# EXECUTIVE SUMMARY

## OF

## ENVIRONMENTAL IMPACT ASSESSMENT REPORT

## &

## ENVIRONMENTAL MANAGEMENT PLAN

## FOR

**Gare Palma Sector-I Coal Mine in Mand Raigarh Coalfield**
**(Block Area: 3020.00 ha)**
**with Coal Production Capacity: 15.00 Million TPA**
**by Opencast and Underground Mining Method**

**At**
**Villages: Aamgaon, Dhourabhatha, Libra, Jhikabahal, Telaipara, Bijna, Budhiya, Baghbadi, Mahloi, Raipara, Jharna, Khuruselenga, Samkera and Tangarghat, Tehsil: Tamnar, District: Raigarh, Chhattisgarh**


**PROJECT PROPONENT**

JINDAL POWER

**M/s. Jindal Power Limited (JPL)**

Jindal Centre,
Plot No. 2, Sector 32
Gurgaon, Haryana,
India, Pincode-122001

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***EXECUTIVE SUMMARY***

## 1.0 PROJECT DESCRIPTION

### 1.1 INTRODUCTION

M/s. Jindal Power Limited has proposed Gare Palma Sector-I Coal mine in Mand Raigarh Coalfield (Block area: 3020.00 ha) with Combined Coal Production 15.00 Million TPA by Opencast and Underground Mining at Villages: Aamgaon, Dhourabhatha, Libra, Jhikabahal, Telaipara, Bijna, Budhiya, Baghbadi, Mahloi, Raipara, Jharna, Khuruselenga, Samkera and Tangarghat, Tehsil: Tamnar, District: Raigarh, Chhattisgarh.

As per EIA Notification dated 14$^{th}$ September, 2006 and its subsequent amendments, the project falls under Category "A" (>500 ha) Project or Activity 1 (a) (3) for "Mining of Mineral" (Coal Mining).

Application for Environment Clearance was submitted on Parivesh Web Portal on 19.02.2025 for which ToR has been issued by MoEF&CC vide Letter no IA-J-11015/6/2025-IA-II(M), dated 28.04.2025.

Mining operations will be carried out by fully mechanized Opencast and underground mining methods.

### 1.2 NEED FOR THE PROJECT

- The coal block is allotted for commercial coal sale including sale to affiliates & related parties, captive consumption, underground coal gasification, coal liquefaction and export of coal.
- The coal produced from Gare Palma Sector-I Coal Mine will be transported to Tamnar Power Plant of Jindal Power Ltd. If there will be surplus production after fulfilling the plant requirement then the coal will be sold to consumers through proposed railway siding.
- Commissioning of the project will fulfill the demand of coal in India, thus substantiating the country's mission towards "Atmanirbhar Bharat".

### 1.3 VESTING ORDER DETAILS

Earlier, Gare Palma Sector-I Coal Mine was allocated to M/s. Gujarat State Electricity Corporation Limited (GSECL) over an area of 57.39 sq km vide allotment order no. 103/27/2015/NA dated 14.09.2015.

Thereafter, the geological block area of Gare Palma Sector I was revised to 3020.00 ha and M/s. Jindal Power Ltd. has been declared as successful bidder for block area of 3020.00 ha in accordance with Coal Mines (Special Provision) Rules, 2014 read with Coal Mines (Special Provision) Act, 2015 vide vesting order no. NA-104/14/2023-NA dated 08.06.2023 issued by Ministry of Coal.

### 1.4 STATUS OF APPROVAL OF MINING PLAN & MINE CLOSURE PLAN

Mining Plan and Mine Closure Plan with rated Coal production capacity: 15.00 Million TPA by Opencast cum Underground mining method (Block Area: 3020.00 ha) has been approved by Ministry of Coal vide letter no. CTCG013/APP00315/2023 on 24.02.2025.

## 1.5 STATUS OF FOREST CLEARANCE

Total block area is 3020.00 ha out of which 119.277 ha is Forest Land. Application for Diversion of Forest Land (Form-A (Part-I)) has been submitted on Parivesh Web Portal dated 13.02.2025. (Proposal No. FP/CG/MIN/QRY/523861/2025). Thereafter, EDS was raised on 05.03.2025.

