EXECUTIVE SUMMARY

OF DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT AND ENVIRONMENT MANAGEMENT PLAN FOR

ANUPPUR ULTRA SUPER CRITICAL THERMAL POWER PLANT STAGE II (2X800 MW)

MB POWER (MADHYA PRADESH) LIMITED AT VILLAGE LAHARPUR, MURRA, GUWARI, BELIA & JAITHARI IN JAITHARI TEHSIL, ANUPPUR DISTRICT, MADHYA PRADESH.

Project Proponent

MB Power (Madhya Pradesh) Limited

a 100% subsidiary of Hindustan Powerprojects Private Limited (HPPPL)

HINDUSTAN POWER

Environment Consultant

Greencindia Consulting Pvt Ltd

Greencindia Consulting Private Limited

QCI-NABET Certificate No.- NABET/ EIA/2326/RA 0297 Valid up to 22.02.2026

February, 2025

EXECUTIVE SUMMARY

1.1 Introduction

MB Power (Madhya Pradesh) Limited (MBPMPL) is operating a 2x630 MW coal based sub-critical power plant on the left bank of Sone River near village Laharpur, Murra, Guwari, Belia & Jaithari in Anuppur district of Madhya Pradesh in an area of 417.996 hectares which is under possession of MBPMPL.

Initially MBPMPL planned to set up 2x600 MW subcritical power plant. Environment Clearance for 2x600 MW in the name of M/s Moser Baer Power & Infrastructure Ltd. was obtained vide letter no.-J-13012/99/2008-IA.II(T) dated 28.05.2010. Transfer of EC - From "M/s Moser Baer Power & Infrastructure Ltd.," to "M/s. MB Power (Madhya Pradesh) Ltd" vide letter no. J-13012/99/2008-IA.II(T) dated 23.11.2010. Forest clearance for 37.875 ha (93.6 acres) forest land coming under revenue forest land was obtained in two stages, Stage 1 vide letter no. 6MPCo51/2009-BHO/1032 dated 04.06.2010. and Stage 2 vide letter no. 6MPC051/2009-BHO/3598 dated 17.08.2011. Environment Clearance (Under clause 7(ii)(a)) - for 2 x 630 MW in the name of M/s MB Power (Madhya Pradesh) Ltd. vide letter no. J-13012/99/2008-IA.II(T) dated 07.05.2024.

1.2 Project Description

MB Power (Madhya Pradesh) Ltd is planning to expand the Anuppur Thermal Power Plant by adding 1600 MW (2x800 MW) of Ultra Super Critical Technology to the existing 1260 MW (2x630 MW) capacity within the current plant boundary in Village Laharpur, Murra, Guwari, Belia & Jethari in Jaithari Tehsil, Anuppur District, Madhya Pradesh. Total capacity after proposed expansion would be 2860 MW.

Capacity & Unit Configurations: Proposed expansion for State II- 1600 MW (2 X 800 MW) Ultra Super Critical Technology.

Regional and Locational Setting: MBPMPL's Anuppur - Thermal Power Project is located on the left bank of Sone River near village Laharpur, Murra, Guwari, Belia & Jethari in Anuppur district of Madhya Pradesh. The site is at a distance of about 20 km from Anuppur dist Head Quarter and is approachable from -NH 43 (Gulganj to Chaibasa) (~10.6 km in N direction). Shahdol town is about 47.6 km from the project.

Connectivity: The nearest Railway Station is Jaithari Railway station which is at an approx. distance of 2.6 km SE from the project site. The approximate distances from the nearest commercial airports to the site are 237 km from Jabalpur and 281 km from Raipur.

Land Requirement and Availability: A total of 451.202 Ha of land has been acquired to accommodate the MBPMPL's Anuppur Thermal Power Plant. Out of that, 417.996 hectares of land is within Plant boundary and has been utilized for Stage-I and some un-used area The Stage-II of the project will be accommodated within the existing Plant boundary and the remaining 33.206 hectares of land outside the plant boundary will be used for incoming railway line and green belt development for the Stage-II expansion.

Fuel Requirement: The annual coal requirement for Stage-I is estimated at 6.17 MTPA. The estimated coal requirement for Stage-II is approximately 7.36 MTPA.

Support Fuel: Light Diesel Oil (LDO) will be used for initial startup and as secondary fuel.

Fuel Transportation: Indigenous Coal to be transported through Railways. The secondary fuel shall be sourced from the refineries located nearer to the project by surface transportation.

Coal Handling System: Coal handling facility, which comprises receipt of coal through Rail, with on-line crushing and stacking by stacker-cum-reclaimer in the coal yard and finally feeding the bunker level conveyors.

Ash Disposal system: The ash produced by the project comprises 80% fly ash and 20% bottom ash. The fly ash handling system will include Compressors/ vacuum pumps, aeration blowers and heaters, intermediate surge hopper, air compressors and dryers, fly ash transmitter, all valves, piping, supports, platforms etc. The bottom ash shall be conveyed in lean slurry form from the slurry sump to the hydrobin or ash dyke. It is envisaged to have disposal system sized for 100% generation of ash.

The ash management scheme for fly ash and bottom ash involves dry collection of fly ash, supply of ash to entrepreneurs for utilisation, promoting ash utilisation and safe disposal of unused ash if any.

Water Requirement: The water requirement for Stage-I of the project is approximately 68,400 KLD. For the MBPMPL's Anuppur TPP Stage-II (2x800 MW) project, the water requirement is expected to be around 95,808 KLD.

Source of Water: The source of water for 2x800 MW expansion project is Son River. 36 MCM Water allocated by WRD vide letter ref: पत्र.क्र.वृ.प.नि.मं./31/तक/रा.स्त.-160/2008/589 dated 29/11/2024.

Power Generating Unit: MBPMPL's Anuppur TPP Stage-II will be a pulverized coal-fired thermal power project utilizing Ultra Super Critical boiler technology. The plan includes building and operating two units, each with a capacity of 800 MW.

Power Evacuation: The Stage-II generation switchyard shall be interconnected to Stage-I at 400 kV/756 kV level.

