ENVIRONMENTAL STATEMENT
IN
FORM-V

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

(2020 – 2021)

for
COMPOSITE SAND MINING PLAN
in the
RIVERBED OF DAMODAR RIVER
(J. K. ROPEWAYS AREA)
Eastern Coalfields Limited

Prepared at

Regional Institute – I

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CMPDI

ISO 9001:2015 Company

ENVIRONMENTAL STATEMENT FOR
Composite Sand Mining Plan in Damodar Riverbed

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

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, the work of Environmental Statement for Composite Sand Mining in Ajoy Riverbed was entrusted to CMPDI by GM (Environment & Forest), Eastern Coalfields Limited.

1.2 PROJECT DESCRIPTION:

Sand for the sole purpose of stowing in underground mines is being extracted by ECL from Damodar Riverbed for the last 40 years on the basis of temporary leases / permits obtained from the Govt. of West Bengal. There are in all 15 stations of sand mining in the Damodar Riverbed spread in stations over 42 kms of its course along the southern boundary of the Raniganj Coalfield. Since obtaining environment clearance is now mandatory for sand mining to continue, a composite plan for extracting sand from the Damodar Riverbed has been prepared covering all the 15 stations with combined mining leasehold area of 213.86 Acre (86.58 Ha). Total quantity of sand proposed to be extracted is 1.5 million m3 per annum at peak level of extraction. Sand mining is carried out manually as well as mechanically at these stations. Out of these 15 stations, sand is extracted manually at 7 stations. Diesel operated dredgers have been deployed at 1 station, electrically operated scrapers at 1 station and pontoons at 2 stations. Maximum depth up to which sand is extracted from riverbed is 2.0m (maximum depth of 1.5 m at manual average depth of about 1.7 m). It is then loaded on trucks and transported either directly to the linked underground mines or stored in depots at transfer points for subsequent transport to the mines. Sand extraction and transportation activities are outsourced to experienced contractors and carried out under the supervision and guidelines of ECL.
The proposal is for extraction of 1.5 million m^3 of sand per annum from 15 stations in the riverbed of Damodar River, flowing along the southern portion of Raniganj Coalfield. They fall under three districts, namely, Burdwan on the northern bank of Damodar and Bankura & Purulia on the southern. The combined lease area of the 15 stations is 213.86 Acre (86.58 Ha) spread over 42 kms of the course of Damodar along Raniganj Coalfield.
Sand is available in the riverbed of Damodar River up to depths ranging from 8 m to 17 m as per studies carried out. As per the sand replenishment studies carried out for this proposal, the annual replenishment is up to 1.9 m of sand which gets evenly distributed on the riverbed. However, sand extraction is required up to depths of 1.5 to 2.0 m (average depth of 1.7 m within leasehold) in order to achieve the targeted capacity of 1.5

million m^3. Thus, it has been proposed to mine sand from the designated stations up to an average depth of 0.5 m only in order to maintain sufficient surplus sand in the riverbed each year.

EC was obtained vide letter no. J-11015/268/2012-IA.II (M)(Pt.) dated 26.05.2016 for production capacity of 1.5 Mm^3 in ML area of 86.58 Ha. Total production during 2019-20 was 0.36 Mm^3. Total manpower as on 31.03.2020 is 149. Total no. of working days were 303 days in GM office and 305 days in Agent Office. Sand is extracted and loaded mechanically at Narainkuri sand ghat while it is done manually at other designated sand ghats. Trucks mostly of 12 cum capacity is used for transportation of sand from designated ghats to sand bunkers distance of which varies upto 10 km for different bunkers. At Narainkuri sand ghat, 1 no. each of diesel operated dredger, electric operated dredger and scraper is operating and for sand transportation mechanism, 1 no. of mono cable ropeway system and 2 nos. of conveyors are installed.

Location of the plan is shown in Plate No. – 1.

Mouza & Plotwise land in Damodar Riverbed where sand is being extracted for stowing purpose

Station No.	P.S.	J.L. No.	Mouza	Gram Panchayat	Patch No.	Plot No.	Area (Acre)	Maximum extraction per year (M Cum)	Method of mining
1	Mejia	8	Gopalpur	Ardhagram	1	1094	6.00		Manual
2	Mejia	7	Ardhagram	Ardhagram	1	1324, 1325	46.00		Manual/Electrically operated dredger
3	Mejia	36	Gopalganj	Ardhagram	1	657	6.00		Manual
4	Saltora	42	Majit	Durlavpur	1	1731, 1736	10.00		Manual
5	Saltora	45	Sahebdanga	Durlavpur	1	1	25.00		Manual
6	Mejia	1	Bhara	Ardhagram	1	1819, 1824	6.00		Manual/Pontoon
					2	1629	4.00		
					3	1814	2.00		
					4	1	4.00		
7	Mejia	35	Anandpur	Durlavpur	1	1	4.50		Manual
8	Andal	51	Ramprasadpur	Ramprasadpur	1	1983, 665, 667 – 681, 683 – 685, 687 – 698, 804 - 819	13.20		Diesel Operated Dredger
9	Andal	50	Baska	Madanpur	1	1071, 1073, 1075, 1076, 1217, 1218, 1220 -1223, 1205, 1234,		**1.50**	Electrically operated Scraper
10	Andal	48	Madanpur	Madanpur	1	3, 1215 - 1222, 2330, 2335, 2337 – 2339, 2454, 2520, 2547, 2578, 2579, 2444	33.66		Diesel Operated Dredger
11	Raniganj	31	Napur	Raniganj	1	1891, 2391, 2394 – 2396			-do-
12	Raniganj	12	Narayankuri	Raniganj	1	217, 231 - 233			Electrically operated Dredger
13	Kulti	40	Sitalpur	Kulti Municipality	1	1620	24.50		Manual/Pontoon
					2	637	5.75		
14	Kulti	60	Chinakuri	Kulti Municipality	1	278	6.75		Manual
15	Neturia	95	Parebelia	Bhamuria	1	1, 901, 3567	16.50		Manual
	Total						213.86		
							i.e 86.58 Ha		

