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EXECUTIVE SUMMARY
OF
DRAFT EIA & EMP
(As per EIA Notification, 2006)
for
Mohanpur Expansion OCP (Phase – II)
Salanpur Area
Raniganj Coalfield
Eastern Coalfields Limited

(June, 2020)

Prepared at

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CMPDI

ISO 9001:2015 Company

EXECUTIVE SUMMARY

1.0 Project Description

1.1 Present Proposal

The proposed Mohanpur Expansion OCP (Phase-II) is part of Mohanpur Geological Coal Block of Raniganj Coalfields and is located in the Paschim Bardhaman district of West Bengal. As the name suggests, the proposed Mohanpur Expansion OCP (Phase-II) is an extension to the existing Mohanpur OCP, which is currently under operation as per environmental clearance obtained from MoEF&CC in 2009 vide letter no. J-11015/1128/2007-IA.II (M) dated 10 – 12 – 2009. The proposed OCP is under the administrative control of Salanpur Area of ECL.

Altogether nine seams/splits of Barakar measures starting from Salanpur Special Bottom at the bottom to Salanpur-D Top seam at the top are found to occur within the proposed area of OCP. Out of these nine seams/splits, Salanpur-A is the thickest seam with the average thickness of around 15 m to 18 m. All the seams are lying virgin within the proposed zone of work except a limited portion of Salanpur 'D' (Top) seam, which had been developed and depillared in past by UG method of working. The seams occurring in the proposed zone are banded and some of them have also been affected by igneous intrusions.

At present, Mohanpur OC mine is working Quarry-1 by adopting Partial Outsourcing mode and producing around 1.0 MT of coal per year with Salanpur A seam as base. Most of the production comes from Salanpur-A seam as this is the thickest seam having average thickness of around 15 m to 18 m.

The proposed Expansion (Phase-II) primarily envisages extension of mining zone beyond the Southern Boundary (Dip side boundary) of the approved Mohanpur PR (1.0 MTY) up to the geological Block Boundary, which coincides with fault F4-F4 with down throw of 90 m towards South. It also includes Quarry-2 of approved PR (1.0 MTY). The PR has been planned to extract the workable parts of all the seams occurring in the Block starting from Salanpur Special Bottom up to Salanpur-D Top in ascending order. In most of the area of proposed expansion, Salanpur Spl (Bot) seam is not developed and hence, in these zones floor of Salanpur Spl.(Top) seam will be the quarry floor.

The mine boundaries of the proposed OCP have been fixed considering the various surface constraints and geological structure of the block and the proposed OCP has been planned for a rated capacity of 2.50 MTY.

1.2 Justification for the project

There is a considerable gap between Country's demand of coal and availability of indigenous coal. All out efforts are being made for augmentation in indigenous coal production. Coal India Limited, being the major supplier of coal, has been entrusted with the responsibility of bridging a substantial chunk of the demand-supply gap of the country. In the given scenario, all possible avenues are being assessed by CIL and its subsidiaries to enhance the existing level of coal production.

Mohanpur OC is currently operating in a limited area of the Mohanpur geological Block and producing around 1.0 MT of coal annually. It is seen that if the entire strike length of the Block is considered for OC mining as per the approved PR, the production level from the OC may be enhanced to a level of 2.50 MTY.

The proposed OC would enable to extract a considerable amount of thermal coal from the various seams of the Block. The proposed OC would also facilitate the extraction of thick Salanpur-A seam and some other seams affected by igneous intrusions, which are not suitable for U/G mining.

1.3 Size of the project and Magnitude of Operation

The existing opencast mine is working with a project area of 109.91 Ha within a leasehold of 164.91 Ha. Environment Clearance was obtained in 2009 for a capacity of 1.0 MTY with acquisition of additional land of 50.0 Ha having one village, Pahargora, with 34 households. Rehabilitation of Pahargora village has taken more than the expected time but is now complete.

Meanwhile, PR of Mohanpur Expansion OCP (Phase – II) with production capacity of 2.50 MTY within project area of 415.71 Ha has been approved by ECL board in partial outsourcing mode. The higher productivity is likely to be sustained in future after additional land acquisition to the tune of 290.80 Ha and rehabilitation of 2 additional villages. In view of enhanced production capacity and project area, life of the mine will get extended by 12 years from 2020-21 onwards.

The peak volume of OBR is 8.00 Mm^3 at a stripping ratio of 4.00 m^3/te. The average stripping ratio for the entire life of the mine is 3.73 m^3/te. The summarized calendar programme of excavation is given in table below:

Summarized calendar programme of excavation				
Year		**Coal (MT)**	**OB (M cu.m)**	**Stripping Ratio (m^3/Te)**
2020-21	1	1.00	5.00	5.00
2021-22	2	2.00	7.60	3.80
2022-23	3	2.50	7.90	3.16
2023-24	4	2.50	7.90	3.16
2024-25	5	2.50	7.90	3.16
2025-26	6	2.00	7.90	3.95
2026-27	7	2.00	8.00	4.00
2027-28	8	2.00	8.00	4.00
2028-29	9	2.00	8.00	4.00
2029-30	10	2.00	8.00	4.00
2030-31	11	1.80	7.00	3.89
2031-32	12	0.80	2.93	3.66
Total		**23.10**	**86.13**	**3.73**
Re-handling of 1.20 Mcum of OB from existing in-pit dump in the 1st year by Outsourcing means at a lead distance of 0-1 Km.				

