Pre-Feasibility Report For

PROPOSED DHIRAULI COAL BLOCK OF PRODUCTION CAPACITY OF 6.5 MTPA (5 MTPA OPENCAST AND 1.5 MTPA UNDEGROUND)

AT

SINGRAULI COAL FIELDS

SINGRAULI DISTRICT, MADHYA PRADESH

Project Proponent

Stratatech Mineral Resources Private Limited (SMRPL)

Submitted to

Ministry of Environment Forest & Climate Change
(MoEF&CC)

New Delhi

JUNE, 2021

EXECUTIVE SUMMARY

The Dhirauli Coal Block in Singrauli Coalfield, in the State of Madhya Pradesh has been allocated to M/s Stratatech Mineral Resource Private Limited (SMRPL) vide Letter No. NA-104/7/2020-NA dated 03.03.2021 by MoC, GoI. The salient features of proposed Dhirauli Open Cast/Underground Project are given below:

S.No	Description	Details
1.	Name of the Project	Proposed Dhirauli coal block of production capacity of 6.5 MTPA (5 MTPA opencast and 1.5 MTPA Underground) located at Singrauli Coal Fields, Singrauli District, Madhya Pradesh.
2.	Total land requirement for the Project	Mine Lease Area: 2672 ha (Forest land: 1335.35 ha; Revenue Forest land: 100.84 & Non-Forest land – 1235.81ha).
3.	Excavation area	2143.39 ha
4.	Geological reserves	Net Geological reserves: 558.011 MTPA Opencast Mine – 260.263 MTPA Underground Mine – 297.748 MTPA
5.	Mineable reserves	313.79 MTPA; Opencast Mine – 195.74 MTPA; Underground Mine – 118.05 MTPA
6.	Target capacity	6.5 MTPA; Opencast Mine – 5.0 MTPA; Underground Mine – 1.5 MTPA.
7.	Percentage Extraction	Overall – 53.43 %; Opencast Mine – 71.49% Underground Mine – 37.64%
8.	Average total thickness of all seam	Open cast - Underground - 1.5 m (Workable thickness)
9.	Average stripping ratio	10.55 mm^3/te
10.	Average Grade of coal	G8
11.	Main mining equipment	Opencast mining is proposed by Surface miners (SM) -FEL-Truck for coal and drill blast for OB. Underground mining is proposed by Continuous miner (CM).
12.	Project cost	Rs. 2800 crores

13.	Gradient of Coal Seams	2^0 to 4^0
14.	Maximum bench height	For OBR : 10-12 m Top soil :3-6 m
15.	Bench width	Working : 20-30 m Non-working : 12-20 m
16.	Overall (ultimate)pit slope	37^0
17.	Water requirement (Mine) and source	The total water required for the project is estimated 1540 KLD of industrial water including 50 KLD potable water. Source of water will be groundwater for initial 2-3 years and later mine quarry water will be used.
18.	Power requirement & source	The estimated connected load and maximum demand of project for the targeted production of 6.5 MTPA comes to the tune of 5346 KVA.
19.	Manpower requirement	970 (Direct/Indirect)

Source: Mine Plan

2.0 INTRODUCTION OF THE PROJECT/ BACKGROUND INFORMATION

i) Identification of Project and Project Proponent

Identification of Project

As per the vesting order no: NA-104/07/2020-NA dated 3rd March 2021, Government of India, Ministry of Coal has allocated the Dhirauli coal mine to Stratatech Mineral Resources Private Limited a Private company wholly owned by the Adani Enterprises Limited (AEL).

The ultimate target production capacity is estimated as 6.5 MTPA (OC-5 MTPA; UG-1.5 MTPA) from Dhirauli Coal Mine. The production build up has been planned in such a way that it will meet the requirement peak production of 5.0 MTPA of Opencast in the 3rd year of mine operation.

As per the geological report prepared by Mineral Exploration Corporation Limited, Dhirauli Block has a gross geological reserve of 620.013 MT and net geological reserve of 558.011 MT (OCP-260.263 MTPA; UG-297.748 MTPA). The mining plan envisages for mining of 313.79 MTPA (OCP-195.74 MTPA, UG-118.05 MTPA) of mineable coal reserves within the area where the reserves are proved at an average stripping ratio of 10.55.

Identification of Project Proponent

Stratatech Mineral Resources Private Limited (SMRPL), a Private company wholly owned by the Adani Enterprises Limited (AEL). it has been planned to conduct mining operations through open cast mining with capacity of 5 MTPA and 1.5 MTPA through underground mining at Singrauli Coalfield, Singrauli District, Madhya Pradesh. The Block is auctioned under commercial coal block. There shall be no restriction to carry on mining operations for own consumption, sale or for any other purpose.

ii) Brief Description & Nature of the Project

The proposed Dhirauli coal mine of 6.5 MTPA capacity is an open cast/underground coal mine to supply for open market and will accelerate the economic development of the nation.

For the proposed Dhirauli coal mine, the total requirement of land is estimated as 2672 Ha, which includes 1436.19 ha of forest land and 1235.81 of non-forest land.

iii) Need for the Project and Its Importance to the Country and or Region

Coal is the most important and abundant fossil fuel in India. It accounts for 55% of the country's energy need. The country's industrial heritage was built upon indigenous coal.

Commercial primary energy consumption in India has grown by about 700% in the last four decades. The current per capita commercial primary energy consumption in India is about 350 kg/year which is well below that of developed countries. Driven by the rising population, expanding economy and a quest for improved quality of life, energy usage in India is expected to rise. Considering the limited reserve potentiality of petroleum & natural gas, eco-conservation restriction on hydel project and geo-political perception of nuclear power, coal will continue to occupy center-stage of India's energy scenario. Indian coal offers a unique eco-friendly fuel source to domestic energy market for the next century and beyond.

Through sustained programme of investment and greater thrust on application of modern technologies, it has been possible to raise the production of coal from a level of about 70 million tons at the time of nationalization of coal mines in early 1970's to 729.10 (Provisional) million tons (All India) in 2019-20 (Source: https://coal.nic.in/content/production-and-supplies assessed on 09.06.2020).

The importance of coal as a fuel or power resource cannot be overestimated. The economic development of any country largely depends upon its industrial progress and the industrial development of a country largely depends upon its possessing a sufficiently large stock of this most valuable mineral product. Coal is regarded as the backbone of power generation in India. There is huge demand for power in India. Power is essential and most important factor for industrial and business set up. India’s coal position is quite encouraging and it offers good prospects for the development of this industry. During 2011, India was the third largest coal producing country in the world. Hence, coal is an important constituent of the present Indian economy. The total reserves of coal in India have been over 290 billion metric tons. The coalfields in India are located mostly in Odisha, Madhya Pradesh, Chhattisgarh, Uttar Pradesh, Meghalaya, Telangana, Jharkhand, West Bengal, Sikkim, Arunachal Pradesh and Bihar. The power sector is the largest consumer of coal followed by the iron & steel and cement segments. India is the world’s fifth largest energy consumer, accounting for 4.1% of the global energy consumption. Of the total electricity consumed in the country, approximately 54.2% is produced from coal. (Source:

https://powermin.nic.in/en/content/power-sector-glance-all-india assessed on 09.06.2020).

iv) Demand-Supply Gap

The overall long-term demand of coal is closely linked to the performance of the end-use sectors. In India, the end-use sectors of coal mainly include electricity, iron and steel and cement. Demand from the unorganized small scale sector comprising primarily of the brick and ceramic industry is relatively large though infirm as users switch between coal, firewood and biomass depending on their relative prices. Other industries using coal have only a marginal impact on the long-term demand for coal.

In FY 2017 – 18, total production of coal from Public & private sectors.is 675.54 MT (coking coal – 40.14 million tons and non-coking in 635.25 million tons). Against the estimated demand of 908.40 MT coal in 2017-18, the actual dispatch of coal is 687.83 MT while balance demand of coal is met by import of 208.879 MT of coal. (Source: Indian Minerals Year Book 2018, IBM, November 2019).

Some of this shortfall will be met by supplies from captive coal blocks and rest through imports. Also, the choice between the supplies from domestic and imported coal is mainly driven by timely availability of coal from domestic sources, quality requirements and the economics of landed cost of coal at the end-use plant. Captive coal mining in India was, gradually, being permitted by amending the Coal Mines Nationalization Act, primarily in iron and steel making, power generation and cement production. Hence, it became important for India to secure coal through imports from international market to meet their significantly rising coal demand. However, import is mainly dependent on availability of coal in global market, increasing competitive scenario and affordability.

The proposed production of Dhirauli coal mine is 6.5 MTPA (5.0 MTPA capacity through open cast and 1.5 MTPA production will be achieved by underground mining) to supply coal for open market.

v) Imports vs. Indigenous production

The proposed Dhirauli coal mine lies within India and caters the coal requirement of commercial use within the country, hence import not applicable.

vi) Export Possibility

The coal will not be exported from the proposed Dhirauli block open cast/underground coal mining project.

vii) Domestic/Export Markets

As mentioned above, there will be no export of coal. Coal will cater the requirement within the country.

viii) Employment Generation (Direct and Indirect) due to the project.

About 970 (Direct/Indirect) persons will get direct and indirect employment will be generated from the proposed project.

