

**ENVIRONMENTAL STATEMENT
IN
FORM-V**

(Under Rule-14, Environmental (Protection) Rules, 1986)

(2020-2021)

**FOR
CLUSTER NO. – 5
(GROUP OF MINES)
Sodepur Area
Eastern Coalfields Limited**

**Prepared at
Regional Institute – I
Central Mine Planning & Design Institute Ltd.
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A Maharatna Company
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CMPDI

ISO 9001:2015 Company

ENVIRONMENTAL STATEMENT FORM – V

Environmental statement for the financial year ending 31st March, 2021

Cluster No. – 5

FOR THE YEAR: 2020-21

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CHAPTER – I

INTRODUCTION

1.1 GENESIS:

The Gazette Notification vide G.S.R No. 329 (E) dated 13th March, 1992 and subsequently renamed to 'Environmental Statement' vide Ministry of Environment & Forests (MOEF), Govt. of India gazette notification No. G.S.R No. 386 (E) Dtd.22nd April'93 reads as follows.

"Every person carrying on an industry, operation or process requiring consent under section 25 of the Water Act, 1974 or under section 21 of the Air Act, 1981 or both or authorisation under the Hazardous Waste Rules, 1989 issued under the Environmental Protection Act, 1986 shall submit an Environmental Audit Report for the year ending 31st March in Form V to the concerned State Pollution Control Board on or before the 30th day of September every year."

In compliance with the above and in fulfillment of condition laid out in the EC for the Cluster, the work of Environmental Statement for Cluster No. 5 was entrusted to CMPDI by GM (Environment and Forest), Eastern Coalfields Limited.

1.2 PROJECT DESCRIPTION:

Prior to 2014 – 15, a large number of taken over mines from pre – nationalization period, mostly underground mines, in the old coalfields of Raniganj and Jharia did not have environmental clearance from the MoEF&CC and were operating on the basis of "Consents" received from the respective PCBs. It was felt that if these mines could be brought under the ambit of EC, several measures for environmental protection and pollution control could be put in place. However, the work of obtaining EC for such mines, individually, would have taken a lot of time. To circumvent the problem, it was mooted that since the environmental problems being faced were of regional nature and not confined to individual mines alone, cluster/groups of such mines could be identified for preparing cluster-wise integrated EIA & EMPs, addressing such environmental concerns comprehensively and ensuring effective co-ordination of environmental control measures within each cluster. 13 such clusters were identified in the Raniganj Coalfield of ECL and EC has been obtained on the cluster approach for 12 such clusters.

Cluster of Mines No. 5 is one of the clusters for which EC has been granted vide letter no. J-11015/288/2010-IA-II.(M) dated 22nd September, 2014 for a combined peak capacity of 0.63 MTY and within a ML area of 2970 Ha.

The mines of Cluster-5 are located in the south-western part of Raniganj Coalfields and south or right bank of the Damodar River in the Purulia District of West Bengal and are having lease boundaries adjacent to each other, The Cluster is located within Latitudes 23° 38' N & 23° 41' N and Longitudes 86° 46' E & 86° 51' E lying 100m to 140m above MSL.

It comes under the administrative control of Sodepur area, ECL.

Location of cluster – 5 is shown in plate no. – 1.

The composition of the cluster is tabulated as under:

Name of Mine	Peak Production Capacity (MTY)	Lease Hold Area (Ha)	Life of the mine	Production during 2020-21 (MT)
Parbelia UG	0.19	2730	>25 years	0.06
Parbelia OC Patch (10 Ha)	0.13		1.5 years	-
Dubeshwari UG	0.18	240	> 50 years	0.067
Dubeshwari OC Patch (10.2 Ha)	0.13		2.5 years	-
Total	0.63	2970		0.127

1. Dubeswari UG & OC Patch

At present, production from the mine is obtained through one caving panel P5A and P5B with deployment of 1 SDL in each panel. Hijuli seam is being worked in Dubeswari UG. There are presently no mining activities in the proposed OC patch.

2. Parbelia UG & OC Patch

At present, production from the mine is obtained through one depillaring district panel 12B with caving method in which 2 SDLs are deployed and other 109L development district with 1 SDL is deployed. Hijuli seam is being worked in Parbelia UG. There are presently no mining activities in the proposed OC patch.

1.3 ENVIRONMENTAL SCENARIO:

CMPDI has been engaged to carry out routine Environmental monitoring of the clusters. The monitoring is carried out every fortnight by collecting 24 – hour samples for ambient air at 2 all - weather stations, 3 pre-monsoon stations and 3 post-monsoon stations (based on local meteorology) and compared with NAAQS, 2009 for quality. The details of sampling stations are given below:

Cluster No. 5			
Station Code	Type of Station	Name of Station	Station Category
5A1	Permanent Air Station	Ranipur Village	Residential
5A2	Permanent Air Station	Dubeshwari Colliery	Industrial
5A3	Post monsoon Air Station	Digha Village	Residential
5A4	Post monsoon Air Station	Dhangajore Village	Residential
5A5	Post monsoon Air Station	Sunuri Village	Residential
5A6	Pre monsoon Air Station	Raghunathpur Village	Residential
5A7	Pre monsoon Air Station	Sialdanga Pump House	Industrial
5A8	Pre monsoon Air Station	Sodepur 3A Pit	Industrial

2 nos. of samples of mine water are collected and analysed every fortnight (for 5 parameters i.e., pH, TDS, TSS, COD and O&G) and compared with the MoEF Schedule – VI for discharge of effluents into land / streams. A complete analysis of the mine discharge samples which includes heavy metals and salts is carried out twice every year. Noise level is recorded at 2 locations from the mine pit top (in case of UG mine) and workshops (in case of OC mine) present within the cluster. Groundwater level in the cluster area is monitored by taking measurements at 3 earmarked dugwells in the months of January, May, August and November every year. Samples of groundwater from these wells, which are also utilized by the local population for drinking and other domestic purposes, are analysed once in a year during May and compared with the IS 10500:2012 standards for drinking water quality.

A piezometer has been constructed to measure the ground water level at Bhamuria unit campus, Sodepur Area of Cluster No. 5.

Location of the monitoring stations of air, noise & water are shown in Plate- II.

The environmental monitoring results for 24 fortnights ending 31st March, 2021 are appended as Annexures – I, II & III. The environmental monitoring results for the year 2020-21 are summarized below:

AMBIENT AIR QUALITY

The PM₁₀ concentration at industrial stations were found in the range of 88.9 to 430.2 µg/m³ and had exceeded the limits on 3 occasions out of 36 samples analysed during the year as per the standards while the PM₁₀ concentration at residential stations were found in the range of 84.1 to 99.5 µg/m³ and were within the limits as per the standards. The PM_{2.5} concentration were found in the range of 8.0 to 73.8 µg/m³ and had exceeded the limits on 1 occasion out of 100 samples analysed during the year as per NAAQS, 2009. The SO₂ concentration remained below 10.0 µg/m³ and NO_x concentration was in the range of 14.0 to 18.8 µg/m³ and was well within the limits as per the standards.