1.4 Project Schedules / Cost Estimates

The Project Report of Mohanpur Expansion OCP (Phase-II) has been formulated for a target capacity of 2.50 MTY with mine life of 12 years. To achieve the above said production, two working modes viz. Departmental and Partial Outsourcing option have been examined. With 23.10 Mt of coal and corresponding 86.13 M.Cum of OB average stripping ratio works out to 3.73 cum/te.

The additional capital expenditure required for the project is □ 459.61 Crores for Partial Outsourcing option. The break-up is shown in the following table:

(In □ Crores)

Particulars	**Unit**	**Partial Outsourcing Option**
Existing Capital	Rs in Crore	**51.16**
Additional Capital	Rs in Crore	**459.61**
Total Capital (Crore)	Rs in Crore	**510.77**
Additional Capital requirement up to target year	Rs in Crore	308.70
Specific investment	□/te	2043.10
Specific investment (P&M)	□/te	296.45

Note: The above capital (for partial outsourcing option) was approved as part of the Project Report in the 319th Meeting of Board of Directors of ECL held on 07.12.2018. However, the Project Report has been financially updated in the month of May'20. In the

updated Project Report, □ 888.99 Crores and □ 1138.01 Crores additional capital expenditure is proposed for the expansion project for partial outsourcing and departmental option respectively. The final option will be adopted after the Project Report is approved by Board of Director's, ECL and CIL.

1.5 Mine Closure Plan

Estimation of Mine Closure Cost at WPI of Jan'20 i.e., 123.4:

Sl. No.	Particulars	Value
a	WPI for the base month (April, 2019)	121.1
b	WPI for Jan'20	123.4
c	Total effective Project area considered (ha)	415.71
d	Rate of mine closure cost (□/ha) as per new guidelines	917093.31
e	Estimated mine closure cost (In Lakh Rupees) [c x d]	3812.45
f	Amount already deposited in Escrow Account till March, 2020 (In □ Lakh)	1325.60
g	Balance Amount to be deposited in Escrow Account (In □ Lakh) [e-f]	2486.85
h	Balance Life of the mine (Years)	12
i	Annual Mine closure cost (AMCC) for 1st Year (In □ Lakh) [g / h]	207.24
k	Nth year AMCC (In □ Lakh)	207.24 x [1 + 0.05]^(N-1)
l	Total mine closure cost for 12 years (In □ Lakh)	3298.62
m	total mine closure cost (in □ Lakh)	4624.22

2.0 Description of the Environment

2.1 Topography & Drainage

The block represents a gently undulating topography with general altitudes varying from 130m to 159m above mean sea level. The general slope is towards east. The lowest altitude is recorded in the north-east and highest in the north-west. The higher ground is generally covered by laterite/lateritic soil and the lower ground by soil/cultivable land. Nunia nala flowing easterly through the area located to the North of the Block, forms the main drainage system.

Most of the first order drainage disappears seasonally and also due to the agricultural activity.

2.2 Climate & Meteorology

Rainfall

The area receives rainfall by South-West monsoon. Rainy season sets in the middle of June and lasts till September. The normal average rainfall is 1480 mm.

Climate

The climate is tropical with hot dry summer, a good rainy season and cool winter. Thunder storms accompanied with severe squalls occur in pre-monsoon months. Dust storms also occur occasionally in April and May. Morning fog occurs in the winter months.

The area is characterized by humid to sub-humid climate. During summer the hot spell prevails from March to middle of June. Rainy season starts from middle of June to end to September. Winter starts from the middle of November and continues till the end of February. The area experiences great heat from April to June, when the maximum temperature crosses 45 ^{0}C. December is the coldest month when the minimum temperatures fall down to as low as 1 ^{0}C.

Micro – Meteorological Data

Micro – meteorological data generated during the post-monsoon season (Oct'19-Jan'20). Pre – dominant wind direction during post-monsoon season is from N and NNE which conforms to the long – term trend on the basis of which baseline air monitoring stations had been fixed. Highest wind velocity was recorded as 15.80 kmph. Maximum and minimum temperatures recorded were 33.3 ^{0}C & 10.3 ^{0}C. Maximum and minimum humidity recorded were 29.0 % & 99.0 % and station pressure was around 1008 to 1022 mbar. Total number of rainy days were 10 with a maximum hourly precipitation of 62.1 mm.

2.3 Ambient Air Quality

Baseline data for ambient air quality was generated for post-monsoon season (Oct'19 – Jan'20) by M/s ABC TechnoLabs India Pvt. Ltd.

