

Gujarat Industries Power Company Limited

At. : Nani Naroli, Ta.: Mangrol
Dist. : Surat -394112

Six Monthly Report of Valia and Mangrol Lignite Mines

ENVIRONMENTAL MONITORING & ANALYSIS REPORT

For the period of July to December-2021

Prepared By

ECOSYSTEM RESOURCE MANAGEMENT PVT. LTD.

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PREFACE

Consciousness at national level in the industrial sector is increasing day by day with the focus on environment and sustainable development. A good environment management policy requires a constant effort to analyses and monitors various operations and processes, to generate and transmit this information to the inspecting authority.

As per the Air & Water Consent Orders issued by **Gujarat Pollution Control Board** (GPCB) Gandhinagar & also as per the Environment Clearance certificate issued by Ministry of Environment, Forest and Climate Change (MoEF & CC), Govt. of India, New Delhi, it is mandatory to collect the samples of Air/Gaseous emissions and effluent, to analyses the samples from a recognized laboratory and submit the analysis reports to GPCB & MoEF.

Gujarat Industries Power Company Limited (GIPCL) - Surat Lignite Power Plant is situated at Village – Nani Naroli, Tal. Mangrol, Dist. Surat. This company engaged in the generation of Electricity. The Industry has awarded the contract for bimonthly monitoring and analysis to M/s. Ecosystem Resource Management Pvt. Ltd. Surat.

Ecosystem Resource Management Pvt. Ltd. is one of the leading companies in the field of Environmental Consultancy Service Providers in India. ERM has a well-equipped and developed **NABL Accredited and MoEF & CC** recognized laboratory to carry out the analysis in air, stack emission, fugitive emission, water & waste water, noise, soil, and solid waste etc.

Scope of work for Valia & Mangrol lignite Mine

I. Ambient Air Monitoring

Sr. No.	No. of stations & Location	Duration	Frequency	Parameters	Method of Analysis
1.	8 Nos within the radius of 10 km from the Core Zone and buffer zone.	24 hours	Bi-Monthly	PM ₁₀	IS 5182 Part 23 2006/Reaffirmed 2017
				PM _{2.5}	SOP No.WI/5.4/02-B/03,Issue No.1Date:01/01/2010
				SO ₂	IS 5182 Part II 2001/Reaffirmed 2017
				NO ₂	IS 5182(Part VI):2006/Reaffirmed 2017
				CO	IS 5182(Part 10):1999/Reaffirmed 2014

II. Dust Fall measurement

Sr. No.	No. of station and locations	Duration	Frequency	Parameters	Method of analysis
1.	8 Nos within the radius of 10 km from the Core Zone and buffer zone.	One Month	Bi-Monthly	Dust fall	As per IS-5182

III. Noise Monitoring:

Sr. No.	Noise of stations and locations	Duration	Frequency	Parameters	Method of analysis
1.	8 Nos at various location within the plant premises	24 hours	Bi-Monthly	Day & night noise level	As per IS 9989 using the Noise level meter.

Weather Monitoring Data

Sr. No.	No. of stations and locations	Duration	Frequency	Parameters	Method of analysis
1.	1 No at site office of the Mine	24 hours	Bi-Monthly	Dry & Wet Bulb Temp. Relative Humidity wind speed & direction max & min. Temperature	As per IS 8829 on hourly basis for 24 hrs by using mechanical Instrument.

Water quality monitoring

Sr. No.	No. of stations and locations	Duration	Frequency	Parameters	Method of analysis
1.	10 Nos. of Bore well & 2 No. of Sump Water sample 2 No. of Pond water	1	Bi-Monthly	Physical parameters, Chemical Parameters, Heavy metals	As per the standard methods for the examination of water and waste water APHA 23 rd Edition 2017 and various Indian standards IS 3025.

Comparative Ambient Air Monitoring & Dust fall Monitoring Report & Graphical Presentation

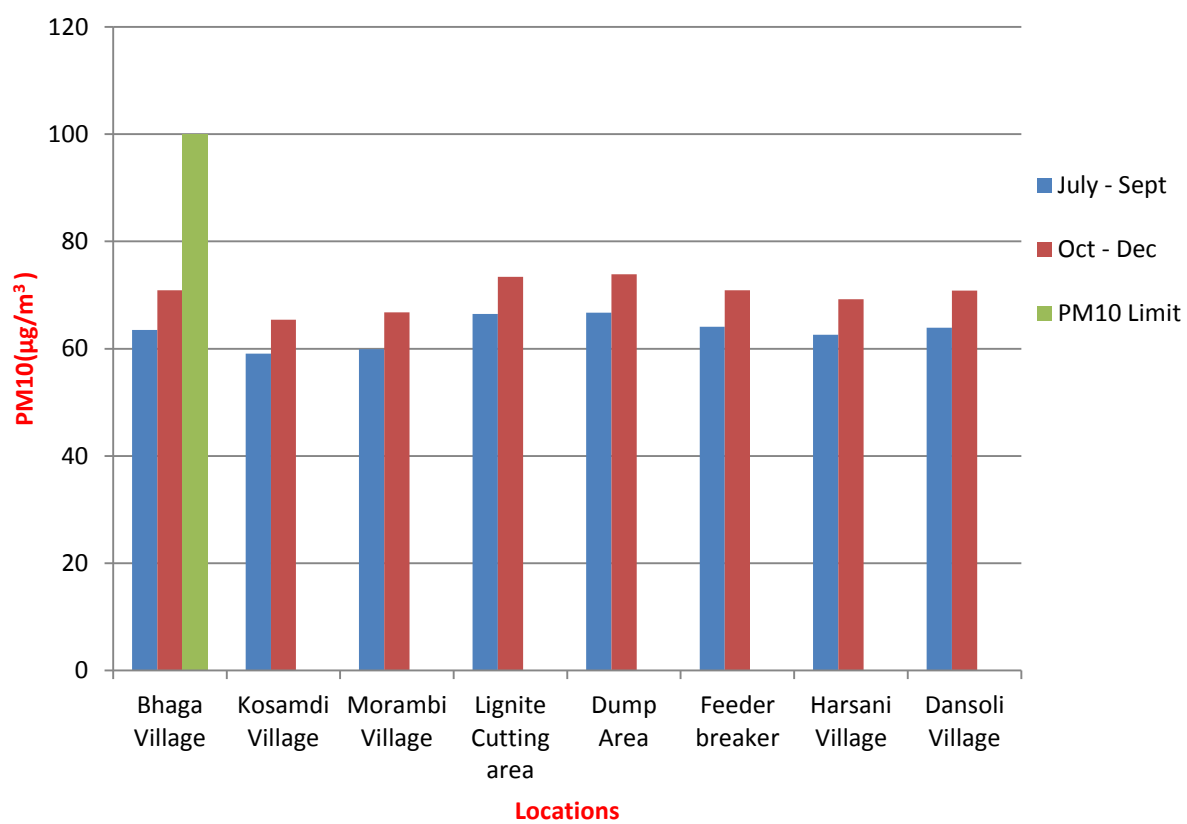
Six Monthly Variation in Ambient Air Quality Data

Parameter: PM₁₀ (Respirable Particulate Matter)

Period: July – 2021 to December – 2021

Sr. No.	Location	Results (µg/m ³)	
		Quarterly July to Sept -2021	Quarterly Oct to Dec - 2021
1	Bhaga Village	63.5	70.9
2	Kosamdi Village	59.1	65.4
3	Morambi Village	59.9	66.8
4	Lignite Cutting area	66.5	73.4
5	Dump Area	66.7	73.9
6	Feeder breaker	64.1	70.9
7	Harsani Village	62.6	69.2
8	Dansoli Village	63.9	70.8
	Limit	100(µg/m ³)	

Graphical Presentation for the Parameter PM10 at Various Locations



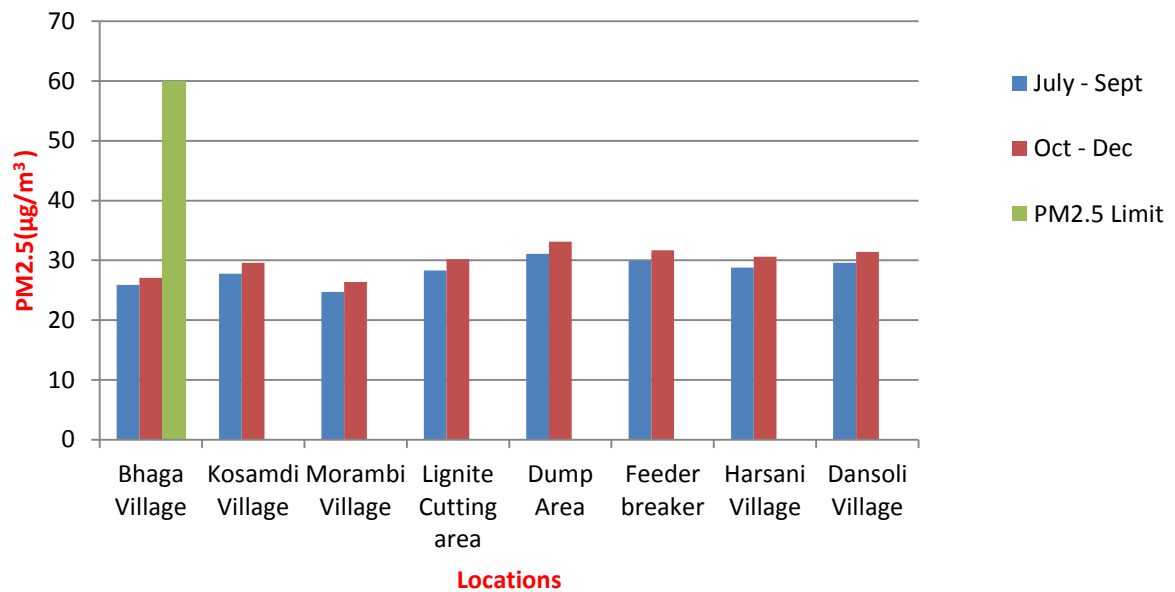
Six Monthly Variation in Ambient Air Quality Data

Parameter: PM_{2.5} (Respirable Particulate Matter)

Period: July – 2021 to December – 2021

Sr. No.	Location	Results (µg/m³)	
		Quarterly July to Sept -2021	Quarterly Oct to Dec - 2021
1	Bhaga Village	25.9	27.1
2	Kosamdi Village	27.8	29.6
3	Morambi Village	24.7	26.4
4	Lignite Cutting area	28.3	30.2
5	Dump Area	31.1	33.1
6	Feeder breaker	29.9	31.7
7	Harsani Village	28.8	30.6
8	Dansoli Village	29.6	31.4
	Limit	60(µg/m³)	

