DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

&

ENVIRONMENTAL MANAGEMENT PLAN

FOR

Expansion in Bauxite Production Capacity from 3.6 Million TPA to 6.0 Million TPA [ROM: 6.0 Million TPA, OB/Waste: 3.29 Million TPA, Top Soil: 0.22 Million TPA (Total Excavation: 9.51 Million TPA)] in Kodingamali Bauxite Mine (ML Area: 428.075 ha)





At

Village: Kodingamali, Tehsil(s): Laxmipur & Kashipur, District(s)- Koraput & Rayagada, State: Odisha

Study Period: Post-Monsoon (October, 2024 to December, 2024)

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JM File No. JMEPL/OMCL/JM-2748/EIA/July, 2025

ABBREVIATIONS

AAQ	:	Ambient Air Quality
AAQM	:	Ambient Air Quality Monitoring
AAQS	:	Ambient Air Quality Standards
AIS & LUS	:	All India Soil and Land Use Survey
AMSL	:	Above Mean Sea Level
ANFO	:	Ammonium Nitrate Fuel Oil
bgl	:	Below Ground Level
CWC	:	Central Water Commission
CPP	:	Captive Power Plant
CPCB	:	Central Pollution Control Board
CSR	:	Corporate Social Responsibility
CEP	:	Corporate Environment Policy
CGWA	:	Central Ground Water Authority
DGMS	:	Directorate General of Mines Safety
DMG	:	Department of Mines and Geology
DTH	:	Down The Hole
DCF	:	Deputy Conservator of Forest
DMF	:	District Mineral Fund
EMS	:	Environment Management System
ECO	:	Emergency Coordinating Officer
EAC	:	Expert Appraisal Committee
EC	:	Environmental Clearance
EIA	:	Environmental Impact Assessment
EMC	:	Environment Management Cell
EMP	:	Environmental Management Plan
ESE	:	East of South East
ENE	:	East of North East
EPA	:	Environmental Protection Act
EPO	:	Emergency planning officer
FMCG	:	Fast Moving Consumer Goods
FPS	:	Fine Particulate Sampler
FCC	:	False Color Composite
Govt.	:	Government
GCP	:	Ground Control Points
GLC	:	Ground Level Concentration
GOI	:	Government Of India
GPS	:	Global Positioning System
GSI	:	Geological Survey Of India
ha	:	Hectare
HEMM	:	Heavy Earth Moving Machinery
HFL	:	Highest Flood Level
HP	:	Horse Power
HOD	:	Head Of Department
IB	:	Inter Burden
IBM	:	Indian Bureau of Mines
IMD	:	India Meteorological Department
IS	:	Indian Standards

ISO	:	International Organization Of Standardization
KW	:	Kilo Watt
KLD	:	Kilo Litre Per Day
LU/LC	:	Land Use / Land Cover
ML	:	Local Magnitude
MT	:	Million Tonne
MOEFCC	:	Ministry of Environment, Forest and Climate Change
M.M.R	:	Metalliferous Mines Regulation
mRL	:	Meter Reduced Level
MSL	:	Mean Sea Level
Mw	:	Moment Magnitude
MW	:	Mega Watt
N	:	North
NH	:	National Highway
NNW	:	North Of North East
NW	:	North West
NAAQS	:	National Ambient Air Quality Standards
NABET	:	National Accreditation Board for Education & Training
NATMO	:	National Atlas & Thematic Mapping Organization
NABL	:	National Accreditation Board for Testing and Calibration Laboratories
NOC	:	No Objection Certificate
NH	:	National Highway
NGO	:	Non Governmental Organization
NONEL	:	Non Electric
OMC Ltd.	:	Odisha Mining Corporation Ltd.
NRSA	:	National Remote Sensing Agency
NRSC	:	National Remote Sensing Centre
OB	:	Over Burden
OHS	:	Occupational Health and Safety
OSHA	:	Occupational Safety and Health Administration
PFR	:	Pre Feasibility Report
pH	:	Potential of Hydrogen
PHCs	:	Public Health Centers
PM	:	Particulate Matter
PPE	:	Personal Protective Equipment
PESO	:	Petroleum and Explosives Safety Organization
PPV	:	Peak Particle Velocity
QCI	:	Quality Council of India
RSPM	:	Respirable Suspended Particulate Matter
ROM	:	Run Of Mine
SPCB	:	State Pollution Control Board
RDS	:	Respirable Dust Sampler
SSE	:	South Of South East
SOB	:	Soft Over Burden
SW	:	South West
SC	:	Scheduled Caste
SHE	:	Safety, Health & Environment
SIA	:	Social Impact Assessment

SOI	:	Survey of India
SPCB	:	State Pollution Control Board
SPM	:	Suspended Particulate Matter
ST	:	Scheduled Tribe
STP	:	Sewage Treatment Plant
TDS	:	Total Dissolved Solids
ToR	:	Terms of Reference
TPA	:	Tones Per Annum
TPD	:	Tones Per Day
TW	:	Tube Well
UNFC	:	United Nations Framework Classification
VT	:	Vocational Training
RF	:	Reserve Forest
PF	:	Protected Forest
$\mu g/m^3$	:	Micro gram per meter cube
µm	:	Micro Meter
dia.	:	diameter
CuM	:	Cubic meter
dB	:	Decibel
gm/sec	:	Gram per second
gm/cc	:	Gram per cubic meter
hr/day	:	Hour per day
kg	:	Kilogram
Kg/hr	:	Kilogram per hour
Kg/ha	:	Kilogram per hectare
km	:	Kilometer
m	:	Meter
mg/l	:	Milligram per Litre
mm	:	Millimeter
Sq.km	:	Square Kilometer
t/hr	:	Tonnes per hour

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File No: J-11015/439/2007-IA.II(M)
Government of India
Ministry of Environment, Forest and Climate Change
IA Division
****

Dated **20/06/2025**

To,

Mr. Debendra Kumar Nanda
M/s. ODISHA MINING CORPORATION LIMITED
OMC House, Post Box No. 34, Bhubaneswar, KHORDHA, ODISHA, Adjacent to Odisha Legislative Assembly, 751001
parivesh@odishamining.in

Subject: **Kodingamali Bauxite Mine with enhancement in production capacity of Bauxite from 3.6 to 6.0 MTPA [ROM 6.0 MTPA, OB/Waste 3.29 MTPA, Top Soil 0.22 MTPA (Total Excavation 9.51 MTPA)] with ML Area of 428.075ha by M/s Odisha Mining Corporation Limited located at Village Kodingamali, Tehsil Laxmipur & Kashipur, District Koraput & Rayagada, Odisha – For Terms of Reference reg.**

Sir/Madam,

This is in reference to your application for Grant of Terms of Reference under the provision of the EIA Notification 2006-regarding in respect of project Expansion in Bauxite Production Capacity from 3.6 Million TPA to 6.0 Million TPA [ROM: 6.0 Million TPA, OB/Waste: 3.29 Million TPA, Top Soil: 0.22 Million TPA (Total Excavation: 9.51 Million TPA)] in Kodingamali Bauxite Mine (ML Area: 428.075 ha) located at Village: Kodingamali, Tehsil: Laxmipur & Kashipur, District: Koraput & Rayagada, State: Odisha by M/s. Odisha Mining Corporation Limited submitted to Ministry vide proposal number IA/OR/MIN/535212/2025 dated 07/05/2025.