3.0 PROJECT DESCRIPTION

i) Type of project including interlinked and interdependent projects, if any

The proposed Dhirauli coal mine of 6.5 MTPA of capacity, which is a commercial coal mine. The project falls under Category 'A' [Sl.no. 1(a) of Schedule: "List of project or activities requiring prior Environmental Clearance"] of MoEFCC's notification dated 14th September, 2006 (amendment till date) in connection with Environment (Protection) Rules 1986.

ii) Location (map showing general location, specific location, and project boundary & project site layout) with coordinates

The Dhirauli coal mine Project covers an area of 2672 Ha and located in eight villages Dhirauli, Phatpani, Sirswah, Amdand, Jhalari, Amraikhoh, Bansibridha, and Belwar.

The Dhirauli coal block boundary coordinates in WGS84 datum as per CMDPA is as follows:

List of Cardinal Points: POINTS NORTHING EASTING

Point	Latitude	Longitude
1	$23^0$56'07"	$82^0$19'04"
2	$23^0$56'07"	$82^0$24'21"
3	$23^0$03'04"	$82^0$24'21"
4	$23^0$03'04"	$82^0$19'04"

The location map, google image of proposed project and are given in **Figure-1 and Figure-2 .**

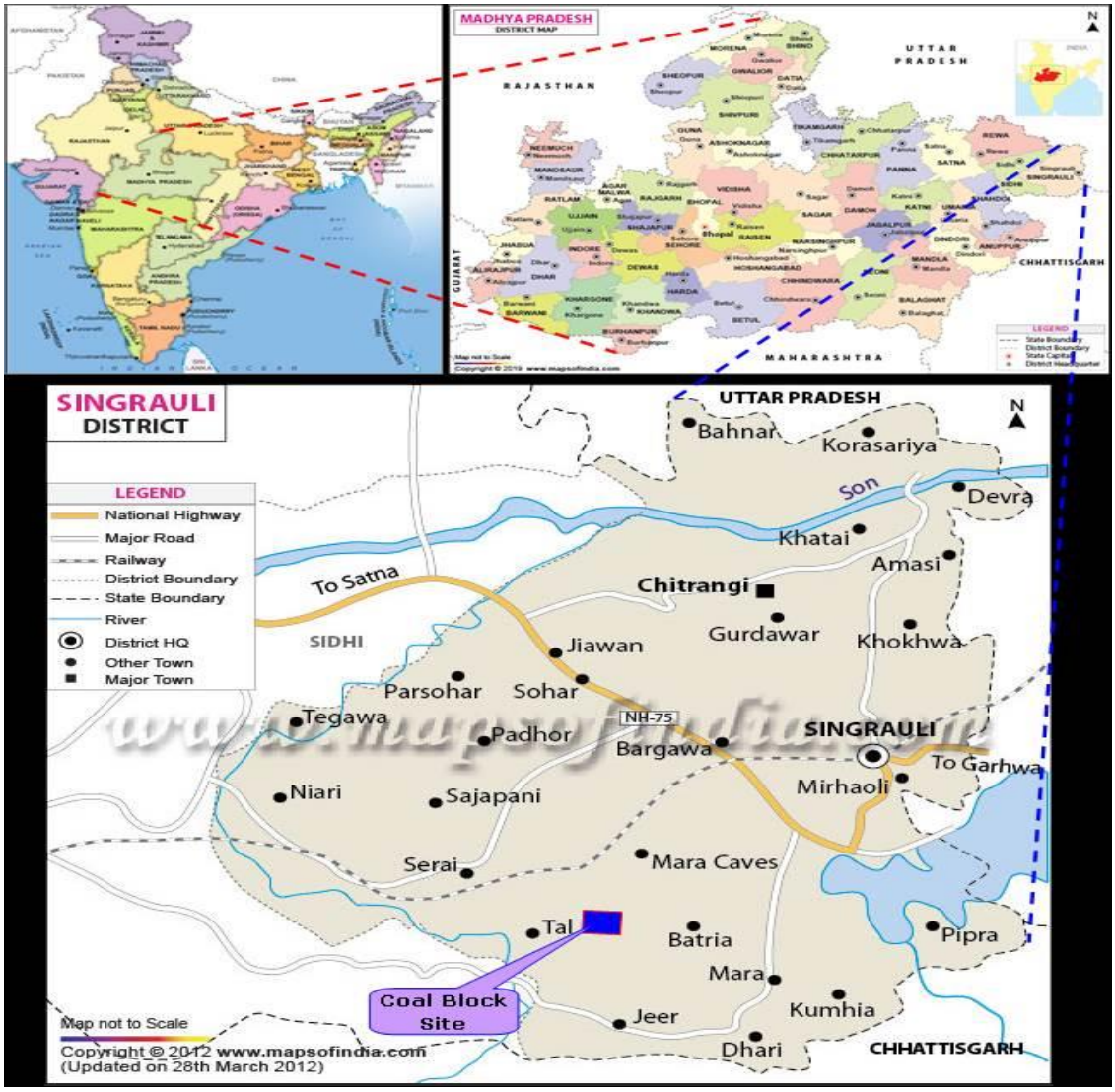


Figure-1: LOCATION MAP

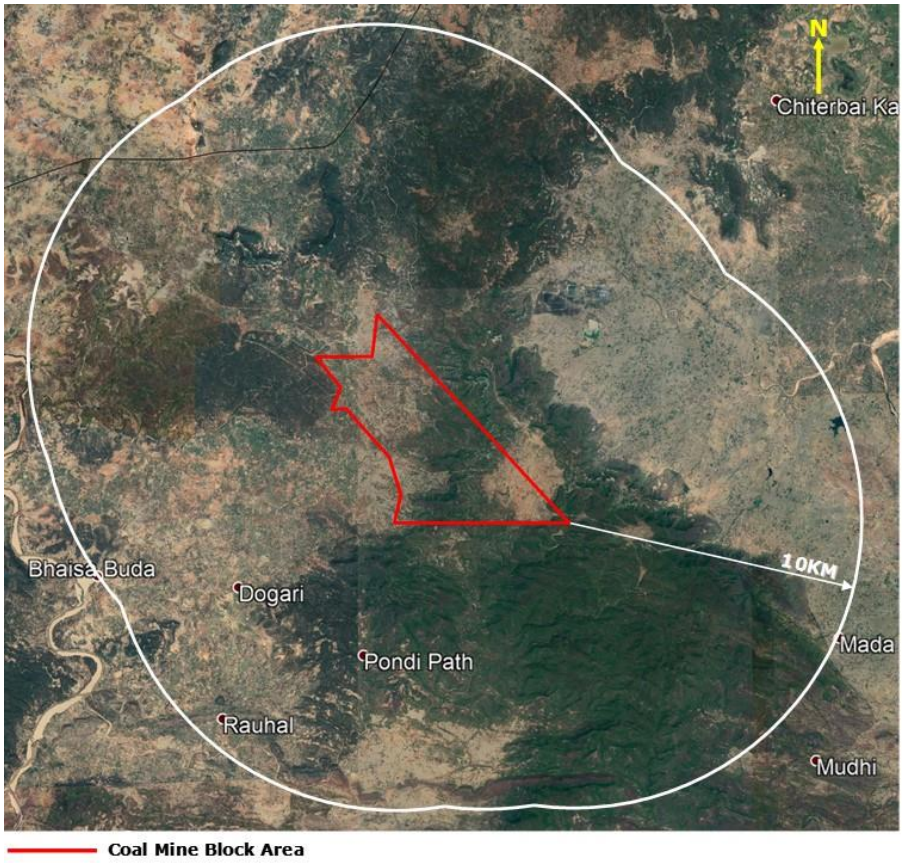


Figure – 2 GOOGLE IMAGE OF DHIRAULI COAL BLOCK

iii) Details of alternate sites considered and the basis of selecting the proposed site, particularly the environmental considerations gone into should be highlighted

No alternative site for this project could be envisaged. As mining in coal block area is due to site specific location of deposition of coal deposit.

iv) Size or Magnitude of Operation

Allottee of Dhirauli coal block is Stratatech Mineral Resources Private Limited (SMRPL), a Private company wholly owned by the Adani Enterprises Limited (AEL). it has been planned to conduct mining operations through open cast mining with capacity of 5 MTPA and 1.5 MTPA through underground mining at Singrauli Coalfield, Singrauli District, Madhya Pradesh. The Block is auctioned under commercial coal block. There shall be no restriction to carry on mining operations for own consumption, sale or for any other purpose.

