ENVIRONMENTAL STATEMENT
IN
FORM-V

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

(2019-2020)

FOR
CLUSTER NO. – 12

(GROUP OF MINES**)**

Pandaveswar, Sonepur Bazari, Jhanjra and Bankola Area

Eastern Coalfields Limited

Prepared at

Regional Institute – I

Central Mine Planning & Design Institute Ltd.
(A Subsidiary of Coal India Ltd.)
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CMPDI

ISO 9001:2015 Company

ENVIRONMENTAL STATEMENT FOR CLUSTER NO. – 12 (GROUP OF MINES)

FOR THE YEAR: 2019-2020

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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 Cluster No. 12 was entrusted to CMPDI by GM (Environment & 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. 12 is one of the clusters for which EC has been granted vide letter no. J-11015/76/2011-IA-II.(M) dated 9th February, 2015 for a combined peak capacity of 31.83 MTY and within a ML area of 14047 Ha.
In the meanwhile, a re-assessment of mine capacities has been carried out for the cluster while keeping the overall cluster capacity and area unchanged. This re-assessment / rationalization has been done based on present condition and capability of the mines for achieving optimum production levels. The re-organization of UG and OC mining has been planned with due regard to environment. Hence, the amended EC was awarded vide letter no. J-11015/76/2011-IA-II.(M) dated 3rd March, 2016 for a total capacity of 31.83 MTY and within a ML area of 12736.0 Ha.
Accordingly, this report is being prepared on the amended EC granted on 3rd March, 2016.

The composition of the cluster is tabulated as under:

Sl No.	Name of the Mine	Lease Area (Ha)	Final Capacity (MTY)		Production during 2019-20 (MT)
1	Pandaveswar- Dalurband UG & OC	1385	UG : 1.47	2.45	0.10
			OC : 2.00		0.55
2	Manderboni UG	467	0.17		0.06
3	Madhaipur UG	622	0.21		0.06
	Madhaipur OC Patch		0.57		0.31
4	Nutandanga UG	543	0.12		0.0
5	Kendra UG	459	0.10		0.0
6	Samla UG	676	0.12		0.0
7	Sonepur Bazari OC	2405	12.00		11.10
8	South Samla UG	558	0.11		0.02
9	Nakrakonda – Kumardihi B UG & OC	642	UG : 1.12	4.12	1.84
			OC: 3.00		
10	Kumardihi A UG	457	0.20		0.03
11	Jhanjra UG	1520	5.00		3.50
12	Tilaboni UG	869	2.14		0.15
13	Shyamsundarpur UG	533	1.12		0.82
14	Bankola UG	830	0.30		0.20
15	Kottadih UG & OC	770	UG : 0.90	3.10	0.35
			OC : 2.20		1.16
	Total	**12736**	**31.83**		**20.25**

The cluster is located in the eastern part of Raniganj Coalfield in Burdwan district of West Bengal between latitudes 23^0, 37′, 30″ N & 23^0, 45′ N and longitudes 87^0, 11′, 35″ E & 87^0, 21′, 30″ E. It is situated at about 30 kms from Asansol, 10 kms from Durgapur and about 14 kms towards North – East of Raniganj Township. The area is well connected by roads and railways. Andal-Sainthia Loop Line of the Eastern Railway passes through the Cluster. The Suri-Raniganj road passes through the cluster and directly connects the Cluster with the NH-2 and Panagarh-Moregram Highway. The mines of the cluster are spread over 4 Areas (Administrative Blocks) of ECL, namely, Pandaveswar Area, Sonepur-Bazari Area, Jhanjra Area and Bankola Area.

Location of cluster – 12 is shown in plate no. – 1.

1. Pandaveswar – Dalurband UG & OC

It is proposed to mine upper three seams R-VIII, R-VII and R-VII A&B by opencast method and lower workable seams (from R-VII C to R-III/II) in succession by Underground method of mining by Continuous Miner Technology. Beside this, three SDL districts are proposed to develop and depillar the seams R-VI, R-V Top and R-IV Top with hydraulic sand stowing in the area lying below the built up zone in the eastern side of Raniganj-Suri road.

The conventional shovel dumper combination has been adopted for extracting coal and OB removal in the OC mine.

2. Manderboni UG

In Manderboni UG mine, extraction of coal is being carried out in two seams, namely R-IV and R-VI. The method of mining adopted in the two seams is depillaring with hydraulic sand stowing. Coal loading is being done by the use of SDLs. Transportation of coal is effected by means of tugger and endless haulages. Coal from the underground coal face

is hauled by combination of endless and tugger haulages to feed the winding system through which coal tubs are raised up to the surface.

3. Madhaipur UG & OC

At present, R-III/II seam is being worked in the UG mine by Bord and Pillar method of mining with use of SDLs. At present pillars are being developed in both Units. Depillaring with sand stowing shall be taken up shortly. Transportation of coal is effected by means of tugger and endless haulages. Coal from the underground coal face is hauled by combination of endless and tugger haulages to feed the winding system for transport to the surface.

The conventional shovel dumper combination has been adopted for extracting coal and OB removal in the OC mine.

4. Nutandanga UG

At present, there is no production from the mine.

5. Kendra UG

At present, there is no production from the mine.

6. Samla UG

At present, there is no production from the mine.

7. Sonepur Bazari OCP

The present mining system deploys shovel-dumper combination for both coal production and OB removal and a dragline for removal of OB at lower horizon. The HEMMs deployed for the purpose are Dragline (one), Electric Shovels, Hydraulic Shovels, Backhoe, Dumpers, Dozers, Drills, FE Loaders and Graders of varying capacities.

As per mining plan, Sonepur-Bazari (Combined) OCP would be worked in eight quarries. Among the eight quarries, Quarry-1, Quarry-1A and Hansdiha Patch lie in the present geological block i.e., Sector-I & Extension. Quarry-2A, Quarry-2B, Quarry-2C, Quarry-2D are the parts of Geological Block Sector-II and Quarry-3 lie in Sector-III Geological Block. Out of the above eight Quarries, three are relatively large quarries, namely Quarry-1, Quarry-2A and Quarry-2B.

The above said eight Quarries would be worked by combination of both departmental and contractual means in the following manner:

Quarry-1

At present, the parting between R-IV (Bot) and R-IV (T) is being worked by existing Dragline. It has been proposed to shift the Dragline to Quarry-2B. Subsequent to shifting of Dragline, Quarry-1 would be worked in following manner:

a. The scope of departmental excavation in Quarry-1 would be:

- Extraction of coal from R-IV and R-IV (Bot) by Shovel-Dumper combination
- Removal of parting between R-IV (Bot) and R-IV (T) by Shovel-Dumper combination

b. Coal and OB above R-IV (T) [including R-IV (T)] would be worked contractually.

Quarry-2A

Quarry-2A would be worked in following manner:

a. The scope of departmental excavation in Quarry-2A would be:

- Extraction of coal from R-IV/R-IV (Bot) by Shovel-Dumper combination
- Removal of parting between R-IV and R-V(T) by Shovel-Dumper combination

b. Coal and OB above R-V [including R-V] would be worked contractually.

Quarry-2B

The Dragline from Quarry-1 would be shifted to Quarry-2B for removal of parting between R-III/R-II and R-IV.

After deploying the available departmental capacity in Quarry-1 and Quarry-2A, as proposed above, if some departmental capacity still remains balance, that will be deployed in Quarry-2B for extracting coal/OB (except the bottom most parting being excavated by the Dragline). Thus, scope of departmental excavation in Quarry-2B is not fixed except the removal of parting between R-III/R-II and R-IV. Further departmental excavation of Coal/OB would depend upon the availability of departmental mine capacity after deployment of requisite HEMMs in Quarry-1 and Quarry-2A, as envisaged earlier.

Extraction of balance coal and OB is being done contractually.

Balance five quarries, namely Quarry-1A, Quarry-2D, Quarry-2C, Quarry-3 and Hansdiha patch will be worked by total outsourcing.

8. South Samla UG

At present, R-III/II seam is being worked in the UG mine by Bord and Pillar method of mining with use of SDLs. The mine is currently under development phase. Transportation of coal is effected by means of tugger and endless haulages. Coal from the underground coal face is hauled by combination of endless and tugger haulages to feed the winding system through which coal tubs are raised up to the surface.

9. Nakrakonda – Kumardihi B UG & OC

The existing Kumardih-B UG consists of following two UG units:

5 & 6 pit Unit

R-VII seam has been developed with B & P system of mining and depillared with caving in this unit. Small area is standing on pillars and at present waterlogged. R-VIIA seam has also been worked with B & P system mining and depillared with caving. Part of the area is standing on pillars and at present waterlogged. No production is being obtained from this unit.

C & E pit Unit

In this unit, R-VII (A+B) Seam has been worked through A & B pit. This seam is exhausted. R-VI seam in this unit has been worked through C & E pit. Major area of this seam has been depillared with caving. Some of panels has been depillared with stowing near the jore. At present, R-V seam is being developed in this unit.

Nakrakonda UG

At present, there is no production from this UG unit.

At present, there is no production from the proposed OC mine. Shovel dumper combination will be used for coal production and OB removal in the proposed OC mine.

10. Kumardihi A UG

At present, R-VII A seam is being worked in the mine. Presently the said seam is being developed by Bord & Pillar method of mining. Loading of coal in tubs is being by deployment of 3 Nos. of SDLs.

Transportation of coal is effected by means of tugger haulages, endless haulages main haulages and winders. Coal from the underground coal face is hauled from the tugger

haulages and endless haulages to feed the winding system, which moves the loaded coal tubs up to the surface.

11. Jhanjra UG

At present, the mine consists of three production units namely MIC (Main Industrial Complex), 1&2 Incline and 3&4 Incline. Coal production is obtained from mechanized Bord and Pillar (LHD/SDL) panels and Continuous Miner panels.

12. Tilaboni UG

The existing Tilaboni UG has two working units namely Tilaboni Unit and SSP unit. Since the inception of FR of 1986, workings have been made in three seams:

R-VIIIB1 Seam

Extensively developed through Tilaboni and SSP (O) units' up to F1-F1 (throw 65) & F9-F9 (throw 15-30m) and standing on pillars. Development is being done by B&P method by haulage & SDL combination. On south-west side, six panels have been depillared with caving. The seam is partly virgin to the south of fault F5-F5 (throw 0-15 m).

R-VII Seam

Almost entire property has been developed up to F1-F1 (throw 65) & F9-F9 (throw 15-30m) except in the eastern portion of the existing leasehold. Development of this portion is being done by B&P method (loading by SDLs).

R-VIIA Seam

This seam is almost virgin only a small portion has been developed through drifts from R-VII seam in Tilaboni unit. Further development is in progress by B&P method, where loading of coal is effected by SDLs.

13. Shyamsundar UG

At present R-VIII B1 and R-VII Seams are being worked in the Project. The method of mining adopted in R-VIII B1 Seam is depillaring with Stowing where loading of coal is carried out mechanically. In R-VII Seam, coal is being extracted by adopting two methods:

- Some of the panel area being developed by Bord & Pillar method of working using LHDs and SDls. Later on depillaring shall be taken up as per the permission obtained from DGMS.
- Some of the Panels are being extracted by Continuous miner allowing the roof to cave in the goaf.

Coal from the Continuous Miner panel and SDL/LHD panel is transported through series of belts of various specifications to the main incline conveyor for transportation up to the surface. Coal from R-VIIIB1 is handled by combination of haulage and belts up to the surface.

14. Bankola UG

In Bankola UG mine, extraction of coal is being carried out in two seams, namely R-VIII and R-VII/RVIIA Seams .The present production of coal is being obtained from 4 Panels existing in above said seams. The methods of mining adopted in the said 4 Panels are Depillaring with stowing and loading by SDLs (3 Panels) and Development with loading by SDLs in one Panel. Transportation of coal is effected by means of tugger haulages, endless haulages main haulages and winders. Coal from the underground coal face is hauled from the tugger

haulages and endless haulages to feed the main surface haulages and also the winding system, which moves the loaded coal tubs up to the surface.

15. Kottadih UG & OC

Khottadih OCP

At present R-VI and R-V seams are being worked in the OCP of kottadih. The OCP had started in 1995 and deploys Shovel-Dumper combination for removal of OB as well as coal.

Khottadih UGP

At present, R-VI, RV and RIII/II seams are being worked in the mine by Bord and Pillar method as per the following scheme:

- R-VI Seam is being depillared in conjunction with stowing as well as caving with deployment of LHDs.
- R-V and R-III/II seams are being developed manually and also with the use of LHDs. The developed seams are proposed to be depillared with caving by deploying CM and use of LHDs. Besides above, it has also been proposed to work R-IV seam by deploying Continuous Miner. R-IV seam is virgin at present and is being approached by a pair of drifts from the main incline/reverse drift.

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 8 all - weather stations, 3 pre-monsoon stations and 3 post-monsoon stations (based on local meteorology) and compared with standards.

The details of the sampling stations are given below:

Cluster 12		
Station Code	**Type of Station**	**Name of Station**
12A1	Permanent Air Station	Agent Office, Kottadih OCP
12A2	Permanent Air Station	Kumardihi A Colliery Store
12A3	Permanent Air Station	Danya Village
12A4	Post monsoon Air Station	GM Office of Kenda Area
12A5	Post monsoon Air Station	Khandra Bishweshari Pit
12A6	Post monsoon Air Station	Office of Jhanjra Incline No. 3 & 4
12A7	Pre monsoon Air Station	Durga Mandir, Churor Village
12A8	Pre monsoon Air Station	Dispensary of Konda Village
12A9	Pre monsoon Air Station	Chapla Village
12A10	Permanent Air Station	Dalurband Colliery Office
12A11	Permanent Air Station	Manderboni Colliery Office Near Railway Siding
12A12	Permanent Air Station	Pandaveshwar Pit Office Near Railway Siding
12A13	Permanent Air Station	Managers' Office Madhaipur Colliery Near Railway Siding
12A14	Permanent Air Station	Bankola Workshop Near Railway Siding

15 nos. of samples of mine water are collected and analysed every fortnight (for 5 parameters namely, pH, TSS, TDS, 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. Day time work place

noise level is recorded at 18 locations. Groundwater level in the cluster area is monitored by taking measurements at 5 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.
Groundwater level is also measured at 5 peizometers installed within the leasehold of Cluster No. 12.
Location of the monitoring stations of air, noise & water are shown in Plate- II.
The environmental monitoring results for 24 fortnights ending 31st March, 2020 are appended as Annexures – I, II, III & IV. The environmental monitoring results for the year 2019-20 are summarized below:

AMBIENT AIR QUALITY

The PM_{10} concentration was found in the range of 37.3 to 289.7 µg/m^3 and has exceeded the limits on 2 occasions out of 282 samples analysed during the year as per GSR 742 (E) dated 25.09.2000. The $PM_{2.5}$ concentration was found in the range of 12.6 to 106.0 µg/m^3. No limit is specified in GSR 742 (E) dated 25.09.2000. however, it has exceeded the limit on 16 occasions out of 282 samples analysed during the year as per NAAQS, 2009 standards. The SO_2 concentration remained below 10.0 µg/m^3 and NO_X concentration was in the range of 11.4 to 23.5 µg/m^3 and was within the limits as per the standards.

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

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 8 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 level results are given in Annexure – IV.