Graphical Presentation for the Parameter PM2.5 at Various Locations



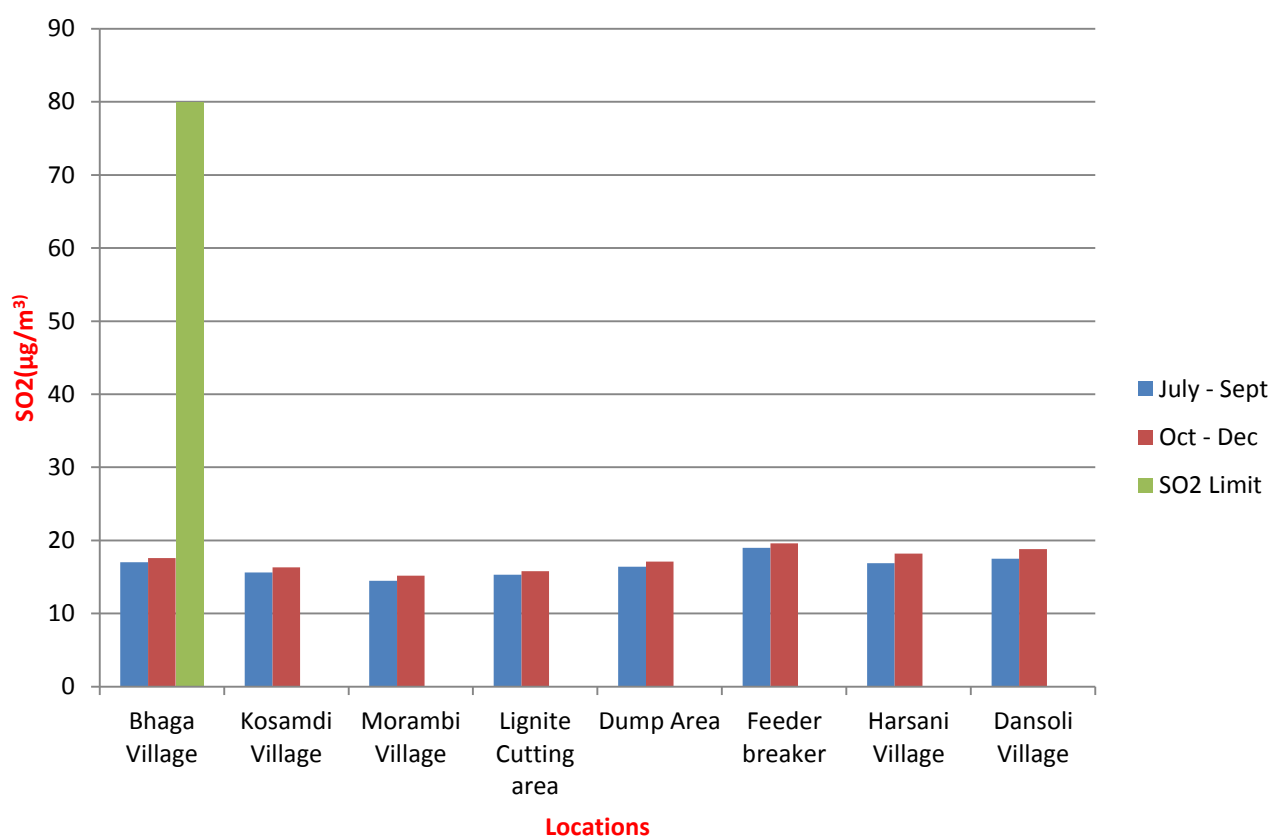
Six Monthly Variation in Ambient Air Quality Data

Parameter: SO₂ (Sulphur Dioxide)

Period: July – 2021 to December – 2021

Sr. No.	Location	Results (µg/m ³)	
		Quarterly July to Sept -2021	Quarterly Oct to Dec - 2021
1	Bhaga Village	17.0	17.6
2	Kosamdi Village	15.6	16.3
3	Morambi Village	14.5	15.2
4	Lignite Cutting area	15.3	15.8
5	Dump Area	16.4	17.1
6	Feeder breaker	19.0	19.6
7	Harsani Village	16.9	18.2
8	Dansoli Village	17.5	18.8
	Limit	80 (µg/m ³)	

Graphical Presentation for the Parameter SO₂ at Various Locations



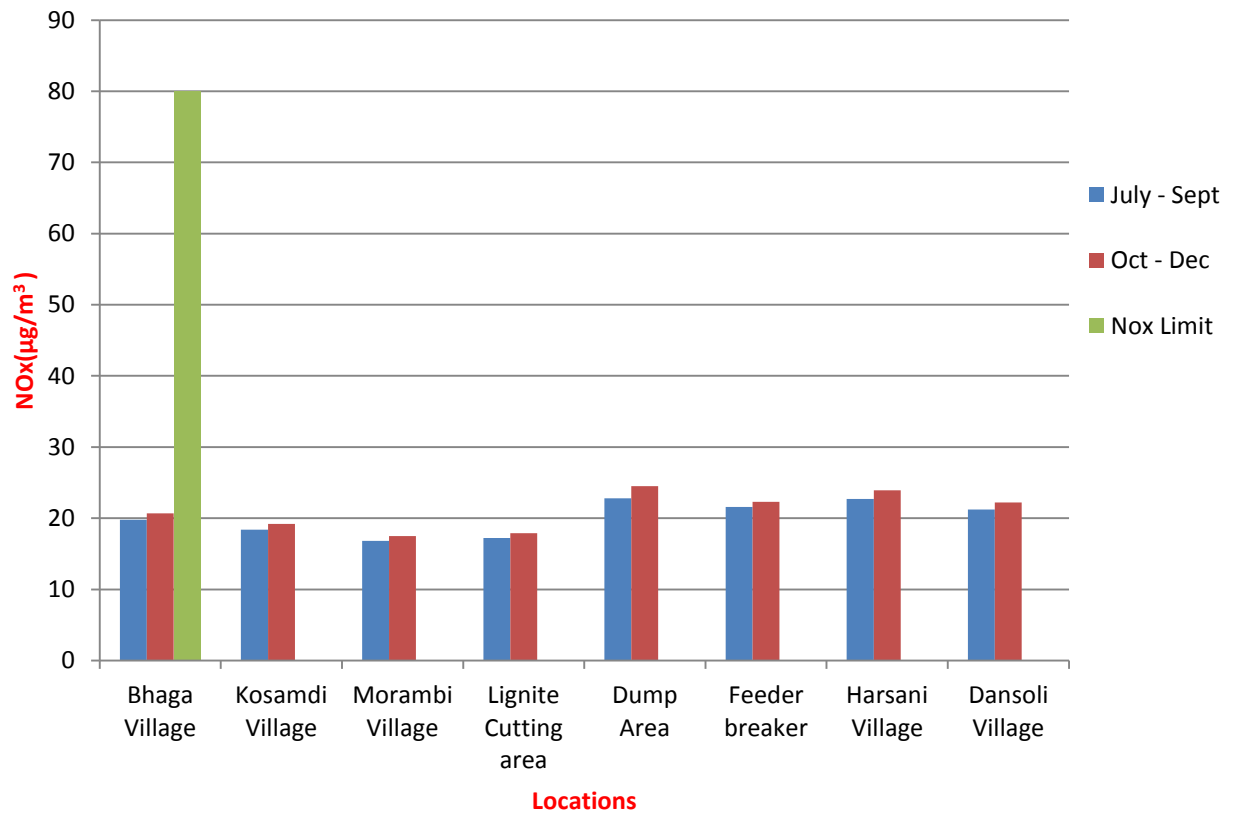
Six Monthly Variation in Ambient Air Quality Data

Parameter: NO_x (Oxides of Nitrogen)

Period: July – 2021 to December – 2021

Sr. No.	Location	Results (µg/m ³)	
		Quarterly July to Sept -2021	Quarterly Oct to Dec - 2021
1	Bhaga Village	19.8	20.7
2	Kosamdi Village	18.4	19.2
3	Morambi Village	16.8	17.5
4	Lignite Cutting area	17.2	17.9
5	Dump Area	22.8	24.5
6	Feeder breaker	21.6	22.3
7	Harsani Village	22.7	23.9
8	Dansoli Village	21.2	22.2
	Limit	80(µg/m ³)	

Graphical Presentation for the Parameter NOx at Various Locations



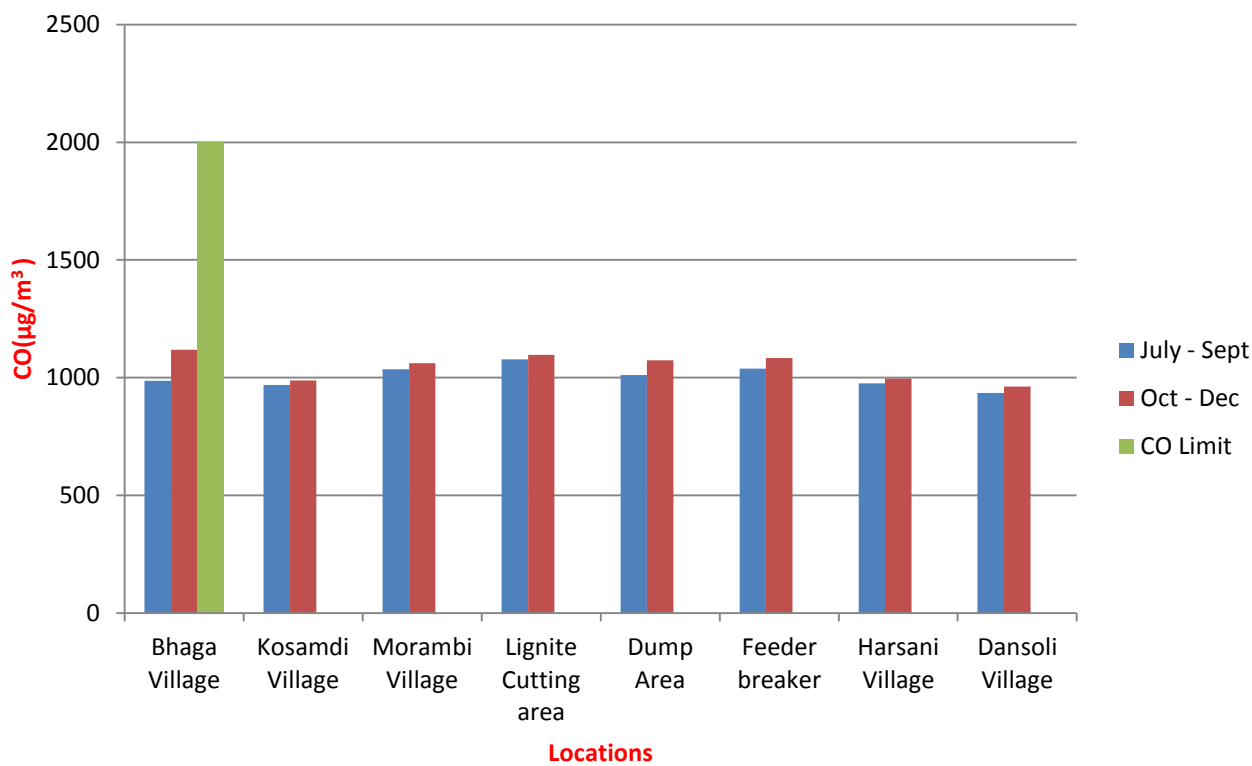
Six Monthly Variation in Ambient Air Quality Data

