

KWPCL Railway Works Completion Schedule

Date: 30-Nov-17

SN	Description	Total Quantity	Executed Quantity	Balance Quantity	Unit	Start Date	Finish Date	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21
<b>KWPCL Railway Works</b>							<b>31-Mar-21</b>																																									
1	Earthwork	23,70,000	11,00,000	12,70,000	CuM	WIP	30-Apr-20																																									
2	Bridges	65	30	35	Nos	WIP	31-Mar-20																																									
3	Utility Shifting (28+21 Nos)	49	28	21	Nos	WIP	31-Dec-19																																									
4	Intermediate Stations	3	50% completed for 2 Stations	3	Nos	WIP	31-Mar-20																																									
5	Track Linking (Ballast, Sleepers, Rail & LCs)	40	0	40	TKM	01-Jul-18	31-Dec-20	order to be awarded																																								
6	OHE Works	40	0	40	TKM	01-Jul-18	31-Dec-20	order to be awarded																																								
7	S&T Works	100	0	100	%	01-Jan-20	31-Dec-20	order to be awarded																																								
8	Bhupdeopur Station Readiness						31-Dec-20	Readiness of Bhupdeopur Station is required by Dec'2020 (Depository Work) ●																																								
9	EIG/Inspection/Commissioning	100	0	100	%	01-Jan-21	31-Mar-21																																									

# RAILWAY SIDING – KWPCCL



RailPictures.Net - Image Copyright © Jimmy Jose

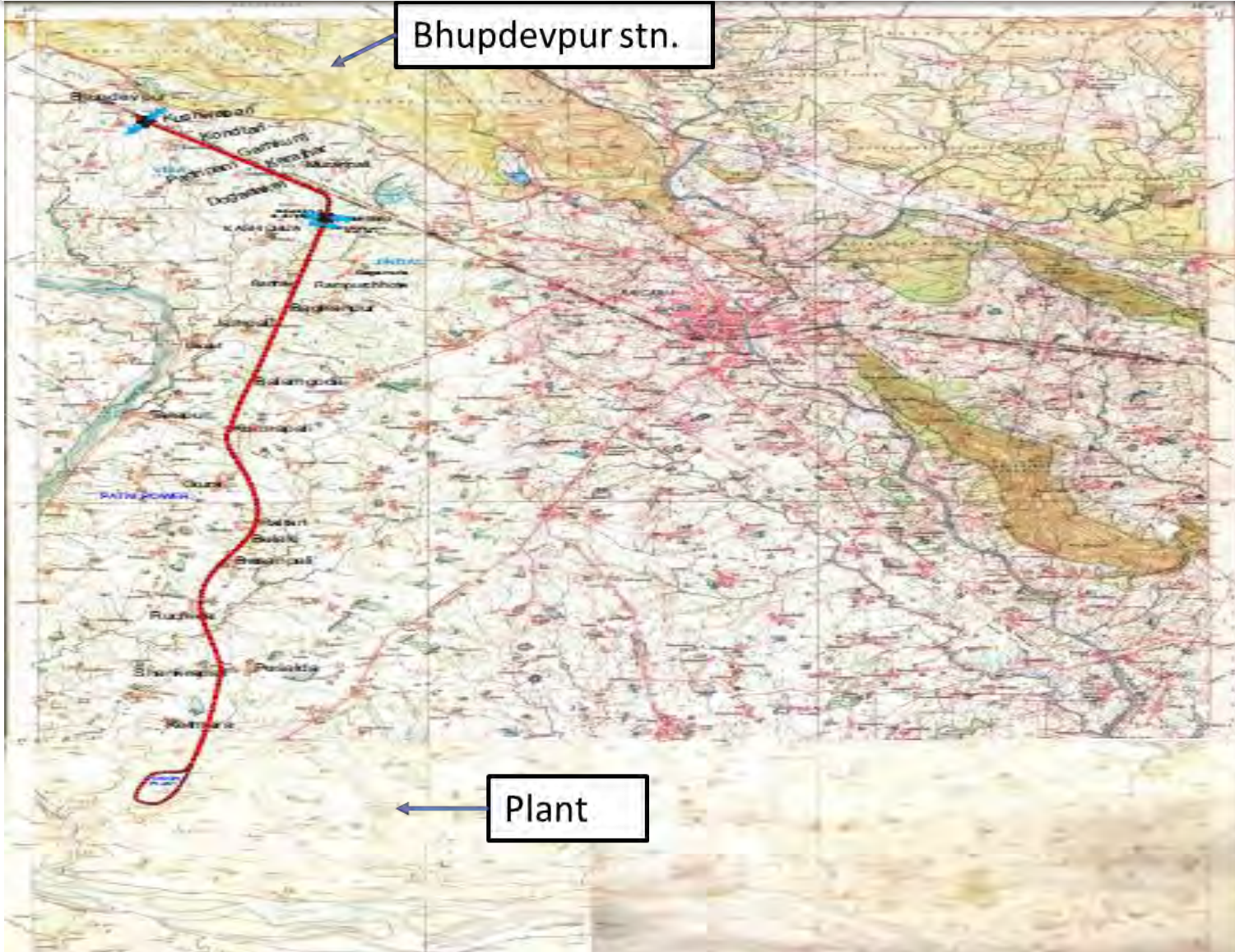
**Korba West Power Company Limited**  
(A subsidiary of Avantha Power and Infrastructure Limited)



# Topo Sheet Showing Railway Alignment



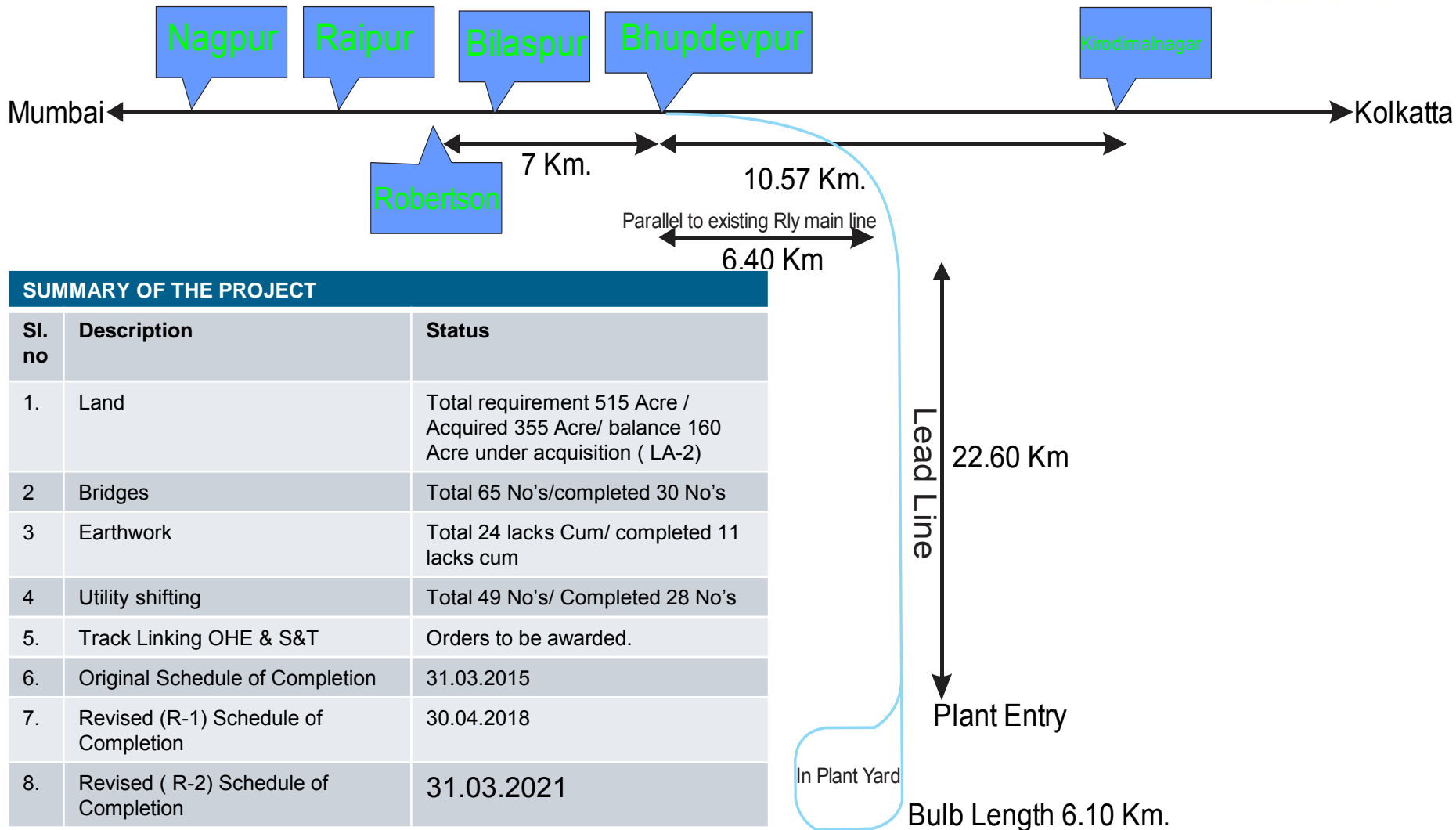
AVANTHA



# Key Plan Showing Main Line & KWPCIL Rail Layout



AVANTHA



## SUMMARY OF THE PROJECT

Sl. no	Description	Status
1.	Land	Total requirement 515 Acre / Acquired 355 Acre/ balance 160 Acre under acquisition ( LA-2)
2.	Bridges	Total 65 No's/completed 30 No's
3.	Earthwork	Total 24 lacks Cum/ completed 11 lacks cum
4.	Utility shifting	Total 49 No's/ Completed 28 No's
5.	Track Linking OHE & S&T	Orders to be awarded.
6.	Original Schedule of Completion	31.03.2015
7.	Revised (R-1) Schedule of Completion	30.04.2018
8.	Revised ( R-2) Schedule of Completion	31.03.2021

\*\* Above Schedule for completion is based on availability of LA-2 land by 31.12.2019.

# Land Status



AVANTHA

## Total Land Requirement – 515 Acre

Sl.No	Particular	Area In Acre	Status as on Date	Target Date
1.	Direct Purchased Land	253.5	Acquired	Completed
2.	Land Acquisition Phase-1	86	R & R to be awarded	31.01.2018
3.	Land Acquisition Phase-2	160	Under process for Acquisition	31.12.2019
4.	Railway Land	4.5	Agreement signed with SECR Rly	Completed
5.	Forest Land	11	Stage 2 clearance Received	Completed
<b>Total</b>		<b>515</b>		

# Schedule of Completion



AVANTHA

## L2 Schedule

Sl. No	Particular	Total Scope	Completed	Balance	Target Date	Status as on date
1.	Earthwork	23,70,000 Cum	11,00,000 Cum	12,70,000 Cum	30.04.2020	Work in progress in available patches of acquired land
2.	Bridge Work	65 No's	30 No's	35 No's	31.03.2020	.....do.....
3.	Utility Shifting	49 No's	28 No's	21 No's	31.12.2019	Diversion approvals received from CSPTCL,PGCIL & IPP Lines.
4.	Crossing Station	3 No's	2 No's ( Partial)		31.03.2020	Building construction WIP for CS-3 & CS-2
5.	Track Linking	40 KM	-	40 KM	31.12.2020	Order to be awarded
6.	OHE & S&T	40 KM	-	40 KM	31.12.2020	Order to be awarded
7.	Commissioning & Engine Rolling				31.03.2021	

\*\* Above Schedule for completion is based on availability of LA-2 land by 31.12.2019.

