

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 January to June-2020

Prepared By

ECOSYSTEM RESOURCE MANAGEMENT PVT. LTD.

**OFFICE FLOOR, ASHOKA PAVILLION-A, OPP. KAPADIA HEALTH CLUB,
NEW CIVIL ROAD, SURAT – 395 001
Tel: 0261-2231630, 2236223 Fax: 0261-2231630**

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.

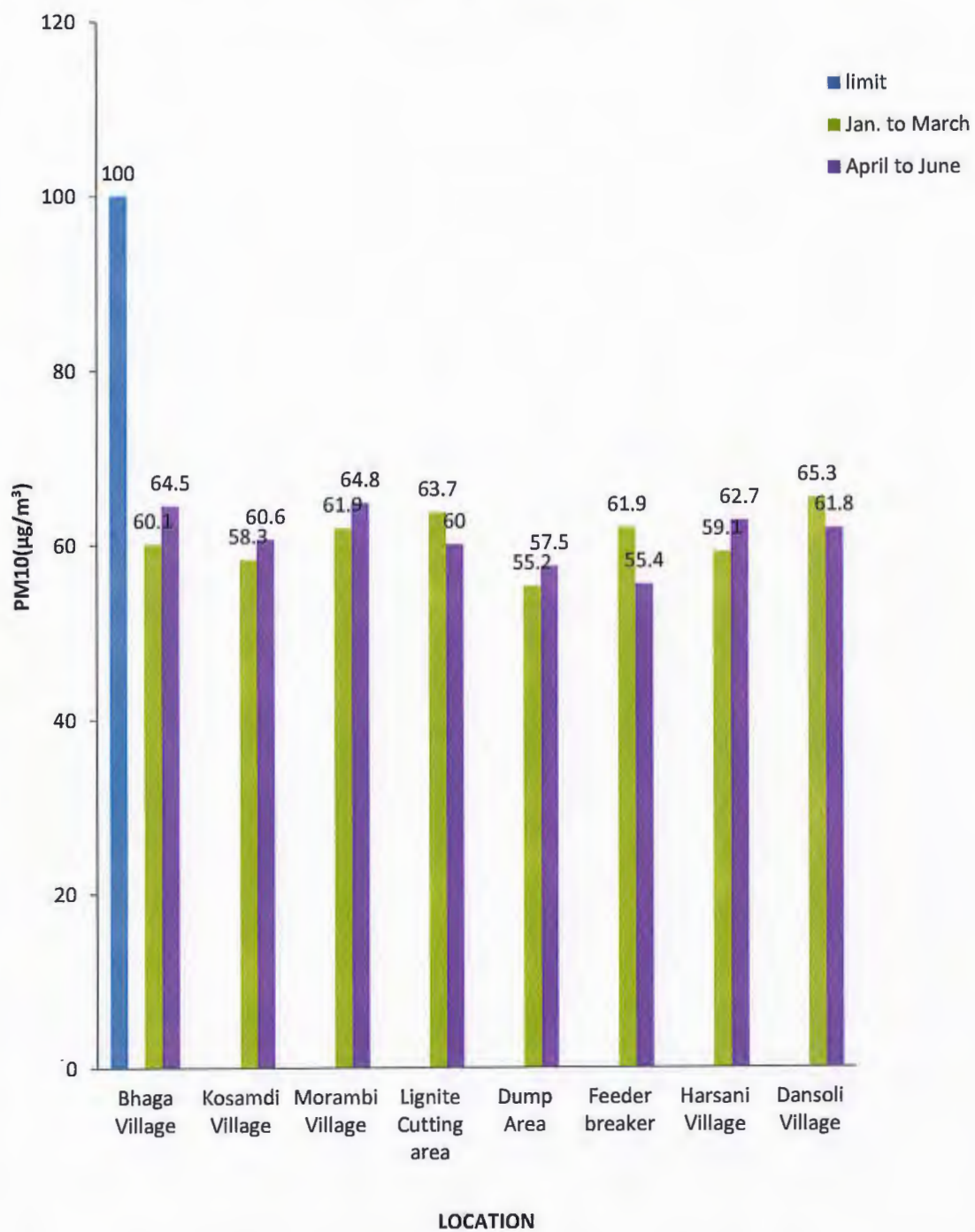
Six Monthly Variation in Ambient Air Quality Data

Parameter: PM₁₀ (Particulate Matter)

Period: January – 2020 to June – 2020

Sr. No.	Location	Results (µg/m³)	
		Quarterly Jan to March -2020	Quarterly April to June - 2020
1	Bhaga Village	60.1	64.5
2	Kosamdi Village	58.3	60.6
3	Morambi Village	61.9	64.8
4	Lignite Cutting area	63.7	60.0
5	Dump Area	55.2	57.5
6	Feeder breaker	61.9	55.4
7	Harsani Village	59.1	62.7
8	Dansoli Village	65.3	61.8
	Limit	100	

Graphical presentation for the variation of PM10 in Ambient Air



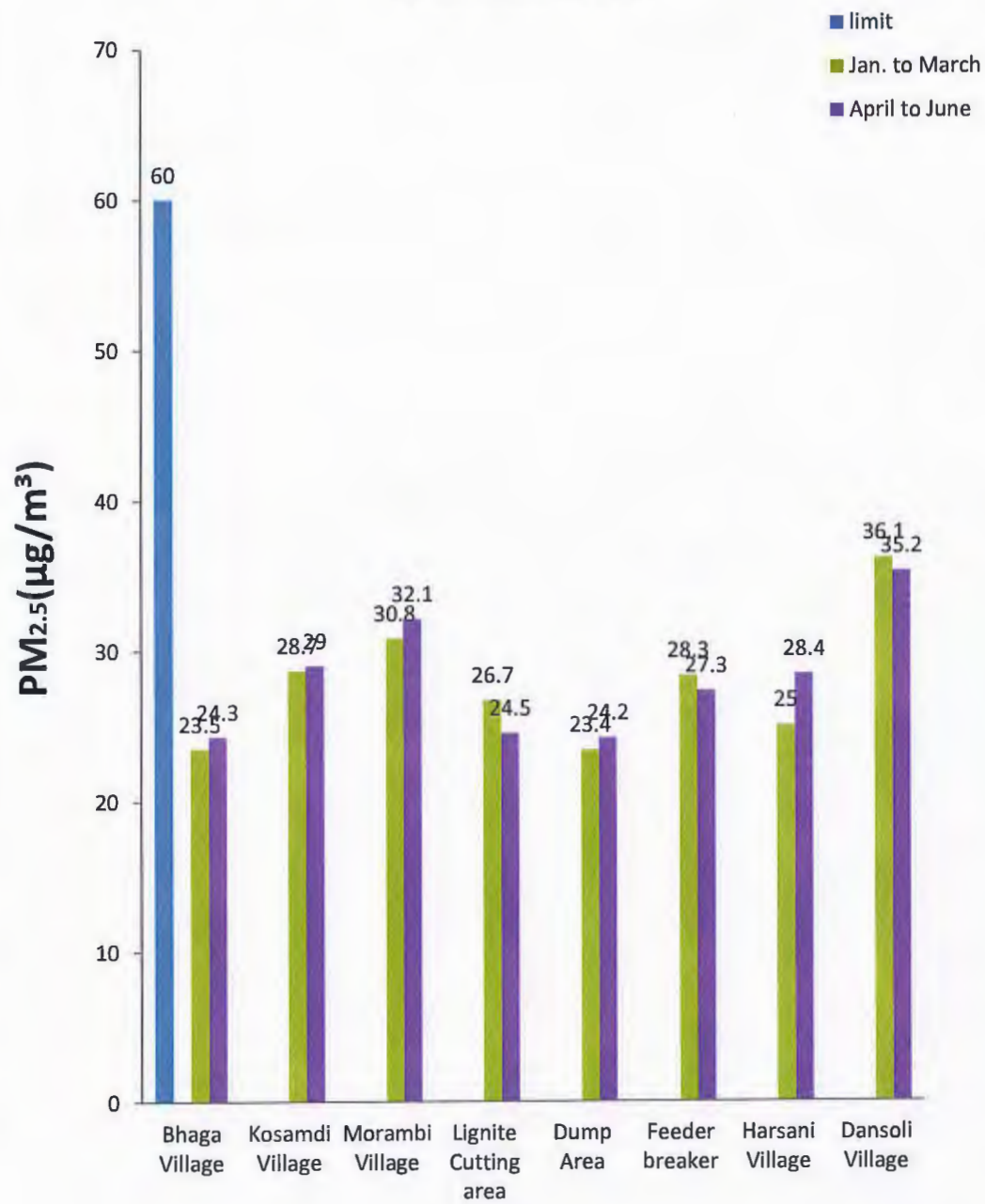
Six Monthly Variation in Ambient Air Quality Data

Parameter: PM_{2.5} (Respirable Particulate Matter)

Period: January – 2020 to June – 2020

Sr. No.	Location	Results (µg/m³)	
		Quarterly Jan to March -2020	Quarterly April to June - 2020
1	Bhaga Village	23.5	24.3
2	Kosamdi Village	28.7	29.0
3	Morambi Village	30.8	32.1
4	Lignite Cutting area	26.7	24.5
5	Dump Area	23.4	24.2
6	Feeder breaker	28.3	27.3
7	Harsani Village	25.0	28.4
8	Dansoli Village	36.1	35.2
	Limit	60 µg/m³	