Parameter: CO (Carbon Monoxide)

Period: July – 2021 to December – 2021

Sr. No.	Location	Results ($\mu\text{g}/\text{m}^3$)	
		Quarterly July to Sept -2021	Quarterly Oct to Dec - 2021
1	Bhaga Village	987	1118
2	Kosamdi Village	969	988
3	Morambi Village	1036	1061
4	Lignite Cutting area	1078	1097
5	Dump Area	1011	1074
6	Feeder breaker	1038	1083
7	Harsani Village	976	996
8	Dansoli Village	935	962
	Limit	2000($\mu\text{g}/\text{m}^3$)	

Graphical Presentation for the Parameter CO at Various Locations



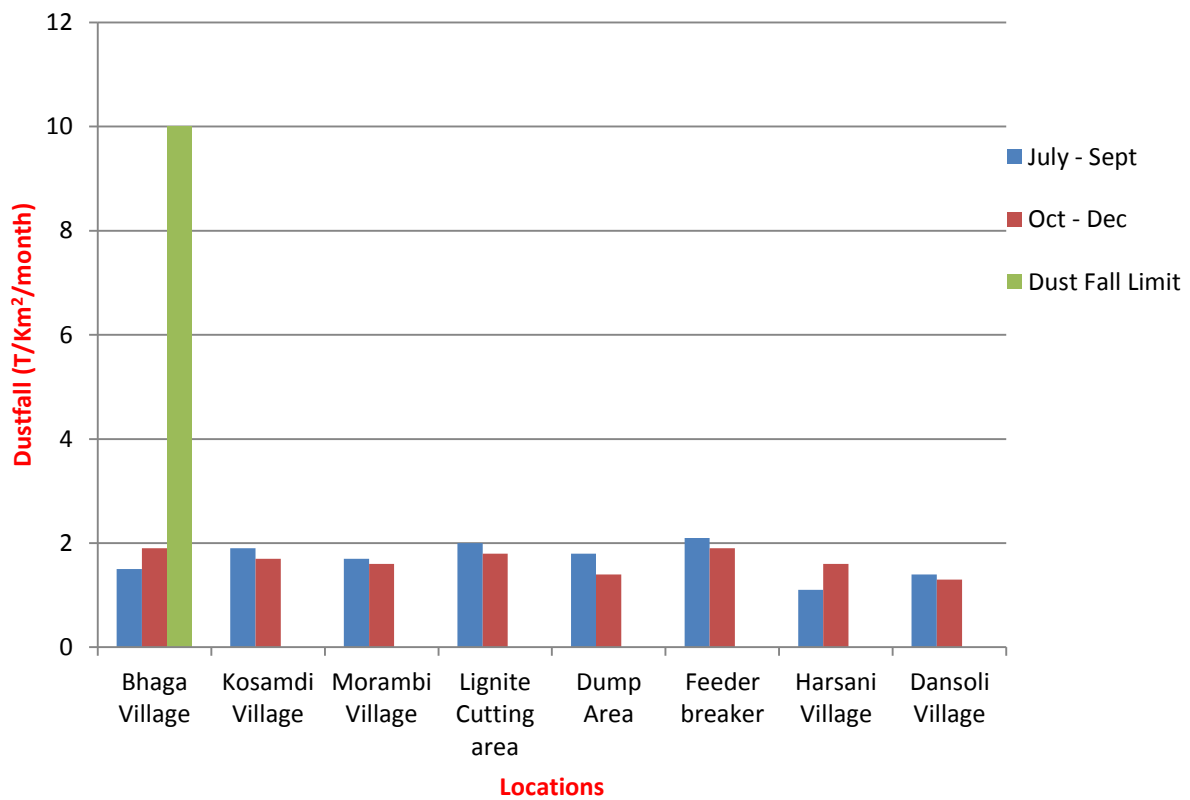
Six Monthly Variation in Ambient Air Quality Data

Parameter: Dust Fall

Period: July – 2021 to December – 2021

Sr. No.	Location	Results (T/Km ² /month)	
		Quarterly July to Sept - 2021	Quarterly Oct to Dec - 2021
1	Bhaga Village	1.5	1.9
2	Kosamdi Village	1.9	1.7
3	Morambi Village	1.7	1.6
4	Lignite Cutting area	2.0	1.8
5	Dump Area	1.8	1.4
6	Feeder breaker	2.1	1.9
7	Harsani Village	1.1	1.6
8	Dansoli Village	1.4	1.3
	Limit	10(T/Km ² /month)	

Graphical Presentation for the Parameter Dust Fall at Various Locations



Comparative Water Analysis Test Report & Graphical Presentation

Six Monthly Variation in bore water Data

Location: Bore water Kosmdi Village

Period: July – 2021 to December – 2021

Sr. No.	Parameter	Unit	Quarterly July to Sept - 2021	Quarterly Oct to Dec - 2021	MoEF Limit
1	Temperature	°C	27.6	27.4	Shall not exceed 5°c above the receiving water temp.
2	pH@ 25°C	pH unit	7.5	7.66	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	1.6	1.5	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	1135	1157	2100
6	Total volatile Solids	mg/L	0.7	0.9	--
7	COD	mg/L	< 4	< 4	250
8	BOD (5 days at 20° C)	mg/L	< 2	< 2	30
9	Oil & Grease	mg/L	< 0.1	< 0.1	10
10	Chloride	mg/L	379	381	1000
11	Sulphate	mg/L	115	119	300
12	Fluoride	mg/L	0.8	0.9	2.0
13	Phosphate as PO ₄ ³⁻	mg/L	1.3	1.1	--
14	Total Residual Chlorine	mg/L	< 0.1	< 0.1	1.0
15	Free Available Chlorine	mg/L	< 0.01	< 0.01	--
16	Phenolic Compound	mg/L	< 0.01	< 0.01	1.0
17	Lead	mg/L	< 0.05	< 0.05	0.1
18	Copper	mg/L	< 0.03	< 0.03	3.0
19	Hexavalent Chromium	mg/L	< 0.03	< 0.03	0.1
20	Total Chromium	mg/L	< 0.03	< 0.03	2.0
21	Zinc	mg/L	< 0.1	< 0.1	5.0
22	Iron	mg/L	0.12	0.14	3.0
23	Calcium	mg/L	115	118	--
24	Magnesium	mg/L	37	40	--
25	Percentage Sodium	%	31.5	33.8	--
26	Total Coliform(MPN)	Present/ Absent	Absent	Absent	--
27	Bioassay Test	% Survival of fish after 96 hrs in 100% effluent	100	100	90%Survival of fish in 96 Hours in 100% of effluent

Six Monthly Variation in bore water Data

Location: Dansoli Village

Period: July – 2021 to December – 2021

Sr. No.	Parameter	Unit	Quarterly July to Sept - 2021	Quarterly Oct to Dec - 2021	MoEF Limit
1	Temperature	°C	27.3	27.4	Shall not exceed 5°c above the receiving water temp
2	pH@ 25 °C	pH unit	7.50	7.68	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	3.4	3.0	100
5	Total Dissolved Solids (TDS) @180 °C	mg/L	1487	1509	2100
6	Total volatile Solids	mg/L	1.8	1.5	--
7	COD	mg/L	< 4	< 4	250
8	BOD (5 days at 20° C)	mg/L	< 2	< 2	30
9	Oil & Grease	mg/L	< 0.1	< 0.1	10
10	Chloride	mg/L	545	543	1000
11	Sulphate	mg/L	168	172	300
12	Fluoride	mg/L	0.8	0.8	2.0
13	Phosphate as PO ₄ ⁻⁻⁻	mg/L	0.9	1.1	--
14	Total Residual Chlorine	mg/L	< 0.1	< 0.1	1.0
15	Free Available Chlorine	mg/L	< 0.1	< 0.1	--
16	Phenolic Compound	mg/L	< 0.01	< 0.01	1.0
17	Lead	mg/L	< 0.01	< 0.01	0.1
18	Copper	mg/L	< 0.05	< 0.05	3.0
19	Hexavalent Chromium	mg/L	< 0.03	< 0.03	0.1
20	Total Chromium	mg/L	< 0.03	< 0.03	2.0
21	Zinc	mg/L	< 0.03	< 0.03	5.0
22	Iron	mg/L	0.07	0.1	3.0
23	Calcium	mg/L	127	132	--
24	Magnesium	mg/L	42	45	--
25	Percentage Sodium	%	42.8	40.2	--
26	Total Coliform(MPN)	Present/ Absent	Absent	Absent	--
27	Bioassay Test	% Survival of fish after 96 hrs in 100% effluent	100	100	90%Survival of fish in 96 Hours in 100% of effluent

Six Monthly Variation in bore water Data

Location: Bore Well Bhaga Village (Valia Block)

Period: July – 2021 to December – 2021

Sr. No.	Parameter	Unit	Quarterly July to Sept - 2021	Quarterly Oct to Dec - 2021	MoEF Limit
1	Temperature	°C	28	26.7	Shall not exceed 5°c above the receiving water temp
2	pH@ 25°C	pH unit	7.34	7.53	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	1.7	1.4	100
5	Total Dissolved Solids (TDS) @180 °C	mg/L	1400	1425	2100
6	Total volatile Solids	mg/L	1.5	1.2	--
7	COD	mg/L	< 4	< 4	250
8	BOD (5 days at 20 °C)	mg/L	< 2	< 2	30
9	Oil & Grease	mg/L	< 0.1	< 0.1	10
10	Chloride	mg/L	505	511	1000
11	Sulphate	mg/L	138	141	300
12	Fluoride	mg/L	0.9	1.1	2.0
13	Phosphate as PO ₄ ⁻⁻⁻	mg/L	0.6	0.8	--
14	Total Residual Chlorine	mg/L	< 0.1	< 0.1	1.0
15	Free Available Chlorine	mg/L	< 0.1	< 0.1	--
16	Phenolic Compound	mg/L	< 0.01	< 0.01	1.0
17	Lead	mg/L	< 0.01	< 0.01	0.1
18	Copper	mg/L	< 0.05	< 0.05	3.0
19	Hexavalent Chromium	mg/L	< 0.03	< 0.03	0.1
20	Total Chromium	mg/L	< 0.03	< 0.03	2.0
21	Zinc	mg/L	< 0.03	< 0.03	5.0
22	Iron	mg/L	0.09	0.08	3.0
23	Calcium	mg/L	131	134	--
24	Magnesium	mg/L	48	50	--
25	Percentage Sodium	%	31.5	32.5	--
26	Total Coliform(MPN)	Present/ Absent	Absent	Absent	--
27	Bioassay Test	% Survival of fish after 96 hrs in 100% effluent	100	100	90%Survival of fish in 96 Hours in 100% of effluent