# KEY CHALLENGES



AVANTHA

- For linear projects, frequent amendments by State Government in land acquisition guidelines for new land acquisition & resettlement & rehabilitation act (LARR – 2013).
- Introduction of New R&R policy notification issued by Govt. of Chhattisgarh on 4<sup>th</sup> January'2017 for linear projects, which delayed the complete acquisition process.
- As Railways is a linear project in which only a part of land is required instead of total area of the land, for which owners are not willing for selling/ acquisition of part land.
- A part of our proposed railway land has already been acquired by NHAI for its highway project, due to which we may have to change our plan, proposal, approvals, designs, drawings etc.
- Kelo canal irrigation project is crossing our railway line at 08 locations due to which construction execution get delayed in cultivation season.
- Shifting of 21/49 Nos. transmission lines of various IPP's, Power grid, CSPDCL of capacity 33KVA, 132 KVA, 220 KVA, 400 KVA, 765 KVA (LT & HT both) which are crossing our proposed railway line.

# KWPCL Railway Project Status



AVANTHA

Orders release : ~ 137 Cr. + Cost incurred on Land : 68 Cr = 205 Cr

Major Orders released

## Civil

S No	Work Description	Agency Name	Awarded Work order Value	Work Done Value	Remark
1.	Earthwork in Embankment	Premco	8.75 Cr.	8.75 Cr.	
2.	Construction of Bridges	Premco	0.50 Cr.	0.50 Cr.	
3.	Consultancy services	Barsyl	1.67 Cr.	1.67 Cr.	
4.	Minor Bridges & Earthwork	RM Engineers	6.86 Cr	6.86 Cr.	
5.	Construction of Bridges-41Nos	JPW	11.86 Cr.	3.90 Cr.	
6.	Construction of PSC Bridges	Ansari	4.36 Cr.	0.86 Cr.	
7.	RUB By Box Pushing	Ghai	6.30 Cr.	4.88 Cr.	
8.	Earthwork 0-11 KM	JPW	9.88 Cr.	Nil	
9.	Earthwork 11-35KM	MK Gupta	12.25 Cr.	0.56 Cr.	
10.	Crossing Station & LC Buildings	Mall Const.	4.53 Cr.	0.66 Cr.	
11.	Supply of Free issue Materials	Various	8.90 Cr.	8.90 Cr.	
12.	Plant Road & drain diversion for MGR	Sarvamangla	3.15 Cr.	1.40 Cr.	



# KWPCL Railway Project Status



AVANTHA

## P. Way Works

SI.No	Work Description	Agency Name	Awarded Work order Value	Work Done Value	Remarks
1.	Supply of P-Way material	Premco	5.73 Cr.	5.73 Cr.	
2.	Supply of Rails	Premco	4.09 Cr.	4.09 Cr.	
3.	Supply of Sleepers	Patil Rail	12.13 Cr.	0.20 Cr.	
4.	Supply of Rails	Guru Kripa	9.81 Cr.	0.07 Cr.	

## Utility Shifting Work/Consultancy Charges

SI.No	Work Description	Agency Name	Awarded Work order Value	Work Done Value	Remarks
1.	Shifting of LT/HT Lines – 28 No's	Jogewar	1.96 Cr.	1.59 Cr.	28 No's Diverted
2.	Shifting of EHT Lines CSPTCL – 05 No's	Jogewar	3.50 Cr.	1.16 Cr.	Approval received for diversion
3.	Shifting of EHT Lines PGCIL – 07 No's	RR Engineers	8.04 Cr.	Nil	Approval received for diversion
4.	Consultancy Services	RITES	0.62 Cr.	0.40 Cr.	For Engineering & approvals
5.	Consultancy Services	Powersol	0.36 Cr.	0.36 Cr.	For Utility Shifting
6.	Consultancy Services	RCC Infra	1.30 Cr.	0.36 Cr.	For Box Pushing

# Project Photographs



AVANTHA





# Project Photographs



AVANTHA





# Project Photographs



AVANTHA



**REPORT**  
**ON**  
**ASSESSMENT OF PROPOSED ROUTE FOR ITS**  
**CARRYING CAPACITY**

**AND**  
**IMPACT DUE TO TRANSPORTATION OF COAL**

**FROM**  
**BHUPDEOPUR RAILWAY STATION**  
**TO**  
**1 X 600 MW THERMAL POWER PLANT**  
**AT**  
**VILLAGES-BADE BHANDAR,**  
**CHOTE BHANDAR, SARWANI AND AMALI**  
**BHONA,**  
**TEHSIL - PUSSORE, DISTRICT - RAIGARH,**  
**CHHATTISGARH**

**OF**  
**M/S KORBA WEST POWER COMPANY LTD.**



## CONTENTS

Sl. No.	Description	Page No.
1.0	Introduction	1
2.0	Assessment of proposed road for its categorisation & carrying capacity as per IRC 64 (1990)- guidelines on capacity of roads in rural area	1
2.1	Road width measurement	1
2.2	Traffic survey	3
2.3	Traffic load carrying capacity of the road	4
2.4	Current load on proposed route	5
3.0	Impact on ambient air quality due to traffic	7
4.0	Observations	9
5.0	Recommendations	10

## LIST OF TABLES

Table No.	Particulars	Page No.
1	Road width measured	3
2	Recommended design service volumes for plain roads with low curvature as per IRC: 64-1990	4
3	Carrying capacity calculation for road length from Bhupdeopur to KW PCL (for existing + proposed traffic)	6
4	Carrying capacity calculation for road length from Bhupdeopur to KW PCL (for projected traffic after 3 years + proposed traffic)	7
5	Top 10 values of predicted incremental ground level concentration ( $\mu\text{g}/\text{m}^3$ ) from road	8
6	Ground level concentrations after increment due to road transportation	8



## LIST OF FIGURES

Figure No.	Particulars	Page No.
1	Proposed route alignment from Bhupdeopur to KW PCL with location codes of road measurement & traffic census points	2

## LIST OF ANNEXURES

Annexure No.	Particulars
1	Photographs of proposed route at road width measurement locations
2	Fugitive Dust Model (FDM) for road



## 1.0 INTRODUCTION

M/s Korba West Power Company Ltd. (KW PCL) had been granted the Environment Clearance vide letter No J-13012/57/2008-IA.II (T), dated 20.05.2010 for the establishment of 1 x 600 MW thermal power plant at Village - Chotte Bhandar, Tehsil: Raigarh, Dist.: Raigarh, Chhattisgarh. Full load operation (600 MW) was achieved on 31.03.2014.

M/s KW PCL had proposed the transportation of coal from coal pit-head to plant site by way of railway. Work for connection of railway network to plant site is in advanced stage but not completed. Since the railway line has not become operational concurrent to the power plant operation, in order to meet the coal requirement, it is proposed to transport coal from Bhupdeopur railway station to the power plant via Dhimrapur Circle & Chatamunda circle.

To access the impact due to the proposed transportation, the following have been carried out:

- (i) traffic and road surveys for assessment of carrying capacity and.
- (ii) air quality prediction modeling for assessment of incremental ground level concentration of air pollutants.

Both the above are described in subsequent sections.

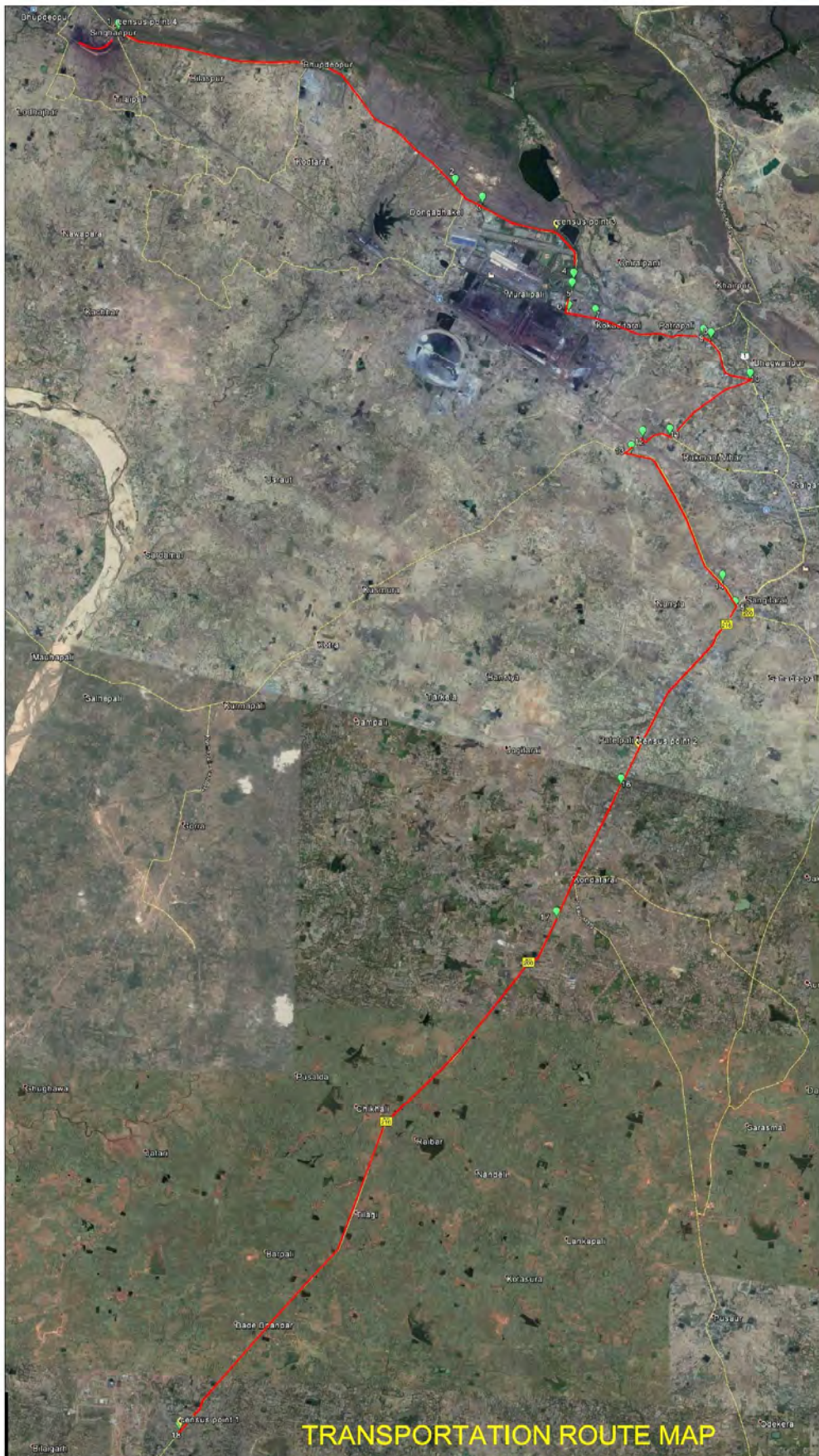
## 2.0 ASSESSMENT OF PROPOSED ROAD FOR ITS CATEGORISATION & CARRYING CAPACITY AS PER IRC 64 (1990)- GUIDELINES ON CAPACITY OF ROADS IN RURAL AREA

### 2.1 Road width measurement

The proposed route of coal transportation is 50 kms from Bhupdeopur to KW PCL. The width of the road was measured. Since the road width was not uniform, the width of measures at a location and the road length traversed till the road width changed. Thus, at a total of 18 locations road width measurement was carried out, which are shown in **Fig. 1**.

The width of the road was measured at each location by using metre tape and the road widths along with their geographical coordinates are given in **Table 1**. The same can be seen in **Fig. 1**.