PM_{10}: The maximum and minimum concentrations for PM_{10} were recorded as 90 µg/m^3 and 54.6 µg/m^3 respectively. The maximum concentration was recorded at the Mohanpur Workshop and the minimum concentration was recorded at CISF Camp. The average concentration is 70.01 µg/m^3.

$PM_{2.5}$: The maximum and minimum concentrations for $PM_{2.5}$ were recorded as 45.56 µg/m^3 and 22.6 µg/m^3 respectively. The maximum concentration was recorded at Mohanpur Workshop and the minimum concentration was recorded at Mohanpur Workshop. The average concentration is 31.72 µg/m^3.

SO_2: The maximum SO_2 concentrations were recorded were recorded as 11.88 µg/m^3 and 6.16 µg/m^3 respectively. The maximum concentration was recorded at CISF Camp Workshop and the minimum concentration was recorded at Mohanpur Workshop. The average concentration is 8.51 µg/m^3.

NO_X: The maximum and minimum NO_X concentrations were recorded were recorded as 28.7 µg/m^3 and 14.85 µg/m^3 respectively. The maximum concentration was recorded at Barmondia Colony and the minimum concentration was recorded at Mohanpur Workshop. The average concentration is 19.44µg/m^3.

CO: The maximum and minimum CO concentrations were recorded as 0.56 mg/m^3 and 0.17 mg/m^3 respectively. The maximum and the minimum concentrations were recorded at Dispensary Office of Dabor Project. The average concentration is 0.35 µg/m^3.

The overall concentration levels of PM_{10}, $PM_{2.5}$, SO_2, NO_X, CO, Cd, Cr, Pb, Hg, As and Ni were observed to be well within the standards prescribed by Central Pollution Control Board (CPCB) and GSR 742 (E) Dated 25th September 2000 for Industrial, Rural, Residential and other area.

2.4 Ground Water/Surface Water/Effluent Water Quality

Baseline data w.r.t. water quality (ground/surface/mine water) was generated by M/s ABC Techno Labs India Pvt. Ltd., Chennai by collecting and analyzing samples from the following points:

Mine Water Sampling Locations			
S. No.	Name of sampling station	Date of sampling	Description
1	Mine Discharge Water	10.04.2019	Mine Discharge after siltation pond
2	Effluent Discharge Water	10.04.2019	Water Discharge from ETP
Ground Water Sampling Locations			
3	Dugwell near Amdiha Village	10.04.2019	Village in Core Zone
4	Dugwell near Bila Village	10.04.2019	Village in Buffer Zone
Surface Water Sampling Locations			
5	Pond water near Mohanpur OCP	10.04.2019	Village falling in Core Zone
6	Nunia Nallah	10.04.2019	Village falling in Core Zone

Ground Water

The pH value of the collected ground water in the study area found to be in the range from 7.56 to 7.91. TDS value is found in the range from 312-468 mg/L. Total alkalinity is found to be the range from 180 mg/L to 290 mg/L and Total Hardness ranges from 220 to 280 mg/L. The chloride values of the samples were observed from 57 mg/L to 66

mg/L and Sulphate values were observed from 21 mg/L to 46 mg/L. Iron content found in the range of 0.2 to 0.28 mg/l. The Calcium values were ranged from 48 mg/L to 68 mg/L. Most of the metals are observed as below the detection limit. Fecal Coliforms were observed to be <2 MPN/100 ml at Locations.

Surface Water

The pH value of the collected surface water in the study area found to be in the range from 7.84 to 7.89. TDS values were observed to be in range from 271 mg/L to 293 mg/ L. Total alkalinity is found to be the range from 160 mg/L to 190 mg/L and Total Hardness ranges from 150 to 180 mg/L. The chloride values of the samples were observed from 34 mg/L to 37 mg/L and Sulphate values were observed from 43 mg/L to 49 mg/L. The Calcium were ranged from 40 mg/L to 48 mg/L. Iron Content found in the range from 0.10 mg/l to 0.13 mg/l. Most of the metals are observed to be within the detection limit. BOD values found within BDL (<2). Total Coliforms were observed Between 33 MPN/100ml and 70 MPN/100ml.

Effluent Water

The pH value of the collected Effluent water in the study area found to be in the range from 7.33 to 7.57. Turbidity of ETP Point is <0.5 NTU & turbidity for Mine Discharge Water is 0.5 NTU. Total Hardness ranges from 126 to 128 mg/L. Iron Content found in the range from 0.22 mg/l to 0.31mg/l. Most of the metals are observed to be within the detection limit.

It can be observed that different parameters of water quality (groundwater/effluent water/surface water) are within the standards as per IS 10500: 2012 (Drinking Water Standards) and Discharge Standard for Inland Surface water (EP Rules 1986, Schedule VI) respectively.