Six Monthly Variation in bore water Data

Location: Bore Well (Harsani Village)

Period: July – 2021 to December – 2021

Sr. No.	Parameter	Unit	Quarterly July to Sept - 2021	Quarterly Oct to Dec - 2021	MoEF Limit
1	Temperature	°C	26	26.8	Shall not exceed 5°c above the receiving water temp 5.5-9.0
2	pH@ 25°C	pH unit	7.38	7.63	
3	Colour	pt. Co. Scale	< 5	< 5	
4	Total Suspended Solids (TSS) @105 °C	mg/L	3.4	3.0	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	998	1115	2100
6	Total volatile Solids	mg/L	1.0	1.1	--
7	COD	mg/L	< 4	< 4	250
8	BOD (5 days at 20° C)	mg/L	< 2	< 2	30
9	Oil & Grease	mg/L	< 0.1	< 0.1	10
10	Chloride	mg/L	265	269	1000
11	Sulphate	mg/L	98	101	300
12	Fluoride	mg/L	0.6	0.9	2.0
13	Phosphate as PO ₄ ⁻⁻⁻	mg/L	0.7	0.7	--
14	Total Residual Chlorine	mg/L	< 0.1	< 0.1	1.0
15	Free Available Chlorine	mg/L	< 0.01	< 0.01	--
16	Phenolic Compound	mg/L	< 0.01	< 0.01	1.0
17	Lead	mg/L	< 0.05	< 0.05	0.1
18	Copper	mg/L	< 0.03	< 0.03	3.0
19	Hexavalent Chromium	mg/L	< 0.03	< 0.03	0.1
20	Total Chromium	mg/L	< 0.03	< 0.03	2.0
21	Zinc	mg/L	< 0.1	< 0.1	5.0
22	Iron	mg/L	0.07	0.09	3.0
23	Calcium	mg/L	111	115	--
24	Magnesium	mg/L	30	33	--
25	Percentage Sodium	%	37.2	38.3	--
26	Total Coliform(MPN)	Present/ Absent	Absent	Absent	--
27	Bioassay Test	% Survival of fish after 96 hrs in 100% effluent	100	100	90%Survival of fish in 96 Hours in 100% of effluent

Six Monthly Variation in bore water Data

Location: Mine water sump – 2(Valia)

Period: July – 2021 to December – 2021

Sr. No.	Parameter	Unit	Quarterly July to Sept - 2021	Quarterly Oct to Dec - 2021	MoEF Limit
1	Temperature	°C	27.3	27.7	Shall not exceed 5°c above the receiving water temp
2	pH@ 25°C	pH unit	7.41	7.56	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	2.9	2.8	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	885	897	2100
6	Total volatile Solids	mg/L	1.8	1.5	--
7	COD	mg/L	< 4	< 4	250
8	BOD (5 days at 20° C)	mg/L	< 2	< 2	30
9	Oil & Grease	mg/L	< 0.1	< 0.1	10
10	Chloride	mg/L	211	217	1000
11	Sulphate	mg/L	117	121	300
12	Fluoride	mg/L	0.9	1.1	2.0
13	Phosphate as PO ₄ ⁻⁻⁻	mg/L	1.1	1.2	--
14	Total Residual Chlorine	mg/L	< 0.1	< 0.1	1.0
15	Free Available Chlorine	mg/L	< 0.1	< 0.1	--
16	Phenolic Compound	mg/L	< 0.01	< 0.01	1.0
17	Lead	mg/L	< 0.01	< 0.01	0.1
18	Copper	mg/L	< 0.05	< 0.05	3.0
19	Hexavalent Chromium	mg/L	< 0.03	< 0.03	0.1
20	Total Chromium	mg/L	< 0.03	< 0.03	2.0
21	Zinc	mg/L	< 0.03	< 0.03	5.0
22	Iron	mg/L	0.08	0.09	3.0
23	Calcium	mg/L	105	109	--
24	Magnesium	mg/L	33	36	--
25	Percentage Sodium	%	33.5	34.5	--
26	Total Coliform(MPN)	Present/ Absent	Absent	Absent	--
27	Bioassay Test	% Survival of fish after 96 hrs in 100% effluent	100	100	90%Survival of fish in 96 Hours in 100% of effluent

Six Monthly Variation in bore water Data

Location: Bore Well (Anoi Village)

Period: July – 2021 to December – 2021

Sr. No.	Parameter	Unit	Quarterly July to Sept - 2021	Quarterly Oct to Dec - 2021	MoEF Limit
1	Temperature	°C	25.8	25.7	Shall not exceed 5°c above the receiving water temp
2	pH@ 25°C	pH unit	7.47	7.62	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	1.2	1.2	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	1366	1383	2100
6	Total volatile Solids	mg/L	1.1	1.1	--
7	COD	mg/L	< 4	< 4	250
8	BOD (5 days at 20° C)	mg/L	< 2	< 2	30
9	Oil & Grease	mg/L	< 0.1	< 0.1	10
10	Chloride	mg/L	532	536	1000
11	Sulphate	mg/L	124	127	300
12	Fluoride	mg/L	0.8	1.1	2.0
13	Phosphate as PO ₄ ⁻⁻⁻	mg/L	1.2	1.0	--
14	Total Residual Chlorine	mg/L	< 0.1	< 0.1	1.0
15	Free Available Chlorine	mg/L	< 0.01	< 0.01	--
16	Phenolic Compound	mg/L	< 0.01	< 0.01	1.0
17	Lead	mg/L	< 0.05	< 0.05	0.1
18	Copper	mg/L	< 0.03	< 0.03	3.0
19	Hexavalent Chromium	mg/L	< 0.03	< 0.03	0.1
20	Total Chromium	mg/L	< 0.03	< 0.03	2.0
21	Zinc	mg/L	< 0.1	< 0.1	5.0
22	Iron	mg/L	0.08	0.08	3.0
23	Calcium	mg/L	122	124	--
24	Magnesium	mg/L	26	27	--
25	Percentage Sodium	%	29.5	30.3	--
26	Total Coliform(MPN)	Present/ Absent	Absent	Absent	--
27	Bioassay Test	% Survival of fish after 96 hrs in 100% effluent	100	100	90%Survival of fish in 96 Hours in 100% of effluent

Six Monthly Variation in bore water Data

Location: Charetha Shah Nallah Down Stream

Period: July – 2021 to December – 2021

Sr. No.	Parameter	Unit	Quarterly July to Sept - 2021	Quarterly Oct to Dec - 2021	MoEF Limit
1	Temperature	°C	27.8	28.2	Shall not exceed 5°c above the receiving water temp
2	pH@ 25°C	pH unit	7.52	7.81	5.5-9.0
3	Colour	pt. Co. Scale	<5	<5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	1.9	1.6	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	808	823	2100
6	Total volatile Solids	mg/L	1.0	1.0	--
7	COD	mg/L	<4	<4	250
8	BOD (5 days at 20° C)	mg/L	<2	<2	30
9	Oil & Grease	mg/L	<0.1	<0.1	10
10	Chloride	mg/L	168	173	1000
11	Sulphate	mg/L	118	122	300
12	Fluoride	mg/L	0.8	1.0	2.0
13	Phosphate as PO ₄ ³⁻	mg/L	0.9	1.1	--
14	Total Residual Chlorine	mg/L	<0.1	<0.1	1.0
15	Free Available Chlorine	mg/L	<0.1	<0.1	--
16	Phenolic Compound	mg/L	< 0.01	< 0.01	1.0
17	Lead	mg/L	< 0.01	< 0.01	0.1
18	Copper	mg/L	< 0.05	< 0.05	3.0
19	Hexavalent Chromium	mg/L	< 0.03	< 0.03	0.1
20	Total Chromium	mg/L	< 0.03	< 0.03	2.0
21	Zinc	mg/L	< 0.03	< 0.03	5.0
22	Iron	mg/L	0.08	0.08	3.0
23	Calcium	mg/L	138	141	--
24	Magnesium	mg/L	27	30.0	--
25	Percentage Sodium	%	35.5	36.1	--
26	Total Coliform(MPN)	Present/ Absent	Absent	Absent	--
27	Bioassay Test	% Survival of fish after 96 hrs in 100% effluent	100	100	90%Survival of fish in 96 Hours in 100% of effluent

Six Monthly Variation in bore water Data

Location: Shahnallah Village up Stream

Period: July – 2021 to December – 2021

Sr. No.	Parameter	Unit	Quarterly July to Sept - 2021	Quarterly Oct to Dec - 2021	MoEF Limit
1	Temperature	°C	28.8	27.4	Shall not exceed 5°c above the receiving water temp
2	pH@ 25 °C	pH unit	7.50	7.82	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	2.7	2.8	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	847	862	2100
6	Total volatile Solids	mg/L	2.5	2.2	--
7	COD	mg/L	< 4	< 4	250
8	BOD (5 days at 20° C)	mg/L	< 2	< 2	30
9	Oil & Grease	mg/L	< 0.1	< 0.1	10
10	Chloride	mg/L	165	171	1000
11	Sulphate	mg/L	112	119	300
12	Fluoride	mg/L	0.9	1.2	2.0
13	Phosphate as PO ₄ ⁻⁻⁻	mg/L	1.3	1.4	--
14	Total Residual Chlorine	mg/L	< 0.1	< 0.1	1.0
15	Free Available Chlorine	mg/L	< 0.01	< 0.01	--
16	Phenolic Compound	mg/L	< 0.01	< 0.01	1.0
17	Lead	mg/L	< 0.05	< 0.05	0.1
18	Copper	mg/L	< 0.03	< 0.03	3.0
19	Hexavalent Chromium	mg/L	< 0.03	< 0.03	0.1
20	Total Chromium	mg/L	< 0.03	< 0.03	2.0
21	Zinc	mg/L	< 0.1	< 0.1	5.0
22	Iron	mg/L	0.09	0.09	3.0
23	Calcium	mg/L	166	170	--
24	Magnesium	mg/L	21	23	--
25	Percentage Sodium	%	34.8	35.7	--
26	Total Coliform(MPN)	Present/ Absent	Absent	Absent	--
27	Bioassay Test	% Survival of fish after 96 hrs in 100% effluent	100	100	90%Survival of fish in 96 Hours in 100% of effluent

