EXECUTIVE SUMMARY

DRAFT EIA-EMP REPORT FOR PROPOSED 1.25 MTPA COAL WASHERY (WET PROCESS) AT VILLAGE – LOKHANDI, TEHSIL – TAKHATPUR, DISTRICT – BILASPUR, STATE- CHHATTISGARH

(ToR Letter No.: J-11015/79/2018-IA-II(M), dated 09th July, 2019)

Project Proponent

M/s Bhatia Energy and Coal Benefication Pvt. Ltd.

Environmental Consultant

M/s Anacon Laboratories Pvt. Ltd., Nagpur

QCI-NABET Accredited EIA Consultant for Coal Washery (Sector 6)

Report No. ANqr /PD/20A/2016/52

[CATEGORY: A, 2 (a)]

January 2020

EXECUTIVE SUMMARY

1.0 INTRODUCTION

M/s Bhatia Energy & Coal Beneficiation Private Limited (hereinafter referred as BECBPL) is established in the year 2015 incorporated under the provision of Company Act 1956. The company is promoted by Shri Tejinder Singh Bhatia engaged in various businesses like Coal trading, Linkage Handling agent, Coal consultancy, Transportation and having good reputation in the market, which was gained with good business experience. Now, the company look forward in prospects of utilization of washed coal, BECBPL proposes to install 1.25 MTPA Coal Washery in Bilaspur District of Chhattisgarh State.

1.1.1 Identification of Project

M/s. Bhatia Energy and Coal Benefication Pvt. Ltd. has proposed to set up a 1.25 MTPA wet type coal washery near existing Coal Crusher (1,80,000 TPA) which is owned by Bhatia Coal Tradelink (BCT) – a partnership firm (Consent granted by CECB vide its letter no. 1363/R.P./T.S./C.E.C.B./2013 Bilaspur, dtd. 24/09/2013) at Lokhandi Village, Takhatpur Tehsil, Bilaspur District, Chhattisgarh. The company has identified an area of 11.53 Acres (4.67 Ha.) for the project. The project falls under sector 2 (a) in Category "A" as per the EIA Notification 2006, based on the capacity of the project. The application for prior Environmental Clearance (Form-1) for proposed coal washery project was submitted to EAC, MoEFCC, New Delhi (Online Proposal No. IA/CG/CMIN/76054/2018) on 9th October, 2018. The proposal was considered by the Expert Appraisal Committee (EAC) and ToR was granted on dtd. 09th July, 2019 (vide letter no. No.J-11015/79/2018-IA-II(M)). The capital cost of the proposed coal washery project is estimated to be Rs. 15 Crores.

1.1.2 Location of the Project

The proposed coal washery area is located at village Lokhandi, Tehsil Takhatpur, District Bilaspur in Chhattisgarh. The project area and 10 km radius study area falls in Toposheet no. 64-J/4 on R.F. 1:50000. The project falls within latitude: 21°07'56.55" N to 22°08'4.67" N, longitude: 82°05'31.94" E to 82°05'44.68" E.

1.2 EIA/EMP REPORT

Proposed coal washery project of M/s Bhatia Energy & Coal Beneficiation Private Limited is classified as "Category A" as per the EIA notification dated on 14th September, 2006. Baseline environmental monitoring was conducted winter season i.e. December 2017 to February 2018 to determine the status of ambient air quality, ambient noise levels, surface and groundwater quality, soil quality, status of flora, fauna and eco-sensitive areas and socio-economic status of the villages within 10 km radius study area. The observations of the studies are incorporated in the EIA/EMP report. Impacts of the proposed project activities during construction and operation stages were identified and duly addressed in the EIA/EMP report along with the proposed management plan to control / mitigate the impacts. Environmental Management Plan is suggested to implement the pollution control measures in the project. Study area map (10 KM radius from the project site) provided in **Figure 1** and environmental setting provided in **Table 1**.

