

## EXECUTIVE SUMMARY

### 1.0 INTRODUCTION

M/s Indus Udyog & Infrastructure Pvt. Ltd. was incorporated under the Companies Act 1956 with the objective to incorporating of Coal Washeries. Company is having wide interest in Coal Handling, Crushing, Screening, Washing& Trading. The company has registered the proposed coal washery at District Trade & Industries Centre. M/s Indus Udyog & Infrastructure Pvt. Ltd. is a noteworthy Coal (World's Fossil Fuel) Trader, liaison agent and Transporter. Company supplies coal, Washed Coal, Imported coal etc. to user industries like Power, Cement, Chemicals, Steel and hundreds of medium and small scale different industries.

Looking to the demand of washed coal, the company decided to setup coal washery of 0.9 MTPA on through put basis by increasing the existing coal crusher capacity from 0.5MTPA to 0.9 MTPA and setting up all the other balance facilities required for washing of Coal at village Jamnipali, Tehsil - Kartala, Dist. – Korba (C.G.) in 10.08 acres of land available with the company. It is also proposed to increase the land up to 20 acres for the plant including railway siding as per recommendation of Hon'ble SEAC, CG. Thus, company has acquired additional land and now total land available is 20.55 Acres (8.32 Ha.). The company has also obtained all the required permission for setting up a railway siding for the washery and has completed the infrastructure required for the Railway siding.

### 1.1 Identification of Project

M/s Indus Udyog& Infrastructure Pvt. Ltd. intends to establish a wet coal washery plant of capacity 0.9 MTPA. The coal will be sourced from Job providers. The company has already acquired 20.55 acres of land for the proposed project at Village -Jamnipali, Tehsil – Kartala, District - Korba (Chhattisgarh) – Pin. 495671.

The project falls under Sector 2 (a) in Category B as per the EIA Notification 2006, based on the capacity of the project. The project was presented before SEAC Chhattisgarh in its 170<sup>th</sup> meeting held on 28<sup>th</sup> October 2015. In the meeting, honourable SEAC recommended Terms of Reference (TOR) for 0.9MTPA coal washery (Wet process) vide letter no. 3994/SEAC.C.G/Coal Wahery/Korba/03. The capital cost of the proposed coal washery project is estimated to be Approx. Rs.12 Crore.

The Coal washery project has now been categorized as Orange Category project as per the Press note of MOEFCC dated 05<sup>th</sup>March 2016 and as per Final Document on“Revised Classification of Industrial Sectors Under Red, Orange, Green and White Categories”issued by Central Pollution Control Board (CPCB) on dated February 29, 2016; the overall pollution Score has been found to be less than 60, hence has been moved from Red to Orange Category. **This indicates that the proposed project is not of highly polluting nature hence has been moved from Red category to orange.**

### 1.2 DRAFT EIA/EMP REPORT

Proposed coal washery project of M/s Indus Udyog & Infrastructure Pvt. Ltd. is classified as “Category B” as per the EIA notification dated on 14<sup>th</sup>September, 2006. Baseline environmental monitoring was conducted in line with the ToR during post-monsoon season with additional one (1 month) (October 2015 to January 2016) for determining 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 draft EIA/EMP report. Impacts of the proposed project activities during construction and operation stages were identified and duly addressed in the draft 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.

**TABLE 1.1  
 SALIENT FEATURES OF THE PROJECT SITE**

Sr. No.	Particulars	Details
1.	Location	Village - Jamnipali, Tehsil – Kartala, District - Korba (Chhattisgarh) – Pin. 495671
2.	Khasra No.	141/1, 411/4 KHA, 263/5, 265/4, 263/6, 265/5, 358/4, 358/2, 409, 423/1, 423/2, 423/3, 424/2, 424/3, 424/4, 425 ME SE, 439/2, 259/1, 259/4, 255, 442/1, 359/3, 360/4, 362/1, 362/4, 420/3, 418/4, 422/1, 422/3, 359/1, 360/1, 360/2, 410/3, 265/1 KHA, 266/4, 266/3, 418/3, 420/4, 411/4 KA, 254/3, 263/1, 263/3, 259/3, 263/4, 265/3, 359/3 360/3, 265/1 KA, 265/2, 442/2, 422/4, 407/3, 264
3.	Total area & present landuse	Own land. 20.55 acres for the plant including railway siding. The land use previously non-industrial barren land which is converted to Industrial use.
4.	Site elevation	Project site located at 270 m above MSL
5.	SoiToposheet No.	64 J/12, 64 J/16
6.	Nearest representative IMD station	Champa
7.	Site topography	Flat terrain
8.	Nearest highway	Champa – Korba(SH 9) ~ 1.05 KM, WNW
9.	Nearest railway station	Champa ~ 15 KM, SSW Kathari Road ~1.5 KM, N
10.	Nearest airport	Swami Vivekanand Airport Raipur~ 160 KM, WSW
11.	Nearest Rivers/Lakes/Streams	Hasdo River ~4.5 km (SW) Son River ~ 0.9 Km (E) Karra Nala ~ 6.7 KM (NW) Bendo Nala ~3.6 KM (NE) Balguriya Nala ~3.1 KM (W)
12.	Nearest town	Champa~ 15 KM, SSW
13.	District headquarters	Korba ~ 26 KM, N
14.	Nearest state/national boundaries	None within 10 KM radius
15.	Nearest village habitation	Jamnipali ~ 0.6 KM E
16.	Nearest tourist place	None within 10 km radius
17.	Archaeological sites	None within 10 km radius
18.	Protected areas as per wildlife protection act 1972 (tiger reserves, elephant reserve, biospheres, national parks wildlife sanctuaries, community reserves & conservation reserves)	None within 10 km radius area
19.	Reserved/protected forests	Protected Forest 3.95 KM (N) Dense Mixed Jungle 6.01 KM (ENE)
20.	Seismicity	Seismic Zone III (Least active)
21.	Defence Installations	None within 10 km radius area