Six Monthly Variation in bore water Data

Location: Mosali Village

Period: July – 2021 to December – 2021

Sr. No.	Parameter	Unit	Quarterly July to Sept - 2021	Quarterly Oct to Dec - 2021	MoEF Limit
1	Temperature	°C	27.8	27.4	Shall not exceed 5°c above the receiving water temp
2	pH@ 25 °C	pH unit	7.56	7.73	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	1.8	2.0	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	1427	1458	2100
6	Total volatile Solids	mg/L	1.8	1.6	--
7	COD	mg/L	< 4	< 4	250
8	BOD (5 days at 20 °C)	mg/L	< 2	< 2	30
9	Oil & Grease	mg/L	< 0.1	< 0.1	10
10	Chloride	mg/L	485	489	1000
11	Sulphate	mg/L	185	189	300
12	Fluoride	mg/L	0.8	1.0	2.0
13	Phosphate as PO ₄ ⁻⁻⁻	mg/L	1.4	1.4	--
14	Total Residual Chlorine	mg/L	< 0.10	< 0.10	1.0
15	Free Available Chlorine	mg/L	< 0.01	< 0.01	--
16	Phenolic Compound	mg/L	< 0.01	< 0.01	1.0
17	Lead	mg/L	< 0.05	< 0.05	0.1
18	Copper	mg/L	< 0.03	< 0.03	3.0
19	Hexavalent Chromium	mg/L	< 0.03	< 0.03	0.1
20	Total Chromium	mg/L	< 0.03	< 0.03	2.0
21	Zinc	mg/L	< 0.1	< 0.1	5.0
22	Iron	mg/L	0.09	0.09	3.0
23	Calcium	mg/L	138	140	--
24	Magnesium	mg/L	31	32	--
25	Percentage Sodium	%	37.8	37.5	--
26	Total Coliform(MPN)	Present/ Absent	Absent	Absent	--
27	Bioassay Test	% Survival of fish after 96 hrs in 100% effluent	100	100	90%Survival of fish in 96 Hours in 100% of effluent

Six Monthly Variation in bore water Data

Location: Pond Water Shahnallah

Period: July – 2021 to December – 2021

Sr. No.	Parameter	Unit	Quarterly July to Sept - 2021	Quarterly Oct to Dec - 2021	MoEF Limit
1	Temperature	°C	27.2	26.6	Shall not exceed 5°c above the receiving water temp 5.5-9.0
2	pH@ 25 °C	pH unit	7.41	7.74	
3	Colour	pt. Co. Scale	<5	<5	
4	Total Suspended Solids (TSS) @105 °C	mg/L	4.6	4.0	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	1175	1196	2100
6	Total volatile Solids	mg/L	1.6	1.4	--
7	COD	mg/L	<4	<4	250
8	BOD (5 days at 20 °C)	mg/L	< 2	< 2	30
9	Oil & Grease	mg/L	< 0.1	< 0.1	10
10	Chloride	mg/L	325	329	1000
11	Sulphate	mg/L	132	135	300
12	Fluoride	mg/L	0.9	0.9	2.0
13	Phosphate as PO ₄ ³⁻	mg/L	1.2	1.3	--
14	Total Residual Chlorine	mg/L	<0.10	<0.10	1.0
15	Free Available Chlorine	mg/L	< 0.01	< 0.01	--
16	Phenolic Compound	mg/L	< 0.01	< 0.01	1.0
17	Lead	mg/L	< 0.05	< 0.05	0.1
18	Copper	mg/L	< 0.03	< 0.03	3.0
19	Hexavalent Chromium	mg/L	< 0.03	< 0.03	0.1
20	Total Chromium	mg/L	< 0.03	< 0.03	2.0
21	Zinc	mg/L	< 0.1	< 0.1	5.0
22	Iron	mg/L	0.09	0.5	3.0
23	Calcium	mg/L	153	156	--
24	Magnesium	mg/L	33	36	--
25	Percentage Sodium	%	37.9	38.6	--
26	Total Coliform(MPN)	Present/ Absent	Absent	Absent	--
27	Bioassay Test	% Survival of fish after 96 hrs in 100% effluent	100	100	90%Survival of fish in 96 Hours in 100% of effluent

Six Monthly Variation in bore water Data

Location: Bore Well Charetha Village
Period: July – 2021 to December – 2021

Sr. No.	Parameter	Unit	Quarterly July to Sept - 2021	Quarterly Oct to Dec - 2021	MoEF Limit
1	Temperature	°C	27.2	27.4	Shall not exceed 5°c above the receiving water temp
2	pH@ 25 °C	pH unit	7.65	7.89	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	3.4	3.0	100
5	Total Dissolved Solids (TDS) @180 °C	mg/L	950	972	2100
6	Total volatile Solids	mg/L	1.7	1.7	--
7	COD	mg/L	< 4	< 4	250
8	BOD (5 days at 20 °C)	mg/L	< 2	< 2	30
9	Oil & Grease	mg/L	< 0.1	< 0.1	10
10	Chloride	mg/L	208	212	1000
11	Sulphate	mg/L	105	108	300
12	Fluoride	mg/L	0.9	1.1	2.0
13	Phosphate as PO ₄ ³⁻	mg/L	0.6	0.8	--
14	Total Residual Chlorine	mg/L	< 0.1	< 0.1	1.0
15	Free Available Chlorine	mg/L	< 0.01	< 0.01	--
16	Phenolic Compound	mg/L	< 0.01	< 0.01	1.0
17	Lead	mg/L	< 0.05	< 0.05	0.1
18	Copper	mg/L	< 0.03	< 0.03	3.0
19	Hexavalent Chromium	mg/L	< 0.03	< 0.03	0.1
20	Total Chromium	mg/L	< 0.03	< 0.03	2.0
21	Zinc	mg/L	< 0.1	< 0.1	5.0
22	Iron	mg/L	0.09	0.09	3.0
23	Calcium	mg/L	161	164	--
24	Magnesium	mg/L	36	38	--
25	Percentage Sodium	%	30.5	32.4	--
26	Total Coliform(MPN)	Present/ Absent	Absent	Absent	--
27	Bioassay Test	% Survival of fish after 96 hrs in 100% effluent	100	100	90%Survival of fish in 96 Hours in 100% of effluent

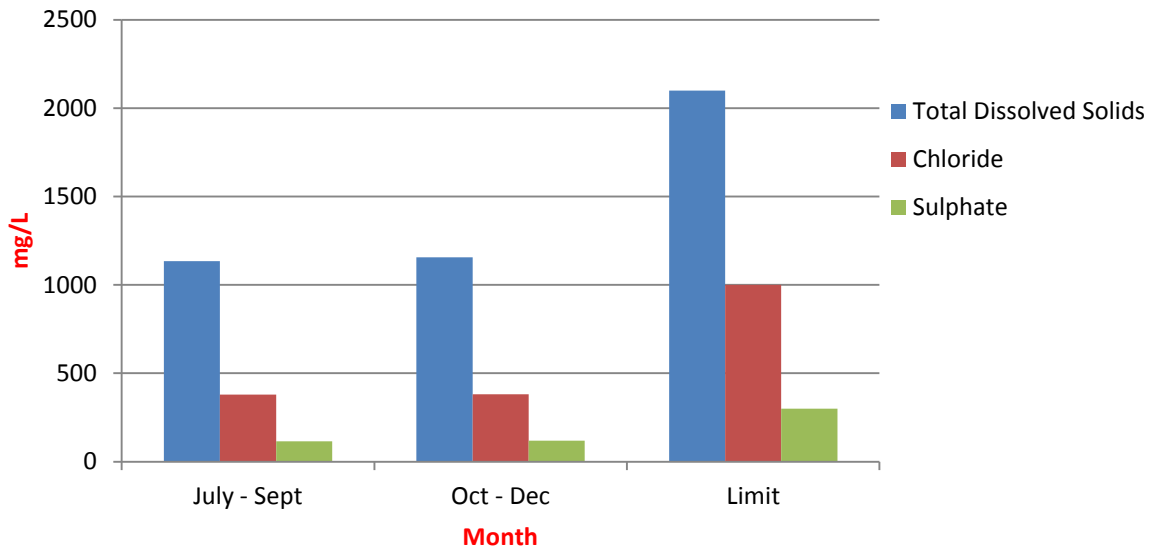
Six Monthly Variation in bore water Data