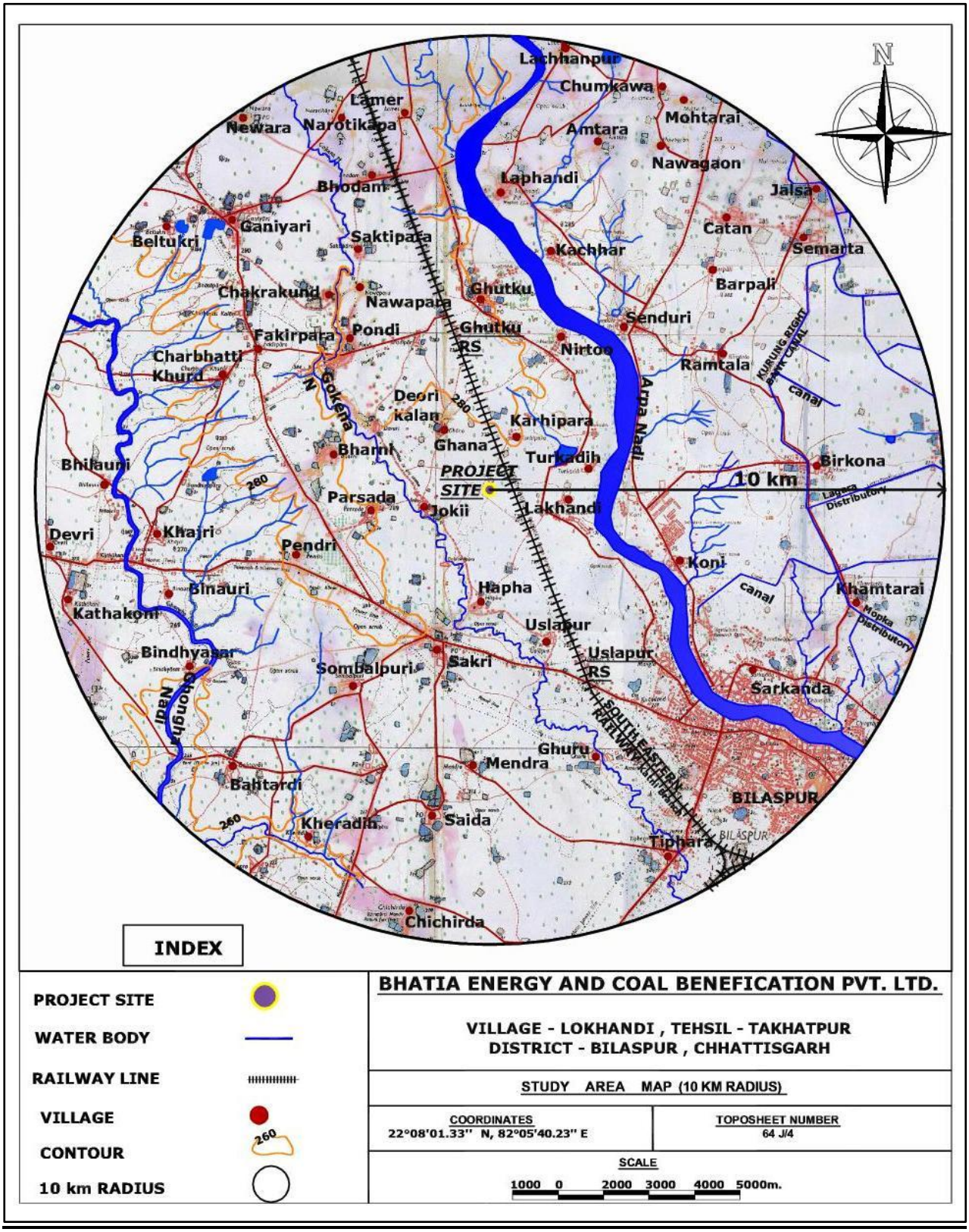


FIGURE 1: STUDY AREA MAP OF 10 KM RADIUS FROM PROJECT SITE

TABLE 1
SALIENT FEATURES OF THE PROJECT SITE

Sr. No.	Particulars	Details
1	Location	Village: Lokhandi, Tehsil: Takhatpur, Dist: Bilaspur, Chhattisgarh.
2	Geographical Location	21°07'56.55" N to 22°08'4.67" N, longitude: 82°05'31.94" E to 82°05'44.68" E
3	Khasra No.	7/4, 7/5, 8/2, 7/2,7/3,8/1,14,9,6,10, 12/3,13/2, 12/2 and 4/5
4	Total area & present landuse	Total land envisaged for the proposed project is 11.53 Acres (4.67 Ha.)
5	Site elevation	280 m
6	SoI Toposheet No.	Survey of India Toposheet No. 64J/4.
7	Nearest representative IMD station	Bilaspur
8	Site topography	Flat terrain with slight undulations
9	Nearest highway	SH7 – 3.2 Km, S.W
10	Nearest railway station	Uslapur railway station: 3.8 Km & Ghutku Railway station: 3.1 Km
11	Nearest airport	Raipur Airport: 112 Km approx.
13	Nearest rivers	Arpa River – 2.5 km (E), Ghoghi Nadi – 8.49 km (W), Gokena Nala 2.01 km (W)
14	Nearest town	Bilaspur 6.8 Km (SE)
15	District headquarters	Bilaspur 6.8 Km (SE)
16	Nearest state/national boundaries	Not Applicable
17	Nearest major city with 2,00,000 population	Bilaspur 6.8 Km (SE)
19	Nearest village	Jonki 0.77km (W) & Lokhandi 1.55 Km (E)
20	Nearest tourist place	Kanan Pendari Zoo, 3.8 km (SW)
21	Archaeological sites	No archaeological site
22	Protected areas as per wildlife protection act 1972 (tiger reverses, elephant reserve, biospheres, national parks wildlife sanctuaries, community reserves & conservation reserves)	There is no protected area within study area
23	Reserved/protected forests	No reserve forest/ protected forest.
24	Seismicity	Seismic Zone III
25	Defence Installations	None within 10 km radius area
	Other industries in 10 km radius	• Arise Clean Coal Pvt. Ltd. Crusher Unit Adjacent to plant boundary wall • Coal Stack Yard • Chhattisgarh Power & Coal Beneficiation Stack Yard • Phil Coal Pvt. Ltd. Crusher Near Railway Crossing • Paras Power & Coal Beneficiation Limited

2.0 PROJECT DESCRIPTION

2. 1 PROCESS DESCRIPTION

- Raw coal in the size range 200-0mm, from the mines will be received by wagons at nearby railway siding and thereby truck to proposed coal washery /or raw coal received directly by truck from mines to proposed coal washery. The stock pile will have a self-flowing capacity of 600-700 tons. In addition arrangements for stocking of raw coal to an extent of 200 tons on the ground (close to the stock pile) will also be provided. A Pay loader will be used for reclamation of coal from ground stock.

- Two mechanical vibratory feeders, 200 TPH each have been provided for reclamation of coal from the stock pile for feeding to the Reclaim conveyor of 200 TPH capacities; which will carry the coal to the screen cum crusher house.
- The reclaim conveyor will feed the coal to a vibratory screen for screening the coal at 50mm. The 200-50 mm coal will then be fed to a 1200 mm wide picking conveyer for picking/removing the shales/ stones which will be disposed off by trucks. The 200-50 mm coal form the picking conveyor, after removal of stones, will then be fed to a double roll crusher down to- 50mm.
- The crushed coal from the crusher and the 50-0mm undersize coal from the vibratory screen will be carried by belt conveyor to supply the coal to the washery.

Washing Section

- The washery feed conveyor carrying crushed coal (50-0mm) will discharge on to a desliming vibrating screen for wet-removal of coal below 0.63mm. The over flow of this screen will be sent to a mixing box where the coal gets mixed with the magnetite medium of required specific gravity. The coal plus magnetite from the mixing box will be pumped to the Heavy Media Cyclone by a centrifugal pump. The HM Cyclones will separate washed/clean coal and rejects by density. The over flow (Clean coal) form the HM cyclone will be fed to a Draining and Rinsing horizontal vibrating screen for initial dewatering and for removal/recovery of magnetite. The overflow of this D & R screen will then be fed to a Vibrating Basket Centrifuge for further / final dewatering of clean coal. The underflow of the HM cyclones (rejects) will be fed to a Draining and Rinsing horizontal vibrating screen for dewatering and removal of media.
- The magnetite with correct density, from the D & R screens for clean and rejects will be fed to the Correct/Heavy – media sump from where it will be pumped for reuse. The dilute media from the D & R screen will be fed to the dilute media sump from where it will be pumped to a magnetic separator to recover the magnetite. The effluent generated after recovery of magnetite from the magnetic separator will be pumped to a thickener to recover process water and to thicken the slurry. The underflow form the desliming screens and the under flow form the thickener will be charged/transported hydraulically to a tailings/slime – pond from natural drying. The clear water form this pond will be pumped back to the system for reuse. The naturally dried material will be disposed of manually. It is proposed to use powdered magnetite as media which will be added by manual process.

2.2 RAW COAL REQUIREMENT, SOURCE & MODE OF TRANSPORT

Desired quantum of ROM coal will be transported through covered trucks from coal mines. Coal will be procured from SECL coal mines in Raigarh & Korba Area. Washed coal will be transported either through covered trucks or rail routes and rejects will be transported through covered truck.