## 1.6 PROJECT DETAILS

**Table: 1**
**Project Details**

| S. No. | Particulars | Details |
|---|---|---|
| **A.** | **Nature of project** | Fully mechanized Opencast and Underground mining method |
| **B.** | **Size of project** | |
| 1. | Block area | Total area: 3020.00 ha<br>➢ 236.175 ha - Govt. land<br>➢ 2664.548 ha - Private land<br>➢ 119.277 ha - Forest Land |
| 2. | Production Capacity | Max. production by Opencast Mining: 15.00 Million TPA<br>Max. production by Underground Mining: 2.0 Million TPA<br>Overall: 15.00 Million TPA |
| **C.** | **Project Location** | |
| 1. | Villages | Aamgaon, Dhourabhatha, Libra, Jhikabahal, Telaipara, Bijna, Budhiya, Baghbadi, Mahloi, Raipara, Jharna, Khuruselenga, Samkera and Tangarghat, |
| 2. | Tehsil | Tamnar |
| 3. | District | Raigarh |
| 4. | State | Chhattisgarh |
| 5. | Coordinates | Latitude: 22°04'59"N to 22°07'02"N<br>Longitude: 83°27'27"E to 83°33'49"E |
| 6. | Toposheet No. | Core Zone: F44L8 (64N/8), F44L12 (64N/12)<br>Buffer Zone: F44L8 (64N/8), F44L12 (64N/12), F44O5 (64O/5), F44O9 (64O/9) |
| **D.** | **Environmental Setting Details** | |
| 1. | State/ National Highway in proximity | As per DSS, State Highway passing through the block area<br>SH 1 (~ 12 km in West direction) |
| 2. | Railway Station in proximity | Raigarh Railway Station (~24 km in SSW Direction) |
| 3. | Nearby Airports | Veer Surendra Sai Airport, Jharsuguda (~53 km in ESE Direction) |
| 4. | Inter district Boundary | Odisha- Chhattisgarh state boundary (0.9 km in East direction) |
| 5. | Nearest Town/City | Gharghoda Town (~ 13 km in NW Direction)<br>Raigarh city (~ 20 km in SSW Direction) |
| 6. | National Park, Wild Life Sanctuaries, Biosphere Reserves, Wildlife corridors, Tiger/ Elephant Reserves, within 10 km radius study area | There is no National Park, Wild Life Sanctuary, Biosphere Reserves, Tiger Reserves, etc. within 10 km radius study area.<br>Charmar-Jingol Elephant Corridor (~6.4 km in WSW direction). |
| 7. | Reserve/Protected Forests within 10 km radius study area | There are 18 Protected Forests and 11 Reserved Forests within 10 km radius study area:<br>**18 Protected Forest**<br>➢ Protected Forest (Within the lease area)<br>➢ Protected Forest (~2.2 km in NW)<br>➢ Jobra PF (~2.0 km in South)<br>➢ Devgaon PF (~3.0 km in SW)<br>➢ Gare PF (~3.5 km in North)<br>➢ Dongamauha PF (~3.7 km in NNE)<br>➢ Protected Forest (~3.8 km in North) |

| S. No. | Particulars | Details |
|---|---|---|
| | | ➢ Protected Forest (~3.8 km in NNW)<br>➢ Protected Forest (~5.3 km in West)<br>➢ Protected Forest (~6.0 km in NNW)<br>➢ Pajhar PF (~6.5 km in WSW)<br>➢ Amaghat PF (~6.8 km in West)<br>➢ Protected Forest (~7.0 km in NNW)<br>➢ Protected Forest (~7.2 km in WNW)<br>➢ Jamjharia PF (~7.4 km in SSE)<br>➢ Khurudaldali PF (~7.6 km in SE)<br>➢ Protected Forest (~8.1 km in NW)<br>➢ Protected Forest (~8.7 km in WNW)<br>**11 Reserve Forest**<br>➢ Barkachhar RF (~3.2 km in SW)<br>➢ Jamkani RF (~3.5 km in East)<br>➢ Buraphar RF (~3.4 km in ESE)<br>➢ Tolge East RF (~3.6 km in NE)<br>➢ Reserved Forest (~4.0 km in North)<br>➢ Garhdongi RF (~4.5 km in South)<br>➢ Pendripani RF (~4.9 km in SE)<br>➢ Taraimal RF (~6.4 km in WSW)<br>➢ Silot RF (~7.3 km in NNW)<br>➢ Samaruma RF (~8.0 km in West)<br>➢ Garjanjor RF(~9.0 km in ESE) |
| 8. | Water Bodies within 10 km radius of the mine site | ➢ Koledega Nala (Passing through the lease area)<br>➢ Kelo Nadi (Adjacent in West direction)<br>➢ Khurusalega Nala (~0.6 km in ESE)<br>➢ Bendra Nala (~2.0 km in NE)<br>➢ Pajhar Nadi (~4.2 km in West)<br>➢ Gardarasi Nala (~5.0 km in West)<br>➢ Suka Nala (~5.6 km in South)<br>➢ Ajbahaljor Nala (~6.0 km in SE)<br>➢ Ratrot Nala (~6.0 km in SW)<br>➢ Digi Nala (~6.2 km in WNW)<br>➢ Barhajharia Nala (~6.5 km in East)<br>➢ Dumer Nala (~7.5 km in ENE)<br>➢ Chini Nala (~9.6 km in N)<br>➢ Putkajor Nala (~9.3 km in East)<br>Few ponds also fall within the block area. |
| 9. | Seismic Zone | Zone – III as per IS: 1893 (Part-I): 2002 |
| **E** | **Cost Details** | |
| 1. | Project Cost | Rs. 9504.7 Crores |
| 2. | Cost of EMP | Capital cost- 73.72 crores<br>Recurring Cost- 9.25 crores/annum |
| **F.** | **Requirements of the Project** | |
| 1. | Water Requirement | Total Water Requirement is 2692 KLD<br>**Source:** Ground water, mine sump water & treated water |
| 2. | Power Requirement | 30 MVA<br>**Source:** JPL's substation, located about ~5 km from the project site through the double circuit overhead transmission line. |
| 3. | Man Power Requirement | 2188 Persons |