### 1.3 PROJECT DESCRIPTION

#### 1.3.1 Process Description

Raw coal from mines shall be transported to the existing railway siding located in the plant premises by railway wagons and from there upto the hopper by dumpers. Dumpers shall either dump coal into the ground hopper or on to the nearby ground dump from where the same shall be fed in the ground hopper.

### **Process of Coal Beneficiation:**

- a) ROM coal, from ramp, will be fed to a feed hopper fitted with 250 mm inclined grating. +250 mm coal will be removed at one side and -250 mm will be collected in a feed hopper. A reciprocating feeder is provided beneath the feed hopper.
- b) 0 to 250 mm size coal is forwarded to a double deck vibrating screen where 0 to -6 mm fine coal is forwarded to a bunker, + 6 to -50 mm is forwarded to a bunker for feeding to Batac Jig and +50 mm to 250 mm is forwarded to double roll crusher for crushing in -50 mm size.
- c) Another feed hopper with inclined grating is also provided for direct feeding to the double roll crusher.
- d) 0 to -50 mm crushed coal is again forwarded to another similar single deck vibrating screen for screening to 0 to -6 mm and + 6 mm to -50 mm.
- e) 0 to -6 mm fine coal is forwarded to bunker as explained above and +6 mm to -50 mm is forwarded to a bunker for feeding to batac jig.
- f) Washed coal is forwarded to washed coal bunker and middling coal is forwarded to a middling coal bunker. Slurry is pumped to a settling tank

### **1.3.2 Raw Coal Requirement, Source & Mode of Transport**

The capacity of proposed coal washery is 0.9 MTPA. Raw coal sourced from job provider by rail/road through covered trucks from job providers. Approximate 85 % raw coal will be transported mainly by railway wagons from job provider upto railway siding located at plant premises. In case of non-availability of railway wagons, coal will be transported by road through trucks covered with tarpaulin from the nearby coal mines/source. Heavy Media will be sourced from market by road through trucks. Overloading will be strictly prohibited to avoid coal spillage. Similarly washed coal will also be returned through railway wagons however in a situation when railway wagons are not available then washed coal will be transported through trucks covered with tarpaulin. Coal rejects, heavy media, shell and sand, solid wastes will be transported by trucks covered with tarpaulin.

### **1.3.3 Solid waste generation & Management**

About 25% of raw coal i.e. 1,98,000 TPA washery rejects will be generated from the proposed coal washery. It will be returned to the user industry or will be supplied to the CFBC based thermal power plants located nearby the washery site.

### **1.3.4 Water Requirement & Source**

The total daily water requirement for the proposed coal washery will be 3672 m<sup>3</sup>/day, out of which 2923 m<sup>3</sup>/day water will be recovered and reused in the coal washing process and only 550 m<sup>3</sup>/day per day make up water will be required. Water will be sourced from borewells located within the plant area. An application for permission for drawal of 550 m<sup>3</sup>/day water from ground water through bore wells has been submitted to Central Ground Water Authority.

### **1.3.5 Manpower Requirement**

During plant operation phase, the manpower requirement is approx. 40 persons, most of which will be recruited from the nearby villages and they will be trained for the requirement. Skilled & managerial staff will be recruited from nearby towns. Apart from these, some contractual jobs will be given to the local people. Moreover around 20 people additionally may be visiting at project site as truck drivers or cleaners or visitors etc. Thus overall 60 people will be involved in the proposed project.