NOISE LEVEL

The day time workplace noise level was found in the range of 57.6 to 72.8 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, 2020

PART – A

SL. NO.	HEADING	PARTICULARS
(I)	**NAME AND ADDRESS OF THE PROJECT**	Cluster No. – 12 (Group of 15 Mines of ECL)
i	Pandaveswar – Dalurband UG & OC	Pandaveswar Underground Project, PO- Pandaveswar, District- Burdwan, State- West Bengal, PIN- 713346, Telephone- 0341- 2677341
ii	Manderboni UG	Manderboni Underground Project, PO- Gogla, District- Burdwan, State- West Bengal, PIN- 713381, Telephone- 0341-2741535
iii	South Samla UG	South Samla Underground Project, PO- Pandaveswar, District- Burdwan, State- West Bengal, PIN- 713346
iv	Madhaipur UG & OC	Madhaipur Underground, PO- Nutandanga, District- Burdwan, State- West Bengal, PIN- 713346
v	Nutandanga UG	Nutandanga UG, PO- Nutandanga, District- Burdwan, State- West Bengal, Pin- 713381
vi	Kendra UG	Kendra Underground Project, PO- Pandaveswar, District- Burdwan, State- West Bengal, PIN- 713380
vii	Samla UG	Samla Colliery, PO- Kendra, District- Burdwan, State- West Bengal, Pin- 713346
viii	Sonepur-Bazari OC	SonepurBazari OCP, PO- Bahula, District- Burdwan, State- West Bengal, PIN- 713322
ix	Nakrakonda – Kumardihi B UG & OC	Kumardihi B Underground Project, PO- Ukhra, District- Burdwan, State- West Bengal, PIN- 713363, Telephone- 0341- 2670183
x	Jhanjra UG	Jhanjra Underground Project, PO- Jhanjra B.O., District- Burdwan, State- West Bengal, PIN- 713385
xi	Tilaboni UG	Tilaboni Underground, PO- Ukhra, District- Burdwan, State- West Bengal, PIN- 713363
xii	Shyamsundarpur UG	Shyamsundarpur Underground Project, PO- Ukhra, District- Burdwan, State- West Bengal, PIN- 713363, Telephone- 0341- 2665368
xiii	Bankola UG	Bankola Underground Project, PO- Ukhra, Dist- Burdwan, W.B., Pin- 713363, Tele- 0341- 2665657
xiv	Kottadih UG & OC	Kottadih Colliery, PO- Kottadih, Dist- Burdwan, W.B., Pin- 713378, Tele- 0341- 2677368
xv	Kumardihi A UG	Kumardihi-A UG Mine, PO- Ukhra, District- Burdwan, State- West Bengal, PIN- 713363, Tel: - 0341 – 2665615
(II)	**INDUSTRY CATEGORY**	All mines in the cluster falls in red category
(III)	**PRODUCTION CAPACITY**	31.83 MTY for the whole cluster
(IV)	**YEAR OF ESTABLISHMENT**	Most of the mines within the cluster are taken over mines from pre-nationalisation period. Kendra UG was established in 1984. Sonepur Bazari OCP was established in 1991. Nakrakonda UG was established in 1981. Jhanjra UG was established in 1984. Shyamsundarpur UG was established in 1989. Kottadih OCP was established in 1995.
(V)	**DATE OF THE LAST ENVIRONMENTAL STATEMENT SUBMITTED**	29.09.2019

PART – B
WATER AND RAW MATERIAL CONSUMPTION

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

1. Pandaveswar – Dalurband UG & OC

#	Particulars	2018-19	2019-20
1	**MINING** (dust suppression, firefighting and others)	27.0	25.0
2	**COOLING** (in radiators of trucks/HEMM/workshop)	0.0	0.0
3	**DOMESTIC**		
	Colony (borewell water from Ajoy river and supply from Pressure Filter)	778.0	778.0
TOTAL		**805.0**	**803.0**

Name of Product	Process water consumption per unit of product output (l/day/te)	
	2018-19	**2019-20**
Coal	0.04	0.04

2. Manderboni UG

#	Particulars	2018-19	2019-20
1	**MINING** (dust suppression, firefighting and others)	12.0	10.0
2	**COOLING** (in radiators of trucks/HEMM/workshop)	10.0	10.0
3	**DOMESTIC**		
	Colony (borewell water from Ajoy river)	200.0	200.0
	Colony (Mine Water)	500.0	500.0
TOTAL		**722.0**	**720.0**

Name of Product	Process water consumption per unit of product output (l/day/te)	
	2018-19	**2019-20**
Coal	0.38	0.35

3. Madhaipur UG & OC

#	Particulars	2018-19	2019-20
1	**MINING** (dust suppression, firefighting and others)	40.0	40.0
2	**COOLING** (in radiators of trucks/HEMM)	10.0	10.0
3	**DOMESTIC**		
	Colony (borewell water from Ajoy river)	374.0	374.0
TOTAL		**424.0**	**424.0**

Name of Product	Process water consumption per unit of product output (l/day/te)	
	2018-19	**2019-20**
Coal	0.13	0.13

4. Sonepur-Bazari OC

#	Particulars	2018-19	2019-20
1	**MINING** (dust suppression, firefighting and others)	3067.0	1717.0
2	**COOLING** (in radiators of trucks/HEMM/workshop)	232.0	234.0
3	**DOMESTIC**		
	Colony (PHED water and well)	440.0	440.0
TOTAL		**3739.0**	**2391.0**

Name of Product	Process water consumption per unit of product output (l/day/te)	
	2018-19	**2019-20**
Coal	0.33	0.17

5. South Samla UG

#	Particulars	2018-19	2019-20
1	**MINING** (dust suppression, firefighting and others)	12.0	10.0
2	**COOLING** (in radiators of trucks/HEMM/workshop)	0.10	0.30
3	**DOMESTIC**		
	Colony (Mine Water)	214.0	214.0
TOTAL		**226.10**	**224.30**

Name of Product	Process water consumption per unit of product output (l/day/te)	
	2018-19	**2019-20**
Coal	0.42	0.43

6. Nakrakonda - Kumardihi B UG & OC

#	Particulars	2018-19	2019-20
1	**MINING** (dust suppression, firefighting and others)	15.0	40.0
2	**COOLING** (in radiators of trucks/HEMM/workshop)	12.0	0.0
3	**DOMESTIC**		
	Colony (Mine Water)	140.0	470.0
TOTAL		**167.0**	**510.0**

Name of Product	Process water consumption per unit of product output (l/day/te)	
	2018-19	**2019-20**
Coal	0.48	0.02

7. Kumardihi A UG

#	Particulars	2018-19	2019-20
1	**MINING** (dust suppression, firefighting and others)	0.0	0.0
2	**COOLING** (in radiators of trucks/HEMM/workshop)	0.0	0.0
3	**DOMESTIC**		
	Colony (Mine Water)	810.0	355.0
TOTAL		**810.0**	**355.0**

Name of Product	Process water consumption per unit of product output (l/day/te)	
	2018-19	**2019-20**
Coal	-	-

8. Jhanjra UG

#	Particulars	2018-19	2019-20
1	**MINING** (dust suppression, firefighting and others)	100.0	100.0
2	**COOLING** (in radiators of trucks/HEMM/workshop)	0.0	0.0
3	**DOMESTIC**		
	Colony	1182.0	1182.0
TOTAL		**1282.0**	**1282.0**

Name of Product	Process water consumption per unit of product output (l/day/te)	
	2018-19	**2018-19**
Coal	0.03	0.03

9. Tilaboni UG

#	Particulars	2018-19	2019-20
1	**MINING** (dust suppression, firefighting and others)	12.0	12.50
2	**COOLING** (in radiators of trucks/HEMM/workshop)	0.0	0.0
3	**DOMESTIC**		
	Colony (Filtered Mine Water)	666.0	410.0
TOTAL			**422.50**

Name of Product	Process water consumption per unit of product output (l/day/te)	
	2018-19	**2019-20**
Coal	0.08	0.08

10. Shyamsundarpur UG

#	Particulars	2018-19	2019-20
1	**MINING** (dust suppression, firefighting and others)	60.0	60.0
2	**COOLING** (in radiators of trucks/HEMM/workshop)	0.0	0.0
3	**DOMESTIC**		
	Colony (Mine water)	780.0	780.0
TOTAL		**840.0**	**840.0**

Name of Product	Process water consumption per unit of product output (l/day/te)	
	2018-19	**2019-20**
Coal	0.08	0.07

11. Bankola UG

#	Particulars	2018-19	2019-20
1	**MINING** (dust suppression, firefighting and others)	50.0	50.0
2	**COOLING** (in radiators of trucks/HEMM/workshop)	2.0	2.0
3	**DOMESTIC**		
	Colony (Mine water)	2950.0	4895.0
TOTAL		**3002.0**	**4947.0**

Name of Product	Process water consumption per unit of product output (l/day/te)	
	2018-19	**2019-20**
Coal	0.22	0.25

12. Kottadih UG

#	Particulars	2018-19	2019-20
1	**MINING** (dust suppression, firefighting and others)	3.0	3.0
2	**COOLING** (in radiators of trucks/HEMM/workshop)	5.0	5.0
3	**DOMESTIC**		
	Colony (Mine water)	600.0	600.0
TOTAL		**608.0**	**608.0**

Name of Product	Process water consumption per unit of product output (l/day/te)	
	2018-19	**2019-20**
Coal	0.02	0.02

Kottadih OC

#	Particulars	2018-19	2019-20
1	**MINING** (dust suppression, firefighting and others)	233.0	250.0
2	**COOLING** (in radiators of trucks/HEMM/workshop)	10.0	10.0
3	**DOMESTIC**		
	Colony (borewell water from Ajoy river and mine water)	320.0	320.0
TOTAL		**563.0**	**580.0**

Name of Product	Process water consumption per unit of product output (l/day/te)	
	2018-19	**2019-20**
Coal	0.28	0.22

(II) RAW MATERIAL CONSUMPTION :

1. Pandaveswar – Dalurband UG

Name of raw material	Name of products	Consumption of raw material per unit of output	
		During previous financial year (2018-19)	**During current financial year (2019-20)**
1. Explosive	Coal	0.46 kg/te	0.50 kg/te
2. Diesel		0.10 l/te	0.12 l/te
3. Lubricants		0.03 l/te	0.04 l/te

Dalurband OC

Name of raw material	Name of products	Consumption of raw material per unit of output	
		During previous financial year (2018-19)	**During current financial year (2019-20)**
1. Explosive	Coal	1.84 Kg/te	1.59 Kg/te
2. Diesel		1.76 l/te	1.63 l/te
3. Lubricants		0.27 l/te	0.25 l/te

2. Manderboni UG

Name of raw material	Name of products	Consumption of raw material per unit of output	
		During previous financial year (2018-19)	**During current financial year (2019-20)**
1. Explosive	Coal	0.39 kg/te	0.35 kg/te
2. Diesel		0.37 l/te	0.37 l/te
3. Lubricants		0.17 l/te	0.18 l/te

3. Madhaipur UG & OC

Name of raw material	Name of products	Consumption of raw material per unit of output	
		During previous financial year (2018-19)	During current financial year (2019-20)
1. Explosive	Coal	0.43 kg/te	0.33 kg/te
2. Diesel		7.29 l/te	3.28 l/te
3. Lubricants		2.39 l/te	0.85 l/te

4. Sonepur Bazari OC

Name of raw material	Name of products	Consumption of raw material per unit of output	
		During previous financial year (2018-19)	During current financial year (2019-20)
1. Explosive	Coal	3.07 kg/te	3.01 kg/te
2. Diesel		1.03 l/te	0.93 l/te
3. Lubricants		0.03 l/te	0.04 l/te

5. South Samla UG

Name of raw material	Name of products	Consumption of raw material per unit of output	
		During previous financial year (2018-19)	During current financial year (2019-20)
1. Explosive	Coal	0.54 kg/te	0.54 kg/te
2. Diesel		0.18 l/te	0.18 l/te
3. Lubricants		0.07 l/te	0.07 l/te

6. Nakrakonda – Kumardihi B UG & OC

Name of raw material	Name of products	Consumption of raw material per unit of output	
		During previous financial year (2018-19)	During current financial year (2019-20)
1. Explosive	Coal	0.63 Kg/te	0.02 Kg/te
2. Diesel		0.04 l/te	0.01 l/te
3. Lubricants		144 l*	2.52 l*

*Consumption for whole year is given

7. Kumardihi A UG

Name of raw material	Name of products	Consumption of raw material per unit of output	
		During previous financial year (2018-19)	During current financial year (2019-20)
1. Explosive	Coal	0.62 kg/te	0.69 kg/te
2. Diesel		0.17 l/te	0.16 l/te
3. Lubricants		0.03 l/te	0.07 l/te

8. Jhanjra UG

Name of raw material	Name of products	Consumption of raw material per unit of output	
		During previous financial year (2018-19)	During current financial year (2019-20)
1. Explosive	Coal	0.04 kg/te	0.03 kg/te
2. Diesel		0.10 l/te	0.10 l/te
3. Lubricants		0.03 l/te	0.03 l/te

9. Tilaboni UG

Name of raw material	Name of products	Consumption of raw material per unit of output	
		During previous financial year (2018-19)	During current financial year (2019-20)
1. Explosive	Coal	0.64 Kg/te	0.27 Kg/te
2. Diesel		-	-
3. Lubricants		-	-

10. Shyamsundarpur UG

Name of raw material	Name of products	Consumption of raw material per unit of output	
		During previous financial year (2018-19)	During current financial year (2019-20)
1. Explosive	Coal	0.09 Kg/te	0.07 Kg/te
2. Diesel		-	-
3. Lubricants		-	-

11. Bankola UG

Name of raw material	Name of products	Consumption of raw material per unit of output	
		During previous financial year (2018-19)	During current financial year (2019-20)
1. Explosive	Coal	0.33 Kg/te	0.38 Kg/te
2. Diesel		-	-
3. Lubricants		-	-

12. Kottadih UG

Name of raw material	Name of products	Consumption of raw material per unit of output	
		During previous financial year (2018-19)	During current financial year (2019-20)
1. Explosive	Coal	0.49 kg/te	0.51 kg/te
2. Diesel		0.26 l/te	0.27 l/te
3. Lubricants		0.23 l/te	0.24 l/te

Kottadih OC

Name of raw material	Name of products	Consumption of raw material per unit of output	
		During previous financial year (2018-19)	During current financial year (2019-20)
1. Explosive	Coal	1.57 Kg/te	1.47 Kg/te
2. Diesel		4.26 l/te	4.0 l/te
3. Lubricants		0.31 l/te	0.33 l/te

PART – C
POLLUTION GENERATED

Mine	Pollution	Quantity of pollutants discharged (mass/day)	Concentrations of Pollutants in discharges (mass/volume)	Percentage variation from prescribed standards with reasons
Pandveswar – Dalurband UG & OC	WATER*	Average concentration of 28.0 mg/l. Mine water discharged is 1510.0 KL/day. Hence, total load is 42.28 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.
	AIR**	Total pollutant load of PM_{10} is 811.78 kg/day while it is 212.99 kg/day for $PM_{2.5}$.		
Manderboni UG	WATER*	Average concentration of 31.0 mg/l. Mine water discharged is 1080.0 KL/day. Hence, total load is 33.48 kg/day.		
	AIR**	Total pollutant load of PM_{10} is 1.06 kg/day while it is 0.14 kg/day for $PM_{2.5}$.		
Madhaipur UG & OC	WATER*	Average concentration of 33.0 mg/l. Mine water discharged is 4796.0 KL/day. Hence, total load is 158.27 kg/day.		
	AIR**	Total pollutant load of PM_{10} is 373.49 kg/day while it is 109.57 kg/day for $PM_{2.5}$.		
Sonepur – Bazari OC	WATER*	-		
	AIR**	Total pollutant load of PM_{10} is 32813.54 kg/day while it is 8062.65 kg/day for $PM_{2.5}$.		
South Samla UG	WATER*	Average concentration of 32.0 mg/l. Mine water discharged is 898.0 KL/day. Hence, total load is 28.74 kg/day.		
	AIR**	Total pollutant load of PM_{10} is 0.45 kg/day while it is 0.06 kg/day for $PM_{2.5}$.		
Nakrakonda – Kumardihi B UG & OC	WATER*	Average concentration of 31.0 mg/l. Mine water discharged is 4947.0 KL/day. Hence, total load is 153.35 kg/day.		
	AIR**	Total pollutant load of PM_{10} is 55.95 kg/day while it is 7.56 kg/day for $PM_{2.5}$.		
Kumardihi A UG	WATER*	-		
	AIR**	Total pollutant load of PM_{10} is 1.13 kg/day while it is 0.15 kg/day for $PM_{2.5}$.		
Jhanjra UG	WATER*	-		

Mine	Pollution	Quantity of pollutants discharged (mass/day)	Concentrations of Pollutants in discharges (mass/volume)	Percentage variation from prescribed standards with reasons
	AIR**	Total pollutant load of PM_{10} is 130.18 kg/day while it is 17.79 kg/day for $PM_{2.5}$.		
Tilaboni UG	WATER*	Average concentration of 30.0 mg/l. Mine water discharged is 670.0 KL/day. Hence, total load is 20.10 kg/day.		
	AIR**	Total pollutant load of PM_{10} is 5.83 kg/day while it is 0.80 kg/day for $PM_{2.5}$.		
Shyamsundarpur UG	WATER*	-		
	AIR**	Total pollutant load of PM_{10} is 23.12 kg/day while it is 3.11 kg/day for $PM_{2.5}$.		
Bankola UG	WATER*	Average concentration of 32.0 mg/l. Mine water discharged is 4675.0 KL/day. Hence, total load is 149.60 kg/day.		
	AIR**	Total pollutant load of PM_{10} is 6.67 kg/day while it is 0.90 kg/day for $PM_{2.5}$.		
Kottadih UG & OC	WATER*	Average concentration of 31.0 mg/l. Mine water discharged is 2150.0 KL/day. Hence, total load is 66.65 kg/day.		
	AIR**	Total pollutant load of PM_{10} is 879.46 kg/day while it is 229.67 kg/day for $PM_{2.5}$.		

