (Hazen Units)	-	10	5	5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.96	7.65	7.85	IS 3025: Part – 11
2	E C	µS/cm	168	170	380	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	36	18	24	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	5.2	5.6	5.4	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	18	10	12	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	4	2	3	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.02	0.01	0.01	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	1.13	0.23	1.58	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	1.15	0.24	1.59	By Calculation
11	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.30	0.30	0.40	IS 3025: Part – 60
15	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	< 0.1	<0.1	< 0.1	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	0.77	0.68	0.88	By Calculation
18	Total Coliforms	MPN/100ml	90	70	110	IS 1622
19	Fecal Coliforms	MPN/100ml	<2	<2	<2	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.06	0.04	0.03	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	0.01	0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	< 0.01	< 0.01	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.10	0.09	0.10	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.05	0.04	0.06	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Near JSPCB Office, Dhanbad	GW – 2 Sindri Village	GW-3 Mugma Village, Nirsa	GW-4 Gobindpur Village	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Redish	Colourless	-
2	Colour (Hazen Units)	-	< 5	< 5	60	< 5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.50	7.49	7.74	7.22	IS 3025: Part – 11
2	E C	µS/cm	638	820	385	684	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	< 10	< 10	52	< 10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	4	6	12	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	0.01	0.02	0.02	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	5.65	0.90	0.23	5.87	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	5.66	0.91	0.25	5.89	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.50	0.60	0.40	0.60	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	1.55	2.84	0.99	1.03	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.01	0.01	0.02	5.12	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	<0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.09	0.11	1.2	0.14	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.06	0.08	0.05	0.06	IS 3025: Part – 57

AMBIENT AIR MONITORING LOCATIONS PHOTOGRAPHS

JSPCB – Dhanbad

Kandra Industrial Area – Dhanbad

Magma GM Office – Dhanbad

Sindri Industrial Area – Dhanbad

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Barkar River – Dhanbad

Damodar River – Dhanbad

Mithan Dam – Dhanbad

Mithan Dam – Dhanbad

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Gobindpur village – Dhanbad

Muguma village – Dhanbad

Sindri village – Dhanbad

JSPCB – Dhanbad

AAQ MONITORING LOCATIONS

SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	Kama Office (Phase-I)	05.02.2013 to 06.02.2013	N19°12'47.6"	E073°06'26.2"
AAQ – 2	CETP (Phase-I)	05.02.2013 to 06.02.2013	N19°12'59.8"	E073°06'17.4"
AAQ – 3	Prathmesh Dye Chemicals Pvt Ltd	04.02.2013 to 05.02.2013	N19°11'34.9"	E073°05'41.8"
AAQ – 4	Mahabir Dyg & Pig mills Pvt	04.02.2013 to 05.02.2013	N19°11'44.6"	E073°05'48.5"

SURFACE WATER SAMPLING LOCATIONS

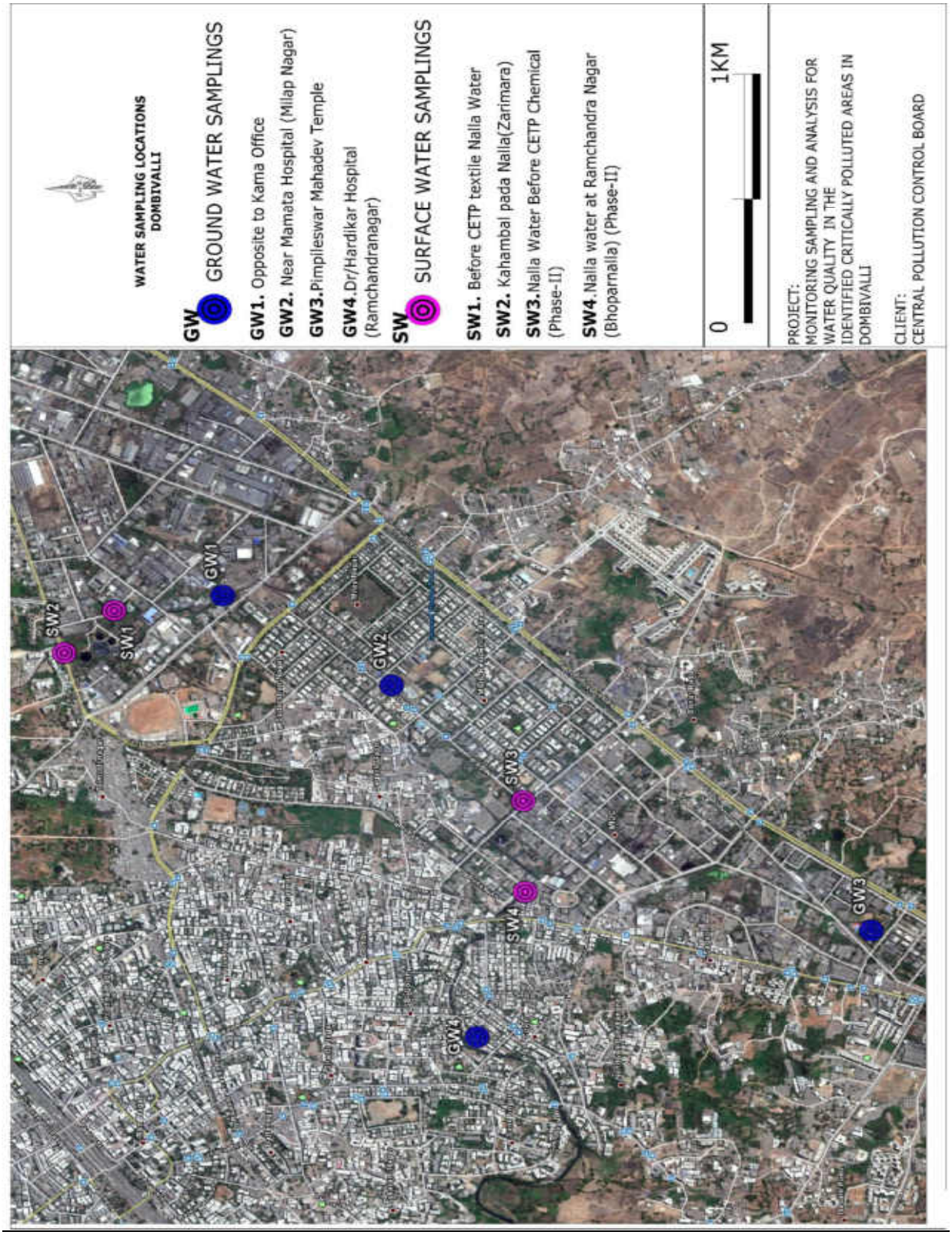
SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	Before CETP textile Nalla Water	04.02.2013	N19°13'02.1"	E073°06'26.8"
SW – 2	Kahambal pada Nalla(Zarimara)	04.02.2013	N19°13'07.7"	E073°06'20.9"
SW – 3	Nalla Water Before CETP Chemical (Phase-II)	04.02.2013	N19°12'16.2"	E073°06'0.5"
SW – 4	Nalla water at Ramchandra Nagar (Bhoparnalla) (Phase-II)	04.02.2013	N19°12'16.0"	E073°05'47.9"

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Opposite to Kama Office	04.02.2013	N19°12'49.9"	E073°06'28.9"
GW – 2	Near Mamata Hospital (Milap Nagar)	04.02.2013	N19°12'30.9"	E073°06'16.4"
GW – 3	Pimpileswar Mahadev Temple	04.02.2013	N19°11'37.0"	E073°05'42.5"
GW – 4	Dr/Hardikar Hospital (Ramchandranagar)	04.02.2013	N19°12'21.4"	E073°05'27.9"

DOMBIVALLI - MAHARASHTRA

DOMBIVALLI - MAHARASHTRA



AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 Kama office (Phase – I)	**AAQ – 2** CETP (Phase – I)	**AAQ – 3** M/s. Prathmesh Dye & Chemicals Pvt. Ltd.,	**AAQ – 4** Mahabir Dye & Pig Mills Pvt. Ltd.,	
1	Lead	µg/m³	0.08	0.11	0.13	0.09	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	<1	1.7	1.4	1.8	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	94.5	87.8	116.0	90.8	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	28.7	32.0	38.9	33.4	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	24	46	54.5	68.6	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	7.6	9.2	11.5	9.6	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	16.8	18.4	14.9	16.5	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	27.4	25.6	30.8	29.8	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	8	6.4	11.5	9.7	IS 5182 (Part 9), 1974, RA 209, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	12.6	14.2	16.2	18.1	
		µg/m³	3	<2	4.2	3.8	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-1 Before CETP textile nalla water (Phase – I)	SW – 2 Khambal pada nalla (Phase – I)	SW-3 Nalla water before CETP Chemical (Phase – II)	SW-4 Nalla water at Ramchandra nagar (Bhoparnatla Phase – II)	
I	**Simple Parameters**						
1	Appearance	-	Grey	Grey	Greenish	Greenish	-
2	Colour (Hazen Units)	-	100	100	20	60	IS 3025: Part – 4
3	Odour (Smell)	-	Un-Agreeable	Un-Agreeable	Un-Agreeable	Un-Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.60	7.43	7.58	7.67	IS 3025: Part – 11
2	E C	µS/cm	800	4500	2000	2200	IS 3025: Part – 14
3	Oil & Grease	mg/l	6	12	5	7	IS 3025: Part – 39
4	Suspended Solids	mg/l	146	448	112	186	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	<1	<1	1.1	<1	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	348	1096	174	376	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	95	320	38	100	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.02	0.05	0.02	0.05	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	3.83	2.71	1.58	2.03	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	3.85	2.76	1.60	2.08	By calculation
11	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.60	0.70	0.60	0.80	IS 3025: Part – 60
15	Sulphides as S	mg/l	6.56	8.91	1.14	8.2	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	1.80	0.85	1.14	0.21	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	1.06	17.75	6.42	6.71	By Calculation
18	Total Coliforms	MPN/100ml	26	21	23	70	IS 1622
19	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	2.7	1.6	1.8	0.5	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	28	62	14	30	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	17	29	7	18	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	0.003	0.010	0.002	0.004	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	0.2	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH's	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.03	0.06	0.05	0.03	IS 3025: Part – 49
10	Nickel as Ni	mg/l	0.02	0.04	0.01	0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	0.02	0.03	<0.01	0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	0.01	0.10	<0.01	0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.62	0.84	0.05	0.18	APHA 3111 – B
19	Iron as Fe	mg/l	1.20	1.36	0.46	0.60	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.15	0.45	0.06	0.18	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Opposite to Kama office	GW – 2 Near Mamata Hospital – Supply water	GW-3 Pimpilesh war Mahadev Temple	GW-4 Dr. Hardikar Hospital (Ramchan dranagar)	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	5	<5	<5	<5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.50	7.80	6.92	7.23	IS 3025: Part – 11
2	E C	µS/cm	2500	300	2100	1200	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	8	4	6	4	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.02	0.01	0.02	0.02	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	1.35	0.45	0.45	7.91	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	1.37	0.46	0.47	7.93	By calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.40	0.20	0.40	0.30	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	0.25	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	2.83	0.37	1.88	1.23	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	0.10	<0.1	0.30	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH's	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.10	0.07	0.06	0.05	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.08	0.04	0.07	0.06	IS 3025: Part – 57

AMBIENT AIR MONITORING PHOTOGRAPHS

KAMA OFFICE PHASE – I

MAHABIR DYE & PIG MILLS PVT LTD

PRATHAMESH DYE CHEMICALS PVT LTD

CETP PHASE - I

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

BHOPAR NALLA RAMCHANDRA NAGAR

NALLA BEFORE CETP TEXTILE

NALLA WATER CETP CHEMICAL

KHAMBAL PADA NALLA

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

MAMATA HOSPITAL

Dr. Hardikar Hospital

OPPOSITE KAMA OFFICE

OPEN WELL IN PIMPLESWAR MAHADEV TEMPLE

AAQ MONITORING LOCATIONS

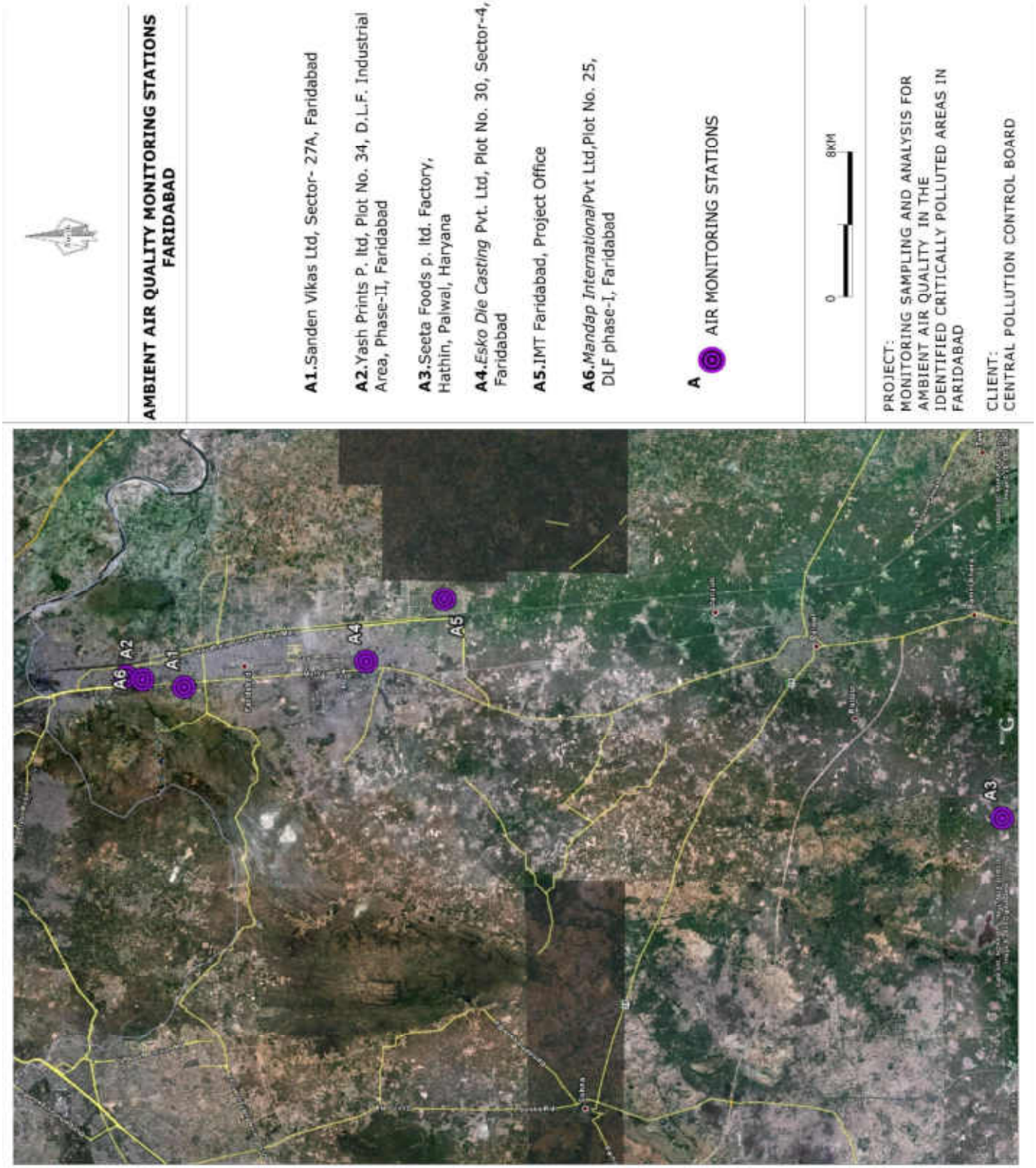
Sample Code	Name of the Monitoring Location	Date of Sampling	Latitude	Longitude
AAQ - 1	Sanden Vikas Ltd, Sector- 27A, Faridabad	04.02.2013 to 05.02.2013	N 28°26'14.0"	E077°18'22.0"
AAQ - 2	Yash Prints P. ltd, Plot No. 34, D.L.F. Industrial Area, Phase-II, Faridabad	04.02.2013 to 05.02.2013	N 28°27'53.2''	E077°18'43.7''
AAQ – 3	Seeta Foods p. ltd. Factory, Hathin, Palwal, Haryana	04.02.2013 to 05.02.2013	N 28°03'02.0"	E077°13'53.5"
AAQ - 4	Esko Die Casting Pvt. Ltd, Plot No. 30, Sector-4, Faridabad	05.02.2013 to 06.02.2013	N 28°21'4.26''	E 077°19'14.6''
AAQ - 5	IMT Faridabad, Project Office	05.02.2013 to 06.02.2013	N 28°18'51.7"	E077°21'20.9"
AAQ - 6	Mandap International Pvt Ltd, Plot No. 25, DLF phase-I, Faridabad	05.02.2013 to 06.02.2013	N 28°27'24.6''	E 077°18'37.5''

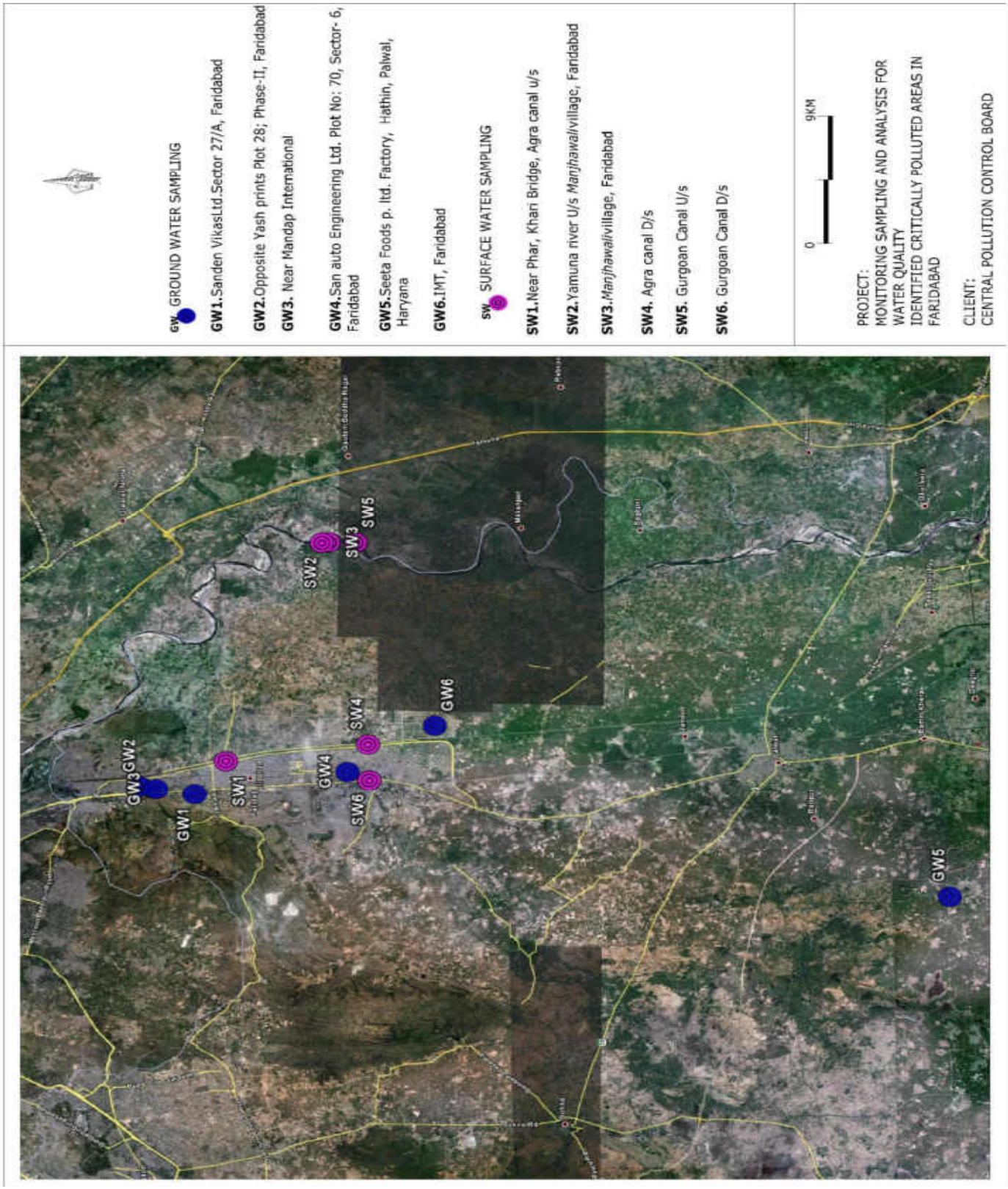
SURFACE WATER SAMPLING LOCATIONS

Sample Code	Name of the Sampling Location	Date of Sampling	Latitude	Longitude
SW – 1	Near Phar, Khari Bridge, Agra canal u/s	06.02.2013	N28°25'16.5"	E077°19'50.0"
SW – 2	Yamuna river U/s Manjhawali village, Faridabad	06.02.2013	N28°22'20.0"	E077°29'16.8"
SW – 3	Manjhawali village, Faridabad	06.02.2013	N28°22'7.7"	E077°29'18.0"
SW – 4	Agra canal D/s	06.02.2013	N28°20'54.6"	E071°20'32.3"
SW – 5	Gurgoan Canal U/s	06.02.2013	N28°21'20.0"	E077°29'28.4"
SW – 6	Gurgoan Canal D/s	06.02.2013	N28°20'52.3"	E077°18'58.5"

GROUND WATER SAMPLING LOCATIONS

Sample Code	Name of the Sampling Location	Date of Sampling	Latitude	Longitude
GW – 1	Sanden Vikas Ltd.Sector 27/A, Faridabad	05.02.2013	N28°26'14.0"	E077°18'22.0"
GW – 2	Opposite Yash prints Plot 28; Phase-II, Faridabad	05.02.2013	N28°27'54.2"	E077°18'42.0"
GW – 3	Near Mandap International	05.02.2013	N28°27'24.9"	E077°18'35.5"
GW – 4	San auto Engineering Ltd. Plot No: 70, Sector-6, Faridabad	05.02.2013	N28°21'32.4"	E077°19'20.9"
GW – 5	Seeta Foods p. ltd. Factory, Hathin, Palwal, Haryana	05.02.2013	N28°03'02.0"	E077°13'53.5"
GW – 6	IMT, Faridabad	07.02.2013	N28°18'51.7"	E077°21'20.9"


AMBIENT AIR QUALITY MONITORING STATIONS
FARIDABAD
A1.Sanden Vikas Ltd, Sector- 27A, Faridabad
A2.Yash Prints P. ltd, Plot No. 34, D.L.F. Industrial Area, Phase-II, Faridabad
A3.Seeta Foods p. ltd. Factory, Hathin, Palwal, Haryana
A4.Esko Die Casting Pvt. Ltd, Plot No. 30, Sector-4, Faridabad
A5.IMT Faridabad, Project Office
A6.Mandap International/Pvt Ltd,Plot No. 25, DLF phase-I, Faridabad
A AIR MONITORING STATIONS
0
8KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR AMBIENT AIR QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN FARIDABAD
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
A1
A2
A3
A4
A5
A6


GW GROUND WATER SAMPLING
GW1.Sanden VikasLtd.Sector 27/A, Faridabad
GW2.Opposite Yash prints Plot 28; Phase-II, Faridabad
GW3. Near Mandap International
GW4.San auto Engineering Ltd. Plot No: 70, Sector- 6, Faridabad
GW5.Seeta Foods p. ltd. Factory, Hathin, Palwal, Haryana
GW6.IMT, Faridabad
SW SURFACE WATER SAMPLING
SW1.Near Phar, Khari Bridge, Agra canal u/s
SW2.Yamuna river U/s Manjhawal/village, Faridabad
SW3.Manjhawal/village, Faridabad
SW4. Agra canal D/s
SW5. Gurgoan Canal U/s
SW6. Gurgoan Canal D/s
0
9KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY
IDENTIFIED CRITICALLY POLLUTED AREAS IN FARIDABAD
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
GW3
GW2
GW1
SW1
GW4
SW6
SW4
GW6
SW2
SW3
SW5
GW5

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS			Test Methods
			AAQ – 1 Sanden Vikas Ltd., Sector – 27A	**AAQ – 2** Yash Prints Pvt. Ltd., LDF IA, Phase - II	**AAQ – 3** Seeta Food Pvt. Ltd., Hathin, Palwal	
1	Lead	µg/m³	0.16	0.07	0.09	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	<1	1.8	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	115.6	231.3	163.0	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	59.0	67.8	54.3	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	19.6	27.2	24.8	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	9.8	4.6	5.5	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	11.8	16.1	9.6	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	23.2	28.5	21.5	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	
		mg/m³	<2	<2	<2	
12	O_3	µg/m³	5.6	8.1	9.4	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	16	14	17.2	
		µg/m³	4.2	3.3	<2	

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS			Test Methods
			AAQ – 4 ESCO Die Casting Pvt. Ltd.,	**AAQ – 5** IMT Faridabad, Project Office	**AAQ – 6** Mandap International Pvt. Ltd., DLF Phase – I.	
1	Lead	µg/m³	0.23	0.17	0.12	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	3.2	1.8	2.1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	129.6	118.7	167.4	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	41.8	67.4	91.4	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	24.2	12.1	22.2	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	11.8	8.2	4.6	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	16.2	13.8	12.9	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	29.2	20.1	26.7	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	
		mg/m³	<2	<2	<2	
12	O_3	µg/m³	7.2	9.4	11.4	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	28	32	26	
		µg/m³	5.6	<2	3.8	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			SW-1 Canal U/s Near Phar, Khari bridge	SW – 2 Yamuna River U/s at Manjhawali Village	SW-3 Yamuna River D/s near Manjhawali village	
I	**Simple Parameters**					
1	Appearance	-	Light Greyish	Light Greyish	Greyish	-
2	Colour (Hazen Units)	-	20	30	20	IS 3025: Part – 4
3	Odour (Smell)	-	Un-Agreeable	Un-Agreeable	Un-Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.19	7.17	7.31	IS 3025: Part – 11
2	E C	µS/cm	940	1214	1230	IS 3025: Part – 14
3	Oil & Grease	mg/l	3	4	5	IS 3025: Part – 39
4	Suspended Solids	mg/l	104	148	136	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	1.2	2.3	2.1	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	106	134	128	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	27	35	34	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.01	0.01	0.02	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	2.03	1.81	1.13	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	2.04	1.82	1.15	By Calculation
11	Free Ammonia	mg/l	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.70	0.50	0.60	IS 3025: Part – 60
15	Sulphides as S	mg/l	1.20	1.80	1.4	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	1.32	4.12	3.6	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	1.12	2.26	2.23	By Calculation
18	Total Coliforms	MPN/100ml	14000	7000	5000	IS 1622
19	Fecal Coliform	MPN/100ml	3300	1700	1300	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	1.56	4.86	4.12	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	18	24	23	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	9	14	12	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	0.10	0.11	0.10	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.09	0.10	0.08	APHA 3111 – B
19	Iron as Fe	mg/l	0.56	0.72	0.64	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.05	0.06	0.07	IS 3025: Part – 57

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			SW-4 Agra Canal Down Stream	SW – 5 Gurgoan canal Up Stream	SW-6 Gurgoan canal Down Stream	
I	**Simple Parameters**					
1	Appearance	-	Light Greyish	Light Greyish	Light Greenish	-
2	Colour (Hazen Units)	-	15	10	20	IS 3025: Part – 4
3	Odour (Smell)	-	Un-Agreeable	Un-Agreeable	Un-Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.21	7.04	7.08	IS 3025: Part – 11
2	E C	µS/cm	1000	922	952	IS 3025: Part – 14
3	Oil & Grease	mg/l	6	4	5	IS 3025: Part – 39
4	Suspended Solids	mg/l	92	62	74	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	1.8	1.6	1.2	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	118	98	112	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	29	25	28	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.01	0.01	0.02	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	0.90	2.03	2.93	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.91	2.04	2.95	By Calculation
11	Free Ammonia	mg/l	<0.1	<0.1	< 0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.7	0.6	0.7	IS 3025: Part – 60
15	Sulphides as S	mg/l	1.2	1.0	1.5	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	1.63	2.18	2.03	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	2.55	2.30	2.12	By Calculation
18	Total Coliforms	MPN/100ml	17000	3300	5000	IS 1622
19	Fecal Coliform	MPN/100ml	5000	1100	1400	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	1.80	2.40	2.30	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	26	19	25	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	18	10	13	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	0.10	0.12	0.10	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.06	0.05	0.07	APHA 3111 – B
19	Iron as Fe	mg/l	0.70	0.54	0.62	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.08	0.06	0.07	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			GW-1 Sanden Vikas Ltd., Faridabad	GW – 2 Opp. Yash Prints, Phase - II	GW-3 Near Mandap International (P) Ltd.,	
I	**Simple Parameters**					
1	Appearance	-	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	<5	<5	<5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.08	7.53	7.05	IS 3025: Part – 11
2	E C	µS/cm	4580	1560	1580	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	8	4	4	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	0.01	<0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	3.16	4.29	2.71	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	3.17	4.30	2.71	By Calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.5	0.4	0.6	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	0.33	0.47	0.28	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	28.77	4.35	0.51	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	0.40	0.56	0.34	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.78	0.09	0.09	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	<0.01	<0.01	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.04	0.05	0.05	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.28	0.14	0.14	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			GW-4 SAN Auto Engineering Ltd., Sector - 6	GW – 5 Seeta Foods – Hathin, Palwal	GW-6 IMT Faridabad	
I	**Simple Parameters**					
1	Appearance	-	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	<5	<5	<5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	6.94	7.03	7.42	IS 3025: Part – 11
2	E C	µS/cm	3380	2150	1334	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	12	14	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	4	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	<0.01	0.02	<0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	26.88	1.81	2.71	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	26.88	1.83	2.71	By Calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.90	0.80	0.70	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	0.37	0.31	0.12	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	5.39	2.61	3.94	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	0.42	0.40	0.15	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	0.01	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	<0.01	<0.01	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.07	0.06	0.07	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.21	0.18	0.12	IS 3025: Part – 57

AMBIENT AIR MONITORING LOCATIONS PHOTOGRAPHS

Sanden Vikas Ltd

Yash Prints Pvt. ltd

Seeta Foods Pvt. ltd

Esko Die Casting Pvt. Ltd

IMT Faridabad, Project Office

Mandap International Pvt Ltd

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Yamuna river Upstream

Yamuna river Downstream

Agra canal Upstream

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Agra canal Downstream

Gurgaon Canal Upstream

Gurgaon Canal Downstream

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Near Mandap International

Sanden Vikas Ltd

Opposite Yash prints

San auto Engineering Ltd

Seeta Foods Pvt. Ltd

IMT Faridabad (near Pump house)

SAMPLING LOCATIONS WITH GPS COORDINATES

AAQ MONITORING LOCATIONS

SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	Manav Beverages	04.05.2013 to 05.05.2013	N28°39'24.5"	E077°28'09.0"
AAQ – 2	Unicem Laboratories	06.05.2013 to 07.05.2013	N28°41'00.3"	E077°26'04.9"
AAQ – 3	Mahadev engineering	06.05.2013 to 07.05.2013	N28°47'06.5"	E077°15'38.3"
AAQ – 4	Jindal pipe	07.05.2013 to 08.05.2013	N28°41'40.9"	E077°34'48.2"
AAQ – 5	Times of india	04.05.2013 to 05.05.2013	N28°41'25.1"	E077°33'24.9"
AAQ – 6	Mohan Mekin	07.05.2013 to 05.05.2013	N28°40'40.7"	E077°23'01.5"

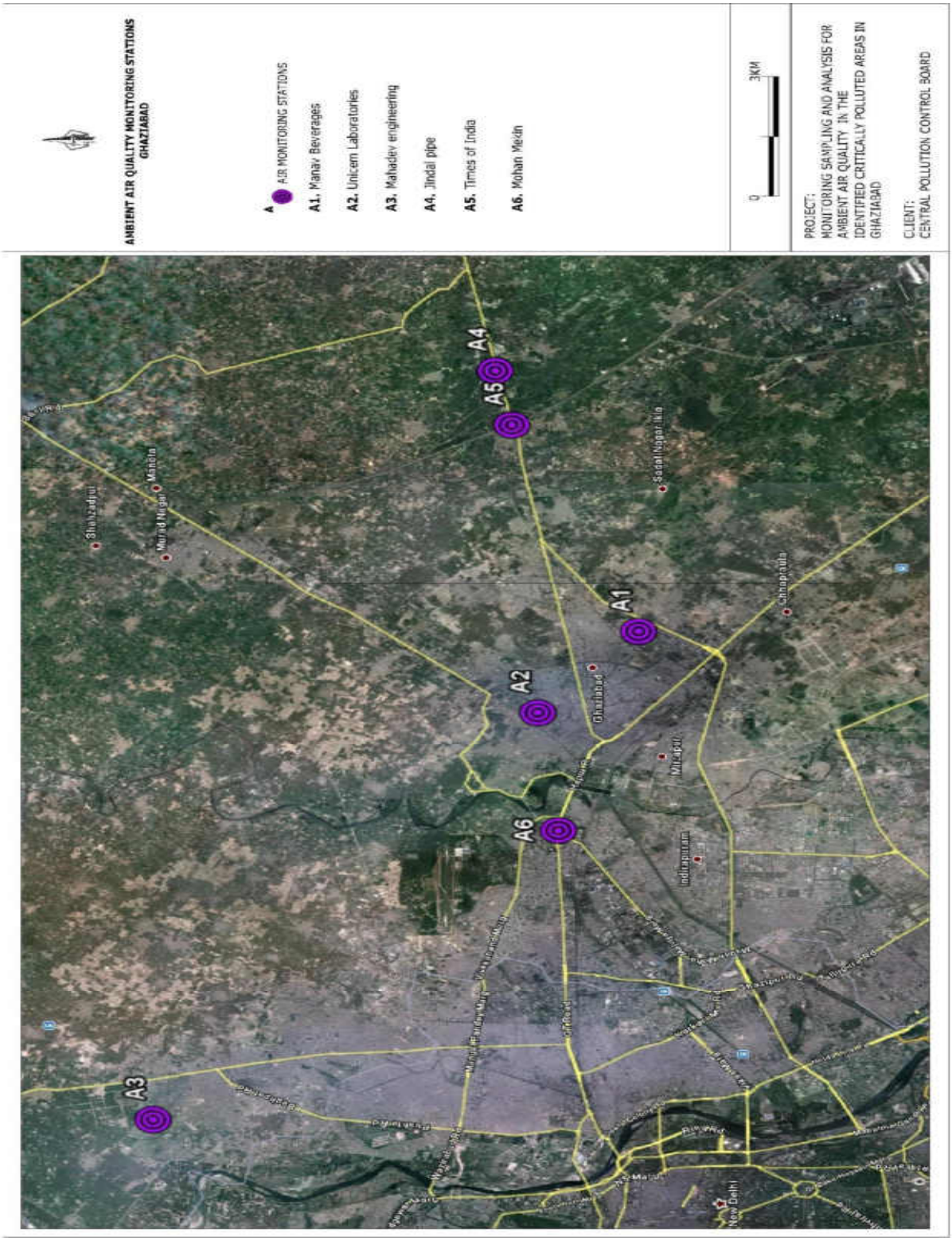
SURFACE WATER SAMPLING LOCATIONS

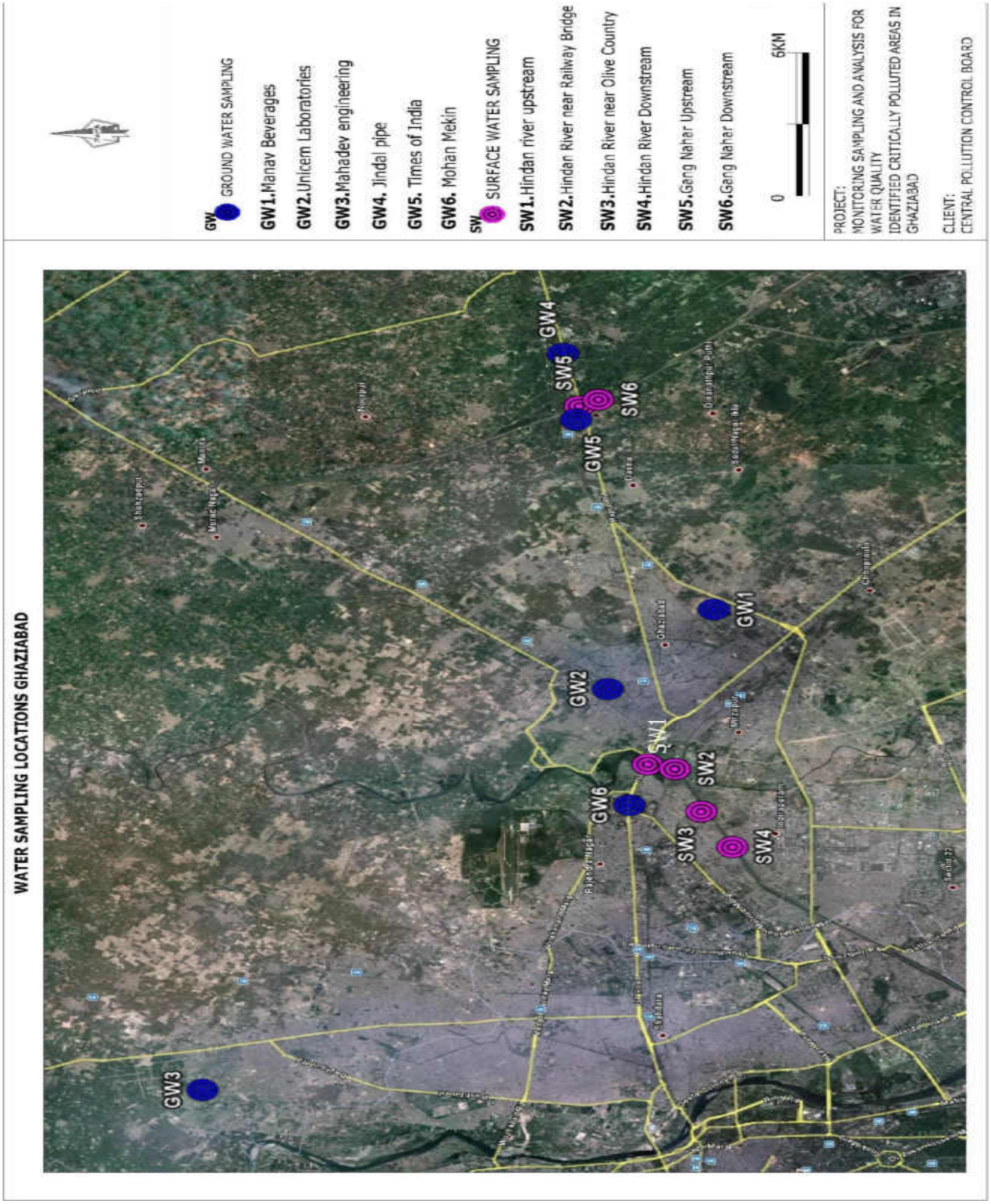
SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	Hindan River upstream	03.05.2013	N28°40'24.3"	E077°24'05.7"
SW - 2	Hindan River near Railway Bridge	03.05.2013	N28°39'59.8"	E077°23'58.2"
SW – 3	Hindan River near Olive Country	03.05.2013	N28°39'23.7"	E077°22'32.6"
SW - 4	Hindan River Downstream	03.05.2013	N28°39.245'	E077°22.109'
SW - 5	Gang Nahar Upstream	03.05.2013	N28°41'43.6"	E077°33'43.7"
SW - 6	Gang Nahar Downstream	03.05.2013	N28°41'25.8"	E077°33'26.4"

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Manav Beverages	04.05.2013	N28°39'24.5"	E077°28'09.0"
GW – 2	Unicem Laboratories	06.05.2013	N28°41'00.3"	E077°26'04.9"
GW – 3	Mahadev engineering	06.05.2013	N28°47'06.5"	E077°15'38.3"
GW – 4	Jindal pipe	07.05.2013	N28°41'40.9"	E077°34'48.2"
GW – 5	Times of india	04.05.2013	N28°41'25.1"	E077°33'24.9"
GW – 6	Mohan Mekin	07.05.2013	N28°40'40.7"	E077°23'01.5"

GHAZIABAD (UTTAR PRADESH)




WATER SAMPLING LOCATIONS GHAZIABAD
GW3
GW2
GW6
SW1
SW2
SW3
SW4
GW1
GW5
SW5
SW6
GW4
GW GROUND WATER SAMPLING
GW1.Manav Beverages
GW2.Unicem Laboratories
GW3.Mahadev engineering
GW4. Jindal pipe
GW5. Times of India
GW6. Mohan Mekin
SW SURFACE WATER SAMPLING
SW1.Hindan river upstream
SW2.Hindan River near Railway Bridge
SW3.Hindan River near Olive Country
SW4.Hindan River Downstream
SW5.Gang Nahar Upstream
SW6.Gang Nahar Downstream
0
6KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY
IDENTIFIED CRITICALLY POLLUTED AREAS IN GHAZIABAD
CLIENT:
CENTRAL POLLUTION CONTROL BOARD

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS			Test Methods
			AAQ – 1 Manav Beverages	AAQ – 2 Unicem Laboratories	AAQ – 3 Mahadev engineering	
1	Lead	µg/m^3	0.27	0.16	0.04	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m^3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m^3	0.68	0.91	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m^3	2.7	2.1	1.3	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m^3	343.3	356.8	181.7	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m^3	166.9	128.2	79.5	Internal SOP & CPCB Manual
7	Ammonia	µg/m^3	18.4	13.5	15.7	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m^3	7.8	5.3	3.4	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m^3	15.6	13.7	11.4	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m^3	29.2	26.3	21.7	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m^3	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m^3	<2	<2	<2	
		mg/m^3	<2	<2	<2	
12	O_3	µg/m^3	6.4	8.1	6.7	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m^3	13.9	14.3	18.5	
		µg/m^3	3.2	4.4	3.0	

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS			Test Methods
			AAQ – 4 Jindal pipe	AAQ – 5 Times of India	AAQ – 6 Mohan Mekin	
1	Lead	µg/m³	0.23	0.28	0.04	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	3.8	2.1	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	331.1	273	180	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	177.9	88.8	75.1	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	<5	<5	7.8	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	8.7	3.8	1.4	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	16.5	14.2	12.8	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	23.4	21.7	17.9	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	
		mg/m³	<2	<2	<2	
12	O_3	µg/m³	5.9	7.2	9.2	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	14.8	18.4	15.7	
		µg/m³	3.6	4.0	2.9	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			SW-1 Hindan river upstream	SW – 2 Hindan river Railway Bridge	SW-3 Hindan river Olive Country	
I	**Simple Parameters**					
1	Appearance	-	Brownish	Brownish	Brownish	-
2	Colour (Hazen Units)	-	40	40	40	IS 3025: Part – 4
3	Odour (Smell)	-	Un - Agreeable	Un-Agreeable	Un - Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.24	7.34	7.36	IS 3025: Part – 11
2	E C	µS/cm	440	400	380	IS 3025: Part – 14
3	Oil & Grease	mg/l	1	1	1	IS 3025: Part – 39
4	Suspended Solids	mg/l	38	18	16	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	<1	<1	<1	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	64	58	52	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	15	14	13	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.02	<0.01	0.04	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	0.68	0.45	0.45	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.70	0.45	0.49	By Calculation
11	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.5	0.5	0.5	IS 3025: Part – 60
15	Sulphides as S	mg/l	0.4	0.3	0.3	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	0.32	0.5	0.2	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	0.76	0.82	0.85	By Calculation
18	Total Coliforms	MPN/100ml	280	500	350	IS 1622
19	Fecal Coliforms	MPN/100ml	21	110	90	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	0.46	0.62	0.40	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	8.1	9.0	8.4	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	4.5	5.9	5.6	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.02	0.02	0.02	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.02	0.02	0.02	APHA 3111 – B
19	Iron as Fe	mg/l	0.20	0.32	0.19	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.05	0.07	0.05	IS 3025: Part – 57

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			SW – 4 Hindan river downstream	SW – 5 Gang nahar Upstream	SW – 6 Gang nahar downstream	
I	**Simple Parameters**					
1	Appearance	-	Brownish	Colourless	Colourless	-
2	Colour (Hazen Units)	-	40	5	5	IS 3025: Part – 4
3	Odour (Smell)	-	Un - Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.18	7.82	7.78	IS 3025: Part – 11
2	E C	µS/cm	390	200	210	IS 3025: Part – 14
3	Oil & Grease	mg/l	2	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	37	10	12	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	1.8	5.4	5.6	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	68	6	8	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	16	<2	<2	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	1.28	<0.01	<0.01	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	0.45	0.23	0.23	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	1.73	0.23	0.23	By Calculation
11	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.50	0.40	0.40	IS 3025: Part – 60
15	Sulphides as S	mg/l	0.6	<0.1	<0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	0.36	<0.1	<0.1	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	0.78	0.14	0.13	By Calculation
18	Total Coliforms	MPN/100ml	900	7	9	IS 1622
19	Fecal Coliforms	MPN/100ml	350	<2	<2	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	0.48	< 0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	9.8	< 1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	6.2	< 1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.10	< 0.01	< 0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	0.02	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.11	<0.01	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	1.8	0.02	0.02	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.05	0.03	0.03	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			GW-1 Manav Beverages	GW – 2 Unicem Laboratories	GW-3 Mahadev engineering	
I	**Simple Parameters**					
1	Appearance	-	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	< 5	< 5	< 5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.84	7.60	7.59	IS 3025: Part – 11
2	E C	µS/cm	740	1590	1550	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	< 10	< 10	< 10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	8	8	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	< 2	< 2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	<0.01	0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	1.35	3.93	12.65	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	1.36	3.93	12.66	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.60	0.50	0.60	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	1.81	4.54	4.23	By Calculation
17	Total Coliforms	MPN/100ml	< 2	< 2	< 2	IS 1622
18	Fecal Coliforms	MPN/100ml	< 2	< 2	< 2	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	< 1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	< 0.01	< 0.01	0.02	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	<0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	<0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.01	0.09	0.11	APHA 3111 – B
19	Iron as Fe	mg/l	0.05	0.07	0.06	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.10	0.17	0.19	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			GW-4 Jindal Pipe	GW – 5 Times of india	GW-6 Mohan Mekin	
I	**Simple Parameters**					
1	Appearance	-	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	< 5	< 5	< 5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.67	7.87	7.80	IS 3025: Part – 11
2	E C	µS/cm	850	2880	1760	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	< 10	< 10	< 10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	6	8	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	< 2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	<0.01	<0.01	<0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	0.68	0.23	1.68	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.68	0.23	1.68	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.60	0.80	0.70	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	< 0.1	< 0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	1.48	5.43	8.3	By Calculation
17	Total Coliforms	MPN/100ml	< 2	< 2	< 2	IS 1622
18	Fecal Coliforms	MPN/100ml	< 2	< 2	< 2	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	<0.1	< 0.1	< 0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	< 1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.24	0.05	0.02	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	<0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	< 0.01	0.21	0.04	APHA 3111 – B
19	Iron as Fe	mg/l	0.05	0.06	0.07	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.08	0.17	0.05	IS 3025: Part – 57

AMBIENT AIR MONITORING LOCATIONS PHOTOGRAPHS

Manav Brewerage

Unicem Laboratories

Mahadev Engg.

Jindal Pipe

Times of India

Mohan Mekin

PHOTOGRAPHS OF SURFACE WATER SAMPLING LOCATIONS

Hindan River Upstream

Hindan River Downstream

Hindan River near Railway Bridge

PHOTOGRAPHS OF SURFACE WATER SAMPLING LOCATIONS

Hindan River near Olive Country

Gang Nahar Upstream

Gang Nahar Downstream

PHOTOGRAPHS OF GROUND WATER SAMPLING LOCATIONS

Manav Brewerage

Unicem Laboratories

Mahadev Engg.

Jindal Pipe

Times of India

Mohan Mekin

AAQ MONITORING LOCATIONS

SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	Haldia Super Market (WBPCB)	18.02.2012 to 19.02.2013	N 22°04.274'	E 088°08.274'
AAQ – 2	Priyambada Housing Comples	18.02.2012 to 19.02.2013	N 22°04.962'	E 088°09.077'
AAQ – 3	WEIIDC- Ruchi Soya Industries Limited	18.02.2012 to 19.02.2013	N 22°03.727'	E 088°07.462'
AAQ – 4	IOCL Management Academy	19.02.2012 to 20.02.2013	N 22.01.393'	E 088°03.283'

SURFACE WATER SAMPLING LOCATIONS

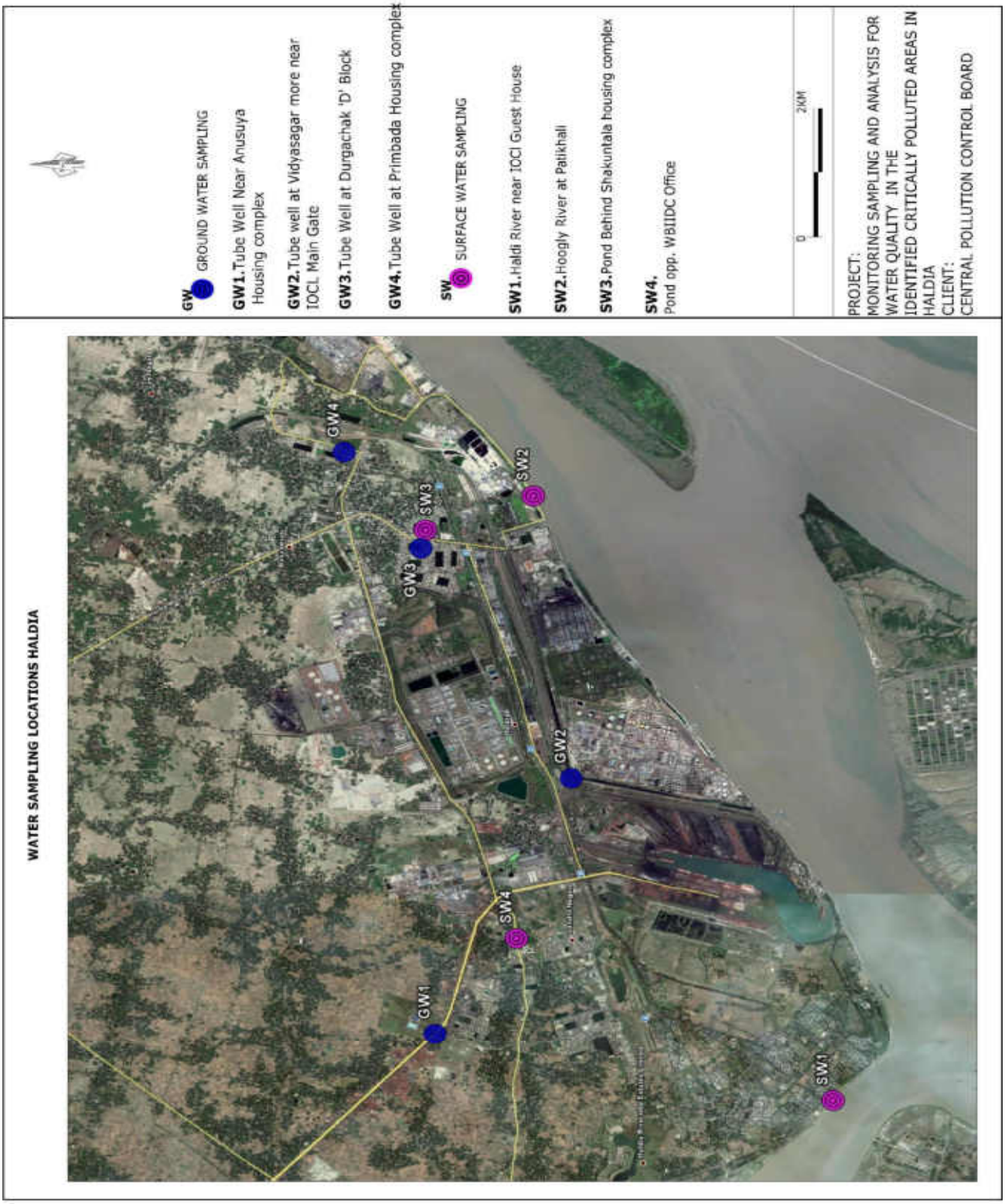
SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	Haldi River near IOCl Guest House	19.02.2013	N 22°01.316'	E 088°03.185'
SW – 2	Hoogly River at Patikhali	19.02.2013	N 22°03.493'	E 088°08.660'
SW – 3	Pond Behind Shakuntala housing complex	18.02.2013	N 22°04.275'	E 088°08.344'
SW – 4	Pond opp. WBIIDC Office	19.02.2013	N 22°03.613'	E 088°04.652'

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Tube Well Near Anusuya Housing complex	19.02.2013	N 22°04.205'	E 088°53.791'
GW – 2	Tube well at Vidyasagar more near IOCL Main Gate	20.02.2013	N 22°03.218'	E 088°06.101'
GW – 3	Tube Well at Durgachak 'D' Block	19.02.2013	N 22°04.308'	E 088°08.181'
GW – 4	Tube Well at Primbada Housing complex	19.02.2013	N 22°04.865'	E 088°09.054'

HALDIA - WEST BENGAL

HALDIA - WEST BENGAL



AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 Haldia Super Market	**AAQ – 2** Priyambada Housing Complex	**AAQ – 3** WBIIDC – Ruchi Soya Industries Ltd.,	**AAQ – 4** IOCL Management Academy	
1	Lead	µg/m³	0.03	0.04	0.07	0.02	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	<1.0	<1.0	<1.0	<1.0	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	67	49	72	66	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	21	18	29	19	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	15	10	16	12	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	<1	<1	1.6	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	11.2	9.5	12.9	8.4	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	16.0	17.2	23.0	18.6	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	6.2	5.6	10.2	7.1	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	15.1	12.3	16.2	11.6	
		µg/m³	<2	2.8	3.4	3.2	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-1 Haldi River near IOCI Guest House	SW – 2 Hoogly River at Patikhali	SW-3 Pond Behind Shakuntala housing complex	SW-4 Pond opp. WBIIDC Office	
I	**Simple Parameters**						
1	Appearance	-	Pale brown	Pale brown	Pale brown	Pale brown	-
2	Colour (Hazen Units)	-	20	20	10	5	IS 3025: Part – 4
3	Odour (Smell)	-	Un-Agreeable	Un-Agreeable	Un-Agreeable	Un-Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.49	7.74	7.50	7.62	IS 3025: Part – 11
2	E C	µS/cm	5000	8000	700	800	IS 3025: Part – 14
3	Oil & Grease	mg/l	3	2	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	146	168	24	28	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	6.1	4.2	6.1	5.6	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	70	58	10	18	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	17	14	2	4	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.01	<0.01	<0.01	0.09	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	0.68	0.68	1.58	0.90	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.69	0.68	1.58	0.99	By Calculation
11	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.50	0.60	0.40	0.50	IS 3025: Part – 60
15	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	0.12	0.24	0.16	0.12	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	4.94	12.72	2.53	2.42	By Calculation
18	Total Coliforms	MPN/100ml	14	900	80	240	IS 1622
19	Fecal Coliforms	MPN/100ml	2	240	50	30	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	0.20	0.38	0.30	0.20	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	7.0	5.6	<1	1.1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	4.2	2.8	<1	<1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH's	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.04	0.08	0.02	0.02	IS 3025: Part – 49
10	Nickel as Ni	mg/l	0.02	0.01	0.01	0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	0.03	0.04	0.03	0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	0.01	0.01	0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	0.03	0.04	0.02	0.02	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.12	0.38	0.03	0.05	APHA 3111 – B
19	Iron as Fe	mg/l	1.2	1.8	0.20	0.28	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.34	0.98	0.10	0.09	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Near Anushuya Housing complex	GW – 2 Vidyasagar more near IOCI main gate	GW-3 Durgachoke 'D' Block	GW-4 Priyambada Housing complex	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	<5	<5	<5	<5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.27	7.46	7.43	7.60	IS 3025: Part – 11
2	E C	µS/cm	1420	1440	1380	1200	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	4	4	6	4	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	<0.01	0.01	0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	0.23	0.68	0.23	0.23	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.24	0.68	0.24	0.24	By Calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.30	0.40	0.30	0.20	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	4.14	2.46	2.94	3.47	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.05	0.06	0.04	0.04	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.02	0.03	0.02	0.02	APHA 3111 – B
19	Iron as Fe	mg/l	0.10	0.12	0.09	0.10	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.18	0.21	0.17	0.16	IS 3025: Part – 57

AMBIENT AIR MONITORING LOCATIONS PHOTOGRAPHS

IOCL – Haldia

Priyambhadha housing complex – Haldia

Rouchi Soya Industry – Haldia

Super Market – Haldia

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Haldia river – Haldia

Hoogly river – Haldia

Pond near Sakuntala Housing complex – Haldia

Pond near WBIDC – Haldia

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Anasuya housing complex – Haldia,

Durga chowk D- Block – Haldia

Priyam Badha Housing complex – Haldia

IOCL Main gate – Haldia

AAQ MONITORING LOCATIONS

SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	Seacom Engg. College	22.03.2013 to 23.03.2013	N 22°34.294'	E 88°11.837'
AAQ – 2	Biprannapara Barwaritala Primary school	22.03.2013 to 23.03.2013	N 22°34.800'	E 88°18.483'
AAQ – 3	Betor Health Centre	22.03.2013 to 23.03.2013	N 22°34.738'	E 88°18.029'
AAQ – 4	Bamangachi 'B'Road Rail quarter	23.03.2013 to 24.03.2013	N 22°36.683'	E 88°19.883'

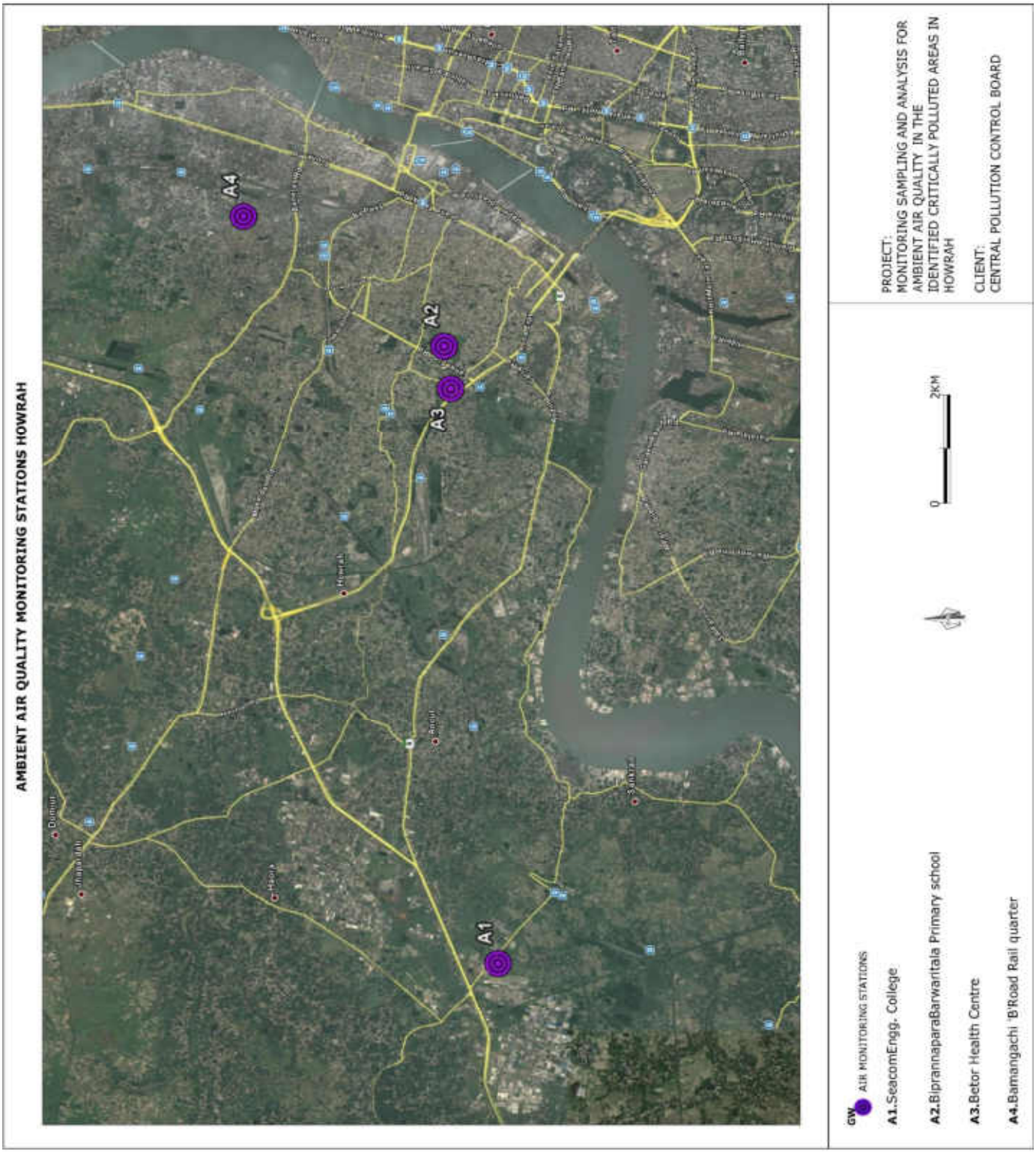
SURFACE WATER SAMPLING LOCATIONS

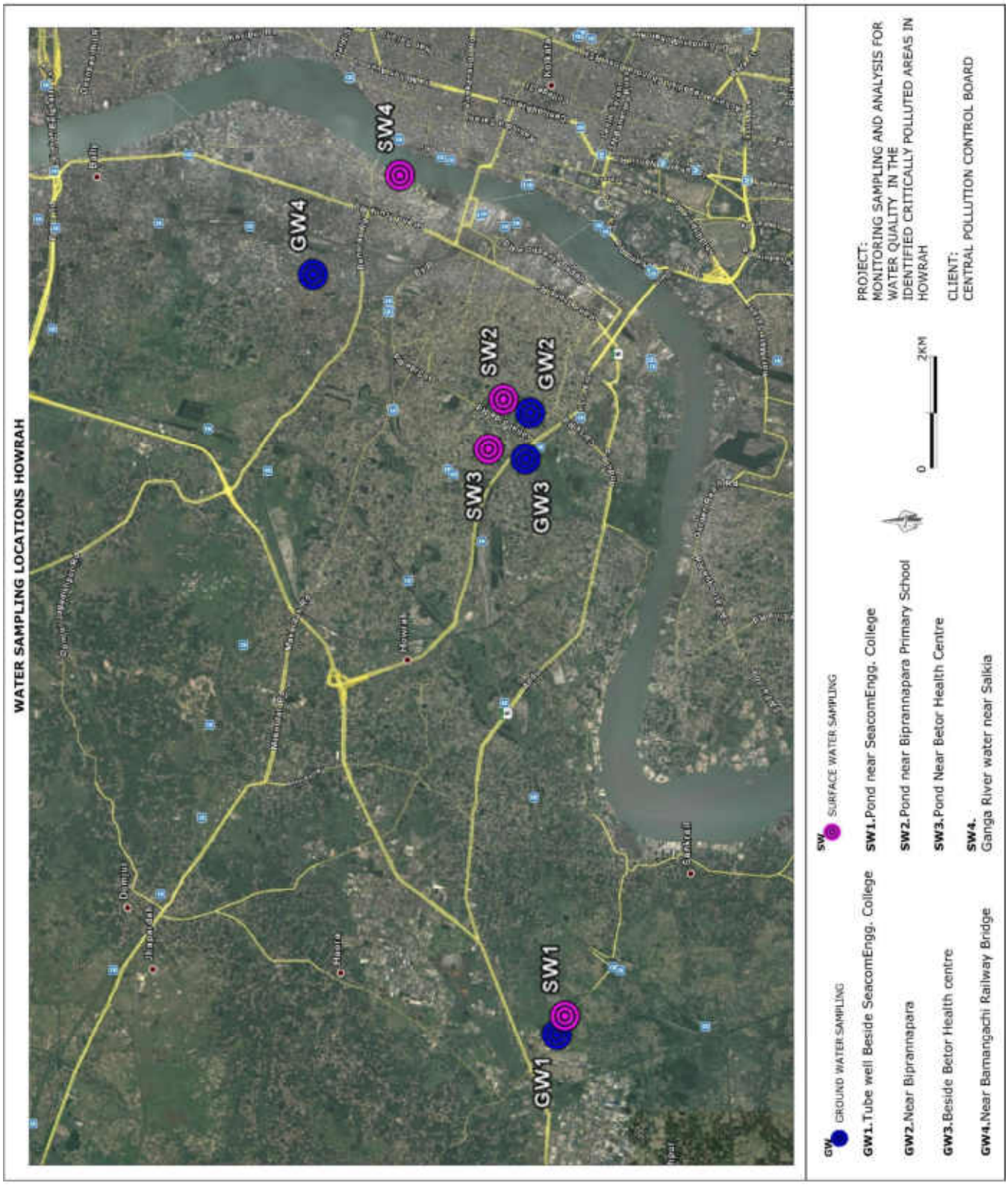
SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	Pond near Seacom Engg. College	23.03.2013	N 22°34.342'	E 88°11.948'
SW – 2	Pond near Biprannapara Primary School	23.03.2013	N 22°34.816'	E 88°18.552'
SW – 3	Pond Near Betor Health Centre	23.03.2013	N 22°34.802'	E 88°18.084'
SW – 4	Ganga River water near Salkia	24.03.2013	N 22°35.816'	E 88°20.866'

