ENVIRONMENTAL QUALITY MONITORING REPORT

WINTER 2017-18

M/S HINDALCO INDUSTRIES LIMITED

DHANGARWADI BAUXITE MINE

DHANGARWADI VILLAGE,
SAHUWADI TALUK,

KOLHAPUR DISTRICT,
MAHARASHTRA

AWI IN 2570993

BHAGAVATHI ANA LABS

PREPARED BY

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PREFACE

Environmental quality monitoring at **Dhangarwadi bauxite mine** situated at Dhangarwadi village, Shahuwadi taluka, Kolhapur, Maharashtra of **M/S. Hindalco Industries Limited** entrusted to **Bhagavathi Ana Labs Pvt. Limited,** during winter season of the year 2017-18**.**

The monitoring was carried out in the selected locations in core zone and buffer zone around the mine lease area during the months of December,January,February 2017-18.

- → Micro-meteorology,
- → Ambient air quality,
- → Ambient noise level quality,
- → Water quality

The data was compiled to assess the current environmental status due to mining as well as allied activities around the surrounding villages in the study area.

Bhagavathi Ana Labs Pvt. Limited, Hyderabad gratefully acknowledges the cooperation extended by management and staff of M/S Hindalco Industries Limited and the village people to their field staff.

EXECUTIVE SUMMARY

Dhangarwadi Bauxite Mine of **M/S Hindalco Industries Limited** includes the study of the ambient air quality, noise level quality, water quality in core zone and buffer zone around the mine lease area during the winter season of the year 2017-18.

AMBIENT AIR QUALITY

The scenario of the existing ambient air quality in the study region has been assessed through a network of selected ambient air quality locations. Pre-calibrated respirable dust sampler has been used for monitoring the existing AAQ status. Maximum, minimum, average and percentile values have been computed from the raw data collected at all individual sampling stations to represent the ambient air quality status.

AMBIENT NOISE LEVEL MONITORING

Mining and allied activities usually cause noise pollution. To know the ambient noise levels in the study area, noise levels were recorded at mining area and nearby villages using noise level recorder.

WATER QUALITY MONITORING

Water quality monitoring consists of the study of surface and ground water sources and its quality in the core and buffer zone of the lease area. Assessment of water quality in the study area and in the mine area includes the quality assessment of parameters as per the Indian Standard IS 10500 (Drinking water standard). Water samples were collected from selected locations during study period and analyzed in the laboratory as per the standard IS & APHA procedures.

MICROMETEOROLOGY

Meteorological scenario helps to understand the trends of the climatic factors. It also helps in the identification of sampling stations in the study area. Meteorological scenario exerts a critical influence on air quality as the pollution arises from the interaction of atmospheric contaminants with adverse meteorological conditions

AREA DETAILS

INTRODUCTION

Hindalco Industries is one of the leading producer of aluminum in the country. The company business involves bauxite mining to alumina refining. Alumina metal conversion, sheet, extrusion, foil manufacturing and is spread all over the country. The company is operating number of bauxite mines in Maharashtra, Orissa, Chhattisgarh and Jharkhand to feed the Alumina Plants located in Belgaum, Renukut and Muri.

On getting concurrence from Central Government, Government of Maharashtra has indicated its intention to grant mining lease over of 122.63 ha, out of which 41.80 ha falls under non forest area. As per the directions of the Government of Maharashtra the mining plan was prepared for the entire lease area of 122.63 ha and the same was approved by the Indian Bureau of Mines vide letter no. MP/KLP/MAH-73-SZ, DT.11/11/2003. On submission of approved mining plan Government of Maharashtra has sanctioned mining lease for the production of bauxite for the revenue land of 41.80 and keeping pending of sanction of mining lease for the forest land of 80.83 ha subject to obtaining "No Objection certificate" from the Ministry of Environment and Forest, Govt. of India. The Environmental Clearance was obtained for the production of 0.6 million TPA of bauxite over an entire area of 122.63 ha.

Considering the delay in the process of forest clearance for the area falling under forest land, the Government of Maharashtra has granted mining lease only for the non forest land of 41.80 ha. by keeping pending the grant of mining lease for the forest area. Accordingly, the mining lease was executed by the collector of Kolhapur over an area 41.80 ha. on 05/05/2008 for period of 30 years.

MINE DETAIL

Dhangarwadi bauxite mine is located near Dhangarwadi village of Shahuwadi taluka of Kolhapur District in Maharashtra state.

GEOGRAPHICAL DETAILS:

Latitude	:	$16^0\,52'$ to $16^0\,56'$
Longitude	:	$73^0\,48'$ to $73^0\,51'$

INDEX MAP

N
INDIA
MAHARASTRA
ARABIAN SEA
KOLHAPUR
Malkapur
Panhala
Kodoli
Wadgaon
Jaisingpur
Kale
Hatkanangale
Shirol
Kolhapur
Ichalkaranji
Hupari
Kagal
Parit
Radhanagari
Murgud
Gargoti
Gandhinglaj
Ajra
Nesari
Chandgad
DHANGARWADI BAUXITE MINE
M/s Hindalco Industries Limited
NOT TO SCALE

Details of lease area

The following table gives the details of the area in terms of district, taluka, village, gat no., etc.

District	Taluka	Village	Gat No.	Area granted (ha)	Owner/Occupier.
Kolhapur	Shahuwadi	Dhangarwadi			
"	"	"	45	12.32	Private land
"	"	"	46(part)	6.53	Private land
"	"	"	50(part)	2.17	Private land
"	"	"	52	10.58	Private land
"	"	"	53(part)	5.09	Private land
"	"	"	56(part)	2.76	Private land
Kolhapur	Shahuwadi	Ainwadi	106(part)	2.35	Private land
				41.80	

ACCESSIBILITY

The district headquarter Kolhapur is connected to Mumbai by broad gauge railway line of South Central Railway of Indian Railway. Daily trains services are available from Mumbai and many other important places to Kolhapur. The nearest (i) railway station is Kolhapur at a distance of 56 kms eastwards with respect to the mines. The district is well served by a network of good roads - National Highways, State Highways and Major District roads. The National Highway Mumbai – Pune- Bangalore passes through Kolhapur.

Road

Dhangarwadi is approachable by a distance of 8 kms from Dhopeshwar Junction, located 6 kms from Malkapur Town on Ratnagiri – Nagpur National Highway.

Rail head

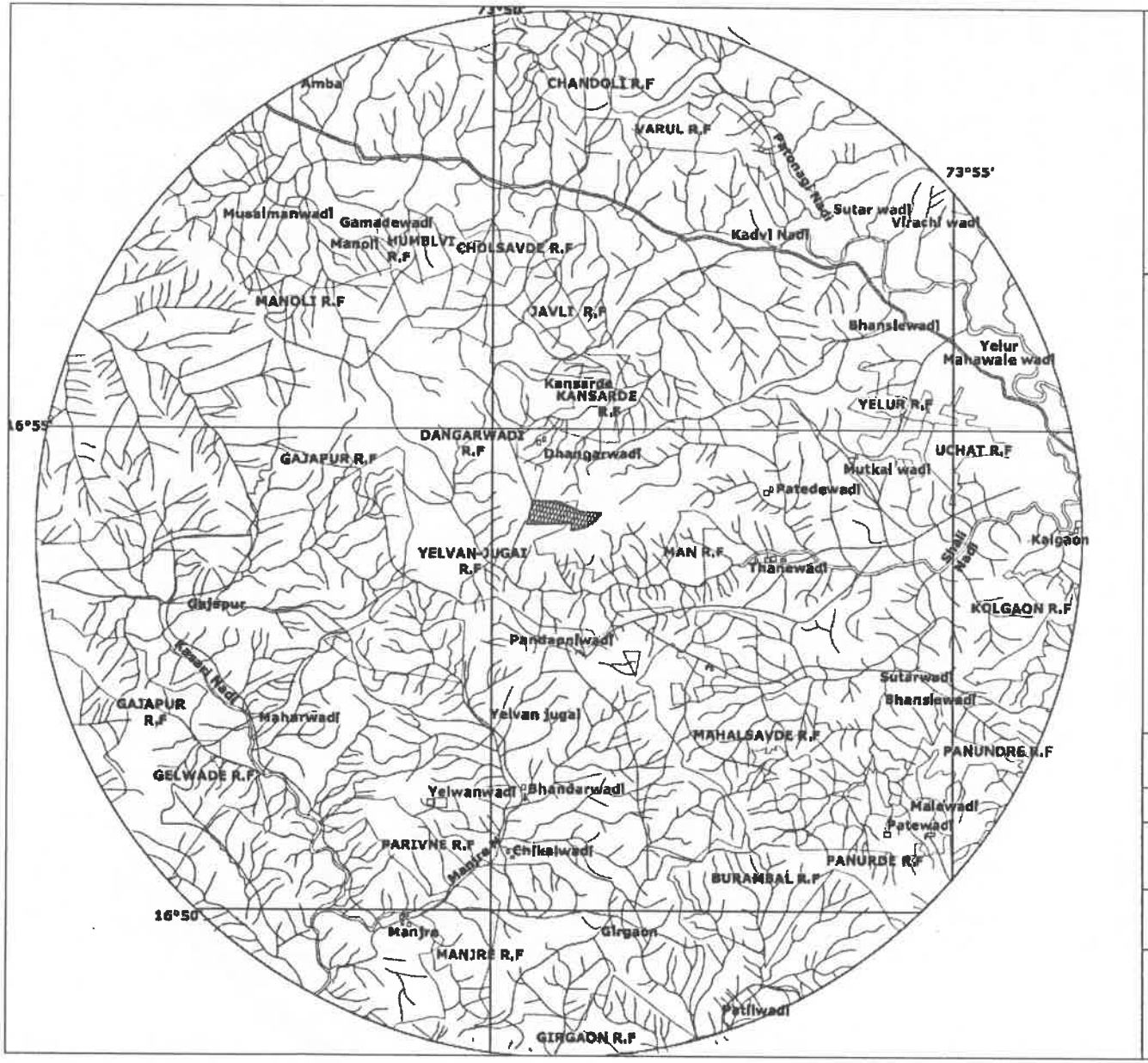
The nearest railway head is Kolhapur which is situated at a distance of about 56 kms by road from the lease area.

Sea Port

The nearest sea port is Ratnagiri sea port is about 95 kms form the mine

Airport

The nearest airport is at Kolhapur which is around 60 kms by road from the lease area.



PROJECT: DHANGARWADI BAUXITE MINES

CLIENT :HINDALCO INDUSTRIES LIMITED

TITLE: TOPOGRAPHICAL MAP OF THE STUDY AREA

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HYDERABAD

DHANGARWADI BAUXITE MINE

(M/s. Hindalco Industries Limited)

DETAILS

State	Maharashtra
District	Kolhapur
Taluka	Shahuwadi
Village	Dhangarwadi
Latitude	16^0 52′ to 16^0 56′
Longitude	73^0 48′ to 73^0 51′
Nature of the area	Plateau terrain
Topposheet no.	47 H/13.

GENERAL CLIMATIC CONDITIONS

Maximum temperature	40.0 °C
Minimum temperature	16.0° C

ACCESSIBILITY

Road connectivity	Approached by road connecting to Dhopeshwar Junction which is at a distance of 8 kms, located 6 kms from Malkapur Town on Ratnagiri-Nagpur National Highway (NH-4).
Rail connectivity	Kolhapur railway station (56km)
Airport	Kolhapur(60km)
Biosphere reserve	Not any
Sanctuary	Chandoli wild life sanctuary is situated at about 50 kms .

MICRO-METEOROLOGY

Meteorological data within the project area during the air quality survey period was assessed

PRIMARY / BASIC METEOROLOGICAL PARAMETERS

→ Wind Velocity

→ Wind Direction

Since the dispersion and diffusion of pollutants mainly depend on the above factors these factors are considered as primary meteorological parameters.

SECONDARY METEOROLOGICAL PARAMETERS

→ Ambient Temperature

MICRO-METEOROLOGICAL DATA

DATE	TEMPERATURE			WIND SPEED Km/h			WIND DIRECTION
	MIN	MAX	AVERAGE	MIN	MAX	AVERAGE	
05-12-2017	24	28	26.0	0	12	6.0	SSE
07-12-2017	21	30	25.5	0	7	3.5	NW
12-12-2017	19	30	24.5	0	11	5.5	NE
14-12-2017	18	30	24.0	0	9	4.5	ESE
19-12-2017	18	34	26.0	0	13	6.5	ESE
21-12-2017	19	34	26.5	0	10	5.0	SE
26-12-2017	18	34	26.0	0	10	5.0	SE
28-12-2017	17	33	25.0	0	7	3.5	ESE

MICRO-METEOROLOGICAL DATA							
DATE	TEMPERATURE			WIND SPEED Km/h			WIND DIRECTION
	MIN	MAX	AVERAGE	MIN	MAX	AVERAGE	
03-01-2018	16	30	23.0	0	7	3.5	E
05-01-2018	19	32	25.5	0	9	4.5	SE
10-01-2018	19	33	26.0	0	12	6.0	WSW
12-01-2018	22	33	27.5	0	10	5.0	NE
16-01-2018	21	35	28.0	0	7	3.5	WNW
18-01-2018	20	35	27.5	0	8	4.0	E
23-01-2018	21	31	26.0	0	5	2.5	NW
25-01-2018	17	31	24.0	0	12	6.0	NNE

MICRO-METEOROLOGICAL DATA							
DATE	TEMPERATURE			WIND SPEED Km/h			WIND DIRECTION
	MIN	MAX	AVERAGE	MIN	MAX	AVERAGE	
01-02-2018	17	34	25.5	0	10	5.0	ESE
05-02-2018	19	35	27.0	0	3	1.5	NW
08-02-2018	18	32	25.0	0	6	3.0	SE
12-02-2018	18	31	24.5	0	7	3.5	ESE
15-02-2018	23	35	29.0	0	11	5.5	SE
19-02-2018	20	33	26.5	0	14	7.0	SE
22-02-2018	20	32	26.0	0	11	5.5	ESE
26-02-2018	19	37	28.0	0	10	5.0	ESE

ENVIRONMENTAL QUALITY

Environmental quality monitoring at **Dhangarwadi Bauxite Mine** of **M/S Hindalco Industries Limited** at Dhangarwadi village of Shahuwadi taluka, Kolhapur district, Maharashtra includes monitoring of various environmental components like air, noise, water quality status within core zone and buffer zone around the mine lease area.

AMBIENT AIR QUALITY

The main aim of the ambient air quality monitoring within core zone and buffer zone was to assess the environmental condition and to know the existing levels of the air pollution in the project area. Thus, air quality has to be frequently monitored to know the extent of pollution due to mining and allied activities. Ambient air quality monitoring stations were set up at eight selected locations, 4 in core zone and 4 in buffer zone.

SELECTION OF SAMPLING LOCATIONS

The status of the ambient air quality has been assessed through ambient air quality-monitoring network. The design of monitoring network in the air quality surveillance program has been based on the following considerations:

- Meteorological conditions on synoptic scale
- Topography of the study area
- Representatives of regional background air quality for obtaining

Ambient air quality monitoring stations were set up at eight locations, 4 in core zone and 4 in buffer zone with due considerations to the above mentioned points.

INSTRUMENT USED FOR SAMPLING

Respirable dust samplers APM-460 BL instruments were used for monitoring suspended particulate matter, particulate matter (PM10), gaseous pollutants etc.