Graphical presentation for the variation of PM_{2.5} in Ambient Air



LOCATION

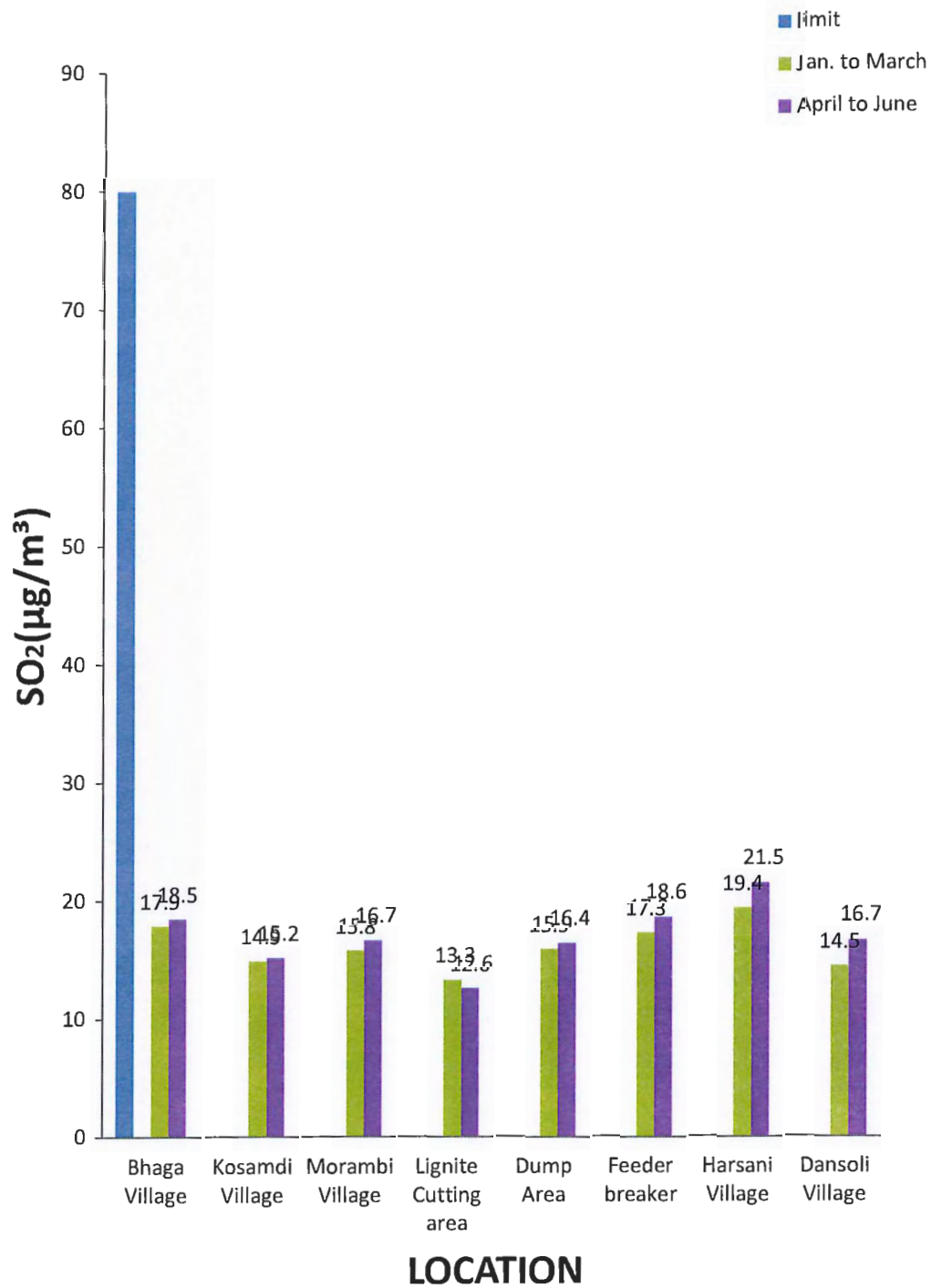
Six Monthly Variation in Ambient Air Quality Data

Parameter: SO₂ (Sulphur Dioxide)

Period: January – 2020 to June – 2020

Sr. No.	Location	Results (µg/m³)	
		Quarterly Jan to March -2020	Quarterly April to June - 2020
1	Bhaga Village	17.9	18.5
2	Kosamdi Village	14.9	15.2
3	Morambi Village	15.8	16.7
4	Lignite Cutting area	13.3	12.6
5	Dump Area	15.9	16.4
6	Feeder breaker	17.3	18.6
7	Harsani Village	19.4	21.5
8	Dansoli Village	14.5	16.7
	Limit	80 µg/m³	

Graphical presentation for the variation of SO₂ in Ambient Air



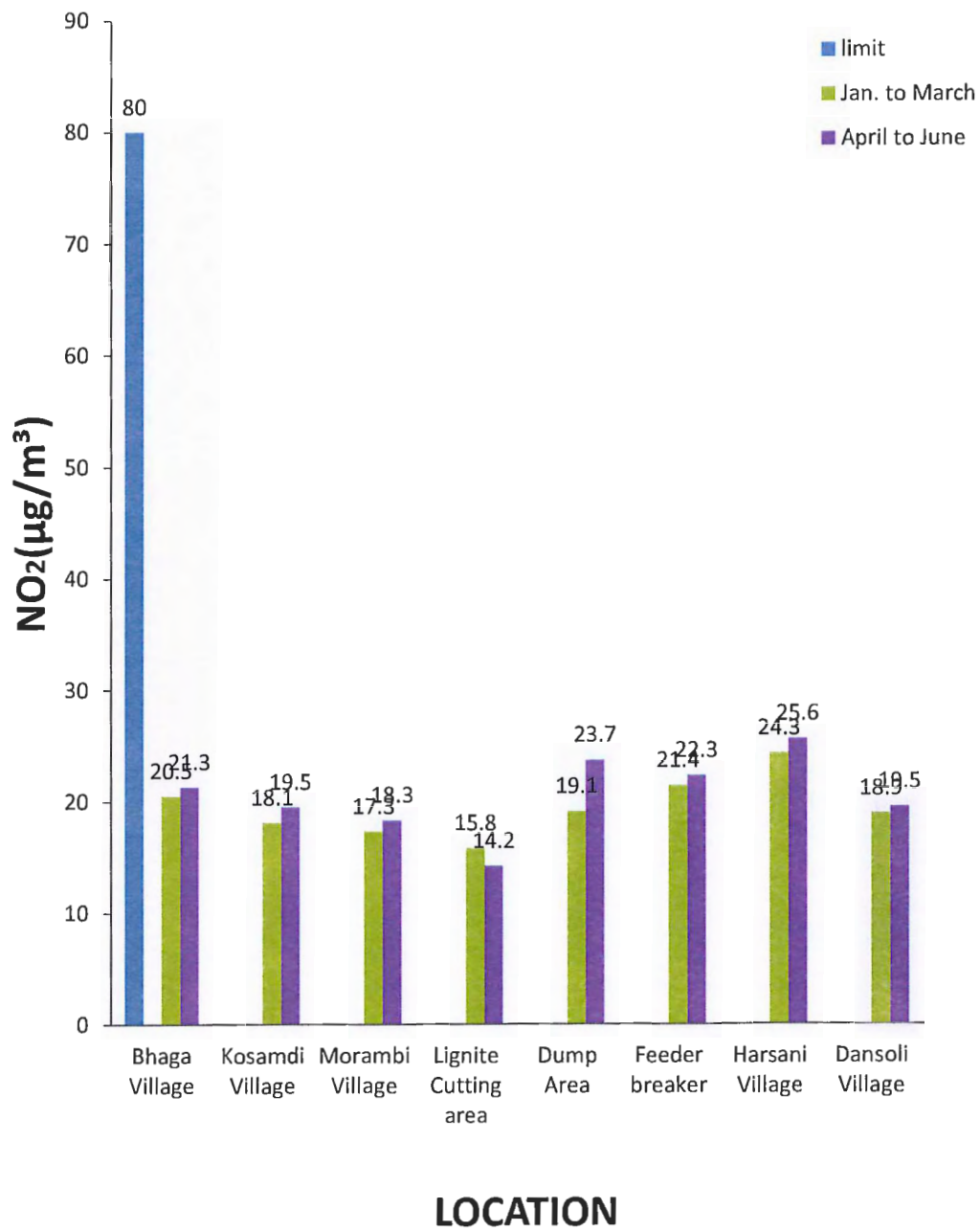
Six Monthly Variation in Ambient Air Quality Data

Parameter: NO_x (Oxides of Nitrogen)

Period: January – 2020 to June – 2020

Sr. No.	Location	Results (µg/m³)	
		Quarterly Jan to March -2020	Quarterly April to June - 2020
1	Bhaga Village	20.5	21.3
2	Kosamdi Village	18.1	19.5
3	Morambi Village	17.3	18.3
4	Lignite Cutting area	15.8	14.2
5	Dump Area	19.1	23.7
6	Feeder breaker	21.4	22.3
7	Harsani Village	24.3	25.6
8	Dansoli Village	18.9	19.5
	Limit	80	

Graphical presentation for the variation of NO₂ in Ambient Air



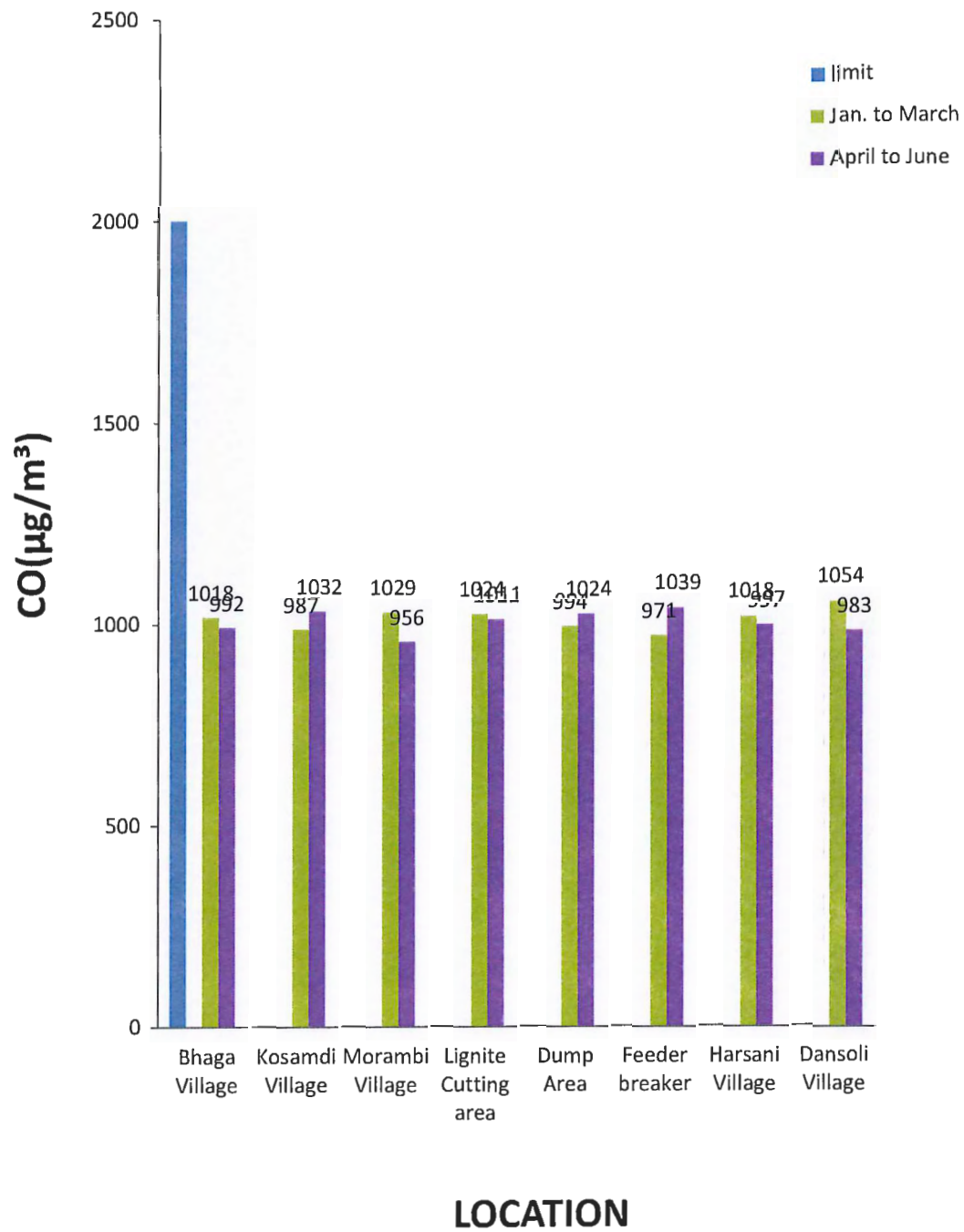
Six Monthly Variation in Ambient Air Quality Data

Parameter: CO (Carbon Monoxide)