ENVIRONMENTAL STANDARDS:

Environmental Standards for Ambient Air Quality (AAQ):

Station Category	<i>Environmental standard for Raniganj Coalfield vide MOEF, Govt. of India, Gazette Notification No. GSR 742 (E) dated 25.09.2000 for 24 hourly samples at 500 meters from dust generating point</i>			<i>National Ambient Air Quality Standards (NAAQS), 2009 for industrial, residential and rural areas for 24 hours samples</i>
	Pollutant Concentration (µg/m³)			
	PM₁₀	SO₂	NO_x	PM_{2.5}
Industrial	300.0	120.0	120.0	60.0
Residential	100.00	80.0	80.0	

WATER QUALITY

Ground water percolates into working area from the surrounding aquifers. The mines are dewatered regularly to maintain dry working conditions. This mine discharge water is partly utilized for dust suppression by sprinkling at coal faces and on haul roads and the remainder is discharged onto adjoining cultivable lands for irrigation purposes, if required. Part-B of the Environmental Statement proforma contains the detailed break-up of water consumption.

The analysis results for the mine discharge water reveal that most of the parameters are within permissible limits prescribed by MoEF&CC as General Standards Schedule – VI for Class-‘A’ effluent (Effluent discharged into inland surface water) and IS 10500:2012 for groundwater standards.

In order to assess the impact of mining on the groundwater level, a network of 3 dugwells has been identified for monitoring of groundwater level in the months of January, May, August and November every year. Samples from these wells are collected and analysed during May every year and compared with IS 10500: 2012 standards for drinking water.

Mine water and ground water analysis results are given in Annexure-III.

Well water and piezometer level results are given in Annexure – IV.

NOISE LEVEL

The workplace day time noise level was found in the range of 52.6 to 74.69 dB(A). The noise level recorded is below permissible limit prescribed by MoEF&CC.

Noise Level Standard as per Noise Pollution (Regulation and Control) Rules, 2000 for different station categories is given below:

Station Category	Limits for noise (Leq dB (A))	
	Day Time (6am-10pm)	Night Time (10pm-6am)
Industrial	75.0	70.0
Commercial	65.0	55.0
Residential	55.0	45.0

CHAPTER - II

ENVIRONMENTAL STATEMENT FORM – V

Environmental statement for the financial year ending March, 2021

PART – A

SL. NO.	HEADING	PARTICULARS
(I)	NAME AND ADDRESS OF THE PROJECT	
i	Parbelia UG & OC	Agent, Parbelia UG, Sodepur Area, Dist. – Purulia, W. B.
ii	Dubeswari UG & OC	Agent, Dubeswari UG, Sodepur Area, Dist. – Purulia, W. B.
(II)	INDUSTRY CATEGORY	All mines in the cluster fall in red category
(III)	PRODUCTION CAPACITY	0.63 MTY
(IV)	YEAR OF ESTABLISHMENT	Parbelia UG is taken over mines from pre-nationalisation period. Dubeswari UG was established in 1985 – 86.
(V)	DATE OF THE LAST ENVIRONMENTAL STATEMENT SUBMITTED	13.09.2020

PART – B

WATER AND RAW MATERIAL CONSUMPTION

(I) WATER CONSUMPTION (Cu.m/day)

1. Parbelia UG & OC

#	Particulars	2019-20	2020-21
A.	MINING (Dust suppression, Firefighting and Others)	55.0	55.0
B.	COOLING (in radiators of trucks/HEMM)	0.0	0.0
C.	DOMESTIC		
i	Colony (Mine water and PHE supply)	2072.0	2000.0
TOTAL		2127.0	2055.0

*Source – Water from Barakar River

Name of Product	Process water consumption per unit of product output (l/day/te)	
	2019-20	2020-21
Coal	0.93	0.93

2. Dubeswari UG & OC

#	Particulars	2019-20	2020-21
A.	MINING (Dust suppression, Firefighting and Others)	55.0	55.0
B.	COOLING (in radiators of trucks/HEMM)	Nil	0.0
C.	DOMESTIC		
i	Colony (Mine water and PHE supply)	1065.0	1000.0
TOTAL		1120.0	1055.0

*Source – PHED water

Name of Product	Process water consumption per unit of product output (l/day/te)	
	2019-20	2020-21
Coal	0.91	0.81

(II) RAW MATERIAL CONSUMPTION:**1. Parbelia UG & OC**

Name of raw material	Name of products	Consumption of raw material per unit of output	
		During previous financial year (2019-20)	During current financial year (2020-21)
1. Explosive	Coal	0.24 kg/te	0.29 kg/te
2. Diesel		0.56 l/te	0.27 l/te
3. Lubricants		0.04 l/te	0.04 l/te

2. Dubeswari UG & OC

Name of raw material	Name of products	Consumption of raw material per unit of output	
		During previous financial year (2019-20)	During current financial year (2020-21)
1. Explosive	Coal	0.38 kg/te	0.36 kg/te
2. Diesel		0.61 l/te	0.32 l/te
3. Lubricants		0.015 l/te	0.01 l/te

PART – C
POLLUTION GENERATED

Mine	Pollution	Quantity of pollutants discharged (mass/day)	Concentrations of pollutants generated (mass/volume)	Percentage variation from prescribed standards with reasons
Parbelia	WATER*	Average concentration of 25.0 mg/l. Mine water discharged is 3100.0 KL/day. Hence, total load is 77.50 kg/day.	1. Mine water discharge Analysis results are given in Annexure-III. 2. The main air pollutant is suspended PM ₁₀ and PM _{2.5} . The air quality results are appended as Annexure-I.	1. The analysis results reveal that most of the parameters are below permissible limits prescribed by MOEF as General Standards for class 'A' effluent (Effluent discharged into inland surface water.) 2. Ambient air quality results show that the values of PM ₁₀ , PM _{2.5} , SO ₂ and NO _x are within the prescribed standards barring few occasions as explained in the earlier section.
	AIR**	Total pollutant load of PM ₁₀ is 4.02 kg/day while it is 0.56 kg/day for PM _{2.5} .		
Dubeswari	WATER*	-		
	AIR**	Total pollutant load of PM ₁₀ is 5.01 kg/day while it is 0.70 kg/day for PM _{2.5} .		

*Water discharged from the mine contains pollutants in the form of suspended solids (mostly fine coal dust).

**PM₁₀ and PM_{2.5} estimation has been done using empirical formula by using Emission Factors derived from S&T studies done by CMPDI.