2. The particulars of the proposal are as below :

(i) TOR Identification No.	TO25A0000OR5819337N
(ii) File No.	J-11015/439/2007-IA.II(M)
(iii) Clearance Type	TOR
(iv) Category	A
(v) Project/Activity Included Schedule No.	1(a) Mining of minerals
(vi) Sector	Non-Coal Mining
(vii) Name of Project	Expansion in Bauxite Production Capacity from 3.6 Million TPA to 6.0 Million TPA [ROM: 6.0 Million TPA, OB/Waste: 3.29 Million TPA, Top Soil: 0.22 Million TPA (Total Excavation: 9.51

	Million TPA)] in Kodingamali Bauxite Mine (ML Area: 428.075 ha) located at Village: Kodingamali, Tehsil: Laxmipur & Kashipur, District: Koraput & Rayagada, State: Odisha by M/s. Odisha Mining Corporation Limited
(viii) Name of Company/Organization	ODISHA MINING CORPORATION LIMITED
(ix) Location of Project (District, State)	KORAPUT, RAYGADA, ODISHA
(x) Issuing Authority	MoEF&CC
(xii) Applicability of General Conditions	no
(xiii) Applicability of Specific Conditions	no

3. In view of the particulars given in Para 1 above, the project proposal, including Form-1 (Part A and B), was submitted to the Ministry for appraisal by the Expert Appraisal Committee (EAC) under the provisions of the EIA Notification, 2006, and its subsequent amendments.

4. The above-mentioned proposal has been considered by Expert Appraisal Committee of EAC in the meeting held on 15/05/2025. The minutes of the meeting and all the Application and documents submitted [(viz. Form-1 Part A, Part B, Part C EIA, EMP)] are available on PARIVESH portal which can be accessed by scanning the QR Code above.

5. The EAC during deliberations noted the following:

The Expert Appraisal Committee (EAC) deliberated on the proposal seeking Terms of Reference (ToR) for the Kodingamali Bauxite Mine, which involves enhancement of the bauxite production capacity from 3.6 million tonnes per annum (MTPA) to 6.0 MTPA [Run-of-Mine (ROM) 6.0 MTPA, Overburden/Waste 3.29 MTPA, and Topsoil 0.22 MTPA; Total Excavation: 9.51 MTPA]. The mining lease (ML) area spans 428.075 hectares and is proposed by M/s Odisha Mining Corporation Limited. The project is located at Village Kodingamali, Tehsils Laxmipur and Kashipur, in the districts of Koraput and Rayagada, Odisha. As per the provisions of the Environmental Impact Assessment (EIA) Notification, 2006, the proposal falls under Category "A", Item 1(a) – “Mining of Minerals”.

The project proponent and the consultant presented key site characteristics using a KML file. The site is situated 4.5 km SSE of a State Highway, with Birigurha Village located 800 meters in the eastern direction. The mine lease area spans in two Districts, 406.385 hectares in Koraput and 21.69 hectares in Rayagada. The Singaramba Railway Station lies 3.0 km to the northeast, while the Laxmipur Railway Station is 4.5 km to the southeast. The project proponent has reported the absence of any perennial surface water bodies, streams, or natural drainage channels within the lease area. PP also submitted that there are no National Park, Wild Life Sanctuaries; Biosphere Reserves & Tiger Reserves present within the 10 km study area. However there are 9 Reserved Forests and 11 Protected Forests within 10 km radius study area namely Kodingamali RF, Kodingamali PRF, Champi RF, kendripadar RF, Bamandeba RF, Titigurha RF, Lakshmipur RF, Shankaraha RF, Minapai RF, Lakshmipur PF, Baghamari PF, Sargighati PF, Bagriguma PF, Masimandi PF, Raishila PF, Kakirimali PF, Kelar PF, Baghaparmar PF Kutili P.F & Kutinga P.F (0 to 9.5 km) Patagarha Nadi and Murani Nadi are present in the study area. Apart from these, Patagarha Nala, Baghri Nala, Debagarha Nala and few other Nalas exist within the study area (4.0 to 9.5 km). Stage I & Stage II Forest Clearance was accorded by MoEF&CC over 434.935 ha of forestland (428.075 ha ML + 6.860 ha approach road) vide F. No 8-46/2016-FC dated 25.09.2017

PP further reported that lease deed over an area of 428.075 ha was executed for District Koraput and District Rayagada for a period of 50 years on 10.01.2017. Review of Mining Plan & Progressive Mine Closure Plan for (Bauxite Production Capacity: 6.0 MTPA), approved by IBM, Bhubaneswar Vide letter No. RMP/A/21-ORI/BHU/2021-22/1206, dated 10.11.2021 (Valid up to 2026-27).

To ensure ecological restoration and environmental sustainability, the post-mining land-use plan includes 368.684 hectares of reclaimed excavated area, 8.438 hectares for roads, 25.261 hectares for infrastructure, 4.169 hectares for mineral storage, 3.425 hectares for a mineral separation plant, and 18.098 hectares dedicated to green belt plantation.

The total water requirement for the project is 475 KLD, comprising 400 KLD of fresh water and 75 KLD of treated water.

Fresh water will be sourced from Dharua Nala (surface water), while rainwater and treated water will meet the remaining demand. Permission for the withdrawal of surface water from Dharua Nala has been obtained from the Department of Water Resources, Government of Odisha. There will be no intersection with the groundwater table at any stage of the mining operations.EAC suggested that PP should explore creation of pond in the lease area for water storage and use in project operations.

To enhance ecological restoration and biodiversity, the project proponent has undertaken greenbelt and plantation initiatives. Currently, 12.87 hectares have been covered with greenbelt and plantation, with 22,971 saplings planted along the lease periphery and backfilled areas. At the conceptual stage, a total of 147.867 hectares will be developed under greenbelt/plantation, with approximately 360,464 saplings planted at a density of 2,500 saplings per hectare. The total expenditure allocated for the greenbelt and plantation activities is 9.31 crore, with a proposed budget of 12.7crore. EAC members recommended to complete the remaining safety belt/zone plantation till coming monsoon (i.e., till October 2025)

The Committee has emphasized the adoption of environmentally sustainable mining practices, recommending the use of a combination of ripper dozers and surface miners for the excavation of soft bauxite deposits. Furthermore, the Committee has advised the deployment of advanced mining machinery and minimize drilling and blasting within the mine lease area.

Regarding transportation of mined out mineral, PP submitted that the excavated Bauxite is being/will be transported from mine face to crushers located within the mine lease area by dumpers via haul road. The crushed ore is being/will be transported via Road through Tippers to the Railway siding near Kakriguma (~24.0 km from ML area) from where the ore is being/will be further dispatched from direct selling to the prospective buyers.

EAC noted that during the plan and conceptual periods, all generated mineral rejects will be blended with high-grade ore to ensure sustainable and optimal utilization of mineral resources. As a result, separate stacking of mineral rejects is not necessary. An area within the leasehold has been identified for temporary storage of mineral rejects.

6. Based on aforesaid discussions and presentation made by the Project Proponent and the Consultant, the Expert Appraisal Committee (EAC), in its 44th EAC meeting held on 15-16th May 2025, under the provisions of the EIA Notification, 2006 and its subsequent amendments, **recommended** the proposal for the grant of Terms of Reference for Kodingamali Bauxite Mine with enhancement in production capacity of Bauxite from 3.6 to 6.0 MTPA [ROM 6.0 MTPA, OB/Waste 3.29 MTPA, Top Soil 0.22 MTPA (Total Excavation 9.51 MTPA)] with ML Area of 428.075ha by M/s Odisha Mining Corporation Limited located at Village Kodingamali, Tehsil Laxmipur & Kashipur, District Koraput & Rayagada, Odisha and is subject to certain specific conditions, in addition to the standard conditions applicable to Non-Coal mining projects (Annexure I).