METHOD FOR TESTING SPM / PM10

Name of Pollutant	SPM / PM10
Medium	Air
Instrument	Respirable Dust Sampler
Duration	Every 24 hours
Mode	Continuous
Unit	$\mu g/m^3$
Method	Gravimetric

METHOD FOR TESTING

Name of Pollutant	**Sulphur dioxide**	**Oxides of Nitrogen**
Method	Modified West & Geake Method	Modified Jacob & Hochheiser Modified (Na-Arsenite) Method
Frequency	8 hour	8 hour
Mode	Continuous	Continuous
Unit	$\mu g/m^3$	µg/m3
Procedure	As per IS 5182 (Part II)	As per IS 5182 (Part IV), 1975

AMBIENT AIR QUALITY MONITORING STATION

SL. NO	STATION CODE	NAME OF SAMPLING STATION	DIRECTION w.r.t MINES LEASE AREA	DISTANCE FROM LEASE AREA (Arial distance)
1	A – 1	Core zone	- - -	- - -
2	A – 2	Near Dumping Site	- - -	- - -
3	A – 3	Near Haulage Road	- - -	- - -
4	A– 4	Near Mines office	- - -	- - -
5	A – 5	Dhangarwadi village	N	2.1km
6	A – 6	Thanewadi village	ESE	3.7km
7	A – 7	Pandapniwadi village	S	2.2km
8	A – 8	Gajapur village	WSW	5.6km

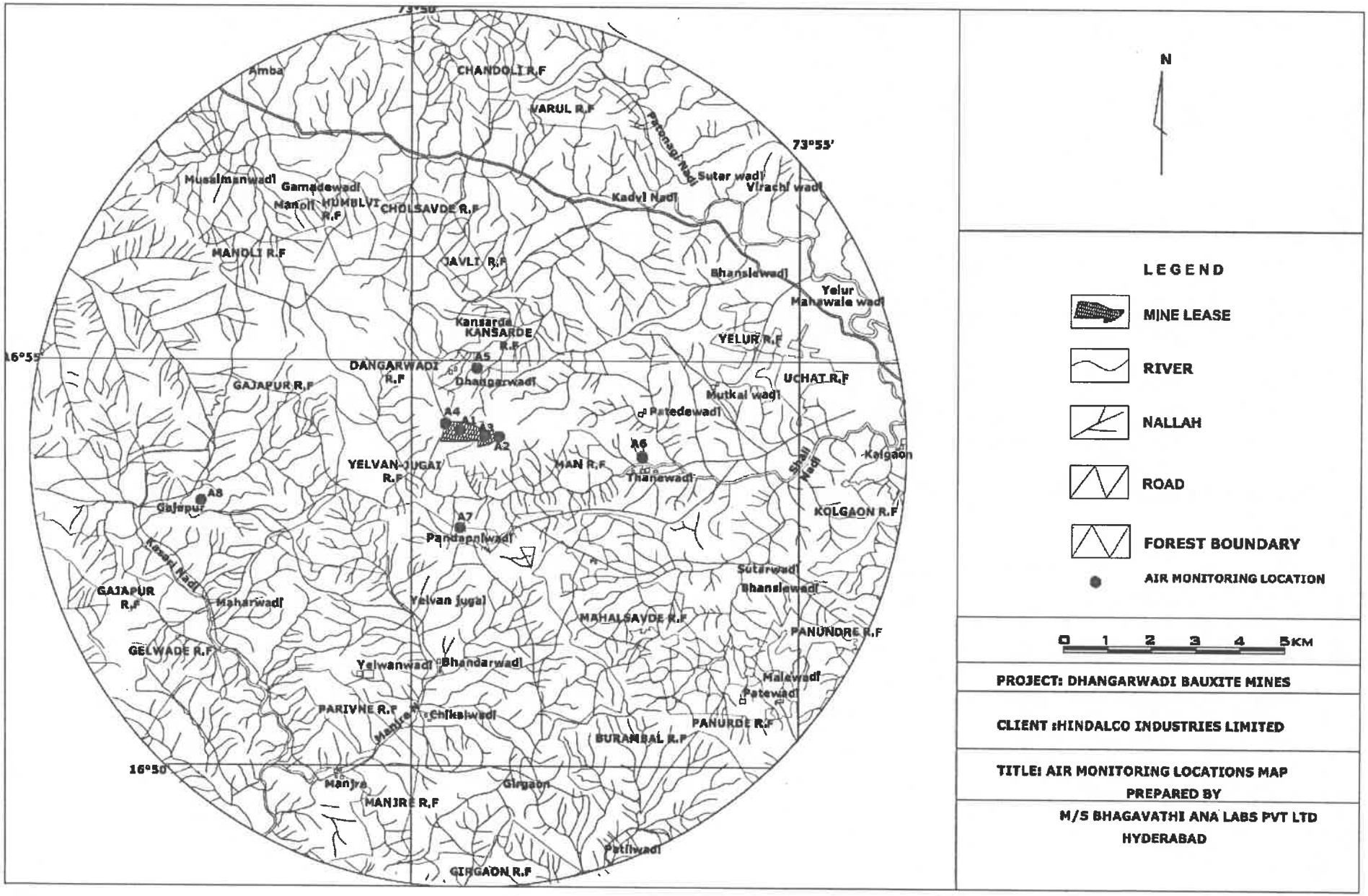
Monitoring Location Details

Respirable dust sampler was placed at a height of 3 m above the ground level in above mentioned monitoring locations. These stations were selected so as to assess present pollution level due to mining and allied activities. The observed levels of SPM, PM 10, SO_2, NO_2 collected during winter season of the year 2017-18 are presented in detail in annexure and are summarized in the following table.

SUMMARY OF AMBIENT AIR QUALITY

Sl. No.	Location		SPM	PM 10	SO_2	NOx
1	Core zone	Min	75.0	22.8	4.2	9.2
		Max	128.7	38.8	6.6	13.6
		Average	102.6	31.3	5.0	10.6
		98th %tile	125.8	38.1	6.3	13.3
2	Near Dumping site	Min	78.0	24.9	BDL	BDL
		Max	121.0	37.6	5.3	12.8
		Average	101.4	32.0	4.6	10.3
		98th %tile	119.5	37.3	5.3	12.4
3	Near Haulage Road	Min	92.0	31.8	4.4	9.6
		Max	118.5	40.5	5.7	12.9
		Average	105.2	36.2	5.1	11.2
		98th %tile	117.1	40.1	5.7	12.7
4	Near Mines office	Min	75.1	23.6	4.4	9.4
		Max	130.8	41.1	5.9	13.1
		Average	105.8	33.3	4.9	10.8
		98th %tile	129.4	40.9	5.9	13.0
5	Dhangarwadi village	Min	97.0	31.2	4.4	9.6
		Max	120.9	39.2	5.5	12.9
		Average	110.4	35.9	5.1	11.1
		98th %tile	120.8	39.0	5.5	12.8
6	Thanewadi village	Min	93.7	30.8	4.2	9.3
		Max	130.3	42.5	5.9	12.7
		Average	108.9	35.3	5.1	10.6
		98th %tile	128.5	42.0	5.9	12.6
7	Pandapniwadi village	Min	94.3	30.2	4.4	9.4
		Max	127.8	40.2	5.8	13.1
		Average	111.9	35.2	5.0	11.0
		98th %tile	127.6	40.1	5.7	12.7
8	Gajapur village	Min	100.0	29.2	4.2	8.9
		Max	143.2	41.8	6.1	13.4
		Average	117.2	34.5	5.0	11.1
		98th %tile	141.5	41.3	6.0	13.1

NOTE: The results relate only to the condition prevailing at the time of sampling
Method of measurement: As per IS 5182


73°50'
73°55'
16°55'
16°50'
Amba
CHANDOLI R.F
VARUL R.F
Patodasi Nadi
Musalmanwadi
Gamadewadi
Manoli
HUMBLVI R.F
CHOLSAVDE R.F
Kadvi Nadi
Sutar wadi
Virachi wadi
MANOLI R.F
JAVLI R.F
Bhanslewadi
Yelur Mahawale wadi
Kansarde
KANSARDE R.F
YELUR R.F
DANGARWADI R.F
A5
Dhangarwadi
UCHAT R.F
GAJAPUR R.F
Mutkal wadi
Patedewadi
A4
A1
A3
A2
A6
YELVAN-JUGAI R.F
MAN R.F
Thanewadi
Shali Nadi
Kolgaon
A8
Gajapur
KOLGAON R.F
A7
Pandapniwadi
Kasal Nadi
Sutarwadi
Bhanslewadi
GAJAPUR R.F
Maharwadi
Yelvan jugai
MAHALSAVDE R.F
PANUNDRE R.F
GELWADE R.F
Yelwanwadi
Bhandarwadi
Malewadi
Patewadi
PARIVNE R.F
Manjre
Chikalwadi
PANURDE R.F
BURAMBAL R.F
Manjre
Girgaon
MANJRE R.F
Patilwadi
GIRGAON R.F
N
LEGEND
MINE LEASE
RIVER
NALLAH
ROAD
FOREST BOUNDARY
AIR MONITORING LOCATION
0 1 2 3 4 5KM
PROJECT: DHANGARWADI BAUXITE MINES
CLIENT :HINDALCO INDUSTRIES LIMITED
TITLE: AIR MONITORING LOCATIONS MAP
PREPARED BY
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HYDERABAD

AMBIENT NOISE LEVEL QUALITY

Noise is nothing but unwanted sound produced due to various activities. As a part of occupational health and safety measures, certain safeguards have been incorporated to mitigate noise pollution in working environment. Noise pollution survey has been carried out in the study area to assess the impacts of the mining activities. So noise level surveys were carried out at 8 selected locations in and around the mine lease area. Noise survey has been conducted in the study area for the period of 24 hr at each location.

AMBIENT NOISE LEVEL MONITORING STATIONS

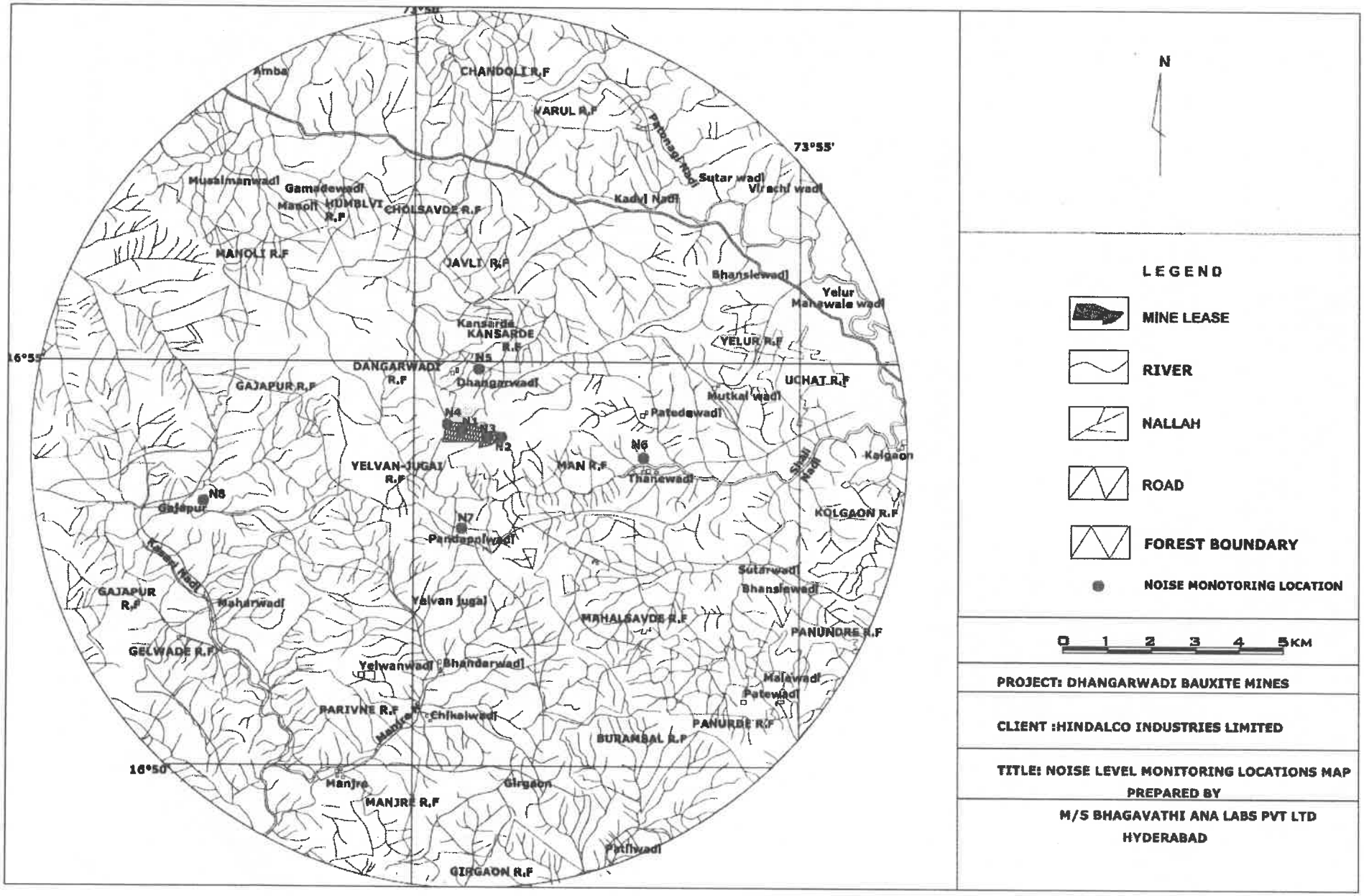
SL. NO	STATION CODE	NAME OF SAMPLING STATION	DIRECTION w.r.t MINES LEASE AREA	DISTANCE FROM LEASE AREA (Arial distance)
1	N– 1	Core zone	- - -	- - -
2	N – 2	Near Dumping Site	- - -	- - -
3	N – 3	Near Haulage Road	- - -	- - -
4	N– 4	Near Mines office	- - -	- - -
5	N – 5	Dhangarwadi village	N	2.1km
6	N – 6	Thanewadi village	ESE	3.7km
7	N – 7	Pandapniwadi village	S	2.2km
8	N – 8	Gajapur village	SW	5.6km

NATIONAL AMBIENT NOISE QUALITY STANDARDS

AREA CODE	CATEGORY OF AREA	LIMIT IN dB (A) Leq	
		DAY TIME	NIGHT TIME
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

Note:

1. **Day time is reckoned in between 6 am and 9 pm.**
2. **Night time is reckoned in between 9 pm and 6 am.**
3. **Silence zone is defined as area upto 100 meters around such premises as hospitals, educational institutions and courts. The silence zones are to be declared by the Competent Authority.**
4. **Mixed categories of areas should be declared as "one of the four above mentioned categories by the Competent Authority and the corresponding standards shall apply.**



PROJECT: DHANGARWADI BAUXITE MINES

CLIENT :HINDALCO INDUSTRIES LIMITED

TITLE: NOISE LEVEL MONITORING LOCATIONS MAP

PREPARED BY

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HYDERABAD

AMBIENT NOISE LEVEL MONITORING RESULTS [Leq in dB(A)]

Time	N1, Core zone	N2, Near Dumping site	N3 Near Haulage road	N4, Near Mines Office	N5, Dhangarwadi village	N6, Thanewadi village	N7, Pandapniwadi village	N8, Gajapur village
06:00	48.4	49.7	49.6	51.0	58.2	60.2	61.6	61.9
07:00	56.1	58.3	57.7	59.3	59.8	60.5	62.0	61.8
08:00	58.7	60.3	59.6	61.5	61.3	62.5	63.1	63.6
09:00	61.6	63.5	62.4	64.7	64.0	65.3	64.6	65.4
10:00	63.9	65.5	64.5	67.0	67.3	67.5	67.1	68.7
11:00	71.8	73.4	72.8	75.0	69.7	69.9	69.4	70.3
12:00	73.5	74.6	73.9	74.7	69.5	69.8	69.4	71.1
13:00	71.9	73.3	72.3	74.9	70.5	70.1	70.2	71.2
14:00	71.5	72.8	72.0	74.6	69.2	70.7	71.2	71.9
15:00	69.7	71.6	70.3	73.1	68.7	69.1	69.2	69.4
16:00	67.7	70.0	68.8	71.3	73.3	74.6	72.5	72.7
17:00	66.1	68.2	67.1	70.1	74.5	75.0	69.4	73.8
18:00	64.3	66.5	66.0	68.2	70.3	71.4	71.4	72.4
19:00	63.6	65.3	65.2	67.5	66.8	66.4	66.6	67.3
20:00	58.5	59.9	59.5	61.7	61.8	62.9	62.4	63.5
21:00	57.1	58.3	58.4	60.3	62.1	62.8	62.2	62.5
22:00	50.6	51.6	51.8	53.4	61.9	62.7	63.4	62.5
23:00	49.2	50.8	50.7	51.9	62.0	61.5	62.7	62.7
00:00	49.1	50.7	50.9	51.4	61.8	62.3	64.2	64.1
01:00	49.4	50.8	51.1	51.7	61.5	61.8	62.1	62.7
02:00	49.8	51.2	51.8	52.3	60.8	61.3	60.5	61.6
03:00	50.6	52.2	52.2	52.5	60.7	60.9	61.2	62.6
04:00	46.0	46.9	47.2	46.8	61.4	61.8	63.8	64.0
05:00	45.9	46.4	47.2	46.8	61.5	62.4	63.6	64.1
Min	**45.9**	**46.4**	**47.2**	**46.8**	**58.2**	**60.2**	**60.5**	**61.6**
Max	**73.5**	**74.6**	**73.9**	**75.0**	**74.5**	**75.0**	**72.5**	**73.8**

All the obtained noise level quality values in core zone and buffer zone are compared with the noise level standards prescribed by Central Pollution Control Board. The observations revealed that the values are found to be within the limit.

WATER QUALITY

Water quality monitoring consists of the study of water sources and its quality in the core and buffer zone of the lease area. Its study consists of following two important systems of water bodies:

- Surface water quality.
- Ground water quality.

- **Surface water quality**

  Tamrapani and Ghataprabha River are the surface water source in the study area. There are others seasonal nallah which flows in the study area. Proper drainage system has prepared to drag the monsoon water into the mine pit so as to reduce the water pollution.