Project Time Frame: The schedule of commissioning of first unit is envisaged as 48 months from the NTP (Notice to Proceed) to EPC Contractor or the Main Plant (BTG Contractors) and second unit shall be commissioned within a gap of 6 months thereafter.

Project Cost

The estimated Cost of the proposed Expansion Project is Rs. 19,200 Crores.

1.3 Baseline Environment

Baseline environment data forms a part of the Environmental Impact Assessment study and helps to evaluate the predicted impacts on various environmental attributes and also required in preparing Environmental Management Plan (EMP) outlining the measures for improving the environment quality and scope of future expansions for environmentally sustainable development.

Study Area and Period: An area of 10km radius (aerial distance) from the boundary of the project area is the study area for the EIA Study. The project site is located at Villages Laharpur, Murra, Guwari, Belia & Jethari, Jethari Tehsil, District Anuppur in Madhya Pradesh District. The study period for baseline data collection was October to December, 2024.

Land use/ Land Cover Details: Land Use pattern of the study Area has been analyzed based on FCC, SOI Toposheet and the graphical projection. The buffer zone of the project site area is of total 45,479.37 ha among which agricultural area is 28299.62 Ha. (62.23%) total study area. The forest land 6197.95 Ha. (13.63%), Scrub land and vegetation is 6,641.78 (13.63%), barren land is 803.19 (1.77%), and plant area is 451.20 Ha. (0.99%) are also crucial land use characters of the study area. About 2.04% of the study area is covered by the water body which covers primarily rivers, channels, ponds and reservoirs. Built up area (1,803.04 Ha) of the study area is which is 3.96% of the total study area.

Physical Environment

- **Topography:** The elevation in the study area is observed to range from 604m to 396m above mean sea level with a general slope from east site to west side. Project site falls under area having elevation between 421m to 460m.
- **Drainage:** Two perennial rivers- Son River and Tipan Nadi are flowing from the study area. Son River is flowing from the East to North-West direction and is located at 4.7 km in the North East direction from the project site. Another River Tipan Nadi is flowing from South- East to North West direction and is located at 1 km distance from the project site. One of the tributaries of Son River, Kirnar Nala is flowing through the project site
- **Geology:** The lithology of the 10 km study area consists mostly of Shale, Sandstone, Clay, Conglomerate, Siltsone, Diamictite and Shale Conglomerate of Lower Gondwana Group of Late Carboniferous to Permian Age. Limestone, Sandstone Conglomerate of Meso-Proterozoic and Neo-Proterozoic age and Chhotanagpur Gneissic Complex of Proterozoic Age could also be found within the study area. The project site consists Majorly of Lower Gondwana Group and Chhotanagpur Gneissic complexes.
- **Geomorphology:** Buffer zone of 10 km radius from the project site comprises of Fine-Grained Sandstone, Granite Gneiss, and Sandstone with Coal. The geomorphology within the study area are majorly Pediment and Pediment-Pediplain complexes with scattered Gullied lands and lateral bars along the Son River, Tiupan River and Fohirari Nadi.
- **Hydrogeology:** Groundwater is the principal source of irrigation in the district and during pre-monsoon ground water were recorded in the level of 1.55mbgl to 15.86 mbgl, the same for the post monsoon season was recorded as 1.25 mbgl to 15.86 mbgl.

Vulnerability of Study Area:

- **Earthquake:** The district Anuppur has fall under Zone III: Moderate Damage Risk Zone. The project site falls in moderate damage risk zone.
- **Wind:** The project site falls in Moderate Damage Risk Zone -B(V= 39 m/s) of Wind Hazard zones.