Period: January – 2020 to June – 2020

Sr. No.	Location	Results ($\mu\text{g}/\text{m}^3$)	
		Quarterly Jan to March -2020	Quarterly April to June - 2020
1	Bhaga Village	1018	992
2	Kosamdi Village	987	1032
3	Morambi Village	1029	956
4	Lignite Cutting area	1024	1011
5	Dump Area	994	1024
6	Feeder breaker	971	1039
7	Harsani Village	1018	997
8	Dansoli Village	1054	983
	Limit	2000	

Graphical presentation for the variation of CO in Ambient Air



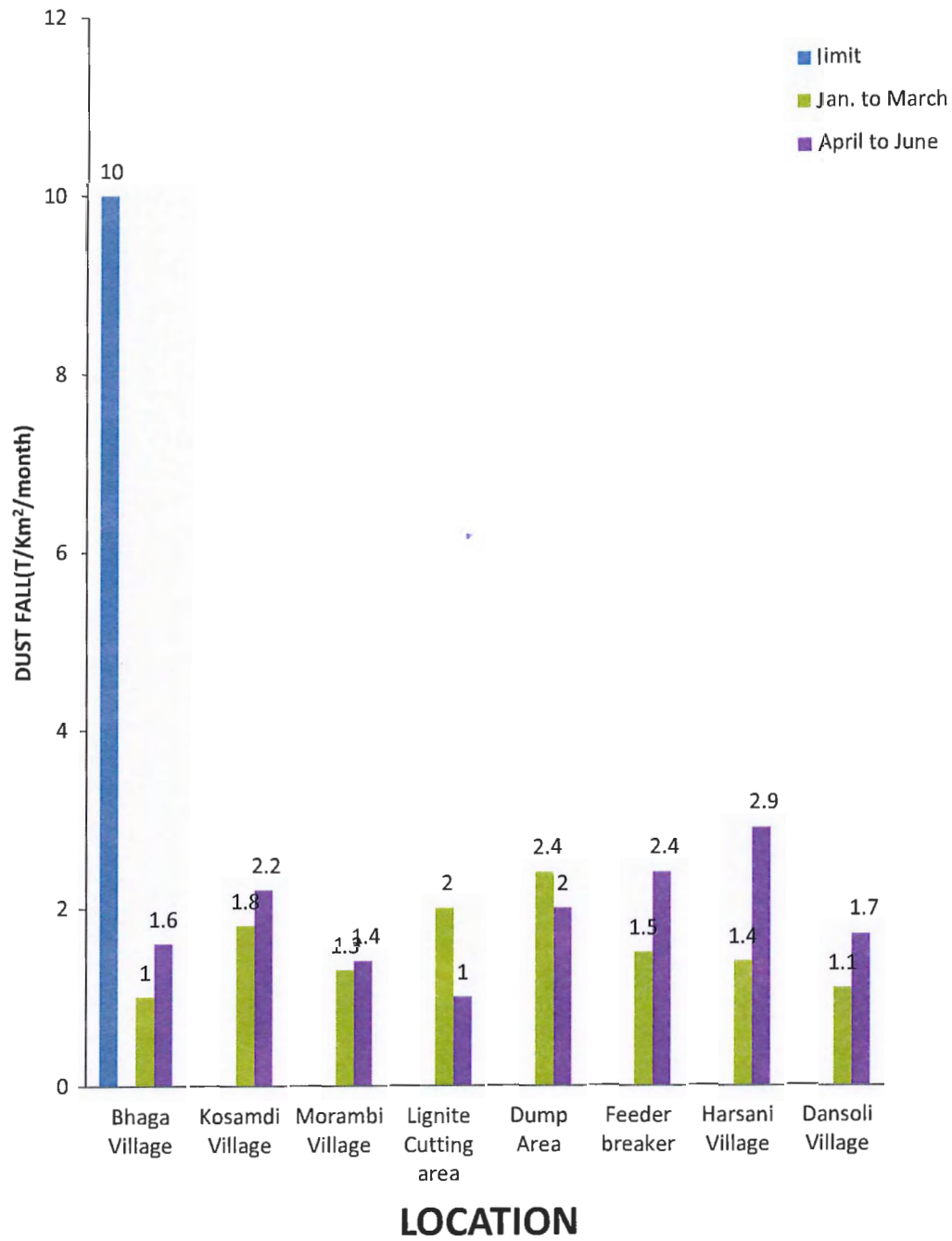
Six Monthly Variation in Ambient Air Quality Data

Parameter: Dust Fall

Period: January – 2020 to June – 2020

Sr. No.	Location	Results (T/Km ² /month)	
		Quarterly Jan to March - 2020	Quarterly April to June - 2020
1	Bhaga Village	1.0	1.6
2	Kosamdi Village	1.8	2.2
3	Morambi Village	1.3	1.4
4	Lignite Cutting area	2.0	1.0
5	Dump Area	2.4	2.0
6	Feeder breaker	1.5	2.4
7	Harsani Village	1.4	2.9
8	Dansoli Village	1.1	1.7
	Limit	10	

Graphical presentation for the variation of Dust Fall in Ambient Air



Six Monthly Variation in bore water Data

Location: Shah Nallah village bore water

Period: January – 2020 to June – 2020

Sr. No.	Parameter	Unit	Quarterly Jan to March - 2020	Quarterly April to June - 2020	MoEF Limit
1	Temperature	°C	29	28	Shall not exceed 5°c above the receiving water temp.
2	pH@ 25°C	pH unit	7.35	7.45	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	4.8	3.6	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	634	853	2100
6	Total volatile Solids	mg/L	3.8	3.3	--
7	COD	mg/L	< 10	< 10	250
8	BOD (5 days at 20° C)	mg/L	< 4	< 4	30
9	Oil & Grease	mg/L	< 1	< 1	10
10	Chloride	mg/L	122	135	1000
11	Sulphate	mg/L	55	61	300
12	Fluoride	mg/L	0.6	0.9	2.0
13	Phosphate as PO ₄ ³⁻	mg/L	1.1	1.0	--
14	Total Residual Chlorine	mg/L	< 0.1	< 0.1	1.0
15	Free Available Chlorine	mg/L	< 0.10	< 0.10	--
16	Phenolic Compound	mg/L	< 0.10	< 0.10	1.0
17	Lead	mg/L	< 0.02	< 0.02	0.1
18	Copper	mg/L	< 0.50	< 0.50	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	< 0.10	< 0.10	5.0
22	Iron	mg/L	< 0.50	< 0.50	3.0
23	Calcium	mg/L	98	104	--
24	Magnesium	mg/L	40	45	--
25	Percentage Sodium	%	33.6	35.6	--
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: Bhaga Village (Valia Block)

Period: January – 2020 to June – 2020

Sr. No.	Parameter	Unit	Quarterly Jan to March - 2020	Quarterly April to June - 2020	MoEF Limit
1	Temperature	°C	30	29	Shall not exceed 5°c above the receiving water temp
2	pH@ 25 °C	pH unit	7.27	7.33	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	2.2	2.0	100
5	Total Dissolved Solids (TDS) @180 °C	mg/L	1357	1253	2100
6	Total volatile Solids	mg/L	1.5	1.3	--
7	COD	mg/L	< 10	< 10	250
8	BOD (5 days at 20° C)	mg/L	< 4	< 4	30
9	Oil & Grease	mg/L	< 1	< 1	10
10	Chloride	mg/L	510	478	1000
11	Sulphate	mg/L	170	164	300
12	Fluoride	mg/L	0.6	0.7	2.0
13	Phosphate as PO ₄ ⁻	mg/L	1.3	1.0	--
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	< 0.10	< 0.10	1.0
17	Lead	mg/L	< 0.02	< 0.02	0.1
18	Copper	mg/L	< 0.50	< 0.50	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	< 0.10	< 0.10	5.0
22	Iron	mg/L	< 0.10	< 0.10	3.0
23	Calcium	mg/L	116	106	--
24	Magnesium	mg/L	82	79	--
25	Percentage Sodium	%	45.1	41.4	--
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: Bore Well (Charetha Village)

Period: January – 2020 to June – 2020

Sr. No.	Parameter	Unit	Quarterly Jan to March - 2020	Quarterly April to June - 2020	MoEF Limit
1	Temperature	°C	29	28	Shall not exceed 5°c above the receiving water temp
2	pH@ 25°C	pH unit	7.25	7.41	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	4.6	4.6	100
5	Total Dissolved Solids (TDS) @180 °C	mg/L	789	905	2100
6	Total volatile Solids	mg/L	2.2	2.3	--
7	COD	mg/L	< 10	< 10	250
8	BOD (5 days at 20 °C)	mg/L	< 4	< 4	30
9	Oil & Grease	mg/L	< 1	< 1	10
10	Chloride	mg/L	108	111	1000
11	Sulphate	mg/L	68	71	300
12	Fluoride	mg/L	0.6	0.8	2.0
13	Phosphate as PO ₄ ³⁻	mg/L	0.7	0.9	--
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	< 0.10	< 0.10	1.0
17	Lead	mg/L	< 0.02	< 0.02	0.1
18	Copper	mg/L	< 0.50	< 0.50	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	< 0.10	< 0.10	5.0
22	Iron	mg/L	<0.10	<0.10	3.0
23	Calcium	mg/L	90	95	--
24	Magnesium	mg/L	59	61	--
25	Percentage Sodium	%	38.3	28.4	--
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: Bore Well (Dansoli Village)

Period: January – 2020 to June – 2020

Sr. No.	Parameter	Unit	Quarterly Jan to March - 2020	Quarterly April to June - 2020	MoEF Limit
1	Temperature	°C	30	28	Shall not exceed 5°c above the receiving water temp
2	pH@ 25°C	pH unit	7.5	7.3	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	5.3	5.0	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	1409	1532	2100
6	Total volatile Solids	mg/L	3.4	3.1	--
7	COD	mg/L	< 10	< 10	250
8	BOD (5 days at 20° C)	mg/L	< 4	< 4	30
9	Oil & Grease	mg/L	< 1	< 1	10
10	Chloride	mg/L	614	624	1000
11	Sulphate	mg/L	163	165	300
12	Fluoride	mg/L	1.1	1.0	2.0
13	Phosphate as PO ₄ ³⁻	mg/L	1.2	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	< 0.10	< 0.10	1.0
17	Lead	mg/L	< 0.02	< 0.02	0.1
18	Copper	mg/L	< 0.50	< 0.50	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	< 0.10	< 0.10	5.0
22	Iron	mg/L	< 0.10	< 0.10	3.0
23	Calcium	mg/L	81	85	--
24	Magnesium	mg/L	50	53	--
25	Percentage Sodium	%	53.4	52.1	--
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: Harsani Village