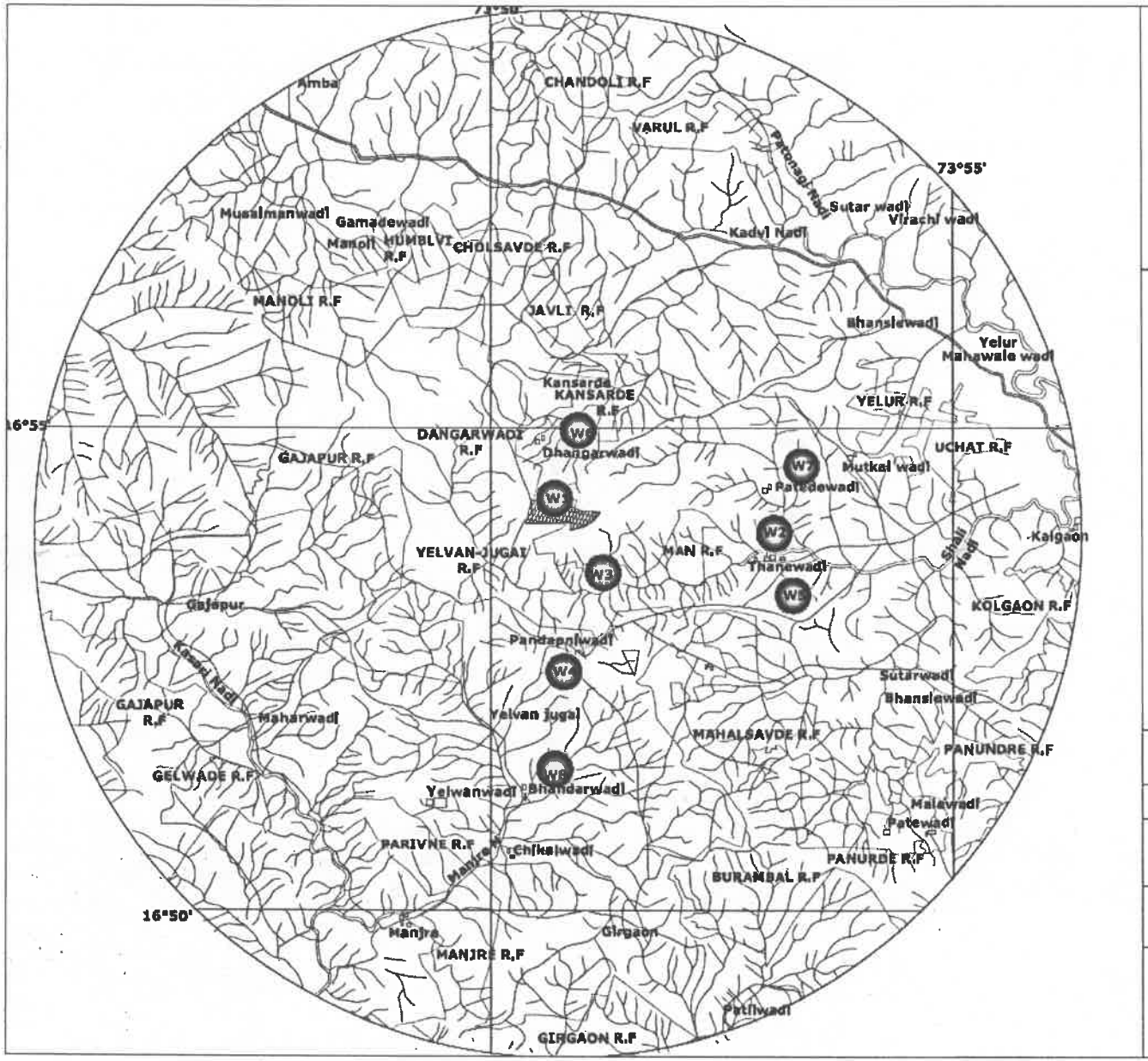
- **Ground water quality**

  The most important source of drinking water in the study area is the ground water, which is tapped by a bore well. The buffer zone is good in ground water source.

Assessment of water quality in the study area and in the mine area includes the quality assessment of parameters as per the Indian Standard IS 10500 (Drinking water standard). A total of 8 locations have selected, out of which one in core zone and seven are in buffer zone. Location of water quality monitoring stations is given below.

WATER QUALITY MONITORING LOCATIONS

Code		Name of sampling station	Source of water
W – 1		Mine pit water	Surface water
W – 2		Shali nadi (up stream)	Surface water
W – 3		Shali nadi (down stream)	Surface water
W – 4		Pandapniwadi village	Ground water
W – 5		Thanewadi village	Ground water
W – 6		Dhangarwadi village	Ground water
W –7		Patewadi village	Ground water
W – 8		Bhandarwadi village	Ground water



N

LEGEND

- MINE LEASE
- RIVER
- NALLAH
- ROAD
- FOREST BOUNDARY
- WATER SAMPLING LOCATION

0 1 2 3 4 5KM

PROJECT: DHANGARWADI BAUXITE MINES

CLIENT :HINDALCO INDUSTRIES LIMITED

TITLE: WATER SAMPLING LOCATIONS MAP

PREPARED BY
M/S BHAGAVATHI ANA LABS PVT. LTD
HYDERABAD

SAMPLING DETAILS

The water samples were collected from selected sampling locations, which are coming under core zone and buffer zone around the mine lease area. Samples were collected in the winter season of the year 2017-18 as per the prescribed sample collecting methods and analyzed as per the IS standard procedures. Analysis report of water samples are given below.

SURFACE WATER QUALITY

Date of Sampling: 20.2.2018

Sl. No	Parameter	Units	W-1 MINE PIT WATER	W-2 SHALI NADI UP STREAM	W-3 SHALI NADI DOWN STREAM
1	Odour	--	Un-objectionable	Un-objectionable	Un-objectionable
2	Taste	--	Agreeable	Agreeable	Agreeable
3	Color	Hazen units	<5	<5	<5
4	pH	--	6.55	6.59	6.63
5	Turbidity	NTU	<5	<5	<5
6	Dissolved Oxygen	mg/l	5.0	7.00	6.30
7	Total Dissolved solids	mg/l	41	55	132
8	Total Suspended solids	mg/l	7	23	20
9	Alkalinity as $CaCO_3$	mg/l	16.0	12	48.0
10	Total Hardness as $CaCO_3$	mg/l	24.0	30.0	90.0
11	Nitrate as NO_3	mg/l	0.004	0.003	0.003
12	Phosphates as PO_4	mg/l	0.77	0.02	0.02
13	Chlorides as Cl	mg/l	11.6	12.57	16
14	Sulphates as SO_4	mg/l	0.02	1	2
15	Sodium as Na	mg/l	1.32	1.32	3.72
16	Potassium as K	mg/l	0.24	0.24	0.09
17	Calcium as Ca	mg/l	6.4	8	3.21
18	Magnesium as Mg	mg/l	1.9	2.4	0.81
19	Lead as Pb	mg/l	BDL	BDL	BDL
20	Manganese as Mn	mg/l	0.02	0.03	0.06
21	Cadmium as Cd	mg/l	BDL	BDL	BDL
22	Chromium as Cr	mg/l	BDL	BDL	BDL
23	Copper as Cu	mg/l	BDL	BDL	BDL
24	Zinc as Zn	mg/l	BDL	BDL	BDL
25	Iron as Fe	mg/l	0.20	0.19	0.12
26	Fluoride as F	mg/l	0.08	0.13	0.09
27	Mercury as Hg	mg/l	BDL	BDL	BDL
28	Selenium as Se	mg/l	BDL	BDL	BDL
29	Arsenic as As	mg/l	BDL	BDL	BDL
30	Cyanide as CN	mg/l	BDL	BDL	BDL
31	Boron as B	mg/l	BDL	BDL	BDL
32	B.O.D	mg/l	5	12	11

BDL: Below Detectable Limit mg/l: Milligram per liter

GROUND WATER QUALITY

Date of Sampling: 20.2.2018

Sl. No	Parameter	Units	W-4 PANDAPNIWADI VILLAGE	W - 5 THANEWADI VILLAGE	W -6 DHANGARWADI VILLAGE	W-7 PATEWADI VILLAGE	W -8 BHANDARWADI VILLAGE
1	Odour	--	Un-objectionable	Un-objectionable	Un-objectionable	Un-objectionable	Un-objectionable
2	Taste	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	Color	Hazen units	<5	<5	<5	<5	<5
4	pH	--	6.72	6.55	6.77	6.87	6.81
5	Turbidity	NTU	<5	<5	<5	<5	<5
6	Dissolved Oxygen	mg/l	4.30	4.00	4.70	3.80	4.00
7	Total Dissolved solids	mg/l	78	54	42	132	66
8	Total Suspended solids	mg/l	3	5	7	9	7
9	Alkalinity as $CaCO_3$	mg/l	36	20	20	44	19.3
10	Total Hardness as $CaCO_3$	mg/l	52.0	40.0	24.0	114.0	50.0
11	Nitrate as NO_3	mg/l	0.015	0.07	0.014	0.008	0.26
12	Phosphates as PO_4	mg/l	0.02	0.03	0.01	0.03	0.02
13	Chlorides as Cl	mg/l	13.53	9.67	8.7	20.3	13.53
14	Sulphates as SO_4	mg/l	1	2.1	0.3	1.2	3
15	Sodium as Na	mg/l	1.33	2.07	2.15	2.15	9.84
16	Potassium as K	mg/l	0.42	1.24	1.02	1.02	2.48
17	Calcium as Ca	mg/l	10.4	8.8	8	36	14.4
18	Magnesium as Mg	mg/l	6.24	4.32	1	5.76	3.36
19	Lead as Pb	mg/l	BDL	BDL	BDL	BDL	BDL
20	Manganese as Mn	mg/l	0.04	0.05	0.03	0.06	0.02
21	Cadmium as Cd	mg/l	BDL	BDL	BDL	BDL	BDL
22	Chromium as Cr	mg/l	BDL	BDL	BDL	BDL	BDL
23	Copper as Cu	mg/l	BDL	BDL	BDL	BDL	BDL
24	Zinc as Zn	mg/l	BDL	BDL	BDL	BDL	BDL
25	Iron as Fe	mg/l	0.53	0.30	0.18	0.18	0.30
26	Fluoride as F	mg/l	0.12	0.07	0.09	0.01	0.01
27	Mercury as Hg	mg/l	BDL	BDL	BDL	BDL	BDL
28	Selenium as Se	mg/l	BDL	BDL	BDL	BDL	BDL
29	Arsenic as As	mg/l	BDL	BDL	BDL	BDL	BDL
30	Cyanide as CN	mg/l	BDL	BDL	BDL	BDL	BDL
31	Boron as B	mg/l	BDL	BDL	BDL	BDL	BDL
32	B.O.D	mg/l	6	8	6	9	8

BDL: Below Detectable Limit **mg/l: Milligram per liter**

NOTE: The results relate only to the condition prevailing at the time of sampling

RESULTS & DISCUSSION

- The pH of the study area varies from 6.55 to 6.67 in the study area. The permissible range of pH is 6.5 to 8.5.
- Dissolved Oxygen content of the study area has been found to be in the range of 3.80 to 7
- Total Dissolved Solids found to be in the range of 41 to 132 mg/l in the water sample collected in study area. As per IS 10500 standard for drinking water, the desirable limit is 500 mg/l and maximum permissible limit is 2000 mg/l.
- Alkalinity as $CaCO_3$ is found to be in the range of 12 to 48 in the water sample collected in study area. As per IS 10500 standard for drinking water, the desirable limit is 200 mg/l and maximum permissible limit is 600 mg/l.
- Total hardness as $CaCO_3$ of the water sample collected in the study area is found to in the range of 24 to 114 mg/l. As per IS 10500 standard for drinking water, the desirable limit is 300 mg/l and maximum permissible limit is 600 mg/l.
- Chloride of the water sample collected in the study area is found to in the range of 8.70 to 20.3 mg/l. As per IS 10500 standard for drinking water, the desirable limit is 250 mg/l and maximum permissible limit is 1000 mg/l.
- Calcium content of the water in the study area found to be in the range of 3.21 to 36 mg/l. As per IS 10500 standard for drinking water, the desirable limit 75 mg/l and maximum permissible limit is 200 mg/l.
- Magnesium content of the water in the study area found to be in the range of .84 to 6.24 mg/l.
- Iron content of the water in the study area found to be in the range of .12 to .53mg/l. As per IS 10500 standard for drinking water, the desirable limit 0.3 mg/l and maximum permissible limit is 1.0 mg/l.

DRINKING WATER STANDARDS
AS PER IS: 10500

Sl.no	Parameter	Unit	Desirable limit as per is: 10500	Maximum permissible limit as per is: 10500
1	Odour		Un-objectionable	
2	Taste		Agreeable	
3	Colour	Hazen Units	5	25
4	pH		6.5 -8.5	
5	Turbidity	NTU	5	10
6	Dissolved Oxygen	mg /l	-----	
7	Total Dissolved Solids	mg /l	500	2000
8	Alkalinity as $CaCo_3$	mg /l	200	600
9	Total hardness as $CaCo_3$	mg /l	300	600
10	Nitrates NO_3	mg /l	45	100
11	Phosphates PO_4	mg /l	-----	
12	Chlorides as Cl	mg /l	250	1000
13	Sulphates, SO_4^{2-}	mg /l	200	400
14	Sodium as Na	mg /l	-----	
15	Potassium as K	mg /l	-----	
16	Calcium as Ca	mg /l	75	200
17	Magnesium, Mg	mg /l	30	100
18	Lead (Pb)	mg /l	0.05	0.05
19	Manganese	mg /l	0.1	0.3
20	Cadmium (Cd)	mg /l	0:01	0.01
21	Chromium (Cr)	mg /l	0.05	0.05
22	Copper (Cu)	mg /l	0.05	1.5
23	Zinc (Zn)	mg /l	5	15
24	Iron as Fe	mg /l	0.3	1.0
25	Fluoride as F	mg /l	1	1.5
26	Mercury as Hg	mg /l	0.001	0.001
27	Selenium as se	mg /l	0.01	0.01
28	Arsenic as As	mg /l	0.05	0.05
29	Cyanide as CN	mg/l	0.05	0.05
30	Boron as B	mg/l	1	5

DOMESTIC EFFLUENT ANALYSIS

Sample Type: **Canteen waste water**

Date of sampling: 20.2.2018

Sl.No	Test	Result
1	**Total Suspended Solids, mg/l**	**22**
2	**Total Dissolved Solids, mg/l**	**45**
3	**COD, mg/l**	**4**
4	**BOD for 3 days at 27°C, mg/l**	**3**
5	**Total Solids**	49
6	**Oil and Grease, mg/l**	<5

Sample Type: **Canteen waste water**

Date of sampling: 21.2.2018

Sl.No	Test	Result
1	**Total Suspended Solids, mg/l**	**30**
2	**Total Dissolved Solids, mg/l**	**45**
3	**COD, mg/l**	**4**
4	**BOD for 3 days at 27°C, mg/l**	**3**
5	**Total Solids**	**47**
6	**Oil and Grease, mg/l**	**<5**

Stack Analysis Report				
Name of the Industry	DHANGARWADI BAUXITE MINE			
Address	DHANGARWADI			
DATE	20-02-2018			
Stack details				
Stack attached to	KVA)		Diameter of stack (mtr) D	0.1
Height of stack above ground (mtr)	5.5		Stack crossectional area m2	0.0020
Fuel used	H.S.D		Consumption of fuel (KLD)	3
Additional Load	Nil		Load on the system	90%

EMMISSION DETAILS

Particulars		Value	* Permissible limit	Method of analysis
Temperature (°C)	:	100.00	NA	As per IS:11255 (Part 3)-2008
Velocity of flue gas (m/sec)	:	6.84	NA	As per IS:11255 (Part 3)-2008
Gas flow rate at NTP (Nm^3/hour)	:	39	NA	As per IS:11255 (Part 3)-2008
Particulate matter (mg/Nm^3)	:	49.21	150.00	As per IS:11255 (Part 1)- 1985
SO_2 (Kg/Hr)	:	0.07	0.29	As per IS:11255 (Part 2)-1985
* Permissible Limits	As per the GSPCB consent			

Ambient Meteorology				
Wind Velocity (Km/hr)	4		Ambient Temp °C	32.6
Wind Direction	SE		Humidity %	68

Details of instrument used - Pollutech model,PEM-SMK 10

Name of instrument	Range	Sensitivity	Calibration date	Validity	Tracebility
Pitot tube	0~200 mm WC	0.01 mmWC	31-01-2018	30-01-2018	FCRI
Manometer (ΔP)	0~200 mm WC	001 mmWC	31-01-2018	30-01-2018	FCRI
Pyrometer	27~600 °C	1°C	31-01-2018	30-01-2018	FCRI
Particulate Matter Flow	2~60 LPM	1 LPM	31-01-2018	30-01-2018	FCRI
Gaseous Flow Meter	0.6~6.0 LPM	0.1 LPM	31-01-2018	30-01-2018	FCRI
DGM Vaccum gauge	0~760 mmWC	10 mmWC	31-01-2018	30-01-2018	FCRI
DGM temp	0 ~100 °C	1°C	31-01-2018	30-01-2018	FCRI

"""Calibration Report No. PICS/F/SMK/01-18/134

* Recognised by Ministry of Environment &Forests, as "Environmental Laboratory" vide Notification S. O. 428 (E) valid upto Jan , 2019
*The results relate only to the condition prevailing at the time of sampling

DHANGARWADI MINES				
WELL DEPTHS OF VILLAGES				
S.NO.	**LOCATION**	**NAME OF THE MINE AREA**	**TOTAL DEPTH IN MTS**	**WATER LEVEL FROM SURFACEIN MTS**
				20.2.2018
1	PANDAPNIWADI VILLAGE	**DHANGARWADI**	6.00	4.20
2	DHANGARWADI VILLAGE	**DHANGARWADI**	5.70	3.70

AMBIENT AIR QUALITY

Station: A1, CORE ZONE						
S.No.	Month	Date	SPM	PM 10	SO_2 (µg/m^3)	NO_x (µg/m^3)
			µg/m^3	µg/m^3 24 hrs Average	24 hrs Average	24 hrs Average
1	Dec-17	05-12-2017	97.0	29.2	4.9	9.5
2		07-12-2017	122.0	37.3	5.4	10.9
3		12-12-2017	109.0	33.2	6.6	13.6
4		14-12-2017	106.0	32.1	4.6	9.9
5		19-12-2017	111.0	34.2	4.9	11.0
6		21-12-2017	105.0	32.1	4.5	10.2
7		26-12-2017	77.0	23.4	4.7	12.2
8		28-12-2017	75.0	23.1	4.6	12.0
1	Jan-18	03-01-2018	104.2	31.5	4.3	8.9
2		05-01-2018	128.6	38.6	5.5	11.8
3		10-01-2018	113.7	34.4	5.7	12.9
4		12-01-2018	101.5	31.0	4.5	10.2
5		16-01-2018	111.2	34.1	4.9	9.6
6		18-01-2018	109.7	33.8	4.9	9.7
7		23-01-2018	80.8	24.5	4.9	10.1
8		25-01-2018	81.8	25.4	5.1	10.9
1	Feb-18	01-02-2018	101.8	30.7	4.2	9.5
2		05-02-2018	122.5	36.8	5.1	11.5
3		08-02-2018	117.5	36.2	5.9	9.4
4		12-02-2018	98.8	30.2	5.0	10.1
5		15-02-2018	106.9	32.6	4.6	9.9
6		19-02-2018	113.3	34.7	4.8	10.4
7		22-02-2018	84.4	26.1	4.3	9.8
8		26-02-2018	85.7	26.3	5.3	10.8