7. The details of the project are enclosed as Annexure (II).

8. The Ministry of Environment, Forest and Climate Change (MoEF&CC) has reviewed the proposal in accordance with the provisions of the Environmental Impact Assessment (EIA) Notification, 2006, and its subsequent amendments. Pursuant to the acceptance of the recommendations of the Expert Appraisal Committee (EAC), the Ministry hereby grants the Terms of Reference (ToR) for the Kodingamali Bauxite Mine, involving enhancement of bauxite production capacity from 3.6 to 6.0 million tonnes per annum (MTPA) [comprising 6.0 MTPA ROM, 3.29 MTPA overburden/waste, and 0.22 MTPA topsoil, with total excavation of 9.51 MTPA], over a mining lease area of 428.075 hectares, located at Village Kodingamali, Tehsils Laxmipur and Kashipur, Districts Koraput and Rayagada, Odisha, proposed by M/s Odisha Mining Corporation Limited; under the provisions of the EIA Notification, 2006, and its amendments.

9. The Ministry reserves the right to stipulate additional conditions, if found necessary.

10. The Terms of Reference (ToR) granted to the aforementioned project are under the provisions of the EIA Notification, 2006. This does not tantamount to approvals, consents, or permissions that are required to be obtained under any other Act, Rule, or Regulation. The Project Proponent is obligated to obtain approvals and clearances under any other applicable Acts, Regulations, or Statutes for the project.

11. You are requested to kindly submit the final EIA/EMP, prepared as per the Terms of Reference (ToRs), to the Ministry for consideration of the proposal for environmental clearance within 4 years, as per the extant rules of the Ministry

notified from time to time.

12. The consultants involved in the preparation of the EIA/EMP report, after accreditation with the Quality Council of India/National Accreditation Board of Education and Training (QCI/NABET), are required to include a certificate in this regard in the EIA/EMP reports. This certificate should also cover the data provided by other organizations/laboratories, including their status of approvals and other relevant information.

13. This issues with the approval of the Competent Authority.

Copy To

i. **The Secretary,** Ministry of Mines, Government of India ShastriBhawan, New Delhi.
ii. **The Chief Secretary,** Government of Odisha, Secretariat, Bhubaneswar.
iii. **The Secretary,**Department of Environment, Government of Odisha, Secretariat, Bhubaneswar.
iv. **The Secretary,** Department of Mines and Geology, Government of Odisha, Secretariat, Bhubaneswar.
v. **The Secretary,** Department of Forests, Government of Odisha, Secretariat, Bhubaneswar.
vi. **The Secretary,** Department of Steel and Mines, Government of Odisha, Secretariat, Bhubaneswar.
vii. **The Member Secretary,** Odisha Pollution Control Board, PariveshBhawan, A/118 Nilakantha Nagar, Unit-VIII, Bhubaneswar-751012.
viii. **The Deputy Director General of Forests (C),** Ministry of Environment, Forest and Climate Change, Regional Office, A/3, Chandersekharpur, Bhubaneswar – 751023.
ix. **The Chief Wildlife Warden,** PrakurtiBhawan, 5th floor, BDA Apartment, Nilakanthanagar, Nayapalli, Bhubaneswar-751012, Odisha.
x. **The Chairman,** Central Pollution Control Board, PariveshBhawan, CBD-Cum-Office Complex, East Arjun Nagar, New Delhi-110 032.
xi. **The Controller General,** Indian Bureau of Mines, Indira Bhavan, Civil Lines, Nagpur-440001.
xii. **The Member Secretary,** Central Ground Water Board, Ministry of Agriculture and Irrigation, 12/1 Jam Nagar House, Shahjahan road, New Delhi 110011.
xiii. **The District Collector, Koraput** District, Govt. of Odisha.
xiv. **The District Collector, Rayagada** District, Govt. of Odisha.
xv. **Guard File.**
xvi. **PARIVESH Portal.**

Annexure 1

Specific Terms of Reference for (Mining Of Minerals)

1. Specific Conditions

S. No	Terms of Reference
1.1	PP needs to explore mining/excavation with the help of ripper dozer, surface miner within the ML area to excavate the Bauxite so that drilling and blasting is minimized. PP should submit the study report for the feasibility of using ripper dozer, surface miner in this project.
1.2	PP should consult with State Forest department with respect to the protection and conservation of elephant cited within/near to ML area in order to avoid any human-wildlife conflict and take their recommendations in this regard.
1.3	The natural water bodies and or streams which are flowing in and around the mine lease area should not be disturbed. PP shall consult state Water Resource department and SPCB regarding

S. No	Terms of Reference
	Nallah/Stream and follow their instructions for the safeguards. Check dams, gabion structures should be planned in consultation with State Forest Department to prevent any silt flow in the natural stream/nallahs around the mine lease area.
1.4	The Project Proponent needs to engage wildlife experts during the traffic study to avoid any mortality of wildlife from the movement of dumpers through the proposed transportation area.
1.5	The Project proponent needs to submit the detailed scientific plan for constructing the retaining wall/ gabion structures/ other structures so that there is no flow of dump/ore silt outside the lease area.
1.6	PP needs to submit the installation plan of CAAQMS and the online data generated by it should be shared on a real time basis with State PCB/ CPCB.
1.7	The Project proponent needs to submit the detail plan for reducing the consumption of diesel w.r.t. the instant proposal.
1.8	The Project proponent needs to submit a detailed plan showing more use of renewable energy in the project.
1.9	The Project Proponent needs to submit the detailed scientific study on flora and fauna and also to highlight on the endangered species. The Project Proponent needs to verify the list as per the latest Wildlife Protection Amendment Act, 2022 and shall accordingly prepare a Wildlife Conservation Plan. PP needs to submit the proof of submission of Wildlife Conservation Plan to State Authorities.
1.10	The Project Proponent needs to monitor the ambient air quality and noise level at the mine lease boundary, nearest village, crusher, predominant downwind direction and at other sensitive receptors. Accordingly, Project Proponent shall propose to install Continuous Ambient Air Quality Monitoring Station within certain timeline.
1.11	The Project Proponent should prepare the EMP considering the scenario of pollution to be generated for normative and peak total excavation for assessing air pollution, noise level and ground vibration.
1.12	The Project Proponent needs to carry out the Public Hearing as per provisions of EIA Notification, 2006. PP should also submit the time bound action plan on concerns of the public through a separate budget with capital expenditure with a timeline of 3 years. The Project proponent shall ensure that the activities proposed under the public hearing shall be different from the CSR activities. PP needs to submit a tangible and monitorable action plan for meeting the public hearing commitments.
1.13	The Project Proponent needs to undertake the enumeration of the species within the mine lease area before cutting. The Project Proponent also needs to submit the compensatory afforestation plan for the number of trees to be cut in the mine lease area and also to explore the possibility of tree transplantation.
1.14	The Project Proponent needs to submit the action plan for undertaking the plantation along the 7.5m barrier, safety zone of tar road/cart tracks, electric line etc., PP should also submit the details number of saplings to be planted (2500/ha), type of saplings proposed and the area to be covered under greenbelt/plantation along with the timeline and budget. PP shall ensure quality planting stock of appropriate height and collar girth. In case of tall seedlings, PP shall plant seedlings with root biomass to commensurate with seedling height so that the seedling can meet the growth parameters