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Tube well Beside Seacom Engg. College	23.03.2013	N 22°34.302'	E 88°11.892'
GW – 2	Near Biprannapara	23.03.2013	N 22°34.784'	E 88°18.428'
GW – 3	Beside Betor Health centre	23.03.2013	N 22°34.762'	E 88°18.102'
GW – 4	Near Bamangachi Railway Bridge	24.03.2013	N 22°36.654'	E 88°19.856'

HOWRAH - WEST BENGAL




WATER SAMPLING LOCATIONS HOWRAH
GW1
SW1
GW3
SW3
GW2
SW2
GW4
SW4
GW
GROUND WATER SAMPLING
GW1.Tube well Beside SeacomEngg. College
GW2.Near Biprannapara
GW3.Beside Betor Health centre
GW4.Near Bamangachi Railway Bridge
SW
SURFACE WATER SAMPLING
SW1.Pond near SeacomEngg. College
SW2.Pond near Biprannapara Primary School
SW3.Pond Near Betor Health Centre
SW4.
Ganga River water near Salkia
0
2KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN HOWRAH
CLIENT:
CENTRAL POLLUTION CONTROL BOARD

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 Seacom Engg. College	**AAQ – 2** Biprannapara Barwaritala Primary school	**AAQ – 3** Betor Health Centre	**AAQ – 4** Bamangachi 'B'Road Rail quarter	
1	Lead	µg/m³	0.06	0.02	0.04	0.07	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	<1	<1	<1	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	92.5	75.2	85.4	80.9	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	37.2	28.6	31.0	36.4	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	22.0	12.4	14.6	10.0	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	2.6	3.5	1.6	4.3	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	10.2	8.6	12.5	14.0	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	17.9	15.2	15.8	17.5	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	5.6	7.2	4.6	8.1	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	11.4	16.1	12.7	14.7	
		µg/m³	<2	3.2	<2	3	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-1 Pond near Seacom Engg. College	SW – 2 Pond near Biprannapara Primary School	SW-3 Pond Near Betor Health Centre	SW-4 Ganga River water near Salkia	
I	**Simple Parameters**						
1	Appearance	-	Pale Brown	Pale Brown	Pale Brown	Pale Brown	-
2	Colour (Hazen Units)	-	10	15	10	10	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.47	7.30	7.09	7.07	IS 3025: Part – 11
2	E C	µS/cm	2100	850	578	412	IS 3025: Part – 14
3	Oil & Grease	mg/l	1	1	2	1	IS 3025: Part – 39
4	Suspended Solids	mg/l	36	42	52	40	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	5.1	5.0	4.9	5.4	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	22	26	36	14	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	5	6	8	3	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.02	<0.01	0.02	0.02	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	2.03	1.35	3.61	0.68	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	2.05	1.35	3.63	0.70	By Calculation
11	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.40	0.50	0.40	0.40	IS 3025: Part – 60
15	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	0.21	0.28	0.32	0.28	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	5.96	2.16	0.72	0.72	By Calculation
18	Total Coliforms	MPN/100ml	1600	900	1600	350	IS 1622
19	Fecal Coliforms	MPN/100ml	8	22	170	23	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	0.34	0.42	0.54	0.46	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	1.40	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.02	0.03	0.02	0.02	IS 3025: Part – 49
10	Nickel as Ni	mg/l	0.01	0.01	0.01	0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	0.01	0.02	0.01	0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	0.01	0.01	<0.01	0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	0.01	0.01	0.01	0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.02	0.05	0.04	0.02	APHA 3111 – B
19	Iron as Fe	mg/l	0.20	0.24	0.28	0.16	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.18	0.12	0.06	0.07	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Beside Seacom Engg. College	GW – 2 Near Biprannapara	GW-3 Beside bettor Health centre	GW-4 Near Bamangachi Railway Bridge	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	<5	<5	<5	10	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.29	7.22	7.86	7.29	IS 3025: Part – 11
2	E C	µS/cm	1680	3000	2000	2000	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	18	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	4	6	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	<0.01	<0.01	0.01	<0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	0.23	0.23	0.23	0.23	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.23	0.23	0.24	0.23	By Calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.40	0.50	0.50	0.50	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	1.77	4.69	4.79	1.32	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.02	0.01	0.03	0.02	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.02	0.03	0.02	0.03	APHA 3111 – B
19	Iron as Fe	mg/l	0.09	0.10	0.09	0.19	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.10	0.26	0.21	0.18	IS 3025: Part – 57

AMBIENT AIR MONITORING PHOTOGRAPHS

Near Bamangachi Railway Station quarters Howrah

Near Biprannapara Primary School Howrah

Near Bitor Health Centre – Howrah

Near Seacom Engineering College – Howrah

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Near Bitor Health centre – Howrah

Ganga River - Howrah

Pond near Bipranapara Primary School Howrah

Pond near Seacom Engg. College Howrah

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Bamangachi Railway quarters

Bipranapara Primary School

Bitor Health centre

Seacom Engg. College

AAQ MONITORING LOCATIONS

SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	Brajrajnagar Mining Belt (MCL Rescue office)	14.02.2013 to 15.02.2013	N 21°51.313'	E 83°55.254'
AAQ – 2	Rampura Area (Water tank)	14.02.2013 to 15.02.2013	N 21°48.173'	E 83°58.270'
AAQ – 3	IB Thermal Power Station (OPGC)	13.02.2013 to 14.02.2013	N 25°41.729'	E 83°51.763'
AAQ – 4	Belphur (Central Workshop)	13.02.2013 to 14.02.2013	N 21°46.466'	E 85°52.427'

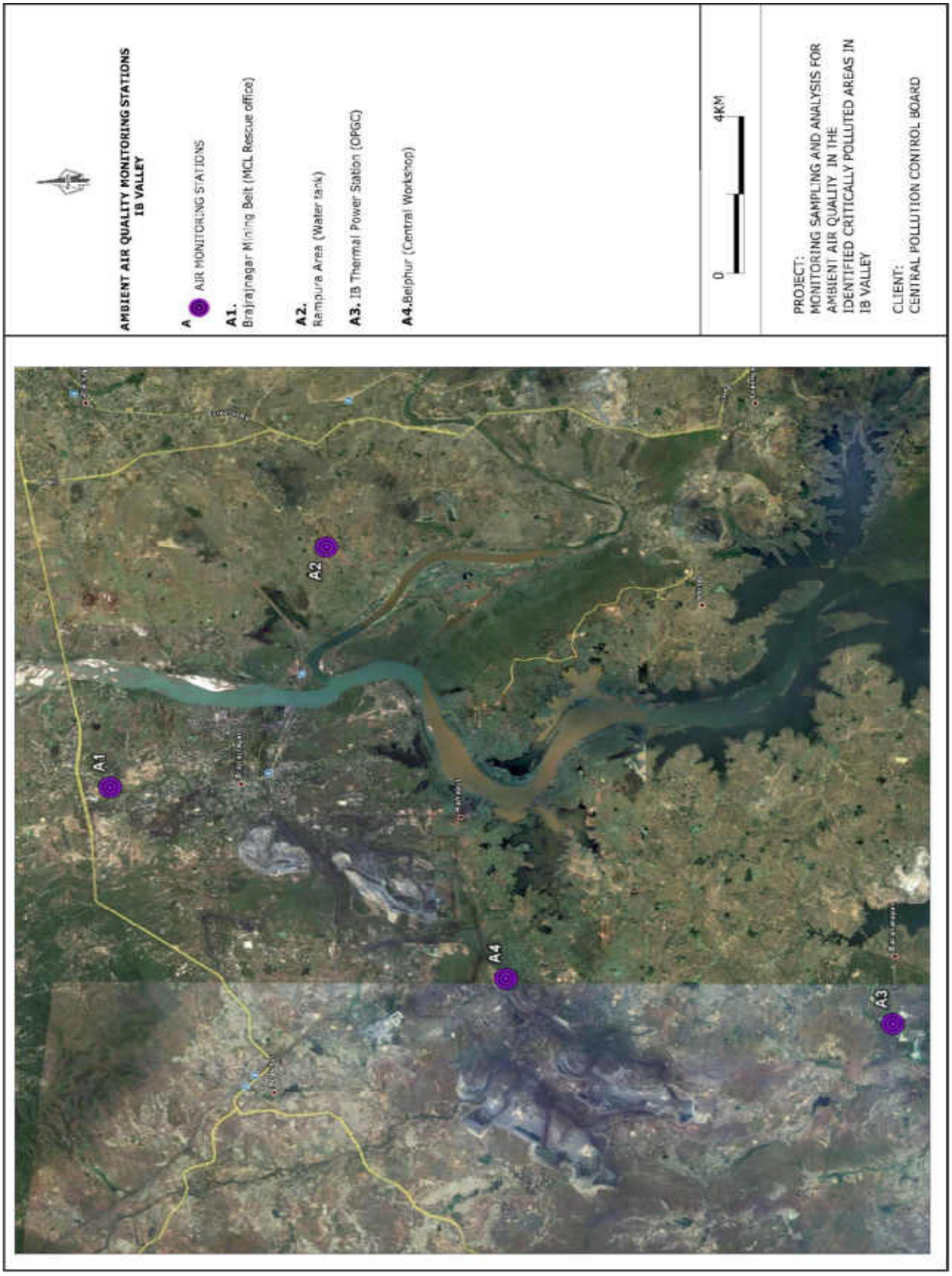
SURFACE WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	IB River Near NH – 200 Bridge	15.02.2013	N 21°51.906'	E 83°57.058'
SW – 2	IB River in between reservoir of Vedanta	15.02.2013	N 21°49.208'	E 83°56.702'
SW – 3	Lilari Nalla (Mines drainage water)	14.02.2013	N 21°46.251	E 83°52.353'
SW – 4	Hirakud Reservoir near IB thermal power station	14.02.2013	N 21°46.805'	E 83°02.101'

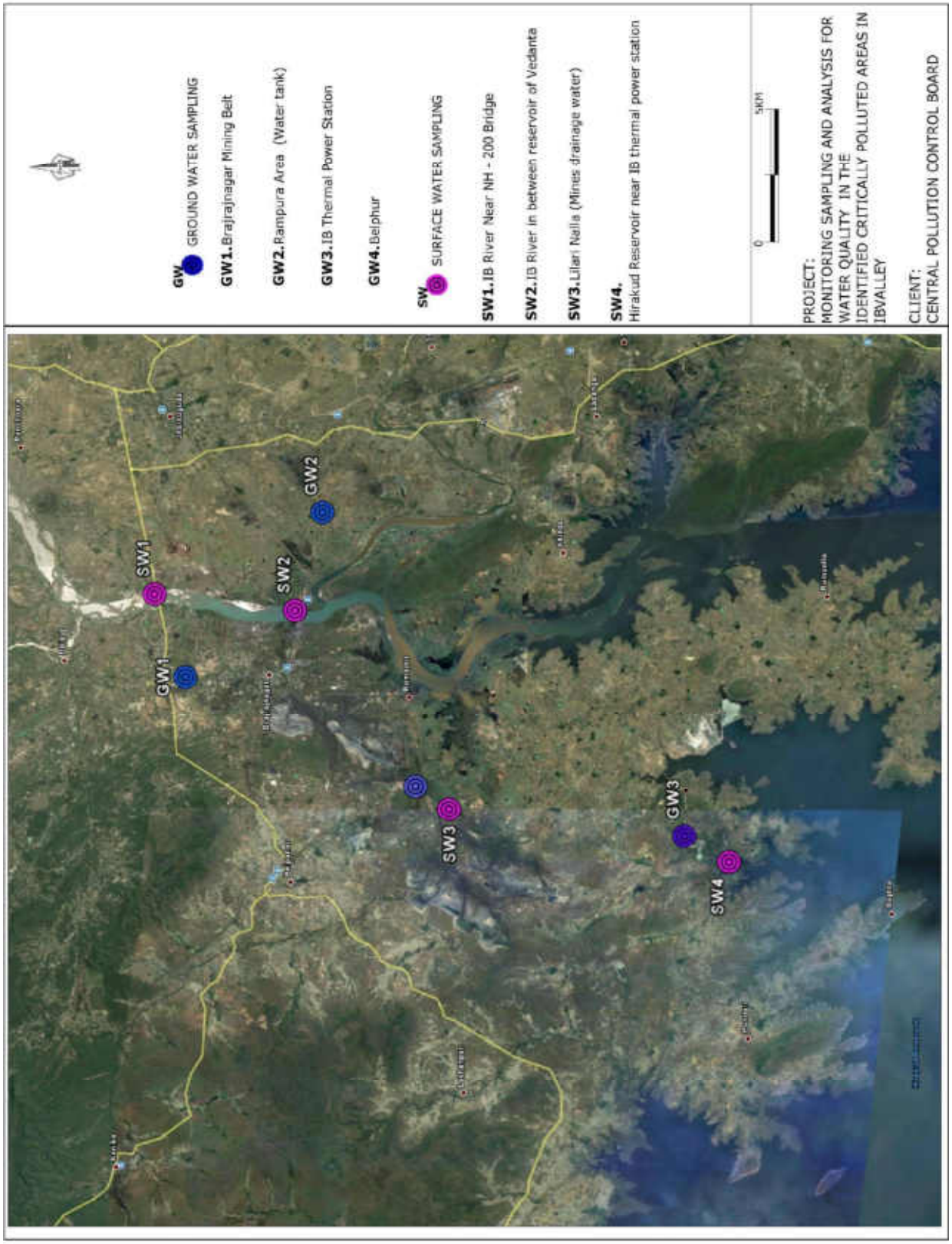
GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Brajrajnagar Mining Belt	15.02.2013	N 21°51.313'	E 83°55.254'
GW – 2	Rampura Area (Water tank)	15.02.2013	N 21°48.173'	E 83°58.270'
GW – 3	IB Thermal Power Station	14.02.2013	N 25°41.729'	E 83°51.763'
GW – 4	Belphur	14.02.2013	N 21°46.466'	E 85°52.427'

IB VALLEY - ODISHA



IB VALLEY - ODISHA



AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 Brajrajnagar Mining Belt (MCI Rescue office)	**AAQ – 2** Rampura Area (Water Tank)	**AAQ – 3** IB Thermal Power Station (OPGC)	**AAQ – 4** Belphar (Central Workshop)	
1	Lead	µg/m³	0.07	0.04	0.13	0.11	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	1.3	<1	2.6	1.6	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	72.5	86.2	98.0	91.3	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	25.6	21.8	34.4	29.0	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	32	28	38	24	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	5.6	7.1	5.9	10.6	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	7.5	7.8	15.6	9.5	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	16.8	12.8	20.2	14.8	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	5.5	4.8	7.6	5.2	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	16.9	12.6	15.8	19.6	
		µg/m³	<2	3.1	4.2	3.3	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-1 IB River Near NH-200 Bridge	SW – 2 IB River in between Reservoir of Vedanta	SW-3 Lilari Nalla (Mines Drainage Water)	SW-4 Hirakud Reservoir near IB Thermal Power Station	
I	**Simple Parameters**						
1	Appearance		Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)		5	5	10	5	IS 3025: Part – 4
3	Odour (Smell)		Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH		7.42	7.95	7.46	8.01	IS 3025: Part – 11
2	E C	µS/cm	170	174	600	170	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	12	14	26	16	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	6.0	5.9	5.8	6.0	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	10	12	16	12	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	3	3	4	3	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.02	<0.01	<0.01	<0.01	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	0.23	0.23	0.90	0.33	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.25	0.23	0.90	0.33	By calculation
11	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.30	0.30	0.40	0.40	IS 3025: Part – 60
15	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	0.43	0.48	0.16	0.26	By Calculation
18	Total Coliforms	MPN/100ml	6	14	22	11	IS 1622
19	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.05	0.06	0.18	0.07	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.03	0.02	0.05	0.02	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Brajrajnagar Mining Belt	GW – 2 Rampura Area	GW-3 IB Thermal Power Station	GW-4 Belphar	
I	**Simple Parameters**						
1	Appearance		Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)		<5	<5	<5	<5	IS 3025: Part – 4
3	Odour (Smell)		Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH		7.34	7.51	7.21	6.97	IS 3025: Part – 11
2	E C	µS/cm	1340	992	150	82	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	4	4	6	4	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	<0.01	0.03	0.01	<0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	0.23	5.42	0.23	0.23	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.23	5.45	0.24	0.23	By Calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.40	0.40	0.30	0.30	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	0.15	<0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	3.39	1.48	0.40	0.15	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	0.26	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.02	0.02	<0.01	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.01	0.01	0.02	0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.08	0.10	0.12	0.10	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.06	0.05	0.03	0.02	IS 3025: Part – 57

AMBIENT AIR MONITORING PHOTOGRAPHS

Belpar (Central Workshop) - IB Valley

Brajrajnagar mining belt - IB Valley

IB Thermal - IB Valley

Rampura Area (water tank) - IB Valley

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Harikund Reservoir near IB Thermal IB Valley

Lillari Nalla (Mine Waste water) IB Valley

IB River near NH 200 Bridge-IB Valley

IB River in between Reservoir-IB Valley

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Belpher village – IB Valley

Brajrajnagar mining belt – IB Valley

IB Thermal – IB Valley

Rampura area – IB Valley

AAQ MONITORING LOCATIONS

SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	MPPCB office	18.04.2013 to 19.04.2013	N 22°45'44.3"	E 075°53'05.2"
AAQ – 2	Indo German Tools	18.04.2013 to 19.04.2013	N 22°46'51.2"	E 075°50'49.1"
AAQ – 3	Jal Instruments – Garbadi AB Road, Tejapur	19.04.2013 to 20.04.2013	N 22°40'24.9"	E 075°03'55.7"
AAQ – 4	Kothari Market (Commercial Area)	19.04.2013 to 20.04.2013	N 22°43'09.4"	E 075°51'45.4"

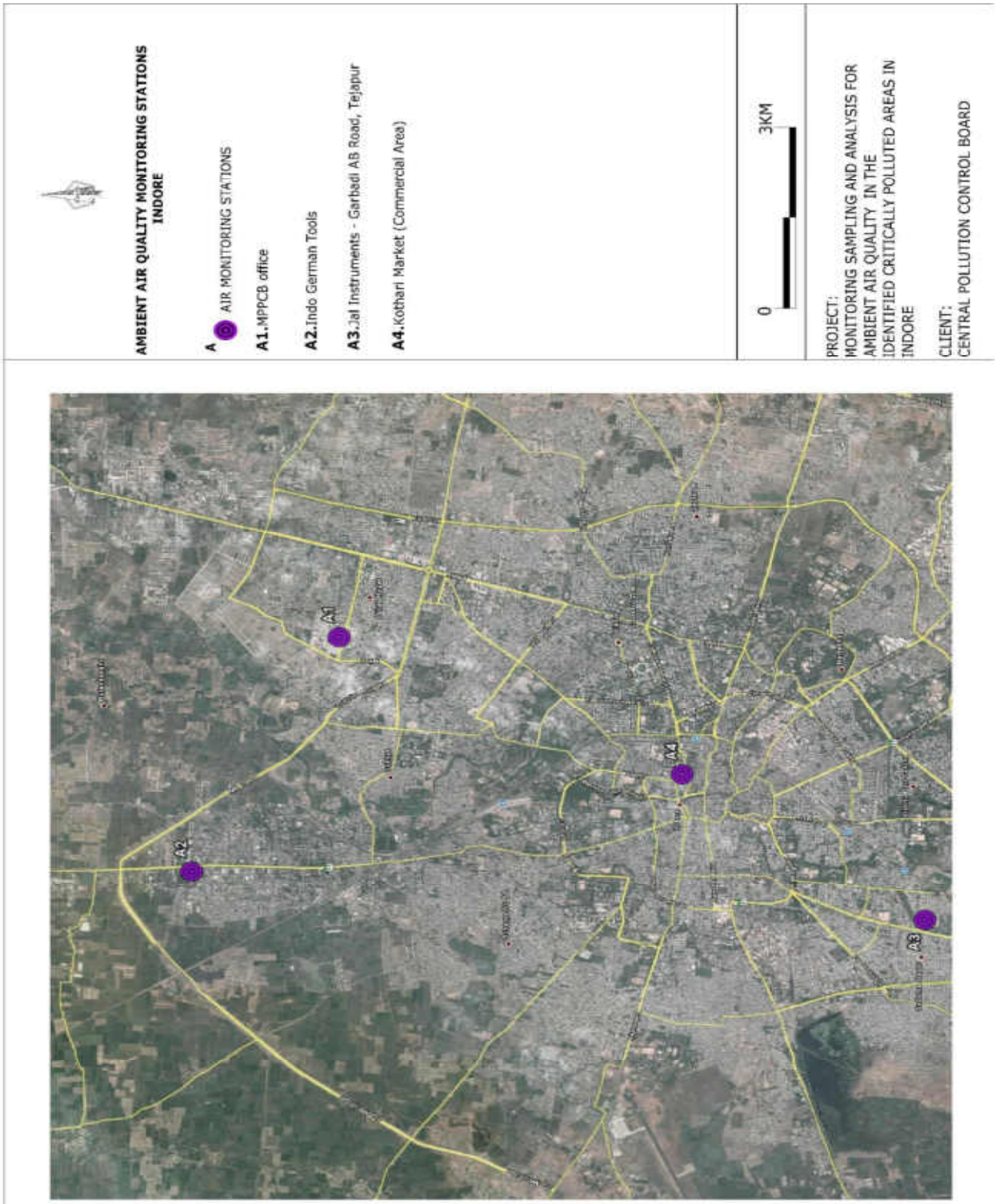
SURFACE WATER SAMPLING LOCATIONS

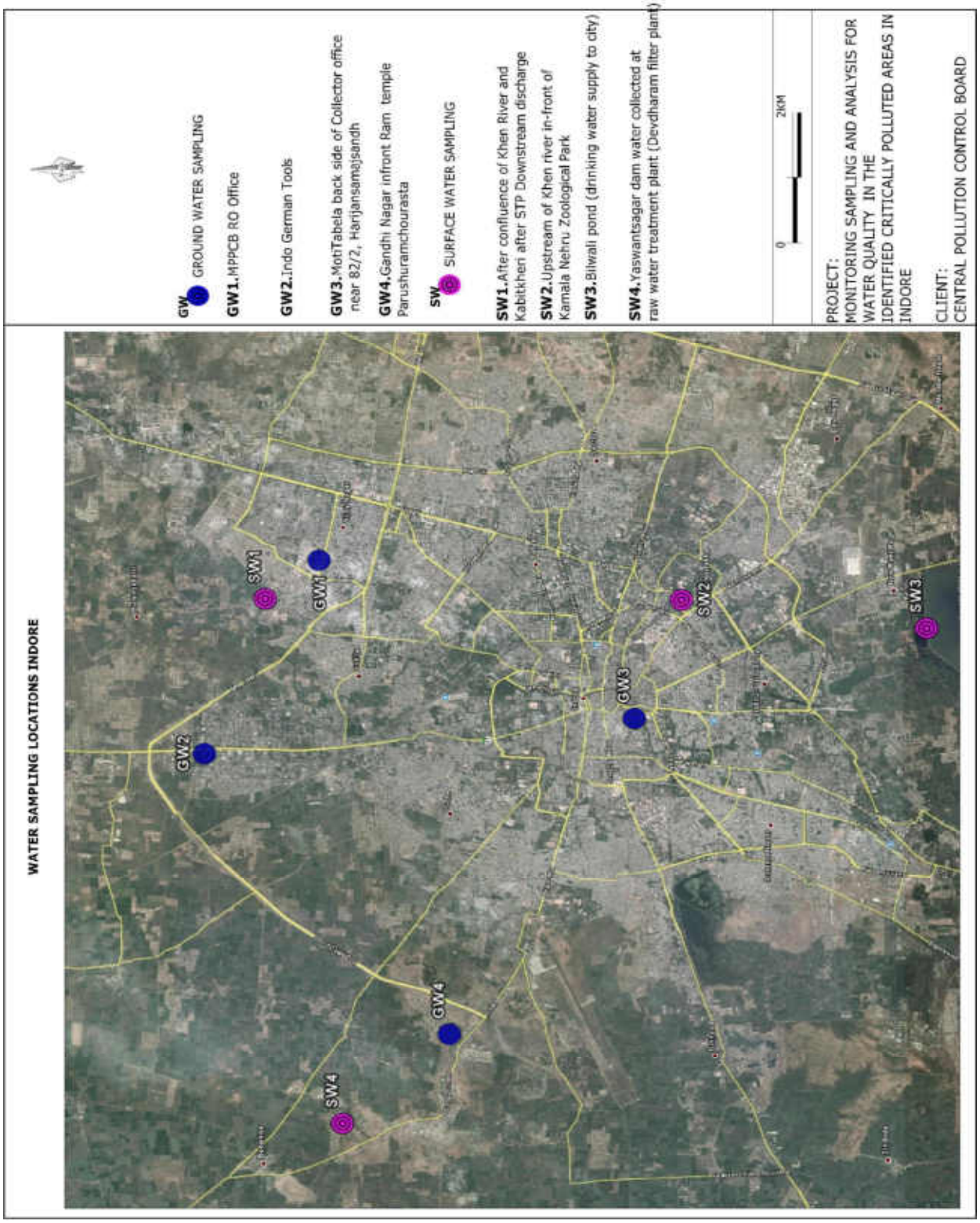
SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	After confluence of Khen River and Kabit kheri after STP Downstream discharge	19.04.2013	N 22°46'15.9"	E 075°52'38.7"
SW – 2	Upstream of Khen river in-front of Kamala Nehru Zoological Park	19.04.2013	N 22°42'12.9"	E 075°52'37.5"
SW – 3	Bilwali pond (drinking water supply to city)	19.04.2013	N 22°39'49.9"	E 075°52'17.5"
SW – 4	Yaswant sagar dam water collected at raw water treatment plant (Devdharam filter plant)	20.04.2013	N 22°45'30.6"	E 075°46'29.3"

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	MPPCB RO Office	20.04.2013	N 22°45'44.3"	E 075°53'05.2"
GW – 2	Indo German Tools	19.04.2013	N 22°46'51.2"	E 075°50'49.1"
GW – 3	Moti Tabela back side of Collector office near 82/2, Harijan samaj sandh	19.04.2013	N 22°42'40.4"	E 075°51'13.7"
GW – 4	Gandhi Nagar infront Ram temple Parushuram chourasta	20.04.2013	N 22°44'28.3"	E 075°47'32.4"

INDORE – MADHYA PRADESH




WATER SAMPLING LOCATIONS INDORE
GW1
GW2
GW3
GW4
SW1
SW2
SW3
SW4
GW GROUND WATER SAMPLING
GW1.MPPCB RO Office
GW2.Indo German Tools
GW3.MotiTabela back side of Collector office near 82/2, Harijansamajsandh
GW4.Gandhi Nagar infront Ram temple Parushuramchourasta
SW SURFACE WATER SAMPLING
SW1.After confluence of Khen River and Kabitkheri after STP Downstream discharge
SW2.Upstream of Khen river in-front of Kamala Nehru Zoological Park
SW3.Biliwali pond (drinking water supply to city)
SW4.Yaswantsagar dam water collected at raw water treatment plant (Devdharam filter plant)
0
2KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN INDORE
CLIENT:
CENTRAL POLLUTION CONTROL BOARD

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 MPPCB R.O office Indore	**AAQ – 2** Indo German Tools	**AAQ – 3** Jal Instruments, Tejapur Garbari Industrial Area	**AAQ – 4** Kothari market	
1	Lead	µg/m³	0.07	0.10	0.12	0.15	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	3.8	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	1.3	1.6	2.4	3.1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	87.6	121.0	90.4	132.6	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	28.1	46.4	38.1	51.5	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	15.1	10.4	21.6	17.4	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	3.4	4.9	3.8	6.1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	8.7	12.7	10.1	16.3	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	18.2	21.6	24.5	27.8	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	10.6	9.8	7.4	8.1	IS 5182 (Part 9), 1974, RA 209, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	16.3	17.7	11.3	15.1	
		µg/m³	2.7	4.1	<2	3.6	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-1 After Confluence of Khen River and Kabit Kheri after STP Downstream	SW – 2 Upstream of Khen River In-front of Kamala Nehru Park	SW-3 Bilawali Pond (water supply for drinking)	SW- 4 Yaswant sagar dam at Raw water treatment plant	
I	**Simple Parameters**						
1	Appearance	-	Light Brown	Light Brown	Colourless	Colourless	-
2	Colour (Hazen Units)	-	35	30	5	5	IS 3025: Part – 4
3	Odour (Smell)	-	Un-Agreeable	Un-Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.61	7.33	8.02	8.16	IS 3025: Part – 11
2	E C	µS/cm	1240	1370	348	490	IS 3025: Part – 14
3	Oil & Grease	mg/l	2	3	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	38	42	10	10	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	<1	<1	6.4	5.9	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	64	90	14	12	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	17	28	3	3	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	1.36	0.19	0.02	0.02	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	2.51	3.00	0.23	0.49	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	3.87	3.19	0.25	0.51	By Calculation
11	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.23	0.40	0.40	0.40	IS 3025: Part – 60
15	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	4.91	5.26	<0.1	<0.1	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	3.78	3.62	0.46	1.51	By Calculation
18	Total Coliforms	MPN/100ml	1700	2200	34	27	IS 1622
19	Fecal Coliform	MPN/100ml	140	170	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	5.46	5.74	0.49	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	5.4	6.4	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	2.8	3.5	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	0.01	0.05	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.09	0.07	0.01	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.17	0.21	0.03	0.04	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.09	0.08	0.03	0.12	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 MPPCB RO Office	GW – 2 Indo German Tools	GW-3 Moti Tabela Sanwar Road	GW-4 Gandhi Nagar infront of Temple	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	<5	<5	<5	<5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.88	7.60	7.31	7.70	IS 3025: Part – 11
2	E C	µS/cm	1270	2740	1820	955	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	4	6	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	<0.01	<0.01	0.05	<0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	2.84	15.72	13.57	5.67	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	2.84	15.72	13.62	5.67	By Calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.50	0.20	0.30	0.50	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	3.40	2.57	2.21	0.43	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	0.28	<0.01	0.06	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	<0.01	<0.01	0.01	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.02	0.05	0.10	0.07	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.15	0.19	0.13	0.13	IS 3025: Part – 57

AMBIENT AIR MONITORING PHOTOGRAPHS

MPPCB Regional office, Indore

Indo German Tools, Indore

Jal Instrument – Tejpur Garbari Industrial Area

Kothari Market (Commercial)

SAMPLING LOCATION PHOTOGRAPHS OF SURFACE WATER

After Confluence of Khen River and Kabit Kheri after STP Downstream

Upstream of Khen River In-front of Kamala Nehru Park

Bilawali Pond (water supply for drinking)

Yaswant sagar dam at Raw water treatment plant

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

MPPCB Regional Office, Indore

Indo German Tools

Mothi Tabela

Gandhi nagar

AAQ MONITORING LOCATIONS

SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	Near Bhushan side (Thelkoli)	11.02.2013 to 12.02.2013	N 20°50.359'	E 85°05.940'
AAQ – 2	Vedanta Aluminum Ltd (Bhurkamunda)	11.02.2013 to 12.02.2013	N 21°48.935'	E 84°01.467'
AAQ – 3	Badmal Industrial estate (SPS Steels)	12.02.2013 to 13.02.2013	N 21°49.179'	E 83°59.970'
AAQ – 4	Jarsuguda Township	12.02.2013 to 13.02.2013	N 21°49.211'	E 84°00.173'

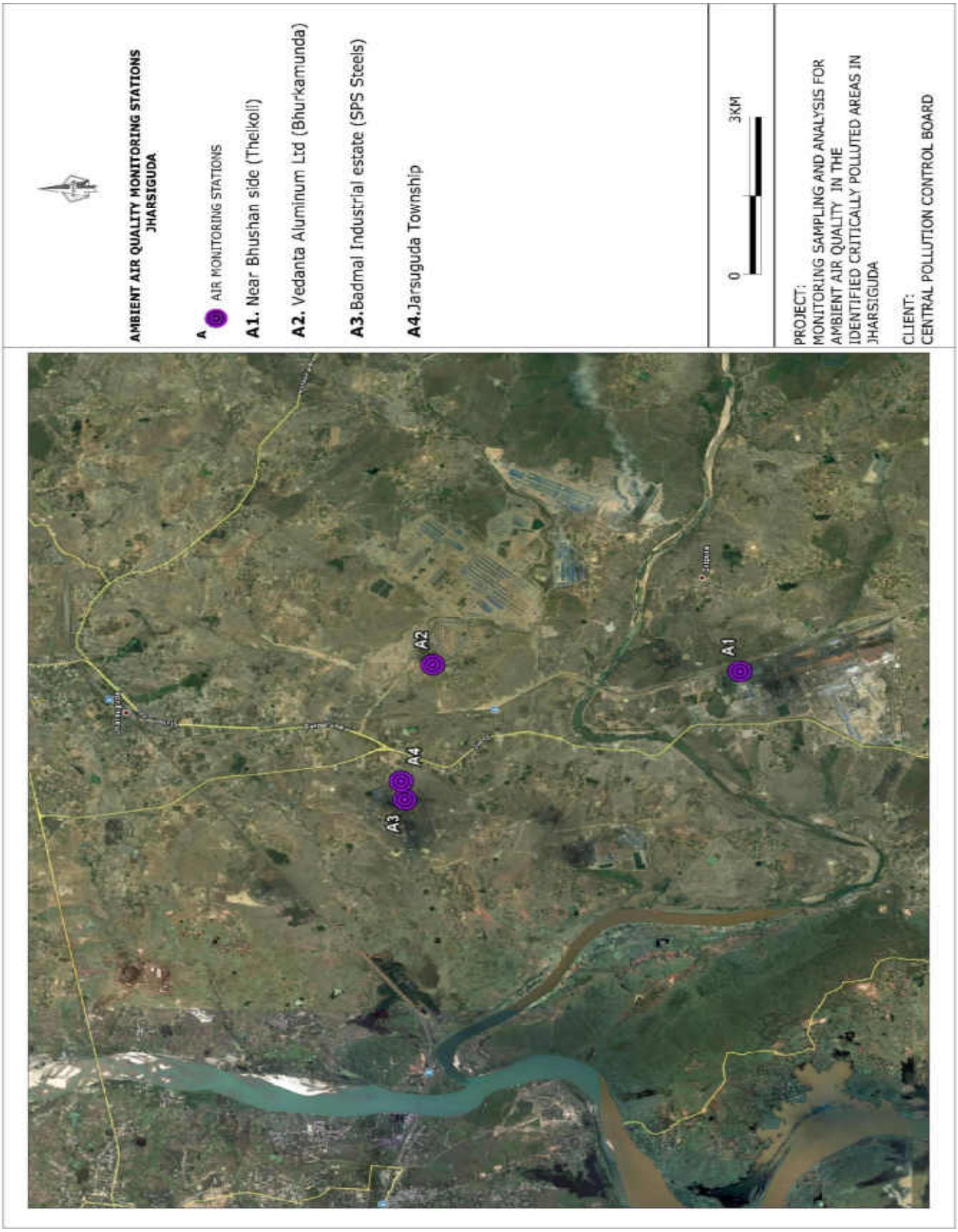
SURFACE WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	Bheden River (Near Kheruwal bridge)	12.02.2013	N 21°41.516'	E 84°2.920'
SW – 2	IB River (confluence point of Bheden and IB)	13.02.2013	N 21°48.492'	E 83°56.645'
SW – 3	Kharkari nalla (Vedanta Boundary)	12.02.2013	N 21°47.916'	E 84°2.076'
SW – 4	Kirakud Reservoir (at sambalpur)	13.02.2013	N 21°29.250'	E 83°51.016'

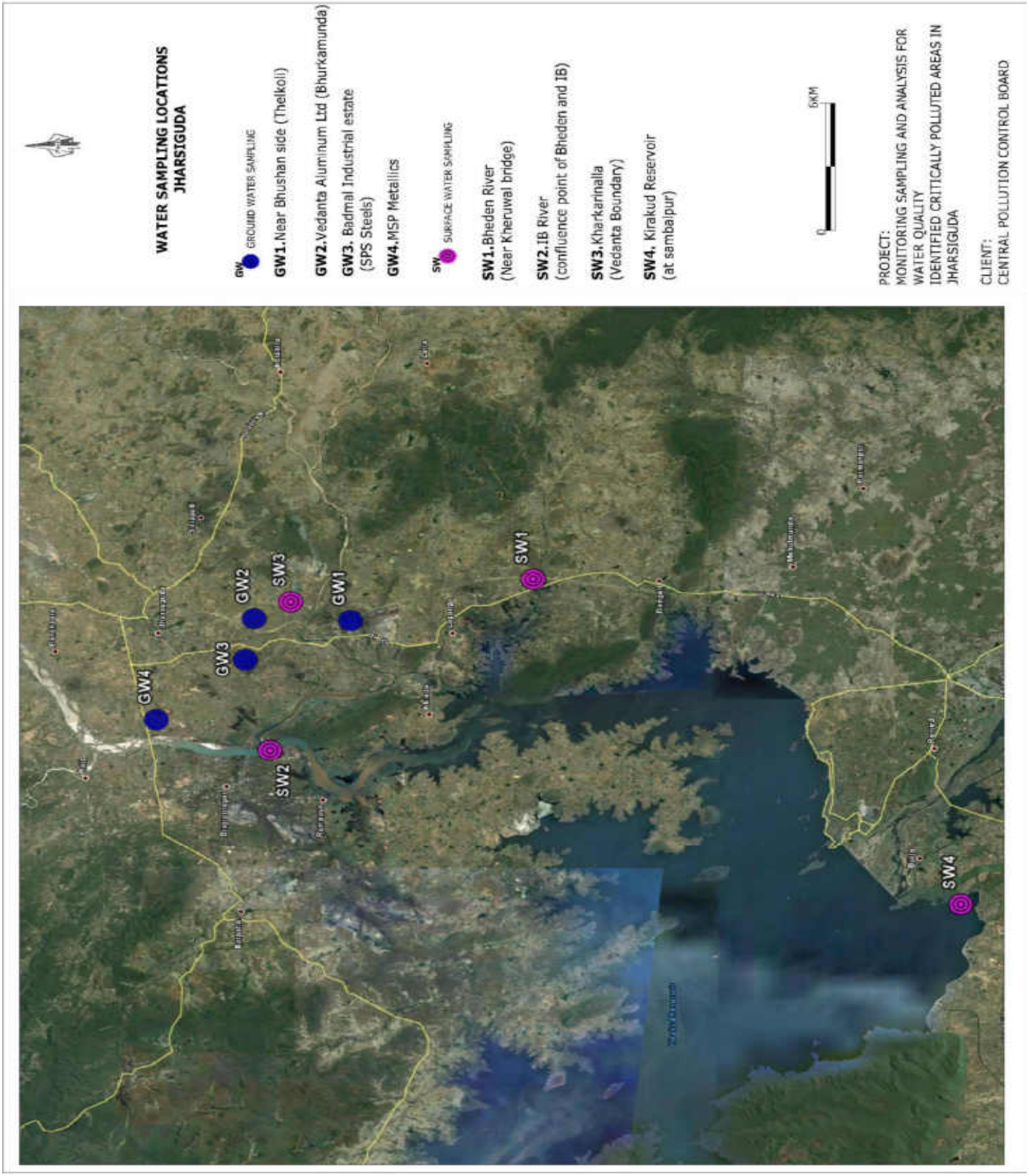
GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Near Bhushan side (Thelkoli)	11.02.2013	N 20°50.360'	E 85°05.936'
GW – 2	Vedanta Aluminum Ltd (Bhurkamunda)	12.02.2013	N 21°48.935'	E 84°01.467'
GW – 3	Badmal Industrial estate (SPS Steels)	13.02.2013	N 21°49.180'	E 83°59.820'
GW – 4	MSP Metallics	13.02.2013	N 21°51.660'	E 83°57.768'

JHARSUGUDA - ODISHA



JHARSUGUDA - ODISHA



AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 Near Bhushan Side	**AAQ – 2** Vedanta Aluminium Ltd.	**AAQ – 3** MSP Metallics	**AAQ – 4** Jharsuguda Township	
1	Lead	µg/m³	0.14	0.11	0.17	0.05	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	3.8	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	3.1	1.8	1.5	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	185	92.5	115.4	69.6	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	49	36	28.9	28.2	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	65	46	40.5	34	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	6.7	8.3	6.5	2.6	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	19.8	14.9	15.8	12.6	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	39	24.6	28.8	21.2	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	5.2	3.1	4.2	<2	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	22.3	17.4	20.1	15.1	
		µg/m³	3.1	<2	2.6	<2	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-1 Bheden River (Near Kheruwal Bridge)	SW – 2 IB River (Confluence Point of Bheden and IB)	SW-3 Kharkari Nalla (Vedanta Boundry)	SW-4 Hirakud Reservoir at Sarnbatour	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	5	10	10	10	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	8.15	8.04	8.12	8.05	IS 3025: Part – 11
2	E C	µS/cm	380	240	440	155	IS 3025: Part – 14
3	Oil & Grease	mg/l	1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	34	18	38	46	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	5.90	6.20	6.10	6.30	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	28	22	24	18	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	6	5	6	4	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.01	0.02	0.02	0.02	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	0.23	0.23	0.45	0.23	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.24	0.25	0.47	0.25	By calculation
11	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.50	0.40	0.90	0.30	IS 3025: Part – 60
15	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	0.68	0.44	1.63	0.29	By Calculation
18	Total Coliforms	MPN/100ml	27	17	21	14	IS 1622
19	Fecal Coliform	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	2.1	<1	2.4	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	1.4	<1	1.7	<1	APHA 4500 – NH_3
4	Phenols as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surface Active Agents	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.18	0.23	0.25	0.29	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.05	0.04	0.08	0.04	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Near Bhushan Side (Thelkoli)	GW – 2 Vedanta Aluminium Ltd. (Bhrkamunda)	GW-3 Badmal Industrial Estate (SPS Steels)	GW-4 MSP Metallics	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	<5	<5	<5	<5	IS 3025: Part – 4
3	Odor (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.65	6.82	6.52	7.07	IS 3025: Part – 11
2	E C	µS/cm	300	320	330	120	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	4	4	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.04	0.02	0.04	0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	2.03	7.23	4.29	3.16	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	2.07	7.25	4.33	3.17	By calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.30	0.50	0.40	0.60	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	0.14	0.13	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	0.52	1.09	0.38	0.66	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliform	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	0.17	0.15	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenols as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surface Active Agents	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.05	<0.01	<0.01	<0.01	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.04	0.03	0.04	0.02	IS 3025: Part – 57

AMBIENT AIR MONITORING LOCATIONS PHOTOGRAPHS

Badmal Industrial Estate - Jharsuguda

Bushan Power and Steel Industy - Jharsuguda

Jarsiguda Township - Jharsuguda

Vedanta – Jharsuguda

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Badan River - Jharsuguda

Confluence Point of IB River and Badan River Jharsuguda

Hirakud Reservoir – Jharsuguda

Khakari Nalla near Vedanta – Jharsuguda

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Badmal Industrial Estate near SPS Steel Jharsuguda

Bhushan Power & Steel Industry Jharsuguda

MSP Metallics - Jharsuguda

Vadanta - Jharsuguda

AAQ MONITORING LOCATIONS

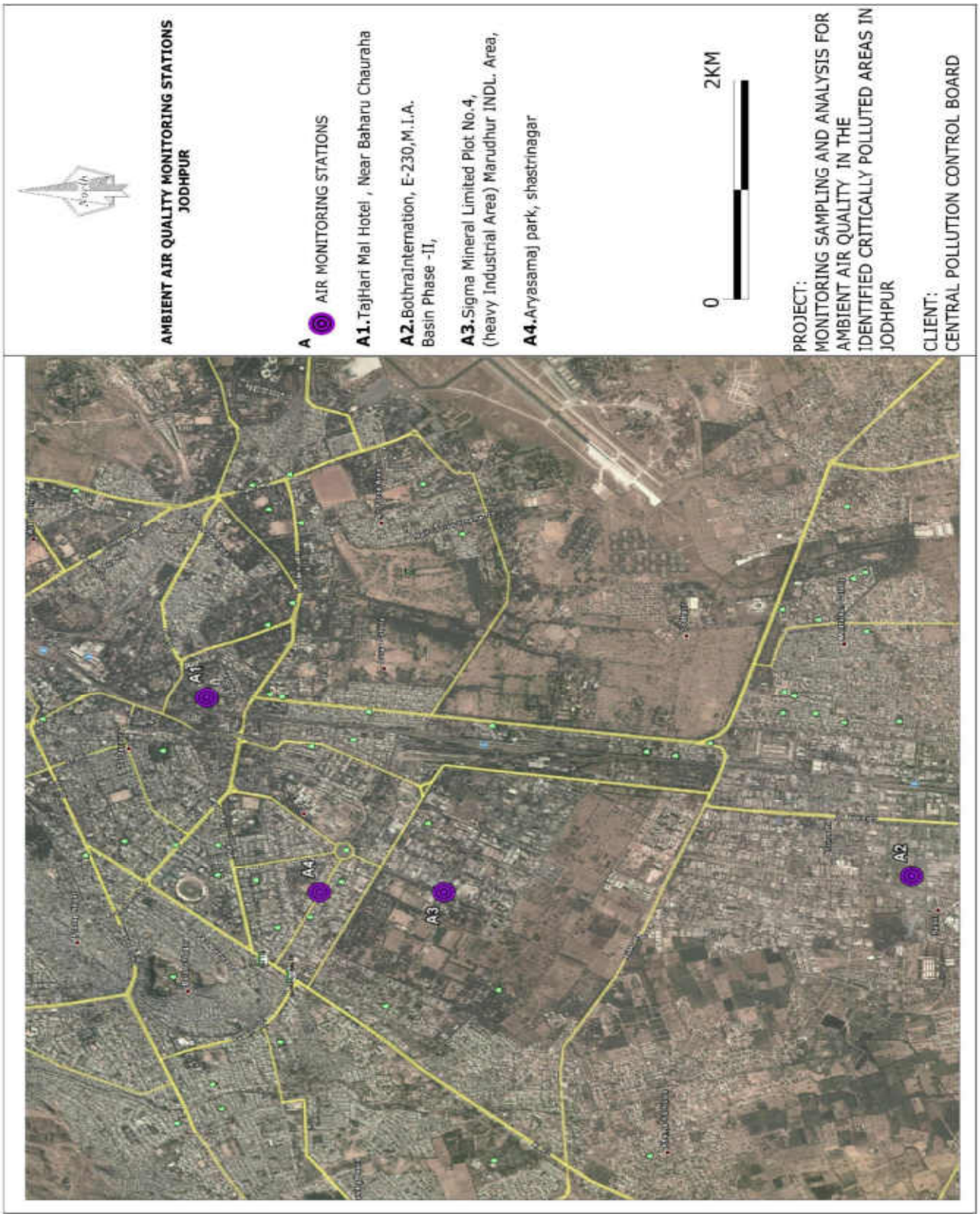
Sample Code	Name of the Monitoring Location	Date of Sampling	Latitude	Longitude
AAQ - 1	Taj Hari Mal Hotel , Near Baharu Chauraha , Jodhpur	28.03.2013 to 29.03.2013	N26°16'20.0"	E073°01'07.2"
AAQ - 2	Bothra Internation, E-230,M.I.A. Basin Phase –II, Jodhpur	28.03.2013 to 29.03.2013	N26°13'93.8"	E073°00'08.4"
AAQ – 3	Sigma Mineral Limited Plot No.4, (heavy Industrial Area) Marudhur INDL. Area, Jodhpur	28.03.2013 to 29.03.2013	N26°15'20.7"	E073°00'03.1"
AAQ - 4	Arya samaj park, shastri nagar	28.03.2013 to 29.03.2013	N26°15'51.8"	E073°00'03.1"

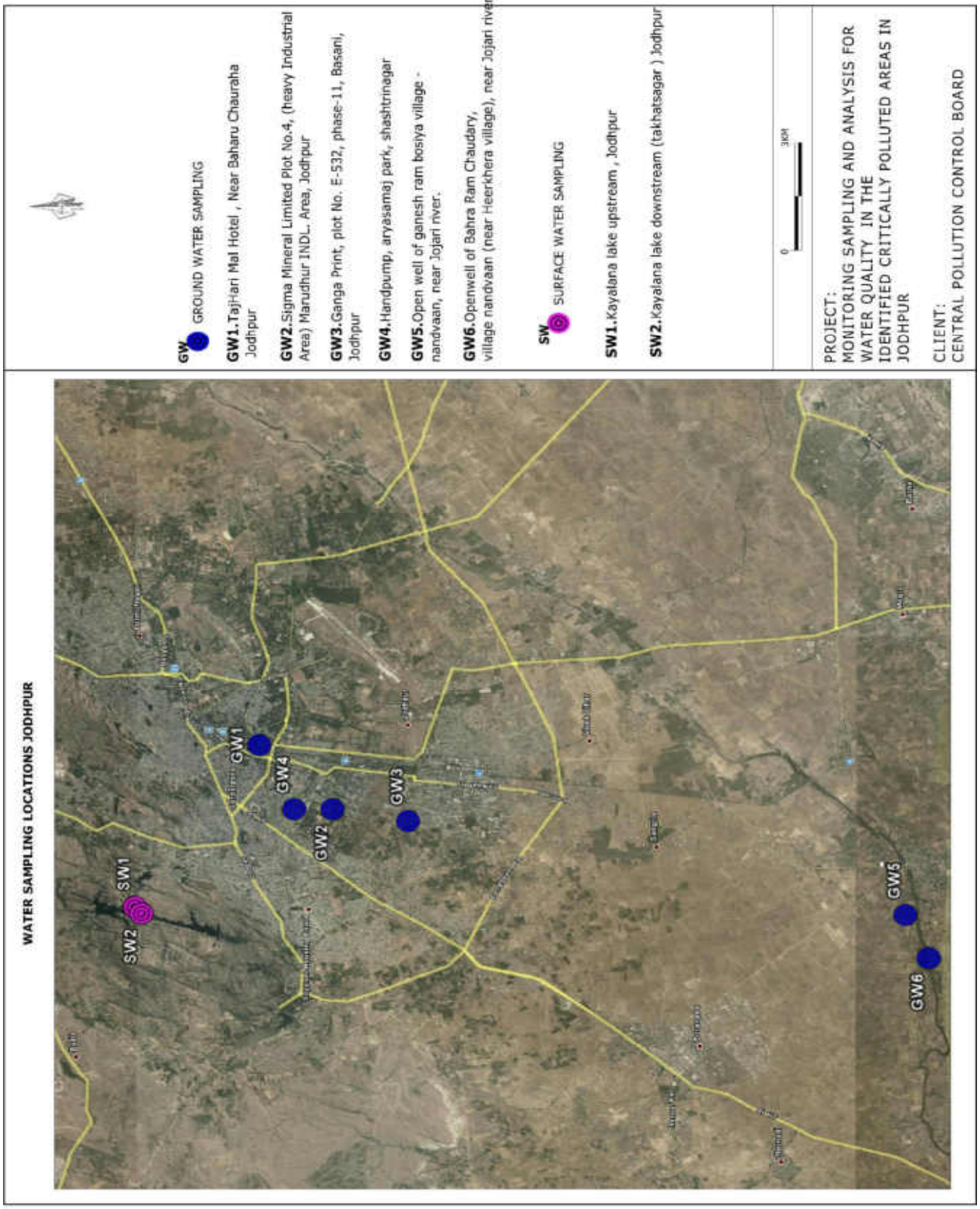
SURFACE WATER SAMPLING LOCATIONS

Sample Code	Name of the Sampling Location	Date of Sampling	Latitude	Longitude
SW – 1	Kayalana lake upstream , Jodhpur	28.03.2013	N26°18'00.4"	E072°58'24.0"
SW – 2	Kayalana lake downstream (takhat sagar) Jodhpur	28.03.2013	N26°17'55.1"	E072°58'17.3"

GROUND WATER SAMPLING LOCATIONS

Sample Code	Name of the Sampling Location	Date of Sampling	Latitude	Longitude
GW – 1	Taj Hari Mal Hotel , Near Baharu Chauraha , Jodhpur	28.03.2013	N26°16'20.0"	E073°01'07.2"
GW – 2	Sigma Mineral Limited Plot No.4, (heavy Industrial Area) Marudhur INDL. Area, Jodhpur	28.03.2013	N26°15'20.7"	E073°00'03.1"
GW – 3	Ganga Print, plot No. E-532, phase-11, Basani, Jodhpur	28.03.2013	N26°14'19.7"	E072°59'51.2"
GW – 4	Handpump, arya samaj park, shashtri nagar	28.03.2013	N26°15'51.8"	E073°00'03.1"
GW – 5	Open well of ganesh ram bosiya village – nandvaan, near Jojari river.	28.03.2013	N26°07'38.3"	E072°58'15.8"
GW – 6	Openwell of Bahra Ram Chaudary, village nandvaan (near Heerkhera village), near Jojari river	28.03.2013	N26°07'19.4"	E072°57'32.6"


AMBIENT AIR QUALITY MONITORING STATIONS
JODHPUR
A AIR MONITORING STATIONS
A1.TajHari Mal Hotel , Near Baharu Chauraha
A2.BothraInternation, E-230,M.I.A. Basin Phase -II,
A3.Sigma Mineral Limited Plot No.4, (heavy Industrial Area) Marudhur INDL. Area,
A4.Aryasamaj park, shastrinagar
0
2KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR AMBIENT AIR QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN JODHPUR
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
A1
A2
A3
A4


WATER SAMPLING LOCATIONS JODHPUR
SW1
SW2
GW1
GW2
GW3
GW4
GW5
GW6
GW GROUND WATER SAMPLING
GW1.TajHari Mal Hotel , Near Baharu Chauraha Jodhpur
GW2.Sigma Mineral Limited Plot No.4, (heavy Industrial Area) Marudhur INDL. Area, Jodhpur
GW3.Ganga Print, plot No. E-532, phase-11, Basani, Jodhpur
GW4.Handpump, aryasamaj park, shashtrinagar
GW5.Open well of ganesh ram bosiya village - nandvaan, near Jojari river.
GW6.Openwell of Bahra Ram Chaudary, village nandvaan (near Heerkhera village), near Jojari river
SW SURFACE WATER SAMPLING
SW1.Kayalana lake upstream , Jodhpur
SW2.Kayalana lake downstream (takhatsagar) Jodhpur
0
3KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN JODHPUR
CLIENT:
CENTRAL POLLUTION CONTROL BOARD

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 Hotel Taj Hari Mahal	**AAQ – 2** Bothra Internation	**AAQ – 3** Sigma Mineral Limited	**AAQ – 4** Arya samaj park	
1	Lead	µg/m³	0.04	0.01	0.07	0.02	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	<1	<1	<1	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	90.4	128.5	110.8	156.8	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	31.5	57.5	49.7	61.1	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	12.1	<5	9.6	11.2	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	1.6	<1	<1	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	11.8	10.2	12.3	9.6	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	16.2	14.8	17.2	19.9	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	7.1	6.4	7.3	5.1	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	14.1	13.7	14.8	11.2	
		µg/m³	2.6	<2	3.0	2.3	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results		Test Method
			SW-1 Kayalana lake upstream , jodhpur	SW – 2 Kayalana lake downstream (takhat sagar) Jodhpur	
I	**Simple Parameters**				
1	Appearance	-	Colourless	Colourless	-
2	Colour (Hazen Units)	-	5	5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**				
1	pH	-	7.27	7.83	IS 3025: Part – 11
2	E C	µS/cm	292	298	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	14	12	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	6.2	5.6	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	12	18	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	3	4	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.01	0.01	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	0.68	1.16	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.69	1.17	By Calculation
11	Free Ammonia	mg/l	< 0.1	< 0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	< 0.1	< 0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	< 0.02	< 0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.40	0.50	IS 3025: Part – 60
15	Sulphides as S	mg/l	< 0.1	< 0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	< 0.1	< 0.1	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	0.44	0.44	By Calculation
18	Total Coliforms	MPN/100ml	500	1400	IS 1622
19	Fecal Coliforms	MPN/100ml	70	280	IS 1622
III	**Special Parameters**				
1	Total Phosphorous as P	mg/l	< 0.1	< 0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	< 0.01	< 0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	< 0.01	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.09	0.06	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.09	0.06	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			GW-1 Taj Hari Mal Hotel	GW – 2 Sigma Mineral Limited	GW-3 Ganga Print	
I	**Simple Parameters**					
1	Appearance	-	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	< 5	< 5	< 5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.82	7.67	7.34	IS 3025: Part – 11
2	E C	µS/cm	1460	3030	2930	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	< 10	< 10	< 10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	4	4	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	< 2	< 2	< 2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.02	0.01	0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	24.84	81.29	36.13	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	24.86	81.30	36.14	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	1.10	1.00	0.70	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	< 0.1	0.15	0.20	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	5.26	11.47	4.78	By Calculation
17	Total Coliforms	MPN/100ml	21	170	220	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	< 0.1	0.18	0.27	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	< 1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.01	< 0.01	0.02	APHA 3111 – B
19	Iron as Fe	mg/l	0.06	0.06	0.07	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.56	1.74	1.06	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			GW-4 Arya samaj park	GW – 5 Open well of ganesh ram bosiya village	GW-6 Open well of Bahra Ram Chaudary	
I	**Simple Parameters**					
1	Appearance	-	Colourless	Pale yellow	Brownish	-
2	Colour (Hazen Units)	-	< 5	20	80	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Un - Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.72	7.82	7.67	IS 3025: Part – 11
2	E C	µS/cm	2550	14650	4800	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	< 10	36	74	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	4	24	38	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	< 2	6	9	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.02	0.04	0.10	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	48.77	47.42	3.39	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	48.79	47.46	3.49	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	1.0	2.6	3.2	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	0.17	0.12	0.40	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	11.79	17.51	15.00	By Calculation
17	Total Coliforms	MPN/100ml	90	280	22000	IS 1622
18	Fecal Coliforms	MPN/100ml	17	21	1700	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	0.23	0.16	0.56	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	1.8	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	1.2	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.25	< 0.01	0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.01	< 0.01	0.17	APHA 3111 – B
19	Iron as Fe	mg/l	0.09	0.06	0.28	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	0.01	0.01	IS 3025: Part – 56
22	Boron as B	mg/l	2.03	2.70	1.45	IS 3025: Part – 57

AMBIENT AIR MONITORING LOCATIONS PHOTOGRAPHS

Arya Samaj, Jodhpur

Bothra international

Sigma minerals

Taj Hari Mahal, Jodhpur

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Kayalana lake upstream , Jodhpur

Kayalana lake downstream (Takhat sagar) Jodhpur

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Arya Samaj - Jodhpur

Ganga Prints - Jodhpur

Sigma minerals – Jodhpur

Taj Hari Mahal - Jodhpur

Openwell of Bahraram Chaudary

Ganesh ram Bosiya village , Nandaan near jojari river

AAQ MONITORING LOCATIONS

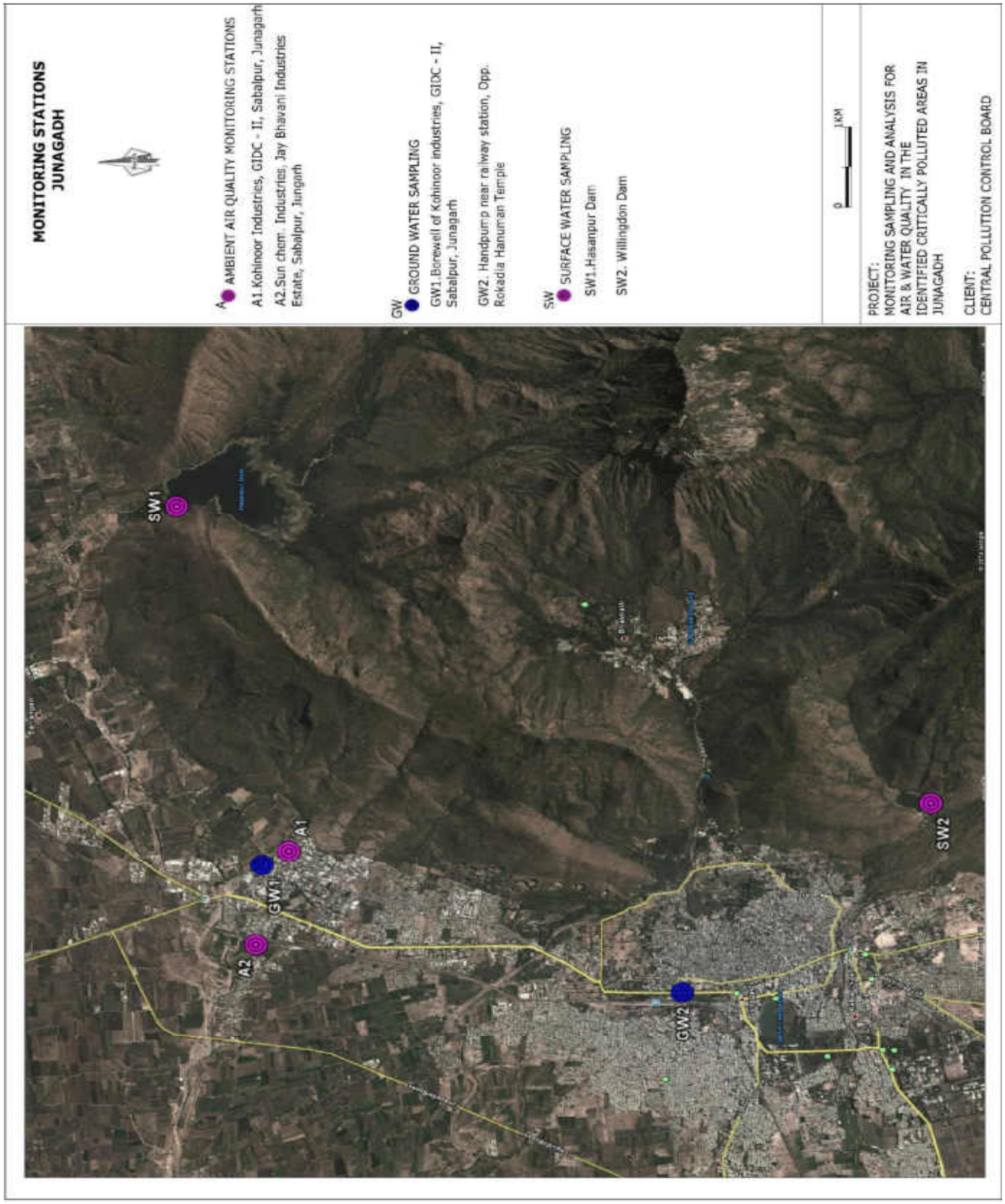
SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	Kohinoor Industries, GIDC – II, Sabalpur, Junagarh	14.02.2013 to 15.02.2013	N 21°34'02.7''	E 70°28'27.3''
AAQ – 2	Sun chem. Industries, Jay Bhavani Industries Estate, Sabalpur, Jungarh	14.02.2013 to 15.02.2013	N 21°34'06.2''	E 70°27'52.0''