3.0 Anticipated Environmental impacts and mitigation measures

3.1 Air Quality Impact Prediction and Mitigation Measures

From the prediction exercise, it can be observed that the predicted concentration levels of PM_{10}, $PM_{2.5}$, SO_2 and NO_X are within the limits as prescribed in GSR 742 (E) dated 25.09.2000 by MoEF&CC and NAAQS, 2009 except at two receptors where PM_{10} concentration have slightly exceeded the standard. Mitigation measures (present and

proposed) as suggested in Chapter No. 4 will be adopted to keep the concentration levels within the limit.

3.2 Impact of Mining on Water Regime and Mitigation Measures

The net ground water availability / recharge in the core & buffer zone is 5767.64 ham and draft of the core & buffer zone is 3768.84 ham. Thus, the balance annual ground water resource available is 1998.79 ham. The Stage of Groundwater Extraction in the study area of project is estimated as 65.34%.

The details of present and peak water demand for Mohanpur Expansion OCP are given as follow:

Purpose	Present water supply of existing Mohanpur OCP (m^3/day)	Peak water demand of Mohanpur Expn. OCP (m^3/day)
Industrial		
HEMM washing	95	155
Dust suppression in CHP	25	60
Workshop	10	20
Fire Service	45	115
Haul Road watering	70	170
Land reclamation & plantation	30	100
Process & Loss	25	60
Total	**300**	**680**
Domestic		
Housing	100	300
Service Building	10	30
Drinking water at Site	20	35
Process & Loss	15	35
Total	**145**	**400**

3.3 Impact of Mining on Ground & Vibration and Mitigation Measures

A cumulative effect of all mining activities produces enormous noise and vibrations in the mining area, which constitutes a source of disturbance. The availability of large diameter high capacity pneumatic drills, blasting of hundreds of tonnes of explosive, handling of coal at railway siding and proposed CHP to facilitate speedy handling of large quantities, etc. are identified as major noise creating activities. All these activities are major sources of noise & vibrations in and around Mohanpur Expnasion OCP (Phase – II) and the Railway Siding.

The obvious implication of noise is, of course, the potential for noise-induced hearing loss. In addition, noise produces other health effects, influences work performance and makes communications more difficult. Besides, the fauna in the nearby forests and

other areas surrounding the mines/industrial complexes are also affected by noise and it has generally been believed that wildlife is more sensitive to noise and vibrations than the human beings. Vibration due to blasting will damage the surrounding structures / houses.

The techniques employed for noise control can be broadly classified as:

- ✓ Control at source
- ✓ Control in the transmission path
- ✓ Using protective equipment.

3.4 Impact of Mining on Ground & Vibration and Mitigation Measures

The proposed changes in land-use during mining and post mining is given below-

Land Use Classes				**Core Zone**		
Sl. No.	**Level-I**	**Sl. No.**	**Level-II**	**Present landuse (Ha)**	**During Mining Landuse (Ha)**	**Post Mining Landuse (Ha)**
1	**Forest**	i	Dense Forest	-		-
		ii	Open Forest	-		-
		Total Forest		**-**		-
2	**Scrubs and Plantation Area**	i	Scrubs	120.00		
		ii	Social Forestry / Plantation	6.00	6.00	32.00
		iii	Plantation on OB & Area freed from External Dump after Re-Handling	5.00	5.00	173.06
		iv	Plantation on Backfill	-	6.00	93.15
		Total Plantation including Scrubs		**131.00**	**17.00**	**298.21**
3	**Agriculture Land**	i	Crop land	20.00	-	-
		ii	Fallow Land	132.00	-	-
		Total Agriculture Land		**152.00**	**-**	**-**
4	**Waste Land**	i	Waste Land	30.00	-	-
		Total Waste Land		**30.00**	**-**	**-**
5	**Mining Area**	i	Advance Quarry area	-	30.00	-
		ii	Coal Quarry	15.71	60.15	-
		iii	Barren OB Dump	40.00	173.06	-
		iv	Back Fill	30.00	74.00	-
		v	Coal Dump	2.00	4.00	-
		vi	Water Filled Quarry	1.00	25.00	-
		Total Mining Area		**88.71**	**366.21**	**-**
6	**Settlements**	i	Settlements including Colony of the Project	1.00	6.50	3.00
		ii	Rural Settlements	1.00	-	-
		iii	Project Infrastructure including Industrial Settlements and others (rail, road)	1.00	26.00	3.50
		Total Settlement Area		**3.00**	**32.50**	**6.50**
7	**Water Body**	i	River/ Ponds/Lagoon	11.00	-	111.00
		Total River/ Ponds		**11.00**	**-**	**111.00**
Total Area				**415.71**	**415.71**	**415.71**

4.0 Environmental Monitoring Programme

Environmental Management System (EMS) refers to the management of an organization's environmental programmes in a systematic, planned and documented manner. It includes the organizational structure, planning and resources for developing, implementing and maintaining policy for environmental protection. The Environmental Action Plan for mining in this project has been prepared accordingly and the measures suggested will go a long way in improving the overall environmental scenario of the project especially in light of the area coming under the list of critically polluted industrial projects of the country. The scope of environmental management includes plantation, surface drainage, industrial waste water treatment plant, subsidence monitoring, air, water and noise pollution check etc.