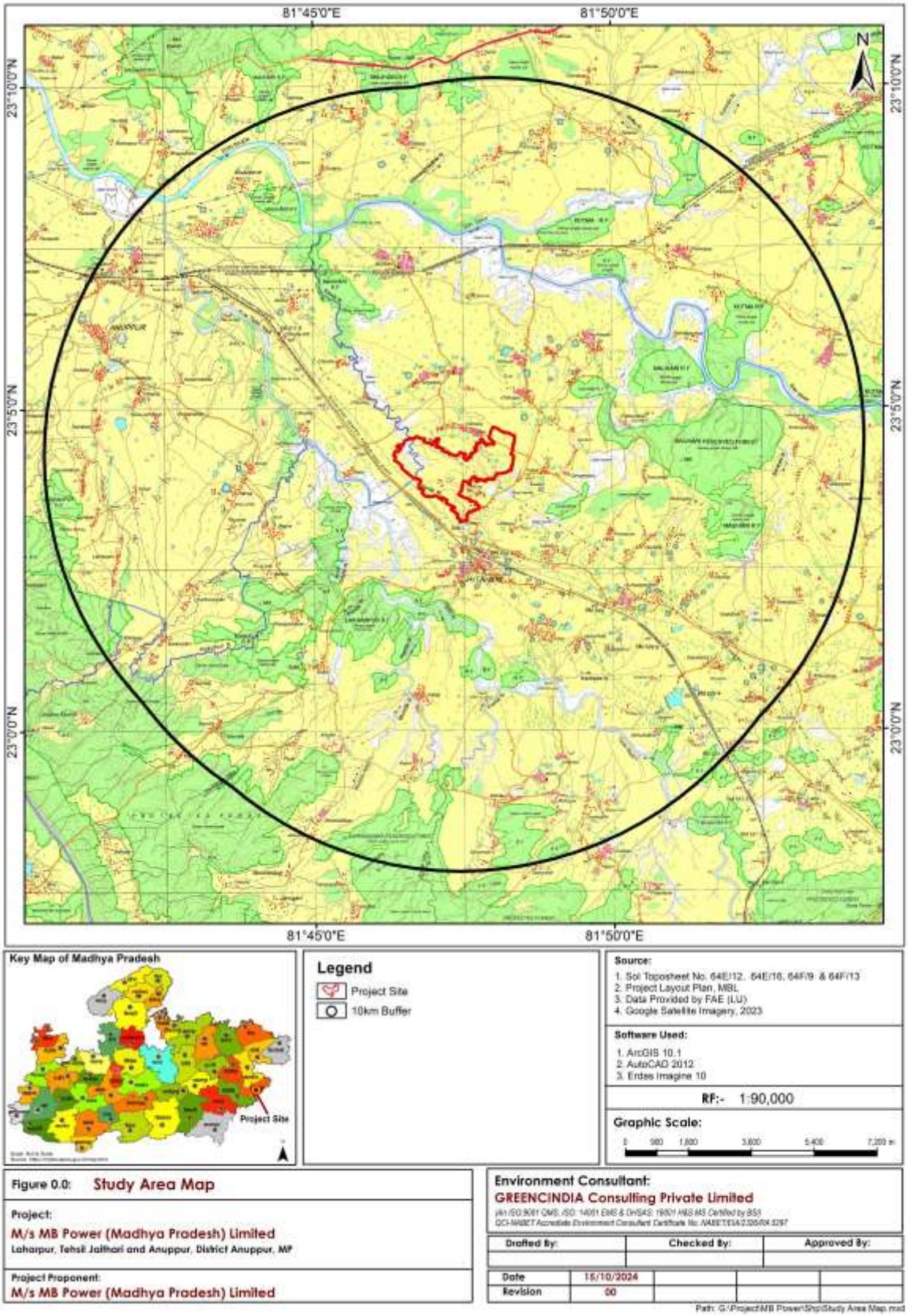

Figure 1: Study Area Map.

Soil Quality:

The NPK content was found to be satisfactory for growth of plants. Therefore, it can be concluded that the soil quality in terms of fertility is good for growth of vegetation in study area.

Climatology and Meteorology

Temperature of the study area is generally high during April to June. The maximum temperature was recorded in the month of May (40.31°C) & minimum temperature is recorded in the month of January (8.57°C). The annual rainfall is 1268.68mm. It rains 12 months and the intensity varies from 10 mm to 349.7 mm per month. The maximum annual rainfall is received during the months from June to September. Relative humidity is highest in July to December with average relative humidity of 80.3% The wind rose shows that the dominant directions of the wind flow throughout the year is WNW and during the post-monsoon the pre-dominant wind direction is from NNE.

Air Environment

The 98th percentile value of PM_{10} varies between 76.23µg/m^3 at AAQ7 to 52.44 µg/m^3 at AAQ5. The 98th percentile value of $PM_{2.5}$ varies between 42.04 µg/m^3 at AAQ1 to 23.59 µg/m^3 at AAQ5. The 98th percentile value of SO2 in the study area ranges from 16.66 μ g/m3 in AAQ6 to 9.43 μ g/m3 in AAQ5. The 98th percentile of NO_2 varies between 19.86 µg/m^3 at AAQ1 to 13.53 µg/m^3 at AAQ5. The CO in the study area varies from 1.10 mg/m^3 at AAQ1 to 0.20 mg/m^3 at AAQ10. The values recorded were below the prescribed standard of NAAQ. Ammonia, Lead, Nikel and Mercury was below detection limit at all locations.

Noise Environment:

The day time noise levels showed maximum 62.4 dB(A) at (N1) Project Site to minimum 51.4 dB(A) at (N3) Jaithari. It is observed that the day time noise levels are high at (N7) Anuppur because of high anthropogenic activity.

The night time noise levels showed maximum 53.1 dB(A) at N1 Project Site and minimum 42.2 dB(A) at Anjani. In study area during night time all locations observed noise value under prescribed limits for all zones except for Anuppur.

Water Environment:

- **Surface Water Quality**

pH of the study area varied from 6.811 (SW10) in month of May to 7.714 (SW 01) in the Post Monsoon season, which is neutral to slightly alkaline in nature. TDS was observed in the range of 98.02 mg/l at SW05 to max. 481 mg/l at SW01 in the post monsoon season. Analysis of total suspended solids was observed 1.4 mg/l to 5.11mg/l. Conductivity of water samples indicated non saline in nature it was varied between 150.8 µS/cm at SW05 to 740 µS/cm at SW2 in the monitoring period. Both Nitrate and fluoride were under limit in post-monsoon season i.e. October to December, 2024. Dissolved oxygen was recorded sufficient in the study area i.e min 6.5 mg/l (SW08) to max. 7 mg/l (SW09). BOD in surface water found high which is varied between <2 mg/l in SW04 to 6.2 mg/l in SW08 during Post monsoon months. The maximum alkalinity of water bodies samples was found to range

between 56.8-255.72 mg/l in the study area. The minimum chloride concentration (10.6 mg/l) was found at SW07 and the maximum (54.07 mg/l) was recorded at SW02 during the post monsoon season. The level of fluoride ranged between 0.22 mg/l at SW1 in April to 0.35 mg/l at SW4 in April and were found to be within the tolerance limit of surface water. The nitrate in surface water ranged between 3.26 mg/l at SW05 to 15.6 mg/l at SW02

- **Ground Water Quality**

The pH value of ground water samples varied from 6.78 to 7.54. Electrical conductivity of ground water ranged between 535 µS/cm to 88o µS/cm during the study period. All the samples are within the permissible limits. The maximum total hardness of ground water was found to be 296.2 mg/l in sample at GW5 in the post monsoon period and the minimum was observed as 132.1 mg/l in the sample at GW. The range of Ca2+and Mg2+ are also remaining within the acceptable limits 27.58-74.42 mg/l and 15.36-26.8 mg/l respectively. The alkalinity of Hand pump water was found to be 313.58 mg/l at GW02 and the minimum was observed as 186.72 mg/l at GW03 during the monitoring period. The maximum chloride concentration 80.1 mg/l was found at GW06 and the minimum 32.04 mg/l was recorded at GW03. The samples were compared with the BIS standard and all the samples were within the acceptable limit of 250 mg/l. The minimum level of fluoride 0.18 mg/l was found in GW05 and the maximum value 0.31 mg/l was found at GW07. All samples were within permissible limits of 1.5 mg/l. The concentration of nitrate in ground water samples ranged from 2.26 mg/l at GW02 to 10.2 mg/l at GW05. All the samples were compared with the BIS standard and found within the acceptable limit of 45 mg/l. Zinc concentration in the ground water samples were within the acceptable limit of 5 mg/l prescribed by BIS. Other heavy metals like arsenic, cadmium, chromium, copper, lead and selenium were recorded below detection limit.