Location of sand stations on the Riverbed of Damodar River is shown in Plate No. 2.

1.3 ENVIRONMENTAL SCENARIO:

CMPDI has been engaged to carry out Routine Environmental Monitoring of the clusters falling in the Raniganj Coalfield. The monitoring is carried out every fortnight by collecting 24 – hour samples for ambient air and compared with standards for quality. There are no specific air/water quality and noise level monitoring stations for the project. The boundary of Damodar River is shared by Cluster Nos. 5, 6 and 9. Accordingly, 4 nos. of permanent (all-weather) stations, 3 nos. of pre-monsoon stations and 3 nos. of post-monsoon stations have been selected to represent the monitored air quality around the project. All these stations fall in the buffer zone within close proximity of the sand ghats where sand extraction is being carried out. The details of the sampling stations are given below:

Station Code	Type of Station	Name of Station
DRA1/6A1	Permanent Air Station	Chhotadhemo Primary School
DRA2/6A2	Permanent Air Station	Sodepur Area Guest House
DRA3/6A11	Permanent Air Station	Managers' Office, Chinakuri Pit No. 1 & 2
DRA4/6A12	Permanent Air Station	CDS Building, Chinakuri Pit No. - 3
DRA5/5A6	Pre-monsoon	Raghunathpur Village
DRA6/5A7	Pre-monsoon	Sialdanga Pump House
DRA7/5A8	Pre-monsoon	Sodepur 3A Pit
DRA8/9A5	Post-monsoon	ECL Colony, Kalidaspur Project
DRA9/9A6	Post-monsoon	Kalikapur Village
DRA10/9A7	Post-monsoon	BDO Office, Mejia

Similarly, 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. These dugwells are near the River boundary in buffer zone. Location of the dugwells are given below:

Station Code	Location of Dugwell
DRGW1/5GWL1	Dugwell at Kartick Banerjee house in Parbelia village
DRGW2/9GWL1	Dugwell at Bakulia High School
DRGW3/9GWL2	Dugwell at Perabad Kalikapur village

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.

Location of the monitoring stations of air & 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 PM_{10} concentration levels were found in the range of 62.8 to 519.1 µg/m^3 and have exceeded the limits on 13 occasions out of 146 samples analysed during the year as per standard. The $PM_{2.5}$ concentration was found in the range of 10.0 to 104.0 µg/m^{3}and have exceeded the limits on 6 occasions out of 146 samples analysed during the year as per the standards of NAAQS, 2009. The SO_2 concentration remained below 10.0 µg/m^3 and NO_X concentration was in the range of 11.4 to 17.9 µg/m^3 and was within the limit as per standard.

ENVIRONMENTAL STANDARDS:

Environmental Standards for Ambient air quality (AAQ):

Station Category	*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*			*National Ambient Air Quality Standards (NAAQS), 2009 for industrial, residential and rural areas for 24 hours samples*
	Pollutant Concentration (µg/m^3)			
	PM_{10}	**SO_2**	**NO_x**	**$PM_{2.5}$**
Industrial	300.0	120.0	120.0	60.0
Residential	100.00	80.0	80.0	

WATER QUALITY

The analysis results reveal that most of the parameters of water are below permissible limits prescribed in IS 10500:2012 standards for groundwater quality.

The well water level data reveals that water level varies from 1.0 m to 5.90 m below ground level during FY 2020-21.

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**	Composite Sand Mining Plan in Damodar Riverbed; Office of the General Manager, J K Ropeways, PO: Kajoragram, West Burdman, West Bengal
(II)	**INDUSTRY CATEGORY**	Red
(III)	**PRODUCTION CAPACITY**	1.50 Mm^3 in a ML area of 86.58 Ha
	PRODUCTION DURING 2019-20	0.47 Mm^3
(IV)	**YEAR OF ESTABLISHMENT**	30.08.2016 (date of grant of CTE)
(V)	**DATE OF THE LAST ENVIRONMENTAL STATEMENT SUBMITTED**	12.07.2020

PART – B
WATER AND RAW MATERIAL CONSUMPTION

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

#	Particulars	2019-20	2020-21
A.	**MINING** (Dust suppression, Firefighting, Others)	0.0	0.0
B.	**COOLING** (in radiators of trucks/HEMM/workshop)	4.0*	4.0*
C.	**DOMESTIC** (Bore hole and mine water from Central Kajora Colliery)	274.0*	274.0*
TOTAL		**278.0***	**278.0***

**Workshop and colonies are common for both the sand mining plans in the Riverbeds of Ajoy and Damodar rivers operating under J K Ropeways*