Period: January – 2020 to June – 2020

Sr. No.	Parameter	Unit	Quarterly Jan to March - 2020	Quarterly April to June - 2020	MoEF Limit
1	Temperature	°C	30	29	Shall not exceed 5°c above the receiving water temp
2	pH@ 25°C	pH unit	7.43	7.32	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	5.3	5.3	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	1247	1325	2100
6	Total volatile Solids	mg/L	2.3	2.0	--
7	COD	mg/L	< 10	< 10	250
8	BOD (5 days at 20° C)	mg/L	< 4	< 4	30
9	Oil & Grease	mg/L	< 1	< 1	10
10	Chloride	mg/L	245	251	1000
11	Sulphate	mg/L	49	53	300
12	Fluoride	mg/L	0.8	1.0	2.0
13	Phosphate as PO ₄ ³⁻	mg/L	1.0	1.1	--
14	Total Residual Chlorine	mg/L	< 0.1	< 0.1	1.0
15	Free Available Chlorine	mg/L	< 0.10	< 0.10	--
16	Phenolic Compound	mg/L	<0.10	<0.10	1.0
17	Lead	mg/L	< 0.02	< 0.02	0.1
18	Copper	mg/L	< 0.50	< 0.50	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	<0.10	<0.10	3.0
23	Calcium	mg/L	179	160	--
24	Magnesium	mg/L	89	89	--
25	Percentage Sodium	%	43.8	42.3	--
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: Bore Well (Kosambdi Village)

Period: January – 2020 to June – 2020

Sr. No.	Parameter	Unit	Quarterly Jan to March - 2020	Quarterly April to June - 2020	MoEF Limit
1	Temperature	°C	30	28	Shall not exceed 5°c above the receiving water temp
2	pH@ 25°C	pH unit	7.26	7.33	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	2.5	2.1	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	1682	1549	2100
6	Total volatile Solids	mg/L	1.3	1.0	--
7	COD	mg/L	< 10	< 10	250
8	BOD (5 days at 20° C)	mg/L	< 4	< 4	30
9	Oil & Grease	mg/L	< 1	< 1	10
10	Chloride	mg/L	902	854	1000
11	Sulphate	mg/L	159	151	300
12	Fluoride	mg/L	0.4	0.8	2.0
13	Phosphate as PO ₄ ³⁻	mg/L	1.3	1.5	--
14	Total Residual Chlorine	mg/L	< 0.1	< 0.1	1.0
15	Free Available Chlorine	mg/L	< 0.10	< 0.10	--
16	Phenolic Compound	mg/L	< 0.10	< 0.10	1.0
17	Lead	mg/L	< 0.02	< 0.02	0.1
18	Copper	mg/L	< 0.50	< 0.50	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	< 0.10	< 0.10	5.0
22	Iron	mg/L	< 0.10	< 0.10	3.0
23	Calcium	mg/L	139	145	--
24	Magnesium	mg/L	80	84	--
25	Percentage Sodium	%	23.4	30.4	--
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: Bore Water (Anoi Village)

Period: January – 2020 to June – 2020

Sr. No.	Parameter	Unit	Quarterly Jan to March - 2020	Quarterly April to June - 2020	MoEF Limit
1	Temperature	°C	29	28	Shall not exceed 5°c above the receiving water temp
2	pH@ 25°C	pH unit	7.39	7.43	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	1.6	1.3	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	1507	1425	2100
6	Total volatile Solids	mg/L	2.0	1.5	--
7	COD	mg/L	< 10	< 10	250
8	BOD (5 days at 20° C)	mg/L	< 4	< 4	30
9	Oil & Grease	mg/L	< 1	< 1	10
10	Chloride	mg/L	580	572	1000
11	Sulphate	mg/L	125	120	300
12	Fluoride	mg/L	0.5	0.3	2.0
13	Phosphate as PO ₄ ³⁻	mg/L	1.0	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	< 0.02	< 0.02	0.1
18	Copper	mg/L	< 0.5	< 0.5	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	< 0.1	< 0.1	3.0
23	Calcium	mg/L	106	98	--
24	Magnesium	mg/L	38	36	--
25	Percentage Sodium	%	25.4	23.1	--
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: Mine Water Sump – 1 (Vastan Village)

Period: January – 2020 to June – 2020

Sr. No.	Parameter	Unit	Quarterly Jan to March - 2020	Quarterly April to June - 2020	MoEF Limit
1	Temperature	°C	30	29	Shall not exceed 5°c above the receiving water temp
2	pH@ 25 °C	pH unit	7.35	7.41	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	5.4	5.0	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	1085	1231	2100
6	Total volatile Solids	mg/L	4.3	4.0	--
7	COD	mg/L	< 10	< 10	250
8	BOD (5 days at 20° C)	mg/L	< 4	< 4	30
9	Oil & Grease	mg/L	< 1	< 1	10
10	Chloride	mg/L	329	335	1000
11	Sulphate	mg/L	81	84	300
12	Fluoride	mg/L	0.6	0.7	2.0
13	Phosphate as PO ₄ ³⁻	mg/L	0.7	1.0	--
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	< 0.10	< 0.10	1.0
17	Lead	mg/L	< 0.02	< 0.02	0.1
18	Copper	mg/L	< 0.50	< 0.50	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	< 0.10	< 0.10	5.0
22	Iron	mg/L	< 0.50	< 0.50	3.0
23	Calcium	mg/L	91	103	--
24	Magnesium	mg/L	39	42	--
25	Percentage Sodium	%	42.7	40.3	--
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

Period: January – 2020 to June – 2020

Sr. No.	Parameter	Unit	Quarterly Jan to March - 2020	Quarterly April to June - 2020	MoEF Limit
1	Temperature	°C	30	29	Shall not exceed 5°c above the receiving water temp
2	pH@ 25 °C	pH unit	7.31	7.43	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	2.7	2.2	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	846	945	2100
6	Total volatile Solids	mg/L	3.9	3.0	--
7	COD	mg/L	< 10	< 10	250
8	BOD (5 days at 20 °C)	mg/L	< 4	< 4	30
9	Oil & Grease	mg/L	< 1	< 1	10
10	Chloride	mg/L	151	161	1000
11	Sulphate	mg/L	83	91	300
12	Fluoride	mg/L	0.8	1.0	2.0
13	Phosphate as PO ₄ ³⁻	mg/L	1.2	1.4	--
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	< 0.10	< 0.10	1.0
17	Lead	mg/L	< 0.02	< 0.02	0.1
18	Copper	mg/L	< 0.50	< 0.50	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	< 0.10	< 0.10	5.0
22	Iron	mg/L	< 0.10	< 0.10	3.0
23	Calcium	mg/L	95	112	--
24	Magnesium	mg/L	56	61	--
25	Percentage Sodium	%	45	46.1	--
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: Bore water (Mangrol Village)

Period: January – 2020 to June – 2020

Sr. No.	Parameter	Unit	Quarterly Jan to March - 2020	Quarterly April to June - 2020	MoEF Limit
1	Temperature	°C	30	28	Shall not exceed 5°C above the receiving water temp
2	pH@ 25 °C	pH unit	7.27	7.54	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105°C	mg/L	2.2	4.7	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	1357	1145	2100
6	Total volatile Solids	mg/L	1.5	2.1	--
7	COD	mg/L	< 10	< 10	250
8	BOD (5 days at 20 °C)	mg/L	< 4	< 4	30
9	Oil & Grease	mg/L	< 1	< 1	10
10	Chloride	mg/L	510	208	1000
11	Sulphate	mg/L	170	112	300
12	Fluoride	mg/L	0.6	0.8	2.0
13	Phosphate as PO ₄ ³⁻	mg/L	1.3	1.0	--
14	Total Residual Chlorine	mg/L	< 0.1	< 0.1	1.0
15	Free Available Chlorine	mg/L	< 0.1	< 0.10	--
16	Phenolic Compound	mg/L	< 0.10	< 0.10	1.0
17	Lead	mg/L	< 0.02	< 0.02	0.1
18	Copper	mg/L	< 0.50	< 0.50	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	< 0.10	< 0.10	5.0
22	Iron	mg/L	< 0.10	< 0.10	3.0
23	Calcium	mg/L	116	111	--
24	Magnesium	mg/L	82	51	--
25	Percentage Sodium	%	45.1	45.7	--
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: Bore Well (Mosali Village)

Period: January – 2020 to June – 2020

Sr. No.	Parameter	Unit	Quarterly Jan to March - 2020	Quarterly April to June - 2020	MoEF Limit
1	Temperature	°C	29	29	Shall not exceed 5°c above the receiving water temp
2	pH@ 25 °C	pH unit	7.33	7.56	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105 °C	mg/L	2.9	2.0	100
5	Total Dissolved Solids (TDS) @180 °C	mg/L	1429	1534	2100
6	Total volatile Solids	mg/L	2.8	2.3	--
7	COD	mg/L	< 10	< 10	250
8	BOD (5 days at 20 °C)	mg/L	< 4	< 4	30
9	Oil & Grease	mg/L	< 1	< 1	10
10	Chloride	mg/L	701	767	1000
11	Sulphate	mg/L	181	186	300
12	Fluoride	mg/L	0.6	0.8	2.0
13	Phosphate as PO ₄ ³⁻	mg/L	1.3	1.2	--
14	Total Residual Chlorine	mg/L	< 0.10	< 0.10	1.0
15	Free Available Chlorine	mg/L	< 0.10	< 0.10	--
16	Phenolic Compound	mg/L	< 0.10	< 0.10	1.0
17	Lead	mg/L	< 0.02	< 0.02	0.1
18	Copper	mg/L	< 0.50	< 0.50	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	< 0.10	< 0.10	5.0
22	Iron	mg/L	< 0.10	< 0.10	3.0
23	Calcium	mg/L	133	137	--
24	Magnesium	mg/L	50	57	--
25	Percentage Sodium	%	43.4	41.5	--
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

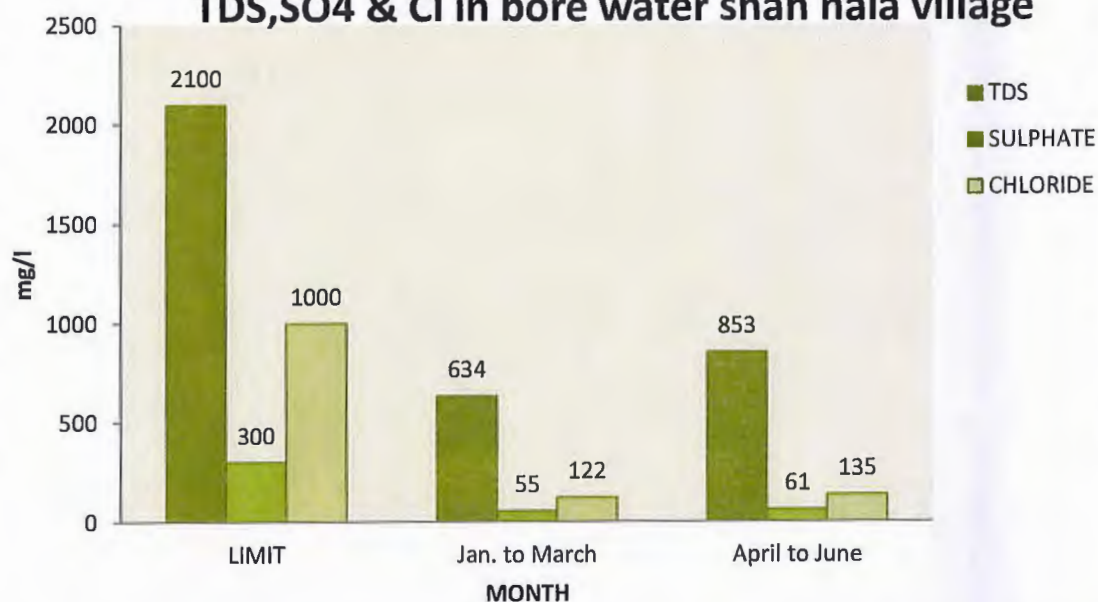
Six Monthly Variation in bore water Data