SURFACE WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	Hasanpur Dam	14.02.2013	N 21°34'33.32"	E 70°31'01.40''
SW – 2	Willingdon Dam	14.02.2013	N 21°30'15.1''	E 70°28'53.2''

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Borewell of Kohinoor industries, GIDC – II, Sabalpur, Junagarh	14.02.2013	N 21°34'04.04''	E 70°28'26.3''
GW – 2	Handpump near railway station, Opp. Rokadia Hanuman Temple	14.02.2013	N 21°31'40.2''	E 70°27'31.5''


MONITORING STATIONS
JUNAGADH
A
AMBIENT AIR QUALITY MONITORING STATIONS
A1.Kohinoor Industries, GIDC - II, Sabalpur, Junagarh
A2.Sun chem. Industries, Jay Bhavani Industries Estate, Sabalpur, Jungarh
GW
GROUND WATER SAMPLING
GW1.Borewell of Kohinoor industries, GIDC - II, Sabalpur, Junagarh
GW2. Handpump near railway station, Opp. Rokadia Hanuman Temple
SW
SURFACE WATER SAMPLING
SW1.Hasanpur Dam
SW2. Willingdon Dam
0
1KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR AIR & WATER QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN JUNAGADH
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
SW1
A1
GW1
A2
GW2
SW2

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS		Test Methods
			AAQ – 1 Kohinoor Industries, GIDC – II, Sabalpur, Junagarh	**AAQ – 2** Sunchem Industries, Jay Bhavani Industries Estate, Sabalpur, Junagarh	
1	Lead	µg/m³	0.06	0.09	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	<1	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	62	75	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	21.0	24.5	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	18	26	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	7.6	5.8	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	9.7	11.3	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	17.6	21.8	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	
		mg/m³	<2	<2	
12	O_3	µg/m³	4.6	7.8	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	13.5	21.3	
		µg/m³	4.0	3.8	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results		Test Method
			SW-1 Hasanpur	SW – 2 Willingdon Dam	
I	**Simple Parameters**				
1	Appearance	-	Colourless	Colourless	-
2	Colour (Hazen Units)	-	5	10	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**				
1	pH	-	7.40	8.00	IS 3025: Part – 11
2	E C	µS/cm	510	480	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	12	18	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	7.6	5.2	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	10	14	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	2	3	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	<0.01	0.01	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	0.45	0.68	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.45	0.69	By calculation
11	Free Ammonia	mg/l	<0.1	<0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.50	0.50	IS 3025: Part – 60
15	Sulphides as S	mg/l	<0.1	<0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	0.06	0.05	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	1.45	0.74	By Calculation
18	Total Coliforms	MPN/100ml	5	9	IS 1622
19	Fecal Coliforms	MPN/100ml	<2	<2	IS 1622
III	**Special Parameters**				
1	Total Phosphorous as P	mg/l	0.09	0.07	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	EPA 508
7	PAH's	mg/l	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.02	0.03	APHA 3111 – B
19	Iron as Fe	mg/l	0.14	0.18	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.04	0.03	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results		Test Method
			GW-1 Borewell sample of Kohinoor Industries	GW – 2 Handpump near Railway station Opp. Rokadia Hanuman temple	
I	**Simple Parameters**				
1	Appearance		Colourless	Colourless	-
2	Colour (Hazen Units)		5	<5	IS 3025: Part – 4
3	Odour (Smell)		Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**				
1	pH		7.25	7.33	IS 3025: Part – 11
2	E C	µS/cm	2210	1360	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	8	4	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	9.26	8.81	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	9.27	8.82	By calculation
10	Free Ammonia	mg/l	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.60	0.70	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	< 0.1	< 0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	3.40	2.56	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	IS 1622
III	**Special Parameters**				
1	Total Phosphorous as P	mg/l	< 0.1	< 0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	EPA 508
7	PAH's	mg/l	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	<0.01	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.10	0.12	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.18	0.10	IS 3025: Part – 57

AMBIENT AIR MONITORING PHOTOGRAPHS

Kohinoor Industries, GIDC – II, Sabalpur

Sunchem Industries - Sabalpur

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Willingdon Dam

Hasanpur

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Borewell sample of Kohinoor Industries

Handpump near Railway station opp. Rokadia Hanuman temple

AAQ MONITORING LOCATIONS

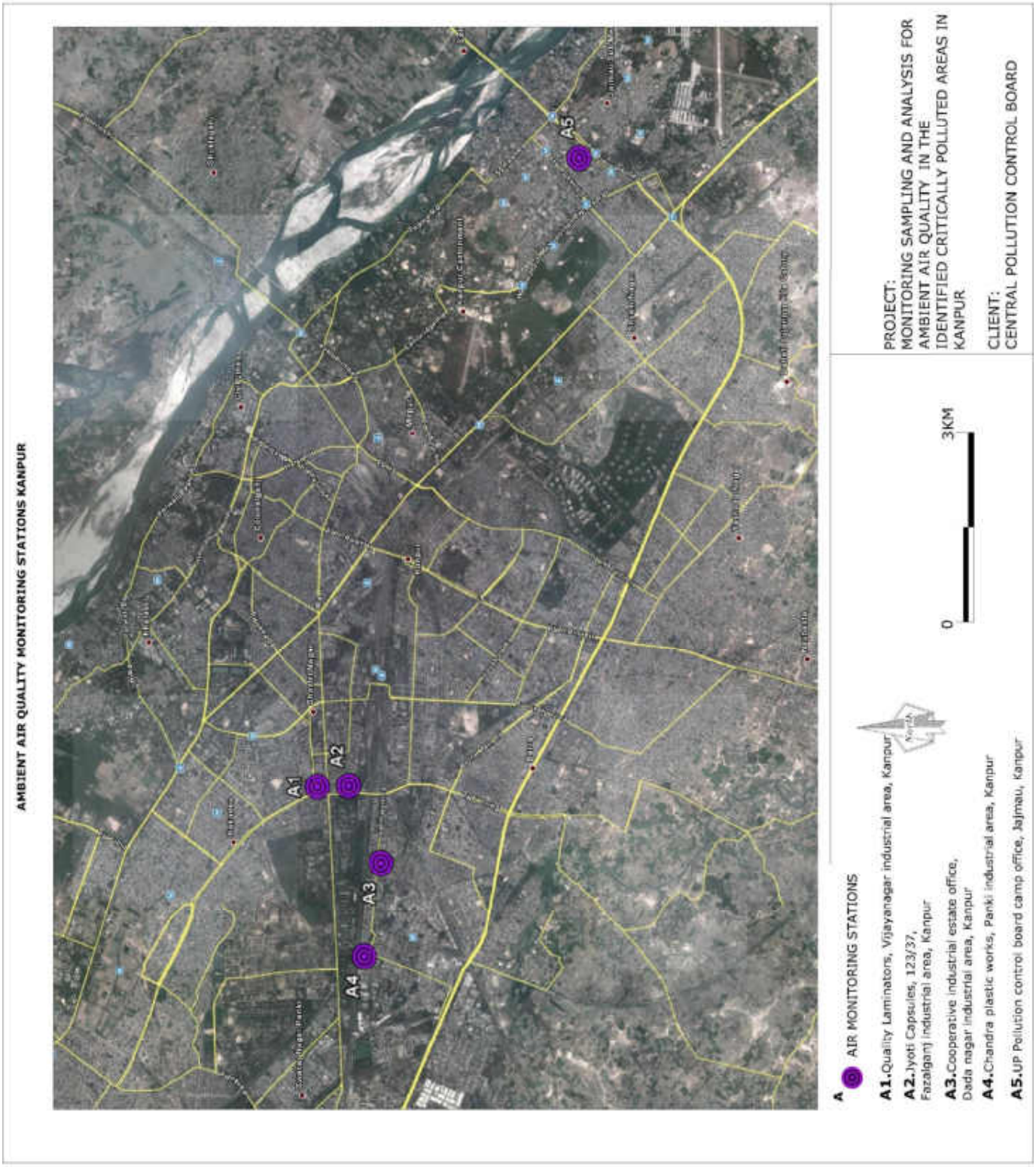
Sample Code	Name of the Monitoring Location	Date of Sampling	Latitude	Longitude
AAQ - 1	Quality Laminators, Vijaya nagar industrial area, Kanpur	18.02.2013 to 19.02.2013	N26°27'47.3"	E080°17'43.3"
AAQ - 2	Jyoti Capsules, 123/37, Fazalganj industrial area, Kanpur	18.02.2013 to 19.02.2013	N26°27'30.7"	E080°17'43.7"
AAQ – 3	Cooperative industrial estate office, Dada nagar industrial area, Kanpur	18.02.2013 to 19.02.2013	N26°27'13.7"	E080°16'59.4"
AAQ - 4	Chandra plastic works, Panki industrial area, Kanpur	18.02.2013 to 19.02.2013	N26°27'22.5"	E080°16'05.8"
AAQ -5	UP Pollution control board camp office, Jaj mau, Kanpur	18.02.2013 to 19.02.2013	N26°25'29.1"	E080°23'45.6"

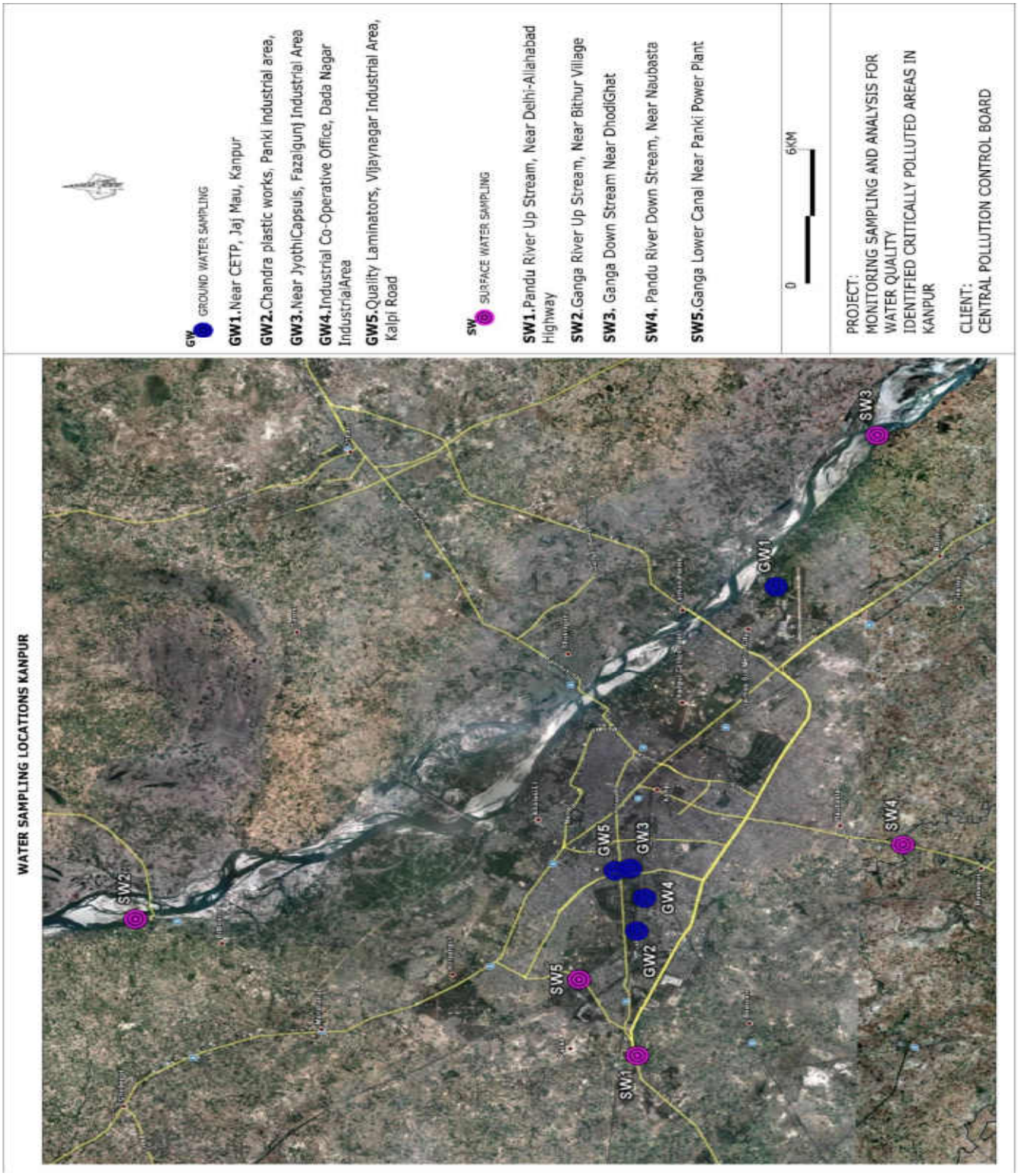
SURFACE WATER SAMPLING LOCATIONS

Sample Code	Name of the Sampling Location	Date of Sampling	Latitude	Longitude
SW – 1	Pandu River Up Stream, Near Delhi-Allahabad Highway	18.02.2013	N26°27'21.8"	E080°12'43.2"
SW – 2	Ganga River Up Stream, Near Bithur Village	19.02.2013	N26°37'00.4"	E080°16'25.6"
SW – 3	Ganga Down Stream Near Dhodi Ghat	19.02.2013	N26°22'45.3"	E080°29'31.7"
SW – 4	Pandu River Down Stream, Near Naubasta	19.02.2013	N26°22'15.8"	E080°18'25.4"
SW – 5	Ganga Lower Canal Near Panki Power Plant	19.02.2013	N26°28'29.2"	E080°14'47.8"

GROUND WATER SAMPLING LOCATIONS

Sample Code	Name of the Sampling Location	Date of Sampling	Latitude	Longitude
GW – 1	Near CETP, Jaj Mau, Kanpur	19.02.2013	N26°24'98.1"	E080°25'36.0"
GW – 2	Chandra plastic works, Panki industrial area, Kanpur	19.02.2013	N26°27'22.5"	E080°16'05.8"
GW – 3	Near Jyothi Capsuls, Fazalgunj Industrial Area	20.02.2013	N26°27'30.1"	E080°17'46.8"
GW – 4	Industrial Co-Operative Office, Dada Nagar IndustrialArea	20.02.2013	N26°77'13.7"	E080°16'59.4"
GW – 5	Quality Laminators, Vijaynagar Industrial Area, Kalpi Road	20.02.2013	N26°27'47.3"	E080°17'43.3"


AMBIENT AIR QUALITY MONITORING STATIONS KANPUR
A1
A2
A3
A4
A5
A AIR MONITORING STATIONS
A1.Quality Laminators, Vijayanagar industrial area, Kanpur
A2.Jyoti Capsules, 123/37, Fazalganj industrial area, Kanpur
A3.Cooperative industrial estate office, Dada nagar industrial area, Kanpur
A4.Chandra plastic works, Panki industrial area, Kanpur
A5.UP Pollution control board camp office, Jajmau, Kanpur
0
3KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR AMBIENT AIR QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN KANPUR
CLIENT:
CENTRAL POLLUTION CONTROL BOARD


WATER SAMPLING LOCATIONS KANPUR
GW GROUND WATER SAMPLING
GW1.Near CETP, Jaj Mau, Kanpur
GW2.Chandra plastic works, Panki Industrial area,
GW3.Near JyothiCapsuls, Fazalgunj Industrial Area
GW4.Industrial Co-Operative Office, Dada Nagar IndustrialArea
GW5.Quality Laminators, Vijaynagar Industrial Area, Kalpi Road
SW SURFACE WATER SAMPLING
SW1.Pandu River Up Stream, Near Delhi-Allahabad Highway
SW2.Ganga River Up Stream, Near Bithur Village
SW3. Ganga Down Stream Near DhodiGhat
SW4. Pandu River Down Stream, Near Naubasta
SW5.Ganga Lower Canal Near Panki Power Plant
0
6KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY
IDENTIFIED CRITICALLY POLLUTED AREAS IN KANPUR
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
SW2
SW5
SW1
GW5
GW3
GW4
GW2
GW1
SW3
SW4

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS			Test Methods
			AAQ – 1 Quality Laminators, Vijaya nagar industrial area,	**AAQ – 2** Jyoti Capsules, Fazalganj industrial area	**AAQ – 3** Cooperative industrial estate office, Dada nagar industrial area,	
1	Lead	µg/m³	0.32	0.26	0.59	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	0.71	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	2.6	1.7	3.1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	158.3	169	170	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	92.9	76.4	98.1	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	14.8	18.8	17.3	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	6.8	8.4	16.2	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	16.7	15.9	19.6	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	26.3	32.1	28.5	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	
		mg/m³	<2	<2	<2	
12	O_3	µg/m³	3.7	4.6	5.1	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	15.6	14.1	12.7	
		µg/m³	5.9	6.1	<2	

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS		Test Methods
			AAQ – 4 Chandra plastic works, Panki industrial area,	**AAQ – 5** UP Pollution control board camp office, Jajmau	
1	Lead	µg/m³	0.69	0.17	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	0.9	0.7	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	2.6	1.9	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	130.8	179.2	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	65.1	113.7	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	16.2	28.5	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	8.4	11.2	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	15.8	20.4	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	24.7	32.1	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	
		mg/m³	<2	<2	
12	O_3	µg/m³	5.1	4.5	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	19.1	15.3	
		µg/m³	3.3	<2	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			SW-1 Pandu River Up Stream, Near Delhi-Allahabad Highway	**SW – 2** Ganga River Up Stream, Near Bithur Village	**SW-3** Ganga Down Stream Near Dhowdi Ghat	
I	**Simple Parameters**					
1	Appearance	-	Pale yellow	Colourless	Colourless	-
2	Colour (Hazen Units)	-	20	10	10	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.58	7.60	7.74	IS 3025: Part – 11
2	E C	µS/cm	332	344	400	IS 3025: Part – 14
3	Oil & Grease	mg/l	2	1	1	IS 3025: Part – 39
4	Suspended Solids	mg/l	46	28	38	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	6.0	6.5	5.9	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	38	22	36	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	12	5	9	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.02	0.02	0.01	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	2.03	1.58	2.71	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	2.05	1.6	2.72	By Calculation
11	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.40	0.40	0.50	IS 3025: Part – 60
15	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	0.76	0.52	0.68	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	1.08	0.48	0.79	By Calculation
18	Total Coliforms	MPN/100ml	140	1600	140	IS 1622
19	Fecal Coliforms	MPN/100ml	7	280	2	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	0.92	0.70	0.84	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	5.6	4.2	4.9	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	2.8	2.0	2.1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.02	0.03	0.02	APHA 3111 – B
19	Iron as Fe	mg/l	0.24	0.18	0.18	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.05	0.05	0.06	IS 3025: Part – 57

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results		Test Method
			SW – 4 Pandu River Down Stream, Near Naubasta	SW – 5 Ganga Lower Canal Near Panki Power Plant	
I	**Simple Parameters**				
1	Appearance	-	Pale yellow	Colourless	-
2	Colour (Hazen Units)	-	30	10	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**				
1	pH	-	7.42	7.53	IS 3025: Part – 11
2	E C	µS/cm	340	230	IS 3025: Part – 14
3	Oil & Grease	mg/l	3	1	IS 3025: Part – 39
4	Suspended Solids	mg/l	98	28	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	5.4	6.2	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	84	28	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	19	6	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.06	0.03	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	3.84	0.90	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	3.90	0.93	By Calculation
11	Free Ammonia	mg/l	< 0.1	< 0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	< 0.1	< 0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	< 0.02	< 0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.40	0.30	IS 3025: Part – 60
15	Sulphides as S	mg/l	0.80	< 0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	1.16	0.46	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	0.40	0.26	By Calculation
18	Total Coliforms	MPN/100ml	500	350	IS 1622
19	Fecal Coliforms	MPN/100ml	11	14	IS 1622
III	**Special Parameters**				
1	Total Phosphorous as P	mg/l	1.42	0.58	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	14	4.0	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	8	2.1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	< 0.01	< 0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.05	0.03	APHA 3111 – B
19	Iron as Fe	mg/l	0.32	0.18	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.05	0.04	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			GW-1 Near CETP, Jaj Mau, Kanpur	GW – 2 Chandra plastic works, Panki industrial area	GW-3 Near Jyothi Capsuls, Fazalgunj Industrial Area	
I	**Simple Parameters**					
1	Appearance	-	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	< 5	< 5	< 5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.76	7.92	7.84	IS 3025: Part – 11
2	E C	µS/cm	2900	384	750	520
3	Oil & Grease	mg/l	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	< 10	< 10	< 10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	4	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	< 2	< 2	< 2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.02	0.01	0.02	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	21.45	0.23	2.94	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	21.47	0.24	2.96	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.90	0.60	0.60	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	12.92	0.53	1.43	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	< 1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.01	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	< 0.01	< 0.01	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.06	0.08	0.05	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.18	0.05	0.09	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results		Test Method
			GW-4 Industrial Co-Operative Office, Dada Nagar IndustrialArea	GW – 5 Quality Laminators, Vijaynagar Industrial Area	
I	**Simple Parameters**				
1	Appearance	-	Colourless	Colourless	-
2	Colour (Hazen Units)	-	< 5	< 5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**				
1	pH	-	7.81	7.82	IS 3025: Part – 11
2	E C	µS/cm	520	534	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	< 10	< 10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	4	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	< 2	< 2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.02	0.02	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	0.68	0.68	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.70	0.70	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.50	0.50	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	< 0.1	< 0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	0.80	0.79	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	IS 1622
III	**Special Parameters**				
1	Total Phosphorous as P	mg/l	< 0.1	< 0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	< 0.01	< 0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	< 0.01	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.07	0.08	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.07	0.08	IS 3025: Part – 57

AMBIENT AIR MONITORING PHOTOGRAPHS

Vijaya nagar industrial area, Kanpur

Jyoti Capsules, 123/37, Fazalganj industrial area, Kanpur

Cooperative industrial estate office Dada nagar, Kanpur

Chandra plastic works, Panki industrial area, Kanpur

UP Pollution control board camp office, Jaj mau, Kanpur

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Pandu River Up Stream, Highway Bridge

Ganga River Up Stream, Near Bithur Village

Ganga Down Stream Near Dhodi Ghat

Pandu River Down Stream, Near Naubasta

Ganga Lower Canal Near Panki Power Plant

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Near CETP, Jaj Mau, Kanpur

Chandra plastic works, Panki industrial area, Kanpur

Near Jyothi Capsuls, Fazalgunj Industrial Area

Industrial Co-Operative Office, Dada Nagar Industrial Area

Quality Laminators, Kanpur

AAQ MONITORING LOCATIONS

SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	Balco guest House No -2	04.03.2013 to 05.03.2013	N 22°24.413'	E 082°45.966'
AAQ – 2	CPCB R .O Office	04.03.2013 to 05.03.2013	N 22°21.100'	E 082°38.130'
AAQ – 3	Gopalpur Vilage	04.03.2013 to 05.03.2013	N 22°26.318'	E 082°38.845'
AAQ – 4	Kusmunda OCM	04.03.2013 to 05.03.2013	N 22°20.698'	E 082°38.489'

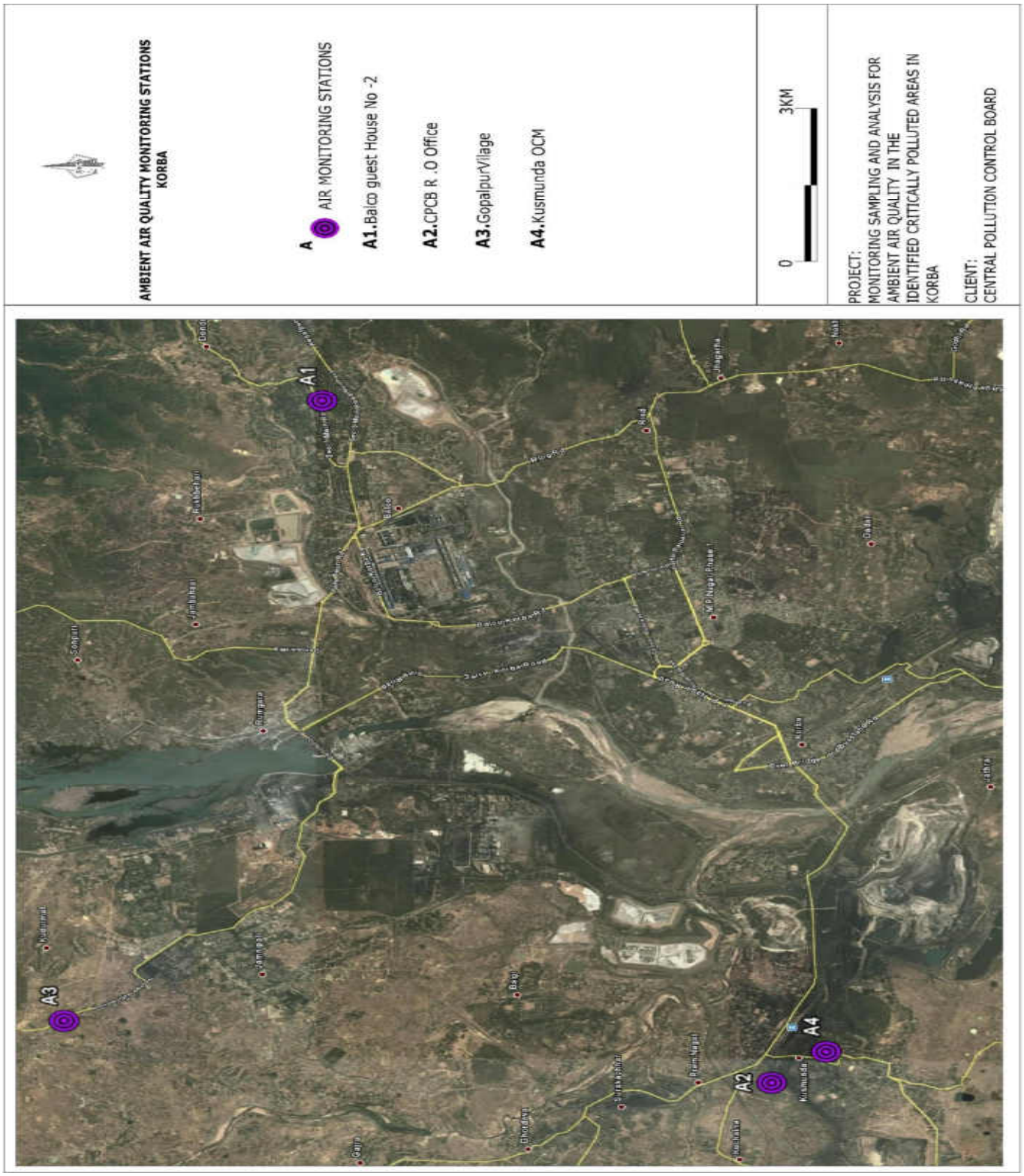
SURFACE WATER SAMPLING LOCATIONS

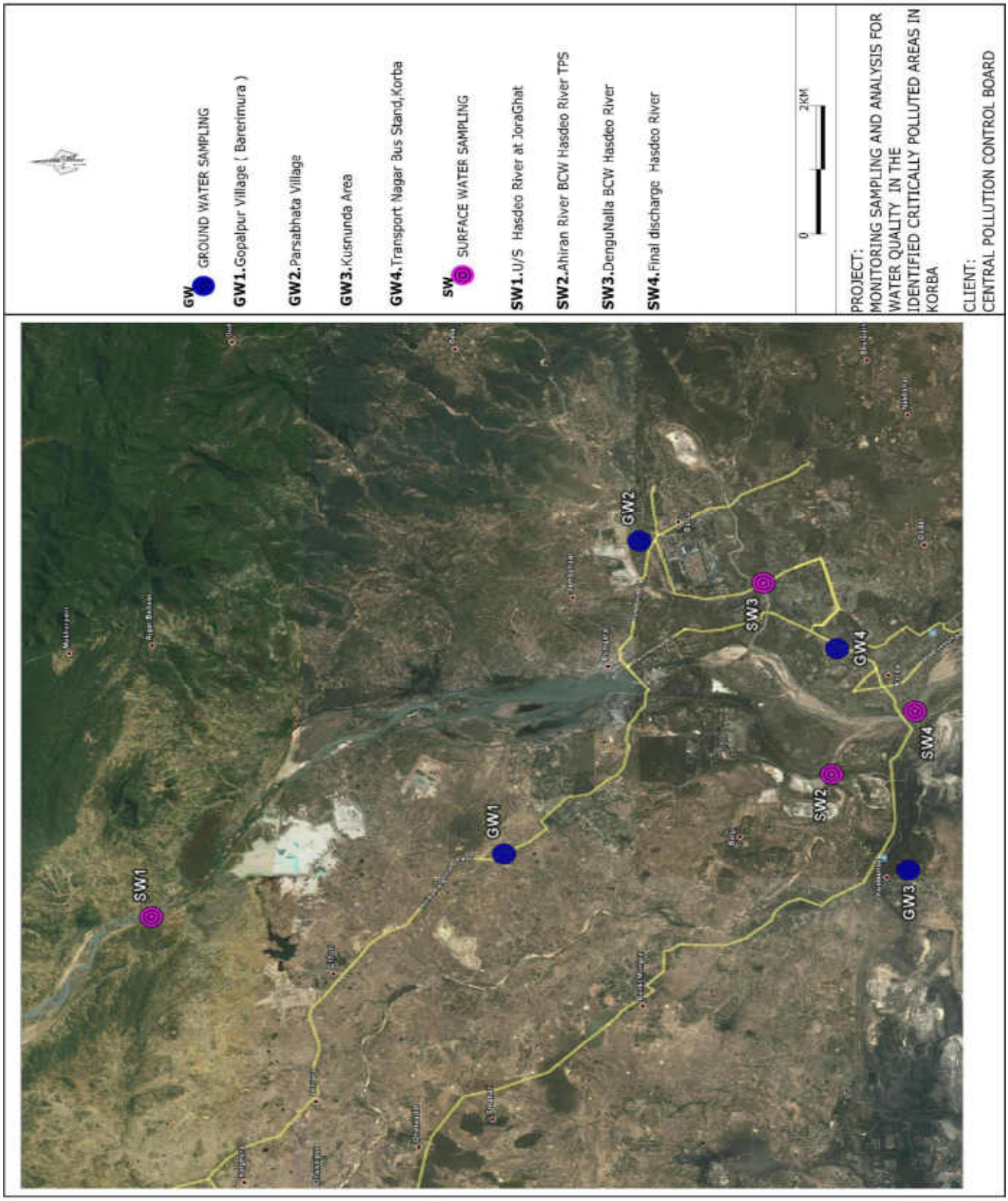
SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	U/S Hasdeo River at Jora Ghat	05.03.2013	N 22°31.309'	E 082°37.719'
SW – 2	Ahiran River BCW Hasdeo River TPS	05.03.2013	N 22°21.676'	E 082°40.260'
SW – 3	Dengu Nalla BCW Hasdeo River	05.03.2013	N 22°22.644'	E 082°43.659'
SW – 4	Final discharge Hasdeo River	05.03.2013	N 22°20.488'	E 082°41.368'

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Gopalpur Village (Barerimura)	05.03.2013	N 22°26.318'	E 082°38.845'
GW – 2	Parsabhata Village	05.03.2013	N 22°24.400'	E 082°44.400'
GW – 3	Kusnunda Area	05.03.2013	N 22°20.589'	E 082°38.551'
GW – 4	Transport Nagar Bus Stand,Korba	05.03.2013	N 22°21.600'	E 082°42.500'

KORBA (CHHATTISGARH)




GW GROUND WATER SAMPLING
GW1.Gopalpur Village (Barerimura)
GW2.Parsabhata Village
GW3.Kusnunda Area
GW4.Transport Nagar Bus Stand,Korba
SW SURFACE WATER SAMPLING
SW1.U/S Hasdeo River at JoraGhat
SW2.Ahiran River BCW Hasdeo River TPS
SW3.DenguNalla BCW Hasdeo River
SW4.Final discharge Hasdeo River
0
2KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN KORBA
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
SW1
GW1
GW2
SW3
GW4
SW4
SW2
GW3

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 Balco guest House No -2	**AAQ – 2** CPCB R .O Office	**AAQ – 3** Gopalpur Vilage	**AAQ – 4** Kusmunda OCM	
1	Lead	µg/m³	0.06	0.03	0.11	0.09	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	<1	<1	<1	1.6	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	89.2	129.0	87.5	98.1	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	33.1	25.6	28.4	31.4	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	23.5	19.7	15.6	20.4	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	3.6	4.8	3.1	5.4	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	14.6	12.3	15.9	13.1	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	23.6	19.9	26.1	22.6	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	2.7	3.6	5.1	4.4	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	16.6	17.4	21.3	14.8	
		µg/m³	<2	2.5	3.1	2.9	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-1 U/S Hasdeo River at Jora Ghat	SW – 2 Ahiran River BCW Hasdeo River TPS	SW-3 Dengu Nalla BCW Hasdeo River	SW-4 Final discharge Hasdeo River	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	5	5	5	5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.74	8.05	7.72	7.71	IS 3025: Part – 11
2	E C	µS/cm	102	347	180	210	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	< 10	28	20	24	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	5.6	5.4	5.5	5.3	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	12	20	16	22	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	3	4	3	5	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	< 0.01	0.02	< 0.01	0.01	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	0.23	0.45	0.45	0.45	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.23	0.47	0.45	0.46	By Calculation
11	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.20	0.30	0.20	0.30	IS 3025: Part – 60
15	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	0.24	0.32	0.20	0.26	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	0.37	0.66	0.62	0.55	By Calculation
18	Total Coliforms	MPN/100ml	22	33	27	40	IS 1622
19	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	0.30	0.40	0.26	0.32	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	2.1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	1.4	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.02	0.02	0.01	0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.09	0.25	0.16	0.18	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.02	0.05	0.03	0.05	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Gopalpur Village	GW – 2 Parsabhata Village	GW-3 Kusnunda Area	GW-4 Transport Nagar Bus Stand,Korba	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Light brown	Pale Yellow	-
2	Colour (Hazen Units)	-	< 5	< 5	15	10	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.50	7.87	6.90	6.92	IS 3025: Part – 11
2	E C	µS/cm	270	498	134	320	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	<1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	< 10	< 10	32	14	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	4	4	8	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	0.01	0.02	0.02	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	0.23	0.90	1.35	4.97	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.24	0.91	1.37	4.99	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.30	0.40	0.20	0.30	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	1.09	2.96	0.48	0.91	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.05	0.02	0.04	0.02	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.03	0.03	0.10	0.05	APHA 3111 – B
19	Iron as Fe	mg/l	0.02	0.12	0.32	0.29	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.05	0.07	0.05	0.06	IS 3025: Part – 57

AMBIENT AIR MONITORING PHOTOGRAPHS

Balco Guest House – Korba

RO office of State PCB – Korba

Gopalpur Village – Korba

Kusmunda OCP – Korba

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Ahiram River – Korba

Dangu Nalla – Korba

Final discharge Hasdeo River-Korba

Hasdeo River – Korba

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Gopalpur village – Korba

Kusmunda village – Korba

Parsavada – Korba

Transportnagar Bus stop – Korba

AAQ MONITORING LOCATIONS

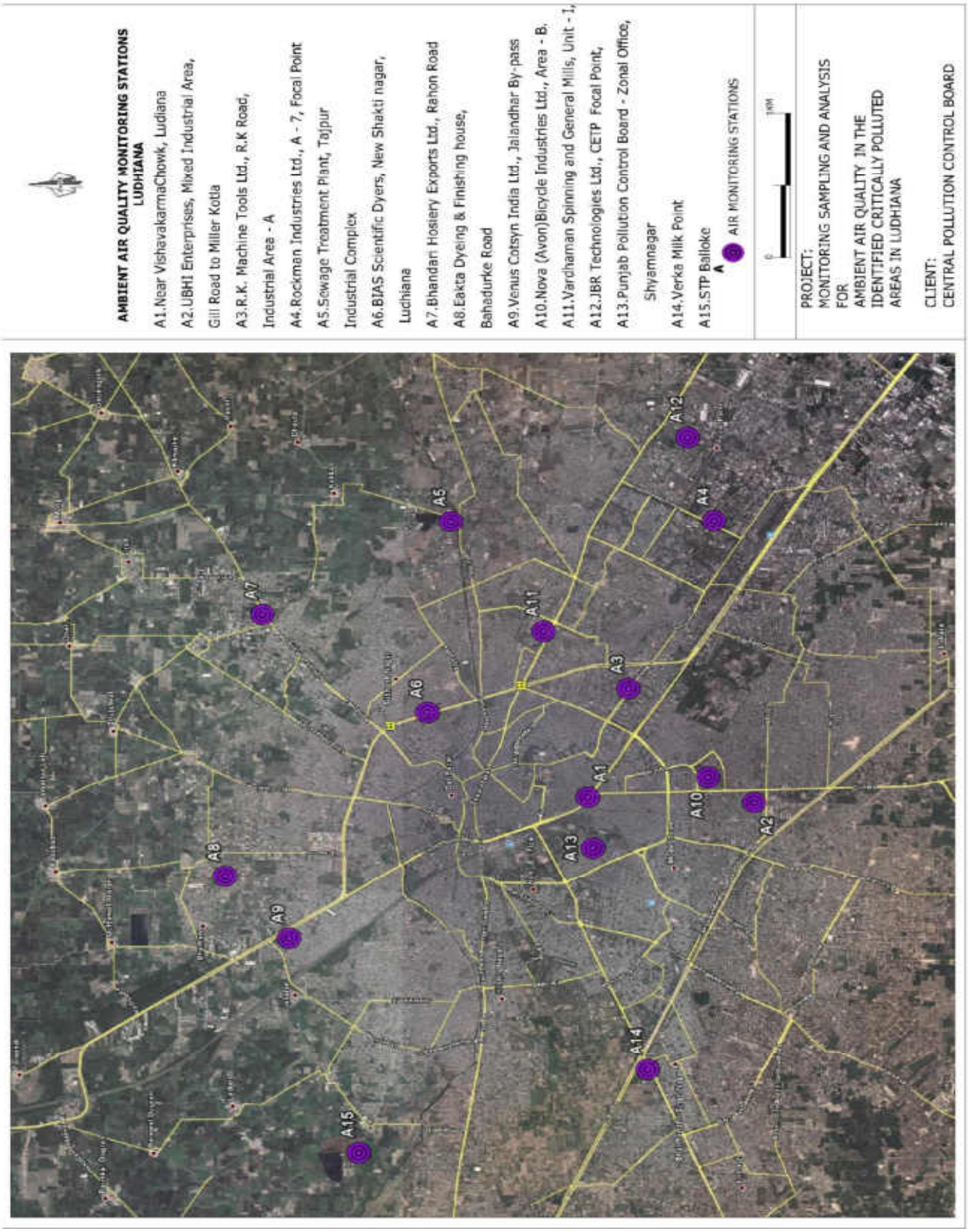
SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	Near Vishavakarma Chowk, Ludiana	08.03.2013 to 09.03.2013	N30°54'03.6"	E075°51'26.7"
AAQ – 2	UBHI Enterprises, Mixed Industrial Area, Gill Road to Miller Kotla	08.03.2013 to 09.03.2013	N30°52'35.9"	E075°51'22.8"
AAQ – 3	R.K. Machine Tools Ltd., R.K Road, Industrial Area - A	08.03.2013 to 09.03.2013	N30°53'42.2"	E075°52'44.8"
AAQ – 4	Rockman Industries Ltd., A – 7, Focal Point	08.03.2013 to 09.03.2013	N30°52'57.0"	E075°54'45.3"
AAQ – 5	Sewage Treatment Plant, Tajpur Industrial Complex	09.03.2013 to 10.03.2013	N30°55'15.7"	E075°54'44.8"
AAQ – 6	BIAS Scientific Dyers, New Shakti nagar, Ludhiana	09.03.2013 to 10.03.2013	N30°55'28.0"	E075°52'27.3"
AAQ – 7	Bhandari Hosiery Exports Ltd., Rahon Road	11.03.2013 to 12.03.2013	N30°56'55.0"	E075°53'37.8"
AAQ – 8	Eakta Dyeing & Finishing house, Bahadurke Road	11.03.2013 to 12.03.2013	N30°57'14.7"	E075°50'29.8"
AAQ - 9	Venus Cotsyn India Ltd., Jalandhar By-pass Road	09.03.2013 to 10.03.2013	N30°56'41.0"	E075°49'45.1"
AAQ – 10	Nova (Avon)Bicycle Industries Ltd., Area – B.	09.03.2013 to 10.03.2013	N30°53'00.2"	E075°51'41.1"
AAQ – 11	Vardhaman Spinning and General Mills, Unit – I,	11.03.2013 to 12.03.2013	N30°54'27.0"	E075°53'25.8"
AAQ – 12	JBR Technologies Ltd., CETP Focal Point, Phase – 8,	11.03.2013 to 12.03.2013	N30°53'10.9"	E075°55'44.8"
AAQ – 13	Punjab Pollution Control Board – Zonal Office, Shyamnagar	11.03.2013 to 12.03.2013	N30°54'00.8"	E075°50'50.0"
AAQ – 14	Verka Milk Point	11.03.2013 to 12.03.2013	N30°53'32.1"	E075°48'10.7"
AAQ – 15	STP Balloke	11.03.2013 to 12.03.2013	N30°56'04.2"	E075°47'10.9"

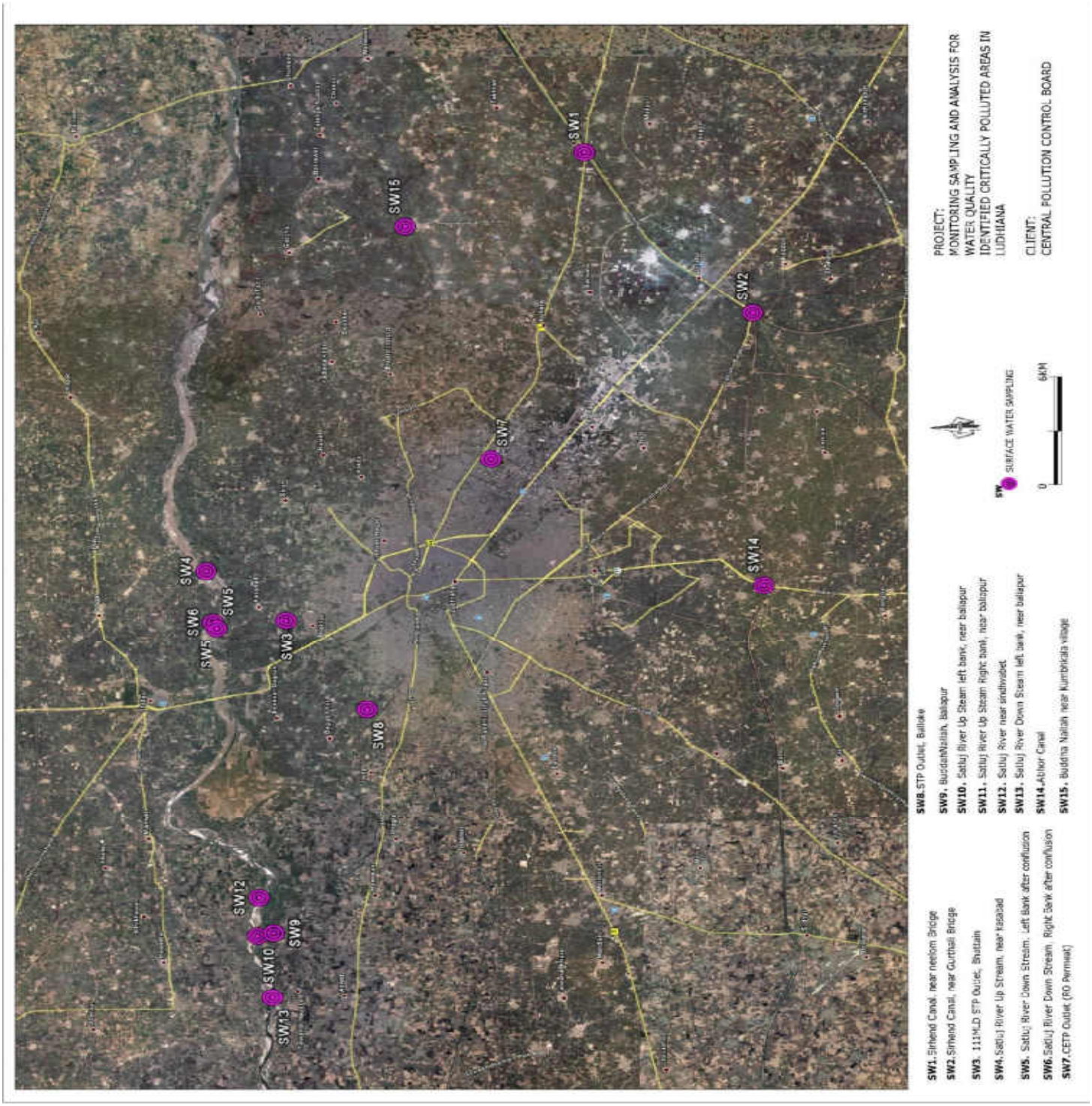
SURFACE WATER SAMPLING LOCATIONS

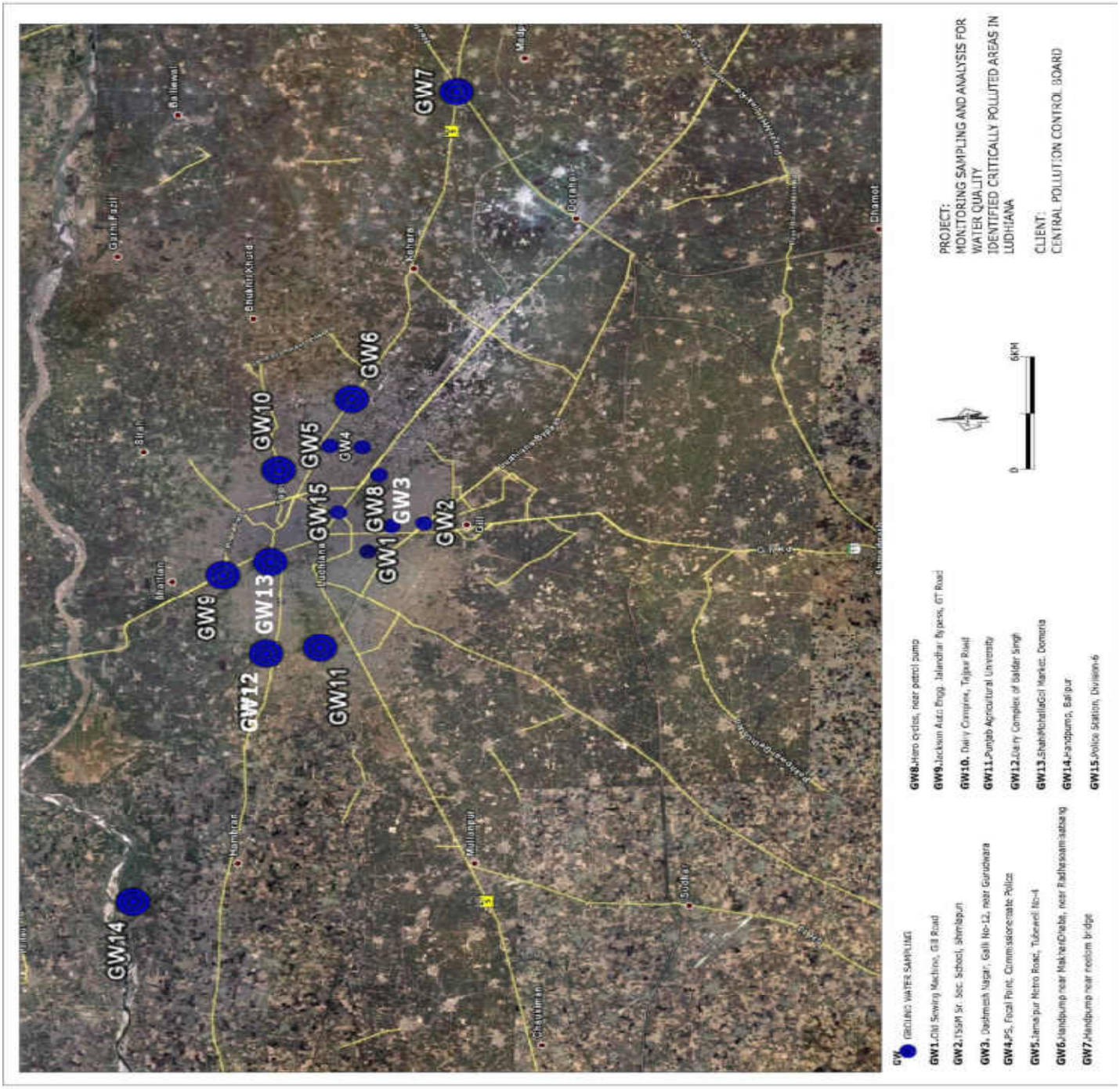
SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	Sirhend Canal, near neelom Bridge	08.03.2013	N30°50'55.7"	E076°06'22.9"
SW - 2	Sirhend Canal, near Gurthali Bridge	08.03.2013	N30°46'57.9"	E076°00'53.9"
SW – 3	111MLD STP Outlet, Bhattain	09.03.2013	N30°58'04.3"	E075°50'04.5"
SW - 4	Satluj River Up Stream, near kasabad	09.03.2013	N30°59'27.2"	E075°50'29.5"
SW – 5	Satluj River Down Stream, Left Bank after conflusion	09.03.2013	N30°59'43.8"	E075°49'48.0"
SW - 6	Satluj River Down Stream, Right Bank after conflusion	12.03.2013	N30°59'48.9"	E075°50'0.76"
SW - 7	CETP Outlet (RO Permeat)	09.03.2013	N30°53'11.9"	E075°55'44.4"
SW – 8	STP Outlet, Balloke	11.03.2013	N30°56'08.7"	E075°46'57.2"
SW – 9	Buddah Nallah, Baliapur	12.03.2013	N30°58'22.0"	E075°39'04.4"
SW - 10	Satluj River Up Steam left bank, near baliapur	12.03.2013	N30°58'45.7"	E075°38'58.3"
SW - 11	Satluj River Up Steam Right bank, near baliapur	12.03.2013	N30°58'53.5"	E075°39'8.7"
SW - 12	Satluj River near sindhvabet	12.03.2013	N30°57'57.9"	E075°28'54.3"
SW - 13	Satluj River Down Steam left bank, near baliapur	12.03.2013	N30°58'28.7"	E075°37'35.5"
SW - 14	Abhor Canal	12.03.2013	N30°46'42.0"	E075°51'18.9"
SW - 15	Buddha Nallah near Kumbhkala village	12.03.2013	N30°55'14.8"	E076°03'54.7"

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Old Sewing Machine, Gill Road	08.03.2013	N30°53'01.5"	E075°51'33.8"
GW – 2	TSSM Sr. Sec. School, Shimlapuri	08.03.2013	N30°51'42.4"	E075°51'52.3"
GW – 3	Dashmesh Nagar, Galli No-12, near Gurudwara	08.03.2013	N30°53'01.4"	E075°51'15.3"
GW – 4	PS, Focal Point, Commissionereate Police	08.03.2013	N30°53'06.8"	E075°54'26.3"
GW – 5	Jamalpur Metro Road, Tubewell No-4	08.03.2013	N30°53'51.1"	E075°54'28.8"
GW – 6	Handpump near Makhan Dhaba, near Radha soami satsang	08.03.2013	N30°53'21.1"	E075°56'03.2"
GW – 7	Hero cycles, near petrol pump	08.03.2013	N30°52'55.2"	E075°53'42.2"
GW – 8	Handpump near neelom bridge	08.03.2013	N30°50'57.8"	E076°06'21.9"
GW – 9	Jackson Auto Engg. Jalandhar Bypass, GT Road	09.03.2013	N30°56'16.6"	E075°50'08.1"
GW – 10	Dairy Complex, Tajpur Road	09.03.2013	N30°55'00.9"	E075°53'38.5"
GW – 11	Punjab Agricultural University	11.03.2013	N30°54'04.2"	E075°47'38.2"
GW – 12	Dairy Complex of Baldar Singh	11.03.2013	N30°55'18.0"	E075°47'26.3"
GW – 13	Shahi Mohalla Gol Market, Domeria	12.03.2013	N30°55'12.2"	E075°50'34.4"
GW – 14	Handpump, Balipur	12.03.2013	N30°58'19.8"	E075°39'07.6"
GW – 15	Police Station, Division-6	12.03.2013	N30°53'39.6"	E075°52'14.0"


AMBIENT AIR QUALITY MONITORING STATIONS
LUDHIANA
A1.Near VishavakarmaChowk, Ludiana
A2.UBHI Enterprises, Mixed Industrial Area, Gill Road to Miller Kotla
A3.R.K. Machine Tools Ltd., R.K Road, Industrial Area - A
A4.Rockman Industries Ltd., A - 7, Focal Point
A5.Sewage Treatment Plant, Tajpur Industrial Complex
A6.BIAS Scientific Dyers, New Shakti nagar, Ludhiana
A7.Bhandari Hosiery Exports Ltd., Rahon Road
A8.Eakta Dyeing & Finishing house, Bahadurke Road
A9.Venus Cotsyn India Ltd., Jalandhar By-pass
A10.Nova (Avon)Bicycle Industries Ltd., Area - B.
A11.Vardhaman Spinning and General Mills, Unit - 1, Shyamnagar
A12.JBR Technologies Ltd., CETP Focal Point,
A13.Punjab Pollution Control Board - Zonal Office,
A14.Verka Milk Point
A15.STP Balloke
AIR MONITORING STATIONS
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR
AMBIENT AIR QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN LUDHIANA
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
A12
A13
A14
A15


SW1
SW2
SW3
SW4
SW5
SW6
SW7
SW8
SW9
SW10
SW12
SW13
SW14
SW15
SW1. Sirhind Canal, near neelom Bridge
SW2. Sirhind Canal, near Gurthali Bridge
SW3. 111MLD STP Outlet, Bhattain
SW4. Satluj River Up Stream, near kasabad
SW5. Satluj River Down Stream, Left Bank after confluscin
SW6. Satluj River Down Stream, Right Bank after confluscin
SW7. CETP Outlet (RO Permeat)
SW8. STP Outlet, Balloke
SW9. BuddaNalish, balapur
SW10. Satluj River Up Stream left bank, near balapur
SW11. Satluj River Up Stream Right bank, near balapur
SW12. Satluj River near sindhwabet
SW13. Satluj River Down Stream left bank, near balapur
SW14. Abhor Canal
SW15. Buddha Nallah near kumbhkala village
SURFACE WATER SAMPLING
0
6KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY IDENTIFIED CRITICALLY POLLUTED AREAS IN LUDHIANA
CLIENT:
CENTRAL POLLUTION CONTROL BOARD


GW14
GW9
GW12
GW13
GW11
GW10
GW5
GW4
GW15
GW8
GW3
GW1
GW2
GW6
GW7
Garhi Fazil
Bhattian
Bhukhari Khurd
Bilaspur
Ballewal
Mehara
Dehlon
Chamot
Mullanpur
Sudhar
Chaukiman
Ludhiana
GW
GROUND WATER SAMPLING
GW1.Old Sewing Machine, Gill Road
GW2.TSSM Sr. Sec. School, shimlapuri
GW3. Deshmesh Nagar, Gali No-12, near Gurudwara
GW4.PS, Focal Point, Commissionerate Police
GW5.Jamapur Metro Road, Tubewell No-4
GW6.Handpump near MakhanDhaba, near Radhesoami satsang
GW7.Handpump near neelam bridge
GW8.Hero cycles, near petrol pump
GW9.Jackson Auto Engg. Jalandhar Bypass, GT Road
GW10. Dairy Complex, Tajpur Road
GW11.Punjab Agricultural University
GW12.Dairy Complex of Balder Singh
GW13.ShahKotallaGol Market, Domoria
GW14.Handpump, Baljpur
GW15.Police Station, Division-6
0
6KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY
IDENTIFIED CRITICALLY POLLUTED AREAS IN LUDHIANA
CLIENT:
CENTRAL POLLUTION CONTROL BOARD

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 Near Vishavakarma Chowk,	**AAQ – 2** UBHI Enterprises	**AAQ – 3** R.K.Machine Tools Ltd.,	**AAQ – 4** Rockman Industries Ltd.,	
1	Lead	µg/m³	0.11	0.07	0.12	0.09	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	1.2	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	<1	<1	1.6	1.9	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	242.7	278.1	224.1	114.3	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	71.1	61.5	94.6	77.8	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	8.6	17.8	10.5	<5	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	1.4	1.9	3.4	2.8	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	16.7	13.9	17.1	12.8	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	29.4	24.5	21.9	26.3	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	5.2	4.8	7.3	3.7	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	12.8	14.2	15.6	13.4	
		µg/m³	3.4	4.1	<2	3.0	

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 5 STP, Tajpur Industrial Complex	**AAQ – 6** BIAS Scientific Dyers, New Shakti nagar, Ludhiana	**AAQ – 7** Bhandari Hosiery Exports Ltd., Rahon Road	**AAQ – 8** Eakta Dyeing & Finishing House, Bahadurke Road	
1	Lead	µg/m³	0.06	0.04	0.05	0.04	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	0.76	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	<1	<1	<1	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	128.1	283.0	171.3	121.9	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	37.4	46.9	87.5	51.6	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	17.2	9.5	15.2	<5	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	1.3	1.2	2.7	1.6	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	15.2	13.9	11.2	12.1	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	18.9	22.8	20.4	23.7	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	5.6	4.6	6.1	6.4	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	14.8	15.8	13.7	15.3	
		µg/m³	3.4	3.4	<2	3.1	

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 9 Venus Cotsyn India Ltd., Jalandhar By-Pass Road	**AAQ – 10** Nova (Avon) Bicycle Industries Ltd., Area - B	**AAQ – 11** Vardhaman Spinning & General Mills, Unit - I	**AAQ – 12** JBR Technologies Ltd., CETP Focal Point	
1	Lead	µg/m³	0.02	0.05	0.03	0.01	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	<1	<1	<1	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	175.9	186.4	141.4	149	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	42.6	69.5	79.4	58.6	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	<5	<5	12.6	21.5	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	<2	<2	<2	<2	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	14.6	11.9	13.2	15.8	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	19.8	16.9	22.6	21.9	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	5.0	6.8	4.6	7.1	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	12.8	10.7	13.2	16.3	
		µg/m³	3.3	<2	3.8	4.1	

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS			Test Methods
			AAQ – 13 Punjab Pollution Control Board - Shyamnagar	**AAQ – 14** Verka Milk Point	**AAQ – 15** STP Balloke	
1	Lead	µg/m³	0.04	0.06	0.10	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	<1	<1	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	140.5	196.7	112.0	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	78.4	65.9	104.6	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	<5	18.3	28.2	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	<2	<2	<2	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	12.6	14.5	11.9	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	21.7	24.5	27.2	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	
		mg/m³	<2	<2	<2	
12	O_3	µg/m³	6.1	3.8	7.0	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	14.8	12.2	16.7	
		µg/m³	3.2	<2	3.0	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-1 Sirhend Canal, near neelom Bridge	SW – 2 Sirhend Canal, near Gurthali Bridge	SW-3 111MLD STP Outlet, Bhattain	SW-4 Satluj River Up Stream, near kasabad	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Light Brown	Colourless	-
2	Colour (Hazen Units)	-	5	5	25	< 5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.97	7.91	7.34	7.67	IS 3025: Part – 11
2	E C	µS/cm	270	255	1580	301	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	12	14	56	< 10	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	5.8	5.9	3.2	5.8	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	12	10	56	12	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	3	3	14	3	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.01	0.01	0.02	0.01	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	1.13	0.45	2.48	0.23	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	1.14	0.46	2.50	0.24	By Calculation
11	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.30	0.30	0.80	0.30	IS 3025: Part – 60
15	Sulphides as S	mg/l	< 0.1	< 0.1	0.60	< 0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	< 0.1	< 0.1	3.98	0.20	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	0.32	0.29	5.53	0.38	By Calculation
18	Total Coliforms	MPN/100ml	110	220	1700	21	IS 1622
19	Fecal Coliforms	MPN/100ml	14	50	210	< 2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	< 0.1	< 0.1	4.6	0.32	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	24	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	18	< 1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.12	0.10	0.15	0.02	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.02	< 0.01	0.09	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.10	0.09	0.46	0.07	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.11	0.12	0.21	0.16	IS 3025: Part – 57

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW- 5 Satluj River Dn/S, Left Bank after confluence	SW – 6 Satluj River Dn/S, Right Bank after confluence	SW-7 CETP Outlet (RO Permeat)	SW-8 STP Outlet, Balloke	
I	**Simple Parameters**						
1	Appearance	-	Light Brown	Light Brown	Colourless	Light Brown	-
2	Colour (Hazen Units)	-	20	20	< 5	20	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Un – Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.37	7.22	7.39	7.32	IS 3025: Part – 11
2	E C	µS/cm	430	420	510	1080	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	2	IS 3025: Part – 39
4	Suspended Solids	mg/l	24	28	< 10	72	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	4.8	4.7	5.0	2.1	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	34	38	8	58	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	8	9	2	15	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.02	0.03	0.01	0.02	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	1.38	2.50	2.10	4.74	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	1.40	2.53	2.11	4.76	By Calculation
11	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.60	0.70	0.70	0.60	IS 3025: Part – 60
15	Sulphides as S	mg/l	0.20	0.40	< 0.1	0.40	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	3.39	3.21	0.20	1.75	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	0.90	0.80	1.89	2.19	By Calculation
18	Total Coliforms	MPN/100ml	1000	1600	7	6000	IS 1622
19	Fecal Coliforms	MPN/100ml	700	900	< 2	3300	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	3.82	3.68	0.28	1.90	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	2.6	3.2	< 1	21	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	1.4	1.8	< 1	12	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.03	0.02	0.02	0.06	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	0.05	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.03	0.02	< 0.01	0.08	APHA 3111 – B
19	Iron as Fe	mg/l	0.38	0.30	0.09	0.60	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.21	0.21	1.4	0.53	IS 3025: Part – 57

