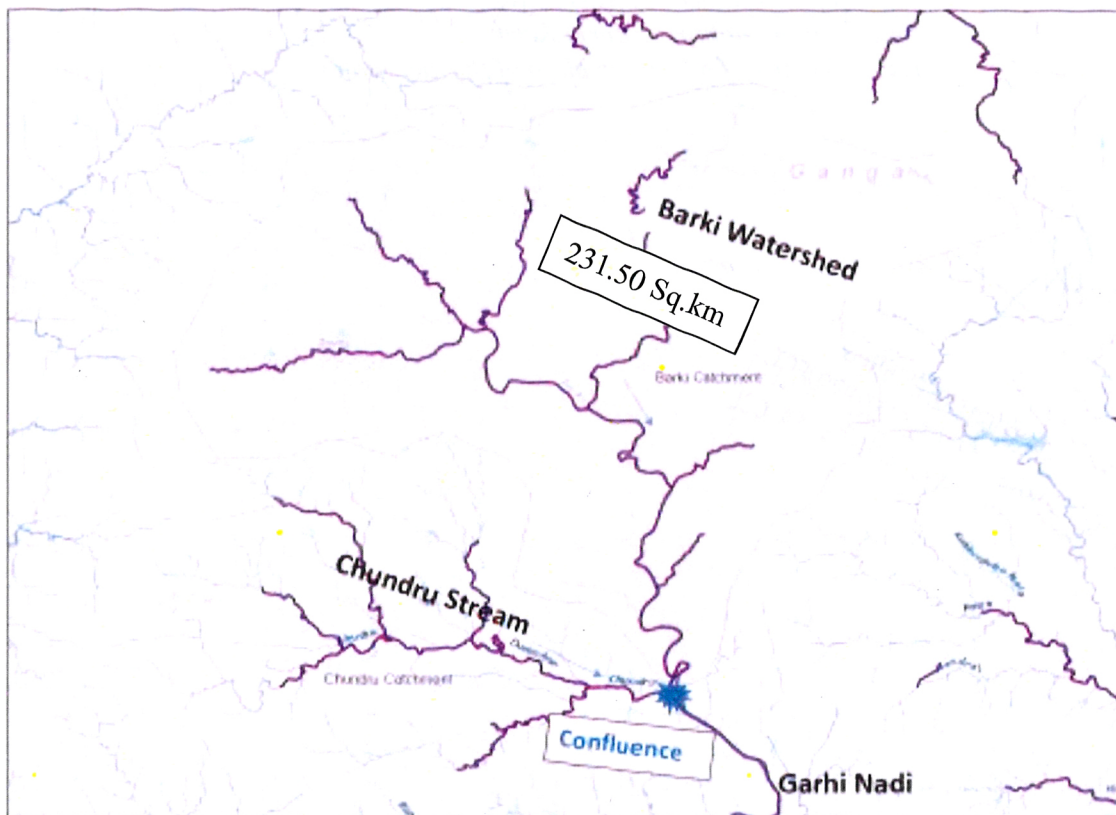




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cmpdi

A Mini Ratna Company

Impact of proposed mining on Surface Hydrology of Barki River and its Management



December- 2023

Prepared by

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CHANDRAGUPT OPEN CAST PROJECT
AMRAPALI-CHANDRAGUPT AREA, CCL

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Management**

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Chapter 1 Introduction

1.1 Catchment Characteristics of Barki River

Barki River is a southerly flowing rain-fed river with an overall catchment area of 231.50 Sq. km. The Chundru River, which flows eastward, meets the Barki River near the Tandwa town. Barki River and Chundru River are the major tributaries of Garhi River.

The Garhi River, which flows southerly, serves as the region's primary drainage system and dependable source of water. The majority of the area's drainage pattern is dendritic, meaning that the smaller and bigger streams meet at an acute angle. The drainage plan of the area is as given below.