Location: Pond Water (Shah Nala Village)

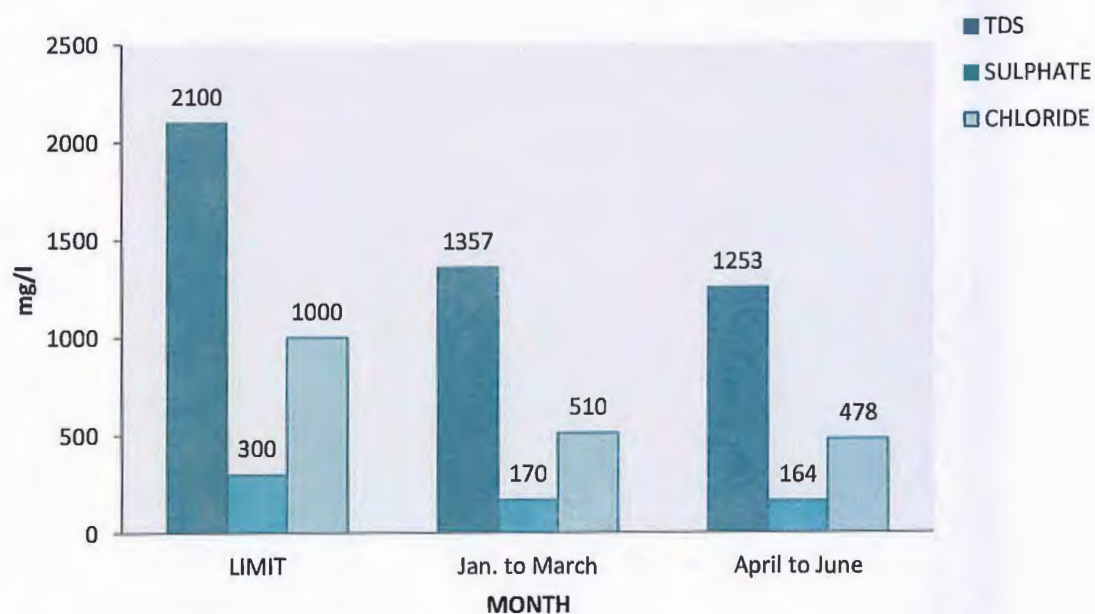
Period: January – 2020 to June – 2020

Sr. No.	Parameter	Unit	Quarterly Jan to March - 2020	Quarterly April to June - 2020	MoEF Limit
1	Temperature	°C	29	29	Shall not exceed 5°c above the receiving water temp
2	pH@ 25°C	pH unit	7.38	7.43	5.5-9.0
3	Colour	pt. Co. Scale	< 5	< 5	--
4	Total Suspended Solids (TSS) @105°C	mg/L	4.9	4.4	100
5	Total Dissolved Solids (TDS) @180° C	mg/L	1036	1231	2100
6	Total volatile Solids	mg/L	3.7	3.3	--
7	COD	mg/L	< 10	< 10	250
8	BOD (5 days at 20° C)	mg/L	< 4	< 4	30
9	Oil & Grease	mg/L	< 1	< 1	10
10	Chloride	mg/L	290	297	1000
11	Sulphate	mg/L	111	116	300
12	Fluoride	mg/L	0.9	0.7	2.0
13	Phosphate as PO ₄ ³⁻	mg/L	1.3	1.1	--
14	Total Residual Chlorine	mg/L	< 0.10	< 0.10	1.0
15	Free Available Chlorine	mg/L	< 0.10	< 0.10	--
16	Phenolic Compound	mg/L	< 0.10	< 0.10	1.0
17	Lead	mg/L	< 0.02	< 0.02	0.1
18	Copper	mg/L	< 0.50	< 0.50	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	< 0.10	< 0.10	5.0
22	Iron	mg/L	< 0.10	< 0.10	3.0
23	Calcium	mg/L	137	141	--
24	Magnesium	mg/L	58	61	--
25	Percentage Sodium	%	59.4	44.3	--
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

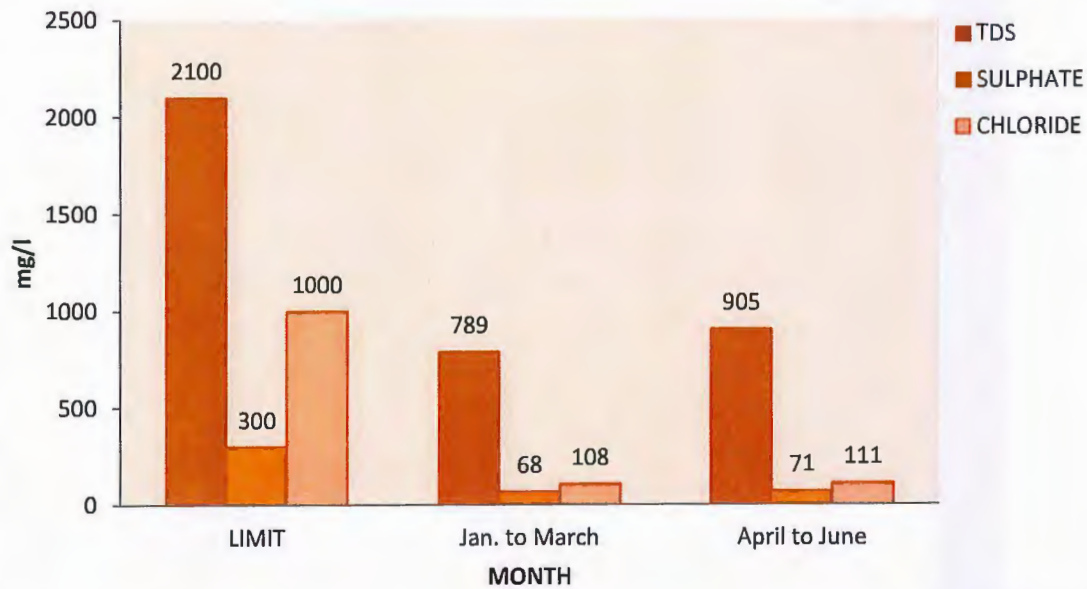
Graphical presentation for the variation of TDS,SO4 & Cl in bore water shah nala village



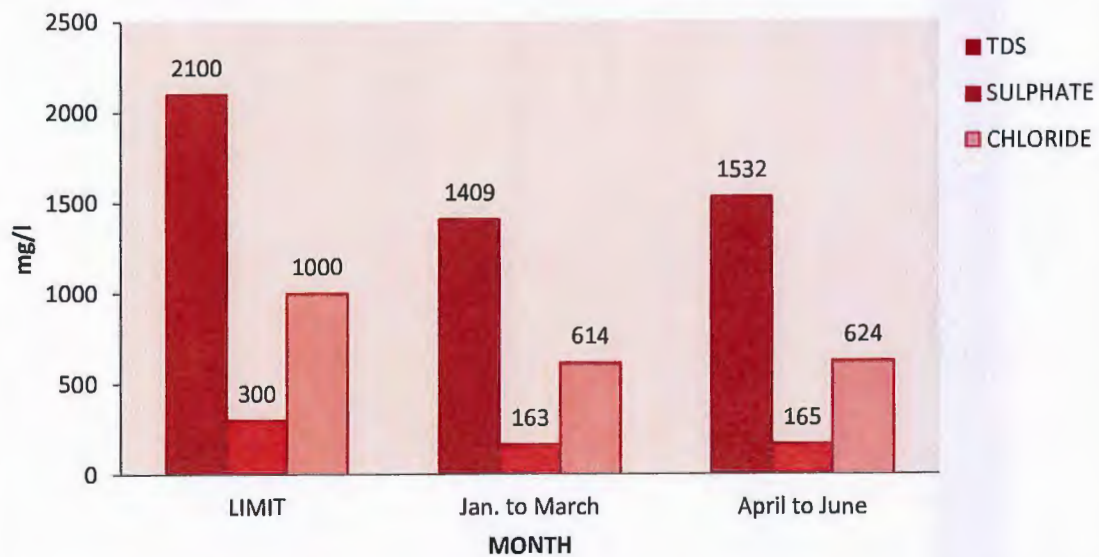
Graphical presentation for the variation of TDS,SO4 & Cl in bore water in Bhaga village



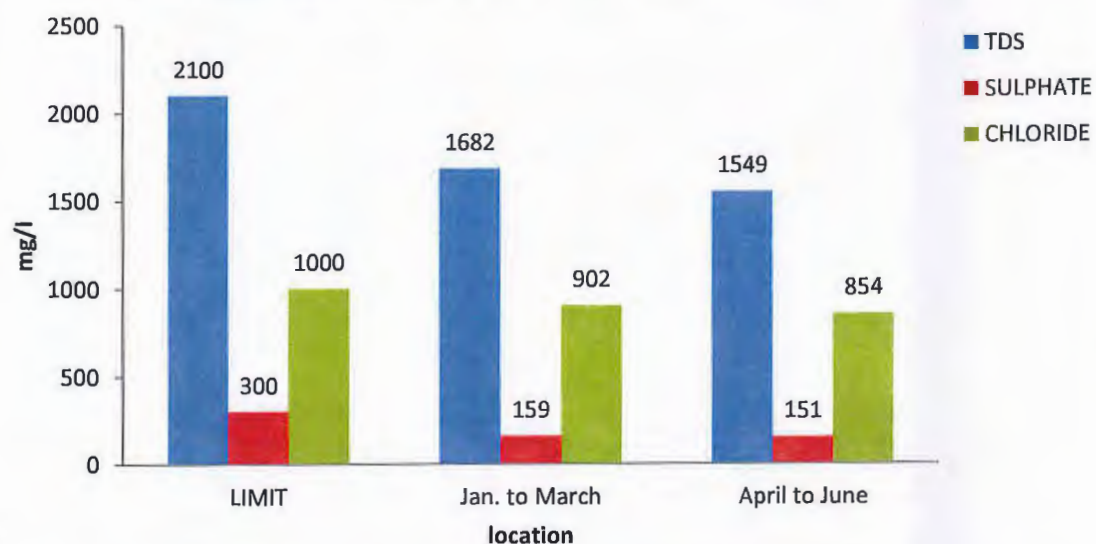
Graphical presentation for the variation of TDS,SO4 & Cl in bore water cheratha village