Location: Mine Water Mangrol

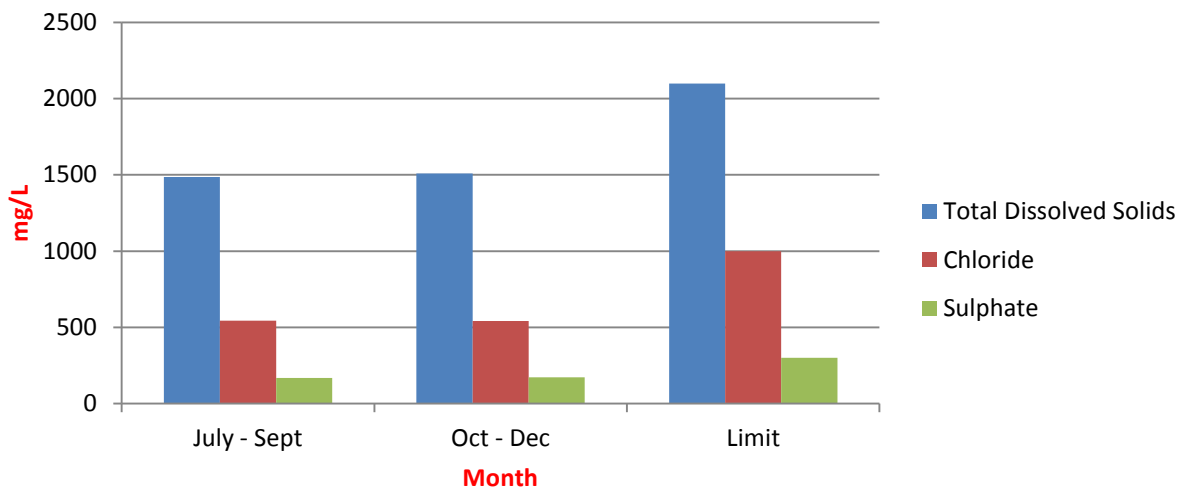
Period: July – 2021 to December – 2021

Sr. No.	Parameter	Unit	Quarterly July to Sept - 2021	Quarterly Oct to Dec - 2021	MoEF Limit
1	Temperature	°C	28.1	27.7	Shall not exceed 5°c above the receiving water temp
2	pH@ 25°C	pH unit	7.52	7.72	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	2.6	3.0	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	1016	1039	2100
6	Total volatile Solids	mg/L	1.1	1.3	--
7	COD	mg/L	< 4	< 4	250
8	BOD (5 days at 20° C)	mg/L	< 2	< 2	30
9	Oil & Grease	mg/L	< 0.1	< 0.1	10
10	Chloride	mg/L	235	239	1000
11	Sulphate	mg/L	132	135	300
12	Fluoride	mg/L	0.9	1.2	2.0
13	Phosphate as PO ₄ ³⁻	mg/L	0.6	0.8	--
14	Total Residual Chlorine	mg/L	< 0.1	< 0.1	1.0
15	Free Available Chlorine	mg/L	< 0.01	< 0.01	--
16	Phenolic Compound	mg/L	< 0.01	< 0.01	1.0
17	Lead	mg/L	< 0.05	< 0.05	0.1
18	Copper	mg/L	< 0.03	< 0.03	3.0
19	Hexavalent Chromium	mg/L	< 0.03	< 0.03	0.1
20	Total Chromium	mg/L	< 0.03	< 0.03	2.0
21	Zinc	mg/L	< 0.1	< 0.1	5.0
22	Iron	mg/L	0.08	0.1	3.0
23	Calcium	mg/L	153	157	--
24	Magnesium	mg/L	40	42	--
25	Percentage Sodium	%	36.8	37.8	--
26	Total Coliform(MPN)	Present/ Absent	Absent	Absent	--
27	Bioassay Test	% Survival of fish after 96 hrs in 100% effluent	100	100	90%Survival of fish in 96 Hours in 100% of effluent

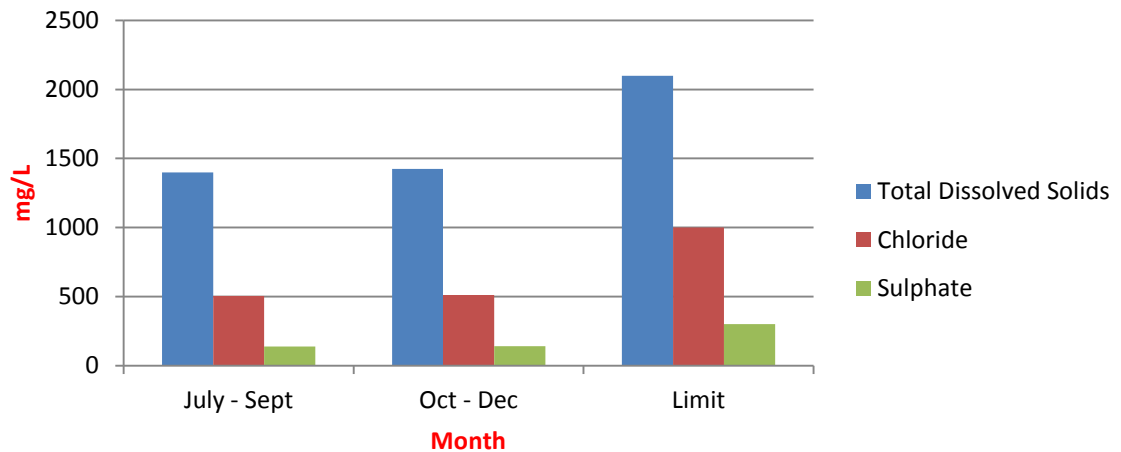
Graphical Presentation for the variation of TDS, Chloride, Sulphate Bore Well (Kosmadi Village)



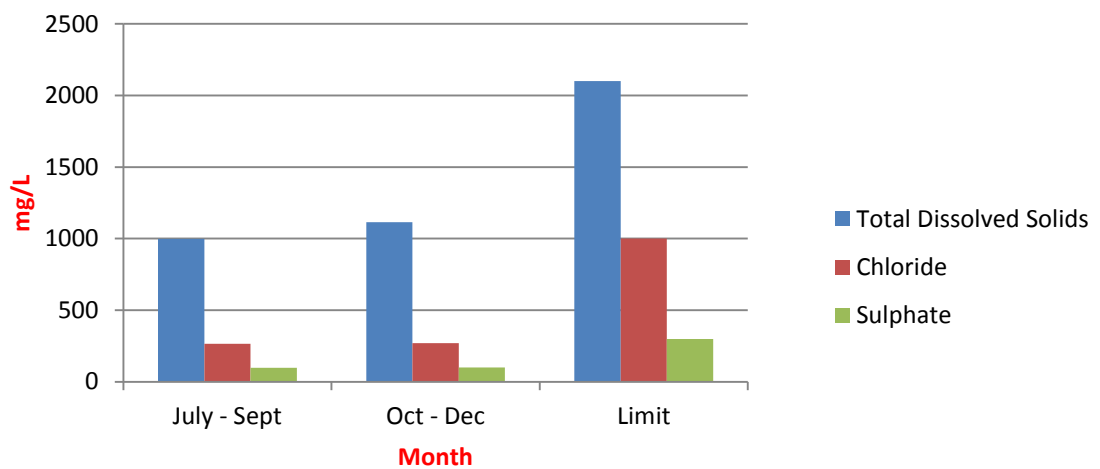
Graphical Presentation for the variation of TDS, Chloride, Sulphate Bore Well (Dansoli Village)



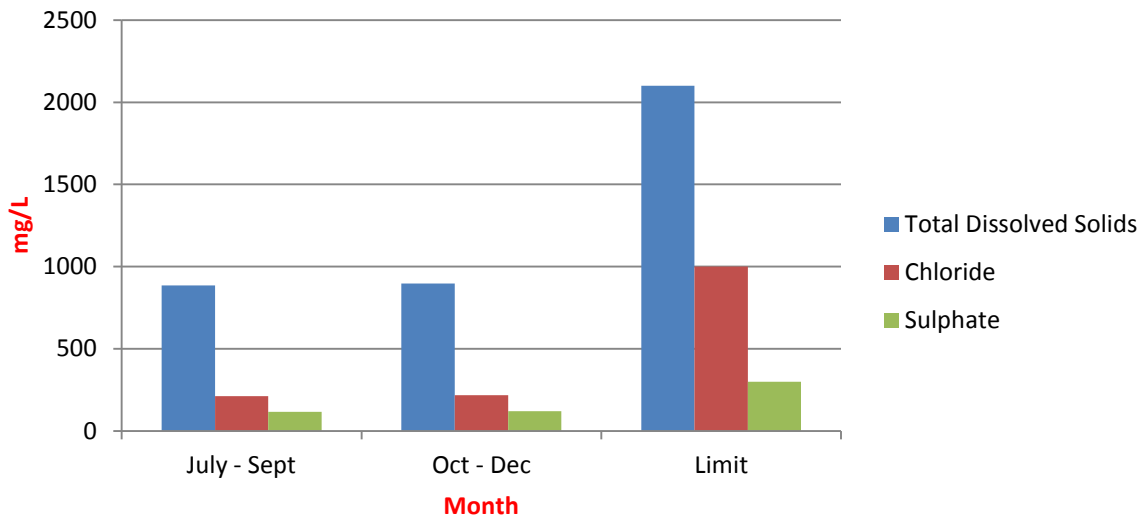
Graphical Presentation for the variation of TDS, Chloride, Sulphate Bhaga Village (Valia Block)



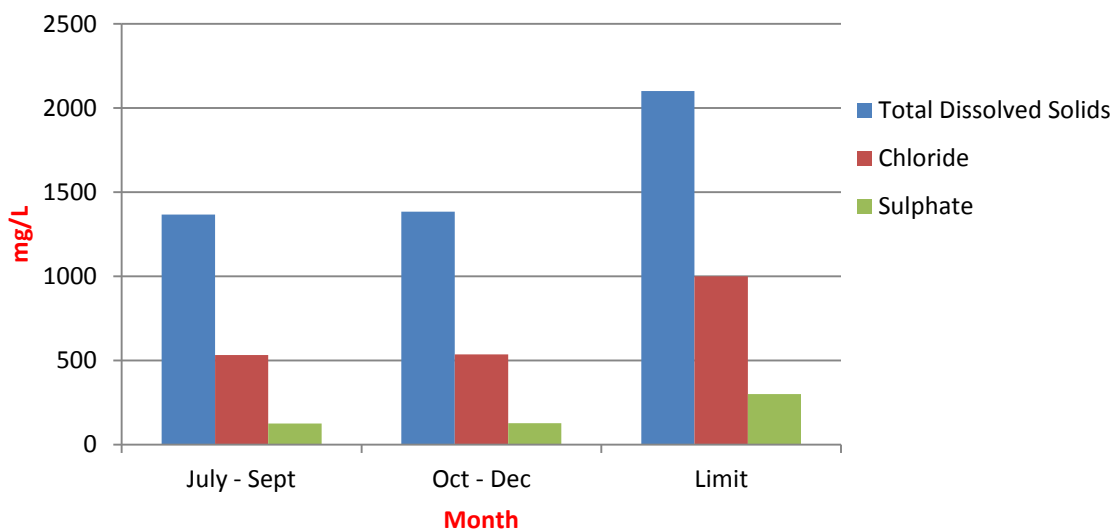
Graphical Presentation for the variation of TDS, Chloride, Sulphate Harsani Village



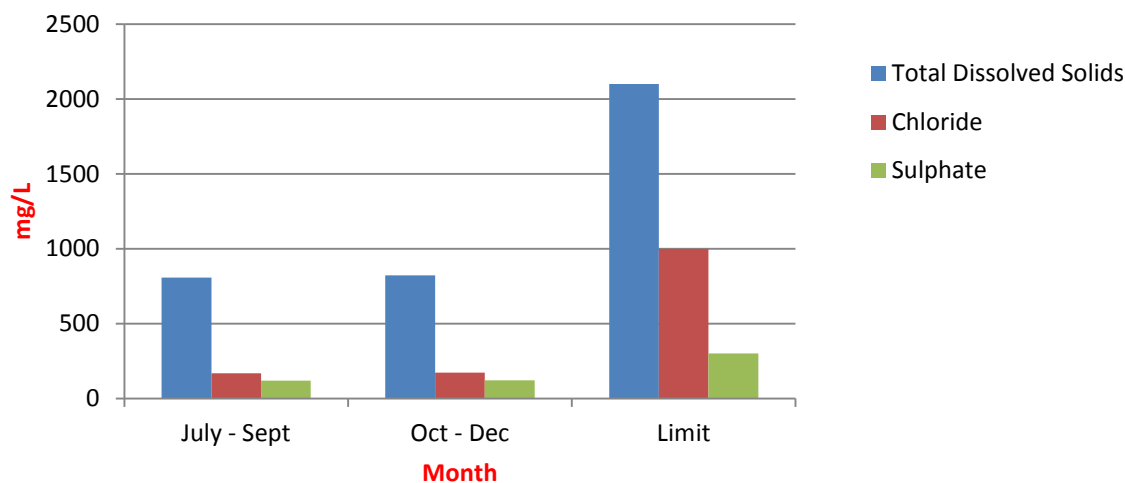
Graphical Presentation for the variation of TDS, Chloride, Sulphate Mine Water Sump – 2(Valia)