S. No	Terms of Reference
	after out planting. The greenbelt/plantation plan shall be prepared in such a way that the ecology of the area shall be restored.
1.15	The Project Proponent shall carry out the assessment of impact due to the proposed project as per the guidelines issued by the Central Ground Water Authority from time to time and submit the same as a part of the EIA/EMP.
1.16	The project proponent shall conduct hydrological study for the project if it involves intersection of ground water table as per the guidelines issued by the Central Ground Water Authority from time to time and submit the same as a part of the EIA/EMP.
1.17	The Project Proponent shall explore the possibility of reduction of specific water requirement by optimization / technology up gradation, etc. The efforts shall be delineated in the EIA/EMP.
1.18	The Project Proponent shall prepare the scheme for mandatory recycle/re-use of water as specified by the Central Ground Water Authority for different category areas seeking NoC for ground water withdrawal and the shall submit as part of EIA/EMP report.
1.19	The Project Proponent shall conduct drone survey of the mine lease area and buffer area and submit during the appraisal for EC.
1.20	The Project Proponent shall provide the details of Special Pollution Control/ Abatement devices that have been installed/ proposed to be installed within the ML area and how does the technology compare with the best available technology in the field.
1.21	PP to engage a reputed national institute for conducting both blasting and vibration studies and also a scientific assessment of air overpressure and fly rock distances following blasting.
1.22	The Project Proponent needs to reduce the dependency upon the ground water and it shall plan to construct a water reservoir within the lease area for meeting its day-to-day water needs.
1.23	PP needs to submit an action plan as per Ministry's OM dated 24.07.2024 wherein it is stated that the plantation of saplings shall be carried out in the earmarked 33% greenbelt area as part of the tree plantation campaign "EK Ped Ma ke Naam" (एक पेड़ माँ के नाम) and the details of the same shall be uploaded in the MeriLife portal(https://merilife.nic.in).
1.24	The Project Proponent needs to submit the detailed R&R plan covering all the components viz. number of Project Affected Families (PAF) and details of the land owned by them, break up of total compensation to be paid including method of calculation including the sources/references adopted and mode of payment etc. The Project Proponent needs to submit the plan for Socio economic development of the neighbourhood habitats based on the need based survey along with the time bound action plan. Further, PP needs to submit the possession certificate and timeline for acquiring the land at the time of submission of EC proposal.
1.25	The PP shall ensure compliance of MoEFCC O.M. dated 14.01.2025 regarding streamlining the implementation of GSR 702 and GSR 703 dated 12.11.2024.
1.26	PP should prepare an action plan enumerating measures to be taken so that there is no pilferage of minerals during transportation. Training of supervisors, workers, and operators should be part of the action plan. Route plan for Ore transportation should be submitted.

S. No	Terms of Reference
1.27	PP should prepare a plan specifying the places where fixed water sprinklers, rain gun/ fog cannon may be deployed in project. PP should also tell the numbers of water tankers that may be utilised in the project and nearby places with proper justification.

Standard Terms of Reference for (Mining of minerals)

1.

S. No	Terms of Reference
1.1	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994
1.2	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given
1.3	All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee
1.4	All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the areashould be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone)
1.5	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics
1.6	Details about the land proposed for mining activities should be givenwith information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority
1.7	It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large,may also be detailed in the EIA Report
1.8	Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided
1.9	The study rea will comprise of 10 km zone around the mine lease from lease periphery and the data

S. No	Terms of Reference
	contained in the EIA such as waste generation etc. should be for the life of the mine / lease period
1.10	Land use of the study rea delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given
1.11	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given
1.12	A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees
1.13	Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished
1.14	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated
1.15	The vegetation in the RF / PF areas in the study area, with necessary details, should be given
1.16	A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted
1.17	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlifeand copy furnished
1.18	A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled- I fauna found in the study area, the necessary plan alongwith budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost
1.19	Proximity to Areas declared as Critically Polluted or the Project areas likely to come under the

S. No	Terms of Reference
	Aravali Range, (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered
1.20	Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL. HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority)
1.21	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report
1.22	One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)]primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given
1.23	Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map
1.24	The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated
1.25	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided
1.26	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided
1.27	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided
1.28	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the

S. No	Terms of Reference
	working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished
1.29	Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out
1.30	Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same
1.31	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given.The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution
1.32	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines
1.33	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report
1.34	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report
1.35	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed
1.36	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations
1.37	Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation
1.38	Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project

S. No	Terms of Reference
1.39	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project
1.40	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given
1.41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out
1.42	A Disaster management Plan shall be prepared and included in the EIA/EMP Report
1.43	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc
1.44	Besides the above, the below mentioned general points are also to be followed:- a) All documents to be properly referenced with index and continuous page numbering. b) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated. c) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project. d) Where the documents provided are in a language other than English, an English translation should be provided. e) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted. f) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed. g) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation. h) As per the circular no. J-11011/618/2010-IA.II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable. i) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area

Additional Terms of Reference

N/A

Annexure-II

Kodingamali Bauxite Mine with enhancement in production capacity of Bauxite from 3.6 to 6.0 MTPA [ROM 6.0 MTPA, OB/Waste 3.29 MTPA, Top Soil 0.22 MTPA (Total Excavation 9.51 MTPA)] with ML Area of 428.075ha by M/s Odisha Mining Corporation Limited located at Village Kodingamali, Tehsil Laxmipur & Kashipur, District Koraput & Rayagada, Odisha

The details of the project: -

The details of the project as ascertained from the document submitted by the Project Proponent are given as under:

i. Project details :

Name of the Proposal	Kodingamali Bauxite Mine with enhancement in production capacity of Bauxite from 3.6 to 6.0 MTPA [ROM 6.0 MTPA, OB/Waste 3.29 MTPA, Top Soil 0.22 MTPA (Total Excavation 9.51 MTPA)] with ML Area of 428.075ha by M/s Odisha Mining Corporation Limited located at Village Kodingamali, Tehsil Laxmipur & Kashipur, District Koraput & Rayagada, Odisha.	
Location	Village	Kodingamali
	Tehsil/Taluka	Laxmipur & Kashipur
	District	Koraput & Rayagada
	State / UT	Odisha
	Latitudes	19º01’46” N to 19º05’14” N
	Longitudes	83º03’22” E to 83º05’12” E
	Sol Toposheet No.	Core Zone: E44F4(65M/4) Buffer Zone: E44F4 (65M/4); E44E16 (65I/16); E44K13 (65J/13), E44L1 (65N/1)
Company’s Name	Odisha Mining Corporation Limited	

Accredited Consultant and certificate sno. and Validity	J.M. EnviroNet Pvt. Ltd. Accredited EIA Consultant by NABET (QCI) Certificate no. NABET/EIA/2326/RA 0308, dated 29.11.2023 which is valid up to 07.08.2026.
KML file	KML has been uploaded in Form I
Seismic zone	Zone – II as per IS: 1893 (Part-I): 2002

ii. Category details:

Category of the project	Category “A”
Schedule No.	Project or Activity 1 (a) “Mining of Mineral”
Mining lease Area (MLA) (In ha.)	428.075ha
General Conditions (if any)	Not Applicable

iii. ToR/EC Details:

Date of application	Proposal No/ File No	Consideration by EAC	Details of ToR	Date of accord
17.02.2020	File No. J-11015/439/2007. IA. II(M) Proposal No. IA/OR/MIN/143523/2020	17th EAC meeting of the Expert Appraisal Committee held during 28th - 29th May, 2020 & 1st June 2020	Form – I and Pre-Feasibility Report	17.06.2020
07.05.2025	File No. J-11015/439/2007. IA. II(M) Proposal No. IA/OR/MIN/535212/2025	44th EAC meeting of the Expert Appraisal Committee (Non-Coal mining sector) to be held on 15.05.2025	CAF, Form - I (Part A and B) / Annexure I/ ToR; Pre-Feasibility Report; Brief Summary; Approved Mining Plan & Progressive Mine Closure Pla	

Date of application	Proposal No/ File No	Consideration by EAC	Details of EC	Date of accord
15.05.2007	File No. J-11015/439/2007. IA. II(M)	-	EC for 3.0 Million TPA Bauxite Production capacity was	28.05.2008

	Proposal No. IA/OR/MIN/6980/2007		granted in favour of M/s. Orissa Mining Corporation Ltd.	
10.11.2016	File No. J-11015/439/2007. IA. II(M) Proposal No. IA/OR/MIN/6980/2007	29-30th May, 2017, July 24, 2017 & August 29-30th , 2017	Amendment in EC for proposal of inclusion of Road Transport as a mode of mineral transport, incorporating correction in ML area from 447.15 ha to 428.075 ha, updating the land use pattern in line with the stage I FC granted by MoEF&CC and incorporating supply of 400 KLD water from water resource department, Govt. of Odisha as the source of water for the project in favour of M/s Orissa Mining Corporation Ltd.	24.11.2017
09.10.2018	File No. J-11015/439/2007. IA. II(M) Proposal No. IA/OR/MIN/6980/2007	23rd -24th October, 2018	Amendment in EC for “Transportation of 3.0 MTPA Bauxite ore by Road” in favour of M/s. Orissa	17.12.2018

			Mining Corporation Ltd.	
09.04.2020	File No. J-11015/439/2007. IA. II(M) Proposal No. IA/OR/MIN/151193/2020	16th EAC Meeting held during 5th- 6th May, 2020	Amendment in Environment Clearance for "Transportation of 0.7 MTPA left over stock of Bauxite Ore through road transportation" in favour of M/s. Orissa Mining Corporation Ltd. (*One time permission*)	29.05.2020
31.03.2021	File No. J-11015/439/2007. IA. II(M) Proposal No. IA/OR/MIN/202346/2021	9th - 15th June, 2021	Amendment in Environment Clearance for "Transportation of 1.43 million tons of left over stock of Bauxite Ore by road" in favour of M/s. Odisha Mining Corporation Ltd. (One time permission)	05.08.2021
18.12.2021	File No. J-11015/439/2007. IA. II(M) Proposal No. IA/OR/MIN/245821/2021	45th EAC meeting held during 24 – 27 January 2022	Amendment in Environment Clearance w.r.t to transportation of leftover stock of 7,34,767.4 Tonnes of Bauxite by road, over and above the permitted EC capacity of 3.0	25.02.2022

			MTPA during the FY 2022-23 in favour of M/s. Odisha Mining Corporation Ltd. (One time permission)	
14.02.2025	File No. J-11015/439/2007. IA. II(M) Proposal No. IA/OR/MIN/523482/2025	41st meeting of the Expert Appraisal Committee (Non-Coal Mining Sector) held on 27.02.2025	EC for expansion under Para 7 (ii) (a) of EIA Notification, 2006 as per MoEF&CC OM dated 11.04.2022 & 30.05.2022 (for expansion in Bauxite Production capacity from 3.0 MTPA to 3.6 MTPA) in favour of M/s. Odisha Mining Corporation Ltd.	15.04.2025

iv. Details of Mine Lease:

S. No.	Prospecting License/Letter of Intent (LoI)/ Grant of Mine lease and Lr No	Date of the grant	Name of the Mineral & (Major/Minor)	Period of Grant	Granted by	Mine lease area in Ha
1.	Initially, the Mining Lease grant order over an area of 715.075 ha in favour of M/s. Odisha Mining Corporation Limited.	01.02.1999	Bauxite (Major)	30 years	Govt. of Odisha	715.075 ha

2.	The ML area was further reduced from 447.25 ha to 428.31 ha (Deleting the non-mineralized area).	11.09.2015	Bauxite (Major)	-	Department of Steel and Mines, Govt. of Odisha	428.31 ha
3.	ML Area has been revised to 428.075 ha vide letter no. 11071/DM.	17.12.2015	Bauxite (Major)	-	Director of Mines, Govt. of Odisha	428.075 ha
4.	The mining lease over an area of 428.075 ha was executed for District Koraput and for District Rayagada in favour of M/s. Odisha Mining Corporation Limited.	10.01.2017 & 11.01.2017	Bauxite (Major)	50 years	Govt. of Odisha	428.075 ha

S. No.	Details of grant of Mine Lease deed execution	Period of Grant		Name of the Mineral	Mine lease area in Ha
		From	To		
1.	The Mining Lease over an area of 428.075 ha was executed on 10.01.2017 for District Koraput and on 11.01.2017 for District Rayagada in favour of M/s. Odisha Mining Corporation Limited	10.01.2017	09.01.2067	Bauxite	428.075 ha

v. Land Use/Land Cover of the Mine Lease Area:

Private land	0
Government land	0

Forest land	428.075 ha (406.385 ha under Kodingamali Reserve Forest + 21.69 ha under Kodingamali Proposed Reserve Forest)
Total Mining lease area (MLA), ha	428.075 ha
Private land for crusher, workshop & other infrastructure outside the MLA	No infrastructure is existing/ proposed outside the ML area.
Additional information (if any)	Stage I Forest Clearance over 434.935 ha of forest land (428.075 ha ML including 18.098 ha safety zone + 6.860 ha approach road) was accorded by MoEF&CC vide F. No 8-46/2016-FC dated 17.04.2017. Stage II Forest Clearance for the same area has been accorded by MoEF&CC vide letter no. F. No. 8-46/2016-FC dated 25.09.2017. Final diversion order was obtained from Govt. of Odisha, Forest and Environment Department, Bhubaneshwar vide letter No. 10F (Con)1/2017/20540/F&E, dated 07.10.2017.

vi. Mining Plan details

Mining Plan including Progressive Mine Closure Plan (approved by Indian Bureau of Mines/DMG)	Letter No.	RMP/A/21-ORI/BHU/2021-22/1206
	Date	10.11.2021
	Mineral & (Major/Minor)	Bauxite (Major)
	Mine Lease Area, Ha	428.075 ha
	Validity	31.03.2027
Additional information (if any)	The Review of Mining Plan & Progressive Mine Closure Plan (FY: 2022-23 to 2026-27) over an area of 428.075 ha for Bauxite Production Capacity: 6.0 Million TPA has been approved by Indian Bureau of Mines, Bhubaneswar vide Letter no. RMP/A/21-ORI/BHU/2021-22/1206 dated 10.11.2021.	
Mining Parameters	Quantitative Description	
Method of Mining	Fully Mechanized Opencast Mining Method	

Drilling/Blasting	Drilling is being/will be carried out by sharp drill bits. Drill equipped with in-built arrangement of water sprinkling for dust suppression and separate dust collection system. Controlled Blasting is being/will be carried out using NONEL detonating fuse as multi -row system of firing is being/will be done to reduce the ground vibration, noise, fly rock etc. due to blasting.
Geological Reserves	79.33 Million Tonnes (as on 30.06.2021) 68.08 Million Tonnes (as on 31.03.2025)
Mineable Reserves	75.79 Million Tonnes (as on 30.06.2021) 64.54 Million Tonnes (as on 31.03.2025)
Breakup of Total Excavation (Topsoil/OB/SB/IB/Mineral Rejects/Waste, MTPA)	Total Excavation: 9.51 Million TPA (For Expansion in Bauxite production capacity from 3.6 MTPA to 6.0 MTPA) 1. Bauxite: 6.0 Million TPA 2. OB/Waste: 3.29 Million TPA 3. Top Soil: 0.22 Million TPA
Life of mine	Considering Bauxite Production capacity as 6.0 Million TPA, based on the Mineable Reserves, the Life of Mine will be: ~13 years [75.79 Million Tonnes (as on 30.06.2021)] ~ 11 Years [64.54 Million Tonnes (as on 31.03.2025)]
Mine Bench Height & Bench Width	Bench Height: 10 m (maximum) Bench Width: 10 m (minimum)
No. of Mine Benches	10
Existing Depth, m bgl	Quarry 1: 1155 AMSL Quarry 2: 1094 AMSL
Ultimate Depth of Mining, m bgl	1080 m AMSL
Ground Water Table, m bgl	Pre-Monsoon: 8.0 m bgl to 24.0 m bgl Post- Monsoon: 6.0 m bgl to 22.8 m bgl

Details of ground water intersection	The mine site is situated on top of Kodingamali Plateau having an average height of ~300 m from the ground level and the depth of workings will be at a maximum 50-60 m bgl from the original surface level. The water table in the area ranges between 6.0 m to 24.0 m bgl from ground level. Hence, the water table is not intersected at any stage of mining.
Individual bench slope	70°-80°
Overall pit slope	36°
Details of existing/ proposed Crusher	Existing Crusher capacity: 2 x 500 TPH Proposed Crusher Capacity: 2400 TPH {*Existing Crushers (2 x 500 TPH) will be phased out after the installation of Proposed Crusher (2400 TPH)}
Mineral Beneficiation	None
RoM output size	< 150 mm
Transportation details including capacity of dumper/tipper, mode of transport and distance	The excavated Bauxite is being/will be transported from mine face to crushers located within the mine lease area by dumpers via haul road. The crushed ore is being/will be transported via Road through Tippers to the Railway siding near Kakriguma (~24.0 km from ML area) from where the ore is being/will be further dispatched for sale to the prospective buyers.
Generation of Topsoil/OB & its Management during plan period & conceptual period	Top Soil: 2.16 Million Tonnes of Top Soil {1.2 CuM} will be generated during the entire life of mine. Out of this, 0.19 Million Tonnes of Top Soil has been already generated during FY 2022-2025. Therefore, 1.97 Million Tonnes of Top Soil will be generated during the entire life of mine. OB/Waste: 44.28 Million Tonnes of OB/Waste {24.60 Million CuM} will be generated during the entire life of mine. Out of this, 3.0 Million Tonnes OB/Waste has been already generated during FY 2022-2025. Therefore, 41.23 Million Tonnes of OB/Waste will be generated during the entire life of mine.

Generation of Mineral Rejects/ Waste & its Management during plan period & conceptual period	All the generated mineral rejects will be blended with high grade ore for sustainable and optimum use of mineral resources. Hence, separate stacking of mineral reject is not required. If required Mineral Rejects ore can be sold directly, as per market requirement in future. However, a space has been designated for mineral reject within the lease hold area for temporary storage.

vii. Water requirement:

Total water requirement	475 KLD	Fresh Water	400 KLD
		Treated Water	75 KLD
Source	Water is being/will be sourced from Dharua Nala (Surface water: 400 KLD), Rain water and Treated water (75 KLD).		
Permission for withdrawal/intersection along with details of grant and its validity	The permission for drawl of Surface water from Dharua Nala has been obtained from Department of Water Resources, Government of Odisha, vide There is no possibility of groundwater table intersection by mine workings at any stage of mining operation.		

viii. Nearest village/town/ highway/interstate boundary/railway station/water bodies/monument/ forest

Particular	Particular's Name	Distance &Directions
Nearest Village	Biriguda	~0.8 km in East direction
Nearest Town/City	Rayagada	~35.0 km in NE direction
	Laxmipur	~6.5 km ins SE direction
Nearest State/National Highway	SH-4	~4.5 km in SSE direction
Interstate Boundary	Nil	ML area falls under two Districts: Koraput and Rayagada
Railway Station/Railway line	Singaramba Railway Stations	~3.0 km in NE Direction
	Laxmipur Railway Stations	~4.5 km in SE Direction
Water Bodies	Patagarha Nadi	~4.0 Km in NNE Direction
	Nala	~4.0 Km in SSE Direction

	Nala	~5.0 Km in ENE Direction
	Murani Nadi	~6.0 Km in SW Direction
	Patagarha Nala	~7.5 Km in NW Direction
	Nala	~8.5 Km in WSW Direction
	Baghri Nala	~9.0 Km in West Direction
	Debagarha Nala	~9.5 Km in SSW Direction
Forests	There are 9 Reserved Forests and 11 Protected Forests within 10 km radius study area:	
	Kodingamali R.F.	Core Zone
	Kodingamali Proposed R.F.	Core Zone
	Champi R.F	~3.5 Km in SW Direction
	Kendripadar R.F.	~4.0 Km in NE Direction
	Bamandeba R.F	~5.5 Km in SSW Direction
	Titigurha R.F	~6.5 Km in NE Direction
	Lakshmipur R.F	~8.0 Km in SE Direction
	Shankaraha R.F	~8.5 Km in NE Direction
	Minapai R.F	~9.0 Km in ESE Direction
	Lakshmipur P.F	~4.0 Km in SSE Direction
	Baghamari P.F.	~4.0 Km in NE Direction
	Sargighati P.F.	~6.0 Km in East Direction
	Bagriguma P.F.	~6.5 Km in NE Direction
	Masimandi P.F	~7.0 Km in NW Direction
	Raishila P.F	~8.0 Km in SSE Direction
	Kakirimali P.F	~8.0 Km in South Direction
	Kelar P.F	~8.0 Km in SW Direction
	Baghaparmar P.F.	~9.0 Km in SSW Direction
	Kutili P.F	~9.0 Km in ENE Direction
	Kutinga P.F.	~9.5 Km in East Direction