***Source:*** *Site Visit & Pre- Feasibility Report*

## 1.7 MINING DETAILS

**Table:.2**
**Mining details**

| S. No. | Particular | Details |
|---|---|---|
| 1. | Method of Mining | Opencast and Underground mining method |
| 2. | Rated Capacity | By Opencast Mining: 15.00 Million TPA<br>By Underground Mining: 2.0 Million TPA<br>Overall: 15.00 Million TPA |
| 3. | Net Geological Reserves | 1034.1200 Million Tonnes |
| 4. | Mineable Reserves | 547.0950 Million Tonnes |
| 5. | Extractable Reserves | 426.0300 Million Tonnes |
| 6. | Life of mine | By OC: 31<br>By UG: 49<br>Overall: 67 |
| 7. | No. of Working Seams | OC: 19 seams<br>UG: 5 Seams |
| 8. | Seams Thickness | 0.02 m to 17.16 m |
| 9. | Elevation Range | 270 m AMSL to 340 m AMSL |
| 10. | Ultimate Working Depth | For OC: 295 m bgl<br>UG: 450 m bgl |
| 11. | ROM/Waste Ratio | 1: 7.3813 |
| 12. | No of working days | 330 |
| 13. | Number of shifts per day | 3 |

***Source:*** *Approved Mining Plan with Progressive Mine Closure Plan*

## 1.8 METHOD OF MINING

The proposed mining project includes mining through opencast method and underground method. In opencast mining, coal excavation is proposed by surface miners except on the corners and edges which are beyond the reach of surface miner. For this purpose, it is estimated that 10% of the coal mining is proposed by drilling & blasting and removal of OB through drilling & blasting. In underground mining, bord and pillar method of working is proposed with Continuous Miner package with Shuttle car, roof bolter and feeder breaker system.