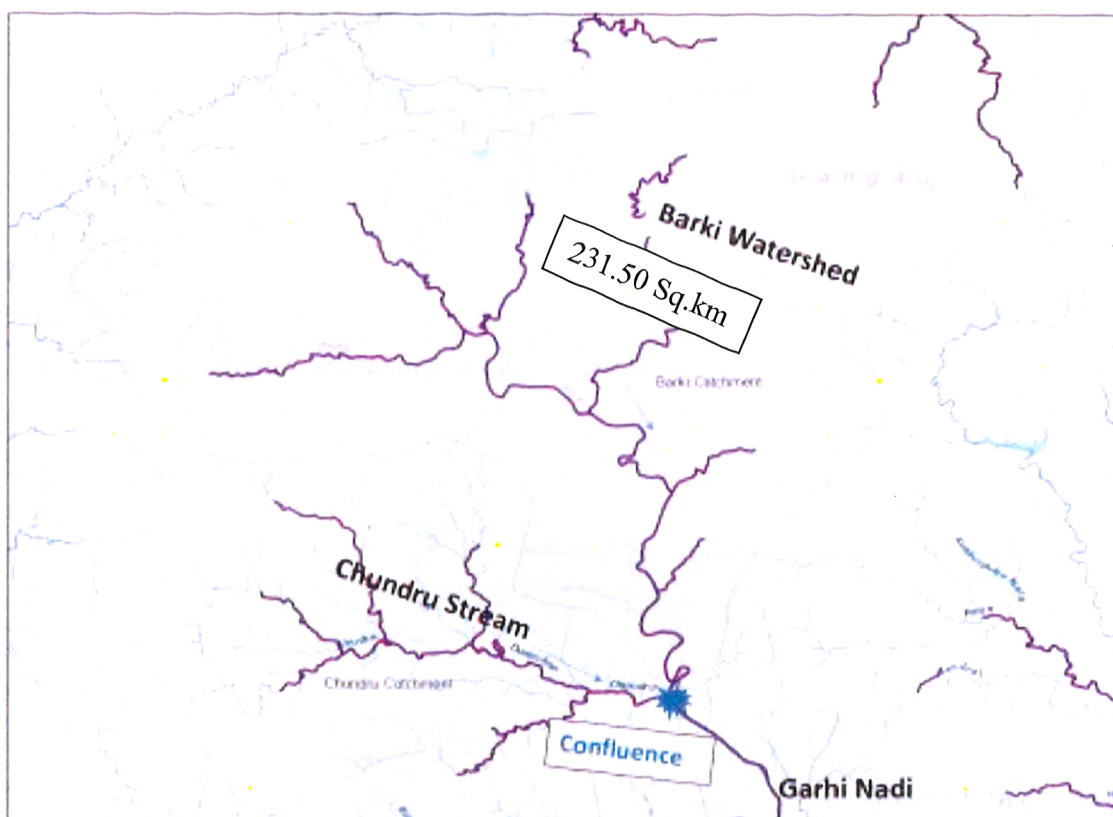



Plate I: Drainage Plan of the Study Area

The Digital elevation model of Barki catchment is as given below:


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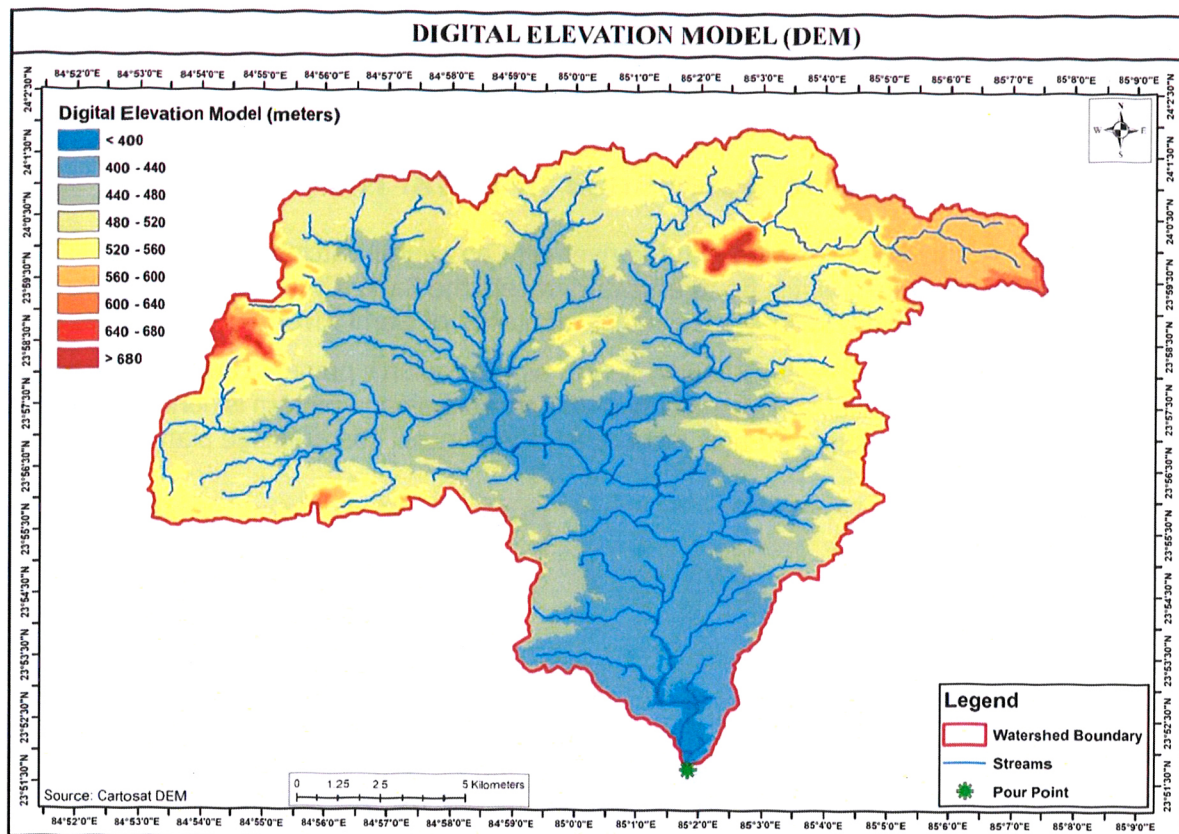