This output is prima facie considered technically feasible because of its favorable geo-mining conditions like:

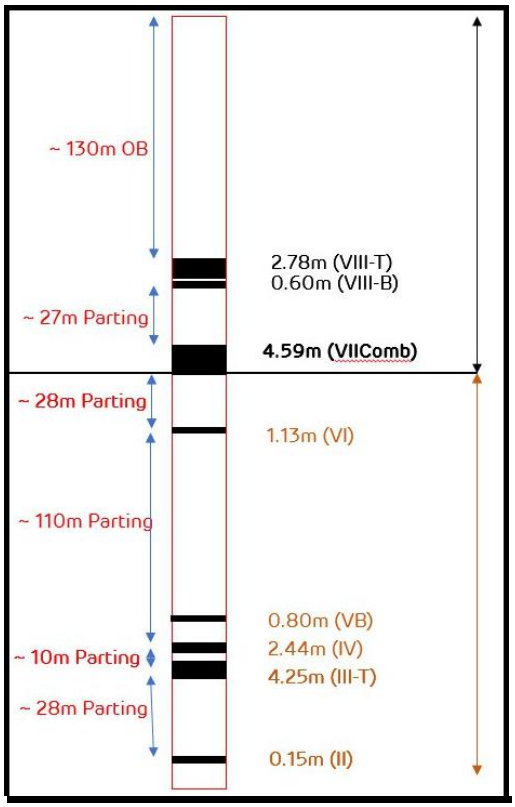
- Thickness of various seams;
- Their disposition & its splits;
- Comparatively long strike length; and
- Sufficient mineable coal reserves etc.

v) Project Description with Process Details (a schematic diagram/flow chart showing the project layout, components of the project etc. should be given)

Mining Method

Proposed Method of mining

Considering the geo-mining characteristics of the block and for conservation of resource, it is proposed to extract the coal reserves within the block using combination of open cast mining (upto seam VII) and underground mining (below Seam VII to Seam II) method.



Opencast Seam Group

Underground Seam Group

Figure : Generalized coal and parting thickness

A) OPENCAST MINING

a) Mine Boundaries

It is proposed to mine maximum area of block boundary considering safety zone, road diversion , garland drain and road diversion and safety distance from road and nala to pit surface limit as per statutory requirement. The diversion of road is proposed along the Southern, Eastern and Northern boundary of block. Nala diversion is proposed in North East corner of block. The mine boundaries of the Opencast mine are as follows

North	The surface limit of the mine has been drawn leaving a surface barrier of 32.50 m to accommodate safety zone (7.5m) and diversion of public road (5m) garland drain (5m) and road to pit safety distance (15m).except some patch where it is 40 meter to divert the existing nala within block boundary

East	The surface limit of the mine has been drawn leaving a surface barrier of 12.50 m (7.5 m safety barrier and 5 meter for garland drain) except small patches where it is left 40 meter to accommodate safety zone (7.5m) and diversion of nala (5m) & bund (20m) and bund to pit safety distance (7.5m) & 32.5 meter to accommodate safety zone (7.5m) and diversion of public road (5m) garland drain (5m) and road to pit safety distance (15m). Two Shaft is also proposed for ventilation (outlet) of UG mining in eastern boundary.
West	The surface limit of the mine has been drawn from in-crop of seam VIIand where seam is not in-crop by leaving a surface barrier of 32.50m to accommodate safety zone (7.5m) and diversion of public road (5m) garland drain (5m) and road to pit safety distance (15m) till the second incline for UG mining. Thereafter 12.5 meter left for 7.5 m safety barrier and 5 meter for garland drain.
South	The surface limit of the mine has been drawn from in-crop of seam VII and where seam is not in-crop by leaving a surface barrier of 32.50m to accommodate safety zone (7.5m) and diversion of public road (5m) garland drain (5m) and road to pit safety distance (15m).

b) Opening location

Mine opening is planned from southwest corner of block (in-crop of seam VII) and further development is planned along strike of the seam. A patch of 387.55 Ha in the south west corner is non coal bearing (considering seams for Opencast mining only) beyond in-crop of seam-VII where it is proposed to have the external dump. Non coal bearing area (beyond in crop of VII seam) of approx. 21 Ha shall be utilized for mine facilities, additionally another patch of ~9 ha is proposed for underground infrastructure for second set of incline planned at north-west side of block. External dumping shall be merged with internal back filling dump in future when mine advances towards further north side.

c) Mine Design

- ***Rated Capacity***

Mining Plan for Dhirauli Coal Block has been prepared for a rated capacity of 5.0 MTPA of power grade ROM Coal from Opencast mine and 1.5 MTPA from underground mines. This output is considered technically feasible because of following conditions-

- Gradient of 20-40 of the coal seams.
- Multiple coal seams (9 No. of Coal Horizons 5 for OCP and 4 for UG))
- strike length.
- Thin coal seams (due to splitting).
- Variable thickness of OB/partings (high strip ratio)
- 11 number of Normal faults (Dip-side)

With this rated capacity of 5.0 Mty of the mine, the annual rate of advance of the mine would be about 150-160 m along the dip on the mine floor for opencast mine.

- ***Design Criteria***

The design criteria adopted in this Mining plan is as follows:

Number of annual working days	330
Number of daily shifts /day	3
Duration of each shift (hours)	8

The opencast mine would be worked on the 3-shift/day and seven days/week round the year for coal extraction and overburden removal

d) Mining Scheme

Based on the above geo-mining condition, Mining system has been worked out for achievement of rated capacity in shorter period i.e. low gestation period as well as reduction of Inter-mixing of Coal with stone bands and starting of internal dumping as soon as sufficient de-coaled area is created. The top OB benches above mining mass would be worked in horizontal slicing method.

Coal Winning & OB Removal

Coal will be mined using Combination of surface miner – FEL – Dumper method. The surface miner shall essentially be used in coal seams for quality improvement. The OBR would be removed using conventional shovel dumper method with drilling & blasting. Drilling & blasting shall be conducted in scientific way using environment friendly technology. Some major system parameters for both coal winning & OB removal are given below

Bench Height	
For OBR (12 m^3 Hyd. Shovel)	10-12 m
Top Soil/ Intervening Parting (3-4.5 m3 excavator)	3-6 m
Coal	as per thickness
Proposed Bench Width	
1. Working Bench Width for 12 m^3 Hyd. Shovel	20-30m
2. Non-Working Bench Width for 12 m^3 Hyd. Shovel	12-20m
3. Width of the temporary transport ramp	20 m
4. Usual height of the Top soil / parting dump bench	12-15 m
5. Usual height of the Hard Rock dump bench	30 m
6. Bench Slope	
a) OB Bench	70^0
b) Coal Bench	70^0
c) Dump bench	37^0
7. Overall (Ultimate) pit slope	37^0

e) Sequence of Mining

Dhirauli Coal mine is planned from south-west corner of block (seam VII incrop). Due to high strip ratio and limited space of OB dumping coal evacuation is planned from advancing face and no permanent haulage road is planned for the block. The box cut is developed in such a manner so as to facilitate the proper drainage of water towards the sump. This would also facilitate extension of coal and OB bench for full development of mine. The mine will advance towards dip direction exposing the floor of Seam-VII. After creation of sufficient de-coaled area of about 100m, internal backfilling of OB will be started in the 3rd year of mining operation. The coal production will start from the 1st year of mine operation and the target coal production of 5.00 MTPA will be achieved in the 3rd year of mine operation.

The alignment of the face has been so planned as to facilitate the drainage of water. Entire quarry has been planned for OB dumping by leaving lag distance of 100 meter from advancing benches (northern side).

A surface retrieving conveyor will be installed along the center of block from 2nd year. Coal shall be transported from mine face to dump station by truck. Moveable Dump station is planned which will be shifted at 5 year interval timeframe.

f) Overburden Removal And OB Dump

The opencast mine is planned upto 280 m depth on the floor of seam-VII with overall average stripping ratio of 10.55 m^3/te.

The total volume of OB has been estimated as 1963.55 Mcum. The OB removed during initial years will be placed beyond the incrop of the seam VII as external dump. The total volume of external dump has been estimated as 259.01 Mm^3. Rest of the OB will be placed as internal dumps. The total volume of internal OB, i.e. the volume which will be accommodated internally by backfilling has been estimated as 1704.54 Mm3.

The internal dumping will start when about 100 m internal space is available on quarry floor. By adopting the proposed sequence of mining, as the quarry advances, the amount of internal dump will increase as more space for the internal dumping is created.

It is proposed to start internal dumping from 3rd year of mine operation along with external dumping to optimize lead. As the gradient of the seam is flat, during working of the quarry substantial amount of OB can be accommodated as internal dump. After 20th year of mine operation, no external dumping will be required. Hence, OB will be accommodated as internal dump for rest of the mine life.

During 1st year, height of external dump will be kept at only 60 m above the ground level. During 3rd year, height of eastern external dump and eastern in-pit dump will be merged by maintaining 90m height above the ground level (RL of 600). At the end of 5th year height of internal dump will be 90m above ground level. At the end of mine life, internal dump will be at 60 above the ground level for some part.

B) UNDERGROUND MINING

1) Mine Boundary

Limit of underground mining is defined by half of the pillar width (24 m), all along the block boundary and workable thickness (1.5 m) of underground seams.