PART – D
HAZARDOUS WASTE
(As specified under Hazardous Waste
(Management and Handling) Rules, 1989)

1. Parbelia UG & OC

Hazardous waste	Total quantity		Disposal method
	During previous financial year (2019-20)	During current financial year (2020-21)	
A) From process			
i) Used oil	-	-	
ii) Lead-Acid Batteries			
a. Automobile batteries	5* Nos.	12* Nos.	Dealt in Part – F
b. Cap-lamp batteries	700* Nos.	Nil (LED is used)	
iii) Used Cotton waste	Nil	Nil	
iv) Metal Scrap	Nil	Nil	

*for entire Sodepur Area

2. Dubeswari UG & OC

Hazardous waste	Total quantity		Disposal method
	During previous financial year (2019-20)	During current financial year (2020-21)	
A) From process			
i) Used oil	-	-	
ii) Lead-Acid Batteries			
a. Automobile batteries	5* Nos.	12* Nos.	Dealt in Part – F
b. Cap-lamp batteries	700* Nos.	Nil (LED is used)	
iii) Used Cotton waste	Nil	Nil	
iv) Metal Scrap	Nil	Nil	

*for entire Sodepur Area

Approximate values may be given where actual values are not available.

Note: a) The detail of used oil is to be given to concerned Pollution Control Board in Form-13 as per time mentioned in HW (M & H), Amendment Rules, 2003.

b) The detail of disposal of Lead Acid batteries is to be given to concerned State Pollution Control Board in Form-VIII as per time mentioned in Batteries (M&H) Rules, 2001.

PART – E
SOLID WASTE

Particulars	Name of Mine	Total quantity (In Million Cu.m)	
		During previous financial year (2019-20)	During current financial year (2020-21)
a) From process (Mining)	Parbelia OC	Not yet started	
	Dubeswari OC		
b) From pollution control facilities	Parbelia OC		
	Dubeswari OC		
c) Quantity recycled or reutilized back filled	Parbelia OC		
	Dubeswari OC		

PART – F

PLEASE SPECIFY THE CHARACTERISTICS (IN TERMS OF CONCENTRATION AND QUANTUM) OF HAZARDOUS AS WELL AS SOLID WASTE AND INDICATE THE DISPOSAL PRACTICE ADOPTED FOR BOTH THESE CATEGORIES OF WASTE.

Hazardous waste generated is given in the table of PART-D which has been deposited at area store disposal stock yard.

Cap lamp batteries are received from HQ Central Stores and stored in Area Store. From Area Store, they are supplied to unit cap lamp room as per allocation by technical HOD of Area. At unit cap lamp room, they are stored in racks with cap lamp number. However, LED bulb is now being used in the mine in place of cap lamp batteries.

HEMM batteries are stored in Area stores.

Metal scraps are declared and report is sent to HQ. The scraps are then auctioned and sold through HQ.

Used oil are brought from different opencast mines and are used for lubrication of coal tubs.

PART – G

IMPACT OF POLLUTION CONTROL MEASURES ON CONSERVATION OF NATURAL RESOURCES AND CONSEQUENTLY ON COST OF PRODUCTION.

In order to carry out mining in an eco-friendly manner following pollution control measures have been implemented.

1.0 AIR POLLUTION CONTROL MEASURES:

- Surfacing of all service roads/permanent roads by asphalt.
- The un-metalled roads is kept free of ruts, potholes, etc. by regular cleaning.
- Regular maintenance of HEMM engines to limit emission of harmful exhaust fumes.
- Physical removal of dust from the roads.
- Greenbelts around quarry, industrial sites, service building area besides avenue plantation along roads.
- Plantation over subsided area of 6.0 Ha was carried out till 2020-21 in Dubeswari Colliery. Local species like Shishu, Karanch, Mohaneem, Jarul and Chatim with 90% survival rate has been planted.
- Installation of water sprinkler at Chinakuri Railway Siding work is complete.
- Plantation will be carried out in future also as per the programme and availability of land.

2.0 WATER POLLUTION CONTROL MEASURES:

(for Mine/CHP/Workshop/Colony discharge water)

- There is no workshop in both the mines of the cluster.
- 2 nos. of sedimentation tank is available for entire Sodepur area. These are sedimentation tanks are available in Bejdih and the other in Dhemomain, Sodepur Area.
- Septic tank has been provided in Parbelia colliery for treating the domestic effluent.
- Excess mine water is discharged in the low lying area under the command area of ECL.
- Regular monitoring of mine discharge water and groundwater is being carried out by CMPDI.

3.0 NOISE POLLUTION CONTROL MEASURES:

- Regular maintenance of machines and other equipment at Bunker and workshop including mine fan.
- Providing green belt around core activity area, along road side in colony and in other vacant space.
- All HEMM & light vehicle are provided with silencers.
- Noise monitoring is being carried out regularly.

4.0 LAND RESOURCE MANAGEMENT:

- Both the OC patches are yet to start production and as such there was no OB generation during 2020 – 21.

PART – H

ADDITIONAL INVESTMENT PROPOSAL FOR ENVIRONMENTAL PROTECTION INCLUDING ABATEMENT OF POLLUTION

The following are the additional investment proposals for environmental protection:

- The Environmental monitoring of the project will be continued fortnightly as per the guidelines of Ministry of Environment and Forest (MoEF).
- Necessary Consent for discharge may be taken from Competent Authority, if required.
- Rainwater harvesting system has been installed at the Area office.
- Roof top solar panel with 5 kW capacity is present at the Area office.
- Various programmes are being carried out under CSR head like construction of community hall, fitter and electrician room at Ramkanali Purushottam ITI in Sodpeur Area, water supply scheme, classrooms, etc.

PART – I

ANY OTHER PARTICULAR IN RESPECT OF ENVIRONMENTAL PROTECTION AND ABATMENT OF POLLUTION.

The Environmental Monitoring is carried out fortnightly for the project by CMPDI, RI-I as per the guideline of Ministry of Environment and Forest & Climate Change (MoEF&CC) and based on the result thereof; colliery takes necessary action if needed.