	Min		**75.0**	**23.1**	**4.2**	**8.9**
	Max		**128.6**	**38.6**	**6.6**	**13.6**
	Mean		**102.7**	**31.3**	**5.0**	**10.6**
	10th percentile		**81.1**	**24.8**	**4.4**	**9.5**
	30th percentile		**98.6**	**30.1**	**4.6**	**9.9**
	50th percentile		**105.5**	**32.1**	**4.9**	**10.2**
	95th percentile		**122.5**	**37.2**	**5.9**	**12.8**
	98th percentile		**125.8**	**38.0**	**6.3**	**13.3**

BDL: BELOW DETECTABLE LIMIT

AMBIENT AIR QUALITY

Station: A2, NEAR MINES OFFICE						
S.No.	Month	Date	SPM	PM 10	SO_2 (µg/m^3)	NO_x (µg/m^3)
			µg/m^3	µg/m^3	24 hrs Average	24 hrs Average
1	Dec-17	05-12-2017	78.0	24.3	4.1	8.7
2		07-12-2017	99.0	30.8	4.3	9.7
3		12-12-2017	121.0	38.4	5.4	11.2
4		14-12-2017	113.0	35.6	5.2	11.9
5		19-12-2017	100.0	31.2	4.5	11.1
6		21-12-2017	89.0	28.0	BDL	BDL
7		26-12-2017	103.0	32.7	4.5	10.1
8		28-12-2017	102.0	32.0	4.4	9.1
1	Jan-18	03-01-2018	85.0	26.9	3.8	8.7
2		05-01-2018	105.6	33.1	4.7	10.6
3		10-01-2018	117.8	37.2	5.4	11.6
4		12-01-2018	113.6	35.9	5.2	11.7
5		16-01-2018	93.8	29.2	4.7	9.7
6		18-01-2018	93.3	29.3	4.0	9.3
7		23-01-2018	106.5	33.1	4.6	10.3
8		25-01-2018	96.8	30.8	4.3	9.3
1	Feb-18	01-02-2018	82.3	25.6	BDL	BDL
2		05-02-2018	98.9	31.6	4.6	9.4
3		08-02-2018	115.7	36.5	5.1	11.8
4		12-02-2018	117.3	37.0	5.2	12.8
5		15-02-2018	97.2	31.0	4.3	9.6
6		19-02-2018	97.1	30.7	4.3	8.8
7		22-02-2018	110.3	34.4	4.8	11.1
8		26-02-2018	100.1	31.3	4.4	10.9

	Min		**78.0**	**24.3**	**BDL**	**BDL**
	Max		**121.0**	**38.4**	**5.4**	**12.8**
	Mean		**101.5**	**31.9**	**4.6**	**10.3**
	10th percentile		**86.2**	**27.2**	**4.1**	**8.8**
	30th percentile		**97.1**	**30.8**	**4.4**	**9.5**
	50th percentile		**100.0**	**31.5**	**4.5**	**10.2**
	95th percentile		**117.7**	**37.2**	**5.4**	**11.9**
	98th percentile		**119.5**	**37.8**	**5.4**	**12.4**

Air location map

Station: A3,NEAR HAULAGE ROAD						
S.No.	Month	Date	SPM	PM 10	SO_2 (µg/m^3)	NO_x (µg/m^3)
			µg/m^3	µg/m^3	24 hrs Average	24 hrs Average
1	Dec-17	05-12-2017	96.0	33.2	4.6	10.0
2		07-12-2017	101.0	34.6	4.8	10.7
3		12-12-2017	106.0	37.0	5.2	11.0
4		14-12-2017	109.0	37.3	5.4	11.6
5		19-12-2017	101.0	34.9	5.1	11.2
6		21-12-2017	111.0	38.4	5.4	11.6
7		26-12-2017	104.0	36.1	5.0	11.2
8		28-12-2017	106.0	36.6	5.2	10.9
1	Jan-18	03-01-2018	103.1	35.5	5.1	11.0
2		05-01-2018	107.7	37.2	5.4	11.9
3		10-01-2018	106.6	36.3	5.1	10.9
4		12-01-2018	109.3	38.1	5.3	11.8
5		16-01-2018	94.3	32.4	4.6	9.7
6		18-01-2018	115.4	39.8	5.8	12.4
7		23-01-2018	107.8	37.3	5.4	11.8
8		25-01-2018	100.2	34.8	4.9	10.5
1	Feb-18	01-02-2018	100.4	34.3	4.7	10.6
2		05-02-2018	100.9	34.7	4.9	10.3
3		08-02-2018	107.4	36.7	5.3	11.5
4		12-02-2018	109.8	37.8	5.5	12.1
5		15-02-2018	91.8	31.8	4.4	9.9
6		19-02-2018	118.7	41.1	5.8	13.1
7		22-02-2018	111.2	38.5	5.3	11.2
8		26-02-2018	103.9	36.3	5.3	11.4

	Min		**91.8**	**31.8**	**4.4**	**9.7**
	Max		**118.7**	**41.1**	**5.8**	**13.1**
	Mean		**105.1**	**36.3**	**5.1**	**11.2**
	10th percentile		**97.3**	**33.5**	**4.7**	**10.1**
	30th percentile		**101.0**	**34.9**	**5.0**	**10.9**
	50th percentile		**106.0**	**36.5**	**5.2**	**11.2**
	95th percentile		**114.7**	**39.6**	**5.7**	**12.4**
	98th percentile		**117.1**	**40.5**	**5.8**	**12.8**

AMBIENT AIR QUALITY

Station: A4, Near Dumping site						
S.No.	Month	Date	SPM	PM 10	SO_2 (µg/m^3)	NO_x (µg/m^3)
			µg/m^3	µg/m^3	24 hrs Average	24 hrs Average
1	Dec-17	05-12-2017	78.0	24.9	5.0	10.7
2		07-12-2017	101.0	32.1	4.4	10.0
3		12-12-2017	105.0	33.2	4.7	9.9
4		14-12-2017	106.0	33.8	4.9	10.5
5		19-12-2017	111.0	34.6	5.1	11.1
6		21-12-2017	123.0	38.9	5.4	11.7
7		26-12-2017	104.0	33.0	4.6	10.2
8		28-12-2017	102.0	32.5	4.6	9.7
1	Jan-18	03-01-2018	78.6	24.4	4.9	10.5
2		05-01-2018	107.6	34.1	5.0	11.0
3		10-01-2018	109.9	34.2	4.8	10.3
4		12-01-2018	111.6	35.3	5.7	12.9
5		16-01-2018	118.0	37.3	5.3	11.1
6		18-01-2018	127.7	40.3	5.8	12.6
7		23-01-2018	104.9	33.0	4.7	10.4
8		25-01-2018	96.5	30.1	4.3	9.2
1	Feb-18	01-02-2018	75.7	23.5	4.7	10.6
2		05-02-2018	101.0	32.2	4.6	9.6
3		08-02-2018	113.8	35.3	5.1	11.0
4		12-02-2018	114.8	36.0	5.3	11.6
5		15-02-2018	115.2	36.1	5.0	11.2
6		19-02-2018	130.9	41.0	5.8	13.1
7		22-02-2018	105.7	33.4	4.6	9.8
8		26-02-2018	99.7	31.6	4.6	9.9

	Min		75.7	23.5	4.3	9.2
	Max		130.9	41.0	5.8	13.1
	Mean		105.9	33.4	5.0	10.8
	10th percentile		84.0	26.5	4.6	9.7
	30th percentile		101.9	32.4	4.7	10.2
	50th percentile		105.8	33.6	4.9	10.6
	95th percentile		127.0	40.1	5.8	12.8
	98th percentile		129.4	40.7	5.8	13.0

Station: A 5, DHANGARWADI VILLAGE						
S.No.	Month	Date	SPM	PM 10	SO_2 (µg/m^3)	NO_x (µg/m^3)
			µg/m^3	µg/m^3	24 hrs Average	24 hrs Average
1	Dec-17	05-12-2017	113.0	36.2	5.0	10.8
2		07-12-2017	107.0	34.4	4.8	10.8
3		12-12-2017	97.0	31.8	4.5	9.6
4		14-12-2017	106.0	34.0	4.9	11.3
5		19-12-2017	105.0	34.0	4.9	12.0
6		21-12-2017	113.0	36.7	5.2	11.2
7		26-12-2017	105.0	34.6	4.8	9.8
8		28-12-2017	108.0	35.2	4.9	10.0
1	Jan-18	03-01-2018	120.7	39.0	5.5	12.5
2		05-01-2018	114.0	37.5	5.3	11.4
3		10-01-2018	101.8	32.9	4.8	10.2
4		12-01-2018	112.0	36.4	5.3	11.8
5		16-01-2018	112.3	36.0	5.1	10.5
6		18-01-2018	117.2	38.0	5.2	12.0
7		23-01-2018	108.1	35.5	4.9	10.1
8		25-01-2018	109.0	35.6	5.0	10.7
1	Feb-18	01-02-2018	118.0	38.4	5.4	12.3
2		05-02-2018	107.6	34.7	5.0	10.3
3		08-02-2018	105.7	34.7	4.9	11.2
4		12-02-2018	115.6	37.4	5.3	13.0
5		15-02-2018	110.2	36.2	5.0	11.2
6		19-02-2018	121.1	39.3	5.5	11.2
7		22-02-2018	111.5	36.0	5.0	10.6
8		26-02-2018	112.9	36.5	5.2	12.7

	Min		**97.0**	**31.8**	**4.5**	**9.6**
	Max		**121.1**	**39.3**	**5.5**	**13.0**
	Mean		**110.5**	**35.9**	**5.1**	**11.1**
	10th percentile		**105.0**	**34.0**	**4.8**	**10.1**
	30th percentile		**107.5**	**34.7**	**4.9**	**10.6**
	50th percentile		**110.8**	**36.0**	**5.0**	**11.2**
	95th percentile		**120.3**	**38.9**	**5.5**	**12.7**
	98th percentile		**120.9**	**39.1**	**5.5**	**12.9**

AMBIENT AIR QUALITY

Station: A6, THANEWADI VILLAGE						
S.No.	Month	Date	SPM	PM 10	SO_2 (µg/m^3)	NO_x (µg/m^3)
			µg/m^3	µg/m^3	24 hrs Average	24 hrs Average
1	Dec-17	05-12-2017	106.0	34.8	5.1	11.5
2		07-12-2017	103.0	33.3	4.9	9.7
3		12-12-2017	107.0	34.6	5.0	10.3
4		14-12-2017	101.0	33.2	4.8	10.3
5		19-12-2017	104.0	33.4	4.8	10.7
6		21-12-2017	122.0	39.2	5.6	12.5
7		26-12-2017	103.0	33.0	5.2	10.2
8		28-12-2017	99.0	32.5	5.1	10.1
1	Jan-18	03-01-2018	113.4	36.8	5.1	10.4
2		05-01-2018	109.3	35.7	5.1	10.9
3		10-01-2018	111.8	36.1	5.3	11.9
4		12-01-2018	106.2	34.2	5.0	11.2
5		16-01-2018	111.3	36.2	5.2	9.6
6		18-01-2018	126.5	40.9	5.9	11.8
7		23-01-2018	106.8	34.4	4.9	10.1
8		25-01-2018	93.4	30.2	4.8	10.3
1	Feb-18	01-02-2018	110.4	35.7	4.2	9.5
2		05-02-2018	103.2	33.0	4.6	10.3
3		08-02-2018	119.0	39.0	5.4	9.4
4		12-02-2018	109.5	35.9	5.1	11.0
5		15-02-2018	108.7	35.0	4.9	9.9
6		19-02-2018	129.9	41.9	5.8	12.5
7		22-02-2018	110.0	36.0	5.0	11.2
8		26-02-2018	97.2	31.9	4.5	9.3

	Min		**93.4**	**30.2**	**4.2**	**9.3**
	Max		**129.9**	**41.9**	**5.9**	**12.5**
	Mean		**108.8**	**35.3**	**5.0**	**10.6**
	10th percentile		**99.6**	**32.6**	**4.6**	**9.5**
	30th percentile		**103.9**	**33.4**	**4.9**	**10.1**
	50th percentile		**107.9**	**34.9**	**5.0**	**10.3**
	95th percentile		**125.8**	**40.6**	**5.8**	**12.4**
	98th percentile		**128.4**	**41.4**	**5.9**	**12.5**

AMBIENT AIR QUALITY

Station: A7, PANDPANIWADI VILLAGE						
S.No.	Month	Date	SPM	PM 10	SO_2 (µg/m^3)	NO_x (µg/m^3)
			µg/m^3	µg/m^3	24 hrs Average	24 hrs Average
1	Dec-17	05-12-2017	104.0	32.2	4.7	9.9
2		07-12-2017	101.0	31.5	4.6	10.0
3		12-12-2017	99.0	30.8	4.4	9.5
4		14-12-2017	110.0	34.2	4.9	11.1
5		19-12-2017	113.0	35.6	4.9	10.6
6		21-12-2017	119.0	37.1	5.4	12.2
7		26-12-2017	121.0	37.6	5.3	11.1
8		28-12-2017	100.0	31.6	4.5	9.8
1	Jan-18	03-01-2018	111.2	35.3	5.1	11.0
2		05-01-2018	107.5	33.3	4.7	10.5
3		10-01-2018	103.4	32.2	4.6	10.0
4		12-01-2018	115.3	35.9	5.0	11.2
5		16-01-2018	120.9	38.3	5.6	11.7
6		18-01-2018	123.8	38.6	5.4	12.0
7		23-01-2018	124.7	39.5	5.6	12.0
8		25-01-2018	94.1	29.5	4.3	9.2
1	Feb-18	01-02-2018	108.2	33.7	4.7	10.1
2		05-02-2018	100.7	31.4	4.5	10.2
3		08-02-2018	112.4	35.5	4.9	11.1
4		12-02-2018	118.9	37.4	5.5	12.0
5		15-02-2018	124.7	39.0	5.4	11.6
6		19-02-2018	127.6	39.9	5.8	13.0
7		22-02-2018	127.8	40.3	5.6	12.1
8		26-02-2018	97.2	30.6	4.4	9.5

	Min		**94.1**	**29.5**	**4.3**	**9.2**
	Max		**127.8**	**40.3**	**5.8**	**13.0**
	Mean		**111.9**	**35.1**	**5.0**	**10.9**
	10th percentile		**99.3**	**31.0**	**4.4**	**9.6**
	30th percentile		**103.9**	**32.2**	**4.7**	**10.1**
	50th percentile		**111.8**	**35.4**	**4.9**	**11.0**
	95th percentile		**127.2**	**39.9**	**5.6**	**12.2**
	98th percentile		**127.7**	**40.2**	**5.7**	**12.6**

AMBIENT AIR QUALITY

Station: A 8, GAJAPUR VILLAGE						
S.No.	Month	Date	SPM	PM 10	SO_2 (µg/m^3)	NO_x (µg/m^3)
			µg/m^3	µg/m^3	24 hrs Average	24 hrs Average
1	Dec-17	05-12-2017	112.0	33.2	5.2	10.9
2		07-12-2017	113.0	33.5	4.9	10.7
3		12-12-2017	131.0	38.8	5.4	11.7
4		14-12-2017	134.0	39.7	5.7	12.8
5		19-12-2017	100.0	30.0	6.0	12.9
6		21-12-2017	107.0	31.3	4.6	10.3
7		26-12-2017	103.0	30.5	4.3	9.0
8		28-12-2017	105.0	30.9	4.6	10.1
1	Jan-18	03-01-2018	119.2	35.2	5.1	11.0
2		05-01-2018	119.9	35.1	4.9	11.0
3		10-01-2018	135.5	39.7	5.7	12.3
4		12-01-2018	139.4	41.3	5.7	12.9
5		16-01-2018	107.0	31.1	4.5	9.5
6		18-01-2018	111.2	32.7	4.6	10.1
7		23-01-2018	106.9	31.1	4.4	9.4
8		25-01-2018	111.9	32.6	5.1	11.0
1	Feb-18	01-02-2018	116.5	33.9	4.7	10.2
2		05-02-2018	113.8	33.7	4.9	11.9
3		08-02-2018	138.7	40.8	5.7	12.7
4		12-02-2018	142.7	41.9	6.1	13.5
5		15-02-2018	107.3	31.8	4.4	9.5
6		19-02-2018	114.7	34.1	4.9	11.1
7		22-02-2018	110.6	32.5	4.5	11.1
8		26-02-2018	115.5	33.5	5.3	11.4

	Min		100.0	30.0	4.3	9.0
	Max		142.7	41.9	6.1	13.5
	Mean		117.3	34.5	5.1	11.1
	10th percentile		105.6	31.0	4.5	9.5
	30th percentile		110.3	32.4	4.6	10.3
	50th percentile		113.4	33.5	4.9	11.0
	95th percentile		139.3	41.2	6.0	12.9
	98th percentile		141.2	41.7	6.1	13.2

BDL for SO2-2.0 & NO2-4.5

NOTE: The results relate only to the conditions prevailing at the time of sampling

Method of measurement: As per CPCB Manual & IS 5182

ENVIRONMENTAL QUALITY MONITORING REPORT

POST MONSOON 2017

M/S HINDALCO INDUSTRIES LIMITED

DHANGARWADI BAUXITE MINE

DHANGARWADI VILLAGE,
SAHUWADI TALUK,

KOLHAPUR DISTRICT,
MAHARASHTRA

IND.BH.41.16.0142/HSR

BHAGAVATHI ANA LABS

PREPARED BY

BHAGAVATHI ANA LABS PVT LTD.,
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Sanathnagar, Hyderabad
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BHAGAVATHI ANA LABS PVT. LTD. GOA

PREFACE

Environmental quality monitoring at **Dhangarwadi bauxite mine** situated at Dhangarwadi village, Shahuwadi taluka, Kolhapur, Maharashtra of **M/S. Hindalco Industries Limited** entrusted to **Bhagavathi Ana Labs Pvt. Limited, Hyderabad** during Post Monsoon season of the year 2017.