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

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

1. Pandaveswar – Dalurband UG & OC

Hazardous waste	Total quantity		Disposal method
	During previous financial year (2018-19)	During current financial year (2019-20)	
A) From process			Dealt in Part – F
i)Used oil	1000 litres	1000 litres	
ii)Lead-Acid Batteries			
a. Automobile batteries	15 Nos.	15 Nos.	
b. Cap-lamp batteries	350 Nos.	300 Nos.	
iii) Used Cotton waste	140 Kg	140 Kg	
iv) Metal Scrap	Nil Kg	Nil Kg	

2. Manderboni UG

Hazardous waste	Total quantity		Disposal method
	During previous financial year (2018-19)	During current financial year (2019-20)	
A) From process i)Used oil ii)Lead-Acid Batteries a. Automobile batteries b. Cap-lamp batteries iii) Used Cotton waste iv) Metal Scrap	 Nil litres Nil Nos. 225 Nos. Nil Kg Nil Kg	 Nil litres Nil Nos. 225 Nos. Nil Kg Nil Kg	Dealt in Part – F

3. Madhaipur UG & OC

Hazardous waste	Total quantity		Disposal method
	During previous financial year (2018-19)	During current financial year (2019-20)	
A) From process i)Used oil ii)Lead-Acid Batteries a. Automobile batteries b. Cap-lamp batteries iii) Used Cotton waste iv) Metal Scrap	 10000 litres 50 Nos. 700 Nos. 70 Kg 500 Kg	 10000 litres 50 Nos. 650 Nos. 70 Kg 500 Kg	Dealt in Part – F

4. Sonepur Bazari OC

Hazardous waste	Total quantity		Disposal method
	During previous financial year (2018-19)	During current financial year (2019-20)	
A) From process i)Used oil ii)Lead-Acid Batteries a. Automobile batteries b. Cap-lamp batteries iii) Used Cotton waste iv) Metal Scrap	 120.40 KL 115 Nos. Nil Nos. 1800 kg Nil	 102.945 KL 75 Nos. Nil Nos. 1950 kg Nil	Dealt in Part – F

5. South Samla UG

Hazardous waste	Total quantity		Disposal method
	During previous financial year (2018-19)	During current financial year (2019-20)	
A) From process i)Used oil ii)Lead-Acid Batteries a. Automobile batteries b. Cap-lamp batteries iii) Used Cotton waste iv) Metal Scrap	 Nil litres Nil Nos. 50 Nos. Nil Kg Nil Kg	 Nil litres Nil Nos. 50 Nos. Nil Kg Nil Kg	Dealt in Part – F

6. Nakrakonda – Kumardihi B UG & OC

Hazardous waste	Total quantity		Disposal method
	During previous financial year (2018-19)	During current financial year (2019-20)	
A) From process i)Used oil ii)Lead-Acid Batteries a. Automobile batteries b. Cap-lamp batteries iii) Used Cotton waste iv) Metal Scrap	 Nil litres Nil Nos 180 Nos 50 kg -	 Nil litres Nil Nos 450 Nos 80 kg -	Dealt in Part – F

7. Kumardihi A UG

Hazardous waste	Total quantity		Disposal method
	During previous financial year (2018-19)	During current financial year (2019-20)	
A) From process i)Used oil ii)Lead-Acid Batteries a. Automobile batteries b. Cap-lamp batteries iii) Used Cotton waste iv) Metal Scrap	 230 litres 01 no. 180 Nos. Nil Kg -	 - 	Dealt in Part – F

8. Jhanjra UG

Hazardous waste	Total quantity		Disposal method
	During previous financial year (2018-19)	During current financial year (2019-20)	
A) From process i)Used oil ii)Lead-Acid Batteries a. Automobile batteries b. Cap-lamp batteries iii) Used Cotton waste iv) Metal Scrap	 3500 litres - - - -	 3500 litres - - - -	Dealt in Part – F

9. Tilaboni UG

Hazardous waste	Total quantity		Disposal method
	During previous financial year (2018-19)	During current financial year (2019-20)	
A) From process i)Used oil ii)Lead-Acid Batteries a. Automobile batteries b. Cap-lamp batteries iii) Used Cotton waste iv) Metal Scrap	 - 	 - 200 nos. 	Dealt in Part – F

10. Shyamsundarpur UG

Hazardous waste	Total quantity		Disposal method
	During previous financial year (2018-19)	During current financial year (2019-20)	
A) From process i)Used oil ii)Lead-Acid Batteries a. Automobile batteries b. Cap-lamp batteries iii) Used Cotton waste iv) Metal Scrap	- Nil Nil Nil Kg 5 T	- Nil Nil Nil Kg 5 T	Dealt in Part – F

11. Bankola UG

Hazardous waste	Total quantity		Disposal method
	During previous financial year (2018-19)	During current financial year (2019-20)	
A) From process i)Used oil ii)Lead-Acid Batteries a. Automobile batteries b. Cap-lamp batteries iii) Used Cotton waste iv) Metal Scrap	-	-	Dealt in Part – F

12. Kottadih UG

Hazardous waste	Total quantity		Disposal method
	During previous financial year (2018-19)	During current financial year (2019-20)	
A) From process i)Used oil ii)Lead-Acid Batteries a. Automobile batteries b. Cap-lamp batteries iii) Used Cotton waste iv) Metal Scrap	Nil - 510 Nos. 150 Kg -	Nil - 450 Nos. 170 Kg -	Dealt in Part – F

Kottadih OC

Hazardous waste	Total quantity		Disposal method
	During previous financial year (2018-19)	During current financial year (2019-20)	
A) From process i)Used oil ii)Lead-Acid Batteries a. Automobile batteries b. Cap-lamp batteries iii) Used Cotton waste iv) Metal Scrap	12500 litres 35 Nos. Nil 180 Kg 40 T	59980 litres 30 Nos. Nil 200 Kg 40 T	Dealt in Part – F

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 (2018-19)	During current financial year (2019-20)
a) From process (Mining)	Pandaveswar – Dalurband OC	4.24	3.03
	Madhaipur OC	0.98	1.25
	Sonepur Bazari OC	54.28	62.32
	Kottadih OC	2.20	2.13
b) From pollution control facilities		-	-
c) Quantity recycled or reutilized back filled	Pandaveswar – Dalurband OC	3.18	2.0
	Madhaipur OC	0.70	1.25
	Sonepur Bazari OC	36.23	40.85
	Kottadih OC	2.20	2.13

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.

Batteries are stored in Area Store from where replacement is taken.

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

Cotton waste generated is burned under control environment and also used as filtration bin.

Used oil is stored and re-used as lubricants in underground mines.

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:

a) Plantation have been carried out in different parts of the cluster like subsided area, external dump, internal dump, other areas within the cluster, etc. to arrest and suppress dust arising out of mining activities.
b) Wet coal transport, road maintenance is being done.
c) Trucks carrying coal to the railway sidings are covered with tarpaulin to avoid spillage.
d) Wet drilling is practiced during drilling operations.

e) Regular repair and maintenance of roads is carried out.
f) Regular sprinkling of water along the haul roads, coal transport route and at railway sidings is being carried out to mitigate dust.
g) Water spraying arrangements in Surface miners to mitigate dust.
h) Routine Environment Monitoring of ambient air quality is being carried out for the cluster on fortnight basis.

2.0 WATER POLLUTION CONTROL MEASURES:

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

a) Septic tanks and soak pits have been provided at colonies attached with Jhanjra UG, Kumardihi B UG, Kumardihi A UG and Bankola UG for discharging domestic effluents.
b) Sedimentation/settling tanks have been provided in Tilaboni UG, Shyamsundarpur UG, Bankola UG and Sonepur Bazari OCP for treating mine water. STP construction for colonies of SB OCP is in final stage.
c) Filtered mine water is being supplied to the local populace in Kumardihi B UG, Kumardihi A UG, Tilaboni UG, Shyamsundarpur UG, Bankola UG, Jhanjra UG, Nakrakonda – Kumardihi B UG and Kottadih UG & OC.
d) Oil and Grease Trap has been provided at Sonepur Bazari OC near the workshop. ETP construction is in final stage.
e) Regular monitoring of groundwater as well as mine effluent discharge is being done by CMPDI and based on the monitoring results, additional measures will be taken, if required.

3.0 NOISE POLLUTION CONTROL MEASURES:

a) Regular maintenance of machines and other equipment at Bunker and workshop including mine fan.
b) Providing green belt around core activity area, along road side in colony and in other vacant space.
c) Non-electric delay detonators are used in place of detonating fuse to eliminate noise pollution during blasting.
d) All HEMM & light vehicle are provided with silencers.
e) Noise monitoring is being carried out regularly.

4.0 LAND RESOURCE MANAGEMENT:

a) Quantity of OB re-handled & backfilled area reclaimed
The details regarding handling of OB dumps have been dealt in Part – E. Around 15.0 Ha plantation have been done over the internal dump in Sonepur – Bazari OCP, 2.0 Ha plantation have been done over internal dump/backfilled area in Khottadih OCP and 5.0 Ha external dump area has been planted upon in Dalurband OCP as part of biological reclamation.
b) Plantation have been carried out in 2019-20 at different locations within the cluster. Plantation programme will also be carried out as proposed in the coming years.

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) **Sonepur Bazari OCP:** STP has been installed at R. N. Colony for treating domestic effluent.
c) **Jhanjra UG:** Rainwater harvesting has been commissioned at Area office and Jhanjra Guest House. Solar lighting, PCC Road, bathing ghats, water tanks etc. have been provided to local communities under CSR. 15 kW Solar Plant at Area office and 30 kW Solar Plant at Guest House has already been commissioned.
d) The Environmental monitoring of the cluster on fortnightly basis will be continued fortnightly as per the guidelines of Ministry of Environment, Forests & Climate Change (MoEF& CC).
e) Different activities have been carried out under CSR like water supply arrangements to villages, medical health camp, blood donation camp, construction of pucca road, training camps, etc.

PART – I
ANY OTHER PARTICULAR IN RESPECTOF 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 (MOEF) and based on the result thereof; colliery takes necessary action if needed.

Annexure – I

AMBIENT AIR QUALITY

(Values in µg/m^3)

Cluster No.	Station No.	Station Name	Month	Fortnight	Date of Sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_X
12	12A1	Agent Office, Khottadih OCP	April	First	05-Apr-19	104.7	55.1	<10.0	19.6
12	12A1	Agent Office, Khottadih OCP	April	Second	22-Apr-19	107.2	54.2	<10.0	19.4
12	12A1	Agent Office, Khottadih OCP	May	First	03-May-19	127.6	51.7	<10.0	22.6
12	12A1	Agent Office, Khottadih OCP	May	Second	17-May-19	129.4	51.3	<10.0	21.5
12	12A1	Agent Office, Khottadih OCP	June	First	04-Jun-19	50.4	50.4	<10.0	21.6
12	12A1	Agent Office, Khottadih OCP	June	Second	18-Jun-19	119.3	51.4	<10.0	22.4
12	12A1	Agent Office, Khottadih OCP	July	First	08-Jul-19	136.4	51.4	<10.0	23.5
12	12A1	Agent Office, Khottadih OCP	July	Second	18-Jul-19	124.7	52.7	<10.0	20.4
12	12A1	Agent Office, Khottadih OCP	August	First	05-Aug-19	113.2	43.8	<10.0	18.7
12	12A1	Agent Office, Khottadih OCP	August	Second	19-Aug-19	103.5	43.5	<10.0	18.7
12	12A1	Agent Office, Khottadih OCP	Sept	First	03-Sep-19	98.7	36.8	<10.0	18.7
12	12A1	Agent Office, Khottadih OCP	April	Second	03-Sep-19	98.7	36.8	<10.0	18.7
12	12A1	Agent Office, Khottadih OCP	April	First	03-Sep-19	98.7	36.8	<10.0	18.7
12	12A1	Agent Office, Khottadih OCP	Sept	Second	30-Sep-19	102.7	37.3	<10.0	17.5
12	12A1	Agent Office, Khottadih OCP	October	First	10-Oct-19	96.8	32.4	<10.0	19.7
12	12A1	Agent Office, Khottadih OCP	October	Second	30-Oct-19	94.6	34.8	<10.0	18.7
12	12A1	Agent Office, Khottadih OCP	November	First	01-Nov-19	118.4	35.7	<10.0	19.7
12	12A1	Agent Office, Khottadih OCP	November	Second	26-Nov-19	119.7	35.7	<10.0	18.7
12	12A1	Agent Office, Khottadih OCP	December	Second	10-Dec-19	143.5	46.9	<10.0	18.5
12	12A1	Agent Office, Khottadih OCP	December	First	10-Dec-19	128.4	42.3	<10.0	17.5
12	12A1	Agent Office, Khottadih OCP	January	First	01-Jan-20	218.4	69.3	<10.0	19.6
12	12A1	Agent Office, Khottadih OCP	January	Second	30-Jan-20	143.5	80.1	<10.0	19.5
12	12A1	Agent Office, Khottadih OCP	February	First	12-Feb-20	174.6	56.2	<10.0	18.7
12	12A1	Agent Office, Khottadih OCP	February	Second	20-Feb-20	194.2	62.1	<10.0	18.5
12	12A1	Agent Office, Khottadih OCP	March	First	03-Mar-20	166.3	56.2	<10.0	18.7
12	12A10	Dalurband colliery office	April	First	06-Apr-19	108.4	55.7	<10.0	21.3
12	12A10	Dalurband colliery office	April	Second	23-Apr-19	110.4	52.3	<10.0	16.5
12	12A10	Dalurband colliery office	May	First	02-May-19	121.8	51.2	<10.0	22.3
12	12A10	Dalurband colliery office	May	Second	17-May-19	120.9	50.9	<10.0	20.4
12	12A10	Dalurband colliery office	June	First	01-Jun-19	50.3	50.3	<10.0	20.5
12	12A10	Dalurband colliery office	June	Second	18-Jun-19	110.7	51.2	<10.0	20.7
12	12A10	Dalurband colliery office	July	First	08-Jul-19	108.7	52.6	<10.0	20.8
12	12A10	Dalurband colliery office	July	Second	18-Jul-19	108.4	52.4	<10.0	21.6
12	12A10	Dalurband colliery office	August	First	05-Aug-19	93.6	39.7	<10.0	18.7
12	12A10	Dalurband colliery office	August	Second	22-Aug-19	94.7	41.2	<10.0	17.3
12	12A10	Dalurband colliery office	April	Second	02-Sep-19	89.6	31.2	<10.0	17.9
12	12A10	Dalurband colliery office	April	First	02-Sep-19	89.6	31.2	<10.0	17.9
12	12A10	Dalurband colliery office	Sept	First	02-Sep-19	89.6	31.2	<10.0	17.9
12	12A10	Dalurband colliery office	Sept	Second	27-Sep-19	91.3	36.2	<10.0	18.3
12	12A10	Dalurband colliery office	October	First	10-Oct-19	98.7	33.6	<10.0	18.3
12	12A10	Dalurband colliery office	October	Second	30-Oct-19	97.8	33.4	<10.0	19.6
12	12A10	Dalurband colliery office	November	First	06-Nov-19	107.6	34.8	<10.0	18.3
12	12A10	Dalurband colliery office	November	Second	30-Nov-19	104.5	34.8	<10.0	16.8
12	12A10	Dalurband colliery office	December	First	12-Dec-19	106.5	35.8	<10.0	16.2
12	12A10	Dalurband colliery office	December	Second	24-Dec-19	116.9	38.9	<10.0	16.8
12	12A10	Dalurband colliery office	January	First	09-Jan-20	216.2	68.7	<10.0	17.5
12	12A10	Dalurband colliery office	January	Second	31-Jan-20	116.9	75.3	<10.0	17.6
12	12A10	Dalurband colliery office	February	First	13-Feb-20	189.3	60.6	<10.0	16.4
12	12A10	Dalurband colliery office	February	Second	20-Feb-20	218.6	69.4	<10.0	17.6

Cluster No.	Station No.	Station Name	Month	Fortnight	Date of Sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_X
12	12A10	Dalurband colliery office	March	First	03-Mar-20	274.3	60.6	<10.0	16.4
12	12A11	Mandarboni colliery office	April	First	06-Apr-19	115.7	53.2	<10.0	18.4
12	12A11	Mandarboni colliery office	April	Second	23-Apr-19	118.6	51.2	<10.0	18.9
12	12A11	Mandarboni village near Railway siding	May	First	02-May-19	122.3	50.7	<10.0	20.4
12	12A11	Mandarboni village near Railway siding	May	Second	31-May-19	124.6	51	<10.0	22.6
12	12A11	Mandarboni village near Railway siding	June	First	01-Jun-19	50.1	50.1	<10.0	21.6
12	12A11	Mandarboni village near Railway siding	June	Second	17-Jun-19	113.5	51.7	<10.0	21.6
12	12A11	Mandarboni village near Railway siding	July	First	08-Jul-19	124.6	52.7	<10.0	23.4
12	12A11	Mandarboni village near Railway siding	July	Second	17-Jul-19	127.3	50.6	<10.0	22.4
12	12A11	Mandarboni village near Railway siding	August	First	01-Aug-19	104.5	43.5	<10.0	16.8
12	12A11	Mandarboni village near Railway siding	August	Second	20-Aug-19	102.4	39.5	<10.0	19.2
12	12A11	Mandarboni village near Railway siding	April	Second	02-Sep-19	97.8	35.8	<10.0	17.4
12	12A11	Mandarboni village near Railway siding	April	First	02-Sep-19	97.8	35.8	<10.0	17.4
12	12A11	Mandarboni village near Railway siding	Sept	First	02-Sep-19	97.8	35.8	<10.0	17.4
12	12A11	Mandarboni village near Railway siding	Sept	Second	27-Sep-19	98.4	33.8	<10.0	18.9
12	12A11	Mandarboni village near Railway siding	October	First	11-Oct-19	93.7	31.8	<10.0	16.8
12	12A11	Mandarboni village near Railway siding	October	Second	30-Oct-19	93.7	31.2	<10.0	17.8
12	12A11	Mandarboni village near Railway siding	November	First	06-Nov-19	116.8	36.2	<10.0	16.8
12	12A11	Mandarboni village near Railway siding	November	Second	26-Nov-19	113.2	36.2	<10.0	17.8
12	12A11	Mandarboni village near Railway siding	December	First	13-Dec-19	116.6	38.8	<10.0	18.4
12	12A11	Mandarboni village near Railway siding	December	Second	30-Dec-19	102.8	34.6	<10.0	17.3
12	12A11	Mandarboni village near Railway siding	January	First	09-Jan-20	194.8	62.2	<10.0	15.8
12	12A11	Mandarboni village near Railway siding	January	Second	27-Jan-20	102.8	59.8	<10.0	15.7
12	12A11	Mandarboni village near Railway siding	February	First	11-Feb-20	207.4	66	<10.0	19.5
12	12A11	Mandarboni village near Railway siding	February	Second	19-Feb-20	174.3	56.1	<10.0	15.8
12	12A11	Mandarboni village near Railway siding	March	First	13-Mar-20	176.7	66	<10.0	19.5
12	12A11	Mandarboni village near Railway siding	March	Second	19-Mar-20	138.5	45.4	<10.0	15.8
12	12A12	Pandaveswar pit ofice near Railway siding	April	First	06-Apr-19	106.8	40.1	<10.0	19.8