Traffic Scenario: The results of the survey, the existing passenger car unit (PCU) of each location were compared with the capacity of each type of road as suggested by Indian Road Congress thus determining the existing Level of Service (LoS) for each location. The existing conditions shows A Level of service at Pendra Road which represents a condition of free flow

Terrestrial Ecological Survey and Biodiversity Study:

- **Forest type:** As per the Champion and Seth classification (1968) Anuppur lies in the Tropical Dry Decious Forest and Tropical Moist Deciduous Forest.
- **Floral Study:** In the study region, During the survey, an inventory of the various plant groups discovered in the study region was created. 19 Near Threatened species, 24 vulnerable species, 7 Endangered species & 2 Critically Endangered species were identified in the study area. In the research region, 192 species of flora were identified. Out of which 85 species of trees and small trees,19 species of Grasses, 29 species of Climbers, 24 species of Shrubs & 36 species of Herbs have been recorded in the study area based on primary observation as well as based on information collected from the secondary data.
- **Faunal Study:** No Schedule-I species were found during the field survey within 10 km radius of the plant site. A number of faunal terrestrial species comprising mammals, avi fauna, reptiles, Amphibians & fishes were recorded from the study area. Among fauna, 12 species of mammals,

73 species of avi fauna, 3 species of reptiles, 3 species of amphibians & 18 species of fishes were recorded from the study area. 1 Near Threatened species & 1 vulnerable species were identified in the study area.

- **Aquatic Ecology:** The aquatic ecology of Anuppur, is characterized by its river systems, especially the Tipan River and Son River and several ponds and wetlands. Studies indicate that the water quality is affected by both natural and anthropogenic factors, including contamination from industrial and agricultural activities. The region's groundwater, heavily relied upon for irrigation and drinking, faces quality issues due to contamination. Additionally, the area is rich in aquatic biodiversity, supporting various fish species and aquatic plants.
- **Wetland Ecology:** As per the Interactive Wetland Map available on Wetlands of India Portal, within the 10km radius of the project site no Ramsar Wetland or significant wetland located, however, two wetlands belonging to other categories namely Dulha Talab and Samtapur Talab are within 10km radius.

Social Environment

There are 72 villages and two Census towns in the study area. These villages have total population of 1,03,195 (in 2001) & 1,23,189 (in 2011). The average household size in the study area was found to have reduced from 4.93 in 2001 to 4.45 in 2011.

- **Vulnerable Group:** As of the 2011 census, the study area encompasses a Scheduled Caste population of approximately 7.76% and a Scheduled Tribe population of 38.20%.
- **Literacy Rate:** The female literacy rate of the study area has increased with time (35% in 2001 & 49% in 2011), whereas the male literacy rate which was 59% in 2001 have increased to 67% in 2011. Which are significantly lower than the national (74%, 82.14% for male and 65.46% for female) and the state (78.73% for male and 59.24% for female) literacy rate.
- **Occupational Structure:** As per the District Census Handbook, Anuppur, the villages around the study area, people mainly earn from agriculture and animal rearing. The percentage of non-workers is high (>50%) in the study area as compared to the total workers. It can also be seen that the percentage of workers have increased marginally from 2001 to 2011.

Infrastructure

- **Educational Facilities:** There is a total of 129 Primary Schools, 49 Middle Schools, 14 Secondary School and 5 Senior Secondary Schools in the study area as per Census 2011. It can be seen that there has been a substantial increase in the number of middle and secondary schools over the 10 years in the study area. This is a very healthy sign which is reflected in the increase of literacy rate of the area.
- **Banking and Post Office Facilities:** Number of banking infrastructures like Cooperative banks have increased whereas infrastructure like Post offices (from 11 in 2001 to 4), Commercial Bank (from 1 to 0) and Agricultural Society (from 4 to 3) have decreased in 2011.
- **Drinking water facilities:** One of the most important factors responsible for the emergence of a settlement is availability of water. Many water sources such as wells, hand pumps, tanks, etc. are available in rural areas. In the villages under study, the main source of water is tap water, well, followed by hand pump and service reservoirs.

- **Health Facility:** The healthcare facilities present in the study area did not have any significant improvement except for the increase in number of primary health sub-centers. Mother and Child Welfare Centers have reduced significantly. Overall, Health Care facilities are poor compared to the population it serves.

1.4 Impacts Assessment & Mitigation Measures

Possible environmental impacts on various features such as air quality, noise level, water use and quality, land-use, ecological status, soil quality and socioeconomic factors are evaluated and appropriate mitigation measures are proposed both for construction phase and operation phase.

Ambient Air: During construction site preparation, transportation and storage of construction material/ equipment, civil construction activities, mechanical and electrical erection activities and transportation and disposal of construction debris will have an adverse impact on ambient air quality of the area. The same for the operation phase are caused by plant operation, unloading and storage of coal, coal combustion, water withdrawal and treatment and ash handling. For mitigation of the impacts necessary dust suppression measures like water sprinkling using road tanker will be deployed, suitable surface treatment to the roads and regular sprinkling of water shall be provided, proper periodical tuning and maintenance of vehicles are recommended.

Water Resources: Impact on water resources during construction phase will be caused during site preparation, influx of labour and construction of temporary houses and transportation and disposal of construction debris. Where as water quality will be affected due to transportation and storage of construction material/equipment, civil construction activities, mechanical and electrical erection activities, and transportation and disposal of debris. During operation phase, water quality will be affected by plant operation, unloading and storage of coal, water withdrawal and treatment, ash handling and disposal and storage of Gypsum. The mitigation measures suggested includes directing wash offs to a sedimentation basin before discharge, storage of fuel oil, lubricants, grease etc in closed containers and proper drainage and disposal of wastewater

Ambient Noise: During construction site preparation, transportation and storage of construction material and equipment, civil construction activity, mechanical and electrical erection activities and transportation and disposal of construction debris will disturb the ambient noise environment. During operation phase unloading and storing of raw material will disturb the noise environment. For mitigating the impacts any machinery or equipment generating excessive noise levels will be taken out for maintenance, use of proper personal protective equipment will be encouraged, well-tuned vehicles will be used and loud noise will be checked every day, D.G set to be used during construction phase shall be provided with acoustic enclosure to reduce noise disturbances.

