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Summary of Karo Exp OCP (1.5 MTPA)
&
Proposed Remediation Plan and Natural & Community Resource Augmentation Plan (NCRAP)

(As per MoEF&CC notification no S.O. 804 (E) , dated 14th March, 2017)

(Bokaro & Kargali Area)

Central Coalfields Limited
(April, 2017)

Prepared by
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Brief Description of Karo OCP

1 Introduction

Karo OCP is located in B&K Area of CCL in Bokaro district of Jharkhand. The PR of Karo OCP was approved by CIL Board for a rated capacity of 3.5 MTY in August, 2006. As per approved PR, two quarries were planned having a capacity of 1.5 MTPA for Quarry-I and 2.00 MTPA for Quarry-II.

The EC of project was granted for 1.50 MTPA capacity in Quarry-I only (limited to part area having released forest land and non-forest land only) vide letter number J-11015/544/2009-IA. II(M) dated 24.12.2014 within project area of 226.33 Ha (instead of original area of 570.26 Ha).

The Project Report of Karo Expansion OCP (11/15 MTPA) including Quarry-I & II and integrated non-coking coal Karo Washery (7.0 MTPA) was approved by CCL Board on 21.05.2013.

An application for EC of Karo Exp OCP (11.0/15.0 MTPA) including Quarry-I & II and integrated Karo Washery (7.0 MTPA) in overall project area of 552.84 Ha is under consideration of EAC (T&C), MoEF&CC for which ToR was granted on 3.11.15, PH held on 05.01.16 and proposal considered by EAC on 23.06.16. However this proposal involves forest land over 234.17 Ha (including belt conveyor route) for which stage-I FC is pending.

In the meanwhile, the coal production from EC approved capacity of 1.50 MTPA has exceeded as given below.

Year	Coal (MT)	OBR(Mm^3)
2014-15	1.63	0.68
2015-16	1.95	1.11
2016-17	1.50	0.77

2 Purpose of present proposal

This supplementary Remediation Plan and Natural and Community Resource Augmentation Plan (NCRAP) has been prepared for consideration of EAC (T&C), MoEF&CC for acceptation of NCRAP in respect of Karo OCP in view of violation of EIA Notification, 2006 on account of increase of production beyond the EC limit of 1.5 MTPA from Quarry-I.

3 Present Status of Mine

The mine management stopped coal production during the financial year 2016-17 after reaching the limit of 1.5 MT of coal in October, 2016.

4 Identification of project & project proponent

The project under consideration, i.e. Karo OCP is administratively under B&K Area of CCL headed by General Manager, B&K Area. Geologically, it falls in East Bokaro Coalfield in Bokaro District of Jharkhand.

The mailing address of the Project Officer is given below:

Karo OCP,
B&K Area, Central Coalfields Limited.
PO- Bermo
Dist- Bokaro, Pin – 829104

5 Location & Communication

The project is located in the north-eastern part of East Bokaro Coalfield between the latitude (N) – $23^0$47′02″ – $23^0$48′38″ and longitude (E) – $85^0$57′27″ – $85^0$58′38″.

East Bokaro Coalfield lies on Gomo-Barkakana-Dehri-on-Sone loop line of Eastern Railway. Nearest railway station is Bermo railway station on this line, which is located at a distance of about 5 Km from Karo OCP. Refer Location plan at Plate-I.

The east-west running Gomia-Jarangdih-Phusro-Jaina More road, which meets the Bisnugarh-Petarwar road and Dhanbad-Ramgarh road, connects the coalfield with Hazaribagh, Dhanbad and Ranchi. The project is also connected to Bokaro Thermal Power Station in the west and Phusro in the southeast by metal road. The nearest township is Phusro, which is situated at a distance of about 7 Km. Phusro is connected to the G.T. Road by Phusro and Dumri road. The nearest Air Port is Ranchi. However, there is a small airstrip located near Sawang colliery.

6 Climate & Rainfall

The climate is extreme. The summer, which is between April and June, is very hot. The maximum temperature reaches upto 46^0C during summer and the minimum temperature reaches 4^0C during winter months of December and January. The average annual rainfall is usually about 1250 mm.

7 Topography & Drainage

The entire topography of the block is rugged and pronounced with hills and valleys. The ground elevation varies from a maximum of 335m in north to a minimum of 236m in the south of the block. The general slope is towards south.

The drainage of the block is controlled by two nalas namely Karo nala (HFL 244 m) and Gati nala (HFL 245 m to the west of Quarry-II) flowing towards south. These nalas ultimately flow into the Damodar River. The block also has few ponds in the southeastern part. Refer plate II.

8 Importance of project

Central Coalfields Limited is facing increasing demand of coal because of increased demand from industry and power sector. Continuing and augmentation of coal production from the mines of CCL will help to bridge the gap of demand and supply of coal in India. To meet the growing demand of coal, especially in power and steel sectors, CCL has planned to increase its production capacity from 61.32 Mt. of coal during 2015-16 to 133.50 MTPA by 2019-20. Augmentation of capacity at Karo OCP will help CCL in meeting the growing demand of power grade coal in country and to fulfill the target of one billion tonne coal production of CIL.