Name of Product	Process water consumption per unit of product output (l/day/cum)	
	During previous FY 2019-20	During current FY 2020-21
Sand	0.002[$]	0.002[$]

[$]Total water consumption per unit product output considering production from both the Rivers

(II) RAW MATERIAL CONSUMPTION :

Name of raw material	Name of products	Consumption of raw material per unit of product	
		During previous FY 2019-20	During current FY 2020-21
1. Explosive	Sand	-	-
2. Diesel		0.18 l/cum	0.18 l/cum
3. Lubricants		0.003 l/cum	0.003 l/cum

PART – C
POLLUTION GENERATED

Pollutants	Quantity of pollutants discharged (mass/day)	Concentration of pollutants discharged (mass/volume)	Percentage variation from prescribed standards with reasons
WATER	Nil	The main air pollutant is suspended PM_{10} and $PM_{2.5}$. The air quality results are appended as Annexure-I.	Ambient air quality results show that the values of PM_{10}, $PM_{2.5}$, SO_2 and NO_x are well within the prescribed standards barring few occasions as explained in the earlier section.
AIR*	Total pollutant load of PM_{10} is 32.46 kg/day while it is around 4.65 kg/day for $PM_{2.5}$.		

**PM_{10} and $PM_{2.5}$ estimation has been done using empirical formula by using Emission Factors derived from S&T studies done by CMPDI. This quantity is generated mostly due to transportation of sand by trucks.*

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

Hazardous waste*	Total quantity		Disposal method
	During previous FY 2019-20	During current FY 2020-21	
A) From process			Dealt in Part – F
i)Used oil	5000 litres	5000 litres	
ii)Lead-Acid Batteries			
a. Automobile batteries	Nil	Nil	
b. Cap-lamp batteries	NA	NA	
iii) Used Cotton waste	Nil	Nil	
iv) Metal Scrap	574 Te	574 Te	

**figures are given for both the sand mining plans operating under the administrative control of J K Ropeways*

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
Nil

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 PART-D which has been deposited at area store disposal stock yard.

Used oil is stored in drums and is re-used as lubricants of pulleys, wheel and axle of coal tubs in the nearby mines.

HEMM batteries and metal scrap are stored at area store and auctioned to authorized recyclers.

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. AIR POLLUTION CONTROL MEASURES:

a) Manual loading is being carried out for sand extraction at all designated sand ghats except Narainkuri.
b) Sand is transported from sand ghats to bunkers by tarpaulin covered trucks to avoid spillage.
c) Total plantation on 74.74 Ha done in sand mining related areas during 2020-21.
d) Local species such as Gamar, Chatim, Neem, Krishnachura etc. have been planted with survival rate of 75%.
e) Regular monitoring will be carried out fortnightly in future also and appropriate action will be taken, if needed.

2. WATER POLLUTION CONTROL MEASURES:

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

a) Routine monitoring and level measurement is being done in dugwells located in the surrounding areas and based on the analysis result, appropriate mitigation measures will be taken, if required.
b) Filter plant has been established to supply filtered water for domestic consumption.

3. NOISE POLLUTION CONTROL MEASURES:

a) Regular maintenance of machines and other equipment.
b) Providing green belt around core activity area, along road side in colony and in other vacant space.
c) Equipment and light vehicles are provided with silencers.

PART – H

ADDITIONAL INVESTMENT PROPOSAL FOR ENVIRONMENTAL PROTECTION INCLUDING ABATEMENT OF POLLUTION

a) Plantation will be carried out as per proposed plan in future.
b) 30kW solar plant connected to grid and is working properly.
c) Different activities has been carried out under CSR by the Areas associated with sand mining in 2020-21 for composite sand mining plans in riverbeds of both the rivers. An amount of ₹ 111.65 Lakh has been spent on these activities.
d) Development of 2 nos. of Eco Park in JK Ropeways area office colony.
e) The Environmental monitoring of the cluster will be continued fortnightly as per the guidelines of Ministry of Environment, Forests & Climate Change (MoEF&CC).

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; appropriate action will be taken, if needed.