Soil Quality: Transportation related activities during construction phase including raw materials and construction debris and during operation phase coal combustion, ash handling and disposal and storage of Gypsum will adversely impact the soil quality. To mitigate the impacts it is recommended that the truck movement shall be carried out through existing roads, trucks shall be covered with tarpaulin and overloading shall be avoided and appropriate soil conservation measures associated with improved construction techniques should be implemented.

Ecology: Fugitive dust deposition during construction may lead to temporary reduction of photosynthesis in nearby flora. The runoff from construction area may lead to a short-term increase in suspended solids and decrease in DO near the discharge point in receiving waterbody. For mitigation of those impacts measures like sprinkling water in dust-generating areas, green belt development and channelizing stormwater runoff though sedimentation basin are to be implemented.

Traffic: After the proposed expansion, there will be increase in number of vehicles. It is considered that 100% of the additional traffic shall travel through the selected locations. In that scenario the level of service will remain LOS A of free flow condition for the Pendra Road.

1.5 Analysis of Alternative Technologies

Site Alternative: No alternative site is explored for this expansion.

Technology Adopted

Super Critical and Ultra-Super Critical Boiler: Super critical and ultra-super critical boilers' ability to operate at much higher pressures and temperatures than subcritical boilers translate into noticeably better efficiency rating. Improved plant efficiency also translates into reduced emissions, particularly CO and Mercury.

For all fossil fuel-fired plants, fuel represents the largest operating cost. By reducing the amount of fuel needed to yield the requisite energy, supercritical plants make a noticeable dent in bottom lines when compared to subcritical plants.

Summary of Advantages of Ultra Super Critical Thermal Power Plant:

- Improve thermal efficiency attainable.
- Reduce fuel cost.
- Reduction of CO_2 emission by as much as 15% per unit of electricity generated compared to typical sub-critical units. This may help in meeting country's GHG Reduction target.
- Very good part load efficiency.
- Very low emissions of NOx, SO_2 and PM achievable using modern flue gas clean-up equipment.
- Initial investment requirement marginally higher than super critical technology and less than other clean coal technology. This, however, depends on the unit size considered.

1.6 Environmental Monitoring Programme

The environmental monitoring program encompasses the location, duration, frequency of the parameters that have to be monitored. Monitoring of environmental components during the construction and operation phase is a part and parcel of the environmental mitigation measures. Only frequent monitoring can assess the functioning and efficiency of all pollution control equipment. Data generated from monitoring and analysis of the samples will be compared with the prescribed/stipulated limits. If any parameter is not found within the prescribed/stipulated limit appropriate control measures will be taken to satisfy the limit. A report will be prepared and submitted to the regional offices of SPCB/CPCB and other concern authority of MoEF&CC for their further assessment. Reporting and Monitoring Systems for various stages have been proposed to ensure timely and effective implementation of the Monitoring Plan.

Environmental Monitoring Cost: Total environmental monitoring cost during construction phase (recurring) is 3,68,000 and the same during operation phase is 17,18,000.

1.7 Additional Studies

MBPMPL, Anuppur is carrying out additional studies of Public Consultation, Risk Assessment, Social Impact Assessment and Rehabilitation and Resettlement Action plan as suggested in EIA Notification 2006.

Public Hearing & Consultation: As per the conditions of the granted ToR and the EIA Notification 2006 & its subsequent amendments, public consultation will be held for the project based on this draft EIA&EMP report.

Hydrology & Hydrogeology Study: A hydrology and Hydrogeological study was conducted in the study are to assess the ground water dynamics, water quality, soil characteristics for ground water recharge potential and to identify potential impacts on ground water due to the project. Action plan for implementation recommended mitigation measures were also furnished.

Biodiversity Study: Biodiversity analysis of the surrounding area was conducted to assess the Floral and Faunal diversity of the area and potential impact of the proposed project on the ecological environment and to recommend mitigation measures.

Watershed Development Plan: Watershed development plan was furnished to identify the watersheds that might have inverse impact due to the project and to recommend measures for slope stabilisation, check dams and other irrigation measures for development of the surrounding watershed.

GHG Inventory Study: A GHG inventory was created for the existing 2x630 MW Thermal Power Plant along with recommendation and action plan to reduce emissions.

Need based Social Impact Assessment: A Need Based SIA was carried out in the village falling within the 10 km study area to determine the infrastructure and services that were prioritized by the residents. Special focus was given for the Tribal villages and needs. Along with the study proposals were also furnished for inclusion in the CSR programmes.

Risk Assessment: Risks present in a thermal power plant operation mostly arises due to involvement of hazards like High pressure super-heater, re-heaters, economizer units exchanging heat with the hot flue gases, Turbines utilizing HP steam, Fuel oil storage and handling units, Coal handling units, Hydrogen as coolant in turbo generators drawn from hydrogen cylinders, Chlorine as water treatment chemical drawn from cylinders and Switchyard including transformers, isolators etc.

Hazard Identification: Hazard identification includes **Component-1:** Identification of contaminants being released which are hazardous. Estimation of probability of an expected event and its consequences form the basis of quantification of risk in terms of damage to property, environment, or personal. Therefore, the type, quantity, location, and conditions of release of a toxic or flammable substance have to be identified in order to estimate its damaging effects, the area involved, and the possible precautionary measures required to be taken.; **Component-2:** Estimation of the amounts of contaminants released from all sources or the source of concern. Fuel oils (LDO/HFO/HSD) will be used in small quantity for initial start-up. Chlorine and other chemicals are used in the makeup water treatment & DM Plant. The hazards associated with the use of these materials would be taken careful

consideration and due precaution would be taken for its safe handling at various stages of usage.; **Component-3:** Estimation of the concentration of contaminants through Preliminary Hazard Analysis considering i) Spillage of chemicals while handling and ii) Leakage of chlorine.