### 1.3.6 Site Infrastructure

The coal washery is proposed in Village - Jamnipali, Tehsil – Kartala, District - Korba (Chhattisgarh). Preference in employment will be given to local people. 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.

## 2.0 EXISTING ENVIRONMENTAL SCENARIO

### 2.1 Baseline Environmental Studies

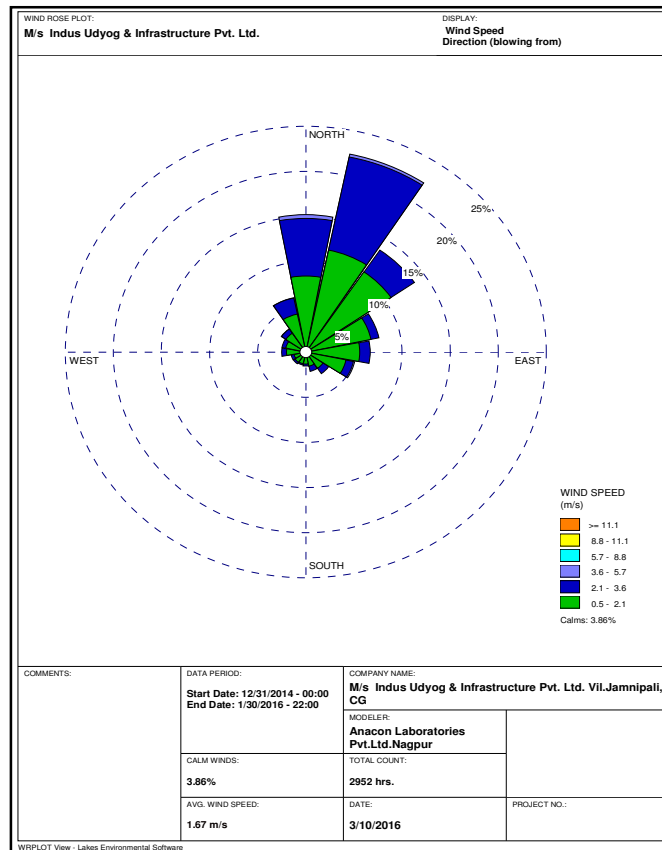
Baseline environmental studies were conducted in the proposed coal washery area and in the area within 10 km radius from the proposed coal washery area to assess the existing environmental scenario in the area. For the purpose of EIA studies, applied coal washery area was considered as the core zone 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 post monsoon season i.e. October 2015 to January 2016 in the study area covering 10 km around the proposed coal washery area.

#### 2.1.1 Meteorology & Ambient Air Quality

### Summary of the Meteorological Data Generated at Site (October 2015 to January 2016)

#### SUMMARY OF SITE SPECIFIC WIND PATTERN

Details	Wind Direction
First Predominant Wind Direction	NNE (22.3 %)
Second Predominant Wind Direction	N (15.2%)
Calm conditions (%)	3.86



### Ambient Air Quality Status

The status of ambient air quality within the study area was monitored for post monsoon season i.e. October 2015 to January 2016 at 9 locations including the proposed coal washery area and in nearby villages. Total 9 sampling locations were selected based on the meteorological conditions considering upwind and downwind directions. The levels of Respirable Particulate Matter (PM<sub>10</sub>), Fine Particulates (PM<sub>2.5</sub>), Sulphur Dioxide (SO<sub>2</sub>) and Oxides of Nitrogen (NO<sub>x</sub>) were monitored. The minimum and maximum values of monitoring results are summarized in **Table 2.1**

**TABLE 2.1**  
**SUMMARY OF AMBIENT AIR QUALITY MONITORING RESULTS**  
**SUMMARY OF AMBIENT AIR QUALITY RESULTS**

Station code	Location	PM <sub>10</sub> (µg/m <sup>3</sup> )				PM <sub>2.5</sub> (µg/m <sup>3</sup> )			
		Min	Max	Avg	98 <sup>th</sup> %	Min	Max	Avg	98 <sup>th</sup> %
AAQ1	Project Site	48	68	53	67	16	23	18	22
AAQ2	Kathari	45	65	50	64	15	22	17	21
AAQ3	Kurda	45	57	51	56	15	19	17	19
AAQ4	Jamnipali	49	70	57	67	16	24	19	23
AAQ5	Balpur	45	65	51	60	15	22	17	20
AAQ6	Jarwe	40	54	46	53	13	19	15	18
AAQ7	Gitori	42	54	48	53	14	18	16	17
AAQ8	Nawagaon	48	60	53	59	16	20	18	19
AAQ9	Nimgaon	50	61	55	60	17	21	18	20
<b>Range</b>		<b>40-70</b>				<b>13-24</b>			
<b>Ambient Air Quality Standards</b>		<b>100(24 hr)</b>				<b>60 (24 hr)</b>			