Transportation of coal SECL will be done via railway wagon up to Uslapur Railway Station which is 2.5 km from project site. The mode of transport of washed coal will depend on the MoU with the customers who may have either road transport or rail transport. Majority of Raw coal and washed coal will be transported through rail. However, in case of non-availability of rail wagons, raw coal, washed coal and rejects will be transported by road.

About 11 trips per hour of 30 Tons capacity trucks will be required for transportation of raw coal from mines to the coal washery. Same trucks may carry the washed coal and rejects to the user industries. The transportation will be carried out through Pendrideh Turkadih byepass road

which is about 700 m away from proposed washery site altimately connected to state highway (SH -2) connecting Bilaspur to Korba and Raipur. The bypass road is four lane, it is sufficient to cater increase in traffic density and thus there will not be any significant impact envisaged due to increase in traffic density.

2.3 SOLID WASTE GENERATION & MANAGEMENT

It is proposed that 100% of Industrial Solid waste generated will be used in the following manner. The total coal rejects will be 0.3125 MTPA out of which 0.0625 MTPA Shale & sand stone sand containing rejects generated will be either returned to job provider or will be disposed for road making or land fill. Fines & Middling 0.25 MTPA washery rejects from beneficiation process will be given to nearby AFBC based power plants or shall be returned to the job provider.

2.4 WATER REQUIREMENT & SOURCE

Total water requirement for the proposed coal washery is estimated to be 3125 m^3/day, out of which 2656 m^3/day water will be recycled and reused in the process. Make up water 516 m^3/day will be supplied from outside. Source of water will be groundwater. An application for permission for drawl of 516 m^3/day water from the CGWA is being made for drawl of Ground Water

2.5 MANPOWER REQUIREMENT

During the construction phase work will be generated for skilled, semiskilled and unskilled labors. Technical persons will be recruited during the operation phase. It is estimated to employ direct / indirect employment of 30 / 150 people of various skills, respectively.

2.6 SITE INFRASTRUCTURE

The coal washery is proposed in Lokhandi village, Tehsil - Takhatpur, District - Bilaspur, Chhattisgarh. Preference in employment will be given to local people. The proposed project to install a 1.25 MTPA Coal Washery will be developed within the identified area of 11.53 Acres (4.67 Ha.) for the project after grant of EC from MoEFCC, New Delhi. Hence, there is no need for provision of township. For efficient plant operation, infrastructure facilities like office, store, rest area, drinking water facilities, urinals, latrines, canteen, first aid centre, etc will be provided within the plant premises. Internal black topped roads will be developed. An ambulance facility will be kept ready to attend medical emergency. A small workshop for routine maintenance will be provided within the washery premises. A rest shelter along with drinking water, urinal, toilet facilities etc. will be provided at the parking site. The land is already acquired and presently it is an industrial land, hence no rehabilitation or resettlement is envisaged in the proposed coal washery project.

3.0 EXISTING ENVIRONMENTAL SCENARIO

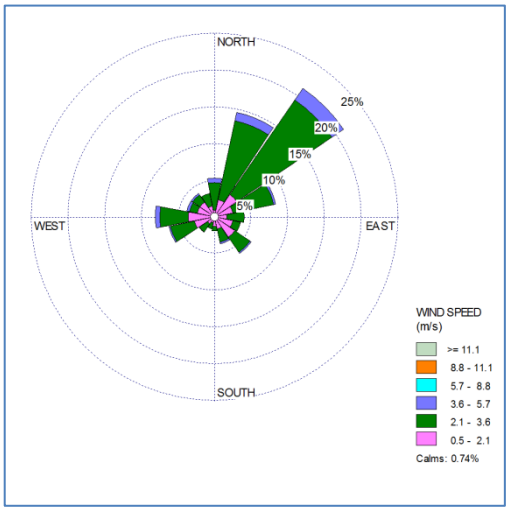
3.1 BASELINE ENVIRONMENTAL STUDIES

Baseline environmental studies were conducted in the proposed coal washery area and in the area within 10 km radius from the proposed coal washery area to assess the existing environmental scenario in the area. For the purpose of EIA studies, applied coal washery area was considered as the core zone and area outside the applied coal washery area upto 10 km radius from the applied area boundary was considered as buffer zone. Core zone and buffer zone together formed study area for the project. The baseline environmental quality data for various components of environment, viz. Air, Noise, Water, Land were monitored during winter season i.e. **December 2017 to February 2018** in the study area covering 10 km around the proposed coal washery area.

3.2 METEOROLOGY & AMBIENT AIR QUALITY

Summary of the Meteorological Data Generated At Site (December 2017 to February 2018)

Temperature (°C)	14°C to 37°C
Relative Humidity (%)	08% to 71%
Wind Direction	NE (22%) & NNE (14%)
Average wind speed	2.34 m/s
Calm wind %	0.74



Ambient Air Quality Status

The status of ambient air quality within the study area was monitored for winter season during Dec 2017 - Feb 2018 at 8 locations including the proposed coal washery area and in nearby villages. Total 8 sampling locations were selected based on the meteorological conditions considering upwind and downwind directions. The levels of Respirable Particulate Matter (PM_{10}), Fine Particulates ($PM_{2.5}$), Sulphur Dioxide (SO_2,), Oxides of Nitrogen (NO_X) and carbon monoxide (CO) were monitored. The minimum and maximum values of monitoring results are summarized in **Table 3.1**.

TABLE 3.1
SUMMARY OF AMBIENT AIR QUALITY MONITORING RESULTS

Sr. No.	Location		PM_{10} µg/m^3	$PM_{2.5}$ µg/m^3	SO_2 µg/m^3	NO_2 µg/m^3	CO mg/m^3	Ozone µg/m^3	NH_3 µg/m^3
1.	Project Site	Min	62.5	26.0	12.2	16.0	0.288	10.0	8.0
		Max	87.3	34.8	16.6	25.0	0.365	18.5	13.2
		Avg	81.0	30.1	14.2	20.8	0.325	14.6	11.0
		98th	87.3	34.8	16.5	24.6	0.361	18.0	12.9
2.	Deori Kalan	Min	43.2	20.3	6.5	14.1	0.211	9.1	7.9
		Max	66.2	26.2	13.7	21.0	0.268	19.4	12.1
		Avg	58.6	23.5	10.3	17.3	0.238	13.5	9.8
		98th	64.9	26.2	13.4	20.6	0.264	19.0	12.1
3.	Ghutku	Min	39.4	15.5	5.7	9.3	0.123	6.0	4.2
		Max	56.3	24.9	9.8	15.9	0.176	12.1	10.3
		Avg	48.6	20.5	7.9	12.9	0.157	8.9	7.2
		98th	56.3	24.5	9.8	15.7	0.176	12.0	9.8
4.	Lophandi	Min	33.8	15.0	4.5	4.3	0.122	3.9	3.8
		Max	47.9	21.3	8.5	13.1	0.150	9.0	8.5
		Avg	42.3	18.1	6.8	9.2	0.138	6.5	6.4
		98th	47.4	21.1	8.5	12.9	0.150	9.0	8.4
5.	Sakri	Min	63.0	23.2	7.1	9.2	0.144	4.7	3.8
		Max	81.7	31.3	12.0	16.6	0.181	13.2	10.7
		Avg	73.0	28.4	9.7	13.3	0.162	8.7	7.5
		98th	81.6	31.3	12.0	16.6	0.180	12.5	10.7