2) Location of Mine Opening

There will be four accesses to the seams in each sector – two shaft and two inclines. One incline will be for coal evacuation by a belt conveyor and will also be used as air intake for each sector. Second incline will be used for man and material transport and also as air intake for ventilation purpose each sector. Two shaft will be used as return air shaft equipped with main mechanical ventilator in each sector. The main parameters of the sector wise openings are proposed in below table-

Sr.No	Name	Purpose	Length/Depth (m)	Size of Entry	Type of Support
Sector-I					
1)	Incline 1	Evacuating of coal by Belt conveyor, Intake	406	5.5m x 3.3m	Roof bolting. Wire mesh & W-straps and yielding access where necessary. Girders in interconnection
2)	Incline 2	Haulage for material & traveling of Man, Intake	410	5.5m x 3.3m	Roof bolting. Wire mesh, W-straps & yielding access where necessary. Girders in interconnection
3)	Air Shaft 1	Return Air	85	6.0m diameter	RCC/MCC lined through out
4)	Air Shaft 2	Return Air	224	6.0m diameter	RCC/MCC lined through out
Sector-II					
1)	Incline 3	Evacuating of coal by Belt conveyor, Intake	1146	5.5m x 3.3m	Roof bolting. Wire mesh & W-straps and yielding access where necessary. Girders in interconnection
2)	Incline 3	Haulage for material & traveling of Man, Intake	1150	5.5m x 3.3m	Roof bolting. Wire mesh, W-straps & yielding access where necessary. Girders in interconnection
3)	Air Shaft 3	Return Air	215	6.0m diameter	RCC/MCC lined through out
4)	Air Shaft 4	Return Air	367	6.0m diameter	RCC/MCC lined through out

3) Mine Design

Rate Capacity – Dhirauli Coal Block has been planned for a rated capacity of 1.50 MTPA underground mining. This output is considered technically feasible because of seam thickness, seam occurrence (mostly patchy), geological disturbance (11 faults dip side), parallel opencast mining operation, limited strike length which is further divided in to small sub sectors due to dip side faults. The distance between the centers of any two adjacent pillars left as per CMR 2017 reproduced in Table below for longer stability and fast development of all the seams as depillaring is proposed after completion of development in the respective seams. This will be beneficial for caving pattern also.

TABLE- PILLARS SIZES IN RESPECT OF SURFACE COVER (SQUIRE IN SHAPE)

Depth of seam from Surface	Where the width of the galleries does not exceed 3.0 m	Where the width of the galleries does not exceed 3.6 m	Where the width of the galleries does not exceed 3.6 m Where the Width of the galleries does not exceed 4.2 m	Where the width of the galleries does not exceed 4.8 m
	The distance between centers of adjacent pillars shall not be less than			
1	2	3	4	5
	Meters	Meters	Meters	Meters
Not exceeding 60m	12.0	15.0	18.0	19.5
Exceeding 60 but not exceeding 90m	13.5	16.5	19.5	21.0
Exceeding 90 but not exceeding 150m	16.5	19.5	22.5	25.5
Exceeding 150 but not exceeding 240m	22.5	25.5	30.5	34.5
Exceeding 240 but not exceeding 360m	28.5	34.5	39.0	45.0
Exceeding 360m	39.0	42.0	45.0	48.0

The mechanized panels shall be laid down on apparent gradient for self draining. The five heading dip drives will be developed with Continuous Miner for faster progress. A fully mechanized panel developed with Continuous Miner will also give annual production @ 0.50MTPA/CM.

4) Mining Scheme

The general orientation of the block is North-South (~9.9 x 2.7 km) and coal extraction by underground mining is proposed by two set of inclines seeing the dip rise length (9.9 km) of block. First set incline is planned to cover first half of the block named as Sector-I (~ 4.9 km length) and second set of incline for remaining half named as Sector B of the property (5 km length). Inclines are proposed at western side of block boundary and Vertical ventilation shaft of 6m diameter will be driven separately for exhaust of return air, proposed at eastern side of block.

The underground mining will be first start with one pair of inclines from surface named as Incline No.1 and No.2. These Inclines will be driven with height of 3.0 meters and width of 5.4 meters having gradient of 1 in 5. The mouths of inclines are located on borehole No.

MSD-107 at Surface RL 460m and are aligned towards borehole No. MSD-59. The Incline will reach the floor of seam III at 380 m FRL and will have a length of 410m crossing Seam VI to III and partings. Seam II is not developed in first half of the property (Sector I) therefore first set of incline is not planned upto seam II.

Second set of Inclines named as incline no. 3 and 4 is proposed to access remaining half of the property (Sector-II). Second set of Inclines will be driven with height of 3.0 meters and width of 5.4 meters having gradient of 1 in 5. The mouths of inclines are located on borehole No. MSD-65 at Surface RL 490m and are aligned towards borehole No. MSD-15. The Incline will reach the floor of seam II at 230 m FRL and will have a length of 1300m crossing Seam VI to II and partings.

5) Support system

a) **During Development:**

- All development galleries in coal are proposed to be supported by six non retractable resin grouted roof bolts of 1.2m length for VI, IV, II , seams and 1.8m length for combined III Top Seams, in one row for Sector-I & II . The bolts will be made of 22mm diameter high tensile strength Tor Steel.
- The distance between the rows of roof bolts as well as between two bolts in the same row shall be 1.0m. The roof bolts nearest to the pillar shall be kept 0.50m away from the edge of the pillars.
- In geologically disturbed areas and in junctions the galleries should be additionally supported by roof bolts of 1.8m / 2.4m length (flexi bolts or hydra bolts) with w-straps.
- In extreme bad condition additional supporting with steel girders shall be provided.
- Support system shall follow the DGMS approved Systematic Support Plan.

b) **During Depillaring Stage**

- During the extraction of pillars, additional supporting will be required at the goaf edges in the form of breaker line support in order to facilitate caving. The breaker line support roof bolts will be of 2.4m length with 0.8m grid pattern which will be placed during development of split galleries only. The first bolt in a row shall be 0.20m away from the edge of the pillar.
- If need be, sides of the pillars are to be supported by two Fiberglass/reinforced plastic (GPR) based rib bolts of 1.8m length. This support may be required where the height of extraction is more than 3m or areas where spalling of coal pillar is observed.

6) Extractable reserve

Seam wise reserve calculation is going on approx. extractable reserve is 298.12 Mt (OCP-186.06 Mte, UG- 112.07 Mte).

7) Blasting

Extraction of coal is planned by Continuous Miner therefore blasting is not required however if required during the development face suitable explosive shall be used.

8) Ventilation system

The calculation of requirement of air for the ventilation system in the mine is as follows

- Requirement of air on production basis (i.e, daily production of coal) is given by := 2.5 m^3 / minute x 5000 te of coal/ day = 12500 m^3 / minute.

- Requirement of air on manpower basis i.e. manpower working in general shift are:

= 6 m^3 / minute x 350 persons in largest shift

= 2100 m^3 / minute

- Requirement of air on Gas basis (i.e, daily gas emission by production of per tonne of coal for degree I Mine max. up to 1 m^3 per tonne of coal raised) is given as under:
Max. allowable concentration of methane in return air = 0.1%

vi) Raw material required along with estimated quantity, likely source, marketing area of final product/s, Mode of transport of raw Material and Finished Product

No raw material is required as this is a mining activity. Only diesel would be required for transportation of vehicles, operation of HEMM and generators in case of emergency. Coal from Mine after weighing the trucks will be unloaded at in-situ crusher to reduce the size less than 200 mm. From the crusher units the coal will be transported to the coal surface storage bunker by conveyor system. From the surface bunker, coal will be transported to Power station through road/railway. The overburden will be removed using shovels/backhoes and will be transported with a fleet of Rear discharging dumpers.

vii) Resource Optimization/Recycling and Reuse envisaged in the Project, if any, should be briefly outlined

Resources like Explosives, Diesel Oil, Machinery, Land, Power and Water are fully optimized to minimize unnecessary losses during the process of excavation and supply of coal to the customers. The production capacity from mine will be 6.5 Million Tons per annum at peak requirement. The coal does not require beneficiation. The resources which are used in the mining will be recycled by various methods. Sludge generated from domestic wastewater treatment will be composted and used as manure. Spent oil from transformers, will be sold to the authorized vendors. The ground water pumped for safe mining will be used for drinking water. Mine sump water collected at settling pits shall be discharged from quarry through pumps and used for dust suppression, mining activity, and irrigation to surrounding villages.

viii) Availability of water its source, Energy/ power requirement and source should be given.

Power Demand and Proposed Power Supply Arrangement

All HEMM proposed for this project, are diesel operated equipment. Hence, electrical power requirement is only for quarry lighting and haul road lighting, besides catering to the electrical load requirement for Workshop, Store, Pumping and Colony.

The estimated connected load and maximum demand for the project for the targeted production of 6.5 MTPA comes to the tune 5346 kVA respectively.

Water requirement

The demand of water for the project has been estimated as per industrial norms. An amount of 1540 KLD of industrial water, which includes 50 KLD of potable water will be required for the proposed coal mine.

Source of water

It is envisaged that to meet the requirement of water for construction, drinking and sanitation as well as mine operation , at the initial stage of 2- 3 years , will be met from ground water. After that mine quarry will collect sufficient water which will meet the industrial demand. However, the potable water demand at mine , mine facilities will be met through ground water by bore wells .

- Water Supply & Sewerage

Domestic and industrial effluent will be disposed of after suitable treatment in the effluent treatment plants (STP/ ETP).

IX) Quantity of wastes to be generated and scheme for their Management/ disposal.