**TABLE 2.1 (Contd...)**  
**SUMMARY OF AMBIENT AIR QUALITY RESULTS**

Station code	Location	SO <sub>2</sub> (µg/m <sup>3</sup> )				NO <sub>x</sub> (µg/m <sup>3</sup> )			
		Min	Max	Avg	98 <sup>th</sup> %	Min	Max	Avg	98 <sup>th</sup> %
AAQ1	Project Site	7	12	9	11	10	16	12	15
AAQ2	Kathari	6	11	9	10	8	13	11	13
AAQ3	Kurda	8	11	9	10	11	20	14	18
AAQ4	Jamnipali	8	12	9	11	10	13	11	12
AAQ5	Balpur	9	12	10	11	12	17	14	16
AAQ6	Jarwe	9	11	10	10	11	16	14	15
AAQ7	Gitori	8	11	9	10	10	14	11	13
AAQ8	Nawagaon	7	11	9	10	10	15	11	14
AAQ9	Nimgaon	7	12	9	11	11	17	13	16
<b>Range</b>		<b>6-12</b>				<b>8-20</b>			
<b>Ambient Air Quality CPCB Standards</b>		<b>80 (24 hr)</b>				<b>80 (24 hr)</b>			

**TABLE 2.1 (Contd...)  
 SUMMARY OF AMBIENT AIR QUALITY RESULTS**

Station code	Location	CO ( $\mu\text{g}/\text{m}^3$ )			
		Min	Max	Avg	98 <sup>th</sup> %
AAQ1	Project Site	425	485	453	480
AAQ2	Kathari	403	445	428	444
AAQ3	Kurda	450	490	465	487
AAQ4	Jamnipali	410	433	421	432
AAQ5	Balpur	412	436	425	435
AAQ6	Jarwe	406	419	412	418
AAQ7	Gitori	412	425	418	424
AAQ8	Nawagaon	424	437	430	436
AAQ9	Nimgaon	421	437	430	436
<b>Range</b>		<b>403-490</b>			
<b>Ambient Air Quality CPCB Standards</b>		<b>2000 hr)</b>			

From the above results, it is observed that the ambient air quality with respect to PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub> and NO<sub>x</sub> at all the monitoring locations was within the permissible limits specified by CPCB.

### 2.1.2 Ambient Noise Levels

Ambient noise level monitoring was carried out at the 9 monitoring locations, those were selected for ambient air quality monitoring. The monitoring results are summarized in **Table 2.2**.

**TABLE 2.2  
 SUMMARY OF AMBIENT NOISE LEVEL MONITORING RESULTS [Leq in dB(A)]**

Sr. No.	Monitoring Locations	Equivalent Noise Level	
		Leq <sub>Day</sub>	Leq <sub>Night</sub>
1.	Project site	54.3	42.7
2.	Kothari	43.1	29.4
3.	Kurda	45.7	30.8
4.	Jamnipali	44.9	29.6
5.	Balpur	47.8	31.6
6.	Jarve	39.9	28.2
7.	Gitori	40.2	31.3
8.	Nawagaon	41.8	32.4
9.	Nimgaon	42.6	29.7
<b>Range</b>		<b>39.9-54.3</b>	<b>28.2 – 42.7</b>

### 2.1.3 Surface and Ground Water Resources & Quality Water Resources

The area for proposed coal washery comprise of uncultivated land owned by the project proponent. The proposed plant site is a flat terrain with general elevation of 270 m MSL. Apart from some shrubs, there is no vegetation in the proposed coal washery area. M/s Indus Udyog& Infrastructure Pvt. Ltd. has already established a crushing and screening unit at the proposed coal washery site after obtaining Consent to Operate from Chhattisgarh Environment Conservation Board. There is no habitation in the proposed washery site.

The surface run-off during monsoon joins nearby seasonal streams. However, nearest water bodies within 5.0 km from the project site are Hasdeo River ~46 km (SW), Son River ~ 1 Km (E), Karra Nala ~ 6.7 KM (NW), Bendo Nala ~3.6 KM (NE) and Balguriya Nala ~3.1 KM (W).

### **Water Quality**

The existing status of groundwater and surface water quality was assessed by identifying 5 ground water (Bore wells) locations in different villages and 7 surface water samples from surface water sources existing within 10 km radius of the plant site.

#### **A. Groundwater Quality**

The physico-chemical characteristic of groundwater was compared with the IS-10500 standards. The pH of the water samples collected ranged from 6.47 to 8.10 and within the acceptable limit of 6.5 to 8.5. The total dissolved solids were found in the range of 112 - 402 mg/l in all samples. The total hardness varied between 63.6- 277.17 mg/l for all samples collected at 5 locations.