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-9 Buddah Nallah, Baliapur	SW – 10 Satluj River Up Steam left bank, near baliapur	SW-11 Satluj River Up Steam Right bank, near baliapur	SW-12 Satluj River near sindhvabet	
I	**Simple Parameters**						
1	Appearance	-	Blackish	Colourless	Colourless	Greyish	-
2	Colour (Hazen Units)	-	50	5	5	30	IS 3025: Part – 4
3	Odour (Smell)	-	Un Agreeable	Agreeable	Agreeable	Un Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.19	7.50	7.22	7.41	IS 3025: Part – 11
2	E C	µS/cm	1600	618	628	1040	IS 3025: Part – 14
3	Oil & Grease	mg/l	6	1	1	2	IS 3025: Part – 39
4	Suspended Solids	mg/l	184	12	14	84	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	< 1	5.2	5.1	2.8	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	248	10	12	108	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	85	3	3	32	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.02	0.01	< 0.01	0.03	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	3.61	4.52	4.74	2.94	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	3.93	4.53	4.74	2.97	By Calculation
11	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.80	0.50	0.50	0.70	IS 3025: Part – 60
15	Sulphides as S	mg/l	3.8	< 0.1	< 0.1	2.8	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	4.71	1.98	1.12	2.22	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	4.29	1.89	1.95	2.90	By Calculation
18	Total Coliforms	MPN/100ml	1700	800	1200	1100	IS 1622
19	Fecal Coliforms	MPN/100ml	1400	500	500	600	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	5.26	2.32	1.46	3.5	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	35	1.4	1.6	20	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	19	< 1	< 1	11	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	<0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.09	0.01	0.01	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.56	0.12	0.10	0.09	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.22	0.25	0.21	0.14	IS 3025: Part – 57

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			SW-13 Satluj River Down Steam left bank, near baliapur	SW – 14 Abhor Canal	SW-15 Buddha Nallah near Kumbhkala village	
I	**Simple Parameters**					
1	Appearance	-	Greyish	Colourless	Pale Brownish	-
2	Colour (Hazen Units)	-	40	< 5	10	IS 3025: Part – 4
3	Odour (Smell)	-	Un Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.23	8.04	7.56	IS 3025: Part – 11
2	E C	µS/cm	1590	265	643	IS 3025: Part – 14
3	Oil & Grease	mg/l	3	< 1	1	IS 3025: Part – 39
4	Suspended Solids	mg/l	96	< 10	18	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	2.0	5.4	5.2	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	134	14	18	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	37	3	4	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.04	< 0.01	0.01	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	1.80	0.90	3.39	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	1.84	0.90	3.40	By Calculation
11	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.80	0.30	0.40	IS 3025: Part – 60
15	Sulphides as S	mg/l	3.2	< 0.1	1.2	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	6.18	1.89	1.63	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	3.37	0.13	0.67	By Calculation
18	Total Coliforms	MPN/100ml	1700	900	1400	IS 1622
19	Fecal Coliforms	MPN/100ml	900	700	600	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	6.9	2.32	1.96	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	29	1.4	1.8	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	15	< 1	1.2	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	<0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.04	0.02	0.05	APHA 3111 – B
19	Iron as Fe	mg/l	0.52	0.16	0.26	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.20	0.47	0.21	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Old Sewing Machine, Gill Road	GW – 2 TSSM Sr. Sec. School, Shimlapuri	GW-3 Dashmesh Nagar, Galli No.12, Gurudwara	GW-4 PS Focal Point, Commission ariate	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	< 5	< 5	< 5	< 5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.75	7.45	7.63	7.50	IS 3025: Part – 11
2	E C	µS/cm	600	620	700	1000	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	< 10	< 10	< 10	< 10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	8	4	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	< 2	< 2	< 2	< 2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	0.01	0.01	< 0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	3.84	2.71	4.97	5.42	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	3.85	2.72	4.98	5.42	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.40	0.50	0.40	0.50	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	1.17	1.40	0.81	1.16	By Calculation
17	Total Coliforms	MPN/100ml	< 2	17	< 2	26	IS 1622
18	Fecal Coliforms	MPN/100ml	< 2	2	< 2	4	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	< 1	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	< 1	< 1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	< 0.01	0.28	0.06	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.07	0.58	0.09	0.07	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.10	0.41	0.18	0.26	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-5 Jamalpur Metro Road, Tubewell No.4	GW – 6 Handpump near Makhan Dhaba near Radha soami satsang	GW-7 Hero cycles, near petrol pump	GW-8 Handpump near neelom bridge	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	< 5	< 5	< 5	< 5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.65	7.57	7.64	7.47	IS 3025: Part – 11
2	E C	µS/cm	574	1030	1110	270	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	< 10	< 10	< 10	< 10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	8	4	6	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	< 2	< 2	< 2	< 2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	< 0.01	0.01	< 0.01	0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	2.94	5.87	6.10	0.90	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	2.94	5.88	6.10	0.91	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.40	0.60	0.70	0.30	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	< 0.1	< 0.1	0.22	0.18	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	0.90	2.10	3.18	0.31	By Calculation
17	Total Coliforms	MPN/100ml	27	< 2	< 2	< 2	IS 1622
18	Fecal Coliforms	MPN/100ml	< 2	< 2	< 2	< 2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	< 1	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	< 1	< 1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.07	0.08	0.07	0.08	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.13	0.14	3.6	0.10	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-9 Jackson Auto Engg. Jalandhar Bypass GT Road	GW – 10 Dairy Complex, Tajpur Road	GW-11 Punjab Agicultural University	GW-12 Dairy Complex of Baldar Singh	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	< 5	< 5	< 5	< 5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.80	7.82	7.98	7.44	IS 3025: Part – 11
2	E C	µS/cm	800	655	510	1200	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	< 10	< 10	< 10	< 10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	4	8	6	8	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	< 2	< 2	< 2	< 2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	< 0.01	0.02	0.02	0.02	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	0.23	1.35	4.52	5.42	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.23	1.37	4.54	5.44	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.40	0.40	0.50	0.60	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	1.41	1.05	0.50	2.01	By Calculation
17	Total Coliforms	MPN/100ml	< 2	14	< 2	27	IS 1622
18	Fecal Coliforms	MPN/100ml	< 2	< 2	< 2	4	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	< 1	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	< 1	< 1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	< 0.01	< 0.01	< 0.01	0.10	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	< 0.01	< 0.01	0.02	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.09	0.09	0.10	0.08	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.33	0.14	0.12	0.12	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			GW-13 Shahi Mohalla Gol Market, Domeria	GW – 14 Handpump, Balipur	GW-15 Police Station, Division - 6	
I	**Simple Parameters**					
1	Appearance	-	Colourless	Pale Brown	Colourless	-
2	Colour (Hazen Units)	-	< 5	10	5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.63	7.40	7.73	IS 3025: Part – 11
2	E C	µS/cm	895	680	710	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	< 10	< 10	< 10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	8	6	4	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	< 2	< 2	< 2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.02	0.01	< 0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	5.19	5.65	5.42	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	5.21	5.66	5.42	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.60	0.80	0.50	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	0.28	0.33	< 0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	1.81	1.62	1.01	By Calculation
17	Total Coliforms	MPN/100ml	50	< 2	< 2	IS 1622
18	Fecal Coliforms	MPN/100ml	17	< 2	< 2	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	< 1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.07	0.05	0.22	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	< 0.01	0.01	0.02	APHA 3111 – B
19	Iron as Fe	mg/l	0.09	0.15	0.12	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.14	0.48	0.12	IS 3025: Part – 57

AMBIENT AIR MONITORING PHOTOGRAPHS

Near Viswakarma Chowk, Ludhiana

UBHI Enterprises, Mixed Industrial Area, Ludhiana

RK Machines & Tools Lid 854, R K Rd, Industrial Area A

Rockman Industries Ltd. A-7 Focal Point, Ludhiana

ST Plant, Jamalpur, Tajpur Industrial Area

BIAS Scientific Dyers, New Shakti nagar, Ludhiana

AMBIENT AIR MONITORING PHOTOGRAPHS

Bhandari Hosiery Exports Ltd., Ludhiana, Rahon Road

Eakta Dyeing & Finishing House, Bahadurke Road

Venus Cotsyn India Ltd, GT Road, Ludhiana

NOVA (Avon) Bicycle Industries Ltd, Area-B, Ludhiana

Vardhaman Spinning & General Mills, Unit-I, Ludhiana

JBR Technologies Ltd, CETP Focal Point, Phase-8

AMBIENT AIR MONITORING PHOTOGRAPHS

Punjab Pollution Control Board, Zonal Office, Shyamnagar

Verka Milk Point

STP Balloke

SAMPLING LOCATION PHOTOGRAPHS OF SURFACE WATER

Sirhend Canal, near neelom Bridge

Sirhend Canal, near Gurthali Bridge

111MLD STP Outlet, Bhattain

Satluj River Up Stream, near kasabad

Satluj River D/S, Left Bank after confluence

Buddha Nallah near Kumbhkala village

SAMPLING LOCATION PHOTOGRAPHS OF SURFACE WATER

CETP Outlet (RO Permeat)

STP Outlet, Balloke

Buddah Nallah, Baliapur

Satluj River Up Stream left bank, near baliapur

Satluj River Up Stream Right bank, near baliapur

Satluj River near sindhvabet

SAMPLING LOCATION PHOTOGRAPHS OF SURFACE WATER

Satluj River Down Stream left bank, near baliapur

Abhor Canal

Satluj River Down Stream Right Bank After Confluence, Ludhiana

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Old Sewing Machine, Gill Road

TSSM Sr. Sec. School, Shimlapuri

Dashmesh Nagar, Gilli No-12, Near Gurudwara

PS, Focal Point, Commissioneriate

Jamalpur Metro Road, Tubewell No. 4

Handpump near Makhan Dhaba, near Radha Soami

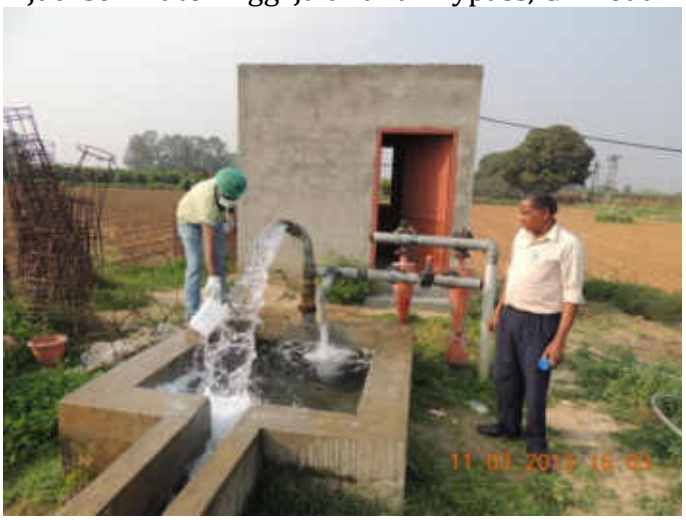
SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Handpump near Neelom Bridge

Hero Cycles near petrol Pump

Jackson Auto Engg. Jalandhar Bypass, GT Road

Dairy Complex, Tajpur Road



Punjab Agricultural University

Police Station, Division - 6

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Shahi Mohalla Gol Market, Domeria

Handpump, Balipur

Dairy complex of balder singh, Ludhiana

AAQ MONITORING LOCATIONS

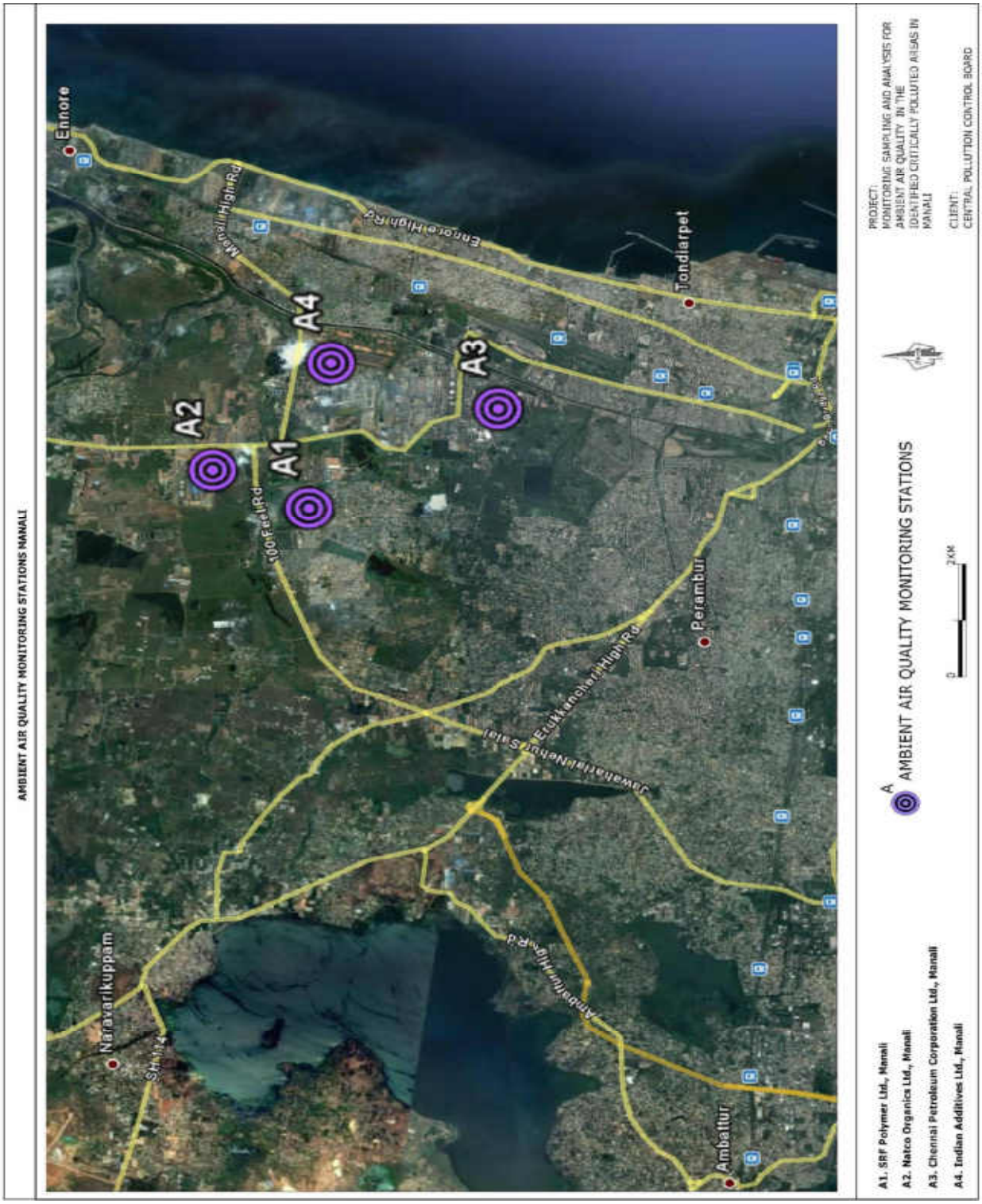
SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	SRF Polymer Ltd., Manali	11.02.2013 to 12.02.2013	N 13°10'26.7"	E 80°15'35.2"
AAQ – 2	Natco Organics Ltd., Manali	11.02.2013 to 12.02.2013	N 13°11'13.5"	E 80°15'57.8"
AAQ – 3	Chennai Petroleum Corporation Ltd., Manali	11.02.2013 to 12.02.2013	N 13°08'54.7"	E 80°16'34.0"
AAQ – 4	Indian Additives Ltd., Manali	11.02.2013 to 12.02.2013	N 13°10'16.0"	E 80°17'00.8"

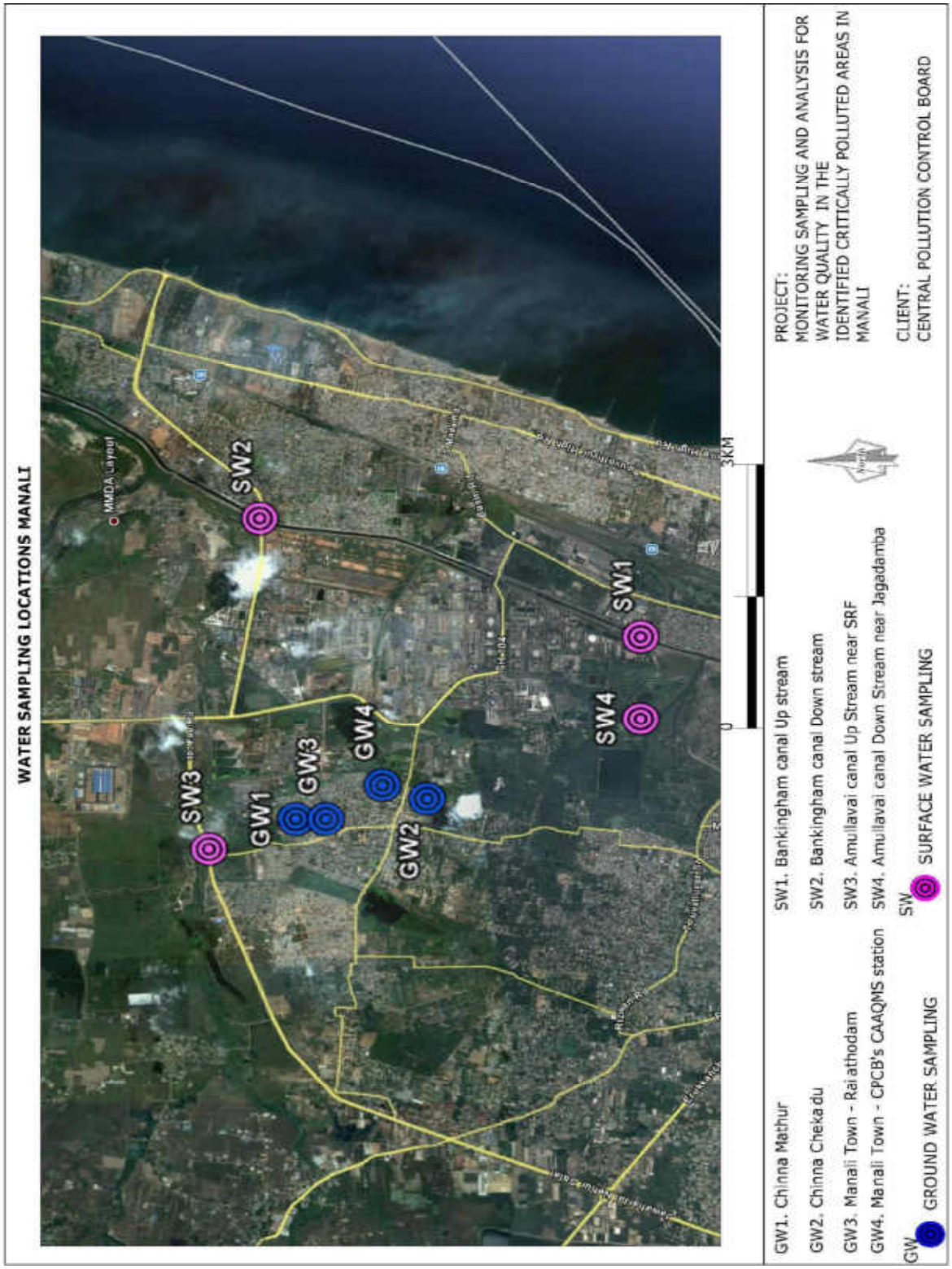
SURFACE WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	Bankingham canal Up stream	10.02.2013	N 13°08'29.4"	E 80°16'42.7"
SW – 2	Bankingham canal Down stream	10.02.2013	N 13°10'31.3"	E 80°17'27.5"
SW – 3	Amullavai canal Up Stream near SRF	10.02.2013	N 13°10'47.5"	E 80°15'22.8"
SW – 4	Amullavai canal Down Stream near Jagadamba	10.02.2013	N 13°08'29.4"	E 80°16'11.7"

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Chinna Mathur	10.02.2013	N 13°10'19.7"	E 80°15'34.0"
GW – 2	Chinna Chekadu	10.02.2013	N 13°09'37.7"	E 80°15'41.6"
GW – 3	Manali Town - Raiathodam	10.02.2013	N 13°10'10.1"	E 80°15'34.0"
GW – 4	Manali Town – CPCB's CAAQMS station	11.02.2013	N 13°09'52.0"	E 80°15'46.7"


AMBIENT AIR QUALITY MONITORING STATIONS MANALI
Ennore
Manali High Rd
Ennore High Rd
Tondiarpet
A4
A3
A2
A1
100 Feet Rd
Perambur
Jawaharlal Nehru Salai
Ambattur High Rd
Naravarikuppam
Ambattur
A1. SRF Polymer Ltd., Manali
A2. Natco Organics Ltd., Manali
A3. Chennai Petroleum Corporation Ltd., Manali
A4. Indian Additives Ltd., Manali
AMBIENT AIR QUALITY MONITORING STATIONS
0
2KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR AMBIENT AIR QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN MANALI
CLIENT:
CENTRAL POLLUTION CONTROL BOARD


WATER SAMPLING LOCATIONS MANALI
SW2
SW3
GW1
GW3
GW4
GW2
SW1
SW4
0
3KM
GW1. Chinna Mathur
GW2. Chinna Chekadu
GW3. Manali Town - Rai athodam
GW4. Manali Town - CPCB's CAAQMS station
GW GROUND WATER SAMPLING
SW1. Bankingham canal Up stream
SW2. Bankingham canal Down stream
SW3. Amullavai canal Up Stream near SRF
SW4. Amullavai canal Down Stream near Jagadamba
SW SURFACE WATER SAMPLING
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN MANALI
CLIENT:
CENTRAL POLLUTION CONTROL BOARD

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 SRF Polymers Ltd	**AAQ – 2** Natco Organics Ltd	**AAQ – 3** Chennai Petroleum Corporation Ltd., (CPCL)	**AAQ – 4** Indian Additives Ltd.,	
1	Lead	µg/m³	0.12	0.09	0.17	0.13	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	3.7	4.1	4.6	3.4	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	2.6	3.2	3.9	2.1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	80.5	90.2	85.3	76.4	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	42.0	38.8	33.6	30.9	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	70.4	80.5	90.7	76	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	13.7	9.6	16.2	9.3	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	30.4	21.5	24.7	17.1	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	41.6	38.2	46.5	33.2	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	12	13	10	14	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	18	18	16	15	
		µg/m³	4	2	4	3	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW -1 Buckingham Canal – U/s	SW – 2 Buckingham Canal – D/s	SW-3 Amullavai Canal U/s	SW-4 Amullavai Canal D/s	
I	**Simple Parameters**						
1	Appearance	-	Greyish	Greyish	Light brown	Light brown	-
2	Colour (Hazen Units)	-	50	50	40	40	IS 3025: Part – 4
3	Odour (Smell)	-	Un- Agreeable	Un- Agreeable	Un- Agreeable	Un-agreeable (Smell of Ammonia)	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH		7.12	7.13	7.92	9.20	IS 3025: Part – 11
2	E C	µS/cm	1900	2400	1480	10600	IS 3025: Part – 14
3	Oil & Grease	mg/l	7	6	4	8	IS 3025: Part – 39
4	Suspended Solids	mg/l	80	64	48	54	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	<0.1	<0.1	3.1	<0.1	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	80	64	62	84	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	22	20	18	21	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.15	0.11	0.23	0.50	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	2.25	1.81	0.45	5.41	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	2.40	1.92	0.68	5.91	APHA 4500 –N.C
11	Free Ammonia	mg/l	<0.1	<0.1	<0.1	5.6	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.4	0.5	0.6	0.9	IS 3025: Part – 60
15	Sulphides as S	mg/l	1.2	0.8	1.4	0.3	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	1.08	0.96	0.10	0.08	APHA 4500 – P D
17	Sodium Absorption Ratio (SAR)	mg/l	5.47	6.84	5.44	48.46	By Calculation
18	Total Coliforms	MPN/ 100ml	20	26	17	14	IS 1622
19	Fecal Coliform	MPN/ 100ml	9	7	6	2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	1.40	1.20	0.30	0.20	APHA 4500 – P-D
2	Total Kjeldal Nitrogen	mg/l	20	17	3.5	18	APHA 4500 – N org B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	13	11	2.8	14	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	0.002	0.005	0.003	0.005	IS 3025: Part – 43
5	Surface Active Agents	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 508
7	PAH	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 525.2
8	PCB and PCT	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 508
9	Zinc as Zn	mg/l	0.03	0.04	0.03	0.26	IS 3025: Part – 49
10	Nickel as Ni	mg/l	0.04	0.02	0.03	0.07	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	0.03	0.03	0.06	0.04	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.18	0.19	0.02	0.03	APHA 3111 – B
19	Iron as Fe	mg/l	0.28	0.21	0.27	0.57	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.29	0.32	0.29	0.69	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Chinna Mathur	GW – 2 Chinna Chekadu	GW-3 Raiathotam Manali Town	GW-4 Manali Town	
I	**Simple Parameters**						
1	Appearance	-	Clear	Clear	Clear	Clear	-
2	Colour (Hazen Units)	-	<5	<5	<5	<5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH		7.15	6.74	6.82	6.90	IS 3025: Part – 11
2	E C	µS/cm	2300	2200	1800	1640	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	4	6	6	4	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.03	0.01	0.05	0.25	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	14	14	32	5.65	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	14.03	14.01	32.05	5.85	APHA 4500 –N.C
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.4	0.5	0.4	0.5	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P D
16	Sodium Absorption Ratio (SAR)	mg/l	5.86	5.57	5.25	4.73	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliform	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P D
2	Total Kjeldal Nitrogen	mg/l	<0.2	<0.2	<0.2	<0.2	APHA 4500 – N org B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<0.2	<0.2	<0.2	<0.2	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surface Active Agents	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 508
7	PAH	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 525.2
8	PCB and PCT	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 508
9	Zinc as Zn	mg/l	0.03	0.03	0.06	0.05	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	0.01	<0.01	0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	0.01	<0.01	0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.06	0.06	<0.01	0.09	APHA 3111 – B
19	Iron as Fe	mg/l	0.05	0.08	0.05	0.08	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.06	0.12	0.10	0.03	IS 3025: Part – 57

AMBIENT AIR MONITORING LOCATIONS PHOTOGRAPHS

SRF Polymer Ltd., Manali

Natco Pharma Ltd., Manali

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Amallavali Upstream

Amalavalli Downstream

Buckingham Downstream

Performing on-site Analysis at Amallavalli Downstream

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Chinna Mathuru

Chinna Chekadu

Raiathodam

Chinna Chekadu Manali Town - Raiathodam

AAQ MONITORING LOCATIONS

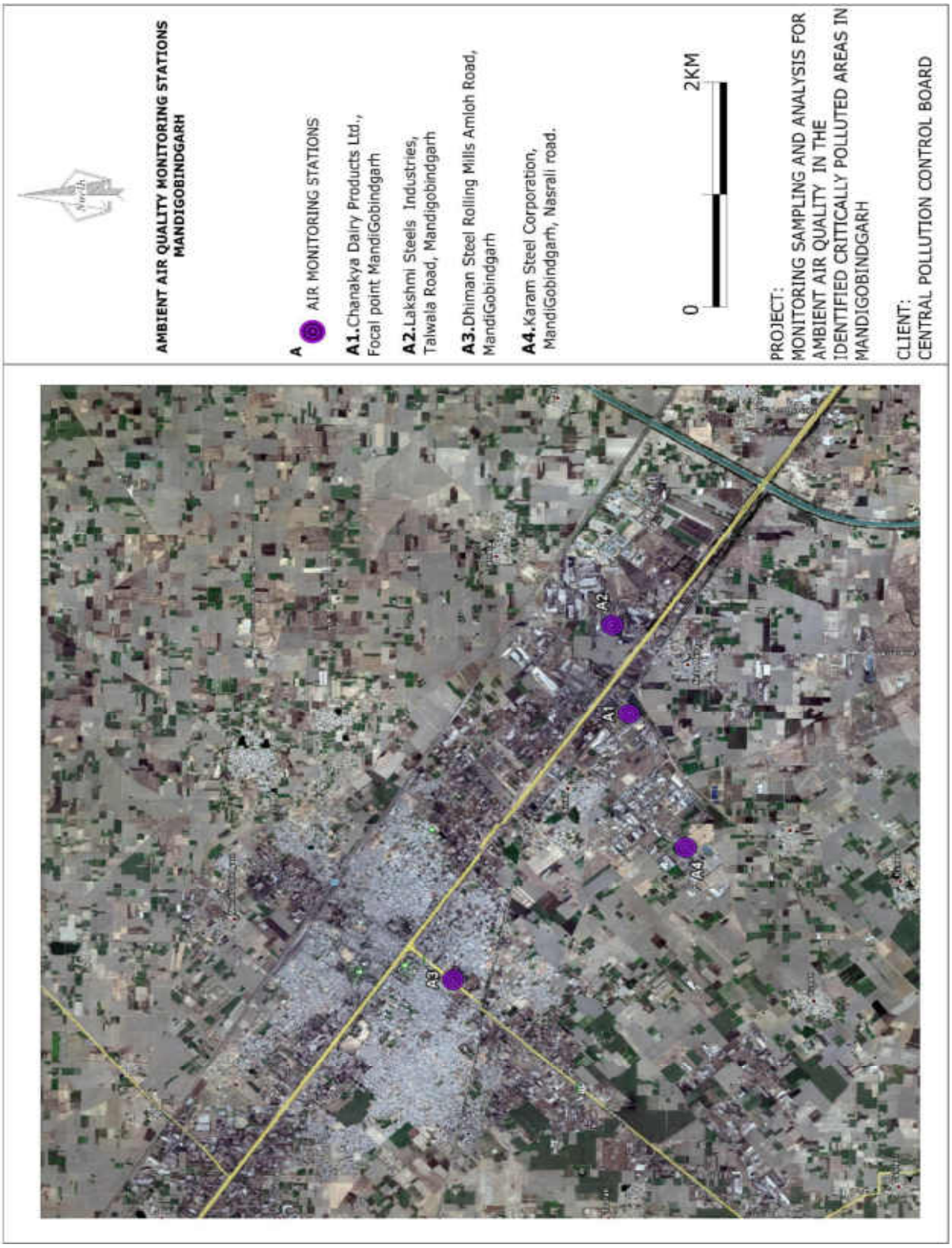
SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	Chanakya Dairy Products Ltd., Focal point MandiGobindgarh	20.03.2013 to 21.03.2013	N30°38'52.9"	E076°18'48.9"
AAQ – 2	Lakshmi Steels Industries, Talwala Road, Mandigobindgarh	20.03.2013 to 21.03.2013	N30°38'57.2"	E076°19'18.7"
AAQ – 3	Dhiman Steel Rolling Mills Amloh Road, MandiGobindgarh	20.03.2013 to 21.03.2013	N30°39'39.6"	E076°17'17.7"
AAQ – 4	Karam Steel Corporation, Mandi Gobindgarh, Nasrali road.	20.03.2013 to 21.03.2013	N30°38'52.9"	E076°18'48.9"

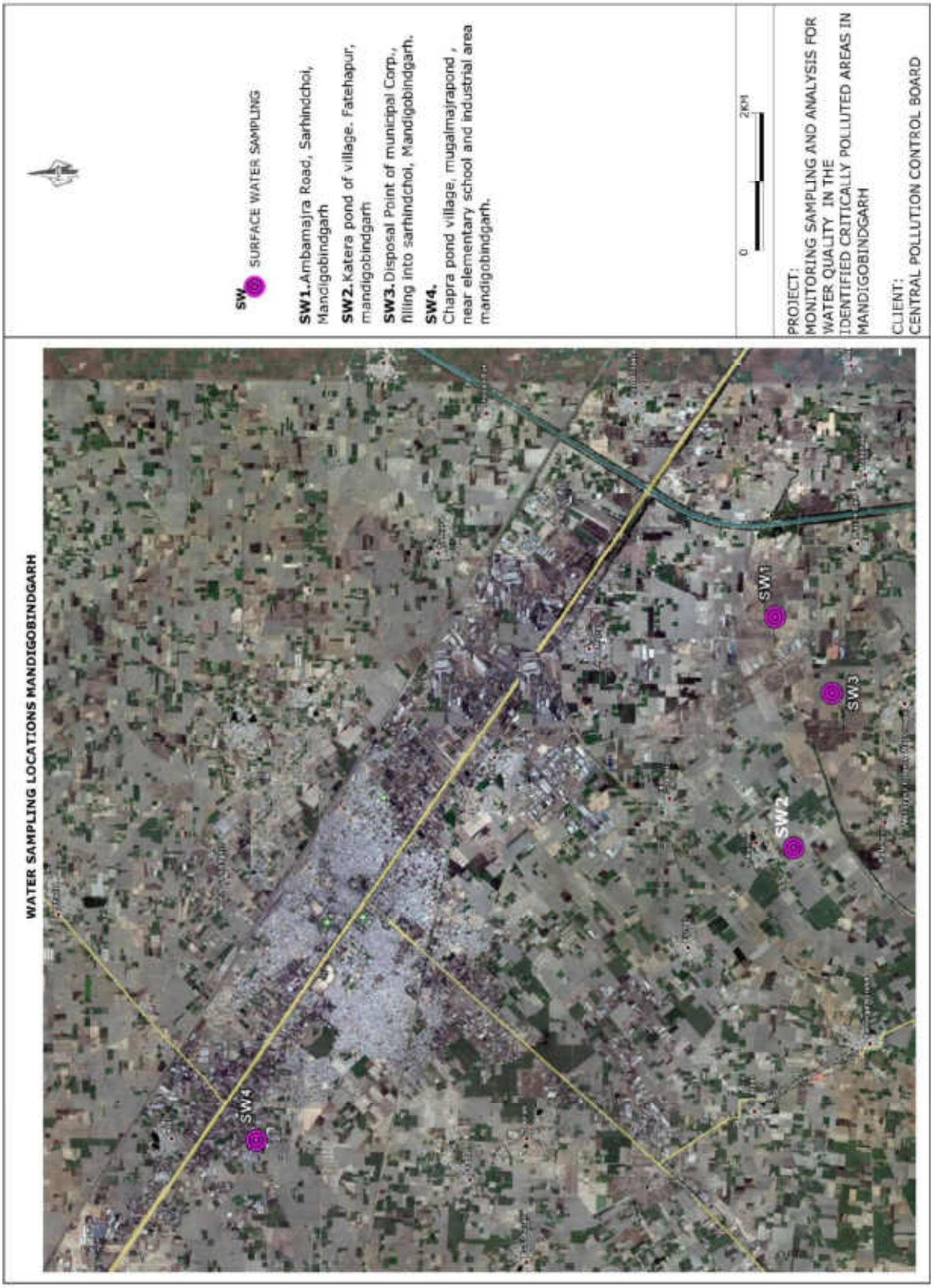
SURFACE WATER SAMPLING LOCATIONS

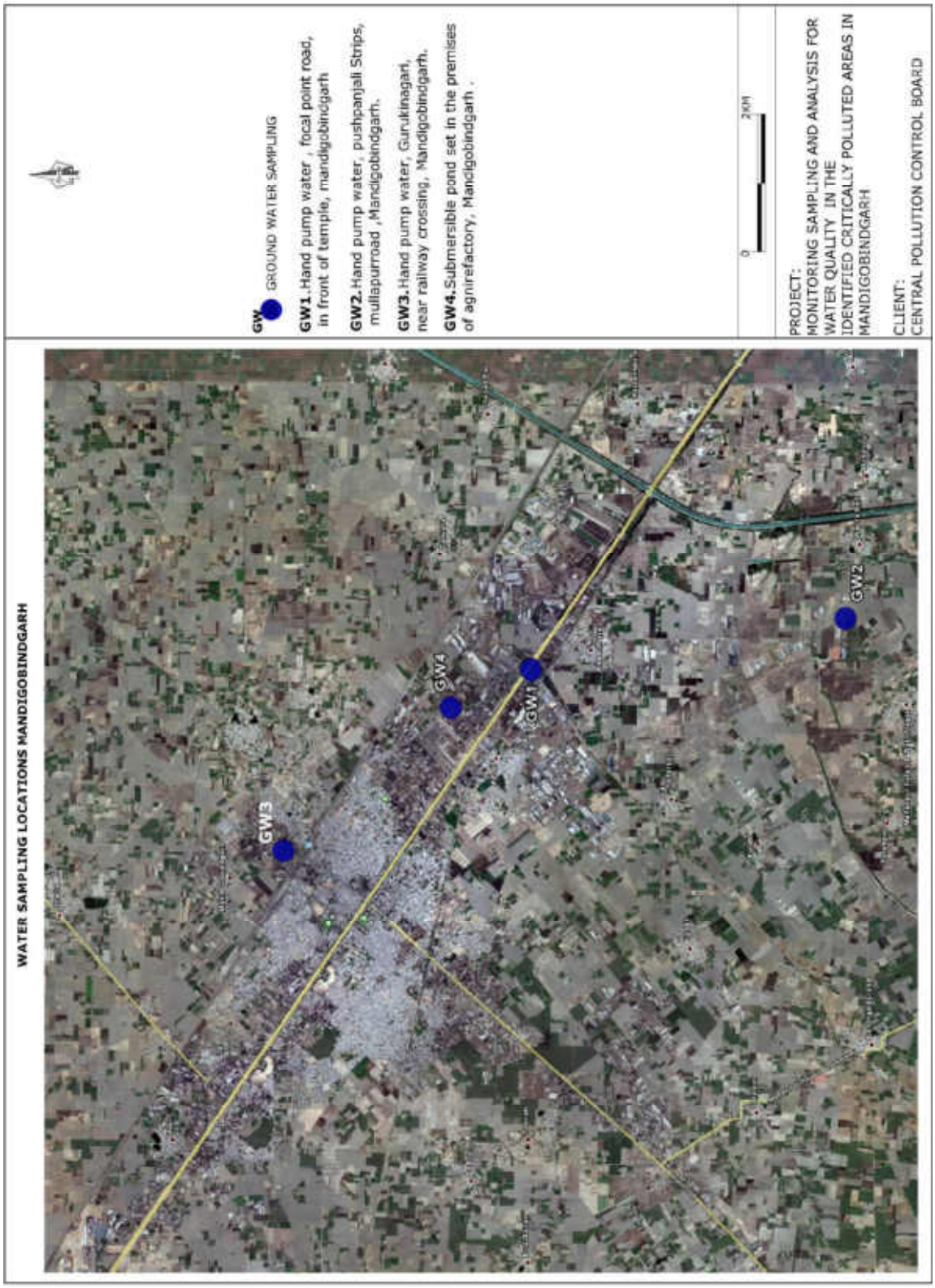
SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	Ambamajra Road, Sarhind choi, Mandigobindgarh	20.03.2013	N30°37'36.5"	E076°19'17.5"
SW - 2	Katera pond of village. Fatehapur,The mandigobindgarh	20.03.2013	N30°37'30.4"	E076°17'49.2"
SW – 3	Disposal Point of municipal Corp., filling into sarhind choi, Mandigobindgarh.	21.03.2013	N30°37'17.8"	E076°18'48.5"
SW – 4	Chapra pond village, mugalmajra pond , near elementary school and industrial area mandigobindgarh.	21.03.2013	N30°40'27.0"	E076°15'57.2"

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Hand pump water , focal point road, in front of temple, mandigobindgarh	20.03.2013	N30°38'57.2"	E076°18'57.9"
GW – 2	Hand pump water, pushpanjali Strips, mullapur road , Mandigobindgarh.	20.03.2013	N30°37'13.9"	E076°19'17.3"
GW – 3	Hand pump water, Gurukinagari, near railway crossing, Mandigobindgarh.	20.03.2013	N30°40'18.5"	E076°17'48.5"
GW – 4	Submersible pond set in the premises of agni refactory, Mandigobindgarh.	21.03.2013	N30°39'23.5"	E076°18'43.4"


AMBIENT AIR QUALITY MONITORING STATIONS
MANDIGOBINDGARH
North
A AIR MONITORING STATIONS
A1.Chanakya Dairy Products Ltd., Focal point MandiGobindgarh
A2.Lakshmi Steels Industries, Talwala Road, Mandigobindgarh
A3.Dhiman Steel Rolling Mills Amloh Road, MandiGobindgarh
A4.Karam Steel Corporation, MandiGobindgarh, Nasrali road.
0
2KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR AMBIENT AIR QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN MANDIGOBINDGARH
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
A1
A2
A3
A4


WATER SAMPLING LOCATIONS MANDIGOBINDGARH
SW4
SW2
SW3
SW1
SW SURFACE WATER SAMPLING
SW1.Ambamajra Road, Sarhindchoi, Mandigobindgarh
SW2.Katera pond of village. Fatehapur, mandigobindgarh
SW3.Disposal Point of municipal Corp., filling into sarhindchoi, Mandigobindgarh.
SW4.
Chapra pond village, mugalmajrapond , near elementary school and industrial area mandigobindgarh.
0
2KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN MANDIGOBINDGARH
CLIENT:
CENTRAL POLLUTION CONTROL BOARD


WATER SAMPLING LOCATIONS MANDIGOBINDGARH
GW3
GW4
GW1
GW2
GW GROUND WATER SAMPLING
GW1.Hand pump water , focal point road, in front of temple, mandigobindgarh
GW2.Hand pump water, pushpanjali Strips, mullapurroad ,Mandigobindgarh.
GW3.Hand pump water, Gurukinagari, near railway crossing, Mandigobindgarh.
GW4.Submersible pond set in the premises of agnirefactory, Mandigobindgarh .
0
2KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN MANDIGOBINDGARH
CLIENT:
CENTRAL POLLUTION CONTROL BOARD

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 Chanakya Dairy Products Ltd	**AAQ – 2** Lakshmi Steels Industries	**AAQ – 3** Dhiman Steel Rolling Mills	**AAQ – 4** Karam Steel Corporation	
1	Lead	µg/m³	0.32	0.27	0.16	0.13	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	< 0.5	1.3	1.9	0.9	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	3.4	2.7	2.1	2.9	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	191.0	220.2	248.5	151.7	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	57.9	68.7	78.5	59.7	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	21.0	18.3	15.8	10.3	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	4.3	2.7	6.1	3.8	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	16.5	22.6	14.8	17.2	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	27.2	35.0	21.6	25.4	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	8.4	6.1	10.6	7.3	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	17.2	14.9	19.1	18.1	
		µg/m³	4.6	3.2	4.4	< 2	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-1 Ambamajra Road, Sarhind choi	SW – 2 Katera pond	SW-3 Disposal Point of municipal Corp	SW-4 Chapra pond	
I	**Simple Parameters**						
1	Appearance	-	Brownish	Pale yellow	Grey	Greenish	-
2	Colour (Hazen Units)	-	30	20	30	40	IS 3025: Part – 4
3	Odour (Smell)	-	Un-Agreeable	Agreeable	Un-Agreeable	Un - Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.47	8.05	7.37	7.85	IS 3025: Part – 11
2	E C	µS/cm	1190	1480	1120	1620	IS 3025: Part – 14
3	Oil & Grease	mg/l	2	3	4	5	IS 3025: Part – 39
4	Suspended Solids	mg/l	32	80	128	114	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	<1	<1	< 1	< 1	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	82	138	168	236	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	21	40	45	70	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.10	0.01	0.02	0.05	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	8.58	1.81	1.58	4.97	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	8.68	1.82	1.60	5.02	By Calculation
11	Free Ammonia	mg/l	0.20	0.90	0.80	1.20	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	1.30	1.20	1.30	1.20	IS 3025: Part – 60
15	Sulphides as S	mg/l	1.8	3.8	6.0	10.4	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	2.78	5.1	3.74	4.16	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	2.16	4.25	1.44	2.34	By Calculation
18	Total Coliforms	MPN/100ml	17000	35000	28000	22000	IS 1622
19	Fecal Coliforms	MPN/100ml	5000	14000	11000	9000	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	3.14	6.8	4.02	4.84	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	18.4	29.4	28	36	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	7.8	14.0	15	19	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	0.18	0.4	0.2	0.62	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.01	0.04	0.10	0.05	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	0.01	0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.08	0.07	0.06	0.12	APHA 3111 – B
19	Iron as Fe	mg/l	0.72	0.34	0.57	0.70	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.16	0.20	0.16	0.39	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Focal point road	GW – 2 Pushpanjali Strips	GW-3 Gurukinagari	GW-4 Premises of Agni refactory	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	5	5	5	< 5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.70	7.90	7.57	7.37	IS 3025: Part – 11
2	E C	µS/cm	1090	738	885	1720	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	< 10	< 10	14	< 10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	4	6	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	< 2	< 2	< 2	< 2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	0.02	0.01	0.02	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	2.71	3.39	8.58	2.03	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	2.72	3.41	8.59	2.05	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	1.20	0.50	0.60	0.80	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	2.71	2.22	1.00	0.35	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	< 1	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	< 1	< 1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.28	0.24	0.21	0.15	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	0.03	0.02	0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.04	0.02	0.02	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.40	0.55	0.32	0.06	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.37	0.12	0.09	0.08	IS 3025: Part – 57

AMBIENT AIR MONITORING LOCATIONS PHOTOGRAPHS

Chanakya Dairy Products Ltd

Dhiman Steels

Karam Steels

Lakshmi Steels

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Ambamajra Road, Sarhind Choi

Katera Pond

Disposal Point of Municipal Corp

Chapra Pond

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Focal Point Road

Pushpanjali Strips

Gurukinagari

Premises of Agni Refectory

AAQ MONITORING LOCATIONS

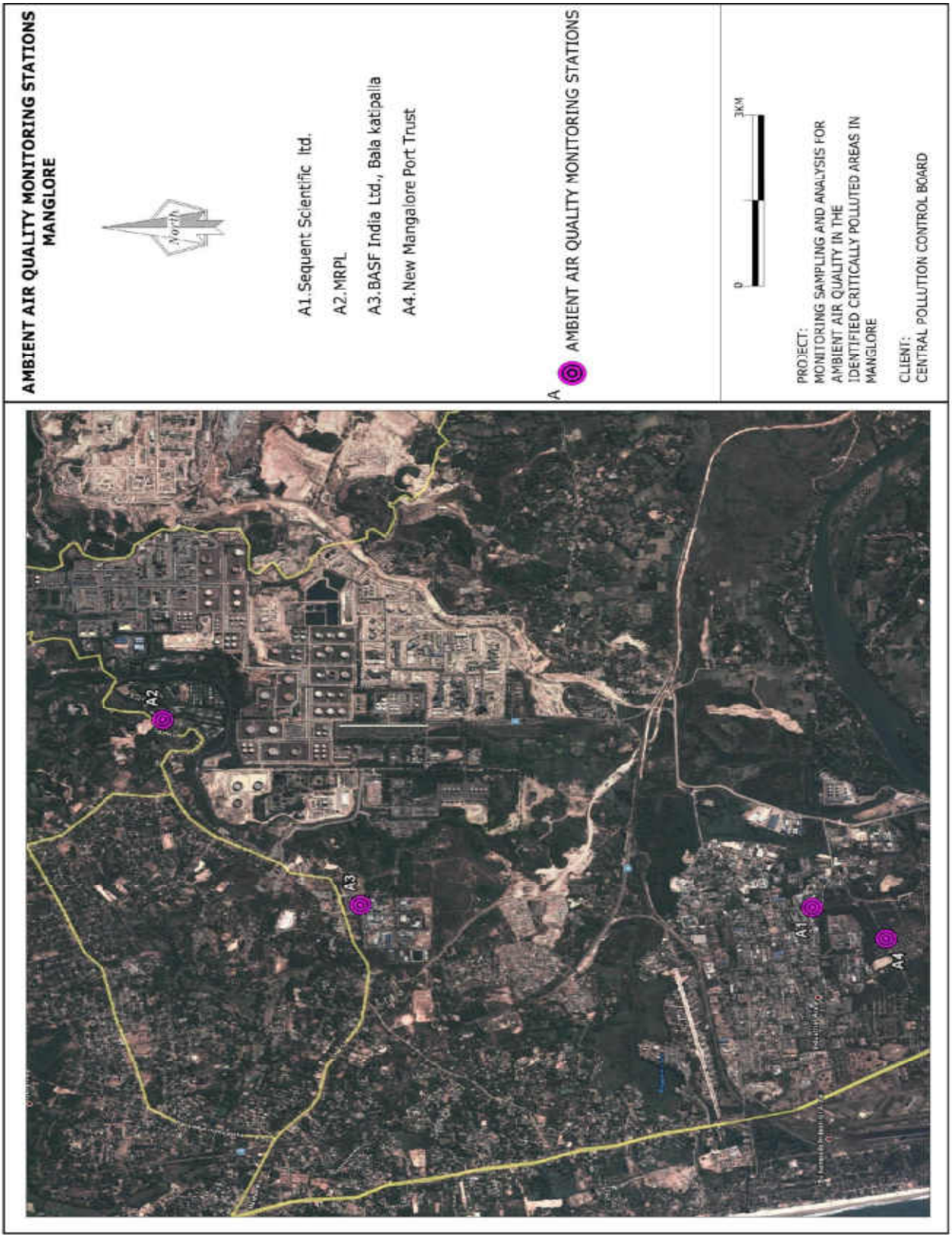
SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	Sequent Scientific ltd.	01.02.2013 to 02.02.2013	N 12⁰57'02.7''	E074⁰49'33.0''
AAQ – 2	MRPL	02.02.2013 to 03.02.2013	N 12⁰59'38.8''	E074⁰50'27.9''
AAQ – 3	BASF India Ltd., Bala katipalla	01.02.2013 to 02.02.2013	N 12⁰58'51.2''	E074⁰49'33.7''
AAQ – 4	New Mangalore Port Trust	01.02.2013 to 02.02.2013	N 12⁰56'44.9''	E074⁰49'23.9''

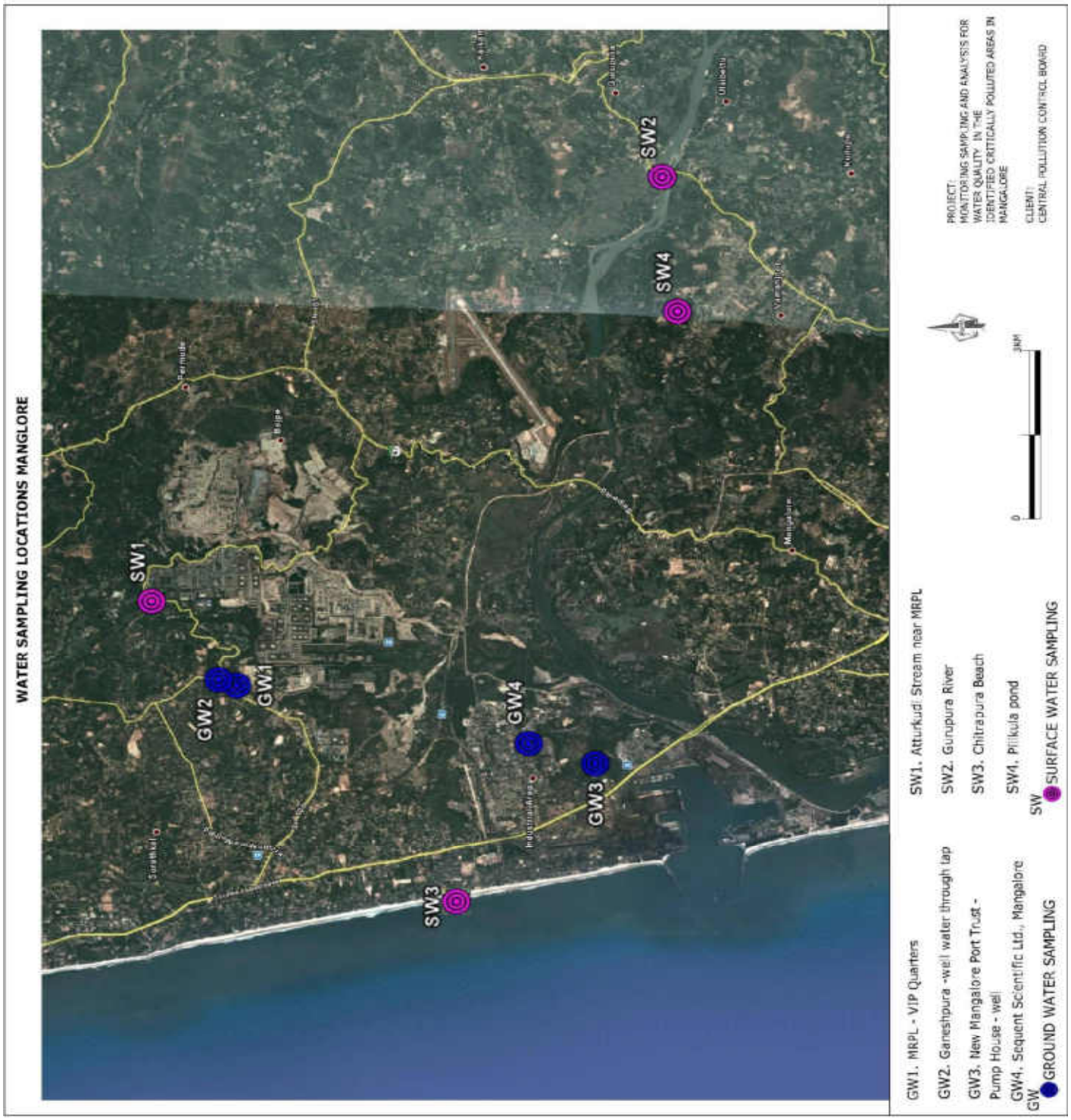
SURFACE WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	Atturkudi Stream near MRPL	02.02.2013	N 13⁰00'13.2''	E074⁰50'52.3''
SW – 2	Gurupura River	03.02.2013	N 12⁰55'56.0''	E074⁰55'02.7''
SW – 3	Chitrapura Beach	03.02.2013	N 12⁰57'24.8''	E074⁰47'59.2''
SW – 4	Pilikula pond	03.02.2013	N 12⁰55'48.4''	E074⁰53'42.9''

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	MRPL – VP Quarters	02.02.2013	N 12⁰59'30.2''	E074⁰50'01.7''
GW – 2	Ganeshpura –well water through tap	02.02.2013	N 12⁰59'39.5''	E074⁰50'05.0''
GW – 3	New Mangalore Port Trust – Pump House – well	02.02.2013	N 12⁰56'29.8''	E074⁰49'15.5''
GW – 4	Sequent Scientific Ltd., Mangalore	02.02.2013	N 12⁰56'29.7''	E074⁰49'15.6''


AMBIENT AIR QUALITY MONITORING STATIONS
MANGLORE
North
A1.Sequent Scientific ltd.
A2.MRPL
A3.BASF India Ltd., Bala katipalla
A4.New Mangalore Port Trust
A AMBIENT AIR QUALITY MONITORING STATIONS
0
3KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR AMBIENT AIR QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN MANGLORE
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
A1
A2
A3
A4


WATER SAMPLING LOCATIONS MANGLORE
SW1
SW2
SW3
SW4
GW1
GW2
GW3
GW4
GW1. MRPL - VIP Quarters
GW2. Ganeshpura -well water through tap
GW3. New Mangalore Port Trust - Pump House - well
GW4. Sequent Scientific Ltd., Mangalore
GW GROUND WATER SAMPLING
SW1. Attukudi Stream near MRPL
SW2. Gurupura River
SW3. Chitrapura Beach
SW4. Pilikula pond
SW SURFACE WATER SAMPLING
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN MANGALORE
CLIENT:
CENTRAL POLLUTION CONTROL BOARD

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 Sequent Scientific Ltd.,	**AAQ – 2** MRPL	**AAQ – 3** BASF Chemical Company	**AAQ – 4** NMPT	
1	Lead	µg/m³	0.15	0.26	0.13	0.16	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	4.4	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	2.1	3.5	2.2	1.6	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	78.6	96.2	87.3	91.0	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	33.2	38	29	35.9	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	38.4	46.3	51.4	24.0	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	7.6	10.2	5.4	4.1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	13.1	16.7	14.2	15.4	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	21.7	29.1	19.9	23.5	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	4.0	10.5	15.8	11.8	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	15.6	18.7	21.7	17.3	
		µg/m³	3.3	4.1	2.5	<2	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW -1 Atturkudi Stream	SW – 2 Gurupura River	SW-3 Chitrapura Beach	SW-4 Pilikula Pond	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	5	10	10	10	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	6.90	7.91	7.98	7.87	IS 3025: Part – 11
2	E C	µS/cm	560	834	52500	70	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	1	1	IS 3025: Part – 39
4	Suspended Solids	mg/l	14	34	30	22	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	5.6	5.6	4.8	5.2	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	8	28	32	24	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	2	5	6	5	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.02	0.01	0.01	<0.01	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	7.00	2.94	0.24	0.45	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	7.02	2.95	0.25	0.45	By calculation
11	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.50	0.70	1.20	0.30	IS 3025: Part – 60
15	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P D
17	Sodium Absorption Ratio (SAR)	-	1.77	2.98	53.06	0.30	By Calculation
18	Total Coliforms	MPN/100ml	30	26	180	50	IS 1622
19	Fecal Coliforms	MPN /100ml	<2	<2	23	2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P-D
2	Total Kjeldal Nitrogen	mg/l	<1	2.10	2.40	2.20	APHA 4500 – N org B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	1.40	1.70	1.90	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 508
7	PAH's	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 525.2
8	PCB and PCT	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 508
9	Zinc as Zn	mg/l	0.01	0.01	0.02	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	0.02	0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	0.02	<0.01	0.05	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.02	0.01	0.02	0.02	APHA 3111 – B
19	Iron as Fe	mg/l	0.21	0.12	0.44	0.15	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	0.14	0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.07	0.04	2.7	0.06	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Mangalore Refinery & Petroleum Ltd., VIP Quarters	GW – 2 Ganeshpura Baikampady Ind. Area	GW-3 New Mangalore Port Trust, Pump house	GW-4 Sequent Scientific Ltd.,	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Brownish	-
2	Colour (Hazen Units)	-	5	5	5	20	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	6.92	7.68	6.76	6.61	IS 3025: Part – 11
2	E C	µS/cm	140	80	113	1780	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	36	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	4	4	5	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	<0.01	<0.01	<0.01	0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	0.23	0.23	0.23	4.29	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.23	0.23	0.23	4.30	By Calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.30	0.20	0.30	0.50	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P D
16	Sodium Absorption Ratio (SAR)	-	0.58	0.17	0.27	2.09	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
19	**Special Parameters**						
III	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P D
1	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – N org B
2	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
3	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
4	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
5	Organo-chlorine Pesticides	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 508
6	PAH's	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 525.2
7	PCB and PCT	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 508.E
8	Zinc as Zn	mg/l	0.04	0.03	0.02	<0.01	IS 3025: Part – 49
9	Nickel as Ni	mg/l	0.03	0.02	0.01	0.02	IS 3025: Part – 54
10	Copper as Cu	mg/l	0.02	0.01	0.02	<0.01	IS 3025: Part – 42
11	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
12	Total Chromium as Cr	mg/l	0.02	0.03	0.01	0.03	IS 3025: Part – 52
13	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
14	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
15	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
16	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
17	Manganese as Mn	mg/l	0.01	<0.01	0.01	0.28	APHA 3111 – B
18	Iron as Fe	mg/l	0.17	0.10	0.15	0.40	IS 3025: Part – 53
19	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
20	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
21	Boron as B	mg/l	0.07	0.06	0.06	0.12	IS 3025: Part – 57

AMBIENT AIR MONITORING LOCATIONS PHOTOGRAPHS

Sequent Scientifics

BASF

Mangalore Port Trust

MRPL

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Atturkudi stream

Chitrapura Beach

Gurupura River

Pulikula Pond

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

NMPT Pump House

Ganeshpura

Sequent Scientific

VIP Quarters MRPL

AAQ MONITORING LOCATIONS

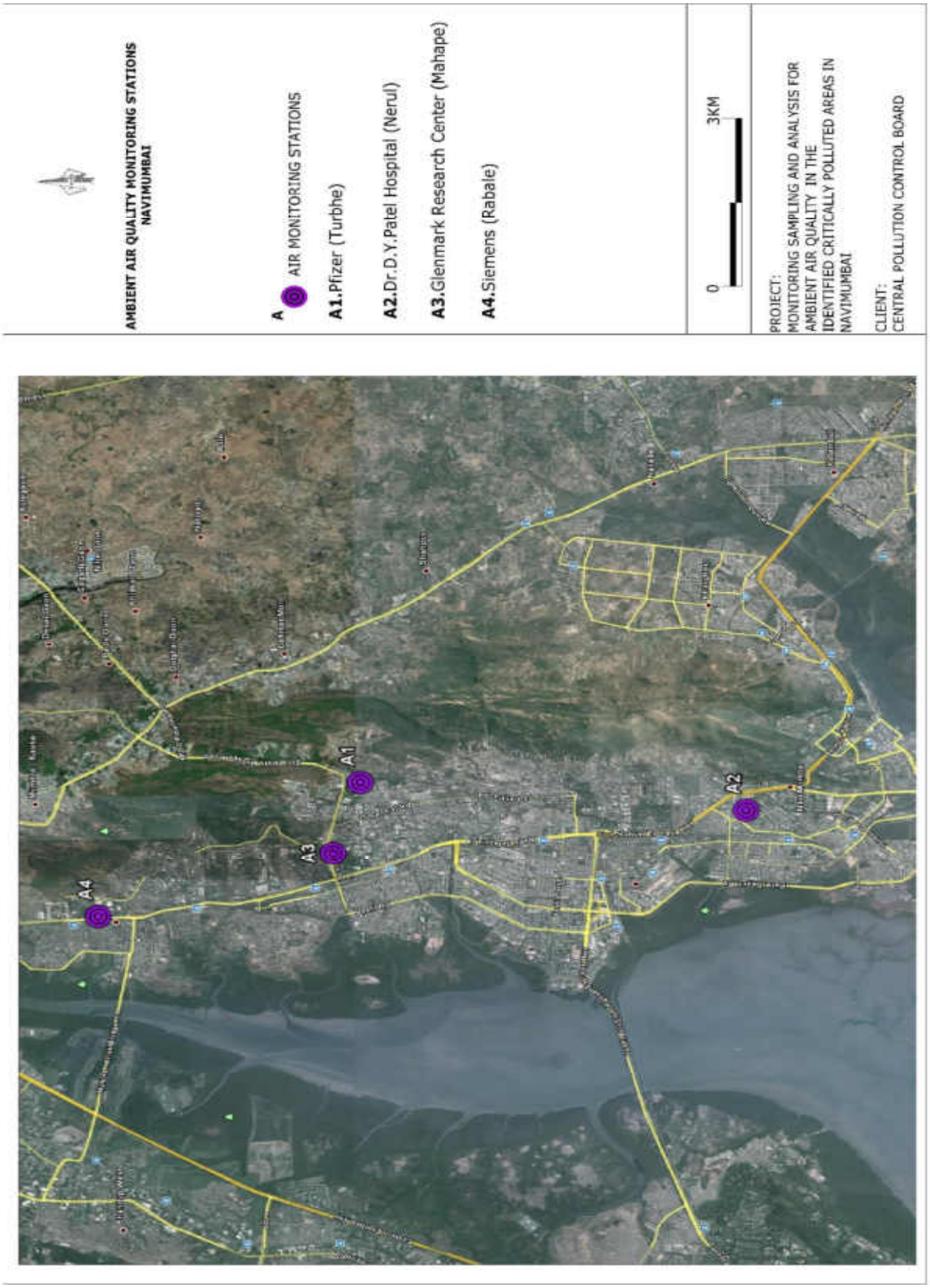
SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	Pfizer (Turbhe)	01.02.2013 to 02.02.2013	N19°04'02.8"	E073°01'28.8"
AAQ – 2	Dr.D.Y.Patel Hospital (Nerul)	01.02.2013 to 02.02.2013	N19°02'26.3"	E073°01'28.4"
AAQ – 3	Glenmark Research Center (Mahape)	01.02.2013 to 02.02.2013	N19°06'46.9"	E073°00'54.0"
AAQ – 4	Siemens (Rabale)	01.02.2013 to 02.02.2013	N19°09'15.2"	E073°00'3.4"