ix. Presence of Environmentally Sensitive areas in the study area

Forest Land/Protected Area/Environmental Sensitivity Zone	Yes/No	Details of Certificate/letter issued by the concerned Department mentioning the Lr no, date of grant and remarks
Forest Land within the mine lease area and (if yes) status of Forest Clearance	Yes	The Mining Lease area of Kodingamali Bauxite Mine is 428.075 ha and the entire ML area is Forest Land. Out of 428.075 ha, 406.385 ha area falls under Kodingamali Reserve Forest and 21.69 ha falls under Kodingamali Proposed Reserve Forest. Stage I Forest Clearance over 434.935 ha of forest land (428.075 ha ML including 18.098 ha safety zone + 6.860 ha approach road) was accorded by MoEF&CC vide F. No 8-46/2016-FC dated 17.04.2017. Stage II Forest Clearance for the same area has been accorded by MoEF&CC vide letter no. F. No. 8-46/2016-FC dated 25.09.2017. Final diversion order was obtained from Govt. of Odisha, Forest and Environment Department, Bhubaneshwar vide letter No. 10F (Con)1/2017/20540/F&E, dated 07.10.2017.
National Park	No	No National Park, Wildlife Sanctuaries, Eco Sensitive Zone (ESZ)/ Eco-Sensitive Area (ESA) etc. within 10 km radius study area.
Wildlife Sanctuary	No	
Elephant/Tiger Reserve	No	
Eco-Sensitive Zone(ESZ)/Eco-Sensitive Area(ESA)	No	
Coastal Regulation Zone (CRZ)	No	-
Schedule-I species (Nos. and name of schedule-I species with authenticated letter)	Yes	There are 29 schedule - I species *Canis aureus* (Jackal), *Urva edwardsii (*Indian grey mongoose*), Urva auropunctata (*Small Indian Mongoose*), Gracula religiosa (*Common Hill Myna*), Bubo bubo (*Eurasian Eagle Owl*), Naja naja (*Indian Cobra*), Varnus bengalensis (*Bengal monitor*), Felis chaus (*Jungle Cat*), Prionailurus bengalensis (*Leopard cat*), Vulpes bengalensis (*Bengal fox*), Canis lupus*

		*(*Grey wolf*), Rusa unicolor(*Sambar deer*), Tetracreus quadricornis (Chousingha/Four-horned Antelope), Lutrogale perspicillata (*Smooth-coated otter*), Mellivora capensis (*Ratel/Honey Badger*), Melursus ursinus (*Sloth bear*), Ratufa indica (*Indian giant squirrel*), Viverricula indica (*Small Indian civet*), Paradoxurus hermaphroditus (*Asian palm civet*), Moschiola indica (*Mouse deer/ Indian Chevrotain*), Hyaena hyaena (*Hyaena*), Hystrix indica (*Indian Porcupine*), Gallus sonneratii (*Grey junglefowl*), Pavo cristatus (*Indian peafowl*), Anthracoceros coronatus (*Malabar pied hornbill*), Python molurus (*Indian rock python*), Ptyas mucosa (*Indian rat snake/Dhaman*), Daboia russelii (*Russell's viper*), Fowlea piscator (*Checkered Keelback*)* were found in Schedule- I according to Indian Wildlife Protection Act, 1972 as amended on 20th Dec. 2022 in the study area . The authenticated list of Flora & Fauna has been obtained from Divisional Forest Officer, Koraput Forest Division vide letter 280/4F(Misc.) dated 27.01.2025 and from Divisional Forest Officer, Rayagada Forest Division vide letter 216/4F(Misc.) 1367/2025 dated 13.01.2025.
Wildlife Conservation Plan	Yes	Site-Specific Wildlife Conservation Plan (SSWLCP) has been approved from Principal Chief Conservator of Forests (Wildlife) & Chief Wildlife Warden vide Memo No. 682 dated 27.01.2010, which was later revised via Memo No. 5845 dated 06.07.2017.

x. Greenbelt/Plantation details:

Proposed area for green belt/plantation and no. of saplings proposed	At conceptual stage, total area covered under greenbelt/plantation will be 147.867 ha (which comprises of 18.098 ha area under 7.5 m greenbelt along lease periphery, Plantation on 125.60 ha on the backfilled area and 4.169 ha area under mineral storage). The total numbers of saplings proposed to be planted are 360464.

Budget for greenbelt & plantation till the end of life of mine.	Tentative Budget proposed for greenbelt & plantation till the end of life of mine is Rs. 12.7 Crore.
Budget for nursery	N/A
Details of existing plantation and its survival rate	Presently, 22971 trees have already been planted in 12.87 ha area with a survival rate of 90% which is being maintained.
No. of tree cuts in the mine lease area and compensatory afforestation	No cutting of tree is envisaged for the proposed expansion project.
Particulars for Green belt/plantation	Area covered (In Ha)
7.5 m barrier & non-mineralized zone	18.098 ha
50 m safety zone of nallah, roads, electric lines	Nil
500 m safety zones of nearest habitation villages	Nil

xi. Baseline detail:

Baseline Data (Air / Water / Noise / Soil / Hydro geological study/ Traffic Study/ others)	
Period of baseline data collection	October 2024 to December 2024
Season(Summer/ Pre-monsoon/ Post-monsoon/ Winter)	Post Monsoon Season
Predominant Wind direction (From)	North East
Ambient Air Quality (no. of locations) and results	11
Noise level (no. of locations) and results	11
Water Quality (no. of locations) and results	Ground water: 09
	Surface water: 06
Soil Quality (no. of locations) and results	10

xii. Details of CTE/CTO, Certified Compliance Report, Certified Production Details from the inception of the mine:

<table>
<tr><td>Particulars</td><td>Details of Letter along with date of grant and validity</td></tr>
<tr><td>Consent to Establish</td><td>CTE issued vide OM No.: 1620/IND-II-NOC-4373 dated 15.12.2017 and its revalidation issued vide OM No. 465/IND-II-NOC-4373 dated 11.01.2018.</td></tr>
<tr><td>Consent to Operate</td><td>CTO issued vide letter No. 6958/INDI-CON-6632, dated. 31.03.2025.</td></tr>
<tr><td>Certified Production Details from the inception of the mine (in tabular form against the EC capacity)</td><td>
<table>
<tr><th>S. No.</th><th>Year</th><th>EC sanctioned capacity (In MTPA)</th><th>Actual Production (MTPA)</th></tr>
<tr><td>1.</td><td>2017-18</td><td>3.0</td><td>0.053</td></tr>
<tr><td>2.</td><td>2018-19</td><td>3.0</td><td>2.7</td></tr>
<tr><td>3.</td><td>2019-20</td><td>3.0</td><td>3.0</td></tr>
<tr><td>4.</td><td>2020-21</td><td>3.0</td><td>2.9</td></tr>
<tr><td>5.</td><td>2021-22</td><td>3.0</td><td>3.0</td></tr>
<tr><td>6.</td><td>2022-23</td><td>3.0</td><td>3.0</td></tr>
<tr><td>7.</td><td>2023-24</td><td>3.0</td><td>3.0</td></tr>
<tr><td>8.</td><td>2024-25</td><td>3.0</td><td>2.15 (Up to Nov. 2024)</td></tr>
</table>
</td></tr>
</table>

xiii. Rehabilitation & Resettlement (R&R):

R & R details	This mine has been in operation since 2018 and the expansion is proposed within the existing ML area. The total mining lease area i.e. 428.075 ha is Forest land and Stage I and Stage II Forest Clearance for the same has already been accorded by MoEF&CC, New Delhi. Hence, Resettlement & Rehabilitation Action Plan is not applicable.

xiv. Court case details:

Court Case, No and its present status	No court case is pending for this mining project.
Undertaking by Project Proponent w.r.t court case	PP has submitted an undertaking for no court cases was pending against the project vide letter dated 09.05.2025

xv. Affidavit/Undertaking details:

Affidavit as per Ministry's OM dated 30.05.2018	PP has submitted an affidavit vide letter dated 04.01.2025

xvi. Details of project cost and employment:

Particular	(Rs. In Crore)
Total cost of EMP (Capital Cost of EMP + capital cost of Public Hearing)	This proposal is for ToR. Detailed EMP will be given in EIA/EMP Report.
Project Cost	Rs. 55.0 Crore
Employment	391 persons

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TOR COMPLIANCE

Point wise compliance of ToR points issued by MoEF&CC, New Delhi vide File no.: J-11015/439/2007.IA. II(M) Proposal No. IA/OR/MIN/535212/2025 dated 20.06.2025 for Expansion in Bauxite Production Capacity from 3.6 Million TPA to 6.0 Million TPA [ROM: 6.0 Million TPA, OB/Waste: 3.29 Million TPA, Top Soil: 0.22 Million TPA (Total Excavation: 9.51 Million TPA)] in Kodingamali Bauxite Mine (ML Area: 428.075 ha) located at Village: Kodingamali, Tehsil(s): Laxmipur & Kashipur, District(s) Koraput & Rayagada, State: Odisha of M/s. Odisha Mining Corporation Ltd.