Annexure – I

Station No.	Station Name	Month	Fortnight	Date of Sampling	PM ₁₀	PM _{2.5}	SO ₂	NO _x
5A1	Ranipur village	May	First	06-May-20	94.6	41.8	<10.0	15.2
5A1	Ranipur village	May	Second	22-May-20	95.6	40.4	<10.0	15
5A1	Ranipur village	June	Second	18-Jun-20	94.3	39.4	<10.0	14.4
5A1	Ranipur village	July	First	03-Jul-20	90.3	34.6	<10.0	14.2
5A1	Ranipur village	August	First	10-Aug-20	87.4	32.6	<10.0	13.6
5A1	Ranipur village	August	Second	19-Aug-20	88.2	33.5	<10.0	13.9
5A1	Ranipur village	September	First	07-Sep-20	89.6	34.2	<10.0	14.3
5A1	Ranipur village	September	Second	24-Sep-20	90.2	34.8	<10.0	14.6
5A1	Ranipur village	October	First	08-Oct-20	93.6	35.4	<10.0	15.3
5A1	Ranipur village	October	Second	16-Oct-20	93.4	35.2	<10.0	15.1
5A1	Ranipur village	November	First	09-Nov-20	94.6	35.8	<10.0	15.5
5A1	Ranipur village	November	Second	20-Nov-20	95	35.2	<10.0	15.6
5A1	Ranipur village	December	First	07-Dec-20	96.2	36.1	<10.0	15.9
5A1	Ranipur village	December	Second	17-Dec-20	96.5	36.4	<10.0	15.8
5A1	Ranipur village	January	First	05-Jan-21	97.3	37.2	<10.0	15.6
5A1	Ranipur village	January	Second	20-Jan-21	97.5	37.6	<10.0	15.8
5A1	Ranipur village	February	First	09-Feb-21	97.8	32.8	<10.0	16.1
5A1	Ranipur village	February	Second	25-Feb-21	98.2	37.4	<10.0	16.3
5A1	Ranipur village	March	First	08-Mar-21	98.3	33.6	<10.0	16.4
5A1	Ranipur village	March	Second	17-Mar-21	98.1	33.4	<10.0	16.5
5A2	Dubeshwari Colliery	May	First	06-May-20	183	52.6	<10.0	18.4
5A2	Dubeshwari Colliery	May	Second	26-May-20	176.7	50.8	<10.0	17.7
5A2	Dubeshwari Colliery	June	Second	18-Jun-20	164.3	48.7	<10.0	17
5A2	Dubeshwari Colliery	July	First	03-Jul-20	138.2	40.1	<10.0	16.6
5A2	Dubeshwari Colliery	August	First	10-Aug-20	136.4	40.5	<10.0	16.7
5A2	Dubeshwari Colliery	August	Second	19-Aug-20	138.1	41.2	<10.0	16.9
5A2	Dubeshwari Colliery	September	First	07-Sep-20	139.2	41.6	<10.0	16.5
5A2	Dubeshwari Colliery	September	Second	24-Sep-20	140.6	41.9	<10.0	16.7
5A2	Dubeshwari Colliery	October	First	08-Oct-20	143.8	43.7	<10.0	16.9
5A2	Dubeshwari Colliery	October	Second	27-Oct-20	144.6	44	<10.0	17
5A2	Dubeshwari Colliery	November	First	09-Nov-20	153.7	46.2	<10.0	17.3
5A2	Dubeshwari Colliery	November	Second	20-Nov-20	155.6	47.1	<10.0	17.4
5A2	Dubeshwari Colliery	December	First	08-Dec-20	157.3	48.6	<10.0	17.2
5A2	Dubeshwari Colliery	December	Second	24-Dec-20	292.4	45	<10.0	17.4
5A2	Dubeshwari Colliery	January	First	05-Jan-21	362.1	73.8	<10.0	17.2
5A2	Dubeshwari Colliery	January	Second	19-Jan-21	430.2	60	<10.0	17.9
5A2	Dubeshwari Colliery	February	First	03-Feb-21	217.5	38	<10.0	18.2
5A2	Dubeshwari Colliery	February	Second	25-Feb-21	224.6	57.3	<10.0	18.8
5A2	Dubeshwari Colliery	March	First	08-Mar-21	298.5	8	<10.0	18.6
5A2	Dubeshwari Colliery	March	Second	31-Mar-21	325.6	15	<10.0	18.3
5A3	Digha village	October	First	08-Oct-20	84.1	25.2	<10.0	14
5A3	Digha village	October	Second	28-Oct-20	84.8	25.9	<10.0	14.5
5A3	Digha village	November	First	09-Nov-20	87.3	28.1	<10.0	15.5
5A3	Digha village	November	Second	20-Nov-20	88.4	29.2	<10.0	15.6
5A3	Digha village	December	First	08-Dec-20	89.7	30.4	<10.0	15.3
5A3	Digha village	December	Second	24-Dec-20	90.5	31.5	<10.0	15.2
5A3	Digha village	January	First	08-Jan-21	91.4	32.6	<10.0	15.4
5A3	Digha village	January	Second	19-Jan-21	92.5	32.7	<10.0	15.5
5A3	Digha village	February	First	03-Feb-21	94.2	31.7	<10.0	15.8

Environmental Statement (Form-V) Cluster No. – 5 (Group of Mines) 2020-21

Station No.	Station Name	Month	Fortnight	Date of Sampling	PM ₁₀	PM _{2.5}	SO ₂	NO _x
5A3	Digha village	February	Second	25-Feb-21	95.3	33.8	<10.0	16
5A3	Digha village	March	First	10-Mar-21	95.1	32.4	<10.0	16.3
5A3	Digha village	March	Second	17-Mar-21	95.3	32.8	<10.0	16.4
5A4	Dhangajare village	October	First	14-Oct-20	93.6	34.8	<10.0	15.3
5A4	Dhangajare village	October	Second	31-Oct-20	94.2	35.2	<10.0	15.4
5A4	Dhangajare village	November	First	10-Nov-20	96.3	35.9	<10.0	15.8
5A4	Dhangajare village	November	Second	20-Nov-20	96.6	36.1	<10.0	15.7
5A4	Dhangajare village	December	First	08-Dec-20	97.2	36.8	<10.0	15.8
5A4	Dhangajare village	December	Second	24-Dec-20	98.3	37.2	<10.0	16
5A4	Dhangajare village	January	First	08-Jan-21	98.9	37.5	<10.0	16.2
5A4	Dhangajare village	January	Second	19-Jan-21	99.3	37.8	<10.0	16.4
5A4	Dhangajare village	February	First	08-Feb-21	98.9	34.9	<10.0	16.7
5A4	Dhangajare village	February	Second	25-Feb-21	99.2	37.2	<10.0	16.8
5A4	Dhangajare village	March	First	10-Mar-21	99.3	35.1	<10.0	17.2
5A4	Dhangajare village	March	Second	26-Mar-21	99.5	35.4	<10.0	17.3
5A5	Sanuri village	October	First	14-Oct-20	84.2	25.5	<10.0	14.2
5A5	Sanuri village	October	Second	31-Oct-20	85	26.2	<10.0	14.6
5A5	Sanuri village	November	First	10-Nov-20	88.2	27.3	<10.0	14.8
5A5	Sanuri village	November	Second	20-Nov-20	89.4	28.4	<10.0	14.7
5A5	Sanuri village	December	First	08-Dec-20	90.5	29.5	<10.0	15
5A5	Sanuri village	December	Second	24-Dec-20	91.4	30.6	<10.0	15.1
5A5	Sanuri village	January	First	08-Jan-21	92.7	31.8	<10.0	15.4
5A5	Sanuri village	January	Second	20-Jan-21	93.2	32.6	<10.0	15.5
5A5	Sanuri village	February	First	08-Feb-21	94.6	32.7	<10.0	15.9
5A5	Sanuri village	February	Second	22-Feb-21	95.7	34.4	<10.0	16.2
5A5	Sanuri village	March	First	10-Mar-21	95.4	33.6	<10.0	16.4
5A5	Sanuri village	March	Second	26-Mar-21	95.7	33.8	<10.0	16.5
5A6	Raghunathpur village	May	First	06-May-20	92.6	40.8	<10.0	14.9
5A6	Raghunathpur village	May	Second	28-May-20	93.4	41.6	<10.0	15
5A6	Raghunathpur village	June	Second	18-Jun-20	90.8	39.4	<10.0	14.4
5A6	Raghunathpur village	July	First	13-Jul-20	87.3	36.1	<10.0	14.1
5A6	Raghunathpur village	August	First	10-Aug-20	84.7	34.7	<10.0	14
5A6	Raghunathpur village	August	Second	19-Aug-20	85.3	35.1	<10.0	14.2
5A6	Raghunathpur village	September	First	07-Sep-20	85.8	35.4	<10.0	14.4
5A6	Raghunathpur village	September	Second	24-Sep-20	86.4	35.6	<10.0	14.6
5A7	Sialdanga Pump House	May	First	07-May-20	96.2	42.6	<10.0	14.8
5A7	Sialdanga Pump House	May	Second	26-May-20	97.9	43.4	<10.0	15.2
5A7	Sialdanga Pump House	June	Second	18-Jun-20	94.3	42.1	<10.0	14.6
5A7	Sialdanga Pump House	July	First	13-Jul-20	89.2	37.4	<10.0	14.4
5A7	Sialdanga Pump House	August	First	10-Aug-20	88.9	37.2	<10.0	14.3
5A7	Sialdanga Pump House	August	Second	20-Aug-20	89.3	37.4	<10.0	14.5
5A7	Sialdanga Pump House	September	First	07-Sep-20	90.2	37.6	<10.0	14.8
5A7	Sialdanga Pump House	September	Second	25-Sep-20	91.3	37.4	<10.0	14.6
5A8	Sodepur 3A pit	May	First	07-May-20	121.8	46.9	<10.0	16.2
5A8	Sodepur 3A pit	May	Second	27-May-20	124.6	48.2	<10.0	16.4
5A8	Sodepur 3A pit	June	Second	26-Jun-20	118.4	43.6	<10.0	15.2
5A8	Sodepur 3A pit	July	First	03-Jul-20	102.4	38.8	<10.0	14.9
5A8	Sodepur 3A pit	August	First	11-Aug-20	96.3	36.1	<10.0	14.5
5A8	Sodepur 3A pit	August	Second	20-Aug-20	97.1	36.8	<10.0	14.7
5A8	Sodepur 3A pit	September	First	07-Sep-20	98.3	36.5	<10.0	14.6
5A8	Sodepur 3A pit	September	Second	25-Sep-20	98.9	36.3	<10.0	14.4

Analysis of Heavy Metals in Air

Station No.	Station Name	Date of Sampling	Arsenic (ng/m ³)	Cadmium (µg/m ³)	Chromium (µg/m ³)	Mercury (µg/m ³)	Nickel (ng/m ³)	Lead (µg/m ³)
Method of Detection			Atomic Absorption Spectrophotometric (AAS)					
Detection Limit			1.0	0.001	0.01	0.001	0.10	0.005
5A1	Ranipur village	7-Sep-20	BDL	BDL	BDL	BDL	BDL	BDL
5A1	Ranipur village	8-Mar-21	BDL	BDL	BDL	BDL	BDL	BDL
5A2	Dubeshwari Colliery	7-Sep-20	BDL	BDL	BDL	BDL	BDL	BDL
5A2	Dubeshwari colliery	8-Mar-21	BDL	BDL	BDL	BDL	BDL	BDL
5A3	Digha village	10-Mar-21	BDL	BDL	BDL	BDL	BDL	BDL
5A4	Dhangajore village	10-Mar-21	BDL	BDL	BDL	BDL	BDL	BDL
5A5	Sunuri village	10-Mar-21	BDL	BDL	BDL	BDL	BDL	BDL
5A6	Raghunathpur village	7-Sep-20	BDL	BDL	BDL	BDL	BDL	BDL
5A7	Sialdanga Pump House	7-Sep-20	BDL	BDL	BDL	BDL	BDL	BDL
5A8	Sodepur 3A pit	7-Sep-20	BDL	BDL	BDL	BDL	BDL	BDL

Environmental standards:

National Ambient Air Quality Standards (NAAQS), 2009 for residential, industrial and rural areas for 24 hourly/yearly samples:

Heavy Metal	Arsenic (As) (ng/m ³)	Cadmium (Cd) (µg/m ³)	Chromium (Cr) (µg/m ³)	Mercury (Hg) (µg/m ³)	Nickel (Ni) (ng/m ³)	Lead (Pb) (µg/m ³)
Concentration	6	Not specified	Not specified	Not specified	20	0.5

Annexure – II**Noise Level**

Station No.	Station Name	Month	Fortnight	Date of Sampling	Noise Level dB(A)
5N1	Pit-top Parbelia UG	May	First	06-May-20	64.8
5N1	Pit-top Parbelia UG	September	First	04-Sep-20	57.4
5N1	Pit-top Parbelia UG	November	First	09-Nov-20	52.8
5N1	Pit-top Parbelia UG	December	First	06-Dec-20	57.2
5N1	Pit-top Parbelia UG	March	First	04-Feb-21	68.61
5N2	Pit-top Dubeswari UG	May	First	06-May-20	64.9
5N2	Pit-top Dubeswari UG	September	First	04-Sep-20	52.6
5N2	Pit-top Dubeswari UG	November	First	09-Nov-20	56.7
5N2	Pit-top Dubeswari UG	December	First	06-Dec-20	53.8
5N2	Pit-top Dubeswari UG	March	First	04-Feb-21	74.69