SURFACE WATER SAMPLING LOCATIONS

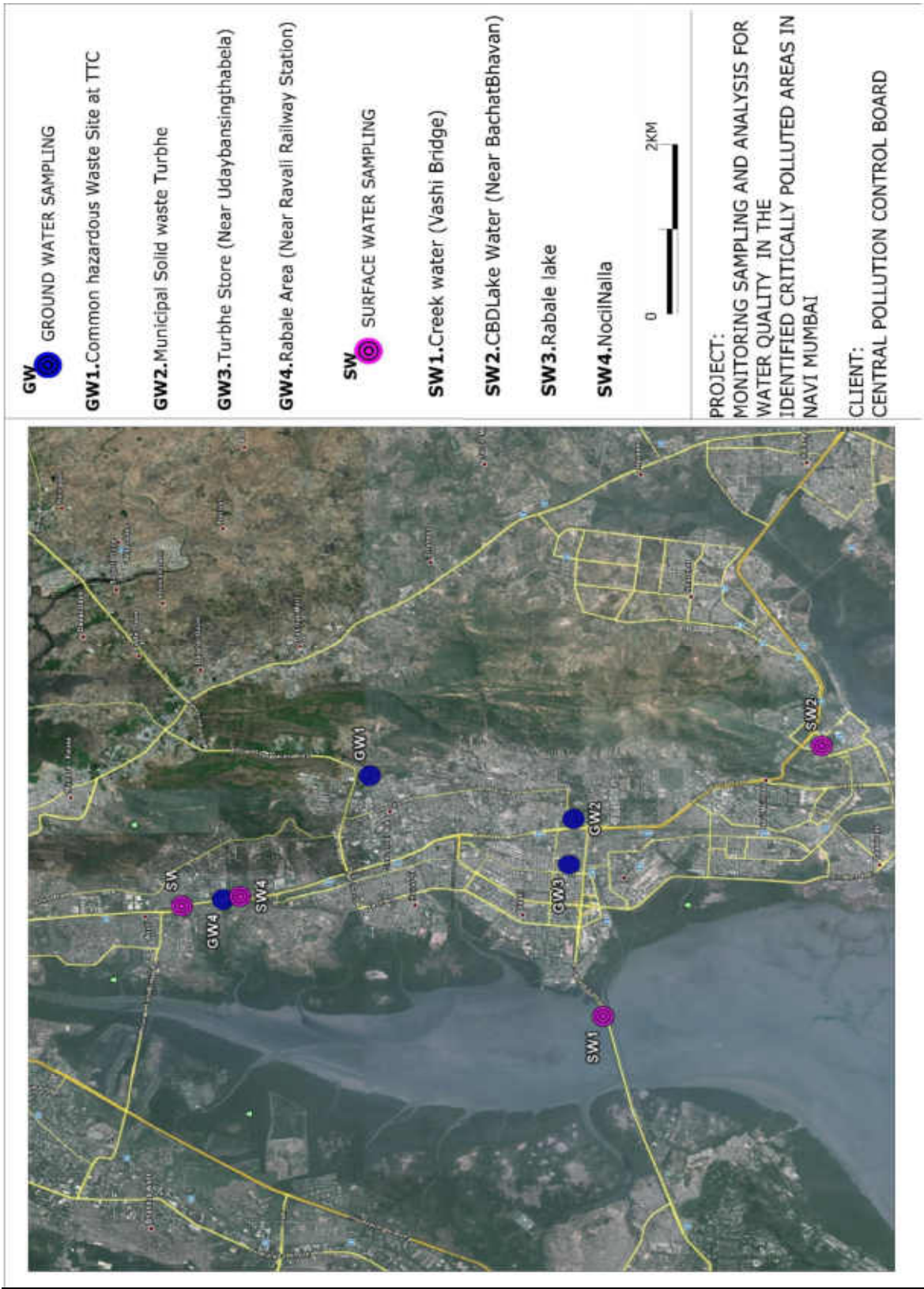
SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	Creek water (Vashi Bridge)	02.02.2013	N19°03'50.2"	E072°58'40.5"
SW – 2	CBDLake Water (Near Bachat Bhavan)	02.02.2013	N19°01'20.7"	E073°02'14.2"
SW-3	Rabale lake	02.02.2013	N19°08'38.5"	E073°00'07.2"
SW-4	Nocil Nalla	02.02.2013	N19°07'58.8"	E073°00'14.7"

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Common hazardous Waste Site at TTC	02.02.2013	N19°06'29.8"	E073°01'50.6"
GW – 2	Municipal Solid waste Turbhe	02.02.2013	N19°04'10.5"	E073°01'16.4"
GW-3	Turbhe Store (Near Udaybansing thabela)	02.02.2013	N19°04'13.7"	E073°00'40.0"
GW-4	Rabale Area (Near Ravali Railway Station)	02.02.2013	N19°08'16.8"	E073°00'62.5"


AMBIENT AIR QUALITY MONITORING STATIONS
NAVIMUMBAI
A AIR MONITORING STATIONS
A1.Pfizer (Turbhe)
A2.Dr.D.Y.Patel Hospital (Nerul)
A3.Glenmark Research Center (Mahape)
A4.Siemens (Rabale)
0
3KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR AMBIENT AIR QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN NAVIMUMBAI
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
A1
A2
A3
A4

NAVI MUMBAI - MAHARASHTRA



AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 Pfizer (Turbhe)	**AAQ – 2** Dr. D.Y.Patel Hospital (Nerul)	**AAQ – 3** Glenmark Research Centre (Mahaoel)	**AAQ – 4** Siemens (Rabale)	
1	Lead	µg/m³	0.22	0.04	0.13	0.17	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	3.8	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	0.92	0.46	0.92	0.67	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	2.7	<1	<1	1.2	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	72.3	50.9	62.2	97.2	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	31.7	25.4	34.5	38.0	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	39.6	18.1	26.7	29.6	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	8.2	2.1	4.5	6.7	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	17.1	10.6	13.8	18.4	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	29.6	16.9	24.7	31.6	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	6.8	5.4	8.2	5.9	IS 5182 (Part 9), 1974, RA 209, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	12.1	14.5	15.6	21.6	
		µg/m³	2.6	3.3	3.7	2.9	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-1 Creek Water (Vashi Bridge)	SW – 2 CBD Lake (Near Bachat Bhavan)	SW-3 Rabale Lake	SW-4 Nocil Nalla	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Greenish	-
2	Colour (Hazen Units)	-	5	5	5	30	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.02	7.54	7.56	2.00	IS 3025: Part – 11
2	E C	µS/cm	55400	2700	1600	18900	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	5	IS 3025: Part – 39
4	Suspended Solids	mg/l	36	24	16	192	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	5.1	5.4	5.6	<1	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	34	18	14	244	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	8	4	3	60	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.06	0.03	0.04	0.03	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	3.61	0.68	0.68	32.06	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	3.67	0.71	0.72	32.09	By Calculation
11	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	1.2	0.8	0.5	1.4	IS 3025: Part – 60
15	Sulphides as S	mg/l	0.40	0.20	0.20	3.60	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	0.25	0.10	0.12	1.28	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	mg/l	56.35	3.39	1.59	1.31	By Calculation
18	Total Coliforms	MPN/100ml	110	90	70	1300	IS 1622
19	Fecal Coliform	MPN/100ml	7	<2	<2	170	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	0.36	0.18	0.14	1.60	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	2.8	<1	<1	23	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	1.7	<1	<1	12	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	0.002	0.001	0.001	0.005	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	0.16	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.04	0.01	0.01	0.12	IS 3025: Part – 49
10	Nickel as Ni	mg/l	0.01	<0.01	<0.01	0.02	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	0.18	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	0.01	<0.01	<0.01	0.15	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	0.01	<0.01	<0.01	0.04	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	0.001	0.001	0.001	0.004	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.01	<0.01	<0.01	0.32	APHA 3111 – B
19	Iron as Fe	mg/l	0.25	0.09	0.07	1.8	IS 3025: Part – 53
20	Vanadium as V	mg/l	0.02	0.01	0.01	0.02	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	0.01	IS 3025: Part – 56
22	Boron as B	mg/l	3.6	0.15	0.12	1.12	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Common Hazardous Waste Site at TIC	GW – 2 Municipal Solid Waste Turbhe	GW-3 Turbhe Store (Near Uday Bansina thabelal)	GW-4 Rabale Area (Near Ravali Railway Station)	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	<5	<5	<5	<5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.94	7.30	7.65	7.21	IS 3025: Part – 11
2	E C	µS/cm	1200	800	1200	2000	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	8	8	6	4	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.02	0.02	0.04	0.04	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	0.90	<1	3.39	1.13	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.93	0.06	3.43	1.17	By Calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.50	0.60	0.60	0.90	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	mg/l	2.31	0.70	1.88	1.31	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliform	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.09	0.10	0.08	0.06	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.12	0.10	0.13	0.15	IS 3025: Part – 57

AMBIENT AIR MONITORING LOCATIONS PHOTOGRAPHS

DR D Y PATEL HOSPTAL

PFIZER

SIEMENS

GLENMARK

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

CBD LAKE WATER

CREEK WATER SAMPLING AT VASHI BRIDGE

RABALE LAKE

NOCIL NALLAH

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Municipal Solid Waste Turbhe

Municipal Solid Waste Turbhe

OPENWELL FROM RABALE AREA

TURBHE STORE

AAQ MONITORING LOCATIONS

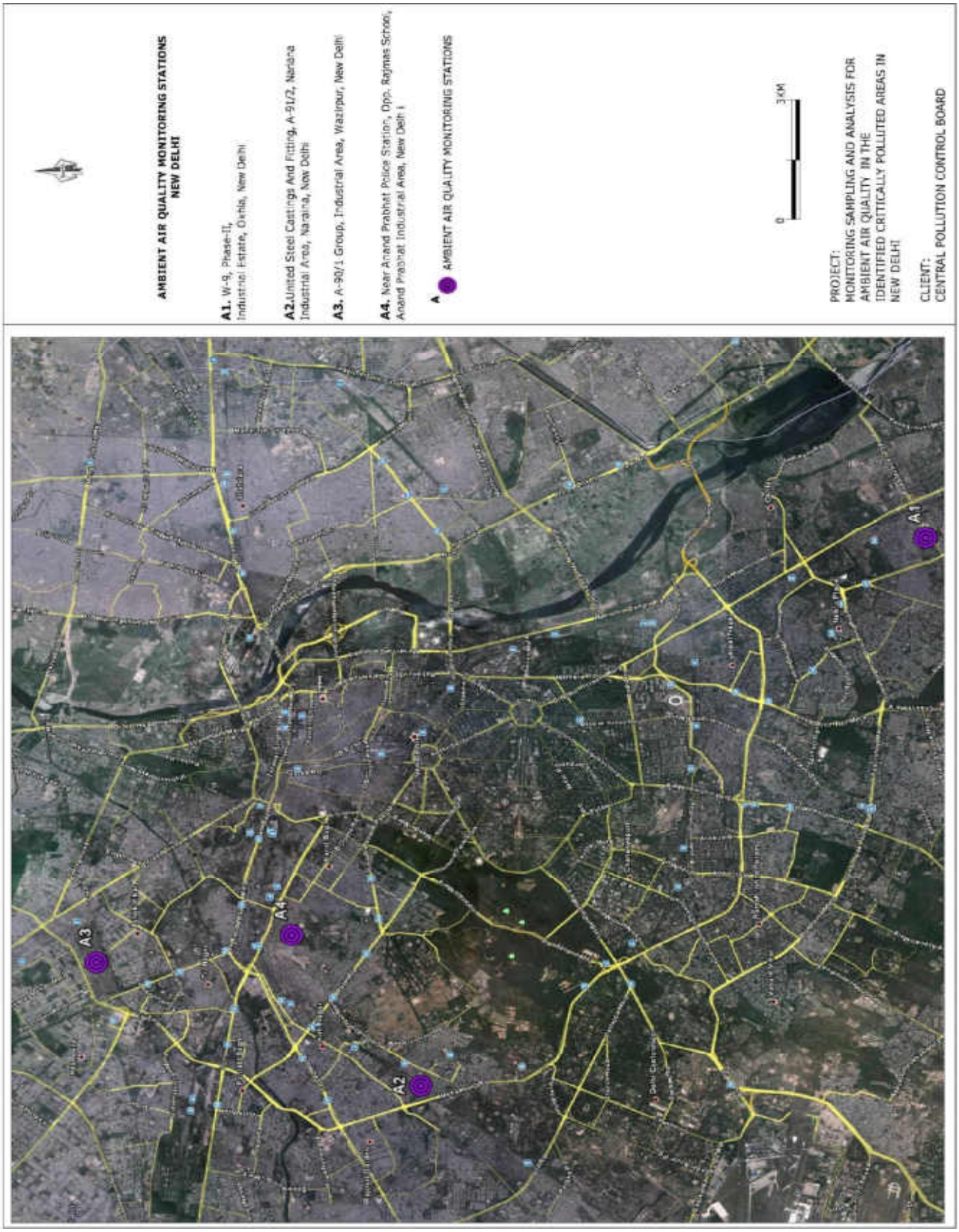
Sample Code	Name of the Monitoring Location	Date of Sampling	Latitude	Longitude
AAQ - 1	W-9, Phase-II, Industrial Estate, Okhla, New Delhi	02.02.2013 to 03.02.2013	N28°31'57"	E077°16'33.1"
AAQ - 2	United Steel Castings And Fitting, A-91/2, Nariana Industrial Area, Naraina, New Delhi	02.02.2013 to 03.02.2013	N28°38'2.2"	E077°08'7.8"
AAQ – 3	A-90/1 Group, Industrial Area, Wazirpur, New Delhi	02.02.2013 to 03.02.2013	N28°41'56.9"	E077°10'1.5"
AAQ - 4	Near Anand Prabhat Police Station, Opp. Rajmas School, Anand Prabhat Industrial Area, New Delhi	02.02.2013 to 03.02.2013	N28°39'35.6"	E077°10'26.4"

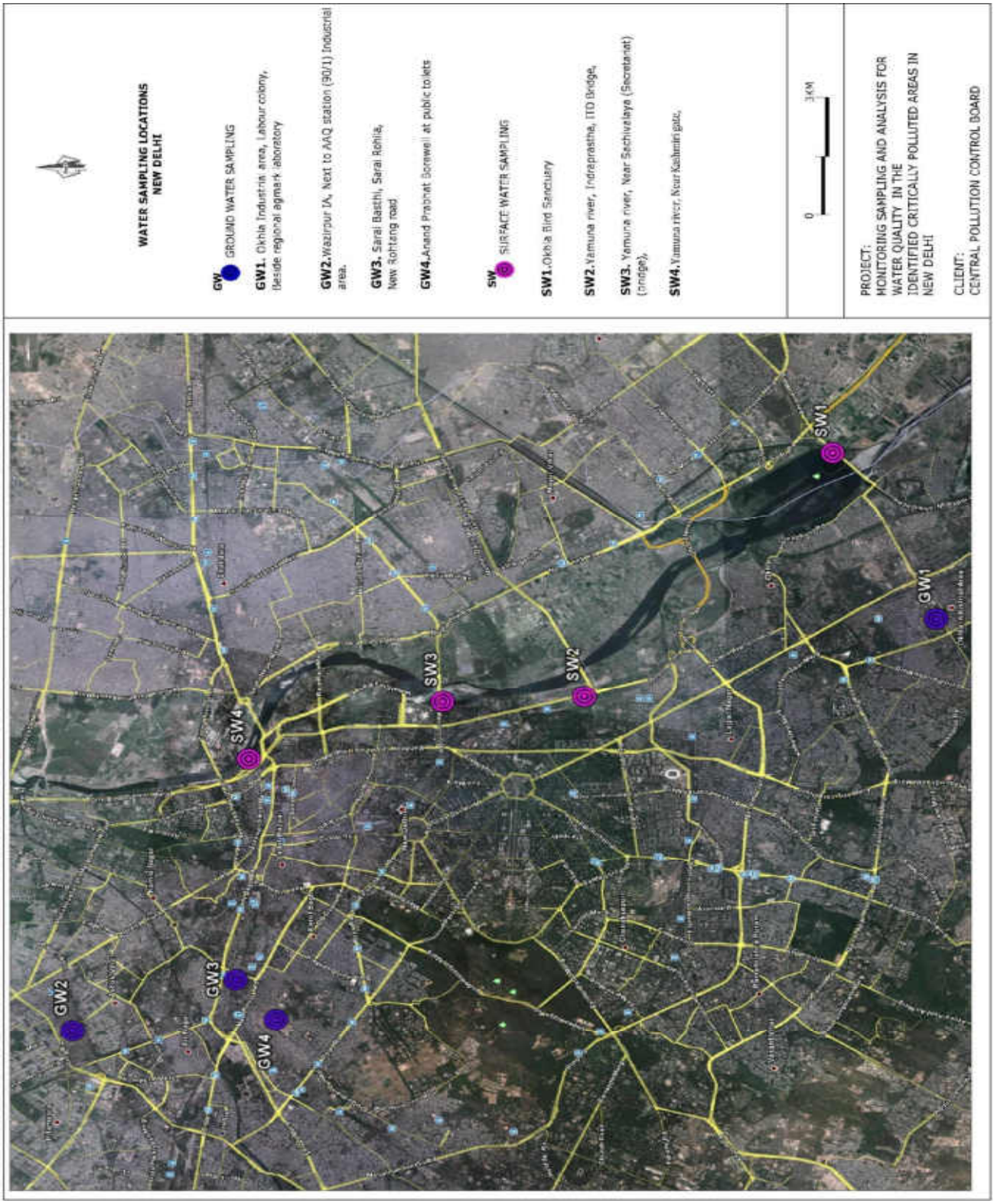
SURFACE WATER SAMPLING LOCATIONS

Sample Code	Name of the Sampling Location	Date of Sampling	Latitude	Longitude
SW – 1	Okhla Bird Sanctuary	01.02.2013	N 28°33'06"	E077°19'06.3"
SW – 2	Yamuna river, Indraprastha, ITO Bridge,	03.02.2013	N28°35'59.4"	E077°15'16.8"
SW – 3	Yamuna river, Near Sachivalaya (Secretariat) (bridge),	03.02.2013	N28°37'38.4"	E077°15'11.9"
SW – 4	Yamuna river, Near Kashmiri gate,	03.02.2013	N28°39'53.7"	E077°14'17.9"

GROUND WATER SAMPLING LOCATIONS

Sample Code	Name of the Sampling Location	Date of Sampling	Latitude	Longitude
GW – 1	Okhla Industrial area, Labour colony, Beside regional agmark laboratory	01.02.2013	N28°31'53.7"	E077°16'30.1"
GW – 2	Wazirpur IA, Next to AAQ station (90/1) Industrial area.	01.02.2013	N28°41'56.9"	E077°10'1.5"
GW – 3	Sarai Basthi, Sarai Rohila, New Rohtang road	01.02.2013	N28°40'03.0"	E077°10'49.8"
GW – 4	Anand Prabhat Borewell at public toilets	01.02.2013	N28°39'34.8"	E077°10'12.2"


AMBIENT AIR QUALITY MONITORING STATIONS
NEW DELHI
A1. W-9, Phase-II, Industrial Estate, Okhla, New Delhi
A2. United Steel Castings And Fitting, A-91/2, Naraina Industrial Area, Naraina, New Delhi
A3. A-90/1 Group, Industrial Area, Wazirpur, New Delhi
A4. Near Anand Prabhat Police Station, Opp. Rajmas School, Anand Prabhat Industrial Area, New Delhi
A AMBIENT AIR QUALITY MONITORING STATIONS
0
3KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR AMBIENT AIR QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN NEW DELHI
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
A1
A2
A3
A4


WATER SAMPLING LOCATIONS
NEW DELHI
GW GROUND WATER SAMPLING
GW1. Okhla Industrial area, Labour colony, Beside regional agmark laboratory
GW2. Wazirpur IA, Next to AAQ station (90/1) Industrial area.
GW3. Sarai Basthi, Sarai Rohila, New Rohtang road
GW4. Anand Prabhat Borewell at public toilets
SW SURFACE WATER SAMPLING
SW1. Okhla Bird Sanctuary
SW2. Yamuna river, Indraprastha, ITO Bridge,
SW3. Yamuna river, Near Sechivalaya (Secretariat) (bridge),
SW4. Yamuna river, Near Kashmiri gate,
0
3KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN NEW DELHI
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
GW1
GW2
GW3
GW4
SW1
SW2
SW3
SW4

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 Okhla Industrial Estate	**AAQ – 2** United Steel Castings, Naraina	**AAQ – 3** Industrial Area, Wazirpur	**AAQ – 4** Industrial Area - Anand Prabhat	
1	Lead	µg/m³	0.29	0.18	0.22	0.31	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	4.6	5.9	3.3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	0.65	1.4	0.77	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	2.5	2.1	3.3	2.8	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	290.0	239.0	304.2	188.5	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	102.6	83.2	84.8	106.9	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	36.1	27.4	34.9	24.9	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	5.1	10.4	6.3	8.9	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	19.7	18.3	20.5	18.2	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	29.4	31.9	37.0	33.7	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	5.6	4.3	6.9	6.1	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	11.3	12.7	15.5	13.9	
		µg/m³	2.3	1.7	3.7	<2	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-1 Okhla Bird Sanctuary	SW – 2 Yamuna River -Indra Prastha	SW-3 Yamuna River near Sachivalaya bridge	SW-4 Yamuna River near Kashmiri Gate	
I	**Simple Parameters**						
1	Appearance	-	Light Brownish	Blackish	Blackish	Greyish	-
2	Colour (Hazen Units)	-	20	25	20	20	IS 3025: Part – 4
3	Odour (Smell)	-	Un-agreeable	Un-agreeable	Un-agreeable	Un-agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.02	7.15	7.06	7.15	IS 3025: Part – 11
2	E C	µS/cm	570	1180	1200	1220	IS 3025: Part – 14
3	Oil & Grease	mg/l	2	8	7	5	IS 3025: Part – 39
4	Suspended Solids	mg/l	46	138	124	72	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	4.8	1.6	1.8	2.8	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	92	192	168	134	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	20	58	52	36	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.02	0.01	0.02	0.01	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	1.13	0.90	1.35	0.68	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	1.15	0.91	1.37	0.69	By Calculation
11	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.60	0.70	0.60	0.60	IS 3025: Part – 60
15	Sulphides as S	mg/l	0.80	1.4	1.0	0.8	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	1.64	1.2	0.6	0.47	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	1.47	2.98	2.79	3.12	By Calculation
18	Total Coliforms	MPN/100ml	900	9000	7000	5000	IS 1622
19	Fecal Coliforms	MPN/100ml	140	2600	2100	1400	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	2.10	1.60	0.80	0.70	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	23	28	25	21	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	12	16	14	13	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	0.004	0.002	0.002	0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.01	0.02	0.07	0.12	IS 3025: Part – 49
10	Nickel as Ni	mg/l	0.03	0.03	0.03	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	0.06	0.06	0.04	0.09	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.25	0.30	0.38	0.18	APHA 3111 – B
19	Iron as Fe	mg/l	0.86	0.99	1.02	0.93	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.18	0.21	0.24	0.25	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Okhla Industrial Area	GW – 2 Wazirpur Industrial Area	GW-3 Sara Basthi, Sarai Rohila	GW-4 Anand Prabhath – Public toilets	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	<5	5	<5	5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.21	6.75	7.40	7.20	IS 3025: Part – 11
2	E C	µS/cm	1320	2560	1320	3780	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	4	6	4	4	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	0.01	0.01	0.10	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	11.52	15.80	12.19	29.35	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	11.53	15.81	12.20	29.45	By Calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.50	0.70	0.50	0.80	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	0.10	0.36	0.12	0.19	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	2.42	4.43	3.44	6.62	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	14	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	0.15	0.40	0.15	0.23	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.14	0.02	0.03	0.07	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	0.02	0.01	0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	<0.01	0.02	0.02	0.03	APHA 3111 – B
19	Iron as Fe	mg/l	0.09	0.28	0.30	0.34	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.18	0.25	0.20	0.32	IS 3025: Part – 57

AMBIENT AIR MONITORING LOCATIONS PHOTOGRAPHS

W-9, Phase-II, Industrial Estate

United Steel Castings and Fitting

A-90/1 Group, Industrial Area

Near Anand Prabhat Police Station

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Okhla Bird Sanctuary, New Delhi

Yamuna river, Indraprastha

Yamuna river, Near Sachivalaya bridge

Yamuna river, Near Kashmiri gate

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Okhla Industrial area, Labour colony

Anand Prabhat Borewell at Public Toilets

Sarai Basthi, Sarai Rohila, New Rohtang road

Wazirpur IA

AAQ MONITORING LOCATIONS

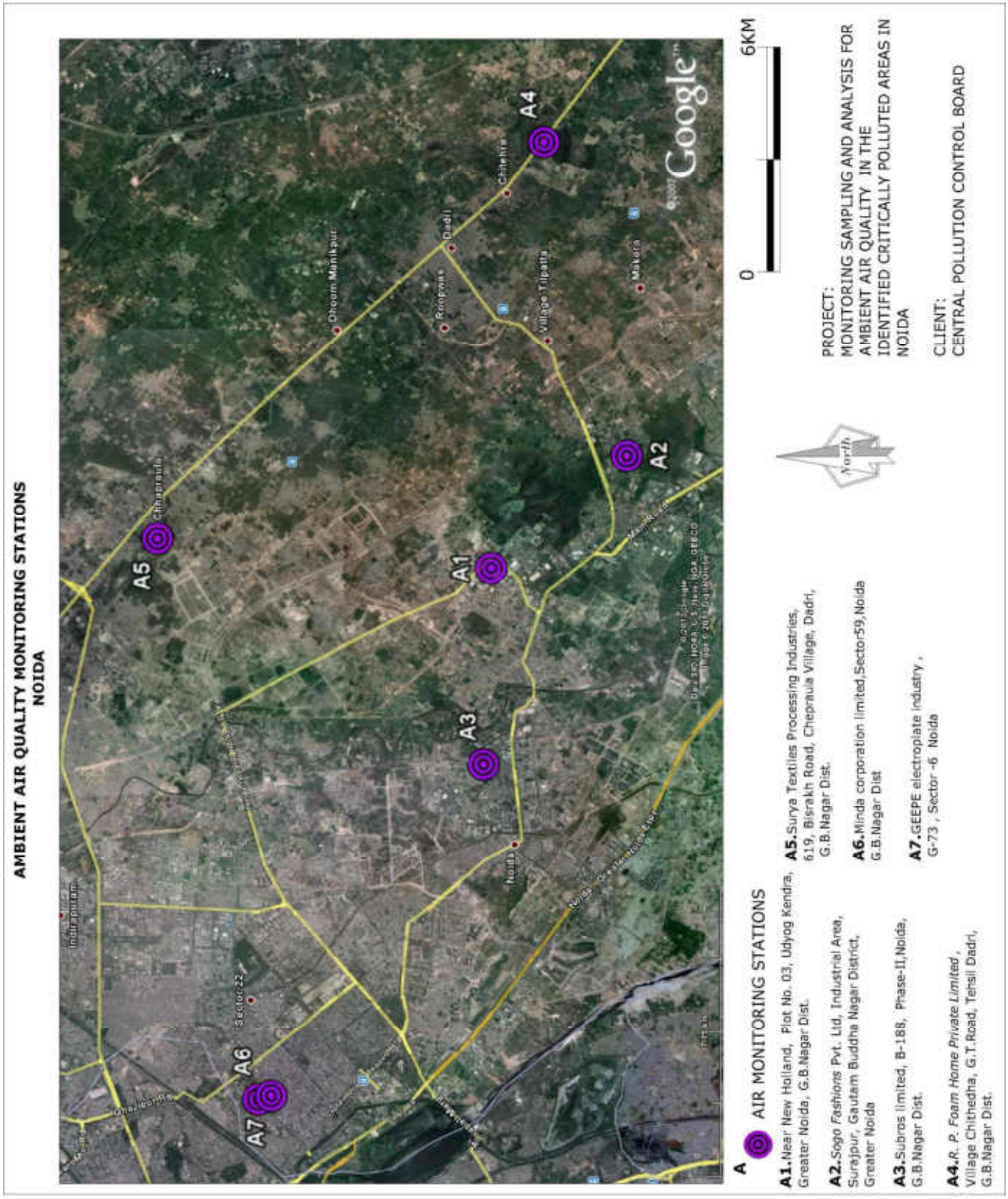
Sample Code	Name of the Monitoring Location	Date of Sampling	Latitude	Longitude
AAQ - 1	Near New Holland, Plot No. 03, Udyog Kendra, Greater Noida, G.B.Nagar Dist.	07.02.2013 to 08.02.2013	N28°32'27.2"	E077°28'00.0"
AAQ - 2	Sogo Fashions Pvt. Ltd, Industrial Area, Surajpur, Gautam Buddha Nagar District, Greater Noida	08.02.2013 to 09.02.2013	N28°30'33.2"	E077°29'51.0"
AAQ – 3	Subros limited, B-188, Phase-II,Noida, G.B.Nagar Dist.	08.02.2013 to 09.02.2013	N28°32'33.7"	E077°24'46.8"
AAQ - 4	R. P. Foam Home Private Limited, Village Chithedha, G.T.Road, Tehsil Dadri, G.B.Nagar Dist.	08.02.2013 to 09.02.2013	N28°31'42.7"	E077°35'00.2"
AAQ -5	Surya Textiles Processing Industries, 619, Bisrakh Road, Chepraula Village, Dadri, G.B.Nagar Dist.	09.02.2013 to 10.02.2013	N28°37'07.4"	E077°28'29.1"
AAQ -6	Minda corporation limited, Sector 59, Noida, G.B.Nagar Dist.	09.02.2013 to 10.02.2013	N28°36'31.7"	E077°22'19.2"
AAQ -7	GEEPE electroplate industry , G-73 , Sector -6 Noida	03.04.2013 to 04.04.2013	N28°35'42.3"	E077°19'14.4"

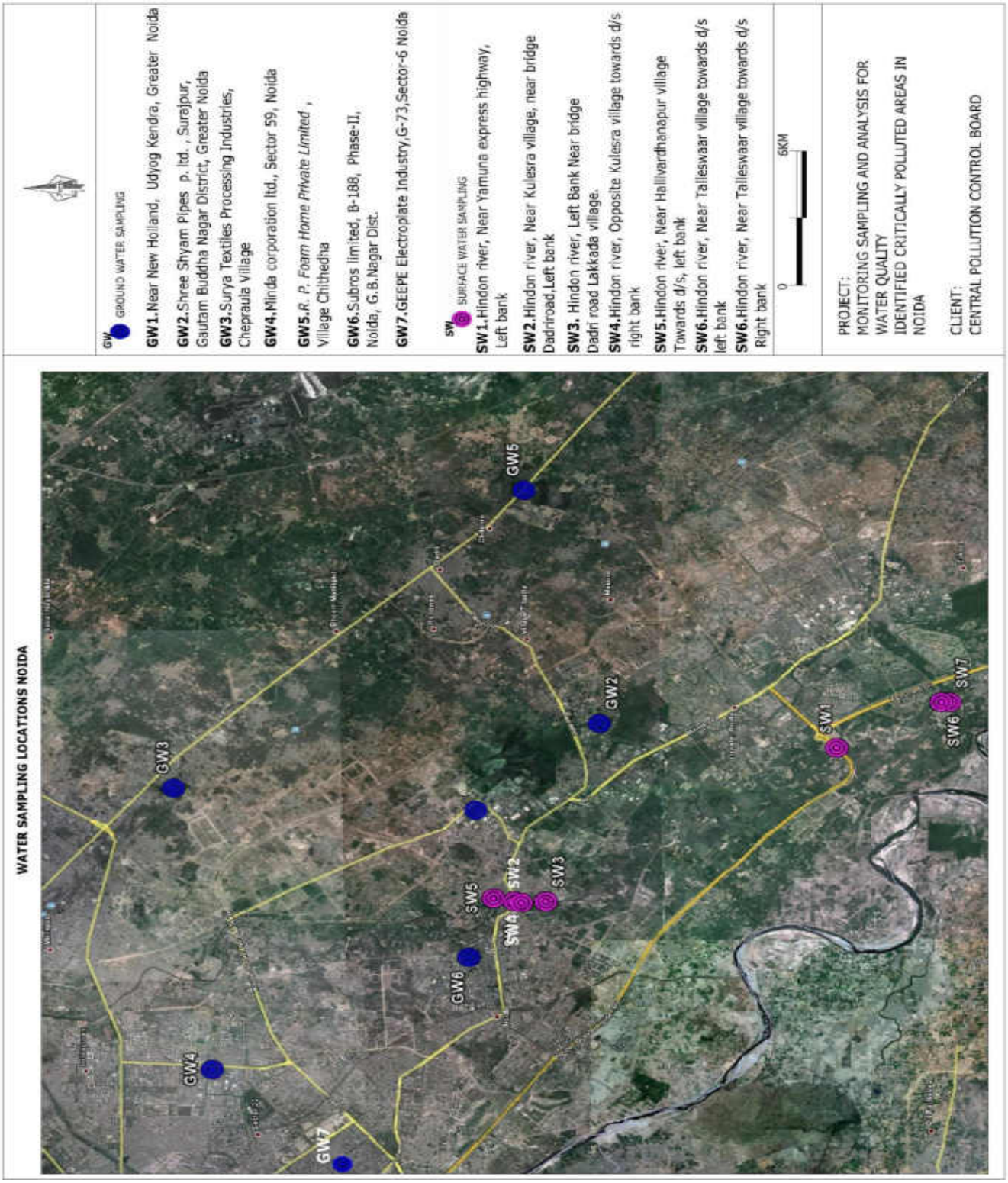
SURFACE WATER SAMPLING LOCATIONS

Sample Code	Name of the Sampling Location	Date of Sampling	Latitude	Longitude
SW – 1	Hindon river, Near Yamuna express highway, Left bank	10.02.2013	N28°26'52.5"	E077°29'22.0"
SW – 2	Hindon river, Near Kulesra village, near bridge Dadri road,Left bank	10.02.2013	N28°31'51.3"	E077°26'00.2"
SW – 3	Hindon river, Left Bank Near bridge Dadri road Lakkada village.	10.02.2013	N28°31'22.3"	E077°25'59.9"
SW – 4	Hindon river, Opposite Kulesra village towards d/s , right bank	10.02.2013	N28°31'49.7"	E077°25'58.4"
SW – 5	Hindon river, Near Hallivardhana pur village Towards d/s, left bank	10.02.2013	N28°32'10.9"	E077°26'04.1"
SW – 6	Hindon river, Near Talleswaar village towards d/s left bank	10.02.2013	N28°25'15.5"	E077°30'22.0"
SW – 7	Hindon river, Near Talleswaar village towards d/s Right bank	10.02.2013	N28°25'14.8"	E077°30'19.6"

GROUND WATER SAMPLING LOCATIONS

Sample Code	Name of the Sampling Location	Date of Sampling	Latitude	Longitude
GW – 1	Near New Holland, Udyog Kendra, Greater Noida	07.02.2013	N28°32'27.2"	E077°28'00"
GW – 2	Shree Shyam Pipes p. ltd. , Surajpur, Gautam Buddha Nagar District, Greater Noida	08.02.2013	N28°30'32.6"	E077°29'53.7"
GW – 3	Surya Textiles Processing Industries, Chepraula Village	08.02.2013	N28°37'07.4"	E077°28'29.1"
GW – 4	Minda corporation ltd., Sector 59, Noida	08.02.2013	N28°36'31.7"	E077°22'19.2"
GW – 5	R. P. Foam Home Private Limited, Village Chithedha	09.02.2013	N28°31'42.7"	E077°35'00.2"
GW – 6	Subros limited, B-188, Phase-II, Noida, G.B.Nagar Dist.	10.02.2013	N28°32'33.7"	E077°24'46.8"
GW – 7	GEEPE electroplate industry , G-73 , Sector -6 Noida	04.04.2013	N28°35'42.3"	E077°19'14.4"


AMBIENT AIR QUALITY MONITORING STATIONS
NOIDA
A5
A1
A3
A6
A7
A4
A2
Chiperauli
Sector 22
Noida
Ghoom Manikpur
Rorepur
Dadri
Chitehra
Village Tilpatta
Makora
Google
0
6KM
North
A AIR MONITORING STATIONS
A1.Near New Holland, Plot No. 03, Udyog Kendra, Greater Noida, G.B.Nagar Dist.
A2.Sogo Fashions Pvt. Ltd, Industrial Area, Surajpur, Gautam Buddha Nagar District, Greater Noida
A3.Subros limited, B-188, Phase-II,Noida, G.B.Nagar Dist.
A4.R. P. Foam Home Private Limited , Village Chithedha, G.T.Road, Tehsil Dadri, G.B.Nagar Dist.
A5.Surya Textiles Processing Industries, 619, Bisrakh Road, Chepraula Village, Dadri, G.B.Nagar Dist.
A6.Minda corporation limited,Sector59,Noida G.B.Nagar Dist
A7.GEEPE electroplate industry , G-73 , Sector -6 Noida
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR AMBIENT AIR QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN NOIDA
CLIENT:
CENTRAL POLLUTION CONTROL BOARD


WATER SAMPLING LOCATIONS NOIDA
GW
GROUND WATER SAMPLING
GW1.Near New Holland, Udyog Kendra, Greater Noida
GW2.Shree Shyam Pipes p. ltd. , Surajpur, Gautam Buddha Nagar District, Greater Noida
GW3.Surya Textiles Processing Industries, Chepraula Village
GW4.Minda corporation ltd., Sector 59, Noida
GW5.R. P. Foam Home Private Limited , Village Chithedha
GW6.Subros limited, B-188, Phase-II, Noida, G.B.Nagar Dist.
GW7.GEEPE Electroplate Industry,G-73,Sector-6 Noida
SW
SURFACE WATER SAMPLING
SW1.Hindon river, Near Yamuna express highway, Left bank
SW2.Hindon river, Near Kulesra village, near bridge Dadriroad,Left bank
SW3. Hindon river, Left Bank Near bridge Dadri road Lakkada village.
SW4.Hindon river, Opposite Kulesra village towards d/s right bank
SW5.Hindon river, Near Hallivardhanapur village Towards d/s, left bank
SW6.Hindon river, Near Talleswaar village towards d/s left bank
SW6.Hindon river, Near Talleswaar village towards d/s Right bank
0
6KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY IDENTIFIED CRITICALLY POLLUTED AREAS IN NOIDA
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
GW1
GW2
GW3
GW4
GW5
GW6
GW7
SW1
SW2
SW3
SW4
SW5
SW6
SW7

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS			Test Methods
			AAQ – 1 Near New Holland, Udyog Kendra, G.Noida	**AAQ – 2** SOGO Fashions Ltd., Surajpur	**AAQ – 3** Subros company Ltd., Noida	
1	Lead	µg/m³	0.30	0.21	0.26	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	2.3	1.8	1.3	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	149.1	133.3	165.3	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	62.4	87.0	51.4	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	21.6	18.7	28.2	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	9.6	12.3	10.4	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	14.7	13.8	16.1	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	29.6	25.9	28.6	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	
		mg/m³	<2	<2	<2	
12	O_3	µg/m³	7.4	10.9	8.4	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	18.2	27.0	24.0	
		µg/m³	5.3	<2	3.1	

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 4 RP Foam Chittahada, Dadri	**AAQ – 5** Surya Textiles Processing, Chepraula	**AAQ – 6** Minda Corporation Ltd., Sector 59, Noida	**AAQ – 7** GEEPE Electroplate Industry	
1	Lead	µg/m³	0.32	0.24	0.27	0.47	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	3.6	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	0.68	<0.5	0.71	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	1.8	2.9	3.4	2.1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	162.0	159.3	78.9	251.1	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	86.0	74.3	38.6	106.3	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	14.6	22.0	16.8	11.6	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	14.7	12.9	7.2	19.4	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	18.7	15.6	13.8	21.3	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	30.5	28.6	24.2	31.5	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	7.8	9.6	11.7	12.3	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	16	24.2	27	31.6	
		µg/m³	4.1	2.8	< 2	4.8	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-1 Hindon River Near Yamuna express highway,	SW – 2 Hindon River Near kulleswara village	SW-3 Hindon river, Lakkada village	SW – 4 Hindon river,Opp. Kulleswara village	
I	**Simple Parameters**						
1	Appearance	-	Light brown	Light brown	Light brown	Light brown	-
2	Colour (Hazen Units)	-	20	20	20	20	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.20	7.20	7.12	7.19	IS 3025: Part – 11
2	E C	µS/cm	522	440	420	434	IS 3025: Part – 14
3	Oil & Grease	mg/l	1	1	1	1	IS 3025: Part – 39
4	Suspended Solids	mg/l	98	88	84	92	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	2.7	3.1	4.8	3.2	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	72	60	64	68	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	20	17	18	19	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.02	0.04	< 0.01	0.02	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	3.16	4.52	5.87	6.10	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	3.18	4.56	5.87	6.12	By Calculation
11	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.60	0.70	0.60	0.60	IS 3025: Part – 60
15	Sulphides as S	mg/l	1.76	1.60	1.28	<0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	<0.1	0.28	0.36	0.41	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	0.97	0.81	0.79	0.77	By Calculation
18	Total Coliforms	MPN/100ml	2600	2700	3300	9000	IS 1622
19	Fecal Coliforms	MPN/100ml	1400	1400	1700	2600	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	0.42	0.54	0.62	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	14.8	13.6	12.0	15.4	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	7.0	6.4	5.8	7.6	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.01	0.01	0.01	0.02	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.04	0.05	0.04	0.04	APHA 3111 – B
19	Iron as Fe	mg/l	0.26	0.24	0.26	0.22	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.08	0.10	0.09	0.09	IS 3025: Part – 57

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			SW-5 Hindon River,Near Hallivardhana pur village	SW-6 Hindon river,Near Talleswaar village,left bank	SW-7 Hindon river,Near Talleswaar village, Right bank	
I	**Simple Parameters**					
1	Appearance	-	Light brown	Light brown	Light brown	-
2	Colour (Hazen Units)	-	20	10	10	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.04	7.28	7.57	IS 3025: Part – 11
2	E C	µS/cm	395	465	484	IS 3025: Part – 14
3	Oil & Grease	mg/l	1	1	1	IS 3025: Part – 39
4	Suspended Solids	mg/l	74	78	72	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	3.2	3.0	3.1	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	56	54	48	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	14	15	14	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.02	0.02	0.02	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	5.87	5.65	5.87	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	5.89	5.67	5.89	By Calculation
11	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.50	0.70	0.50	IS 3025: Part – 60
15	Sulphides as S	mg/l	0.64	< 0.1	< 0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	0.35	0.35	< 0.1	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	0.88	0.94	0.97	By Calculation
18	Total Coliforms	MPN/100ml	8000	5000	3400	IS 1622
19	Fecal Coliforms	MPN/100ml	2200	2100	1700	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	0.54	0.52	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	5.4	6.0	5.2	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	2.8	3.4	2.5	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.02	<0.01	0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.02	0.03	0.02	APHA 3111 – B
19	Iron as Fe	mg/l	0.30	0.18	0.18	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.09	0.08	0.08	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Near new Holland, Udyog Kendra, Noida	GW – 2 Shree Shyam Pipes Ltd. Surjapura	GW-3 Surya Textiles Processing Industries. Chepraula Village	GW-4 Minda Corporation Ltd.,	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	<5	<5	<5	<5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.42	7.64	7.98	7.65	IS 3025: Part – 11
2	E C	µS/cm	980	1100	700	2500	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	< 10	< 10	< 10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	6	4	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.02	0.01	0.01	<0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	5.87	2.93	4.97	2.71	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	5.89	2.94	4.98	2.71	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.70	0.50	0.40	0.56	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	< 0.1	< 0.1	< 0.1	<0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	2.48	1.59	1.13	7.83	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	< 0.1	< 0.1	< 0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	< 1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	< 1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.09	0.08	0.09	0.07	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.10	0.12	0.08	0.18	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			GW – 5 Subros Co. Ltd., Noida	GW – 6 R.P.Foams	GW – 7 GEEPE Electroplate Industry	
I	**Simple Parameters**					
1	Appearance	-	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	< 5	<5	5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.94	7.46	7.14	IS 3025: Part – 11
2	E C	µS/cm	3900	1040	3340	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	58	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	6	8	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	<0.01	0.02	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	0.23	6.32	6.77	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.24	6.32	6.79	By Calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.62	0.50	0.70	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	0.19	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	11.38	2.65	7.72	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	<0.1	<0.1	0.26	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	0.05	0.02	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	<0.01	<0.01	0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.08	0.06	0.17	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.24	0.13	0.40	IS 3025: Part – 57

AMBIENT AIR MONITORING PHOTOGRAPHS

Near New Holland, Plot No. 03, Udyog Kendra

Sogo Fashions Pvt. Ltd

Subros limited

Surya Textiles Processing Industries

AMBIENT AIR MONITORING PHOTOGRAPHS

Minda Corporation limited

GEEPE Electroplate Industry

SAMPLING LOCATION PHOTOGRAPHS FOR SURFACE WATER

Hindon River - Near Yamuna Express Highway Left Bank

Hindon River - Near Kulesra Village – Bridge Dadri Road

Hindon River- Near Lakkada Village – Bridge Dadri Road

Hindon River - Opp. Kulesra Village – Downstream Right Bank

Hindon River - Near Hallivardhanapur Village – Towards Downstream Left Bank

Hindon River - Near Talleswar Village – Towards Downstream Left Bank

SAMPLING LOCATION PHOTOGRAPHS FOR SURFACE WATER

Hindon River - Near Talleswar Village – Towards Downstream Right Bank

GROUND WATER QUALITY PHOTOGRAPHS OF NOIDA REGION OF UTTAR PRADESH

NEW HOLLAND, UDYOG KENDRA

NEAR SOGO FASHION

SURYA TEXTILE

MINDA CORPORATION

HAND PUMP, NEAR RP FOAM AT CHITTADA VILLAGE

PUMP HOUSE, NEAR SUBROSE

GROUND WATER QUALITY PHOTOGRAPHS OF NOIDA REGION OF UTTAR PRADESH

SECTOR-6, NEAR GEEPE ELECTROPLATE INDUSTRIES, NOIDA

SAMPLING LOCATIONS WITH GPS COORDINATES

AAQ MONITORING LOCATIONS

SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	Jodhpur vidyut vitran Pali, industrial area phase-II, Pali	25.03.2013 to 26.03.2013	N25°47'32.6"	E073°18'33.6"
AAQ – 2	Shree Bangur Hospital, Pali	25.03.2013 to 26.03.2013	N25°46'37.6"	E073°19'53.2"
AAQ – 3	4-b2, New Housing Board Colony, Jodhpur Road, Pali	25.03.2013 to 26.03.2013	N25°47'32.6"	E073°18'33.6"
AAQ – 4	Common Effluent treatment Plant Number -03 Industrial Area Pali	25.03.2013 to 26.03.2013	N25°46'43.1"	E073°17'13.3"

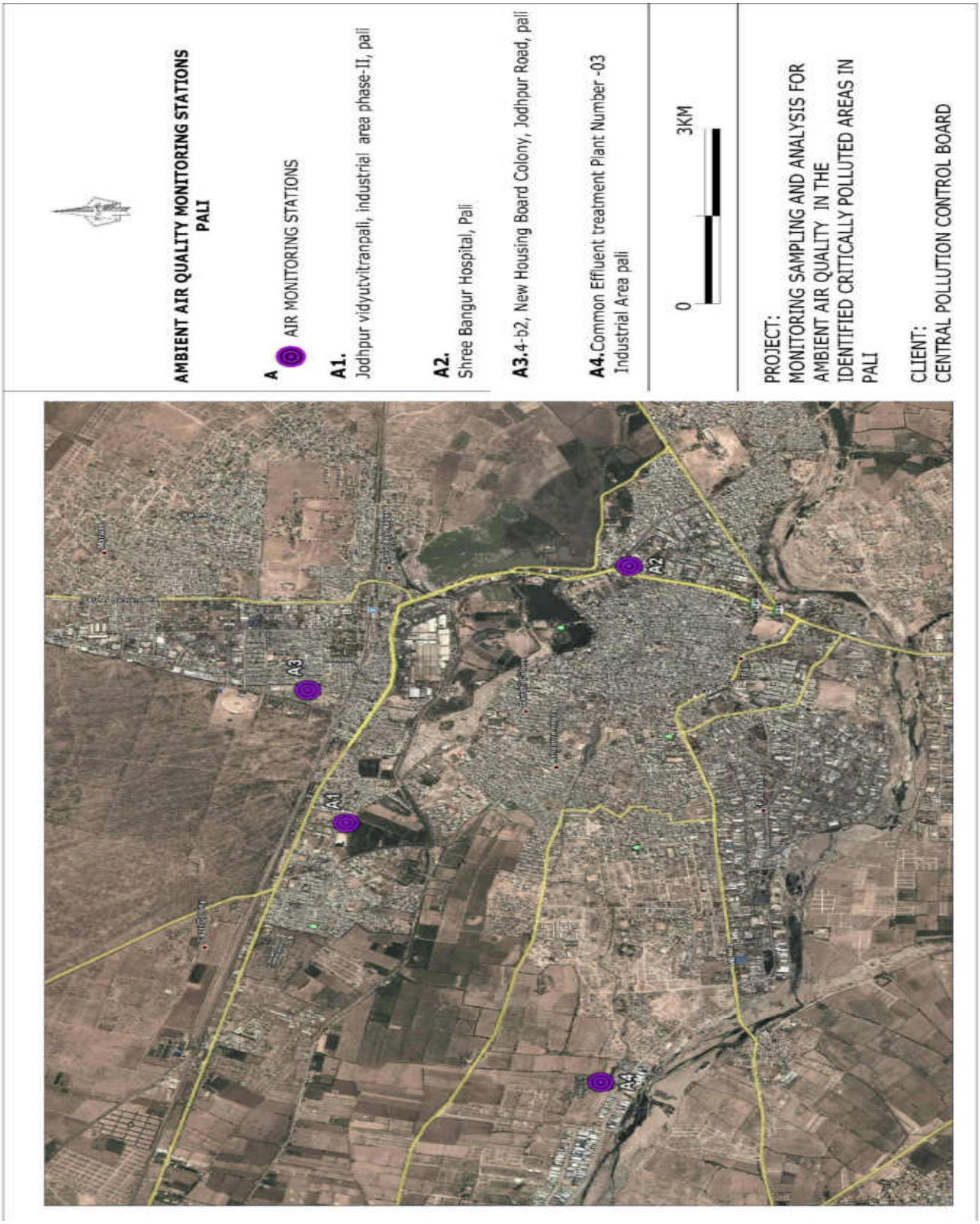
SURFACE WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	Lodiyac talab near Gandhi stechue circle, bahrugate Pali	25.03.2013	N25°46'58.8"	E073°19'44.4"
SW - 2	Bandi river downstream , Jaipur – Palli Highway , Pali	25.03.2013	N25°46'03.1"	E073°21'14.5"
SW – 3	Lakhotiya talab Pali	25.03.2013	N25°46'54.8"	E073°19'53.6"

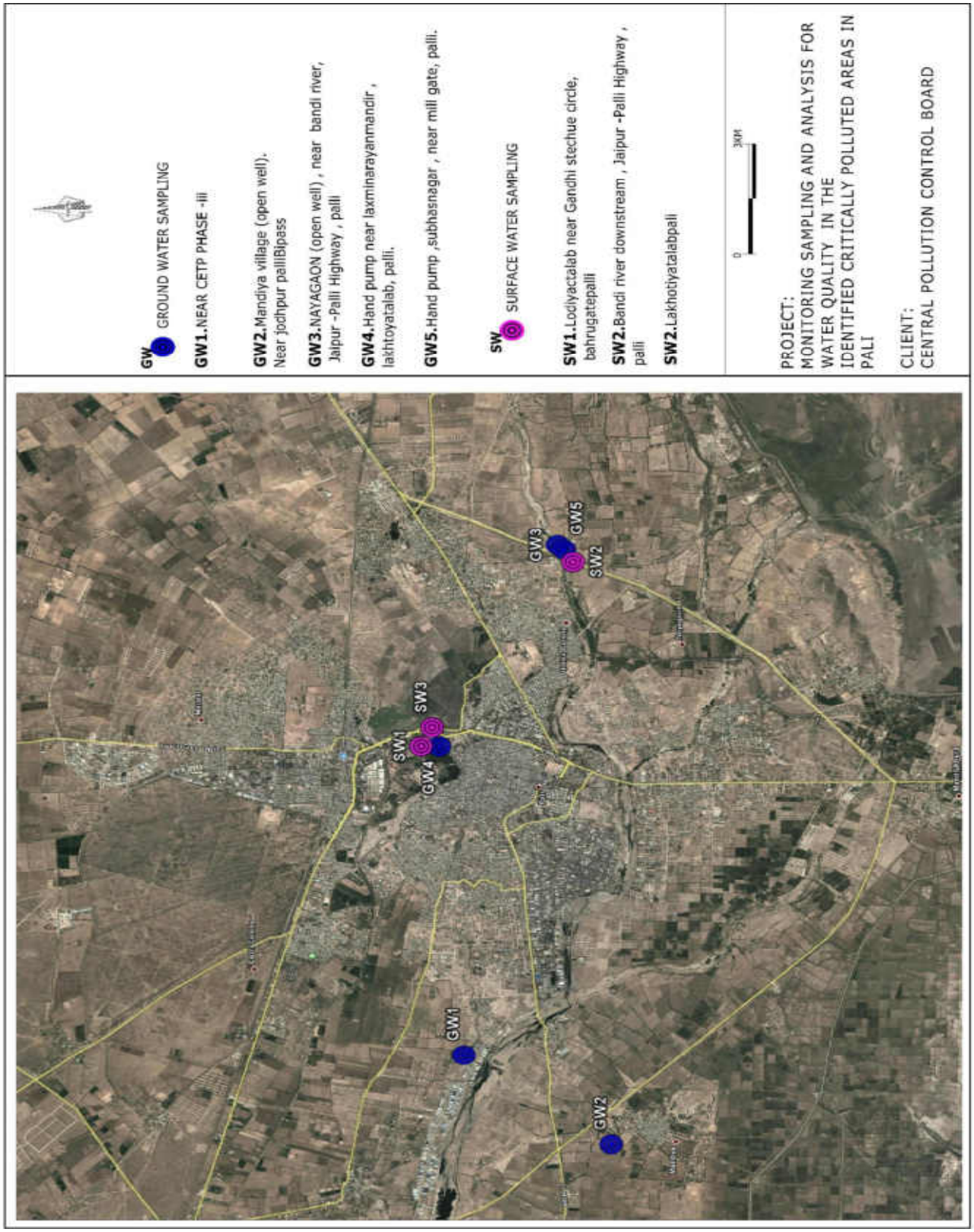
GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	NEAR CETP PHASE - III	25.03.2013	N25°46'43.1"	E073°17'13.3"
GW – 2	Mandiya village (open well). Near jodhpur palli By-pass	25.03.2013	N25°45'49.1"	E073°16'29.1"
GW – 3	NAYAGAON (open well) , near bandi river, Jaipur –Palli Highway , Pali	25.03.2013	N25°46'08.8"	E073°21'22.8"
GW – 4	Hand pump near laxmi narayan mandir, lakhtoya talab, Pali.	25.03.2013	N25°46'52.1"	E073°19'44.2"
GW – 5	Hand pump, subhas nagar , near mill gate, Pali.	25.03.2013	N25°46'06.4"	E073°21'20.6"

PALI (RAJASTHAN)



PALI (RAJASTHAN)



AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 Jodhpur vidyut vitran Pali,	AAQ – 2 Shree Bangur Hospital,	AAQ – 3 New Housing Board Colony, Jodhpur Road	AAQ – 4 CETP Number -03 Industrial Area, Pali	
1	Lead	µg/m³	0.02	0.02	0.03	0.05	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	<1	<1	<1	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	129.8	98.6	102.1	149.5	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	43.6	36.4	43.1	54.0	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	12.3	10.9	8.6	17.8	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	2.9	<1	<1	1.6	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	12.9	10.4	12.1	13.4	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	16.7	18.6	15.8	19.6	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	8.2	5.8	7.0	9.1	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	14.7	16.4	12.9	17.8	
		µg/m³	<2	3.8	2.9	4.2	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			SW-1 Lodiyactalab near Gandhi stechue circle	SW – 2 Bandi river downstream, Jaipur –Palli Highway	SW-3 Lakhotiya talab Pali	
I	**Simple Parameters**					
1	Appearance	-	Light Yellow	Light Yellow	Colour less	-
2	Colour (Hazen Units)	-	30	25	< 5	IS 3025: Part – 4
3	Odour (Smell)	-	Un-Agreeable	Un - Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	8.19	7.57	8.16	IS 3025: Part – 11
2	E C	µS/cm	760	984	510	IS 3025: Part – 14
3	Oil & Grease	mg/l	2	2	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	118	56	12	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	4.5	4.6	5.9	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	76	52	14	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	19	13	3	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.02	0.09	0.01	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	0.45	2.03	0.23	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.47	2.12	0.24	By Calculation
11	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.70	1.3	0.50	IS 3025: Part – 60
15	Sulphides as S	mg/l	0.40	0.30	< 0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	0.68	0.54	< 0.1	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	3.28	4.22	1.43	By Calculation
18	Total Coliforms	MPN/100ml	14000	9000	2400	IS 1622
19	Fecal Coliforms	MPN/100ml	500	220	80	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	0.84	0.76	< 0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	9.5	6.3	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	5.3	3.5	< 1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.01	<0.01	0.02	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	<0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	<0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	<0.01	<0.01	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.17	<0.01	<0.01	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	<0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.30	2.10	0.15	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			GW-1 Near CETP PHASE -III	GW – 2 Mandiya village	GW-3 Nayagaon (open well)	
I	**Simple Parameters**					
1	Appearance	-	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	< 5	< 5	< 5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.38	7.67	7.80	IS 3025: Part – 11
2	E C	µS/cm	14202	9740	8580	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	< 10	< 10	14	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	8	12	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	< 2	< 2	2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	0.02	0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	21.81	13.10	2.71	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	21.82	13.12	2.72	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.40	1.4	1.3	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	< 0.1	0.18	< 0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	3.79	13.02	23.51	By Calculation
17	Total Coliforms	MPN/100ml	<2	2800	3500	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	700	900	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	< 0.1	0.20	< 0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	< 1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.16	< 0.01	< 0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	0.02	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	< 0.01	0.01	0.01	APHA 3111 – B
19	Iron as Fe	mg/l	< 0.01	0.03	0.10	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	0.04	0.05	IS 3025: Part – 56
22	Boron as B	mg/l	0.08	2.36	2.94	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results		Test Method
			GW-4 Hand pump near laxmi narayan mandir	GW – 5 Hand pump, subhas nagar	
I	**Simple Parameters**				
1	Appearance	-	Colourless	Colourless	-
2	Colour (Hazen Units)	-	< 5	5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**				
1	pH	-	7.87	7.76	IS 3025: Part – 11
2	E C	µS/cm	736	2320	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	< 10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	14	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	< 2	< 2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.02	0.06	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	0.23	10.84	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.25	10.90	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.60	1.00	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	0.11	< 0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	2.41	7.28	By Calculation
17	Total Coliforms	MPN/100ml	34	70	IS 1622
18	Fecal Coliforms	MPN/100ml	9	17	IS 1622
III	**Special Parameters**				
1	Total Phosphorous as P	mg/l	0.18	< 0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.06	0.12	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.04	0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.10	0.18	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.16	0.84	IS 3025: Part – 57

AMBIENT AIR MONITORING PHOTOGRAPHS OF PALI REGION OF RAJASTHAN

Shree Bangur Hospital, Pali

Housing Board Colony, Pali

Common Effluent Treatment

Vidyut Bhavan

SURFACEWATER QUALITY PHOTOGRAPHS OF PALI REGION OF RAJASTHAN

Bandi River Downstream

Lodiyac Talab, Pali

Lokotiya Talab, Pali

GROUND WATER QUALITY PHOTOGRAPHS OF PALI REGION OF RAJASTHAN

Mandya Village Open Well

Near Lakshmi Naran Mandir, Pali

Near Mill Road, Pali

Open Well Near Jaipur Highway

AAQ MONITORING LOCATIONS

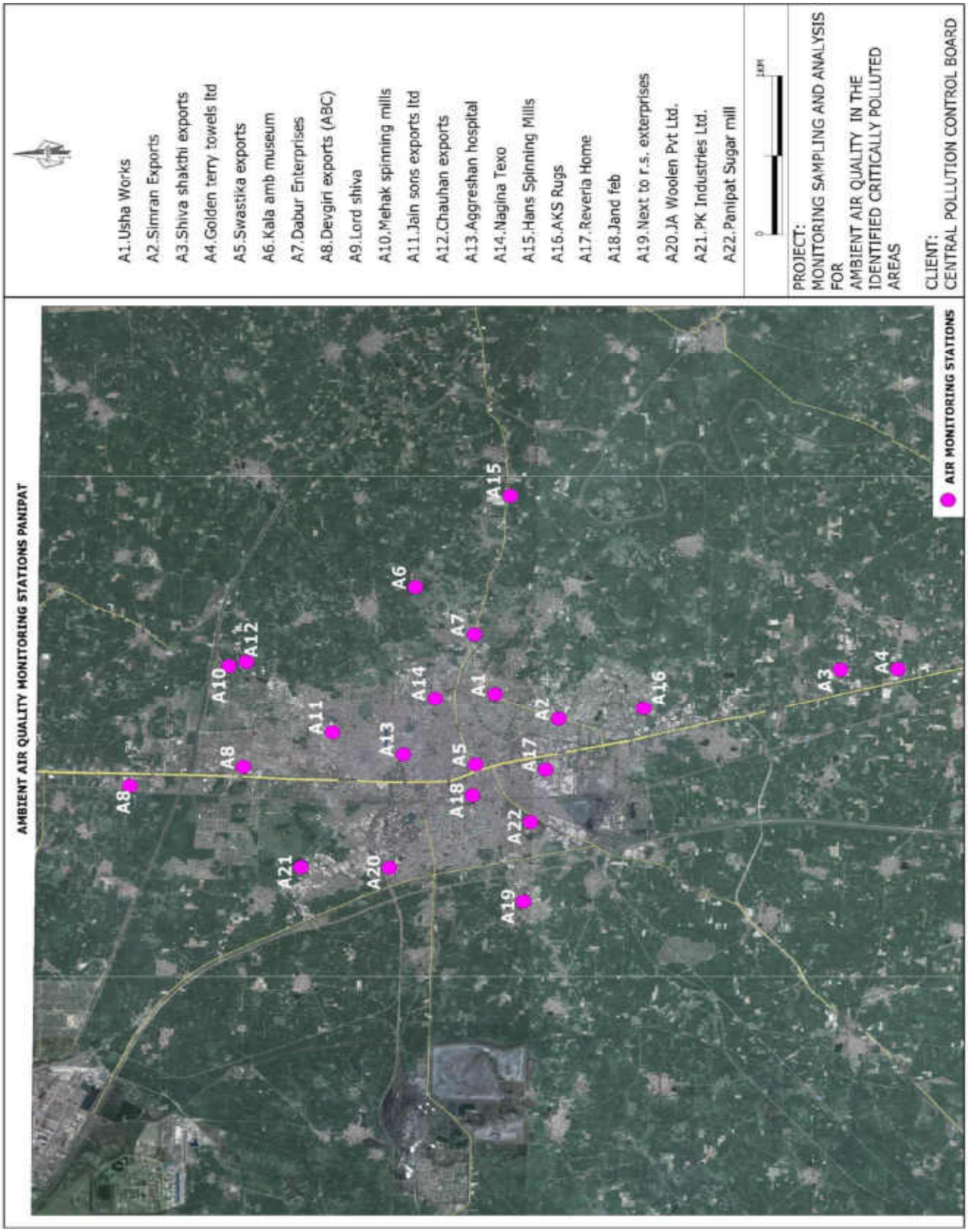
SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	Usha Works	13.03.2013 to 14.03.2013	N29°22'48.9"	E076°59'32.9"
AAQ – 2	Simran Exports	13.03.2013 to 14.03.2013	N29°22'07.1"	E076°59'03.5"
AAQ – 3	Shiva shakthi exports	13.03.2013 to 14.03.2013	N29°18'40.0"	E076°59'49.7"
AAQ – 4	Golden terry towels ltd	13.03.2013 to 14.03.2013	N29°17'59.5"	E076°59'55.6"
AAQ – 5	Swastika exports	13.03.2013 to 14.03.2013	N29°23'03.0"	E076°58'24.3"
AAQ – 6	Kala amb museum	14.03.2013 to 15.03.2013	N29°23'48.7"	E077°01'12.1"
AAQ – 7	Dabur Enterprises	14.03.2013 to 15.03.2013	N29°23'07.1"	E077°00'21.9"
AAQ – 8	Devgiri exports (ABC)	15.03.2013 to 16.03.2013	N29°27'17.9"	E076°58'02.6"
AAQ - 9	Lord shiva	15.03.2013 to 16.03.2013	N29°25'52.9"	E076°58'19.4"
AAQ – 10	Mehak spinning mills	15.03.2013 to 16.03.2013	N29°26'01.6"	E076°59'53.2"
AAQ – 11	Jain sons exports ltd	15.03.2013 to 16.03.2013	N29°24'50.1"	E076°58'54.6"
AAQ – 12	Chauhan exports	15.03.2013 to 16.03.2013	N29°25'54.8"	E076°59'59.3"
AAQ – 13	Aggreshan hospital	16.03.2013 to 17.03.2013	N29°23'57.5"	E076°58'31.0"
AAQ – 14	Nagina Texo	16.03.2013 to 17.03.2013	N29°23'36.0"	E076°59'26.5"
AAQ – 15	Hans Spinning Mills	16.03.2013 to 17.03.2013	N29°22'40.3"	E077°02'36.7"
AAQ – 16	AKS Rugs	16.03.2013 to 17.03.2013	N29°21'03.1"	E076°59'13.0"
AAQ - 17	Reveria Home	16.03.2013 to 17.03.2013	N29°22'17.7"	E076°58'20.2"
AAQ – 18	Hand feb	18.03.2013 to 19.03.2013	N29°23'07.6"	E076°57'56.7"
AAQ – 19	Next to r.s. exterprises	18.03.2013 to 19.03.2013	N29°22'30.3"	E076°56'16.4"
AAQ – 20	JA Woolen Pvt Ltd.	18.03.2013 to 19.03.2013	N29°24'06.4"	E076°56'49.2"
AAQ – 21	PK Industries Ltd.	18.03.2013 to 19.03.2013	N29°25'09.7"	E076°56'52.6"
AAQ – 22	Panipat Sugar mill	18.03.2013 to 19.03.2013	N29°22'25.6"	E076°57'33.4"