In all samples, iron content varied in between 0.11 - 0.21 mg/l, Nitrate in between 1.1 – 1.8 mg/l, fluoride varied between <0.1 - 0.70 mg/l, chloride 21.99 - 91.97 mg/l, Sulphate 9.57 - 23.58 mg/l and alkalinity 60 - 240 mg/l. **The overall ground water quality was found to be mineralized with respect to TDS, hardness, chloride, sulphate with moderate buffering capacity. The levels of heavy metals content were found to be within permissible limits.**

#### **B. Surface Water Quality**

The results of the surface water samples analysed are compared with the IS-10500 standards. The pH of the surface water samples collected was 7.49 to 7.78 and within the acceptable limit of 6.5-8.5. The total dissolved solids were found to be 118 - 144 mg/l. Total hardness was observed between 72.12- 97.52 mg/l. Iron content in all samples was found in the range of 0.14 -0.22 mg/l, concentration of nitrate was 1.62- 2.6 mg/l. The fluoride concentration was found to be <0.1 to 0.27mg/l and chloride concentration was varied between 12.99 - 26.99 mg/l. The sulphate content in all samples was in the range of 7.12 - 12.21 mg/l. The variation in alkalinity recorded was in the range of 78 - 86 mg/l. It was observed from the analysis that, the physico-chemical characteristics of the surface water are within the permissible limits of drinking water standards.

#### **C. Bacteriological Characteristics**

Coliform group of organisms are indicators of faecal contamination in water. Water samples were analysed for total and faecal coliform by membrane filtration technique. In groundwater samples, total coliform & faecal coliform were absent in all the samples. Whereas surface water was found to be faecally contaminated. From the results, it was observed that, groundwater is suitable for drinking and domestic uses in absence of alternate drinking water source whereas surface water was not suitable for drinking and requires chlorination/ disinfection before consumption.

#### **2.1.4 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-4 having 5.6 m spatial resolution and date of pass 22 Nov 2015 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 2015. In order to strengthen the baseline information on existing land use pattern, the following data covering the proposed project site as well as the 10km radius from the periphery of the project site i.e. 22°01'35.87" N - 22°12'15.80" N latitude and 82°35'54.59" E - 82°47'31.57" E longitude and elevation 164 - 448 meter are used.

The Land Cover classes and their coverage are summarized in **Table 2.3**.

**TABLE 2.3**  
**LU/LC CLASSES AND THEIR COVERAGE WITHIN 10 KM RADIUS**

LU/LC classes and their coverage in Sq. Km			
Sr. No.	LU/LC Class	Area (Sq.Km <sup>2</sup> )	Percentage (%)
1	Built up Land Rural/Urban)		
	Settlement	29.96	9.54
	Industrial Settlement	1.09	0.35
	Road Infrastructure	1.29	0.41
	Railway Infrastructure	1.36	0.43
2	Agriculture Land		
	Cropland	181.98	57.96
	Barren Land	3.06	0.97
3	Water bodies		
	River/Nala/Stream	18.95	6.04
	Pond/Tank	8.84	2.82
4	Scrub/Waste Land		
	Land with scrub/Open Scrub	23.65	7.53
5	Forest		
	Dense Forest	22.82	7.27
	Open Mixed Forest	20.58	6.55
6	Mining/Stone Quarry	0.42	0.13
	Total	314.00	100.00

### 2.1.5 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 15-20 cm. Total 9 samples within the study area were collected and analyzed.

From the analysis results of the soil samples, the soil was medium fertile to fertile and having low productivity. The soil in the study area needs additional fertilizers for improving the fertility status and increase in crop productivity. The concentration of heavy metals in the water extract of soil was found to be low with a negligible concentration level of cadmium, chromium, lead, cobalt and selenium. This also indicates the poor level of micro-nutrient. The organic matter and organic carbon was found in the range of 1.16 – 1.42 % and 0.67 – 0.82 % respectively indicating moderate organic content in the soil. Overall the soil quality in the area was found to medium fertile to fertile with low productivity.

### 2.1.6 Biological Environment

#### Flora in the core & Buffer Zone

The climatic, edaphic and biotic variations with their complex interrelationship and composition of species, which are adapted to these variations, have resulted in different vegetation cover, characteristic of each region. The following account of floral diversity, based on the field survey conducted for a short duration, is aimed only to give a general pattern of vegetation of this region as a baseline data. It is also important to recognize that the outcome of the survey plants and animals are seasonally constrained.

The tree species, herbs and shrubs were documented during this baseline study.