Disaster Management Plan: Anuppur STPP has already implemented a Disaster Management Plan for existing unit. New units shall also be included in the same plan. Emergency preparedness planning is divided in two subsections:

- **Onsite Disaster Management Plan:** The Onsite Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operation in this same order of priorities. The important elements in the DMP suggested for emergency planning are- Reliable and early detection of an emergency and careful planning, Command, co-ordination, and response organisation structure along with efficient trained personnel, availability of resource for handling emergencies, appropriate emergency response actions, effective notification and communication facilities, regular review and updating of the EMP and proper training of the concern personnel.

  The management plan will include a sequence of action in order to handle disaster/emergency situations, with organizational chart entrusting responsibility to various plant personnel with their specific roles. Infrastructures & operational systems should be provided to meet emergencies. Assembly points, evacuation path should be marked. Different types of alarms to differentiate types of emergencies should be provided along with warning system and control, emergency services and fire protection systems.

- **Off-site Disaster Management Plan:** Under the Environmental Protection Act 1986, the responsibility of preparation of Off-site Emergency Plan lies with the State Government. The Collector/ Deputy Collector are ordinarily nominated by State Government to prepare Off-site Emergency Plan.

Occupational Health and Safety Management Plan: Large industries, in general, and power plants in particular where multi-functional activities are involved during construction, erection, testing, commissioning, operation and maintenance, occupational health needs attention during all phases. However, the problem varies both in magnitude and variety in the above phases.

Assessment of Endemic Diseases of Environmental origin: Jaundice, measles and malaria are the endemic diseases in the region which occurs due to lack of hygiene and health facilities. District Health Department is a nodal agency to prevent the occurrence of diseases of environment origin. During construction of project, community toilets and sanitation facilities will be provided in labour colony so that stagnation of wastewater can be prevented. The following activities are being undertaken by MBPMPL to maintain sanitation & hygiene.

Corporate Social Responsibility: MBPMPL is committed to develop the surrounding area in a well-coordinated and balanced manner while safeguarding the environmental and social aspects under its CSR programme. Wherever possible, MBPMPL shall provide infrastructure to help set up local schools, centres for primary learning and education, and repair/construction of primary schools in neighbouring villages. MBPMPL is committed to inclusive development and will further strengthen

its activities for improvement in education, sanitation and health, livelihood, rural infrastructure and rural sports.

The company has contributed substantially to the overall economy and social development of the area through CSR activities. The same will be continued in future, in addition to the social developmental activities for proposed expansion project. The operation zone of the social developmental activities for the proposed expansion project will be extended to the nearby villages of plant site.

The CSR Projects have been carried out in the area to align with the Sustainable Development Goal covering each segment and domain of the society which includes broadly the area of Education & Training, Livelihoods, Infrastructure & Development, Sports & Culture, Horticulture, Health & Sanitation.

A total amount of **Rs 8.83 Crore** has been incurred on CSR activities since inception till 2022-23.

1.8 Project Benefits

Hindustan Thermalprojects Limited, the thermal arm of Hindustan Power through its Special Purpose Vehicle ("SPV"), MB Power (Madhya Pradesh) Limited ("**MBPMPL**"), developed in 2 phases 1260 MW (2 X 630) coal-based generating capacity unit 1 in 2015 and unit 2 in 2016 at District Anuppur, Madhya Pradesh. The project benefits include-

- Improvement in infrastructure and community development.
- Improvement in Social infrastructure
- Direct & indirect employment opportunity
- Revenue generation to central & state government.
- Allocation of project cost towards the CSR activities.
- Trickledown effect of enhance profitability to the local populace
- Skill development and capacity building like vocational training, income generation programmes and entrepreneurship development program
- Awareness programme and community activities, like health camps, medical aides, family welfare camps, sanitization/ cleanliness awareness programme, immunization camp, sports & cultural activities, plantation, etc.
- Awareness about water borne diseases and pandemic diseases etc. will be done to local villagers.

Improvement in Physical Infrastructure & Community Development: Establishment of large developmental projects improve the availability of the physical infrastructure (like approach roads, drainage, communication and transportation facilities etc.) and social infrastructures (like education and health care system). These will also benefit the local population.

The power generated from this plant will benefit to large extent leading to industrial/ commercial development in the state of Madhya Pradesh and also in the country.

Improvement in Social Infrastructure: Implementing the proposed project is expected to have a favourable impact on existing infrastructure, creating conditions conducive to urban development in

the region. Company will employ additional workers, supervisors and engineers available locally to the extent possible. Necessary medical facility will upgrade under CSR activities/ programs which will be beneficial to locals residing in the study area as per Companies Act.

Employment potential: Employees required for the proposed project are estimated to be around 450 nos through direct employment which would exist mainly with the contractors and sub-contractors along will unskilled people would be satisfied from the local population, depending on availability and feasibility. In addition to the direct employment opportunities, there will be indirect employment opportunities of local people in different sectors like horticulture, travel services, housekeeping and painting etc. During operation phase, there will be employment opportunities, mainly in service sector.

1.9 Cost Benefit Analysis.

The impact of the project was evaluated as per the current values in monetary terms. Most of the impacts were on the Air environment, as per MoEF&CC OM. No. 19-125/2019-Ia.III dated 05.03.2020 the monetary equivalence of the emissions was evaluated to be 21.49 crore. The water, noise, solid waste, ecology, social and land environments were not adversely impacted due to the mitigation measures.

Evaluating the benefits of the project including ecological benefit of the green belt, benefit to social environment through generation of electricity, benefit to economy through employment was a total of 789.39 crore.

The cost benefit ratio for the project was evaluated to be 1:36.7. The cost benefit analysis for the proposed MBPMPL's Anuppur TPP Stage- II (2x800 MW) indicates in favour of the project. The financial expenditure incurred in preventing, containing, mitigation or removing environmental contaminations occurring as a result of the proposed project activity will further add to the environmental benefit.