SURFACE WATER SAMPLING LOCATIONS

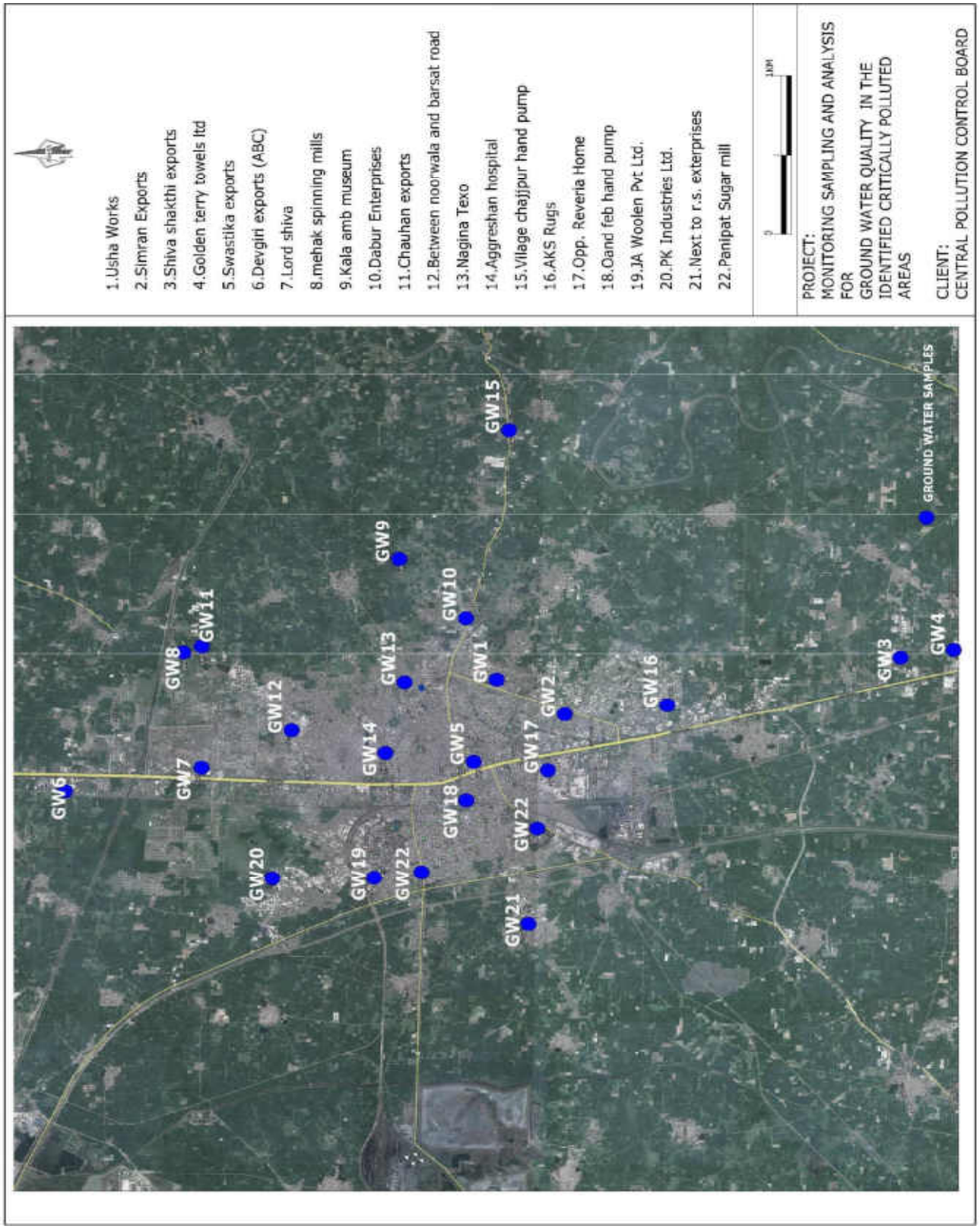
SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	Garunda drain	16.03.2013	N29°27'20.0"	E076°58'13.7"
SW - 2	Pamipat drain no.2	16.03.2013	N29°26'34.3"	E076°58'15.1"
SW – 3	Panipat drain no.1	16.03.2013	N29°23'39.0"	E076°59'26.8"
SW - 4	Yamuna River Down Stream	16.03.2013	N29°23'60.3"	E077°09'18.4"
SW – 5	Yamuna River Up Stream	16.03.2013	N29°24'58.2"	E077°18'24.2"
SW - 6	Panipat drain up stream near Chajjpur	17.03.2013	N29°22'55.5"	E077°04'00.6"
SW - 7	Panipat drain downstream near Chajjpur	17.03.2013	N29°22'54.1"	E077°03'59.6"
SW – 8	Kala Amb pond near war memeorial	17.03.2013	N29°23'53.6"	E077°01'13.9"
SW – 9	Surface water Panipat canal gohana road	18.03.2013	N29°22'38.7"	E076°56'51.9"
SW - 10	STP 10 MLD outlet	18.03.2013	N29°22'16.1"	E076°56'36.1"
SW - 11	STP 10 MLD inlet	18.03.2013	N29°22'17.4"	E076°56'42.6"
SW - 12	Surface water Panipat canal IOC munek Road	18.03.2013	N29°23'34.8"	E076°56'40.5"
SW - 13	STP 35 MLD inlet	18.03.2013	N29°20'06.6"	E076°59'36.5"
SW - 14	STP 35 MLD outlet	18.03.2013	N29°19'58.5"	E076°79'48.7"
SW - 15	CETP 21 MLD outlet	19.03.2013	N29°20'58.3"	E076°59'44.9"
SW - 16	CETP 21 MLD inlet	19.03.2013	N29°21'11.1"	E076°59'46.1"
SW - 17	Panipat Drain Near Simla Gujran	19.03.2013	N29°19'12.0"	E077°03'31.3"
SW - 18	Main drain before mixing	19.03.2013	N29°16'26.1"	E077°07'28.7"
SW - 19	Main drain + Yamuna during mixing	19.03.2013	N29°16'25.4"	E077°07'29.1"
SW - 20	River Yamuna After mixing	19.03.2013	N29°16'13.7"	E077°07'34.4"

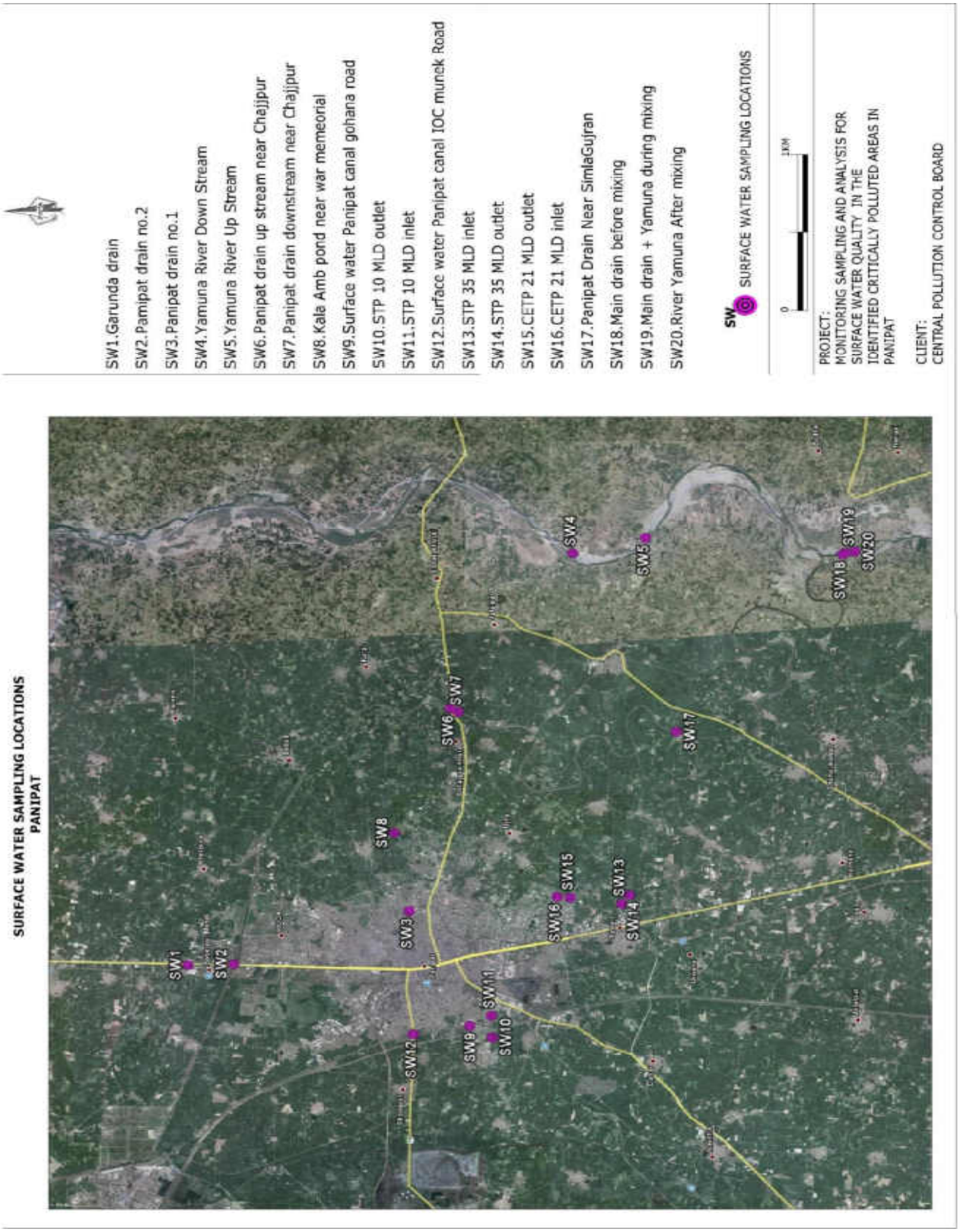
GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Usha Works	14.03.2013	N29°22'48.9''	E076°59'32.9''
GW – 2	Simran Exports	14.03.2013	N29°22'07.1''	E076°59'03.5''
GW – 3	Shiva shakthi exports	14.03.2013	N29°18'40.0''	E076°59'49.7''
GW – 4	Golden terry towels ltd	14.03.2013	N29°17'59.5''	E076°59'55.6''
GW – 5	Swastika exports	14.03.2013	N29°23'03.0''	E076°58'24.3''
GW – 6	Devgiri exports (ABC)	15.03.2013	N29°27'17.9''	E076°58'02.6''
GW – 7	Lord shiva	15.03.2013	N29°25'52.9''	E076°58'19.4''
GW – 8	Mehak spinning mills	15.03.2013	N29°26'01.6''	E076°59'53.2''
GW – 9	Kala amb museum	15.03.2013	N29°23'48.7''	E077°01'12.1''
GW – 10	Dabur Enterprises	15.03.2013	N29°23'07.1''	E077°00'21.9''
GW – 11	Chauhan exports	15.03.2013	N29°25'54.8''	E076°59'59.3''
GW – 12	Between noorwala and barsat road	16.03.2013	N29°25'54.8''	E076°59'59.3''
GW – 13	Nagina Texo	16.03.2013	N29°23'36.0''	E076°59'26.5''
GW – 14	Aggreshan hospital	17.03.2013	N29°23'57.5''	E076°58'31.0''
GW – 15	Vilage chajjpur hand pump	17.03.2013	N29°22'41.9''	E077°02'58.3''
GW – 16	AKS Rugs	17.03.2013	N29°21'03.1''	E076°59'13.0''
GW – 17	Opp. Reveria Home	17.03.2013	N29°22'17.7''	E076°58'20.2''
GW – 18	Hand feb hand pump	19.03.2013	N29°23'07.6''	E076°57'56.7''
GW – 19	JA Woolen Pvt Ltd.	19.03.2013	N29°24'06.4''	E076°56'49.2''
GW – 20	PK Industries Ltd.	19.03.2013	N29°25'09.7''	E076°56'52.6''
GW – 21	Next to r.s. exterprises	19.03.2013	N29°22'30.3''	E076°56'16.4''
GW – 22	Panipat Sugar mill	19.03.2013	N29°22'25.6''	E076°57'33.4''


AMBIENT AIR QUALITY MONITORING STATIONS PANIPAT
A1.Usha Works
A2.Simran Exports
A3.Shiva shakthi exports
A4.Golden terry towels ltd
A5.Swastika exports
A6.Kala amb museum
A7.Dabur Enterprises
A8.Devgiri exports (ABC)
A9.Lord shiva
A10.Mehak spinning mills
A11.Jain sons exports ltd
A12.Chauhan exports
A13.Aggreshan hospital
A14.Nagina Texo
A15.Hans Spinning Mills
A16.AKS Rugs
A17.Reveria Home
A18.Jand feb
A19.Next to r.s. exterprises
A20.JA Woolen Pvt Ltd.
A21.PK Industries Ltd.
A22.Panipat Sugar mill
0
1KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR
AMBIENT AIR QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
AIR MONITORING STATIONS

PANIPAT (HARYANA)




SURFACE WATER SAMPLING LOCATIONS
PANIPAT
SW1
SW2
SW3
SW4
SW5
SW6
SW7
SW8
SW9
SW10
SW11
SW12
SW13
SW14
SW15
SW16
SW17
SW18
SW19
SW20
SW1.Garunda drain
SW2.Panipat drain no.2
SW3.Panipat drain no.1
SW4.Yamuna River Down Stream
SW5.Yamuna River Up Stream
SW6.Panipat drain up stream near Chajjpur
SW7.Panipat drain downstream near Chajjpur
SW8.Kala Amb pond near war memeorial
SW9.Surface water Panipat canal gohana road
SW10.STP 10 MLD outlet
SW11.STP 10 MLD inlet
SW12.Surface water Panipat canal IOC munek Road
SW13.STP 35 MLD inlet
SW14.STP 35 MLD outlet
SW15.CETP 21 MLD outlet
SW16.CETP 21 MLD inlet
SW17.Panipat Drain Near SimlaGujran
SW18.Main drain before mixing
SW19.Main drain + Yamuna during mixing
SW20.River Yamuna After mixing
SW SURFACE WATER SAMPLING LOCATIONS
0
1KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR SURFACE WATER QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN PANIPAT
CLIENT:
CENTRAL POLLUTION CONTROL BOARD

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 Usha Works	**AAQ – 2** Simran Exports	**AAQ – 3** Shiva shakthi exports	**AAQ – 4** Golden terry towels ltd	
1	Lead	µg/m³	0.07	0.13	0.14	0.06	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	<1	1.6	1.8	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	134.7	146.4	190.9	129.3	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	31.6	42.8	61.4	57.6	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	14.8	16.2	<5	13.7	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	3.8	6.5	8.3	4.9	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	16.8	13.3	12.5	15.7	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	19.4	27.6	21.4	19.7	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	5.1	6.4	8.1	4.6	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	16.7	17.2	14.8	15.6	
		µg/m³	4.3	4.6	3.2	<2	

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 5 Swastika exports	**AAQ – 6** Kalamb museum	**AAQ – 7** Dabur Enterprises	**AAQ – 8** Devgiri exports (ABC)	
1	Lead	µg/m³	0.06	0.02	0.12	0.15	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	0.69	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	1.6	<1	1.4	2.4	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	231.5	127.9	175.7	143.5	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	79.2	53.6	69.6	46.2	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	16.7	<5	11.6	14.8	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	8.2	2.3	10.1	5.6	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	12.4	10.7	12.9	14.6	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	21.6	23.2	25.6	19.2	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	5.6	4.1	5.8	5.1	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	12.6	10.8	13.7	12.9	
		µg/m³	<2	<2	3.2	2.8	

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 9 Lord shiva toll plaza	**AAQ – 10** Mehak spinning mills	**AAQ – 11** Jain sons Exports ltd	**AAQ – 12** Chauhan Exports	
1	Lead	µg/m³	0.12	0.04	0.09	0.10	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	0.67	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	<1	<1	<1	2.3	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	140.3	153.7	131.7	179.1	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	49.8	47.8	43.4	65.3	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	<5	12.4	10.8	16.8	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	3.7	2.7	3.1	4.3	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	14.6	12.7	14.2	11.5	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	25.6	26.4	24.6	18.7	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	8.1	6.2	4.8	6.1	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	14.4	13.1	11.6	15.2	
		µg/m³	4.2	3.0	3.4	<2	

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 13 Agrashen Hospital	**AAQ – 14** Nagina Texo	**AAQ – 15** Hans Spinning Mills	**AAQ – 16** AKS Rugs	
1	Lead	µg/m³	0.14	0.11	0.04	0.06	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	<1	<1	<1	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	110.6	296	152.0	102.4	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	37.3	86.8	67.8	43.4	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	16.2	14.7	8.9	12.6	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	4.6	5.4	2.7	5.2	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	10.6	16.1	12.9	14.8	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	21.4	27.4	19.2	25.2	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	6.2	7.2	8.2	6.4	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	14.4	15.6	14.9	16.2	
		µg/m³	3.6	3.2	4.8	<2	

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS			Test Methods
			AAQ – 17 Reveria Home	**AAQ – 18** Hand feb	**AAQ – 19** Next to R.S. enterprises	
1	Lead	µg/m³	0.03	0.03	0.04	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	<1	<1	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	106.2	97.2	91.7	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	36.5	44.5	34.4	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	<5	10.2	14.2	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	2.1	3.2	2.4	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	12.9	12.1	13.2	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	17.6	21.6	27.1	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	
		mg/m³	<2	<2	<2	
12	O_3	µg/m³	6.2	5.8	7.3	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	14.2	13.6	16.4	
		µg/m³	3.4	4.2	<2	

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS			Test Methods
			AAQ – 20 JA Woolen Pvt. Ltd.,	**AAQ –21** PK Industries Ltd.,	**AAQ – 22** Panipat Sugar Mill	
1	Lead	µg/m³	0.02	0.09	0.11	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	1.26	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	<1	1.8	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	110.5	126	196.4	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	40.1	37.8	97.8	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	12.3	18.9	16.7	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	2.8	3.7	2.4	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	11.9	13.0	13.2	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	23.6	27.2	27.6	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	
		mg/m³	<2	<2	<2	
12	O_3	µg/m³	6.7	8.1	6.2	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	15.2	13.8	14.6	
		µg/m³	4.1	3.6	3.2	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-1 Garunda drain	SW – 2 Pamipat drain No.2	SW-3 Panipat drain No.1	SW-4 Yamuna River Down Stream	
I	**Simple Parameters**						
1	Appearance	-	Light brown	Colourless	Grayish	Colourless	-
2	Colour (Hazen Units)	-	50	10	60	5	IS 3025: Part – 4
3	Odour (Smell)	-	Un-Agreeable	Agreeable	Un-Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.56	7.70	7.32	7.67	IS 3025: Part – 11
2	E C	µS/cm	1420	272	2000	408	IS 3025: Part – 14
3	Oil & Grease	mg/l	6	1	9	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	56	24	86	14	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	< 1	4.5	< 1	6.4	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	98	38	272	18	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	36	9	75	4	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.02	0.01	0.04	0.01	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	8.58	0.90	3.84	0.45	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	8.60	0.91	3.88	0.46	By Calculation
11	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	1.0	0.4	1.1	0.6	IS 3025: Part – 60
15	Sulphides as S	mg/l	6.7	< 0.1	4.2	< 0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	5.2	0.18	5.78	0.28	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	3.18	0.24	3.83	0.34	By Calculation
18	Total Coliforms	MPN/100ml	5000	21	2700	350	IS 1622
19	Fecal Coliforms	MPN/100ml	1700	< 2	2100	280	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	5.8	< 0.1	6.2	0.42	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	41	4.2	52	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	29	2.8	38	< 1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.24	0.10	0.03	< 0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.02	0.01	0.02	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.34	0.10	0.38	0.08	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.49	0.44	0.57	0.44	IS 3025: Part – 57

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW- 5 Yamuna River Up Stream	SW – 6 Panipat drain Up/s near Chajjpur	SW-7 Panipat drain Dn/s near Chajjpur	SW-8 Kala Amb pond near war memeorial	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Pale Yellow	-
2	Colour (Hazen Units)	-	5	10	5	15	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.66	7.60	7.62	7.96	IS 3025: Part – 11
2	E C	µS/cm	400	272	278	1410	IS 3025: Part – 14
3	Oil & Grease	mg/l	1	1	1	4	IS 3025: Part – 39
4	Suspended Solids	mg/l	16	32	34	38	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	6.2	5.6	5.0	4.2	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	20	34	38	96	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	5	8	9	24	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	< 0.01	< 0.01	< 0.01	0.02	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	0.45	0.23	0.23	3.16	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.45	0.23	0.23	3.18	By Calculation
11	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.5	0.4	0.4	0.9	IS 3025: Part – 60
15	Sulphides as S	mg/l	< 0.1	0.5	0.6	1.8	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	< 0.1	< 0.1	< 0.1	0.92	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	0.37	0.41	0.42	3.44	By Calculation
18	Total Coliforms	MPN/100ml	110	500	90	1100	IS 1622
19	Fecal Coliforms	MPN/100ml	40	350	60	270	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	< 0.1	< 0.1	< 0.1	1.06	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	7.0	4.9	10.0	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	4.2	3.5	7.0	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	0.01	0.02	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.02	0.05	< 0.01	0.02	APHA 3111 – B
19	Iron as Fe	mg/l	0.26	0.30	0.12	0.46	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.60	0.81	0.43	0.52	IS 3025: Part – 57

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-9 Surface water Panipat canal gohana road	SW – 10 STP 10 MLD outlet	SW-11 STP 10 MLD inlet	SW-12 Surface water Panipat canal IOC munek Road	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Greyish	Greyish	Colour Less	-
2	Colour (Hazen Units)	-	5	80	100	5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Un-Agreeable	Un-Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.98	7.20	7.05	7.73	IS 3025: Part – 11
2	E C	µS/cm	224	2310	1340	230	IS 3025: Part – 14
3	Oil & Grease	mg/l	2	9	12	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	24	136	158	28	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	5.9	< 1	< 1	6.0	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	24	560	612	18	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	5	130	230	4	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	< 0.01	0.02	0.04	< 0.01	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	0.45	8.81	4.29	0.23	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.45	8.83	4.33	0.23	By Calculation
11	Free Ammonia	mg/l	< 0.1	0.30	< 0.1	< 0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.4	1.2	1.1	0.3	IS 3025: Part – 60
15	Sulphides as S	mg/l	0.2	7.4	11.5	< 0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	< 0.1	4.31	5.80	< 0.1	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	0.35	1.95	2.80	0.16	By Calculation
18	Total Coliforms	MPN/100ml	180	3400	5000	240	IS 1622
19	Fecal Coliforms	MPN/100ml	23	1000	1700	30	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	< 0.1	4.68	6.1	< 0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	2.1	39	52	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	1.4	27	38	< 1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	< 0.01	0.05	0.11	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.08	0.50	0.76	0.07	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.40	0.41	0.48	0.44	IS 3025: Part – 57

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-13 STP 35 MLD inlet	SW – 14 STP 35 MLD outlet	SW-15 CETP 21 MLD outlet	SW-16 CETP 21 MLD inlet	
I	**Simple Parameters**						
1	Appearance	-	Greyish	Brownish grey	Pale Yellowish	Grey	-
2	Colour (Hazen Units)	-	60	50	120	100	IS 3025: Part – 4
3	Odour (Smell)	-	Un-Agreeable	Un-Agreeable	Un-Agreeable	Un-Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.35	7.81	8.04	7.66	IS 3025: Part – 11
2	E C	µS/cm	2460	3610	4620	4360	IS 3025: Part – 14
3	Oil & Grease	mg/l	10	6	4	7	IS 3025: Part – 39
4	Suspended Solids	mg/l	128	104	56	112	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	< 1	< 1	< 1	< 1	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	460	224	104	304	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	160	54	23	110	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.04	0.02	0.02	0.05	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	3.16	5.65	9.03	5.87	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	3.20	5.67	9.05	5.93	By Calculation
11	Free Ammonia	mg/l	0.40	0.20	< 0.1	< 0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	1.2	1.3	1.0	1.0	IS 3025: Part – 60
15	Sulphides as S	mg/l	3.6	1.9	6.1	8.6	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	3.6	2.90	0.40	3.2	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	7.15	7.27	15.46	22.29	By Calculation
18	Total Coliforms	MPN/100ml	11000	170	4000	11000	IS 1622
19	Fecal Coliforms	MPN/100ml	4000	60	2200	5000	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	4.2	3.20	0.60	3.9	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	56	42	20	38	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	38	24	12	21	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.05	0.04	0.03	0.06	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	0.01	< 0.01	< 0.01	0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	0.02	< 0.01	< 0.01	0.02	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.03	0.02	0.02	0.04	APHA 3111 – B
19	Iron as Fe	mg/l	0.95	0.38	0.30	0.68	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.40	0.44	0.43	0.62	IS 3025: Part – 57

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-17 Panipat Drain Near Simla Gujran	SW – 18 Main drain before mixing	SW-19 main drain + Yamuna during mixing	SW-20 River Yamuna After mixing	
I	**Simple Parameters**						
1	Appearance	-	Greyish	Light Greyish	Pale grey	Light Greyish	-
2	Colour (Hazen Units)	-	60	15	10	5	IS 3025: Part – 4
3	Odour (Smell)	-	UnAgreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.62	7.54	7.95	7.92	IS 3025: Part – 11
2	E C	µS/cm	2600	390	492	498	IS 3025: Part – 14
3	Oil & Grease	mg/l	2	1	1	1	IS 3025: Part – 39
4	Suspended Solids	mg/l	62	46	34	32	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	< 1	5.0	5.2	5.6	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	108	48	40	26	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	25	11	9	6	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.05	0.03	0.02	0.02	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	2.71	0.45	0.23	0.90	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	2.76	0.48	0.25	0.92	By Calculation
11	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	1.2	0.70	0.6	0.7	IS 3025: Part – 60
15	Sulphides as S	mg/l	1.9	2.0	0.6	0.4	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	2.62	0.40	0.20	0.20	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	-	0.97	0.77	0.87	By Calculation
18	Total Coliforms	MPN/100ml	1100	280	220	180	IS 1622
19	Fecal Coliforms	MPN/100ml	140	170	130	70	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	3.04	0.56	0.32	0.30	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	23	11	5.6	2.8	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	15	7	3.5	1.4	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.06	0.01	0.01	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.54	0.18	0.12	0.09	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.52	0.42	0.41	0.42	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Usha Works	GW – 2 Simran Exports	GW-3 Shiva shakthi exports	GW-4 Golden terry towels ltd	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	< 5	< 5	< 5	< 5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.75	7.52	7.46	7.53	IS 3025: Part – 11
2	E C	µS/cm	1310	1230	1260	1540	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	< 10	< 10	< 10	< 10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	8	4	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	< 2	< 2	< 2	< 2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	0.01	0.01	0.02	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	1.58	3.61	4.06	4.74	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	1.59	3.62	4.07	4.76	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	1.0	1.0	0.9	0.8	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	2.58	4.34	5.64	6.99	By Calculation
17	Total Coliforms	MPN/100ml	< 2	< 2	< 2	< 2	IS 1622
18	Fecal Coliforms	MPN/100ml	< 2	< 2	< 2	< 2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	< 1	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	< 1	< 1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.27	0.10	0.24	0.37	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	0.001	0.001	0.001	0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	< 0.01	0.03	< 0.01	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.07	0.07	0.10	0.08	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.40	0.49	0.50	0.54	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-5 Swastika exports	GW – 6 Devgiri exports (ABC)	GW-7 Lord shiva Toll bridge	GW-8 Mehak spinning mills	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	< 5	< 5	< 5	< 5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.67	7.64	7.89	8.05	IS 3025: Part – 11
2	E C	µS/cm	1260	840	580	530	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	< 10	< 10	< 10	< 10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	4	6	4	8	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	< 2	< 2	< 2	< 2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.02	0.01	0.01	0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	9.94	1.58	2.71	2.94	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	9.96	1.59	2.72	2.95	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	1.2	0.9	0.8	1.0	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	2.09	1.40	1.06	4.10	By Calculation
17	Total Coliforms	MPN/100ml	<2	< 2	< 2	< 2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	< 2	< 2	< 2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	< 1	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	< 1	< 1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.16	0.06	0.03	0.02	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.10	0.08	0.09	0.08	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.43	0.40	0.48	0.48	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-9 Kala amb museum	GW – 10 Dabur Enterprises	GW-11 Chauhan Exports	GW-12 Between Noorwala and Barsat Road	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	< 5	< 5	< 5	< 5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.43	7.84	7.90	7.77	IS 3025: Part – 11
2	E C	µS/cm	1420	870	850	760	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	< 10	< 10	< 10	< 10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	6	4	4	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	< 2	< 2	< 2	< 2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	0.01	0.01	0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	3.16	4.51	2.94	2.71	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	3.17	4.52	2.95	2.72	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	1.1	0.9	1.0	0.8	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	3.39	2.09	1.07	2.49	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	< 2	< 2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	< 2	< 2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	< 1	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	< 1	< 1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.02	0.01	0.05	0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	0.71	0.01	0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.02	< 0.01	< 0.01	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.10	0.08	0.09	0.10	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.50	0.39	0.52	0.54	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-13 Nagina Texo	GW – 14 Aggreshan hospital	GW-15 Vilage Chajjpur Hand Pump	GW-16 AKS Rugs	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	< 5	< 5	5	< 5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.30	7.65	7.99	7.59	IS 3025: Part – 11
2	E C	µS/cm	1690	1170	640	970	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	< 10	< 10	14	< 10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	4	4	6	4	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	< 2	< 2	< 2	< 2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	0.01	0.01	0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	12.65	11.29	2.94	9.74	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	12.66	11.30	2.95	9.75	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	1.3	1.2	0.9	1.0	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	2.85	0.83	4.87	1.66	By Calculation
17	Total Coliforms	MPN/100ml	< 2	500	< 2	< 2	IS 1622
18	Fecal Coliforms	MPN/100ml	< 2	27	< 2	< 2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	< 1	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	< 1	< 1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	< 0.01	0.05	0.04	0.07	IS 3025: Part – 49
10	Nickel as Ni	mg/l	0.01	0.01	0.01	0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.01	< 0.01	0.03	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.08	0.09	0.20	0.09	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.43	0.44	0.50	0.46	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			GW-17 Opp. Reveria Home	GW –18 Hand Feb Hand Pump	GW-19 JA Woolen Pvt Ltd.	
I	**Simple Parameters**					
1	Appearance	-	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	5	< 5	< 5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.60	7.83	8.14	IS 3025: Part – 11
2	E C	µS/cm	1070	1840	530	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	12	< 10	< 10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	4	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	< 2	< 2	< 2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	0.01	< 0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	9.48	6.32	3.16	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	9.49	6.33	3.16	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	1.0	0.9	0.8	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	2.15	3.22	1.17	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	210	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	90	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	< 1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.10	0.08	0.04	IS 3025: Part – 49
10	Nickel as Ni	mg/l	0.01	0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.04	< 0.01	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.23	0.10	0.08	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.53	0.48	0.46	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			GW-20 PK Industries Ltd.	GW –21 Next to R.S. enterprises	GW-22 Panipat Sugar mill	
I	**Simple Parameters**					
1	Appearance	-	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	< 5	< 5	< 5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.86	7.70	7.71	IS 3025: Part – 11
2	E C	µS/cm	770	720	970	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	< 10	< 10	< 10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	4	6	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	< 2	< 2	< 2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	0.01	0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	6.10	3.4	5.78	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	6.11	3.41	5.79	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.9	0.9	1.0	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	0.21	< 0.1	< 0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	0.68	0.94	3.11	By Calculation
17	Total Coliforms	MPN/100ml	< 2	<2	< 2	IS 1622
18	Fecal Coliforms	MPN/100ml	< 2	<2	< 2	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	0.28	< 0.1	< 0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	< 1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.04	< 0.01	0.09	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	< 0.01	< 0.01	0.02	APHA 3111 – B
19	Iron as Fe	mg/l	0.08	0.07	0.10	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.47	0.46	0.56	IS 3025: Part – 57

AMBIENT AIR MONITORING PHOTOGRAPHS

Usha Works

Simran Export

Shivshakthi

Golden Terry Towels

Shalimar Exports

Kalamba Musium

AMBIENT AIR MONITORING PHOTOGRAPHS

Dabur Works

Devagiri Exports

Lord Shiva

Mehak Spinning Mills

Jain Sons Exports

Chauhan Spinning

AMBIENT AIR MONITORING PHOTOGRAPHS

Aggrashen Hospital

Nagina Texo

Hans Spinning Mills

AKS Rugs

Rivera Home

Hand Feb

AMBIENT AIR MONITORING PHOTOGRAPHS

RS Enterprises

JA Woolens

PK Industries

Panipat Sugar Mill

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Garaunda Drain

Panipat Drain No:2 Down Stream

Panipat Drain No:1 Up Stream

Yamuna River Down Stream

Yamuna River Up Stream

Drain Near Chajpur Up Stream

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Drain Near Chajpur Down Stream

Kalamba Pond

Panipat Canal

10 MLD STP Jatal Road Out Let

10 MLD STP Jatal Road In Let

Panipat Canal Down Stream

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

STP 35 MLD Zone- II Inlet

STP 35 MLD Zone- II Outlet

CETP 21 MLD Outlet

CETP 21 MLD Inlet

Panipat Drain Near Shilagujran

Drain Before Mixing Yamuna River

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Drain mixing Yamuna River

Yamuna River

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Usha Works

Simran Exports

Shiv Shakthi Expo

Golden Terry

Shalimar Exports

Devgir Exdport

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Lord shiva

Mahek Spnning Mills

War Memorial

Darbur

Chauhan Spinning Mills

Between Noorwala & Barsat Road

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Nagina Texo

Aggrashen Hospital

Village Chhajpur

AKS Rugs

Opp. Rivera Homes

Hand Feb

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

JA Woolan **PK Industries**

RS Enterprises **Panipat Sugar Mill**

AAQ MONITORING LOCATIONS

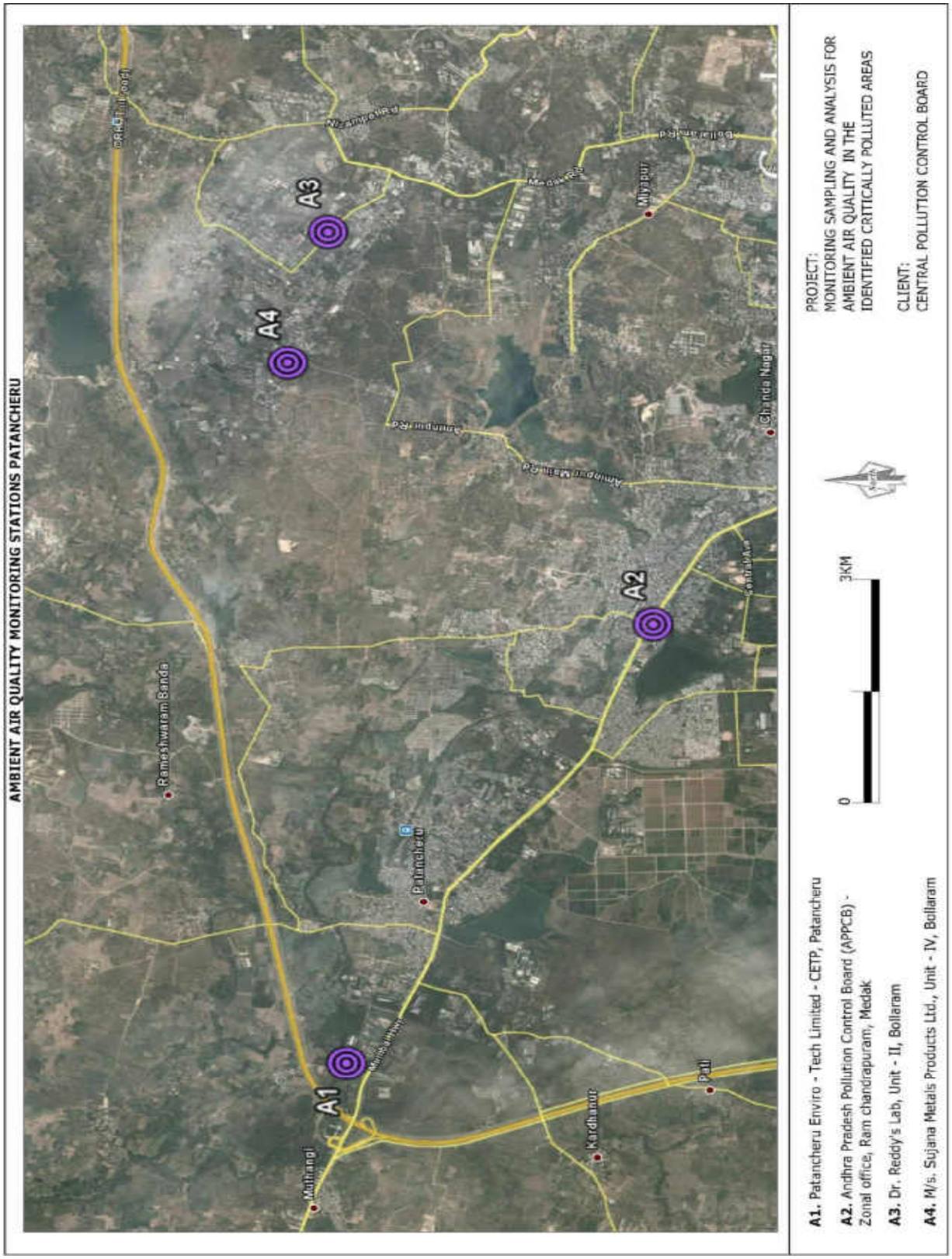
SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	Patancheru Enviro – Tech Limited – CETP, Patancheru	30.01.2013 to 31.01.2013	N 17°32.337'	E 078°14.683'
AAQ – 2	Andhra Pradesh Pollution Control Board (APPCB) – Zonal office, Ram chandrapuram, Medak	30.01.2013 to 31.01.2013	N 17°30.519'	E 078°18'016'
AAQ – 3	Dr. Reddy's Lab, Unit – II, Bollaram	30.01.2013 to 31.01.2013	N 17°32.448'	E 078°20.995'
AAQ – 4	M/s. Sujana Metals Products Ltd., Unit – IV, Bollaram	30.01.2013 to 31.01.2013	N 17°32.687'	E 078°20.001'

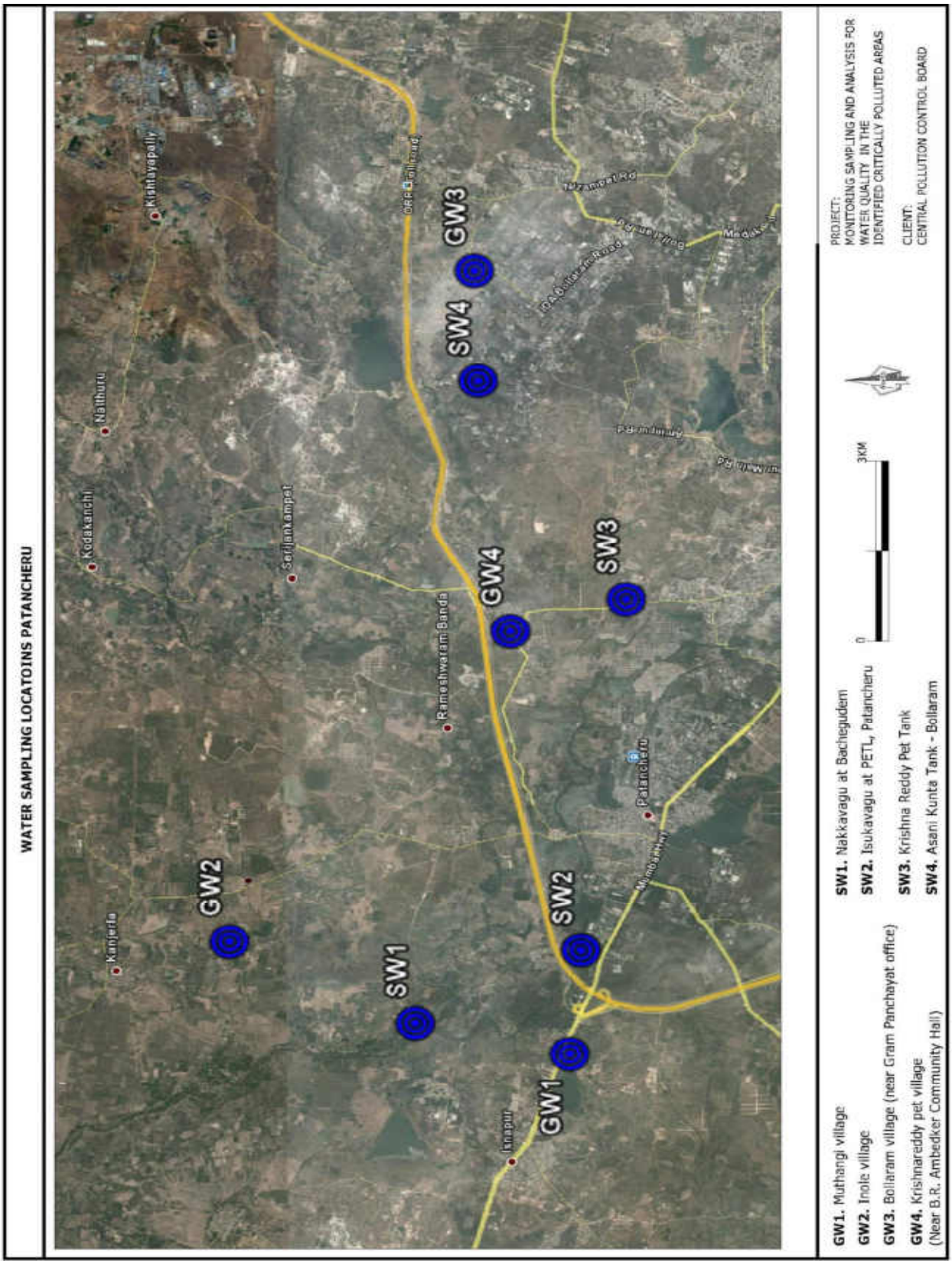
SURFACE WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	Nakkavagu at Bachegudem	30.01.2013	N 17°33.637'	E 078°13.943'
SW – 2	Isukavagu at PETL, Patancheru	30.01.2013	N 17°32.384'	E 078°14.628'
SW – 3	Krishna Reddy Pet Tank	31.01.2013	N 17°32.044'	E 078°17.933'
SW – 4	Asani Kunta Tank - Bollaram	31.01.2013	N 17°33.164'	E 078°19.989'

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Muthangi village	30.01.2013	N 17°32.469'	E 078°13.655'
GW – 2	Inole village	31.01.2013	N 17°35.043'	E 078°14.708'
GW – 3	Bollaram village (near Gram Panchayat office)	31.01.2013	N 17°33.193'	E 078°21.027'
GW – 4	Krishnareddy pet village (Near B.R. Ambedker Community Hall)	31.01.2013	N 17°32.919'	E 078°17.634'


AMBIENT AIR QUALITY MONITORING STATIONS PATANCHERU
A1
A2
A3
A4
Muthangi
Rameshwaram Banda
Patancheru
Kardhanur
Pati
Miyapur
Chanda Nagar
0
3KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR AMBIENT AIR QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
A1. Patancheru Enviro - Tech Limited - CETP, Patancheru
A2. Andhra Praidesh Pollution Control Board (APPCB) - Zonal office, Ram chandrapuram, Medak
A3. Dr. Reddy's Lab, Unit - II, Bollaram
A4. M/s. Sujana Metals Products Ltd., Unit - IV, Bollaram


WATER SAMPLING LOCATOINS PATANCHERU
GW1
GW2
GW3
GW4
SW1
SW2
SW3
SW4
Kishtayapally
Naithuru
Kodakanchi
Kanjerla
Sarijankampet
Rameshwaram Banda
Patancheru
Ianapur
0
3KM
GW1. Muthangi village
GW2. Inole village
GW3. Bollaram village (near Gram Panchayat office)
GW4. Krishnareddy pet village
(Near B.R. Ambedker Community Hall)
SW1. Nakkavagu at Bacheguden
SW2. Isukavagu at PETL, Patancheru
SW3. Krishna Reddy Pet Tank
SW4. Asani Kunta Tank - Bollaram
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS
CLIENT:
CENTRAL POLLUTION CONTROL BOARD

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 PETL – CETP Patancheru	**AAQ – 2** APPCB – Zonal Office, R.C.Puram	**AAQ – 3** Dr. Reddy Laboratories – Unit – II, Bollaram	**AAQ – 4** M/s. Sujana Metals Pvt. Ltd., Unit – IV, Bollaram	
1	Lead	µg/m³	0.07	0.11	0.14	0.19	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	3.6	4.5	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo (a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	1.6	2.1	2.8	1.7	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	123	114	187	119	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	50.8	38.5	83.1	42.0	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	58	52	66	43	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	6.8	5.1	8.2	7.9	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	12.7	14.5	17.6	13.1	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	20.6	24.0	26.3	21.9	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	10.8	11.2	8.7	10.1	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	14.5	18.4	16.8	15.6	
		µg/m³	2.6	3.0	4.2	<2	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW -1 Nakkavagu at Bachegudem	SW – 2 Isukavagu at PETL	SW-3 Krishna reddypet Tank	SW-4 Asanikunta Tank	
I	**Simple Parameters**						
1	Appearance	-	Light Greyish	Greyish	Greenish	Blackish	-
2	Colour (Hazen Units)	-	30	40	40	200	IS 3025: Part – 4
3	Odour (Smell)	-	Un-Agreeable	Un-Agreeable	Un-Agreeable	Un-Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	8.09	8.02	8.21	8.14	IS 3025: Part – 11
2	E C	µS/cm	1340	1520	5600	10220	IS 3025: Part – 14
3	Oil & Grease	mg/l	5	7	4	12	IS 3025: Part – 39
4	Suspended Solids	mg/l	62	76	84	592	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	2.6	<1	1.1	<1	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	84	128	346	1860	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	28	45	90	630	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.35	0.10	0.05	0.05	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	6.30	0.90	4.30	8.10	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	6.65	1.00	4.35	8.15	By calculation
11	Free Ammonia	mg/l	0.30	0.40	0.20	1.4	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	1.2	1.4	1.3	2.1	IS 3025: Part – 60
15	Sulphides as S	mg/l	2.4	2.9	1.6	16	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	2.25	3.05	0.72	8.82	APHA 4500 – P D
17	Sodium Absorption Ratio (SAR)	-	3.05	3.21	10.01	8.89	By Calculation
18	Total Coliforms	MPN/100ml	80	20	21	22	IS 1622
19	Fecal Coliforms	MPN/100ml	70	9	17	11	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	2.90	3.80	1.34	10.2	APHA 4500 – P-D
2	Total Kjeldal Nitrogen	mg/l	23	28	30	114	APHA 4500 – N org B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	19	23	25	85	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	0.005	0.005	0.015	0.010	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH's	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	0.04	0.04	0.08	0.16	IS 3025: Part – 54
11	Copper as Cu	mg/l	0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	0.07	0.06	0.12	0.40	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	0.04	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	0.04	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.02	0.03	0.65	1.16	APHA 3111 – B
19	Iron as Fe	mg/l	0.33	0.32	0.43	2.93	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	0.01	0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.14	0.18	1.2	2.8	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Muthangi Village	GW – 2 Inole Village	GW-3 Bollaram Village	GW-4 Krishnared dypet Village	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	<5	<5	<5	<5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.50	7.90	7.30	7.40	IS 3025: Part – 11
2	E C	µS/cm	1570	1210	2370	1360	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	4	8	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.13	0.04	0.72	0.05	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	7.45	6.32	7.45	7.90	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	7.58	6.36	8.17	7.95	By calculation
10	Free Ammonia	mg/l	< 0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	1.20	1.30	1.30	1.20	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P D
16	Sodium Absorption Ratio (SAR)	-	4.67	2.62	2.89	1.13	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – N org B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 508
7	PAH's	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 525.2
8	PCB and PCT	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 508.E
9	Zinc as Zn	mg/l	0.18	<0.01	<0.01	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	0.02	0.01	0.05	0.02	IS 3025: Part – 54
11	Copper as Cu	mg/l	0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	0.02	0.02	0.05	0.03	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.02	<0.01	0.11	0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.25	0.14	0.48	0.16	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.14	0.18	0.17	0.12	IS 3025: Part – 57

AMBIENT AIR MONITORING LOCATIONS PHOTOGRAPHS

APPCB R.C.Puram

CETP – PETL, Patancheru

Dr.DRL – II - Bollaram

Sujana Metals Unit-IV

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Krishnareddypet

Nakkavagu

Isukavagu

Asanikunta

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Muthangi village - Patancheru

Inole Village

Bollaram Village

Krishnareddypet

AAQ MONITORING LOCATIONS

SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ -1	Executive club, NTPC Colony, Shakti nagar	26.02.2013 to 27.02.2013	N28°06'45.7"	E082°41'17.0"
AAQ -2	GM Office, NCL, Dudhichau, Khadia,	26.02.2013 to 27.02.2013	N28°07'27.2"	E082°40'3.4"
AAQ -3	Expert hostel, Khadia colony, NCL	26.02.2013 to 27.02.2013	N28°07'21.0"	E082°41'17.7"
AAQ -4	Senior Transit Camp, NCL, Bina	26.02.2013 to 27.02.2013	N24°09'25.1"	E082°46'16.1"
AAQ -5	Guest house, NCL Amlori colony, Near Shiv mandir	26.02.2013 to 27.02.2013	N24°05'56.5"	E082°36'20.2"
AAQ -6	Officers club, NCL, Kakri colony	27.02.2013 to 28.02.2013	N24°10'45.5"	E082°40'17.0"
AAQ -7	Hindalco colony (Hanuman mandir) Renusagar	27.02.2013 to 28.02.2013	N24°11'09.9"	E082°47'07.8"
AAQ -8	IIIrd type colony, Anpara	27.02.2013 to 28.02.2013	N24°11'57.2"	E082°46'14.0"
AAQ -9	Guest house, NCL colony, Jingurda	27.02.2013 to 28.02.2013	N24°11'50.0"	E082°42'13.6"
AAQ -10	Experts Hostel, Jayant, NCL Project	28.02.2013 to 01.03.2013	N24°07'03.1"	E082°39'26.5"
AAQ -11	NCL Area (Near Police station), Jayant.	28.02.2013 to 01.03.2013	N24°07'14.8"	E082°39'45.5"
AAQ -12	Guest House Sector-B, Dudichua, NCL Project	28.02.2013 to 01.03.2013	N24°06'30.5"	E082°38'42.1"
AAQ -13	Gust house, NCL residential colony, Nighai	28.02.2013 to 01.03.2013	N24°06'30.0"	E082°37'40.5"
AAQ -14	NTPC Vindhyanagar residential colony (NH 2)	01.03.2013 to 02.03.2013	N24°05'26.8"	E082°38'41.4"
AAQ -15	Main Market, NTPC Rihandnagar, Bijpur	01.03.2013 to 02.03.2013	N24°01'40.4"	E082°48'32.5"
AAQ -16	Renukeswar mandir, Hindalco colony, Renukoot	01.03.2013 to 02.03.2013	N24°12'43.7"	E083°02'23.0"
AAQ -17	Guest house, Dalla town ship, Dalla	03.03.2013 to 04.03.2013	N24°26'40.3"	E083°02'46.1"
AAQ -18	Guest house , Obra colony, Obra	03.03.2013 to 04.03.2013	N24°26'54.9"	E083°02'44.7"

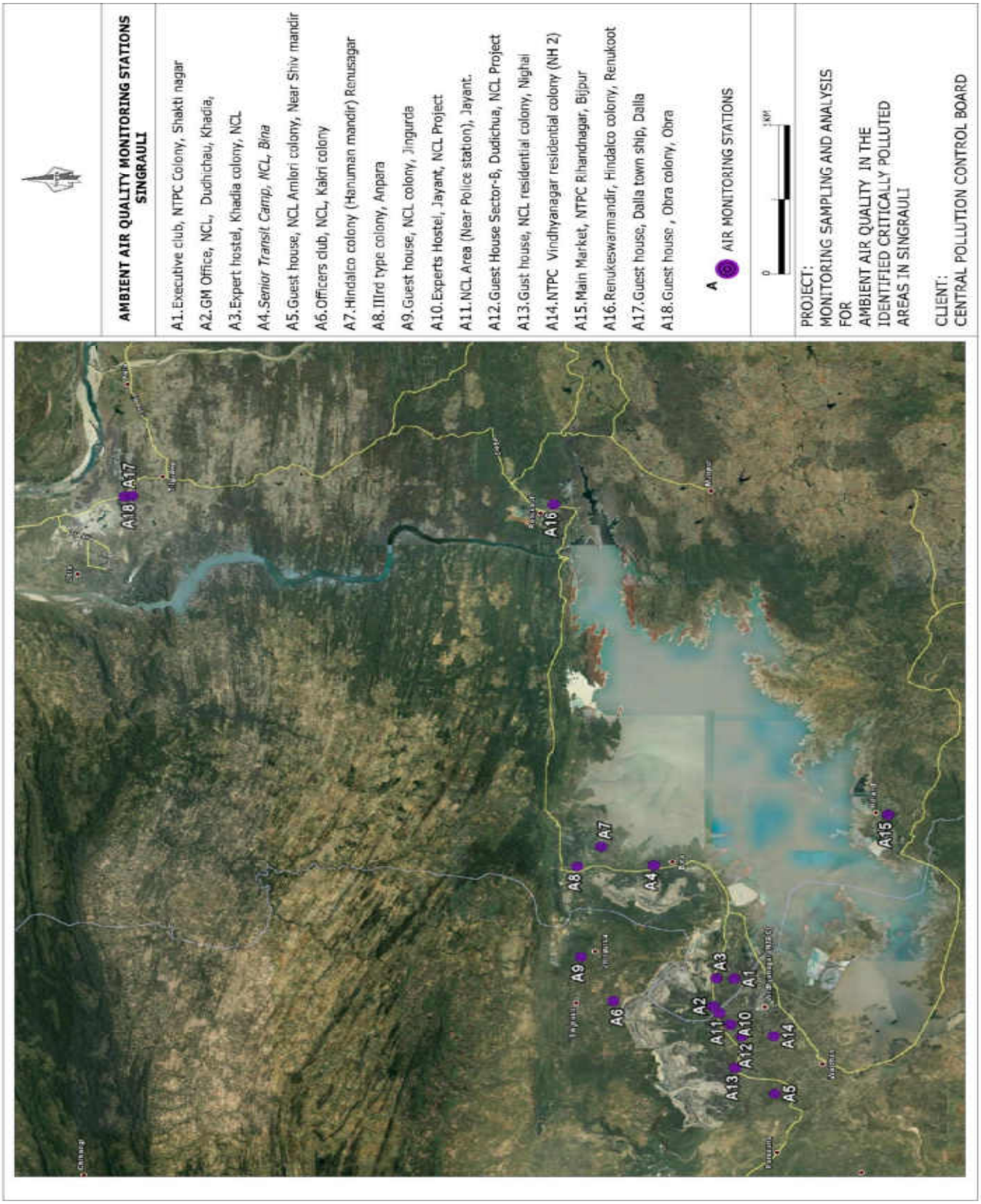
SURFACE WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW - 1	Balia Nala Down Stream, near Bridge, Shaktinagar	26.02.2013	N24°05'56.6"	E082°42'05.3"
SW – 2	Balia Nala Up Stream, near Bridge, Kadia colony	26.02.2013	N24°07'08.9"	E082°40'38.6"
SW – 3	Lake water near Senior Transit Camp, NCL, Bina	27.02.2013	N24°09'28.8"	E082°46'11.7"
SW – 4	Kava nala, Anpara	28.02.2013	N24°11'52.0"	E082°45'43.3"
SW – 5	Rihand river near Kohadowal village	28.02.2013	N24°07'27.7"	E082°46'28.0"
SW – 6	Surya Nala, near police station bridge, Vindhyanagar	01.03.2013	N24°05'03.0"	E082°39'45.4"
SW – 7	Rihand Reservoir near Baliyari village upstream	01.03.2013	N24°02'22.6"	E082°38'12.2"
SW – 8	Kanchana nallah near chauhan cold storage, Kachni	01.03.2013	N24°04'31.1"	E082°35'15.9"
SW – 9	Balia Nallah near Dudichua STP	01.03.2013	N24°07'20.1"	E082°40'3.9"
SW – 10	Rihand river, Singrauli to rihand nagar road under rail bridge	02.03.2013	N24°02'01.7"	E082°37'28.6"
SW – 11	Murdhwa Nallah	02.03.2013	N24°13'33.8"	E083°02'32.6"
SW – 12	Rihand Reservior, Up Stream	02.03.2013	N24°11'42.6"	E083°02'41.2"
SW – 13	Dongia Nallah	02.03.2013	N24°11'55.1"	E083°02'36.1"
SW – 14	Rihand Dam Down Stream	02.03.2013	N24°12'33.7"	E083°00'06.2"
SW – 15	Sone River Mid stream	03.03.2013	N24°27'38.1"	E082°58'18.1"
SW – 16	Sone River upstream, near somnath mandir, gotheni	03.03.2013	N24°32'45.8"	E082°58'42.0"
SW – 17	Sone River near toll Bridge	03.03.2013	N24°32'10.2"	E083°01'20.4"
SW – 18	Sone River Down Stream	03.03.2013	N24°31'52.4"	E083°01'16.8"