The monitoring was carried out in the selected locations in core zone and buffer zone around the mine lease area during the months of August, September & October 2017 for the following environmental parameters.

- → Micro-meteorology,
- → Ambient air quality,
- → Ambient noise level quality,
- → Water quality

The data was compiled to assess the current environmental status due to mining as well as allied activities around the surrounding villages in the study area.

Bhagavathi Ana Labs Pvt. Limited, Hyderabad gratefully acknowledges the cooperation extended by management and staff of M/S Hindalco Industries Limited and the village people to their field staff.

EXECUTIVE SUMMARY

Dhangarwadi Bauxite Mine of **M/S Hindalco Industries Limited** includes the study of the ambient air quality, noise level quality, water quality in core zone and buffer zone around the mine lease area during the Post Monsoon season of the year 2017.

AMBIENT AIR QUALITY

The scenario of the existing ambient air quality in the study region has been assessed through a network of selected ambient air quality locations. Pre-calibrated respirable dust sampler has been used for monitoring the existing AAQ status. Maximum, minimum, average and percentile values have been computed from the raw data collected at all individual sampling stations to represent the ambient air quality status.

AMBIENT NOISE LEVEL MONITORING

Mining and allied activities usually cause noise pollution. To know the ambient noise levels in the study area, noise levels were recorded at mining area and nearby villages using noise level recorder.

WATER QUALITY MONITORING

Water quality monitoring consists of the study of surface and ground water sources and its quality in the core and buffer zone of the lease area. Assessment of water quality in the study area and in the mine area includes the quality assessment of parameters as per the Indian Standard IS 10500 (Drinking water standard). Water samples were collected from selected locations during study period and analyzed in the laboratory as per the standard IS & APHA procedures.

MICROMETEOROLOGY

Meteorological scenario helps to understand the trends of the climatic factors. It also helps in the identification of sampling stations in the study area. Meteorological scenario exerts a critical influence on air quality as the pollution arises from the interaction of atmospheric contaminants with adverse meteorological conditions

AREA DETAILS

INTRODUCTION

Hindalco Industries is one of the leading producer of aluminum in the country. The company business involves bauxite mining to alumina refining. Alumina metal conversion, sheet, extrusion, foil manufacturing and is spread all over the country. The company is operating number of bauxite mines in Maharashtra, Orissa, Chhattisgarh and Jharkhand to feed the Alumina Plants located in Belgaum, Renukut and Muri.

On getting concurrence from Central Government, Government of Maharashtra has indicated its intention to grant mining lease over of 122.63 ha, out of which 41.80 ha falls under non forest area. As per the directions of the Government of Maharashtra the mining plan was prepared for the entire lease area of 122.63 ha and the same was approved by the Indian Bureau of Mines vide letter no. MP/KLP/MAH-73-SZ, DT.11/11/2003. On submission of approved mining plan Government of Maharashtra has sanctioned mining lease for the production of bauxite for the revenue land of 41.80 and keeping pending of sanction of mining lease for the forest land of 80.83 ha subject to obtaining "No Objection certificate" from the Ministry of Environment and Forest, Govt. of India. The Environmental Clearance was obtained for the production of 0.6 million TPA of bauxite over an entire area of 122.63 ha.

Considering the delay in the process of forest clearance for the area falling under forest land, the Government of Maharashtra has granted mining lease only for the non forest land of 41.80 ha. by keeping pending the grant of mining lease for the forest area. Accordingly, the mining lease was executed by the collector of Kolhapur over an area 41.80 ha. on 05/05/2008 for period of 30 years.

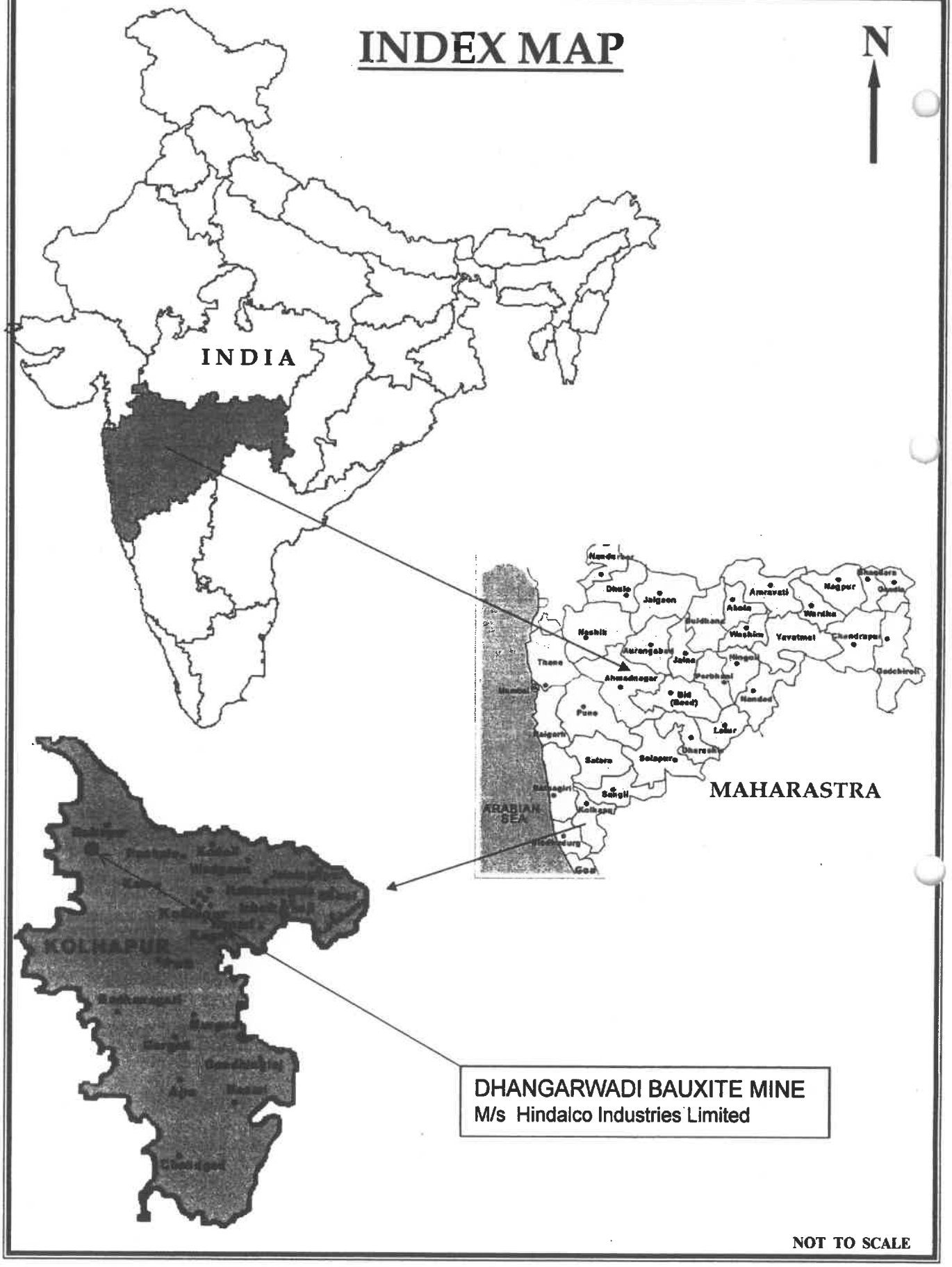
MINE DETAIL

Dhangarwadi bauxite mine is located near Dhangarwadi village of Shahuwadi taluka of Kolhapur District in Maharashtra state.

GEOGRAPHICAL DETAILS:

Latitude	:	$16^0\,52'$ to $16^0\,56'$
Longitude	:	$73^0\,48'$ to $73^0\,51'$

INDEX MAP


N
INDIA
MAHARASTRA
ARABIAN SEA
KOLHAPUR
DHANGARWADI BAUXITE MINE
M/s Hindalco Industries Limited
NOT TO SCALE

Details of lease area

The following table gives the details of the area in terms of district, taluka, village, gat no., etc.

District	Taluka	Village	Gat No.	Area granted (ha)	Owner/Occupier.
Kolhapur	Shahuwadi	Dhangarwadi			
"	"	"	45	12.32	Private land
"	"	"	46(part)	6.53	Private land
"	"	"	50(part)	2.17	Private land
"	"	"	52	10.58	Private land
"	"	"	53(part)	5.09	Private land
"	"	"	56(part)	2.76	Private land
Kolhapur	Shahuwadi	Ainwadi	106(part)	2.35	Private land
				41.80	

ACCESSIBILITY

The district headquarter Kolhapur is connected to Mumbai by broad gauge railway line of South Central Railway of Indian Railway. Daily trains services are available from Mumbai and many other important places to Kolhapur. The nearest (i) railway station is Kolhapur at a distance of 56 kms eastwards with respect to the mines. The district is well served by a network of good roads - National Highways, State Highways and Major District roads. The National Highway Mumbai – Pune- Bangalore passes through Kolhapur.

Road

Dhangarwadi is approachable by a distance of 8 kms from Dhopeshwar Junction, located 6 kms from Malkapur Town on Ratnagiri – Nagpur National Highway.

Rail head

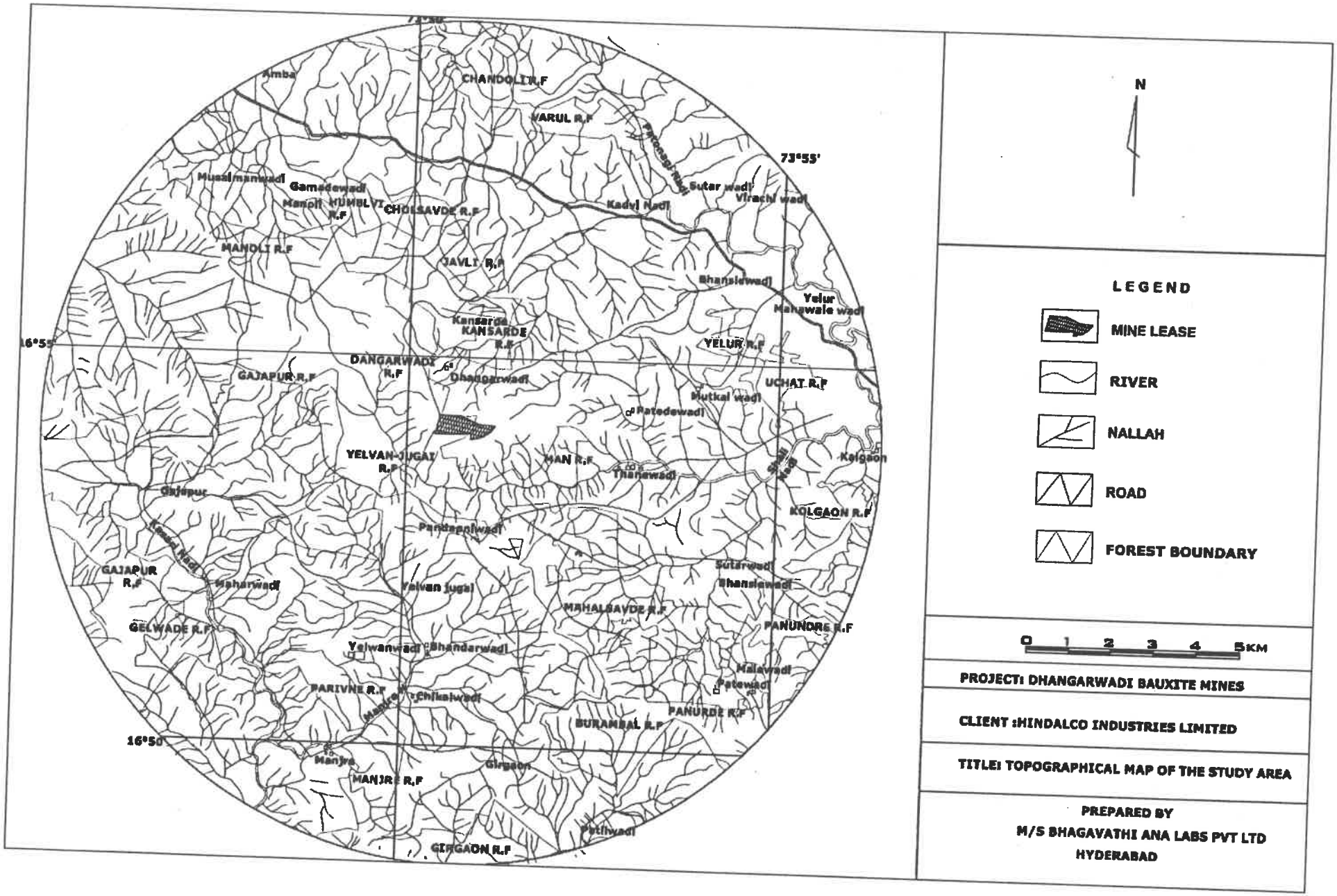
The nearest railway head is Kolhapur which is situated at a distance of about 56 kms by road from the lease area.

Sea Port

The nearest sea port is Ratnagiri sea port is about 95 kms form the mine

Airport

The nearest airport is at Kolhapur which is around 60 kms by road from the lease area.



PROJECT: DHANGARWADI BAUXITE MINES

CLIENT :HINDALCO INDUSTRIES LIMITED

TITLE: TOPOGRAPHICAL MAP OF THE STUDY AREA

PREPARED BY
M/S BHAGAVATHI ANA LABS PVT LTD
HYDERABAD

DHANGARWADI BAUXITE MINE
(M/s. Hindalco Industries Limited)

DETAILS

State	Maharashtra
District	Kolhapur
Taluka	Shahuwadi
Village	Dhangarwadi
Latitude	16^0 52′ to 16^0 56′
Longitude	73^0 48′ to 73^0 51′
Nature of the area	Plateau terrain
Topposheet no.	47 H/13.

GENERAL CLIMATIC CONDITIONS

Maximum temperature	40.0 °C
Minimum temperature	16.0° C

ACCESSIBILITY

Road connectivity	Approached by road connecting to Dhopeshwar Junction which is at a distance of 8 kms, located 6 kms from Malkapur Town on Ratnagiri-Nagpur National Highway (NH-4).
Rail connectivity	Kolhapur railway station (56km)
Airport	Kolhapur(60km)
Biosphere reserve	Not any
Sanctuary	Chandoli wild life sanctuary is situated at about 50 kms .

MICRO-METEOROLOGY

Meteorological data within the project area during the air quality survey period was assessed

PRIMARY / BASIC METEOROLOGICAL PARAMETERS

→ Wind Velocity

→ Wind Direction

Since the dispersion and diffusion of pollutants mainly depend on the above factors these factors are considered as primary meteorological parameters.

SECONDARY METEOROLOGICAL PARAMETERS

→ Ambient Temperature

MICRO-METEOROLOGICAL DATA

DATE	TEMPERATURE			WIND SPEED Km/h			WIND DIRECTION
	MIN	MAX	AVERAGE	MIN	MAX	AVERAGE	
06-09-2017	25	32	28.5	0	1.2	0.6	W
08-09-2017	25	32	28.5	0	4	2.0	SW
12-09-2017	25	32	28.5	0	3.2	1.6	SW
15-09-2017	24	30	27.0	0	6	3.0	SW
19-09-2017	23	27	25.0	0	4.3	2.2	S
21-09-2017	23	26	24.5	0	4.5	2.3	SE
25-09-2017	25	31	28.0	0	4.3	2.2	SE
27-09-2017	25	31	28.0	0	2.3	1.2	E

MICRO-METEOROLOGICAL DATA

DATE	TEMPERATURE			WIND SPEED Km/h			WIND DIRECTION
	MIN	MAX	AVERAGE	MIN	MAX	AVERAGE	
02-10-2017	24	31	27.5	0	1.2	0.6	NNW
03-10-2017	23	31	27.0	0	2	1.0	NE
09-10-2017	25	32	28.5	0	2	1.0	NE
10-10-2017	25	32	28.5	0	3	1.5	SW
16-10-2017	25	31	28.0	0	3.1	1.6	SSW
17-10-2017	23.1	33.4	28.3	0	1.3	0.7	SW
23-10-2017	25	32	28.5	0	1.4	0.7	SW
24-10-2017	25	35	30.0	0	2.3	1.2	SW

MICRO-METEOROLOGICAL DATA

DATE	TEMPERATURE			WIND SPEED Km/h			WIND DIRECTION
	MIN	MAX	AVERAGE	MIN	MAX	AVERAGE	
02-11-2017	23	36	29.5	0	3.2	1.6	SE
04-11-2017	19	35	27.0	0	3.1	1.6	E
07-11-2017	23	35	29.0	0	1.4	0.7	SE
08-11-2017	21	36	28.5	0	5	2.5	SSE
13-11-2017	18	34	26.0	0	1.4	0.7	SE
14-11-2017	17	36	26.5	0	4	2.0	E
20-11-2017	24	33	28.5	0	1.6	0.8	E
21-11-2017	25	35	30.0	0	2.3	1.2	SE

ENVIRONMENTAL QUALITY

Environmental quality monitoring at **Dhangarwadi Bauxite Mine** of **M/S Hindalco Industries Limited** at Dhangarwadi village of Shahuwadi taluka, Kolhapur district, Maharashtra includes monitoring of various environmental components like air, noise, water quality status within core zone and buffer zone around the mine lease area.

AMBIENT AIR QUALITY

The main aim of the ambient air quality monitoring within core zone and buffer zone was to assess the environmental condition and to know the existing levels of the air pollution in the project area. Air pollution forms an important and critical factor to study the environmental issues in the mining areas. Thus, air quality has to be frequently monitored to know the extent of pollution due to mining and allied activities. Ambient air quality monitoring stations were set up at eight selected locations, 4 in core zone and 4 in buffer zone.