In order to minimize the land requirement for external dumping, internal dumping has been planned which can be commenced only after sufficient void is created within the mining pit. Quantity of year wise land degradation and technical Reclamation has been given in below **Table.**

YEAR WISE LAND DEGRADATION AND TECHNICAL RECLAMATION

Year	Land Degraded				Technically Reclaimed Area			
	Excav area	Dump (Ext + top soil)	Infra / Others	Total	Backfill	Dump (Extn +Top Soil)	Other	Total
Y-01	57.21	163.34	141.06	361.61	-	-	8.20	8.20
Y-03	173.92	355.54	141.06	670.53	-	-	11.26	11.26
Y-05	323.79	548.15	141.06	1013.00	-	-	53.70	53.70
Y-10	536.33	274.34	141.06	951.73	343.12	200.45	78.74	622.31
Y-15	764.83	330.94	141.06	1236.84	519.75	250.76	78.74	849.25
Y-20	993.34	387.55	141.06	1521.95	664.33	330.94	78.74	1074.01
Y-25	1251.42	387.55	141.06	1780.03	771.97	387.55	78.74	1238.26
Y-30	1509.50	387.55	141.06	2038.10	931.35	387.55	78.74	1397.64
Y-35	1826.42	387.55	141.06	2355.03	1135.27	387.55	78.74	1601.56
Y-40	2096.59	387.55	187.86	2672.00	1596.23	387.55	115.24	2099.02
Y-45	2096.59	387.55	187.86	2672.00	1843.03	387.55	181.53	2412.11

Biological Reclamation (Cumulative in "Ha")

Table : Biological Reclamation

Year	Biological Reclaimed Area (Ha)							
	Agri	Plantation	Water Body	Public / Company Use	Total	Forest Land (Return)	Undisturbed / to be left for Public / com use	Total
Y-01	-	-	2.2	-	2.2	-	-	-
Y-03	-	-	2.2	4.13	6.33	-	4.13	4.13
Y-05	-	-	2.2	4.13	6.33	-	4.13	4.13
Y-10	-	543.57	2.2	4.13	549.9	543.57	4.13	547.7
Y-15	-	770.51	2.2	4.13	776.84	770.51	4.13	774.64
Y-20	-	995.28	2.2	4.13	1,001.61	995.28	4.13	999.41
Y-25	-	1,159.52	2.2	4.13	1,165.85	1,159.52	4.13	1,163.65
Y-30	-	1,318.90	2.2	4.13	1,325.23	1,318.90	4.13	1,323.03
Y-35	-	1,522.81	2.2	4.13	1,529.14	1,522.81	4.13	1,526.94
Y-40	-	1,729.35	2.2	4.13	1,735.69	1,729.35	4.13	1,733.49
Y-45	-	2,412.11	255.76	4.13	2,672.00	2,412.11	4.13	2,416.24

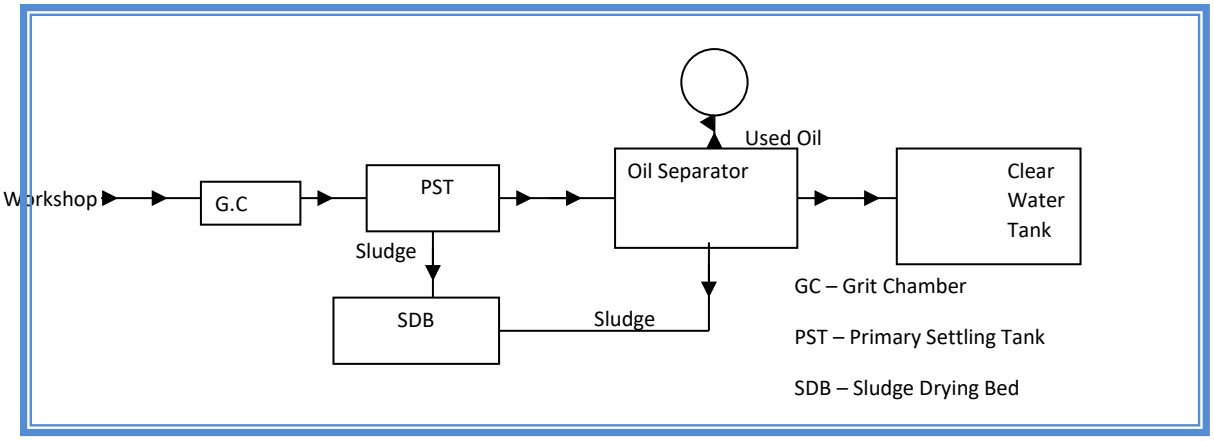
Water Quality Management

Waste water from service facilities

Water used at various service facilities viz. office, canteen, etc is likely to generate waste water with high suspended solids, BOD, etc. Estimated quantity of waste water from this source will be 10 Kl/d. The waste generated from these units will be collected and treated in a Package Sewage Treatment Plant and the effluent will be chlorinated and used for plant greeneries and dust suppression.

(iii) Waste from HEMM washing and Workshops

Waste water / industrial effluent coming out of the HEMM washing in Base Workshop and other repair and maintenance shops will be estimated 45 Kl/d. This effluent contains suspended solids, TSP, oil and grease and the same will be sent to a grease trap. After removal of grease, the effluent from the Grease Trap will be fed to a settling tank with oil skimming arrangement in the Effluent Treatment Plant (ETP). The effluent of the settling tank will be utilized in haul road dust suppression / forestation / green belt.



iv) Waste from dust suppression at CHP and coal stock pile

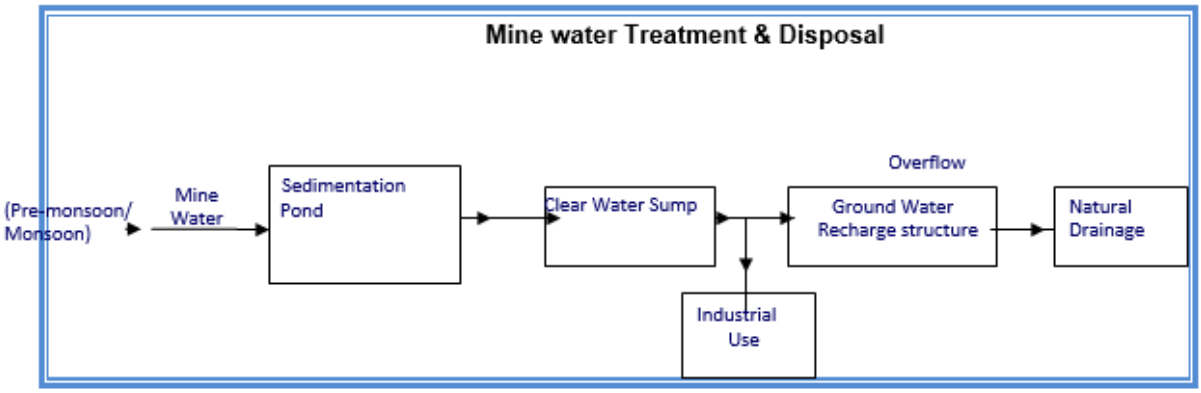
Waste water from CHP system which will contain fine coal dust as suspended solid has been estimated as 30 Kl/d . This will be routed through a settling tank to the Sedimentation Pond for treatment.

Pyritic impurities in coal is a source of acid drainage. From the petrographic studies of the coal stated in the GR, Pyrite is there in the samples . It is proposed that during the operation of the mine, effluent quality of CHP is to be sampled frequently to determine the pH and corrective action taken.

(v) Pumped out water from the quarry

Water accumulates in course of mining and has to be constantly pumped out for safety of men and machines Mine water is generated from two sources (a) ground water: as the quarry goes deeper, more and more aquifers are intercepted and volume of water increases, (b) rain water: direct precipitation over the excavated area and surface run-off flowing into the mine during rains. For reducing the run-off , garland drains will be constructed around the excavated area and the top of back-filled area will be given a grade, so that rain water flows outwards. However, a portion of the rain water will always find way in the quarry.

The pumped out water of the quarry generally contains high TSP and in some cases dissolved minerals making the water acidic. Though a substantial portion of this water is used within the mine for industrial use viz. HEMM washing / workshop use / CHP and for dust suppression and forestation, it is not advisable to discharge the surplus water to the general drainage system without treatment, lest the surrounding will be contaminated. To mitigate this, it has been proposed to conduct the water to a Sedimentation Pond of 10,000 cu.m. from where the water will collect in clear water sump. During actual mining, it will be decided whether raw water treatment will be needed to avoid high turbid water supply. After treatment, the water is distributed by pumping to consuming points. And the surplus water allowed to flow out. Regular sampling of surplus water shall also be conducted.