### 1.8.1 YEARWISE PRODUCTION AND EXCAVATION DETAILS

**Table-3**
**Year wise production & excavation details**

| Year | | Coal Production Schedule | | | Top Soil MM3 | OB MM3 | Total Waste MM3 | SR |
|---|---|---|---|---|---|---|---|---|
| Year | Calendar Year | UG(MT) | OC (MT) | Total | | | | |
| 1. | 2027-28 | 0 | 0 | 0 | 2 | 16 | 18 | 0 |
| 2. | 2028-29 | 0 | 0 | 0 | 3.44 | 38 | 41.44 | 0 |
| 3. | 2029-30 | 0 | 0.2 | 0.2 | 2.25 | 38.2 | 40.45 | 202.25 |
| 4. | 2030-31 | 0 | 1.4 | 1.4 | 2 | 58.76 | 60.76 | 43.4 |
| 5. | 2031-32 | 0 | 3 | 3 | 2.05 | 60.95 | 63 | 21 |
| 6. | 2032-33 | 0 | 6 | 6 | 2.11 | 79.47 | 81.58 | 13.5967 |
| 7. | 2033-34 | 0 | 10 | 10 | 4 | 110.31 | 114.31 | 11.431 |
| 8. | 2034-35 | 0 | 12 | 12 | 4.71 | 114.01 | 118.72 | 9.8933 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 9. | 2035-36 | 0 | 15 | 15 | 2.28 | 108.55 | 110.83 | 7.3887 |
| 10. | 2036-37 | 0 | 15 | 15 | 3.29 | 107.31 | 110.595 | 7.373 |
| 11. | 2037-38 | 0 | 15 | 15 | 3.36 | 107.24 | 110.595 | 7.373 |
| 12. | 2038-39 | 0 | 15 | 15 | 3.36 | 107.24 | 110.595 | 7.373 |
| 13. | 2039-40 | 0 | 15 | 15 | 3.36 | 107.24 | 110.595 | 7.373 |
| 14. | 2040-41 | 0 | 15 | 15 | 3.36 | 107.24 | 110.595 | 7.373 |
| 15. | 2041-42 | 0 | 15 | 15 | 2.06 | 93 | 95.06 | 6.3373 |
| 16. | 2042-43 | 0 | 15 | 15 | 2.06 | 93 | 95.06 | 6.3373 |
| 17. | 2043-44 | 0 | 15 | 15 | 2.06 | 93 | 95.06 | 6.3373 |
| 18. | 2044-45 | 0 | 15 | 15 | 2.06 | 93 | 95.06 | 6.3373 |
| 19. | 2045-46 | 0.5 | 14.5 | 15 | 2 | 90 | 92 | 6.3448 |
| 20. | 2046-47 | 1 | 14 | 15 | 1.95 | 80.05 | 82 | 5.8571 |
| 21. | 2047-48 | 1 | 14 | 15 | 1.95 | 80.05 | 82 | 5.8571 |
| 22. | 2048-49 | 1.5 | 13.5 | 15 | 1.95 | 77.2 | 79.15 | 5.863 |
| 23. | 2049-50 | 2 | 13 | 15 | 1.95 | 74.18 | 76.131 | 5.8562 |
| 24. | 2050-51 | 2 | 13 | 15 | 1.95 | 74.18 | 76.131 | 5.8562 |
| 25. | 2051-52 | 2 | 13 | 15 | 1.95 | 74.18 | 76.131 | 5.8562 |
| 26. | 2052-53 | 2 | 13 | 15 | 1.95 | 74.18 | 76.131 | 5.8562 |
| 27. | 2053-54 | 2 | 13 | 15 | 1.95 | 74.18 | 76.131 | 5.8562 |
| 28. | 2054-55 | 2 | 11 | 13 | 0.43 | 62.92 | 63.35 | 5.7591 |
| 29. | 2055-56 | 2 | 11 | 13 | 0 | 58.92 | 58.92 | 5.3564 |
| 30. | 2056-57 | 2 | 7 | 9 | 0 | 37.53 | 37.53 | 5.3614 |
| 31. | 2057-58 | 2 | 1.34 | 3.34 | 0 | 7 | 7 | 5.2239 |
| 32. | 2058-59 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 33. | 2059-60 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 34. | 2060-61 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 35. | 2061-62 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 36. | 2062-63 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 37. | 2063-64 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 38. | 2064-65 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 39. | 2065-66 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 40. | 2066-67 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 41. | 2067-68 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 42. | 2068-69 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 43. | 2069-70 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 44. | 2070-71 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 45. | 2071-72 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 46. | 2072-73 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 47. | 2073-74 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 48. | 2074-75 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 49. | 2075-76 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 50. | 2076-77 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 51. | 2077-78 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 52. | 2078-79 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 53. | 2079-80 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 54. | 2080-81 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 55. | 2081-82 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 56. | 2082-83 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 57. | 2083-84 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 58. | 2084-85 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 59. | 2085-86 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 60. | 2086-87 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 61. | 2087-88 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 62. | 2088-89 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 63. | 2089-90 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 64. | 2090-91 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 65. | 2091-92 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 66. | 2092-93 | 1.5 | 0 | 1.5 | 0 | 0 | 0 | 0 |
| 67. | 2093-94 | 0.59 | 0 | 0.59 | 0 | 0 | 0 | 0 |

***Source:*** *Approved Mining Plan with Mine Closure Plan*

## 2.0 DESCRIPTION OF THE ENVIRONMENT

Baseline study of the study area was conducted during Summer Season (March to May, 2024).

### A. Ambient Air Quality

Ambient Air Quality Monitoring reveals that the concentrations of PM2.5 and PM10 for all the 17 AAQM stations were found between 20.6 to 53.8 µg/m3 and 34.2 to 92 µg/m3 respectively. The concentrations of SO2 and NO2 were found to be in range of 4.9 to 18.5 µg/m3, 8.2 to 34.2 µg/m3, respectively. The values of PM10 and PM2.5 were found more at Existing Power Plant and Existing Coal Mine (Gare Palma IV 2&3) due to operating Power Plant and operating coal mine and associated activities etc.