SELECTION OF SAMPLING LOCATIONS

The status of the ambient air quality has been assessed through ambient air quality-monitoring network. The design of monitoring network in the air quality surveillance program has been based on the following considerations:

- Meteorological conditions on synoptic scale
- Topography of the study area
- Representatives of regional background air quality for obtaining

Ambient air quality monitoring stations were set up at eight locations, 4 in core zone and 4 in buffer zone with due considerations to the above mentioned points.

INSTRUMENT USED FOR SAMPLING

Respirable dust samplers APM-460 BL instruments were used for monitoring suspended particulate matter, particulate matter (PM10), gaseous pollutants etc.

METHOD FOR TESTING SPM / PM10

Name of Pollutant	SPM / PM10
Medium	Air
Instrument	Respirable Dust Sampler
Duration	Every 24 hours
Mode	Continuous
Unit	$\mu g/m^3$
Method	Gravimetric

METHOD FOR TESTING

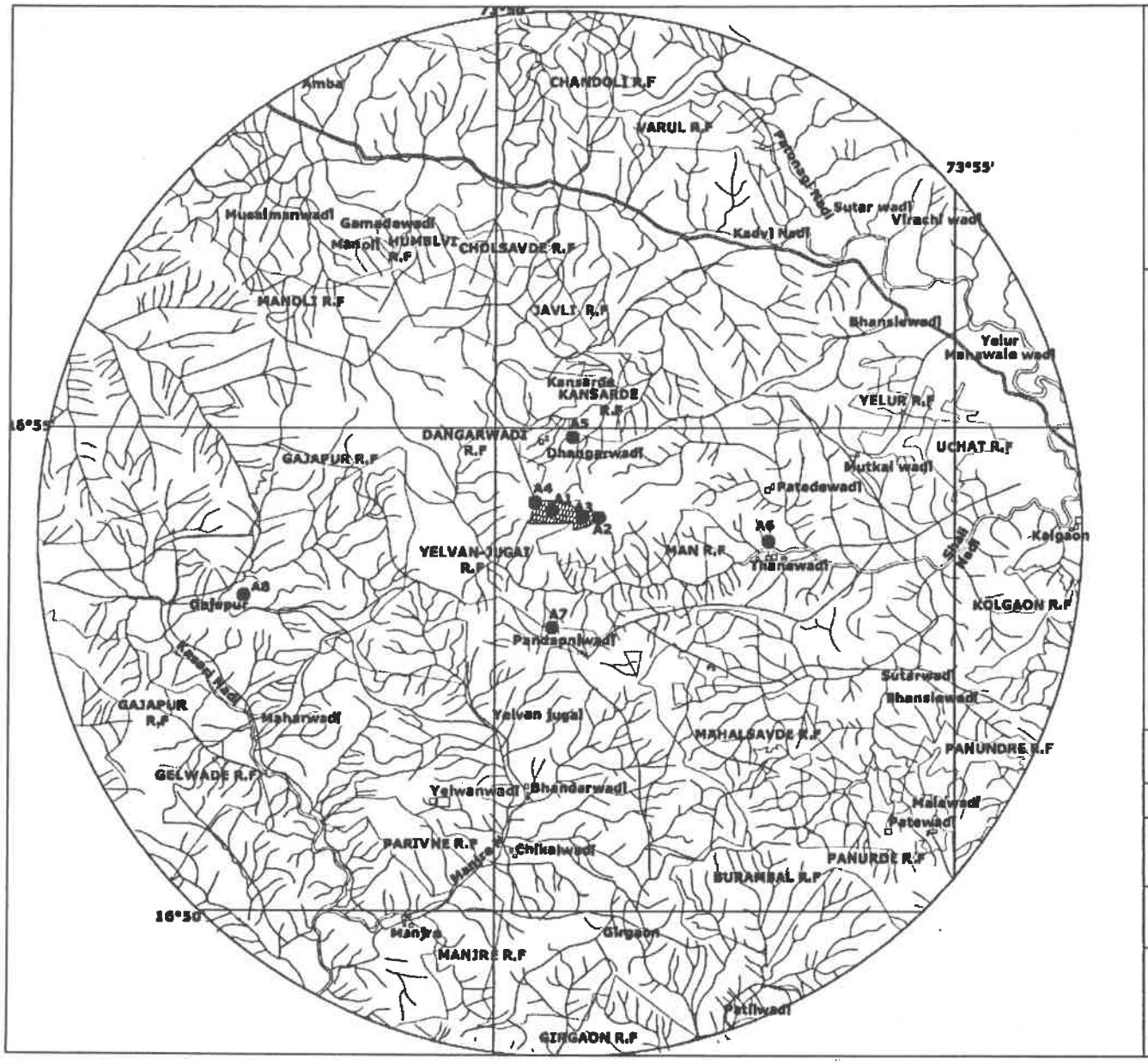
Name of Pollutant	**Sulphur dioxide**	**Oxides of Nitrogen**
Method	Modified West & Geake Method	Modified Jacob & Hochheiser Modified (Na-Arsenite) Method
Frequency	8 hour	8 hour
Mode	Continuous	Continuous
Unit	$\mu g/m^3$	µg/m3
Procedure	As per IS 5182 (Part II)	As per IS 5182 (Part IV), 1975

AMBIENT AIR QUALITY MONITORING STATION

SL. NO	STATION CODE	NAME OF SAMPLING STATION	DIRECTION w.r.t MINES LEASE AREA	DISTANCE FROM LEASE AREA (Arial distance)
1	A – 1	Core zone	- - -	- - -
2	A – 2	Near Dumping Site	- - -	- - -
3	A – 3	Near Haulage Road	- - -	- - -
4	A– 4	Near Mines office	- - -	- - -
5	A – 5	Dhangarwadi village	N	2.1km
6	A – 6	Thanewadi village	ESE	3.7km
7	A – 7	Pandapniwadi village	S	2.2km
8	A – 8	Gajapur village	WSW	5.6km

Monitoring Location Details

Respirable dust sampler was placed at a height of 3 m above the ground level in above mentioned monitoring locations. These stations were selected so as to assess present pollution level due to mining and allied activities. The observed levels of SPM, PM 10, SO_2, NO_x collected during Post Monsoon season of the year 2017 are presented in detail in annexure and are summarized in the following table.



N

LEGEND

- MINE LEASE
- RIVER
- NALLAH
- ROAD
- FOREST BOUNDARY
- AIR MONITORING LOCATION

0 1 2 3 4 5KM

PROJECT: DHANGARWADI BAUXITE MINES

CLIENT :HINDALCO INDUSTRIES LIMITED

TITLE: AIR MONITORING LOCATIONS MAP

PREPARED BY

M/S BHAGAVATHI ANA LABS PVT LTD
HYDERABAD

SUMMARY OF AMBIENT AIR QUALITY

Sl. No.	Location		SPM	PM 10	SO_2	NOx
1	Core zone	Min	52.0	15.8	4.5	9.4
		Max	109.9	33.7	6.8	15.7
		Average	91.4	27.9	5.1	11.7
		98th %tile	109.0	33.4	6.5	15.6
2	Near Dumping site	Min	67.0	21.5	5.4	11.3
		Max	107.2	34.1	8.5	19.2
		Average	86.9	27.5	6.9	15.2
		98th %tile	105.7	33.6	8.4	19.0
3	Near Haulage Road	Min	72.0	25.4	5.1	10.9
		Max	101.2	35.2	7.0	15.5
		Average	91.8	31.7	6.3	13.4
		98th %tile	100.7	34.9	7.0	15.2
4	Near Mines office	Min	56.0	17.8	5.7	12.1
		Max	108.9	34.0	7.4	16.7
		Average	92.9	29.2	6.6	14.6
		98th %tile	107.9	34.0	7.4	16.6
5	Dhangarwadi village	Min	56.5	18.4	4.6	9.9
		Max	151.3	48.9	12.2	26.3
		Average	107.9	35.0	8.8	18.7
		98th %tile	150.3	48.6	12.2	26.1
6	Thanewadi village	Min	78.0	24.5	4.9	9.3
		Max	101.6	31.8	6.4	14.9
		Average	90.9	28.7	5.7	12.5
		98th %tile	100.1	31.5	6.3	14.8
7	Pandapniwadi village	Min	79.0	23.8	4.8	9.5
		Max	113.5	33.0	6.6	15.1
		Average	96.9	28.7	5.7	12.6
		98th %tile	111.9	32.6	6.5	14.7
8	Gajapur village	Min	73.9	22.2	5.5	12.3
		Max	112.2	33.1	8.3	18.8
		Average	97.3	28.7	7.2	16.0
		98th %tile	110.5	32.6	8.2	18.4

NOTE: The results relate only to the condition prevailing at the time of sampling
Method of measurement: As per IS 5182

AMBIENT NOISE LEVEL QUALITY

Noise is nothing but unwanted sound produced due to various activities. As a part of occupational health and safety measures, certain safeguards have been incorporated to mitigate noise pollution in working environment. Noise pollution survey has been carried out in the study area to assess the impacts of the mining activities. So noise level surveys were carried out at 8 selected locations in and around the mine lease area. Noise survey has been conducted in the study area for the period of 24 hr at each location.

AMBIENT NOISE LEVEL MONITORING STATIONS

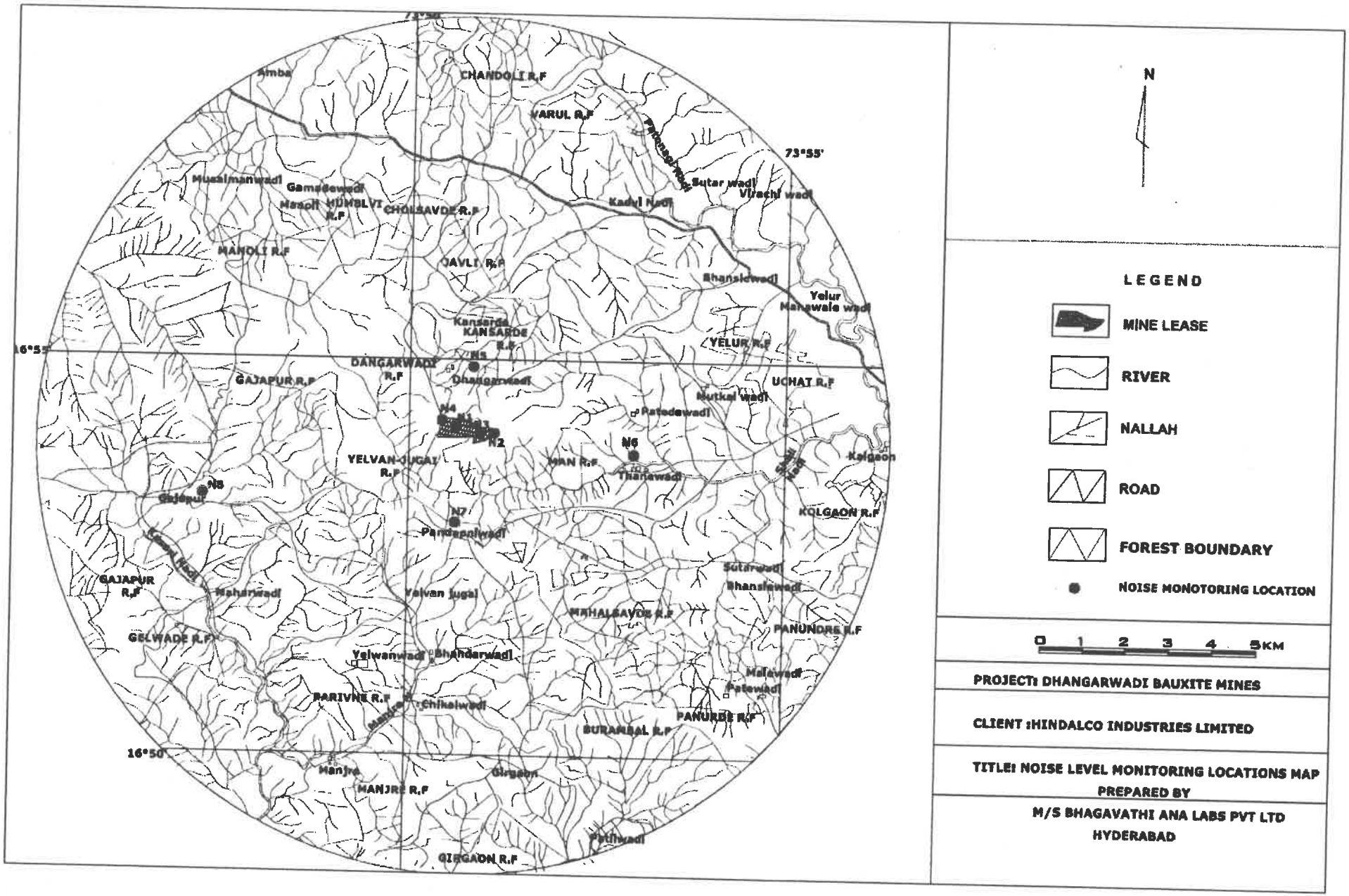
SL. NO	STATION CODE	NAME OF SAMPLING STATION	DIRECTION w.r.t MINES LEASE AREA	DISTANCE FROM LEASE AREA (Arial distance)
1	N– 1	Core zone	- - -	- - -
2	N – 2	Near Dumping Site	- - -	- - -
3	N – 3	Near Haulage Road	- - -	- - -
4	N– 4	Near Mines office	- - -	- - -
5	N – 5	Dhangarwadi village	N	2.1km
6	N – 6	Thanewadi village	ESE	3.7km
7	N – 7	Pandapniwadi village	S	2.2km
8	N – 8	Gajapur village	SW	5.6km

NATIONAL AMBIENT NOISE QUALITY STANDARDS

AREA CODE	CATEGORY OF AREA	LIMIT IN dB (A) Leq	
		DAY TIME	NIGHT TIME
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

Note:

1. **Day time is reckoned in between 6 am and 9 pm.**
2. **Night time is reckoned in between 9 pm and 6 am.**
3. **Silence zone is defined as area upto 100 meters around such premises as hospitals, educational institutions and courts. The silence zones are to be declared by the Competent Authority.**
4. **Mixed categories of areas should be declared as "one of the four above mentioned categories by the Competent Authority and the corresponding standards shall apply.**


Amba
CHANDOLI R.F
VARUL R.F
73°55'
Musalmanwadi
Gamadewadi
Masoli
HUMBLVT R.F
CHOUSAVDE R.F
Kadvi Nadi
Sutar wadi
Virachi wadi
MANOLI R.F
JAVLI R.F
Bhanslewadi
Yelur Manawale wadi
Kansarde
KANSARDE R.F
YELUR R.F
16°55'
DANGARWADI R.F
N5
Dhangarwadi
GAJAPUR R.F
UCHAT R.F
Nutkal wadi
Patodewadi
N4
N1
N3
N2
N6
YELVAN-JUGAI R.F
MAN R.F
Thanewadi
Kolgaon
N8
Gajapur
KOLGAON R.F
N7
Pandapalwadi
Sutarwadi
Bhanslewadi
GAJAPUR R.F
Maharwadi
Yelvan Jugai
MAHALSAVDE R.F
PANUNDRE R.F
GELWADE R.F
Yelwanwadi
Bhandarwadi
Malewadi
Patewadi
BARIVNE R.F
Chikalwadi
PANURDE R.F
BURAMBAL R.F
16°50'
Manjre
Girgaon
MANJRE R.F
Pathrwadi
GIRGAON R.F
N
LEGEND
MINE LEASE
RIVER
NALLAH
ROAD
FOREST BOUNDARY
NOISE MONOTORING LOCATION
0 1 2 3 4 5KM
PROJECT: DHANGARWADI BAUXITE MINES
CLIENT :HINDALCO INDUSTRIES LIMITED
TITLE: NOISE LEVEL MONITORING LOCATIONS MAP
PREPARED BY
M/S BHAGAVATHI ANA LABS PVT LTD
HYDERABAD

AMBIENT NOISE LEVEL MONITORING RESULTS [Leq in dB(A)]

Time	N1, Core zone	N2, Near Dumping site	N3 Near Haulage road	N4, Near Mines Office	N5, Dhangarwadi village	N6, Thanewadi village	N7, Pandapniwadi village	N8, Gajapur village
06:00	56.3	57.8	60.4	60.4	60.6	46.7	48.2	48.5
07:00	57.9	58.7	60.3	60.5	61.2	54.1	56.6	56.2
08:00	58.9	59.9	61.5	62.0	62.4	56.1	59.1	58.0
09:00	62.6	63.1	63.0	63.5	63.2	58.6	62.4	61.4
10:00	64.4	65.4	65.3	66.2	66.2	60.9	65.2	63.4
11:00	67.2	68.8	67.6	68.6	68.6	68.9	73.7	71.2
12:00	67.9	68.3	67.7	68.9	68.6	70.3	74.5	72.0
13:00	67.8	68.6	68.0	69.3	69.1	68.3	72.8	70.1
14:00	67.1	69.0	70.0	69.6	70.7	68.5	72.4	70.0
15:00	66.2	67.5	67.3	67.0	68.4	66.8	70.9	68.1
16:00	71.3	73.1	70.3	71.2	71.8	65.1	69.8	66.8
17:00	72.7	73.8	67.6	71.5	68.9	64.1	68.5	65.0
18:00	68.4	70.0	69.4	70.4	70.0	62.3	67.1	63.3
19:00	64.8	64.6	64.2	65.8	65.0	61.1	66.4	62.1
20:00	60.2	61.4	61.2	61.0	61.5	56.3	61.1	56.5
21:00	60.2	60.9	60.9	60.7	60.8	55.2	59.8	55.5
22:00	59.5	60.8	61.0	60.9	62.0	49.3	52.7	49.1
23:00	59.4	60.6	60.7	61.1	61.7	48.2	51.6	48.6
00:00	59.8	61.0	62.0	61.8	62.8	47.9	51.3	49.0
01:00	59.2	59.9	60.1	61.0	60.8	48.7	52.1	49.4
02:00	59.0	58.9	58.4	59.9	59.1	49.0	53.0	50.1
03:00	59.2	59.9	59.6	61.4	60.8	49.6	53.5	50.8
04:00	59.2	60.3	61.9	61.8	62.8	45.0	48.5	45.2
05:00	59.2	60.2	61.2	61.5	62.5	44.5	48.5	45.2
Min	**56.3**	**57.8**	**58.4**	**59.9**	**59.1**	**44.5**	**48.2**	**45.2**
Max	**72.7**	**73.8**	**70.3**	**71.5**	**71.8**	**70.3**	**74.5**	**72.0**

All the obtained noise level quality values in core zone and buffer zone are compared with the noise level standards prescribed by Central Pollution Control Board. The observations revealed that the values are found to be within the limit.