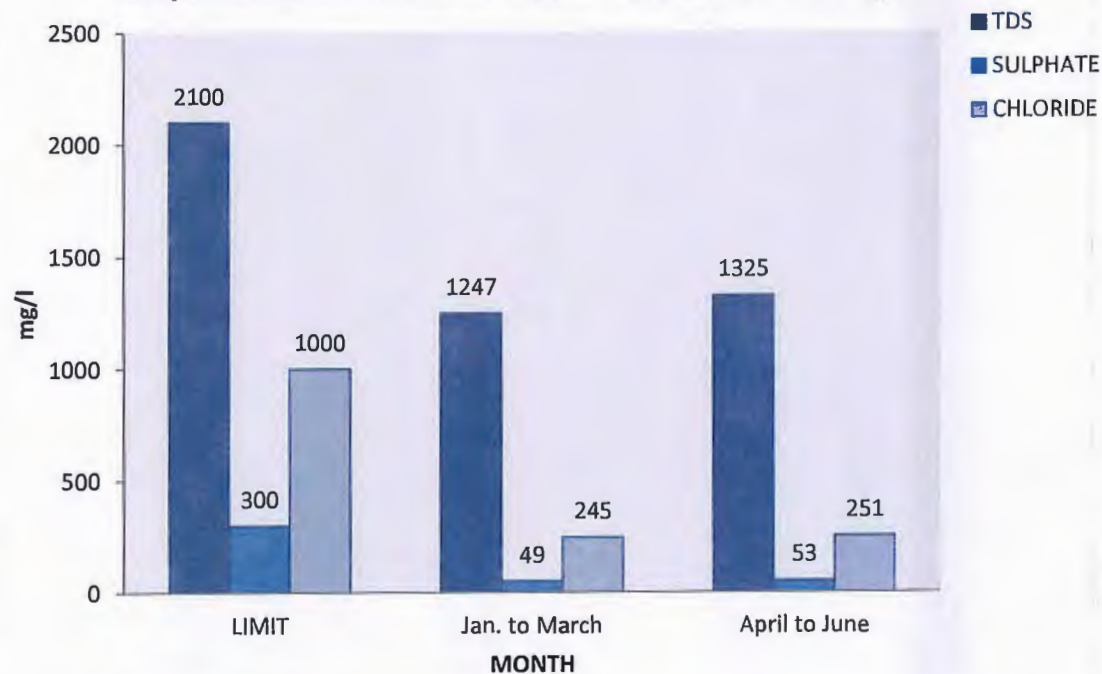
Graphical presentation for the variation of TDS,SO4 & Cl in bore water Near Dansolivillage



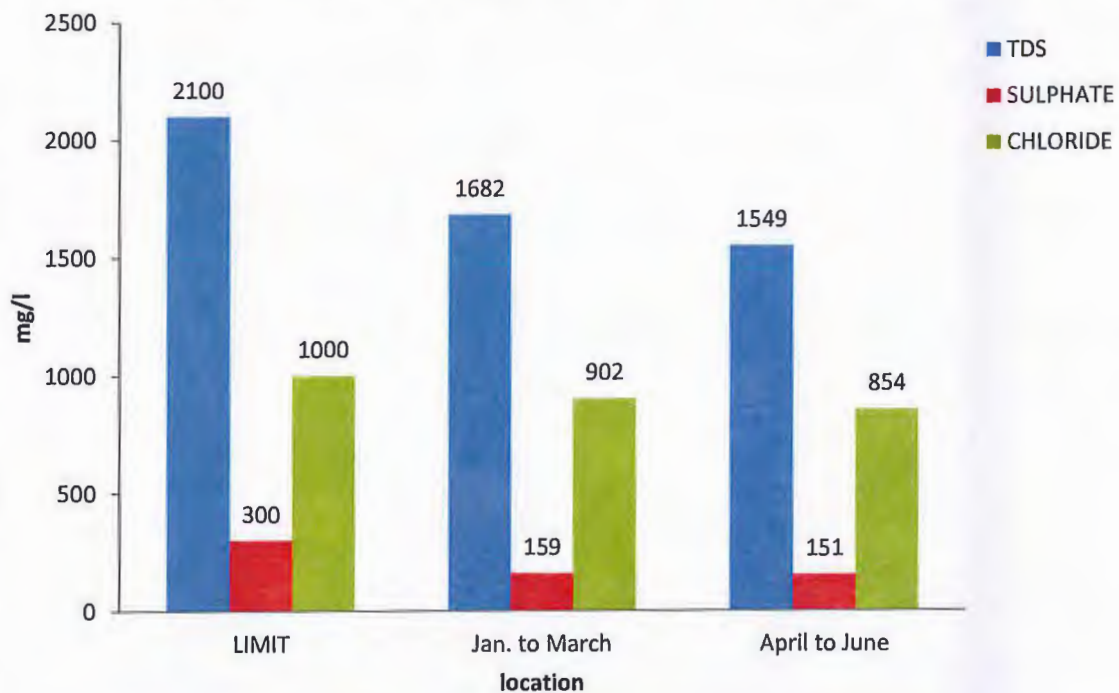
Graphical presentation for the variation of TDS,SO4 & Cl in bore water Kosambadi village



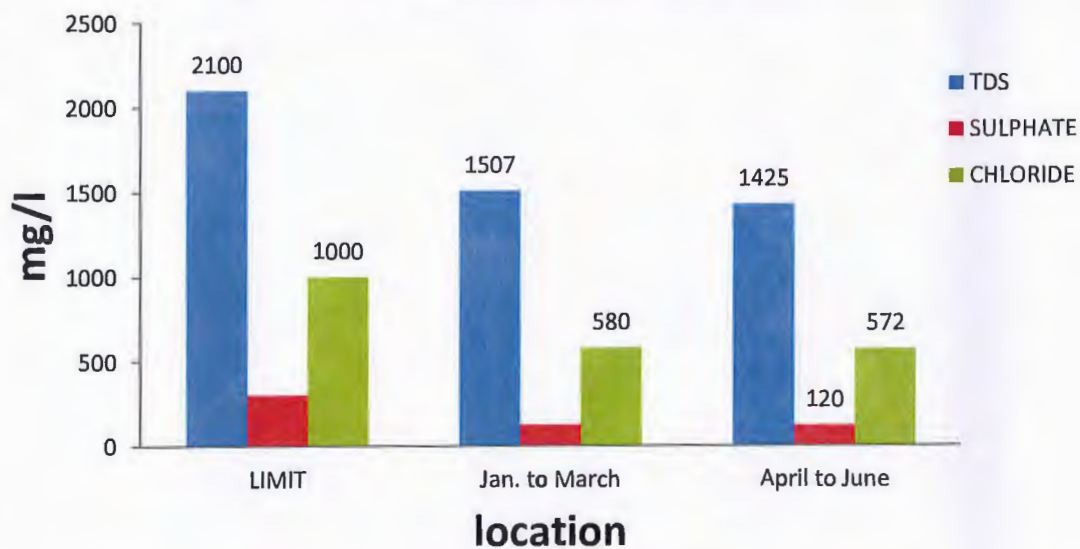
Graphical presentation for the variation of TDS,SO4 & Cl in bore water Harsani village



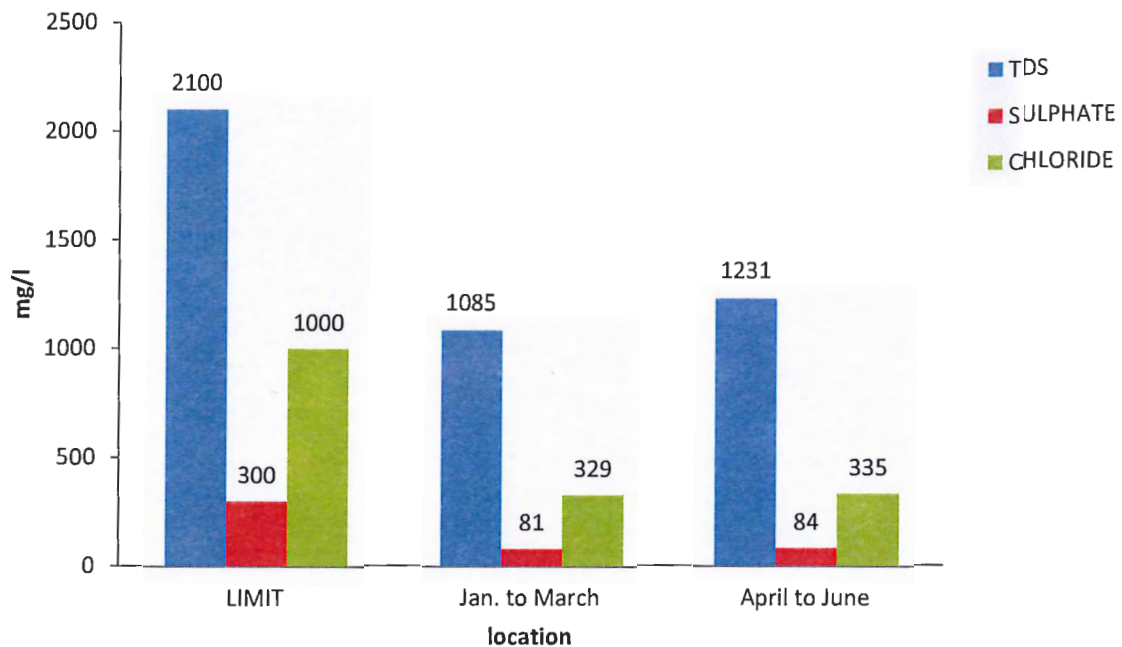
Graphical presentation for the variation of TDS,SO4 & Cl in bore water Kosambadi village



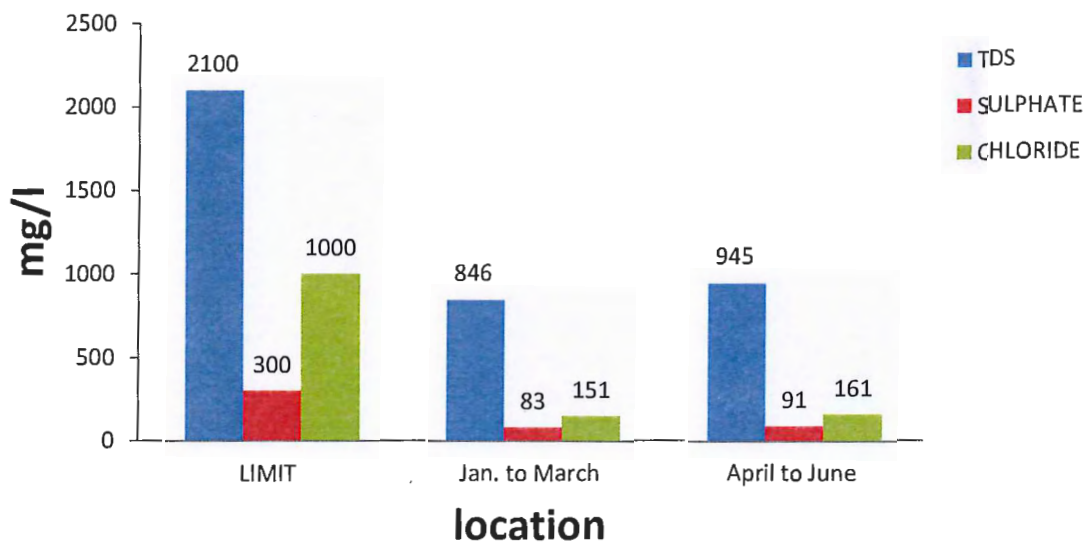
Graphical presentation for the variation of TDS,SO4 & Cl in bore water Anoi village