Cluster No.	Station No.	Station Name	Month	Fortnight	Date of Sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_X
12	12A12	Pandaveswar pit ofice near Railway siding	April	Second	22-Apr-19	98.2	43.4	<10.0	17.5
12	12A12	Pandaveswar village near Railway siding	May	First	03-May-19	107.9	41.8	<10.0	22.8
12	12A12	Pandaveswar village near Railway siding	May	Second	17-May-19	109.8	40.9	<10.0	21.8
12	12A12	Pandaveswar village near Railway siding	June	First	04-Jun-19	40.7	40.7	<10.0	20.5
12	12A12	Pandaveswar village near Railway siding	June	Second	18-Jun-19	106.3	39.6	<10.0	23.4
12	12A12	Pandaveswar village near Railway siding	July	First	08-Jul-19	112.9	51.4	<10.0	21.7
12	12A12	Pandaveswar village near Railway siding	July	Second	18-Jul-19	113.5	38.5	<10.0	21.6
12	12A12	Pandaveswar village near Railway siding	August	First	05-Aug-19	101.6	33.7	<10.0	18.7
12	12A12	Pandaveswar village near Railway siding	August	Second	22-Aug-19	93.6	33.6	<10.0	18.5
12	12A12	Pandaveswar pit ofice near Railway siding	April	Second	03-Sep-19	99.3	36.7	<10.0	18.9
12	12A12	Pandaveswar pit ofice near Railway siding	April	First	03-Sep-19	99.3	36.7	<10.0	18.9
12	12A12	Pandaveswar pit ofice near Railway siding	Sept	First	03-Sep-19	99.3	36.7	<10.0	18.9
12	12A12	Pandaveswar pit ofice near Railway siding	Sept	Second	17-Sep-19	97.6	35.7	<10.0	16.5
12	12A12	Pandaveswar pit ofice near Railway siding	October	First	11-Oct-19	96.4	32.6	<10.0	17.5
12	12A12	Pandaveswar pit ofice near Railway siding	October	Second	31-Oct-19	96.4	32.6	<10.0	18.7
12	12A12	Pandaveswar pit ofice near Railway siding	November	First	06-Nov-19	113.2	33.8	<10.0	17.5
12	12A12	Pandaveswar pit ofice near Railway siding	November	Second	30-Nov-19	118.6	33.8	<10.0	19.5
12	12A12	Pandaveswar pit ofice near Railway siding	December	First	13-Dec-19	154.7	50.2	<10.0	16.8
12	12A12	Pandaveswar pit ofice near Railway siding	December	Second	23-Dec-19	127.6	42.1	<10.0	15.9
12	12A12	Pandaveswar pit ofice near Railway siding	January	First	09-Jan-20	164.4	53.1	<10.0	14.3
12	12A12	Pandaveswar pit ofice near Railway siding	January	Second	31-Jan-20	127.6	48.4	<10.0	15.6
12	12A12	Pandaveswar pit ofice near Railway siding	February	First	14-Feb-20	154.7	50.2	<10.0	17.8
12	12A12	Pandaveswar pit ofice near Railway siding	February	Second	20-Feb-20	159.6	51.7	<10.0	16.4
12	12A12	Pandaveswar pit ofice near Railway siding	March	First	13-Mar-20	184.3	50.2	<10.0	17.8
12	12A12	Pandaveswar pit ofice near Railway siding	March	Second	19-Mar-20	154.7	50.2	<10.0	16.4
12	12A13	Manager's office, Madhaipur colliery	April	First	05-Apr-19	107.2	54.2	<10.0	17.5

Cluster No.	Station No.	Station Name	Month	Fortnight	Date of Sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_X
12	12A13	Manager's office, Madhaipur colliery	April	Second	23-Apr-19	108.5	51.7	<10.0	15.8
12	12A13	Manager's office, Madhaipur colliery	May	First	03-May-19	110.8	50.6	<10.0	19.7
12	12A13	Manager's office, Madhaipur colliery	May	Second	31-May-19	109.7	51.3	<10.0	18.5
12	12A13	Manager's office, Madhaipur colliery	June	First	03-Jun-19	50.7	50.7	<10.0	20.9
12	12A13	Manager's office, Madhaipur colliery	June	Second	19-Jun-19	102.6	51.4	<10.0	21.4
12	12A13	Manager's office, Madhaipur colliery	July	First	09-Jul-19	122.6	51.2	<10.0	23.5
12	12A13	Manager's office, Madhaipur colliery	July	Second	17-Jul-19	112.2	52.4	<10.0	20.8
12	12A13	Manager's office, Madhaipur colliery	August	First	02-Aug-19	99.8	37.6	<10.0	19.3
12	12A13	Manager's office, Madhaipur colliery	August	Second	20-Aug-19	96.8	40.5	<10.0	17.8
12	12A13	Manager's office, Madhaipur colliery	Sept	First	03-Sep-19	94.5	33.5	<10.0	17.6
12	12A13	Manager's office, Madhaipur colliery	April	Second	03-Sep-19	94.5	33.5	<10.0	17.6
12	12A13	Manager's office, Madhaipur colliery	April	First	03-Sep-19	94.5	33.5	<10.0	17.6
12	12A13	Manager's office, Madhaipur colliery	Sept	Second	18-Sep-19	89.3	37.4	<10.0	15.6
12	12A13	Manager's office, Madhaipur colliery	October	First	11-Oct-19	89.7	30.7	<10.0	18.4
12	12A13	Manager's office, Madhaipur colliery	October	Second	31-Oct-19	98.2	34.3	<10.0	17.4
12	12A13	Manager's office, Madhaipur colliery	November	First	01-Nov-19	98.6	31.7	<10.0	18.4
12	12A13	Manager's office, Madhaipur colliery	November	Second	25-Nov-19	289.7	31.7	<10.0	18.6
12	12A13	Manager's office, Madhaipur colliery	December	First	12-Dec-19	168.7	106	<10.0	15.6
12	12A13	Manager's office, Madhaipur colliery	December	Second	30-Dec-19	156.4	50.7	<10.0	17.5
12	12A13	Manager's office, Madhaipur colliery	January	First	02-Jan-20	134.6	12.6	<10.0	16.5
12	12A13	Manager's office, Madhaipur colliery	January	Second	30-Jan-20	156.4	43.2	<10.0	13.5
12	12A13	Manager's office, Madhaipur colliery	February	First	11-Feb-20	204.1	55	<10.0	15.6
12	12A13	Manager's office, Madhaipur colliery	February	Second	19-Feb-20	288.7	44	<10.0	17.3
12	12A13	Manager's office, Madhaipur colliery	March	First	09-Mar-20	163.8	55	<10.0	15.6
12	12A14	Bankola workshop near Railway siding	April	First	05-Apr-19	93.8	41.9	<10.0	20.3
12	12A14	Bankola workshop near Railway siding	April	Second	23-Apr-19	109.3	40.8	<10.0	19.5

Cluster No.	Station No.	Station Name	Month	Fortnight	Date of Sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_X
12	12A14	Bankola workshop near Railway siding	May	First	03-May-19	119.5	38.9	<10.0	22.3
12	12A14	Bankola workshop near Railway siding	May	Second	31-May-19	120.8	39.4	<10.0	20.6
12	12A14	Bankola workshop near Railway siding	June	First	03-Jun-19	40.1	40.1	<10.0	21.6
12	12A14	Bankola workshop near Railway siding	June	Second	17-Jun-19	116.8	38.5	<10.0	22.8
12	12A14	Bankola workshop near Railway siding	July	First	09-Jul-19	134.8	49.7	<10.0	22.8
12	12A14	Bankola workshop near Railway siding	July	Second	16-Jul-19	121.6	51.7	<10.0	21.4
12	12A14	Bankola workshop near Railway siding	August	First	01-Aug-19	116.4	41.2	<10.0	18.7
12	12A14	Bankola workshop near Railway siding	August	Second	20-Aug-19	106.8	38.3	<10.0	19.5
12	12A14	Bankola workshop near Railway siding	April	First	02-Sep-19	105.7	38.4	<10.0	17.5
12	12A14	Bankola workshop near Railway siding	Sept	First	02-Sep-19	105.7	38.4	<10.0	17.5
12	12A14	Bankola workshop near Railway siding	April	Second	02-Sep-19	105.7	38.4	<10.0	17.5
12	12A14	Bankola workshop near Railway siding	Sept	Second	18-Sep-19	107.3	35.6	<10.0	18.2
12	12A14	Bankola workshop near Railway siding	October	First	01-Oct-19	98.6	34.5	<10.0	19.6
12	12A14	Bankola workshop near Railway siding	October	Second	31-Oct-19	99.6	36.8	<10.0	18.3
12	12A14	Bankola workshop near Railway siding	November	First	01-Nov-19	98.6	30.8	<10.0	19.6
12	12A14	Bankola workshop near Railway siding	November	Second	22-Nov-19	106.3	33.4	<10.0	17.5
12	12A14	Bankola workshop near Railway siding	December	First	06-Dec-19	136.4	44.7	<10.0	17.3
12	12A14	Bankola workshop near Railway siding	December	Second	30-Dec-19	148	48.3	<10.0	16.7
12	12A14	Bankola workshop near Railway siding	January	First	01-Jan-20	226.2	71.7	<10.0	18.9
12	12A14	Bankola workshop near Railway siding	January	Second	28-Jan-20	148	78.4	<10.0	14.5
12	12A14	Bankola workshop near Railway siding	February	First	11-Feb-20	179.6	57.7	<10.0	17.3
12	12A14	Bankola workshop near Railway siding	February	Second	21-Feb-20	204.9	65.3	<10.0	19.8
12	12A14	Bankola workshop near Railway siding	March	First	12-Mar-20	196.6	57.7	<10.0	17.3
12	12A2	Kumardihi A Colliery Store	April	First	05-Apr-19	95.4	41.3	<10.0	17.5
12	12A2	Kumardihi A Colliery Store	April	Second	22-Apr-19	95	40.2	<10.0	17.3
12	12A2	Kumardihi A Colliery Store	May	First	03-May-19	99.4	37.4	<10.0	20.7
12	12A2	Kumardihi A Colliery Store	May	Second	16-May-19	104.2	37.8	<10.0	20.3
12	12A2	Kumardihi A Colliery Store	June	First	03-Jun-19	37.3	37.3	<10.0	22.5
12	12A2	Kumardihi A Colliery Store	June	Second	17-Jun-19	101.4	38.4	<10.0	21.5

Cluster No.	Station No.	Station Name	Month	Fortnight	Date of Sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_X
12	12A2	Kumardihi A Colliery Store	July	First	09-Jul-19	116.2	48.9	<10.0	21.6
12	12A2	Kumardihi A Colliery Store	July	Second	16-Jul-19	117.6	36.7	<10.0	22.3
12	12A2	Kumardihi A Colliery Store	August	First	01-Aug-19	98.7	41.6	<10.0	19.4
12	12A2	Kumardihi A Colliery Store	August	Second	19-Aug-19	98.6	38.7	<10.0	17.6
12	12A2	Kumardihi A Colliery Store	April	Second	02-Sep-19	93.4	34.7	<10.0	18.2
12	12A2	Kumardihi A Colliery Store	Sept	First	02-Sep-19	93.4	34.7	<10.0	18.2
12	12A2	Kumardihi A Colliery Store	April	First	02-Sep-19	93.4	34.7	<10.0	18.2
12	12A2	Kumardihi A Colliery Store	Sept	Second	30-Sep-19	96.4	32.8	<10.0	16.8
12	12A2	Kumardihi A Colliery Store	October	First	10-Oct-19	83.4	29.7	<10.0	15.3
12	12A2	Kumardihi A Colliery Store	October	Second	30-Oct-19	76.4	24.7	<10.0	15.7
12	12A2	Kumardihi A Colliery Store	November	First	14-Nov-19	96.7	30.8	<10.0	19.6
12	12A2	Kumardihi A Colliery Store	November	Second	29-Nov-19	94.9	31.6	<10.0	15.8
12	12A2	Kumardihi A Colliery Store	December	First	10-Dec-19	118.2	39.3	<10.0	14.1
12	12A2	Kumardihi A Colliery Store	December	Second	16-Dec-19	104.3	35.1	<10.0	13.2
12	12A2	Kumardihi A Colliery Store	January	First	04-Jan-20	167.4	54	<10.0	17.4
12	12A2	Kumardihi A Colliery Store	January	Second	31-Jan-20	104.3	55.5	<10.0	13.5
12	12A2	Kumardihi A Colliery Store	February	First	10-Feb-20	128.3	42.3	<10.0	14.8
12	12A2	Kumardihi A Colliery Store	February	Second	21-Feb-20	132.8	43.6	<10.0	14.3
12	12A2	Kumardihi A Colliery Store	March	First	11-Mar-20	198.5	42.3	<10.0	14.8
12	12A2	Kumardihi A Colliery Store	March	Second	17-Mar-20	203.6	72.5	<10.0	14.3
12	12A3	Danya village	April	First	11-Apr-19	95.6	42.4	<10.0	14.1
12	12A3	Danya village	April	Second	22-Apr-19	95	41.3	<10.0	11.5
12	12A3	Danya village	May	First	03-May-19	95.8	39.2	<10.0	15.7
12	12A3	Danya village	May	Second	18-May-19	94.1	40.1	<10.0	16.8
12	12A3	Danya village	June	First	04-Jun-19	39.7	39.7	<10.0	14.6
12	12A3	Danya village	June	Second	18-Jun-19	93.2	40.2	<10.0	17.5
12	12A3	Danya village	July	First	08-Jul-19	87.6	36.8	<10.0	16.4
12	12A3	Danya village	July	Second	16-Jul-19	84.6	41.6	<10.0	15.7
12	12A3	Danya village	August	First	01-Aug-19	79.3	33.7	<10.0	13.4
12	12A3	Danya village	August	Second	19-Aug-19	78.6	35.6	<10.0	13.4
12	12A3	Danya village	April	First	01-Sep-19	72.8	28.7	<10.0	12.7
12	12A3	Danya village	Sept	First	01-Sep-19	72.8	28.7	<10.0	12.7
12	12A3	Danya village	April	Second	01-Sep-19	72.8	28.7	<10.0	12.7
12	12A3	Danya village	Sept	Second	30-Sep-19	76.8	27.2	<10.0	13.7
12	12A3	Danya village	October	First	10-Oct-19	78.6	26.2	<10.0	12.8
12	12A3	Danya village	October	Second	31-Oct-19	82.7	28.6	<10.0	16.8
12	12A3	Danya village	November	First	13-Nov-19	96.2	32.4	<10.0	15.3
12	12A3	Danya village	November	Second	25-Nov-19	98.5	32.4	<10.0	17.8
12	12A3	Danya village	December	First	11-Dec-19	84.6	29.2	<10.0	12.6
12	12A3	Danya village	December	Second	30-Dec-19	91.6	31.3	<10.0	12.6
12	12A3	Danya village	January	First	08-Jan-20	106.2	35.7	<10.0	15.2
12	12A3	Danya village	January	Second	31-Jan-20	91.6	33.1	<10.0	14.5
12	12A3	Danya village	February	First	11-Feb-20	96.4	32.7	<10.0	15.6
12	12A3	Danya village	February	Second	21-Feb-20	94.6	32.2	<10.0	15.1
12	12A3	Danya village	March	First	12-Mar-20	102.6	32.7	<10.0	15.6
12	12A3	Danya village	March	Second	18-Mar-20	98.6	33.4	<10.0	15.1
12	12A4	GM office , Kenda Area	October	First	10-Oct-19	82.4	30.2	<10.0	14.6
12	12A4	GM office , Kenda Area	October	Second	31-Oct-19	80.3	27.3	<10.0	14.4
12	12A4	GM office , Kenda Area	November	First	01-Nov-19	89.4	30.4	<10.0	12.8
12	12A4	GM office , Kenda Area	November	Second	26-Nov-19	86.4	30.4	<10.0	13.4
12	12A4	GM office , Kenda Area	December	First	10-Dec-19	106.2	35.7	<10.0	13.4
12	12A4	GM office , Kenda Area	December	Second	30-Dec-19	98.3	33.3	<10.0	14.3