**FIG. 1: PROPOSED ROUTE ALIGNMENT FROM BHUPDEOPUR TO KW PCL WITH LOCATION CODES OF ROAD MEASUREMENT & TRAFFIC CENSUS POINTS**





**TABLE 1  
ROAD WIDTH MEASURED**

Location	Latitude, N	Longitude, E	Road Width, m	No. of lanes
1	21°58'17.8"	83°16'31"	10.0	2
2	21°56'43.8"	83°20'06.4"	9.2	2
3	21°56'33"	83°20'23.8"	10.1	2
4	21°55'47.1"	83°21'22.4"	14.3	2
5	21°55'41.4"	83°21'21.4"	12.7	4
6	21°55'27.7"	83°21'19.2"	21.6	4
7	21°55'24.9"	83°21'36.3"	16.6	4
8	21°55'12.8"	83°22'45.3"	14.5	4
9	21°55'10.8"	83°22'50.1"	7.0	2
10	21°54'45.7"	83°23'15.4"	7.4	2
11	21°54'12.1"	83°22'23.8"	7.0	2
12	21°54'10.8"	83°22'06.4"	7.0	2
13	21°54'01.9"	83°21'59.2"	7.0	2
14	21°52'43.2"	83°22'57.6"	7.0	2
15	21°52'27.2"	83°23'05.9"	7.0	2
16	21°50'39.5"	83°21'52.6"	7.0	2
17	21°49'19.1"	83°21'11.4"	7.0	2
18	21°44'07.9"	83°17'09.9"	7.0	2

The locations of the width measurement from Bhupdeopur to KW PCL are shown in Photograph 1 to Photograph 18 (Each location refers to its corresponding no. photograph) in **Annexure 1**.

## 2.2 Traffic Survey

The traffic survey was conducted as per IRC: 9-1972. The sites for traffic survey monitoring were fixed away from the villages and the roads were divided into sections. The traffic density was monitored at the up and down sides of the locations namely:

- Census Point 1- Near KW PCL Plant area
- Census Point 2- Near Patelpali village
- Census Point 3- Near JSPL, C & D Colony
- Census Point 4- Near Bhupdeopur Vimla Siding



The locations can be seen in Fig 1. The monitoring was done for a period of 24 hours continuously. The observed traffic density has been processed for an interval of 1 hour. The total no. of vehicles was calculated on hourly basis as well as for 24 hours. The monitoring plan included the following vehicles namely LMV, buses, trucks, motor cycles and scooters, cycles and the others.

### 2.3 Traffic Load Carrying Capacity Of The Road

In the study, the route considered is a rural highway, which is considered as an all-purpose road, with no control of access and with heterogeneous mix of fast and slow-moving vehicles.

The recommended design service volumes for plain roads with low curvature (0-50 degrees/km) as is the case in the study area is given in **Table 2**.

**TABLE 2  
RECOMMENDED DESIGN SERVICE VOLUMES FOR PLAIN ROADS WITH  
LOW CURVATURE AS PER IRC: 64-1990**

Type of Road	Description	Recommended Design Service Volume* in PCU/day
Single Lane Roads	A single lane bi-directional road should have at least 3.75 metre wide paved carriageway with good quality shoulders such as moorum shoulders of minimum 1.0 metre width on either side.	2000
Intermediate Lane Roads	Intermediate lane roads should have a pavement width of around 5.5 metre with good usable shoulders on either side	6000
Two Lane Roads	Two lane roads shall have a 7 metre wide carriageway and good earthen shoulders	15000
Two Lane Roads +	Two lane roads + paved & surface shoulders of atleast 1.5 m width on either side	17250

\*Design Service Volume is defined as the maximum hourly volume at which vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time period under the prevailing roadway, traffic and control conditions while maintaining a designated level of service.

## 2.4 Current load on proposed route

The current traffic load on the proposed route was monitored as per procedure outlined in IRC: 9-1972. Slow moving vehicles produce interference to the free movement of traffic. Hence, to account for the interaction of the different kinds of vehicles moving on the route, the capacity of the roads has been converted into Passenger Car Unit as per IRC: 64-1990 and the current traffic load was found after applying the conversion factors which is given in **Table 3**.

**Additional Traffic** : The projected traffic volume due to the movement of trucks for transportation of coal has been assessed as follows:

Coal requirement	MT/Day	8767
Carrying capacity of trucks	MT	25
Total No of coal trucks required	No/Day	351
Daily truck movement (to & fro)		752 nos.

**Table 3** also shows the road width, the carrying capacity according to road width the present plus proposed traffic expressed as a percentage of the designed service volume (carrying capacity) of the road.

**Growth in existing traffic:** It is proposed to use the road for coal transportation for 3 years years. During three years, the road traffic will experience a natural growth which is affected by the following factors:

- |             |   |
|-------------|---|
| Economic    | 1. Gross National Product (GNP) or Gross Domestic Product (GDP) |
|             | 2. Agricultural Output  |
|             | 3. Industrial Output  |
| Demographic | 4. Population   |
|             | 5. Rural/ Urban mix of population                               |

The natural growth can be assessed through various ways which related to either one of more of the above parameters. Past trends of data related to traffic flow from census, vehicle registration or fuel sales can also be use, in available. In this case, being a rural road, past trend data was not available for sufficient number of years from authentic sources for extrapolations. Hence, a growth rate of 2.26% has been assumed on the basis of 22.61% population growth rate in Chhattisgarh in the previous decade, as per Census 2001 & 2011. The growth in traffic has been projected for three years based on the formula prescribed by IRC:108-1996 (Guidelines for Traffic Prediction on Rural Highways) in **Table 3** and added to the proposed traffic load to determine the adequacy of the road in future also.



**TABLE 3**  
**CARRYING CAPACITY CALCULATION FOR ROAD LENGTH FROM BHUPDEOPUR TO KW PCL**  
**(FOR EXISTING + PROPOSED TRAFFIC)**

Location		LMV	Buses	Trucks	Motor Cycles & Scooters	Cycles	Others	Total	Additional proposed Traffic	Total resultant traffic in future	Width of road (m)	Design Service Volume as per IRC 64-1990	% Utilization in future
<b>Equivalency factor</b>		<b>1.00</b>	<b>3.00</b>	<b>3.00</b>	<b>0.50</b>	<b>0.50</b>	<b>1.50</b>		<b>3.0</b>				
<b>Near JSPL, C &amp; D Colony (Up)</b>	<b>Observed traffic</b>	1104	99	1138	1358	164	59	<b>3922</b>	352	<b>4274</b>			
	<b>Equivalent PCU</b>	1104	297	3414	679	82	89	<b>5665</b>	1056	<b>6721</b>			
<b>Near JSPL, C &amp; D Colony (Down)</b>	<b>Observed count</b>	922	79	1186	1362	174	48	<b>3771</b>	352	<b>4123</b>			
	<b>Equivalent PCU</b>	922	237	3558	681	87	72	<b>5557</b>	1056	<b>6613</b>			
	<b>Sub Total of Equivalent PCU</b>	<b>2026</b>	<b>534</b>	<b>6972</b>	<b>1360</b>	<b>169</b>	<b>161</b>	<b>11222</b>	<b>2112</b>	<b>13334</b>	<b>10.1</b>	17250	77.3 %
<b>Near Patel Pali village (Up)</b>	<b>Observed count</b>	1329	84	784	2851	481	63	<b>5592</b>	352	<b>5944</b>			
	<b>Equivalent PCU</b>	1329	252	2352	1426	241	95	<b>5695</b>	1056	<b>6751</b>			
<b>Near Patel Pali village (Down)</b>	<b>Observed count</b>	1272	87	811	2830	544	71	<b>5615</b>	352	<b>5967</b>			
	<b>Equivalent PCU</b>	1272	261	2433	1415	272	107	<b>5760</b>	1056	<b>6816</b>			
	<b>Sub Total of Equivalent PCU</b>	<b>2601</b>	<b>513</b>	<b>4785</b>	<b>2841</b>	<b>513</b>	<b>202</b>	<b>11455</b>	<b>2112</b>	<b>13567</b>	<b>7.0</b>	15000	90.45%
<b>Near KW PCL Plant (Up)</b>	<b>Observed count</b>	594	136	545	1309	231	87	<b>2902</b>	352	<b>3254</b>			
	<b>Equivalent PCU</b>	594	408	1635	655	116	131	<b>3539</b>	1056	<b>4595</b>			
<b>Near KW PCL Plant (Down)</b>	<b>Observed count</b>	584	97	618	1416	194	92	<b>3001</b>	352	<b>3353</b>			
	<b>Equivalent PCU</b>	584	291	1854	708	97	138	<b>3672</b>	1056	<b>4728</b>			
	<b>Sub Total of Equivalent PCU</b>	<b>1178</b>	<b>699</b>	<b>3489</b>	<b>1363</b>	<b>213</b>	<b>269</b>	<b>7211</b>	<b>2112</b>	<b>9323</b>	<b>7.0</b>	15000	62.15 %
<b>Near Bhupdeopur Vimla Siding (Up)</b>	<b>Observed count</b>	594	36	802	913	136	28	<b>2509</b>	352	<b>2861</b>			
	<b>Equivalent PCU</b>	594	108	2406	457	68	42	<b>3675</b>	1056	<b>4731</b>			
<b>Near Bhupdeopur Vimla Siding (Down)</b>	<b>Observed count</b>	586	53	778	882	146	30	<b>2475</b>	352	<b>2827</b>			
	<b>Equivalent PCU</b>	586	159	2334	441	73	45	<b>3638</b>	1056	<b>4694</b>			
	<b>Sub Total of Equivalent PCU</b>	<b>1180</b>	<b>267</b>	<b>4740</b>	<b>898</b>	<b>141</b>	<b>87</b>	<b>7313</b>	<b>2112</b>	<b>9425</b>	<b>10.0</b>	17250	54.6 %

The formula used for projection is  $P_n = P_o(1+r)^n$

Where

$P_n$  = Traffic in the nth year i.e. in 3<sup>rd</sup> years

$P_o$  = Traffic flow in the base year

$n$  = number of years (3 years)

$r$  = annual rate of growth of traffic, expressed in decimals. (0.0226)

**TABLE 4**  
**CARRYING CAPACITY CALCULATION FOR ROAD LENGTH FROM**  
**BHUPDEOPUR TO KWPCCL**  
**(FOR PROJECTED TRAFFIC AFTER 3 YEARS + PROPOSED TRAFFIC)**

Location	Total (Year 2014), PCU	Projected Traffic after 3 years, PCU	Additional proposed Traffic, PCU	Total resultant traffic in future	Width of road (m)	Design Service Volume as per IRC 64-1990	% Utilization in future
Near JSPL, C & D Colony (Up & Down)	11222	12000	2112	14112	10.1	17250	81.81 %
Near Patel Pali village (Up & down)	11455	12249	2112	14361	7.0	15000	95.74%
Near KWPCCL Plant (Up & Down)	7211	7711	2112	9823	7.0	15000	65.49%
Near Bhupdeopur Vimla Siding (Up & down)	7313	7820	2112	9932	10.0	17250	57.58%

Thus, it can be seen that even after considering the natural growth rate in traffic, the roads will have sufficient capacity to accommodate the present & proposed traffic for the next three years.

### 3.0 IMPACT ON AMBIENT AIR QUALITY DUE TO TRAFFIC

For the transportation to and from the plant, Fugitive Dust Model (FDM) has been used, which is a computerized air quality model specifically designed for computing concentration and deposition impacts from fugitive dust sources. The sources may be point, line or area sources. The model has not been designed to compute the impacts of buoyant point sources, thus it contains no plume rise algorithm. The model is generally based on the well-known Gaussian Plume formulation for computing concentrations, but the model had been specifically adapted to incorporate an improved gradient transfer deposition algorithm. Emissions for each source are apportioned by the user into a series of particle size classes. A gravitational settling velocity and a deposition velocity are calculated by FDM for each class. Concentration and deposition are computed at all user selectable receptor

location. The purpose of the model is to assess increment in air pollutants due to transportation for worst case scenario of road transport to and from plant. Given source strength, meteorology and site geometry, FDM can predict pollutant concentrations for receptors located within 500 meters of the roadway. The model helps in predicting concentrations of pollutants, such as carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), sulphur dioxide (SO<sub>2</sub>) and particulate matter concentrations.

