

EXPANSION OF IRON ORE PRODUCTION CAPACITY FROM 10 MTPA TO 26 MTPA HEMATITE, 45 MTPA BHQ, 5 MTPA WASTE (TOTAL EXCAVATION: 60.0 MTPA) ALONG WITH CRUSHING AND SCREENING PLANT AT SURJAGARH IRON ORE MINE LEASE AREA OF 348.09 HA BY LLOYDS METALS & ENERGY LTD.

VILLAGE SURJAGARH
TEHSIL ETAPALLI
GADCHIROLI DISTRICT, MAHARASHTRA

**DRAFT
ENVIRONMENTAL IMPACT ASSESSMENT
AND
ENVIRONMENTAL MANAGEMENT PLAN
EXECUTIVE SUMMARY**



SCHEDULE AS PER EIA NOTIF. 2006

Sn. 1(a) Mining of minerals

ToR prescribed vide letter no.
TO24A0000MH5711372N, file no. J-11015/348/2005-IA.II (M) dated 26th Nov, 2024

**Baseline Environmental Monitoring :
WINTER SEASON (DEC 23-JAN 24-FEB 24)**

MEC/01/S2/M0016/EIA-EMP/R-0

Dec, 2024

Project Proponent

EIA Consultant

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MECON LIMITED
(A Govt. of India Enterprise)

CERTIFICATE NO: NABET/EIA/24-27/RA0342
Validity 09.02.2027

EXECUTIVE SUMMARY

1.0 INTRODUCTION

Lloyds Metals and Energy Limited (LMEL) is the leading player in iron and steel making industry with its operations spread over Chandrapur and Gadchiroli Districts, Maharashtra. Lloyds Steel, a group company, was a pioneer in setting up India's first private-sector Steel Plant in Wardha, Maharashtra. LMEL is the sole iron ore miner in the state of Maharashtra operating mines at Surjagarh, Gadchiroli district, Maharashtra with 10 MTPA production capacity.

It is proposed to expand the ROM production capacity of mines from 10 MTPA to 26 MTPA Hematite, 45 MTPA BHQ (Banded Hematite Quartzite), 5 MTPA waste (Total Excavation: 60.0 MTPA) along with crushing and screening plant. The proposed expansion does not envisage any increase in the lease area of 348.09 ha.

1.1 Need of the project

The National Steel policy envisages the crude steel capacity to reach 300 MT by 2030. The steel production is further aimed to reach 500 MT by year 2047. With the Indian economy and the steel industry growing at its historic highest pace, the iron ore demand is expected to grow multi-fold both in the short term and long term. In this regard, the iron ore threshold has been revised to 45% Fe and 35% Fe for hematite ore and siliceous hematite ore, respectively. With fast depletion of high-grade ores it becomes imperative that the Mining industry also identify low/lean grade ore such as BHQ and beneficiate it to required grades for the steel industry otherwise it remains as untapped/waste. In order to meet the increasing demand from steel, these ores would not be sufficient to fulfil the industry needs and therefore it becomes imperative that the Mining industry also identify low -lean grade ore such as BHQ & beneficiate it to required grades for steel industry. LMEL is the first of its kind in the nation to come forward with detailed exploration beyond threshold limit of Iron Ore at Surjagarh Iron Ore Mines covering Banded Hematite Quartzite (BHQ) as a whole. This has led to enhancement of ROM production for scientific Mining of Hematite ore and Banded Hematite Quartzite (BHQ- Hematite Siliceous ore).

At present, iron ore-based industries of Maharashtra require about 32 MTPA of iron ore and are dependent mainly on Chhattisgarh and Odisha for raw material. Hence, the raw material produced from the Surjagarh mines will be utilized for own consumption in sponge and pellet plant and can also be marketed in the region to the steel, pellet and sponge iron plant

The proposed project falls under 1(a) "Mining of minerals" of Schedule to the EIA Notification 2006 & its subsequent amendments under the Environment (Protection) Rules 1986. As the lease area is 348.09 ha and is non-coal mining, it is categorized under Category A and necessitates Environment Clearance from MOEF&CC, GoI for increase in production capacity.

1.2 Statutory approvals

Permissions	Status	Remarks
Grant of Lease	03.05.2007 to 02.05.2027 [Initial] extended upto 02.05.2057	As per the MMDR Amendment Act 2015 supplementary lease deed for extension of lease period was executed on 03.12.2021 valid up to 02.05.2057 (50 Years)
Environmental Clearance	Iron Ore production – 10 MTPA (ROM)	MoEFCC letter No. J-11015/348/2005-IA.II(M) dated 24.02.2023
Consent to Operate	10 MTPA (ROM) of Iron ore production	Letter no. 0000188508/CR/2403003071 dated 28.03.2024;
Mining Plan	Approval of modification of Review of Mining Plan (60 MTPA)	IBM letter No. MCDR-GAD0FE/8/2023-NR-IBM RO NR dated 14.06.2024
Forest Clearance	348.09 ha	Obtained vide F. No. 8-31/2005-FC dated 23/03/2007
Site specific wildlife conservation plan	Site specific wildlife conservation plan is Approved by PCCF(Wildlife),	Letter dated 15.02.2023
CGWA NOC	CGWA NOC obtained for 70 KLD & Application submitted for enhanced quantity of 158 KLD.	CGWA/NOC/MIN/REN/1/2024/10185, dated 22.11.2024
Surface water	13200 KLD	Approval obtained vide letter no. 2022/(218/22)/सस.व्य.(धो-2) dated 13.01.2023

1.3 Environmental setting of the project

The salient features and environmental setting/sensitivity of the project is summarized in the following table:

Sl.No	Particulars	Description
1.	Project Location	Village Surjagarh
2.	Geographical Coordinates (Lat. & Long.)	19° 36' 58.96" N to 19° 38' 21.48" N Latitude 80° 20' 57.12" E to 80° 22' 32.84" E Longitude
3.	Survey of India (SOI) Toposheet Reference	E44C6
4.	Topography of project site	<ul style="list-style-type: none"> • Hilly • Altitude: 290 m to 710 m above MSL
5.	Climatic conditions	<ul style="list-style-type: none"> • Avg. annual rainfall: 1538 mm • Annual Temperature: 13.4 °C to 42.9 °C
6.	Land details	<ul style="list-style-type: none"> • Entire ML of 348.09 ha falls under forest land
7.	Water requirement	<ul style="list-style-type: none"> • Present: 1200 KLD, Incremental: 1012 KLD, Total: 2212 KLD (Potable water: Present :70 KLD, Incremental: 88 KLD, Total: 158 KLD • Industrial (dust suppression & allied activities): 2054 KLD



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Sl.No	Particulars	Description
		<ul style="list-style-type: none"> • Source: River Bande, Potable: Bore-wells,
8.	Power requirement	<ul style="list-style-type: none"> • 40 MW after expansion • Etapalli substation, MSED Co Ltd
ENVIRONMENTAL SENSITIVITY		
9.	Involvement of Forest land if any.	Entire lease falls in Bhamragarh Reserve Forest
10.	Water body (Rivers, Lakes, Pond, Nala, Natural Drainage, Canal etc.) exists within the project site as well as study area	<ul style="list-style-type: none"> • Within Project Site: None • Within Study Area: Rivers/streams <ul style="list-style-type: none"> i) Bande river – 1.75 km (W) ii) Kappe Nallah – 2.95 km (N) iii) Akeran Nallah – 6.04 km (W) iv) Dumme Nallah – 6.07 km (SW)
11.	Nearest State/National Highway	<ul style="list-style-type: none"> • NH353C (Sakoli-Atmakur) – 57 km (SW) from project site • MH SH 363 - 5 Km S of project site
12.	Nearest Railway station	• Balharshah Jn (~157 km W)
13.	Nearest commercial airport	• Dr. Babasahab Bhimrao Ambedkar International Airport, Nagpur (~300 km NW)
14.	Ecologically sensitive areas (Wild Life Sanctuary National Park / Biosphere Reserve etc.)	None within 10 km of project site
15.	Whether the project falls under Critically Polluted Area (CPA) or Severely Polluted Area (SPA)?	The location does not fall under any Critically Polluted Area/Severely Polluted Area category.
16.	RF / PF in Project Site	The project site and study area falls under Bhamragarh Reserve Forest
17.	RF / PF In Study Area	
18.	Seismic Zone	The project area falls in Zone-II Which is under low intensity
19.	Vulnerability to other hazards	None
20.	Densely populated or built-up area	Etapalli – 26 km W (by road)
21.	Other major habitations	<ul style="list-style-type: none"> • Bande village – 2.1 km SW • Moharli village - 2.9 km NW • Mallampahad village – 2.2 km E • Hedri village – 2.7 km S
22.	Land Acquisition & R&R Issue	NIL
23.	Defence Installations	None
24.	Applicability of CRZ regulations	Not applicable

2.0 PROJECT DESCRIPTION

2.1 Salient features of the project

Method of Work	Fully Mechanized Open Cast mining - Category "A" as per IBM guidelines		
Mineral	Iron Ore		
Total Mineral Resources	856.771 Million tonnes		
Peak Production Capacity	Hematite -26 MTPA, BHQ – 45 MTPA & Waste – 5 MTPA. Peak total excavation per year – 60 MTPA (including 5 MTPA - Waste)		
Crushing & Screening	Material	Primary Crushing	Secondary Crushing
	Hematite	1 x700 TPH, 1 x 350 TPH, 5 x 250 TPH	1 x700 TPH ,1 x 350 TPH, 5 x 250 TPH
	BHQ	Gyratory crusher - 3 x 3000 TPH	Cone Crusher - 12 x 625 TPH
	Screening Plant		
	5 x 900 TPH Screen plant, 3 x 400 TPH Screen plant, 2 x 250 TPH Screen plant		
	12 x 625 TPH Screen plant		
	BHQ will be sent to beneficiation plant located outside ML area through overland conveyor (Initially by road).		
Waste generation	14.58 Million Ton during plan period		
Waste disposal	Wastes will be dumped externally within the ML at designated places in non-mineralized zone as temporary waste dump.		
Mineral Dispatch	Hematite Ore - Dispatch for its own consumption through slurry pipeline (part of the product), Road & sale through trucks BHQ- Through road till overland conveyor belt is established to designated places / beneficiation plant located at Hedri (~3 kms). Further, part of product will be transported through slurry pipeline to own plant.		
Life of Mine	32 years		

2.2 Project requirements

Water Demand	Present: 1200 KLD, Incremental: 1012 KLD, Total : 2212 KLD (Potable water : Present :70 KLD, Incremental: 88 KLD, Total : 158 KLD)
Source of water	Industrial: River Bande, Approval obtained vide letter no. 2022/(218/22)/सस.व्य.(धो-2) dated 13.01.2023 Potable: Bore-wells, Permission obtained from CGWA for existing consumption. It will be augmented for proposed expansion.
Power Consumption	40 MW after expansion
Source of power	Etapalli substation, MSEDCo Ltd.
Man Power	6000 (direct & indirect)
Explosives Consumption	Approx. ~ 48 MT/Day
Fuel Consumption	Approx. ~ 105 KL/Day



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Infrastructure	All necessary infrastructure already existing, the same will be augmented.
Proposed Investment	Rs. 1349.3 Crores (Additional), Total Investment : Rs 1713.58 Crores

3.0 DESCRIPTION OF THE ENVIRONMENT

Baseline environmental data generation in and around the mine lease area has been carried out during December 2023-February, 2024 (winter season). The baseline environmental data generation covered micro-meteorology, land use, air quality, water quality, noise levels, soil quality, ecology, traffic density and socio-economic environment. Information on climate and population were collected from secondary sources.

3.1 Micro-meteorology

A Micro-Meteorological station was set up to generate meteorological data during winter season, 2023-24 close to project site. As per the monitored data, the overall predominant wind directions are from North-West (NW), North-North-West (NNW) and West-North-West (WNW). The calm conditions prevailed for 2.33% of time. The temperature ranged from 13.3°C to 33.6 °C.

3.2 Ambient Air Quality

Ambient Air Quality was monitored at 10 locations and work zone air quality at 02 locations. Of these stations, 01 is in the core zone, one was placed within 140m of the site in the pre-dominant downwind direction while the rest are outside the core zone mostly within 8km of the core zone. The ambient air quality was evaluated in terms of Particulate Matter (PM₁₀, PM_{2.5}), Sulphur-di-oxide (SO₂), Oxides of Nitrogen (NO₂), Carbon Monoxide (CO), Ammonia, (NH₃), Ozone (O₃), Benzene (C₆H₆) and Polynuclear Aromatic Hydrocarbons (PAH), Lead (Pb), Nickel (Ni) & Arsenic (As) in PM₁₀. Chemical characterization of heavy metals in PM₁₀ was also carried out for Fe, Mn, Zn, Cr, Cd, Cu & Hg concentrations as well as Free Silica (Si). It is observed that PM₁₀ ranges from 65.43-80.9 µg/m³, PM_{2.5} from 26.81- 36.12 µg/m³, SO₂ from 7.45-17.05 µg/m³ and NO_x from 17.65-37.42 µg/m³.

The results indicate that ambient air quality monitored are well within the norms at all ten monitoring locations in the study area for PM₁₀, PM_{2.5}, SO₂, NO₂, NH₃, CO, O₃, Pb, Ni, As, benzene and Benzo(a)Pyrene (BaP) as prescribed by NAAQS 2009.

3.3 Ambient noise levels

The noise levels were monitored at eight (08) locations. It was observed that the ambient noise levels at all locations is well within the applicable norms.

3.4 Water Quality

Water quality monitoring was carried out at sixteen (16) locations covering eight (08) surface water samples and eight (08) ground water samples.

Surface water samples were analysed for different parameters as required by CPCB's Water Quality Criteria for Surface Water and also with different parameters as per IS: 10500 (2012) Amendment No. 1, 2015. In absence of any norms for ground water, the analysis results of ground water samples were compared with Drinking Water Specification IS:10500. The pH of water samples are in the range of 6.52 to 7.65 which are well within

prescribed standards of 6.5-8.5. The dissolved oxygen varied from 5.6 to 7.5 mg/l. Total coliform results of one sample is below 50 MPN/ 100 ml which makes this surface water quality fall under Class A i.e. Drinking water source without conventional treatment but after disinfection. The rest of the surface water samples is suitable can be used for outdoor bathing (organised) (i.e. Class B) as the Total coliform concentrations are less than 500 MPN/ 100 ml.

The results for ground water quality indicate that all the parameters analysed to assess the ground water quality in study area meets the prescribed norms. The concentration of Total hardness (as CaCO₃) varied from 25 to 248 mg/l in eight groundwater samples which are well within the permissible limit. TDS values varies from 42-692 mg/l. Total alkalinity values ranges from 32-228 mg/l which is within permissible limit. Toxic substances have not been detected in the tested samples

The results for ground water quality indicate that all the parameters analysed to assess the ground water quality in study area meets the prescribed norms.

3.5 Soil Characteristics

Soil quality was determined at eight (08) locations belonging to various land use classes viz. agricultural land, forest land, and mines dump area. As the area is rich in iron and the same is observed in the tested soil samples. The higher concentration of micro nutrients in the soil is attributable to rich mineralization in the region Hence, it implies that no external application of micro-nutrients is required.

3.6 Traffic density

Traffic density has been monitored every hour continuously for two locations. The recorded daily traffic volumes at all the surveyed roads were within their respective design service volumes as per IRC. The present Levels of service (LoS) were found to be within B i.e. stable flow of traffic.

3.7 Ecology

The core zone and majority of study area lies in Bhamragarh Reserve Forest and is marked by hills and plain area. The flora of the Core zone includes trees, shrubs, herbs, climbers and bamboo. The vegetation mainly consists of different varieties of trees like teak and teak-miscellaneous forest with large number of associate tree species. The most common trees are *Diospyros melanoxylon*, *Tectona grandis*, *Pterocarpus marsupium*, *Terminalia bellirica* etc. Among the shrubs, *Gardenia gummifera*, *Morinda citrifolia* etc. are prominent. Common herbs include *Withania somnifera*, *Euphorbia hirta*, *Eclipta prostrata*, etc. Bamboos and grasses were also observed in core zone.

The Schedule-I species as identified by the Forest department to be found in the study area are Sloth bear, Indian Fox, Indian porcupine, Russel's viper. The site specific wildlife conservation plan has already been approved by PCCF (wildlife). The authenticated list of flora and fauna has been updated inline with "The Wild Life (Protection) Amendment Bill, 2022" and the same got approved. Further, there are no ESZs, ESAs, national parks, wildlife sanctuaries, biosphere reserves, tiger reserves, elephant reserves, or other protected areas within 10 kilometres of the project area.

3.8 Land use-Land cover

Existing Land-use/land cover pattern in the study area has been interpreted from

Resourcesat-2A, Resourcesat-2, LISS-IV FX satellite imagery with a spatial resolution of 5 m dated 16/11/2023 & 22/12/2023. Forests is the predominant landuse covering almost 70% of the study area. Agricultural land constitutes 24.34%, water bodies covers 3.48%, built up area covers 1.3% while others including mining area and industrial area covers 0.99%

3.9 Socio-economic environment

There are about 13578 persons in the 10 km study area as per 2011 Census, which is anticipated to have increased to 15552 as per the decadal growth of the area published by Census of India. The population density up to 0-10 km is estimated to slightly increase from ~43 person/sq km to 49 persons/sq. km. The study area of 10 km radius consists of only rural population. Literacy rate is alarming which is 49%. Scheduled Tribes make up ~94% of the total population.

As per 2011 census altogether the main workers, marginal workers and non-workers constitute of 36%, 19% and 45% of the total population within 10 km radius, respectively. The occupational structure indicates that most of the workers are employed in agriculture and forestry related activities.

4.0 ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

Impact of project activities on environmental attributes in study area including land environment, drainage and water environment, air environment, noise environment, blasting impacts, soil quality, socio-economic profile & flora & fauna and traffic infrastructure have been assessed.

4.1 Land environment

The mining lease of 348.09 ha is in hilly terrain in Forest land. The mining activity has started in the lease since 2007. During mining operations carried out in the past and to be carried out in future, land degradation of pre-mining land status has taken. Presently, the mining is carried out in central and eastern pit with development of western pit for proposed expansion. As per the approved Mining Plan, the area under mining will increase from existing 39.5ha to 121.4 ha in plan period and 236.5 ha in conceptual period. Post mining, out of 348.09 ha of ML area, 345.19 ha shall be converted to plantation and 2.9 ha into water body.

The wastes from the mines will consist of overburden and inter-burden and mineral rejects. Currently there are 4 waste dumps in an area of 7 ha. The total waste generated during plan period including is 14.58 Million Tonnes. Top soil is not encountered in plan period. As there will be no space generated for backfilling within the plan period, waste disposal has been planned to accommodate the waste in the non -mineralized zone a temporary waste dump. The dump stability analysis has been carried out by the National Institute of Rock Mechanics (NIRM), (Ministry of Mines, Govt. of India), Bengaluru. The studies and numerical modelling states that the pit slopes and waste dumps are stable. Retaining Wall and garland drains will be maintained along the dump to avoid any surface run-off.

The Retaining wall, garland drain and settling ponds have been adequately constructed and further proposed to be constructed and maintained around the waste dump to arrest the solid wash-off materials. Surjagarh Iron Ore Mines has started good dump management comprising proper compaction, coir matting, plantation settling pits at the corner of each dump etc., on the inactive waste dumps, sub grade dumps and all these measures will be

continued in future also to minimize the impact due to dumping of waste and mineral

4.2 Drainage and Water environment

The principal drainage in the area is South-easterly flowing Bande River which is the main perennial surface water source or surface water body within the study area. The seasonal run off is the main source of water flow in Bande river watershed. Water required for mining is within the permitted quantity from the sources of water viz. Bande river and is adequate to meet the requirements of the mine after the proposed expansion also. Domestic water will be treated in STP and effluent from workshop will be treated in ETP which will be recycled. The above analysis shows no impact on water availability is expected at the downstream users due to the proposed expansion.

The Total Annual Replenishable Recharge (TARR) is significantly high and there will be no draft due to the mine from groundwater sources. Hence, no impact on water resources is expected due to the proposed project.

At present, surface runoff management structures already exist such as garland drains of 2445 m length in the uphill side of the working mine faces, along the haul road, garland drains around the available small waste dump, along haul road, mineral stack. The water from the garland drains will drain the runoff water into settling pond. Besides, coir matting of 61,750 sq.m. is carried out to prevent dump erosion. About 2400 m of Retaining wall is constructed at the toe of the dump. Drains are connected to the settling ponds and supernatant clear water is let out.

Further, it will be extended with about 4640 m of garland drain and 4640 m of retaining wall. Presently, there are 4 nos. of settling cum harvesting ponds and another 5 nos. of settling cum harvesting ponds will be constructed to collect the run-off water. The supernatant water will be reused.

During the plan period, there is no intersection of the ground water table. However, during conceptual period, there is intersection of ground water. The water table is likely to be encountered in the mine pit at later stage of mining for the planned depth of 160 m RL and accordingly the seepage computation using the mine geometry is made. It is envisaged that the mining will progress in three segments in west, central and east with ultimate deeper zone in the eastern side. The local depression for collection of mine face seepage and Rain water collection to the pit will be in later part of mine life.

To reduce the overall water consumption footprint, in tune with the Corporate Environmental Policy, LMEL has proposed a comprehensive rain water harvesting scheme in mines to collect rain water from office and administrative building through roof top rain water harvesting. About 10,000 KL per annum of rain water can be harvested annually. The Surface rainwater harvesting cum runoff management is being done by establishing the de-siltation cum harvesting ponds at strategic location which leads to augmentation of groundwater resources as well as utilization of accumulated water for dust suppression purpose, etc.

The mines has already established a 15 KLD ETP with oil and grease separation unit for treatment of the workshop effluents which will be augmented to 50 KLD. Presently the domestic waste water is being treated through STP of 110 KLD. Further, the same will be

augmented to 200 KLD to treat the domestic sewage generated. The treated water will be used for dust suppression and green belt development. The treated water quality will conform to MPCB norms.

4.3 Air environment

Iron ore mining activities including drilling, blasting, ore handling and transportation activities generates fugitive dust. Emissions from diesel powered earth moving and material handling machinery also contribute air pollutants during transportation. However, the fugitive dust during these activities is not expected to spread beyond lease area. During transportation of ore outside the lease area, the emission shall be limited to close to road sides. Presently the ore is being transported through roads however, its proposed to lay slurry pipeline capacity of 10 MTPA, which will further reduce the pollution on the roads. Further, due to expansion, there will be only additional load of 6 MTPA on the roads. Gaseous pollutants like SO₂ and NO_x will also be added to the ambient air due to vehicular traffic movement associated with the construction phase. Gaseous emissions from construction machineries and vehicles will be controlled by technological means as well as emission reduction practices.

Predictive modelling of the air emissions for all the sources cumulatively was done for PM₁₀, PM_{2.5}, SO₂, and NO_x,) for both peak and normative scenarios. The Ground Level Concentrations (GLC) for all these parameters were superimposed on the baseline AAQ of the area and the future predicted AAQ for all the parameters were found to be well within the NAAQS norms.

Lloyds Metals and Energy Limited's commitment to environment sustainability and reduce carbon footprint has driven its transition from fossil- fuel based HEMM to a greener; electric and EV equipment. LMEL have introduced a fleet of 34 battery-operated hauling trucks with loading capacity of 70T. Further complimenting, electric compressors driven drill machines, battery-operated wheel loaders for the loading process and matching loading equipment for ore excavation have been adopted. This transition will significantly reduce the environmental impact due to diesel driven vehicles and improve the air quality and a major step towards decarbonisation.

In the present mine workings, following measures are adopted to control impact on the air quality in the area. These measures will be suitably upgraded during the proposed expansion.

Sl. No.	Air Pollution Source	Mitigation Measures
1.0	Dumping	Coir matting, Water sprinkling, Plantation, Greenbelt development.
2.0	Material handling	Dust suppression by fixed sprinklers and Mist canon at material transfer points
3.0	Transportation	Road sweep cum vacuum cleaner machine, Water sprinkling, proper maintenance of vehicles and tarpaulin covers of all the mineral trucks. Wheel wash system at the exit gate of the mines for better dust suppression purposes.
4.0	Blasting	Controlled blasting is being practiced and the same will be continued. Blasting will be

		preferably done in mid-day time.
5.0	Drilling	Use of dust aprons on drilling equipment and adopting wet drilling methods and use of dust extractor machine based on availability
6.0	Excavation	Water sprinkling
7.0	Screening and crushing plant	Dust Extraction system with Bag filter, ID fan, ducting & Stack of suitable height for Crusher plant and cold fog dust suppression system (CFDS) in screening plants. Further the conveyor belts will be encapsulated.
8.0	DG sets	DG Sets will comply with CPCB norms with stacks for proper dispersion

4.4 Noise environment

Anticipated noise levels resulting from operation of the various machineries like excavator, tippers, drill have been computed using point source model. Computation of cumulative noise levels at the nearby villages is made based on the assumption that there are no attenuation paths between the source and the boundary. From the studies, it is found that the predicted Noise Levels due to mining operations at the periphery of the mine lease itself will be less even without considering any attenuation factor.

Periodical monitoring of noise level in the existing mine shows that the values are well within statutory limits. Hence, by continuing the following mitigative measures already being adopted in the existing mine workings, no major impact due to noise level is expected after enhanced production also.

- ❖ Providing Sound proof operator's cabin for equipment's like dumpers, shovel, tippers, etc.
- ❖ Planting trees at various places within the lease area , on either side of the mineral transport road to act as acoustic barriers.
- ❖ Proper and regular maintenance of vehicles, machinery and other equipment. All HEMM are monitored for any abnormal sound and rectified with due precaution by maintenance personnel.
- ❖ Providing in-built mechanism for reducing sound emissions.
- ❖ Providing workers with earmuffs & earplugs, as a protection from exposed to higher noise level.
- ❖ Conducting regular health check-up of workers including Audiometry test for the workers engaged in noise prone area.
- ❖ Displaying the noise level status of operational machinery on the machines to know the extent of noise level and to control the time to which the worker is exposed to higher noise levels.

4.5 Blasting and vibration effects

To assess the impact of blasting and ground vibrations on the surrounding environment, a detailed study has been carried out by CSIR –Central Institute of Mining and Fuel Research (CIMFR), Dhanbad. Based on the study, the safe values of maximum charge per delay after expansion for different residential houses and structures are determined.

Since, the villages are located more than 2.0 km from the mining lease boundary, blasting operations can be carried out safely without causing any adverse impacts to the residential houses/structures of the nearby villages.

Due to the sensitiveness of the area, SME explosives and electronic detonators were used in all the experimental blasts. It is recommended to continue SME and electronic initiation system for safe blasting operations at the mine. However, it was also observed that shock-tube initiation system and other explosive system can also be used without any adverse blasting impacts to the nearby villages/habitats as the villages are located more than 2.0 km from the mining lease boundary. Besides, various control measures are recommended for ground vibration and to control fly rock. All these measures being implemented in the preset working mines will be continued effectively and it will be ensured that there is no impact due to blasting induced vibration after the expanded mining operations also

4.6 Biological environment

As indicated earlier, the entire mine lease area of 348.09 ha falls under Bhamragarh Reserve forest, the clearance for which is already available. So far, 48.83Ha of the lease area is already broken up in the existing mining operation. In the post mining stage Plantation will be carried out in places like mined out area, waste dumps, mineral storage, mineral separation plant area, roads, infrastructure, Unused and safety zone area etc. In the post mining stage the entire area will be reclaimed by plantation.

The vegetation mainly consists of different varieties of plant species. The project authorities will ensure that only trees whose removal is essential for the project are cut down. However, the loss is compensated by Compensatory Afforestation and also green belt/cover development planned in and around the mine, which will rather increase the green cover and vegetation diversity.

As regards impact on wildlife is concerned, most of the wild life in the core zone and its vicinity are common small species. Since mining operations in the area have been going on for several years now, these fauna have adapted themselves to prevailing conditions. There are existing operating mining blocks of open-cast mines in the project site, where blasting operations are frequent which may have scared away some of the fauna from the mine lease area. But after the life of mine, the plantations developed on the abandoned mine area and it will attract back the animals displaced / scared away by the project.

Safety zone planation over an area of 6.17 ha. has been done with native species in consultation with State Forest Department. 5285 saplings have been planted so far in safety zone as gap filling plantation. The plantation efforts will continue as per the progressive mine closure plan and approved mine closure plan. The progressive plantation in the safety zone will be done in a phase wise manner till end of work.

Towards compensatory afforestation, an area of 377.58 Ha of private land was identified in Arvi and Karanja Taluka in lieu of diversion of 374.90 Ha. It has been transferred and mutated in favour of Forest Department and the same land has been declared as Reserve Forest by Government of Maharashtra.

In view of the presence of above Schedule-1 species, Site-specific conservation plans have been prepared to ensure that the mine activities have minimum impact on them. The Site Specific Wildlife Conservation Plan has been approved by PCCF (WL), Maharashtra vide

letter dated 15.02.2023 with a total financial out lay of Rs.912.5 lakhs for ML area and buffer zone. LMEL has paid the amount of Rs. 683.50 lakhs in favour of Deputy Conservator of Forest, Bhamragarh Forest Division, Allapali towards implementation works to be taken up by State Forest Dept. Apart from that a total of Rs. 551.89 Lakhs has been spent by LMEL for implementation of conservation activities as per the Wildlife Conservation plan for conservation of the Schedule-I and other vulnerable faunal species in the area and the same will continue in future also.

4.7 Soil and agriculture

Presently top soil is not encountered in excavation and is not anticipated in plan period. No agricultural land or grazing land will be required for the mine expansion. Hence impacts on soil and agriculture is not anticipated.

4.8 Socio-economic environment

Surjagarh Iron Ore Mines is an existing mine and there will be no change in the ML area of the mines due to the proposed expansion. So, no displacement of people is anticipated from the ML area, hence no R&R is involved

A need-based social-impact study has been carried out within the study area, wherein the socio-economic condition of the area reflected that Surjagarh mine's developmental efforts have played a major role in the improvement of living conditions in the areas. The people are interested in further strengthening the same and expressed their desire of more and better education infrastructure including technical education, better employment opportunities, better amenities, good logistics, infrastructure, aid for sport, health & cultural activities etc. Further, the inhabitants of the nearby villages are primarily rural inhabitants with a large number of inhabitants depending on nearby mines for unskilled labour work for their sustenance

LMEL is implementing various developmental activities in the area as part of its CSR activities under Lloyds Infinite Foundation (LIF) i.e. 30-bedded Multi-speciality hospital established at Hedri, CBSE medium school, Garment Unit, Drinking water facility with overhead tank & bore wells, Outreach centre, promotion of agriculture with supply of equipment's, seeds, manure etc. The same will be further augmented through management measures which will be proposed as part of the Corporate Environmental Responsibility (CER).

4.9 Occupational Health & Safety

Lloyds Metals & Energy Ltd. is committed to work towards 'Zero Harm' from their mining activities and carry out Health Risk Assessment (HRA) for identification of workplace hazards and assess their potential risks to health and determine appropriate control measures to protect the health and wellbeing of workers and nearby community.

Rules and Safety guidelines as issued by Directorate General of Mines Safety (DGMS) through various circulars are being followed in the mines. Occupational health survey is carried out for the workers and officers. IME will be carried out for all the category of workers and thereafter every five years.

LMEL has a well equipped 30 bedded multi-speciality hospital at Hedri and it is being maintained and operated by highly qualified doctors and para medical staffs. Facilities like – Medicine, Orthopaedic, Gynaecology, Surgery, Paediatric, Dentistry, Ophthalmologist,

Physiotherapy etc. are available with round o’ clock ambulance facilities. This hospital is facilitated with Occupational Health centre (OHC) with qualified medical staff. Safety management of workers during work hours is ensured in consultation with the Safety officers. Workers will be provided with adequate PPEs such as ear muffs/plugs, masks, safety shoes etc. as per regulations.

4.10 Traffic infrastructure

Considering the current situation of the road network, M/S Lloyds Metals and Energy Ltd. have approached CSIR-CRRI, New Delhi, to conduct a feasibility study of mineral transportation due to the expansion of Surajgarh Iron Mines from 10 to 55 MTPA, where there will be saleable ore of 26 MTPA. The transportation plan involves using water transport i.e. slurry pipeline for 10 MTPA and the remaining 16.0 MTPA using existing road network of Gadchiroli District. The materials of 45 MTPA low grade iron ore / BHQ will be transported from mines to BHQ plant by road till conveyor belt system covering a length of 3.5 Kms is established.

The study predicted an average V/C ratio of approximately 0.22 across the study road network. The analysis, conducted according to IRC guidelines, emphasized proactive planning to accommodate industrial expansions effectively. Intersection improvement plans (conceptual) were also proposed, taking into account future traffic, prevailing site conditions, and the proposed enhancement of mines.

Further studies were done to minimize wildlife mortality along the mineral transport route from Etapalli to Allapalli and Allapalli to Ashti. Wildlife signboards have been installed along the transportation roads to warn drivers and protect wildlife. Lloyds has been organizing regular awareness camps to educate truck drivers, local communities, and company employees about the importance of protecting wildlife in the region

5.0 ENVIRONMENTAL MONITORING PROGRAMME

To ensure effective implementation of proposed mitigation measures, elaborate arrangements are envisaged for monitoring of various environmental parameters. Environmental aspects are monitored for drainage systems, water quality, emissions and air quality, noise pollution, solid/hazardous waste utilization, green belt development, housekeeping & occupational health. The monitoring program will be further augmented for future expansion.

Ambient air quality is monitored regularly in accordance with CPCB/MPCB. Already three no. of Continuous monitoring stations (CAAQMS) are installed. After implementation of the proposed Project, the existing monitoring regime will be continued which would include the (nine) AAQ stations and 03 (three) CAAQMS which are connected with servers of MPCB for real-time monitoring. Work zone air quality is monitored at 6 locations.

Surface and ground water quality in and around the mine at varying distances and directions are monitored at a total of 17 (Seventeen) locations as per MPCB / CPCB/ CGWA directives, of which 12 (three) are groundwater sampling locations and 05 (six) are surface water monitoring locations

At present, noise levels are monitored at 6 locations for work zone noise in weekly basis and 8 locations for Ambient noise in and around the mine area once in a month. The EMC is keeping a record of noise levels and takes necessary organizational actions like rotation

of workmen, availability and use of personal protective devices, regular inspection of damage to enclosures or insulation layers over enclosures and piping.

Solid wastes are segregated as hazardous, non-hazardous, combustible or non-combustible depending on their nature or origin and packed in labelled bags. The packed bags with necessary paper-work recording the nature and quantity of wastes are then handed over to licensed waste disposal contractors for disposal

For green belt the data on area of green cover, survival rate etc. is compiled for periodic review. The socio-economic interventions under CSR and CER are recorded every year along with the location of the villages benefitted, physical targets achieved and expenditure made for implementation of the social interventions.

Budgetary provisions for environmental monitoring plan

The additional cost of the expansion is estimated to be Rs. 1349.3 Crore (Total capital cost of the project is Rs. 1713.58 Crore including existing project cost). The capital costs of environmental protection and management measures included in the project cost is estimated to be Rs. 3666.50 Lakhs. The annual recurring costs of environmental conservation, pollution control and monitoring facilities for the proposed project is estimated to be Rs. 541.96 Lakhs per annum.

Additionally, the CER cost will be allocated based on findings of the Public Hearing. The CER cost and the cost for Environmental Protection Measures will together form the total EMP implementation Cost.

6.0 ADDITIONAL STUDIES

RISK ASSESSMENT & DISASTER MANAGEMENT PLAN

Risk assessment has been carried out and based on the same, the existing disaster management plan shall be augmented for addressing the anticipated risks due to the proposed expansion. During the operation of the mine, the primary risks which have been identified are failure of slope in the pits and external dumps, fly rock from blasting, surface fire and danger due to handling of explosives and fuel. Chances of fire in electric vehicles.

In order to allay dangers due to open cast slope failure, slope stability estimations have been made for the existing quarries and waste dumps by National Institute of Rock Mechanics (NIRM), Bengaluru. Besides determining factor of safety the slopes are monitored at regular intervals to check for any possible failure. For dumps, retaining walls will be built all-around the external dumps which will have weep holes for passage of storm water to join garland drains.

Optimum blast design has been worked out on the basis of scientific blasting studies. All precautions related to control of fly rock, use of control blasting through bottom initiation, etc. as prescribed by DGMS, will be taken during the blasting operations.

Spillage of HSD and resultant fire constitutes a potential risk. The quantity of the maximum fuel oil which can spill is not much and can be easily controlled. Sufficient nos. of portable fire-extinguishers shall be provided in office building and canteen to take care of any eventuality. The handling of explosives will be carried out strictly in accordance with the Dept. of Explosives/PESO guidelines. All precautions and regular maintenance will be done

to prevent safety hazards due to electric vehicles

SOCIAL IMPACT ASSESSMENT

The socio-economic impact assessment of the study area has been carried out starting with scoping of issues related to potential significance like education, health, drinking water facility, employment and income etc. The major findings of the socio-impact assessment study indicated that the project is not going to cause any damage to the existing socio economic condition. The project shall have positive impact on pattern of demand and very strong positive employment and income effects. There is a possibility of increase in industrialization in the vicinity of the mines, which shall bring more skill diversification among local people. The project shall have strong positive impact on raising average consumption and also income through multiplier effect.

The CSR activities of the project will have very strong positive impact on the social and economic condition of the people of the study area. The project shall have positive impact on health situation of the local people through development of the area. The project shall also have significant positive impact on community development activities of the project which are likely to bring benefits to the people of the study area.

7.0 BENEFITS OF THE PROJECT

This project will lead to augmentation of iron ore resources i.e. by means of beneficiation of low-grade iron ore /BHQ to higher grade suitable for steel industry. The ore produced will cater to LMEL's own requirement as well as for other iron and steel industries of the region. Being one of the first project of its kind, it is going to be the model in the iron ore sector of the nation.

With the implementation of the proposed expansion project, the socio-economic status of the local people will improve substantially. There may be a development of infrastructural facilities due to proposed activity in the region. Ample commercial opportunities will become available for economic development of the district through ancillary services and cottage industries. The State Govt. will directly benefit from the revenue.

The project promises to boost the local economy through direct and indirect employment. It aims to create employment for about 6000 nos. including direct and indirect employment. Preference will be given to the local people from nearby villages according to the skill as well as requirement which will increase employment opportunity.

8.0 ENVIRONMENT MANAGEMENT PLAN (ADMINISTRATIVE ASPECTS)

LMEL is committed, as a responsible corporate entity, towards protection of environment and the community and also to employ best environmental management practices, regular maintenance and consistent operation of pollution control systems, recycling of solid & liquid wastes and adoption of cleaner and environment friendly technologies etc. The concerted efforts put forth earlier and proposed through the Environmental Management Plan (EMP) are expected to result in resource conservation, waste reduction as well as cleaner environment.

A separate Environment Management Cell (EMC) headed by Executive Director (operations) will be setup to look after the environmental activities of the mines. The implementation and monitoring of effectiveness of the environmental mitigation measures during the operation phase will be done by the EMC. Also, LMEL's commitment to

protection of the environment is reflected in the Corporate Environmental Policy of LMEL, which will guide the administrative aspects of EMP implementation in the proposed plant. In summary, the EMP will be a vital component of LMEL's commitment to minimize environmental impacts and promote responsible environmental stewardship throughout the project's lifecycle.

9.0 SUMMARY & CONCLUSION

Environmental Impact Assessment (EIA) has been carried out to assess the possible impacts of the proposed expansion of mines from 10 MTPA to 26 MTPA Hematite, 45 MTPA BHQ (Banded Hematite Quartzite), 5 MTPA waste (Total Excavation: 60.0 MTPA) along with crushing and screening plant on land, water, air, noise, soil and biological environment as well as on socio economic profile of the area.

The EIA/EMP study for the proposed expansion of mines has been prepared inline with the TOR issued by MoEFCC vide letter no-J-11015/348/2005-IA.II(M) dated 26.11.2024 and applicable CPCB/MPCB standards

The baseline environmental status of the study area is observed within applicable standards. Reputed subject experts have been engaged for assessment of impacts on environmental attributes and suitable control measures have been suggested based on investigation and analyses of sampling and observation during the study. The project is envisaged to impart minimum impact on the environment through implementation of the environment management plan.

Scientific studies have been carried out by renowned institutions for studying the impact of blasting, road traffic and dump stability and their recommendations will be implemented. The implementation and monitoring of the effectiveness of environmental mitigation measures will be carried out in line with Environmental Policy of LMEL wherein organizational arrangement of the project, playing pivotal role. An Environmental Management Cell (EMC), comprising of senior management level officers periodically assess and monitor the implementation of mitigation measures for continual improvements in the environmental performance of the project.

It is concluded that the implementation of project will not have any adverse impact on the environment. This project will lead to augmentation of iron ore resources i.e. by means of scientific and sustainable mining. The expansion proposal of Surjagarh Iron Ore Mine is one of its kind in the interest of Nation towards mineral conservation i.e. conversion of Waste to Wealth which is a step towards Zero waste mining (utilisation of low and lean grade iron ore/BHQ) and will set a new model to the Mining Industry a step-forward towards social and environmentally sustainable development of mineral blocks. The project will have direct and indirect employment opportunities and infrastructure support to the people of the area/region and uplift their socio-economic status. Moreover, CER and CSR activities as per guidelines will uplift the socio-economic condition of the area which is predominantly having tribal population and is presently lagging from the mainstream in terms of development.