Cluster No.	Station No.	Station Name	Month	Fortnight	Date of Sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_X
12	12A4	GM office , Kenda Area	January	First	01-Jan-20	158.4	51.3	<10.0	16.5
12	12A4	GM office , Kenda Area	January	Second	30-Jan-20	98.3	44.7	<10.0	16.5
12	12A4	GM office , Kenda Area	February	First	12-Feb-20	107.2	36	<10.0	12.3
12	12A4	GM office , Kenda Area	February	Second	18-Feb-20	103.2	34.8	<10.0	13.4
12	12A4	GM office , Kenda Area	March	First	12-Mar-20	97.8	36	<10.0	12.3
12	12A4	GM office , Kenda Area	March	Second	18-Mar-20	112.4	37.5	<10.0	13.4
12	12A5	Khandra Bishweshwar Pit	October	First	11-Oct-19	78.2	27.8	<10.0	13.8
12	12A5	Khandra Bishweshwar Pit	October	Second	22-Oct-19	78.2	23.8	<10.0	12.8
12	12A5	Khandra Bishweshwar Pit	November	First	14-Nov-19	91.5	29.8	<10.0	14.6
12	12A5	Khandra Bishweshwar Pit	November	Second	25-Nov-19	88.3	29.8	<10.0	15.4
12	12A5	Khandra Bishweshwar Pit	December	First	12-Dec-19	98.2	33.3	<10.0	12.8
12	12A5	Khandra Bishweshwar Pit	December	Second	31-Dec-19	107.2	36	<10.0	11.7
12	12A5	Khandra Bishweshwar Pit	January	First	04-Jan-20	162.3	52.5	<10.0	14.5
12	12A5	Khandra Bishweshwar Pit	January	Second	30-Jan-20	107.2	44.1	<10.0	14.3
12	12A5	Khandra Bishweshwar Pit	February	First	11-Feb-20	114.9	38.3	<10.0	13.7
12	12A5	Khandra Bishweshwar Pit	February	Second	22-Feb-20	93.8	31.9	<10.0	12.8
12	12A5	Khandra Bishweshwar Pit	March	First	12-Mar-20	111.4	38.3	<10.0	13.7
12	12A5	Khandra Bishweshwar Pit	March	Second	18-Mar-20	98.2	33.3	<10.0	12.8
12	12A6	Jhnajra Incline 3 & 4 Office	October	First	10-Oct-19	76.4	25.6	<10.0	14.2
12	12A6	Jhnajra Incline 3 & 4 Office	October	Second	26-Oct-19	76.5	26.5	<10.0	13.7
12	12A6	Jhnajra Incline 3 & 4 Office	November	First	05-Nov-19	86.3	28.7	<10.0	13.8
12	12A6	Jhnajra Incline 3 & 4 Office	November	Second	28-Nov-19	83.7	28.7	<10.0	13.8
12	12A6	Jhnajra Incline 3 & 4 Office	December	First	06-Dec-19	118.6	39.4	<10.0	12.4
12	12A6	Jhnajra Incline 3 & 4 Office	December	Second	24-Dec-19	95.4	32.4	<10.0	12.8
12	12A6	Jhnajra Incline 3 & 4 Office	January	First	08-Jan-20	178.4	57.3	<10.0	13.6
12	12A6	Jhnajra Incline 3 & 4 Office	January	Second	27-Jan-20	95.4	38.8	<10.0	15.2
12	12A6	Jhnajra Incline 3 & 4 Office	February	First	12-Feb-20	134.6	44.2	<10.0	14.1
12	12A6	Jhnajra Incline 3 & 4 Office	February	Second	21-Feb-20	104.6	35.2	<10.0	14.6
12	12A6	Jhnajra Incline 3 & 4 Office	March	First	13-Mar-20	93.8	44.2	<10.0	14.1
12	12A6	Jhnajra Incline 3 & 4 Office	March	Second	19-Mar-20	97.3	33	<10.0	14.6
12	12A7	Durga mandir, Churor Village	April	First	05-Apr-19	89.3	39.4	<10.0	12.6
12	12A7	Durga mandir, Churor Village	April	Second	23-Apr-19	91.2	38.6	<10.0	13.6
12	12A7	Durga mandir, Churor Village	May	First	05-May-19	92.1	37.5	<10.0	17.3
12	12A7	Durga mandir, Churor Village	May	Second	17-May-19	92.7	38.4	<10.0	18.4
12	12A7	Durga mandir, Churor Village	June	First	01-Jun-19	38.6	38.6	<10.0	15.8
12	12A7	Durga mandir, Churor Village	June	Second	18-Jun-19	91.4	39.2	<10.0	16.8
12	12A7	Durga mandir, Churor Village	July	First	09-Jul-19	91.4	37.6	<10.0	17.3
12	12A7	Durga mandir, Churor Village	July	Second	16-Jul-19	93.8	40.7	<10.0	13.7
12	12A7	Durga mandir, Churor Village	August	First	02-Aug-19	83.5	31.4	<10.0	14.6
12	12A7	Durga mandir, Churor Village	August	Second	22-Aug-19	84.3	33.8	<10.0	14.5
12	12A7	Durga mandir, Churor Village	April	First	01-Sep-19	78.6	26.8	<10.0	13.4
12	12A7	Durga mandir, Churor Village	April	Second	01-Sep-19	78.6	26.8	<10.0	13.4
12	12A7	Durga mandir, Churor Village	Sept	First	01-Sep-19	78.6	26.8	<10.0	13.4
12	12A7	Durga mandir, Churor Village	Sept	Second	27-Sep-19	72.5	29.8	<10.0	13.1
12	12A8	Dispensary of Konda village	April	First	11-Apr-19	90.2	38.9	<10.0	13.8
12	12A8	Dispensary of Konda village	April	Second	23-Apr-19	91.1	38.1	<10.0	14.3
12	12A8	Dispensary of Konda village	May	First	03-May-19	91.6	37.3	<10.0	18.6
12	12A8	Dispensary of Konda village	May	Second	17-May-19	92	38.7	<10.0	19.3
12	12A8	Dispensary of Konda village	June	First	04-Jun-19	39.5	39.5	<10.0	16.4
12	12A8	Dispensary of Konda village	June	Second	17-Jun-19	90.5	40.6	<10.0	16.5
12	12A8	Dispensary of Konda village	July	First	09-Jul-19	93.8	38.4	<10.0	15.3
12	12A8	Dispensary of Konda village	July	Second	17-Jul-19	87.5	38.2	<10.0	15.4

Cluster No.	Station No.	Station Name	Month	Fortnight	Date of Sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_X
12	12A8	Dispensary of Konda village	August	First	02-Aug-19	81.6	32.8	<10.0	12.8
12	12A8	Dispensary of Konda village	August	Second	22-Aug-19	81.6	32.7	<10.0	13.1
12	12A8	Dispensary of Konda village	Sept	First	01-Sep-19	74.6	23.7	<10.0	12.7
12	12A8	Dispensary of Konda village	April	First	01-Sep-19	74.6	23.7	<10.0	12.7
12	12A8	Dispensary of Konda village	April	Second	01-Sep-19	74.6	23.7	<10.0	12.7
12	12A8	Dispensary of Konda village	Sept	Second	17-Sep-19	74.2	22.4	<10.0	11.9
12	12A9	Chapla village	April	First	06-Apr-19	90	38.6	<10.0	12.3
12	12A9	Chapla village	April	Second	22-Apr-19	90.4	37.7	<10.0	12.7
12	12A9	Chapla village	May	First	03-May-19	90.9	36.9	<10.0	16.3
12	12A9	Chapla village	May	Second	17-May-19	91.1	37.3	<10.0	15.7
12	12A9	Chapla village	June	First	01-Jun-19	37.9	37.9	<10.0	14.8
12	12A9	Chapla village	June	Second	17-Jun-19	91.6	38.4	<10.0	14.5
12	12A9	Chapla village	July	First	09-Jul-19	86.4	38.6	<10.0	16.8
12	12A9	Chapla village	July	Second	17-Jul-19	83.4	33.8	<10.0	14.6
12	12A9	Chapla village	August	First	02-Aug-19	79.3	33.7	<10.0	13.3
12	12A9	Chapla village	August	Second	20-Aug-19	78.4	31.4	<10.0	12.5
12	12A9	Chapla village	April	Second	02-Sep-19	71.3	24.6	<10.0	11.4
12	12A9	Chapla village	Sept	First	02-Sep-19	71.3	24.6	<10.0	11.4
12	12A9	Chapla village	April	First	02-Sep-19	71.3	24.6	<10.0	11.4
12	12A9	Chapla village	Sept	Second	17-Sep-19	76.3	26.8	<10.0	12.4

Analysis of Heavy Metals in Air

Station No	Station Name	Month	Fortnight	Date of Sampling	Arsenic (ng/m^3)	Cadmium ($\mu g/m^3$)	Chromium ($\mu g/m^3$)	Mercury ($\mu g/m^3$)	Nickel (ng/m^3)	Lead ($\mu g/m^3$)
12A1	Agent Office, Khottadih OCP	Sept	First	03-Sep-19	<0.005	<0.001	<0.01	<0.001	<0.10	<0.005
12A1	Agent Office, Khottadih OCP	March	First	03-Mar-20	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
12A10	Dalurband colliery office	Sept	First	02-Sep-19	<0.005	<0.001	<0.01	<0.001	<0.10	<0.005
12A10	Dalurband colliery office	March	First	03-Mar-20	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
12A11	Mandarboni colliery office	Sept	First	02-Sep-19	<0.005	<0.001	<0.01	<0.001	<0.10	<0.005
12A11	Mandarboni colliery office	March	First	13-Mar-20	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
12A12	Pandaveswar pit ofice near Railway siding	Sept	First	03-Sep-19	<0.005	<0.001	<0.01	<0.001	<0.10	<0.005
12A12	Pandaveswar pit ofice near Railway siding	March	First	13-Mar-20	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
12A13	Manager's office, Madhaipur colliery	Sept	First	03-Sep-19	<0.005	<0.001	<0.01	<0.001	<0.10	<0.005
12A13	Manager's office, Madhaipur colliery	March	First	09-Mar-20	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
12A14	Bankola workshop near Railway siding	Sept	First	02-Sep-19	<0.005	<0.001	<0.01	<0.001	<0.10	<0.005
12A14	Bankola workshop near Railway siding	March	First	12-Mar-20	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
12A2	Kumardihi A Colliery Store	Sept	First	02-Sep-19	<0.005	<0.001	<0.01	<0.001	<0.10	<0.005
12A2	Kumardihi A Colliery Store	March	First	11-Mar-20	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005

Station No	Station Name	Month	Fortnight	Date of Sampling	Arsenic (ng/m^3)	Cadmium ($\mu g/m^3$)	Chromium ($\mu g/m^3$)	Mercury ($\mu g/m^3$)	Nickel (ng/m^3)	Lead ($\mu g/m^3$)
12A3	Danya village	Sept	First	01-Sep-19	<0.005	<0.001	<0.01	<0.001	<0.10	<0.005
12A3	Danya village	March	First	12-Mar-20	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
12A4	GM office , Kenda Area	March	First	12-Mar-20	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
12A5	Khandra Bishweshwar Pit	March	First	12-Mar-20	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
12A6	Jhnajra Incline 3 & 4 Office	March	First	13-Mar-20	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
12A7	Durga mandir, Churor Village	Sept	First	01-Sep-19	<0.005	<0.001	<0.01	<0.001	<0.10	<0.005
12A8	Dispensary of Konda village	Sept	First	01-Sep-19	<0.005	<0.001	<0.01	<0.001	<0.10	<0.005
12A9	Chapla village	Sept	First	02-Sep-19	<0.005	<0.001	<0.01	<0.001	<0.10	<0.005

Environmental standards:

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

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

Annexure – II

NOISE LEVEL

Cluster No.	Station No.	Station Name	Month	Fortnight	Date of Sampling	Noise Level dB(A)
12	12N1	Pit-top Pandaveswar UG	June	First	20-Jun-19	63.7
12	12N1	Pit-top Pandaveswar UG	August	First	05-Aug-19	68.3
12	12N1	Pit-top Pandaveswar UG	November	First	15-Nov-19	63.4
12	12N1	Pit-top Pandaveswar UG	February	First	12-Feb-20	58.3
12	12N10	Pit-top Jhanjra UG	June	First	19-Jun-19	69.7
12	12N10	Pit-top Jhanjra UG	August	First	01-Aug-19	62.2
12	12N10	Pit-top Jhanjra UG	November	First	15-Nov-19	66.4
12	12N10	Pit-top Jhanjra UG	February	First	12-Feb-20	63.7
12	12N11	Pit-top Tilaboni UG	June	First	19-Jun-19	63.5
12	12N11	Pit-top Tilaboni UG	August	First	01-Aug-19	69.8
12	12N11	Pit-top Tilaboni UG	November	First	15-Nov-19	67.8
12	12N11	Pit-top Tilaboni UG	February	First	12-Feb-20	62.6
12	12N12	Pit-top Shyamsundarpur UG	June	First	19-Jun-19	65.7
12	12N12	Pit-top Shyamsundarpur UG	August	First	01-Aug-19	63.1
12	12N12	Pit-top Shyamsundarpur UG	November	First	15-Nov-19	62.8
12	12N12	Pit-top Shyamsundarpur UG	February	First	11-Feb-20	69.4
12	12N13	Pit-top Bankola UG	June	First	18-Jun-19	68.3
12	12N13	Pit-top Bankola UG	August	First	02-Aug-19	66.7
12	12N13	Pit-top Bankola UG	November	First	15-Nov-19	62.9
12	12N13	Pit-top Bankola UG	February	First	11-Feb-20	57.8
12	12N14	Pit-top Kottadih UG	June	First	19-Jun-19	66.4
12	12N14	Pit-top Kottadih UG	August	First	02-Aug-19	61.3
12	12N14	Pit-top Kottadih UG	November	First	15-Nov-19	69.3
12	12N14	Pit-top Kottadih UG	February	First	13-Feb-20	60.3
12	12N15	Pit-top Kumardihi A UG	June	First	19-Jun-19	69.4
12	12N15	Pit-top Kumardihi A UG	August	First	02-Aug-19	60.5
12	12N15	Pit-top Kumardihi A UG	November	First	15-Nov-19	62.8
12	12N15	Pit-top Kumardihi A UG	February	First	13-Feb-20	58.3
12	12N16	Pit-top Jhanjra MIC UG	August	First	02-Aug-19	68.7
12	12N16	Pit-top Jhanjra MIC UG	November	First	15-Nov-19	63.4
12	12N16	Pit-top Jhanjra MIC UG	February	First	14-Feb-20	64.7
12	12N17	Pit-top Jhanjra 3 & 4 UG	August	First	02-Aug-19	62.9
12	12N17	Pit-top Jhanjra 3 & 4 UG	November	First	15-Nov-19	67.5
12	12N17	Pit-top Jhanjra 3 & 4 UG	February	First	14-Feb-20	69.6
12	12N18	Pit-top Madhaipur UG	August	First	02-Aug-19	61.6
12	12N18	Pit-top Madhaipur UG	November	First	15-Nov-19	62.9
12	12N18	Pit-top Madhaipur UG	February	First	14-Feb-20	58.7
12	12N2	Pit-top Dalurband UG	June	First	20-Jun-19	68.7
12	12N2	Pit-top Dalurband UG	August	First	05-Aug-19	70.3
12	12N2	Pit-top Dalurband UG	November	First	15-Nov-19	62.8
12	12N2	Pit-top Dalurband UG	February	First	12-Feb-20	62.5
12	12N3	Pit-top Manderboni UG	June	First	20-Jun-19	63.9
12	12N3	Pit-top Manderboni UG	August	First	05-Aug-19	72.8
12	12N3	Pit-top Manderboni UG	November	First	15-Nov-19	63.8
12	12N3	Pit-top Manderboni UG	February	First	11-Feb-20	58.2
12	12N4	Pit-top South Samla UG	June	First	20-Jun-19	69.4
12	12N4	Pit-top South Samla UG	August	First	05-Aug-19	68.2
12	12N4	Pit-top South Samla UG	November	First	15-Nov-19	65.4
12	12N4	Pit-top South Samla UG	February	First	11-Feb-20	57.6

Cluster No.	Station No.	Station Name	Month	Fortnight	Date of Sampling	Noise Level dB(A)
12	12N5	Pit-top Madhaipur UG	June	First	18-Jun-19	66.7
12	12N5	Pit-top Madhaipur UG	February	First	20-Aug-19	61.5
12	12N5	Pit-top Madhaipur UG	November	First	15-Nov-19	62.9
12	12N5	Pit-top Madhaipur UG	February	First	11-Feb-20	66.2
12	12N6	Workshop Sonepur Bazari OC	June	First	18-Jun-19	70.5
12	12N6	Workshop Sonepur Bazari OC	February	First	20-Aug-19	63.4
12	12N6	Workshop Sonepur Bazari OC	November	First	15-Nov-19	71.5
12	12N6	Workshop Sonepur Bazari OC	February	First	13-Feb-20	64.8
12	12N7	Pit-top Kumardihi B UG	June	First	18-Jun-19	63.8
12	12N7	Pit-top Kumardihi B UG	August	First	20-Aug-19	68.5
12	12N7	Pit-top Kumardihi B UG	November	First	15-Nov-19	70.6
12	12N7	Pit-top Kumardihi B UG	February	First	13-Feb-20	67.3
12	12N8	Workshop Nakrakonda B OC (Extension)	June	First	18-Jun-19	69.4
12	12N8	Workshop Nakrakonda B OC (Extension)	August	First	20-Aug-19	62.7
12	12N8	Workshop Nakrakonda B OC (Extension)	November	First	15-Nov-19	71.3
12	12N8	Workshop Nakrakonda B OC (Extension)	February	First	13-Feb-20	59.6
12	12N9	Pit-top Nakrakonda UG	June	First	19-Jun-19	64.8
12	12N9	Pit-top Nakrakonda UG	August	First	01-Aug-19	63.4
12	12N9	Pit-top Nakrakonda UG	November	First	15-Nov-19	72.8
12	12N9	Pit-top Nakrakonda UG	February	First	12-Feb-20	62.8