### Fauna in the core & Buffer zone

The fauna of study area included spotted deer, black naped hare, Jackal and wild boar were a commonly sighted in the forests as well as in the fringes of forest within the study area. The other common mammalian species were, monkey, Jungle cat, squirrel, rat, mongoose and bat etc. Sometimes, Melursusursinus (Sloth Bear) is also sighted by many villages, direct sightings during survey period not envisaged, but recognized through foot print and digging marks in search of tubers/young roots beneath the earth surface within the protected forest near village Birtarai 4.10 km away from the project site towards north direction. Sloth bear presence also reconfirmed through villagers residing in the vicinity of protected forest area. The common reptiles such as lizard, garden lizard, and different varieties of snakes were reported in the locality.

### 2.1.7 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 & village directory 2011. Summary of the socio-economic status of the study area is given in **Table 2.4**.

**TABLE 2.4**  
**SUMMARY OF SOCIO-ECONOMIC ENVIRONMENT OF VILLAGES WITHIN 10 KM RADIUS AREA**

Zone	No_HH	TOT_P	TOT_M	TOT_F	P_06	M_06	F_06	P_SC	P_ST
0-2 km	1511	6754	3432	3322	967	502	465	1640	1148
2-5 km	3865	15793	7867	7926	2274	1126	1110	1826	7111
5-10 km	6083	25676	12952	12724	3747	1916	1831	2226	15228
<b>0-10 km</b>	<b>11,459</b>	<b>48,223</b>	<b>24,251</b>	<b>23,972</b>	<b>6,988</b>	<b>3,544</b>	<b>3,406</b>	<b>5,562</b>	<b>23,487</b>

Source: Primary census abstract 2011, district Korba, state Chhattisgarh

**Note:** No\_HH: Number of household, TOT\_P: Total population, TOT\_M: Total Male, TOT\_F: Total female, P\_06: Population 0-6, M\_06: Male 0-6, F\_06: Female 0-6, P\_SC: Population SC, M\_SC: Male SC, F\_SC: Female SC, P\_ST: Population ST, M\_ST: Male ST F\_ST: Female ST

#### 2.1.7.1 Socio economic survey

##### Primary Socio-Economic Survey Methodology

The study was carried out with a participatory approach by involving the stakeholders, particularly the project beneficiaries and probable affected persons through a series of consultative process. The population groups that were consulted include beneficiary group of people in the project influence area, particularly the shopkeepers, farmers, school teachers, gram panchayat Sarpanch/members and village elders etc. This was helped to know the exact situation and views of the people about the project.

Proportionate and purposive sampling methods were used for selecting respondents (male and female) for household survey. Out of 45 Villages, 20% villages surveyed which were 10 villages. For official information of village, sarpanch /Gram panchayat member was chosen. Structured questionnaire were used for survey. For group discussion, panchayat bhawan, Aanganwadi bhawan, community halls were used.

### LIST OF SURVEYED VILLAGES

Sr. No	Villages
1.	Jamnipali
2.	Sohagpur
3.	Kharwani
4.	Makundpur
5.	Tunda
6.	Faraswani
7.	Chicholi
8.	Birtarai
9.	Pachpedi
10.	Bagdor

Source: Primary Survey Executed by Anacon Socio-Economic Surveyteam

### 3.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

#### 3.1 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 SO<sub>2</sub>, NO<sub>x</sub> and CO may also slightly increase due to increased vehicular traffic. 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.

##### 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 streams 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. Septic tanks and soak pits will be constructed for disposal of domestic effluent.

##### 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.

##### Ecology & Land environment

The 20.55 acres land selected for proposed coal washery is owned by the company is uncultivated land with few shrubs. M/s Indus Udyog& Infrastructure Pvt. Ltd. has already established a crushing and screening unit at the proposed coal washery site after obtaining Consent to Operate from Chhattisgarh State Pollution Control Board. During construction phase, some temporary sheds including sanitation facilities are constructed at the plant site for providing accommodation for construction workers. After completion of the construction phase, the present land use of the project area will get permanently changed to industrial category. There will not be any change in the land use pattern outside the plant premises. Plant design will be maintained such that there will not be any

need of cutting the existing trees. The trees will act as immediate green belt. Also, plantation of green belt along the plant boundary will be taken up during plant construction stage.

### **3.2 Identified Impacts during Operation phase and proposed mitigation measures**

#### **3.2.1 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, transportation of raw coal, washed coal and rejects by 20 tonne capacity trucks, loading of washed coal in railway wagons, use of DG sets etc. Ambient air quality modeling was carried out to assess the impacts on air quality due to proposed 0.9 MTPA coal washery. ISCST3 Dispersion Model was used for assessing air pollution load from washery operations and coal transportation through road.