1.10 Environment Monitoring Plan

EMP Implementation, Inspection and Monitoring: This covers description of the administrative aspects of ensuring that mitigative measures are implemented and their effectiveness monitored, after approval of the EIA/ EMP report and grant of Environmental Clearance (EC). The assessment of environmental impacts and mitigation measures have been identified for effective operation of environmental management activities in the pre-construction, construction, commissioning and operation & maintenance (O&M) activities.

Components of EMP: Environmental Management Plan comprises of the components of i) Institutional Arrangements; ii) Monitoring Programme/ plan; iii) Environmental Enhancement Measures; and iv) Social Enhancement Measures.

Institutional Arrangements: An Environmental Management Cell (EMC) is envisaged which is responsible for monitoring EMP and its implementation. Environment management is the responsibility of the environment management cell headed by the Head – HSE and comprising of Head Environment, Engineers, Safety Officer, Chemists etc. Head HSE is directly reporting to the CEO/ Plant Head of the organization. Plant Head is responsible for environment management activities for the organization. The company has well established compliance management system. A separate legal team available for the same.

Operation and Maintenance Group: O&M team head would have primary responsibility for the operation & maintenance of the power station. MBPMPL Anuppur has Operation & Maintenance Group Management Organization headed by a GM (O&M) and is assisted by a team of managers & engineer. This O&M Group Organization will take up additional responsibility of operations, maintenance and monitoring of pollution control equipment/system related to proposed Ultra Super Critical Thermal Power Plant. O&M team is expected to comprise four broad functional areas viz. operations, maintenance, engineering, support service and administration.

Occupational Safety: In power plant, primary safety hazards include burns, slips, falls, fire and explosions. Electrical hazards and the risk of electrocution are significant due to high voltage in electrical lines. To prevent and reduce accidents safety measures including spatial measures, insulation, guard rails, shield guards, grounding of electrical equipment, protective measures, mock drills and regular safety awareness programs and training will be conducted for all workers.

Ash Utilisation Plan: 100% Ash will be utilised in Cement Industries, reclamation of abandoned mines and low lying areas, manufacturing of bricks and road construction.

Fly ash will be collected in dry form in silos for subsequent utilization or transportation via rail wagons or bulk trucks to nearby cement plants. The existing Anuppur STPP Stage-I (2x630 MW) has already achieved 100% ash utilization from last six years. Moving forward, all ash will be fully utilized in cement manufacturing, reclamation of abandoned mines, brick production, road construction, and as an aggregate replacement in concrete, in compliance with the Fly Ash Notification of December 31, 2021. For any unutilized ash, provisions will be in place to dispose of it in high-concentration slurry form to the ash dyke. Ash Generation and Utilization Data of Stage-I from 2018-19, 2019-20, 2020-21, 2021-22, 2022-23 and 2023-24 in table below-

Table 1: Ash Utilization till 2024

FLY ASH UTILIZATION			
Period	**Total Ash generation (MT)**	**Total Ash Utilization (MT)**	**% Utilization**
2018-19	1577875.30	1635958.00	103.68
2019-20	1552755.00	1598765.00	102.96
2020-21	1540524.00	1751594.64	113.7
2021-22	2184816.659	2189356.102	100.21
2022-23	2117475.21	2155390.612	101.79
2023-24	2295675.29	2311283.00	100.7
Total	11269121.46	11642347.35	103.84
Total Ash in Ash Pond as on 31-03-2024		**73445.40**	

As per MoEF&CC Fly Ash Notification on dated 31.12.2021, starting w.e.f. April 2022, all TPPs to utilise 100% current ash (fly ash and bottom ash) generated during that year with minimum utilization of 80% every year in 03-year cycle while achieving average 100% AU in each 03-year cycle. However, there is relaxation of two years for Plants with Ash utilization below 60 % in FY 2021-22.
Since Ash utilization in Financial Year 2021-22 was 100 %, 03-year cycle shall start from April 2024. So accordingly, Ash Utilization Plan For MOEF&CC 3-Compliance Cycle (from FY 2023-24 to FY 2032-33) is given below.

Table 2: Ash Utilization Plan till 2034-35.

Ash Management Plan upto 10 years																				
Year	**2025-26**		**2026-27**		**2027-28**		**2028-29**		**2029-30**		**2030-31**		**2031-32**		**2032-33**		**2033-34**		**2034-35**	
Capacity (MW)	1250		1250		1250		1250		1250		2850		2850		2850		2850		2850	
Coal Fired (MT)	6132000		6132000		6132000		6132000		6132000		13980960		13980960		13980960		13980960		13980960	
Description	**Quantity**		**Quantity**		**Quantity**		**Quantity**		**Quantity**		**Quantity**		**Quantity**		**Quantity**		**Quantity**		**Quantity**	
	MT	**% age**	**MT**	**% age**	**MT**	**% age**	**MT**	**% age**	**MT**	**% age**	**MT**	**% age**	**MT**	**% age**	**MT**	**% age**	**MT**	**% age**	**MT**	**% age**
Ash Generation	2452800		2452800		2452800		2452800		2452800		5592384		5592384		5592384		5592384		5592384	
Abandoned Mines	1387000	56.55%	730000	29.76%	730000	29.76%	730000	29.76%	730000	29.76%	1898000	33.94%	1898000	33.94%	1898000	33.94%	1898000	33.94%	1898000	33.94%
Low Lying areas	329750.5	13.44%	69350	2.83%	69350	2.83%	69350	2.83%	69350	2.83%	365000	6.53%	365000	6.53%	365000	6.53%	365000	6.53%	365000	6.53%
By Road to Cement Plant	365000	14.88%	182500	7.44%	182500	7.44%	182500	7.44%	182500	7.44%	365000	6.53%	365000	6.53%	365000	6.53%	365000	6.53%	365000	6.53%
By Rake to Cement Plant	360000	14.68%	1460000	59.52%	1460000	59.52%	1460000	59.52%	1460000	59.52%	2920000	52.21%	2920000	52.21%	2920000	52.21%	2920000	52.21%	2920000	52.21%
Brick Plant	11049.65	0.45%	10950	0.45%	10950	0.45%	10950	0.45%	10950	0.45%	44384	0.79%	44384	0.79%	44384	0.79%	44384	0.79%	44384	0.79%
Ash Utilization	**2452800**	**100.00%**	**2452800**	**100.00%**	**2452800**	**100.00%**	**2452800**	**100.00%**	**2452800**	**100.00%**	**5592384**	**100.00%**	**5592384**	**100.00%**	**5592384**	**100.00%**	**5592384**	**100.00%**	**5592384**	**100.00%**