Annexure – III

EFFLUENT WATER QUALITY (5 PARAMETERS)

Station No.	Station Name	Month	Fortnight	Date of Sampling	pH	TSS	TDS	O&G	COD
12MW1	Pandaveswar UG	April	First	04-Apr-19	8.36	26	590	<2.0	32
12MW1	Pandaveswar UG	April	Second	23-Apr-19	8.39	24	556	<2.0	28
12MW1	Pandaveswar UG	May	First	15-May-19	8.13	20	600	<2.0	32
12MW1	Pandaveswar UG	May	Second	29-May-19	8.46	22	576	<2.0	24
12MW1	Pandaveswar UG	June	First	13-Jun-19	8.25	26	586	<2.0	28
12MW1	Pandaveswar UG	June	Second	20-Jun-19	8.24	22	674	<2.0	32
12MW1	Pandaveswar UG	July	First	06-Jul-19	8.18	24	682	<2.0	36
12MW1	Pandaveswar UG	July	Second	17-Jul-19	8.18	26	604	<2.0	32
12MW1	Pandaveswar UG	August	First	03-Aug-19	8.25	28	638	<2.0	36
12MW1	Pandaveswar UG	August	Second	20-Aug-19	8.11	30	654	<2.0	32
12MW1	Pandaveswar UG	Sept	Second	28-Sep-19	8.31	32	632	<2.0	34
12MW1	Pandaveswar UG	October	First	12-Oct-19	8.15	30	636	<2.0	24
12MW1	Pandaveswar UG	October	Second	25-Oct-19	8.18	32	640	<2.0	20
12MW1	Pandaveswar UG	November	First	15-Nov-19	8.13	28	640	<2.0	20
12MW1	Pandaveswar UG	November	Second	29-Nov-19	8.07	32	636	<2.0	36
12MW1	Pandaveswar UG	December	First	11-Dec-19	8.10	34	628	<2.0	32
12MW1	Pandaveswar UG	December	Second	23-Dec-19	8.05	40	636	<2.0	28
12MW1	Pandaveswar UG	January	First	07-Jan-20	8.07	42	640	<2.0	24
12MW1	Pandaveswar UG	January	Second	30-Jan-20	8.03	38	626	<2.0	32
12MW1	Pandaveswar UG	February	First	10-Feb-20	8.10	40	687	<2.0	28
12MW1	Pandaveswar UG	February	Second	22-Feb-20	8.07	32	605	<2.0	36
12MW2	Dalurband OC patch III	April	First	04-Apr-19	7.64	28	586	<2.0	20
12MW2	Dalurband OC patch III	April	Second	23-Apr-19	7.24	26	572	<2.0	16
12MW2	Dalurband OC patch III	May	First	15-May-19	7.42	22	518	<2.0	24
12MW2	Dalurband OC patch III	May	Second	29-May-19	7.75	20	538	<2.0	16
12MW2	Dalurband OC patch III	June	First	13-Jun-19	7.47	22	546	<2.0	20
12MW2	Dalurband OC patch III	June	Second	20-Jun-19	7.66	26	528	<2.0	24
12MW2	Dalurband OC patch III	July	First	06-Jul-19	7.36	24	498	<2.0	28
12MW2	Dalurband OC patch III	July	Second	17-Jul-19	7.59	22	534	<2.0	24
12MW2	Dalurband OC patch III	August	First	03-Aug-19	7.52	24	476	<2.0	28
12MW2	Dalurband OC patch III	August	Second	20-Aug-19	7.72	24	386	<2.0	36
12MW2	Dalurband OC patch III	Sept	Second	28-Sep-19	7.52	24	378	<2.0	32
12MW2	Dalurband OC patch III	October	First	12-Oct-19	8.20	20	382	<2.0	28
12MW2	Dalurband OC patch III	October	Second	25-Oct-19	7.23	24	374	<2.0	24
12MW2	Dalurband OC patch III	November	First	15-Nov-19	8.08	26	386	<2.0	24
12MW2	Dalurband OC patch III	November	Second	29-Nov-19	7.33	28	390	<2.0	40
12MW2	Dalurband OC patch III	December	First	12-Dec-19	8.04	28	382	<2.0	36
12MW2	Dalurband OC patch III	December	Second	23-Dec-19	7.46	36	386	<2.0	24
12MW2	Dalurband OC patch III	January	First	07-Jan-20	8.09	38	362	<2.0	28
12MW2	Dalurband OC patch III	January	Second	30-Jan-20	7.52	34	334	<2.0	36
12MW2	Dalurband OC patch III	February	First	10-Feb-20	8.08	36	394	<2.0	36
12MW2	Dalurband OC patch III	February	Second	22-Feb-20	7.47	36	311	<2.0	32
12MW3	Manderboni UG	April	First	04-Apr-19	7.77	26	448	<2.0	28
12MW3	Manderboni UG	April	Second	22-Apr-19	7.43	28	424	<2.0	20
12MW3	Manderboni UG	May	First	15-May-19	7.54	24	412	<2.0	16
12MW3	Manderboni UG	May	Second	29-May-19	7.69	22	430	<2.0	12
12MW3	Manderboni UG	June	First	13-Jun-19	7.56	26	436	<2.0	32
12MW3	Manderboni UG	June	Second	20-Jun-19	7.89	30	428	<2.0	36
12MW3	Manderboni UG	July	First	06-Jul-19	7.42	28	418	<2.0	32

Station No.	Station Name	Month	Fortnight	Date of Sampling	pH	TSS	TDS	O&G	COD
12MW3	Manderboni UG	July	Second	17-Jul-19	7.76	30	418	<2.0	36
12MW3	Manderboni UG	August	First	03-Aug-19	7.63	34	386	<2.0	32
12MW3	Manderboni UG	August	Second	20-Aug-19	7.85	30	408	<2.0	32
12MW3	Manderboni UG	Sept	Second	28-Sep-19	7.39	36	382	<2.0	28
12MW3	Manderboni UG	October	First	12-Oct-19	7.41	30	390	<2.0	32
12MW3	Manderboni UG	October	Second	25-Oct-19	7.52	32	386	<2.0	28
12MW3	Manderboni UG	November	First	15-Nov-19	7.57	30	390	<2.0	28
12MW3	Manderboni UG	November	Second	29-Nov-19	7.63	34	386	<2.0	32
12MW3	Manderboni UG	December	First	12-Dec-19	7.43	32	390	<2.0	28
12MW3	Manderboni UG	December	Second	23-Dec-19	7.52	38	384	<2.0	20
12MW3	Manderboni UG	January	First	07-Jan-20	7.62	32	376	<2.0	20
12MW3	Manderboni UG	January	Second	30-Jan-20	7.62	30	346	<2.0	20
12MW3	Manderboni UG	February	First	10-Feb-20	7.53	38	325	<2.0	24
12MW3	Manderboni UG	February	Second	22-Feb-20	7.54	32	375	<2.0	24
12MW4	South Samla UG	April	First	04-Apr-19	8.50	28	522	<2.0	24
12MW4	South Samla UG	April	Second	22-Apr-19	8.55	22	500	<2.0	12
12MW4	South Samla UG	May	First	15-May-19	8.30	26	500	<2.0	8
12MW4	South Samla UG	May	Second	29-May-19	8.48	24	520	<2.0	12
12MW4	South Samla UG	June	First	13-Jun-19	8.17	30	552	<2.0	24
12MW4	South Samla UG	June	Second	20-Jun-19	8.20	32	452	<2.0	20
12MW4	South Samla UG	July	First	06-Jul-19	8.21	36	422	<2.0	24
12MW4	South Samla UG	July	Second	17-Jul-19	8.19	32	568	<2.0	28
12MW4	South Samla UG	August	First	03-Aug-19	8.02	36	468	<2.0	36
12MW4	South Samla UG	August	Second	20-Aug-19	8.15	38	484	<2.0	36
12MW4	South Samla UG	Sept	Second	28-Sep-19	8.10	30	434	<2.0	32
12MW4	South Samla UG	October	First	12-Oct-19	8.16	32	430	<2.0	36
12MW4	South Samla UG	October	Second	25-Oct-19	8.07	30	438	<2.0	24
12MW4	South Samla UG	November	First	15-Nov-19	8.08	28	442	<2.0	32
12MW4	South Samla UG	November	Second	29-Nov-19	8.12	32	446	<2.0	24
12MW4	South Samla UG	December	First	12-Dec-19	8.11	34	438	<2.0	32
12MW4	South Samla UG	December	Second	23-Dec-19	8.10	42	442	<2.0	24
12MW4	South Samla UG	January	First	07-Jan-20	8.07	40	454	<2.0	24
12MW4	South Samla UG	January	Second	27-Jan-20	8.09	36	463	<2.0	24
12MW4	South Samla UG	February	First	10-Feb-20	8.06	36	446	<2.0	28
12MW4	South Samla UG	February	Second	22-Feb-20	8.10	28	448	<2.0	28
12MW5	Madhaipur UG	April	First	04-Apr-19	8.28	22	526	<2.0	16
12MW5	Madhaipur UG	April	Second	22-Apr-19	8.67	20	566	<2.0	08
12MW5	Madhaipur UG	May	First	15-May-19	8.41	28	504	<2.0	16
12MW5	Madhaipur UG	May	Second	29-May-19	8.32	26	526	<2.0	24
12MW5	Madhaipur UG	June	First	13-Jun-19	8.06	32	482	<2.0	44
12MW5	Madhaipur UG	June	Second	20-Jun-19	8.12	34	512	<2.0	40
12MW5	Madhaipur UG	July	First	06-Jul-19	8.10	38	546	<2.0	36
12MW5	Madhaipur UG	July	Second	17-Jul-19	8.07	38	454	<2.0	32
12MW5	Madhaipur UG	August	First	03-Aug-19	8.21	42	508	<2.0	32
12MW5	Madhaipur UG	August	Second	20-Aug-19	8.31	40	492	<2.0	40
12MW5	Madhaipur UG	Sept	Second	28-Sep-19	8.22	40	504	<2.0	42
12MW5	Madhaipur UG	October	First	12-Oct-19	8.08	40	508	<2.0	28
12MW5	Madhaipur UG	October	Second	25-Oct-19	8.12	36	512	<2.0	32
12MW5	Madhaipur UG	November	First	15-Nov-19	8.13	32	512	<2.0	36
12MW5	Madhaipur UG	November	Second	29-Nov-19	8.07	34	508	<2.0	28
12MW5	Madhaipur UG	December	First	12-Dec-19	8.09	36	512	<2.0	36
12MW5	Madhaipur UG	December	Second	23-Dec-19	8.11	40	508	<2.0	32

Station No.	Station Name	Month	Fortnight	Date of Sampling	pH	TSS	TDS	O&G	COD
12MW5	Madhaipur UG	January	First	07-Jan-20	8.05	36	508	<2.0	28
12MW5	Madhaipur UG	January	Second	27-Jan-20	8.10	32	524	<2.0	28
12MW5	Madhaipur UG	February	First	10-Feb-20	8.07	32	538	<2.0	32
12MW5	Madhaipur UG	February	Second	22-Feb-20	8.11	36	561	<2.0	24
12MW5	Madhaipur UG	March	Second	17-Mar-20	8.07	24	573	<2.0	28
12MW6	Sonepur Bazari OC	April	First	04-Apr-19	7.68	24	600	<2.0	32
12MW6	Sonepur Bazari OC	April	Second	23-Apr-19	7.41	22	632	<2.0	24
12MW6	Sonepur Bazari OC	May	First	15-May-19	7.75	20	628	<2.0	28
12MW6	Sonepur Bazari OC	May	Second	29-May-19	7.69	28	608	<2.0	32
12MW6	Sonepur Bazari OC	June	First	13-Jun-19	7.55	32	634	<2.0	32
12MW6	Sonepur Bazari OC	June	Second	20-Jun-19	7.48	30	574	<2.0	28
12MW6	Sonepur Bazari OC	July	First	06-Jul-19	7.45	34	534	<2.0	32
12MW6	Sonepur Bazari OC	July	Second	17-Jul-19	7.60	36	628	<2.0	36
12MW6	Sonepur Bazari OC	August	First	03-Aug-19	7.56	40	494	<2.0	28
12MW6	Sonepur Bazari OC	August	Second	20-Aug-19	7.62	42	518	<2.0	24
12MW6	Sonepur Bazari OC	Sept	Second	28-Sep-19	7.51	40	534	<2.0	26
12MW6	Sonepur Bazari OC	October	First	12-Oct-19	7.21	34	530	<2.0	36
12MW6	Sonepur Bazari OC	October	Second	25-Oct-19	7.59	30	538	<2.0	28
12MW6	Sonepur Bazari OC	November	First	15-Nov-19	7.62	28	542	<2.0	28
12MW6	Sonepur Bazari OC	November	Second	29-Nov-19	7.52	30	546	<2.0	32
12MW6	Sonepur Bazari OC	December	First	12-Dec-19	7.72	36	530	<2.0	32
12MW6	Sonepur Bazari OC	December	Second	23-Dec-19	7.63	42	538	<2.0	36
12MW6	Sonepur Bazari OC	January	First	07-Jan-20	7.65	38	554	<2.0	32
12MW6	Sonepur Bazari OC	January	Second	30-Jan-20	7.71	30	536	<2.0	32
12MW6	Sonepur Bazari OC	February	First	10-Feb-20	7.53	34	572	<2.0	36
12MW6	Sonepur Bazari OC	February	Second	22-Feb-20	7.68	28	543	<2.0	36
12MW6	Sonepur Bazari OC	March	Second	17-Mar-20	7.67	16	541	<2.0	32
12MW7	Kumardihi B UG	April	First	04-Apr-19	7.83	26	540	<2.0	40
12MW7	Kumardihi B UG	April	Second	22-Apr-19	7.58	24	556	<2.0	36
12MW7	Kumardihi B UG	May	First	15-May-19	7.57	24	582	<2.0	40
12MW7	Kumardihi B UG	May	Second	29-May-19	7.74	40	570	<2.0	48
12MW7	Kumardihi B UG	June	First	13-Jun-19	7.74	36	526	<2.0	40
12MW7	Kumardihi B UG	June	Second	20-Jun-19	7.55	32	564	<2.0	36
12MW7	Kumardihi B UG	July	First	06-Jul-19	7.65	30	526	<2.0	28
12MW7	Kumardihi B UG	July	Second	18-Jul-19	7.47	32	554	<2.0	36
12MW7	Kumardihi B UG	August	First	03-Aug-19	7.28	32	534	<2.0	32
12MW7	Kumardihi B UG	August	Second	20-Aug-19	7.81	28	578	<2.0	32
12MW7	Kumardihi B UG	Sept	Second	28-Sep-19	7.63	36	528	<2.0	38
12MW7	Kumardihi B UG	October	First	12-Oct-19	8.11	38	532	<2.0	24
12MW7	Kumardihi B UG	October	Second	25-Oct-19	7.31	36	536	<2.0	36
12MW7	Kumardihi B UG	November	First	15-Nov-19	8.07	32	536	<2.0	24
12MW7	Kumardihi B UG	November	Second	29-Nov-19	7.46	32	540	<2.0	36
12MW7	Kumardihi B UG	December	First	12-Dec-19	8.06	42	532	<2.0	28
12MW7	Kumardihi B UG	December	Second	23-Dec-19	7.52	34	536	<2.0	32
12MW7	Kumardihi B UG	January	First	07-Jan-20	8.07	30	568	<2.0	36
12MW7	Kumardihi B UG	January	Second	27-Jan-20	7.47	32	528	<2.0	36
12MW7	Kumardihi B UG	February	First	10-Feb-20	8.09	32	559	<2.0	32
12MW7	Kumardihi B UG	February	Second	22-Feb-20	7.52	34	539	<2.0	32
12MW9	Nakrakonda UG	April	First	04-Apr-19	8.31	28	664	<2.0	24
12MW9	Nakrakonda UG	April	Second	22-Apr-19	8.33	26	644	<2.0	16
12MW9	Nakrakonda UG	May	First	15-May-19	8.36	16	640	<2.0	24
12MW9	Nakrakonda UG	May	Second	29-May-19	8.52	22	650	<2.0	20