Objectives of the Environmental Action Plan

The EIA & EMP for the project has been prepared with the following objectives –

- ✓ Integrated efforts by the project for pollution control and monitoring.
- ✓ Rationalization of the coal transport system to reduce pollution due to truck movements.
- ✓ Effective solid waste management to achieve backfilling of OC voids
- ✓ Synchronization of rehabilitation measures for unstable locations with the Master plan for Raniganj Coalfield.
- ✓ Co-ordinated reclamation works.
- ✓ Meaningful CSR activity due to pooling of resources.
- ✓ To meet the water requirement of the community from mine water after filtration and treatment.
- ✓ Setting up of special environment management and monitoring cell for meeting the above objectives and to closely interact with the concerned SPCB and Forest Deptt. for achieving the set standards.

The above programme will be in keeping with the goals set out as per the CIL's **Corporate Policy for Environmental Management (2012)** as stated below –

Policy Statement

Coal India Ltd affirms its commitment for environment friendly mining with right mitigation of pollution, reclamation of the degraded land, preservation of biodiversity and

proper disposal of waste following the best environmental practices including judicious use of the non-renewable energy on the path of continual improvement.

Objectives:

Coal India Ltd. shall endeavor to:

1. Conduct mining and associated operation in an environmentally responsible manner to comply with applicable laws and other requirements related to environmental aspects. Design projects with due consideration of sustainable development.
2. Prevent pollution of surrounding habitation by continuous monitoring and adopting suitable measures for environment protection.
3. Ensure compliance of all applicable EC conditions, FC conditions and other statutory conditions issued by regulatory agencies.
4. Implement EMP in the mine effectively to mitigate pollutions on air, water and noise, reclamation of degraded land and proper disposal of wastes.
5. Strive to conserve Bio-Diversity.
6. Conserve natural resources through recycling of waste on the principle of REDUCE, RECYCLE and REUSE. Put special thrust on efficient energy utilization as a measure to reduce carbon foot-print.
7. Strive for continual improvement in environmental performance by setting targets, measuring progress and taking corrective action.
8. Create environmental awareness among employees and local communities through pro-active communication and training.

4.1 Environmental Monitoring & Control

For effective implementation and midterm corrective measures (if required), monitoring and control is essential. Keeping in view this fact and in compliance with the existing Environmental Clearance (EC) of Mohanpur OCP, samples of ambient air and water (effluent/ground water) are collected and tested for all four seasons at strategic places representing all the categories of areas as indicated by CPCB at defined interval. Noise level and well water level measurement is being done on quarterly basis. The implementation authority is guided and advised as per the feedback data from these

tests to take additional steps, if required. CMPDI is also consulted as and when necessary.

4.2 Monitoring Schedule

As per the condition of EC, the monitoring schedule for different parameters is shown below:

a) Fortnightly monitoring is being carried out for ambient air quality (4 parameters i.e., PM_{10}, $PM_{2.5}$, SO_2 and NO_X) and effluent water quality (5 parameters i.e., TDS, TSS, pH, COD and O&G) at 4 ambient air quality stations and 5 mine discharge stations respectively. Sampling stations have been chosen based on meteorological data, topographic features and environmental & ecological sensitive areas in consultation with SPCB. Parameters chosen for assessment of ambient air quality are Particulate Matter (PM10), Fine Particulate Matter (PM2.5), Sulphur Di-oxide (SO2), Nitrogen Oxides (NOx), heavy metals such as Arsenic (As), Cadmium (Cd), Chromium (Cr), Mercury (Hg), Nickel (Ni) and Lead (Pb). Respirable Dust Samplers (RDS) & Fine Dust Samplers (FDS) are used for sampling of PM10 & other gaseous pollutants and PM2.5 respectively. Atomic Absorption Spectrophotometer (AAS) is used to analyse heavy metals in the air. The samples are analysed in Environmental Laboratory of CMPDI, RI-I, Asansol.

b) Heavy metals (Cr, Cd, Ni, Pb, Hg and As) in ambient air are analysed twice in a year at 4 ambient air quality stations.

c) 29 parameters of effluent water as per Schedule – VI of MoEF&CC are analysed twice in a year at 1 mine discharge station.

d) Well water level and noise level measurements are done on quarterly basis at 4 ambient air quality stations and 5 dugwells in different villages.

e) 26 Parameters of groundwater samples as per IS 10500:2012 are analysed once in a year during the month of May from samples at 5 dugwells.

f) 01 (one) no. of piezometer has also been installed at the following locations:

Sl. No.	Piezometer Station Code	Location
1	SL/MP-01	Salanpur (Mohanpur OCP)

4.3 Health Monitoring

A regular schedule is programmed for monitoring health of the workers and staff associated with the mining operations and other connected industrial activities for identifying occupational diseases etc. in time and initiating remedial measures. Personnel working in dusty areas is given adequate training and information on safety and health aspects. They are made aware to use protective devices judiciously.