Plate II: Digital Elevation Model of Barki Catchment

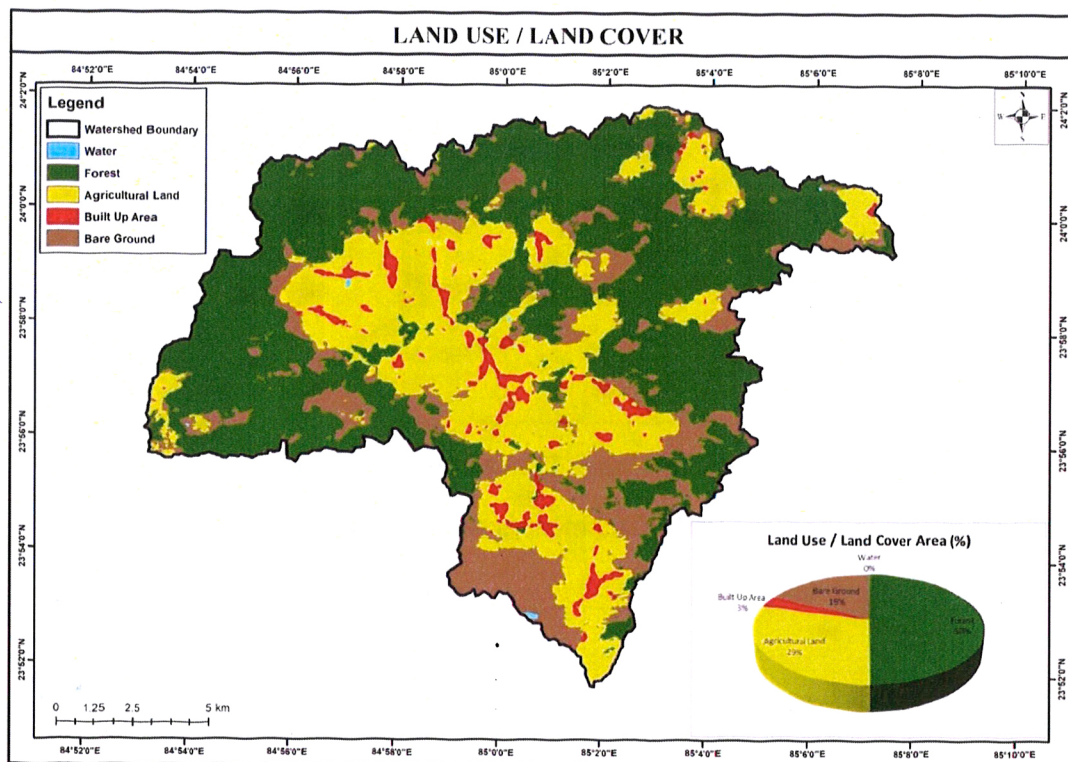


Plate III: Landuse Classification of Barki Cathment

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Sn	Particulars	Details
1	catchment area	231.50 Sq. km
2	Length of Longest Stream	43 km
3	Elevation Drop From point of Origin to Confluence	236 m
4	Bed Slope	5.47 m/km
5	Land use	Forest cover (50%) along the ridges and Human activity near the stream flow

1.2 Coal Blocks falling within the Barki Catchment

The southern part of Barki catchment is a coal bearing area and is a part of North Karanpura Coalfields. Four Coal blocks of North Karanpura namely, Brinda, Sisai, Amrapali and Chandragupt fall within the catchment of Barki River.

Amrapali and Chandragupt blocks are located in the southern most part of Barki catchment, and near to its confluence to Chundru River.

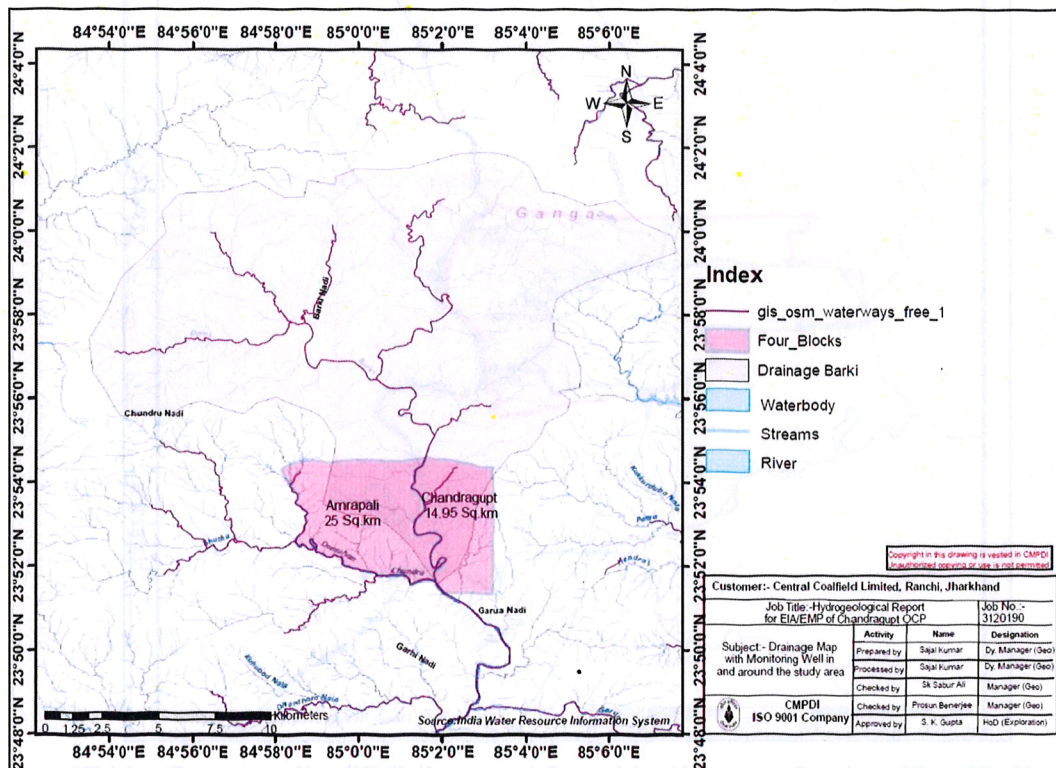


Plate IV: Drainage map Showing Location of Amrapali and Chandragupt Blocks w.r.t Catchment of Barki River

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As depicted in the above plan, only a part of Both Amrapali and Chandragupt blocks fall within the catchment of Barki River.

As per the catchment delineation, approx. 10.50 Sq. km of Amrapali block and 9.95 sq. km of Chandragupt block fall within the catchment of Barki river.