The maximum incremental rise of ground level concentration (GLC) due to Unloading/Loading and transportation of Raw Coal and heavy media for particulate matter generated from the different activities in the areas is carried out. The predicted 24 hourly maximum concentrations for mining activity like loading/unloading, transportation, was found to be  $7 \mu\text{g}/\text{m}^3$ , in the SSW directions. The maximum incremental ground level concentrations (GLCs) for particulate matter,  $\text{SO}_2$  and  $\text{NO}_x$  due to proposed developmental activities were carried out. The predicted 24 hourly maximum concentrations for proposed scenario, particulate matter,  $\text{SO}_2$  and  $\text{NO}_x$  are found to be  $0.85 \mu\text{g}/\text{m}^3$ ,  $0.065 \mu\text{g}/\text{m}^3$  and  $2.4 \mu\text{g}/\text{m}^3$  occurred at 1.km, 1km & 2.2km distance respectively in SSW & S, SSW and SSW & S directions.

##### **Air Pollution Control Measures**

- Plantation of tall trees along transport road and boundary of the project site;
- Widening of existing public road proposed for coal transport, where necessary.
- Periodic maintenance of public road used for coal transport in collaboration with PWD.
- Periodic water sprinkling on roads used for coal transport
- Provision of water sprinklers at railway siding area during unloading / loading of coal
- Fixed water sprinklers will be provided at all plant areas where materials are loaded / unloaded.
- Provision of bag filters of adequate capacity for coal crushers.
- Use of covered conveyors for internal transport of coal.
- Provision of dust extraction / water sprinkling arrangement at all transfer points.
- Dust mask will be provided to all the workers.
- Transportation of graded coal / rejects will be carried out during day time only;
- The speed of trucks transporting coal will be controlled to avoid generation of dust;
- Coal will be transported only through trucks covered with tarpaulin. Overloading will be strictly prohibited.

#### **3.2.2 Impact on Traffic Density**

M/s Indus Udyog& Infrastructure Pvt. Ltd. has proposed to use railway siding established in plant premises for transporting raw coal from mines to plant site and for transportation of washed coal and rejects to the user industries. From the railway siding, the coal will be transported upto the hopper by dumpers. Thus, there will be minimum road transportation required for transportation of raw coal to the coal washery. The existing road will be strengthened and widened at necessary locations to cater the increase in traffic load.

Since most of the raw coal, washed coal and coal rejects will be transported through rail, no major transportation will take place from public roads. However, occasionally in case of non-availability of rail wagons, raw coal, washed coal and rejects will be transported by road. The transport will take

place through state highway (SH-9). The overall scenario pertaining to utilization of trucks for transportation of raw coal, washed coal and coal rejects considering the traffic load on road/rail due to proposed coal washery is presented in Chapter 4. .

### **Proposed Traffic control measures**

- Transportation of coal only through trucks covered with tarpaulin
- Overloading and over-speeding will be strictly prohibited
- Conducting coal transport during day time only.
- Periodic maintenance of public roads used for coal transport in collaboration with PWD
- Periodic water sprinkling on roads used for coal transport
- Plantation along both the sides of public road used for coal transport
- Provision of speed breakers, traffic signals, etc. at strategic locations
- Conducting awareness programs for traffic safety

### **3.2.3 Ambient Noise Levels**

For predicting the impacts on ambient noise levels, 'DHWANI'Noise model, developed by NEERI was used. From the modeling results, it was observed that the resultant noise levels at the plant boundary was about 50dB(A), which will further reduce over short distance. The resultant noise levels due to plant operations at the nearest habitation i.e. Jamnipali village was about 30dB(A). Thus, it was observed that no significant impact will take place on the ambient noise levels due to the proposed coal washery plant operations.

### **Proposed Noise Control Measures**

- Design and layout of building to minimize transmission of noise;
- Periodic maintenance of equipment and machinery;
- Provision of acoustic enclosures to stationary equipment like crushers, DG sets, etc.;
- Provision of enclosures to conveyor belts;
- Provision of ear muffs/ear plugs to workers exposed to high noise generating areas;
- Development of thick green belt & plantation covering about 33% of the plant area.
- Periodic maintenance of plant machinery and loading and transportation vehicles;
- Periodical monitoring of noise in the plant premises and in nearby villages;

### **3.2.4 Water Resources & Quality**

#### **Impact on Water Resources & Quality**

There is no surface water stream flowing within the applied project site. However, since no surface water drawal is proposed in the project. Hence, no impact is envisaged on the surface water. About 550 m<sup>3</sup>/day make up water is required for industrial, dust suppression and domestic use during the operation phase of the proposed coal washery project. The water is proposed to be obtained from ground water. Application for necessary permission for drawal of 550 m<sup>3</sup>/day ground water has been submitted to Central Ground Water Board.

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.

#### **Proposed Water Conservation & Water Pollution Control Measures**

- M/s Indus Udyog& Infrastructure 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 Indus Udyog& Infrastructure 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 settled water in coal washing process, dust suppression and plantation in the plant premises.
- Domestic discharge from rest shelters, canteens and toilets will be channeled through proper sewage drains connected to Septic tanks followed by soak pits.
- 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.