### B. Ambient Noise Levels

Ambient noise levels were measured at 17 locations within the study area. Noise levels vary from 50.4 to 68.2 Leq dB (A) during day time and from 40.1 to 54.2 Leq dB(A) during night time. Maximum noise levels during day & night time were recorded at Existing Power Plant due to ongoing activities in the power plant and its operation.

### C. Surface Water Quality

Surface water samples were collected from 12 water bodies present within the study area. The pH of the water bodies ranges from 7.31 to 7.91 Total hardness (58.84 to 185.2 mg/l), Calcium (7.85 to 59.73 mg/l), Alkalinity (47.9 to 126.7 mg/l), Chloride (14.5 to 52.68 mg/l), Magnesium (7.76 to 14.35 mg/l), Total Dissolved Solids (102 to 261 mg/l), Sulphate (7.89 to 33.12 mg/l), Fluoride (0.11 to 0.33 mg/l), Nitrate (0.13 to 1.22 mg/l), Iron (0.04 to 0.13 mg/l), Zinc (0.01 to 0.03 mg/l), Manganese (0.01 to 0.07 mg/l, Total Suspended Solid (3.0 to 14.0 mg/l), Biochemical Oxygen Demand (2.2 to 12.0 mg/l), Chemical Oxygen Demand (8.0 to 36.0 mg/l), Sodium as Na (8.0 to 16.0 mg/l), Potassium as K (2.0 to 8.0 mg/l), Conductivity(164.0 to 416.0 µs/cm), Dissolved Oxygen (6.7 to 7.3 mg/l).

Some of the parameters like Color, Residual Free Chlorine, Cyanide as CN (DL 0.2 mg/l), Aluminum as Al (DL 0.03 mg/l), Boron (DL 0.2 mg/l), Phenolic Compounds (DL 0.001 mg/l), Anionic Detergents as MBAS (DL 0.02 mg/l), Hexa Chromium as Cr+6 (DL 0.03 mg/l), Copper as Cu (DL 0.02 mg/l), Lead as Pb (DL 0.008 mg/l), Selenium as Se (DL 0.001 mg/l), Arsenic (DL 0.002), Hg (0.001) & Nickel (DL 0.005 mg/l) were analyzed and not detected.

**D. Ground Water Quality**

The ground water /drinking water samples were collected from 17 locations. Ranges observed for ground water quality parameters are given as under:

The pH of collected water samples varied from 7.08 to 7.70. Total hardness varied from 102.98 mg/l to 419.8 mg/l. Total dissolved solids varied from 146.0 mg/l to 598.0 mg/l. The water samples contain Calcium ranging from 21.6 to 119.8 mg/l, Fluoride ranging from 0.06 to 0.92 mg/l, Nitrate ranging from 0.29 to 3.62 mg/l, Iron ranging from 0.05 to 0.21, Sodium ranging from 10 to 47 mg/l, Potassium 3 to 15 mg/l, Conductivity 220.0 to 901.0 µS/cm, Chloride ranging from 25.78 to 184.91 mg/l, Alkalinity ranging from 76.50 to 260.1 mg/l, Magnesium ranging from 7.11 to 29.23 mg/l, Sulphate from 6.79 to 46.19 mg/l.

Ground water quality was also analyzed for Aluminum (DL 0.03), Boron (DL 0.20), Cyanide (DL 0.02), Phenolic Compounds (DL 0.001), Anionic Detergents as MBAS (DL 0.02), Chromium as Cr (DL 0.002), Hexa Chromium as $Cr^{+6}$ (DL 0.03), Zinc (DL 0.0005), Copper (DL 0.02), Manganese (DL 0.10), Cadmium (DL 0.002), Lead (DL 0.008), Phosphate as PO4 (DL 0.02), Arsenic (DL 0.002), Mercury (DL 0.001), Nickel (DL 0.005), Total Suspended Solid (DL 1.0) etc. and were found below detection limit.