Environment Enhancement Measures:

- Soal Power Harnessing: For harnessing solar power, rooftop solar PV, solar street lights will be provided.
- **Tubular Daylight Devices (TDDs):** Tubular daylighting devices are a versatile alternative to traditional skylights because they can be used to provide light to areas that are not in a direct line of sight with the sun. Tubular daylighting devices (TDDs) utilize a rooftop dome to harness sunlight, which is then directed through a reflective tube. TDDs are more effective than traditional skylights or windows because of the reflective tubing, delivering maximum daylight with minimal heat transfer.
- **Greenbelt:** Out of the total area for the Existing plant of 417.996 Ha, greenbelt encompasses 110.33 Ha, accounting for 26.4% of the project area. Density of 2500 trees/ha will be maintained. A total of more than 2 lakh trees have been already planted within the plant premises. Further, -45.991 Ha land is proposed to be developed as greenbelt & plantation inside and outside MBPMPL premises. The greenbelt shall have 3-tier plantation as per the CPCB guidelines with re-densification & strengthening of existing greenbelt. Details of tree plantation in Stage-I is given in Table 3 and green belt development plan for Stage-II is given in Table 4.

Table 3: Tree Plantation from 2014-15 to 2023-24.

Period	Plantation inside plant premises, Nos	Plantation outside plant premises, Nos	Total trees planted, Nos
2015-16	128952	250	129202
2016-17	25893	0	25893
2017-18	21905	100	22005
2018-19	17413	0	17413
2019-20	13748	0	13748
2020-21	14944	1200	16144
2021-22	16290	0	16290
2022-23	20014	2000	22014
2023-24	10402	1500	11902
Township area (2015-23)	3439	0	3439
2024-25*	8700	600	9300
Total	**281700**	**5650**	**287350**

Approximate cost incurred toward plantation is Rs. 5 Cr. (till 2023-24)
**Plantation work for FY 2024-25 is in progress.*

Table 4: Five-year plan for developing Green-belt.

Months-	1	2	3	4	5	6	7	8	9	10	11	12	
Year 1	Site Preparation of Patch 1												
		Plantation											
				Maintenance Phase I (Watering, Mulching, Weeding)									Maintenance Phase 2 Pest management, monitoring)
Year 2	Site Preparation of Patch 2												
		Plantation											
				Maintenance Phase I (Watering, Mulching, Weeding)									
Year 3	Site Preparation of Patch 3												
		Plantation											
				Maintenance Phase I (Watering, Mulching, Weeding)									
											Replacement of non-survival plants		
Year 4	Continued Maintenance Phase 2 Pest management, monitoring) for Patch 2 and 3												
Year 5	Replacement of non-survival plants												
	Continued Maintenance Phase 2 Pest management, monitoring) for Patch 2 and 3												

- **Rainwater Harvesting:** The rainwater available for harvesting is calculated 17,37,480 m3 or 1.7 MCM per annum. There is no extraction of groundwater for project. Provision is made for rainwater harvesting to collect stormwater from roof top, road/paved areas, greenbelt and open areas.

Social Enhancement Measures:

- **Training:** Management will be responsible to instruct employees in proper use of all equipment operated, safe lifting practices, location and handling of fire extinguishers, and use of personal protective equipment and overall education and training in good safety practices.
- **Welfare Activities & Facilities for Employees:** In addition to the plants & equipment for the generation of power facilities like construction offices and stores, time and security offices, first aid and fire-fighting station, canteen, parking, training stations, toilets and restrooms shall also be adequately furnished and equipped. The work atmosphere will be monitored for SPM, SO_2, and NO_x etc. to avoid excessive exposure.
- **Cost of Environment Management Measure:** A cost provision of Rs. 3,067.6 crores towards providing environmental measures have been earmarked and the recurring cost (Operations & Management will be about Rs. 72.22 Crore per annum).

1.11 Cost of Environmental Management Measures

A capital cost provision of **Rs. 3,067.6 Crores** towards environmental protection measures/EMP and the recurring cost of **Rs. 72.22 Crores per annum** (as an operations & management cost) have been earmarked. The break of EMP cost is mentioned below in **Table 5.**

Table 5: Environment Management Cost Provisions

S. No.	Item Description	Cost (Rs. In Crores)		
		Capital Cost	Recurring Cost	Total
1	Electrostatic Precipitator	534	11	545
2	Chimney	58.8	1.2	60
3	Aux. Cooling Towers incl. Civil Works	188.2	3.8	192
4	Ash Handling incl AWRS	225.4	4.6	230
5	Ash Dyke	23.75	1.25	25
6	Dust extraction & suppression System	8	1	9
7	DM plant waste treatment systems	58.2	1.8	60
8	Sewerage collection, treatment & disposal	1.96	0.04	2
9	Green Belt & Landscaping	9.68	0.92	10.6
10	FGD and De-NOx Control	1862	38	1900
11	Rainwater harvesting	5.88	0.12	6
12	Environmental Laboratory & Environmental Monitoring	11.83	0.17	12
13	CEMS, CAAQMS, EQMS monitoring system & Main gate display board	11.76	0.24	12
14	Wind Breaking wall, Dry Fog System & RCC Flooring in coal storage Area	3.92	0.08	4
Total in Rs in Lakhs		**3003.38**	**64.22**	**3,067.6**

All the project details are summaries in this document. Any further details could be found in the Draft EIA Report.