WATER QUALITY

Water quality monitoring consists of the study of water sources and its quality in the core and buffer zone of the lease area. Its study consists of following two important systems of water bodies:

- Surface water quality.
- Ground water quality.

- **Surface water quality**

  Tamrapani and Ghataprabha River are the surface water source in the study area. There are others seasonal nallah which flows in the study area. Proper drainage system has prepared to drag the monsoon water into the mine pit so as to reduce the water pollution.

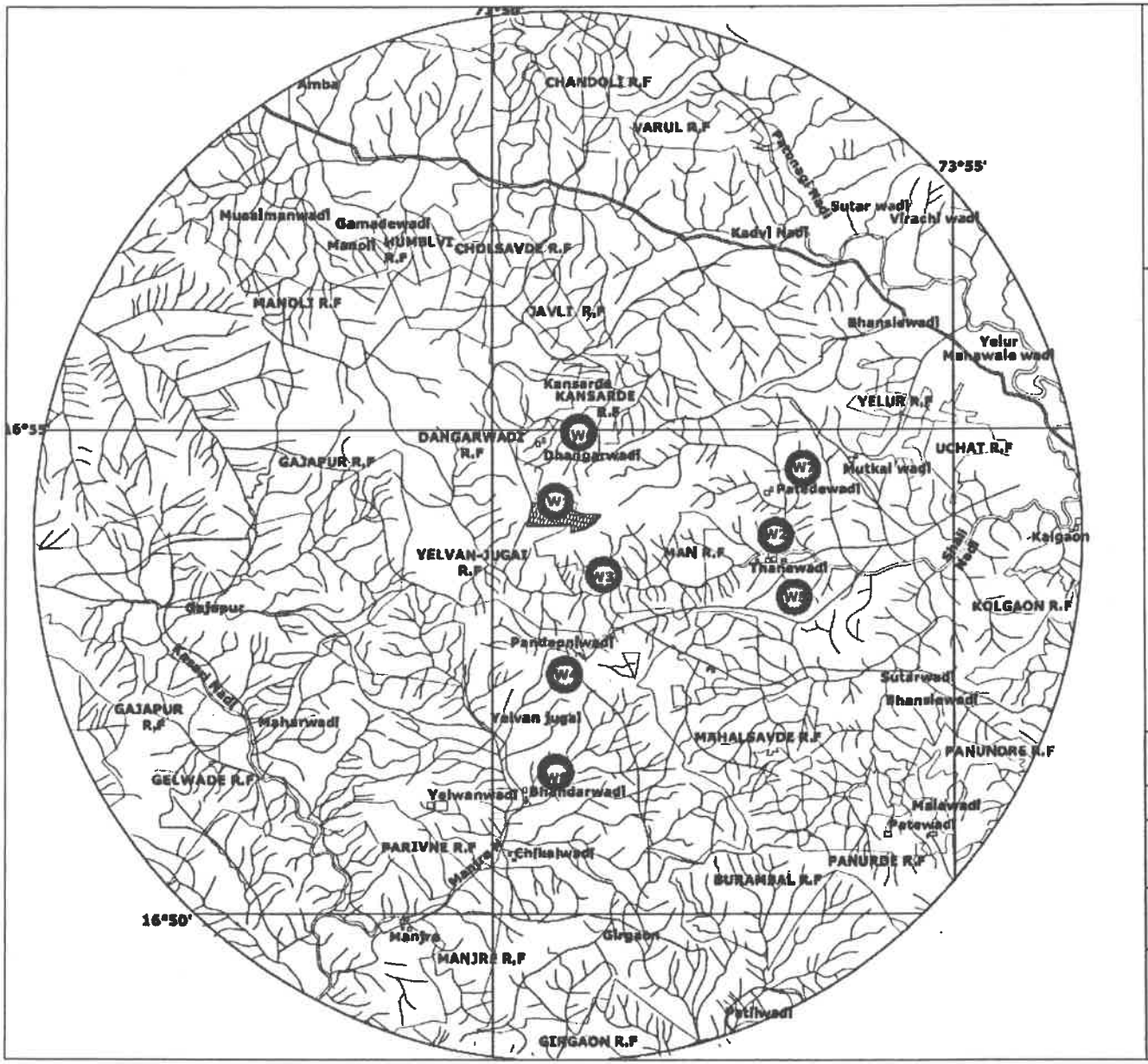
- **Ground water quality**

  The most important source of drinking water in the study area is the ground water, which is tapped by a bore well. The buffer zone is good in ground water source.

Assessment of water quality in the study area and in the mine area includes the quality assessment of parameters as per the Indian Standard IS 10500 (Drinking water standard). A total of 8 locations have selected, out of which one in core zone and seven are in buffer zone. Location of water quality monitoring stations is given below.

WATER QUALITY MONITORING LOCATIONS

Code		Name of sampling station	Source of water
W – 1		Mine pit water	Surface water
W – 2		Shali nadi (up stream)	Surface water
W – 3		Shali nadi (down stream)	Surface water
W – 4		Pandapniwadi village	Ground water
W – 5		Thanewadi village	Ground water
W – 6		Dhangarwadi village	Ground water
W –7		Patewadi village	Ground water
W – 8		Bhandarwadi village	Ground water



N

LEGEND

- MINE LEASE
- RIVER
- NALLAH
- ROAD
- FOREST BOUNDARY
- WATER SAMPLING LOCATION

0 1 2 3 4 5KM

PROJECT: DHANGARWADI BAUXITE MINES

CLIENT :HINDALCO INDUSTRIES LIMITED

TITLE: WATER SAMPLING LOCATIONS MAP

PREPARED BY
M/S BHAGAVATHI ANA LABS PVT. LTD
HYDERABAD

SAMPLING DETAILS

The water samples were collected from selected sampling locations, which are coming under core zone and buffer zone around the mine lease area. Samples were collected in the Post Monsoon season of the year 2017 as per the prescribed sample collecting methods and analyzed as per the IS standard procedures. analysis report of water samples are given below.

SURFACE WATER QUALITY

Date of Sampling: 25.11.2017

Sl. No	Parameter	Units	W-1 MINE PIT WATER	W-2 SHALI NADI UP STREAM	W-3 SHALI NADI DOWN STREAM
1	Odour	–	Un-objectionable	Un-objectionable	Un-objectionable
2	Taste	–	Agreeable	Agreeable	Agreeable
3	Color	Hazen units	<5	<5	<5
4	pH	–	6.59	6.50	6.54
5	Turbidity	NTU	<5	<5	<5
6	Dissolved Oxygen	mg/l	6.6	6.60	6.40
7	Total Dissolved solids	mg/l	35	51	49
8	Total Suspended solids	mg/l	34	45	47
9	Alkalinity as $CaCO_3$	mg/l	20.0	16	20.0
10	Total Hardness as $CaCO_3$	mg/l	44.0	56.0	50.0
11	Nitrate as NO_3	mg/l	0.22	0.33	0.27
12	Phosphates as PO_4	mg/l	0.30	0.02	0.02
13	Chlorides as Cl	mg/l	9.5	11.6	12.57
14	Sulphates as SO_4	mg/l	2.3	3	1
15	Sodium as Na	mg/l	1.68	2.32	3.72
16	Potassium as K	mg/l	0.24	0.11	0.09
17	Calcium as Ca	mg/l	9.6	14.4	14.4
18	Magnesium as Mg	mg/l	4.8	4.8	3.36
19	Lead as Pb	mg/l	BDL	BDL	BDL
20	Manganese as Mn	mg/l	0.01	0.01	0.03
21	Cadmium as Cd	mg/l	BDL	BDL	BDL
22	Chromium as Cr	mg/l	BDL	BDL	BDL
23	Copper as Cu	mg/l	BDL	BDL	BDL
24	Zinc as Zn	mg/l	BDL	BDL	BDL
25	Iron as Fe	mg/l	0.10	0.09	0.50
26	Fluoride as F	mg/l	0.01	0.01	0.01
27	Mercury as Hg	mg/l	BDL	BDL	BDL
28	Selenium as Se	mg/l	BDL	BDL	BDL
29	Arsenic as As	mg/l	BDL	BDL	BDL
30	Cyanide as CN	mg/l	BDL	BDL	BDL
31	Boron as B	mg/l	BDL	BDL	BDL
32	B.O.D	mg/l	2	4	6

BDL: Below Detectable Limit mg/l: Milligram per liter

GROUND WATER QUALITY

Date of Sampling: 25.11.2017

Sl. No	Parameter	Units	W-4 PANDAPNIWADI VILLAGE	W - 5 THANEWADI VILLAGE	W -6 DHANGARWADI VILLAGE	W-7 PATEWADI VILLAGE	W -8 BHANDARWADI VILLAGE
1	Odour	–	Un-objectionable	Un-objectionable	Un-objectionable	Un-objectionable	Un-objectionable
2	Taste	–	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	Color	Hazen units	<5	<5	<5	<5	<5
4	pH	–	6.63	6.61	6.93	6.60	6.81
5	Turbidity	NTU	<5	<5	<5	<5	<5
6	Dissolved Oxygen	mg/l	5.00	4.50	5.10	4.30	4.00
7	Total Dissolved solids	mg/l	53	55	39	32	66
8	Total Suspended solids	mg/l	12	10	9	11	12
9	Alkalinity as $CaCO_3$	mg/l	16	12	8	12	19.3
10	Total Hardness as $CaCO_3$	mg/l	48.0	42.0	44.0	52.0	50.0
11	Nitrate as NO_3	mg/l	0.3	0.33	0.2	0.3	0.26
12	Phosphates as PO_4	mg/l	0.02	0.03	0.01	0.03	0.02
13	Chlorides as Cl	mg/l	10.63	11.6	10.63	8.7	13.53
14	Sulphates as SO_4	mg/l	1.3	2.1	1.1	1.4	3
15	Sodium as Na	mg/l	2.68	4.23	2.68	8.9	9.84
16	Potassium as K	mg/l	0.18	0.24	0.2	7.7	2.48
17	Calcium as Ca	mg/l	11.2	12.8	9.6	14.4	14.4
18	Magnesium as Mg	mg/l	4.8	2.4	4.8	3.84	3.36
19	Lead as Pb	mg/l	BDL	BDL	BDL	BDL	BDL
20	Manganese as Mn	mg/l	0.02	0.02	0.04	0.02	0.02
21	Cadmium as Cd	mg/l	BDL	BDL	BDL	BDL	BDL
22	Chromium as Cr	mg/l	BDL	BDL	BDL	BDL	BDL
23	Copper as Cu	mg/l	BDL	BDL	BDL	BDL	BDL
24	Zinc as Zn	mg/l	BDL	BDL	BDL	BDL	BDL
25	Iron as Fe	mg/l	0.17	0.05	0.16	0.30	0.30
26	Fluoride as F	mg/l	0.01	0.01	0.01	0.01	0.01
27	Mercury as Hg	mg/l	BDL	BDL	BDL	BDL	BDL
28	Selenium as Se	mg/l	BDL	BDL	BDL	BDL	BDL
29	Arsenic as As	mg/l	BDL	BDL	BDL	BDL	BDL
30	Cyanide as CN	mg/l	BDL	BDL	BDL	BDL	BDL
31	Boron as B	mg/l	BDL	BDL	BDL	BDL	BDL
32	B.O.D	mg/l	2	3	2	3	2

BDL: Below Detectable Limit **mg/l: Milligram per liter**

NOTE: The results relate only to the condition prevailing at the time of sampling

RESULTS & DISCUSSION

- The pH of the study area varies from 6.51 to 6.93 in the study area. The permissible range of pH is 6.5 to 8.5.
- Dissolved Oxygen content of the study area has been found to be in the range of 4 to 6.60.
- Total Dissolved Solids found to be in the range of 32 to 66 mg/l in the water sample collected in study area. As per IS 10500 standard for drinking water, the desirable limit is 500 mg/l and maximum permissible limit is 2000 mg/l.
- Alkalinity as $CaCO_3$ is found to be in the range of 8 to 20 in the water sample collected in study area. As per IS 10500 standard for drinking water, the desirable limit is 200 mg/l and maximum permissible limit is 600 mg/l.
- Total hardness as $CaCO_3$ of the water sample collected in the study area is found to in the range of 42 to 56 mg/l. As per IS 10500 standard for drinking water, the desirable limit is 300 mg/l and maximum permissible limit is 600 mg/l.
- Chloride of the water sample collected in the study area is found to in the range of 8.70 to 13.53 mg/l. As per IS 10500 standard for drinking water, the desirable limit is 250 mg/l and maximum permissible limit is 1000 mg/l.
- Calcium content of the water in the study area found to be in the range of 9.60 to 14.40 mg/l. As per IS 10500 standard for drinking water, the desirable limit 75 mg/l and maximum permissible limit is 200 mg/l.
- Magnesium content of the water in the study area found to be in the range of 2.40 to 4.80 mg/l.
- Iron content of the water in the study area found to be in the range of 0.05 to 0.5 mg/l. As per IS 10500 standard for drinking water, the desirable limit 0.3 mg/l and maximum permissible limit is 1.0 mg/l.

DRINKING WATER STANDARDS
AS PER IS: 10500

Sl.no	Parameter	Unit	Desirable limit as per is: 10500	Maximum permissible limit as per is: 10500
1	Odour		Un-objectionable	
2	Taste		Agreeable	
3	Colour	Hazen Units	5	25
4	pH		6.5 –8.5	
5	Turbidity	NTU	5	10
6	Dissolved Oxygen	mg /l	-----	
7	Total Dissolved Solids	mg /l	500	2000
8	Alkalinity as $CaCo_3$	mg /l	200	600
9	Total hardness as $CaCo_3$	mg /l	300	600
10	Nitrates NO_3	mg /l	45	100
11	Phosphates PO_4	mg /l	-----	
12	Chlorides as Cl	mg /l	250	1000
13	Sulphates, SO_4^{2-}	mg /l	200	400
14	Sodium as Na	mg /l	-----	
15	Potassium as K	mg /l	-----	
16	Calcium as Ca	mg /l	75	200
17	Magnesium, Mg	mg /l	30	100
18	Lead (Pb)	mg /l	0.05	0.05
19	Manganese	mg /l	0.1	0.3
20	Cadmium (Cd)	mg /l	0.01	0.01
21	Chromium (Cr)	mg /l	0.05	0.05
22	Copper (Cu)	mg /l	0.05	1.5
23	Zinc (Zn)	mg /l	5	15
24	Iron as Fe	mg /l	0.3	1.0
25	Fluoride as F	mg /l	1	1.5
26	Mercury as Hg	mg /l	0.001	0.001
27	Selenium as se	mg /l	0.01	0.01
28	Arsenic as As	mg /l	0.05	0.05
29	Cyanide as CN	mg/l	0.05	0.05
30	Boron as B	mg/l	1	5

DOMESTIC EFFLUENT ANALYSIS

Sample Type: **Canteen waste water**

Date of sampling: 25.11.2017

Sl.No	Test	Result
1	**Total Suspended Solids, mg/l**	**47**
2	**Total Dissolved Solids, mg/l**	**98**
3	**COD, mg/l**	**13**
4	**BOD for 3 days at 27°C, mg/l**	**4**
5	**Total Solids**	**67**
6	**Oil and Grease, mg/l**	**<5**

Sample Type: **Canteen waste water**

Date of sampling: 26.11.2017

Sl.No	Test	Result
1	**Total Suspended Solids, mg/l**	**40**
2	**Total Dissolved Solids, mg/l**	**67**
3	**COD, mg/l**	**10**
4	**BOD for 3 days at 27°C, mg/l**	**4**
5	**Total Solids**	**45**
6	**Oil and Grease, mg/l**	**<5**

BHAGAVATHI ANA LABS GOA

DHANGARWADI MINES				
WELL DEPTHS OF VILLAGES				
S.NO.	LOCATION	NAME OF THE MINE AREA	TOTAL DEPTH IN MTS	WATER LEVEL FROM SURFACEIN MTS
				25.11.2017
1	PANDAPNIWADI VILLAGE	DHANGARWADI	6.00	4
2	DHANGARWADI VILLAGE	DHANGARWADI	5.70	5.1