Sr. No.	Location		PM_{10} µg/m^3	$PM_{2.5}$ µg/m^3	SO_2 µg/m^3	NO_2 µg/m^3	CO mg/m^3	Ozone µg/m^3	NH_3 µg/m^3
6.	Joki	Min	37.7	14.7	5.3	8.4	0.093	4.4	4.4
		Max	56.5	22.7	8.9	13.9	0.127	8.9	8.7
		Avg	48.2	19.1	7.1	11.6	0.114	6.6	6.6
		98th	56.4	22.6	8.9	13.9	0.125	8.8	8.4
7.	Bilaspur	Min	92.6	51.2	19.6	30.6	0.632	13.2	12.0
		Max	136.0	62.3	26.1	42.4	0.745	20.3	17.5
		Avg	124.1	55.8	24.3	36.6	0.692	17.7	15.6
		98th	135.9	61.3	26.1	41.6	0.744	20.2	17.5
8.	Lokhandi	Min	63.5	30.2	15.6	21.1	0.326	10.2	10.0
		Max	95.0	46.7	19.6	28.6	0.429	17.5	15.7
		Avg	86.2	40.7	17.7	25.2	0.371	13.5	13.0
		98th	94.8	46.7	19.6	28.2	0.427	17.4	15.4
CPCB Standards			**100 (24hr)**	**60 (24hr)**	**80 (24hr)**	**80 (24hr)**	**2 (8hr)**	**100 (8hr)**	**400 (24hr)**

From the above results, it is observed that the ambient air quality with respect to PM_{10}, $PM_{2.5}$, SO_2, NOx and CO at all the monitoring locations, (except Bilaspur city, for which PM_{10} value is 124.1 µg/m^3) was within the permissible limits specified by CPCB. The maximum concentration of PM_{10} reported at Bilaspur city was due to industrial activities and commercial activities in that area.

3.3 AMBIENT NOISE LEVELS

Ambient noise level monitoring was carried out at the 8 monitoring locations, those were selected for ambient air quality monitoring. The monitoring results are summarized in **Table 3.2.**

TABLE 3.2
SUMMARY OF AMBIENT NOISE LEVEL MONITORING RESULTS

Sr. No.	Monitoring Locations	Equivalent Noise Level	
		Leq $_{Day}$	Leq $_{Night}$
Residential Area CPCB Standards dB(A)		**55**	**45**
1	Deori Kalan	52.9	42.3
2	Lophandi	54.2	44.1
3	Joki	53.5	41.5
Commercial Area CPCB Standards dB(A)		**65**	**55**
4	Sakri	63.0	52.6
5	Ghutku	55.7	51.2
6	Bilaspur	74.6	65.8
Industrial Area CPCB Standards dB(A)		**75**	**70**
7	Project site(Core Zone)	69.3	65.8
Silence Zone CPCB Standards dB(A)		**50**	**40**
8	Lokhandi	45.5	40.2

Source: Field monitoring and analysis by Anacon Laboratories Pvt. Ltd., Nagpur

3.4 SURFACE AND GROUND WATER RESOURCES & QUALITY

3.4.1 Water Resources

Geomorphologically the study area in 10km radius displays major part of structural plains while a small portion falls under flood plain. The average elevation of the area varies from 273 to 290m MSL in North to South direction.

Structural Plain: This geomorphic unit is developed in small portion of study area in northern part. It is characterized by gently undulating and flat terrain. It is developed on Proterozoic rocks with extensive fractures and joints.

Flood Plain: The flood plain is developed in the southern part of the area. Flood plain is an area of land adjacent to a stream or river that stretches from the banks of its channel to the base of the enclosing valley walls and experiences flooding during periods of high discharge of Arpa River.

In the 10km study area consist of Calcareous & Argillaceous sediments (Fissured Media) and ground water occurs under phreatic or Discontinuous unconfined to semi confined aquifers down to 150 mbgl, restricted to weathered zones, fractures & contact zones with underlying basement may give good amount of water and Water table contour observed in the area is from 270 to 300m.

The Pre-monsoon depth to water level ranges between 6.00 to 26.00 mbgl while Post-monsoon water level from 4.2 to 9.00 mbgl.

The proposed coal washery area falls under 'Semi-critical' category, as per CGWB norms.

3.4.2 *Water Quality*

11 water (surface and groundwater) samples were collected from various sampling locations, eight (08) from groundwater sources and two (02) from surface water sources.

A. Groundwater Quality

The physico-chemical characteristics of groundwater are compared with the IS-10500 standards. The analysis results indicate that the pH ranged between 7.71 - 8.39.

The TDS was ranging from 345-644 mg/l. Total hardness was found to be in the range of 182.16-390.06 mg/l. The fluoride concentrations were varied between 0.29-0.71 mg/l which is within the acceptable limit of 1 mg/l. The nitrate and sulphate were found in the range of 6.1-30.98 mg/l and 2-28.23 mg/l respectively.

B. Surface Water Quality

The physico-chemical characteristics of the surface water samples collected and analysed are compared with the IS-10500 standards. The analysis results indicate that the pH ranged between 7.93-7.97 which is well within the specified standard of 6.5 to 8.5. The TDS was observed to be 333-386 mg/l which is within the permissible limit of 2000 mg/l. The total hardness recorded was in the range of 151.6-211.8 mg/l as $CaCO_3$ which is also within the permissible limit of 600 mg/l. The nitrate was found to be in the range of 9.09-10.26 mg/l. The levels of chloride and sulphate were found to be in the range of 44.15-46.90 mg/l and 14.14-22.55 mg/l respectively.