**E. Soil Quality**

Soil samples were collected from 17 different specified locations within the study area. Based on the results obtained, it is evident that the soil samples have predominantly clay to Silty clay texture. The soil samples indicate pH value ranging from 6.09 to 7.21, conductivity (0.03 to 0.11 mS/cm), Chloride (577.66 to 1046.18 mg/kg), Sodium (58.84 to 109.67 mg/kg), Chromium (5.51 to 12.43 mg/kg), Lead (7.54 to 17.53 mg/kg), Copper (8.84 to 23.61 mg/kg), Organic Carbon (0.3 to 0.68 %), Water holding capacity (34.79 % to 44.51 %), and Organic Matter ranged from 0.52 % to 1.18 % in the soil samples. Nitrogen ranged from 197.21 to 311.68 kg/ha, Phosphorous from 9.35 to 27.29 kg/ha and Potassium was found to be ranging from 288.73 kg/ha to 1608.04 kg/ha. The micro and macro nutrients are available in good amount making the soil fertile i.e. Calcium (739.9 to 1481.75 mg/kg), Magnesium (217.03 to 677.42 mg/kg), Manganese (358.05 to 733.14 mg/kg), Zinc (7.72 to 20.38 mg/kg). The analysis of the results indicates that the soil in the study area have good amount of nutrient levels which promotes higher agricultural yields.

## 3.0 ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

**A. Ambient Air Environment**

The proposed mining project includes mining through opencast method and underground method. The mining operations generally result in generation of dust and gaseous pollutants and thereby pose health hazards.

Proper mitigation measures will be taken like controlled blasting, Permanent water sprinkling arrangements, wet drilling, covered conveyor belt and development of greenbelt/plantation to control the fugitive emission. Ambient Air Quality will be monitored regularly. Air quality impact

prediction has been carried out by AERMOD view 10.2.1 - Model. Detailed of the same along with the mitigation measures are given in Chapter-4 of the EIA/EMP Report.

**B. Water Environment**

**Ground water**

Total water requirement is 2692 KLD. Out of which domestic water requirement will be 73.14 KLD and 2,618.86 KLD water requirement will be met by mine sump water & treated water. Prior permission will be taken from competent authority before abstraction & dewatering. Application for NoC to abstract Ground water has been submitted to Central Ground Water Authority (CGWA) on 06.05.2025. The company will take all protective measures to mitigate and reduce the impacts on ground water.

**Surface Water**

Kelo River is flowing along the western boundary of the block and no opencast mining is proposed in the western part of the block. Hence the same will not be disturbed during any stage of mining.

One seasonal Nallah namely Koledega Nala (Length: ~1500 m) is flowing in the southern part of the block. The Nallah will be diverted in 15$^{th}$ along the southern boundary of the block with a 10 m wide channel subject to approval from Water Resources Department of the state of Chhattisgarh.

Adequate measures will be taken for protection of the Kelo river and Koledega nallah including Garland drains & Retaining walls proposed along the external dumps, thick Greenbelt will be developed all along the block boundary to prevent the erosion, Construction of Check dams to prevent any solids being carried out away by precipitation, top of dump as well as slope surface will be vegetated for stability. Regular monitoring of surface water quality will be carried out.

**C. Noise & Vibration**

OB removal will be undertaken by drilling-blasting by deploying shovel-dumper and coal winning by surface miner & payloader. Drilling with sharp drill bits to achieve optimum drilling performance and to reduce noise generation at source will be adopted. Personal protective equipment's i.e. earmuffs/ earplugs in drilling & in high noise area. Blasting will be carried out by use of non-electric detonators (NONEL) system. Advanced technology HEMMs will be deployed with adequate silencers in HEMMs will be provided to reduce generation of noise. Work place noise monitoring will be carried out quarterly. Vibrations and noise monitoring will be carried out regularly.

**D. Waste Generation and Management**

***Top Soil***

Over life of mine, total 67.84 Mbcm topsoil will be generated. Topsoil of average 5 m thickness will be dumped inside the pit area for 10 years. Afterwards, the generated topsoil will be used for reclamation. The topsoil dump will be rehandled after 10$^{th}$ year.

***OB/ Waste***

Over life of mine, total 2397.07 Mbcm waste will be generated. Initially, the OB/waste is proposed to be dumped in external dump which is proposed at western side of the pit. The waste quantity that is proposed to be accommodated in External dump within lease is 848.57 Mbcm (Excluding

the fly ash proposed to be dumped along with the waste) and 1548.50 Mbcm waste will be accommodated in internal dump. The inpit waste dumping is planned from 9th year. Entire waste generated from the pit will be handled by conventional shovel dumper system.

After 18th year, all the waste generated apart from topsoil is planned to be mixed with 25% of fly ash from Tamnar Power Plant & Dongamahua Power Plant (DCPP).