PME is being done to each worker at an interval of five years under occupational health surveillance programme as per norms at Central Hospital, Kalla, ECL. If any contractions are observed due to exposure to coal dust, appropriate corrective actions will be taken.

Periodical Medical Examinations (PME) of workers are being carried out regularly in which audiometric tests are also carried out. Periodic Medical Examination (PME) of each and every worker is done as per DGMS guidelines. Workers have undergone PME test and no one identified with notified diseases. If any occupational diseases found then they will be sent for health checkup at Regional Hospital Salanpur at Kalla/ referred to specialized agency/institutuion within the District/State.

4.4 Conservation Measures for Water

The ground water development factor in the project comes to about 65.34% which is classified as ‘Safe’ category.

The following conservation measures are being / will be adopted –

- The mine discharge will be effectively utilized to meet the mine’s domestic and industrial needs. Almost, the entire industrial and domestic water demand of the Mohanpur Expansion OCP is being met from treated mine water.
- After cessation of mining, with plenty rainfall and abundant ground water recharge, the water levels will recoup and attain normalcy. Thus, the impact of mining on groundwater system may be considered as a temporary phenomenon. The abandoned mine workings (underground and opencast) also behave as water pool and improve the resources availability in the area.
- To increase the source availability, Hand pumps and in some places piped water supply will be provided nearby villages.

- The treated mine water is being supplied to nearby villages for their irrigation and domestic use.
- Domestic water supply to the peripheral villages (Itapara village, Amdiha etc) is being made from West Barabani waterlogged opencast mine void. For this a filter plant has been set up by PHE department of West Bengal at Itapara.
- Regular plantation is being taken up during the life of the mine to create green barrier. The plant species will be selected in consultation with State Forest Department.

4.5 Conservation Measures for Land

The following conservation / reclamation measures for land will be taken –

Management of OC Voids & Dumps

a. The external dump area after re-handling will be brought under plantation.
b. Maximum portion of OC void will be filled-up after exhaustion of reserves and reclaimed with plantation and around 100.0 Ha of land will be converted to lagoon upto a depth of 20 m at the end of mine life to facilitate water availability in the area.

Additional Plantation works proposed

c. By the end of mining, the total planted area within the mine will be 298.21 Ha or 71.73 % of leasehold area.

Stage-wise Cumulative Plantation

Sl. No	YEAR	Green Belt / Social Forestry		External Dump & Area freed from External Dump after Re-Handling		Backfilled Area		Others (Undisturbed Area / etc.)		Total	
		Area (Ha)	No. of Trees	Area (Ha)	No. of Trees	Area (Ha)	No. of Trees	Area (Ha)	No. of Trees	Area (Ha)	No. of Trees
1	1st Year (Present Landuse	6.00	9600	5.00	8000	0.00	0	0.00	0	11.00	17600
2	3rd year	8.00	12800	15.00	24000	20.00	32000	0.00	0	43.00	68800
3	5th year	15.00	24000	20.00	32000	35.00	56000	0.00	0	70.00	112000
4	10th year	18.00	28800	25.00	40000	50.00	80000	0.00	0	93.00	148800
5	12th year	26.00	41600	30.00	48000	80.00	128000	0.00	0	136.00	217600
6	Post Mining Landuse	32.00	51200	173.06	276896	93.15	149040	0.00	0	298.21	477136

Post-Mining Landuse Pattern of ML/Project Area (ha)

Sl. No.	Land use during Mining	Land Use (Ha)				
		Plantation	Water body	Public Use	Undisturbed	Total
1	Plantation on OB & Area freed from External Dump after Re-Handling	173.06				173.06
2	Excavation	93.15	111.00			204.15
3	Social Forestry / Green Belt				6.00	6.00
4	Plantation	26.00				26.00
5	Settlements including Colony of the Project				3.00	3.00
6	Project Infrastructure including Industrial Settlements				3.50	3.50
	Total Area	**292.21**	**111.00**	**0.00**	**12.50**	**415.71**

4.6 Provisions for Environmental Management

Capital Provisions

For environmental management, necessary capital, manpower and equipment have been provided. As per the Project Report approved by ECL Board, a total capital investment of 1484.98 lakh for partial outsourcing option has been envisaged for various environmental management activities. However, in the revised Project Report capital provisions for environmental measures have been updated for both the options as shown in the table below:

Capital Investment on Environment Control Measures

S.N.	Particulars	Amount (in Lakh)	
		Departmental	Partial Outsourcing
I	**Capital for Restoration**		
a.	HEMM for reclamation (Appendix – A.3.1)	471.74	471.74
b.	Equipment for Environmental work (Appendix – A.3.6)	16.00	16.00
	Sub-total (I)	**487.74**	**487.74**
II	**Capital for anti-pollution measures in mine & industrial area.**		
a.	28 KL water sprinklers (Appendix – A.3.1)	370.40	185.20
b.	ETP & disposal system (Appendix – A.8.3.4)	344.11	194.15
c.	Garland drains (Appendix – A.8.1)	9.49	9.49
d.	Settling Pond (Appendix – A.8.1)	35.00	35.00
e.	Toe-wall & drain around OB dump. (Appendix – A.8.1)	606.17	606.17
f.	Afforestation in and around project area (Appendix – A.8.1)	10.00	10.00
g.	Dust Suppression System at CHP(Appendix 3.5.1)	79.40	79.40
	Sub-total (II)	**1454.57**	**1119.41**
III	**Environmental control measures in township**		
a.	STP & disposal in colony (Appendix – A.8.3.3)	384.02	214.61
b.	Water treatment plant (Appendix – A.8.3.1)	25.33	14.07
c.	Tree guards in colony (Appendix – A.8.2.1)	0.99	0.50
	Sub-total (III)	**410.34**	**229.18**
IV	**EMP**		

S.N.	Particulars	Amount (in Lakh)	
		Departmental	Partial Outsourcing
	EMP Preparation (Appendix – A.8.4)	60.00	60.00
	Environmental data generation (Appendix – A.8.1)	25.00	25.00
	Corporate Environment Responsibility (Appendix-A.8.4)	284.50*	444.49*
	Sub-total (IV)	**369.50**	**529.49**
Grand Total (I to IV)		**2722.15**	**2365.82**

Apart from the above proposals, 3.45 Crores (since it is a brown-field project, 0.75% of the additional Capital Investment of 459.61 Crores for partial outsourcing option is to be allotted as CER) will be provisioned for Corporate Environment Responsibility (CER) as per the F. No. 22-65/2017-IA.III dated 01.05.2018 issued by MoEF&CC as per the partial outsourcing option approved by Board of Directors, ECL on 07.12.2018.

Note: Note: However, the Project Report has been financially updated in the month of May'20 and the updated financial provisions will be provided in the EIA & EMP report after approval from the Board. Updated financial provisions will also modify the CER cost. Apart from the above capital fund earmarked for environment control measures, an amount of 284.50 Lakh (@ 0.25 % of the additional capital investment of 1138.01 Crores for departmental option) and 444.49 Lakh (@ 0.50 % of the additional capital investment of 888.99 Crores for partial outsourcing option) have been kept as CER as per F. No. 22 – 65/2017-IA.III dated 01.05.2018 issued by MoEF&CC.

Major activities proposed to be carried out under CER are infrastructure creation for drinking water supply, sanitation, health, education, skill development, roads, cross-drains, electrification including solar power, solid waste management facilities, scientific support and awareness to local farmers to increase yield of crop and fodder, rain water harvesting, soil moisture conservation works, avenue plantation, plantation in community areas, etc. Some of the salient features of CER are as follows:

1. The entire activities proposed under CER will be treated as project and shall be monitored.
2. The monitoring report shall be submitted to regional office as a part of half-yearly compliance report, and to District Collector.
3. It shall be posted on the website of the project proponent.

Recurring Expenditure on Environment

1. In addition to the above-mentioned capital provision, a revenue expenditure @ □ 6.0 per tonne of coal produced is suggested for carrying out the progressive environmental control measures.

5.0 Additional Studies

5.1 R&R Action Plans

Three number of Villages are lying within the proposed zone of work. The name of the Villages along with number of households are given below:

Villages & Households to Be Rehabilitated				
Sl. No.	Name of Village	Total No. Of PAF	PAF Already Rehabilitated	PAF To Be Rehabilitated
1	Pahargora	96	80	16
2	Mohanpur	83	80	3
3	Binodikata	56	-	56
	TOTAL	235	160	75

No rehabilitation site has been proposed as per the advice of OCP authority. The PAFs will be rehabilitated with monitory compensation. The cost for balance rehabilitation and resettlement of the proposed PR, as assessed by the Area/Project authorities are given below:

Details of Resettlement & Rehabilitation Package		
Sl. No.	**Particulars**	**Amount (□ Lakh)**
1	Compensation for home assets and other infrastructures	527.00
2	Rehabilitation cost @ □300000/family for 75 PAF	225.00
3	One-time Assistance @ □ 90000/family for 75 PAF	75.00
4	Shifting of existing Schools, Mandirs, factories and other infrastructures	118.00
Total		**945.00**

The amount spent so far on R&R involving 160 PAFs is □ 817.71 Lakh.

Out of total requirement of 415.71 Ha land, 152.90 Ha of land is already under the possession of ECL. Hence, another 262.81 Ha of land has to be purchased which includes 23.23 Ha of Govt. land and 239.58 Ha. of Tenancy land.

Against balance 239.58 Ha (592.01 acre) of tenancy land 296 nos. of employment is to be provided. Another 8 nos. of employment against already acquired tenancy land is still pending. Hence, total 304 nos. additional employment is to be provided.