Annexure – I

AMBIENT AIR QUALITY

Station No.	Station Name	Month	Fortnight	Date of Sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_X
DRA1/6A1	Chhottadhemo Primary School	May	First	06-May-20	92.8	37.6	<10.0	14.9
DRA1/6A1	Chhottadhemo Primary School	May	Second	26-May-20	91.7	36.9	<10.0	14.6
DRA1/6A1	Chhottadhemo Primary School	June	Second	19-Jun-20	88.4	35.4	<10.0	14
DRA1/6A1	Chhottadhemo Primary School	July	First	09-Jul-20	82.5	30.7	<10.0	14.1
DRA1/6A1	Chhottadhemo Primary School	August	First	11-Aug-20	81.6	31.3	<10.0	14
DRA1/6A1	Chhottadhemo Primary School	August	Second	20-Aug-20	82.7	32.1	<10.0	14.2
DRA1/6A1	Chhottadhemo Primary School	September	First	08-Sep-20	83.4	33.4	<10.0	14.6
DRA1/6A1	Chhottadhemo Primary School	September	Second	25-Sep-20	84.2	33.9	<10.0	14.5
DRA1/6A1	Chhottadhemo primary School	October	First	13-Oct-20	87.3	35.2	<10.0	14.9
DRA1/6A1	Chhottadhemo primary School	October	Second	20-Oct-20	88.4	35.7	<10.0	15.1
DRA1/6A1	Chhottadhemo primary School	November	First	09-Nov-20	89.6	35.4	<10.0	15.2
DRA1/6A1	Chhottadhemo primary School	November	Second	25-Nov-20	90.2	34.6	<10.0	15.1
DRA1/6A1	Chhottadhemo primary School	December	First	09-Dec-20	91.5	35.5	<10.0	15.3
DRA1/6A1	Chhottadhemo primary School	December	Second	23-Dec-20	92.4	36.1	<10.0	15.4
DRA1/6A1	Chhottadhemo primary School	January	First	06-Jan-21	344.4	32	<10.0	15.9
DRA1/6A1	Chhottadhemo primary School	January	Second	18-Jan-21	462.1	47	<10.0	16.1
DRA1/6A1	Chhottadhemo primary School	February	First	01-Feb-21	98.2	33.5	<10.0	15.6
DRA1/6A1	Chhottadhemo primary School	February	Second	24-Feb-21	98.8	33.7	<10.0	15.8
DRA1/6A1	Chhottadhemo primary School	March	First	01-Mar-21	98.8	33.9	<10.0	16
DRA1/6A1	Chhottadhemo primary School	March	Second	24-Mar-21	209.7	52.1	<10.0	16.7
DRA3/6A11	Manager's Office, Chinakuri pit no.1 & 2	May	First	05-May-20	154.2	51	<10.0	17
DRA3/6A11	Manager's Office, Chinakuri pit no.1 & 2	May	Second	29-May-20	151.8	50.6	<10.0	16.5
DRA3/6A11	Manager's Office, Chinakuri pit no.1 & 2	June	First	02-Jun-20	143.6	45.8	<10.0	15.9
DRA3/6A11	Manager's Office, Chinakuri pit no.1 & 2	June	Second	25-Jun-20	138.4	42.6	<10.0	15.4
DRA3/6A11	Manager's Office, Chinakuri pit no.1 & 2	July	First	09-Jul-20	116.5	38.7	<10.0	15.1
DRA3/6A11	Manager's Office, Chinakuri pit no.1 & 2	July	Second	25-Jul-20	110.3	42.6	<10.0	14.6
DRA3/6A11	Manager's Office, Chinakuri pit no.1 & 2	August	First	07-Aug-20	112.4	37.3	<10.0	14.8
DRA3/6A11	Manager's Office, Chinakuri pit no.1 & 2	August	Second	19-Aug-20	113.6	38.2	<10.0	14.9
DRA3/6A11	Manager's Office, Chinakuri pit no.1 & 2	September	First	09-Sep-20	115.4	38.5	<10.0	14.8
DRA3/6A11	Manager's Office, Chinakuri pit no.1 & 2	September	Second	29-Sep-20	116.2	39.3	<10.0	14.7
DRA3/6A11	Manager's Office, Chinakuri pit no.1 & 2	October	First	15-Oct-20	120.5	40.4	<10.0	15
DRA3/6A11	Manager's Office, Chinakuri pit no.1 & 2	October	Second	28-Oct-20	123.7	41.3	<10.0	15.6
DRA3/6A11	Manager's Office, Chinakuri pit no.1 & 2	November	First	06-Nov-20	130.4	42.4	<10.0	15.9
DRA3/6A11	Manager's Office, Chinakuri pit no.1 & 2	November	Second	19-Nov-20	131.5	42.4	<10.0	15.8
DRA3/6A11	Manager's Office, Chinakuri pit no.1 & 2	December	First	09-Dec-20	134.2	42.9	<10.0	16