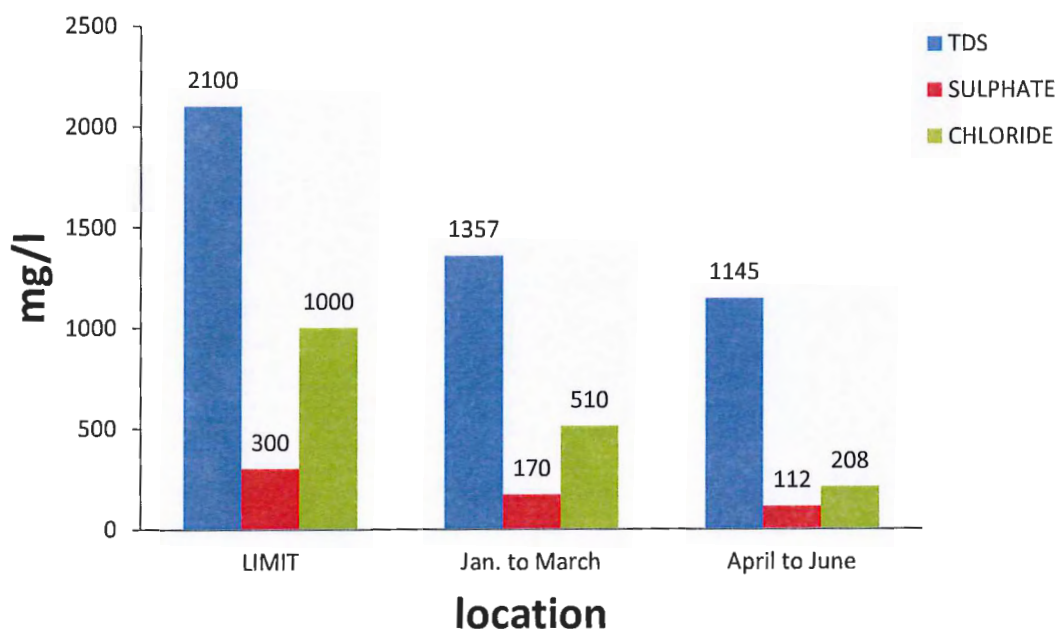
Graphical presentation for the variation of TDS,SO4 & Cl in bore water Mine water sump 1



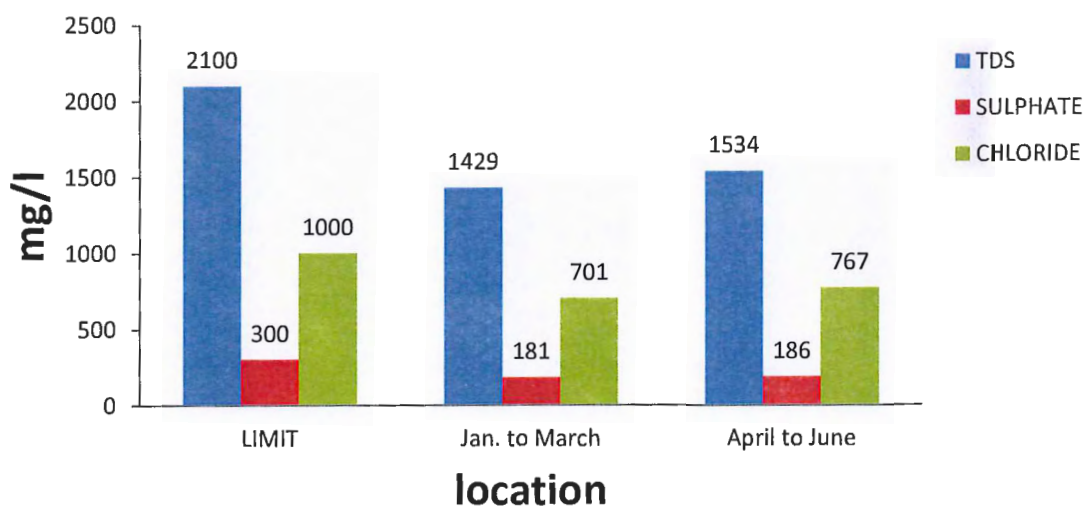
Graphical presentation for the variation of TDS,SO4 & Cl in bore water Mine water sump 2



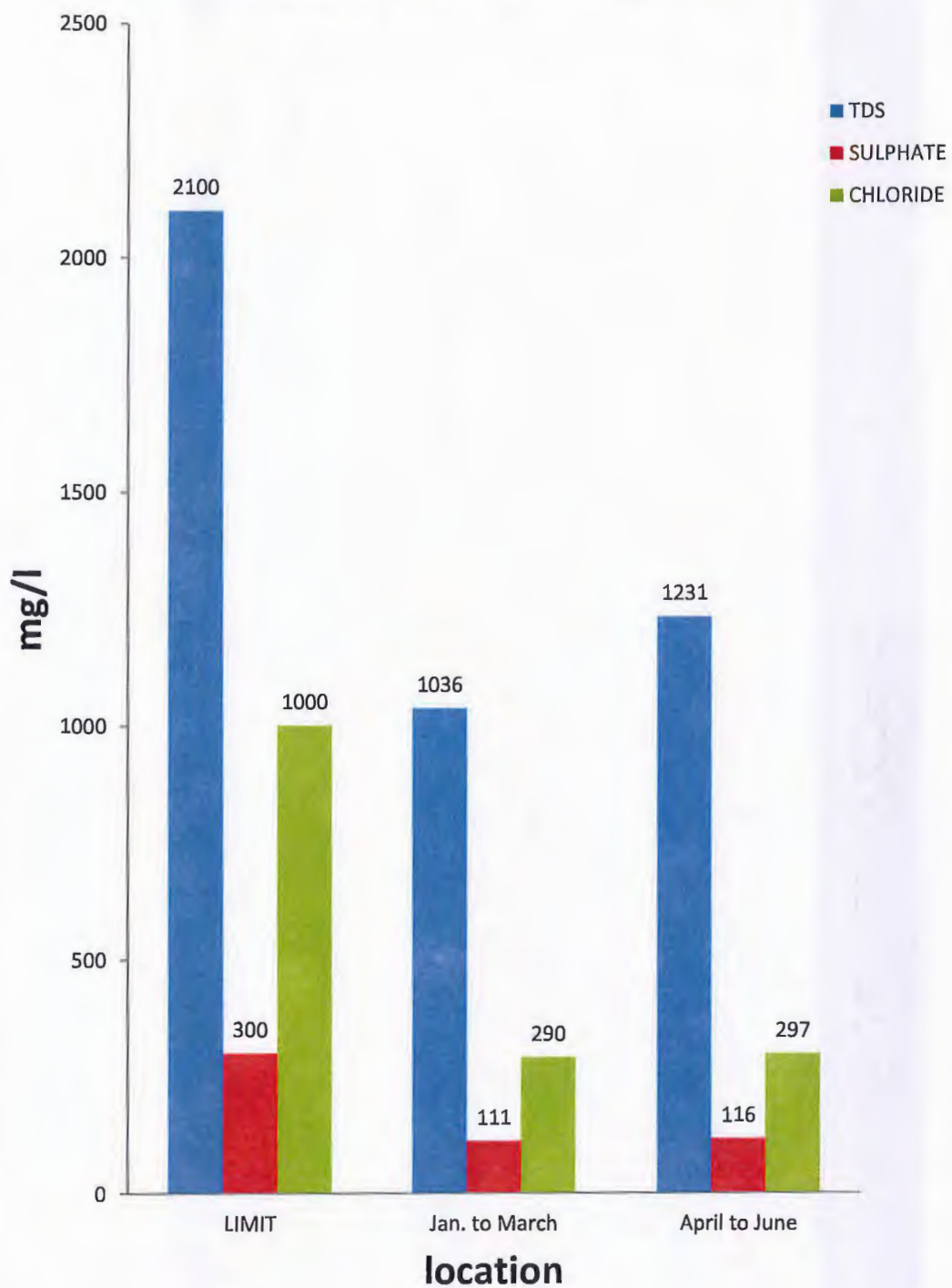
Graphical presentation for the variation of TDS,SO4 & Cl in bore water Mangrol village



Graphical presentation for the variation of TDS,SO4 & Cl in bore water Mosali village



Graphical presentation for the variation of TDS,SO4 & Cl in bore water Shah nala village



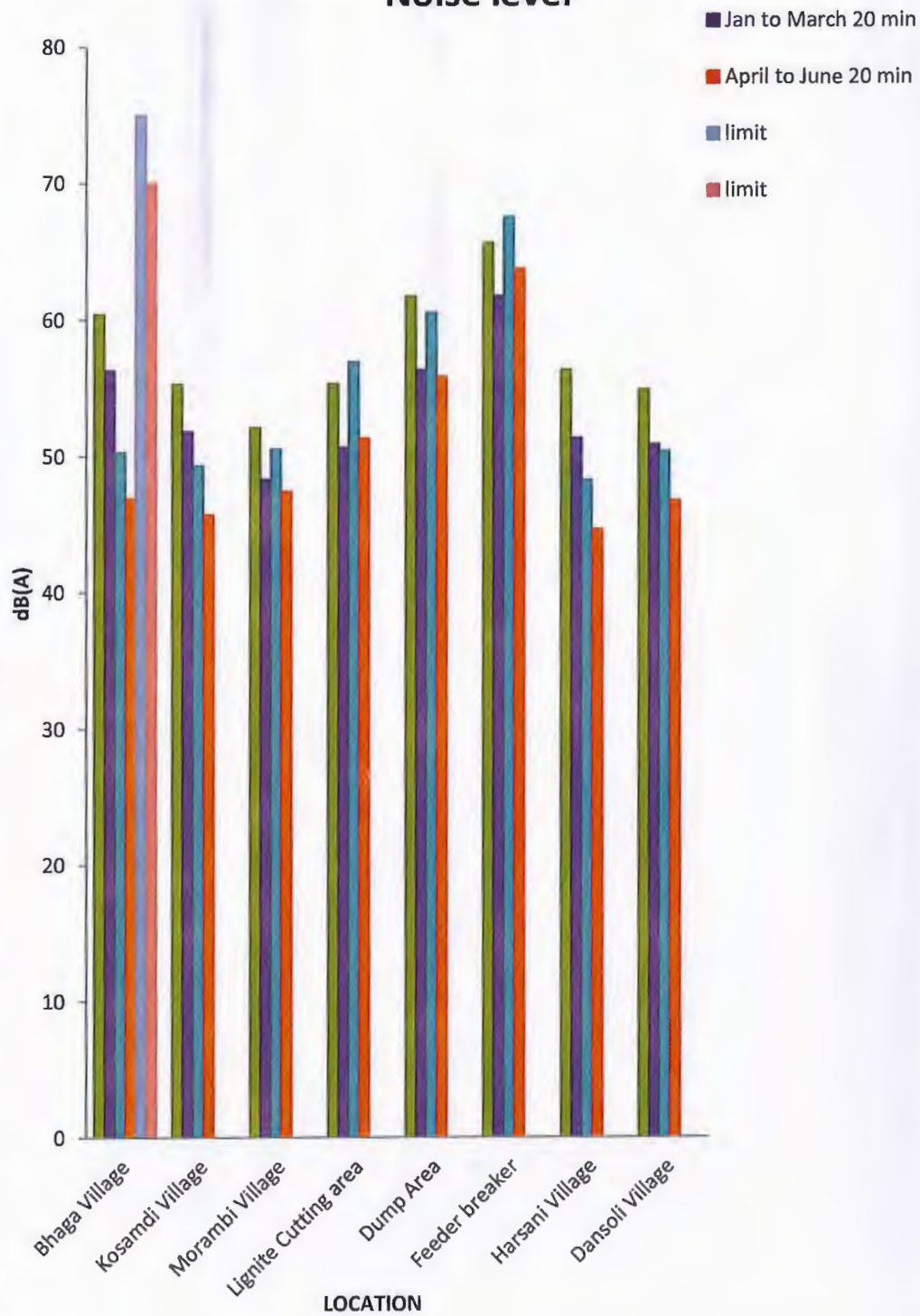
Six Monthly Variations in Noise Level Data