Annexure – III**Effluent Water Quality for 5 parameters**

Station No.	Station Name	Month	Fortnight	Date of Sampling	pH	TSS	TDS	O&G	COD
5MW1	Parbelia UG	May	First	06-May-20	8	26	542	<2.0	20
5MW1	Parbelia UG	May	Second	22-May-20	7.9	24	562	<2.0	20
5MW1	Parbelia UG	June	First	04-Jun-20	8.1	28	522	<2.0	16
5MW1	Parbelia UG	June	Second	24-Jun-20	7.8	26	564	<2.0	24
5MW1	Parbelia UG	July	First	09-Jul-20	8	22	522	<2.0	24
5MW1	Parbelia UG	July	Second	22-Jul-20	7.7	28	592	<2.0	24
5MW1	Parbelia UG	August	First	10-Aug-20	7.9	28	580	<2.0	32
5MW1	Parbelia UG	August	Second	25-Aug-20	7.9	30	540	<2.0	20
5MW1	Parbelia UG	September	Second	25-Sep-20	7.9	28	554	<2.0	16
5MW1	Parbelia UG	October	First	08-Oct-20	7.8	30	528	<2.0	16
5MW1	Parbelia UG	October	First	08-Oct-20	7.8	30	528	<2.0	16
5MW1	Parbelia UG	October	Second	28-Oct-20	7.9	32	536	<2.0	24
5MW1	Parbelia UG	October	Second	28-Oct-20	7.9	32	536	<2.0	24
5MW1	Parbelia UG	November	First	04-Nov-20	7.7	28	534	<2.0	32
5MW1	Parbelia UG	November	Second	17-Nov-20	7.9	26	570	<2.0	32
5MW1	Parbelia UG	December	First	10-Dec-20	7.5	21	558	<2.0	28
5MW1	Parbelia UG	December	Second	22-Dec-20	7.2	19	564	<2.0	28
5MW1	Parbelia UG	January	First	15-Jan-21	8.5	17	530	<2.0	20
5MW1	Parbelia UG	January	Second	22-Jan-21	7.6	18	529	<2.0	40
5MW1	Parbelia UG	February	First	05-Feb-21	7.4	17	539	<2.0	36
5MW1	Parbelia UG	February	Second	23-Feb-21	7.4	16	542	<2.0	40
5MW1	Parbelia UG	March	First	09-Mar-21	7.4	18	553	<2.0	28
5MW2	Dubeswari UG	May	First	06-May-20	7.4	34	436	<2.0	24
5MW2	Dubeswari UG	May	Second	22-May-20	7.5	30	424	<2.0	24
5MW2	Dubeswari UG	June	First	04-Jun-20	7.6	32	458	<2.0	20
5MW2	Dubeswari UG	June	Second	24-Jun-20	7.3	32	426	<2.0	28
5MW2	Dubeswari UG	July	First	09-Jul-20	7.5	30	478	<2.0	28
5MW2	Dubeswari UG	July	Second	22-Jul-20	7.3	30	436	<2.0	20
5MW2	Dubeswari UG	August	First	10-Aug-20	7.5	30	464	<2.0	20
5MW2	Dubeswari UG	August	Second	25-Aug-20	7.5	28	432	<2.0	24
5MW2	Dubeswari UG	September	Second	25-Sep-20	7.5	26	420	<2.0	24
5MW2	Dubeswari UG	October	First	08-Oct-20	7.5	30	482	<2.0	20
5MW2	Dubeswari UG	October	First	08-Oct-20	7.5	30	482	<2.0	20
5MW2	Dubeswari UG	October	Second	28-Oct-20	7.6	32	488	<2.0	16
5MW2	Dubeswari UG	October	Second	28-Oct-20	7.6	32	488	<2.0	16
5MW2	Dubeswari UG	November	First	04-Nov-20	7.6	24	466	<2.0	28
5MW2	Dubeswari UG	November	Second	17-Nov-20	7.5	22	444	<2.0	20
5MW2	Dubeswari UG	December	First	10-Dec-20	7.7	20	426	<2.0	20
5MW2	Dubeswari UG	December	Second	22-Dec-20	7.8	19	438	<2.0	24
5MW2	Dubeswari UG	January	First	15-Jan-21	7.8	18	422	<2.0	24
5MW2	Dubeswari UG	January	Second	22-Jan-21	7.8	18	452	<2.0	20
5MW2	Dubeswari UG	February	First	05-Feb-21	8.4	18	421	<2.0	28
5MW2	Dubeswari UG	February	Second	23-Feb-21	7.6	19	480	<2.0	44
5MW2	Dubeswari UG	March	First	09-Mar-21	7.6	21	442	<2.0	20

Note: All parameters in mg/l unless otherwise specified.

Effluent Water Quality Standards (MoEF Schedule – VI Standards)

Parameters	pH	TSS	TDS	Oil & Grease	COD
Limit	5.5-9.0	100	Not Specified	10	250

Effluent Water Quality for full parameters (29 parameters)

Sl. No.	Parameters	Analytical Results				General Standards for Discharge of Effluent (Schedule VI)	Method of Detection	Detection Limit
	Date of Sampling	7-Sep-20	7-Sep-20	19-Mar-21	19-Mar-21			
1	Colour	4	5	3	4	Unobjectionable	Platinum Cobalt	1.0
2	Odour	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Physical	-
3	TSS	27	25	15.4	20.8	100	Gravimetric	10
4	pH	7.82	7.62	7.56	7.21	5.5-9.0	Electrometric	0.01
5	Temperature (°C)	29.3	29.3	27.3	27.3	Shall not exceed 5 °C above the receiving water temperature	Thermometric	0.1
6	Oil & Grease	BDL	BDL	BDL	BDL	10	Partition Gravimetric	2.0
7	Total Residual Chlorine	BDL	BDL	BDL	BDL	1.0	Colorimetric	0.02
8	Ammonical Nitrogen	0.84	0.82	0.78	0.72	50	Nesslerization	0.01
9	Total Kjeldahi Nitrogen	1.94	1.49	1.72	1.58	100	Macro Kjeldahl	1.0
10	Free Ammonia	BDL	BDL	BDL	BDL	5.0	Spectrophotometric	0.02
11	BOD	14	16	14.0	9.0	30	Bioassay	2.0
12	COD	32	20	24	24	250	Closed Reflux	4.0
13	Arsenic	BDL	BDL	BDL	BDL	0.2	AAS-VGA	0.002
14	Lead	BDL	BDL	BDL	BDL	0.1	AAS-GTA	0.005
15	Hexavalent Chromium	BDL	BDL	BDL	BDL	0.1	Colorimetric	0.01
16	Total Chromium	BDL	BDL	BDL	BDL	2.0	AAS-Flame	0.04
17	Copper	0.03	0.04	BDL	BDL	3.0	AAS-Flame	0.03
18	Zinc	0.03	0.03	BDL	BDL	5.0	AAS-Flame	0.01
19	Selenium	BDL	BDL	BDL	BDL	0.05	AAS-GTA	0.002
20	Nickel	BDL	BDL	BDL	BDL	3.0	AAS-Flame	0.01
21	Fluoride	0.30	0.84	0.34	0.74	2.0	SPADNS	0.02
22	Dissolved Phosphate	1.70	1.62	1.69	1.55	5.0	Molybdovanadate	0.30
23	Sulphide	0.005	0.009	0.008	0.010	2.0	Methylene Blue	0.005
24	Phenolics	BDL	BDL	BDL	BDL	1.0	Chloroform Extraction	0.001
25	Manganese	0.16	0.19	BDL	BDL	2.0	AAS-Flame	0.02
26	Iron	0.08	0.08	BDL	BDL	3.0	AAS-Flame	0.06
27	Nitrate Nitrogen	3.2	2.6	3.0	4.2	10	Spectrophotometric	0.5
28	Cadmium	BDL	BDL	BDL	BDL	2.0	AAS-GTA	0.0005
29	Total Dissolved Solids	526	448	564	448	Not Specified	Gravimetric	25.0

Note: All parameters in mg/l unless otherwise specified.