Station No.	Station Name	Month	Fortnight	Date of Sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_X
DRA3/6A11	Manager's Office, Chinakuri pit no.1 & 2	December	Second	21-Dec-20	194.6	84	<10.0	16.2
DRA3/6A11	Manager's Office, Chinakuri pit no.1 & 2	January	First	07-Jan-21	382.7	52	<10.0	16.4
DRA3/6A11	Manager's Office, Chinakuri pit no.1 & 2	January	Second	18-Jan-21	364	103	<10.0	16.6
DRA3/6A11	Manager's Office, Chinakuri pit no.1 & 2	February	First	01-Feb-21	290	88	<10.0	16.8
DRA3/6A11	Manager's Office, Chinakuri pit no.1 & 2	February	Second	26-Feb-21	176.7	51.8	<10.0	17
DRA3/6A11	Manager's Office, Chinakuri pit no.1 & 2	March	First	08-Mar-21	145.8	37.2	<10.0	17.2
DRA3/6A11	Manager's Office, Chinakuri pit no.1 & 2	March	Second	25-Mar-21	294	79	<10.0	17.3
DRA4/6A12	CDS Building, Chinakuri pit no.3	May	First	06-May-20	171.3	55.6	<10.0	17.6
DRA4/6A12	CDS Building, Chinakuri pit no.3	May	Second	29-May-20	162.7	52.7	<10.0	17
DRA4/6A12	CDS Building, Chinakuri pit no.3	June	First	02-Jun-20	152.4	47.3	<10.0	16.2
DRA4/6A12	CDS Building, Chinakuri pit no.3	June	Second	25-Jun-20	144.5	45.8	<10.0	16
DRA4/6A12	CDS Building, Chinakuri pit no.3	July	First	09-Jul-20	118.4	39.3	<10.0	15.7
DRA4/6A12	CDS Building, Chinakuri pit no.3	July	Second	25-Jul-20	112.8	45.8	<10.0	14.9
DRA4/6A12	CDS Building, Chinakuri pit no.3	August	First	07-Aug-20	116.6	38.2	<10.0	15
DRA4/6A12	CDS Building, Chinakuri pit no.3	August	Second	19-Aug-20	118.9	39.3	<10.0	15.2
DRA4/6A12	CDS Building, Chinakuri pit no.3	September	First	09-Sep-20	119.3	40.2	<10.0	15.4
DRA4/6A12	CDS Building, Chinakuri pit no.3	September	Second	29-Sep-20	120.7	40.8	<10.0	15.6
DRA4/6A12	CDS Building, Chinakuri pit no.3	October	First	13-Oct-20	124.8	41.7	<10.0	15.9
DRA4/6A12	CDS Building, Chinakuri pit no.3	October	Second	28-Oct-20	128.2	42.5	<10.0	16.2
DRA4/6A12	CDS Building, Chinakuri pit no.3	November	First	06-Nov-20	137.1	43.9	<10.0	16.4
DRA4/6A12	CDS Building, Chinakuri pit no.3	November	Second	19-Nov-20	138.4	44.2	<10.0	16.3
DRA4/6A12	CDS Building, Chinakuri pit no.3	December	First	09-Dec-20	141.6	45.8	<10.0	16.5
DRA4/6A12	CDS Building, Chinakuri pit no.3	December	Second	21-Dec-20	512.5	59.6	<10.0	16.8
DRA4/6A12	CDS Building, Chinakuri pit no.3	January	First	07-Jan-21	373.5	57.9	<10.0	17
DRA4/6A12	CDS Building, Chinakuri pit no.3	January	Second	19-Jan-21	393.7	104	<10.0	17.3
DRA4/6A12	CDS Building, Chinakuri pit no.3	February	First	02-Feb-21	250.8	57	<10.0	17.5

Station No.	Station Name	Month	Fortnight	Date of Sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_X
DRA4/6A12	CDS Building, Chinakuri pit no.3	February	Second	26-Feb-21	519.1	55	<10.0	17.6
DRA4/6A12	CDS Building, Chinakuri pit no.3	March	First	11-Mar-21	160	39.5	<10.0	17.8
DRA4/6A12	CDS Building, Chinakuri pit no.3	March	Second	25-Mar-21	320.6	58.2	<10.0	17.9
DRA2/6A2	Sodpur Area Guest House	May	First	05-May-20	95.6	34.9	<10.0	14.8
DRA2/6A2	Sodpur Area Guest House	May	Second	29-May-20	94.3	34.6	<10.0	14.4
DRA2/6A2	Sodpur Area Guest House	June	First	11-Jun-20	93.1	34.5	<10.0	14.2
DRA2/6A2	Sodpur Area Guest House	June	Second	19-Jun-20	91.5	33.8	<10.0	14.1
DRA2/6A2	Sodpur Area Guest House	July	First	09-Jul-20	85.4	31.2	<10.0	14
DRA2/6A2	Sodpur Area Guest House	August	First	11-Aug-20	83	31.2	<10.0	13.7
DRA2/6A2	Sodpur Area Guest House	August	Second	20-Aug-20	83.6	31.8	<10.0	13.8
DRA2/6A2	Sodpur Area Guest House	September	First	08-Sep-20	84.2	32.5	<10.0	14.1
DRA2/6A2	Sodpur Area Guest House	September	Second	25-Sep-20	85	33.1	<10.0	14.2
DRA2/6A2	Sodepur Guest House	October	First	13-Oct-20	88.2	35	<10.0	14.6
DRA2/6A2	Sodepur Guest House	October	Second	19-Oct-20	88.6	35.6	<10.0	14.8
DRA2/6A2	Sodepur Guest House	November	First	09-Nov-20	90.4	35.2	<10.0	14.9
DRA2/6A2	Sodepur Guest House	November	Second	25-Nov-20	91.5	35.8	<10.0	14.8
DRA2/6A2	Sodepur Guest House	December	First	09-Dec-20	92.6	36.2	<10.0	14.7
DRA2/6A2	Sodepur Guest House	December	Second	22-Dec-20	423.4	54	<10.0	14.8
DRA2/6A2	Sodepur Guest House	January	First	07-Jan-21	413.2	19.9	<10.0	14.7
DRA2/6A2	Sodepur Guest House	January	Second	18-Jan-21	459.7	72	<10.0	15
DRA2/6A2	Sodepur Guest House	February	First	01-Feb-21	239.7	54	<10.0	15.2
DRA2/6A2	Sodepur Guest House	February	Second	24-Feb-21	97.6	34.5	<10.0	15.4
DRA2/6A2	Sodepur Guest House	March	First	01-Mar-21	96.4	32.1	<10.0	15.6
DRA2/6A2	Sodepur Guest House	March	Second	24-Mar-21	417.8	10	<10.0	15.5
DRA5/5A6	Raghunathpur village	May	First	06-May-20	92.6	40.8	<10.0	14.9
DRA5/5A6	Raghunathpur village	May	Second	28-May-20	93.4	41.6	<10.0	15
DRA5/5A6	Raghunathpur village	June	Second	18-Jun-20	90.8	39.4	<10.0	14.4
DRA5/5A6	Raghunathpur village	July	First	13-Jul-20	87.3	36.1	<10.0	14.1
DRA5/5A6	Raghunathpur village	August	First	10-Aug-20	84.7	34.7	<10.0	14
DRA5/5A6	Raghunathpur village	August	Second	19-Aug-20	85.3	35.1	<10.0	14.2
DRA5/5A6	Raghunathpur village	September	First	07-Sep-20	85.8	35.4	<10.0	14.4
DRA5/5A6	Raghunathpur village	September	Second	24-Sep-20	86.4	35.6	<10.0	14.6
DRA6/5A7	Sialdanga Pump House	May	First	07-May-20	96.2	42.6	<10.0	14.8
DRA6/5A7	Sialdanga Pump House	May	Second	26-May-20	97.9	43.4	<10.0	15.2
DRA6/5A7	Sialdanga Pump House	June	Second	18-Jun-20	94.3	42.1	<10.0	14.6
DRA6/5A7	Sialdanga Pump House	July	First	13-Jul-20	89.2	37.4	<10.0	14.4
DRA6/5A7	Sialdanga Pump House	August	First	10-Aug-20	88.9	37.2	<10.0	14.3
DRA6/5A7	Sialdanga Pump House	August	Second	20-Aug-20	89.3	37.4	<10.0	14.5
DRA6/5A7	Sialdanga Pump House	September	First	07-Sep-20	90.2	37.6	<10.0	14.8
DRA6/5A7	Sialdanga Pump House	September	Second	25-Sep-20	91.3	37.4	<10.0	14.6
DRA7/5A8	Sodepur 3A pit	May	First	07-May-20	121.8	46.9	<10.0	16.2
DRA7/5A8	Sodepur 3A pit	May	Second	27-May-20	124.6	48.2	<10.0	16.4
DRA7/5A8	Sodepur 3A pit	June	Second	26-Jun-20	118.4	43.6	<10.0	15.2
DRA7/5A8	Sodepur 3A pit	July	First	03-Jul-20	102.4	38.8	<10.0	14.9
DRA7/5A8	Sodepur 3A pit	August	First	11-Aug-20	96.3	36.1	<10.0	14.5
DRA7/5A8	Sodepur 3A pit	August	Second	20-Aug-20	97.1	36.8	<10.0	14.7
DRA7/5A8	Sodepur 3A pit	September	First	07-Sep-20	98.3	36.5	<10.0	14.6
DRA7/5A8	Sodepur 3A pit	September	Second	25-Sep-20	98.9	36.3	<10.0	14.4