C. Bacteriological Characteristics

Coliform group of organisms are indicators of faecal contamination in water. Bacteriologically, all surface water samples were contaminated and water treatment followed by chlorination or disinfection treatment is needed before use for domestic purpose whereas most groundwater samples were not bacteriologically contaminated except Project site, Sakri and Lokhandi.

3.5 LAND USE LAND COVER CLASSIFICATION

The land-use & land cover map of the 10 km radial study area from the periphery of project site has been prepared using Resource SAT-2 (IRS-P6), sensor- LISS-3 having 23.5 m spatial resolution and date of pass 28th May 2018 satellite image with reference to Google Earth data

and the IRS-P5- Cartosat-I data having 2.5 m spatial resolution and date of pass Jan 2018.In order to strengthen the baseline information on existing land use pattern, the following data covering approx. the proposed project site as well as the 10 km radius from the periphery of the project site i.e. 21°02'36.17" N - 22°13'26.13" N latitude and 81°59'50.56" E - 82°11'28.20" E longitude and elevation 270-295 meter are used.

Land use pattern of the study area as well as the catchment area was carried out by standard methods of analysis of remotely sensed data and followed by ground truth collection and interpretation of satellite data. The Land Cover classes and their coverage are summarized in **Table 3.3.**

TABLE 3.3
LU/LC CLASSES AND THEIR COVERAGE WITHIN 10 KM RADIUS

LU/LC Classification System				
Sl.No.	**Level-I**	**Level-II**	**Area (Sq.Km²)**	**Percentage (%)**
1	Built-up land	Settlement	36.10	11.50
		Industrial Settlement	0.96	0.31
		Road Infrastructure	1.14	0.36
		Railway Infrastructure	0.52	0.17
2	Agricultural Land	Cropland	226.14	72.02
3	Scrubs/Wastelands	Barren Land	4.39	1.40
		Land with scrub/Open Scrub	18.27	5.82
		Plantation	8.75	2.79
4	Water bodies	River/Nala/Stream	11.74	3.74
		Pond/Tank	5.23	1.67
5	others	Coal Washery area	0.52	0.17
		Brick Kline area	0.24	0.08
		Total	**314.00**	**100.00**

3.6 SOIL QUALITY

For studying soil profile of the region, sampling locations were selected to assess the existing soil conditions in and around the proposed project site representing various land use conditions. The physical, chemical properties and heavy metals concentrations were determined. The samples were collected by ramming a core-cutter into the soil up to a depth of 20 cm. Total 8 samples within the study area were collected and analyzed.

From the analysis results of the soil samples, it was observed that, the bulk density of the soil in the study area ranged between 1.05-1.17 g/cc which indicates favorable physical condition for plant growth. The water holding capacity is between 44.33-50.12 % whereas the texture of soil in the maximum area is found to be silty clay. Infiltration rate, in the soil is in the range of 17.14-19.61 mm/hr. pH was found to be neutral (6.95-7.15) in reaction. Electrical conductivity was in the range of 70.41-120.4 µS/cm. The important soluble cautions in the soil are calcium and magnesium whose concentration levels ranged from 78.91-316.53 mg/Kg and 190.58-384.17 mg/Kg respectively. Chloride was in the range of 189.50-382.47 mg/Kg. Organic matter and nitrogen were found in the range of 3.58-4.22 % and 198.91-263.32 kg/ha.

3.7 BIOLOGICAL ENVIRONMENT

The terrain was almost plain without much undulation; except along the ravines of River Arpa and River Ghonda. These rivers were passing through the study area by taking various twist and turns along its path. The land use pattern of this region was predominated by agricultural land/fallow land followed by settlements / Habitation area. No forest observed within study area, natural habitats had confined to very limited area. Trees in the study area were restricted to homestead/ farmland/ canal side / pond side /village side road side plantation. This sort of tree

cover is termed by Forest Survey of India (FSI) as 'Trees Outside Forests" (TOF), in the form of small woodlots and block plantations as trees along linear features, such as roads, canals bunds, etc. and scattered trees on farmlands, homesteads, community lands and urban areas. Details of dominant trees observed as per the non-forest area classification of **Forest Survey of India 1992** are as follows:

- **Farm forestry:** Dominant trees observed along the *Acacia nilotica*, *Butia monosperma*, *Azadirachta indica* and *Ailanthus excelsa*.
- **Roadside plantation:** Predominant tree observed along road side is *Acacia nilotica*, *Butia monosperma*, *Peltophorum pterocarpum*, etc.
- **Village woodlot:** *Tactona grandis*, *Syzizium cumini*, Mangifera indica (Aam), *Bauhinia racemosa* (Asta), *Emblica officinalis* (Aawla), *Ailanthus excels* (Maharukh), *Anona squamosa* (Sitafal), *Tamarindus indica* (Emali) and *Delbergia sissoo* (Sisam).
- **Pond side plantation:** similar trend of growing trees like *Acacia nilotica*, *Butia monosperma*, *Azadirachta indica* and *Zizyphus xylopyra (*Ghont) were observed.
- **Railway side plantation:** *Acacia nilotica*, *Pongamia pinnata*, *Butia monosperma*, *Delbergia sissoo* (Sisam), *Zizyphus mauritiana* (Ber), *Ailanthus excelsa* (Maharukh) and *Acacia leucophloea* (Hivar), etc.
- **Canal side plantation:** *Acacia nilotica, Ailanthus excelsa* (Maharukh), *Azadirachta indica* (Neem) and *Cassia fistula* (Cassia), *Pithecellobium dulce* (Vilayti imli), *Prosopis juliflora* (Babool), etc.

Majority of the villages comprise in study area are cultivating rice as dominant crop, while few villagers are cultivating wheat crops. The study area is also remarkable due to the very less *Prosopis juliflora* intrusion and was observed only few patches along the river Arpa and majority of area comprises of open scrub lands of the study area. No endemic or endangered flora specie observed within the study area.

Fauna in the core & Buffer zone

The wild mammals observed in the core zone are Five striped squirrel, Field rat and Common house rat. The mammals observed in the study area includes Hanuman Langoor, Common Mongoose, Palm squirrel, Field rat, Common house rat and Black-naped hare. The reptiles observed in the study area include Common garden lizard, Common rat snake, House Gecko, Indian Cobra, Russell's Viper and Common Indian Krait. Birds observed in the study area includes Common Swift, Cattle Egret, Indian Pond-Heron, Small Indian/pariah kite, Red-wattled Lapwing, Indian Cormorant, Red-naped Ibis, Rock Pigeon, Common Kingfisher, Indian Roller, Little Green Bee-eater, Asian Koel, Grey Francolin, Common moorhen, Black Drongo, House Crow, Indian Robin, Purple Sunbird, House Sparrow, Red-whiskered Bulbul, Bank Myna, Brahminy starling, Common Babbler, Common Tailorbird, Rose-ringed Parakeet, Spotted Owlet and Eurasian Hoopoe, etc. There is no schedule I fauna observed in the study area of the project.