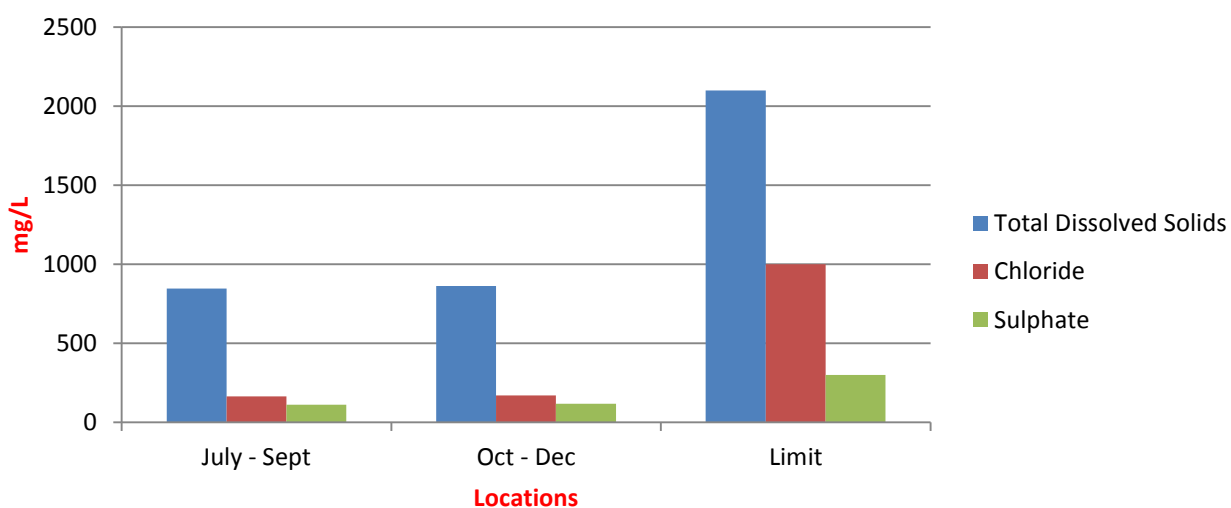
Graphical Presentation for the variation of TDS, Chloride, Sulphate Bore Water (Anoi Village)



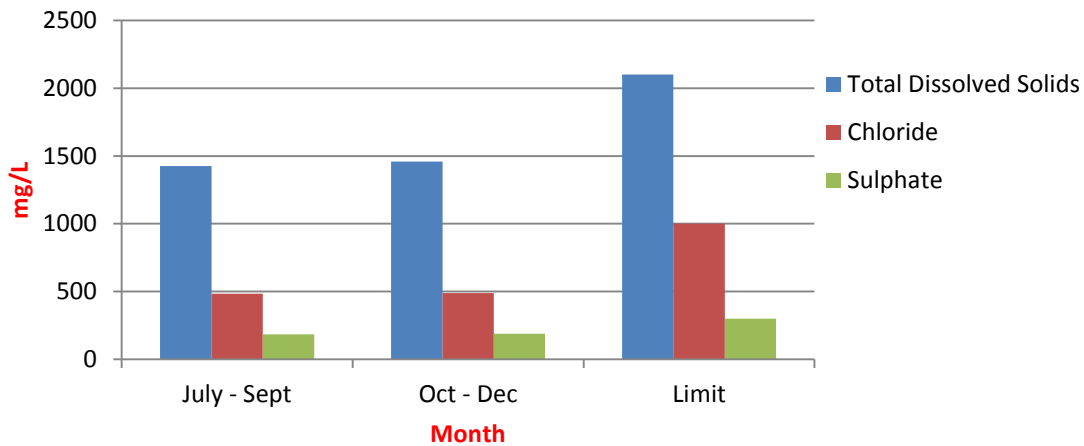
Graphical Presentation for the variation of TDS, Chloride, Sulphate Charetha Shah Nallah down stream



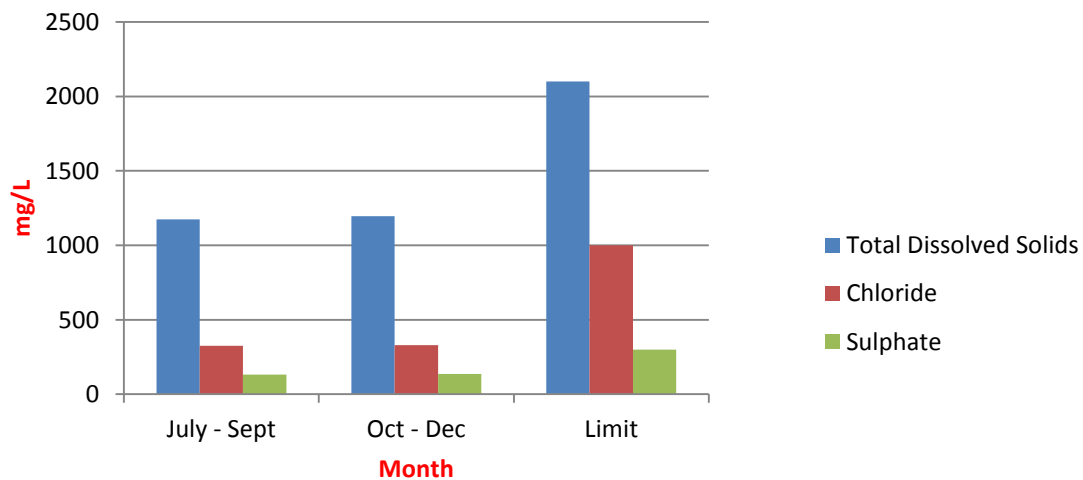
Graphical Presentation for the variation of TDS, Chloride, Sulphate Bore water Shah Nallah village



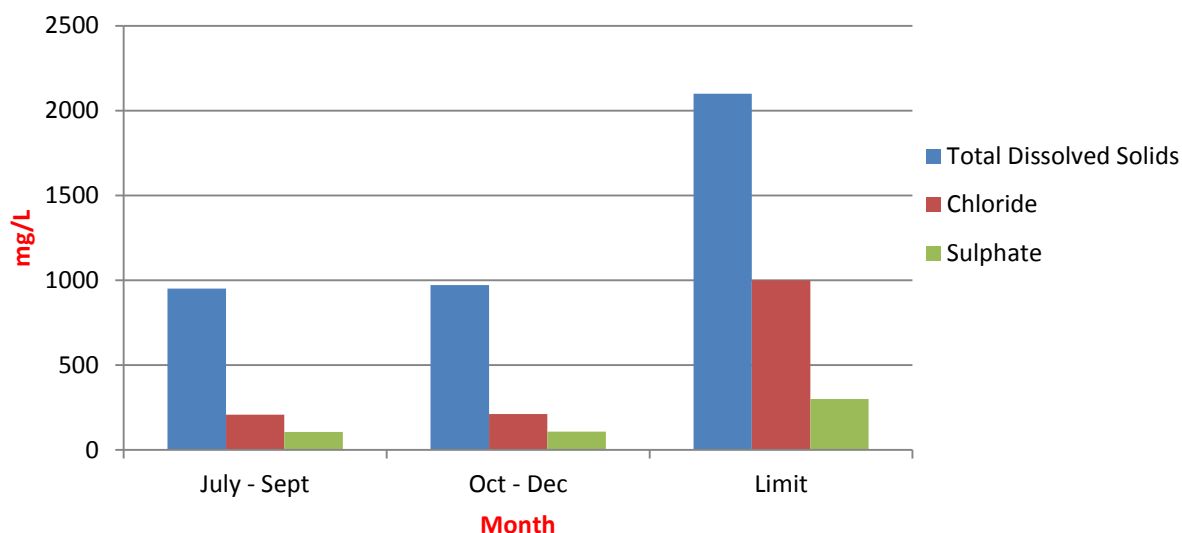
Graphical Presentation for the variation of TDS, Chloride, Sulphate Bore Well (Mosali Village)



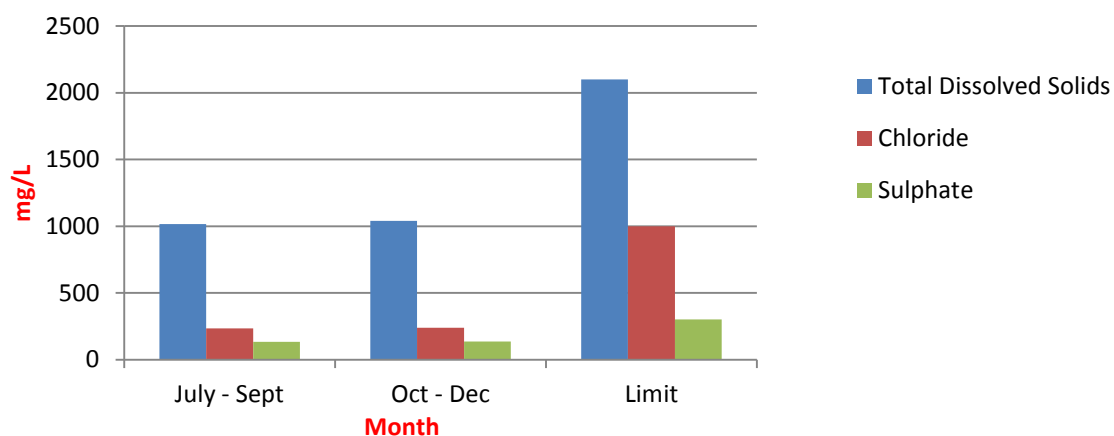
Graphical Presentation for the variation of TDS, Chloride, Sulphate Pond Water (Shah Nala Village)



Graphical Presentation for the variation of TDS, Chloride, Sulphate Bore Well (Charetha Village)