**E. Land Environment**

Total excavated area will be 1356.76 ha. Out of which 1261.260 ha area will be backfilled (Plantation on 1141.99 ha area and 119.27 ha Forest land will be returned after plantation) and 95.5 ha will be the area of water reservoir. 1032.73 ha will be covered under external dump, 22.322 ha area will be under safety zone, 2.202 ha under settling pond, 20.394 ha will be under road diversion, 93.051 ha will covered under road & infrastructure, 33.189 ha will be covered under garland drains, 0.547 ha will be covered under embankment, 37.185 ha will be covered under greenbelt and 421.620 ha area will be the undisturbed area/Mining right for UG.

**Table: 4**

**Post Mining Land Use Details**

| S. No | Description | Land Use (In Ha) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Plantation/ Re-grassing | Water Body | Public use/ company use | Land to be returned to Forest Department after plantation | Undisturbed | Total |
| 1. | Backfilled Area | 1141.99 | - | - | 119.27 | - | 1261.26 |
| | Excavated Void | - | 95.5 | - | | - | 95.5 |
| | Total Excavated Area | **1141.99** | **95.5** | **-** | **119.27** | **-** | **1356.76** |
| 2. | External dump | 1032.73 | - | - | - | - | 1032.73 |
| 3 | Safety zone | 22.322 | - | - | - | - | 22.322 |
| 4. | Road Diversion | - | - | 20.394 | - | - | 20.394 |
| 5. | Settling pond | 2.202 | - | - | - | - | 2.202 |
| 6. | Roads & Infrastructure | 65.311 | - | 27.74 | - | - | 93.0510 |
| 7. | Garland drains | 33.189 | - | - | - | - | 33.189 |
| 8. | Embankment | 0.547 | - | - | - | - | 0.547 |
| 9. | Greenbelt | 37.185 | - | - | - | - | 37.185 |
| 10. | Undisturbed/ Mining Right for UG | - | - | - | - | 421.62 | 421.62 |
| | **Total** | **2335.476** | **95.5** | **48.134** | **119.27** | **421.62** | **3020.00** |

***Source:*** *Approved Mining Plan with Mine Closure Plan*

**RESETTLEMENT & REHABILITATION ACTION PLAN**

The comprehensive entitlement framework for the proposed project is formulated including the best of the provisions of The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (LARR Act, 2013) as well as Chhattisgarh State R&R Policy. There are 14 villages within the allocated block area namely Aamgaon, Dhourabhatha, Libra, Jhikabahal, Telaipara, Bijna, Budhiya, Baghbadi, Mahloi, Raipara, Jharna, Khuruselenga, Samkera and Tangarghat.

Tentatively, habitation of 08 Villages falls within the proposed block (Baghbadi, Budhiya. Mahloi, Jharna, Raipara, Khuruslenga, Bijna, Aamgaon). However, few hutments/structures of

Dhourabhantha village and Telaipara also comes within the proposed mine site. Total no. of project affected families are 6213 tentatively identified. Same will be shifted according to R&R Policy after taking the prior approval from concerned authority.

Detailed R &R study has been undertaken to identify the impact of proposed coal mine project in compliance to the TOR issued by MOEF&CC, New Delhi vide letter no. IA-J-11015/6/2025-IA-II(M) dated 28/04/2025.

**F. Biological Environment**

A primary field survey was carried out within 10 km radius impact zone in and around the project area to study the floral and faunal diversity of the study area.

There are 18 protected and 11 reserve forests falling within the study area. There is no National Park, Wild Life Sanctuaries, Biosphere Reserves and Tiger Reserves etc. within 10 km radius of the mining lease area. However, Charmar-Jingol Elephant Corridor is present at ~6.4 km in WSW direction from the mine boundary.

Total 29 schedule - I species are found in the study area according to Wildlife Protection Act, 1972 as amended on 19$^{th}$ Dec., 2022. The list of Flora & Fauna has been submitted to District Forest Officer, Raigarh, Chhattisgarh on 29.04.2025.

Wildlife Conservation Plan for the Schedule I species has been prepared and submitted to forest department for further approval.

**G. ANALYSIS OF ALTERNATIVES (TECHNOLOGY & SITE)**

The mine site has been selected based on the occurrence of coal seams due to which Gare Palma Sector I Coal mine is site specific project. The mining operations will be carried out by fully mechanized opencast and underground mining method based on the thickness of seam, depth of occurrence, geological disturbances, gradient of seams, availability of land etc. Surface miner and shovel-dumper technology will be used for opencast mining and Bord & Pillar method with continuous miner will be used for underground mining. Jindal Power Ltd. is also exploring Underground Coal Gasification as a green initiative for extraction of energy from coal.