Currently, mining is being carried out in the Amrapali block within the projecticised area of 619.87 Ha. Furthermore, Expansion of Amrapali OCP (1459.08 Ha.) and Chandragupt OCP (1495 Ha.) are among the proposed mining activities.

The Super Thermal Power Plant (STPP) in Tandwa is situated downstream of the Barki River, and Tandwa Barrage is constructed on the Garhi River 1 km downstream of Barki River.

1.3 Layout of Amrapali and Chandragupt Mines

1.3.1 Present Condition

As discussed in the previous section, currently Amrapali OCP is operating within the project boundary of 619.87 Ha. The extent of mine operation w.r.t to adjacent water body is as shown in the below figure.

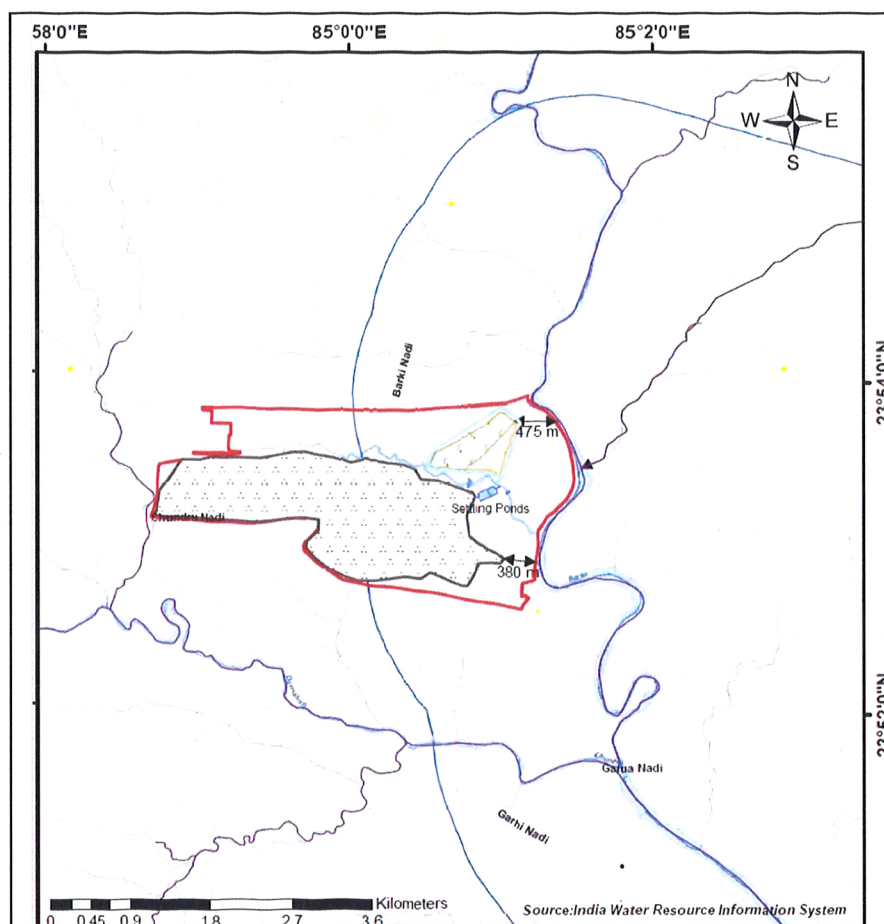


Plate V: Plan Showing Present Working of Amrapali OCP adjacent to Barki River

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Checkdam on Dudhmatia Stream Before Confluence into Barki River




Siltation Pond for Treatment of Mine Seepage Before Discharging into Surface Water Bodies



Toe Wall along the OB Dump


Proposed Measures at Chandragupt OCP

Proposed Water Pollution Control Measures			
S.No	Details	Estimated Capital Cost in Rs. Lakhs	Action Plan


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1	Toe wall along OB Dumps of length 2100 m	276.69	as per the Progressive mine plan
2	Embankment along the Eastern bank of Barki River	150	
3	Garland drain of length 2100 m	125.58	
4	Development of Sedimentation pond, lagoon, check dam etc.	250	Construction Period
5	Rainwater Harvesting	20	Construction Period
6	Treated water Supply to colony and industrial use	1550.81	Construction Period
7	Effluent Treatment Plant	718.28	Construction Period