### 3.2.5 Land Use Pattern

The proposed coal washery project will be located in 20.55 acres area. The land is already acquired by M/s Indus Udyog& Infrastructure Pvt. Ltd. and comprise of uncultivated land with few shrubs. The proposed land utilization pattern of the coal washery project is given in **Table 3.1**.

**TABLE 3.1  
 PROPOSED LAND USE OF COAL WASHERY AREA**

Sr. No.	Particulars	Area (in acres)	Area (Hectares)	Percent (%)
1	Green Belt Area	6.89	2.79	33.5
2	Coal Handling Platform Area	4.64	1.88	22.6
3	Builtup area in Plant	1.06	0.43	5.2
4	Railway Track area	2.18	0.88	10.6
5	Remaining area having coal yard/ middling / rejects storage as well as underground water tank, ETP, road and open area	5.78	2.34	28.1
<b>6</b>	<b>Total</b>	<b>20.55</b>	<b>8.32</b>	<b>100.0</b>

### Measures to avoid impact on land use pattern

- Development of thick green belt in 6.89 acres 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.

### 3.2.6 Solid Waste Generation & Management

- About 198000 Tonnes per annum washery rejects will be generated, which will be supplied to CFBC based thermal power plants. Also 28800 tonnes per annum shale & sand stone sand heavy media containing rejects generated will be either returned to job provider or will be disposed for road making or land fill.
- Sludge from thickener will be mixed with coal 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.

### 3.2.7 Biological Environment

The 20.55 acres land selected for proposed coal washery is owned by the company, is uncultivated land with few shrubs. In consideration of land cover of study area, predominantly covered by natural habitats like Agriculture land (57.96%) followed by Forest land (13.82%). There is no vulnerable or endangered species observed either in the vicinity of project site or 10 km radial distance from the study area. However, based on past experience, dust deposition on leaf lamina will take place on nearby local plant species like *Acacia nilotica* (Babool), *Butia monosperma* (Palash), *Azadirachta indica*, *Ailanthus excelsa* and *Tamirandusi ndica*, *Zizipus* sp., etc. along the transport road which may result in decline the rate of photosynthesis and retards the plant growth.

### Proposed Biological Environment Conservation Measures

- Development of thick green belt is 6.89 acres area within the plant premises.
- Preference for high canopy covers plants with local varieties
- Perennial and evergreen plants will be preferred.

### Control Measures to avoid impacts on agriculture crops:

1. Periodic maintenance of coal transport road in collaboration with PWD
2. Regular sprinkling of water through mobile tanker on coal transport road upto the railway siding.
3. Adoption of Covered Transport system
4. Thick green belt plantation along the transportation route

### 3.2.8 Socio-economic Environment

- Land for the proposed coal washery is already owned by M/s Indus Udyog& Infrastructure Pvt. Ltd. There is no rehabilitation and resettlement involved in the project.
- The proposed coal washery will require about 40 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 Indus Udyog& Infrastructure Pvt. Ltd. will take up various socio-economic development programmes in the nearby villages, which will improve socio-economic status of the nearby villages.

#### **4.0 ENVIRONMENTAL MONITORING PROGRAM**

An Environmental Management Cell (EMC) will be established for the proposed coal washery project under the control of Unit Head (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 MOEF accredited agencies regularly and reports will be submitted to CECB/MoEFCC.

#### **5.0 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 Draft EIA/EMP report. A detailed Disaster Management Plan for facing disasters due to natural effects and human reasons, is prepared and incorporated in the draft 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.

#### **6.0 PROJECT BENEFITS**

The proposed project of coal washery at Jamnipali 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 Indus Udyog& Infrastructure Pvt. Ltd. will carry community welfare activities in the following areas:

- Community development
- Education
- Health& medical care
- Drainage and sanitation
- Roads
- Drinking water supply occasionally through tankers

A budget of Rs. 18.4 Lakh as Capital cost and Rs. 10.9 Lakh per annum as recurring expenses has been proposed for implementation of Socio-economic welfare activities in the nearby villages.

#### **7.0 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.

The capital cost of the proposed project is approx. Rs 1200 Lakhs. It is proposed to invest an amount of Rs. 93.6 Lakh as capital cost and Rs. 38.75 Lakh/annum as recurring expenses towards implementation of Environmental Management Plan.

## **8.0 CONCLUSION**

The proposed 0.9 MTPA coal washery project of M/s Indus Udyog& Infrastructure 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 and plantation within plant premises and along transport road, adoption of rainwater harvesting in the plant and in nearby villages, etc. will be implemented. The CSR 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.