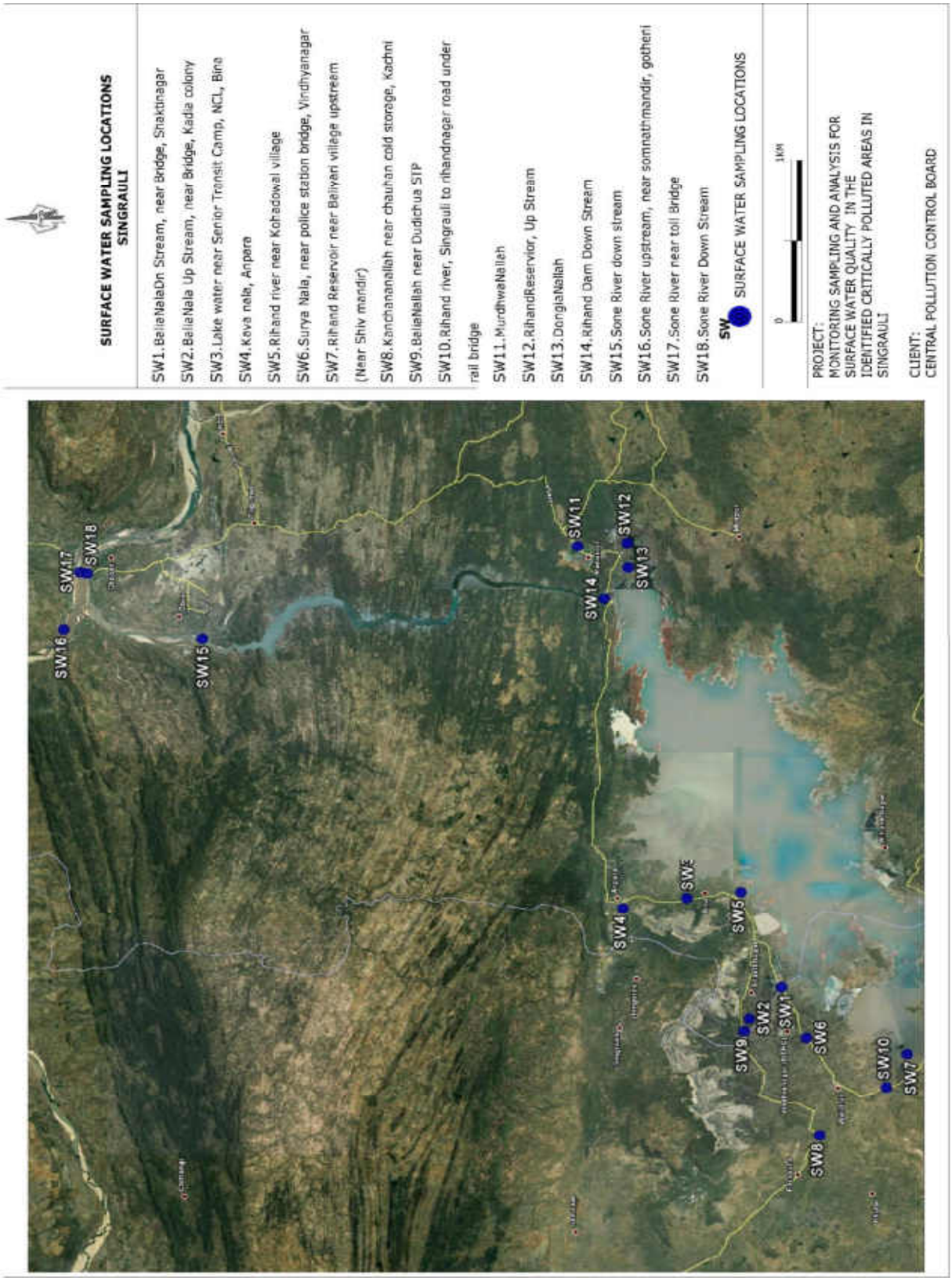
GROUND WATER SAMPLING LOCATIONS

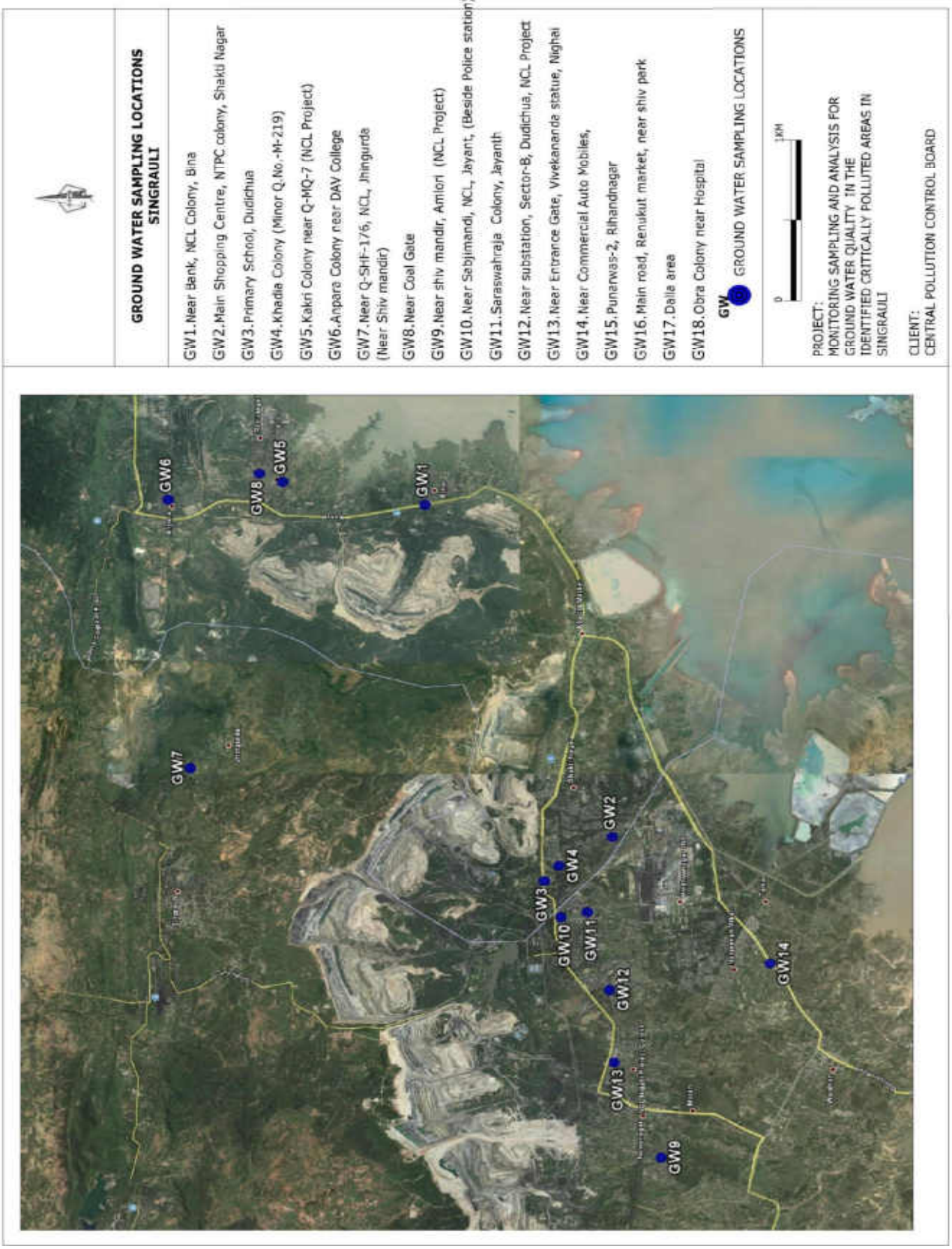
SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW -1	Near Bank, NCL Colony, Bina	26.02.2013	N24°08'55.5"	E082°46'12.4"
GW -2	Main Shopping Centre, NTPC colony, Shakti Nagar	26.02.2013	N24°06'35.7"	E082°41'03.1"
GW -3	Primary School, Dudichua	27.02.2013	N24°07'26.7"	E082°40'22.0"
GW -4	Khadia Colony (Minor Q.No.-M-219)	27.02.2013	N24°07'15.6"	E082°40'36.2"
GW -5	Kakri Colony near Q-MQ-7 (NCL Project)	27.02.2013	N24°10'41.6"	E082°46'33.6"
GW -6	Anpara Colony near DAV College	27.02.2013	N24°12'07.0"	E082°46'17.0"
GW -7	Near Q-SHF-176, NCL, Jhingurda (Near Shiv mandir)	27.02.2013	N24°11'50.5"	E082°42'7.2"
GW -8	Near Coal Gate (out side of Renusagar Power Division Boundary)	28.02.2013	N24°10'59.0"	E082°46'41.3"
GW -9	Near shiv mandir, Amlori (NCL Project)	28.02.2013	N24°05'59.3"	E082°36'3.6"
GW -10	Near Sabji mandi, NCL, Jayant, (Beside Police station)	01.03.2013	N24°07'14.2"	E082°39'47.9"
GW -11	Saraswahraja Colony, Jayanth	01.03.2013	N24°06'54.2"	E082°39'52.8"
GW -12	Near substation, Sector-B, Dudichua, NCL Project	01.03.2013	N24°06'37.8"	E082°38'40.5"
GW -13	Near Entrance Gate, Vivekananda statue, Nighai	01.03.2013	N24°06'34.5"	E082°37'33.4"
GW -14	Near Commercial Auto Mobiles, Beside Bharath Petrol Bunk, Vindhyanagar	02.03.2013	N24°04'37.4"	E082°39'05.4"
GW -15	Punarwas-2, Rihandnagar	02.03.2013	N24°01'34.0"	E082°49'26.8"
GW -16	Main road, Renukut market, near shiv park	02.03.2013	N24°13'11.0"	E083°02'7.8"
GW -17	Dalla area	03.03.2013	N24°26'54.9"	E083°02'44.7"
GW -18	Obra Colony near Hospital	03.03.2013	N24°27'51.1"	E082°59'11.7"

SINGRAULI - UTTAR PRADESH



SINGRAULI - UTTAR PRADESH




GROUND WATER SAMPLING LOCATIONS SINGRAULI
GW1.Near Bank, NCL Colony, Bina
GW2.Main Shopping Centre, NTPC colony, Shakti Nagar
GW3.Primary School, Dudichua
GW4.Khadia Colony (Minor Q.No.-M-219)
GW5.Kakri Colony near Q-MQ-7 (NCL Project)
GW6.Anpara Colony near DAV College
GW7.Near Q-SHF-176, NCL, Jhingurda (Near Shiv mandir)
GW8.Near Coal Gate
GW9.Near shiv mandir, Amlori (NCL Project)
GW10.Near Sabjimandi, NCL, Jayant, (Beside Police station)
GW11.Saraswahraja Colony, Jayanth
GW12.Near substation, Sector-B, Dudichua, NCL Project
GW13.Near Entrance Gate, Vivekananda statue, Nighai
GW14.Near Commercial Auto Mobiles,
GW15.Punarwas-2, Rihandnagar
GW16.Main road, Renukut market, near shiv park
GW17.Dalla area
GW18.Obra Colony near Hospital
GW GROUND WATER SAMPLING LOCATIONS
0
1KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR GROUND WATER QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN SINGRAULI
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
GW1
GW2
GW3
GW4
GW5
GW6
GW7
GW8
GW9
GW10
GW11
GW12
GW13
GW14

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 Executive club, NTPC Colony	**AAQ – 2** GM Office, NCL,	**AAQ – 3** Expert hostel, Khadia colony	**AAQ – 4** Senior Transit Camp, NCL	
1	Lead	µg/m³	0.03	0.01	0.04	0.07	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	<1	1.6	<1	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	92.6	179.6	226.7	126.5	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	38.7	83.9	98.2	44.0	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	<5	<5	12.7	16.4	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	6.5	4.9	6.6	5.4	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	18.6	22.4	19.8	12.6	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	25.4	37.8	36.5	27.1	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	5.8	7.3	9.1	5.6	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	17.2	14.8	20.6	14.7	
		µg/m³	3.7	<2	4.2	<2	

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 5 Guest house, NCL Amlori colony	**AAQ – 6** Officers club, NCL, Kakri colony	**AAQ – 7** Hindalco colony (Hanuman mandir) Renusagar	**AAQ – 8** IIIrd type colony, Anpara	
1	Lead	µg/m^3	0.03	0.04	0.03	0.01	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m^3	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m^3	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m^3	<1	1.4	<1	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m^3	94.2	145.9	78.2	159.2	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m^3	34.5	67.8	31.6	51.6	Internal SOP & CPCB Manual
7	Ammonia	µg/m^3	16.3	11.4	<5	<5	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m^3	5.2	3.9	6.1	5.8	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m^3	12.8	18.9	13.2	16.9	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m^3	22.4	33.6	20.6	24.2	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m^3	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m^3	<2	<2	<2	<2	
		mg/m^3	<2	<2	<2	<2	
12	O_3	µg/m^3	6.1	8.2	5.8	7.6	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m^3	15.6	11.4	18.2	16.3	
		µg/m^3	4.1	3.2	4.6	<2	

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 9 Guest house, NCL colony, Jingurda	**AAQ – 10** Experts Hostel, Jayant, NCL Project	**AAQ –11** NCL Area (Near Police station), Jayant	**AAQ – 12** Guest House Sector-B, Dudichua, NCL Project	
1	Lead	µg/m³	0.02	0.03	0.01	0.04	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	<1	<1	<1	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	82.0	146.7	114.6	162.5	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	45.3	62.8	61.3	53.5	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	18.6	21.8	<5	<5	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	2.9	5.6	3.5	7.9	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	13.7	15.2	16.9	15.6	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	21.4	26.4	28.9	26.9	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	4.6	7.3	5.9	7.2	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	12.8	16.5	13.8	18.6	
		µg/m³	5.1	4.3	<2	3.4	

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS			Test Methods
			AAQ – 13 Guest house, NCL residential colony, Nighai	**AAQ – 14** NTPC Vindhyanagar residential colony (NH 2)	**AAQ – 15** Main Market, NTPC Rihandnagar, Bijpur	
1	Lead	µg/m³	0.03	0.01	0.03	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	<1	<1	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	112.4	85.6	128.4	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	35.8	37.3	48.2	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	16.8	<5	19.4	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	2.9	4.7	3.3	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	15.6	17.2	18.7	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	26.4	29.4	31.6	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	
		mg/m³	<2	<2	<2	
12	O_3	µg/m³	6.1	8.3	10.8	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	18.2	15.6	18.6	
		µg/m³	3.4	3.0	4.1	

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS			Test Methods
			AAQ – 16 Renukeswar mandir, Hindalco colony, Renukoot	**AAQ – 17** Guest house, Dalla town ship, Dalla	**AAQ – 18** Guest house , Obra colony, Obra	
1	Lead	µg/m³	0.07	0.04	0.03	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	<1	<1	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	141.6	166.9	178.4	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	36.4	37.7	44.7	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	<5	18.8	<5	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	7.4	5.6	3.8	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	14.6	13.9	15.2	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	21.8	23.4	20.6	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	
		mg/m³	<2	<2	<2	
12	O_3	µg/m³	5.7	7.1	6.2	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	14.6	16.1	15.7	
		µg/m³	2.7	3.1	2.5	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-1 Balia Nala D/s near Bridge, Shaktinagar	SW – 2 Balia Nala U/s Bridge, Kadia colony	SW-3 Lake water near Senior Transit Camp, NCL, Bina	SW-4 Kava nala, Anpara	
I	**Simple Parameters**						
1	Appearance		Light Yellow	Grey	Colourless	Light greenish	-
2	Colour (Hazen Units)		20	20	5	10	IS 3025: Part – 4
3	Odour (Smell)		Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH		7.72	7.76	7.84	8.32	IS 3025: Part – 11
2	E C	µS/cm	480	576	598	515	IS 3025: Part – 14
3	Oil & Grease	mg/l	1	3	< 1	1	IS 3025: Part – 39
4	Suspended Solids	mg/l	56	114	18	42	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	5.2	3.8	6.0	5.4	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	42	96	12	28	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	10	21	3	6	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.02	0.06	0.02	0.02	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	2.94	4.74	3.39	0.23	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	2.96	4.80	3.41	0.25	By calculation
11	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.40	0.50	0.40	0.50	IS 3025: Part – 60
15	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	0.20	0.46	0.10	0.12	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	1.25	0.82	0.84	1.65	By Calculation
18	Total Coliforms	MPN/100ml	23	26	50	110	IS 1622
19	Fecal Coliforms	MPN/100ml	< 2	< 2	< 2	< 2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	0.28	0.58	0.14	0.15	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	3.5	6.3	< 1	2.1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	2.1	3.5	< 1	1.4	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.05	0.06	0.03	0.02	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.06	0.02	< 0.01	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.45	0.60	0.15	0.14	IS 3025: Part – 53
20	Vanadium as V	mg/l	0.05	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.12	0.04	0.15	0.12	IS 3025: Part – 57

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-5 Rihand river near Kohadowal village	SW – 6 Surya Nala, near police station bridge, Vindhyanagar	SW – 7 Rihand Reservoir near Baliyari village U/s	SW - 8 Kanchana nallah near chauhan cold storage, Kachni	
I	**Simple Parameters**						
1	Appearance		Colourless	Pale Yellow	Pale Yellow	Pale Yellow	-
2	Colour (Hazen Units)		5	10	5	5	IS 3025: Part – 4
3	Odour (Smell)		Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH		7.80	7.46	8.10	7.75	IS 3025: Part – 11
2	E C	µS/cm	124	348	542	438	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	1	< 1	1	IS 3025: Part – 39
4	Suspended Solids	mg/l	24	36	28	38	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	6.2	5.2	6.4	6.1	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	12	20	14	12	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	3	4	3	3	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.01	< 0.01	1.85	0.01	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	0.23	2.26	5.65	3.61	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.24	2.26	7.50	3.62	By calculation
11	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.20	0.50	0.40	0.50	IS 3025: Part – 60
15	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	< 0.1	0.59	< 0.1	0.10	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	0.39	1.04	0.87	1.19	By Calculation
18	Total Coliforms	MPN/100ml	< 2	< 2	< 2	2200	IS 1622
19	Fecal Coliforms	MPN/100ml	< 2	< 2	< 2	17	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	< 0.1	0.70	< 0.1	0.12	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	< 1	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	< 1	< 1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.01	0.02	0.02	0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	< 0.01	0.05	0.03	0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.18	0.26	0.16	0.10	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.04	0.08	0.04	0.03	IS 3025: Part – 57

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-9 Balia Nallah near Dudichua STP	SW-10 Rihand river, Singrauli to rihand nagar road under rail bridge	SW – 11 Murdhwa Nallah	SW – 12 Rihand Reservior, Up Stream	
I	**Simple Parameters**						
1	Appearance		Grey	Pale Yellow	Pale yellow	Colourless	-
2	Colour (Hazen Units)		50	5	15	5	IS 3025: Part – 4
3	Odour (Smell)		Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH		7.58	8.03	7.59	8.42	IS 3025: Part – 11
2	E C	µS/cm	635	427	996	152	IS 3025: Part – 14
3	Oil & Grease	mg/l	5	1	3	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	146	38	76	12	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	3.6	5.2	4.1	6.4	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	92	20	68	8	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	21	4	16	2	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.37	< 0.01	0.03	0.01	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	4.74	0.90	0.90	0.23	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	5.11	0.90	0.93	0.24	By calculation
11	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.60	0.40	0.70	0.20	IS 3025: Part – 60
15	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	0.52	< 0.1	0.36	0.14	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	0.75	1.13	0.63	0.47	By Calculation
18	Total Coliforms	MPN/100ml	3000	900	2800	22	IS 1622
19	Fecal Coliforms	MPN/100ml	50	17	70	< 2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	0.68	< 0.1	0.45	0.26	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	8.4	< 1	5.6	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	5.6	< 1	2.8	< 1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	< 0.01	< 0.01	0.08	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.80	0.03	0.04	0.06	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.05	0.03	0.07	0.03	IS 3025: Part – 57

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			SW – 13 Dongia Nallah	SW – 14 Rihand Dam Down Stream	SW – 15 Sone River down stream	
I	**Simple Parameters**					
1	Appearance		Light Yellow	Pale Yellow	Pale Yellow	-
2	Colour (Hazen Units)		20	5	5	IS 3025: Part – 4
3	Odour (Smell)		Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH		8.17	7.94	7.67	IS 3025: Part – 11
2	E C	µS/cm	5000	134	130	IS 3025: Part – 14
3	Oil & Grease	mg/l	2	< 1	1	IS 3025: Part – 39
4	Suspended Solids	mg/l	78	24	46	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	3.8	6.4	4.3	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	50	10	38	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	12	2	10	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	< 0.01	0.01	0.01	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	2.48	0.23	0.23	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	2.48	0.24	0.24	By calculation
11	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.40	0.20	0.20	IS 3025: Part – 60
15	Sulphides as S	mg/l	0.20	< 0.1	< 0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	0.47	0.15	0.22	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	15.3	0.37	0.45	By Calculation
18	Total Coliforms	MPN/100ml	350	500	40	IS 1622
19	Fecal Coliforms	MPN/100ml	9	< 2	< 2	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	0.62	0.18	0.38	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	4.9	< 1	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	2.1	< 1	< 1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	< 0.01	< 0.01	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.08	0.02	0.09	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.06	< 0.01	0.03	IS 3025: Part – 57

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			SW – 16 Sone River up stream, near somnath mandir, gotheni	SW – 17 Sone River near toll Bridge	SW – 18 Sone River Down Stream	
I	**Simple Parameters**					
1	Appearance		Pale Yellow	Colourless	Colourless	-
2	Colour (Hazen Units)		10	5	5	IS 3025: Part – 4
3	Odour (Smell)		Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH		7.96	8.10	7.93	IS 3025: Part – 11
2	E C	µS/cm	252	253	132	IS 3025: Part – 14
3	Oil & Grease	mg/l	1	1	1	IS 3025: Part – 39
4	Suspended Solids	mg/l	34	28	18	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	4.8	4.6	4.9	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	18	12	10	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	4	3	3	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.01	0.01	< 0.01	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	0.23	0.23	0.23	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.24	0.24	0.23	By calculation
11	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.30	0.30	0.20	IS 3025: Part – 60
15	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	0.33	0.16	< 0.1	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	0.39	0.38	0.42	By Calculation
18	Total Coliforms	MPN/100ml	240	220	110	IS 1622
19	Fecal Coliforms	MPN/100ml	11	14	8	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	0.47	0.21	< 0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	< 1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	< 0.01	0.01	0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	< 0.01	< 0.01	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.05	0.17	0.15	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.02	0.02	0.03	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Near Bank, NCL Colony, Bina	GW – 2 Main Shopping Centre, NTPC colony, Shakti Nagar	GW-3 Primary School, Dudichua	GW-4 Khadia Colony (Minor Q.No.-M-219)	
I	**Simple Parameters**						
1	Appearance		Colourless	Pale Yellow	Colourless	Colourless	-
2	Colour (Hazen Units)		5	5	<5	<5	IS 3025: Part – 4
3	Odour (Smell)		Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH		7.31	7.62	7.54	7.84	IS 3025: Part – 11
2	E C	µS/cm	492	600	820	510	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	24	14	< 10	< 10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	8	6	4	4	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	< 2	< 2	< 2	< 2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.02	0.02	0.01	0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	1.35	3.84	3.61	0.23	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	1.37	3.86	3.62	0.24	By Calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.30	0.80	1.0	0.80	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	0.26	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	0.97	1.64	3.09	0.95	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	0.26	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.02	0.15	0.15	0.16	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	0.01	0.01	0.01	0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.14	0.05	0.14	0.06	APHA 3111 – B
19	Iron as Fe	mg/l	0.13	0.12	0.12	0.15	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.04	0.06	0.03	0.03	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-5 Kakri Colony near Q-MQ-7 (NCL Project)	GW –6 Anpara Colony near DAV College	GW-7 Near Q-SHF-176, NCL, Jhingurda	GW-8 Near Coal Gate	
I	**Simple Parameters**						
1	Appearance		Colourless	Colourless	Brownish	Colourless	-
2	Colour (Hazen Units)		<5	<5	25	<5	IS 3025: Part – 4
3	Odour (Smell)		Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH		7.63	7.87	7.80	7.68	IS 3025: Part – 11
2	E C	µS/cm	795	526	150	1120	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	< 10	< 10	78	< 10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	4	4	10	8	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	< 2	< 2	< 2	< 2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	0.01	0.05	0.02	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	1.13	3.39	1.35	5.42	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	1.14	3.40	1.40	5.44	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.90	0.70	0.20	0.90	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	0.14	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	0.37	0.81	1.41	2.55	By Calculation
17	Total Coliforms	MPN/100ml	< 2	< 2	< 2	< 2	IS 1622
18	Fecal Coliforms	MPN/100ml	< 2	< 2	< 2	< 2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	0.16	< 0.1	< 0.1	< 0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	< 1	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	< 1	< 1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 43
5	Surfactants	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.15	0.15	2.01	0.50	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	0.01	0.01	0.01	0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.01	0.03	0.40	0.12	APHA 3111 – B
19	Iron as Fe	mg/l	0.14	0.13	2.70	0.13	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	0.04	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.02	0.03	0.02	0.10	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-9 Near shiv mandir, Amlori (NCL Project)	GW –10 Near Sabji mandi, NCL, Jayant,	GW-11 Saraswahraja Colony, Jayanth	GW-12 Near substation, Sector-B, Dudichua, NCL Project	
I	**Simple Parameters**						
1	Appearance		Colourless	Pale Yellow	Colourless	Light Brownish	-
2	Colour (Hazen Units)		<5	10	< 5	15	IS 3025: Part – 4
3	Odour (Smell)		Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH		7.79	7.92	7.86	7.47	IS 3025: Part – 11
2	E C	µS/cm	1180	364	952	624	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	< 10	18	< 10	24	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	4	6	4	8	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	< 2	< 2	< 2	< 2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.02	< 0.01	0.02	0.02	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	0.23	0.23	2.26	0.23	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.25	0.23	2.28	0.25	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.30	0.30	0.40	0.50	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	0.40	< 0.1	< 0.1	0.26	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	3.96	0.47	0.94	0.68	By Calculation
17	Total Coliforms	MPN/100ml	< 2	< 2	< 2	< 2	IS 1622
18	Fecal Coliforms	MPN/100ml	< 2	< 2	< 2	< 2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	0.50	< 0.1	< 0.1	0.32	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	< 1	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	< 1	< 1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.22	0.15	0.08	0.34	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.11	0.04	0.03	0.08	APHA 3111 – B
19	Iron as Fe	mg/l	0.20	0.50	0.14	0.30	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.10	0.03	0.03	0.04	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			GW-13 Near Entrance Gate, Vivekananda statue, Nighai	GW – 14 Near Commercial Auto Mobiles, Beside Bharath Petrol Bunk, Vindhyanagar	GW-15 Punarwas-2, Rihandnagar	
I	**Simple Parameters**					
1	Appearance		Colourless	Light Brownish	Colourless	-
2	Colour (Hazen Units)		<5	20	< 5	IS 3025: Part – 4
3	Odour (Smell)		Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH		7.81	7.60	7.80	IS 3025: Part – 11
2	E C	µS/cm	924	976	880	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	< 10	38	< 10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	4	8	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	< 2	< 2	< 2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	0.06	0.02	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	8.35	2.71	5.65	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	8.36	2.77	5.67	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.40	0.35	0.90	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	0.20	0.16	0.14	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	0.96	1.16	1.53	By Calculation
17	Total Coliforms	MPN/100ml	< 2	< 2	< 2	IS 1622
18	Fecal Coliforms	MPN/100ml	< 2	< 2	< 2	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	0.28	0.24	0.20	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	< 1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.73	0.36	0.11	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.09	0.02	< 0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.14	0.50	0.15	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.03	0.02	0.02	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results			Test Method
			GW-16 Main road, Renukut market, near shiv park	**GW – 17** Dalla area	**GW-18** Obra Colony near Hospital	
I	**Simple Parameters**					
1	Appearance		Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)		< 5	< 5	< 5	IS 3025: Part – 4
3	Odour (Smell)		Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH		7.93	7.70	7.73	IS 3025: Part – 11
2	E C	µS/cm	1180	655	522	IS 3025: Part – 14
3	Oil & Grease	mg/l	< 1	< 1	< 1	IS 3025: Part – 39
4	Suspended Solids	mg/l	< 10	< 10	14	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	4	4	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	< 2	< 2	< 2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.02	0.02	0.02	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	5.65	4.29	0.23	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	5.67	4.31	0.25	By Calculation
10	Free Ammonia	mg/l	< 0.1	< 0.1	< 0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	< 0.02	< 0.02	< 0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.80	0.50	0.40	IS 3025: Part – 60
14	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	0.15	0.12	< 0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	2.82	0.69	0.69	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	0.20	0.16	< 0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	< 1	< 1	< 1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	< 1	< 1	< 1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.02	0.01	0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	< 0.05	< 0.05	< 0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.03	0.04	0.03	APHA 3111 – B
19	Iron as Fe	mg/l	0.16	0.14	0.15	IS 3025: Part – 53
20	Vanadium as V	mg/l	< 0.01	< 0.01	< 0.01	APHA 3111 – D
21	Selenium as Se	mg/l	< 0.01	< 0.01	< 0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.05	0.05	0.05	IS 3025: Part – 57

AMBIENT AIR MONITORING PHOTOGRAPHS

Executive Club, NTPC Colony, Shaktinagar

GM Office, NCL, Dudhichau, Khadia

Expert Hostel, Khadia colony, NCL

Senior Transit Camp, NCL, Bina

Guest House, NCL Amlori colony,
Near Shiv mandir

Officers Club, NCL, Kakri colony

AMBIENT AIR MONITORING PHOTOGRAPHS

Hindalco Colony (Hanuman mandir) Renusagar

Guest House Sector-B, Dudichua, NCL Project

Guest House, NCL colony, Jingurda

Experts Hostel, Jayant, NCL Project

NCL Area (Near Police station), Jayant.

IIIrd Type colony, Anpara

AMBIENT AIR MONITORING PHOTOGRAPHS

Guest House, NCL Residential Colony, Nighai

NTPC Vindhyanagar Residential Colony(NH 2)

Main Market, NTPC Rihandnagar, Bijpur

Renukeswar mandir, Hindalco colony, Renukoot

Guest House, Dalla Town Ship, Dalla

Guest House , Obra Colony, Obra

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Balia Nallah Down Stream, near Bridge

Rihand river near Kohadowal village

Lake water near Senior Transit Camp, NCL, Bina

Kava nallah, Anpara

Surya Nallah, near police station bridge, Vindhyanagar

Shaktinaga Balia Nallah Up Stream near Bridge, Kadia colony

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Kanchana Nallah Near Chauhan Cold Storage, Kachni

Rihand Reservoir near Baliyari village upstream

Balia Nallah near Dudichua STP

Rihand River, Singrauli To Rihand Nagar Road

Murdhwa Nallah

Rihand Reservior, Up Stream

SAMPLING LOCATION PHOTOGRAPHS OF SURFACE WATER

Dongia Nallah

Rihand Dam Down Stream

Sone River Mid stream

Sone River upstream, near Somnath Mandir, Gotheni

Sone River Down Stream

Sone River near Toll Bridge, Singrauli

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Near Bank, NCL Colony, Bina

Main Shopping Centre, NTPC colony, Shakti Nagar

Primary School, Dudichua

Khadia Colony (Minor Q.No.-M-219)

Kakri Colony near Q-MQ-7 (NCL Project)

Anpara Colony near DAV College

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Near Q-SHF-176, NCL, Jhingurda (Near Shiv Mandir)

Near Coal Gate(out side of Renusagar Power Division Boundary)

Near shiv mandir, Amlori (NCL Project)

Near Sabji Mandi, NCL,

Saraswahraja Colony, Jayant

Near substation, Sector-B, Dudichua, NCL Project

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Near Entrance Gate, Vivekananda statue, Nighai

Near Commercial Auto Mobiles, Beside Bharath Petrol Bunk, Vindhyanagar

Punarwas-2, Rihandnagar

Main road, Renukut market, near shiv park

Dalla area

Obra Colony near Hospital

SAMPLING LOCATION WITH GPS COORDINATES

AAQ MONITORING LOCATIONS

SAMPLE CODE	NAME OF THE MONITORING LCOATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	MPCB Office	05.02.2013 to 06.02.2013	N19⁰48'32.6"	E72⁰44'38.0"
AAQ – 2	Kokuyo Camlin Ltd [Name Changed From Camlin Limited]	05.02.2013 to 06.02.2013	N19⁰47'52.5"	E72⁰44'15.7"
AAQ – 3	Sports Stadium	05.02.2013 to 06.02.2013	N19⁰47'25.4"	E72⁰45'07.8"
AAQ – 4	Kumbhavalli Nakha Bhumb Nakha – Sumitomo Chemical India Pvt Ltd (Proposed Name) – SC Enviro Chem (Present Name)	05.02.2013 to 06.02.2013	N19⁰47'20.9"	E72⁰43'11.8"

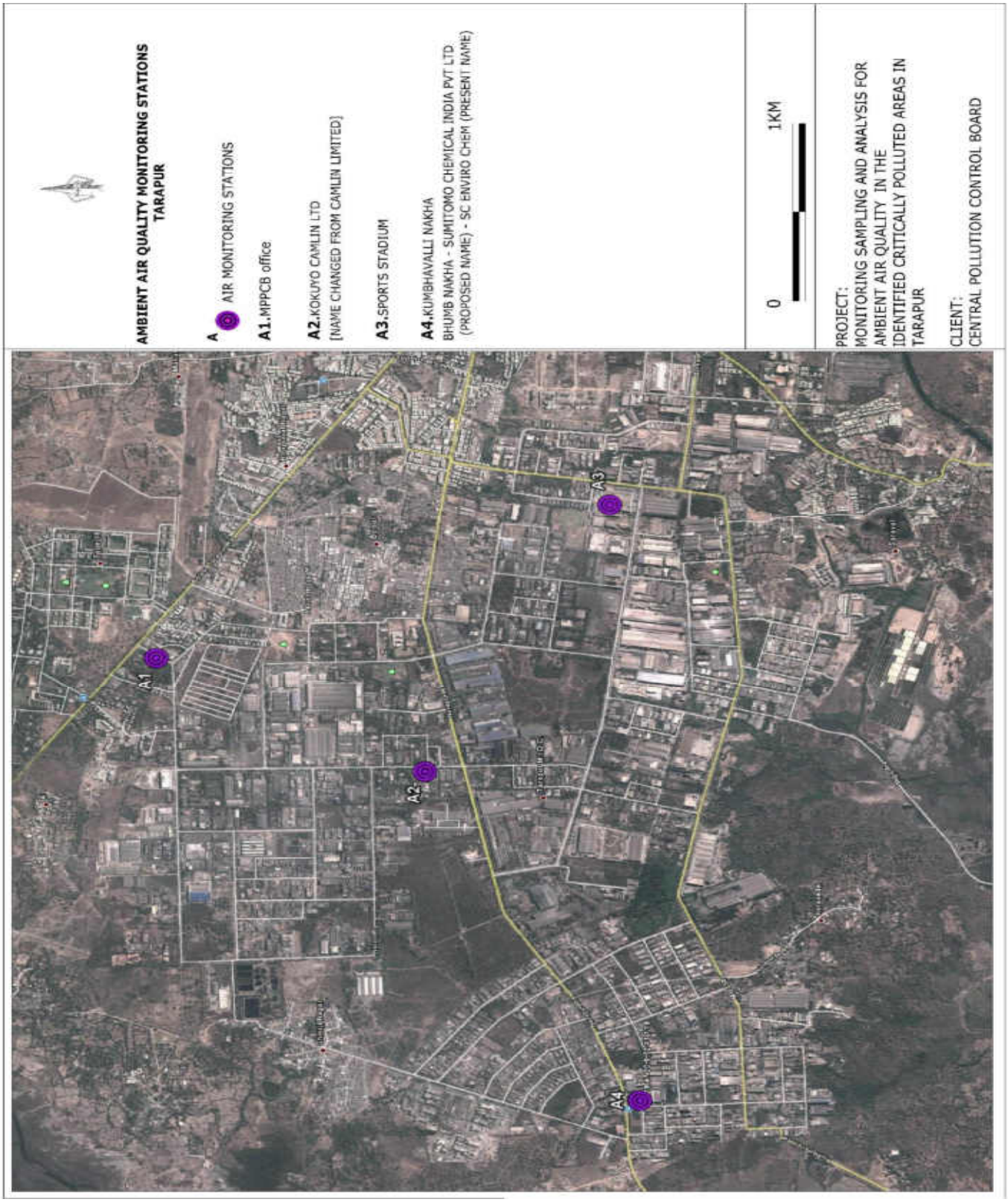
SURFACE WATER SAMPLING LOCATIONS

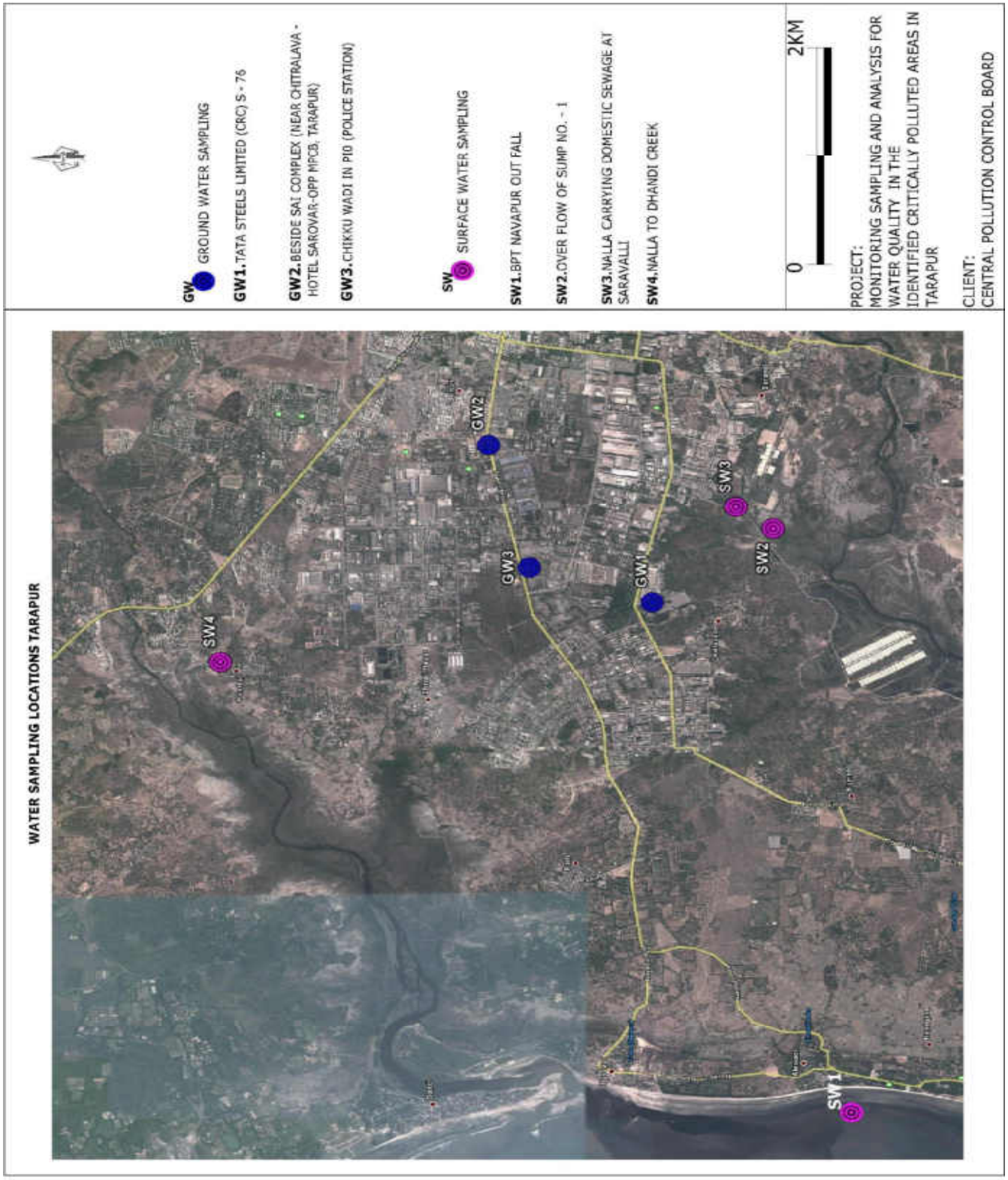
SAMPLE CODE	NAME OF THE MONITORING LCOATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	BPT Navapur Out Fall	06.02.2013	N19⁰46'09.0"	E72⁰41'10.0"
SW – 2	Over Flow Of Sump No. - 1	06.02.2013	N19⁰46'40.0"	E72⁰44'16.2"
SW – 3	Nalla Carrying Domestic Sewage at Saravalli	06.02.2013	N19⁰46'49.5"	E72⁰44'23.2"
SW – 4	Nalla to Dhandi	06.02.2013	N19⁰49'01.3"	E72⁰43'34.9"

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE MONITORING LCOATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Tata Steels Limited (Crc) S – 76	06.02.2013	N19⁰47'10.8"	E72⁰43'52.8"
GW – 2	Beside Sai Complex (Near Chitralava – Hotel Sarovar-Opp Mpcb, Tarapur)	06.02.2013	N19⁰47'52.5"	E72⁰44'42.9"
GW – 3	Chikku Wadi In Pi0 (Police Station)	06.02.2013	N19⁰47'42.1"	E72⁰44'03.8"
GW – 4	M/s. PRECISE ALLOY	06.02.2013	Sample could not be collected as the point was closed by MIDC	

TARAPUR - MAHARASHTRA




WATER SAMPLING LOCATIONS TARAPUR
SW4
GW2
GW3
GW1
SW3
SW2
SW1
GW GROUND WATER SAMPLING
GW1.TATA STEELS LIMITED (CRC) S - 76
GW2.BESIDE SAI COMPLEX (NEAR CHITRALAVA - HOTEL SAROVAR-OPP MPCB, TARAPUR)
GW3.CHIKKU WADI IN PID (POLICE STATION)
SW SURFACE WATER SAMPLING
SW1.BPT NAVAPUR OUT FALL
SW2.OVER FLOW OF SUMP NO. - 1
SW3.NALLA CARRYING DOMESTIC SEWAGE AT SARAVALLI
SW4.NALLA TO DHANDI CREEK
0
2KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN TARAPUR
CLIENT:
CENTRAL POLLUTION CONTROL BOARD

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 MPCB office	**AAQ – 2** Camlin Ltd.,	**AAQ – 3** Sports Stadium	**AAQ – 4** Kumbhavalli Nakha	
1	Lead	µg/m³	0.07	0.11	0.05	0.18	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	4.2	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	1.8	1.6	<1	2.1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	80.1	85.6	71.6	143.4	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	38.6	42.4	26.9	39.4	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	10.8	26.2	21.8	12.7	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	2.8	4.2	2.3	5.1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	16.9	19.6	11.8	17.5	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	25.4	31.6	19.6	27.2	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	8.9	6.9	7.2	10.4	IS 5182 (Part 9), 1974, RA 209, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	14.2	12.6	15.6	13.7	
		µg/m³	3.1	2.3	2.3	<2	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-1 BPT Navapur out fall	SW – 2 Over Flow of Sump No. - 1	SW-3 Nalla Carrying domestic sewage at Saravalli	SW-4 Nalla to Dhandi Creek	
I	**Simple Parameters**						
1	Appearance	-	Brown	Light Brownish	Greyish	Grey (dark black)	-
2	Colour (Hazen Units)	-	>100	20	10	20	IS 3025: Part – 4
3	Odour (Smell)	-	Un-Agreeable	Un-Agreeable	Un-Agreeable	Un-Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	6.92	6.00	7.07	7.36	IS 3025: Part – 11
2	E C	µS/cm	55300	2000	1200	13720	IS 3025: Part – 14
3	Oil & Grease	mg/l	6	7	2	8	IS 3025: Part – 39
4	Suspended Solids	mg/l	260	118	46	146	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	<1	<1	2.8	<1	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	82	76	42	672	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	34	19	10	280	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.04	0.10	1.15	0.16	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	3.39	4.74	7.68	29.35	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	3.43	4.84	8.83	29.51	By Calculation
11	Free Ammonia	mg/l	<0.1	<0.1	<0.1	0.6	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	1.2	1.40	1.20	0.40	IS 3025: Part – 60
15	Sulphides as S	mg/l	4.8	1.28	1.92	3.52	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	0.28	0.13	0.17	0.21	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	mg/l	56.67	3.46	1.53	14.98	By Calculation
18	Total Coliforms	MPN/100ml	12	90	2800	110	IS 1622
19	Fecal Coliform	MPN/100ml	<2	<2	90	22	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	0.34	0.18	0.24	0.36	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	21.0	7.0	1.4	58.0	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	1.8	3.5	0.56	31.0	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	0.02	0.02	0.06	IS 3025: Part – 49
10	Nickel as Ni	mg/l	0.03	0.01	0.02	0.04	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	0.08	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	0.13	0.03	0.02	0.10	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	0.01	<0.01	<0.01	0.02	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.12	<0.01	<0.01	0.21	APHA 3111 – B
19	Iron as Fe	mg/l	2.54	0.07	0.03	0.97	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.64	0.07	0.07	0.21	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Tata steel Ltd., (CRC) S - 76	GW – 2 Sai Complex (Near Chitralaya)	GW-3 Chikkuwadi in P10	GW-4 M/s. Precise Alloy	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Sample were not collected at this location	-
2	Colour (Hazen Units)	-	<5	<5	<5		IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable		IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.75	7.30	6.87		IS 3025: Part – 11
2	E C	µS/cm	1020	710	400		IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1		IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10		IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	4	6	4		IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2		IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	0.01	0.02		APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	3.00	2.71	2.48		APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	3.01	2.72	2.50		By Calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1		APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1		IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02		IS 3025: Part – 27
13	Fluoride as F	mg/l	0.40	0.50	0.40		IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1		IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	0.12	0.04	0.04		APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	mg/l	1.08	0.58	0.96		By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2		IS 1622
18	Fecal Coliform	MPN/100ml	<2	<2	<2		IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	0.15	0.07	0.06		APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<0.2	<0.2	<0.2		APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<0.2	<0.2	<0.2		APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001		IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1		IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected		EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected		EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected		EPA 508
9	Zinc as Zn	mg/l	<0.01	<0.01	0.02		IS 3025: Part – 49
10	Nickel as Ni	mg/l	0.01	0.01	0.02		IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01		IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05		APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	0.02	0.03	0.03		IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01		IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01		IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01		IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001		IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.05	<0.01	0.61		APHA 3111 – B
19	Iron as Fe	mg/l	0.05	0.07	0.13		IS 3025: Part – 53
20	Vanadium as V	mg/l	0.02	0.05	0.03		APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01		IS 3025: Part – 56
22	Boron as B	mg/l	0.03	0.04	0.90		IS 3025: Part – 57

PHOTOGRAPHS OF AAQ MONITORING STATIONS

AAQ STATION AT MPCB OFFICE – TARAPUR

AAQ STATION AT CAMLIN (KOKOYA CAMLIN) - TARAPUR

AAQ STATION AT PDTSA SPORTS COMPLEX - TARAPUR

AAQ STATION AT KUMBHAVALLI NAKHA - TARAPUR

PHOTOGRAPHS OF SURFACE WATER SAMPLING LOCATIONS

SARAVALLI NALLA

SUMP NO 1: OVERFLOW - TARAPUR

DHANDI CREEK - TARAPUR

NEAR BPT OUTFALL NAVAPUR

PHOTOGRAPHS OF GROUND WATER SAMPLING LOCATIONS

Tata steel Ltd., (CRC) S – 76

M/s. Precise Alloy ground water sampling station – closed by MIDC

Chikkuwadi in P10 (Police station)

AAQ MONITORING LOCATIONS

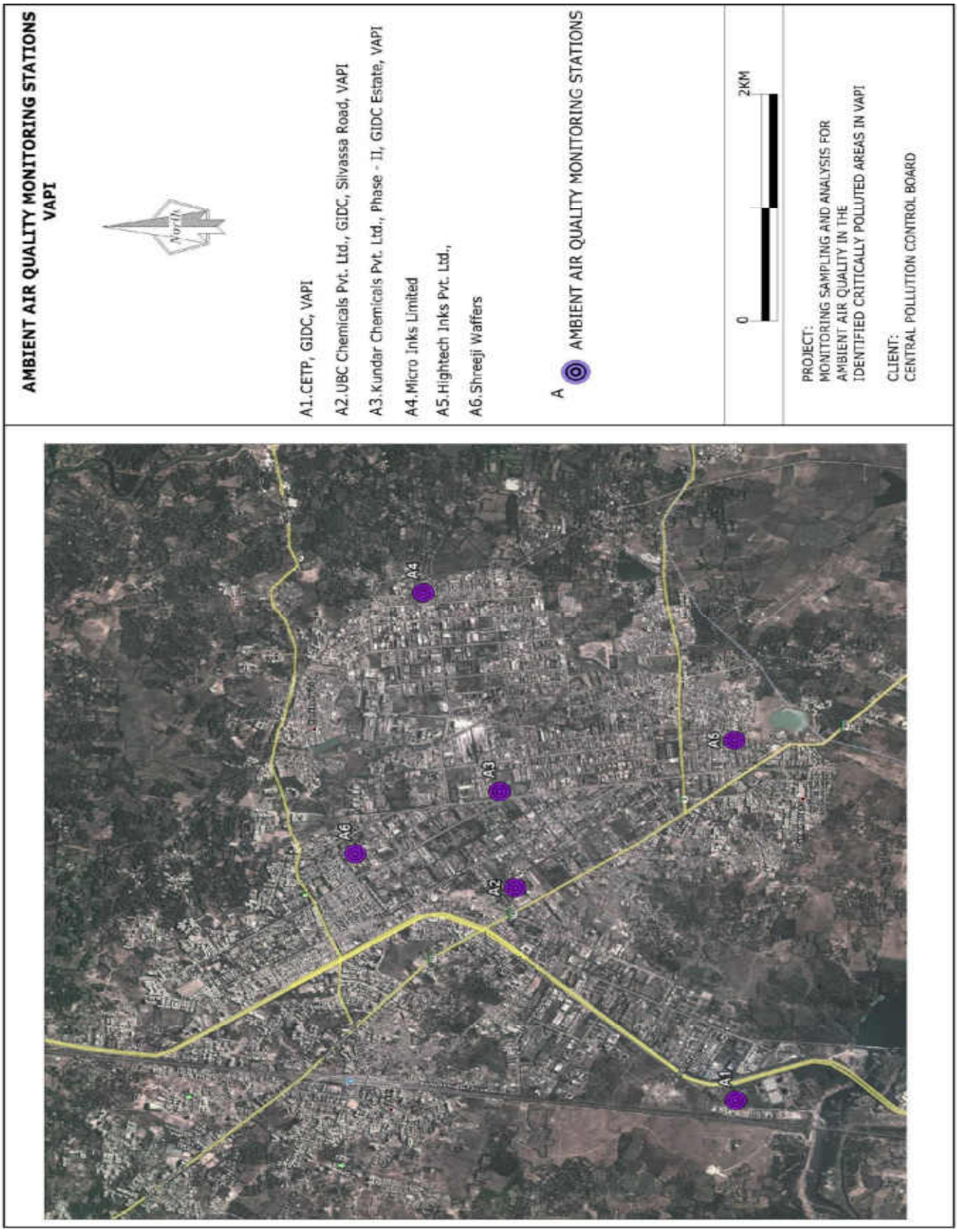
SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	CETP, GIDC, VAPI	01.02.2013 to 02.02.2013	N 20°21'54.3"	E 072°54'25.7"
AAQ – 2	UBC Chemicals Pvt. Ltd., GIDC, Silvassa Road, VAPI	01.02.2013 to 02.02.2013	N 20°20'46.8"	E 072°55'30.7"
AAQ – 3	Kundar Chemicals Pvt. Ltd., Phase – II, GIDC Estate, VAPI	01.02.2013 to 02.02.2013	N 20°21'50.5"	E 072°56'0.26"
AAQ – 4	Micro Inks Limited, VAPI	01.02.2013 to 02.02.2013	N 20°22'08.6"	E 072°57'01.1"
AAQ – 5	Hightech Inks Pvt. Ltd. VAPI	02.02.2013 to 03.02.2013	N 20°20'54.6"	E 072°56'15.9"
AAQ – 6	Shreeji Waffers,VAPI	02.02.2013 to 03.02.2013	N 20°22'24.8"	E 072°55'41.0"

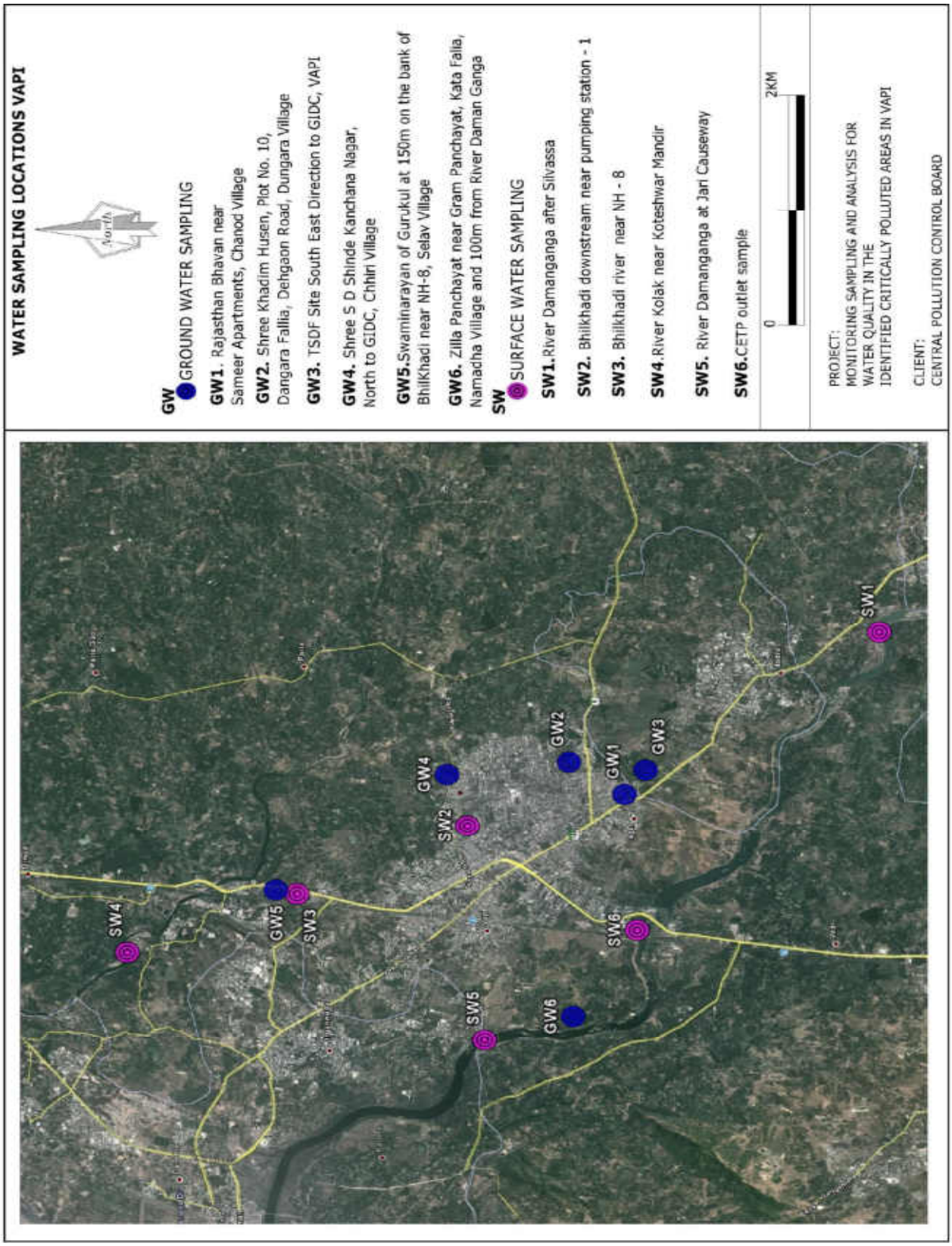
SURFACE WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	River Damanganga after Silvassa	01-02-2013	N 20°17'53.9"	E 072°58'34.8"
SW – 2	Bhilkhadi downstream near pumping station – 1	01-02-2013	N 20°22'29.4"	E 072°55'51.7"
SW – 3	Bhilkhadi river near NH - 8	02-02-2013	N 20°24'23.1"	E 072°54'53.9"
SW – 4	River Kolak near Koteshwar Mandir	02-02-2013	N 20°26'16.8"	E 072°54'04.7"
SW – 5	River Damanganga at Jari Causeway	02-02-2013	N 20°22'17.9"	E 072°52'50.8"
SW – 6	CETP outlet sample	02-02-2013	N 20°20'35.9"	E 072°54'23.4"

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Rajasthan Bhavan near Sameer Apartments, Chanod Village	02-02-2013	N 20°20'44.4"	E 072°56'18.3"
GW – 2	Shree Khadim Husen, Plot No. 10, Dangara Fallia, Dehgaon Road, Dungara Village	02-02-2013	N 20°21'21.4"	E 072°56'45.4"
GW – 3	TSDF Site South East Direction to GIDC, VAPI	01-02-2013	N 20°20'30.2"	E 072°56'38.8"
GW – 4	Shree S D Shinde Kanchana Nagar, North to GIDC, Chhiri Village.	01-02-2013	N 20°22'43.0"	E 072°56'34.9"
GW – 5	Swaminarayan of Gurukul at 150m on the bank of BhilKhadi near NH-8, Selav Village	02-02-2013	N 21°32'32.6"	E 072°59'03.3"
GW – 6	Zilla Panchayat near Gram Panchayat, Kata Falia, Namadha Village and 100m from River Daman Ganga	02-02-2013	N 20°21'18.6"	E 072°53'11.0"


AMBIENT AIR QUALITY MONITORING STATIONS
VAPI
North
A1.CETP, GIDC, VAPI
A2.UBC Chemicals Pvt. Ltd., GIDC, Silvassa Road, VAPI
A3.Kundar Chemicals Pvt. Ltd., Phase - II, GIDC Estate, VAPI
A4.Micro Inks Limited
A5.Hightech Inks Pvt. Ltd.,
A6.Shreeji Waffers
A AMBIENT AIR QUALITY MONITORING STATIONS
0
2KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR
AMBIENT AIR QUALITY IN THE
IDENTIFIED CRITICALLY POLLUTED AREAS IN VAPI
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
A1
A2
A3
A4
A5
A6


WATER SAMPLING LOCATIONS VAPI
North
GW
GROUND WATER SAMPLING
GW1. Rajasthan Bhavan near Sameer Apartments, Chanod Village
GW2. Shree Khadim Husen, Plot No. 10, Dangara Fallia, Dehgaon Road, Dungara Village
GW3. TSDF Site South East Direction to GIDC, VAPI
GW4. Shree S D Shinde Kanchana Nagar, North to GIDC, Chhiri Village
GW5.Swaminarayan of Gurukul at 150m on the bank of BhilKhadi near NH-8, Selav Village
GW6. Zilla Panchayat near Gram Panchayat, Kata Falia, Namadha Village and 100m from River Daman Ganga
SW
SURFACE WATER SAMPLING
SW1.River Damanganga after Silvassa
SW2. Bhilkhadi downstream near pumping station - 1
SW3. Bhilkhadi river near NH - 8
SW4.River Kolak near Koteshwar Mandir
SW5. River Damanganga at Jari Causeway
SW6.CETP outlet sample
0
2KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN VAPI
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
SW4
GW5
SW3
GW4
SW2
SW5
GW6
GW2
GW1
GW3
SW6
SW1

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS			Test Methods
			AAQ – 1 CETP	**AAQ – 2** UBC Chemicals Pvt. Ltd.,	**AAQ – 3** Kunder Chemicals Pvt. Ltd.,	
1	Lead	µg/m³	0.12	0.09	0.21	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo (a) Pyrene	ng/m³	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	1.6	2.1	1.9	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	82	90	78	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	31	28	32	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	24	15.5	18.7	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	11.2	10.8	8.6	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	11.8	13.3	12.7	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	19.6	22.1	21.8	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	
		mg/m³	<2	<2	<2	
12	O_3	µg/m³	9.2	7.6	10.4	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	16.7	14.5	18.1	
		µg/m³	3.4	<2	3.6	

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS			Test Methods
			AAQ – 4 Micro Inks Ltd.,	**AAQ – 5** Hightech Inks Pvt. Ltd.,	**AAQ – 6** Shreeji Waffers	
1	Lead	µg/m³	0.12	0.18	0.11	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	3.1	2.4	1.9	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	83	97	158	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	26	34	46	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	16.5	12.5	13.7	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	11.6	13.4	12.6	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	12.6	14.2	16.9	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	21.8	26.7	29.0	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	
		mg/m³	<2	<2	<2	
12	O_3	µg/m³	8.5	10.2	7.6	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	21.0	24.0	19.0	
		µg/m³	4.0	3.6	2.8	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	Results UOM	SW-1 River Damanganga after Silvassa	SW – 2 Bhilkhadi Downstream near Pumping station - 1	SW-3 Bhilkhadi near NH - 8	Test Method
I	**Simple Parameters**					
1	Appearance		Colourless	Bluish Green	Light Brown	-
2	Colour (Hazen Units)		<5	200	10	IS 3025: Part – 4
3	Odour (Smell)		Agreeable	Un-agreeable	Un-agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.74	7.47	7.92	IS 3025: Part – 11
2	E C	µS/cm	390	5190	1020	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	6	1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	94	48	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	6.8	<1	2.0	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	18	308	62	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	4	82	15	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.01	0.03	0.02	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	0.45	1.81	1.13	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.46	1.84	1.15	By calculation
11	Free Ammonia	mg/l	<0.1	0.80	<0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.40	0.60	0.80	IS 3025: Part – 60
15	Sulphides as S	mg/l	<0.1	3.8	<0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	<0.1	1.20	0.79	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	0.72	5.25	0.57	By Calculation
18	Total Coliforms	MPN/100ml	<2	17	220	IS 1622
19	Fecal Coliforms	MPN/100ml	<2	7	50	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	0.07	1.52	0.96	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	0.7	51	7.0	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	0.56	35	4.2	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	0.10	0.12	0.14	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.04	0.18	0.12	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	0.09	0.03	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	0.16	0.04	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	0.01	0.05	0.02	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	0.02	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.02	0.52	0.16	APHA 3111 – B
19	Iron as Fe	mg/l	0.14	0.98	0.24	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.04	0.18	0.12	IS 3025: Part – 57

SURFACE WATER QUALITY

Sl. No.	Test Parameters	Results UOM	SW- 4 River Kolak near Koteshwar Mandir	SW – 5 River Damanganga at Jari Causeway	SW- 6 CETP Outlet	Test Method
I	**Simple Parameters**					
1	Appearance		Pale yellowish	Light Brown	Brown	-
2	Colour (Hazen Units)		10	20	350	IS 3025: Part – 4
3	Odour (Smell)		Agreeable	Agreeable	Un-agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.24	7.10	7.16	IS 3025: Part – 11
2	E C	µS/cm	690	2500	8000	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	5	IS 3025: Part – 39
4	Suspended Solids	mg/l	16	28	46	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	1.8	1.4	<1.0	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	28	52	280	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	7	12	74	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.01	0.20	0.02	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	1.35	1.81	2.03	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	1.36	2.01	2.05	By calculation
11	Free Ammonia	mg/l	<0.1	<0.1	0.21	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.8	0.9	1.20	IS 3025: Part – 60
15	Sulphides as S	mg/l	<0.1	<0.1	3.7	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	0.49	<0.1	<0.1	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	1.10	2.47	4.59	By Calculation
18	Total Coliforms	MPN/100ml	34	50	70	IS 1622
19	Fecal Coliforms	MPN/100ml	22	17	23	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	0.70	0.10	0.12	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	1.12	2.10	48	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	0.84	1.4	32	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	0.10	0.14	0.10	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	<0.01	0.10	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	0.06	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	0.07	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	0.01	0.01	0.10	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	0.03	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.02	0.03	0.28	APHA 3111 – B
19	Iron as Fe	mg/l	0.12	0.18	0.96	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.06	0.18	0.86	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	Results UOM	GW-1 Chanod Village	GW – 2 Dungara village	GW-3 TSDF Site, GIDC	Test Method
I	**Simple Parameters**					
1	Appearance	-	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	<5	<5	<5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.50	7.50	7.69	IS 3025: Part – 11
2	E C	µS/cm	1200	3200	1900	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	6	4	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	0.02	0.02	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	0.45	2.94	4.06	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.46	2.96	4.08	By calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.60	0.50	0.70	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	1.43	5.35	2.22	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	IS 1622
18	Fecal Coliform	MPN/100ml	<2	<2	<2	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	<0.01	<0.01	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.07	0.09	0.12	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.10	0.18	0.14	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	Results UOM	GW-4 Chhiri village	GW – 5 Premise of Swami narayan gurukul	GW-6 Gram Panchayat Namadha Village	Test Method
I	**Simple Parameters**					
1	Appearance		Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)		<5	<5	<5	IS 3025: Part – 4
3	Odour (Smell)		Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**					
1	pH	-	7.83	7.37	7.20	IS 3025: Part – 11
2	E C	µS/cm	1050	1200	960	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	4	6	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	0.01	0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	2.03	2.94	1.35	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	2.04	2.95	1.36	By Calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.90	0.70	0.60	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	2.53	2.10	1.10	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	IS 1622
18	Fecal Coliform	MPN/100ml	<2	<2	<2	IS 1622
III	**Special Parameters**					
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	<0.01	<0.01	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.05	0.06	0.05	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.07	0.08	0.06	IS 3025: Part – 57

AMBIENT AIR MONITORING LOCATIONS PHOTOGRAPHS

CETP - Vapi

UCB India Private Limited – Vapi

Kunder Chemicals Private Limited – Vapi

Micro Inks Limited - Vapi

Hightech Inks Private Limited – Vapi

Shreeji Waffers - Vapi

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

River Damanganga after Silvassa

Bhilkhadi Downstream near Pumping station - 1

CETP Outlet

River Damanganga at Jari Causeway

River Kolak near Koteshwar Mandir

Bhilkhadi near NH – 8

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

TSDF Site, GIDC

Chanod Village

Dungara village

Chhiri village

Gram Panchayat Namadha Village

Premise of Swami narayan gurukul

Doing Analysis at Vapi

AAQ MONITORING LOCATIONS

Sample Code	Name of the Monitoring Location	Date of Sampling	Latitude	Longitude
AAQ - 1	Ajay Iron & Steel Works, Chandpur industrial estate, Varanasi	21.02.2013 to 22.02.2013	N25°18'11.8"	E082°57'21.7"
AAQ - 2	Pushpanjali Sarees Pvt Ltd, Chandpur industrial area, Varanasi	21.02.2013 to 22.02.2013	N25°18'18.7"	E082°57'35.9"
AAQ – 3	Aishwarya Creations Pvt Ltd, *Chandpur industrial area, Varanasi*	21.02.2013 to 22.02.2013	N25°18'19.6"	E082°57'14.9"
AAQ - 4	UMANG Agro park, UPSIDC, Karkhiyon, Phoolpur, Varanasi	21.02.2013 to 22.02.2013	N25°32'38.6"	E082°47'42.4"
AAQ - 5	Shri Durga agro oil pvt. Ltd. UPSIDC, Karkhiyon, Phoolpur, Varanasi	21.02.2013 to 22.02.2013	N25°32'22.4"	E082°47'55.1"
AAQ - 6	Parag dairy, Ramnagar industrial area, Varanasi	22.02.2013 to 23.02.2013	N25°14'33.7"	E083°03'45.8"
AAQ - 7	Shri Omkar Paper Board Mills Pvt Ltd , Ramnagar industrial area, Varanasi	22.02.2013 to 23.02.2013	N25°14'46.9"	E083°03'27.7"
AAQ - 8	HITEC Food industries , Ramnagar industrial area, Varanasi	22.02.2013 to 23.02.2013	N25°14'57.2"	E083°03'49.9"