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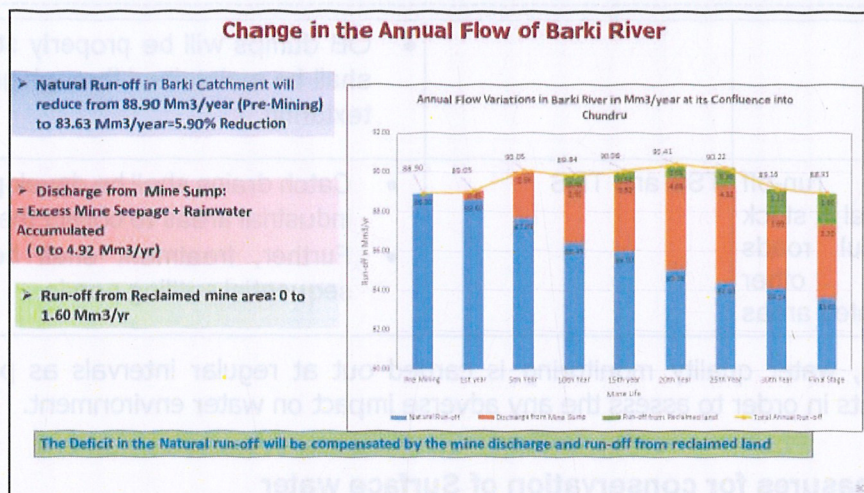


Fig: Excess Mine Seepage Contribution to Barki River at Different Stages of Mine Operation

1.4.2 Contamination of Barki River

Coal mining is a physical process wherein over burden is removed for extraction of coal. Coal and Over burden of the study area does not contain pyritic materials. Hence Acidic mine drainage will not be produced due to mining activities.

The possible water pollutants from the coal mining activity include suspended and dissolved solids (TSS and TDS) and oil and grease pollutants due to deployment of HEMM machinery.

The following is the summary of water pollution control measures to be adopted during mining operations in order to contain water pollution.

Sn	Source	Type of Contaminant	Proposed Management Plan
(i)	Workshop Effluent	Suspended solids and Oil & Grease.	<ul style="list-style-type: none"> An ETP with oil and grease trap and sedimentation tank will be installed to treat the workshop effluent. This system is proposed to work on zero discharge.
(ii)	Excess mine seepage from mine	TSS and TDS	<ul style="list-style-type: none"> Excess Mine seepage is collected into sequential Settling ponds for removal of suspended solids. The TSS of effluent water shall be maintained <100 mg/l before discharging into surface water bodies.
(iii)	Surface. run-off passing through OB Dumps	Suspended solids.	<ul style="list-style-type: none"> Toe wall and garland drain shall be installed all along the dumps to collect Run-off from OB dumps. A series of settling ponds will be constructed to treat the run-off.

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			<ul style="list-style-type: none"> OB dumps will be properly stabilized, slopes shall be maintained through grassing and geo texturing.
(iv)	Surface run-off from coal stock piles, haul roads and other contaminated areas	TSS and TDS	<ul style="list-style-type: none"> Catch drains shall be developed all along the industrial areas to collect the run-off water. Further, treatment shall be done through sequential settling ponds.

In addition, water quality monitoring is carried out at regular intervals as per statutory requirements in order to assess the any adverse impact on water environment.

1.4.3 Measures for conservation of Surface water

Existing Measures at Amrapali OCP

Sn	Existing Water Pollution Control Measures
1	Mine Sumps have been provided for collection and treatment of Mine Seepage water.
2	Workshop effluent is being treated at ETP consisting of Oil and grease trap and Sequential Settling ponds.
3	Around 5.5 km of Toe wall, catch drain along with sequential settling ponds have been provided all around external OB dumps to treat surface run-off and prevent soil erosion.
4	Rain water harvesting system at 11 locations has been provided.
5	Two no. check dam at Dhudhmatia nallah has been constructed for the ground water recharge and to prevent the siltation.
6	Two no. of check dam constructed at Honhe Stream near Hohne, and parsna village. Further, one no. of check dam has been constructed at Godwar Stream near Godwar Village.
7	4 no. of ponds were constructed in villages Hone, Ursu, Koed and Tileadih.
8	Five Piezometers have been installed in Amrapali project to check the level of ground water.
9	Catch drains and settling ponds have been provided at Shivpur Railway siding to treat surface run-off from siding.
10	Beautification of Pond at Honhe, Birhortola & Construction of Pond at Mangwatongri has been completed.
11	Slope stabilization of Dudhmatia Stream (1500 m Length) has been done.
12	Embankment has been provided along Barki River.