AMBIENT AIR QUALITY

Station: A1, CORE ZONE						
S.No.	Month	Date	SPM	PM 10	SO_2 (µg/m³)	NO_x (µg/m³)
			µg/m³	µg/m³	24 hrs Average	24 hrs Average
1	SEPTEMEBER 2017	06/09/2017	91.0	27.5	4.6	9.9
2		08/09/2017	MONITORING IS NOT CARRIED OUT DUE TO RAIN			
3		12/09/2017	102.0	31.5	5.2	11.0
4		15/09/2017	104.0	31.4	4.6	9.8
5		19/09/2017	MONITORING IS NOT CARRIED OUT DUE TO RAIN			
6		21/09/2017	100.0	31.0	5.2	11.9
7		25/09/2017	67.0	20.5	5.1	15.4
8		27/09/2017	52.0	15.8	5.3	14.1
1	Oct-17	02/10/2017	98.4	29.8	6.0	12.5
2		03/10/2017	96.3	29.5	4.9	15.5
3		09/10/2017	106.8	32.7	4.6	10.4
4		10/10/2017	99.6	30.0	6.0	13.8
5		16/10/2017	107.9	32.6	4.5	9.7
6		17/10/2017	104.5	32.3	4.7	9.4
7		23/10/2017	70.2	21.2	5.3	11.7
8		24/10/2017	58.1	17.9	4.5	9.6
1	Nov-17	02/11/2017	96.1	29.2	5.8	13.1
2		04/11/2017	89.8	27.4	6.8	15.7
3		07/11/2017	109.9	33.7	4.9	10.5
4		08/11/2017	97.2	29.7	5.0	14.8
5		13/11/2017	103.0	31.7	5.3	11.3
6		14/11/2017	107.9	33.0	4.6	9.8
7		20/11/2017	73.7	22.3	4.5	10.1
8		21/11/2017	62.0	18.9	4.7	10.8

	Min		52.0	15.8	4.5	9.4
	Max		109.9	33.7	6.8	15.7
	Mean		90.8	27.7	5.1	11.9
	10th percentile		62.5	19.0	4.5	9.7
	30th percentile		90.2	27.4	4.6	10.1
	50th percentile		97.8	29.7	4.9	11.2
	95th percentile		107.9	33.0	6.0	15.5
	98th percentile		109.1	33.4	6.5	15.6

BDL: BELOW DETECTABLE LIMIT

AMBIENT AIR QUALITY

Station: A2, NEAR DUMPING SITE						
S.No.	Month	Date	SPM	PM 10	SO_2 (µg/m^3)	NO_x (µg/m^3)
			µg/m^3	µg/m^3	24 hrs Average	24 hrs Average
1	SEPTEMEBER 2017	06/09/2017	67.0	21.5	5.4	11.3
2		08/09/2017	MONITORING IS NOT CARRIED OUT DUE TO RAIN			
3		12/09/2017	99.0	31.5	7.9	17.7
4		15/09/2017	103.0	31.9	8.0	18.8
5		19/09/2017	MONITORING IS NOT CARRIED OUT DUE TO RAIN			
6		21/09/2017	76.0	24.5	6.1	13.8
7		25/09/2017	74.0	23.0	5.7	12.9
8		27/09/2017	90.0	28.2	7.0	14.8
1	Oct-17	02/10/2017	74.9	24.0	6.0	12.9
2		03/10/2017	84.9	26.4	6.6	14.8
3		09/10/2017	95.2	30.2	7.6	17.7
4		10/10/2017	103.9	33.0	8.2	17.7
5		16/10/2017	94.7	30.1	7.5	17.0
6		17/10/2017	80.5	25.6	6.4	14.4
7		23/10/2017	77.8	24.5	6.1	13.8
8		24/10/2017	84.2	26.8	6.7	13.7
1	Nov-17	02/11/2017	72.0	22.7	5.7	12.8
2		04/11/2017	78.4	25.2	6.3	14.8
3		07/11/2017	93.0	29.2	7.3	15.7
4		08/11/2017	107.2	34.1	8.5	19.2
5		13/11/2017	98.6	31.4	7.8	17.6
6		14/11/2017	84.1	26.6	6.7	14.3
7		20/11/2017	80.8	25.3	6.3	14.2
8		21/11/2017	87.8	27.5	6.9	15.5

	Min		67.0	21.5	5.4	11.3
	Max		107.2	34.1	8.5	19.2
	Mean		86.7	27.4	6.9	15.2
	10th percentile		74.1	23.1	5.8	12.9
	30th percentile		79.0	25.2	6.3	13.9
	50th percentile		84.6	26.7	6.7	14.8
	95th percentile		103.8	32.9	8.2	18.7
	98th percentile		105.8	33.7	8.4	19.0

AMBIENT AIR QUALITY

Station: A3,NEAR HAULAGE ROAD						
S.No.	Month	Date	SPM	PM 10	SO_2 (µg/m³)	NO_x (µg/m³)
			µg/m³	µg/m³	24 hrs Average	24 hrs Average
1	SEPTEMEBER 2017	06/09/2017	90.0	30.8	6.2	13.2
2		08/09/2017	MONITORING IS NOT CARRIED OUT DUE TO RAIN			
3		12/09/2017	95.0	32.7	6.5	14.4
4		15/09/2017	99.0	34.4	6.9	14.8
5		19/09/2017	MONITORING IS NOT CARRIED OUT DUE TO RAIN			
6		21/09/2017	92.0	32.3	6.5	13.9
7		25/09/2017	94.0	32.6	6.5	13.3
8		27/09/2017	78.0	27.3	5.5	12.0
1	Oct-17	02/10/2017	97.4	33.4	6.7	14.4
2		03/10/2017	85.6	29.6	5.9	11.7
3		09/10/2017	95.6	33.0	6.6	14.2
4		10/10/2017	99.6	34.6	6.9	14.2
5		16/10/2017	93.8	32.6	6.5	14.4
6		17/10/2017	96.4	33.5	6.7	14.4
7		23/10/2017	97.9	33.5	6.7	13.3
8		24/10/2017	72.0	25.4	5.1	10.9
1	Nov-17	02/11/2017	94.6	32.8	6.6	13.4
2		04/11/2017	79.4	27.0	5.4	11.9
3		07/11/2017	96.5	33.7	6.7	14.5
4		08/11/2017	99.7	34.3	6.9	13.6
5		13/11/2017	91.8	31.4	6.3	13.5
6		14/11/2017	100.0	34.0	6.8	14.0
7		20/11/2017	101.2	35.2	7.0	15.5
8		21/11/2017	75.1	26.3	5.3	11.3

	Min		72.0	25.4	5.1	10.9
	Max		101.2	35.2	7.0	15.5
	Mean		92.0	31.8	6.4	13.5
	10th percentile		78.1	27.1	5.4	11.7
	30th percentile		91.8	31.6	6.3	13.3
	50th percentile		94.8	32.8	6.6	13.7
	95th percentile		100.0	34.6	6.9	14.8
	98th percentile		100.7	35.0	7.0	15.2

AMBIENT AIR QUALITY

Station: A4, NEAR MINES OFFICE						
S.No.	Month	Date	SPM	PM 10	SO_2 (µg/m^3)	NO_x (µg/m^3)
			µg/m^3	µg/m^3	24 hrs Average	24 hrs Average
1	SEPTEMEBER 2017	06/09/2017	89.0	28.5	6.2	14.6
2		08/09/2017	MONITORING IS NOT CARRIED OUT DUE TO RAIN			
3		12/09/2017	99.0	30.9	6.7	14.4
4		15/09/2017	100.0	31.6	6.9	15.1
5		19/09/2017	MONITORING IS NOT CARRIED OUT DUE TO RAIN			
6		21/09/2017	95.0	30.3	6.6	13.5
7		25/09/2017	100.0	32.0	6.9	16.3
8		27/09/2017	89.0	27.8	6.1	13.6
1	Oct-17	02/10/2017	89.4	28.2	6.1	13.2
2		03/10/2017	62.4	19.7	6.6	14.5
3		09/10/2017	103.3	32.8	7.1	15.7
4		10/10/2017	105.7	33.0	7.2	14.7
5		16/10/2017	104.9	32.6	7.1	16.7
6		17/10/2017	99.4	31.1	6.8	15.2
7		23/10/2017	101.0	31.3	6.8	15.0
8		24/10/2017	83.7	26.0	5.7	12.4
1	Nov-17	02/11/2017	87.3	27.5	6.0	14.0
2		04/11/2017	56.4	17.9	6.0	12.2
3		07/11/2017	106.7	34.0	7.4	15.5
4		08/11/2017	108.9	33.9	7.4	16.6
5		13/11/2017	101.9	32.5	7.1	15.2
6		14/11/2017	102.8	32.5	7.1	15.6
7		20/11/2017	101.4	31.6	6.9	16.2
8		21/11/2017	87.3	27.2	5.9	12.1

	Min		56.4	17.9	5.7	12.1
	Max		108.9	34.0	7.4	16.7
	Mean		94.3	29.7	6.7	14.7
	10th percentile		84.0	26.1	6.0	12.5
	30th percentile		89.1	28.3	6.3	14.2
	50th percentile		99.7	31.2	6.8	14.8
	95th percentile		106.6	33.9	7.4	16.6
	98th percentile		108.0	34.0	7.4	16.6

AMBIENT AIR QUALITY

Station: A 5, DHANGARWADI VILLAGE						
S.No.	Month	Date	SPM	PM 10	SO_2 (µg/m³)	NO_x (µg/m³)
			µg/m³	µg/m³	24 hrs Average	24 hrs Average
1	SEPTEMEBER 2017	06/09/2017	98.0	31.8	7.9	16.3
2		08/09/2017	MONITORING IS NOT CARRIED OUT DUE TO RAIN			
3		12/09/2017	123.0	40.0	10.0	22.5
4		15/09/2017	126.0	40.5	10.1	21.8
5		19/09/2017	MONITORING IS NOT CARRIED OUT DUE TO RAIN			
6		21/09/2017	97.0	31.5	7.9	15.6
7		25/09/2017	99.0	32.3	8.1	16.3
8		27/09/2017	94.0	30.7	7.7	15.7
1	Oct-17	02/10/2017	105.4	33.8	8.4	18.2
2		03/10/2017	62.7	20.8	5.2	11.7
3		09/10/2017	127.1	41.2	10.3	22.1
4		10/10/2017	131.5	42.7	10.7	24.0
5		16/10/2017	151.3	48.9	12.2	24.2
6		17/10/2017	101.0	33.3	8.3	16.8
7		23/10/2017	102.7	33.3	8.3	17.9
8		24/10/2017	88.4	29.2	7.3	15.7
1	Nov-17	02/11/2017	103.4	33.6	8.4	18.9
2		04/11/2017	56.5	18.6	4.7	10.0
3		07/11/2017	134.9	43.6	10.9	24.5
4		08/11/2017	134.9	43.5	10.9	21.5
5		13/11/2017	149.1	48.3	12.1	26.0
6		14/11/2017	105.0	33.7	8.4	19.0
7		20/11/2017	106.3	34.8	8.7	18.0
8		21/11/2017	92.0	29.7	7.4	15.0

	Min		56.5	18.6	4.7	10.0
	Max		151.3	48.9	12.2	26.0
	Mean		108.6	35.3	8.8	18.7
	10th percentile		88.8	29.2	7.3	15.0
	30th percentile		98.3	31.9	8.0	16.3
	50th percentile		104.2	33.6	8.4	18.1
	95th percentile		148.4	48.1	12.0	24.5
	98th percentile		150.4	48.6	12.2	25.3

AMBIENT AIR QUALITY

Station: A6, THANEWADI VILLAGE						
S.No.	Month	Date	SPM	PM 10	SO_2 (µg/m^3)	NO_x (µg/m^3)
			µg/m^3	µg/m^3	24 hrs Average	24 hrs Average
1	SEPTEMEBER 2017	06/09/2017	90.0	28.1	5.6	11.1
2		08/09/2017	MONITORING IS NOT CARRIED OUT DUE TO RAIN			
3		12/09/2017	78.0	24.5	4.9	10.0
4		15/09/2017	87.0	27.5	5.5	11.8
5		19/09/2017	MONITORING IS NOT CARRIED OUT DUE TO RAIN			
6		21/09/2017	89.0	28.2	5.6	14.1
7		25/09/2017	92.0	29.4	5.9	12.8
8		27/09/2017	94.0	29.4	5.9	11.1
1	Oct-17	02/10/2017	97.0	30.6	6.1	12.5
2		03/10/2017	85.1	27.3	5.5	11.7
3		09/10/2017	82.4	26.5	5.3	12.4
4		10/10/2017	92.9	29.8	6.0	14.9
5		16/10/2017	97.8	30.5	6.1	12.1
6		17/10/2017	93.6	30.0	6.0	12.5
7		23/10/2017	95.2	29.5	5.9	12.1
8		24/10/2017	88.2	27.5	5.5	11.8
1	Nov-17	02/11/2017	94.3	30.2	6.0	14.2
2		04/11/2017	79.0	25.1	5.0	12.5
3		07/11/2017	90.9	29.0	5.8	11.5
4		08/11/2017	96.8	30.3	6.1	12.6
5		13/11/2017	101.6	31.8	6.4	13.1
6		14/11/2017	97.0	30.8	6.2	13.2
7		20/11/2017	98.3	31.2	6.2	14.7
8		21/11/2017	91.3	28.4	5.7	14.2

	Min		78.0	24.5	4.9	10.0
	Max		101.6	31.8	6.4	14.9
	Mean		91.4	28.9	5.8	12.6
	10th percentile		82.7	26.5	5.3	11.2
	30th percentile		89.3	28.1	5.6	11.9
	50th percentile		92.5	29.4	5.9	12.5
	95th percentile		98.3	31.2	6.2	14.6
	98th percentile		100.2	31.6	6.3	14.8

AMBIENT AIR QUALITY

Station: A7, PANDAPANIWADI VILLAGE						
S.No.	Month	Date	SPM	PM 10	SO_2 (µg/m^3)	NO_x (µg/m^3)
			µg/m^3	µg/m^3	24 hrs Average	24 hrs Average
	NAAQSTANDARDS		100	60	80	80
1	SEPTEMEBER 2017	06/09/2017	79.0	23.8	4.8	11.2
2		08/09/2017	MONITORING IS NOT CARRIED OUT DUE TO RAIN			
3		12/09/2017	89.0	26.6	5.3	11.4
4		15/09/2017	92.0	27.2	5.4	9.5
5		19/09/2017	MONITORING IS NOT CARRIED OUT DUE TO RAIN			
6		21/09/2017	97.0	29.0	5.8	11.9
7		25/09/2017	100.0	29.6	5.9	13.9
8		27/09/2017	103.0	30.8	6.2	13.9
1	Oct-17	02/10/2017	86.3	25.4	5.1	10.9
2		03/10/2017	92.2	27.2	5.4	12.0
3		09/10/2017	93.8	27.9	5.6	12.3
4		10/10/2017	97.3	28.9	5.8	11.8
5		16/10/2017	102.4	30.2	6.0	14.2
6		17/10/2017	101.7	30.3	6.1	13.6
7		23/10/2017	103.8	30.8	6.2	13.2
8		24/10/2017	110.0	32.2	6.4	14.1
1	Nov-17	02/11/2017	84.1	25.0	5.0	11.8
2		04/11/2017	85.6	25.1	5.0	10.3
3		07/11/2017	97.1	28.6	5.7	12.0
4		08/11/2017	101.1	29.9	6.0	13.5
5		13/11/2017	102.5	30.4	6.1	13.1
6		14/11/2017	104.8	30.8	6.2	13.5
7		20/11/2017	107.6	32.1	6.4	15.1
8		21/11/2017	113.5	33.0	6.6	13.5

	Min		79.0	23.8	4.8	9.5
	Max		113.5	33.0	6.6	15.1
	Mean		97.5	28.9	5.8	12.6
	10th percentile		85.6	25.1	5.0	10.9
	30th percentile		92.7	27.4	5.5	11.9
	50th percentile		98.7	29.3	5.9	12.7
	95th percentile		109.9	32.2	6.4	14.2
	98th percentile		112.1	32.7	6.5	14.7

AMBIENT AIR QUALITY

Station: A 8, GAJAPUR VILLAGE						
S.No.	Month	Date	SPM	PM 10	SO_2 (µg/m³)	NO_x (µg/m³)
			µg/m³	µg/m³	24 hrs Average	24 hrs Average
1	SEPTEMEBER 2017	06/09/2017	89.0	26.2	6.6	13.8
2		08/09/2017	MONITORING IS NOT CARRIED OUT DUE TO RAIN			
3		12/09/2017	104.0	30.8	7.7	17.3
4		15/09/2017	89.0	25.8	6.5	15.2
5		19/09/2017	MONITORING IS NOT CARRIED OUT DUE TO RAIN			
6		21/09/2017	94.0	27.3	6.8	15.4
7		25/09/2017	100.0	29.7	7.4	16.7
8		27/09/2017	79.0	23.4	5.9	12.3
1	Oct-17	02/10/2017	96.2	28.3	7.1	15.7
2		03/10/2017	107.0	31.2	7.8	17.5
3		09/10/2017	108.6	32.0	8.0	18.8
4		10/10/2017	94.3	27.9	7.0	15.0
5		16/10/2017	104.0	31.0	7.7	17.4
6		17/10/2017	98.5	28.8	7.2	16.2
7		23/10/2017	103.4	30.6	7.7	17.2
8		24/10/2017	73.9	22.2	5.5	12.5
1	Nov-17	02/11/2017	93.4	27.9	7.0	15.7
2		04/11/2017	100.1	29.3	7.3	17.2
3		07/11/2017	112.2	33.1	8.3	17.8
4		08/11/2017	98.1	29.4	7.4	16.6
5		13/11/2017	107.8	32.0	8.0	18.0
6		14/11/2017	102.3	30.3	7.6	16.3
7		20/11/2017	106.5	31.1	7.8	17.5
8		21/11/2017	77.5	23.0	5.8	13.0

	Min		73.9	22.2	5.5	12.3
	Max		112.2	33.1	8.3	18.8
	Mean		97.2	28.7	7.2	16.0
	10th percentile		80.0	23.7	5.9	13.0
	30th percentile		94.1	27.9	7.0	15.5
	50th percentile		99.3	29.4	7.3	16.4
	95th percentile		108.5	32.0	8.0	18.0
	98th percentile		110.7	32.6	8.2	18.5

BDL for SO_2-2.0 & NOx-4.5

NOTE: The results relate only to the conditions prevailing at the time of sampling

Method of measurement: As per CPCB Manual & IS 5182

BHAGAVATHI GOA