9 Brief Description of Project

Base Seam

In Quarry-I, the base Seam considered is Seam -VI/VII/VIII combined. The Parting between Seam- VI/VII/VIII combined i.e. the base seam proposed for Karo Expansion OCP and seam lying below is Seam- V, at a parting range of 27.56 to 36.19 m. Thickness of Seam- V is 1.11 to 3.58 m. Therefore it will not be economical to mine out Seam- V in Quarry- I. So the Quarry floor has been fixed along the floor of Seam VI/VII/VIIIC. However it may be taken out by Underground Mining method after exhaustion of opencast mining.

Mining System

The method of mining adopted to extract coal and OB in Quarry- I by Surface Miner & Shovel-Dumper combination. This method has been proposed considering the following Geo mining conditions of the quarry.

i) Moderately steep (6-8 degrees) gradient of seams.
ii) Multiple seams.
iii) Sufficient strike length.
iv) Variable thickness of OB/Partings.

The dip of the formation varies from 6^{O} - 8^{0} in Quarry- I towards south. The quarriable area is traversed by 12 faults with throw ranging from less than 5m to over 80m.

Quarry-I is a working mine, it has advanced in dip side by approximately 800m from incrop of Seam-VI/VII/VIII.

Coal Winning

Considering the geo-mining conditions surface miner & shovel-dumper combination with drilling and blasting is being used for mining.

O.B. Removal

The total volume of OB to be removed from Quarry I is estimated as 26.77 Mcum (as on 01.04.2017). It is envisaged to dump 6.0 Mcum externally and balance 20.77 Mcum internally. The external dumping would be undertaken during the initial years. Approach road to project has been designed at a distance of 20 m to the north side from toe of external dump. Proposed route of Karo nala diversion has been kept further 20 m from approach road.

Garland drain and retention wall around external dump have been provided from safety point of view.

Mine Boundary for Quarry-I

The boundaries of the proposed quarry as shown in the Final Stage Quarry Plan have been fixed in the following manner:

Northern Boundary

The northern floor boundary has been fixed along the incrop of Seam-VI/VII/VIII combined. The present extent of mining has also been considered while defining this boundary.

Western Boundary

The western floor boundary lies along faults F_3, which is the common floor boundary with Quarry-II.

Southern Boundary

The southern surface boundary has been fixed at a distance of about 30m from the DVC lease line. In DVC leasehold, there is a quarry, which belongs to DVC. The surface barrier between the proposed Karo expansion OCP and DVC quarry is 30m.

Eastern Boundary

The eastern floor boundary has been fixed along the fault F_{1b} that acts as the common floor boundary of this quarry with Amlo (Dhori West) OCP in the east of Quarry-I. Amlo has already worked upto the upthrow side of the fault and the area is free from any OB Dump.

Mining Parameters

Parameters	**Unit**	**Min**	**Max**
Mineable reserves (on 01.04.2017)	(MT)	35.60	
Total OB	(MCum)	26.77	
Average Stripping Ratio	(Cum/T)	0.75	
Capacity	(MTY)	1.95	
Length along strike at floor	Km	0.56	1.09
Length along strike at surface	Km	0.75	1.19
Width along dip at floor	Km	0.98	1.2

Width along dip at surface	Km	1.39	1.90
Depth of quarry	m	125	
Area of Excavation at floor	Sqkm	1.07	
Area of Excavation at surface	Sqkm	1.48	

Minable Reserve & Life of Mine

There are all together four coal seams namely Seam-VI/VII/VIII, Seam-IX, Seam-X, and Seam-XI occurring within quarry-I of Karo OCP which have been considered for planning purpose. The strike of the strata is broadly E-W with southerly dip of about 6 degree to 8 degree with varying thickness. All the four seams within the block have potential for opencast mining.

The cumulative balance mineable reserves (after deducting production figures upto 31st March 2017) within the mining block have been estimated as 35.60 MTe with corresponding OB removal of 26.77 Mcum with an average stripping ratio of 0.75 cum/T.

10 Void Creation & Management

The void left at the end of mine life is about 30.14 Ha in Quarry-I, which is around 13.32 % of the project area of 226.33 Ha. The void so formed will be left as water body. Please refer Final Stage Plan at Plate-III.

11 Water Demand

Purpose	Water Demand (m^3/day)
INDUSTRIAL	
HEMM Washing	70
CHP/Industrial Premises	160
Workshop	45
Fire Service	315
Dust suppressing	470
Land Reclamation & Plantation	70
Total	1130
DOMESTIC (Township)	
Housing	400
Service Building	40
Process & Loss	40
Total	480
Total Industrial and Domestic water demand	1610

At present drinking water supply in the area is being done through IWSP (Integrated Water Supply Projects) under which Kargali Filter Plant supplies domestic water to Project Area and nearby locations such as Kargali Bazar, Gandhi Nagar, Jawahar Nagar, Subhas Nagar, Kurukpania Village, Bermo Colony, Ghutia Tand Village, Ram Nagar Colony etc.

The domestic (raw water use) and Industrial water supply of the project will be met by mine discharge.

12 Source of Electrical Power Supply

Karo OCP is receiving power at 11 kV from the existing 33/11 kV substation of CCL located in the area. This substation receives power at 33 kV from Bokaro Thermal Power Station of DVC. One number sub-station of capacity 11/3.3 kV, 1.6 MVA is existing in the Karo OCP to cater the existing loads of the project. This system will continue.

13 Coal Handling & Dispatch System

It is proposed to transport non-coking coal from mine to Kargali Railway Siding and coking coal to Kargali washery/ siding. Length of transport route is about 4.0 km. This system will continue till the time of commissioning of belt conveyors after forest land diversion.

14 Description of the Environment

Ambient Air Quality as per latest baseline study (Oct'15 to Jan'16)

Ambient air quality study was done in core & buffer zone of Karo OCP at six locations during Post-monsoon season between October' 2015 to January' 2016 at the following stations.

Location Name	Stn Code	Nature of sampling station	Direction (w.r.t core zone)
Workshop	SA1	RDS & FDS machines were placed on the rooftop of Workshop Office to assess air quality from mining / vehicular transport.	In core zone
Baidya Karo Basti	SA2	The machines were placed on the rooftop of Mr Narayan Mahato's residence to assess air quality from mining/ vehicular transport.	-do-
Subhash Nagar	SA3	The machines were placed very close to project boundary in Subhash Nagar Colony.	South East
Charakpaniya	SA4	The machines were placed at a distance of 0.30 km from mine lease boundary.	North
Kurpaniya Colony	SA5	The machines were placed at the rooftop of Bokaro Rest House at a distance of about 1.5 km from mine.	West
GM Office	SA6	The machines were placed at the rooftop of Transit Camp B & K Area, CCL Kargil.	South

Station number	Sampling station	24 Hours average concentration (µg/ m^3)			
		PM_{10}	**$PM_{2.5}$**	**SO_2**	**NO_X**
SA - 1	Workshop	157.46	67.82	24.35	30.17
Sa – 2	Baidya Karo Basti	137.00	62.21	18.66	30.25
Limit as per Coal Mining Standard, 2000		**300.00**	**-**	**80.00**	**80.00**
SA - 3	Subhash Nagar	65.25	39.38	18.28	30.18
SA - 4	Charakpaniya	67.10	42.63	12.42	32.15
SA - 5	Kurpaniya Colony	71.66	47.08	14.63	29.83
SA - 6	GM Office	74.40	54.31	9.47	30.97
Limit as per NAAQS, 2009		**100.00**	**60.00**	**80.00**	**80.00**

Ambient Air Quality of main parameters as per routine monitoring in core zone

Quarter ending	24 Hours average concentration (µg/ m^3)			
	PM_{10}	$PM_{2.5}$	SOx	NOx
Sept'2015	88.00	-	<25	20.75
Dec' 2015	96.25	42.00	<25	20.75
Mar' 2016	129.25	54.25	<25	20.75
June' 2016	88.25	42.25	<25	<6.00
Sept'2016	77.75	34.00	<25	<6.00
Dec' 2016	66.00	26.00	<25	<6.00
Coal Mining Standard	**300.00**	**-**	**80.00**	**80.00**

Ambient Air Quality of main parameters as per routine monitoring in nearby New Karo Colony

Quarter ending	24 Hours average concentration (µg/ m^3)			
	PM_{10}	$PM_{2.5}$	SOx	NOx
Sept'2015	75.00	-	<25	22.00
Dec' 2015	80.00	31.00	<25	21.00
Mar' 2016	76.00	53.00	<25	20.00
June' 2016	86.00	43.00	<25	<6.00
Sept'2016	79.00	28.00	<25	<6.00
Dec' 2016	60.00	23.00	<25	<6.00
NAAQS, 2009	**100.00**	**60.00**	**80.00**	**80.00**

Ambient Noise Level Observations as per baseline study

Station Code		Noise level in dB(A)			
		Maximum	Minimum	Day (leq)	Night (leq)
Ambient Noise Level (dBA)					
N1	Workshop	63.2	51.0	60.5	53.9
N2	Baidya Karo Basti	59.8	43.6	54.8	44.8
N3	Subhash Nagar	65.5	53.9	63.9	56.9
N4	Charakpaniya	65.8	52.6	60.2	52.6
N5	Kurpaniya Colony	55.3	43.6	53.6	44.2
N6	GM Office	53.3	43.6	51.9	45.6

Ambient Noise Level Observations as per routine monitoring

Location	Type of sampling point	Noise level in dB(A) Leq							
		Sept'15	Dec'15	Mar'16	June'16	Sept' 16	Dec' 16	Average	Limit
New Karo Colony	Residential	44.1	43.6	43.7	48.8	49.8	49.7	47.06	55.00
Karo Village	In mining area	43.5	44.1	44.3	50.1	48.7	48.5	47.21	55.00

Water quality status as per baseline study

For assessing the water quality, 6 location water-sampling locations were selected as per detail given below.

Stn No.	Name of sampling station	Type of sample
DW1	Hand Pump in Ghutia Tand	Ground water
DW2	Hand Pump in Baidya Karo Basti	-do-
SW1	Godo Nala	Surface water
SW2	Damodar River	-do-
SW3	Konar River	-do-
EW1	Effluent from Karo OCP	Effluent

Observations:

GROUND WATER QUALITY DATA

The summary of few important parameters is given below:

Location Code	pH	TDS (mg/l)	Chloride (mg/l)	Fluoride (mg/l)	Nitrate (mg/l)	Iron (mg/l)	Total Coliform (MPN/100ml)
GW-1	7.44	389	26	0.91	8.81	0.14	Absent
GW-2	6.94	394	28	0.89	10.10	0.16	Absent
IS: 10500:1991 (Reaff:2012)	6.5-8.5	500	250	1.00	45.00	0.30	Absent

GW_1: Bhutia Tand, Hand Pump **GW_2:** Bore Well of Baidya Karo Basti

SURFACE WATER QUALITY DATA

The summary of few important parameters is given below:

Location Code	pH	TDS (mg/l)	Chloride (mg/l)	Fluoride (mg/l)	Nitrate (mg/l)	Iron (mg/l)	Total Coliform (MPN/100ml)
SW-1	7.41	452	50.0	0.38	8.00	0.06	160
SW-2	7.46	400	42.5	0.43	8.48	0.14	180
SW-3	7.31	410	48.0	0.48	5.86	0.098	120
IS: 2296 (Class C)	6.5-8.5	1500	600	1.50	50.00	50.00	5000

SW_1: Godo Nala, **SW_2:** Damodar River, Konar River- **SW_3**

EFFLUENT WATER QUALITY DATA

EW_1: Karo OCP Discharge

Location Code	pH	TSS (mg/l)	BOD (mg/l)	COD (mg/l)	Chloride (mg/l)	O & G(mg/l)	Ammonical Nitrogen as NH_3-N (mg/l)
EW-1	7.46	10.1	3.0	8.0	40.0	BDL	0.22
GSR 422(E) Std.	5.5-9.0	100	30	250	2.0	10.0	50.0

NOTE: The concentration of all parameters except pH is in mg/l.

Conclusion:
All parameters as given above in respect of ground water samples, surface water samples & mine effluent are within the permissible limit.

Quarterly concentration of main parameters as per routine monitoring

Parameter wise quarterly concentration of main parameters (in mg/litre except pH)									
SN	Parameter	Sept'15	Dec'15	Mar'16	Jun'16	Sep'16	Dec'16	Average	Limit
1	pH	7.44	7.93	7.47	7.05	8.09	7.88	7.62	5.5-9.0
2	TSS	31.00	30.00	21.00	38.00	20.00	20	26.14	100.00
3	Oil & Grease	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	10.00
4	COD	38.00	36.00	28.00	44.00	28.00	28	34.00	250.00
5	BOD (3 days & 27 ^{0}C)	2.00	2.00	2.00	2.00	2.00	2.00	2.00	30.00
6	Iron as Fe	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	3.00
7	Fluoride	0.60	0.75	0.79	1.01	0.2	0.78	0.67	2.00

The above table indicates that the mine water discharged into the local drainage fully conforms with MoEF&CC Schedule-VI standard, for discharge into surface water bodies.

15 Stage-wise land-use and reclamation plan (Ha)

The final land use plan (Post mining) is given in Table below. It is shown in Plate-IV also.

Land use upto end of mining		**Post-mining land use**	
Particulars	**Area (Ha)**	**Particulars**	**Area (Ha)**
Quarry	146.44	Water body	30.14
		Plantation	92.14
		Quarry batter	24.16
External OB dump	33.40	Plantation	33.40
Infrastructure	14.19	CCL future use	14.19
Land for road diversion	1.00	Public use	1.00
Land for nala diversion	1.00	Water body	1.00
Safety zone/Green belt	30.30	Undisturbed/ vacant	24.74
		Plantation / Green belt	5.56
Total	226.33	Total	226.33

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Supplementary Remediation Plan and Natural & Community Resource Augmentation Plan (NCRAP)

1 The examination of the proposal with an angle that the project or activity is a permissible activity at the site on which it has come up. If it is not then the recommendation of EAC will be for closure.

Karo OCP is an existing coal mining project of CCL lying in East Bokaro Coalfield. The project area is coal bearing & land was acquired under CBA Act, 1957. There are number of other projects in adjoining locations and Karo OCP lies to the north of Bokaro Colliery and Bermo Quarry of DVC, to the west of Amlo Project and to the east of Konar Project. The project has existing EC capacity of 1.50 MTPA in project area of 226.33 Ha.

The production in last few years is given below.

Year	Coal (MT)	OBR(Mm^3)	Composite Excavation (Mm^3)
2014-15	1.63	0.68	1.72
2015-16	1.95	1.11	2.35
2016-17	1.50	0.77	1.73

Note: The composite specific gravity is 1.57 Te/m^3 of coal (1.55 for seams IX, X & XI and 1.64 for seam VI-VII comb) for calculation of composite excavation.

However, as per calendar program of Quarry-I submitted to EAC at the time of presentation for EC of 1.50 MTPA, the highest OB generation was 1.65 Mm3 for corresponding 1.50 MT coal production. This comes to 2.61 Mm3 composite excavation of coal+OB. This limit has never been exceeded in any of previous years in Karo OCP.

The project has run in violation in previous years on account of coal production beyond the prescribed EC capacity of 1.50 MTPA.

However, the production was done as per the technology approved in the EC and coal extraction was done within the approved quarry area of 146.44 Ha permitted as per EC condition.

Further, the expansion of project from 1.50 MTPA to 11.0/15.0 MTPA along with coal washery was considered by EAC for EC on 23.06.2016 after conducting PH in January, 2016.

In view of above, it can be said that the project is a permissible activity at the site on which it has come up.

2 All the cases of violation, irrespective of category, will be appraised as category "A" projects by respective sector Expert Appraisal Committee (EAC) at Central level. So, violation cases can only be appraised at the level of Ministry.

Karo OCP is a category-A project and this proposal is being submitted to Expert Appraisal Committee (EAC) at Central level for appraisal.

3 Respective EAC will prescribe the specific ToR for assessment of ecological damage, Remediation Plan and Natural and Community Resource Augmentation Plan (NCRAP) in addition to general ToR required under EIA Notification, 2006 for undertaking EIA/EMP.

An application for EC of Karo Exp OCP (11.0/15.0 MTPA) comprising of Quarry-I & II and integrated Karo Washery (7.0 MTPA) in overall project area of 552.84 Ha is under consideration of EAC (T&C), MoEF&CC for which ToR was granted on 3.11.15, PH held on 05.01.16 and proposal was considered by EAC on 23.06.16.

In view of this, it is proposed that in place of a fresh ToR, EC for coal production of 11/15 MTPA with coal washery be considered on basis of the Remediation Plan & Natural & Community Resource Augmentation Plan (NCRAP) proposed below, for violation of EC capacity of 1.50 MTPA.

4 Economic benefits derived due to violation.

Year	Coal (MT)	Cost per Te (Rs)	Selling Price per Te (Rs)	Profit per Te (Rs)	Production more than EC capacity (MTPA)	Gross benefit of excess production (Rs Crore)*
2014-15	1.63	1107.02	1397.07	290.05	0.13	3.77
2015-16	1.95	920.37	1700.99	780.62	0.45	35.12
Total						38.89

*The accrued cumulative benefit on account of excess production is about Rs 38.89 Crore.

5 Assessment of ecological damage due to violation.

The major impact because of additional coal production to the tune of 0.45 MT (Maximum) beyond the EC capacity is mainly on ambient air quality due to additional material handling & transport. The assessment of air quality due to additional production is given below (based on FDM model for 1.95 MTPA coal production).

Zone Category	24 Hours average PM10 concentration (μ g/ m^3)					
	Incremental Concentration without control measures **(BAU)**	Incremental Concentration with control measures	Background/ Baseline concentration	Total predicted concentration without control measures **(BAU)**	Total predicted concentration with control measures	Permissible limit
A1-Workshop	82.47	10.77	157.46	239.93	168.23	300
A2-Baidyakaro	0.00	0.00	137.00	137.00	137.00	
A3-Subhash Nagar	0.13	0.02	65.25	65.38	65.27	100
A4-Charakpaniya	0.00	0.00	67.10	67.10	67.10	
A5-Kurpaniya Colony	0.11	0.06	71.66	71.77	71.72	
A6-GM Office	0.35	0.06	74.40	74.75	74.46	

The table below shows predicted ambient air quality status (1.50 MTPA vs 1.95 MTPA).

Sl N	Category of station	Predicted concentration as per EIA & EMP of 1.50 MTPA project	Predicted concentration as per 1.95 MTPA coal production
		PM10 Concentration (μg/m3)	
1	Core Zone	138.16	168.23
2	Buffer Zone	69.65-87.76	65.27-74.46

The monitored values are given earlier in Table at Pg. No.9. The values are within limits. However, remediation plan for further improvement in ambient air quality is given below.

Minor impact will be on water regime due to additional mining for which the remediation plan is also given below.

6 Proposed Remediation Plan and Natural and Community Resource Augmentation Plan (NCRAP)

SN	Environmental/ Social Issue	Existing measures	Proposed measures	Category of Plan	Cost of proposed mitigation measure (Rs Lakh)
1	Air pollution mitigation	2 nos. of 28KL and 2 nos. of 8KL of Water sprinklers are deployed.	Additional 1no. of 28KL mist type water Sprinkler is proposed.	Remediation plan	125.00
		Plantation on 8 Ha of land done on internal OB Dump	Plantation around feeder breaker, workshop & along coal transportation road with 3 storied multi species saplings.	Remediation plan	15.00
		Repair of coal transportation road.	Additional expenditure in this head to be incurred for 1.56 Km of metalled coal transport road to improve air quality.	Remediation plan	56.00 Completed in Dec'16
2	Water pollution mitigation	Garland drain of dimension 200 m (L) X 1.5m (W) X1.0m (D) is provided.	Additional expenditure for garland drain of 3 Km length to channelize and store water in check dam.	Natural Resource Augmentation Plan	40.00
		ETP in the workshop is operating.	Up-gradation / strengthening of ETP	Remediation plan	10.00
		Various ground water recharging activities (ponds, check dam, etc under CSR / planned activities around mine).	Construction of check–dam for water conservation and use by community.	Natural Resource Augmentation Plan	100.00

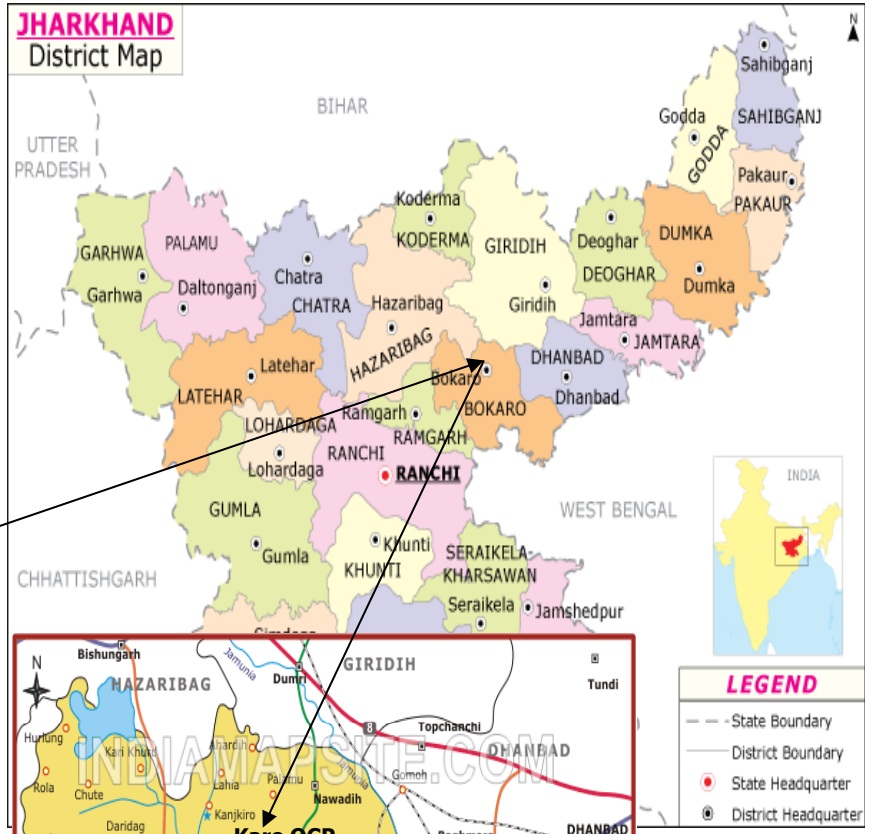
SN	Environmental/ Social Issue	Existing measures	Proposed measures	Category of Plan	Cost of proposed mitigation measure (Rs Lakh)
3	Socio-economic issues	Health camps in the neighboring villages	Additional health camps in Karo, Baid-Karo, Kargali, Bardi-Kudi & Amlo villages	Community Resource Augmentation Plan	3.00
Total					349.00
Amount already spent (Rs Lakh)					56.00
Balance amount (Rs Lakh)					293.00

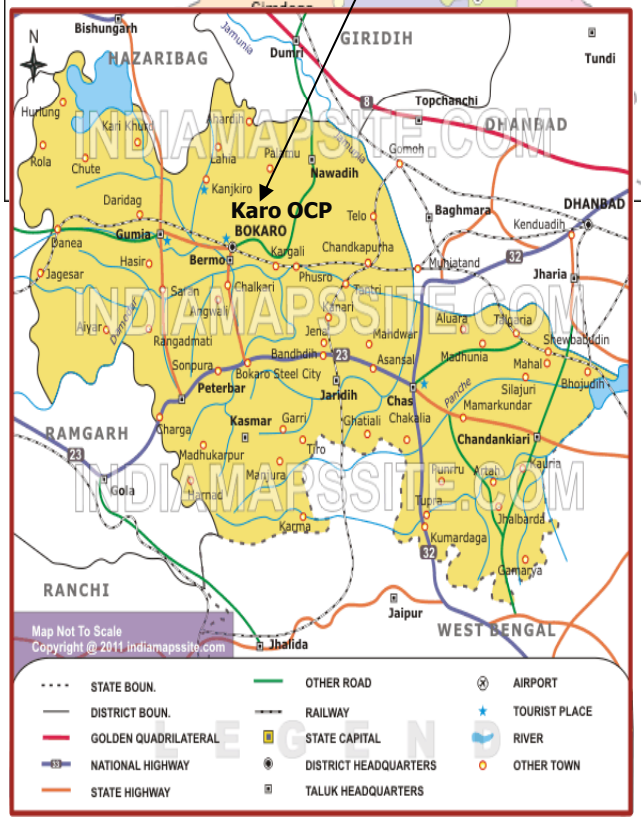
6 Detail of accredited consultant & environmental laboratory

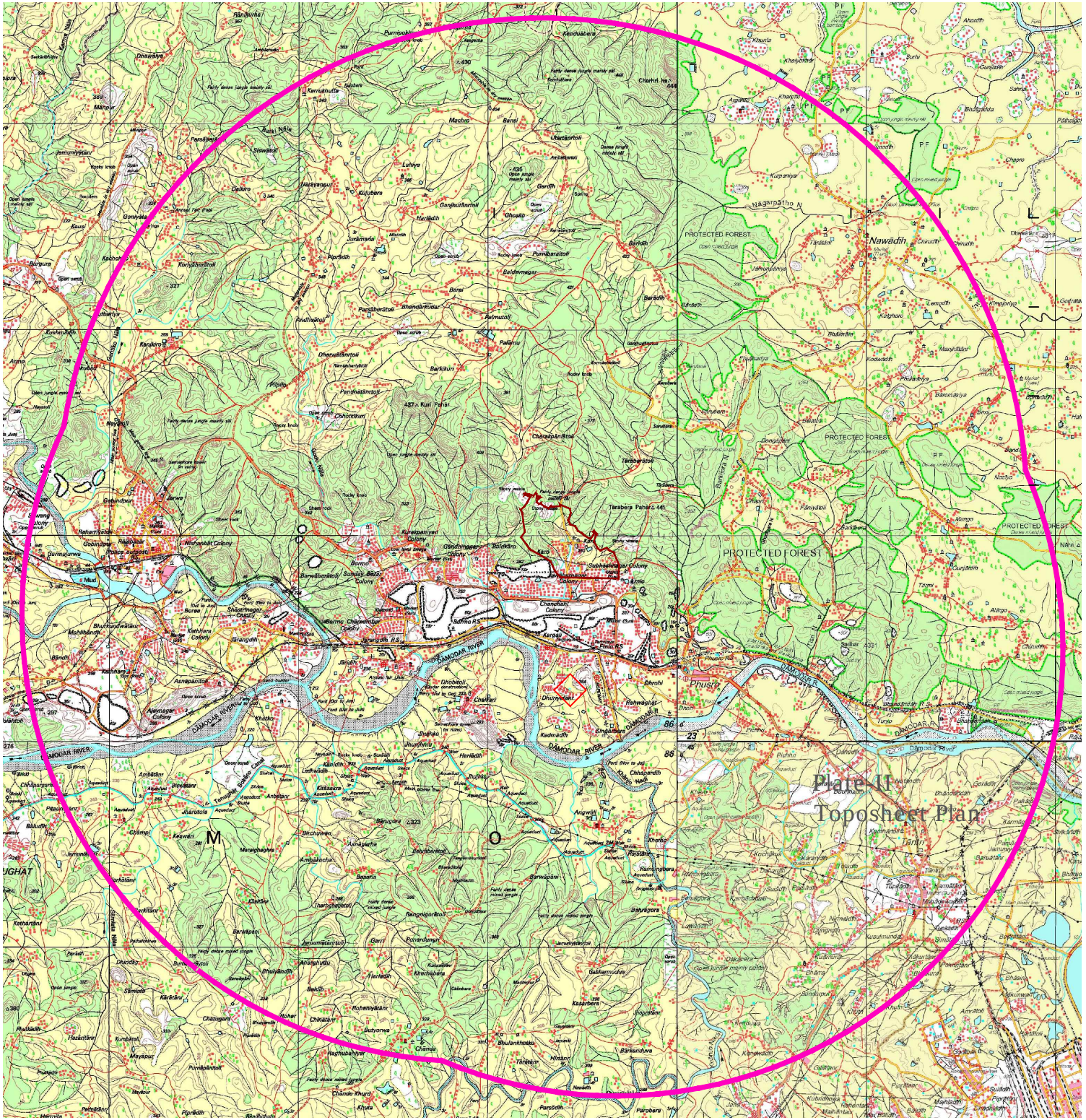
SN	Field of activity/ study	Name of the Agency	Name & address of concerned officer
1	Remediation Plan and Natural and Community Resource Augmentation Plan (NCRAP)	Central Mine Planning & Design Institute Limited (A subsidiary of Coal India Limited) QCI/NABET Accredition: Vide letter number NABET/EIA/01/12/002 dated 31.01.2012	AK Das, Regional Director, Regional Institute-III, CMPDI, Gondwana Place, Kanke Road, Ranchi-834008 Phone: 0651-2231506 Fax:0651-2231501 Mobile:8987788893 Email: rdri3.cmpdi@coalindia.in
2	Geological Report	-do-	AK Das, Regional Director, Regional Institute-III, CMPDI, Gondwana Place, Kanke Road, Ranchi-834008 Phone: 0651-2231506 Fax:0651-2231501 Mobile:8987788893 Email: rdri3.cmpdi@coalindia.in
3	Project report	-do-	
4	Seasonal Ambient Air Quality, water quality Study	Ecomen Laboratories NABL Certificate of Accreditation Certificate No: T-2202 Issue Date: 25.7.2014 Valid Till: 24.7.2016	Ecomen Laboratories Pvt Ltd Flat no. 5 to 8, IInd Floor, Arif Chamber-V, Sector-H, Aliganj, Lucknow, Uttar Pradesh, PIN: 226024 Phone: 0522-2746282 Fax: 0522-2745726 Email:ravi.bhargava@gmail.com Website: www.ecomen.in

PLATES

1. Ranchi -130 km
2. Bokaro -30 km
3. Nearest Rly. Stn.- Bermo at 4 km






PROTECTED FOREST
PROTECTED FOREST
PROTECTED FOREST
DAMODAR RIVER
DAMODAR RIVER
DAMODAR RIVER
DAMODAR R.
Phusro
Nawadih
Plate II
Toposheet Plan

CHARAK PANIA VILLAGE

EXT-2
+395

Melamorphic Line

WASHERY

Workshop

INDUSTRIAL AREA

SS-1

ROM STOCKYARD

+310

Ext (Under Process & Mine)
+310

Proposed Diversion of Karo Nala

Approach Road to Project

+300

J1

Gati nala

Bald karo

DVC Berro Leasehold Line

Existing road

Plate-IV

All values are in meters.

Legend

Sl No.	Particulars	Symbol
01	SURFACE COUNTOUR	265
02	FLOOR COUNTOUR	170
03	FAULT	
04	EXTERNAL DUMP	
05	INTERNAL DUMP	
06	PROPOSED DIVERTION KARO NALA	
07		
08		
09		

Reference Drawings

Sl No.	Particulars	Ref. Number
01	Geological Plan of Karo Eastern Block, East Bokaro CF	R III/G/2476
02	Working Plan of Karo Seam Quarry (X to VI) as on 20/10/03	Colliery Plan
03	Floor Contour & Isochore Plan of Seam-VI, Karo Eastern Block	R III/G/2442

Customer: CENTRAL COALFIELDS LIMITED

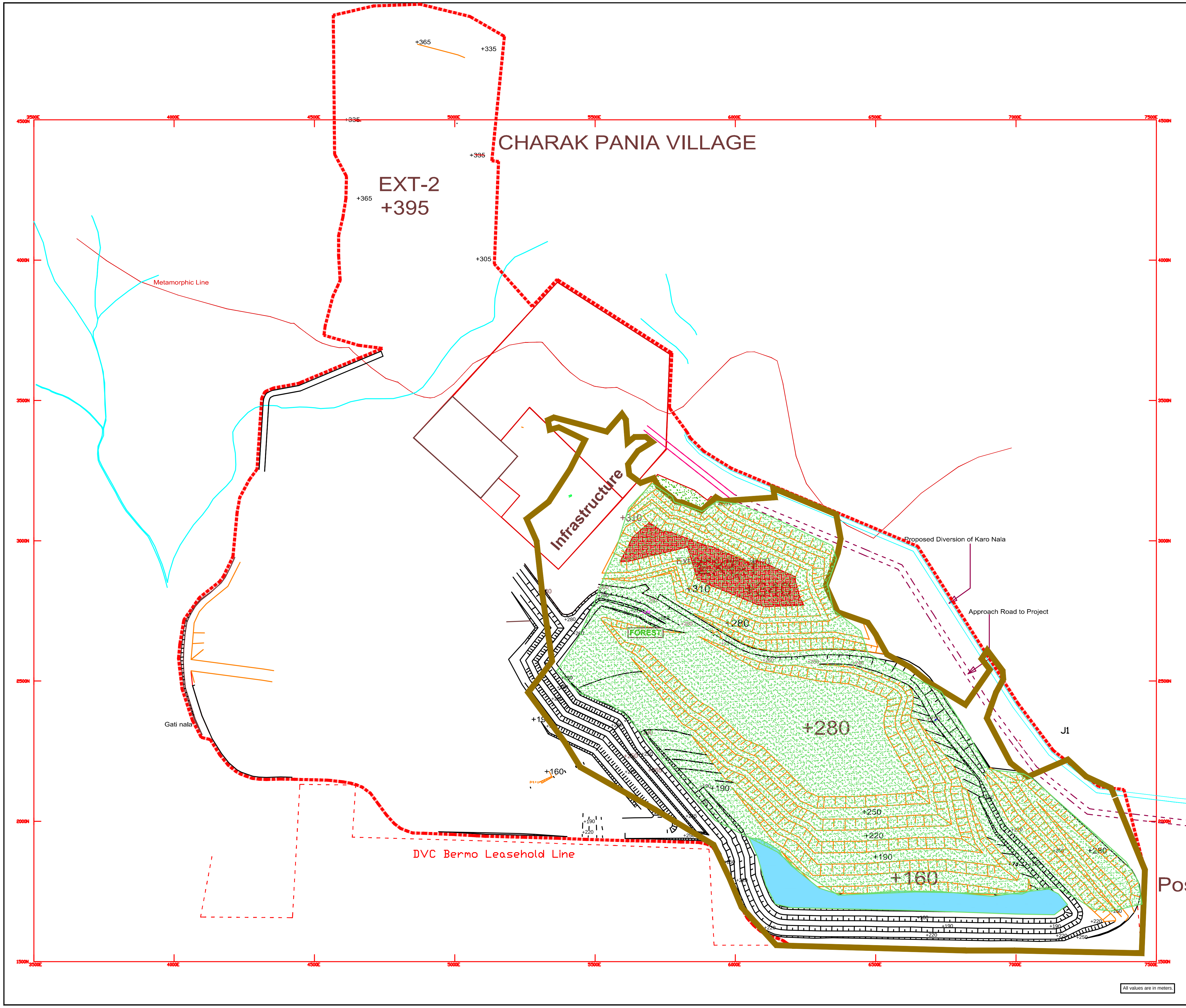
Job Title: PROJACT REPORT FOR KARO OCP — Job No. 341301

Subject: FINAL STAGE DUMP PLAN

Activity	Name	Designation	Signature	Date
Created				
Created	Kanchan Sinha	Sr Mgr(Excom)		16/3/2015
Checked	Jayant Chakravarty	HOD(MP)		16/3/2015
Approved	Dr A Sinha	CGM		16/3/2015

CMPDI, R.I.-III
A MINI RATNA COMPANY

Scale: 1 : 4000 — Sheet — Drg No. — Rev.No.



Post mining landuse plan

Plate-V

Legend

Sl No.	Particulars	Symbol
01	SURFACE COUNTOUR	
02	FLOOR COUNTOUR	170
03	FAULT	
04	EXTERNAL DUMP	
05	INTERNAL DUMP	
06	PROPOSED DIVERTION KARO NALA	
07		
08		
09		

Reference Drawings

Sl No.	Particulars	Ref. Number
01	Geological Plan of Karo Eastern Block, East Bokaro CF	R III/G/2476
02	Working Plan of Karo Seam Quarry (X to VI) as on 20/10/03	Colliery Plan
03	Floor Contour & Isochore Plan of Seam-VI, Karo Eastern Block	R III/G/2442

Customer: CENTRAL COALFIELDS LIMITED

Job Title: DRAFT PROJACT REPORT FOR KARO OCP (11.0 MTY) | Job No. 341301

Subject:

Activity	Name	Designation	Signature	Date
Created				
Created	Kanchan Sinha	Sr Mgr(Excvn)		16/3/2013
Checked	Jayant Chakravarty	HOD(MP)		16/3/2013
Approved	Dr A Sinha	R.D.		16/3/2013

Scale: 1 : 4000 | Sheet:

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Drg.No. R III OCM 000942 | Rev.No.

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