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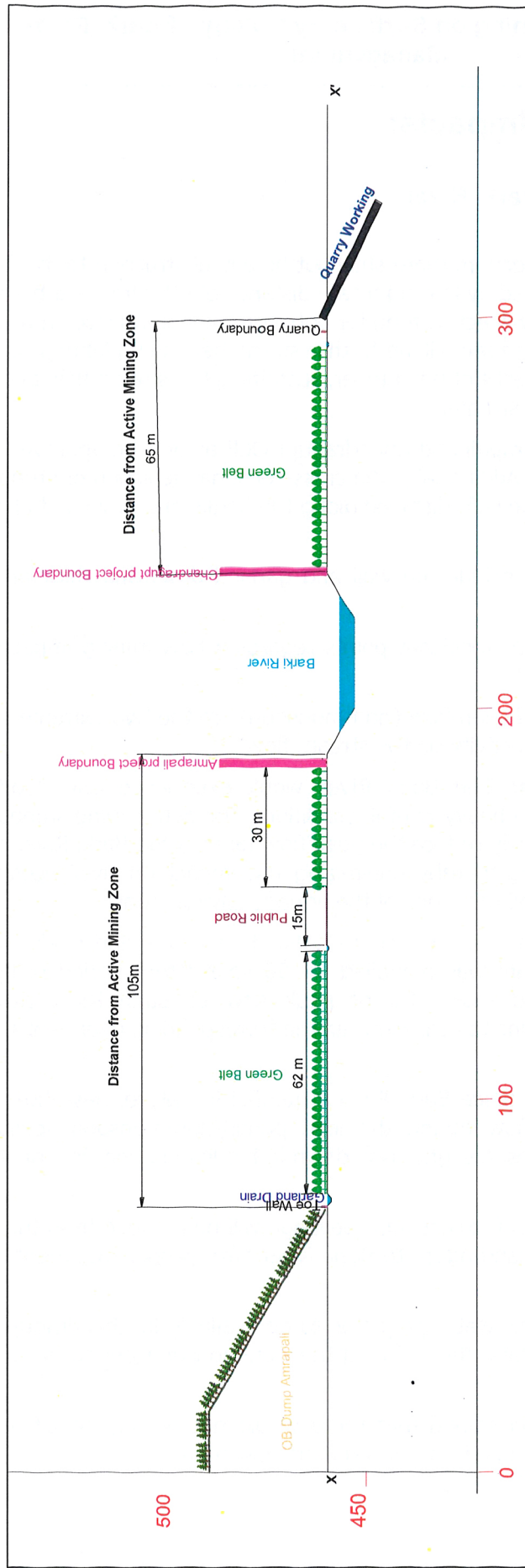


Plate VII: C/S Detailing of Mine Working Adjacent to Barki River along Section X-X'

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As detailed in the above fig., the present mine working and dumping are at a safe distance of 380m to 475 m respectively from the HFL of Barki River. Additionally, following major water conservation measures have been adopted.