Station No.	Station Name	Month	Fortnight	Date of Sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_X
DRA8/9A5	ECL Colony, Kalidaspur Project	October	First	15-Oct-20	92.6	31.6	<10.0	14.3
DRA8/9A5	ECL Colony, Kalidaspur Project	October	Second	16-Oct-20	68.3	27.3	<10.0	13.1
DRA8/9A5	ECL Colony, Kalidaspur Project	November	First	06-Nov-20	83.7	28.9	<10.0	14.2
DRA8/9A5	ECL Colony, Kalidaspur Project	November	Second	27-Nov-20	92.7	31.6	<10.0	14.3
DRA8/9A5	ECL Colony, Kalidaspur Project	December	First	03-Dec-20	108.5	36.4	<10.0	12.3
DRA8/9A5	ECL Colony, Kalidaspur Project	December	Second	16-Dec-20	108.3	36.3	<10.0	12.7
DRA8/9A5	ECL Colony, Kalidaspur Project	January	First	12-Jan-21	176.8	35.4	<10.0	14.2
DRA8/9A5	ECL Colony, Kalidaspur Project	January	Second	25-Jan-21	219.7	31.2	<10.0	14.7
DRA8/9A5	ECL Colony, Kalidaspur Project	February	First	15-Feb-21	118.3	32.6	<10.0	12.7
DRA8/9A5	ECL Colony, Kalidaspur Project	February	Second	19-Feb-21	125.4	34.8	<10.0	12.6
DRA8/9A5	ECL Colony, Kalidaspur Project	March	First	15-Mar-21	88.6	28	<10.0	12.6
DRA8/9A5	ECL Colony, Kalidaspur Project	March	Second	19-Mar-21	89.7	31	<10.0	12.3
DRA9/9A6	Kalikapur village	October	First	13-Oct-20	83.6	28.9	<10.0	13.6
DRA9/9A6	Kalikapur village	October	Second	16-Oct-20	76.2	26.7	<10.0	14.5
DRA9/9A6	Kalikapur village	November	First	06-Nov-20	91.6	31.3	<10.0	12.8
DRA9/9A6	Kalikapur village	November	Second	27-Nov-20	93.8	31.9	<10.0	13.8
DRA9/9A6	Kalikapur village	December	First	03-Dec-20	128.6	42.4	<10.0	13.6
DRA9/9A6	Kalikapur village	December	Second	16-Dec-20	116.9	38.9	<10.0	13.8
DRA9/9A6	Kalikapur village	January	First	14-Jan-21	87.4	26.2	<10.0	12.6
DRA9/9A6	Kalikapur village	January	Second	29-Jan-21	116.2	34.9	<10.0	13.8
DRA9/9A6	Kalikapur village	February	First	15-Feb-21	134.8	18	<10.0	14.6
DRA9/9A6	Kalikapur village	February	Second	20-Feb-21	154.6	19.7	<10.0	14.8
DRA9/9A6	Kalikapur village	March	First	04-Mar-21	93.8	33	<10.0	14.8
DRA9/9A6	Kalikapur village	March	Second	19-Mar-21	93.8	28	<10.0	13.6
DRA10/9A7	BDO office Mejia	October	First	13-Oct-20	62.8	22.6	<10.0	12.7
DRA10/9A7	BDO office Mejia	October	Second	16-Oct-20	63.8	22.9	<10.0	13.9
DRA10/9A7	BDO office Mejia	November	First	06-Nov-20	89.8	30.7	<10.0	13.4
DRA10/9A7	BDO office Mejia	November	Second	28-Nov-20	97.4	33	<10.0	12.2
DRA10/9A7	BDO office Mejia	December	First	03-Dec-20	134.5	44.2	<10.0	11.7
DRA10/9A7	BDO office Mejia	December	Second	16-Dec-20	132.4	43.5	<10.0	11.4
DRA10/9A7	BDO office Mejia	January	First	14-Jan-21	93.7	28.1	<10.0	13.8
DRA10/9A7	BDO office Mejia	January	Second	29-Jan-21	159.3	42.6	<10.0	14.6
DRA10/9A7	BDO office Mejia	February	First	15-Feb-21	104.8	21.4	<10.0	13.2
DRA10/9A7	BDO office Mejia	February	Second	20-Feb-21	106.7	21.5	<10.0	12.2
DRA10/9A7	BDO office Mejia	March	First	04-Mar-21	96.4	31	<10.0	13.2
DRA10/9A7	BDO office Mejia	March	Second	19-Mar-21	99.4	36	<10.0	13.1