Station No.	Station Name	Month	Fortnight	Date of Sampling	pH	TSS	TDS	O&G	COD
12MW9	Nakrakonda UG	June	First	13-Jun-19	8.27	24	540	<2.0	20
12MW9	Nakrakonda UG	June	Second	20-Jun-19	8.27	28	584	<2.0	24
12MW10	Jhanjra UG	April	First	02-Apr-19	8.53	22	770	<2.0	36
12MW10	Jhanjra UG	April	Second	22-Apr-19	8.12	28	762	<2.0	20
12MW10	Jhanjra UG	May	First	15-May-19	8.22	22	710	<2.0	16
12MW10	Jhanjra UG	May	Second	29-May-19	8.26	20	750	<2.0	28
12MW10	Jhanjra UG	June	First	13-Jun-19	8.22	26	644	<2.0	28
12MW10	Jhanjra UG	June	Second	20-Jun-19	8.35	22	712	<2.0	32
12MW10	Jhanjra UG	July	First	06-Jul-19	8.19	24	732	<2.0	36
12MW10	Jhanjra UG	July	Second	17-Jul-19	8.28	26	620	<2.0	32
12MW10	Jhanjra UG	August	First	03-Aug-19	8.61	30	716	<2.0	24
12MW10	Jhanjra UG	August	Second	20-Aug-19	8.37	34	694	<2.0	20
12MW10	Jhanjra UG	Sept	Second	28-Sep-19	8.19	32	716	<2.0	22
12MW10	Jhanjra UG	October	First	12-Oct-19	8.08	34	720	<2.0	28
12MW10	Jhanjra UG	October	Second	25-Oct-19	8.07	32	724	<2.0	40
12MW10	Jhanjra UG	November	First	15-Nov-19	8.13	30	724	<2.0	20
12MW10	Jhanjra UG	November	Second	29-Nov-19	8.14	34	720	<2.0	20
12MW10	Jhanjra UG	December	First	12-Dec-19	8.14	34	724	<2.0	32
12MW10	Jhanjra UG	December	Second	23-Dec-19	8.11	44	720	<2.0	28
12MW10	Jhanjra UG	January	First	07-Jan-20	8.11	40	746	<2.0	24
12MW10	Jhanjra UG	January	Second	30-Jan-20	8.08	44	754	<2.0	24
12MW10	Jhanjra UG	February	First	10-Feb-20	8.11	36	720	<2.0	20
12MW10	Jhanjra UG	February	Second	22-Feb-20	8.06	40	780	<2.0	20
12MW11	Tilaboni UG	April	First	02-Apr-19	7.29	28	338	<2.0	20
12MW11	Tilaboni UG	April	Second	22-Apr-19	8.44	22	302	<2.0	12
12MW11	Tilaboni UG	May	First	15-May-19	7.46	18	344	<2.0	20
12MW11	Tilaboni UG	May	Second	29-May-19	7.64	18	352	<2.0	16
12MW11	Tilaboni UG	June	First	13-Jun-19	7.57	24	634	<2.0	24
12MW11	Tilaboni UG	June	Second	20-Jun-19	7.49	26	354	<2.0	20
12MW11	Tilaboni UG	July	First	06-Jul-19	7.51	26	368	<2.0	24
12MW11	Tilaboni UG	July	Second	17-Jul-19	7.51	28	344	<2.0	20
12MW11	Tilaboni UG	August	First	03-Aug-19	7.32	28	376	<2.0	20
12MW11	Tilaboni UG	August	Second	20-Aug-19	7.52	24	388	<2.0	32
12MW11	Tilaboni UG	Sept	Second	28-Sep-19	7.32	30	374	<2.0	36
12MW11	Tilaboni UG	October	First	12-Oct-19	7.48	26	378	<2.0	36
12MW11	Tilaboni UG	October	Second	25-Oct-19	7.42	30	370	<2.0	32
12MW11	Tilaboni UG	November	First	15-Nov-19	7.45	34	382	<2.0	24
12MW11	Tilaboni UG	November	Second	29-Nov-19	7.55	32	378	<2.0	24
12MW11	Tilaboni UG	December	First	12-Dec-19	7.52	36	378	<2.0	28
12MW11	Tilaboni UG	December	Second	23-Dec-19	7.62	42	370	<2.0	24
12MW11	Tilaboni UG	January	First	07-Jan-20	7.64	38	390	<2.0	28
12MW11	Tilaboni UG	January	Second	30-Jan-20	7.57	40	362	<2.0	28
12MW11	Tilaboni UG	February	First	10-Feb-20	7.58	36	366	<2.0	24
12MW11	Tilaboni UG	February	Second	22-Feb-20	7.42	38	344	<2.0	24
12MW12	Shyamsundarpur UG	April	First	02-Apr-19	7.50	24	502	<2.0	24
12MW12	Shyamsundarpur UG	April	Second	22-Apr-19	7.68	20	518	<2.0	24
12MW12	Shyamsundarpur UG	May	First	15-May-19	7.43	20	480	<2.0	16
12MW12	Shyamsundarpur UG	May	Second	29-May-19	7.86	20	500	<2.0	24
12MW12	Shyamsundarpur UG	June	First	13-Jun-19	7.80	26	472	<2.0	20
12MW12	Shyamsundarpur UG	June	Second	20-Jun-19	7.60	22	458	<2.0	24
12MW12	Shyamsundarpur UG	July	First	06-Jul-19	7.69	24	428	<2.0	20
12MW12	Shyamsundarpur UG	July	Second	17-Jul-19	7.52	22	484	<2.0	28

Station No.	Station Name	Month	Fortnight	Date of Sampling	pH	TSS	TDS	O&G	COD
12MW12	Shyamsundarpur UG	August	First	03-Aug-19	7.85	24	414	<2.0	28
12MW12	Shyamsundarpur UG	August	Second	20-Aug-19	7.35	26	418	<2.0	36
12MW12	Shyamsundarpur UG	Sept	Second	28-Sep-19	7.48	24	422	<2.0	32
12MW12	Shyamsundarpur UG	October	First	12-Oct-19	8.20	26	426	<2.0	24
12MW12	Shyamsundarpur UG	October	Second	25-Oct-19	7.51	28	430	<2.0	28
12MW12	Shyamsundarpur UG	November	First	15-Nov-19	8.10	26	430	<2.0	28
12MW12	Shyamsundarpur UG	November	Second	29-Nov-19	7.38	30	434	<2.0	28
12MW12	Shyamsundarpur UG	December	First	12-Dec-19	8.10	28	426	<2.0	32
12MW12	Shyamsundarpur UG	December	Second	23-Dec-19	7.57	32	430	<2.0	20
12MW12	Shyamsundarpur UG	January	First	07-Jan-20	8.08	36	416	<2.0	32
12MW12	Shyamsundarpur UG	January	Second	30-Jan-20	7.62	32	434	<2.0	32
12MW12	Shyamsundarpur UG	February	First	10-Feb-20	8.04	32	424	<2.0	28
12MW12	Shyamsundarpur UG	February	Second	22-Feb-20	7.48	36	428	<2.0	36
12MW13	Bankola UG	April	First	04-Apr-19	7.67	26	336	<2.0	32
12MW13	Bankola UG	April	Second	22-Apr-19	7.61	28	308	<2.0	28
12MW13	Bankola UG	May	First	15-May-19	7.29	20	308	<2.0	24
12MW13	Bankola UG	May	Second	29-May-19	7.94	30	294	<2.0	32
12MW13	Bankola UG	June	First	13-Jun-19	7.98	34	318	<2.0	24
12MW13	Bankola UG	June	Second	20-Jun-19	7.73	30	284	<2.0	28
12MW13	Bankola UG	July	First	06-Jul-19	7.67	32	278	<2.0	32
12MW13	Bankola UG	July	Second	17-Jul-19	7.69	30	382	<2.0	24
12MW13	Bankola UG	August	First	03-Aug-19	7.36	30	262	<2.0	32
12MW13	Bankola UG	August	Second	20-Aug-19	7.42	32	286	<2.0	40
12MW13	Bankola UG	Sept	Second	28-Sep-19	7.21	34	278	<2.0	42
12MW13	Bankola UG	October	First	12-Oct-19	8.15	36	282	<2.0	28
12MW13	Bankola UG	October	Second	25-Oct-19	7.39	38	286	<2.0	24
12MW13	Bankola UG	November	First	15-Nov-19	8.07	36	286	<2.0	32
12MW13	Bankola UG	November	Second	29-Nov-19	7.40	32	290	<2.0	16
12MW13	Bankola UG	December	First	12-Dec-19	8.07	30	282	<2.0	36
12MW13	Bankola UG	December	Second	23-Dec-19	7.43	34	286	<2.0	28
12MW13	Bankola UG	January	First	07-Jan-20	8.05	30	248	<2.0	36
12MW13	Bankola UG	January	Second	27-Jan-20	7.51	34	252	<2.0	36
12MW13	Bankola UG	February	First	10-Feb-20	8.07	34	286	<2.0	32
12MW13	Bankola UG	February	Second	22-Feb-20	7.63	34	222	<2.0	32
12MW14	Kottadih UG & OC	April	First	04-Apr-19	8.12	38	352	<2.0	48
12MW14	Kottadih UG & OC	April	Second	23-Apr-19	8.43	26	338	<2.0	36
12MW14	Kottadih UG & OC	May	First	15-May-19	8.20	22	340	<2.0	20
12MW14	Kottadih UG & OC	May	Second	29-May-19	8.38	18	356	<2.0	16
12MW14	Kottadih UG & OC	June	First	13-Jun-19	8.17	22	322	<2.0	28
12MW14	Kottadih UG & OC	June	Second	20-Jun-19	8.28	24	674	<2.0	32
12MW14	Kottadih UG & OC	July	First	06-Jul-19	8.21	30	364	<2.0	28
12MW14	Kottadih UG & OC	July	Second	17-Jul-19	8.12	32	346	<2.0	28
12MW14	Kottadih UG & OC	August	First	03-Aug-19	8.48	30	354	<2.0	36
12MW14	Kottadih UG & OC	August	Second	20-Aug-19	8.69	34	374	<2.0	28
12MW14	Kottadih UG & OC	Sept	Second	28-Sep-19	8.52	40	382	<2.0	22
12MW14	Kottadih UG & OC	October	First	12-Oct-19	7.62	38	386	<2.0	24
12MW14	Kottadih UG & OC	October	Second	25-Oct-19	8.30	36	378	<2.0	24
12MW14	Kottadih UG & OC	November	First	15-Nov-19	7.03	31	203	<2.0	12
12MW14	Kottadih UG & OC	November	Second	29-Nov-19	8.13	32	452	<2.0	24
12MW14	Kottadih UG & OC	December	First	12-Dec-19	7.21	36.4	556	<2.0	24
12MW14	Kottadih UG & OC	December	Second	23-Dec-19	7.17	40	536	<2.0	32
12MW14	Kottadih UG & OC	January	First	14-Jan-20	7.38	34	604	<2.0	20

Station No.	Station Name	Month	Fortnight	Date of Sampling	pH	TSS	TDS	O&G	COD
12MW14	Kottadih UG & OC	January	Second	27-Jan-20	8.07	40	612	<2.0	24
12MW14	Kottadih UG & OC	February	First	07-Feb-20	7.21	30	652	<2.0	36
12MW14	Kottadih UG & OC	February	Second	22-Feb-20	7.54	28	623	<2.0	36
12MW15	Kumardihi A UG	April	First	04-Apr-19	8.74	20	506	<2.0	16
12MW15	Kumardihi A UG	April	Second	22-Apr-19	8.35	26	480	<2.0	24
12MW15	Kumardihi A UG	May	First	15-May-19	8.44	24	450	<2.0	16
12MW15	Kumardihi A UG	May	Second	29-May-19	8.36	22	462	<2.0	20
12MW15	Kumardihi A UG	June	First	13-Jun-19	8.23	26	506	<2.0	20
12MW15	Kumardihi A UG	June	Second	20-Jun-19	8.07	24	452	<2.0	24
12MW15	Kumardihi A UG	July	First	06-Jul-19	8.17	28	458	<2.0	32
12MW15	Kumardihi A UG	July	Second	17-Jul-19	8.10	28	488	<2.0	32
12MW15	Kumardihi A UG	August	First	03-Aug-19	8.51	24	464	<2.0	24
12MW15	Kumardihi A UG	August	Second	20-Aug-19	8.39	22	482	<2.0	24
12MW15	Kumardihi A UG	Sept	Second	28-Sep-19	8.12	28	456	<2.0	26
12MW15	Kumardihi A UG	October	First	12-Oct-19	7.52	32	452	<2.0	28
12MW15	Kumardihi A UG	October	Second	25-Oct-19	8.24	30	448	<2.0	28
12MW15	Kumardihi A UG	November	First	15-Nov-19	7.35	28	464	<2.0	28
12MW15	Kumardihi A UG	November	Second	29-Nov-19	8.16	30	468	<2.0	28
12MW15	Kumardihi A UG	December	First	12-Dec-19	7.46	34	460	<2.0	32
12MW15	Kumardihi A UG	December	Second	23-Dec-19	8.12	38	464	<2.0	36
12MW15	Kumardihi A UG	January	First	07-Jan-20	7.53	34	472	<2.0	36
12MW15	Kumardihi A UG	January	Second	27-Jan-20	8.10	30	454	<2.0	28
12MW15	Kumardihi A UG	February	First	10-Feb-20	7.61	36	448	<2.0	32
12MW15	Kumardihi A UG	February	Second	22-Feb-20	8.08	32	421	<2.0	24
12MW16	Madhaipur OC	April	First	04-Apr-19	7.22	22	490	<2.0	32
12MW16	Madhaipur OC	April	Second	22-Apr-19	7.67	28	518	<2.0	40
12MW16	Madhaipur OC	May	First	15-May-19	7.84	20	526	<2.0	28
12MW16	Madhaipur OC	May	Second	29-May-19	7.83	30	506	<2.0	32
12MW16	Madhaipur OC	June	First	13-Jun-19	7.93	32	494	<2.0	32
12MW16	Madhaipur OC	June	Second	20-Jun-19	7.59	34	408	<2.0	36
12MW16	Madhaipur OC	July	First	06-Jul-19	7.84	36	386	<2.0	32
12MW16	Madhaipur OC	July	Second	17-Jul-19	7.63	34	534	<2.0	36
12MW16	Madhaipur OC	August	First	03-Aug-19	7.32	32	378	<2.0	28
12MW16	Madhaipur OC	August	Second	20-Aug-19	7.42	34	368	<2.0	20
12MW16	Madhaipur OC	Sept	Second	28-Sep-19	7.53	38	328	<2.0	24
12MW16	Madhaipur OC	October	First	12-Oct-19	8.07	34	332	<2.0	32
12MW16	Madhaipur OC	October	Second	25-Oct-19	7.28	32	336	<2.0	32
12MW16	Madhaipur OC	November	First	15-Nov-19	8.12	30	336	<2.0	32
12MW16	Madhaipur OC	November	Second	29-Nov-19	7.52	34	340	<2.0	20
12MW16	Madhaipur OC	December	First	12-Dec-19	8.10	34	332	<2.0	24
12MW16	Madhaipur OC	December	Second	23-Dec-19	7.63	40	336	<2.0	28
12MW16	Madhaipur OC	January	First	07-Jan-20	8.07	36	354	<2.0	32
12MW16	Madhaipur OC	January	Second	30-Jan-20	7.72	32	328	<2.0	32
12MW16	Madhaipur OC	February	First	10-Feb-20	8.03	38	355	<2.0	36
12MW16	Madhaipur OC	February	Second	22-Feb-20	7.65	36	378	<2.0	36
12MW16	Madhaipur OC	March	Second	17-Mar-20	7.86	26	335	<2.0	32

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

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

Annexure – III

EFFLUENT WATER QUALITY (29 PARAMETERS) for September, 2019

Cluster	12	12	12	12	12	12	12	12	12	12	12	12	12	12	**Effluent Water (MOEF Schedule-VI Standard)**
Station No	12MW16	12MW15	12MW14	12MW13	12MW2	12MW11	12MW12	12MW3	12MW1	12MW4	12MW10	12MW7	12MW6	12MW5	
Station Name	Madhaipur OC	Kumardihi A UG	Kottadih UG & OC	Bankola UG	Dalurband UG	Tilaboni UG	Shyamsundar pur UG	Manderboni UG	Pandaveswar UG	South Samla UG	Jhanjra UG	Kumardihi B UG	Sonepur Bazari OC	Madhaipur UG	
Month	September	September	September	September	September	September	September	September	September	September	September	September	September	September	
Fortnight	First	First	First	First	First	First	First	First	First	First	First	First	First	First	
Date of Sampling	12-Sep-19	12-Sep-19	12-Sep-19	12-Sep-19	13-Sep-19	12-Sep-19	12-Sep-19	12-Sep-19	13-Sep-19	12-Sep-19	12-Sep-19	12-Sep-19	12-Sep-19	12-Sep-19	
Colour	4	3	4	3	3	5	5	5	4	4	4	5	5	3	Unobjectionable
Odour	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
TSS	34	30	32	28	30	18	26	34	28	38	28	26	16	18	100.0
pH	8.10	7.64	7.85	8.14	8.01	7.56	8.23	7.53	8.24	8.21	8.16	8.17	7.32	8.10	5.5-9.0
Temperature(Deg C)	29.3	28.6	29.6	30.1	28.4	29.7	28.8	30.1	28.6	29.6	28.2	28.4	28.7	29.4	Shall not exceed 50C above the receiving water temp
Oil & Grease	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	10.0
Total Residual Chlorine	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	1.0
Ammonical Nitrogen	0.79	0.84	0.73	0.42	0.52	0.72	0.76	0.46	0.58	0.49	0.89	0.82	0.46	0.82	50.0
Total Kjeldahi Nitrogen	1.74	1.92	1.84	1.72	1.72	1.32	1.49	1.84	1.69	1.72	1.94	1.82	1.49	1.69	100.0
Free Amonia	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	5.0
BOD	12	12	12	10	10	8	8	12	12	8	12	10	10	8	30.0
COD	20	32	44	40	20	32	36	24	16	28	28	24	36	32	250.0
Arsenic	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.2
Lead	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.1
Hexavalent Chromium	0.02	0.03	0.03	0.02	0.02	0.04	0.03	0.04	0.03	0.04	0.02	0.02	0.04	0.03	0.1