The assumptions, input data and other details are given in **Annexure 2** (along with the GLC contours for 5 pollutants) and the top 10 readings of the predicted incremental ground level concentrations for 24 hour average sampling have been given in **Table 5**.

**TABLE 5  
TOP 10 VALUES OF PREDICTED INCREMENTAL GROUND LEVEL  
CONCENTRATION ( $\mu\text{g}/\text{m}^3$ ) FROM ROAD**

Rank	Receptor	Co-ordinates		Ending Hour	PM <sub>10</sub>		PM <sub>2.5</sub>		SO <sub>2</sub>		NO <sub>x</sub>		CO	
		X	Y		GLC ( $\mu\text{g}/\text{m}^3$ )	Depo. ( $\mu\text{g}/\text{m}^2\text{-s}$ )	GLC ( $\mu\text{g}/\text{m}^3$ )	Depo. ( $\mu\text{g}/\text{m}^2\text{-s}$ )	GLC ( $\mu\text{g}/\text{m}^3$ )	Depo. ( $\mu\text{g}/\text{m}^2\text{-s}$ )	GLC ( $\mu\text{g}/\text{m}^3$ )	Depo. ( $\mu\text{g}/\text{m}^2\text{-s}$ )	GLC ( $\mu\text{g}/\text{m}^3$ )	Depo. ( $\mu\text{g}/\text{m}^2\text{-s}$ )
1	70	26013.0	21747.3	120.C	0.1492	0.0028	0.0850	0.0016	2.0050	0.0371	20.1556	0.3727	8.4654	0.1565
2	75	26864.9	22631.7	120.C	0.1467	0.0028	0.0836	0.0016	1.9719	0.0371	19.8234	0.3726	8.3258	0.1565
3	76	26723.8	22952.0	120.C	0.1467	0.0028	0.0836	0.0016	1.9719	0.0371	19.8233	0.3726	8.3258	0.1565
4	77	26582.6	23272.3	120.C	0.1467	0.0028	0.0836	0.0016	1.9718	0.0371	19.8225	0.3726	8.3255	0.1565
5	78	26441.5	23592.6	120.C	0.1467	0.0028	0.0836	0.0016	1.9715	0.0371	19.8193	0.3725	8.3241	0.1565
6	122	14266.8	30620.3	120.C	0.1464	0.0027	0.0834	0.0016	1.9680	0.0366	19.7842	0.3677	8.3094	0.1544
7	93	21839.0	25359.0	120.C	0.1461	0.0026	0.0833	0.0015	1.9640	0.0353	19.7437	0.3546	8.2923	0.1489
8	69	26180.6	21440.0	120.C	0.1458	0.0027	0.0831	0.0015	1.9598	0.0364	19.7016	0.3658	8.2747	0.1536
9	121	14510.0	30370.7	120.C	0.1441	0.0026	0.0821	0.0015	1.9370	0.0355	19.4722	0.3571	8.1784	0.1500
10	94	21587.8	25589.7	120.C	0.1439	0.0027	0.0820	0.0015	1.9350	0.0359	19.4520	0.3607	8.1698	0.1515

The impact due to road transportation in context of the ambient air quality has been summarised in **Table 6**.

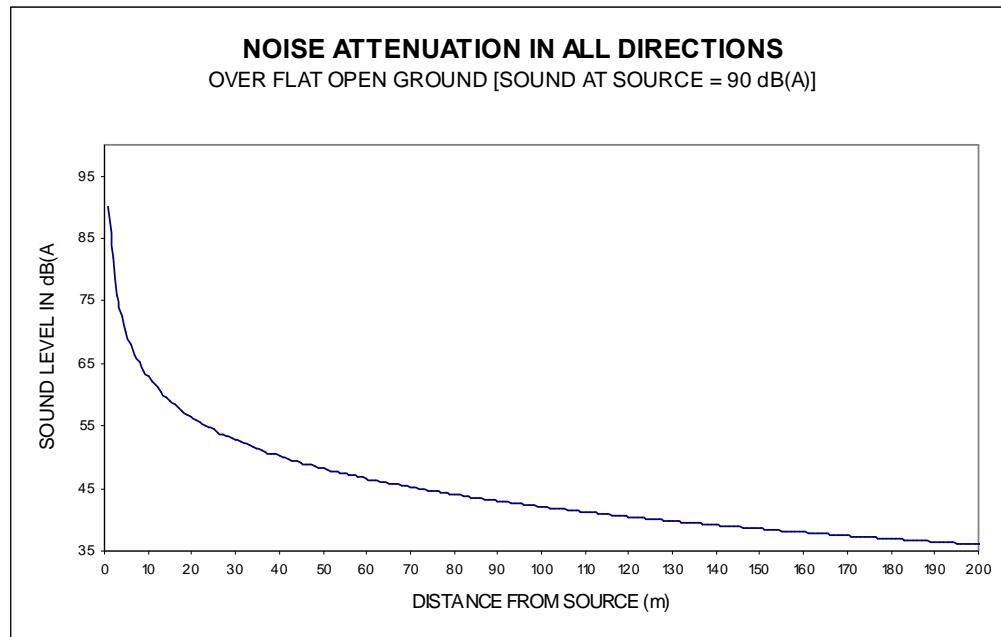
**TABLE 6  
GROUND LEVEL CONCENTRATIONS AFTER INCREMENT  
DUE TO ROAD TRANSPORTATION**

Pollutant	Highest baseline value observed in lease area	Incremental due to additional transportation	Total resultant concentration ( $\mu\text{g}/\text{m}^3$ )	Permissible Limits (NAAQS 2009) ( $\mu\text{g}/\text{m}^3$ )	Remark
PM10	80.1	0.1492	80.2492	100	Within limit
PM2.5	40.2	0.0850	40.285	60	Within limit
SO <sub>2</sub>	13.2	2.0050	15.205	80	Within limit
NO <sub>x</sub>	22.3	20.1556	42.4556	80	Within limit



## Ambient Noise

The number of trucks anticipated are 2112 per day i.e. an average of 88 trucks per hour or more than one truck per minute. The sound level from the movement of a truck passing on the road is approximately 90 dBA. This will be a short term increase, prevailing only at the time of passage of truck. The overall LeQ will be lower. As the distance increases from the line of truck movement, the anticipated LeQs will be as follows:



At a distance of 7 m, the LeQ is anticipated to be approximately 65 dB(A), falling within the limits for commercial areas, which is the usual case within along roads.

## 4.0 OBSERVATIONS

The study found that all the roads were black topped and in good condition. The roads at the different locations had variable width. The average width was found to be 9.96 metre with a minimum width of 7.0 m at locations 9 to 18 (except 10) and maximum width of 21.6 m at location 6. No bottle necks and issues were found at any location at the time of study. Also there were no traffic jams observed.

When the PCU projections for the future percent utilization were estimated it was found that the carrying capacity (as per IRC 64-1990) at all Census points were within limits.

The incremental GLCs for air pollutants are also well within the National Ambient Air Quality Standards. It may be noted that the increase in traffic will not have be impacting the water quality, water resources or land environment along the transportation route. The plying of 2112 trucks everyday will lead to job opportunity to drivers, helpers and supporting

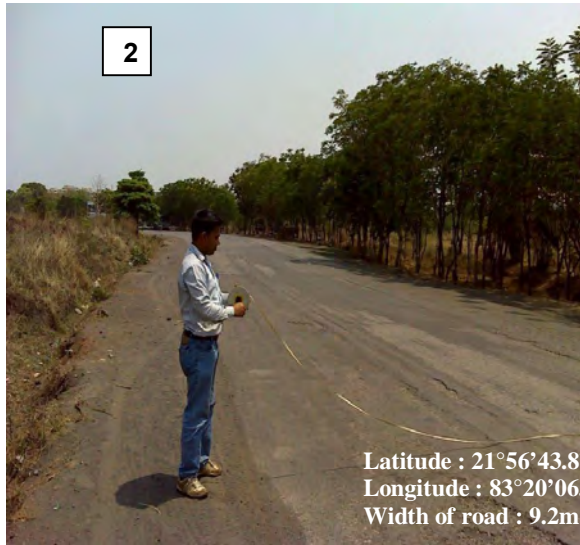
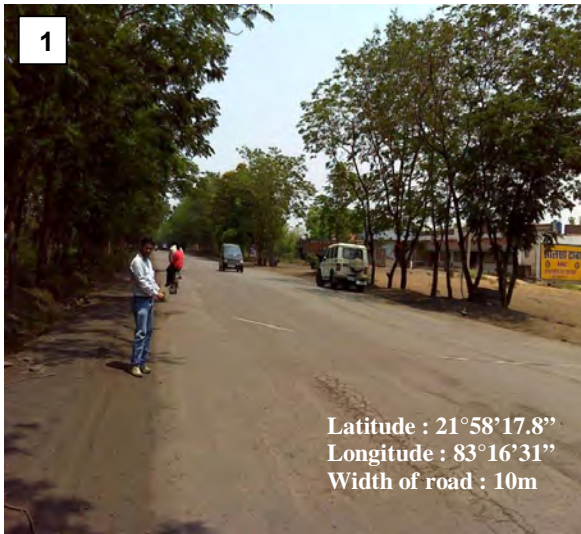
workers like mechanics, cleaners, kiosk operators, food & beverage, etc. In areas, such as near School at Chiraipani, speed breaker shall be constructed.

## **5.0 RECOMMENDATIONS**

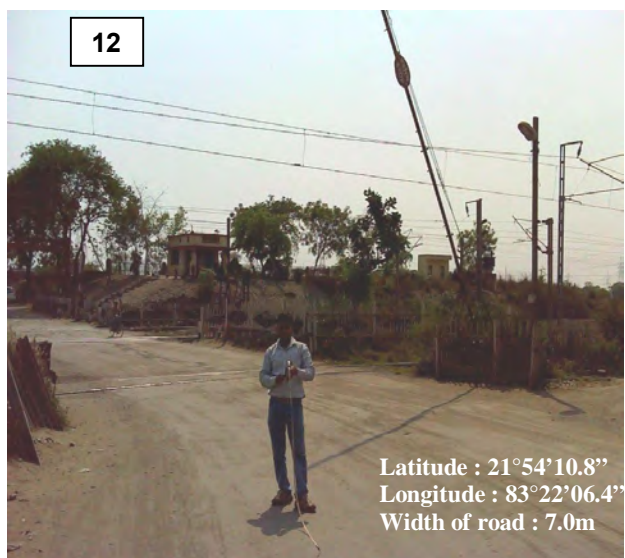
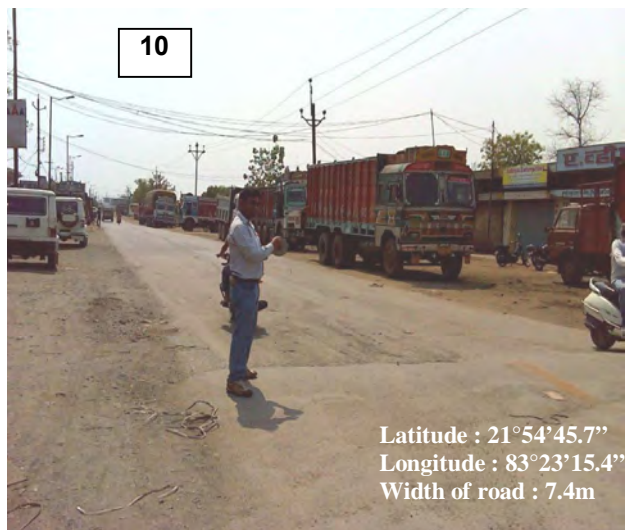
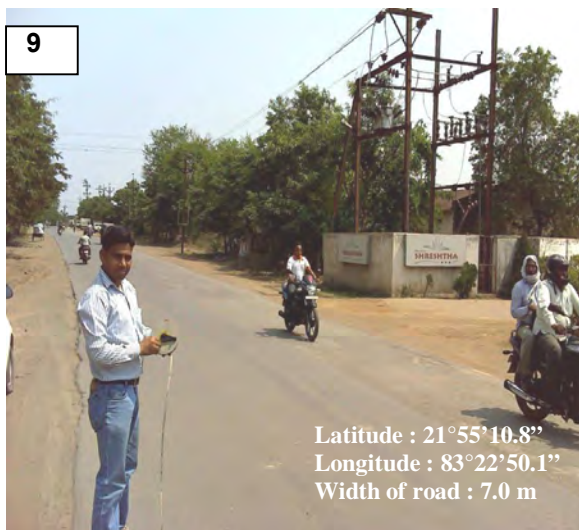
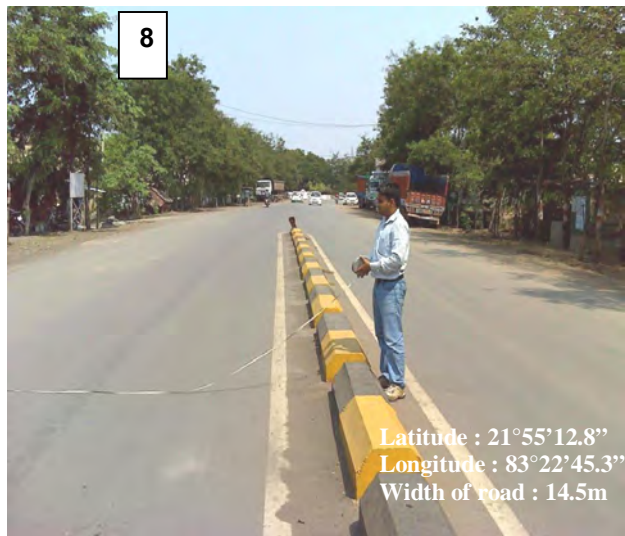
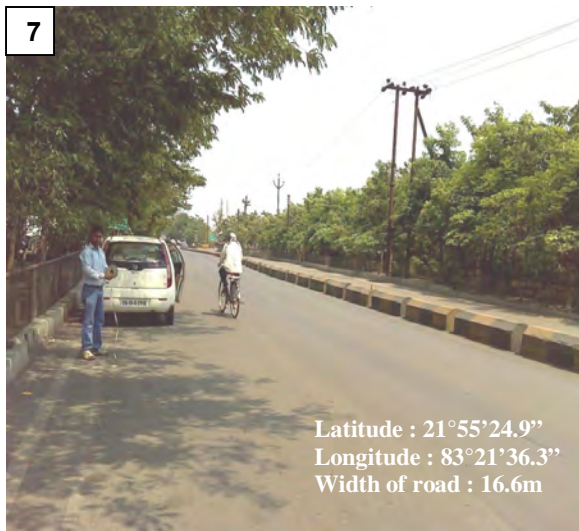
The roads at all locations have a carriageway of at least 7 metre width and good earthen shoulders. It is recommended that as per the traffic survey & the measured road widths along the entire transportation route, there is no need for widening as the current road is having sufficient carrying capacity to accommodate the additional traffic.

The vehicles used for transportation should be covered with tarpaulin, be spill proof, have their PUC certificates, be well maintained and the drivers sensitised to their specific work to minimise accidents and pollution. As the speed of the truck increases, the sound level will also increase, thus, the speed limit of the trucks will be restricted within 40 kmph. The trucks will be maintained as per the manufacturers specifications to ensure minimum noise generation.

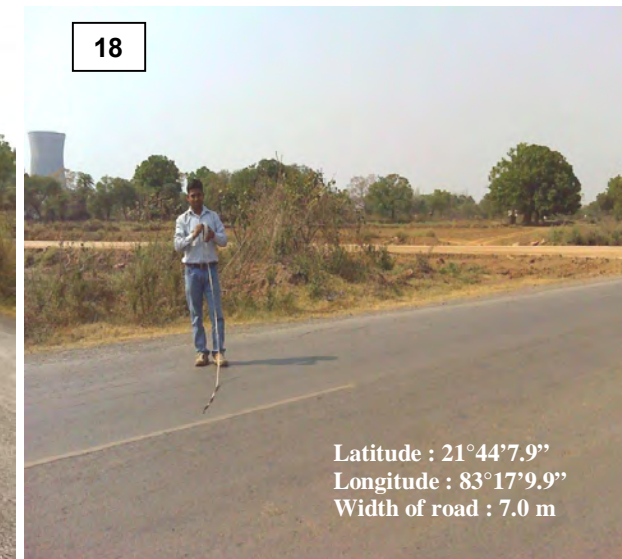
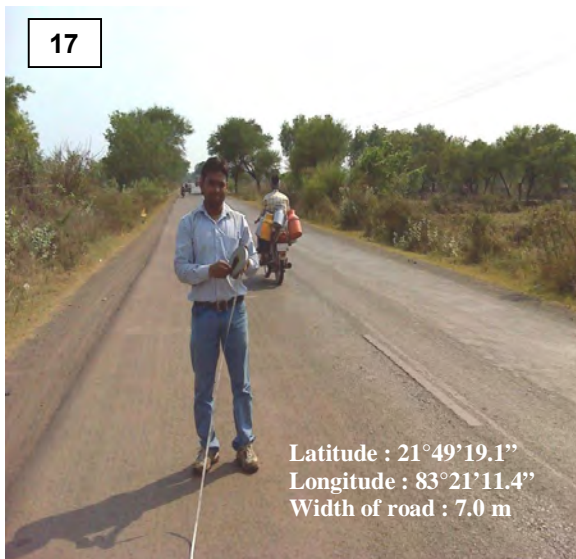
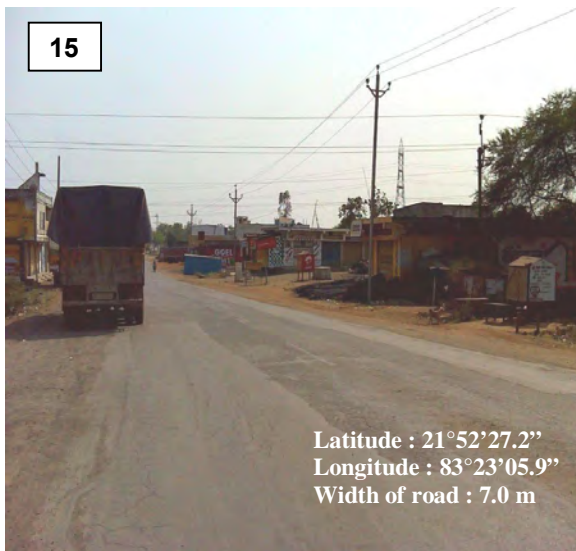
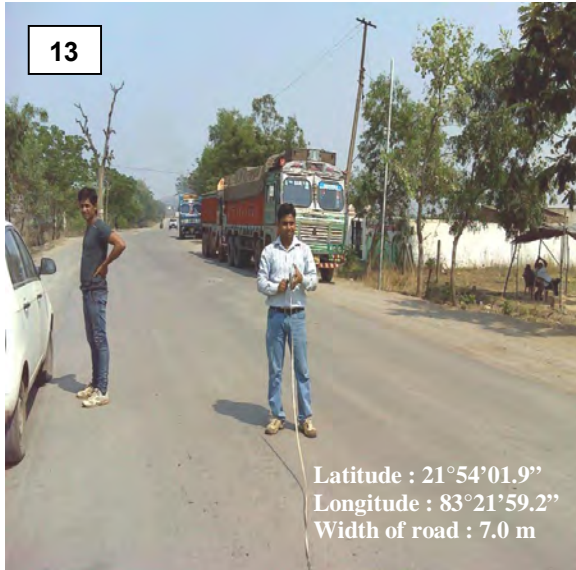
PHOTOGRAPHS OF PROPOSED ROUTE AT ROAD WIDTH MEASUREMENT LOCATIONS













**FUGITIVE DUST MODEL (FDM)**

**RUN TITLE: ROAD MODELLING FOR KORBA WEST POWER CO.**

INPUT FILE NAME: Rd-PM10.IN  
 OUTPUT FILE NAME: Rd-PM10.OUT  
 PLOT OUTPUT WRITTEN TO FILE NAME: Rd-PM10.DAT

CONVERGENCE OPTION 1=OFF, 2=ON	2
MET OPTION SWITCH, 1=CARDS, 2=PREPROCESSED	1
PLOT FILE OUTPUT, 1=NO, 2=YES	2
MET DATA PRINT SWITCH, 1=NO, 2=YES	1
POST-PROCESSOR OUTPUT, 1=NO, 2=YES	1
DEP. VEL./GRAV. SETTL. VEL., 1=DEFAULT, 2=USER	1
PRINT 1-HOUR AVERAGE CONCEN, 1=NO, 2=YES	1
PRINT 3-HOUR AVERAGE CONCEN, 1=NO, 2=YES	1
PRINT 8-HOUR AVERAGE CONCEN, 1=NO, 2=YES	1
PRINT 24-HOUR AVERAGE CONCEN, 1=NO, 2=YES	4
PRINT LONG-TERM AVERAGE CONCEN, 1=NO, 2=YES	1
BYPASS RAMMET CALMS RECOGNITION, 1=NO, 2=YES	1
READ HOURLY EMISSION RATES, 1=NO, 2=YES	0
NUMBER OF SOURCES PROCESSED	38
NUMBER OF RECEPTORS PROCESSED	498
NUMBER OF PARTICLE SIZE CLASSES	5
NUMBER OF HOURS OF MET DATA PROCESSED	2208
LENGTH IN MINUTES OF 1-HOUR OF MET DATA	60.
ROUGHNESS LENGTH IN CM	1.00
SCALING FACTOR FOR SOURCE AND RECPTORS	1.0000
PARTICLE DENSITY IN G/CM**3	2.50
ANEMOMETER HEIGHT IN M	10.00

**GENERAL PARTICLE SIZE CLASS INFORMATION**

PARTICLE SIZE CLASS	CHAR. DIA. (UM)	GRAV. SETTLING VELOCITY (M/SEC)	DEPOSITION VELOCITY (M/SEC)	FRACTION IN EACH SIZE CLASS
1	1.2500000	**	**	0.0262
2	3.7500000	**	**	0.0678
3	7.5000000	**	**	0.1704
4	12.5000000	**	**	0.1536
5	20.0000000	**	**	0.5820

-----  
 \*\* COMPUTED BY FDM

**ANNEXURE : 2 Contd..**

**RECEPTOR COORDINATES (X,Y,Z)**

( 20., 20., 0.)	( 14470., 2817., 0.)	( 14760., 3009., 0.)
( 15028., 3235., 0.)	( 15296., 3460., 0.)	( 15552., 3696., 0.)
( 15765., 3974., 0.)	( 15978., 4252., 0.)	( 16190., 4530., 0.)
( 16403., 4808., 0.)	( 16628., 5076., 0.)	( 16860., 5338., 0.)
( 17091., 5601., 0.)	( 17322., 5864., 0.)	( 17553., 6127., 0.)
( 17784., 6389., 0.)	( 18016., 6652., 0.)	( 18247., 6915., 0.)
( 18478., 7178., 0.)	( 18709., 7440., 0.)	( 18899., 7727., 0.)
( 19013., 8058., 0.)	( 19127., 8389., 0.)	( 19241., 8720., 0.)
( 19355., 9051., 0.)	( 19469., 9382., 0.)	( 19582., 9713., 0.)
( 19762., 10003., 0.)	( 20010., 10250., 0.)	( 20258., 10497., 0.)
( 20506., 10744., 0.)	( 20754., 10991., 0.)	( 21002., 11238., 0.)
( 21244., 11490., 0.)	( 21460., 11766., 0.)	( 21676., 12041., 0.)
( 21892., 12316., 0.)	( 22108., 12592., 0.)	( 22324., 12867., 0.)
( 22540., 13143., 0.)	( 22722., 13439., 0.)	( 22874., 13754., 0.)
( 23026., 14069., 0.)	( 23179., 14385., 0.)	( 23331., 14700., 0.)
( 23483., 15015., 0.)	( 23635., 15330., 0.)	( 23787., 15646., 0.)
( 23939., 15961., 0.)	( 24091., 16276., 0.)	( 24243., 16591., 0.)
( 24396., 16906., 0.)	( 24548., 17222., 0.)	( 24700., 17537., 0.)
( 24853., 17851., 0.)	( 25098., 18101., 0.)	( 25344., 18350., 0.)
( 25590., 18599., 0.)	( 25797., 18878., 0.)	( 25973., 19181., 0.)
( 26149., 19483., 0.)	( 26420., 19697., 0.)	( 26708., 19896., 0.)
( 26785., 20230., 0.)	( 26845., 20575., 0.)	( 26904., 20920., 0.)
( 26746., 21123., 0.)	( 26407., 21207., 0.)	( 26181., 21440., 0.)
( 26013., 21747., 0.)	( 25983., 22011., 0.)	( 26318., 22114., 0.)
( 26652., 22217., 0.)	( 26987., 22320., 0.)	( 26865., 22632., 0.)
( 26724., 22952., 0.)	( 26583., 23272., 0.)	( 26442., 23593., 0.)
( 26135., 23701., 0.)	( 25918., 23906., 0.)	( 25786., 24223., 0.)
( 25522., 24421., 0.)	( 25173., 24449., 0.)	( 24824., 24476., 0.)
( 24475., 24503., 0.)	( 24137., 24574., 0.)	( 23819., 24720., 0.)
( 23484., 24814., 0.)	( 23141., 24886., 0.)	( 22799., 24958., 0.)
( 22465., 25060., 0.)	( 22138., 25184., 0.)	( 21839., 25359., 0.)
( 21588., 25590., 0.)	( 21544., 25937., 0.)	( 21500., 26284., 0.)
( 21457., 26632., 0.)	( 21364., 26945., 0.)	( 21055., 27111., 0.)
( 20838., 27377., 0.)	( 20641., 27665., 0.)	( 20375., 27892., 0.)
( 20108., 28118., 0.)	( 19841., 28345., 0.)	( 19575., 28572., 0.)
( 19321., 28811., 0.)	( 19117., 29095., 0.)	( 18827., 29289., 0.)
( 18496., 29400., 0.)	( 18162., 29504., 0.)	( 17817., 29497., 0.)
( 17471., 29487., 0.)	( 17127., 29554., 0.)	( 16784., 29621., 0.)
( 16441., 29688., 0.)	( 16097., 29756., 0.)	( 15754., 29823., 0.)
( 15410., 29890., 0.)	( 15067., 29957., 0.)	( 14767., 30133., 0.)
( 14510., 30371., 0.)	( 14267., 30620., 0.)	( 14088., 30921., 0.)
( 13801., 30799., 0.)	( 14499., 2770., 0.)	( 14790., 2962., 0.)
( 15057., 3187., 0.)	( 15325., 3413., 0.)	( 15584., 3647., 0.)
( 15797., 3925., 0.)	( 16009., 4203., 0.)	( 16222., 4481., 0.)
( 16434., 4759., 0.)	( 16659., 5027., 0.)	( 16890., 5290., 0.)
( 17121., 5553., 0.)	( 17353., 5815., 0.)	( 17584., 6078., 0.)
( 17815., 6341., 0.)	( 18046., 6604., 0.)	( 18277., 6866., 0.)
( 18509., 7129., 0.)	( 18740., 7392., 0.)	( 18939., 7673., 0.)
( 19053., 8004., 0.)	( 19167., 8335., 0.)	( 19281., 8666., 0.)
( 19394., 8997., 0.)	( 19508., 9328., 0.)	( 19622., 9659., 0.)
( 19792., 9955., 0.)	( 20040., 10202., 0.)	( 20288., 10449., 0.)
( 20536., 10696., 0.)	( 20784., 10943., 0.)	( 21032., 11190., 0.)
( 21275., 11441., 0.)	( 21491., 11716., 0.)	( 21707., 11992., 0.)
( 21923., 12267., 0.)	( 22139., 12543., 0.)	( 22355., 12818., 0.)
( 22571., 13094., 0.)	( 22758., 13387., 0.)	( 22910., 13702., 0.)
( 23062., 14018., 0.)	( 23215., 14333., 0.)	( 23367., 14648., 0.)
( 23519., 14963., 0.)	( 23671., 15278., 0.)	( 23823., 15594., 0.)
( 23975., 15909., 0.)	( 24127., 16224., 0.)	( 24279., 16539., 0.)
( 24432., 16854., 0.)	( 24584., 17170., 0.)	( 24736., 17485., 0.)
( 24888., 17800., 0.)	( 25129., 18053., 0.)	( 25374., 18302., 0.)

## ANNEXURE : 2 Contd..

( 25620., 18551., 0.)	( 25831., 18827., 0.)	( 26007., 19130., 0.)
( 26183., 19432., 0.)	( 26450., 19651., 0.)	( 26738., 19850., 0.)
( 26832., 20174., 0.)	( 26891., 20519., 0.)	( 26950., 20864., 0.)
( 26895., 21143., 0.)	( 26556., 21227., 0.)	( 26273., 21385., 0.)
( 26106., 21692., 0.)	( 26021., 21966., 0.)	( 26356., 22069., 0.)
( 26690., 22172., 0.)	( 27025., 22275., 0.)	( 26949., 22576., 0.)
( 26808., 22896., 0.)	( 26667., 23217., 0.)	( 26526., 23537., 0.)
( 26284., 23731., 0.)	( 25991., 23848., 0.)	( 25895., 24184., 0.)
( 25661., 24445., 0.)	( 25321., 24492., 0.)	( 24972., 24519., 0.)
( 24623., 24547., 0.)	( 24274., 24574., 0.)	( 23955., 24718., 0.)
( 23629., 24840., 0.)	( 23287., 24912., 0.)	( 22944., 24984., 0.)
( 22605., 25066., 0.)	( 22278., 25190., 0.)	( 21961., 25333., 0.)
( 21685., 25549., 0.)	( 21607., 25877., 0.)	( 21563., 26224., 0.)
( 21520., 26571., 0.)	( 21476., 26918., 0.)	( 21189., 27101., 0.)
( 20936., 27328., 0.)	( 20743., 27620., 0.)	( 20494., 27862., 0.)
( 20228., 28089., 0.)	( 19961., 28315., 0.)	( 19694., 28542., 0.)
( 19428., 28769., 0.)	( 19218., 29048., 0.)	( 18955., 29271., 0.)
( 18639., 29413., 0.)	( 18305., 29517., 0.)	( 17966., 29571., 0.)
( 17618., 29529., 0.)	( 17274., 29581., 0.)	( 16931., 29649., 0.)
( 16587., 29716., 0.)	( 16244., 29783., 0.)	( 15900., 29850., 0.)
( 15557., 29917., 0.)	( 15213., 29985., 0.)	( 14896., 30116., 0.)
( 14626., 30337., 0.)	( 14372., 30578., 0.)	( 14182., 30870., 0.)
( 13937., 30943., 0.)	( 13636., 30765., 0.)	( 50., 50., 0.)
( 14305., 2758., 0.)	( 14610., 2929., 0.)	( 14881., 3150., 0.)
( 15149., 3376., 0.)	( 15416., 3601., 0.)	( 15644., 3865., 0.)
( 15856., 4143., 0.)	( 16069., 4421., 0.)	( 16282., 4699., 0.)
( 16499., 4973., 0.)	( 16730., 5236., 0.)	( 16961., 5499., 0.)
( 17192., 5762., 0.)	( 17423., 6025., 0.)	( 17655., 6287., 0.)
( 17886., 6550., 0.)	( 18117., 6813., 0.)	( 18348., 7076., 0.)
( 18579., 7338., 0.)	( 18811., 7601., 0.)	( 18936., 7926., 0.)
( 19050., 8256., 0.)	( 19163., 8587., 0.)	( 19277., 8918., 0.)
( 19391., 9249., 0.)	( 19505., 9580., 0.)	( 19625., 9908., 0.)
( 19873., 10155., 0.)	( 20121., 10402., 0.)	( 20369., 10649., 0.)
( 20617., 10896., 0.)	( 20865., 11143., 0.)	( 21113., 11390., 0.)
( 21337., 11658., 0.)	( 21553., 11933., 0.)	( 21769., 12209., 0.)
( 21985., 12484., 0.)	( 22201., 12759., 0.)	( 22417., 13035., 0.)
( 22628., 13313., 0.)	( 22780., 13629., 0.)	( 22932., 13944., 0.)
( 23085., 14259., 0.)	( 23237., 14574., 0.)	( 23389., 14889., 0.)
( 23541., 15205., 0.)	( 23693., 15520., 0.)	( 23845., 15835., 0.)
( 23997., 16150., 0.)	( 24149., 16465., 0.)	( 24302., 16781., 0.)
( 24454., 17096., 0.)	( 24606., 17411., 0.)	( 24758., 17726., 0.)
( 24962., 18005., 0.)	( 25208., 18254., 0.)	( 25453., 18504., 0.)
( 25693., 18758., 0.)	( 25869., 19060., 0.)	( 26044., 19363., 0.)
( 26264., 19626., 0.)	( 26552., 19825., 0.)	( 26731., 20093., 0.)
( 26791., 20438., 0.)	( 26850., 20783., 0.)	( 26886., 21058., 0.)
( 26564., 21137., 0.)	( 26239., 21269., 0.)	( 26068., 21584., 0.)
( 25900., 21893., 0.)	( 26150., 22094., 0.)	( 26484., 22197., 0.)
( 26819., 22300., 0.)	( 26907., 22462., 0.)	( 26767., 22780., 0.)
( 26628., 23094., 0.)	( 26487., 23415., 0.)	( 26297., 23643., 0.)
( 25934., 23738., 0.)	( 25846., 24052., 0.)	( 25652., 24328., 0.)
( 25344., 24405., 0.)	( 24992., 24433., 0.)	( 24642., 24460., 0.)
( 24284., 24488., 0.)	( 23954., 24625., 0.)	( 23645., 24750., 0.)
( 23293., 24824., 0.)	( 22952., 24895., 0.)	( 22616., 24971., 0.)
( 22277., 25100., 0.)	( 21952., 25232., 0.)	( 21671., 25453., 0.)
( 21537., 25753., 0.)	( 21493., 26101., 0.)	( 21450., 26449., 0.)
( 21408., 26779., 0.)	( 21198., 27000., 0.)	( 20909., 27214., 0.)
( 20717., 27505., 0.)	( 20484., 27759., 0.)	( 20225., 27980., 0.)
( 19946., 28217., 0.)	( 19690., 28434., 0.)	( 19413., 28670., 0.)
( 19199., 28929., 0.)	( 18954., 29171., 0.)	( 18648., 29321., 0.)
( 18313., 29426., 0.)	( 17997., 29489., 0.)	( 17639., 29446., 0.)
( 17290., 29492., 0.)	( 16949., 29558., 0.)	( 16606., 29626., 0.)