Annexure – II

GROUNDWATER QUALITY

Station No	DRGW1/5GW1	DRGW4/9GW1	DRGW5/9GW2	Indian Drinking Water Standard (IS-10500:2012)	
Station Name	Dugwell at Kartick Banerjee house in Parbelia village	Dugwell at Bakulia High School	Dugwell at Perabad Kalikapur village		
Month	May'20	May'20	May'20		
Fortnight	Second	Second	Second		
Date of sampling	26-May-20	21-May-20	21-May-20	Acceptable Limit	Permissible Limit
Colour, Hazen unit Max	3	2	2	5.0	15.0
Odour	Unobjectionable	Unobjectionable	Unobjectionable	Agreeable	Agreeable
Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Turbidity, NTU Max	2	2	2	1.0	5.0
pH	7.34	6.96	7.82	6.5-8.5	No relaxation
Total Hardness	235	202	118	200.0	600.0
Iron	BDL	BDL	BDL	0.30	No relaxation
Chlorides	253	72	25	250.0	1000.0
Res Free chlorine	0.04	0.03	0.04	0.20	1.0
Dissolved Solids	935	871	174	500.0	2000.0
Calcium	78	69	73	75.0	200.0
Copper	BDL	BDL	BDL	0.05	1.5
Manganese	BDL	BDL	BDL	0.1	0.3
Sulphate	21	62	20	200.0	400.0
Nitrate	52.61	10.24	9.18	45.0	No relaxation
Fluoride	0.43	0.48	0.26	1.0	1.5
Selenium	BDL	BDL	BDL	0.01	No relaxation
Arsenic	BDL	BDL	BDL	0.01	0.05
Lead	BDL	BDL	BDL	0.01	No relaxation
Zinc	0.02	0.01	0.02	5.0	15.0
Total Chromium	BDL	BDL	BDL	0.05	No relaxation
Boron	BDL	BDL	BDL	0.5	1.0
Coliforms (MPN)	NIL	NIL	NIL	Shall not be detectable in any 100 ml sample	
Phenolics	BDL	BDL	BDL	0.001	0.002
Alkalinity	208	132	82	200.0	600.0
Cadmium	BDL	BDL	BDL	0.003	No relaxation