Annexure – III**Groundwater Quality**

Sl. N o.	Parameters	Analytical Results			Indian Standard Drinking Water (IS-10500 :2012)		Method of detection	Detection Limit
	Sample code	5GW1	5GW2	5GW3				
	Sampling Date	26-May-20	26-May-20	26-May-20	Acceptable Limit	Permissible Limit		
1	Colour, Hazen	3	2	3	5.0	15.0	Platinum Cobalt	1.0 Hazen
2	Odour	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable		Physical	-
3	Taste	Agreeable	Agreeable	Agreeable	Agreeable		Physical	-
4	Turbidity, NTU	1	2	2	1	5	Nephelometric	1.0 NTU
5	pH value	7.76	7.20	7.34	6.5-8.5	No relaxation	Electrometric	0.01
6	Total Hardness	128	179	235	300	600	EDTA	4.0
7	Iron	BDL	BDL	BDL	0.3	No relaxation	AAS Flame	0.06
8	Chlorides	16	37	253	250	1000	Argentometric	2.0
9	Res Free Chlorine	0.02	0.03	0.04	0.2	1	Spectrophotometric	0.02
10	Dissolved Solids	154	388	935	500	2000	Gravimetric	10.0
11	Calcium	43	67	78	75	200	EDTA	1.60
12	Copper	BDL	BDL	BDL	0.05	1.5	AAS Flame	0.03
13	Manganese	BDL	BDL	BDL	0.1	0.3	AAS Flame	0.02
14	Sulphate	76	194	21	200	400	Turbidity	2.0
15	Nitrate	1.44	4.56	52.61	45	No relaxation	Spectrophotometric	0.5
16	Fluoride	0.52	0.38	0.43	1	1.5	SPANDS	0.02
17	Selenium	BDL	BDL	BDL	0.01	No relaxation	AAS - GTA	0.002
18	Arsenic	BDL	BDL	BDL	0.01	0.05	AAS - VGA	0.002
19	Lead	BDL	BDL	BDL	0.01	No relaxation	AAS - GTA	0.005
20	Zinc	0.03	0.03	0.02	5	15	AAS Flame	0.01
21	Hex Chromium	BDL	BDL	BDL	0.05	0.05	Colorimetric	0.01
22	Boron	BDL	BDL	BDL	0.5	1	Colorimetric Carmine	0.20
23	Coliforms (MPN)	NIL	NIL	NIL	Not Specified		Chloroform Extraction	1.0
24	Phenolics	BDL	BDL	BDL	0.001	0.002	Titrimetric Indicator	0.001
25	Alkalinity	132	164	208	200	600	Titrimetric	4.0
26	Cadmium	BDL	BDL	BDL	0.003	No relaxation	AAS - GTA	0.0005

Note: All parameters in mg/l unless otherwise specified.

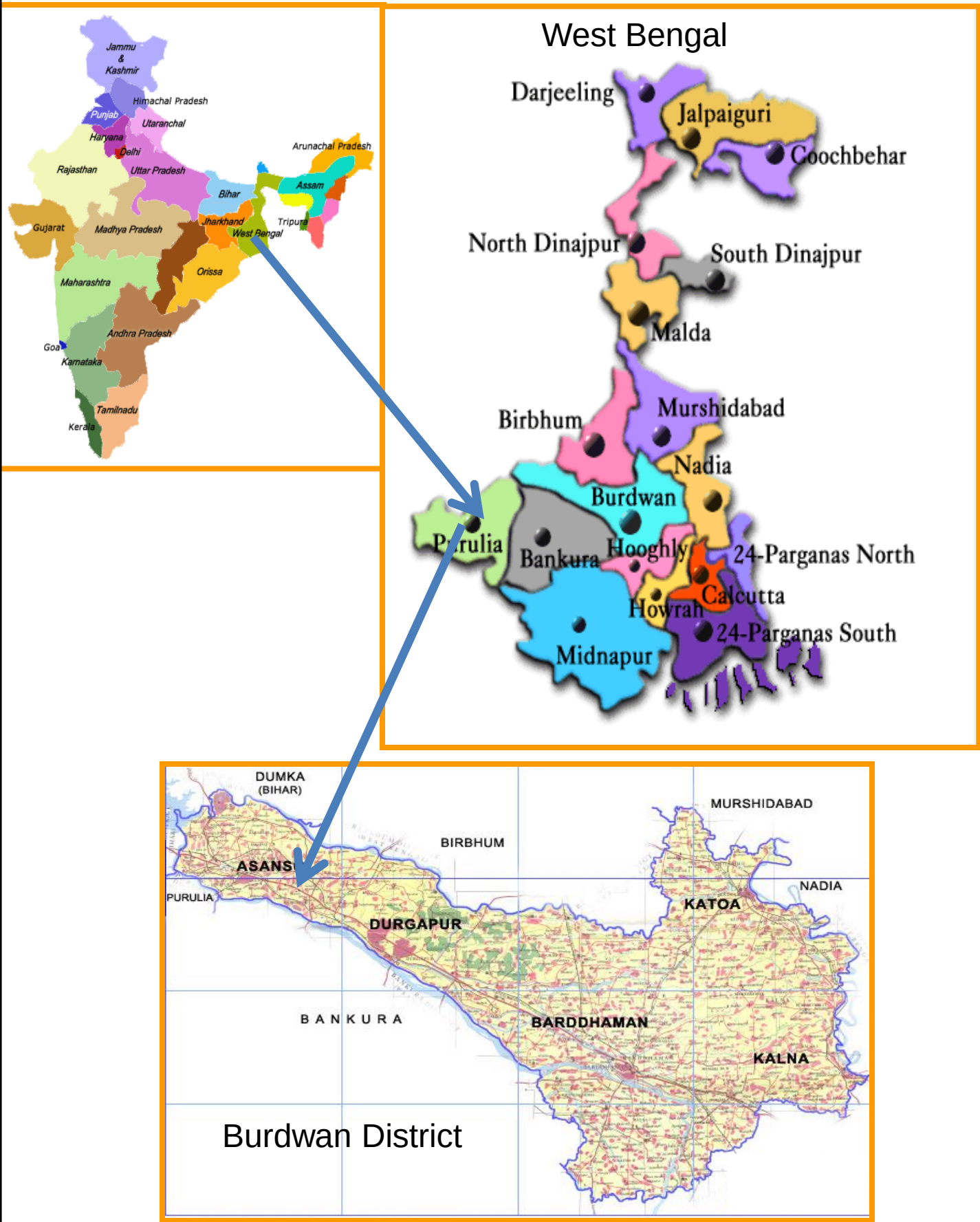
Annexure – IV**Groundwater Level**

Station Code	Location of Dugwell	Date of measurement	Water level (in Meters) Below Ground Level
5GW2	Dugwell near Bhamaria Star Club	26-May-20	4.3
5GW3	Dugwell near Shiv Mandir in Digha village	26-May-20	10.5
5GW5	Dugwell at Kartick Banerjee house at Parbelia village	26-May-20	1.6
5GWL1	Dugwell at Kartick Banerjee house at Parbelia village	8-Jan-00	1.65
5GWL1	Dugwell at Kartick Banerjee house at Parbelia village	12-Nov-20	1.2
5GWL1	Dugwell at Kartick Banerjee house at Parbelia village	22-Jan-21	1.6
5GWL2	Dugwell near Bhamaria Star Club	11-Aug-20	2.3
5GWL2	Dugwell near Bhamuria Star Club	13-Nov-20	3.85
5GWL2	Dugwell near Bhamuria Star Club	22-Jan-21	5.2
5GWL3	Dugwell near Shiv Mandir in Digha village	11-Aug-20	2.05
5GWL3	Dugwell near Shiv Mandir in Digha village	13-Nov-20	3
5GWL3	Dugwell near Shiv Mandir in Digha village	22-Jan-21	3.4