3.8 SOCIO-ECONOMIC ENVIRONMENT

Information on socio-demographic status and the trends of the communities in the 10 km radius was collected through primary social survey and secondary data from census 2011 & District Census handbook 2011. Summary of the socio-economic status of the study area is given in **Table 3.4 & Table 3.4A**

Demographic Structure

Dwelling units explain the geographical composition of the area. The 10 km radial map covers total 36 villages, 25 villages from Takhatpur Tehsil and 11 villages from Bilaspur Tehsil in Bilaspur District Chhattisgarh.

TABLE 3.4
SUMMARY OF SOCIO-ECONOMIC ENVIRONMENT OF VILLAGES WITHIN 10 KM RADIUS AREA

No. of villages	36
Total households	23100
Total population	111802
Male Population	57565
Female population	54237
SC Population	36384
ST Population	9151
Total literates	68670
Total Illiterates	43132
Total workers	47345
Total main workers	36441
Total marginal workers	10904
Total non-workers	64457

Source: Primary census abstract 2011, District Bilaspur, state Chhattisgarh

INFRASTRUCTURE FACILITIES

The availability of infrastructure facility and resources availability in the study area wrt education, medical facility, water supply, post and telegraph transportation, communication facility and power supply etc. According to 2011 district census handbook of Bilaspur district from Chhattisgarh state, the details regarding infrastructure facilities

TABLE 3.4 A
DETAILS REGARDING EDUCATION FACILITIES WITHIN 10 KM RADIUS STUDY AREA

Education	Medical	Drinking water	drainage	communication	Transportation	social security	Recreation	electricity
100%	34%	100%	40%	91%	100%	14%	94%	100%

Source: District Census handbook 2011, District Bilaspur, state Chhattisgarh

4.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 IDENTIFIED IMPACTS DURING CONSTRUCTION PHASE AND PROPOSED MITIGATION MEASURES

Ambient Air Quality

During construction phase, dust will be the main pollutant, which will be generated from the site development activities and vehicular movement on the road. Further, concentration of NO_x and CO may also slightly increase due to increased vehicular traffic. The dust generated during the construction activities will however, settle quickly. Therefore, the impact will be for short duration and confined locally to the construction site. Sprinkling of water at regular intervals preferably using truck-mounted sprinklers along the roads and work zone areas will be carried out to control fugitive dust emissions.

4.1.1 Water resources and Quality

There will not be any process wastewater generation during the construction phase. The surface run-off during rainy season from the broken up areas containing silt wash off may be carried to the seasonal steams flowing outside the project area. Wastewater generation during the construction period will be from domestic effluent from the sanitation facilities provided for the workers. The earth work (cutting and filling) will be avoided during rainy season. In-plant roads will be concreted. Soil binding and fast growing vegetation will be grown within the plant premises to arrest the soil erosion.. Mobile toilet facility will be provided during construction phase.

4.1.2 Ambient Noise Levels

The major sources of noise during the construction phase are vehicular traffic, construction equipment like dozers, scrapers, concrete mixers, cranes, pumps, compressors, pneumatic tools, saws, vibrators etc. Equipment will be maintained appropriately to keep the noise level within 85 dB(A). Wherever possible, equipment will be provided with silencers and mufflers. Acoustic enclosures will be provided to stationary machines like DG Sets, wherever possible. High noise generating construction activities will be restricted to day time only. Greenbelt will be developed from construction stage.

4.1.3 Ecology & Land environment

The existing land is industrial type with no existing vegetation observed within plant premises. No tree cutting involved in site preparation. Thus, insignificant impact will be envisaged on ecology and biodiversity during construction phase.

Local and fast growing plant species will be planted under greenbelt development programme to enhance green cover in the area as per CPCB guidelines.

4.2 IDENTIFIED IMPACTS DURING OPERATION PHASE AND PROPOSED MITIGATION MEASURES

4.2.1 Ambient Air Quality

Impacts on Air Quality

Emissions from the coal washery project includes emissions from unloading of raw coal at railway siding, coal transport from railway siding to ground hopper, coal crushing and screening, stacking of raw coal, washed coal and rejects, loading of washed coal in railway wagons/trucks, transportation of raw coal, washed coal and rejects by 30 tons capacity trucks (occasional), etc. Ambient air quality modelling was carried out to assess the cumulative impacts on air quality due to proposed 1.25 MTPA coal washery of M/s BECBPL. ISCST3 Dispersion Model was used for assessing air pollution load from washery operations as well as assessing air pollution load from coal transportation through road.

The predicted 24 hourly maximum incremental concentration of particulate matters for transportation (without control and with control), was found to be 12.0 µg/m^3 & 4.2 µg/m^3 in the SW & SSW direction, respectively. The resultant (maximum baseline at project site + incremental) concentration was found to be 99.3µg/m^3 & 91.5 µg/m^3 occurred at a 1.0 km distance in SW & SSW direction. The maximum incremental ground level concentrations (GLCs) for particulate matter (24 hourly) for existing and proposed scenario, in case of worst scenarios, was found to be 0.115 µg/m^3 and 0.23 µg/m^3 occurred at a 1.4 km distance in SW & SSW direction, respectively.

There are no dense habitations in the nearby area; few villages with sparse habitation are available in the core zone beyond 5 km away from the project site. Moreover the meteorological condition i.e. the predominant wind direction is in NE & NNE directions so the impact will be in the SW and SSW direction where lot of vegetation barrier is available so there will not be any impact on the nearby habitations due to proposed project.

Air Pollution Control Measures

- Provision of water sprinklers at the railway siding. Continuous water sprinkling will be carried out during wagon unloading and truck loading activities.
- Pucca roads will be developed from railway siding to ground hopper.
- Plantation will be developed around coal stock yard to act as dust control measure.
- Retention wall of 20 feet height will be constructed over boundary.
- Bag filter will be provided and will arrest the dust from conveyor belt transfer point. An adequate height (30 m) stack will be installed for proposed crusher unit.
- Use of covered conveyors for internal transport of coal.
- The fugitive dust emission from crusher unit will contained to 50 mg/Nm^3 by using bag filters.
- Provision of dust extraction / water sprinkling arrangement at all transfer points.
- Thick green belt will be developed around the plant boundary as a wind screen and dust arrestor.
- Plantation in the plant premises will cover more than 33% of the plant area.