## 4.0 ENVIRONMENTAL MONITORING PROGRAMME

**Table - 5**
**Post Project Monitoring Programme**

| S. No. | Description | Frequency of Monitoring |
|---|---|---|
| 1. | Micro-Meteorological Data | Hourly |
| 2. | Ambient Air Quality Monitoring | Twice in a week & Continuous Online Monitoring |
| 3. | Personal Dust Monitoring & Free Silica Analysis/ Area dust sampling / statics dust sampling/ Fugitive dust | Monthly/ As per DGMS |
| 4. | Ground Water Quality & Level Monitoring | Quarterly & As per CGWA NOC condition |
| 5. | Surface Water Quality Monitoring | As per EC & CTO condition/any government guidelines |
| 6. | Ambient Noise Level Monitoring | Monthly & as per EC/CTO/ Continuous Hourly for 24 hrs. |
| 7. | Waste Water Inlet & Outlet –STP | Monthly |
| 8. | Mine Seepage Water | Monthly |
| 9. | Soil Quality Monitoring | Half Yearly |
| 10. | Medical Checkup of employees | 3 to 5 Year Interval |

| | | |
|---|---|---|
| | | ➢ Age of workers <45 years: After every 5 years<br>➢ Age of workers >45 years: After every 3 years |
| 11. | Digital Mapping/Drone Survey of ML Area | Once in 3 years as per IBM guidelines |

***Source:*** *M/s. Jindal Power Limited*

## 5.0 ADDITIONAL STUDIES

Additional Studies i.e. Hydrological Study and Hydro–Geological Study, Biological Study & Wild Life Conservation Plan, Rehabilitation and Resettlement Plan, Land Use & Land Cover Study, and Risk Assessment & Disaster Management Plan, Cumulative Impact Assessment study, Health Assessment study, Social Impact Assessment study, carrying capacity study, protection of ecology and post mining ecological restoration study with Biodiversity and Eco system services study, impact of underground mining on air quality, Blasting Impact Assessment Study, Impact Assessment of Mining on Agricultural Productivity & Developing Sustainable Agricultural Management Practices etc. are covered in EIA/EMP Report as per the Terms of References issued letter no File No: IA-J-11015/6/2025-IA-II(M) dated 28.04.2025.

## 6.0 PROJECT BENEFITS

The proposed project will generate employment opportunities directly as well as indirectly. Total manpower required will be around 2188 persons for mining operation. Skilled, Unskilled/ Semi-Skilled person will be employed and preference will be given to the local for employment as per their requirement & eligibility. The project activity will help in meeting the growing demand of coal & hence help in the economic growth of the country. The mine shall be contributing to the State and Central Govt. exchequer by way of mining revenue (Royalty, DMF, NMET & Premium tax). Proposed mine will result in growth of the surrounding areas by community development to be undertaken by the company.Overall, the socioeconomic region will benefit from the expansion of economic activity, the generation of new job possibilities, the improvement of infrastructure, and the provision of better healthcare and educational resources. Urbanization and accelerated economic activity may raise living standards and quality of life. The Livelihood and Skill development plan has been prepared by JPL to promote alternative livelihood options in agriculture, animal husbandry & entrepreneurship, support indigenous and tribal communities with specialized livelihood programs, implement welfare measures for economic resilience.

## 7.0 ENVIRONMENT MANAGEMENT PLAN

M/s Jindal Power Limited has a full-fledged Environmental Management Cell (EMC) for environmental monitoring and control. The roles and responsibilities of various personnel, who manage, perform and verify the activities having effect on environment and have been fixed by the Top Management. A group of qualify ed and efficient engineers with technicians are available for maintenance, up keeping and monitoring of mining machinery & equipment, to keep them in working mode at the best of their efficiencies.

## 8.0 CONCLUSION

The EIA/ EMP Report is prepared in compliance of ToR issued by MoEF&CC. Baseline data of land, air, water, noise, biological and socio-economic environment was duly assessed by conducting field

investigation as well as by having an access to the available secondary information. The prediction of impacts was identified & evaluated and EMP is suggested to mitigate the environmental concerns arising from the proposed project.

The project will prove beneficial to the local people as direct and indirect employment opportunity will be generated. There will be increase in revenue generation to the government by way of royalty, excise and government taxes etc. Further improvement in infrastructure will take place like education, roads, availability of drinking water, medical facilities in adjacent villages. There will be increase in earnings of local villagers, as they will get employment in the coal mine, which ultimately will result in better standard of living of the Villagers. There will be no significant pollution of air, water, soil and noise. Regular monitoring of all the components of environment will be done. Increased social welfare measures taken by the company will bring development in the near-by Villages.