5.2 Traffic Density Study

The total number of dumper trips for ferrying coal from mine to Bonjemehari Railway Siding that were recorded on the date of study i.e. 29.01.2020 was 155. The production at 2.50 MTY capacity works out to 7576 TPD. Thus, total dumper – trips required for carrying this amount of coal to railway siding by 15 te dumpers would be 7576 / 15 = 505 i.e. an additional 505 – 155 = 350 dumper trips. Converting this figure into PCUs, we get 350 x 3 (conversion factor for truck) x 2 (both up and down) = 2100 additional PCUs / day and 2100 / 10 (hours of transport) = 210 additional PCUs / hour.

It can be seen that there is sufficient road capacity at existing level of coal transport. The level of traffic after adding the incremental number of PCUs to the existing levels is shown as under:

Study	Recommendation	Traffic Observations		Incremental PCU for additional 1.50 MTY	Predicted PCU for 2.50 MTY despatch	Road Capacity Utilization after increase in dispatch
		Min	Max			
Research conducted by AICTE titled "Capacity Analysis of Two-lane Roads under Mixed Traffic Conditions"	Not to exceed 3100 PCU / h	46 PCU/h	390.50 PCU/h	210 PCU/h	600.50 PCU/h	19.4%
Indian Road Congress Guidelines for Capacity of Roads In Rural Areas	Not to exceed 11000 PCU / day	1070 PCU/day	5519.50 PCU/day	2100 PCU/day	7619.50 PCU/day	69.3%

It can be seen that there is sufficient left over road capacity after adding the incremental dumper fleet movement at peak production level and the mine will be able to transport the average daily produced quantity by road even in the unlikely event of slippage in timeline for preparation of dedicated coal transport route without causing any road congestion and dangerous traffic conditions.

6.0 Project Benefits

6.1 Improvements in Physical and Social Infrastructure

Sl. No.	CSR Activity (**for improving physical infrastructure**)	Financial Year	Status
1	Providing 10 nos. hand pumps in different nearby villages falling within Salanpur Area	2013 – 14	Completed
2	Providing submersible pump, motor, pipe with all electrical installation and boring with casing at – Parvatpur, Bokonda Village	2013 – 14	Completed
3	Increasing depth of Babur Bandh pond at Samdi Village	2013 – 14	Completed
4	Child and Adult Education Centre for SC/ST at Nuni Village	2014 – 15	Completed
4	Installation of rig borewells at different villages	2016-17 to 2018-19	Completed and few in pipeline

Sl. No.	CSR Activity (**for improving physical infrastructure**)	Financial Year	Status
5	Construction of PCC roads	2016-17 to 2018-19	Completed
6	Construction of boundary walls at schools, kitchen with drain at Sadhuna SSK, Kanyapur Village, Ethora Village,	2017-18 and 2018-19	Completed
7	Construction of Toilets and Drinking water provision with water purification in schools situated in and around Salanpur Area	2014-15 and 2017-18	Completed

Sl. No.	CSR Activity (**for improving social infrastructure**)	Financial Year	Status
1	Supply of drinking water from Pressure Filter installed at Mohanpur OCP to nearby villages	2013-14 to 2018-19	Completed
2	Essay & Debate Competition in Area Guest House	2016-17	Completed
3	Health Awareness Camp with WIPS (Area community hall)	2015-16 and 2016-17	Completed
4	Health Check-Up Camp by Medical Dptt., Area Office (Jamgram village, Kotsal village, Buradanga SKS, Lalganj School)	2015-16 and 2016-17	Completed
5	Medical camp at Dabor	2017-18	Completed
6	Medical Camp at different locations	2018-19	Completed

As per the revised Project Report, a total of 304 additional employment will be provided to the land losers @ 1 employment/2 acres of land as per R&R policy of CIL. Other than direct employment, indirect employment has also been provided to local residents by means of opening of small businesses like sale of consumables (batteries, tyre and tubes), vehicle repairing shops, local eatery shops etc. in the vicinity of the mine engaging various categories of workers viz. skilled, semi-skilled and unskilled.

Resourceful and good markets / shopping centres are being established for feeding the incoming population, workers and villagers in the area.

Apart from above direct employment, indirect employment of skilled, semi-skilled and unskilled workers deployed through contract is huge. Traders, dealers, retailers, vendors, etc. are also being indirectly employed with the commencement of the project.

There is spontaneous economic stimulus in the area after the commencement of the project. Some traders and private enterprises have grown in the area with this economic growth. Economic status of the people of the area has also increased, and a good market involving lots of economic transaction are taking place and will take place in future too. With opening of shopping centres all the commodities, essential as well as luxury have been made available in the area. Communication are improving and will have better shape in future also. The area will be a good economic zone thereafter.

Besides, the State exchequer is deriving financial revenues through levy of royalty; sales tax etc. and Central Government is also being benefited by way of Taxes, Cesses etc.

These benefits as mentioned above will be further boosted by the expansion project.