(vi) Surface run-off from External dump

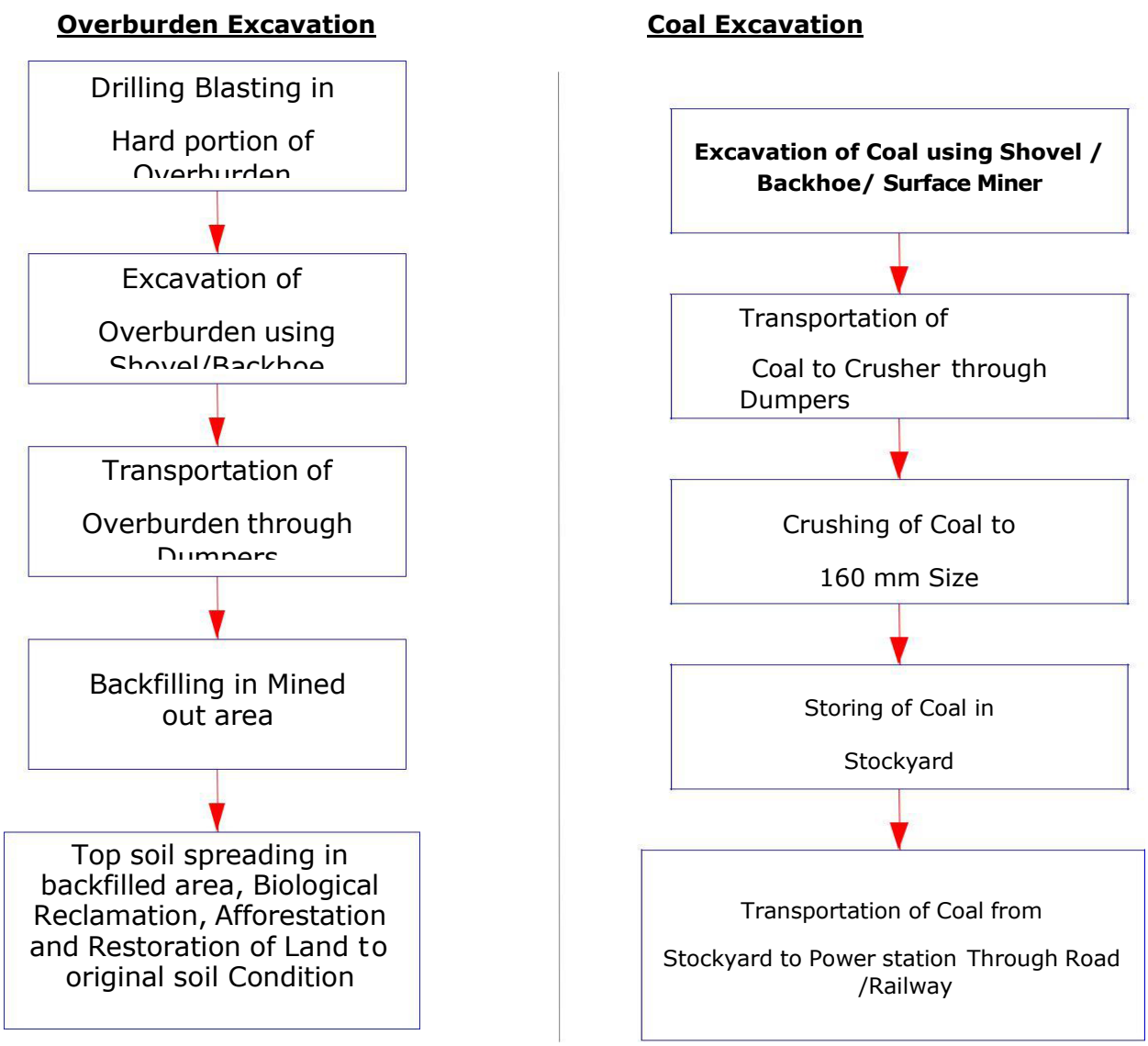
This topic has already been dealt in detail for external dump of OB. Broadly, the external dump will have garland drain all around. To arrest the sediments and prevent silting of the water courses by the run-off during rains, toe-walls / retaining walls with weep-holes at strategic stretches will be constructed. The gullies will have check-dams to prevent erosion.

x) Schematic representations of the feasibility drawing which give information of EIA purpose.

Schematic diagram showing the operation of OB & coal Excavation which give information of EIA purpose is shown below. These are the activities which are the source for Pollution. The pollution will be mitigated effectively.

Schematic Diagram Showing the Operation of OB & Coal Excavation is given in **Figure-4.**

FIGURE-4
SCHEMATIC DIAGRAM SHOWING THE OPERATION OF OB & COAL EXCAVATION (OPENCAST MINING)



4.0 SITE ANALYSIS

i) Connectivity

There are 4 roads passing from block having total length of approx. ~18 km which needs to be diverted along southern, western and northern boundary of the block.

1.	Khanua-Dongri-Phatpani Road
2.	Suliyari- Baheritola Road
3.	Pondi-Gurwani Road
4.	Jhalari-Basiberdha Road

ii) Land Form, Land use and Land Ownership

As per the vesting order no: NA-104/07/2020-NA dated 3rd March 2021, Government of India, Ministry of Coal has allocated the Dhirauli coal mine to Stratatech Mineral Resources Private Limited (SMRPL). The life of mine for opencast and underground mining for 46 and 87 years respectively.

TABLE-7 DETAILS OF LAND WITHIN DHIRAULI BLOCK

Village	Forest Land (ha)	Non Forest Land (ha)
Aamdand Village	7.49	43.73
Amraikhoh Village	2.63	110.52
Basi Bedrah Village	29.83	170.97
Phatpani Village	0.00	62.88
Belwar Village	0.00	41.49
Dhirauli Village	60.89	699.15
Jahalari Village	0.00	98.35
Sirswah Village	0.00	8.72
Reserved Forest	1335.35	0.00
Total	**1436.19**	**1235.81**

For the proposed Dhirauli Opencast/underground Project, the total requirement of land is estimated to be 2672 ha.. Mining rights shall be required for a quarry excavation area of 2096.59 ha as mentioned in **Table-8.**

TABLE-8
REQUIREMENT OF LAND (IN HECTARE)

S. No.	Item	Total Forest Area (in Ha)	Non Forest (in ha)	Total
1	Excavation area	1111.93	984.66	2096.59
2	External Dump Area & Top Soil Dump (35.34 ha)	230.40	157.15	387.55
3	Safety Zone	8.23	11.50	19.73

5	Other Use	0	19.17	19.17
6	Infrastructure	6.30	23.75	30.05
7	Greenbelt	7.22	39.58	46.80
6	Undisturbed Area	72.11	0	72.11
		1436.19	**1235.81**	**2672**

Topography (along with map)

Mine opening is planned from southwest corner of block (in-crop of seam VII) and further development is planned along strike of the seam. External dumping shall be merged with internal back filling dump in future when mine advances towards further north side. Location map is shown in **Figure-2**.

Physiography & Drainage

- *Physiography*

Western part of Dhirauli block is characterized by almost plain topography, while, north-eastern and south-central part are highly undulating and have rugged topography as evident from the topographical plan. The north-eastern and south central part of the block have forest cover and is occupied by hillocks of elevation up to a maximum of 638 m above MSL. In general elevation of ground varies from 459.23m as observed near borehole MSD-102 to 603.45 m near borehole MDP-19 located in the south-western and south-eastern corner of the block respectively.

- *Drainage*

Drainage of the block is mainly controlled by westerly flowing Hurdul Nala which traverses the block and passes almost through central part of the block. Many small seasonal nallas originating from elevated topography of north eastern and south central part of the block drain its water into Hurdul Nala. The minor nallas and tributaries present in the block shows dendritic to sub-dendritic drainage pattern.

vii) Climatic Data from Secondary Sources

The area experiences typical tropical to semi tropical monsoon type climate of a distinct hot summer from March to June, a good monsoon between June to September and a pleasant winter from November to February. Maximum temperature recorded in the region was found to be 44.8°C while the minimum temperature was 8°C and the average temperature is 29.1°C. The average relative humidity was found to be 31.2%.

Predominant wind direction in the mine is North-West (NW) direction and Calm conditions prevailed for 44.60% during the season. The maximum wind speed recorded was 5.1 m/s. Relative humidity in winter varies from 20–36% in the winter while it reaches upto 100% in the rainy season.

Rainfall in the area varies from 864 mm to 1397 mm with an average annual rainfall of 1054.23 mm. Average number of rainy days is around 120. Nearly 80% of rainfall is received between June to September.

viii) Social Infrastructure Available

The life of Dhirauli coal mine a target capacity of 6.5 MTPA (OCP-5 MTPA; UG-1.5 MTPA) has been estimated as 40 years for Open Cast Project & 87 years for Underground and hence social infrastructure development envisaged in the surrounding area.

Workshops and stores

Provisions will be made for maintenance and repair of HEMM, LMV and other plant and machineries. Accordingly, workshop and stores cater for the needs of their repairs and maintenance have been considered. The area of various shops and facilities are envisaged on the basis of technological & operational requirements.

Statutory Buildings

There will be provisions for canteen, first aid center, rest shelter, training centers, pithead bath etc. The area required for various statutory buildings have been considered on the basis of respective guidelines.

5.0 PLANNING BRIEF

i) Planning concept (type of industries, facilities, transportation etc.) Town and Country Planning/Development authority Classification

Production will be done as per mining plan not exceeding 6.5 MTPA.

ii) Population Projection

Manpower requirements are assessed on the basic design criteria for a production of 6.5 MTPA. Break up of total manpower requirement for the Dhirauli open cast and underground project will be around 910.

iii) Land use Planning (break up along with greenbelt etc.)

After cessation of mining, the land under infra area, washery etc. will all be reclaimed. It is proposed to use the buildings, i.e. office and residential areas for use of local community & society at large. The **Table-10** shows the envisaged changes for bringing the land to better post mining land uses.