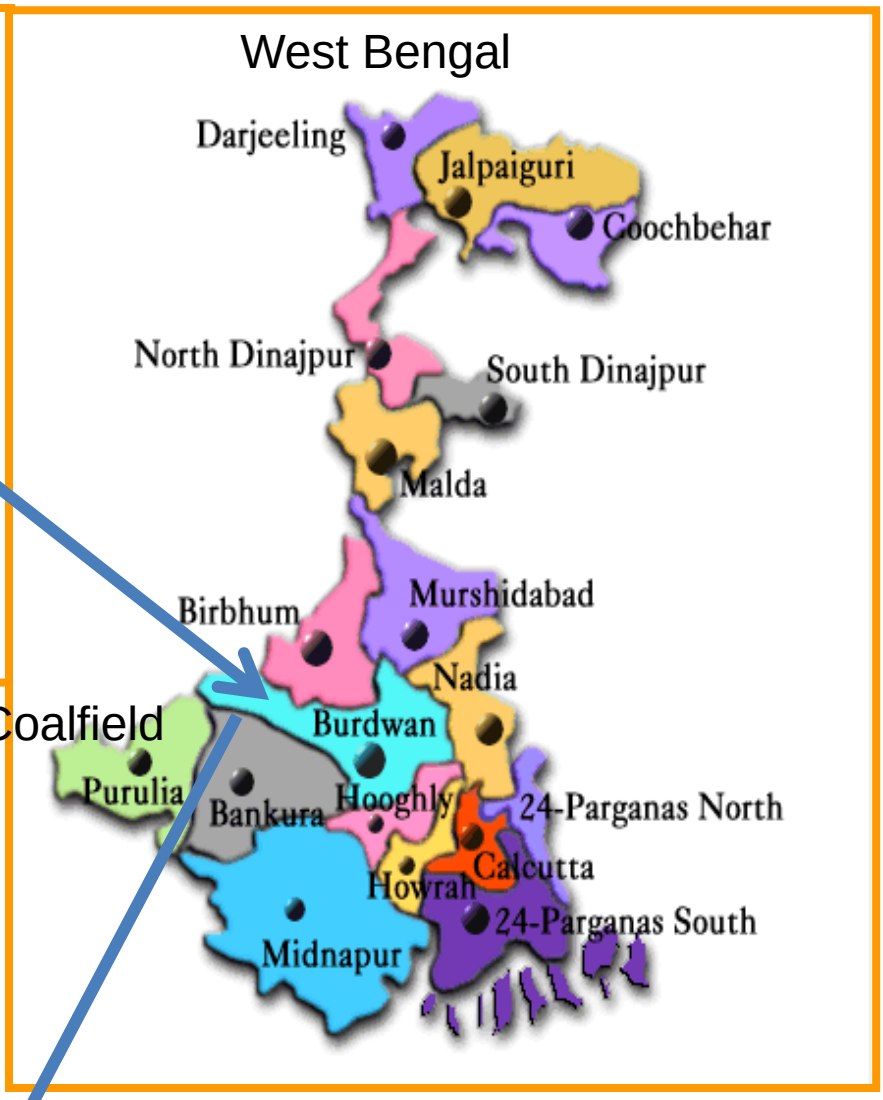
Note: All parameters in mg/l unless otherwise specified

Annexure – III

GROUNDWATER LEVEL

Station Code	Location of Dugwell	Date of measurement	Water level (in Meters) Below Ground Level
5GWL1	Dugwell at Kartick Banerjee house at Parbelia village	26-May-20	1.60
5GWL1	Dugwell at Kartick Banerjee house at Parbelia village	11-Aug-20	1.65
5GWL1	Dugwell at Kartick Banerjee house at Parbelia village	12-Nov-20	1.20
5GWL1	Dugwell at Kartick Banerjee house at Parbelia village	22-Jan-21	1.60
9GWL1	Dugwell at Bakulia high school	21-May-20	5.90
9GWL1	Dugwell at Bakulia high school	10-Aug-20	1.70
9GWL1	Dugwell at Bakulia high school	9-Nov-20	2.80
9GWL1	Dugwell at Bakulia high school	28-Jan-21	4.35
9GWL2	Dugwell at Perabad Kalikapur village	21-May-20	3.00
9GWL2	Dugwell at Perabad Kalikapur village	10-Aug-20	1.00
9GWL2	Dugwell at Perabad Kalikapur village	9-Nov-20	2.45
9GWL2	Dugwell at Perabad Kalikapur village	28-Jan-21	4.60

Plate – 1 Location of Damodar river Job 111726



Raniganj Coalfield

Damodar River

Burdwan District

Plate No. 2 Location of Sand Ghats on the Riverbed of Damodar River

AIR QUALITY MONITORING STATIONS

Station Code	Type of Station	Name of Station
DRA1/6A1	Permanent Air Station	Chhotadhemo Primary School
DRA2/6A2	Permanent Air Station	Sodepur Area Guest House
DRA3/6A11	Permanent Air Station	Managers' Office, Chinakuri Pit No. 1 & 2
DRA4/6A12	Permanent Air Station	CDS Building, Chinakuri Pit No. - 3
DRA5/5A6	Pre monsoon Air Station	Raghunathpur Village
DRA6/5A7	Pre monsoon Air Station	Sialdanga Pump House
DRA7/5A8	Pre monsoon Air Station	Sodepur 3A Pit
DRA8/9A5	Post monsoon Air Station	ECL Colony, Kalidaspur Project
DRA9/9A6	Post monsoon Air Station	Kalikapur Village
DRA10/9A7	Post monsoon Air Station	BDO Office, Mejia

GROUND WATER LEVEL

Station Code	Location of Dug Well
DRGW4/9GWL1	Dugwell at Bakulia High school
DRGW3/6GWL5	Dugwell at Perabad Kalikapur village
DRGW6/9GWL3	Dugwell in Parbelia Village

INDEX

- Metalled Road
- Unmetalled Road
- Rail Line
- River & Nala
- Contour
- Builtup Area
- Sand Stations
- Forests
- Quarry
- Tank

EASTERN COALFIELDS LTD.

ENVIRONMENT STATEMENT OF SAND MINING FROM DAMODAR RIVER BED

Location of Sampling Stations

PLATE NO.- 3

Job No. 111726

SCALE:- 1 : 63360

CMPDI ISO 9001 Company

23°45'N
23°40'N
23°35'N
23°30'N
86°45'
86°50'
86°55'
87°00'
87°05'
87°10'
87°15'