Piezometer water level

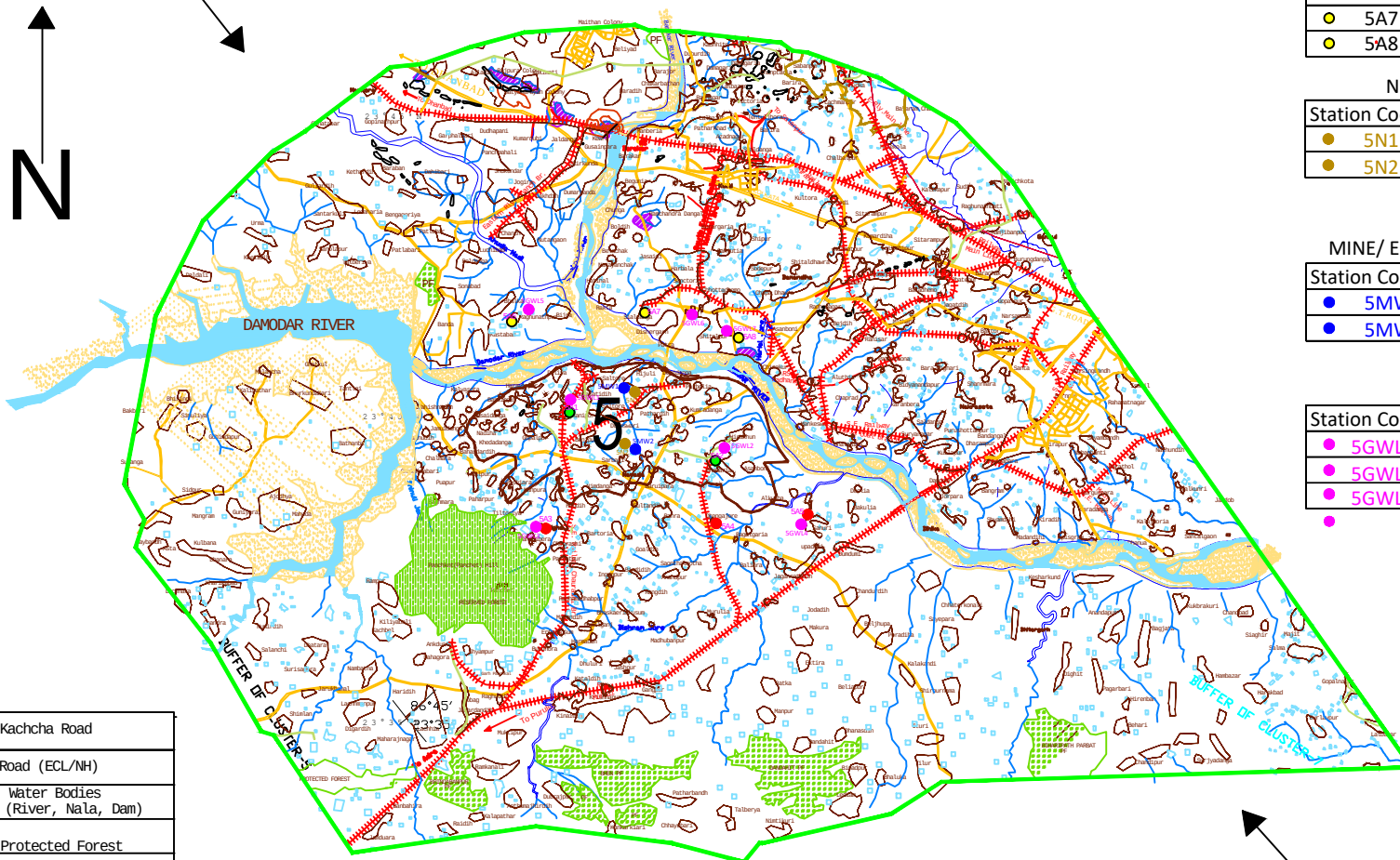
Station Code	Location of Piezometer	Date of measurement	Water level (in Meters) Below Ground Level
5/SO/PP-01	Sodepur (Bhamuria Unit Campus)	26-May-20	30.30
5/SO/PP-01	Sodepur(Bhamuria Unit Campus)	11-Aug-20	31.10
5/SO/PP-01	Sodepur(Bhamuria Unit Campus)	13-Nov-20	29.75
5/SO/PP-01	Sodepur(Bhamuria Unit Campus)	25-Jan-21	29.90

Plate – 1: Location Plan Of Cluster 5 in Country/ State/District



Predominant Wind Direction
during October - March (Post - Monsoon)

N



AIR QUALITY MONITORING STATIONS

Station Code	Type of Station	Name of Station
● 5A1	Permanent Air Station	In Ranipur Village
● 5A2	Permanent Air Station	Dubeshwari Colliery
● 5A3	Post monsoon Air Station	In Digha Village
● 5A4	Post monsoon Air Station	In Dhangajore Village
● 5A5	Post monsoon Air Station	In Sanuri Village
● 5A6	Pre monsoon Air Station	In Raghunathpur Village
● 5A7	Pre monsoon Air Station	Sialdanga Pump House
● 5A8	Pre monsoon Air Station	Sodepur 3A Pit

NOISE SAMPLING STATIONS

Station Code	Name of Station (Workplace)
● 5N1	Parbelia UG
● 5N2	Dubeshwari UG

MINE/ EFFLUENT WATER STATIONS

Station Code	Mine/Effluent Water Station
● 5MW1	Parbelia UG
● 5MW2	Dubeshwari UG

GROUND WATER LEVEL

Station Code	Location of Dug Well
● 5GWL1	Dugwell at Kartick Banerjee house in Parbelia village
● 5GWL2	Dugwell near Bhamaria star club
● 5GWL3	Dugwell near Shiv Mandir in Digha village

- Permanent Air Station
- Pre - monsoon
- Post - monsoon

Predominant Wind Direction
during April - September
(Pre - Monsoon & Monsoon Period)

JOB NO

EASTERN COALFIELDS LIMITED

111726

ENVIRONMENT STATEMENT FOR CLUSTER NO. 5

SAMPLING STATIONS
OF CLUSTER NO. 5

CMPDI
ISO 9001 Company

REV. No. 0

Sheet
1 OF 1