Details of Pre-mining & Post-mining land use pattern is given in **Table-10** & **Table-11.**

TABLE-10

PRESENT LAND USE IN THE LEASE AREA

Ownership	Type of Land	Area(Ha)
Tenancy Land	Agricultural	530.841
	Township	
	Grazing	
	Barren	
	Water bodies	6.000
	Road	12.000
	Community	
Sub Total		**548.841**
Govt Non Forest Land	Agricultural	684.431
	Township	

	Grazing	
	Barren (Road)	
	Other	
Sub Total		**684.431**
Forest Land	Protected Forest land	1337.144
	Rev Forest (CJBJ)	101.585
Free hold		
Sub Total		**1438.729**
Grand Total		**2672.00**

Source: Mine Plan

TABLE-11
POST MINING LAND USE SCENARIO

Mining Activity	Proposed Land Use Area (Ha)	Land Use (End of Life) Area	Post Mining Land Use (Ha)						
			Agriculture Land	Plantation	Water Body	Public Use	Forest land (Returned)	Undisturbed	Total
Excavation Area	2,096.59	2,096.59	-	1,843.03		-	1,843.03	-	1,843.03
Backfilled Area (in Excavation Area)	1,796.23	1,796.23	-	1,843.03	-	-	1,843.03	-	1,843.03
Excavated Void (in Excavation Area)	300.36	300.36	-	-	253.56	-	-	-	253.56
Top Soil Dump *	35.34 (Upto 5th Year)	35.34 (Upto 5th Year)	-	-	-	-	-	-	0.00
External Dump	387.55	387.55	-	387.55	-	-	387.55	-	387.55
Safety Zone	19.73	19.73	-	19.73	-	-	19.73		19.73
Haul Road between quarries	-	-	-	-	-	-	-	-	0.00
Road diversion	4.13	4.13	-	-	-	4.13	-	-	4.13
Settling pond	2.20	2.20	-	-	2.20	-	-	-	2.20
Road & Infrastructure area	20.80	20.80	-	20.80	-	-	20.80	-	20.80
CHP & Washery	8.10	8.10	-	8.10	-	-	8.10	-	8.10
Coal Evacuation Route & Approach Road	1.15	1.15	-	1.15	-	-	1.15	-	1.15
Garland drains	5.34	5.34	-	5.34	-	-	5.34	-	5.34
Embankment	7.50	7.50	-	7.50	-	-	7.50	-	7.50
Green Belt	46.80	46.80	-	46.80			46.80		46.80
Water Reservoir	-	-	-	-	-	-	-	-	0.00
Rationalization area	72.11	72.11	-	72.11	-	-	72.11	-	72.11
Total (exclude back filled void & topsoil area)	**2,672.00**	**2,672.00**	-	**2,412.11**	**255.76**	**4.13**	**2,412.11**	**-**	**2,672.00**

iv) Assessment of Infrastructure Demand (Physical and Social)

Improvement in Physical Infrastructure

The project is having positive impact on the socio-economic environment. It helps sustain the development of this area including further development of physical infrastructural facilities. The following physical infrastructure facilities are existing.

- Road Transport facilities;
- Water supply and sanitation;
- Power;
- Medical facilities; and
- Community development etc.

Improvement in Social Infrastructure

The following changes in socio-economic status are in place due to mining activities:

Water Quality Management

The effluent from the mine HEMM & E&M workshops will be treated in treatment plant consisting sedimentation unit, oil & grease trap unit and flocculation & clarification unit so that treated effluent conforms to permissible limit. Domestic sewage treatment plant will be constructed for treating organic pollution and TSS so that treated water conform to permissible limit before discharging to surface water resource.

Rehabilitation & Resettlement

All eight villages lying within the block has been identified to be rehabilitated and resettled. The displaced families are proposed to be rehabilitated and resettled colony in a nearby area after discussion with villagers. Detailed R&R studies will be carried out.

Industrial development and consequent economic development lead to improvement of environment through better living and greater social awareness. On the other hand, continuation of project is likely to have several benefits like improvement in indirect employment generation and economic growth of the area, by way of improved infrastructure facilities and better socio-economic conditions.

V) Amenities/Facilities

Electricity is available in almost all the villages and communication facilities are overall satisfactory. However, post and telegraph facilities are limited to only a few villages and market facilities lacking in the area. Most of the households are using coal as fuel. However, people are also using gas or kerosene as a fuel as per economic condition. Educational facilities are available in almost all villages.

6.0 PROPOSED INFRASTRUCTURE

i) Industrial Area

a) Workshop

The workshop will have two separate sections to look after the maintenance needs of HEMM and other P&M.

b) HEMM Section

This section will look after the maintenance needs of all the heavy earth moving equipment provided in the project and shall have the following facilities:

- Daily maintenance including washing of equipment;
- Scheduled technical maintenance including lubrication and inspection;
- Day-to-day minor repairs/replacement of components and sub-assemblies; and
- Routine inspection and scheduling for attending to major repairs and overhauls from outside agencies.

c) E & M Section

This section will look after the maintenance needs of all the other equipment like pumps, CHP equipment, power supply and light vehicles etc. provided in the project and shall have the following facilities:

- Washing of LMV, lubrication, inspection and minor repairs of the E&M equipment as required;
- Routine/scheduled maintenance of all E&M equipment (lubrication and minor adjustments and filling of POL etc.);
- Incidental minor repair/replacement of sub-assemblies and components of CHP equipment and accessories, water pumps and pumping installations and other E&M equipment;
- Day-to-day repair and maintenance of LMVs including repair of dynamos, self-starters, radiators and battery charging etc.
- Repair of small electrical motors, switch gears and instruments etc. including rewinding jobs; and
- Inspection and scheduling of major repairs from outside agencies.

d) Project Store

The workshop and project store shall be located in the same compound for faster availability of spares required by the workshop. Provision for a closed shed is made for the project stores. Separate provision for a store yard of adequate area is also made for loading/unloading, truck movement etc.

Store racking system, weigh scale, fork lift truck are also provided in the stores which shall be located adjacent to the workshop complex for quick issuing of materials to the workshops.

e) Service Buildings

Office buildings, sub-station, statutory buildings such as first aid center, rest shelter, canteen etc. of appropriate area would be provided near the coal mine. Requirement of bulk explosive is proposed to be met by the supplier directly.

ii) Drinking Water Management (Source & Supply of water)

An amount of 50 KLD of potable water and 1540 KLD of industrial water will be required for the proposed Dhirauli coal mine.

Precautions against danger of inundation from surface water

- Hurdul Nala flows from east to west, from the center of block which will be diverted for opencast mine. Since there is no major river near by the block and diversion of existing nala is proposed for opencast mining there is no issue of flood. All required precaution against inundation would be taken care of.

- A careful assessment shall be made against the danger from surface water before the onset of rainy season. Garland drains shall be provided to drain away the surface rain water from the mine excavated area. Adequate capacity of pumping will be installed. All pumps in designated sumps, will be mounted on floats to prevent drowning in case of unwarranted heavy rainfall. Inspection for any accumulation of water, obstruction in normal drainage and weakening of embankment shall be carried out regularly.
- HFL of this river is to be considered and if necessary embankment may be constructed for any possible inundation in future. Garland drains around the proposed quarry boundaries will be provided and periodically maintained as far as possible for adequate safety measure. Proper drainage system will be provided in haul roads and other roads to guard against damage of pavement and slippery condition during heavy shower.

iii) Sewerage System

Domestic and industrial effluent will be disposed off after suitable treatment in the effluent treatment plants (STP/ ETP) located in colony and industrial area.

v) Industrial Waste Management

Mine discharge

Mine effluent contains silt and coal particles, which will be treated in two stages at primary sedimentation sump in mine floor and secondary sedimentation sump at mine surface.

The mine discharge will be used to meet the requirement of the afforestation/plantation, dust suppression, fire-fighting, other industrial, domestic applications. Surplus water meeting the prescribed standards, if any, will be discharged into nearby surface body.

Workshop effluent

The workshop effluent will be treated in a proper effluent treatment plant. Oil and grease will be skimmed using oil trap and stored in leak proof containers and will be sold to authorized vendors

Domestic effluent

STP will be provided.

vi) Solid Waste Management

The opencast mine is planned upto 280 m depth on the floor of seam-VII with overall average stripping ratio of 10.55 m^3/te.

The total volume of OB has been estimated as 1963.55 Mcum. The OB removed during initial years will be placed beyond the incrop of the seam VII as external dump. The total volume of external dump has been estimated as 259.01 Mm^3. Rest of the OB will be placed as internal dumps. The total volume of internal OB, i.e. the volume which will be accommodated internally by backfilling has been estimated as 1704.54 Mm^3.

The internal dumping will start when about 100 m internal space is available on quarry floor. By adopting the proposed sequence of mining, as the quarry advances, the amount of internal dump will increase as more space for the internal dumping is created.

It is proposed to start internal dumping from 3rd year of mine operation along with external dumping to optimize lead. As the gradient of the seam is flat, during working of the quarry substantial amount of OB can be accommodated as internal dump. After 18th year of mine operation, no external dumping will be required. Hence, OB will be accommodated as internal dump for rest of the mine life.

During 1st year, height of external dump will be kept at only 60 m above the ground level. During 3rd year, height of eastern external dump and eastern in-pit dump will be merged by maintaining 90m height above the ground level (RL of 600). At the end of 5th year height of internal dump will be 90m above ground level. At the end of mine life, internal dump will be at 60 above the ground level for some part.