**ANNEXURE : 2 Contd..**

( 16255., 29694., 0.)	( 15913., 29761., 0.)	( 15565., 29829., 0.)
( 15223., 29896., 0.)	( 14902., 30011., 0.)	( 14606., 30238., 0.)
( 14351., 30480., 0.)	( 14148., 30762., 0.)	( 13953., 30854., 0.)
( 13673., 30689., 0.)	( 14361., 2658., 0.)	( 14666., 2829., 0.)
( 14938., 3048., 0.)	( 15206., 3274., 0.)	( 15474., 3499., 0.)
( 15707., 3758., 0.)	( 15919., 4036., 0.)	( 16132., 4314., 0.)
( 16344., 4592., 0.)	( 16559., 4868., 0.)	( 16790., 5131., 0.)
( 17022., 5394., 0.)	( 17253., 5656., 0.)	( 17484., 5919., 0.)
( 17715., 6182., 0.)	( 17946., 6445., 0.)	( 18178., 6708., 0.)
( 18409., 6970., 0.)	( 18640., 7233., 0.)	( 18871., 7496., 0.)
( 19017., 7809., 0.)	( 19131., 8139., 0.)	( 19245., 8470., 0.)
( 19359., 8801., 0.)	( 19473., 9132., 0.)	( 19586., 9463., 0.)
( 19700., 9794., 0.)	( 19932., 10052., 0.)	( 20180., 10299., 0.)
( 20428., 10546., 0.)	( 20676., 10793., 0.)	( 20924., 11040., 0.)
( 21172., 11287., 0.)	( 21400., 11551., 0.)	( 21616., 11827., 0.)
( 21832., 12102., 0.)	( 22048., 12377., 0.)	( 22264., 12653., 0.)
( 22480., 12928., 0.)	( 22696., 13204., 0.)	( 22853., 13515., 0.)
( 23006., 13831., 0.)	( 23158., 14146., 0.)	( 23310., 14461., 0.)
( 23462., 14776., 0.)	( 23614., 15091., 0.)	( 23766., 15407., 0.)
( 23918., 15722., 0.)	( 24070., 16037., 0.)	( 24223., 16352., 0.)
( 24375., 16668., 0.)	( 24527., 16983., 0.)	( 24679., 17298., 0.)
( 24831., 17613., 0.)	( 25021., 17901., 0.)	( 25267., 18151., 0.)
( 25513., 18400., 0.)	( 25758., 18649., 0.)	( 25937., 18950., 0.)
( 26113., 19252., 0.)	( 26321., 19525., 0.)	( 26609., 19724., 0.)
( 26827., 19971., 0.)	( 26886., 20316., 0.)	( 26945., 20660., 0.)
( 27005., 21005., 0.)	( 26734., 21214., 0.)	( 26394., 21297., 0.)
( 26219., 21546., 0.)	( 26056., 21847., 0.)	( 26225., 21997., 0.)
( 26559., 22100., 0.)	( 26894., 22203., 0.)	( 27056., 22408., 0.)
( 26915., 22728., 0.)	( 26774., 23049., 0.)	( 26633., 23369., 0.)
( 26492., 23689., 0.)	( 26122., 23789., 0.)	( 25977., 24012., 0.)
( 25818., 24314., 0.)	( 25495., 24509., 0.)	( 25146., 24536., 0.)
( 24797., 24563., 0.)	( 24449., 24590., 0.)	( 24109., 24680., 0.)
( 23803., 24816., 0.)	( 23467., 24904., 0.)	( 23115., 24978., 0.)
( 22770., 25051., 0.)	( 22445., 25159., 0.)	( 22119., 25282., 0.)
( 21834., 25471., 0.)	( 21656., 25731., 0.)	( 21616., 26047., 0.)
( 21572., 26394., 0.)	( 21529., 26741., 0.)	( 21360., 27044., 0.)
( 21050., 27210., 0.)	( 20877., 27473., 0.)	( 20650., 27769., 0.)
( 20383., 27996., 0.)	( 20116., 28223., 0.)	( 19845., 28453., 0.)
( 19568., 28689., 0.)	( 19358., 28906., 0.)	( 19127., 29196., 0.)
( 18820., 29388., 0.)	( 18481., 29494., 0.)	( 18146., 29598., 0.)
( 17794., 29580., 0.)	( 17454., 29577., 0.)	( 17109., 29644., 0.)
( 16767., 29711., 0.)	( 16421., 29779., 0.)	( 16073., 29847., 0.)
( 15731., 29914., 0.)	( 15399., 29979., 0.)	( 15052., 30051., 0.)
( 14772., 30239., 0.)	( 14516., 30482., 0.)	( 14296., 30738., 0.)
( 14091., 31050., 0.)	( 13781., 30886., 0.)	( 13467., 30759., 0.)

**SOURCE INFORMATION**

Type	X1 (m)	Y1 (m)	X2 (m)	Y2 (m)	Height (m)	Width (m)	PM <sub>10</sub>		PM <sub>2.5</sub>		SO <sub>2</sub>		NO <sub>x</sub>		CO	
							(g/sec/ m <sup>2</sup> )	(g/s)	(g/sec/ m <sup>2</sup> )	(g/s)	(g/sec/ m <sup>2</sup> )	(g/s)	(g/sec/ m <sup>2</sup> )	(g/s)	(g/sec/ m <sup>2</sup> )	(g/s)
2	14027	2537	14670	2897	0.5	15	1.25E-6	0.0009	7.10E-7	0.0005	1.67E-5	0.0123	1.68E-4	0.1241	7.07E-5	0.0521
2	14670	2897	15531	3622	0.5	15	1.25E-6	0.0014	7.10E-7	0.0008	1.67E-5	0.0188	1.68E-4	0.1894	7.07E-5	0.0795
2	15531	3622	16490	4876	0.5	15	1.25E-6	0.0020	7.10E-7	0.0011	1.67E-5	0.0264	1.68E-4	0.2658	7.07E-5	0.1117
2	16490	4876	18883	7597	0.5	15	1.25E-6	0.0045	7.10E-7	0.0026	1.67E-5	0.0607	1.68E-4	0.6101	7.07E-5	0.2562
2	18883	7597	19665	9867	0.5	15	1.25E-6	0.0030	7.10E-7	0.0017	1.67E-5	0.0402	1.68E-4	0.4042	7.07E-5	0.1698
2	19665	9867	21224	11420	0.5	15	1.25E-6	0.0027	7.10E-7	0.0016	1.67E-5	0.0369	1.68E-4	0.3706	7.07E-5	0.1557
2	21224	11420	22666	13259	0.5	15	1.25E-6	0.0029	7.10E-7	0.0017	1.67E-5	0.0391	1.68E-4	0.3934	7.07E-5	0.1652
2	22666	13259	24873	17833	0.5	15	1.25E-6	0.0063	7.10E-7	0.0036	1.67E-5	0.0851	1.68E-4	0.8551	7.07E-5	0.3592
2	24873	17833	25723	18695	0.5	15	1.25E-6	0.0015	7.10E-7	0.0009	1.67E-5	0.0203	1.68E-4	0.2037	7.07E-5	0.0856
2	25723	18695	26195	19509	0.5	15	1.25E-6	0.0012	7.10E-7	0.0007	1.67E-5	0.0158	1.68E-4	0.1584	7.07E-5	0.0665

**ANNEXURE : 2 Contd..**

Type	X1 (m)	Y1 (m)	X2 (m)	Y2 (m)	Height (m)	Width (m)	PM <sub>10</sub>		PM <sub>2.5</sub>		SO <sub>2</sub>		NO <sub>x</sub>		CO	
							(g/sec/m <sup>2</sup> )	(g/s)	(g/sec/m <sup>2</sup> )	(g/s)	(g/sec/m <sup>2</sup> )	(g/s)	(g/sec/m <sup>2</sup> )	(g/s)	(g/sec/m <sup>2</sup> )	(g/s)
2	26195	19509	26756	19896	0.5	15	1.25E-6	0.0009	7.10E-7	0.0005	1.67E-5	0.0114	1.68E-4	0.1147	7.07E-5	0.0482
2	26756	19896	26962	21098	0.5	15	1.25E-6	0.0015	7.10E-7	0.0009	1.67E-5	0.0204	1.68E-4	0.2054	7.07E-5	0.0863
2	26962	21098	26311	21258	0.5	15	1.25E-6	0.0008	7.10E-7	0.0005	1.67E-5	0.0112	1.68E-4	0.1129	7.07E-5	0.0474
2	26311	21258	25926	21965	0.5	15	1.25E-6	0.0010	7.10E-7	0.0006	1.67E-5	0.0135	1.68E-4	0.1355	7.07E-5	0.0569
2	25926	21965	27038	22307	0.5	15	1.25E-6	0.0015	7.10E-7	0.0008	1.67E-5	0.0195	1.68E-4	0.1959	7.07E-5	0.0823
2	27038	22307	26434	23678	0.5	15	1.25E-6	0.0019	7.10E-7	0.0011	1.67E-5	0.0251	1.68E-4	0.2521	7.07E-5	0.1059
2	26434	23678	25989	23754	0.5	15	1.25E-6	0.0006	7.10E-7	0.0003	1.67E-5	0.0076	1.68E-4	0.0761	7.07E-5	0.0319
2	25989	23754	25874	24167	0.5	15	1.25E-6	0.0005	7.10E-7	0.0003	1.67E-5	0.0072	1.68E-4	0.0722	7.07E-5	0.0303
2	25874	24167	25628	24441	0.5	15	1.25E-6	0.0005	7.10E-7	0.0003	1.67E-5	0.0062	1.68E-4	0.0620	7.07E-5	0.0260
2	25628	24441	24259	24548	0.5	15	1.25E-6	0.0017	7.10E-7	0.0010	1.67E-5	0.0230	1.68E-4	0.2310	7.07E-5	0.0970
2	24259	24548	23733	24790	0.5	15	1.25E-6	0.0007	7.10E-7	0.0004	1.67E-5	0.0097	1.68E-4	0.0975	7.07E-5	0.0410
2	23733	24790	22663	25015	0.5	15	1.25E-6	0.0014	7.10E-7	0.0008	1.67E-5	0.0183	1.68E-4	0.1842	7.07E-5	0.0773
2	22663	25015	22005	25264	0.5	15	1.25E-6	0.0009	7.10E-7	0.0005	1.67E-5	0.0118	1.68E-4	0.1185	7.07E-5	0.0498
2	22005	25264	21618	25566	0.5	15	1.25E-6	0.0006	7.10E-7	0.0004	1.67E-5	0.0082	1.68E-4	0.0826	7.07E-5	0.0347
2	21618	25566	21447	26931	0.5	15	1.25E-6	0.0017	7.10E-7	0.0010	1.67E-5	0.0230	1.68E-4	0.2316	7.07E-5	0.0973
2	21447	26931	21010	27166	0.5	15	1.25E-6	0.0006	7.10E-7	0.0004	1.67E-5	0.0083	1.68E-4	0.0835	7.07E-5	0.0351
2	21010	27166	20677	27671	0.5	15	1.25E-6	0.0008	7.10E-7	0.0004	1.67E-5	0.0101	1.68E-4	0.1018	7.07E-5	0.0428
2	20677	27671	19386	28768	0.5	15	1.25E-6	0.0021	7.10E-7	0.0012	1.67E-5	0.0284	1.68E-4	0.2852	7.07E-5	0.1198
2	19386	28768	19127	29127	0.5	15	1.25E-6	0.0006	7.10E-7	0.0003	1.67E-5	0.0074	1.68E-4	0.0746	7.07E-5	0.0313
2	19127	29127	18815	29330	0.5	15	1.25E-6	0.0005	7.10E-7	0.0003	1.67E-5	0.0062	1.68E-4	0.0626	7.07E-5	0.0263
2	18815	29330	18083	29557	0.5	15	1.25E-6	0.0010	7.10E-7	0.0006	1.67E-5	0.0129	1.68E-4	0.1292	7.07E-5	0.0543
2	18083	29557	17571	29495	0.5	15	1.25E-6	0.0006	7.10E-7	0.0004	1.67E-5	0.0086	1.68E-4	0.0868	7.07E-5	0.0365
2	17571	29495	15040	29991	0.5	15	1.25E-6	0.0032	7.10E-7	0.0018	1.67E-5	0.0432	1.68E-4	0.4341	7.07E-5	0.1823
2	15040	29991	14762	30169	0.5	15	1.25E-6	0.0004	7.10E-7	0.0002	1.67E-5	0.0055	1.68E-4	0.0556	7.07E-5	0.0234
2	14762	30169	14313	30596	0.5	15	1.25E-6	0.0008	7.10E-7	0.0004	1.67E-5	0.0104	1.68E-4	0.1042	7.07E-5	0.0438
2	14313	30596	14077	30994	0.5	15	1.25E-6	0.0006	7.10E-7	0.0003	1.67E-5	0.0078	1.68E-4	0.0781	7.07E-5	0.0328
2	14077	30994	13603	30714	0.5	15	1.25E-6	0.0007	7.10E-7	0.0004	1.67E-5	0.0092	1.68E-4	0.0927	7.07E-5	0.0389
2	13603	30714	13170	30673	0.5	15	1.25E-6	0.0005	7.10E-7	0.0003	1.67E-5	0.0073	1.68E-4	0.0732	7.07E-5	0.0308
							<b>Total</b>	<b>0.0548</b>		<b>0.0312</b>		<b>0.7370</b>		<b>7.4085</b>		<b>3.1116</b>