4.2.2 Ambient Noise Levels

Noise will be mainly generated from crushing and screening operations in the coal washery. Other noise sources includes loading of coal with wheel loader, internal transport of coal through trucks, noise from belt conveyors and noise from DG sets, in case of power failure. For predicting the impacts on ambient noise levels, 'DHWANI' Noise model, developed by NEERI was used. From the modeling results, the resultant noise levels at the plant boundary was about 50-55 dB (A), which will further reduce over short distance. It could be seen that no significant impact will take place on the ambient noise levels due to the proposed coal washery plant operations. Due to presence of various topographical features in the path of sound propagation the noise levels will be further attenuated. No ground vibration impacts are expected on property and human beings due to proposed project due to absence of any major vibration source during construction and operation phases.

Proposed Noise Control Measures

- Design and layout of building to minimize transmission of noise, segregation of particular items of plant and to avoid reverberant areas;
- Tall trees with heavy foliage shall be planted along the boundary / project site / plantation area, which will act as a natural barrier to propagating noise;
- Use of lagging with attenuation properties on plant components / installation of sound attenuation panels around the equipment;
- Periodic maintenance of equipments and machinery;
- Provision of acoustic enclosures to stationary equipments;
- Provision of sound proof cabins to wheel loaders & other HEMMs;

- Provision of ear muffs/ear plugs to workers exposed to high noise generating areas;
- Development of thick green belt around plant boundary and within plant premises;
- Use of loud speakers shall comply with the regulations set forth by CPCB;
- Periodical monitoring of noise in the plant premises and in nearby villages.

4. 3 WATER RESOURCES & QUALITY

Impact on Water Resources & Quality

There is no surface water stream flowing within the applied project site. The surface run-off from the project area will be collected in a settling tank through a network of storm water drains. The water will be used for plantation, dust suppression and coal washing, thereby reducing the fresh water demand.

About 516 m^3/day make up water is required for industrial purposes during the operation phase of the proposed coal washery project. The water will be proposed to be drawn from underground water, application for which has been submitted to CGWA. However, rainwater harvesting measures will be implemented in the plant premises and in nearby villages, which in turn, will improve the ground water table conditions in the area.

The potential sources of wastewater / effluent generation in the proposed coal washery project are Storm water run-off carrying coal particles & silt, coal washery effluent and domestic effluent from plant premises. These effluents / wastewater, if discharged to environment (surface streams / land), will not only increase the plant water requirement, but will also cause significant pollution of the receiving water bodies / land surfaces. Insignificant quantity of workshop effluent (wash water from workshop floor) will be generated. Provisions will be made to collect the effluent generated in the settling tank to get settle the particulates and recycled for the washery process, sprinkling and also greenbelt plantation purposes.

Coal as well as associated waste material does not contain any toxic elements in it. Hence, there is no possibility of contamination of ground water resources due to the percolation of water from coal stack yards. However, contamination of ground water may occur if there are leakages of oil and grease from the storage area / washery sections, if necessary protection measures are not adopted.

Proposed Water Conservation & Water Pollution Control Measures

- **M/s Bhatia Energy and Coal Benefication Pvt. Ltd.** will implement water recovery system involving high speed thickener coupled with belt press for maximum recovery of water and recirculation of the recovered water in process, thereby making the plant a zero discharge unit. This will drastically reduce the fresh water requirement in the plant and will also protect the water quality of surface water resources flowing outside the plant area.
- Apart from this, M/s Bhatia Energy and Coal Benefication Pvt. Ltd. will also implement rainwater harvesting measures in the plant premises. This will involve collection of the storm water run-off from the plant premises to a settling tank and use of the properly settled water in coal washing process, dust suppression and plantation in the plant premises.
- Domestic wastewater from plant premises will be discharged in STP.
- Storm water run-off from the plant area and parking premises will be collected in a series of settling tanks and will be utilized for coal washing, dust suppression and plantation.
- Wash water from workshop will be treated in oil & grease trap and treated water will be used for sprinkling at coal stack yard.

4.4 LAND USE PATTERN

Proposed plant will be coming up in an area of 11.53 acres (4.67 Ha). The proposed land utilization pattern of the coal washery project is given in **Table 4.1**

TABLE 4.1
PROPOSED LAND USE OF COAL WASHERY AREA

Sr. No.	Description	Area in Acres	Area (In %)
1.	Area of processing Plant	0.350	3.04
2.	Coal Storage Yard	1.890	16.39
3.	Clean Coal Storage Yard	1.110	9.63
4.	Reject Coal Storage Yard	0.500	4.34
5.	Green belt and plantation area	3.810	33.04
6.	Water Reservoir & Rainwater Harvesting Area	0.500	4.34
7.	Office Building and Rest Shelters/labour room	1.740	15.09
8.	Area of Weigh Bridge	0.510	4.42
9.	Area of Road	1.120	9.71
	Total Land	**11.530**	**100.00**

Measures to avoid impact on land use pattern

- Development of thick green belt in 3.81 Acre (33.04%) area within plant premises;
- Aesthetic landscaping of plant and maintaining natural gradient;
- Stacking of raw coal, washed coal and coal rejects will be carried out at designated areas within the plant premises.
- Regular maintenance of internal roads and public roads used for coal transport.
- Plantation along the village roads used for coal transport.
- Adoption of suitable air pollution control measures to control dust emission.
- Adoption of Zero Effluent Discharge Practice.

4.5 SOLID WASTE GENERATION & MANAGEMENT

- It is proposed to washed 1.25 MTPA of raw coal in the proposed coal washery. Washery rejects will be generated from the proposed coal washery. These rejects have considerable amount of carbonaceous material hence the same will be utilized as blend with coal to make fuel mix for generation of power and will be sold-out to nearby Power generating units.
- Sludge from thickener will be mixed with washery rejects and will be supplied to user industries.
- Spent oil & grease will be separately collected and stored in leak proof containers and will be sold to the CPCB/CECB authorised recycling vendors.
- Damaged / worn out parts of the machines will be collected and stored in shed on concrete flooring. These parts will be returned to the manufacturing company or will be sold to the authorized recycling vendors.
- The food waste from canteen will be dumped in a composting pit provided in plantation area and the compost will be used as manure for plantation in green belt area.

- There will be about 6 kg/d domestic solid waste generation from the plant comprising inorganic materials like broken glasses, drums, papers, polythene bags, etc. including the food waste from canteen as organics. The organic and inorganic wastes will be segregated at site itself. Organics will be dumped in a composting pit provided in plantation area and the compost will be used as manure for plantation in green belt area. The inorganic waste material will be sent to authorize vendors.