Table 8 - Dhirauli Coal Block Solid Waste Management

Year	External Dump		Internal Dump		Total OB	
	Progressive (Mcum)	Cumulative (Mcum)	Progressive (Mcum)	Cumulative (Mcum)	Progressive (Mcum)	Cumulative (Mcum)
Yr-1	16.35	16.35	-	-	16.35	16.35
Yr-2	28.12	44.47	-	-	28.12	44.47
Yr-3	19.36	63.83	13.94	13.94	33.30	77.77
Yr-4	12.39	76.22	20.76	34.70	33.15	110.92
Yr-5	11.64	87.86	21.53	56.23	33.17	144.09
Yr-6	10.5	98.36	24.30	80.53	34.80	178.89
Yr-7	11.34	109.70	24.66	105.19	36.00	214.89
Yr-8	11.55	121.25	25.70	130.89	37.25	252.14
Yr-9	11.97	133.22	26.33	157.22	38.30	290.44
Yr-10	12.11	145.33	26.49	183.71	38.60	329.04
Yr-11	12.81	158.14	27.49	211.20	40.30	369.34
Yr-12	13.02	171.16	28.73	239.93	41.75	411.09
Yr-13	13.58	184.74	30.32	270.25	43.90	454.99
Yr-14	13.79	198.53	32.11	302.36	45.90	500.89
Yr-15	14.42	212.95	32.88	335.24	47.30	548.19
Yr-16	14.91	227.86	34.09	369.33	49.00	597.19
Yr-17	15.33	243.19	34.72	404.05	50.05	647.24
Yr-18	15.82	259.01	35.03	439.08	50.85	698.09
Yr-19	-	259.01	51.40	490.48	51.40	749.49
Yr-20	-	259.01	52.25	542.73	52.25	801.74
Yr-21	-	259.01	53.30	596.03	53.30	855.04
Yr-22	-	259.01	54.25	650.28	54.25	909.29
Yr-23	-	259.01	55.75	706.03	55.75	965.04
Yr-24	-	259.01	58.25	764.28	58.25	1023.29
Yr-25	-	259.01	60.75	825.03	60.75	1084.04
Yr-26	-	259.01	62.75	887.78	62.75	1146.79
Yr-27	-	259.01	64.00	951.78	64.00	1210.79
Yr-28	-	259.01	64.50	1016.28	64.50	1275.29
Yr-29	-	259.01	65.50	1081.78	65.50	1340.79

Year	External Dump		Internal Dump		Total OB	
	Progressive (Mcum)	Cumulative (Mcum)	Progressive (Mcum)	Cumulative (Mcum)	Progressive (Mcum)	Cumulative (Mcum)
Yr-30	-	259.01	65.75	1147.53	65.75	1406.54
Yr-31	-	259.01	66.50	1214.03	66.50	1473.04
Yr-32	-	259.01	67.25	1281.28	67.25	1540.29
Yr-33	-	259.01	67.25	1348.53	67.25	1607.54
Yr-34	-	259.01	67.75	1416.28	67.75	1675.29
Yr-35	-	259.01	68.50	1484.78	68.50	1743.79
Yr-36	-	259.01	68.50	1553.28	68.50	1812.29
Yr-37	-	259.01	69.25	1622.53	69.25	1881.54
Yr-38	-	259.01	53.50	1676.03	53.50	1935.04
Yr-39	-	259.01	21.50	1697.53	21.50	1956.54
Yr-40	-	259.01	7.01	1704.54	7.01	1963.55
Total	**259.01**	**259.01**	**1704.54**	**1704.54**	**1963.55**	**1963.55**
	259.01		**1704.54**		**1963.55**	

REHABILITATION AND RESETTLEMENT (R & R) PLAN

i) Policy to be adopted in respect of the project affected persons including home oustees, land oustees and landless labourers

The important villages in and around the block are Jhalari, Dhirauli, Phatani, Beri-Berdah, Belwar, Aamdand, Amarai khoh and Seerswah villages. During Baseline study data on socio-economic parameters such as demography, social infrastructure, economic resource base, health status, cultural aspects and aesthetic attribute has been collected from various secondary data sources viz. Govt. agencies,census data, statistical abstract and health agencies.

Socio-economic sample survey also been carried out covering the villages of the study area to record awareness, opinion, apprehensions, quality of life and expectations of the local people about the proposed project. The opinion of local people about the proposed project was obtained through socio-economic survey of the villages in the study area.

8. PROJECT SCHEDULE & COST ESTIMATES

i) Likely date of start of construction and likely date of Completion

Initial two year has been kept for Approval and clearance stage. After Approval and clearance stage, two year will be required for Development or construction stage. Yearly production planned until achievement of full capacity has been given in **Table-9.**

TABLE-9
CALENDAR PLAN OF COAL PRODUCTION AND OB REMOVAL

years		Coal Production			OB	SR	
		OC	UG	Total	Running	Running	cumulative
		(Mt)	(Mt)	(Mt)	(MCum)	(Cum/t)	(Cum/t)
1	2025-26	2.00	0.00	2.00	16.35	8.18	8.18
2	2026-27	4.00	0.00	4.00	28.12	7.03	7.41
3	2027-28	5.00	0.00	5.00	33.30	6.66	7.07
4	2028-29	5.00	0.00	5.00	33.15	6.63	6.93
5	2029-30	5.00	0.00	5.00	33.17	6.63	6.86
6	2030-31	5.00	0.00	5.00	34.80	6.96	6.88
7	2031-32	5.00	0.00	5.00	36.00	7.20	6.93
8	2032-33	5.00	0.00	5.00	37.25	7.45	7.00
9	2033-34	5.00	0.00	5.00	38.30	7.66	7.08
10	2034-35	5.00	0.00	5.00	38.60	7.72	7.15
11	2035-36	5.00	0.50	5.50	40.30	8.06	7.24
12	2036-37	5.00	1.00	6.00	41.75	8.35	7.34
13	2037-38	5.00	1.50	6.50	43.90	8.78	7.46
14	2038-39	5.00	1.50	6.50	45.90	9.18	7.59
15	2039-40	5.00	1.50	6.50	47.30	9.46	7.72
16	2040-41	5.00	1.50	6.50	49.00	9.80	7.86
17	2041-42	5.00	1.50	6.50	50.05	10.01	7.99
18	2042-43	5.00	1.50	6.50	50.85	10.17	8.12
19	2043-44	5.00	1.50	6.50	51.40	10.28	8.24
20	2044-45	5.00	1.50	6.50	52.25	10.45	8.35
21	2045-46	5.00	1.50	6.50	53.30	10.66	8.47
22	2046-47	5.00	1.50	6.50	54.25	10.85	8.58
23	2047-48	5.00	1.50	6.50	55.75	11.15	8.69
24	2048-49	5.00	1.50	6.50	58.25	11.65	8.82
25	2049-50	5.00	1.50	6.50	60.75	12.15	8.96
26	2050-51	5.00	1.50	6.50	62.75	12.55	9.10
27	2051-52	5.00	1.50	6.50	64.00	12.80	9.24
28	2052-53	5.00	1.50	6.50	64.50	12.90	9.38
29	2053-54	5.00	1.50	6.50	65.50	13.10	9.51
30	2054-55	5.00	1.50	6.50	65.75	13.15	9.63
31	2055-56	5.00	1.50	6.50	66.50	13.30	9.76
32	2056-57	5.00	1.50	6.50	67.25	13.45	9.87

years		Coal Production			OB	SR	
		OC	UG	Total	Running	Running	cumulative
		(Mt)	(Mt)	(Mt)	(MCum)	(Cum/t)	(Cum/t)
33	2057-58	5.00	1.50	6.50	67.25	13.45	9.98
34	2058-59	5.00	1.50	6.50	67.75	13.55	10.09
35	2059-60	5.00	1.50	6.50	68.50	13.70	10.20
36	2060-61	5.00	1.50	6.50	68.50	13.70	10.30
37	2061-62	5.00	1.50	6.50	69.25	13.85	10.40
38	2062-63	3.00	1.50	4.50	53.50	17.83	10.52
39	2063-64	1.50	1.50	3.00	21.50	14.33	10.55
40	2064-65	0.56	1.50	2.56	7.01	12.52	10.55
41-87	2065-2113	-	68.57	68.57			
Total		**186.06**	**112.07**	**298.13**	**1963.55**	**-**	**10.55**

(ii) Estimated project cost along with analysis in terms of economic viability of the project

The mining operations will be started only after getting all the clearances. The capital cost of the project is Rs 2800 Crores including environment protection measures.

9. ANALYSIS OF PROPOSAL (FINAL RECOMMENDATIONS)

i) Financial and Social Benefits with Special Emphasis on the benefit to the local people including tribal Population, if any, in the Area

The project will improve the socio-economic status of the society in the region by generating direct and indirect employment opportunities. The project will contribute additional revenue to the State & Central exchequers in the form of taxes, cess, etc.

The anticipated positive impacts of the project are explained below:

Human settlement is expected to increase after this project gets operational. In the long term, the project will have impact on the population growth due to migration of people from outside area. Indirect employment opportunities will also add to this.

The literacy level of the project area is likely to increase as there will be influx of many educated people taking up jobs in the project, which is likely to result in establishment of better educational facilities.

The impact of the project on the civic amenities will be minimal. Health care facilities will be developed for the employees of the proposed coal mine. These medical facilities will be extended to surrounding villages.

The project related construction activities will benefit the local populace in a number of ways such as supply of construction labourers – skilled, semi-skilled and un- skilled, tertiary sector employment and provision of goods and services for daily needs including transport. The local population will be given preference depending upon their suitability to the job requirement. Besides direct employment, indirect employment opportunities will also open up. The project will have positive impact in the region. Quality of life of the people will improve, which in-turn will improve the socio-economic conditions of the area.

Annexure I
Vesting Order

Annexure II
Mine plan approval

Annexure- III
Acknowledgment of application & Status of Forest Clearance