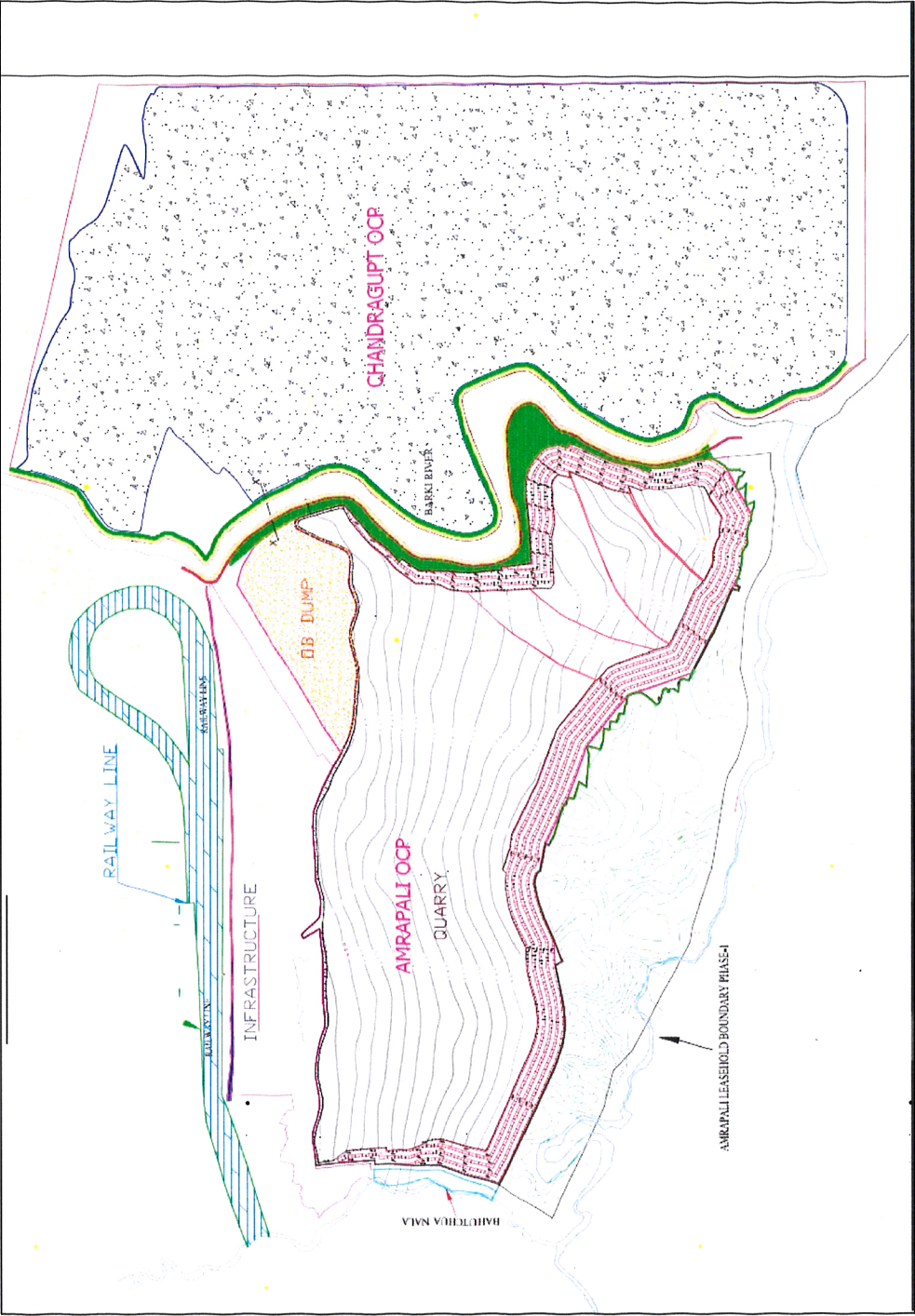
1. A Toe wall, catch drain along with sequential settling ponds have been provided all around external OB dumps to treat surface run-off and prevent soil erosion. Further, plantation and grassing were done on the stabilized portion of OB dump.
2. Excess mine water is being treated through sequential settling ponds before discharging into nearby stream.
3. 2 no. of check dams were constructed along Dudhmatia stream for prevention of silt transport and ground water recharge.

1.3.2 Proposed Mining Activities

As part of the Amrapali OCP Expansion (1459.08 Ha.), Amrapali OCP will be extended southward, maintaining a safe distance of 90 m from Barki's HFL, while Chandragupt OCP will develop next to the Barki River's eastern bank, maintaining a 60 m safe distance.


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LEGENDS

SL. No.	PARTICULARS	SYMBOL
01	Project Boundary	
02	Quarry Boundary	
03	Surface Contours	
04	OB Dump	
05	Green Belt	
06	River/Nala	
07	Embankment	
08	Public Road	

Plate VI: Mine Layout Plan of Amrapali and Chandragupt OCP adjacent to Barki River

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