**Note :**

- The coal transportation route is Bhupdeopur railway station-Dhimrapur circle-Chatamuda Circle-KWPCL which is about 50 km long.
- Total 8767.12 tonnes per day coal will be transported by trucks of 25 tonne carrying capacity which comes 351 trucks per day. The total traffic load for coal transportation is 351 x 2 = 702 truck trips (to and fro) per day.
- The emission standards for new heavy-duty engines—applicable to diesel vehicles with GVW > 3,500 kg has been considered as follows:

Year	Reference	Engine Steady State Cycle (ESC) test			Engine Load Response (ELR) test	
		CO (g/kWh)	HC (g/kWh)	NOx (g/kWh)	PM (g/kWh)	Smoke (m <sup>-1</sup> )
2010	Euro III	2.10	0.66	5.00	0.1/0.13	0.80

- Control measures applied during calculation are 20%.
- SO<sub>2</sub> emissions have been calculated on the basis of diesel consumption containing 0.25% of sulphur.
- PM<sub>10</sub> has been assumed as 37% of PM and PM<sub>2.5</sub> has been assumed 57% of PM<sub>10</sub>.
- Meteorology input has been taken hourly reading for 3 months of monitoring period.

Location of receptors and road (source) can be seen in Fig 1. The model was run to obtain the highest and the second highest 24 hour average concentration at each



**ANNEXURE : 2 Contd..**

receptor. Based on the result, the top 10 incremental GLC values is given in the subsequent table.

**TOP 10 TABLE FOR 24 HOUR AVERAGES**

Rank	Receptor	Co-ordinates		Ending Hour	PM <sub>10</sub>		PM <sub>2.5</sub>		SO <sub>2</sub>		NO <sub>x</sub>		CO	
		X	Y		GLC	Deposition	GLC	Deposition	GLC	Deposition	GLC	Deposition	GLC	Deposition
1	70	26013.0	21747.3	120.C	0.1492	0.0028	0.0850	0.0016	2.0050	0.0371	20.1556	0.3727	8.4654	0.1565
2	75	26864.9	22631.7	120.C	0.1467	0.0028	0.0836	0.0016	1.9719	0.0371	19.8234	0.3726	8.3258	0.1565
3	76	26723.8	22952.0	120.C	0.1467	0.0028	0.0836	0.0016	1.9719	0.0371	19.8233	0.3726	8.3258	0.1565
4	77	26582.6	23272.3	120.C	0.1467	0.0028	0.0836	0.0016	1.9718	0.0371	19.8225	0.3726	8.3255	0.1565
5	78	26441.5	23592.6	120.C	0.1467	0.0028	0.0836	0.0016	1.9715	0.0371	19.8193	0.3725	8.3241	0.1565
6	122	14266.8	30620.3	120.C	0.1464	0.0027	0.0834	0.0016	1.9680	0.0366	19.7842	0.3677	8.3094	0.1544
7	93	21839.0	25359.0	120.C	0.1461	0.0026	0.0833	0.0015	1.9640	0.0353	19.7437	0.3546	8.2923	0.1489
8	69	26180.6	21440.0	120.C	0.1458	0.0027	0.0831	0.0015	1.9598	0.0364	19.7016	0.3658	8.2747	0.1536
9	121	14510.0	30370.7	120.C	0.1441	0.0026	0.0821	0.0015	1.9370	0.0355	19.4722	0.3571	8.1784	0.1500
10	94	21587.8	25589.7	120.C	0.1439	0.0027	0.0820	0.0015	1.9350	0.0359	19.4520	0.3607	8.1698	0.1515

For clarity in GLC contour preparation, a separate study of 2 km section has been done and given in the table below. The GLC contours for the incremental values of various pollutants for the section is given Fig 2 to 6.

**TOP 10 TABLE FOR 24 HOUR AVERAGES (2 KM ROAD)**

Rank	Receptor	Co-ordinates		Ending Hour	PM <sub>10</sub>		PM <sub>2.5</sub>		SO <sub>2</sub>		NO <sub>x</sub>		CO	
		X	Y		GLC	Deposition	GLC	Deposition	GLC	Deposition	GLC	Deposition	GLC	Deposition
1	19	19350.0	28771.2	120.C	0.1505	0.0028	0.0858	0.0016	2.0236	0.0374	20.3427	0.3756	8.5440	0.1577
2	20	19338.3	28787.5	120.C	0.1458	0.0027	0.0831	0.0015	1.9605	0.0364	19.7090	0.3655	8.2778	0.1535
3	18	19361.7	28755.0	120.C	0.1418	0.0026	0.0808	0.0015	1.9056	0.0349	19.1568	0.3510	8.0459	0.1474
4	13	19436.7	28689.0	120.C	0.1406	0.0026	0.0802	0.0015	1.8904	0.0347	19.0044	0.3489	7.9818	0.1465
5	14	19421.4	28702.0	120.C	0.1406	0.0026	0.0802	0.0015	1.8903	0.0347	19.0031	0.3489	7.9813	0.1465
6	15	19406.2	28715.0	120.C	0.1406	0.0026	0.0801	0.0015	1.8898	0.0347	18.9980	0.3488	7.9792	0.1465
7	16	19391.0	28727.9	120.C	0.1406	0.0026	0.0801	0.0015	1.8896	0.0347	18.9961	0.3488	7.9784	0.1465
8	12	19451.9	28676.1	120.C	0.1405	0.0026	0.0801	0.0015	1.8881	0.0347	18.9811	0.3486	7.9721	0.1464
9	11	19467.1	28663.1	120.C	0.1403	0.0026	0.0800	0.0015	1.8859	0.0346	18.9589	0.3483	7.9627	0.1463
10	21	19326.6	28803.7	120.C	0.1402	0.0026	0.0799	0.0015	1.8850	0.0351	18.9496	0.3528	7.9589	0.1482

**KORBA WEST POWER COMPLANY LTD.**

**Noise Quality Monitoring**

Parameters	Unit	VILLAGES																			
		SUPA				KONDATARAI				KOSAMNARA				KIRODIMAL NAGAR				BHUPDEOPUR			
		2015-16																			
		Jan-Mar	Apr-Jun	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec
Noise Quality Monitoring Day	dB(A)	55.5	55.2	58.8	54.4	55.4	53.8	55.3	55.4	55.5	55.5	54.3	55.1	55.1	57.5	52.5	54.5	55.5	54	55	56.8
Noise Quality Monitoring Night	dB(A)	48.8	40.4	45	48.8	48.2	48.9	52.4	51.5	44.1	48.6	48.5	48.5	50.5	45.4	52.1	51.5	52.2	50.2	44.4	51.1
		2016-17																			
		Jan-Mar	Apr-Jun	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec
Noise Quality Monitoring Day	dB(A)	58.8	55.1	52.2	53.2	56.8	53.5	52.8	58.8	55.5	55.5	60.2	59.2	59.8	55.5	53.5	54.8	53.5	55.9	58	54.5
Noise Quality Monitoring Night	dB(A)	48.5	44.2	43.5	50.4	49.2	52.5	43.8	50.2	50.5	55.3	48.5	50.5	52.5	49.2	45.8	46.1	50.5	42.2	49.5	48.9
		2017-18																			
		Jan-Mar	Apr-Jun	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec
Noise Quality Monitoring Day	dB(A)	55.4	58.2	50.5	51	55.2	52.8	52.2	54.2	54.4	54.8	52.8	52.1	54.1	53.2	59.9	50.4	55.1	54	51.5	56.2
Noise Quality Monitoring Night	dB(A)	49.5	44.5	45.8	45.8	50.7	47.4	48.6	51	50.2	51.8	48.5	49	46.2	51.7	49.4	45	44.8	50.5	48.8	47.4

**KORBA WEST POWER COMPLANY LTD.**

**Ambient Air Quality Monitoring**

Parameters	Unit	Location																			
		SUPA				KONDATARAI				KOSAMNARA				KIRODIMAL NAGAR				BHUPDEOPUR			
		2015-16																			
		Jan-Mar	Apr-Jun	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec
Sulphur Dioxide (SO <sub>2</sub> )	µm/m <sup>3</sup>	12.8	14.6	8.6	10.6	14.4	13.2	10.5	15.6	13.6	12	8.6	11.5	8.4	18.4	11.6	13.5	11.2	13.2	11	14.4
Nitrogen Dioxide (NO <sub>2</sub> )	µm/m <sup>3</sup>	22.4	26.4	19.1	20.9	23.1	25.5	15.4	23.2	28.2	18.4	13.2	28	22	30.2	14.2	20.8	16.4	18.4	17.5	19.6
Particulate Matter <10.0 µm	µm/m <sup>3</sup>	69	98	55	72	78	112	49	88	75	118	56	94	94	96	55	102	104	90	50	88
Particulate Matter <2.5 µm	µm/m <sup>3</sup>	44	59	26	40	48	64	34	47	54	66	32	60	56	59	30	58	58	66	27	55
2016-17																					
Jan-Mar	Apr-Jun	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec		
Sulphur Dioxide (SO <sub>2</sub> )	µm/m <sup>3</sup>	11.6	16	12.6	14.6	15.6	16.4	8.2	11.8	14.6	16.6	7.6	13.2	11.2	15.4	13.1	14.6	11.1	15.8	6.4	16
Nitrogen Dioxide (NO <sub>2</sub> )	µm/m <sup>3</sup>	18.2	28.4	19	26.4	26.4	28	18	17.5	30.2	28	10.2	22.8	20.2	24.8	17.1	22.6	15.2	20.6	11.5	18.2
Particulate Matter <10.0 µm	µm/m <sup>3</sup>	92	118	52	90	82	88	50	94	88	105	48	98	84	92	60	88	87	100	51	92
Particulate Matter <2.5 µm	µm/m <sup>3</sup>	58	68	34	57	54	68	30	58	50	78	26	59	52	64	21	60	54	59	20	54
2017-18																					
Jan-Mar	Apr-Jun	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec		
Sulphur Dioxide (SO <sub>2</sub> )	µm/m <sup>3</sup>	11.6	18.2	8.4	13.1	13.2	18	7.5	13.1	11.5	13.2	9.1	10.6	12.5	15	9.5	13.8	14.6	15.2	6.9	10.2
Nitrogen Dioxide (NO <sub>2</sub> )	µm/m <sup>3</sup>	20.2	21.8	13.6	17.8	17.2	20.4	11	17.1	20.4	22.2	12	16.5	20	14.6	11.6	16.1	18.2	18.4	10.5	14.6
Particulate Matter <10.0 µm	µm/m <sup>3</sup>	84	102	50	68	86	95	44	68	68	90	50	76	99	89	44	80	78	86	48	75
Particulate Matter <2.5 µm	µm/m <sup>3</sup>	56	68	22	56	50	59	25	46	55	60	31	52	54	65	18	55	52	60	30	53