Parameter: Noise

Period: January – 2020 to June – 2020

SR. NO.	LOCATION	NOISE LEVEL, dB [A]							
		Quarterly Jan to March - 2020				Quarterly April to June - 2020			
		DAY Time		Night Time		DAY Time		Night Time	
		Max	Min	Max	Min	Max	Min	Max	Min
1	Bhaga Village	60.4	56.3	59.7	54.1	50.3	46.9	59.7	56.7
2	Kosamadi Village	55.3	51.8	56.3	51.2	49.3	45.7	56.3	52.4
3	Morambi Village	52.1	48.3	50.7	45.9	50.5	47.4	50.7	46.9
4	Lignite Cutting Area	55.3	50.6	54.3	50.2	56.9	51.3	54.3	51.3
5	Dump Area	61.7	56.3	60.3	56.7	60.5	55.8	60.3	56.9
6	Feeder Breaker	65.6	61.7	64.1	60.3	67.5	63.7	64.1	61.0
7	Harsani Village	56.3	51.3	55.3	51.7	48.2	44.6	55.3	52.3
8	Dansoli Village	54.8	50.8	53.1	49.3	50.3	46.7	53.1	50.6
	GPCB limit	75 (dB)		70(dB)		75 (dB)		70(dB)	

Graphical presentation for the variation of in Noise level



Six Monthly Variations in Micro-meteorological data

Period: January – 2020 to June – 2020

Dry Bulb Temperature (°C)		
Time in Hrs.	Quarterly Jan to March - 2020	Quarterly April to June - 2020
10.00	26.5	32.6
11.00	28.5	33.8
12.00	31.0	34.7
13.00	31.2	32.6
14.00	31.7	31.9
15.00	31.4	33.1
16.00	30.9	32.4
17.00	29.4	32.0
18.00	28.7	31.7
19.00	27.6	30.7
20.00	26.5	29.1
21.00	25.3	29.6
22.00	24.8	27.8
23.00	24.0	26.1
00.00	23.1	26.6
01.00	22.8	27.0
02.00	22.9	27.4
03.00	22.5	27.1
04.00	23.4	27.9
05.00	23.8	28.0
06.00	23.9	28.9
07.00	24.9	29.6
08.00	25.6	30.4
09.00	27.8	31.1
Maximum	31.7	34.7
Minimum	22.5	26.1
Average	26.6	30.1

Six Monthly Variations in Micrometeorological data

Period : January – 2020 to June – 2020

Wet Bulb Temperature ($^{\circ}\text{C}$)		
Time in Hrs.	Quarterly Jan to March - 2020	Quarterly April to June - 2020
10.00	22.5	28.4
11.00	23.4	29.0
12.00	25.8	32.6
13.00	26.4	30.1
14.00	27.0	28.9
15.00	27.3	31.4
16.00	26.9	30.0
17.00	26.0	31.3
18.00	25.1	27.5
19.00	24.6	28.5
20.00	24.0	27.9
21.00	23.5	27.0
22.00	22.5	25.2
23.00	21.3	24.1
00.00	20.3	24.0
01.00	19.7	25.4
02.00	19.0	25.0
03.00	19.4	25.2
04.00	20.5	25.8
05.00	20.9	25.9
06.00	20.1	25.0
07.00	22.6	26.8
08.00	24.7	27.9
09.00	25.6	28.9
Maximum	27.3	32.6
Minimum	19.0	24.0
Average	23.3	27.6

Six Monthly Variations in Micrometeorological data

Period : January – 2020 to June – 2020

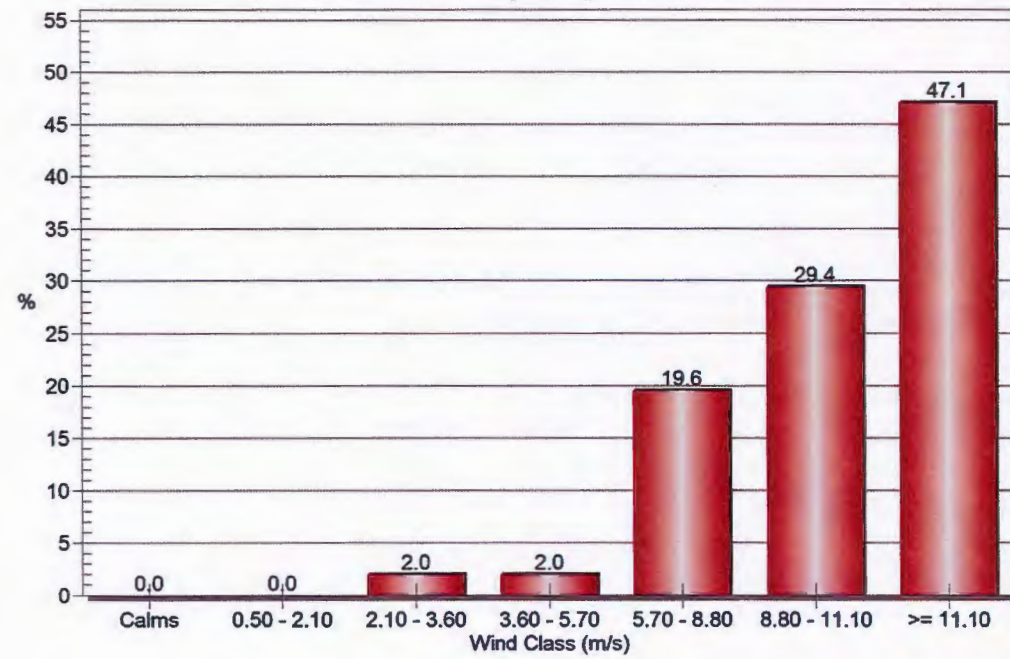
Relative Humidity %		
Time in Hrs.	Quarterly Jan to March - 2020	Quarterly April to June - 2020
10.00	55.4	64.3
11.00	42.1	61.3
12.00	34.3	60.0
13.00	33.8	59.2
14.00	32.1	61.4
15.00	32.0	62.0
16.00	32.5	61.0
17.00	32.4	65.4
18.00	32.5	70.0
19.00	34.5	72.6
20.00	37.4	75.8
21.00	38.4	80.6
22.00	40.1	82.7
23.00	45.6	84.2
00.00	47.5	86.7
01.00	48.9	84.1
02.00	49.2	83.9
03.00	50.3	83.1
04.00	47.3	80.9
05.00	45.3	78.4
06.00	42.7	77.8
07.00	40.7	70.8
08.00	35.6	68.4
09.00	34.5	64.5
Maximum	55.4	72.5
Minimum	32.0	86.7
Average	40.5	59.2

Six Monthly Variations in Micrometeorological data

Period : January – 2020 to June – 2020

Wind Speed (km/hour)		
Time in Hrs.	Quarterly Jan to March - 2020	Quarterly April to June - 2020
10.00	3	15
11.00	5	16
12.00	10	18
13.00	16	21
14.00	17	22
15.00	17	22
16.00	15	19
17.00	13	21
18.00	11	25
19.00	10	23
20.00	8	22
21.00	8	20
22.00	9	16
23.00	10	18
00.00	10	14
01.00	9	12
02.00	8	10
03.00	7	11
04.00	7	9
05.00	8	8
06.00	8	8
07.00	7	10
08.00	9	12
09.00	9	11
Maximum	17	25
Minimum	3	8
Average	9.8	16

Wind Class Frequency Distribution

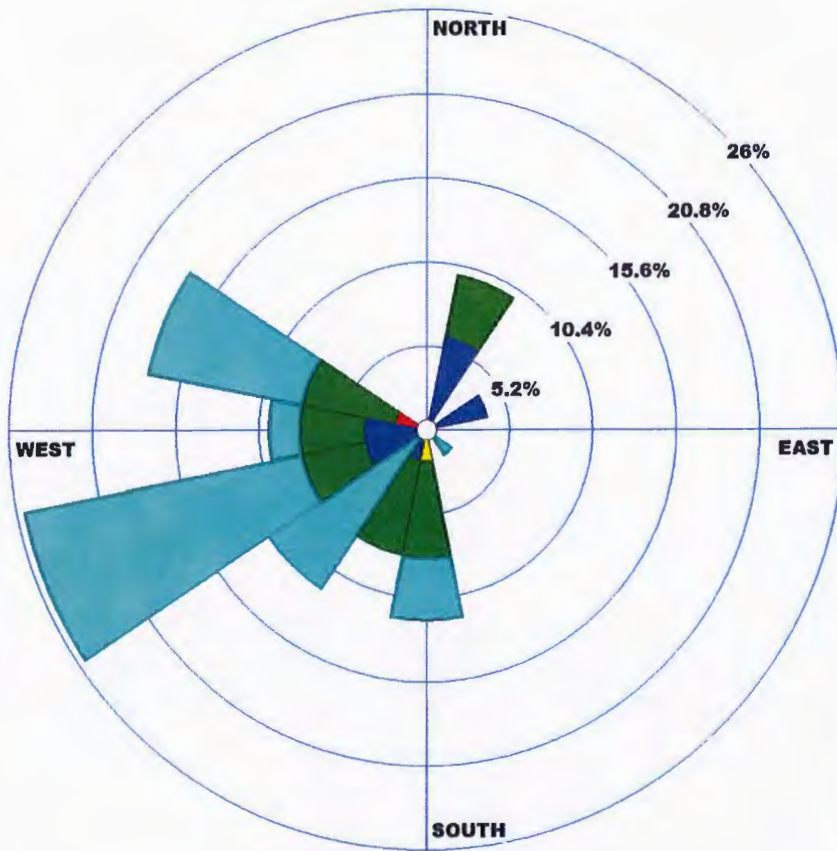


WIND ROSE PLOT:

M/s. Gujarat Industries Power Company Limited
Valia and Mangrol Lignite Mines

DISPLAY:

Wind Speed
Direction (blowing from)



WIND SPEED
(m/s)

- >= 11.10
- 8.80 - 11.10
- 5.70 - 8.80
- 3.60 - 5.70
- 2.10 - 3.60
- 0.50 - 2.10

Calms: 0.00%

COMMENTS:

DATA PERIOD:

Start Date: 22-08-2019 - 10:00
End Date: 13-08-2020 - 09:00

COMPANY NAME:

M/s. Gujarat Industries Power Company Limited

MODELER:

**M/s. Ecosystem Resource
Management Pvt. Ltd.**

CALM WINDS:

0.00%

TOTAL COUNT:

51 hrs.

AVG. WIND SPEED:

12.86 m/s

DATE:

25-08-2020

PROJECT NO.: