



**CENTRALCOALFIELDS LIMITED**  
(A subsidiary of Coal India Ltd)  
(A MINIRATNA COMPANY)  
**OFFICE OF THE PROJECT OFFICER**  
**KEDLA OPENCAST PROJECT**  
**P.O: KEDLA: DIST: RAMGARH (JHARKHAND)-825325**

Ref. PO/KOCP/ENV/2019/ 232

Dated: 30.04.2019

To  
Member Secretary,  
EAC (Violation),  
Ministry of Environment, Forest and Climate Change,  
Indira Paryawaran Bhawan, Vayu Wing,  
Jor Bagh Road, Aliganj,  
New Delhi-3

**Sub: Reply to the proposal No. . [IA/JH/CMIN/74115/2018 DATED 11.04.2018] [F. NO. 23-244/2018-IA.III (V)] Kedla OCP (1.35 MTPA (Peak))**

**Ref: MINUTES OF 13TH MEETING OF EAC (VIOLATION), 19<sup>TH</sup> SEPTEMBER 2018**

Dear Sir,

The EAC for Kedla OCP (1.35 MTPA (Peak)) was held on 19.09.2018. The reply to the observation made by the EAC as detailed in the minutes of meeting is enclosed for kind consideration and issuance of Terms of Reference.

Yours Faithfully

Project Officer  
Kedla OCP

**Project Officer**  
**Kedla O/C Project**

**KEDLA OPENCAS T PROJECT (1.35 MTPA PEAK) OF M/S CENTRAL COALFIELDS LIMITED LOCATED AT WEST BOKARO COALFIELD IN MANDU DEVELOPMENT BLOCK OF RAMGARH DISTRICT, JHARKHAND - TERMS OF REFERENCE**

**REF: 1. [IA/JH/CMIN/74115/2018 DATED 11.04.2018] [F. NO. 23-244/2018-IA.III (V) ]  
2. MINUTES OF 13TH MEETING OF EAC (VIOLATION), 18<sup>TH</sup> SEPTEMBER 2018**

**RECOMMENDATIONS OF EAC AND REPLY TO ITS OBSERVATIONS:**

<b>S. No.</b>	<b>Observations and Recommendations of committee</b>	<b>Compliance/Action Taken</b>																
I.	Submission of revised pre-feasibility report.	Enclosed as Annexure-I																
II.	Surface drainage plan within 2km, 5km and 10km is to be submitted	Enclosed as Annexure-II																
III.	Submission of Dump management plan.	Enclosed as Annexure-III																
IV.	Forest clearance status.	<table border="1"> <thead> <tr> <th><b>Type of forest land &amp; status of diversion</b></th> <th><b>Land in ha.</b></th> </tr> </thead> <tbody> <tr> <td>Notified Forest land Stage-I diverted</td> <td>168.50</td> </tr> <tr> <td>Forest land released before 1980</td> <td>69.57</td> </tr> <tr> <td>Area of notified forest land for which NPV is paid</td> <td>139.00</td> </tr> <tr> <td>Area of GMJJ land for which NPV is paid</td> <td>135.38</td> </tr> <tr> <td><b>Total Forest Land</b></td> <td><b>512.45</b></td> </tr> <tr> <td><b>Total Non Forest Land</b></td> <td><b>572.04</b></td> </tr> <tr> <td><b>Total Project Area</b></td> <td><b>1084.49</b></td> </tr> </tbody> </table> <p>Stage- I Forest Clearance for 168.50ha. is accorded vide letter no. FC NO. 8-55/2003 FC dated 23<sup>rd</sup> August, 2004 (Enclosed as Annexure-IV).</p>	<b>Type of forest land &amp; status of diversion</b>	<b>Land in ha.</b>	Notified Forest land Stage-I diverted	168.50	Forest land released before 1980	69.57	Area of notified forest land for which NPV is paid	139.00	Area of GMJJ land for which NPV is paid	135.38	<b>Total Forest Land</b>	<b>512.45</b>	<b>Total Non Forest Land</b>	<b>572.04</b>	<b>Total Project Area</b>	<b>1084.49</b>
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<b>Total Project Area</b>	<b>1084.49</b>																	
V.	DGMS permission for blasting at project site is to be submitted.	Enclosed as Annexure-V																
VI.	Mine water drainage plan along with protection measures for nearby water	Enclosed as Annexure-VI																
VII.	Submission of detail plan for rain harvesting water.	Proposal has been initiated for the rain water harvesting cum ground water recharge. Design and Proposal Enclosed as																

		Annexure-VII
VIII.	Mining lease document is to be submitted.	Enclosed as Annexure-VIII
IX.	Past production details since inception of mine.	Enclosed as Annexure-IX
X.	Detailed hydrological study to be carried out as per the GEC-2015 guidelines	<ul style="list-style-type: none"> <li>i. The hydrogeological assessment of Kedla OCP has been done using GEC-1997 (enclosed as Annexure-X).</li> <li>ii. New methodology is under adaptation and the report shall be submitted with final EMP.</li> <li>iii. To adopt the GEC-2015 norms specially in coal mining areas a training was taken at CGWB, Raipur (RGNGWTRI, CGWB training institute).</li> </ul>
XI.	Submission of details of Coal washeries with EC status and details of coal transport plan.	<p>There is no Coal Washery in the project boundary of Kedla OCP. However coal is linked to nearby Kedla Washery by road transport.</p> <p>Coal Transport plan is enclosed as annexure-XI</p>
XII.	Details of R&R plan.	Given in Prefeasibility report enclosed as Annexure-I

# **Annexure I**

## **Revised Pre Feasibility Report**

**PRE-FEASIBILITY REPORT**  
**OF**  
**KEDLA OCP**

<b>Project Area (Ha)</b>	<b>Capacity of OCP (MTPA)</b>
<b>1084.49 Ha</b>	<b>1.0 (Normative)/1.35 (Peak)</b>

**(Hazaribagh Area)**  
**Central Coalfields Limited**  
**(April, 2019)**

Prepared at

Regional Institute – III

**Central Mine Planning & Design Institute Ltd.**  
**(A Subsidiary of Coal India Ltd.)**  
**Gondwana Place, Kanke Road**  
**Ranchi-834008, Jharkhand**

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# Chapter 1

## Executive Summary

### 1.1 Summary

1	Kedla Colliery is an operating project under Hazaribagh Area of Central Coalfields Limited, Jharkhand. The existing Kedla Opencast mine was earlier producing coal @ about 0.30 million tonnes of medium coking coal/year. The mine achieved maximum production of 0.79 MT in 1989-90 & 0.373 MT in 1993-94.
2	Kedla Geological Block lies in the eastern part of West Bokaro Coalfield in Mandu Development Block of Ramgarh District of Jharkhand. Kedla Block lies between the Hazaribagh Plateau and Damodar Valley. The block is bounded by latitude $23^{\circ}45'25''$ & $23^{\circ}50'35''$ longitude $85^{\circ}34'20''$ & $85^{\circ}37'50''$ . The block is covered in Survey of India toposheet no. 73E/9(RF: 25000).
3	Kedla Block lies between the Hazaribagh Plateau and Damodar Valley. The Central portion of Kedla Block is gently undulating with depressions and occasional sandstone ridges and rounds. The general elevation is 340 m above MSL. The Bokaro River forms the southern boundary and Chutua Nullah flows in the northern half of the block.
4	The area is approachable through 20 km long Ghatotand Charhi road branching from NH-33 at Charhi. NH-33 connects Ranchi and Hazaribagh. Hazaribagh is about 35 Km away and Ranchi is about 90 Km away by road. Another approach is through a 12 km all weather road connecting Gidi Washery and crossing the National Highway No. 33 at Kuju. Nearest Railway Station is Dania at about 8.0 Km on Gomoh-Barkakana Loop-line of EC. Railway. Nearest Airport is Ranchi at a distance of 90 Km.
5	Pre-feasibility report of Kedla OCP is being prepared for the rated capacity of 1 MTPA within the project area of 1084.49 Ha. for making an application in Form I for EC as per MoEFCC notification no: SO 804 (E) Dt.14.03.2017 and subsequent notifications 1030 (E) Dt 08.03.2018 & OM No Z-11013/22/2017-IA-II (M) Dt 15/16.03.2018.
6	The project area of present proposal is 1084.49 Ha. This project is proposed to produce 1.0 MTPA of R.O.M coal. The balance reserves for Kedla OCP as on April'2017 is 22.51 million tonnes and OB is 84.27 Mcum with balance life of 27 years.
7	OB is 84.27 Mcum which is proposed to be dumped internally. O.B. will be removed by Electric Shovel of 4.6 cu.m capacity in conjunction with 35 Te rear Dumpers. Coal will be won by Hydraulic (Electric) Shovel of 3.2 cu.m. capacity in conjunction with Bottom Dump Coal Haulers of 29 tonnes capacity.
8	Removal of O.B. as well as winning of coal will be done by mechanization. It has been proposed to work Seams IV to VII in Sectors D, C & B upto the cut-off ratio line of 1:4 in the Central Part of the Kedla Block.

9	The project will receive power at 33 KV from the Central 33KV receiving sub-station of CCL for Kedla Group of mines. This sub-station will receive power from DVC/JSEB. The mine sub-station will have an installed transformer capacity of 2x3 MVA, 33/7.0-3.5 KV. The power, distribution to the mine is ultimately anticipated at 6.6 KV, the double ratio transformer secondary voltage has been provided.										
10	The industrial and domestic water demand is 1102 and 770 m <sup>3</sup> /day, respectively. Adequate provisions have been made for pumping and drainage to cater the needs of various stages of mine including the monsoons. A sump of about 75x10 <sup>3</sup> cu.m has been planned. Water from various benches will be drained to the Central pumping Station from where it will be pumped out to the nearest surface drain. After domestic and industrial uses, excess mine water discharge will be supplied to peripheral villages.										
11	<p>The existing manpower for Kedla OCP for a rated capacity of 1 MTY of coal has been estimated as 1026. The broad break-up is given below:</p> <table border="1" data-bbox="689 736 1139 920"> <thead> <tr> <th data-bbox="689 736 970 775">Category</th> <th data-bbox="973 736 1139 775">Number</th> </tr> </thead> <tbody> <tr> <td data-bbox="689 779 970 817">Officers</td> <td data-bbox="973 779 1139 817">37</td> </tr> <tr> <td data-bbox="689 822 970 860">Monthly paid</td> <td data-bbox="973 822 1139 860">257</td> </tr> <tr> <td data-bbox="689 864 970 902">Daily rated</td> <td data-bbox="973 864 1139 902">732</td> </tr> <tr> <td data-bbox="689 907 970 920">Total</td> <td data-bbox="973 907 1139 920">1026</td> </tr> </tbody> </table>	Category	Number	Officers	37	Monthly paid	257	Daily rated	732	Total	1026
Category	Number										
Officers	37										
Monthly paid	257										
Daily rated	732										
Total	1026										
12	The Buffer zone consists of 62 villages in Ramgarh district surrounding the area at 10 Km radius from the Core Zone.										

# Chapter 2

## Project Background

### 2.1 Introduction

To meet the increased demand of coking coal in the fifth and subsequent plan periods, a number of new/ expansion coking coal projects were proposed to be taken up in CCL. Kedla opencast project was opened in West Bokaro Coalfield for a target output of 1.0 million tonnes of R.O.M coal per annum at an average stripping ratio of 2.59 of over-burden per tonne of coal.

Existing Kedla Opencast mine was earlier producing coal @ about 0.30 million tonnes of medium coking coal/year. The mine achieved maximum production of 0.79 MT in 1989-90. The O.B. removal was partly mechanized whereas coal was won manually.

The Feasibility Report for Kedla Opencast (Reorganisation) Project (1.0 MTPA) was prepared in July, 1978 and sanctioned in September, 1979. It is now envisaged as per this report that removal of O.B. as well as winning of coal will be done by mechanization. It has been proposed to work Seams IV to VII in Sectors D, C & B upto the cut-off ration line of 1:4 in the Central Part of the Kedla Block. Kedla, Jharkhand and Rautacoal mines are the taken over mines from Raja of Ramgarh. These mines were included in the Schedules to Coal Mines (taking over Management) Ordinance, 1973 and Coal mines (Nationalisation) Act, 1973. Subsequently, these mines were handed over to CIL (erstwhile CMAL) on 20-09-1973.

### 2.2 Purpose of the report

Kedla Colliery is an operating project under Hazaribagh Area of Central Coalfields Limited, Jharkhand. The existing Kedla Opencast mine was earlier producing coal @ about 0.30 million tonnes of medium coking coal/year. The mine achieved maximum production of 0.79 MT in 1989-90 and 0.373 MT in 1993-94. The O.B. removal was partly mechanized whereas coal was won manually.

Pre-feasibility report of Kedla OCP is prepared for the rated capacity of 1 MTPA within the project area of 1084.49 Ha. for making an application in Form I for EC as per MoEFCC notification no: SO 804 (E) Dt.14.03.2017 and subsequent notifications 1030 (E) Dt 08.03.2018 & OM No Z-11013/22/2017-IA-II (M) Dt 15/16.03.2018.

### 2.3 Identification of project & project proponent

The project under consideration, i.e. Kedla OCP is administratively under Hazaribagh Area of CCL headed by General Manager, Hazaribagh Area. Geologically, it falls in West Bokaro Coalfield in Ramgarh District of Jharkhand.

The mailing address of the Project Officer is given below:

R. B. Prajapati,

Kedla OCP,

Hazaribagh Area, Central Coalfields Limited

PO-Kedla, Dist- Ramgarh, Pin –825325

Phone – 8987784319

## **2.4 Location & Communication**

Kedla Geological Block lies in the eastern part of West Bokaro Coalfield in Mandu Development Block of Ramgarh District of Jharkhand. Kedla Block lies between the Hazaribagh Plateau and Damodar Valley.

The area is approachable through 20 km long Ghatotand Charhi road branching from NH-33 at Charhi. NH-33 connects Ranchi and Hazaribagh. Hazaribagh is about 35 Km away and Ranchi is about 90 Km away by road. Another approach is through a 12 km all weather road connecting Gidi Washery and crossing the National Highway No. 33 at Kuju. Nearest Railway Station is Dania at about 8.0 Km on Gomoh-Barkakana Loop-line of EC. Railway. Nearest Airport is Ranchi at a distance of 90 Km.

## **2.5 Description of importance to the country and region**

### **Benefits at national level-**

Central Coalfields Limited is facing increasing demand of coal because of increased demand from industry and steel sector. Continuing 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 the present production level of 63.405 Mt. of coal during 2017-18 to 88.0 MTPA by 2020-21.

Continuation of coal production from KedlaOCP will help to a certain degree to meet the growing demand of coking coal in the country.

### **Benefits at regional level-**

The project has created employment opportunities both for skilled and semi- skilled persons in the area. Power network has been extended to the project site for the construction & operation of the plant. This network is facilitating distribution of power in the neighbouring area. The project has brought about enhanced socio-economic benefits to local population due to expenditure on CSR activities

## **2.6 Employment Generation:**

Kedla OCP is an existing project which has been a major source of direct and indirect employment for nearby villagers in buffer zone.

Under R&R of Project affected people, around 180 PAPs have already been provided with direct employment against tenancy land falling and 4 PAPs are proposed to be provided with employment.

# Chapter 3

## Project Description

### 3.1 Mining Method

Considering the geo-mining characteristics of the mining block, it is proposed to produce coal and remove O.B by Shovel Dumper combination. O.B. will be removed by Electric Shovel of 4.6 cu.m capacity in conjunction with 35 Te rear Dumpers. Coal will be won by Hydraulic (Electric) Shovel of 3.2 cu.m capacity in conjunction with Bottom Dump Coal Haulers of 29 tonnes capacity.

Some major system parameters are given below:

SN	Particulars	Kedla OCP
1	Area (Ha)	1084.49
2	Method of mining	Opencast-Shovel Dumper
3	Mineable Reserve (MT)	22.51
4	Balance OB (Mm <sup>3</sup> )	84.27
5	Stripping ratio (m <sup>3</sup> /T)	3.77
6	Nominal Capacity	1.00
7	Peak Capacity	1.35
8	Seams to be mined	VI/VII, V & IV
9	Average gradient of seam	1 in 10
10	Seam thickness	3-14
11	Grade of Coal	W-III to W-IV
12	Nominal Capacity	1.00
13	Life of mine	27
14	Maximum depth of working	111
15	Manpower	1026

### 3.2 Drilling and Blasting

Overburden rocks consist of medium grained sandstone to coarse-grained sandstone. Assumed category of rock is 50% of CAT-III + 50% of CAT-IV.

**Type & capacity of drills:**

OB	Coal
250mm/ 160mm dia drill	160mm drill

**Elements of Drilling and Blasting:**

The elements of drilling and blasting are decided during actual operation after trial blasting in the field. Controlled blasting is being practiced near project boundary. However, drilling of coal & OB benches is recommended to be done vertically at 90°. It is suggested to use slurry

explosive in cartridge / site mixed slurry for better result and enhance safety with proper stemming material. Secondary blasting is not suggested in any circumstances.

### 3.3 Geological and Mining Characteristics

Removal of O.B. as well as winning of coal will done by mechanization. It has been proposed to work Seams IV to VII in Sectors D, C & B upto the cut-off ratio line of 1:4 in the Central Part of the Kedla Block.

1	Location of Kedla Block	Latitude 23 <sup>0</sup> 45'25" & 23 <sup>0</sup> 50'35" Longitude 85 <sup>0</sup> 34'20" & 85037'50"
2	Area of Kedla Block Area of quarriable patch	28.12 sq.km 3.5 sq.km
3	Total number of boreholes Drilled in quarriable patch	NCWBK-11 GMK-41 Total-52
4	Density of boreholes	15 boreholes per sq.km
5	Meterage drilled	NCWBK boreholes - 2408.35 m. CMK boreholes - 4004.52 m. Total - 6412.87 m.
6	Geological setting	Lower Gondwana - Barakar Formation.
7	Strike	E – W with broad swings.
8	Dip	6 to 10 <sup>0</sup> towards north
9	Faults	There are four N – S trending faults which trending faults which demaracate the quarriable patch in three sectors viz. B, C and D from East to West.  The fault (F) in the extreme West has a large throw to the West and the fault (F) in the extreme East has a 45 m. throw to the East. The other two faults within the quarriable sector have minor throws.

#### Coal Seams

Seam/Parting	Seam thickness (m)	Parting (m)	Remarks
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Strata upto 1:4 coal to OB ratio line.		43.72	Seams VI Bottom to VII Top have been taken as a combined seam (VI/VII) for the opencast mining, in view of thin partings in between the seams.
VII Top	0.16 to 1.60		
Carb shale		0.26 to 1.35	
VII Bottom	0.50 to 2.36		
Sandstone,sandyshale,intercalated sandstone and shale,carb shale		0.25 to 4.09	
VI Top	0.28 to 2.24		
Carb shale		1.14 to 2.94	
VI Bottom	3.57 to 5.55		
Mainly sandstones		18.89 to 47.04	
V	5.60 to 9.87		
Mainly sandstone		3.25 to 15.94	
VI	2.54 to 5.51		
Sandstone/shale		17.03 to 20.83	
III Top	3.09 to 4.33		

### 3.4 Mining reserves – volume of OB-life of mine

This project is proposed to produce 1.0 MTPA of R.O.M coal. The balance reserves for Kedla OCP as on April'2017 is 22.51million tonnes and OB is 84.27 Mcum with balance life of 27 years.

### 3.5 Size or Magnitude of Operation

The mining schedule has been formulated based upon the adopted sequence of mine development. For making the section wise calendar programme of excavation; the reserves of coal and volume of OB have been calculated and depicted as follows:

<b>Years</b>	<b>Coal(MTY)</b>	<b>OB(Mcum)</b>
1	0.30	1.12
2	0.50	1.87
3	0.80	2.99
4	1.00	3.80
5	1.00	3.80
6	1.00	3.80
7	1.00	3.80
8	1.00	3.80
9	1.00	3.80
10	1.00	3.80
11	1.00	3.80
12	1.00	3.80
13	1.00	3.80
14	1.00	3.80
15	1.00	3.80
16	1.00	3.64
17	1.00	3.64
18	1.00	3.64
19	1.00	3.64
20	1.00	3.64
21	0.60	2.14
22	0.60	2.24
23	0.60	2.24
24	0.60	2.24
25	0.60	2.24
26	0.60	2.24
27	0.31	1.16
<b>Total</b>	<b>22.51</b>	<b>84.27</b>
<b>SR</b>		<b>3.74</b>

### 3.6 Coal Handling & Dispatch System

The coal from this project is being sent to Kedla Washery by tipping truck. For its targeted production of 1 MTPA of coal, a coal handling arrangement has also been envisaged.

### 3.7 Power Requirement

The project will receive power at 33 KV from the Central 33KV receiving sub-station of CCL for Kedla Group of mines. This sub-station will receive power from DVC/JSEB. The mine sub-station will have an installed transformer capacity of 2x3 MVA, 33/7.0-3.5 KV.

The power, distribution to the mine is ultimately anticipated at 6.6 KV, the double ratio transformer secondary voltage has been provided.`

Estimated maximum demand of the project is expected to reach 3.6 MVA in the 9<sup>th</sup> year after deploying capacitor bank of 1650KVAR. The specific energy conservation and maximum demand is estimated at 6.78 KWH per tonne of coal and 2.86 MVA respectively to achieve targeted production of 1 million tonne per year. However, the maximum demand is anticipated to rise to 3.93 MVA from 22<sup>nd</sup> year & onwards.

### 3.8 Water Requirement

Adequate provisions have been made for pumping and drainage to cater the needs of various stages of mine including the monsoons. A sump of about 75x10<sup>3</sup>cu.m has been planned. Water from various benches will be drained to the Central pumping Station from where it will be pumped out to the nearest surface drain.

### 3.9 Land Requirement

The land-use is given below

Type of land	Area of land (Ha)
Forest land	512.45
Government land	370.46
Tenancy land	201.58
<b>Total</b>	<b>1084.49</b>

Type of forest land & status of diversion	Area of land (Ha)
Notified Forest land Stage-I diverted	168.50
Forest land released before 1980	69.57
NPV paid for notified forest land in project area	139.00
NPV paid for JJ in project area	135.38

<b>Total</b>	<b>512.45</b>
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**Details of Acquisition under CB Act:**

1. S.O. no. 3687 Dt. 01.10.1983
2. S.O. no: 1754 Dt. 15.5.1996
3. S.O. no: 343 Dt. 05.02.2004

# Chapter 4

## Site Description

### 4.1 Identification of Project

The project under consideration, i.e. Kedla OCP is administratively under Hazaribagh Area of CCL headed by General Manager, Hazaribagh Area. Geologically, it falls in West Bokaro Coalfield in Ramgarh District of Jharkhand.

### 4.2 Topography & Drainage

Kedla Block lies between the Hazaribagh Plateau and Damodar Valley. The Central portion of Kedla Block is gently undulating with depressions and occasional sandstone ridges and rounds. The general elevation is 340 m above MSL. The Bokaro River forms the southern boundary and Chutua Nullah flows in the northern half of the block.

### 4.3 Land Use Pattern

The land-use is given below.

Type of land	Area of land (Ha)
Forest land	512.45
Government land	370.46
Tenancy land	201.58
<b>Total</b>	<b>1084.49</b>

### 4.4 Climate

The climate is extreme. The summer, which is between April and June, is very hot. The maximum temperature reaches upto 46°C during summer and the minimum temperature reaches 4°C during winter months of December and January. The monsoon breaks in June and lasts till October. The average rainfall is about 1251.2 mm (reported by CGWB, Mid-Eastern Region, Patna).

# Chapter 5

## Project Planning

### 5.1 Mine Planning

Considering the geo-mining characteristics of the mining block, it is proposed to produce coal and remove O.B by Shovel Dumper combination. O.B. will be removed by Electric Shovel of 4.6 cu.m capacity in conjunction with 35 Te rear Dumpers. Coal will be won by Hydraulic (Electric) Shovel of 3.2 cu.m. capacity in conjunction with Bottom Dump Coal Haulers of 29 tonnes capacity.

### 5.2 Life of Mine and Magnitude of Operation

The approved project proposes to produce 1.0 MTPA of R.O.M coal. The balance reserves for Kedla OCP as on April'2017 is 22.51 million tonnes and OB is 84.27 Mcum with balance life of 27 years. The calendar programme is given in Section 3.5, page no

### 5.3 Coal linkage to Washery

The coal from this project is being sent to Kedla Washery by tipping truck. For its targeted production of 1 MTPA of coal, a coal handling arrangement has also been envisaged.

### 5.4 Land Use Planning

#### 5.4.1 Land Use Plan during Mining

The land-use is given section 4.3 page no

#### 5.4.2 Post-Mining Land Use Plan

##### 5.4.2.1 Post Mining Reclamation Plan

The proposed post mining land use plan is as given below.

S No.	Description	Land-use (Ha)				Total
		Plantation	Water Body (Lagoon)	Public/CCL use	Landscaped Quarry Batter	
1	External OB Dump	21.41	0.00	0.00	0.00	21.41
2	Top soil dump	0.00	0.00	0.00	0.00	0.00
3	Excavation/Backfilled	101.14	199.90	0.00	0.00	301.04
4	Roads	0.00	0.00	0.00	0.00	0.00

5	Built-up area	0.00	0.00	4.60	0.00	4.60
6	Green belt	0.00	0.00	0.00	0.00	0.00
7	Undisturbed area	0.00	0.00	757.44	0.00	757.44
<b>Total</b>		<b>122.55</b>	<b>199.90</b>	<b>762.04</b>	<b>0.00</b>	<b>1084.49</b>

In the Post mining stage, it is proposed to reclaim 122.55 Ha of land with plantation. This includes plantation on existing external OB dump and quarry area, and safety zone/ vacant land in project area.

## **5.5 Amenities/Facilities**

The total number of houses is 562 for 1026 employees of this project. Out of this, 318 miner's quarters and rest are of BPE's specification. The overall housing satisfaction comes to about 55%.

# Chapter 6

## Infrastructure

### 6.1 Existing Infrastructure

The total number of houses is 562 for 1026 employees of this project. Out of this, 318 miner's quarters and rest are of BPE's specification. The overall housing satisfaction comes to about 55%. There is one existing workshop and one store.

### 6.2 Proposed Infrastructure

The existing infrastructure is sufficient. So, there is no proposed infrastructure.

### 6.3 Drinking water Management

SN	Water Use	Demand (m <sup>3</sup> /d)
1	Industrial	1102
2	Domestic	770
	Total	1872

Adequate provisions have been made for pumping and drainage to cater the needs of various stages of mine including the monsoons. A sump of about 75x10<sup>3</sup>cu.m has been planned. Water from various benches will be drained to the Central pumping Station from where it will be pumped out to the nearest surface drain.

After domestic and industrial uses, excess mine water discharge will be supplied to peripheral villages. At present mine water is being supplied to Project Area for their domestic purposes after filtration through filter plant situated in Kedla Colliery area. Provision of roof-top rain water harvesting has been envisaged for recharging the ground water or by collecting the water into the constructed/developed water bodies for use Mine Area.

### 6.4 Sewerage System

The existing sewerage system of Kedla OCP consists of soak pit and septic tank

### 6.5 Industrial Waste water Management:

a	Daily average discharge (m <sup>3</sup> /day) from different sources	
i	Mine water discharge during	
	Lean period	96
	Monsoon period	-
ii	Workshop (40% after losses)	44.4
iii	Domestic	0.0
iv	Beneficiation / Washeries	0.0
v	Coal Handling Plant	0.0

vi	Tailing pond	0.0
vii	Others (Fire service, dust suppression, green belt)	00
Total		140.4

Quantity of water recycled / reused / to be recycled

i	Percentage	31.62%
ii	m <sup>3</sup> /day	44.4 out of 140.4

Treatment Technology

1. Mine water discharge → Sedimentation lagoon/sump → Discharge into local drainage/old quarry
2. Mine water discharge → Filter Plant → Domestic supply to colony → soak pit
3. Workshop discharge → O&G Trap → Settling tank → Reuse.

Point of final discharge

Final Point	Quantity discharged (in m <sup>3</sup> /day)
Pond/ Tank/Old quarry	96

## 6.6 Solid waste Management

OB is 84.27 Mcum which is proposed to be dumped internally. O.B. will be removed by Electric Shovel of 4.6 cu.m capacity in conjunction with 35 Te rear Dumpers. Coal will be won by Hydraulic (Electric) Shovel of 3.2 cu.m. capacity in conjunction with Bottom Dump Coal Haulers of 29 tonnes capacity.

# Chapter 7

## Rehabilitation & Resettlement

### 7.1 Status of R&R

Particulars	Kedla OCP
Employment to land losers	<ul style="list-style-type: none"><li>• 218PAPs given employment</li><li>• 33 PAPs proposed to be given employment</li></ul>
PAFs shifting	<ul style="list-style-type: none"><li>• 271 PAFs from KedlaChowk shifted since 1977 till date (Rs 2.37 Crore monetary compensation paid).</li><li>• 23 PAFs from Kedla village shifted .</li><li>• 327 PAFs from Kedla village to be shifted.</li><li>• Compensation as per actual homestead valuation proposed +</li><li>• Cash compensation @ Rs. 3 lakh per family (Rs. 11.22 crore to be paid) +</li><li>• Subsistence allowance @ 300 days MAW to be paid (Rs. 2.88 crore @ Rs. 257 per day)</li></ul>

#### 7.1.1 R&R Policy of CIL

The R&R Policy of CIL was revised with effect from 5th April, 2012 for implementation of Rehabilitation Action Plan. The salient features in brief are given below.

##### R&R Policy of CIL

###### Compensation For Land

One Employment per 2 acres to land losers (plots can be clubbed together)

Or monetary compensation @ Rs.5.0 Lakh per acre subject to a minimum of Rs.0.50 Lakh.

The compensation can be paid in form of annuity also on monthly, quarterly, annually etc upto 60 years of age or life of project, whichever is earlier.

Note: A person receiving employment forgoes all claims to monetary compensation and a person receiving monetary compensation forgoes all claims to employment.

###### Compensation For Homestead

Compensation for homestead building as per standard valuation method under LA Act subject to a minimum of Rs. 2 Lakh per household
Payment of Rs 3.0 Lakh in lieu of alternate housing site, assistance in designing & shifting, compensation for construction cattle shed and working shed etc.
Subsistence allowance to each affected family @ 25 days Minimum Agricultural Wages per month for one year.
Compensation For Sharecroppers, Land lessees, Tenants, Day labourers, Landless tribals etc. @ Rs. 5 lakh per household in lieu of livelihood loss.
Affected landless tribal families will be provided one time financial assistance equivalent to 500 days MAWs as a compensation for loss of customary rights.
Assistance to PAPs to take up non-farm self employment through petty contracts or formation of co-operatives.
Contractors will be persuaded to give jobs to eligible PAPs on preferential basis.

## Chapter 8

# Project Schedule & Cost Estimates

### 8.1 Capital Expenditure

The P.R of Kedla Opencast Project was approved by the Govt. on 22<sup>nd</sup> Sept. 1979 for 1.0 MTY of medium coking coal at an estimated capital of Rs. 17.30 crores.

The mine closure cost according to approved Mining and Mine Closure Plan of Kedla OCP in meeting of the board of directors held on 27.12.2017 is Rs.15009.31 lakhs.

### 8.2 Environmental Capital Expenditure

#### 8.2.1 Cost of Environmental Control Measures of Kedla OCP as per approved PR

SN	Particulars	Amount (Rs. In Lakh)
1	Capital for Bio reclamation of External and Internal dumps	151.89
2	Water Sprinklers (2 Nos., 28 KL each)	60.00
3	Industrial Sewage treatment plant	30.96
4	Haul Road Construction and Maintenance	48.15
5	Sewage Treatment	10.19
6	Water Treatment Plant and Distribution System	31.03
7	Strom water Drains and other development measures in Township	15.31
8	Arboriculture	2.07
9	Baseline Data generation and Monitoring costs	12.93
12	Other Pollution Control Measures	28.14
<b>Total</b>		<b>390.67</b>

## Chapter 9

### **Analysis of Proposal**

Kedla Colliery is an operating project under Hazaribagh Area of Central Coalfields Limited, Jharkhand. The existing Kedla Opencast mine was earlier producing coal @ about 0.30 million tonnes of medium coking coal/year. The mine achieved maximum production of 0.79 MT in 1989-90. The O.B. removal was partly mechanized whereas coal was won manually.

The Feasibility Report for Kedla Opencast (Reorganisation) Project (1.0 MTPA) was prepared in July, 1978 and sanctioned in September, 1979. It is now envisaged as per this report that removal of O.B. as well as winning of coal will be done by mechanization. It has been proposed to work Seams IV to VII in Sectors D, C & B upto the cut-off ratio line of 1:4 in the Central Part of the Kedla Block. Kedla, Jharkhand and Rauta coal mines are the taken over mines from Raja of Ramgarh. These mines were included in the Schedules to Coal Mines (taking over Management) Ordinance, 1973 and Coal mines (Nationalisation) Act, 1973. Subsequently, these mines were handed over to CIL (erstwhile CMAL) on 20-09-1973.

Central Coalfields Limited is facing increasing demand of coal because of increased demand from industry and steel sector. Continuing 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 the present production level of 63.405 Mt. of coal during 2017-18 to 88.0 MTPA by 2020-21. Continuation of coal production from Kedla OCP will help to a certain degree to meet the growing demand of coking coal in the Country.



## **Annexure II**

### **Surface drainage plan**

## Physiography and Drainage Plan of Kedla OCP

### Physiography

**Regional:** Undulating terrain sloping towards Bokaro nadi, which is master drainage of the buffer zone. General elevation ranges from 281 m (in the eastern most part at a distance of 8.30 km near Bokaro nadi) to 939 m above msl (in the N-E part at a distance of 8.20 km near dense mixed jungle of Jhumra Pahar). Northern part is dominated by hill and dense mixed jungle area in comparison to southern part. Several hillocks are present in the northern part of buffer zone. Some of the hillocks with highest peak of 938 m above msl are present in the dense mixed jungle of Jhumrapahar at about 8.50 km N-E of the project and Lugu hill about 933 m above msl is present around 9.50 km east of the project. Hillock having peak of 790 m above msl is present around 8-9 km north of the project in the dense mixed jungle.

**Mining/Project area:** Kedla Block lies between the Hazaribagh Plateau and Damodar Valley. The Central portion of Kedla Block is gently undulating with depressions and occasional sandstone ridges and rounds. The elevation varies from 326 m around BH No. NCWBK 1 in the East to 388m to the West of BH No NCWBK 9 in the Western part of the block. The average general elevation is around 340 m above MSL. The natural topography of the area has been obliterated to a certain extent by a network of open cast mine. However, in general, the topography is undulating and at places is seen to be broken by hillocks. The topography is rugged in the NW part also.

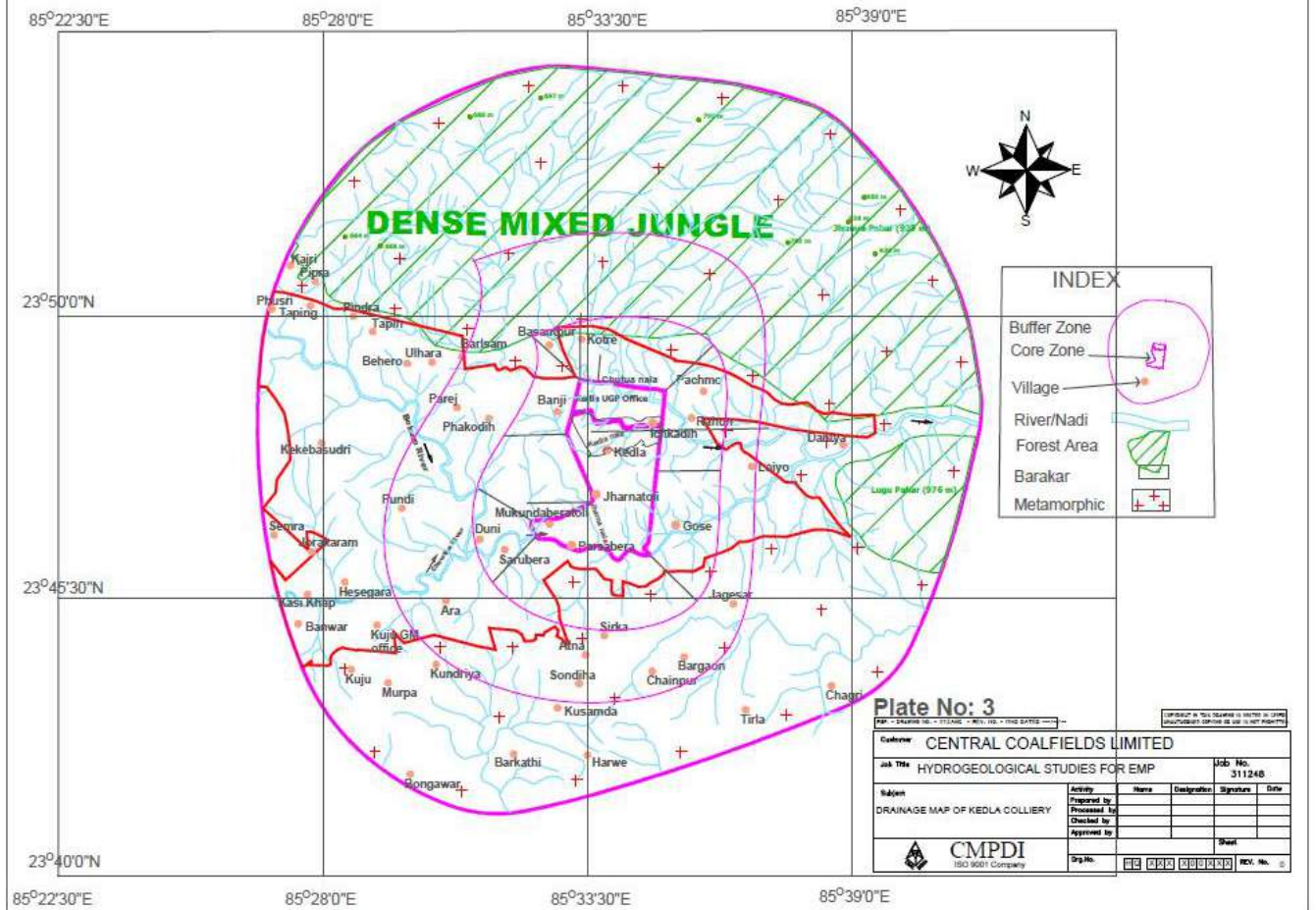
### Drainage

**Regional:** The Bokaro Nadi flows from west to east in the south of the project. Two major tributaries of Bokaro nadi, i.e. easterly flowing Chutuanadi in the north of the project meet the master drainage Bokaro river at around 5.0 km in the east of project and easterly flowing Chowtha nadi meet Bokaro nadi in the S-W of the project at a distance of around 2.20 km. Bokaro nadi, the major drainage of the study area ultimately joins master drainage Damodar river, outside the buffer zone of the project. There are other drainages which are tributaries of Bokaro nadi, Chutuanadi and Chowtha nadi present in the buffer zone i.e. Jharna nala, Kedla nala etc. The drainage pattern of the buffer zone is mostly dendritic.

**Mining/Project area** The drainage of the block is controlled by the Easterly flowing Chutua Nala in the North along the Northern boundary, the Easterly flowing seasonal Kedla Nala in the central part and the Easterly flowing Bokaro River in the South, beyond the quarry edge boundary. The Chutua nala flows near the block boundary of Kedla underground and around 700 m to the opencast quarry of Kedla and meet the master drainage Bokaro river at around 5.0 km in the east of Kedla Colliery. The Bokaro river flows at a distance of around 3.0 km from the present quarry edge. There are some other seasonal tributaries of Bokaro river and Chutua nala flows around the project. The seasonal Jharna nala flows from north to south and meet Bokaro river in the south of the project. The easterly flowing Bokaro River is the major drainage and perennial source of water for the area. The HFL of the Chutua nala as recorded in the vicinity of the project is 332.18 m above MSL (As on 26.09.1978) (nearby RL is ranges from 336.0 m to 340.0 m). The HFL of the Kedla nala as recorded in the vicinity of the project is ranges from 334.0 m (nearby RL is 344.0 m) to 354.0 m (nearby RL is 360.0 m) above MSL. Bokaro nadi, the major river of the buffer zone ultimately joins master drainage Damodar river, outside the buffer zone of the project. The drainage pattern of the area is mostly dendritic.

Drainage pattern at a distance of 10, 5 and 2 kms from the project boundary is shown in Plate no.3

# DRAINAGE MAP OF KEDLA COLLIERY BUFFER ZONE



## Surface drainage and flood protection

For taking precaution against danger of inundation from surface water, the following points should be taken care of:

- i) A careful assessment is to be made against the danger from surface water before the onset of rainy season. The necessary precautions should be clearly laid down and implemented. A garland drain needs to be provided to drain away the surface rainwater from coming into the mine.
  - ii) Inspections for any accumulation of rainwater, obstruction in normal drainage and weakening in embankment.
  - iii) Standing order for withdrawal of working persons in case of apprehended danger.
  - iv) During heavy rain inspection of vulnerable points is essential. In case of any danger persons are to be withdrawn to safer places.
- Nala or water inlets may be diverted or isolated by embankments if so required.

## **In-pit Drainage Work**

- During the rainy season, water will be allowed to accumulate in the sump on the floor of lower most Seam of the quarry.

- Sumps are provided for the dewatering pumps which will transfer in-pit water for controlled discharge off the site.

The planning of dewatering the mine has been done in such a way that the working faces and haul roads in the quarry shall remain dry as far as possible. The layout of the quarry provides suitable gradient along the quarry floors and the benches to facilitate self drainage of water to the sump at the lowest level of the quarry.

**Annexure III**  
**Dump management plan**

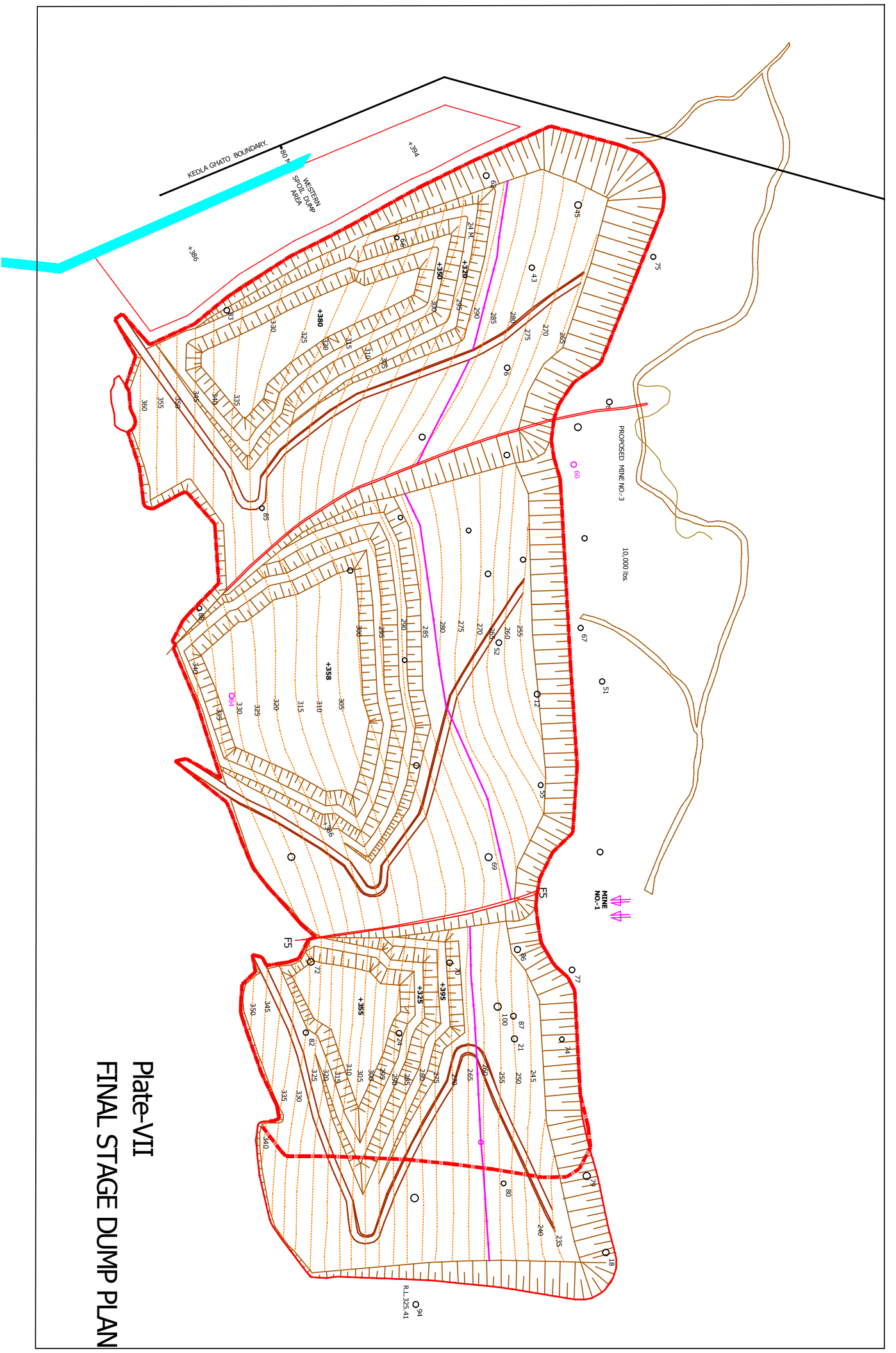


Plate-VII  
 FINAL STAGE DUMP PLAN

R.L. 325.41

## **Annexure IV**

### **Stage- I Forest Clearance Letter**

9

✓

**F. No.8-55/2003-FC**  
**Government of India**  
**Ministry of Environment & Forests**  
**(FC Division)**

Paryavaran Bhawan  
CGO Complex, Lodhi Road  
New Delhi-110 003

Dated: 23<sup>rd</sup> August 2004

To

**The Secretary (Forests)**  
Government of Jharkhand  
Ranchi.

**Sub: Diversion of 168.50 ha of forest land in respect of Kedla Open Cast mining project in favour of Central Coalfields Limited, Jharkhand.**

Sir,

I am directed to refer to your letter no. Vanbhumi-36/2003/1727/VP dated 03.04.2003 on the above mentioned subject seeking prior approval of the Central Government in accordance with the Forest (Conservation) Act, 1980.

2. After careful consideration of the proposal of the State Government, and recommendation of the advisory committee on the proposal, the Central Government hereby agrees **in-principle** for diversion of 168.50 ha of forest land in respect of Kedla Open Cast mining project in favour of Central Coalfields Ltd. Jharkhand, subject to fulfilment of following conditions:-

- i. The Compensatory Afforestation shall be raised and maintained over double the degraded forest land, i.e., 337.00 ha at the cost of User Agency.
- ii. The penal Compensatory Afforestation shall be raised and maintained at the cost of the User Agency two times over double the degraded forest land involved in violation of the Forest (Conservation) Act, 1980.
- iii. A detailed reclamation plan showing physical and financial targets should be submitted by the User Agency before final approval, and should be implemented and monitored continuously.
- iv. The User Agency shall create, fence and maintain a Safety Zone around the mining area. The User Agency will deposit fund with the Forest Department for creation, protection and regeneration of Safety Zone area and also will have to bear the cost of afforestation over one and a half time of the Safety Zone area in degraded forest elsewhere.

- 8
- v. The State Government shall charge Net Present Value from the User Agency as directed by Hon'ble Supreme Court, and as per the guidelines issued vide Ministry of Environment and Forests' letters No. 5-1/98-FC (Pt II) dated 18<sup>th</sup> September and 22<sup>nd</sup> September 2003.
  - vi. The State Government shall deposit all the above-mentioned funds with Compensatory Afforestation Fund Management and Planning Authority (CAMPA), which has already been constituted and notified by the Central Government on 23.04.2004. Till such time, the CAMPA intimates the Head of Account for deposition of funds, the funds will be maintained in the form of fixed deposits in the name of Nodal Officer or concerned Divisional Forest Officer of the State Government. The funds realized towards the NPV shall not be utilized by the State Government.
  - vii. The User Agency shall provide comprehensive details of various mines which are still under operation and required to be regularized, and shall also take action over various issues discussed in the meeting in the chamber of IGF (FC) on 31.03.2003 and subsequently communicated vide the Ministry's letter no. 8-149/2002-FC dated 22.04.2003.
  - viii. Other standard condition as applicable to proposals relating to open cast mining shall be applicable in the instant case also.

3. After receipt of the compliance report on the fulfilment of the above-mentioned conditions of the para-2 above from the State Government, formal approval will be issued in this regard under Section-2 of the Forest (Conservation) Act, 1980. Transfer of forest land to the user agency should not be affected by the State Government till final order approving diversion of forest land is issued by the Central Government.

Yours faithfully

(Pankaj Asthana)  
Assistant Inspector General of Forests

Copy to:

1. The Principal Chief Conservator of Forests, Government of Jharkhand, Ranchi.
2. The Nodal Officer, Forest Department, Government of Jharkhand, Ranchi.
3. The Chief Conservator of Forest, Regional Office, Bhubaneswar.
4. The Regional Office (Hq.), New Delhi.
5. User Agency.
6. Guard File.
7. Monitoring Cell

(Pankaj Asthana)  
Assistant Inspector General of Forests

**Annexure V**  
**DGMS permission**

श्रम मंत्रालय  
खान सुरक्षा महानिदेशालय  
राँची क्षेत्र।

संख्या : रा0क्ष0/10314/...../राँची, दिनांक ...../2002

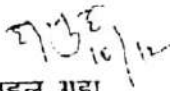
सेवा में,  
अभिकर्ता  
केदला खुली खदान  
सेन्ट्रल कोलफिल्ड लिमिटेड  
पोस्ट केदला जिला हजारीबाग

महोदय,

विशय **Permission under Regulation 98(1) & (3) of the Coal Mines Regulations 1957 to form high benches in coal and overburden in Seam No.V & IV and under Regulation 168 of Coal Mines Regulations 1957 to use different type of explosives in the same hole Using deep hole blasting in conjunction with HEMM deployment in Kedla Opencast Project of M/s. C.C.Ltd.**

उपर्युक्त विषय से सम्बन्धित पत्र यथोचित कार्रवाई के लिए इस पत्र के साथ संलग्न कर भेजा जा रहा है।

भवदीय,

  
राहुल गुहा  
खान सुरक्षा निदेशक

ANNEXURE - A

Annexure to letter No. RR/Perm/4026 / Ranchi, dated the 10/12/2020

GENERAL :

Except where otherwise provided for in this additional permission all provisions of the Coal Mines Regulations, 1957 relating to opencast workings, use of explosives and machinery shall be strictly complied with.

a)(i) Adequate general lighting shall be provided at the work sites and in the opencast workings after sun-set:

(ii) In addition, flood lights shall be provided for proper inspection of the quarry faces and work sites at night.

(b) After sun-set all work persons employed in the opencast workings shall be provided individually with electric cap lamps.

Suitable arrangement shall be made for proper inspection at night at suitable intervals of all work places and sites in order to guard against the fall of rock or material.

a) No coal or carbonaceous matter or debris or overburden shall be stacked within 100m around the periphery of the opencast workings.

(b) Blasting operation shall be so regulated that broken coal is removed/transported out of the quarry expeditiously.

(c) Pipe range containing water under pressure with taps at 20m apart shall be laid in and around the quarry workings. Such pipe range shall be connected to a water reservoir of adequate capacity so that water in the pipe range is available under pressure of not less than 25 lbs/sq. inch. Adequate number of water hoses of 120m length shall be kept stored at suitable places in the quarry.

(d) All part of the quarry including places within the quarry limit shall be inspected daily for detection of heating or fire. As soon as heating or a fire is detected, suitable measures to quench it and to dig it out shall be adopted. All heated debris/coal shall be removed by machines and deposited outside the premises of the opencast workings.

(e) No persons shall be employed either directly below or near the spot on fire within 30m of it except for the purpose of removing the hot material or quenching it. The employment of persons so engaged for dealing with the fire shall be governed by provisions of Regulation 19(1)(a) and 2(a) of the Coal Mines Regulations, 1957.

(a) All damages to the lives and property not belonging to the management of the mine and damages or injuries to persons as a result of blasting or mining operations shall be adequately indemnified. Should there be any controversy in this respect, the decision of the D.G.M.S. shall be final and binding on the management.

(b) No workings shall be extended to any point within 45m of village, dwellings, Roadway, Public structure.

(a) No work whatsoever shall be done where the provision of Regulation 126 are attracted due to the presence of jore and nallah in the vicinity. The entire ground lying within 15m of all the nallahs and jores shall be filled up and raised and consolidated to a R.L. of atleast 3m above the highest flood level.

(b) Blasting operations shall be under the direct charge of one Assistant Manager in strict compliance of Regulation 170A of Coal Mines Regulations, 1957.

#### OPENCAST WORKINGS :

(a) The height of the benches in overburden, coal or other rock formation shall not be more than the digging height of the machine used for digging, excavation or removal.

(b) The width of any bench shall not be less than: (i) the width of the widest machine plying on the bench plus two metres, or (ii) if dumpers ply on the bench three times the width of the dumper, or (iii) the height of the bench, whichever is more.

(c) If tipping trucks or similar transport vehicles are deployed for transportation of coal, separate roads for such tipping trucks or similar vehicles shall be provided and safe loading practices shall be adopted avoiding plying of trucks on the same bench where men are to work, travel or rest.

(d) Pay loader shall be provided with substantially constructed operator's cabin and it shall be deployed at coal bench only beyond a distance of not less than 30m from the swing of boom of any excavator. The bench height shall not be more than 4.5m and 3m when the reach of pay loader's buckets are 8m and 4.5m respectively.

#### FENCING AROUND OPENCAST WORKINGS :

(a) The periphery around the limits of opencast workings shall be kept fenced with a masonry wall not less than 0.40m thick and not less than 1.2m high, with parapet top.

(b) The edges of benches of the opencast workings shall be kept fenced with wire ropes strand or barbed wire supported by movable posts (wooden, iron or concrete). The gap between the adjacent rope strands or wires shall not be more than 0.30m and the bottom most rope strand or wire shall not be more than 0.25m and the top most rope strand or wire not less than 1.00m from ground level.

**0. SPOIL OVERBURDEN OR DEBRIS BANKS :**

- (a) Spoils, overburden or debris shall be deposited at places below the surface of the ground and duly approved by the manager in writing.
- (b) spoils, overburden or debris shall not be deposited, beneath transmission, telephone or power lines or near any public structure.
- (c) The slope of a spoil bank face shall be determined by natural angle of repose of the material being deposited, but shall in no case exceed 37 degree 30' from the horizontal. The spoil bank face shall not be retained by artificial means at an angle in excess of its natural angle of repose.

- I. (a) The spoils overburden or debris shall not be deposited within 45m of a railway or other structures and it shall not be permitted to approach any of the above said structures closer than a distance equal to 1.5 times the vertical height of its face.

(b) The toe of a spoil-bank shall not be permitted to approach railway or other public works, public road or building or other permanent structure not belonging to the owner of the mine closer than distance equal to the vertical height of its face.

(c) A suitable fence shall be erected between any railway of public works or road or building or structures and the toe of an active spoil bank so as to prevent un-authorized persons from approaching the spoil bank.

- III. No person shall, or shall be permitted to approach the toe of an active spoil bank where he may be endangered from material rolling down the face. Suitable signs for warning the persons at conspicuous places shall also be displayed.

**5.0. ROADS FOR TRUCKS AND DUMPERS, ETC. :**

- I. All haul roads for dumpers or other mobile machinery shall be constructed to suit its load capacity and maintained in good condition. No vehicles other than heavy transport vehicles shall use haul roads except between designated points and when permitted in writing by the manager.

II. Where practicable, all roads leading from the opencast workings to surface shall be arranged to provide one way traffic and no road shall be of a width less than three times the width of the largest vehicle plying on that road. Where it is not practicable, definite turn-outs, crossing points and waiting points shall be designated for use of vehicles.

III. All corners and bends in roads shall be made in such a way that the operators and drivers of vehicle have clear view for a distance of not less than 30m along the road.

IV. Except with the express permission (in writing) of the Regional Inspector, no road shall have a gradient steeper than 1 in 14 at any place.

Where any road exists above the level of the surrounding area, a strong parapet wall or embankment of height not less than 0.75m of the diameter of the wheel of the largest dumper used shall be provided to prevent any out of control vehicle from getting off the road and falling to the bottom.

#### ADDITIONAL DUTIES OF ASSISTANT MANAGER INCHARGE OF OPENCAST WORKING :

During every shift, the opencast workings shall be placed under the charge of a qualified experienced Assistant Manager to have overall control and guidance of all operations.

During his shift the Assistant Manager shall :

- a) make frequent inspections for evidence of any unsafe conditions including evidence of slide of material from high wall and shall guide that operations are conducted in a safe and efficient manner.
- b) not allow any person to work under overhanging edges or where there is evidence of slides, until such danger has been removed.
- c) ensure that every person engaged in dressing operations on high walls is provided with and uses safety belt of a type approved by the Chief Inspector.
- d) ensure that all loose material is removed from high walls before drillers are engaged there : and
- e) ensure that parapet walls along truck roads are properly maintained.

#### ADDITIONAL DUTIES OF ENGINEERS PLACED IN CHARGE OF MACHINES AND EQUIPMENTS IN OPENCAST WORKINGS :

During each shift the machines and equipments at work shall be placed under the charge of qualified and experienced engineer to effect inspection, examination, safe operations and maintenance of the machines, equipments and accessories.

During his shift the engineer/engineers shall :

- a) inspect, examine machines, equipments and accessories and satisfy himself that they are in sound and safe working order.
- b) not allow any machine, equipment to be used, if it is found defective.
- c) ensure that every machine, equipment, accessory used is in a safe and efficient manner.
- d) ensure that each operation, activity is carried on in safe and efficient manner.

### 3.0. EXAMINATION, REPAIR AND MAINTENANCE OF MACHINES :

- I. a) A code of practice for inspection, examination and repair of all breakdowns and repairs etc. shall be drawn up and practiced.
  - b) Every drilling and earth moving machinery or equipment or accessory (herein after called machine) shall be thoroughly examined at least once in each shift and maintained in good and safe working conditions.
  - c) A record of all such examinations and maintenances shall be maintained in a bound paged register and shall be signed by the engineer in charge of the shift and countersigned by the Colliery Engineer.
- II. a) Every machine shall be allocated at least one day in every week for examination and maintenance, when it shall be thoroughly examined and inspected by the Engineer, who shall satisfy himself that it is mechanically sound and is in efficient working order before it is allowed to be re-used.
  - b) A report of every maintenance made under clause (a) shall be recorded in a bound paged book kept for the purpose, and shall be signed and dated by person making the inspection and countersigned by the Engineer.
  - c) If the engineer, mechanical Foreman or other competent person making an inspection under Clause (I) (a), notices any defect in any machinery, the said machinery shall not be used until the defect has been remedied.
  - d) Any defect in a machinery reported by its operator shall be promptly attended to.
- III. a) Any machinery found to be in an unsafe operating condition shall be tagged at the operator's position: "Out of Service, Do not Use" and its use shall be prohibited until the unsafe condition has been corrected.
  - b) All repairs to a machine shall be done at a location which will provide a safe place for the persons engaged on repairs.
  - c) Except for testing, trial or adjustment, which must necessarily be done while the machine is in motion, every machine shall be shut down and positive means taken to prevent in operation while any repair or manual lubrication is being done.
  - d) Power shall be disconnected when repairs are made to any electric machine.
  - e) Any machinery, equipment or part thereof which is suspended or held apart by use of slings, hoists jacks shall be substantially blocked or cribbed before men are permitted to work underneath or between the same.
  - f) The operator or driver shall not leave the machine while it is running unless it is placed under the charge of a competent person.

**GENERAL LIGHTING :** Where natural lighting is insufficient, general lighting shall be provided during working hours, in the opencast workings and along roads etc.

**PROTECTIVE EQUIPMENT :** Every person working in the opencast working shall be provided with, and shall use, a hard hat and reinforced safety boots of a type approved by the Chief Inspector of Mines.

**PRECAUTIONS AGAINST DUST :** Adequate arrangements, to allay dry dust by wetting shall be made on roads and benches where trucks and dumpers operate.

#### **D. DRILLING AND BLASTING OF DEEP HOLES :**

##### **PRECAUTIONS WHILE DRILLING :**

The position of every deep hole to be drilled shall be distinctly marked by the overman so as to be readily seen by the drillers.

a) No drilling shall be commenced in an area where shots have been fired, until the shottirer has made a thorough examination at all places, including remaining butts of old deep holes, for unexploded charges that the drill may strike.

b) No drill or bore rod or pick shall be inserted in butts of old deep holes even if an examination under clause (a) has failed to reveal presence of explosives.

I. a) Drilling and charging of deep holes shall not be carried out in the same area at the same time.

b) Drilling operations shall not be carried on simultaneously on two benches, at places directly one above the other.

##### **D. DUTIES OF DRILL OPERATORS :**

At the beginning of his shift, the drill operator shall examine the drilling equipment and satisfy himself that :

a) crown blocks are mounted securely:

b) where compressed air drills are used, all holes connections are in order: and

c) the drilling equipment is in safe working condition.

I. The drill operator shall ensure that:

a) work persons keep clear of, auger and drill stem while the drill is in motion:

b) work persons do not work under suspended tools, when tools are removed from the holes, these shall be lowered on the platform: and

c) all finished drill holes are properly plugged so as avoid possible leg injuries to any one accidentally stepping into the hole.

## 2.0. GENERAL :

All conditions specified by the Chief Inspector of Mines in the documents granting permission to carry a larger quantity of explosives in a single case or canister or for the use at one time in one place of more than one such case or canister, in relaxation of Regulation 163 of the Coal Mines Regulations, 1957, shall be strictly complied with.

- I. Notwithstanding anything contained in the Coal Mines Regulations, 1957, the preparation of charges and the charging and stemming of holes shall be carried out under the personal supervision of an Overman who shall fire the shots in deep hole himself.

## 3.0. CHARGING OF DEEP HOLES :

Explosives shall be delivered first to the hole furthest from the 'Priming Station' so as to avoid persons walking among piles of explosives.

- I. Not more than one hole shall be in the process of being charged at any one face at any one time.
- II. All charging, stemming and connecting up shall be done while standing on the solid, that is to say, on the side of holes remote from the quarry face.

## 4.0. PRECAUTIONS DURING FIRING :

a) Shots shall not be fired except during the hours of day light. All holes charged on any one day shall be fired on the same day.

b) As far as practicable, the shotfiring shall be carried out either between shifts, or during the rest interval, or at the end of work for the day.

- I. The danger zone shall be distinctly demarcated (by means of red flags properly arranged and supported) atleast 30 minutes before firing of holes is to commence.
- II. Ten minutes before firing, a siren installed for the purpose shall be blown three times for one minute each at intervals of one minute; and no shots shall be fired unless the blasting foreman with assistance of sufficient number of persons appointed in writing by the manager for the purpose has ensured that all persons have left the danger zone or have taken adequate shelter.
- V. No shot shall be fired when there is traffic on any road or railway track within the danger zone.

## 5.0. PRECAUTIONS AGAINST ELECTRICAL STORM :

During the approach and progress of an electric storm, the following precautions shall be taken :

- a) No explosives, particularly detonators shall be handled.
- b) If charging operations have begun, the work shall be discontinued until the storm has passed.

c) If the blast is to be fired electrically, all exposed wires shall be coiled up and, if possible placed in the mouth of the holes, or kept covered by something other than a metal plate.

d) All wires shall be removed from contact with the steel rails of a haulage track so as to prevent the charge being exploded prematurely by a local strike of the lighting.

#### D. DESIGN, OPERATION AND MAINTENANCE OF SHOVELS(AND DRAGLINE) :

##### 1) DESIGN :

a) Every shovel (and dragline) shall be so designed as to afford the operator clear and uninterrupted vision all around.

b) Every shovel (and dragline) shall be provided with :-  
1) efficient warning devices:

ii) adequate front and rear lights and a portable lamp for emergency, unless the shovel is not used after day-light hours; and

iii) an efficient portable fire extinguisher so placed as to be within easy reach of the operator.

. A special retracting ladder mounted on the excavating machine.

##### 2) OPERATION :

Every shovel (and dragline) shall be under the charge of a competent person authorised in writing by the manager, herein called the 'Operator'.

a) No person other than the operator or his helper if any, or the manager or any person so authorised in writing by the manager shall ride on a shovel or dragline.

b) No person shall be permitted to ride in the bucket of a shovel.

c) Shovel dippers (and dragline buckets) shall be lowered to the ground during greasing operations.

a) No shovel (or dragline) shall be operated in a position where any part of the machine suspended and leads or lines are brought closer than 3m to exposed high voltage lines, unless the current has been cut off and positive means taken to prevent the lines from being energised. A notice of this requirement shall be posted at the operator's position.

b) Electrical cables, if any, shall be laid in such a manner that they are not endangered either by falling rocks or by any mobile equipment.

The shovel bucket shall be pulled out of the bank as soon as it is full.

a) When being operated in soft or unstable ground, every shovel (and dragline) shall be supported by mats, heavy planks or poles so as to distribute the load of the machinery over larger area and to prevent any danger of the shovel (or dragline) overturning itself.

b) When not in use, the shovel (or dragline) shall be moved to a stood on stable ground.

I. If more than one stripping machines are in use in any area either on the same bench or on different benches, the machines shall be so spaced that there is no danger of accident from flying or falling objects etc. from one machine to the other.

**DUTIES OF SHOVEL (AND DRAGLINE) OPERATORS :**

a) At the commencement of every shift, the operator shall personally inspect and test the machine, paying special attention to the following details :

- i) that every warning device is in working order; or
- ii) if the machine is required, to work after day-light hours, he shall not take out the machine for work nor shall he work the machine, unless he is satisfied that it is mechanically sound and in efficient working order including the lighting fixtures.

b) The operator shall maintain a record of every inspection made under clause (a) in a bound paged book kept for the purpose and shall fill every entry made therein.

II. a) The operator shall keep the cab window clean so as to ensure clear vision at all times.

b) The walkways in or about the cab of any shovel/dragline shall be kept free of loose tools, grease containers or other materials that might fall or present a falling or tripping hazard.

III. a) The operator shall not operate the machine when persons are in such proximity as to be endangered.

b) He shall not swing the bucket over passing haulage unit when the trucks/dumpers are being loaded, he shall swing over the body of the truck/dumpers and not over the cab, unless the cab is protected by a substantially strong cover.

IV. Before leaving the machine, the operator shall lower the bucket to the ground.

V. The operator shall not allow any unauthorised person to ride on the machine.

**17.0. DESIGN, OPERATION AND MAINTENANCE OF TRUCKS OR DUMPERS :**

**(A) DESIGN :**

Every truck or dumper shall be provided with :

- i) efficient brakes;
- ii) efficient audible warning device and
- iii) efficient head-lights, if the truck or dumper is required to work after day-light hours.

#### OPERATION :

Every truck or dumper shall be under the charge of a competent person authorised in writing by the manager herein called the driver.

a) No person other than the driver or his helper, if any or the manager or any person authorised in writing by the manager shall ride on a truck or dumper.

b) No person shall be permitted to ride on the board of a running truck or dumper.

a) As far as possible, loaded trucks or dumpers shall not be reversed on gradients.

b) Sufficient stop blocks shall be provided at every tipping point and these shall be used on every occasion, material is dumped.

c) Standard traffic rules shall be adopted and followed during movement of all trucks and dumpers. They shall be prominently displayed at relevant places in the opencast workings and truck/dumper roads.

When not in use, every truck or dumper shall be moved to and stand in proper parking places.

No person shall be permitted to work on the chassis of a truck or dumper, with the body in a raised position until after the truck or dumper body has been securely blocked in position. The mechanical hoist mechanism shall not be depended upon to hold the body of the truck or dumper in a raised position.

#### DUTIES OF TRUCK/DUMPER OPERATORS :

a) Before commencing work, the driver shall personally inspect and test the vehicle, paying special attention to the following details :

i) that brakes are in working order;

ii) that the warning devices are in working order; and

iii) that the lights are in working order, if the vehicle is required to work after day-light hours.

He shall not take out the vehicle for work nor shall he drive the vehicle, unless he is satisfied that it is mechanically sound and in efficient working order.

b) The driver shall maintain a record of every inspection made under clause (a) in a bound page book kept for the purpose and shall be signed and dated by the person making the inspection.

The driver shall keep the cab window clean so as to ensure clear vision at all times.

a) The driver shall ensure that the gear is in neutral position before stopping the engine.

The driver shall handle the truck/dumper carefully and keep it under control at all times. He shall operate the downhill gradients in low gear so that minimum of braking is required.

c) He shall not drive too fast, shall avoid distractions and shall drive defensively. He shall not attempt to overtake another vehicle unless he can see clearly far enough ahead to be sure that he can pass it safely. He shall also sound audible warning signal before overtaking.

d) When approaching a stripping equipment, the driver of the truck or dumper shall sound the audible warning signal and shall not attempt to pass the stripping equipment until he has received a proper audible signal in reply.

e) Before crossing a road or railway line, he shall reduce his speed, look in both directions along the road or line and shall proceed across the road or line only if it is safe to do so.

f) The driver shall not operate the truck or dumper in reverse unless he has a clear view of the area behind the vehicle or he has the assistance of a 'spotter' or 'pitmen/trioman' duly authorised in writing for the purpose by the manager. He shall give an audible warning signal before reversing a truck or dumper.

g) The driver shall be sure of clearance before driving through tunnels, archways, plant structure etc.

h) The driver shall not drive 'nose to tail' particularly behind a vehicle with twin rear wheels from which a stone piece wedged between the tyres may play back into the windscreen of his vehicle.

The driver shall see that the vehicle is not overloaded and that material is not loaded in a truck or dumper as to project horizontally beyond the sides of its body and that any material projecting beyond the front or rear is indicated by the red flag during day and a red light after day-light hours.

The driver shall not allow any unauthorised person to ride on the vehicle. He shall also not allow more than the authorised number of persons to ride on the vehicle.

#### TESTING OF BRAKE:

At least once in two weeks, the brakes of the truck, dumper or any such other vehicles shall be tested as indicated below.

##### a) SERVICE BRAKE TEST :

The brake shall be tested on a specified gradient and speed when the vehicle is fully loaded. The vehicle shall stop within a specified distance when the brake is applied. The specified stopping distance shall be obtained from the manufacturer of the vehicle.

#### **PARKING BRAKE TEST :**

The parking brake shall be capable to hold the vehicle when it is fully loaded and placed at the maximum gradient of roadway which is permitted for a period of atleast ten minutes.

c) A record of such test shall be maintained in a bound paged book and shall be signed by the person carrying out the test and the engineer and manager.

#### **INSPECTION AND OTHER PRECAUTIONS :**

Surprise inspection shall be carried out by the Engineer/Superior official at an interval not exceeding 15 days to ensure that the examination schedule of machinery/equipment are carried out.

While inflating tyres, suitable protective cages shall be used. Tyres shall never be inflated by sitting either in the front or on the top of the same.

While the vehicle is being loaded/unloaded on gradient, the same shall be secured stationary by parking brake and other means such as suitably designed stopper blocks which should be placed below the tyres.

Operation and maintenance of heavy machineries such as shovel, dumpers etc. shall be done strictly in accordance with the operation instructions. The operation instructions and maintenance schedule shall be obtained from the manufacturers.

a) Automatic fire protection system shall be provided and maintained in working order for surface heavy machinery such as coal haulers, mine haulage vehicles, ash haulers, dozers, front end loaders, draglines, bucket wheel excavators, blast hole drills, hydraulic and electric shovels etc. It is also necessary that the recommended procedure for testing of such fire protection system at a given schedule by the manufacturer is also adopted. The automatic fire systems consist of one or more containers of fire suppressant (usually a dry chemical) connected by a fixed plumbing network to nozzles directed at specific pre-determined fire hazard areas on the machinery.

b) Optical, thermal or any other suitable type of sensing device shall be suitably located to sense the fire and actuate the suppressant to come out through the nozzles already fixed to deal with the fires. An over riding manual system along with fire alarm shall also be additionally provided for better effectiveness of the system.

#### **INSPECTION, EXAMINATION AND MAINTENANCE OF ELECTRICALLY OPERATED HEAVY EARTH MOVING MACHINES, EQUIPMENT AND ACCESSORIES :**

No machine, equipments or accessories of any electrically operated heavy earth moving machine shall be installed, commissioned and used without carrying out the following tests :

**Electrical Shovel :**

**a) Field Circuit Breakers :**

- i) All the H.V. tests as given in I.E.Rules, 65.
- ii) Insulation test with H.V. megger.
- iii) Oil test, and
- iv) E/L & O/L and single phase preventer and stall protection relays.

**b) Trailing Cable :**

- i) Insulation test with H.V. megger
- ii) Earth continuity test
- iii) Earth loop resistance test.

**c) Shovels EKG - 4.6**

All tests enumerated in the instruction manual of manufacturers.

**Drilling Equipment(CBW - 250) :**

**a) Field Switch :**

- i) Insulation test;
- ii) Earth continuity;
- iii) Earth loop resistance

**C) Trailing Cable :**

- i) Insulation test;
- ii) Earth continuity; and
- iii) Earth loop resistance.

**D) Drilling Equipments :**

a) i) Insulation test of all auxiliary motors i.e. rotor compressor, caterpillar drive, hydraulic pump motor etc.

ii) Efficacy of Asym-meter for earth fault in the drill machine body.

iii) Emergency tripping when required.

iv) All the hydraulic valves, pressure slide valve for their efficacy

b) i) If the results of tests enumerated in (A) to (D) above do not confirm to limits prescribed in I.E.Rules, 1956(Revised 1982), I.S.I specifications and directions issued in this respect from time to time the machine, equipment, switch or cable shall not be energised and used.

ii) The above test results shall be recorded in a bound paged book and shall be signed and dated by the Electrical Supervisor or Senior Electrician holding H.V.Certificate issued by the State Licensing Board and shall be countersigned by the Colliery Engineer.

**Electrical :**

The efficacy of earth leakage relays protecting the trailing cables of heavy earth moving machines shall be tested in the beginning of each shift by a competent person (inspector, electrician or supervisor) and if they are found in-operative, power shall not be switched on till the defects are removed. The results of all such tests shall be recorded.

**Maintenance :**

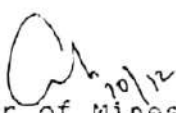
a) All bearings, hydraulic system lubrication system etc. shall be examined atleast once in each shift and adjustments effected as per the directives in the instruction manual of the manufacturers log-book.

b) The record of all shift-wise daily, weekly and fortnightly examinations, maintenances, adjustments and repairs effected shall be kept in a bound pagged register duly signed by the person making the examinations and countersigned by the Engineer.

c) General overhaul of all cutting and drilling and Heavy Earth Moving Machines shall be effected as per instructions in the manufacturers instruction sheets.

d) **GENERAL :** No electrically operated machine, equipment and accessories shall be energised, commissioned and used without prior approval of the competent authority under the relevant provisions of Indian Electricity Rules.

e) It shall be the duty of the Manager to issue duty charts (in the language which is understood by the person concerned) to various Operators/Supervisors connected with the use of Heavy Earth Moving Machinery and both the Manager and the Engineer shall be responsible to ensure that all the precautions and guidelines listed in this permission are strictly followed.

  
Director of Mines Safety  
Ranchi Region, Ranchi.

**Annexure VI**  
**Mine water drainage plan**



## **Annexure VII**

### **Detail plan for rain harvesting water**

V.O.No. P.O.KCP/Estimate/19/17 dated: 29/4/19

Sub:-estimate for the work "making arrangement roof water harvesting of P.O office building under kocp Hazaribagh Area.

Estimated cost:-141937.32 as per DSR2014.

Purpose:-To conserve rain water for recharging underground water.

Proposed by: - as per instruction of P.O KOC P.

Justification: - As per instruction of P.O kocp and SO(C) this estimate has been prepared and purposed. This work is required for harvesting rain water and recharging underground water. This work is very important for conservation of environment and nature. The same work has been executed in many area of CCL. Estimate has been prepared by overseer(C) KOC P. Details of items of work required are along with estimate copy.


It is submitted to PO KOC P for his kind perusal and obtaining competent approval.

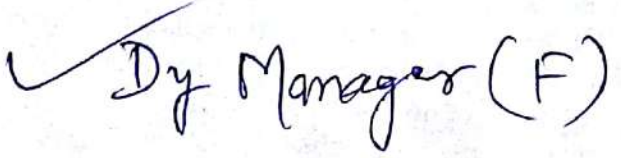
V.S  
29/4/19  
PE(C)/KOC P

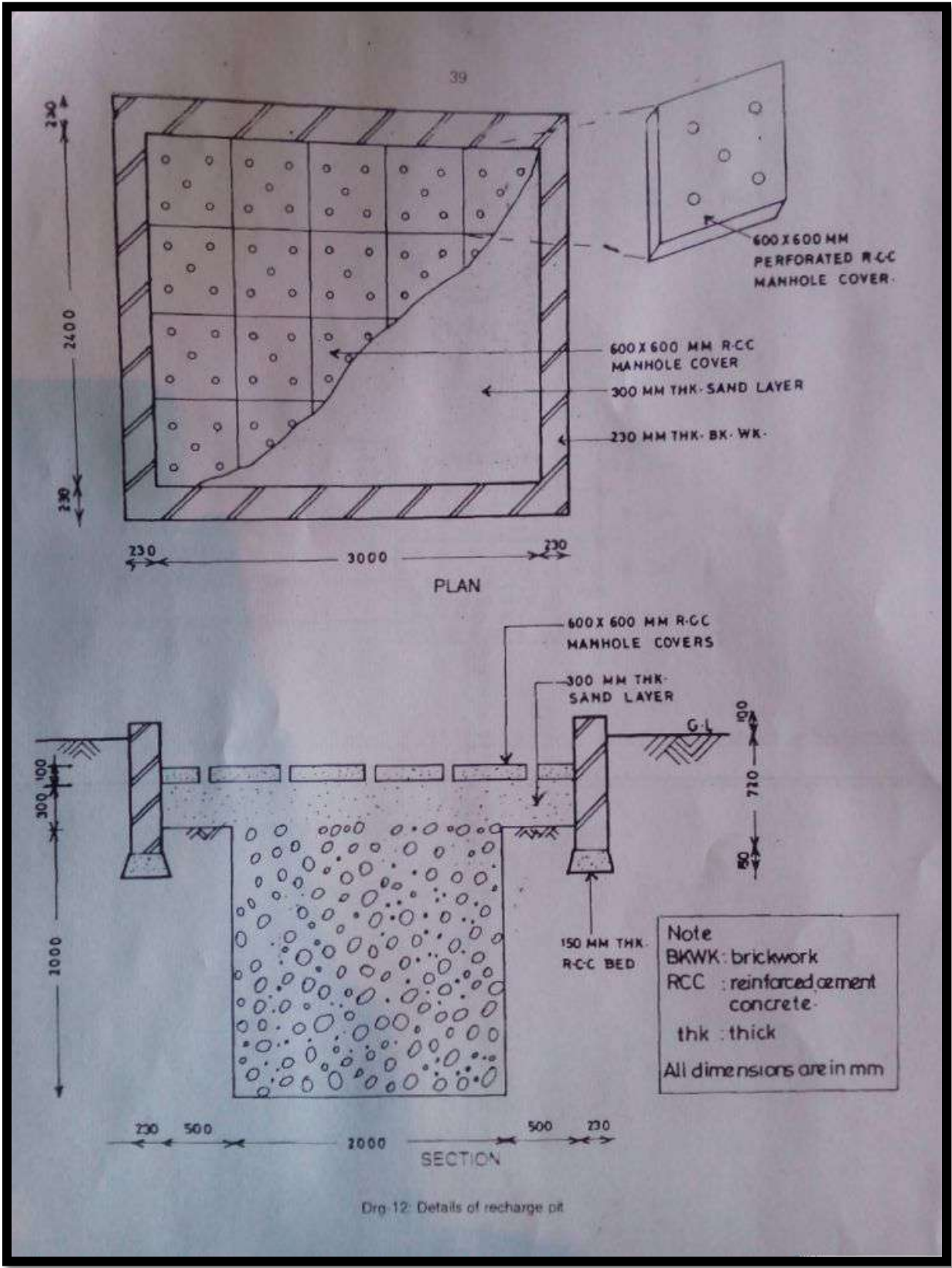
PO, kocp

1002  
29/4/19  
MGR(M)

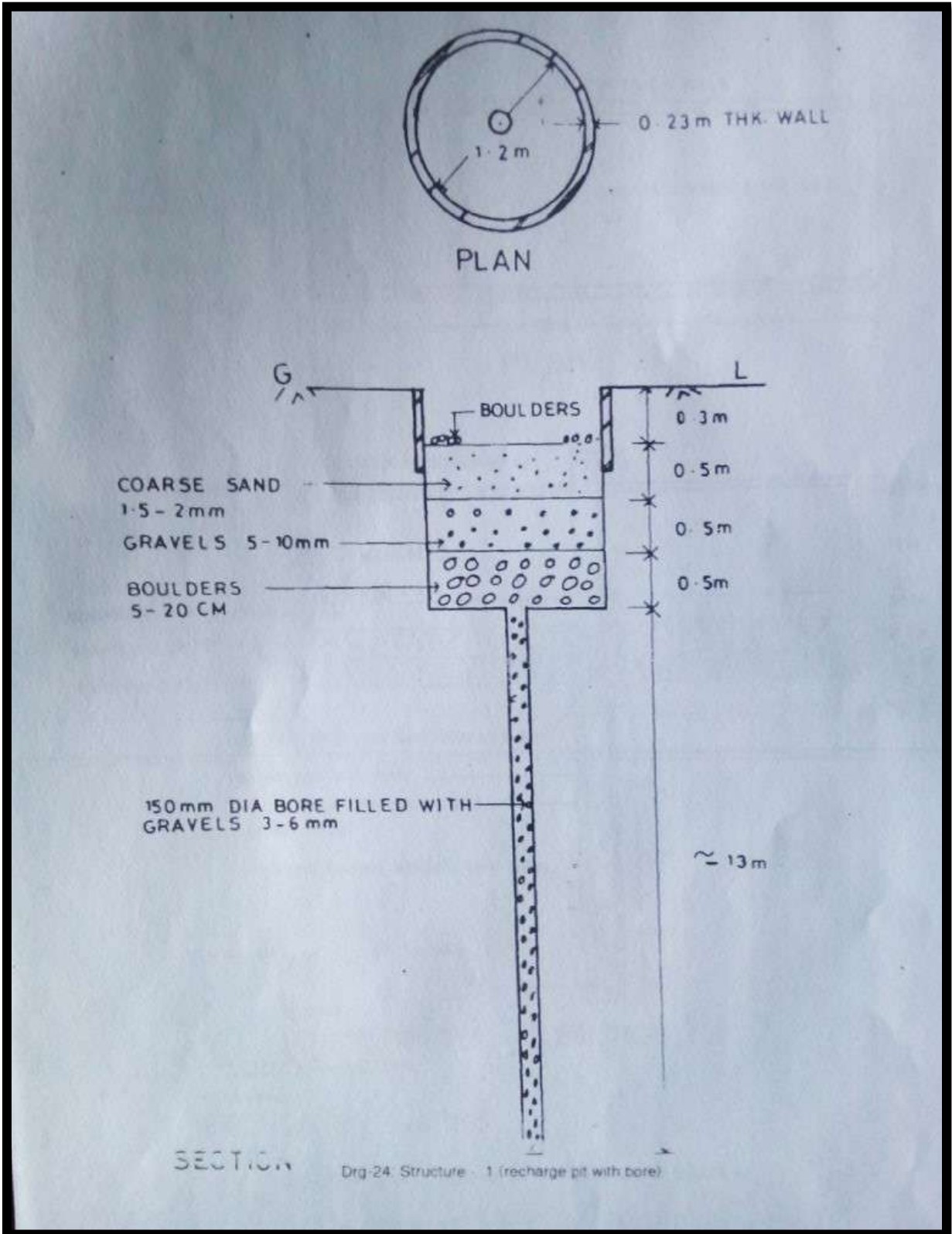
Manager  
Kedla Open Cast Pr.

  
29/4/19  
P.O  
KOC P  
**Project Officer**  
**Kedla Open Cast Project**

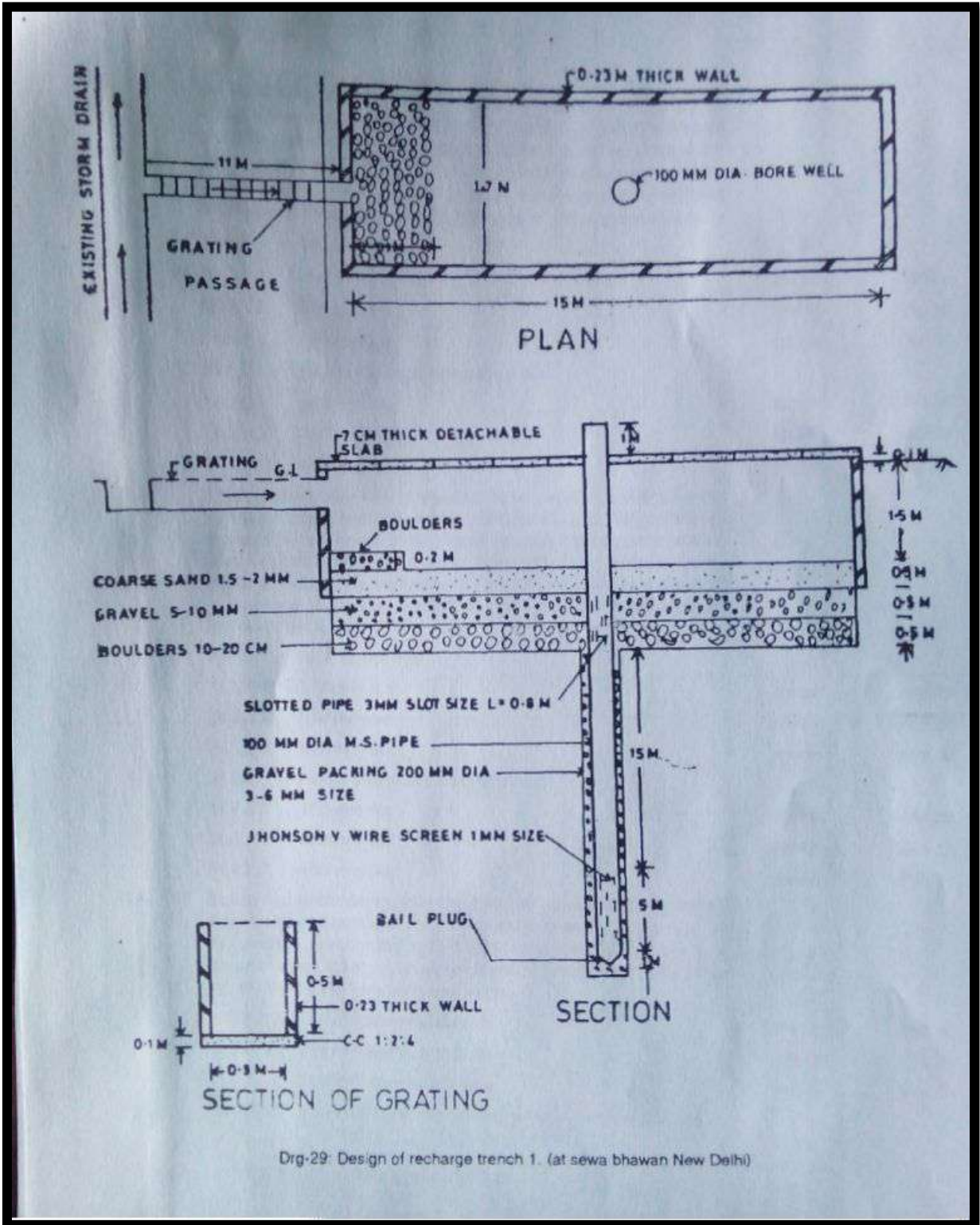
  
Dy Manager (F)



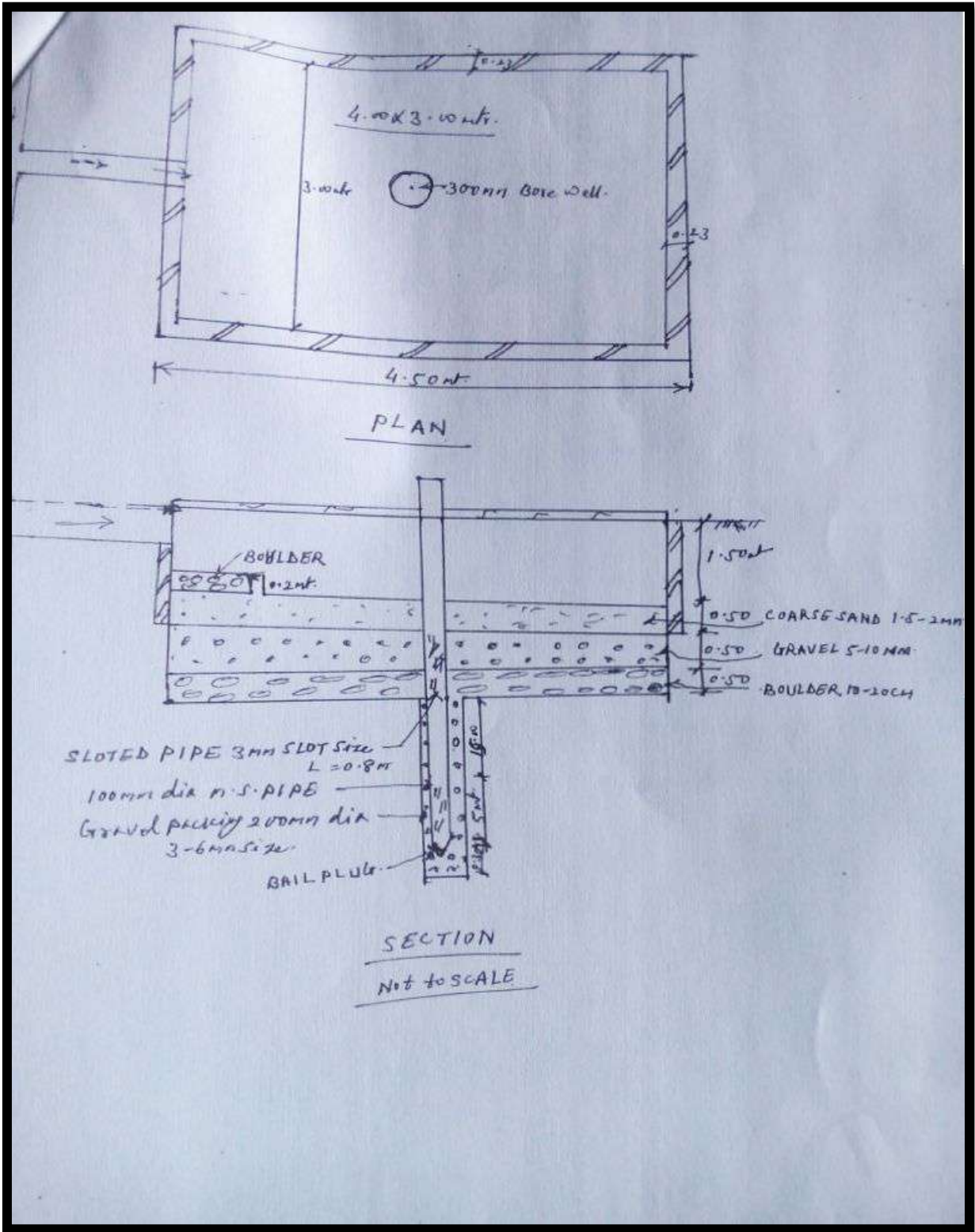
**Schematic Design of Proposed Recharge Pit**



**Ground Water Recharge Pit**



Sample Design collected from Sewa Bhawan, New Delhi



**Roof Top Rain Water Harvesting System**

# **Annexure VIII**

## **Mining lease document**

A/VII 253  
(To be published in part II section 3 sub-section (ii) of  
the Gazette of India) 1.10.1983

.....

Government of India (Bharat Sarkar)  
Ministry of Energy (Oorja Mantralaya)  
Deptt. of Coal (Koyala Vibhag)

.....

New Delhi, the 13.9.83

3687 ✓  
Notification

S.O. Whereas by the notification of the Government of India in the Ministry of Energy (Department of Coal) No. S.O. 1785 dated the 28th April, 1982, under sub-section (1) of section 7 of the Coal Bearing Areas (Acquisition and Development) Act, 1957 (20 of 1957), the Central Government gave notice of its intention to acquire the lands in the locality specified in the Schedule appended to that notification;

And whereas the Competent Authority, in pursuance of section 8 of the said Act, has made his report to the Central Government;

And whereas the Central Government, after considering the report aforesaid, and after consulting the Government of Bihar, is satisfied that the lands measuring 11943.50 acres (approximately) or 4833.29 hectares (approximately) described in the Schedule appended hereto; should be acquired;

Now, therefore, in exercise of the powers conferred by sub-section (1) of section 9 of the said Act, the Central Government hereby declares that the lands measuring 11943.50 acres (approximately) or 4833.29 hectares (approximately), described in the said Schedule, are hereby acquired.

The plans of the area covered by this notification may be inspected in the Office of the Deputy Commissioner, Hazaribagh (Bihar) or in the Office of the Coal Controller, 1, Council House Street, Calcutta or in the Office of the Central Coalfields Limited, (Revenue Section) Darbhanga House, Ranchi (Bihar).

.....2

Schedule  
Parej Extension  
sub-blocks 1, 2 and 3  
West Boksa Coalfield  
District Hazaribagh(Bihar)

Drg. No. Rev/59 /82  
Dated 18.8.1982  
(Showing lands acquired)

<u>Serial number</u>	<u>Village</u>	<u>Thana</u>	<u>Thana Number</u>	<u>District</u>	<u>Area</u>	<u>Remarks</u>
1.	Gobindpur	Mandu	57	Hazaribagh	372.50	part
2.	Indra	-do-	51	-do-	53.25	-do-
3.	Phusri	-do-	62	-do-	906.45	Full
4.	Bahera	-do-	63	-do-	637.50	part
5.	Kajri	-do-	64	-do-	79.75	-do-
6.	Pipra	-do-	67	-do-	8.25	-do-
7.	Durukasmar	-do-	108	-do-	110.50	-do-
8.	Rauta	-do-	110	-do-	343.00	-do-
9.	Pindra	-do-	112	-do-	535.70	-do-
10.	Taping	-do-	113	-do-	1951.25	-do-
11.	Mandu	-do-	114	-do-	1317.00	-do-
12.	Kekebasaudi	-do-	115	-do-	1500.00	-do-
13.	Pundi	-do-	116	-do-	382.50	-do-
14.	Parej	-do-	117	-do-	513.25	-do-
15.	Barughutu	-do-	118	-do-	79.50	-do-
16.	Banji	-do-	153	-do-	24.50	-do-

Total area :- 9120.00 acres (approximately)  
or 3690.63 hectares (approximately)

Plot numbers acquired in village Gobindpur :-

1 to 5, 6(part), 7(part), 291(part), 292(part), 293(part)  
295(part), 296, 297, 298(part), 299(part), 300, 301, 302  
(part), 303 to 305, 307(part), 308, 309(part), 318(part)  
462(part), 547, 548 & 549(part).

Plot numbers acquired in village Indra :-

1418(part), 1419, 1420(part), 1421(part) and 1465(part).

Plot numbers acquired in village Phusri :-

1 to 2075.

Plot numbers acquired in village Bahera:-

29(part), 34(part), 35(part), 39(part), 40(part), 41(part), 42, 43, 44(part), 45, 46, 47(part), 48(part), 49(part), 50 to 165, 167(part), 168 to 203, 209(part), 212(part), 213(part), 214 to 252.

Plot numbers acquired in village Kajri:- 163 (part), 180, 181(part), 182(part), 183(part), 184, 185(part), 186, 187(part), 188, 189(part), 190(part) and 198(part).

Plot numbers acquired in village Pipra:- 1(part) and 20.

Plot numbers acquired in village Durnesmar:-  
46(part), 48 to 59 and 303 to 372.

Plot numbers acquired in village Raita:- 137(part), 140 (part), 141(part), 142(part), 143 to 153, 154(part), 155 to 175, 176(part) & 177 to 181.

Plot numbers acquired in village Pindra:- 2(part), 3 to 79, 80(part), 81(part), 82, 83(part), 84(part), 85 (part), 86(part), 87(part), 104(part).

Plot numbers acquired in village Taping :- 1, 2(part) and 3 to 416.

Plot numbers acquired in village Mendu:- 1 to 246, 247(part), 248(part), 253(part), 254(part), 255(part), 256 (part), 257(part), 262(part), 263, 264(part), 265(part), 266(part), 267 to 324, 325(part), 326 to 344, 345(part), 346(part), 347 to 359, 360(part), 361 to 365, 366(part), 369(part), 435(part), 438(part), 439(part), 440 to 449, 450(part), 451(part), 454(part), 455, 456, 457(part), 459 (part), 460, 461, 599, 600(part), 601(part), 620(part), 621, 622, 623, 624, 625(part), 626 to 630, 631(part), 634 (part), 639(part), 902(part), 904(part), 905(part), 906, 907(part), 1903(part), 1904(part), 1905, 1906(part), 1907 to 1921, 1922(part), 1923(part), 1924(part), 1925(part), 1928(part), 1941(part), 1942, 1943(part), 1944, 1945(part), 1946 to 1986, 1987(part), 1988 to 1995, 1996(part), 1997 (part), 1998, 1999(part), 2008(part), 2009(part), 2010, 2011(part), 2012(part), 2013, 2014(part), 2019(part), 2024 (part), 2058(part), 2327(part), 2328, 2329, 2330, 2331 (part), 2332 (part), 2333(part), 2334(part), 3135, 3136, 3137, 3138, 3139, 3140, 3141, 3142, 3143, 3144, 3145, 3146, 3147, 3148, 3149, 3150, 3151, 3152, 3153, 3154, 3155, 3156,

3157, 3158, 3159, 3160, 3161, 3162, 3163, 3164, 3165, 3166, 3167, 3168, 3169, 3170, 3171, 3172, 3173, 3174, 3175, 3176, 3177, 3178(part), 3179, 3180, 3181, 3188, 3200, 3201, 3202(part), 3203(part), 3235, 3242, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3254 & 3255.

Plot numbers acquired in village Kekebasandi:-

1 to 118, 119(part), 120 to 171, 172(part), 173(part), 174, 175, 176(part), 177(part), 178 to 207, 208(part), 209, 210, 211(part), 212, 213(part), 215(part), 238(part), 251(part), 252 to 255, 256(part), 266(part), 267, 268(part), 269, 270(part), 271(part), 279, 280, 281, 283, 284, 285, 286 & 287.

Plot numbers acquired in village Pundi:-

1 to 25, 26(part), 27 to 41, 42(part), 43 to 68, 69(part), 70 to 82, 83(part), 84(part), 85(part), 1427, 1428, 1429, 1430, 1431, 1432, 1433, 1434 & 1435.

Plot numbers acquired in village Pareji:-

1 to 91, 92(part), 93(part), 105(part), 106(part), 107 to 112, 113(part), 118(part), 119(part), 120 to 161, 165(part), 166 to 203, 204(part), 205 to 233, 234(part), 235 to 249, 250(part), 251, 252, 253(part), 254 to 257, 265(part), 266(part) & 268(part).

Plot numbers acquired in village Baughutui:-

1(part), 2, 3, 4(part), 7(part), 14(part), 17(part), 18, 19(part), 20(part), 21 to 71, 72(part), 73 to 81, 82(part), 83 to 102, 103(part), 104(part), 105 to 108, 109(part), 110(part), 111 to 133, 134(part), 135 to 150, 151(part), 152(part), 153(part), 163(part), 173(part), 291(part), 309(part), 311(part) & 312(part).

Plot numbers acquired in village Benji:-

1 to 26, 27(part), 28 to 34, 35(part), 36(part), 46(part), 48(part), 50(part), 53(part) and 262(part).

Boundary description:-

A-B line passes through plot numbers 35, 34, 41, 39, 40, 29, 44, 49, 47, 48, 167, 209, 212 and 213 of village Bahera through plot nos. 163, 183, 185, 182, 181, 187, 189, 190 and 198 of village Kajri through plot no. 1 of village Pipra, again through plot no. 2 of village Taping, then

through plot nos. 2, 30, 31, 37, 36, 35, 34, 33 and 104, of village Pindra, again through plot nos. 176, 137, 140, 141, 142 and 151 of village Rauta and meets at point 'B'.

B-B' line passes along the common boundary of villages Rauta and Basantpur (which forms common boundary with Basantpur Block acquired u/s 9(1) of Coal Act) and meets at point 'B'.

B'-C line passes along the part common boundary of villages Rauta and Barisun, ~~and~~ Rauta and Ulhara, Pindra and Ulhara and meets at point 'C'.

C-D line passes along part common boundary of villages Taping and Ulhara, Parej and Durukasmr then through plot no. 46 southern boundary of plot nos. 62, 63, 301, 302, 290, 289, 284, 283, 279, 278, 275, 273, 408, 373 and 375 of village Durukasmr and passes along part common boundary of villages Banji and Durukasmr (which forms common boundary with Parej block notified u/s 4(1) of the Coal Act) and meets at point 'D'.

D-E-F lines pass through plot nos. 36, 46, 35, 48, 50, 53, 27 and 262 of village Banji, then through plot nos. 176, 151, 152, 134, 153, 163, 309, 110, 109, 104, 103, 309, 291, 309, 82, 309, 311, 72, 312, 20, 19, 14, 17, 7, 1 and 4 of village Barughutu through plot nos. 255, 92, ~~93~~, 265, 118, 119, 113, 105, 106, 265, 234, 165, 265, 253, 250, 266/ of village Parej (which forms part common boundary with Tata's West Bokaro Colliery) and meets at point 'F'.

/ and 268

F-G line passes along part left bank of Bokaro River through plot nos. 204 of village Parej then through plot no. 42 and southern boundary of plot no. 33 (Nalla) through plot nos. 81, 85, 84, 83, 69, 26 and southern boundary of plot no. 1427 of village Pundi again through plot nos. 256, 251, 238, 208, X 211, 213, 215, 119, 177, 176, 173 and southern boundary of plot no. 170 of village Kekebasaudi (which forms common boundary with Pundi block acquired u/s 9(1) of Coal Act) and meets at point 'G'.

G-H-I-J lines pass through plot nos. 172, 119, 266, 268, 271, and 270 of village Kekebasaudi through plot nos. 2331, 2334, 2333, 2332, 2327, 1937, 2021, 1987, 2019, 1987, 2014, 2012, 1997, 2011, 2058, and southern boundary of plot no. 2008, through plot nos. 2008, 2009, 1997, 1999, 1997, 1996, 1945, 1943, 1941, 1924, 1922, 1923, 1924, 1928, 1925, 1906, 1904, 1903, 907, 904, 905, 904, 902, X 325, 459 and 325 of village Mandu and meets at point 'J'.

∠ 1418,

J-K-L lines pass through plot nos. 325, 457, 451, 450, 451, 439, 438, 435, 345, 3178, 346, 369, 366, 360, 262, 264, 265, 266, 257, 256, 255, 254, 253, 248, 247, 599, 600, 601, 620, 634, 3203, 631, 3202, 639 and 625 of village Mandu, through plot nos. 318, 309, 162, 307, 462, 291, 292, 293, 302, 299, 519, 299, 298, 295, 299, 6 and 7 of village Gobindpur, through plot nos. 1465 (River) 1420, 1421, 1418 and 1419 (River) of village Indra and meets at point 'L'.

L-A line passes along part common boundary of villages Bahera and Indra, Bahera & Charhi, Bahera and Chamara (Central line of Bokaro River) and meets at starting point 'A'.

Sub-Block-2

All Rights

Serial number	Village	Thana	Thana number	District	Area	Remarks
1.	Durukasmar	Mandu	108	Hazaribagh	48.50	part
2.	Banji	-do-	159	-do-	7.00	-do-
3.	Ichakdih	-do-	161	-do-	328.00	-do-

Total area :- 383.50 acres (approximately)  
or 357.53 hectares (approximately)

Plot numbers acquired in village Durukasmar:-

632(part), 710(part), 711(part), 712 to 721, 722(part), 724 to 740, 741(part), 742, 743(part), 744(part), 745(part), 756(part), 757.

Plot numbers acquired in village Banji:-

516(part), 615(part), 617(part), 618(part), 619(part), 621(part).

Plot numbers acquired in village Ichakdih:-

2 to 2132, 2184 to 2364, 2366, 2367, 2368.

Boundary description:-

M-N line passes through plot numbers 722, 710, 711, 756, 744, 745, 741, 756 & 632 of village Durukasmar, through plot numbers 516, 615, 619, 617, 618 and 621 of village Banji (which forms part common boundary of Tata West Bokaro Colliery) and meets at point 'N'.

- N-O line passes through plot no. 621 of village Banji then along the common boundary of village Ichakdih & Kedla, Ichakdih & Loiyo and meets at point 'O'.
- O-M line passes along the right bank of Chutua Nadi and along common boundary of villages Ichakdih & Hurdag, again along right bank of Chutua Nadi in village Ichakdih & Durukasmār (which forms common boundary with Hurdag Block acquired u/s 9(1) of the Coal Act) and meets at starting point 'M'.

Sub-Block-3

All Rights

Serial number	Village	Thana	Thana number	District	Area	Remarks
1.	Garkia alias Parsabera	Mandu	158	Hazaribagh	364.00	part
2.	Kedla	-do-	160	-do-	681.00	-do-
3.	Loiyo	-do-	162	-do-	895.00	-do-

Total area :- 1940.00 acres (approximately)  
or 785.08 hectares (approximately)

Plot numbers acquired in village Garkia alias Parsabera:-

1(part), 57(part), 84(part), 98(part), 102(part), 103 to 121, 122(part), 123 to 144, 145(part), 146, 147(part), 154(part), 155(part), 157(part), 159(part), 160 to 195, 191(part), 195, 196(part), 201(part), 205 to 237, 238(part), 239 to 352, 353 (part), 354(part), 355 to 357, 358, 359, 360 & 361.

Plot numbers acquired in village Kedla :-

75(part), 76(part), 99(part), 102(part), 104(part), 105(part), 123(part), 129 to 158, 159(part), 160, 161(part), 162, 163 (part), 164, 165, 166, 167(part), 169(part), 184(part), 185(part), 186(part), 189(part), 190 to 341, 342(part), 345(part), 346, 347, 348, 349(part), 350, 352(part), 353 (part), 371(part), 386, 620(part), 1200 to 1204, 1205(part), and 1212.

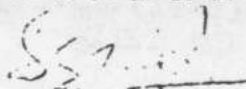
∠ 175(part), 176 to 178, 180(part), 181, 182(part), 183(part),

Plot numbers acquired in village Loiyo:-

1902(part), 2131(part), 2132(part), 2133 to 2275, 2276(part), 2277 to 2303, 2304(part), 2305, 2306(part), 2307(part), 2308(part), 2310(part), 2311(part), 2312(part), 2318(part), 2319(part), 2343(part), 2507(part), 2509(part), 3363(part), 3364, 3365, 3366(part), 3367, 3368, 3369(part), 3377(part), 3383(part), 3387(part), 3388(part), 3389(part), 3390 to 3415, 3416(part), 3417 to 3420, 3455 and 3456.

Boundary description:-

- Q-R line passes through plot nos. 1205, 620, 371, southern boundary of plot no. 385 through plot nos. 371, 342, 345, 349, 371, 352, 353, 76 and 75 of village Kedla and meets at point 'R'.
- R-S line passes through plot nos. 75, 102, 99, 102, 371, 105, 128, 163, 167, 169, 161, 159, 182, 183, 184, 185, 182, 180, 175, 186, 175, 189, 175, and 104 of village Kedla through plot nos. 354, 57, 353, 238, 201, 194, 196, 84, 159, 157, 155, 147, 145, 154, 122, 151, 98, 102 and 1 of village Garkia alias Parsabera (which forms common boundary with Tata's West Bokaro Colliery) and meets at point 'S'.
- S-T line passes along the part common boundary of villages Garkia, alias Parsabera and Duni and meets at point 'T'.
- T-U line passes along the part common boundary of villages Garkia alias Parsabera and Sarubera, Garkia alias Parsabera and Sirka Loiyo and Sirka, Loiyo and Bhuiyadh and meets at point 'U'.
- U-V-W lines pass along the eastern boundary of 3420, through plot numbers 3416, 3389, 3388, 3387, 3416, 3383, 3416, 3377, 3363, 3369, 3363, 3366, 3363, 2319, 2318 and 2312 of village Loiyo and meets at point 'W'.
- W-X-Y-P lines pass through plot numbers 2312, 2311, 2310, 2304, 2308, 2307, 2306, 2343, 2276, 2132, 2507, 2509, 1902 and 2131 of village Loiyo and meets at point 'P'.
- P-Q line passes along the part common boundary of villages Loiyo and Kedla and meets at starting point 'Q'.
- 



(Samay Singh)

Under Secretary to the Govt. of India

No. 19/82/82-CL

To

The Asstt. Manager (Tech.),  
Government of India Press,  
Mayapuri, New Delhi (with copy to Hindi version).

Copy forwarded for information and necessary action :-

1. The Secretary to the Govt. of Bihar, Department of Mines and Geology, Patna. It is requested that the notification may be republished in the State Gazette and a copy of the same sent to this Ministry.
2. The Chairman-cum-Managing Director, Central Coalfields Ltd., Darbhanga House, Ranchi ( with 20 spare copies).
3. The Coal Controller, 1, Council House Street, Calcutta, with two spare copies alongwith two copies of the plan for inspection by the interested parties.
4. The Controller, Indian Bureau of Mines, Nagpur (2 spare copies)
5. The Director General, GSI, Calcutta.
6. The Deputy Commissioner, Hazaribagh (Bihar), with two spare copies alongwith two copies of the plan for inspection by the interested parties.
7. The Planning Commission, New Delhi.
8. The Regional Manager, CIL, 401, Ansal Bhawan, Kasturba Gandhi Marg, New Delhi.
9. The Regional Director, RI-III, CIPDI, Ranchi.
10. The Folder.

(Samay Singh)

Under Secretary to the Govt. of India  
No. 19/82/82-CL.

1/2  
भारत के राजपत्र, भाग 2, खंड 3, उपखंड ॥ii॥ में प्रकाशित है ॥

भारत सरकार  
कोयला मंत्रालय

15.6.96

नई दिल्ली, दिनांक 15/5/1996

अधिसूचना

का.आ. 17.54  
केन्द्रीय सरकार ने कोयला धारक वर्क जर्नल और विकास अधिनियम, 1957 ॥1957 का 20॥ जिले चर्खे इसके पश्चात् उक्त अधिनियम कहा गया है ॥ की धारा 7 की उपधारा ॥1॥ के अधीन भारत सरकार के कोयला मंत्रालय की अधिसूचना सं. का.आ. 475 जो भारत के राजपत्र, भाग 2, खंड 3, उपखंड ॥ii॥ तारीख 13 फरवरी, 1995 में प्रकाशित की गई थी, के साथ पठित भारत के राजपत्र तारीख 2 अक्टूबर, 1993 में प्रकाशित भारत सरकार के कोयला मंत्रालय की अधिसूचना सं. का.आ. 2047, तारीख 9 अक्टूबर, 1993 द्वारा उस अधिसूचना से संश्लेष अनुसूची में विनिर्दिष्ट परिच्छेद में भूमि का जर्नल करने के अपने आदेश की सूचना दी थी ;

सक्षम प्राधिकारी ने उक्त अधिनियम की धारा 9 के अनुसरण में केन्द्रीय सरकार को अपनी रिपोर्ट दे दी है ।

और केन्द्रीय सरकार का पूर्वोक्त रिपोर्ट पर विचार करने के पश्चात् और विचार सरकार ने परामर्श करने के पश्चात् यह समाधान हो गया है कि संश्लेष अनुसूची में वर्णित 840.00 एकड़ ॥तागभाग॥ वा 339.93 हेक्टर ॥तागभाग॥ माप की भूमि अर्जित की जानी चाहिए ।

अतः, अब, केन्द्रीय सरकार, उक्त अधिनियम की धारा 9 की उपधारा ॥1॥ द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए घोषणा करती है कि उक्त संश्लेष अनुसूची में वर्णित 840.00 एकड़ ॥तागभाग॥ वा 339.93 हेक्टर ॥तागभाग॥ माप की भूमि अर्जित की जाती है ।

...../..

इस अधिसूचना के अंतर्गत आने वाले क्षेत्र के रेजॉल्ट नं० राजस्व/3/95, तारीख 19 अप्रैल, 1995 का निरीक्षण, उपायुक्त, हजारीबाग जिला के कार्यालय में या कोयला विभाग, 1, कार्गिल हाउस स्ट्रीट, बलकत्ता के कार्यालय में या मैट्रोल कोलफील्ड्स लि० राजस्व अनुभाग, दरभंगा हाउस, रांची विहार के कार्यालय में किया जा सकता है।

अनुसूची

केवला उत्तर और बारूंड कोयला खान

परिचाली लोकरो कोलफील्ड्स

रेजॉल्ट नं० राजस्व/3/95-तारीख 19 अप्रैल, 1995

अर्जित की गई भूमि का विवरण

सभी अधिकार

क्र.सं. ग्राम	थाना	थाना सं.	जिला	क्षेत्र एकड़ में	क्षेत्र हेक्टर में	टिप्पणियां
1. केवला	बारूंड	160	हजारीबाग	479.49	194.04	भाग
2. तोरयो	बारूंड	162	हजारीबाग	360.51	145.89	भाग

कुल क्षेत्र: 840.00 एकड़

या

339.93 हेक्टर

ग्राम केवला में अर्जित किए गए प्लॉट संख्या : 367 भाग

369 भाग, 371 भाग, 410, 411 भाग, 412, 413, 414, 415 भाग, 416, 417, 418, 419 भाग, 421 भाग, 423 भाग, 477 भाग, 478 भाग, 479, 480, 481, 482, 483 भाग, 484, 485 भाग, 487 भाग, 488 भाग, 489 से 497, 498 भाग, 506 भाग, 507, 508, 509, 510 भाग, 513 भाग, 514, 515, 516 भाग, 518 भाग, 519 भाग, 524 भाग, 525 भाग, 526 भाग, 527 से 588, 589 भाग, 590 भाग, 594 भाग, 595 भाग, 598 भाग, 599, 600, 601 भाग, 602 से 619, 620 भाग, 621 से 733, 741 भाग, 792 भाग, 793, 794, 795 भाग, 796 से 800, 801 भाग, 803 भाग, 804 से 809, 810 भाग, 811 से 1195,

1196 ॥भाग॥, 1197, 1198, 1199 ॥भाग॥, 1208, 1209 और 1214

ग्राम तोरणों में अर्जित किए गए प्लॉट सं. :- 1855 ॥भाग॥

1856, 1857 ॥भाग॥, 1858 ॥भाग॥, 1859 ॥भाग॥, 1860 से 1888, 1889 ॥भाग॥, 1891 से 1901, 1902 ॥भाग॥, 1903 से 1909, 1910 ॥भाग॥, 1911 ॥भाग॥, 1912 ॥भाग॥, 2048 ॥भाग॥, 2049 से 2119, 2120 ॥भाग॥, 2121 से 2130, 2131 ॥भाग॥, 2509 ॥भाग॥, 2524 ॥भाग॥, 3447 और 2462 ॥भाग॥ ।

सीमा वर्णन :-

- क-ख रेखा ग्राम केदला में प्लॉट सं. 795, 792, 801, 803, 810, 741, 415, 741, 411, 741, 367 और 371 से होकर जाती है और बिन्दु "ड" पर मिलती है ।
- ख-ग-घ-ङ-च-छ रेखा ग्राम केदला में प्लॉट सं. 369, 371, 419, 421, 422, 423, 525, 524, 526, 519, 518, 516, 513, 510, 506, 498, 487, 488, 485, 483, 479, 371 और 477 से होकर जाती है और बिन्दु "छ" पर मिलती है ।
- छ-ज रेखा ग्राम केदला में प्लॉट सं. 477, 371, 590, 589, 590, 598, 371, 601, 595, 594, 620, 1199, 1196 और 1199 से होकर जाती है और बिन्दु "ज" पर मिलती है ।
- ज-झ रेखा ग्राम तोरणों से प्लॉट सं. 2120, 2131, 1902, 2509, 1889, 2509, 2524, 1859 और 3462 से होकर जाती है और बिन्दु "झ" पर मिलती है ।
- झ-ण रेखा ग्राम तोरणों में प्लॉट सं. 3462 की पश्चिमी सीमा के साथ-साथ जाती है उसके पश्चात् प्लॉट सं. 1853, 1857, 1855, 1910, 1911, 1912, 1910 और 2048 से जो तोरणों का एक विस्तार की सम्मिलित सीमा बनाती है जो कोयला धारण क्षेत्र ॥अर्जन और विकास॥ अधिनियम, 1957 की धारा 9 ॥1॥ के अधीन अर्जित किया गया है, से होकर जाती है और बिन्दु "ण" पर मिलती है ।

ठ-ठ

रेडाएं चुटुआ नदी की दक्षिणी तीरा के साथ साथ जाती है जो हरदा  
बाक की सम्पत्ति तीरा बनाती है जिसका योजना धारक क्षेत्र  
वर्जन और विकास अधिनियम, 1957 की धारा 9(1) के अधीन वर्जन  
किया गया है और लिन्दु "ठ" पर मिलती है।

ठ-उ-ठ

रेडाएं ग्राम लोदयो और ह्याकडीह केदना और ह्याकडीह की  
सम्पत्ति तीरा के भाग के साथ साथ जाती है जो परोज बाक  
विस्तार की सम्पत्ति तीरा बनाती है जिसका योजना धारक क्षेत्र  
वर्जन और विकास अधिनियम, 1957 की धारा 9(1) के अधीन वर्जन  
किया गया और "ठ" लिन्दु पर मिलती है।

ठ-क

रेडा ग्राम केदना और ह्याकडीह की सम्पत्ति तीरा के भाग के होकर  
जाती है और धारक लिन्दु "क" पर मिलती है।

फा.सं. 43015/10/91 एन.एस.उ.बू.

ज. एस. देवी

॥ शीलती प्रेम तत्ता शैली ॥  
अवर सचिव, भारत सरकार

सेवा में

प्रबंधक, तदानीकी,  
भारत सरकार सुदामातय,  
गाथापुरी, रिंग रोड,  
नई दिल्ली.

325/

(To be published in part - II, Section 3, Sub-section (ii) of the Gazette of India)

dt-14.2.04



**Government of India  
Ministry of Coal**

New Delhi, the 5th February, 2004.

*Disputed*  
*21/1/04*  
*Com. Sec.*  
*OS*

*[Signature]*

*[Signature]*  
21/2

**Notification**

S.O. 343..... whereas by the notification of the Government of India in the Ministry of Coal and Mines number S.O. 467 dated the 31<sup>st</sup> January, 2003, published in the Gazette of India, dated the 8<sup>th</sup> February, 2003, under sub-section (1) of section 7 of the Coal Bearing Areas (Acquisition and Development) Act, 1957 ( 20 of 1957) (hereinafter referred to as the said Act), the Central Government gave notice of its intention to acquire the lands in the locality specified in the Schedule appended to that notification.

And whereas the competent authority, in pursuance of section 8 of the said Act, has made his report to the Central Government.

And whereas the Central Government after considering the report aforesaid and after consulting the Government of Jharkhand is satisfied that the lands measuring 475.40 acres (approx.) or 192.46 hectares (approx.) described in the Schedule appended hereto should be acquired.

Now, therefore, in exercise of the power conferred by sub-section (1) of section 9 of the said Act, the Central Government hereby declares that the lands measuring 475.40 acres (approx.) or 192.46 hectares (approx.) described in the said Schedule are hereby acquired.

The plan no. Rev./11/2003 dated the 5<sup>th</sup> June, 2003 of the area covered by this notification may be inspected in the office of the Deputy Commissioner, Hazaribagh, Jharkhand or in the office of the Coal Controller, 1, Council House Street, Kolkata or in the office of the Central Coalfields Ltd., (Revenue Section), Darbhanga House, Ranchi, Jharkhand.

**Schedule**  
**Kedla Jharkhand Block Extension**  
**(West Bokaro Coalfields)**  
**District : Hazaribagh, (Jharkhand)**

Drg. No. Rev/11/2003 Dt.5.6.2003

(All Right)				(Showing land acquired)			
Serial number	Village	Thana	Thana number	District	Area in acres	Area in hectares	Remarks
1.	2.	3.	4.	5.	6.	7.	8
1.	Kedla	Mandu	160	Hazaribagh	475.40	192.46	Part

**Total area 475.40 acres (approximately) 192.46 hectares (approximately)**

**Plot numbers acquired in village Kedla :-**

9, 10, 13, 15, 16, 24(Part), 33, 41, 43(Part), 45, 55(Part), 73, 75(Part), 345(Part), 371(Part), 392(Part), 393, 394, 395, 396, 397, 398, 399, 400, 401, 402(Part), 403(Part), 404, 405, 406(Part), 408, 419(Part), 420(Part), 421(Part), 422(Part), 423(Part), 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477(Part), 478(Part), 483(Part), 485(Part), 486, 487(Part), 488(Part), 498(Part), 499, 500, 501, 502, 503, 504, 505, 506(Part), 510(Part), 511, 512, 513(Part), 516(Part), 517, 518(Part), 519(Part), 520, 521, 522, 523, 524(Part), 525(Part), 526(Part), 620(Part), 741(Part), 756, 773, 781, 783, 785, 789, 792(Part), 803(Part), 810(Part), 1199(Part) and 1205(Part).

**Boundary Description :-**

A-B Line starts from 'A' and passes through plot nos.24,43,50,49,67,75,76 & 75 in village Kedla (along common boundary of Kedla Banji Road) and meets at point "B"

B-C-D-E-F-G Lines pass through plot nos. 75,76,353,371,352,371,349,345,342,371,620, and 1205 in village Kedla (which forms part common boundary of Parej Extn. Block U/S 9(1) of C.B.A (A&D)ACT 1957 vide, S.O.. No3687 dt. 20.10.81) and meets at point 'G'.

G-H Line passes through common boundary of village Kedla & Loiyo and meets at point 'H'.

H-I-J-K-L- Lines pass though plot nos. 1199, 1196, 1199, 620,594, 595, 601, 600,371.

M-N-O 601, 598, 590, 589, 590, 371, 477, 478, 485, 488, 487, 498, 506, 510, 513, 516, 518, 519, 526, 524, 525, 423, 422, 419, 371& 369 in village Kedla (which forms part common boundary of Kedla Jharkhand Block U/S 9(1) of CBA(A&D)Act, 1957 vide S.O. No. 1754 dt. 15.6.96) and meets at point 'O'.

O-P

Line passes through plot nos. 369,367,741,810,803,801, 792 and 795 in village Kedla (which forms part common boundary of Kedla Jharkhand Block U/S 9(1) of C.B.A.(A&D) Act 1957 vide S.O. No. 1754 dt. 15.6.96) and meets at point 'P'.

P-A

Line passes through common boundary of village Kedla & Ichakdih (which forms part common boundary of Parej Extn. Block U/S 9\*(1) of C.B.A.(A&D) Act,1957 vide S.O. No. 3687 dt. 20.10.81) and meets at starting point 'A'.

(No. 43015/22/2000-PRIW)

  
(Sanjay Bahadur)  
Director

To,  
The Assistant Manager(Tech.)  
Government of India Press,  
Mayapuri, New Delhi.

Copy forwarded for information & necessary action to :-

1. The Secretary to the Government of Jharkhand, Department of Mines and Geology, Ranchi. It is requested that the notification may be re-published in the State Gazette and copy of the same sent to this Ministry.
2. The Secretary to the Government of Jharkhand, Department of Land Reforms, Jharkhand, Ranchi.
3. ~~The Chairman-Cum-managing Director, Central Coalfields Limited, Darbhanga House, Ranchi (with 20 copies).~~
4. The Coal Controller, 1, Council House Street, Kolkata, with two spare copies alongwith two copies of the plans for inspection by the interested parties.
5. The Controller, Indian Bureau of Mines, Nagpur (with two spare copies).
6. The Director General, Geological Survey of India, Kolkata.
7. The Deputy Commissioner, Hazaribagh (Jharkhand) with two spare copies alongwith two copies of plans for inspection by the interested parties.
8. The Regional Director, RI-III, CMPDI, Jharkhand, Ranchi.
9. The Planning Commission, New Delhi.
10. The Regional Manager, Coal India Limited, 404, Ansal Bhawan, Kasturba Gandhi Marg, New Delhi.
11. Section Folder.

(No. 43015/22/2000-PRIW)

  
(Sanjay Bahadur)  
Director

DT (P/P)

comd/ceel/19/2/04

DT/PP/1984  
20/2


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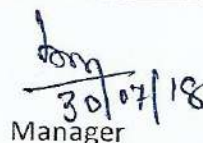
# **Annexure IX**

## **Past production details**

**CENTRAL COALFIELDS LIMITED**  
**KEDLA OPENCAST PROJECT**

<b>Coal production from 1979-80 to 2017-18</b>	
Year	Production (Te)
1979-80	350000
1980-81	500000
1981-82	400000
1982-83	380000
1983-84	400000
1984-85	400000
1985-86	529686
1986-87	575001
1987-88	498565
1988-89	442475
1989-90	408156
1990-91	403005
1991-92	338221
1992-93	145250
1993-94	373293
1994-95	341287
1995-96	392444
1996-97	326839
1997-98	384815
1998-99	450733
1999-2000	490152
2000-01	376485
2001-02	326760
2002-03	330115
2003-04	333010
2004-05	402015
2005-06	426170
2006-07	462745
2007-08	452285
2008-09	457600
2009-10	486315
2010-11	750185
2011-12	648204
2012-13	405097
2013-14	256000
2014-15	360651
2015-16	303291
2016-17	170800
2017-18	252754

  
Dy surveyor (M)  
30/07/18

  
Manager  
30/07/18

  
Project Officer  
30/07/18

# **Annexure X**

## **Hydrogeological Assessment**

## **HYDROGEOLOGY & GROUNDWATER BALANCE**

### **1.0 Hydro-logical features and Water Availability**

#### **1.1 Watershed Description**

The drainage of the block is controlled by the Easterly flowing Chutua Nala in the North along the Northern boundary, the Easterly flowing seasonal Kedla Nala in the central part and the Easterly flowing Bokaro River in the South, beyond the quarry edge boundary. The Chutua nala flows near the block boundary of Kedla underground and around 700 m to the opencast quarry of Kedla and meet the master drainage Bokaro river at around 5.0 km in the east of Kedla Colliery. The Bokaro river flows at a distance of around 3.0 km from the present quarry edge. There are some other seasonal tributaries of Bokaro river and Chutua nala flows around the project. The seasonal Jharna nala flows from north to south and meet Bokaro river in the south of the project.

The easterly flowing Bokaro River is the major drainage and perennial source of water for the area. The HFL of the Chutua nala as recorded in the vicinity of the project is 332.18 m above MSL (As on 26.09.1978) (nearby RL is ranges from 336.0 m to 340.0 m). The HFL of the Kedla nala as recorded in the vicinity of the project is ranges from 334.0 m (nearby RL is 344.0 m) to 354.0 m (nearby RL is 360.0 m) above MSL. Bokaro nadi, the major river of the buffer zone ultimately joins master drainage Damodar river, outside the buffer zone of the project. The R.L. of incline-I for seam VA (which is also the incline of seam VIII) is 338.015 m (nearby R.L. is 342.0 m). The R.L. of incline-III for seam VA is 323.315 m (nearby R.L. is 350.09 m). The R.L. of incline-II for seam VIII is 356.575 m (nearby R.L. is 358.0 m). The drainage pattern of the area is mostly dendritic.

Refer Plate-XI for Contour Map Showing Drainage of the Study Area.

#### **1.2 Historical Ground Water Level**

Ground water level by Permanent Observation Well (PoW) of the area is continuously monitored by CMPDI. There is no Permanent Observation Well (PoW) of CGWB in the buffer zone of Kedla Colliery. The pre-monsoon and post monsoon historical groundwater levels for the last few years (2003 to 2015) recorded by CMPDI at the nearest permanent hydrograph stations like at Ichakdih Basti (Well No.: WB-05) and Pundi Basti (Well No.: WB-25) located within the core zone and buffer zone, respectively, were collected and are given below:

(in metres bgl.)

Station/ Year	<b>Ichakdih Basti (WB-05)</b> (Distance 200 m N-E of the Kedla Colliery)		
	Pre-Monsoon	Post-Monsoon	Fluctuation
2003	9.38	3.58	5.80
2004	9.97	3.87	6.10

2005	9.55	4.95	4.60
2006	10.0	4.30	5.70
2007	8.10	4.28	3.82
2008	9.80	3.45	6.35
2009	8.80	4.80	4.0
2010	9.20	4.10	5.10
2011	5.90	4.0	1.90
2012	8.90	3.10	5.80
2013	8.70	4.70	4.0
2014	7.70	4.50	3.20
2015	6.80	4.45	2.35
Average	8.68	4.16	4.52

Station/ Year	Pundi Basti (Well No.: WB-25) (Distance 6.20 km West of the Kedla Colliery)		
	Pre-Monsoon	Post-Monsoon	Fluctuation
2003	-	3.76	-
2004	8.98	4.40	4.58
2005	8.65	6.63	2.02
2006	9.15	3.68	5.47
2007	8.88	3.23	5.65
2008	-	2.53	-
2009	7.18	3.08	4.10
2010	8.53	4.13	4.40
2011	3.0	2.48	0.52
2012	6.83	1.78	5.05
2013	7.58	3.55	4.03
2014	5.38	4.78	0.60
2015	6.98	4.88	2.10
Average	7.38	3.76	3.62

### 1.3 Water Level Trend

The above data shows that the pre-monsoon water levels vary from 10.0 m (2006 at Ichakdih Basti) to 3.0 m (2011 at Pundi Basti) with an average of 8.03 m and the post-monsoon water levels vary from 6.63 m (2005 at Pundi Basti) to 1.78 m (2012 at Pundi Basti) with an average of 3.96 m. The water level fluctuation varies from 6.35 m (2008 at Ichakdih Basti) to 0.52 m (2011 at Pundi Basti) with an average fluctuation of 4.51 m in the area. The pre-monsoon water levels at Ichakdih and Pundi Basti hydrograph station shows a slightly increasing trend while post-monsoon water levels show a normal trend. Overall groundwater utilisation with the increasing population and by mining has not affected the local groundwater regime. Studies reveal that the general water table gradient for the top aquifer in the buffer zone is  $6.67 \times 10^{-3}$  towards east.

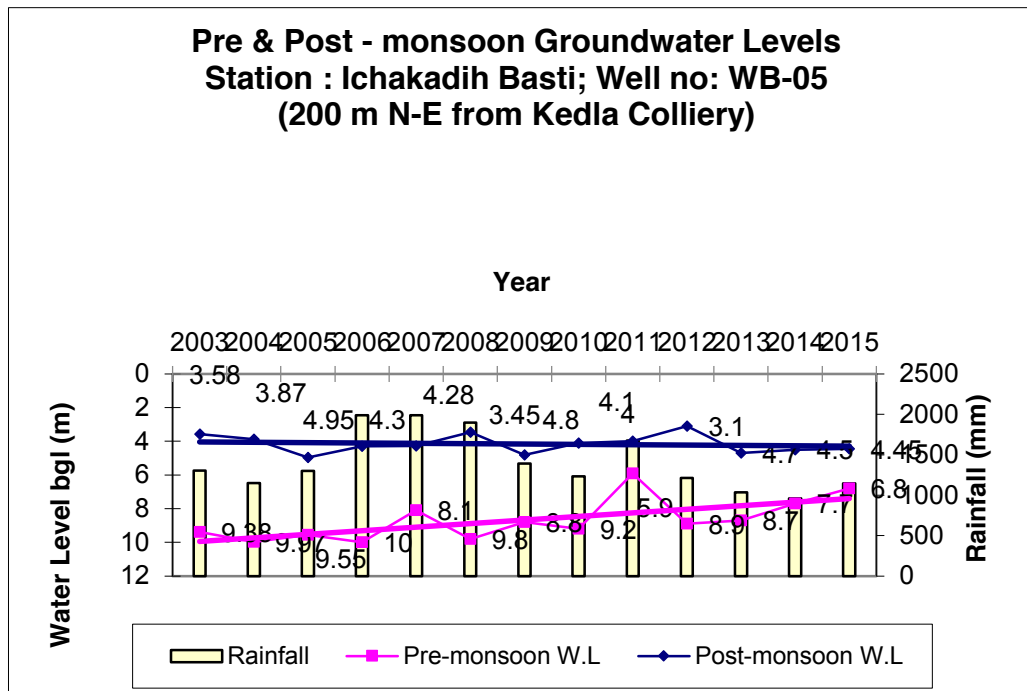


Fig: Hydrograph of Ichakdih Basti (Well No: WB-05)

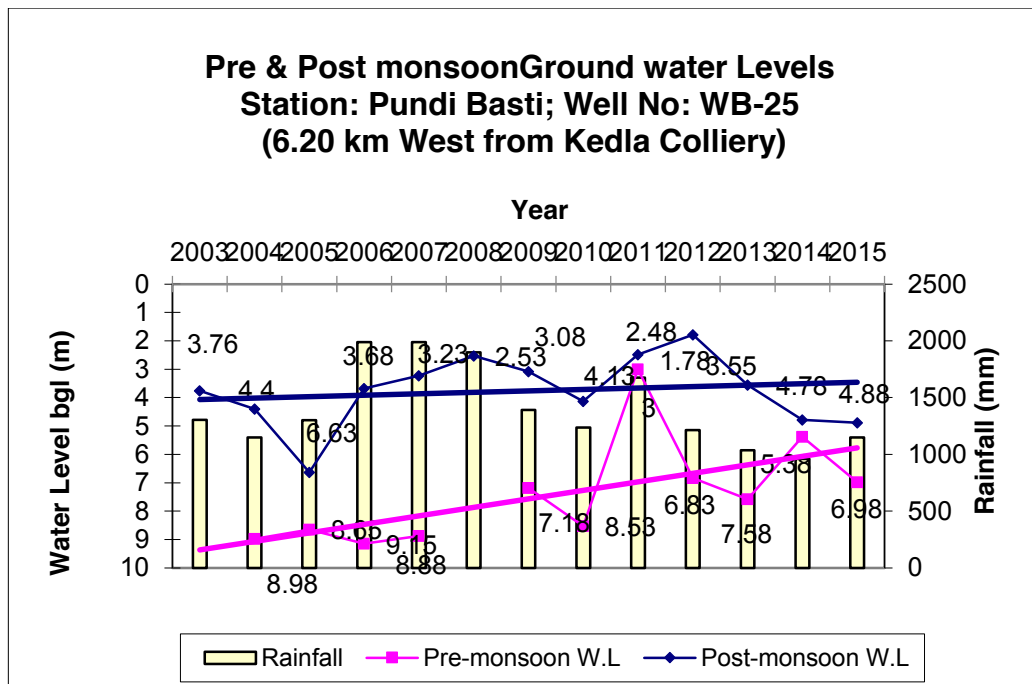


Figure: Hydrograph of Pundi Basti (Well No: WB-25)

#### 1.4 Groundwater stage development

Coal mining is the major industrial activity in the area. CGWB, Mid-Eastern Region, Patna has reported the stage of ground water development in Mandu development block (where Kedla Colliery exist), Ramgarh district as 29.51 % and identified the region with category "Safe". The ground water development in Ramgarh district was reported as 39.03 % and identified under the category of "Safe". Stage of groundwater development for buffer zone of the project area determined is about 48.87 %, which is also under 'safe' category.

## 2.0 GROUND WATER BALANCE OF CORE ZONE

The industrial and domestic water demand by mining projects in the buffer zone was estimated as 8.55 M. cum and this demand is made through the treated mine discharge. The total mine discharge in the area through existing and proposed mine was estimated as 13.80 M.cum and of which about 8.55 M.cum has been gainfully utilised by mines. The balance 5.25 M.cum mine water will be discharged into old abandoned quarries/ peripheral village ponds for various uses by local population. Of this, about 20% i.e. 1.05 M.cum is estimated as return flow to the groundwater system. Thus, the net mine discharge in the area was projected as 4.20 M.cum. The net groundwater draft in the study area was projected as 20.89 M.cum. The net annual groundwater availability in buffer zone is 42.75 M.cum. Thus, the balance available annual groundwater resource was projected as 21.86 M.cum. From the water balance studies, it is estimated that there is surplus ground water available per annum from the ground water annual recharge after catering to the future requirement in the buffer zone. However, in the core zone, the extraction of ground water by mining will be 0.90 Mm<sup>3</sup> per annum, which is less than the annual rainfall recharge (2.13 Mm<sup>3</sup>).

CGWB, Mid-Eastern Region, Patna, has assessed and reported the total annual groundwater recharge in the Ramgarh district (where Kedla Colliery exists) as 113.23 M.cum (11323.0 Ham). The net groundwater draft and source availability were reported as 40.43 M.cum (4043.0 Ham) and 103.58 M.cum (10358.0 Ham) respectively. Refer Plate XVI Ground Water Balance Flow.

**Table: Groundwater Recharge Estimation of Buffer Zone (As Per GEC'97)**

i) Rainfall Recharge in Buffer Zone by Rainfall Infiltration Method

Description of items			
1. Area			
Sedimentary (sq.km)	152.47		
Hard Rock (sq.km)	322.46		
2. Normal Rainfall during			
a. Monsoon season (in mm)	1040.5		
b. Non-monsoon season (in mm)	210.7		
c. Is non-monsoon season rainfall as a percentage of normal annual rainfall greater than 10% (yes/no) (*Then Non-monsoon Rainfall Recharge will also be taken)	Yes* (20.25%)		
3. Rainfall infiltration factor	Sedimentary	Hard Rock	
	12%	8%	
4. Rainfall recharge in Buffer zone by Rainfall Infiltration Factor Method	Sedimentary	Hard Rock	Total
a. Monsoon season (Mcum) [ (1) * (2a) * (3) ]	19.04	26.84	45.88
b. Non-monsoon season (M.Cum) [ = Nil if (2c) is 'No' = (1) * (2b) * (3) if (2c) is 'Yes' ]	3.86	5.44	9.30
Total	22.90	32.28	
Gross Rainfall Recharge (Mcum)	55.18		

ii) Rainfall Recharge in Buffer Zone by Water Level Fluctuation Method during monsoon season

Description of items	Sedimentary	Hard Rock
1. Area (sq.km)	152.47	322.46
2. Water Table Fluctuation (m)	1.57	1.77
3. Specific Yield	4%	3%
4. Change in Groundwater Storage [ (1) * (2) * (3) ] (M cum)	9.58	17.12
5. Total (M cum)	26.70	
6. Gross groundwater Draft for 'All Uses' during monsoon season (M cum)	8.15	
7. Gross Rainfall Recharge (M cum) [ (5) + (6) ]	34.85	

iii) Rainfall Recharge in Buffer Zone after comparing results from Water Level Fluctuation Method and Rainfall Infiltration Factor Method during monsoon season

Description of items	Quantity
1. Rainfall Recharge during monsoon season in Buffer Zone	
a. By Water Table Fluctuation Method (Mcum)	34.85
b. By Rainfall Infiltration Factor Method (Mcum)	45.88
2. Difference between (1a) and (1b) expressed as a percentage of (1b), 'PD'	
$\left[ \frac{\{(1a) - (1b)\}}{(1b)} * 100 \right]$	- 24.04%
3. Rainfall Recharge in the Buffer Zone during monsoon season (Mcum)	
[ = (1a) if 'PD' is between -20 and +20% = 0.8 * (1b) if 'PD' is less than -20% = 1.20 * (1b) if 'PD' is greater than +20% ]	36.70

iv) Net Annual Groundwater Availability in Buffer Zone

Description of items	(Mcum)
1. Rainfall Recharge in Buffer Zone	
a. During Monsoon season (Rainfall Infiltration Method)	36.70
b. During Non-monsoon season (Rainfall Infiltration Method)	9.30
c. Annual [ (1a) + (1b) ]	46.0
2. Recharge from 'Other Sources'	
a. During Monsoon season	

b. During Non-monsoon season	
i. Return flow to Groundwater system (25%) through irrigation	0.45
ii. Return flow to Groundwater system (20%) through mine discharge	1.05
c. Annual [ (2a) + (2b) ]	1.50
3. Gross Annual Groundwater Recharge [ (1c) + (2c) ]	47.50
4. Natural discharge and other losses	
a. [ 5% * (3) ] if rainfall recharge during monsoon season computed by 'Water table Fluctuation Method'	-
b. [ 10% * (3) ] if rainfall recharge during monsoon season computed by 'Rainfall Infiltration factor Method'	4.75
5. Net Annual Groundwater Availability in Buffer Zone [ (3) – (4) ]	<b>42.75</b>
6. Annual Gross Groundwater Draft for all uses in Buffer Zone	<b>20.89</b>
7. Balance Available Annual Groundwater Recharge (Net Annual Groundwater Availability – Gross Annual Groundwater Draft)	<b>21.86</b>

v) Gross Groundwater Draft for all uses in Buffer zone

Description of items	Monsoon Season	Non-monsoon season	Total
1. Gross Groundwater Draft of the Buffer Zone	(Mcum)	(Mcum)	(Mcum)
a. Irrigation Draft	-	1.33	1.33
b. Community Water Draft	6.40	8.96	15.36
c. Industrial Draft (Net Mine Discharge)	1.75	2.45	4.20
d. 'All Uses' [ (1a) + (1b) + (1c) ]	8.15	12.74	
2. Annual Gross Groundwater Draft for 'All uses' in Buffer Zone [sum of monsoon and non-monsoon season]	20.89 Mcum		

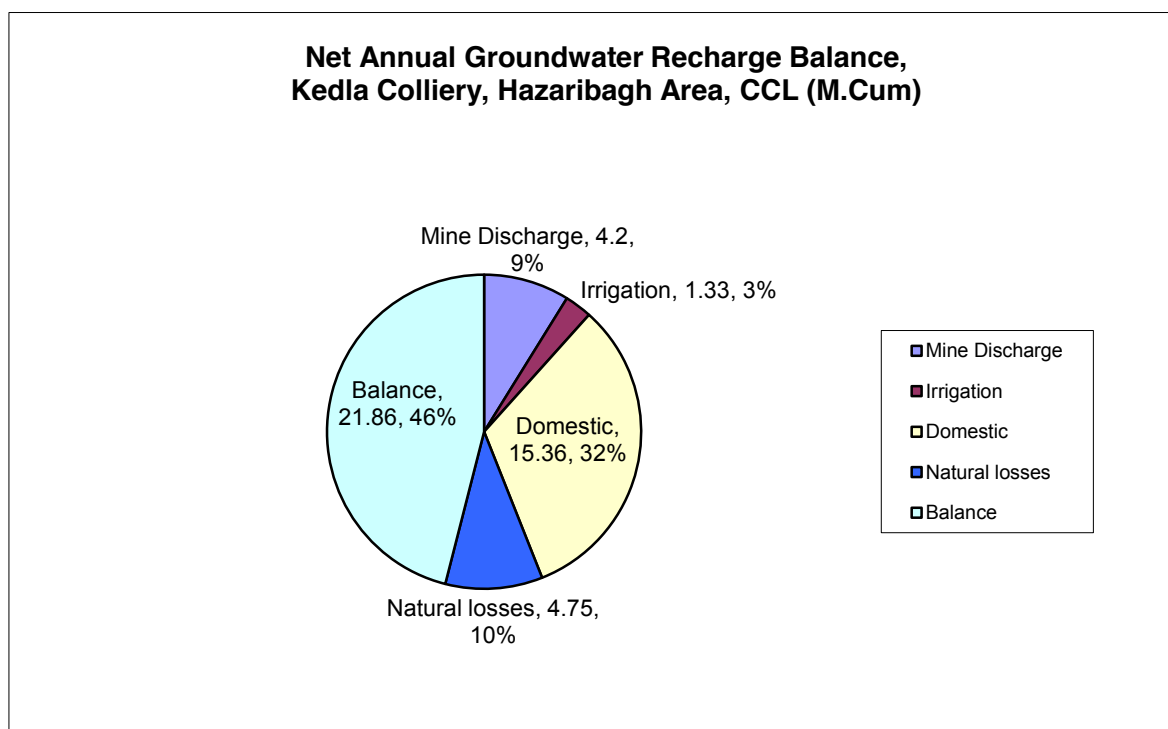
vi) Stage of Groundwater Development in Buffer Zone

Description of items	Buffer Zone
1. Stage of Groundwater Development	
a. Net Groundwater Availability (Mcum)	42.75
b. Annual Gross Groundwater Draft (Mcum)	20.89
c. Balance Available Annual Groundwater Recharge	21.86
d. Stage of Groundwater Development [ {(1b) / (1a)} * 100 ]	<b>48.87%</b>

**Table: Groundwater Balance of Core Zone**

<b>A.</b>	<b>Ground Water Recharge</b>	<b>Mcum</b>
	Recharge through rainfall in geographical area (Rg) (14.1799 sq.km x 1.2512 m rainfall x 12% infiltration)	2.13
	Gross Recharge (Rg):	2.13
	Natural discharges & other losses (10% of Rg): (-)	0.21
	<b>Net Annual Ground water Recharge:</b>	<b>1.92</b>
<b>B.</b>	<b>GROUNDWATER DRAFT</b>	
	Mine Pumping (2,460 cum/day)	<b>0.90</b>
	20% return flow to Groundwater system (-)	0.18
	<b>Net mine discharge in the area</b>	0.72
	Industrial water consumption, domestic water consumption of mine and nearby of villages are being met from mine pumping	
	<b>Net Annual Groundwater Draft</b>	<b>0.72</b>
<b>C.</b>	<b>Balance Available Annual Groundwater Recharge (A-B)</b>	<b>1.20</b>

Fig: Net Annual Groundwater Recharge Balance



To meet the safety of the mine and create good working conditions, it is necessary to discharge the mine water collection onto surface.

Kedla Colliery (Normative capacity: 1.18 MTPA and Peak capacity: 1.57 MTPA) is an existing old mine, which consisted of two adjacent mines such as Kedla OCP (Normative capacity: 1.0 MTPA and Peak capacity: 1.35 MTPA) and Kedla UGP (Normative capacity: 0.18 MTPA and Peak capacity: 0.22 MTPA). In Kedla UGP, seam VIII has been developed and proposed for depillaring (through caving) through incline no I & II. The pumping has been carried out through incline no I and also entry for

seam VA through drift from this incline. Incline no II has been sealed and no pumping is carried out. Development of seam VA is going on through incline no I (through drift from seam VIII) & III (as per Project Authority). The proposed seams of Kedla UGP for future production is seam VA, VI and VIII. In Kedla OCP, seam VI/VII (comb.) has already been worked and also proposed for further working in this project. Presently seam IV & V is working seam at a depth of around 53.0 m and maximum depth of opencast working is 73.0 m. Therefore, proposed seam in this project are VI/VII (comb.), V and IV. Mine inflow has also been predicted based on Darcy's equation for the exposure of complete formation/aquifer of Kedla OCP which will be get exposed and will attained its maximum strike length from 3<sup>rd</sup> year onwards. The predicted inflow upto the 2<sup>nd</sup> year of mining and 3<sup>rd</sup> year onwards (Peak mine inflow) has also been estimated. Mine inflow has also predicted for Kedla UGP for seam VIII during depillaring through caving condition. In the active face, due to weathered and high permeable nature, a permeability value of 0.50 m/day is considered for the top aquifer. As the water table will have a higher gradient near to the high wall face, a hydraulic gradient (I) of 0.02 was considered for the aquifer. The permeability of the middle and lower aquifers has been taken as 0.25 m/day due to its clayey and shaly nature.

Table: Mine Water Seepage of Kedla OCP for present mining condition

<b>PRESENT MINE INFLOW CALCULATION OF KEDLA OCP</b>						
<b>Mine Face/aquifer – Northern Curvilinear flank</b>	Face length (m)	Avg. saturated thickness (m) above working seams (Aquifer)	Seepage Area (m <sup>2</sup> )	Permeability K (m/day)	Hydraulic gradient (I)	Mine inflow (m <sup>3</sup> /day)
Top OB	700	39.56	25,438	0.50	0.02	276.92
Mine face between seam VII/VI (comb) & V	600	32.97	19,782	0.25	0.02	98.91
Mine face between seam V & IV	450	9.60	4,320	0.25	0.02	21.60
<b>Sub-total (a)</b>						397.43
<b>Eastern Flank</b>						
Top OB	350	39.56	12,719	0.50	0.02	138.46
Mine face between seam VII/VI (comb) & V	300	32.97	9,891	0.25	0.02	49.455
Mine face between seam V & IV	225	9.60	2,160	0.25	0.02	10.80
<b>Sub-total (b)</b>						198.72
<b>Western Flank</b>						
Top OB	350	39.56	12,719	0.50	0.02	138.46

Mine face between seam VII/VI (comb) & V	300	32.97	9,891	0.25	0.02	49.455
Mine face between seam V & IV	225	9.60	2,160	0.25	0.02	10.80
<b>Sub-total (c)</b>						198.72
<b>Total (a+b+c)</b>						<b>794.87</b> <b>(say, 795 m<sup>3</sup>/day)</b>

Thus the projected mine inflow calculation for the existing stage is 794.87 m<sup>3</sup>/day (say, 795 m<sup>3</sup>/day) which is very close to the actual mine inflow 818.18 m<sup>3</sup>/day as observed in the field.

**Present Mine water discharge and disposal for Kedla UGP:** Kedla underground is running mine of Kedla colliery and presently working in seam VA through I (through drift from seam VIII) & III incline. The surface depth of seam VA in Incline no I is 120 m (at 13 L) and in Incline no III is 75 m (at 30 L). The surface depth of seam VA in the block ranges from 18 m to 140 m. The maximum depth of working of seam VA in the block is 130 m (at 71 L). The parting between seam VIII and VA in Incline no I is ranges from 46.03m to 72.82m while in Incline no III is ranges from 42.81m to 64.24m. The average parting between seam VIII and VA is 58.0m. Seam VI is not consistent through the block but workable thickness is found in some part of the block. The average depth of seam VI from surface is appr 68 m. The parting between seam VIII and seam VI is appr. 51.27 m and between seam VI and seam VA is appr. 3.14 m.

Seam VIII has already been developed and proposed for depillaring through caving by incline no I & II. Incline II of seam VIII has been sealed and no pumping has been carried out. There are four pump installed in Kedla UGP in to two Incline (Incline no I and III). In Incline no I, one pump of 500 GPM and 150 m head is installed which is pumping water from seam VIII at 20L to surface, whereas one pump of 500 GPM and 60 m head is installed which is pumping water from seam VA at 3L to surface (from 17L to 3L and 3L to surface). In Incline no III, two pumps have been installed in seam VA, which carried out pumping from 45L to surface. One pump is 500 GPM and 200 m head and another is 500 GPM and 150 m head. Total mine discharge from the Kedla underground mine in non-monsoon period is 818.18 m<sup>3</sup>/day (say, 820 m<sup>3</sup>/day).

**Therefore, the total mine inflow in existing stage of mining of Kedla Colliery i.e. from Kedla OCP and Kedla UGP is 1,615 m<sup>3</sup>/day** (Kedla OCP: 795 m<sup>3</sup>/day and Kedla UGP: 820 m<sup>3</sup>/day).

Table: Projected Mine Water Seepage for Kedla OCP (upto 2<sup>nd</sup> Year project)

<b>PROJECTED MINE INFLOW CALCULATION OF KEDLA OCP</b>						
<b>Mine Face/aquifer – Northern Curvilinear flank</b>	Face length (m)	Avg. saturated thickness (m) above working seams (Aquifer)	Seepage Area (m <sup>2</sup> )	Permeability K (m/day)	Hydraulic gradient (I)	Mine inflow (m <sup>3</sup> /day)
Top OB	889	39.56	32,306	0.50	0.02	351.69
Mine face between seam VII/VI (comb) & V	889	32.97	29,310	0.25	0.02	146.55
Mine face between seam V & IV	889	9.6	8,534	0.25	0.02	42.67
<b>Sub-total (a)</b>						540.91
<b>Eastern Flank</b>						
Top OB	340	39.56	12,356	0.50	0.02	134.50
Mine face between seam VII/VI (comb) & V	340	32.97	11,210	0.25	0.02	56.05
Mine face between seam V & IV	340	9.6	3,264	0.25	0.02	16.32
<b>Sub-total (b)</b>						206.87
<b>Western Flank</b>						
Top OB	340	39.56	12,356	0.5	0.02	134.50
Mine face between seam VII/VI (comb) & V	340	32.97	11,210	0.25	0.02	56.05
Mine face between seam V & IV	340	9.6	3,264	0.25	0.02	16.32
<b>Sub-total (c)</b>						206.87
<b>Total (a+b+c)</b>						<b>954.65 (say, 955 m<sup>3</sup>/day)</b>

Table: Projected Mine Water Seepage for Kedla OCP (3<sup>rd</sup> Year Onwards)

<b>PROJECTED MINE INFLOW CALCULATION OF KEDLA OCP</b>						
<b>Mine Face/aquifer – Northern Curvilinear flank</b>	Face length (m)	Avg. saturated thickness (m) above working seams (Aquifer)	Seepage Area (m <sup>2</sup> )	Permeability K (m/day)	Hydraulic gradient (I)	Mine inflow (m <sup>3</sup> /day)
Top OB	1016	39.56	36,921	0.5	0.02	401.93
Mine face between seam VII/VI (comb) & V	1016	32.97	33,498	0.25	0.02	167.49
Mine face between seam V & IV	1016	9.6	9,754	0.25	0.02	48.77
<b>Sub-total (a)</b>						618.19
<b>Eastern Flank</b>						
Top OB	388	39.56	14,100	0.5	0.02	153.49
Mine face between seam VII/VI (comb) & V	388	32.97	12,792	0.25	0.02	63.96
Mine face between seam V & IV	388	9.6	3,725	0.25	0.02	18.62
<b>Sub-total (b)</b>						236.07
<b>Western Flank</b>						
Top OB	388	39.56	14,100	0.5	0.02	153.49
Mine face between seam VII/VI (comb) & V	388	32.97	12,792	0.25	0.02	63.96
Mine face between seam V & IV	388	9.6	3,725	0.25	0.02	18.62
<b>Sub-total (c)</b>						236.07
<b>Total (a+b+c)</b>						<b>1090.33</b> <b>(say, 1,090 m<sup>3</sup>/day)</b>

**Projected Mine water discharge and disposal for Kedla UGP during Caving Condition:** After development depillaring will be done through caving condition in seam VIII in both the Inclines. The surface depth of seam VIII in Incline no I is 86 m

(at 29 L) and in Incline no II is 90-96 m (at 42 L). The surface depth of seam VIII in the block ranges from 15 m to 100 m, thus the average depth of seam VIII in the Kedla block is approximately 60 m. The parting between seam VIII and VA in Incline no I is ranges from 46.03m to 72.82m while in Incline no III is ranges from 42.81m to 64.24m. The average parting between seam VIII and VA is 58.0m. Seam VI is not consistent throughout the block but workable thickness is found in some part of the block. The average depth of seam VI from surface is appr 68 m. The parting between seam VIII and seam VI is appr. 51.27 m and between seam VI and seam VA is appr. 3.14 m. Seam VIII has already been developed and proposed for depillaring through caving by incline no I & II.

Since depillaring is to be done by caving method after development, so the aquifers present above the seam are presumed to be punctured by fracture equivalent to various radii borehole and the amount of groundwater to be encountered at various times. Therefore, the projected mine inflow for Kedla UGP is estimated as 989.77 m<sup>3</sup>/day when the fracture presumed is 1.0 m of radius and inflow anticipated after one day (1440 minutes). **This peak mine inflow 989.77 m<sup>3</sup>/day of 1.0 m of radius will get gradually stabilised to 755.34 m<sup>3</sup>/day.**

Fracture Radius	Time (min)	Mine Inflow (cum/day)
0.1 m	1	1206.68
	60	902.93
	1440	<b>755.34</b>
1.0 m	1	1941.19
	60	1259.55
	1440	989.77

Since depillaring will be done along with the continuation of mining of seam VA and VI and also seepage will be contributed by Kedla OCP, therefore mine inflow contribution will be from,

- 1) Mine inflow during depillaring through Caving in seam VIII (which is predicted as – 755.34 m<sup>3</sup>/day which will get gradually stabilised to 989.77 m<sup>3</sup>/day) and
- 2) Inflow from the aquifer system lying below the seam VIII and above the seam VA and VI (which is calculated as – 615 m<sup>3</sup>/day)
- 3) Seepage from the Kedla opencast (which is predicted as 1,090 m<sup>3</sup>/day)

Therefore, the peak mine inflow during depillaring stage of mining will be 2,695 m<sup>3</sup>/day, which will get gradually stabilised to **2460.34 m<sup>3</sup>/day (say 2,460 m<sup>3</sup>/day).**

Therefore, the total projected mine inflow for the peak production of Kedla Colliery during complete exposures of the underlying aquifers has been estimated as 2460.34 m<sup>3</sup>/day (say 2,460 m<sup>3</sup>/day) which has been considered for the groundwater estimation of the study area. During rainy season the mine inflow through strata will be increased by about 10% amounting to 2,706 m<sup>3</sup>/day.

A suitable garland drain is proposed to arrest the rainwater into the mine. The sump also behaves as primary settling tanks for the mine water. Thereby, the suspended solids, the major contaminant added to the mine water inflow, would settle down and often clean water will be sent after desiltation for industrial and drinking purposes and rest will be discharged on to the surface into the abandoned quarry (used as a reservoir) or peripheral village ponds for agricultural use etc.

### **3.0 IMPACTS DUE TO GROUNDWATER EXTRACTION**

#### **3.1 Impact on topography**

Mining of coal by **open cast method** causes changes in topography. The change of ground relief in a mine area influences the local drainage. This may alter the drainage at the micro level. Care is taken during mining activity to avoid any serious damage to surface water bodies. The drainage of the block is controlled by the Easterly flowing Chutua Nala in the North along the Northern boundary, the Easterly flowing seasonal Kedla Nala in the central part and the Easterly flowing Bokaro River in the South, beyond the quarry edge boundary. The Chutua nala flows near the block boundary of Kedla underground at safe distance of around 60 m and around 700 m to the opencast quarry of Kedla and meet the master drainage Bokaro river at around 5.0 km in the east of Kedla Colliery, which carries the run-off to the master drainage Damodar River flowing outside of the buffer zone. The Bokaro river flows at a distance of around 3.0 km from the present quarry edge. The easterly flowing Bokaro River is the major drainage and perennial source of water for the area. The HFL of the Chutua nala as recorded in the vicinity of the project is 332.18 m above MSL (As on 26.09.1978) (nearby RL is ranges from 336.0 m to 340.0 m). The HFL of the Kedla nala as recorded in the vicinity of the project is ranges from 334.0 m (nearby RL is 344.0 m) to 354.0 m (nearby RL is 360.0 m) above MSL. Bokaro nadi, the major river of the buffer zone ultimately joins master drainage Damodar river, outside the buffer zone of the project.

A few 1<sup>st</sup> order streams of the Chutua nadi and Bokaro river originate within the mine area. Hence with progress in the mining activity, the catchment area in the upstream region of these nalas will be disturbed but more water will be collected in the mine sump arising as a result of this disturbance. This water will be pumped out into the downstream of the respective nalas itself i.e. outside the mining property where the original course of these nalas will be maintained. Pre-mining elevation of topography for Kedla block varies from 326.0 m and 388 m above MSL, whereas the average general elevation is around 340 m above MSL. So, there is no problem of surface water inrush into the mine. Rainwater, which falls on the mining area and groundwater which seeps into the mine are also pumped out in the drainage system after treatment. Hence, there is no impact on drainage quantitatively.

#### **3.2 Impact on groundwater system**

The impact of mining on local water regime is dependent mainly on mine geometry, mining process, its aquifer parameters and hydro-meteorological data. Due to stratification, the permeable beds act as individual Hydrogeological units and develop multi aquifer system. The impact on local water regime varies at different stages of mining in time and space. The mining activities may cause changes in aquifer potential, water level in the vicinity of the mine and disturb groundwater flow direction.

In **open cast** mining only the aquifers lying above the working seam (i.e. unconfined aquifer) gets affected whereas, the lower aquifers are least affected. As the permeability decreases with depth, the inflow from lower most formations also reduces proportionally and marginal to negligible impact may be anticipated. As the unconfined aquifer (i.e. the OB benches), with comparatively high K, contributes the maximum inflow. The top hydrogeological unit receives the maximum impact. So, also with the presence of multi-aquifer system and low permeability, the drawdown cones in the individual hydrogeological units will be small.

In the reclaimed area, the permeability is usually higher and receives maximum rainfall as recharge. With this the impact on the up-dip side gets reduced with time and even improves the ground water system. In the down dip direction, due to blasting, secondary porosity in the immediate working face will increase and in turn this will influence in increase of ground water recharge and mine inflow. So also, the mine water discharge into the local drainage/ peripheral village ponds/ tanks behaves as constant source of recharge and improves the water levels in the mine area.

In an **underground coal mining**, only near to the mine mouth and at shallow mine depth, the unconfined aquifer is affected. Due to poor permeability of the lower aquifers and stratification, the radius of influence of the drawdown will be limited to a small distance. When an impervious bed such as clay (shale), coal seam is present above the working seam the water level in the phreatic aquifer is not affected during developmental phase. During depillaring activity (i.e. caving condition), the aquifer in the mine area may get interconnected and drained for a limited period. However, with sufficient recharge, the aquifers get recouped immediately.

#### **4.0 WATER HARVESTING & ARTIFICIAL RECHARGE**

By nature, mine is a big rainwater harvesting and artificial recharge structure. Rain is a seasonal occurrence, whereas, mine water discharge is a continuous process. Hence, priority is given for mine water harvesting. The mine water discharge into the local ponds converts them into as recharge pits and augments the source availability. The surplus mine water, during monsoon period, is discharged into the nearby paddy fields and abandoned pits not only improves irrigation potential but also increase the ground water recharge (spreading method) in the area. Hundreds of acres of land are irrigated by mine water discharge and about 25% of the discharge enters the groundwater system as return flow.

Coal mining is the major industrial activity in the area. Ground water pumping is an integral part of coal mining. Besides this, groundwater utilization is mainly for domestic and irrigation use in the study area.

To minimize the impact of mining on ground water system, the project/mine authority has been adopting all possible measure to increase the ground water recharge potential. The stage of ground water development in the buffer zone (10 km from the periphery of the core zone) of Kedla Colliery comes to about 48.87% (which falls in the **Safe** category). As per the data collected from the Central Ground Water Board, Mid Eastern Region, Patna, the stage of ground water development in the Mandu Block is 29.51%, in which Kedla Colliery and its buffer zone located and the region falls within the "**Safe**" category. So, artificial recharge is not urgently required in the buffer zone of the Kedla Colliery.

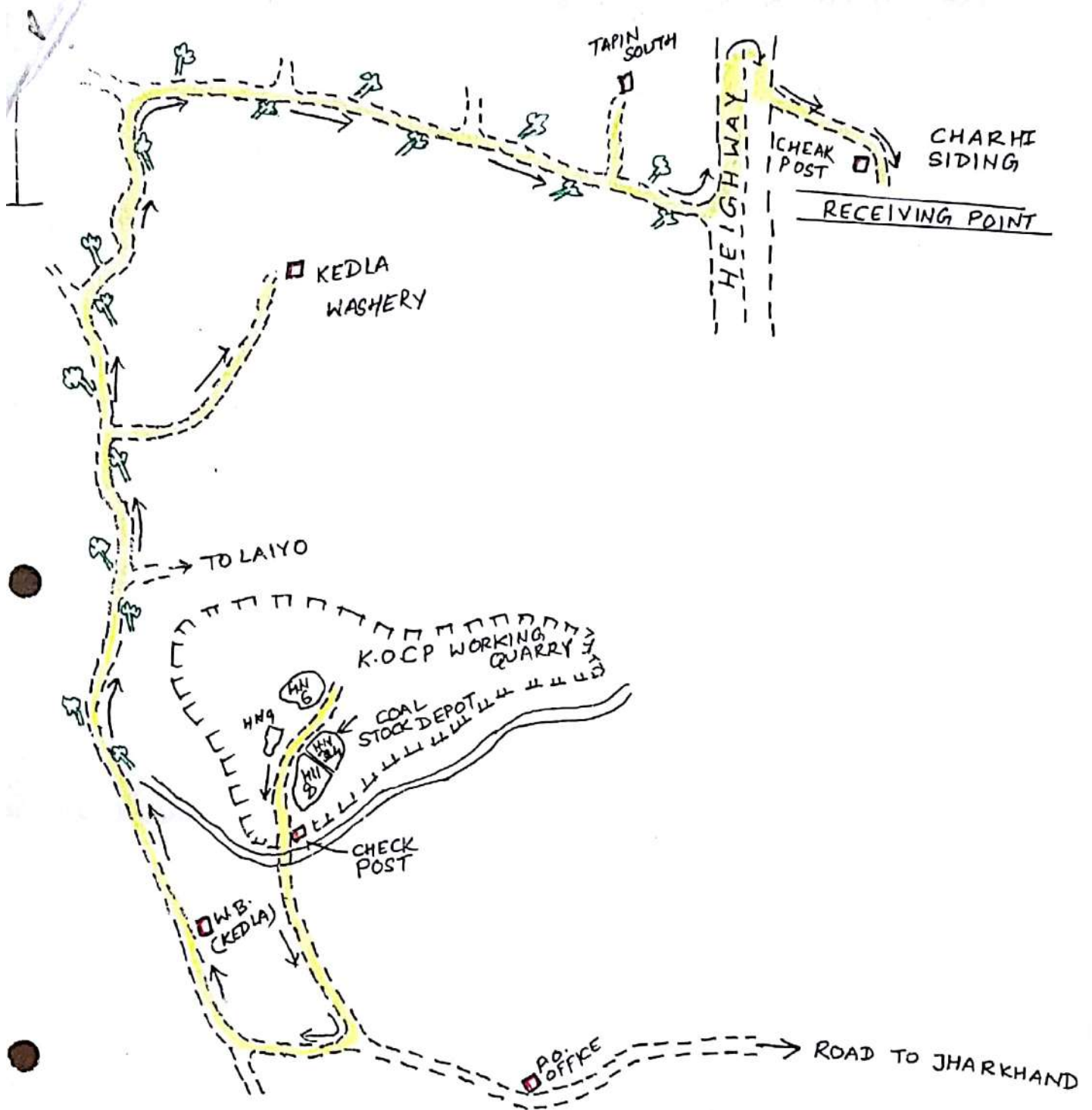
However, artificial recharge may be done for more use of ground water for irrigation augmentation in the study area when the source of water is easily available for recharging.

Groundwater inflow (2,460 m<sup>3</sup>/day) and mine influence area (maximum 320 m from the mine edge) have been estimated and the groundwater monitoring would be undertaken further to study the impact, if any. Kedla Colliery is utilising the mine water for fulfilling the demand of domestic and industrial purpose of the project. Besides this, domestic waste water is also being recharged to the Ground water system. Utilization of mine water for irrigation use is also enhancing the ground water recharge potential through artificial recharge (Spread method) in the area.

The artificial recharge by water conservation structures in the outside mine influence areas will check water level lowering. But within the mine influence area it may not be a viable solution because of the reason that recharged water would drain into the mine at a faster rate due to the steep hydraulic gradient of mining activity affecting safety of mine and machinery. However, the impact on ground water level is being minimized by artificial recharge by spreading of pumped out water, creation and filling of ponds with excess mine water, old abandoned quarry filled with excess mine water and rainwater and construction of rainwater harvesting structure outside mine influence area.

**Annexure XI**

**Coal Transport Plan**



C. C. LTD

HAZARIBAGH AREA

KEDLA OPENCAST PROJECT

HAND SKETCH SHOWING COAL TRANSPORTING ROUTE

NOT TO SCALE

*[Signature]*  
 09/02/19  
 SY. SURVEYOR (M)

*[Signature]*  
 09/02/19  
 MANAGER

*[Signature]*  
 09/02/19  
 PROJECT OFFICER