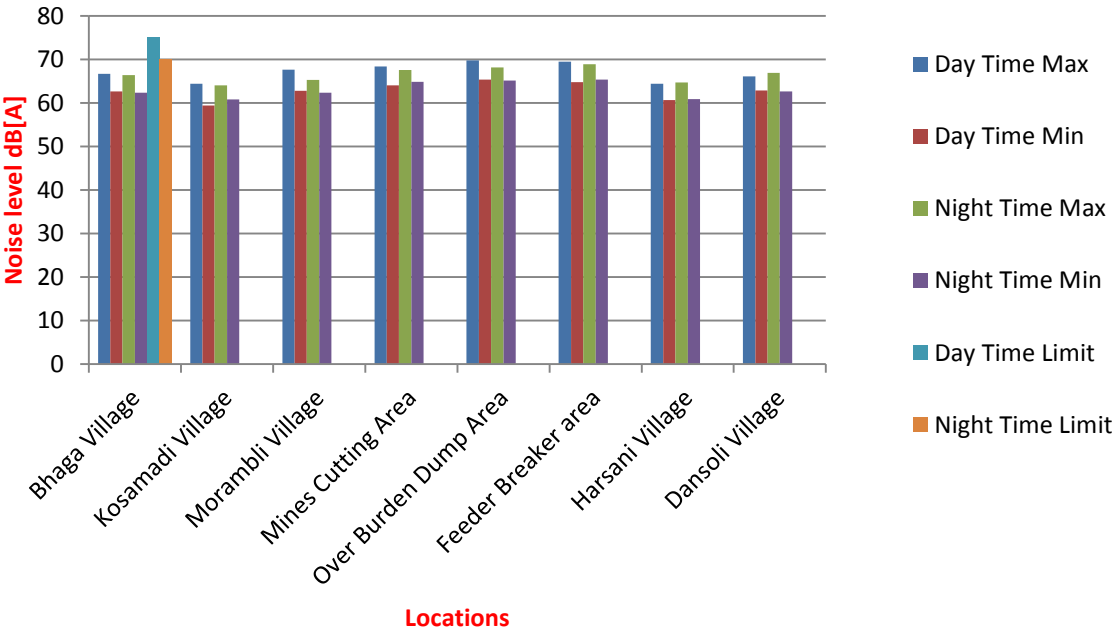


Graphical Presentation for the variation of TDS, Chloride, Sulphate Mine Water - 1 Mangrol Village



Comparative Noise Monitoring Report & Graphical Presentation

Graphical Presentation for the Parameter Noise level at Various Locations



**Comparative Micro
Meteorological Data and
Wind rose & Wind
Frequency Distribution**

Six Monthly Variations in Micro-meteorological data

Period: July – 2021 to December – 2021

Dry Bulb Temperature (°C)		
Time in Hrs.	Quarterly July to Sept - 2021	Quarterly Oct to Dec - 2021
10.00	34	21.9
11.00	35	25.6
12.00	36	30.2
13.00	34	30.5
14.00	35	30.7
15.00	36	30.8
16.00	33	28.5
17.00	34	27.3
18.00	35	26.7
19.00	36	24.3
20.00	35	21.6
21.00	34	20.2
22.00	31	20.3
23.00	32	20.4
00.00	33	20.5
01.00	30	20.1
02.00	31	19.5
03.00	32	19.4
04.00	30	19.1
05.00	32	18.7
06.00	33	18.2
07.00	32	18.9
08.00	33	20.8
09.00	34	21.4
Maximum	36	30.8
Minimum	30	18.2
Average	33	24.5

Six Monthly Variations in Micrometeorological data

Period: July – 2021 to December – 2021

Wet Bulb Temperature (°C)		
Time in Hrs.	Quarterly July to Sept - 2021	Quarterly Oct to Dec - 2021
10.00	30	20.9
11.00	29	26.3
12.00	31	29.7
13.00	29	29.6
14.00	30	29.5
15.00	31	29.4
16.00	33	28.2
17.00	31	26.3
18.00	30	25.9
19.00	27	22.4
20.00	28	21.6
21.00	29	19.9
22.00	31	20.1
23.00	30	20.2
00.00	28	20.3
01.00	26	19.7
02.00	27	19.1
03.00	28	18.9
04.00	26	18.5
05.00	28	17.6
06.00	29	17.9
07.00	30	18.6
08.00	31	20.7
09.00	30	21.1
Maximum	33	29.7
Minimum	26	17.6
Average	29.5	23.7

Six Monthly Variations in Micrometeorological data

Period: July – 2021 to December – 2021

Relative Humidity %		
Time in Hrs.	Quarterly July to Sept - 2021	Quarterly Oct to Dec - 2021
10.00	68	63.0
11.00	64	59.0
12.00	63	58.0
13.00	57	56.0
14.00	48	57.0
15.00	34	58.0
16.00	45	59.0
17.00	58	62.0
18.00	71	63.0
19.00	72	64.0
20.00	74	65.0
21.00	75	64.0
22.00	76	64.0
23.00	77	64.0
00.00	78	64.0
01.00	79	65.0
02.00	77	64.0
03.00	76	66.0
04.00	74	67.0
05.00	72	68.0
06.00	70	69.0
07.00	69	65.0
08.00	68	64.0
09.00	66	63.0
Maximum	79	69.0
Minimum	34	56.0
Average	56.5	62.5

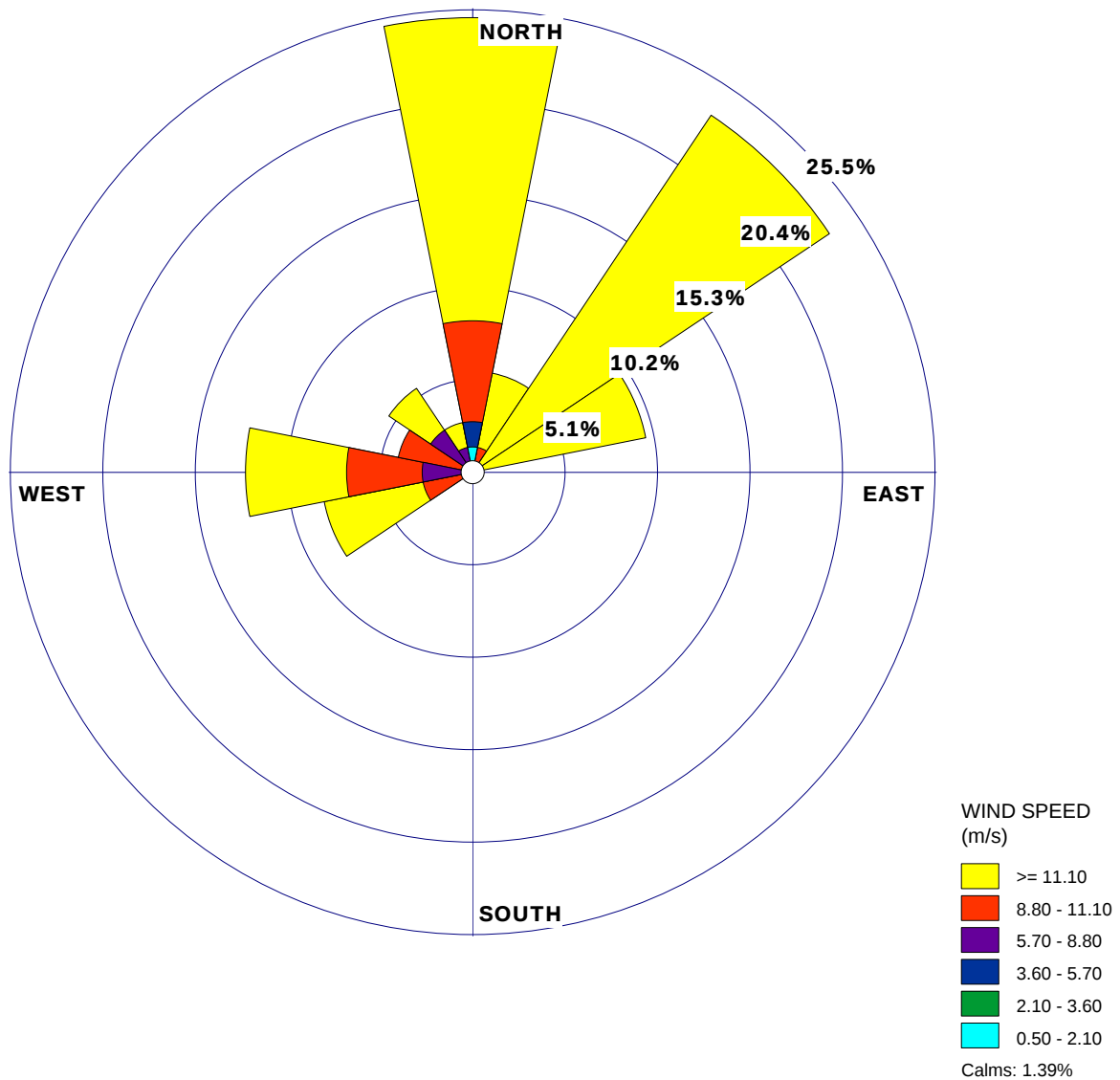
Six Monthly Variations in Micrometeorological data

Period : July – 2021 to December – 2021

Wind Speed (km/hour)		
Time in Hrs.	Quarterly July to Sept - 2021	Quarterly Oct to Dec - 2021
10.00	6.0	17.0
11.00	7.0	17.8
12.00	8.0	18.0
13.00	9.0	18.6
14.00	10	19.7
15.00	6.0	20.0
16.00	7.0	19.2
17.00	8.0	18.1
18.00	9.0	17.0
19.00	11	18.3
20.00	10	18.7
21.00	7.0	19.0
22.00	8.0	18.7
23.00	9.0	18.2
00.00	10	18.0
01.00	9.0	19.8
02.00	8.0	22.5
03.00	9.0	23.0
04.00	6.0	22.7
05.00	8.0	22.1
06.00	9.0	22.0
07.00	7.0	22.8
08.00	8.0	25.3
09.00	9.0	26.0
Maximum	11.0	26.0
Minimum	6.0	17.0
Average	8.5	21.5

WIND ROSE PLOT:
M/s. Gujarat Industries Power Company Limited
Valia - Mangrol Mine

DISPLAY:
 Wind Speed
 Direction (blowing from)



COMMENTS:	DATA PERIOD: Start Date: 23-07-2021 - 00:00 End Date: 30-12-2021 - 10:00	COMPANY NAME: M/s. Gujarat Industries Power Company Limited	
	CALM WINDS: 1.39%	MODELER: M/s. Ecosystem Resources Management	
		TOTAL COUNT: 71 hrs.	
	AVG. WIND SPEED: 14.15 m/s	DATE: 06-01-2022	PROJECT NO.:

Wind Class Frequency Distribution