Total Chromium	0.06	0.07	0.06	0.06	0.06	0.07	0.07	0.07	0.06	0.07	0.06	0.06	0.08	0.07	2.0
Copper	0.03	0.03	0.03	0.04	0.03	0.04	0.03	0.04	0.03	0.03	0.03	0.04	<0.03	0.03	3.0
Zinc	0.02	0.04	0.03	0.02	0.03	0.03	0.02	0.03	0.03	0.02	0.03	0.03	0.03	0.02	5.0
Selenium	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.05
Nickel	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	3.0
Fluoride	0.42	0.52	0.30	0.42	0.30	0.24	0.32	0.62	0.54	0.52	0.60	0.36	0.50	0.40	2.0
Dissolved Phosphate	1.46	1.32	1.34	1.46	1 .62	1.36	1.50	1.40	1.78	1.49	1.60	1.70	1.72	1.60	5.0
Sulphide	0.010	0.008	0.006	0.009	0.005	0.009	0.010	0.005	0.006	0.008	0.011	0.005	0.010	0.006	2.0
Phenolics	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1.0
Manganese	0.20	0.22	0.22	0.20	0.24	0.22	0.24	0.20	0.22	0.22	0.20	0.24	0.22	0.24	2.0
Iron	0.12	0.14	0.12	0.12	0.14	0.14	0.12	0.10	0.12	0.12	0.12	0.14	0.12	0.14	3.0
Nitrate Nitrogen	4.2	4.6	2.8	3.2	4.4	3.0	3.6	4.0	4.6	3.4	2.8	4.2	4.8	3.2	10.0
Cadmium	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	2.0
Total Dissolved Solids	506	428	340	268	578	308	470	432	508	442	726	580	522	496	Not Specified

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

EFFLUENT WATER QUALITY (29 PARAMETERS) for March, 2020

Cluster	12	12	12	12	12	12	12	12	12	12	12	12	12	12	**Effluent Water (MOEF Schedule-VI Standard)**
Station No	12MW13	12MW3	12MW15	12MW14	12MW12	12MW11	12MW7	12MW6	12MW4	12MW2	12MW1	12MW16	12MW5	12MW10	
Station Name	Bankola UG	Manderboni UG	Kumardihi A UG	Kottadih UG & OC	Shyamsundarpur UG	Tilaboni UG	Kumardihi B UG	Sonepur Bazari OC	South Samla UG	Dalurband UG	Pandaveswar UG	Madhaipur OC	Madhaipur UG	Jhanjra UG	
Month	March	March	March	March	March	March	March	March	March	March	March	March	March	March	
Fortnight	First	First	First	First	First	First	First	First	First	First	First	First	First	First	
Date of Sampling	5-Mar-20	5-Mar-20	5-Mar-20	4-Mar-20	5-Mar-20	5-Mar-20	5-Mar-20	5-Mar-20	5-Mar-20	5-Mar-20	5-Mar-20	5-Mar-20	5-Mar-20	5-Mar-20	
Colour	4	5	5	4	5	3	3	5	3	4	5	4	4	4	Unobjectionable
Odour	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
TSS	22	36	34	30	20	20	30	18	28	22	30	30	20	28	100.0
pH	8.05	7.42	7.57	7.18	8.02	7.63	8.06	7.62	8.04	8.05	8.08	8.05	8.08	8.10	5.5-9.0
Temperature(Deg C)	26	28	28	27	26	27	27	30	28	27	26	28	29	28	Shall not exceed 50C above the receiving water temp
Oil & Grease	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	10.0
Total Residual Chlorine	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	1.0
Ammonical Nitrogen	0.52	0.62	0.49	0.62	0.48	0.72	0.62	0.84	0.72	0.48	0.72	0.48	0.59	0.62	50.0
Total Kjeldahi Nitrogen	1.72	1.52	1.59	1.84	1.62	1.49	1.49	1.82	1.72	1.48	1.32	1.49	1.59	1.48	100.0
Free Amonia	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	5.0
BOD	12	8	12	10	10	12	6	10	12	10	16	8	8	14	30.0
COD	32	28	36	20	28	24	16	24	32	24	40	24	20	40	250.0
Arsenic	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.2
Lead	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.1
Hexavalent Chromium	0.03	0.03	0.02	0.03	0.02	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.04	0.02	0.1
Total Chromium	0.08	0.07	0.06	0.06	0.05	0.07	0.06	0.07	0.06	0.06	0.07	0.07	0.08	0.06	2.0
Copper	0.03	0.04	0.03	0.03	0.04	0.03	0.04	0.03	0.03	0.03	0.03	0.04	0.03	0.03	3.0
Zinc	0.04	0.03	0.04	0.04	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.03	0.04	0.04	5.0

Selenium	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.05
Nickel	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	3.0
Fluoride	0.46	0.54	0.48	0.36	0.38	0.32	0.38	0.46	0.48	0.34	0.50	0.38	0.38	0.54	2.0
Dissolved Phosphate	1.42	1.48	1.28	1.30	1.48	1.40	1.68	1.68	1.52	1.70	1.84	1.40	1.64	1.64	5.0
Sulphide	0.007	0.006	0.006	0.006	0.009	0.007	0.005	0.009	0.006	0.007	0.008	0.009	0.006	0.010	2.0
Phenolics	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1.0
Manganese	0.26	0.20	0.22	0.18	0.24	0.20	0.22	0.24	0.24	0.22	0.24	0.22	0.22	0.22	2.0
Iron	0.12	0.12	0.12	0.10	0.14	0.12	0.10	0.14	0.10	0.10	0.10	0.14	0.12	0.12	3.0
Nitrate Nitrogen	2.8	3.8	4.0	3.6	3.8	3.4	4.4	3.8	4.0	4.2	3.2	4.2	3.6	4.0	10.0
Cadmium	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	2.0
Total Dissolved Solids	250	358	453	624	474	343	531	570	475	346	641	326	593	745	Not Specified

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

Annexure – III

GROUNDWATER QUALITY

Cluster No.	12	12	12	12	12	**Indian Drinking Water Standard (IS-10500:2012)**	
Station No.	12GW1	12GW2	12GW3	12GW4	12GW5		
Station Name	Dugwell at NHS Qtrs Khottadih beside primary school	Dugwell at Konda Regional Hospital	Dugwell at NHS Qtrs of Danya village	Dugwell at Ichhapur high school	Dugwell at Kumardih "A" colliery		
Month	May'19	May'19	May'19	May'19	May'19		
Fortnight	Second	Second	Second	Second	Second		
Date of sampling	20-May-19	20-May-19	20-May-19	31-May-19	20-May-19	**Desirable Limit**	**Permissible Limit**
Colour, Hazen unit Max	5	2	3	3	3	5.0	15.0
Odour	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Agreeable	Agreeable
Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Turbidity, NTU Max	2	1	1	2	1	1.0	5.0
pH	8.35	7.27	8.02	8.21	7.42	6.5-8.5	No relaxation
Total Hardness	214	78	178	86	194	200.0	600.0
Iron	<0.06	<0.06	<0.06	<0.06	0.07	0.30	No relaxation
Chlorides	153	21	89	30	91	250.0	1000.0
Res Free chlorine	0.06	0.05	0.04	0.03	0.06	0.20	1.0
Dissolved Solids	988	180	416	154	550	500.0	2000.0
Calcium	72	28	60	32	68	75.0	200.0
Copper	<0.03	<0.03	<0.03	<0.03	<0.03	0.05	1.5
Manganese	<0.02	<0.02	<0.02	<0.02	<0.02	0.1	0.3
Sulphate	92	45	64	23	64	200.0	400.0
Nitrate	8.60	9.20	15.00	16.60	16.32	45.0	No relaxation
Fluoride	0.24	0.42	0.18	0.19	<0.02	1.0	1.5
Selenium	<0.002	<0.002	<0.002	<0.002	<0.002	0.01	No relaxation
Arsenic	<0.002	<0.002	<0.002	<0.002	<0.002	0.01	0.05
Lead	<0.005	<0.005	<0.005	<0.005	<0.005	0.01	No relaxation
Zinc	0.03	0.02	0.03	0.02	0.03	5.0	15.0
Hex Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	No relaxation
Boron	<0.20	<0.20	<0.20	<0.20	<0.20	0.5	1.0
Coliforms (MPN)	Nil	Nil	Nil	Nil	Nil	Shall not be detectable in any 100 ml sample	
Phenolics	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.001
Alkalinity	196	172	188	160	132	200.0	200.0
Cadmium (Cd)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.003	0.003

Note: All parameters in mg/l unless otherwise specified

Annexure – IV

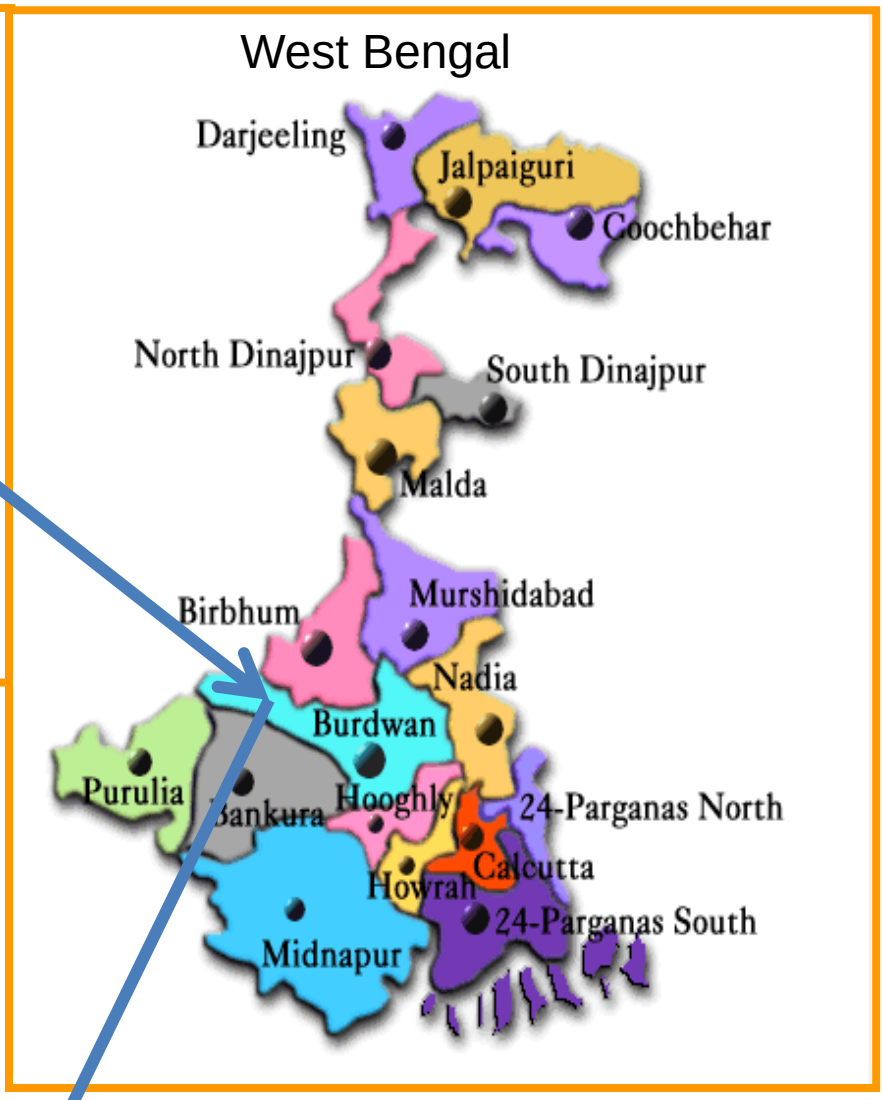
GROUNDWATER LEVEL

Station No	Station Name	Month	Fortnight	Date of Sampling	Ground Water Level BGL (mtr)
12GWL1	Dugwell at NHS Qtrs Khottadih beside primary school	May	First	20-May-19	2.37
12GWL1	Dugwell at NHS Qtrs Khottadih beside primary school	August	First	01-Aug-19	2.35
12GWL1	Dugwell at NHS Qtrs Khottadih beside primary school	November	First	25-Nov-19	2.50
12GWL1	Dugwell at NHS Qtrs Khottadih beside primary school	January	First	14-Jan-20	2.30
12GWL2	Dugwell at Konda Regional Hospital	May	First	20-May-19	4.47
12GWL2	Dugwell at Konda Regional Hospital	August	First	01-Aug-19	2.40
12GWL2	Dugwell at Konda Regional Hospital	November	First	25-Nov-19	2.60
12GWL2	Dugwell at Konda Regional Hospital	January	First	28-Jan-20	4.70
12GWL3	Dugwell at NHS Qtrs of Danya village	May	First	20-May-19	3.87
12GWL3	Dugwell at NHS Qtrs of Danya village	August	First	01-Aug-19	3.75
12GWL3	Dugwell at NHS Qtrs of Danya village	November	First	26-Nov-19	2.70
12GWL3	Dugwell at NHS Qtrs of Danya village	January	First	28-Jan-20	3.20
12GWL4	Dugwell at Ichhapur high school	May	First	31-May-19	2.90
12GWL4	Dugwell at Ichhapur high school	August	First	01-Aug-19	1.65
12GWL4	Dugwell at Ichhapur high school	November	First	27-Nov-19	1.80
12GWL4	Dugwell at Ichhapur high school	January	First	28-Jan-20	1.40
12GWL5	Dugwell at Kumardih "A" colliery	May	First	20-May-19	4.65
12GWL5	Dugwell at Kumardih "A" colliery	August	First	03-Aug-19	4.20
12GWL5	Dugwell at Kumardih "A" colliery	November	First	26-Nov-19	5.30
12GWL5	Dugwell at Kumardih "A" colliery	January	First	21-Jan-20	5.50

Piezometer water level for the month of September, 2019

	Station Code	Location of Piezometer	Date of measurement	Water level (in Meters) Below Ground Level
1	12/JH/JP-01	Jhanjra(Area office)	2-Sep-19	7.75
2	12/SB/SP-03	Sonepur Bazari (Near Magazine house)	2-Sep-19	2.70
3	12/PD/MP-08	Pandaveswar(Madhaipur UG)	3-Sep-19	4.00
4	12/PD/PP-10	Pandaveswar(Pandaveswar UG)	7-Sep-19	15.30
5	12/BN/TP-11	Bankola(Tilaboni)	30-Sep-19	3.00

Plate – 1 Location of Cluster 12



Station Code	Location of Dugwell
12GWL1	Dugwell at NHS Qtrs Khottadih beside primary school
12GWL2	Dugwell at Konda Regional Hospital
12GWL3	Dugwell at NHS Qtrs of Danya village
12GWL4	Dugwell at Ichhapur high school
12GWL5	Dugwell at PHE water tank of Madhaiganj
12GWL6	Dugwell at Banbahal village near Kenda GM office
12GWL7	Dugwell at roadside of Churat village near Barjor village
12GWL8	Dugwell at Kumardih "A" colliery

Station Code	Mine / Effluent Water Station
12MW1	Pandaveswar UG
12MW2	Dalurband UG
12MW3	Manderboni UG
12MW4	South Samla UG
12MW5	Madhaipur UG
12MW6	Sonepur Bazari OC
12MW7	Kumardihi B UG
12MW8	Nakrakonda B OC (Extension)
12MW9	Nakrakonda UG
12MW10	Jhanjra UG
12MW11	Tilaboni UG
12MW12	Shyamsundarpur UG
12MW13	Bankola UG
12MW14	Kottadih UG & OC
12MW15	Kumardihi A UG

Station Code	Name of Station (Workplace)
12N1	Pandaveswar UG
12N2	Dalurband UG
12N3	Manderboni UG
12N4	South Samla UG
12N5	Madhaipur UG
12N6	Sonepur Bazari OC
12N7	Kumardihi B UG
12N8	Nakrakonda B OC (Extension)
12N9	Nakrakonda UG
12N10	Jhanjra UG
12N11	Tilaboni UG
12N12	Shyamsundarpur UG
12N13	Bankola UG
12N14	Kottadih UG & OC
12N15	Kumardihi A UG

Cluster 12

Station Code	Type of Station	Name of Station
12A1	Permanent Air Station	Agent Office, Kottadih OCP
12A2	Permanent Air Station	Kumardihi A Colliery Store
12A3	Permanent Air Station	Danya Village
12A4	Post monsoon Air Station	GM Office of Kenda Area
12A5	Post monsoon Air Station	Khandra Bishweshari Pit
12A6	Post monsoon Air Station	Office of Jhanjra Incline No. 3 & 4
12A7	Pre monsoon Air Station	Durga Mandir, Churor Village
12A8	Pre monsoon Air Station	Dispensary of Konda Village
12A9	Pre monsoon Air Station	Chapla Village
12A10	Permanent Air Station	Dalurband Colliery Office
12A11	Permanent Air Station	Manderboni Colliery Office Near Railway Siding
12A12	Permanent Air Station	Pandaveshwar Pit Office Near Railway Siding
12A13	Permanent Air Station	Managers' Office Madhaipur Colliery Near Railway Siding
12A14	Permanent Air Station	Bankola Workshop Near Railway Siding

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

N

12

	Kachcha Road
	Road (ECL/NH)
	Water Bodies (River, Nala, Dam)
	Protected Forest
	Reserved Forest
	SAND
	Built Up
	River/Nalah

Permanent Air Station

Pre - monsoon

Post - monsoon

BUFFER OF CLUSTER

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

2 KMS

PLATE NO 2

JOB NO

EASTERN COALFIELDS LIMITED	111690
ENVIRONMENT STATEMENT FOR CLUSTER NO. 12	
Location of Sampling Stations OF CLUSTER NO. 12	
CMPDI	