4.6 BIOLOGICAL ENVIRONMENT

Dust deposition on leaf lamina of plant species alongwith agriculture crop in and around 1 km area due to proposed coal washery during uncontrolled conditions may results in decline the rate of photosynthesis and retards the plant growth and subsequently impact on agriculture area in a scale of 5 out of 10. There is no Forest land, National Park, Wildlife Sanctuary and Biosphere Reserve within 10 km radius of the project site. No rare, endemic & endangered species are reported in the buffer zone. Dust deposition on leaf lamina will takes place on nearby local plant species along the transport road which may results in decline the rate of photosynthesis and retards the plant growth. Agricultural crops can be injured when exposed to high concentrations of various air pollutants especially particulate matter (dust) & SO_2. Injury ranges from visible markings on the foliage, to reduced growth and yield, to premature death of the plant.

Proposed Biological Environment Conservation Measures

- Sensor based water sprinkling will be installed at loading, unloading, internal roads, etc.
- Fixed water sprinklers for coal stockyard Closed internal belt conveyors Provision of Bag filters at coal crusher Wet coal washing process;
- Jet sprinklers (automatic) to control fugitive emission Development of thick green belt around plant premises;
- Retention wall of 20 feet height will be constructed over boundary;
- Plants with higher growth rate, lush and high canopies, having higher APTI, and having survival rate more than 90% will be preferred.
- Total 2464 plants will be planted over an area of 1.54 Ha.

4.7 SOCIO-ECONOMIC ENVIRONMENT

- Land for the proposed coal washery is already owned by M/s BECBPL. There is no rehabilitation and resettlement involved in the project.
- The proposed coal washery will require about 30 workers as direct employees. This will provide employment opportunities to the local people as most of the workers will be recruited from nearby villages.
- Due to coal washery activities, vehicle movement will increase in nearby villages.
- The establishment of coal washery will also result in improvement in the existing infrastructure facilities like roads, electricity, communication facilities, etc.
- Under the Corporate Social Responsibility of the company, M/s Bhatia Energy and Coal Benefication Pvt. Ltd. will take up various socio-economic development programmes in the nearby villages, which will improve socio-economic status of the nearby villages.

5.0 ENVIRONMENTAL MONITORING PROGRAM

An Environmental Management Cell (EMC) will be established for the proposed coal washery project under the control of G.M. (Coal washery). The EMC will be headed by an Environmental Manager having adequate qualification and experience in the field of environmental management. Environmental monitoring of ambient air quality, surface and ground water quality, ambient noise levels, etc. will be carried out through MOEFCC accredited agencies regularly and reports will be submitted to CECB/MoEFCC.

6.0 RISK ASSESSMENT & DISASTER MANAGEMENT PLAN

The assessment of risk in the proposed coal washery project has been estimated for fire, explosion and toxicity and corresponding mitigation measures are suggested in the EIA/EMP report.

A detailed Disaster Management Plan for facing disasters due to natural effects and human reasons is prepared and incorporated in the EIA/EMP report for ensuring safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities. For effective implementation of Disaster Management Plan, it will be widely circulated and personnel training through rehearsals. Site facilities, procedures, Duties and responsibilities, Communications, etc. are considered in detail in the Disaster Management Plan.

7.0 PROJECT BENEFITS

The proposed project of coal washery at Lokhandi village would provide development of area and consequent indirect and direct job opportunities which would finally result in improvement in the quality of life of people in the central region and especially in the area around the coal washery site. In line with this CSR policy, M/s BECBPL will carry community welfare activities in the following areas:

- Community development
- Education
- Health& medical care
- Drainage and sanitation
- Roads

Provision of Rs. 21 Lakhs as Capital cost and Rs. 18 Lakh per annum as recurring expenses has been proposed for implementation of Socio-economic welfare activities in the nearby villages. Beside this, as per Corporate Environment Responsibility (C.E.R.) Rs. 30 lakhs will be spent towards sustainable development like social, economic and environment.

8.0 ENVIRONMENTAL MANAGEMENT PLAN

An Environmental Management Plan comprise of following set of mitigation, management, monitoring and institutional measures to be taken during implementation and operation of the project, to eliminate adverse environmental impacts or reduce them to acceptable levels.

- Overall conservation of environment.
- Minimization of natural resources and water.
- Safety, welfare and good health of the work force and populace.
- Ensure effective operation of all control measures.
- Vigilance against probable disasters and accidents.

- Monitoring of cumulative and longtime impacts.
- Ensure effective operation of all control measures.
- Control of waste generation and pollution.

Judicious use of the environmental management plan addresses the components of environment, which are likely to be affected by the different operations in the project. A budget of **Rs. 185 Lakh** as capital cost and **Rs. 73 Lakh** as recurring expenses has been allocated for implementation of the Environmental Management Plan.

9.0 CONCLUSION

The proposed 1.25 MTPA coal washery project of M/s Bhatia Energy and Coal Benefication Pvt. Ltd. will be beneficial for the overall development of the nearby villages. Some environmental aspects like dust emission, noise, wastewater generation, traffic density, etc. will have to be controlled within the permissible norms to avoid impacts on the surrounding environment. Necessary pollution control equipment like bag house, water sprinklers, enclosures, thickener, etc., will form integral part of the plant infrastructure. Additional pollution control measures and environmental conservation measures will be adopted to control/minimize impacts on the environment and socio-economic environment of the area. Measures like development of thick green belt within plant premises and along transport road, adoption of rainwater harvesting in the plant and in nearby villages, etc. will be implemented. The CSR and CER measures proposed to be adopted by the company will improve the social, economic and infrastructure availability status of the nearby villages.

The overall impacts of the proposed coal washery will be positive and will result in overall socio-economic growth of nearby villages.

10.0 DISCLOSURE OF CONSULTANTS

The Environmental studies for proposed project of M/s. BECBPL are carried out by M/s Anacon Laboratories Pvt. Ltd., Nagpur (M/s ALPL). Anacon established in 1993 as an analytical testing laboratory and now a leading Environmental Consultancy firm backed by testing lab for environment and food in Central India region. M/s ALPL is a group of experienced former Scientists from the Government Institutions and excellent young scientist of brilliant career with subject expertise. It is recognized by Ministry of Environment & Forests, New Delhi for carrying out environmental Studies & accredited by Quality Council of India (QCI) for conducting Environmental studies as per QCI-NABET RA - 211th AC Meeting : November 08, 2019 rev. 01.