SURFACE WATER SAMPLING LOCATIONS

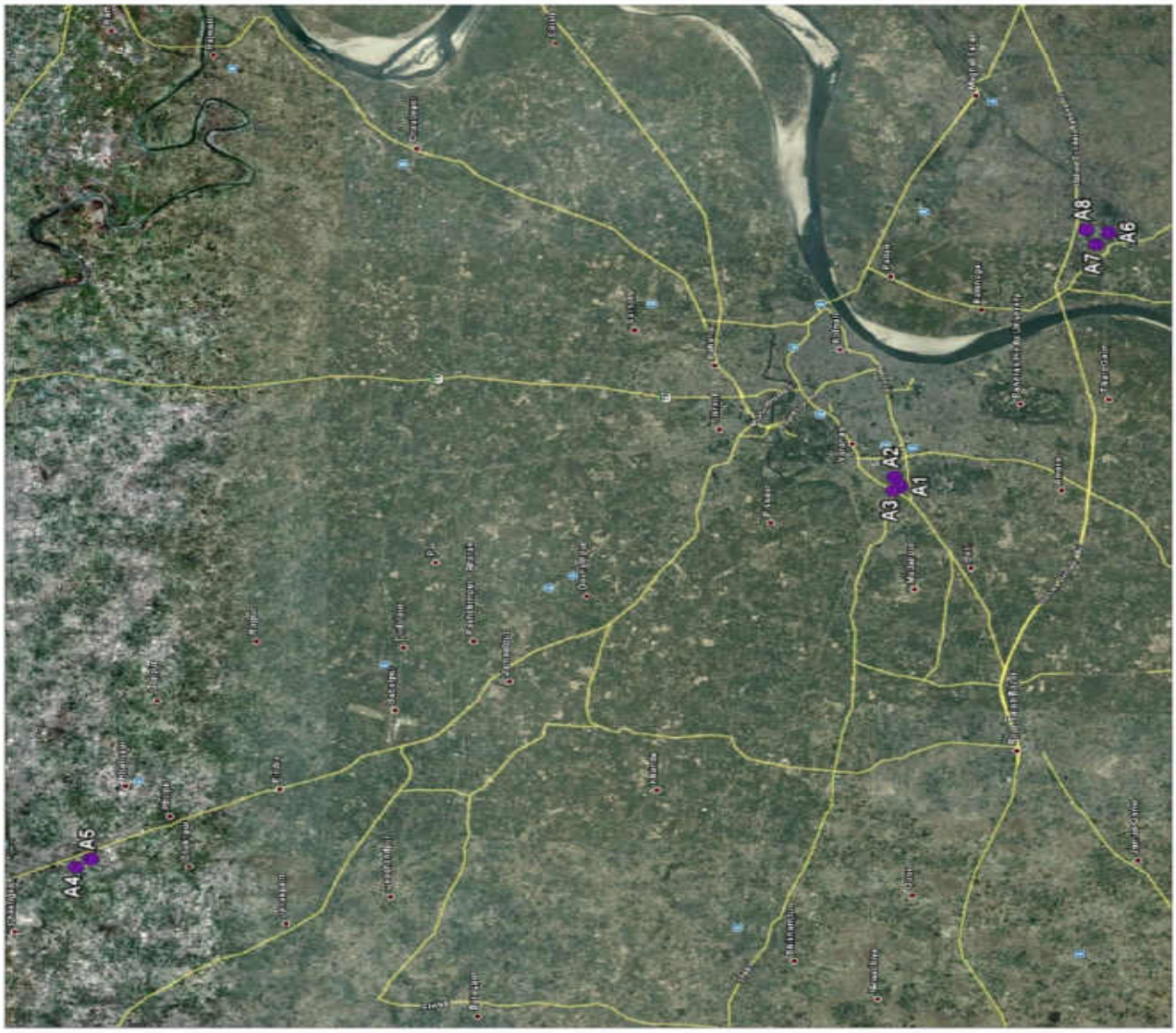
Sample Code	Name of the Sampling Location	Date of Sampling	Latitude	Longitude
SW – 1	Dashashwamedh Ghat, Ganga river, Varanasi	22.02.2013	N25°18'21.8"	E083°00'44.1"
SW – 2	Assi ghat, Ganga river, Varanasi, mid stream	22.02.2013	N25°17'30.4"	E083°00'30.7"
SW – 3	Near High tension wire poles, Ganga river, Down Stream, Varanasi.	22.02.2013	N25°19'44.4"	E083°03'22.4"
SW – 4	Varuna river, Down Stream, Near Rajghat , before entering into ganga river	22.02.2013	N25°19'46.0"	E083°02'38.7"
SW – 5	Ganga river Upstream, Near floating bridge, Ramnagar fort, Varanasi	22.02.2013	N25°16'20.8"	E083°01'17.8"
SW – 6	Pishach Mochan pond, Varanasi	23.02.2013	N25°19'19.9"	E082°59'47.7"
SW – 7	Varuna river, midstream, Near new varuna bridge	23.02.2013	N25°20'25.2"	E082°58'51.1"
SW – 8	Varuna river, upstream, Near Rameswar mahadev dham bridge, Rameswar	23.02.2013	N25°23'15.3"	E082°51'15.0"

GROUND WATER SAMPLING LOCATIONS

Sample Code	Name of the Sampling Location	Date of Sampling	Latitude	Longitude
GW – 1	Aishwarya Creations Pvt Ltd, Chandpur industrial area, Varanasi	22.02.2013	N25°18'19.6"	E082°57'14.9"
GW – 2	Near gate, Parag dairy, Ramnagar industrial area, Varanasi	22.02.2013	N25°14'34.4"	E083°03'49.1"
GW – 3	Near fort, Ramnagar, (Residential Area), Varanasi	22.02.2013	N25°16'12.8"	E083°01'31.9"
GW – 4	Near Chinese temple gate, Sarnath, Varanasi	23.02.2013	N25°22'44.2"	E083°01'44.8"
GW – 5	Primary School , Shivpur, Varanasi	23.02.2013	N25°21'16.6"	E082°57'41.7"
GW – 6	Near Ayurvedic Hospital, Rameshwar Village	23.02.2013	N25°23'6.6"	E082°51'14.6"
GW – 7	Shri Durga agro oil pvt. Ltd. UPSIDC, Karkhiyon, Phoolpur, Varanasi	23.02.2013	N25°32'22.4"	E082°47'55.1"
GW – 8	UMANG Agro park, UPSIDC, Karkhiyon, Phoolpur, Varanasi	23.02.2013	N25°18'19.6"	E082°57'14.9"

VARANASI (UTTAR PRADESH)

AMBIENT AIR QUALITY MONITORING STATIONS VARANASI



A AIR MONITORING STATIONS

A1.Ajay Iron & Steel Works, Chandpur industrial estate, Varanasi

A2. PushpanjaliSareesPvt Ltd, Chandpur industrial area, Varanasi

A3. Aishwarya Creations Pvt Ltd, *Chandpur industrial area, Varanasi*

A4.UMANG Agro park, UPSIDC, Karkhiyon, Phoolpur, Varanasi

A5. ShriDurga agro oil pvt. Ltd. UPSIDC, Karkhiyon, Phoolpur, Varanasi

A6. Parag dairy, Ramnagar industrial area, Varanasi

A7. ShriOmkar Paper Board Mills Pvt Ltd , Ramnagar industrial area, Varanasi

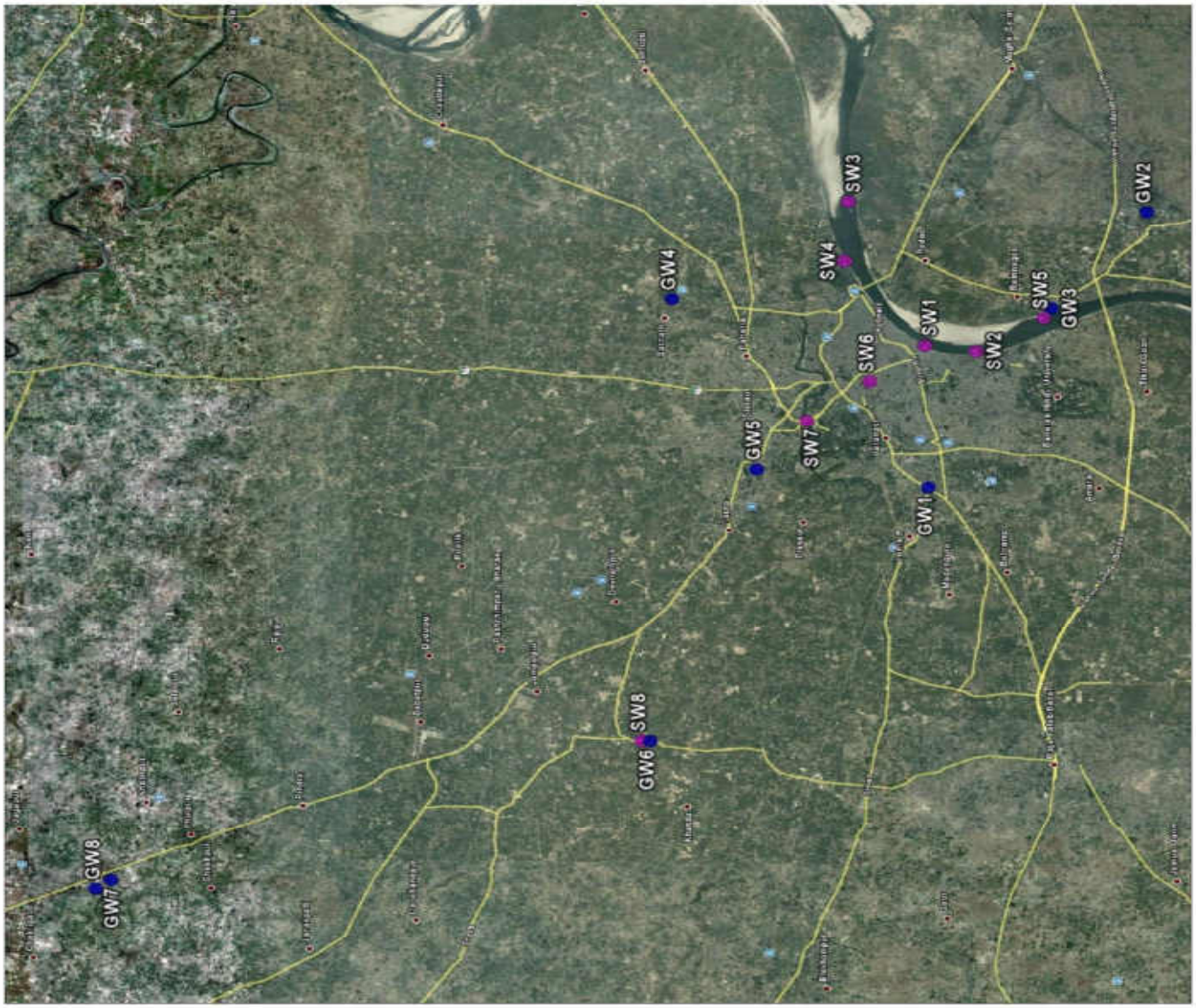
A8.HITEC Food industries , Ramnagar industrial area, Varanasi

0 8KM

PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR AMBIENT AIR QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN VARANASI

CLIENT:
CENTRAL POLLUTION CONTROL BOARD

VARANASI (UTTAR PRADESH)



AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 Ajay Iron & Steel Works	**AAQ – 2** Pushpanjali Sarees Pvt Ltd	**AAQ – 3** Aishwarya Creations Pvt Ltd	**AAQ – 4** UMANG Agro park	
1	Lead	µg/m³	0.09	0.12	0.21	0.17	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	2.8	<1	1.1	1.2	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	178.7	98.6	154.2	85.6	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	69.6	69.2	93.5	61.6	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	25.6	19.6	28.0	9.4	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	4.6	3.9	11.2	3.7	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	15.4	17.6	18.9	11.8	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	27.1	31.7	29.6	19.4	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	10.2	6.4	8.5	7.0	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	18.4	16.7	14.8	17.2	
		µg/m³	4.9	3.7	2.6	<2	

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 5 Shri Durga agro oil pvt. Ltd	**AAQ – 6** Parag dairy	**AAQ – 7** Shri Omkar Paper Board Mills Pvt Ltd	**AAQ – 8** HITEC Food industries	
1	Lead	µg/m³	0.05	0.08	0.11	0.07	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	1.2	<1	1.6	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	192.6	107.5	234.1	126.4	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	126.5	67.4	112	64.8	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	15.5	19.6	25.1	24.5	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	4.6	5.2	3.9	2.8	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	10.8	15.7	12.6	15.1	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	21.2	23.1	27.1	27.4	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	5.8	9.1	4.6	7.2	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	14.2	19.0	15.1	19.1	
		µg/m³	2.8	4.4	3.3	2.4	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-1 Dashashwa medh Ghat, Ganga river,	SW – 2 Assi ghat , Ganga river	SW-3 Near High tension wire poles, Ganga river, Down Stream	SW – 4 Varuna river, Down Stream	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	5	5	5	10	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	8.24	8.02	8.16	7.62	IS 3025: Part – 11
2	E C	µS/cm	530	524	510	442	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	24	18	20	48	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	6.2	6.4	6.4	6.0	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	24	20	18	38	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	5	4	4	10	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.02	0.03	0.05	0.05	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	2.03	2.03	2.03	2.48	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	2.05	2.06	2.08	2.53	By Calculation
11	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.40	0.40	0.50	0.30	IS 3025: Part – 60
15	Sulphides as S	mg/l	0.12	0.14	0.18	0.46	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	0.12	0.16	0.18	0.44	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	1.38	1.39	1.36	0.87	By Calculation
18	Total Coliforms	MPN/100ml	900	500	500	2600	IS 1622
19	Fecal Coliforms	MPN/100ml	11	7	21	1400	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	0.18	0.20	0.24	0.62	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	3.9	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	2.1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.01	0.01	0.01	0.02	APHA 3111 – B
19	Iron as Fe	mg/l	0.18	0.20	0.24	0.36	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.07	0.08	0.07	0.06	IS 3025: Part – 57

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW – 5 Ganga river U/s Near floating bridge, Ramnagar fort	SW – 6 Pishach Mochan pond	SW-7 Varuna river, m/s, Near new varuna bridge	SW – 8 Varuna river, u/s Near Rameswar mahadev dham bridge	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	5	20	5	20	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.95	8.16	8.03	7.92	IS 3025: Part – 11
2	E C	µS/cm	510	715	320	320	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	3	1	1	IS 3025: Part – 39
4	Suspended Solids	mg/l	20	34	26	32	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	6.2	5.9	6.1	6.0	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	28	46	24	32	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	6	11	7	9	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.03	0.04	0.04	0.05	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	2.48	2.71	2.03	1.35	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	2.51	2.75	2.07	1.40	By Calculation
11	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.50	0.60	0.40	0.30	IS 3025: Part – 60
15	Sulphides as S	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	0.16	0.62	0.24	0.32	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	1.36	4.03	0.50	0.73	By Calculation
18	Total Coliforms	MPN/100ml	1600	140	500	350	IS 1622
19	Fecal Coliforms	MPN/100ml	7	9	21	17	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	0.24	0.84	0.36	0.48	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	3.4	2.6	3.2	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	2.1	1.4	1.8	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.01	0.04	0.01	0.03	APHA 3111 – B
19	Iron as Fe	mg/l	0.09	0.28	0.10	0.26	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.07	0.09	0..06	0.07	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Aishwarya Creations Pvt Ltd	GW – 2 Parag dairy	GW-3 Near fort, Ramnagar,	GW-4 Near Chinese temple gate	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	<5	<5	<5	<5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.64	7.72	7.61	7.42	IS 3025: Part – 11
2	E C	µS/cm	613	713	1440	532	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	4	4	6	4	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	0.01	0.02	0.02	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	1.13	0.23	0.23	0.45	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	1.14	0.24	0.25	0.47	By Calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.50	0.60	0.40	0.50	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	1.07	2.26	2.76	0.34	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	<0.01	<0.01	0.01	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.06	0.07	0.10	0.08	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.07	0.08	0.12	0.07	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-5 Primary School Shivpur, Varanasi	GW –6 Near Ayurvedic Hospital, Rameshwar Village	GW-7 Shri Durga agro oil pvt. Ltd	GW-8 UMANG Agro park	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	<5	<5	<5	<5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.79	7.95	8.07	8.13	IS 3025: Part – 11
2	E C	µS/cm	1080	610	800	710	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	10	26	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	8	6	4	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	0.02	0.02	0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	12.19	1.13	0.23	0.23	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	12.20	1.15	0.25	0.24	By Calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.70	0.60	0.40	0.60	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	3.37	0.89	3.67	3.35	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.01	0.02	0.01	0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.08	0.40	0.10	0.09	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.09	0.07	0.08	0.07	IS 3025: Part – 57

AMBIENT AIR MONITORING LOCATIONS PHOTOGRAPHS

Ajay Iron & Steel Works,
Chandpur industrial estate, Varanasi.

Pushpanjali Sarees Pvt Ltd,
Chandpur industrial area, Varanasi

Aishwarya Creations Pvt Ltd,
Chandpur industrial area, Varanasi

UMANG Agro park, UPSIDC
Karkhiyon, Phoolpur, Varanasi

AMBIENT AIR MONITORING LOCATIONS PHOTOGRAPHS

Shri Durga agro oil Pvt. Ltd. UPSIDC, Karkhiyon, Phoolpur, Varanasi.

Parag dairy, Ramnagar industrial area Varanasi.

Shri Omkar Paper Board Mills Pvt Ltd Ramnagar industrial area, Varanasi

HITEC Food industries Ramnagar industrial area, Varanasi

SAMPLING LOCATION PHOTOGRAPHS OF SURFACE WATER

Dashashwamedh Ghat, Ganga river, Varanasi

Assi ghat, Ganga river, Varanasi, mid stream

Near High tension wire poles,
Ganga river, down Stream, Varanasi.

Varuna river, down Stream, near Rajghat
Before entering into Ganga River

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SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Ganga river Upstream, Near floating bridge, Ramnagar fort, Varanasi.

Pishach Mochan pond, Varanasi

Varuna river, midstream, Near new varuna bridge.

Varuna river, upstream Near Rameswar mahadev dham bridge, Rameswar

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Aishwarya Creations Pvt Ltd,
Chandpur industrial area, Varanasi.

Near gate, Parag dairy
Ramnagar industrial area, Varanasi.

Near fort, Ramnagar,(Residential Area),
Varanasi.

Near Chinese temple gate, Sarnath
Varanasi

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Primary School , Shivpur, Varanasi

Near Ayurvedic Hospital, Rameshwar Village.

Shri Durga agro oil Pvt. Ltd. UPSIDC Karkhiyon, Phoolpur, Varanasi

UMANG Agro park, UPSIDC, Karkhiyon Phoolpur, Varanasi

AAQ MONITORING LOCATIONS

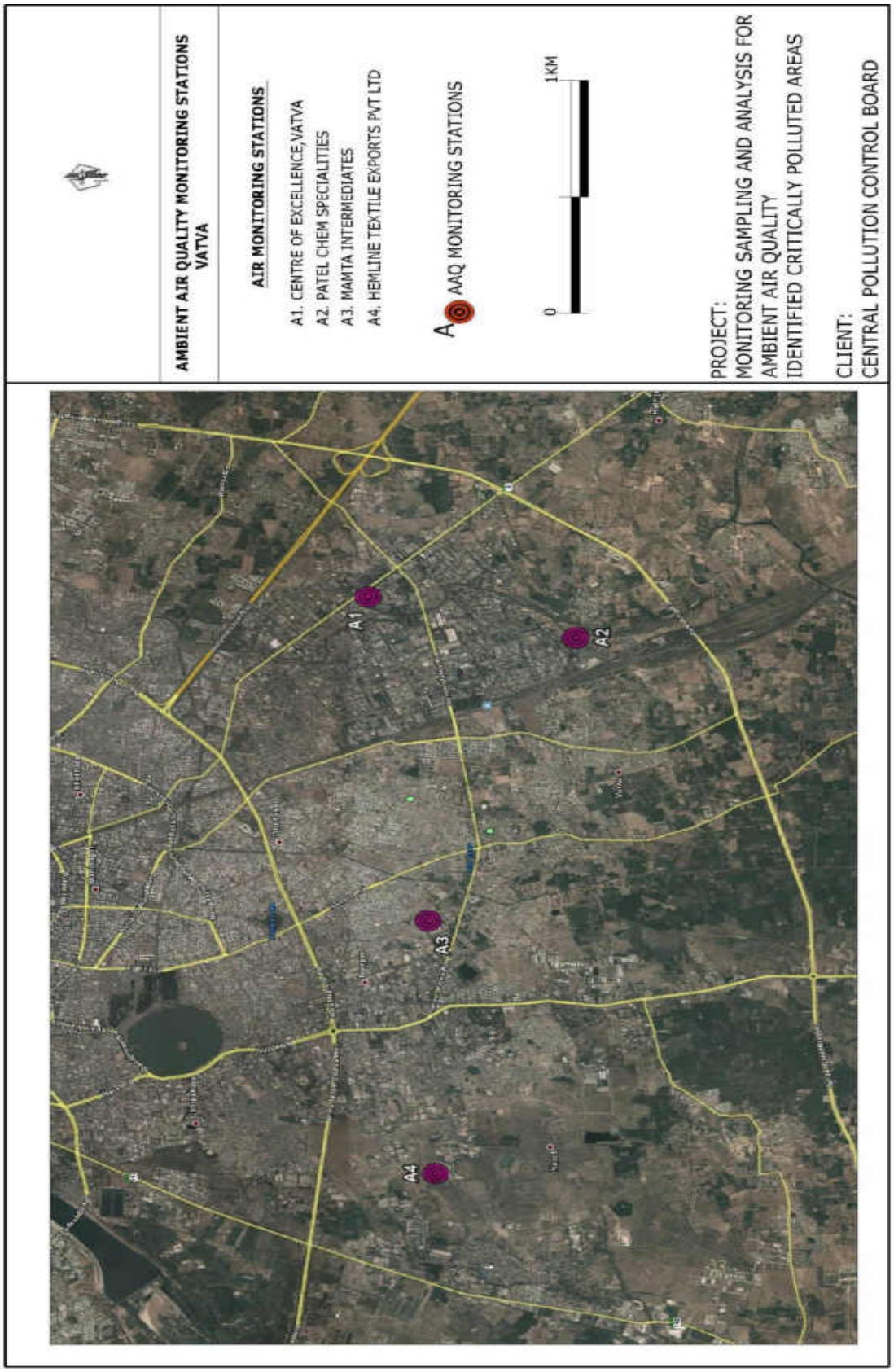
SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	Centre of Excellence, Vatva Industrial Association	09.02.2013 to 10.02.2013	N 22°58'11.0"	E 072°38'35.5"
AAQ – 2	M/s. Patel Chem Specialites	09.02.2013 to 10.02.2013	N 22°57'03.4"	E 072°38'16.8"
AAQ – 3	M/s. Mamta Intermediates	09.02.2013 to 10.02.2013	N 22°57'51.4"	E 072°36'08.3"
AAQ – 4	M/s. Hemline Textile Exports Private Ltd.,	09.02.2013 to 10.02.2013	N 22°57'49.0"	E 072°34'13.1"

SURFACE WATER SAMPLING LOCATIONS

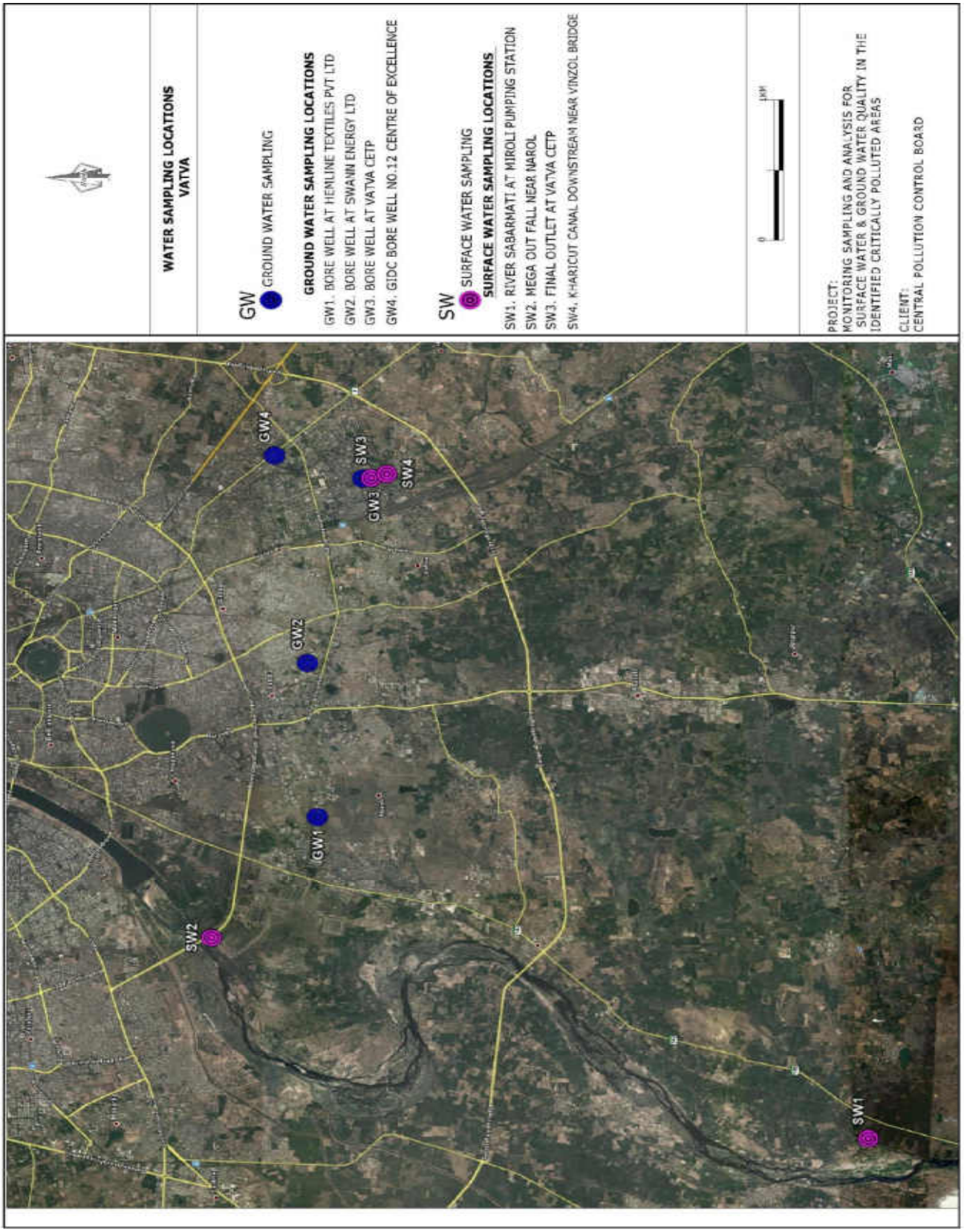
SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	River Sabarmati at Miroli Pumping Station	09.02.2013	N 22°52'34.1"	E 072°30'09.8"
SW – 2	Mega outfall near Narol	09.02.2013	N 22°58'46.4"	E 072°32'39.3"
SW – 3	Final Outlet of Vatva CETP (Green Envn. Service Co-operative Society Ltd.,), GIDC – VATVA	10.02.2013	N 22°57'15.9"	E 072°38'21.1"
SW – 4	Kharicut Canel downstream near Vinzol Bridge, Vatva	10.02.2013	N 22°57'07.1"	E 072°38'24.2"

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Hemlime Textile Pvt. Ltd., Shahwadi (Narol Industrial Area)	09.02.2013	N 22°57'46.5"	E 072°34'09.6"
GW – 2	M/s. Swan Energy Ltd., Narol Vatva Road, Narol	09.02.2013	N 22°57'52.1"	E 072°36'03.8"
GW – 3	Vatva CETP (Green Envn. Service Co-operative Society Ltd.,) GIDC – VATVA	09.02.2013	N 22°57'20.7"	E 072°38'20.8"
GW – 4	GIDC Bore well No.12, Centre of Excellence, Vatva Industrial Association, GIDC -Vatva	09.02.2013	N 22°58'10.7"	E 072°38'37.7"


AMBIENT AIR QUALITY MONITORING STATIONS
VATVA
AIR MONITORING STATIONS
A1. CENTRE OF EXCELLENCE,VATVA
A2. PATEL CHEM SPECIALITIES
A3. MAMTA INTERMEDIATES
A4. HEMLINE TEXTILE EXPORTS PVT LTD
AAQ MONITORING STATIONS
0
1KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR
AMBIENT AIR QUALITY
IDENTIFIED CRITICALLY POLLUTED AREAS
CLIENT:
CENTRAL POLLUTION CONTROL BOARD
A1
A2
A3
A4

VATVA - GUJARAT



AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 Centre of Excellence, Vatva Industrial Association	**AAQ – 2** Patel Chem Specialites	**AAQ – 3** Mamta Intermediates	**AAQ – 4** Hemline Textile Exports Pvt. Ltd.,	
1	Lead	µg/m³	0.14	0.11	0.13	0.16	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	3.2	<3	<3	3.1	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	2.7	1.9	3.6	1.7	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	78	81.5	89.7	96.1	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	29.0	32.7	37.0	42.7	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	15.0	22.7	25.9	34.7	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	12.6	8.6	11.2	9.6	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	12.3	14.1	12.5	10.2	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	21.6	26.4	25.6	19.3	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	10.4	8.6	6.5	9.2	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	24	21.8	20.8	18.9	
		µg/m³	<2	<2	<2	<2	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-1 River Sabarmati at Miroli Pumping station	**SW – 2** Mega outfall near Narol	**SW-3** Outlet of CETP – GIDC VATVA	**SW-4** Kharicut canal downstream near Vinzol Bridge	
I	**Simple Parameters**						
1	Appearance	-	Light Green	Blackish	Brown	Light Brown	-
2	Colour (Hazen Units)	-	50	110	140	20	IS 3025: Part – 4
3	Odour (Smell)	-	Un-Agreeable	Un-Agreeable	Un-Agreeable	Un-Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	7.13	7.51	7.45	7.32	IS 3025: Part – 11
2	E C	µS/cm	1950	5500	7100	370	IS 3025: Part – 14
3	Oil & Grease	mg/l	6	19	9	1	IS 3025: Part – 39
4	Suspended Solids	mg/l	174	212	112	26	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	<1	<1	3.6	6.8	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	168	496	288	24	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	50	150	85	7	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	<0.01	0.01	0.02	0.02	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	4.06	3.61	6.77	1.13	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	4.06	3.62	6.79	1.15	By Calculation
11	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.80	0.90	1.0	0.90	IS 3025: Part – 60
15	Sulphides as S	mg/l	7.2	54	0.8	0.40	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	3.01	1.83	0.69	0.81	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	8.61	14.96	21.79	1.49	By Calculation
18	Total Coliforms	MPN/100ml	13	30	17	300	IS 1622
19	Fecal Coliforms	MPN/100ml	4	23	13	23	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	3.62	2.64	1.04	1.42	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	48	82	54	7.0	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	26	40	29	3.6	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	0.10	<0.1	<0.1	0.12	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH's	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.12	0.28	0.17	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	0.02	0.05	0.03	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	0.01	0.03	0.03	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	0.03	0.16	0.14	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	0.01	0.02	0.02	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.9	1.8	1.5	0.01	APHA 3111 – B
19	Iron as Fe	mg/l	1.8	3.7	3.2	0.24	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.14	0.42	0.59	0.06	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Hemline Textile Pvt. Ltd., Shahwadi	**GW – 2** Swan Energy Ltd., Narol Vatva Road, Narol	**GW-3** Vatva CETP (Green Envn. Services Ltd.) GIDC - VATVA	**GW-4** Centre of Excellence, VATVA	
I	**Simple Parameters**						
1	Appearance		Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)		5	<5	<5	<5	IS 3025: Part – 4
3	Odour (Smell)		Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH		7.78	7.75	7.72	7.84	IS 3025: Part – 11
2	E C	µS/cm	1900	1670	1990	2150	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	4	6	4	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	0.01	0.01	0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	0.45	2.48	6.10	9.0	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	0.46	2.49	6.11	9.01	By calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.60	0.60	0.80	0.80	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	5.56	6.43	11.00	11.30	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH's	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.02	<0.01	<0.01	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.12	0.09	0.07	0.07	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.12	0.10	0.14	0.28	IS 3025: Part – 57

AMBIENT AIR MONITORING PHOTOGRAPHS

Hemlines Textile Exports Pvt Limited, Narol

Mamta Intermediates

Patel Chem Specialites

Centre of Excellence, Vatva Industrial Association

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Kharicut canal downstream near Vinzol Bridge

River Sabarmati at Miroli Pumping station

Mega outfall near Narol

Outlet of CETP – GIDC VATVA

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Vatva CETP GIDC - VATVA

Swan Energy Ltd.,

AAQ MONITORING LOCATIONS

SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	Malladi Drugs & Pharma Ltd	18/02/2013 to 19/02/2013	N 12^{0}57'01.8''	E079^{0}19'11.0''
AAQ – 2	SIVS Labs Ltd	18/02/2013 to 19/02/2013	N 12^{0}57'58.2''	E079^{0}17'45.5''
AAQ – 3	CSI Higher Secondary School	18/02/2013 to 19/02/2013	N 12^{0}57'11.9''	E079^{0}18'19.2''
AAQ – 4	Greaves Cotton Ltd	18/02/2013 to 19/02/2013	N 12^{0}58'15.7''	E079^{0}17'50.1''

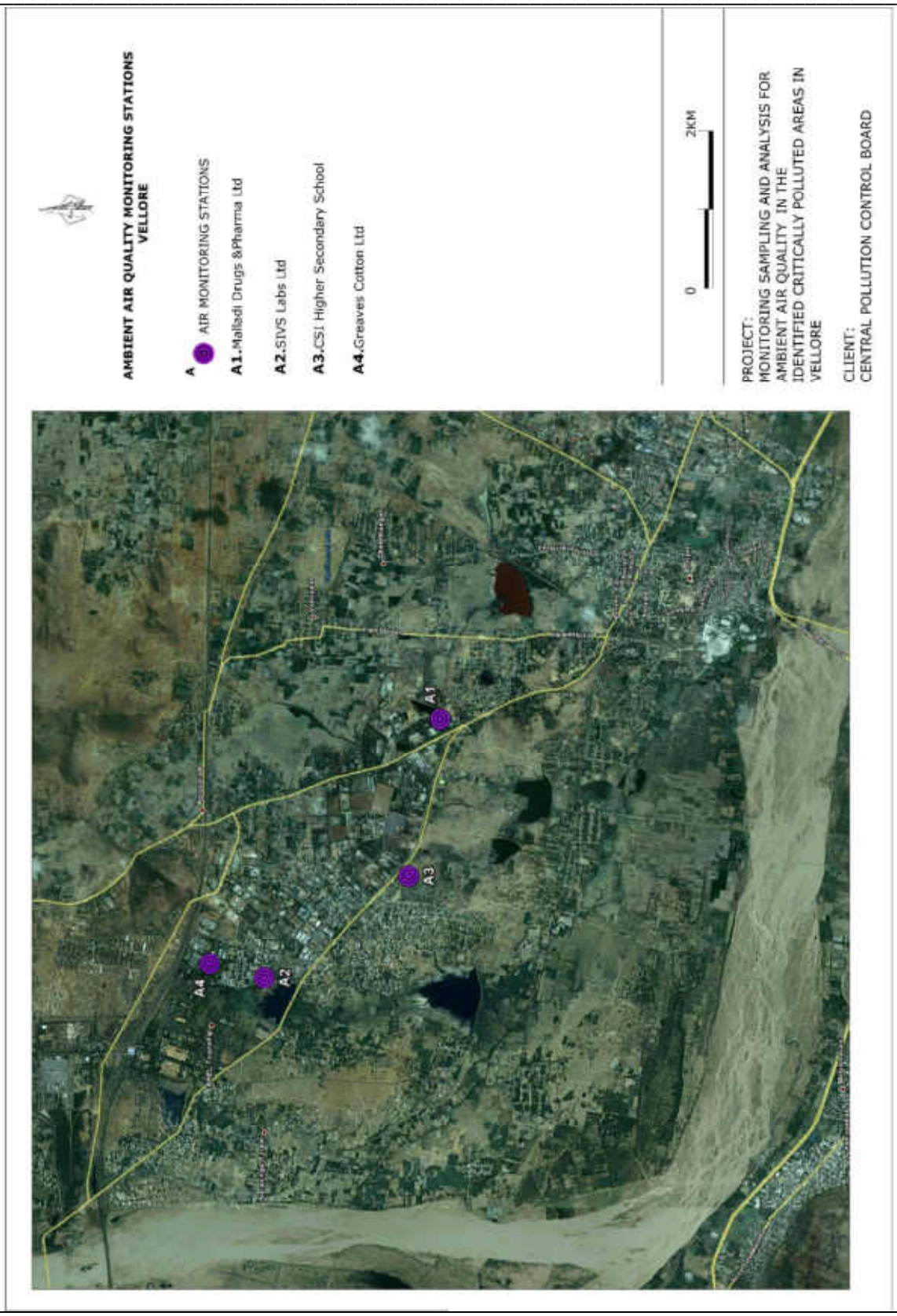
SURFACE WATER SAMPLING LOCATIONS

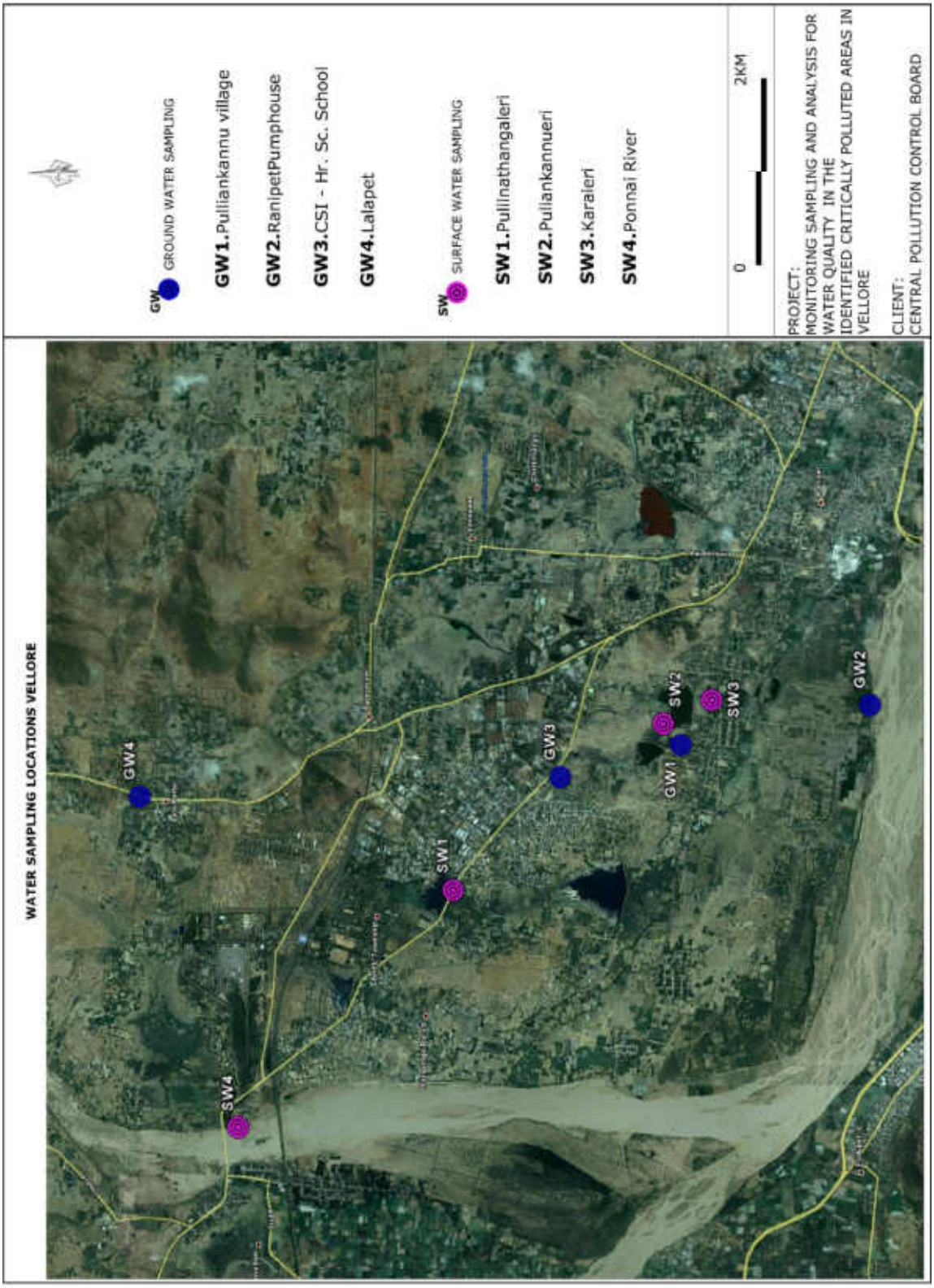
SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	Puliinathangal eri	18.02.2013	N 12^{0}57'48.9''	E079^{0}17'39.2''
SW – 2	Puliankannu eri	18.02.2013	N 12^{0}56'43.3''	E079^{0}18'37.6''
SW – 3	Karai eri	18.02.2013	N 12^{0}56'19.5''	E079^{0}18'46.8''
SW – 4	Ponnai River	18.02.2013	N 12^{0}59'02.9''	E079^{0}16'12.9''

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Pulliankannu village	18.02.2013	N 12^{0}56'30.2''	E079^{0}18'30.7''
GW – 2	Ranipet Pumphouse	18.02.2013	N 12^{0}55'24.7''	E079^{0}18'45.0''
GW – 3	CSI – Hr. Sc. School	18.02.2013	N 12^{0}57'11.9''	E079^{0}18'19.2''
GW – 4	Lalapet	18.02.2013	N 12^{0}59'37.2''	E079^{0}18'12.3''

VELLORE - TAMILNADU




WATER SAMPLING LOCATIONS VELLORE
GW4
SW4
SW1
GW3
GW1
SW2
SW3
GW2
GW GROUND WATER SAMPLING
GW1.Pulliankannu village
GW2.RanipetPumphouse
GW3.CSI - Hr. Sc. School
GW4.Lalapet
SW SURFACE WATER SAMPLING
SW1.Pullinathangaleri
SW2.Pullankannueri
SW3.Karaleri
SW4.Ponnai River
0
2KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR WATER QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN VELLORE
CLIENT:
CENTRAL POLLUTION CONTROL BOARD

AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 Malladi Drugs & Pharma Ltd.,	**AAQ – 2** SIVS Labs Ltd.,	**AAQ – 3** CSI Higher Secondary School	**AAQ – 4** Greaves Cotton Ltd.,	
1	Lead	µg/m³	0.10	0.08	0.03	0.06	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	1.6	1.2	<1	1.5	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	83.0	90.7	77.2	86.0	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	31.2	35.5	28.0	31.5	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	72.6	58.0	22.0	31.0	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	7.8	4.2	2.9	4.6	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	13.6	11.9	8.3	12.7	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	21.2	19.1	17.6	22.3	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	9.8	7.1	11.6	8.5	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	15.3	16.7	18.8	17.1	
		µg/m³	3.4	<2	2.8	3.1	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW -1 Pullianthanqal Eri	SW – 2 Pullianqan Eri	SW-3 Karai Eri	SW-4 Ponnai River	
I	**Simple Parameters**					The drain was dried-up hence sample could not collected during the sampling on 18.02.2013	
1	Appearance	-	Greenish	Dark Brown	Brown		-
2	Colour (Hazen Units)	-	40	350	250		IS 3025: Part – 4
3	Odour (Smell)	-	Un-Agreeable	Un-Agreeable	Un-Agreeable		IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH		8.25	8.17	8.30		IS 3025: Part – 11
2	E C	µS/cm	2700	7700	6600		IS 3025: Part – 14
3	Oil & Grease	mg/l	5	26	18		IS 3025: Part – 39
4	Suspended Solids	mg/l	114	216	80		IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	2.2	<1	<1		IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	140	1456	548		IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	38	410	150		IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.01	0.05	0.04		APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	1.81	5.87	5.19		APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	1.82	5.92	5.23		By Calculation
11	Free Ammonia	mg/l	0.60	2.5	1.60		APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1		IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02		IS 3025: Part – 27
14	Fluoride as F	mg/l	1.00	1.20	0.90		IS 3025: Part – 60
15	Sulphides as S	mg/l	2.1	9.2	7.4		IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	0.45	0.61	0.43		APHA 4500 – P D
17	Sodium Absorption Ratio (SAR)	-	5.50	27.11	21.56		By Calculation
18	Total Coliforms	MPN/100ml	11	17	21		IS 1622
19	Fecal Coliform	MPN/100ml	<2	<2	<2		IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	0.68	0.84	0.62		APHA 4500 – P-D
2	Total Kjeldal Nitrogen	mg/l	15	68	34		APHA 4500 – N org B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	8	34	21		APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.005	0.002		IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1		IS 13428
6	Organo-chlorine Pesticides	mg/l	Not detected	Not detected	Not detected		EPA 508
7	PAH	mg/l	Not detected	Not detected	Not detected		EPA 525.2
8	PCB and PCT	mg/l	Not detected	Not detected	Not detected		EPA 508
9	Zinc as Zn	mg/l	0.10	0.06	0.04		IS 3025: Part – 49
10	Nickel as Ni	mg/l	0.01	0.03	0.02		IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01		IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05		APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	0.10	0.86	0.52		IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01		IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	0.02	0.01		IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01		IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001		IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.18	0.30	0.25		APHA 3111 – B
19	Iron as Fe	mg/l	1.24	1.80	1.50		IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01		APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01		IS 3025: Part – 56
22	Boron as B	mg/l	0.45	0.92	0.84		IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Pulliankannu Village	GW – 2 Ranipet Pump house	GW-3 CSI High School	GW-4 Lalapet (Govt. Hospital)	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	<5	<5	<5	<5	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH		7.60	8.43	8.39	8.38	IS 3025: Part – 11
2	E C	µS/cm	2600	1475	1460	2000	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	6	4	4	8	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.02	<0.01	0.02	<0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	3.16	0.90	8.81	9.48	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	3.18	0.90	8.83	9.48	By Calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.60	0.50	0.50	0.60	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P D
16	Sodium Absorption Ratio (SAR)	-	3.71	4.47	1.76	4.17	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliform	MPN/100ml	<2	<2	<2	<2	IS 1622
III.	**Special Parameters**						
1	Total Phosphorous as P	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – P D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – N org B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 508
7	PAH	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 525.2
8	PCB and PCT	mg/l	Not detected	Not detected	Not detected	Not detected	EPA 508.E
9	Zinc as Zn	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	0.01	<0.01	0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.05	0.06	0.07	0.08	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.10	0.07	0.09	0.11	IS 3025: Part – 57

AMBIENT AIR MONITORING PHOTOGRAPHS

Maladi

Greaves Cotton

SVIS Lab

CSI Higher School

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Pulianthangal

Karai Eri

Puliankanu Eri

Ponnai River (Dried)

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

Lalapet

Pulliankanna village

CSI Higher Senior School

Ranipet Pump House

AAQ MONITORING LOCATIONS

SAMPLE CODE	NAME OF THE MONITORING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
AAQ – 1	APPCB – RO Office, Madhavadhara	04.02.2013 to 05.02.2013	N 17°45.005'	E 83°14.876'
AAQ – 2	Coromandal Industries	04.02.2013 to 05.02.2013	N 17°41.975'	E 83°13.398'
AAQ – 3	S A – LPG Shipyard Area near Dolphin Noise	04.02.2013 to 05.02.2013	N 17°41.035'	E 83°17.683'
AAQ – 4	Beside Little High School -MVP Colony	04.02.2013 to 05.02.2013	N 17°43.931'	E 83°20.382'

SURFACE WATER SAMPLING LOCATIONS

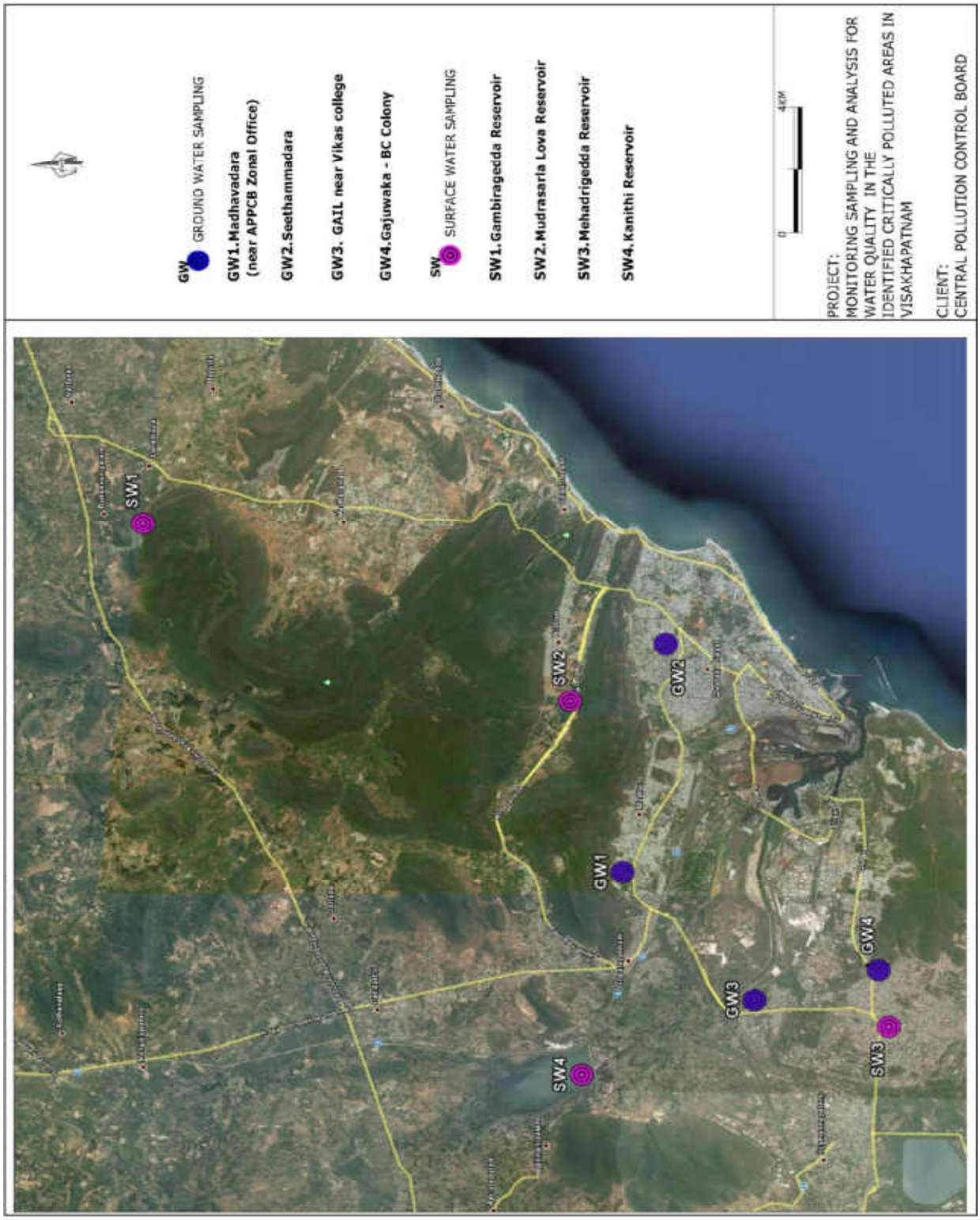
SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
SW – 1	Gambiragedda Reservoir	04.02.2013	N 17° 52.457'	E 83°21.115'
SW – 2	Mudrasarla Lova Reservoir	04.02.2013	N 17° 45.816'	E 83°17.897'
SW – 3	Mehadrigedda Reservoir	05.02.2013	N 17° 40.863'	E 83°12.004'
SW – 4	Kanithi Reservoir	05.02.2013	N 17° 44.704'	E 83°09.842'

GROUND WATER SAMPLING LOCATIONS

SAMPLE CODE	NAME OF THE SAMPLING LOCATION	DATE OF SAMPLING	LATITUDE	LONGITUDE
GW – 1	Madhavadara (near APPCB Zonal Office)	04.02.2013	N 17°45'003'	E 83°14.799'
GW – 2	Seethammadara	04.02.2013	N 17°44.331'	E 83°18.940'
GW – 3	GAIL near Vikas college	05.02.2013	N 17°43.405'	E 83°12.438'
GW – 4	Gajuwaka – BC Colony	05.02.2013	N 17°41.022'	E 83°13.021'

AMBIENT AIR QUALITY MONITORING STATIONS VISAKHAPATNAM
A1
A2
A3
A4
A1.APPCB - RO Office, Madhavadhara
A2. Coromandal Industries
A3. S A - LPG Shipyard Area near Dolphin Noise
A4. Beside Little High School -MVP Colony
A
AMBIENT AIR QUALITY MONITORING STATIONS
0
3KM
PROJECT:
MONITORING SAMPLING AND ANALYSIS FOR AMBIENT AIR QUALITY IN THE IDENTIFIED CRITICALLY POLLUTED AREAS IN VISAKHAPATNAM
CLIENT:
CENTRAL POLLUTION CONTROL BOARD

VISAKHAPATNAM - ANDHRA PRADESH



AMBIENT AIR QUALITY MONITORING

S.No.	Pollutant(s)	Units	RESULTS				Test Methods
			AAQ – 1 APPCB – ZO Office Madhavadhara	**AAQ – 2** Coramandal Industries	**AAQ – 3** SA – LPG Shipyard Area near Dolphine Nose	**AAQ – 4** Beside Little High School – MVP Colony	
1	Lead	µg/m³	0.13	0.18	0.21	0.09	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
2	Benzene	µg/m³	<3	<3	<3	<3	USEPA Method – TO-3, Absorption and Desorption followed by GC-MS & CPCB Manual
3	Benzo(a) Pyrene	ng/m³	<0.5	<0.5	<0.5	<0.5	USEPA Method – TO-13A & CPCB Manual
4	Arsenic	ng/m³	<1	1.5	1.2	<1	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
5	PM_{10}	µg/m³	75	88	94	69	IS 5182 (Part – 23), 1999, RA 2009, Cyclone Flow Technique & CPCB Manual
6	$PM_{2.5}$	µg/m³	24	31	38	27	Internal SOP & CPCB Manual
7	Ammonia	µg/m³	28	52	34	24	Method 401 – Air Sampling and Analysis, APHA, 3rd Edition & CPCB Manual
8	Nickel	ng/m³	4.6	8.1	6.8	5.4	USEPA Method – IO-3.5, (ICP – MS Method) & CPCB Manual
9	SO_2	µg/m³	8.1	16.5	13.0	9.2	IS 5182 (Part 2) – 2001, West & Gaeke Method) & CPCB Manual
10	NO_2	µg/m³	14.2	29.6	21.5	15.2	IS 5182 (Part 6) – 2001, Jacob & Hochheiser – Sodium Arsenite Method) & CPCB Manual
11	CO	mg/m³	<2	<2	<2	<2	IS 5182 (Part – 10), 1999, RA 2009, GC Method & CPCB Manual
		mg/m³	<2	<2	<2	<2	
		mg/m³	<2	<2	<2	<2	
12	O_3	µg/m³	8.2	9.4	7.9	5.8	IS 5182 (Part 9), 1974, RA 2009, UV Spectrophotometric Method/ISC Method No.411, 3rd Edition 1989 & CPCB Manual
		µg/m³	20.8	16.4	18.6	14.5	
		µg/m³	3	<2	3.8	2.6	

SURFACE WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			SW-1 Ghambiragedda	SW – 2 Mudrhara Lava Reservoir	SW-3 Mehadrigedda Reservoir	SW-4 Kanithi Reservoir	
I	**Simple Parameters**						
1	Appearance	-	Light Brown	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	10	10	10	10	IS 3025: Part – 4
3	Odour (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	8.10	8.20	8.01	7.95	IS 3025: Part – 11
2	E C	µS/cm	630	600	380	330	IS 3025: Part – 14
3	Oil & Grease	mg/l	1	1	1	1	IS 3025: Part – 39
4	Suspended Solids	mg/l	46	14	18	24	IS 3025: Part – 17
5	Dissolved Oxygen	mg/l	5.2	5.6	5.5	5.4	IS 3025: Part – 38
6	Chemical Oxygen Demand	mg/l	26	10	16	20	IS 3025: Part – 58
7	Bio-chemical Oxygen Demand (BOD)	mg/l	7	3	4	5	IS 3025: Part – 44
8	Nitrite-Nitrogen as N	mg/l	0.01	<0.01	<0.01	<0.01	APHA 4500 – NO_2.B
9	Nitrate-Nitrogen as N	mg/l	1.80	0.68	0.23	0.45	APHA 4500 – NO_3.B
10	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	1.81	0.68	0.23	0.45	By Calculation
11	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
12	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
13	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
14	Fluoride as F	mg/l	0.90	0.60	0.60	0.40	IS 3025: Part – 60
15	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
16	Dissolved Phosphates as P	mg/l	<0.1	<0.1	<0.1	0.1	APHA 4500 – P.D
17	Sodium Absorption Ratio (SAR)	-	0.61	1.55	1.67	0.99	By Calculation
18	Total Coliforms	MPN/100ml	13	11	8	9	IS: 1622
19	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS: 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	0.10	0.12	0.10	0.16	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	2.80	<1	1.00	1.40	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	1.40	<1	<1	1.00	APHA 4500 – NH_3
4	Phenolic Compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.01	<0.01	<0.01	0.01	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	0.01	<0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.02	<0.01	<0.01	<0.01	APHA 3111 – B
19	Iron as Fe	mg/l	0.19	0.09	0.12	0.15	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	0.08	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.15	0.08	0.15	0.10	IS 3025: Part – 57

GROUND WATER QUALITY

Sl. No.	Test Parameters	UOM	Results				Test Method
			GW-1 Madhavadara (Near APPCB Zonal Office)	**GW – 2** Seethammadhara	**GW-3** GAIL near Vikas College	**GW-4** Gajuwaka – B C Colony	
I	**Simple Parameters**						
1	Appearance	-	Colourless	Colourless	Colourless	Colourless	-
2	Colour (Hazen Units)	-	<5	<5	<5	5	IS 3025: Part – 4
3	Odor (Smell)	-	Agreeable	Agreeable	Agreeable	Agreeable	IS 3025: Part – 5
II	**Regular Monitoring Parameters**						
1	pH	-	6.71	7.29	8.07	6.95	IS 3025: Part – 11
2	E C	µS/cm	624	660	650	1290	IS 3025: Part – 14
3	Oil & Grease	mg/l	<1	<1	<1	<1	IS 3025: Part – 39
4	Suspended Solids	mg/l	<10	<10	<10	<10	IS 3025: Part – 17
5	Chemical Oxygen Demand	mg/l	4	4	6	4	IS 3025: Part – 58
6	Bio-chemical Oxygen Demand (BOD)	mg/l	<2	<2	<2	<2	IS 3025: Part – 44
7	Nitrite-Nitrogen as N	mg/l	0.01	0.02	<0.01	0.01	APHA 4500 – NO_2.B
8	Nitrate-Nitrogen as N	mg/l	9.48	9.00	0.23	9.71	APHA 4500 – NO_3.B
9	Nitrite-Nitrogen and Nitrate-Nitrogen (NO_2+NO_3)	mg/l	9.49	9.02	0.23	9.72	By calculation
10	Free Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	APHA 4500 – NH_3.C
11	Total Residual Chlorine	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 26
12	Cyanide as CN	mg/l	<0.02	<0.02	<0.02	<0.02	IS 3025: Part – 27
13	Fluoride as F	mg/l	0.50	0.40	0.60	0.70	IS 3025: Part – 60
14	Sulphides as S	mg/l	<0.1	<0.1	<0.1	<0.1	IS 3025: Part – 29
15	Dissolved Phosphates as P	mg/l	0.13	<0.1	<0.1	<0.1	APHA 4500 – P.D
16	Sodium Absorption Ratio (SAR)	-	0.85	0.96	1.22	2.62	By Calculation
17	Total Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
18	Fecal Coliforms	MPN/100ml	<2	<2	<2	<2	IS 1622
III	**Special Parameters**						
1	Total Phosphorous as P	mg/l	0.15	<0.1	<0.1	<0.1	APHA 4500 – P.D
2	Total Kjeldal Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – Norg. B
3	Total Ammonia (NH_4+NH_3)-Nitrogen	mg/l	<1	<1	<1	<1	APHA 4500 – NH_3
4	Phenolic compounds as C_6H_5OH	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 43
5	Surfactants	mg/l	<0.1	<0.1	<0.1	<0.1	IS 13428
6	Organo-chlorine Pesticides	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
7	PAH's	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 525.2
8	PCB and PCT	mg/l	Not Detected	Not Detected	Not Detected	Not Detected	EPA 508
9	Zinc as Zn	mg/l	0.01	0.01	<0.01	2.80	IS 3025: Part – 49
10	Nickel as Ni	mg/l	<0.01	<0.01	<0.01	0.01	IS 3025: Part – 54
11	Copper as Cu	mg/l	<0.01	<0.01	<0.01	0.02	IS 3025: Part – 42
12	Hexavalent Chromium as $Cr6^+$	mg/l	<0.05	<0.05	<0.05	<0.05	APHA 3500 - Cr. D
13	Total Chromium as Cr	mg/l	<0.01	<0.01	<0.01	0.02	IS 3025: Part – 52
14	Arsenic as As	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 37
15	Lead as Pb	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 47
16	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 41
17	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	IS 3025: Part – 48
18	Manganese as Mn	mg/l	0.01	<0.01	<0.01	0.02	APHA 3111 – B
19	Iron as Fe	mg/l	0.10	0.05	0.09	0.20	IS 3025: Part – 53
20	Vanadium as V	mg/l	<0.01	<0.01	<0.01	<0.01	APHA 3111 – D
21	Selenium as Se	mg/l	<0.01	<0.01	<0.01	<0.01	IS 3025: Part – 56
22	Boron as B	mg/l	0.14	0.06	0.29	0.55	IS 3025: Part – 57

AMBIENT AIR MONITORING PHOTOGRAPHS

APPCB Zonal office Visakhapatnam

Coromandal Fertilizers Visakhapatnam

MVP Colony – Visakhapatnam

SALPG – Visakhapatnam

SAMPLING LOCATION PHOTOGRAPHS OF SURFACEWATER

Gambiramgadda

Kanthi Reservoir

Meghadri Reservoir

Musaranlova Reservoir

SAMPLING LOCATION PHOTOGRAPHS OF GROUNDWATER

GAIL near Vikas

Gajuwaka

Madavadara

Sitammadara