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
A.	**As per Specific TOR**		
1.1	PP needs to explore mining/excavation with the help of ripper dozer, surface miner within the ML area to excavate the Bauxite so that drilling and blasting is minimized. PP should submit the study report for the feasibility of using ripper dozer, surface miner in this project.	Mining is being/will be done by fully opencast mechanized method using conventional mining technology i.e. Shovel- Dumper combination. However, the company will explore the possibility of use of Ripper- dozer, surface miner in the area and a study for the feasibility of using Ripper dozer, surface miner in this project is under process.	***Chapter 5,*** *Para 5.3, Pg no. 241-242*
1.2	PP should consult with State Forest department with respect to the protection and conservation of elephant cited within/near to ML area in order to avoid any human wildlife conflict and take their recommendations in this regard.	Site-Specific Wildlife Conservation Plan (SSWLCP) as per Indian Wildlife (Protection) Act, 2022 is under approval for active consideration from Divisional Forest Officer, Koraput Forest Division & Divisional Forest Officer Rayagada Forest Division. A request letter regarding the same has been submitted to Divisional Forest Officer, Kopraput Forest Division and Divisional Forest Officer Rayagada Forest Division and the same is enclosed with this EIA/EMP Report. Although no Elephant movement was observed in the area, Wildlife conservation Plan will be prepared in consultation with State Forest Department with respect to the protection of Elephant cited near to ML area, if any, and recommendations of the State Forest Department will be considered for implementation of protection & conservation measures to avoid human wildlife conflicts if any such incident occur.	***Chapter 4,*** *Para 4.5.7.1, Pg 227* ***Annexure X***
1.3	The natural water bodies and or streams which are flowing in and around the mine lease area should not	There is no perennial surface water body i.e. nalla (s) or streams within the lease area.	***Chapter 4,*** *Para 4.5.3.1,*

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
	be disturbed. PP shall consult state Water Resource department and SPCB regarding Nallah/Stream and follow their instructions for the safeguards. Check dams, gabion structures should be planned in consultation with State Forest Department to prevent any silt flow in the natural stream/nallahs around the mine lease area.	However, few springs of seasonal nature originates from foothills of Kodingamali plateau. Besides this, two Rivers and few Nalas exist within the study area viz. Patagarha Nadi (~4.0 Km in NNE Direction), Murani Nadi (~6.0 Km in SW Direction), Nala (~5.0 Km in ENE Direction), Nala (~5.0 Km in ENE Direction), Patagarha Nala (~7.5 Km in NW Direction), Nala (~8.5 Km in WSW Direction), Baghri Nala (~9.0 Km in West Direction) and Debagarha Nala (~9.5 Km in SSW Direction). These water bodies will not be impacted/disturbed due to the mining activities as these are distantly located. However, the following mitigation measures have been/will be adopted to control the surface run-off: ➢ Garland drains and Retaining walls have been/will be provided at the toe of the temporary waste dump to channelize the runoff water from the dumps and will be maintained after expansion also. ➢ A series of settling pits along with a main settling tank at the outlet of the garland drains will be provided to arrest the wash-off solid particles. ➢ Check dams with settling ponds are/will be provided to arrest the silt and suspended solids from surface run-offs.	*Pg 198-199*
1.4	The Project Proponent needs to engage wildlife experts during the traffic study to avoid any mortality of wildlife from the movement of dumpers through the proposed transportation area.	From the ML area, Bauxite produced from the mine is being transported via Road through Trucks to the Railway siding near Kakriguma After expansion, along with Kakriguma Railway siding; the ore will be also be transported to other Railway Sidings namely, Singaram, Rayagada and Dumriput. From the Railway Sidings, the ore is being/will be further dispatched for sale to the prospective buyers (for its used in Alumina & Aluminium Plants/Refinery).	***Chapter 4,*** *4.5.6 Pg no. 217-220*

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
		A Traffic study has been conducted at locations on all four Transportation routes. Proper measures will be adopted during transportation for protection of wildlife. A site-specific Wildlife conservation plan is under approval for active consideration and conservation measures will be suggested to minimize the impact of mining on surrounding Bio-diversity and to develop favourable environment for local flora & fauna. Protection measures have been/will be adopted and implemented accordingly, for conservation of wildlife.	*Para 4.5.7.2 Pg no. 226-*
1.5	The Project proponent needs to submit the detailed scientific plan for constructing the retaining wall/ gabion structures/ other structures so that there is no flow of dump/ore silt outside the lease area.	To control the Surface runoff, Garland drains and Retaining walls have been/will be provided at the toe of the temporary waste dump. A series of settling pits along with a main settling tank at the outlet of the garland drains will be provided to arrest the wash-off solid particles. To control silt and suspended solids from surface runoff, check dams with settling ponds have also been/will also be constructed. Presently, Garland Drains (Dimensions of exisitng Garland Drains: 6500 m x 1.5 m x 1 m) with Check dams and Retaining Walls (Dimensions of exisitng Retaining Wall: 5435 m x 1.5 m x 3 m) have been constructed. Garland Drains of dimensions 4500 x 1.50 x 1 m and Retaining Walls of dimensions 4500 x 1.50 x 3 m are proposed to be constructed.	***Chapter 4,*** *Para 4.5.3.1, Table 4.15 & 4.16 Pg. no. 198-201*
1.6	PP needs to submit the installation plan of CAAQMS and the online data generated by it should be shared on a real time basis with State PCB/ CPCB.	Noted and will be complied with. Continuous Ambient Air Quality Monitoring stations will be established within the ML area and online data will be shared on real time basis with SPCB, Odisha. The installation of CAAQMS is under process and the commissioning is expected to be completed by February, 2026. Plan for installation of CAAQMS is enclosed with this EIA/EMP Report.	***Annexure XIV***

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
1.7	The Project proponent needs to submit the detail plan for reducing the consumption of diesel w.r.t. the instant proposal.	Necessary measures for reduction in the consumption of Diesel are being/will be taken by the company like Purchase of most fuel-efficient equipment, regular repair and schedule maintenance of equipment, checking and inflation of tyres of dump trucks, reduction in idle running of equipment, etc. Besides this, the company also explore options with leading OEMs like Komatsu, BEML, Tata Hitachi, and Caterpillar, etc. for phasing out existing equipment (after completion of its residual life) and transitioning to suitable electrically operated equipment available in the market. Plan for reducing the Diesel Consumption is given in this EIA/EMP Report.	***Chapter 2,*** *Para 2.7.1.2. Pg 81-82*
1.8	The Project proponent needs to submit a detailed plan showing more use of renewable energy in the project.	In view of generation and utilization of renewable energy, M/s. OMC Ltd. has already installed Solar Panels of 50 KW capacity within the lease area. The percentage contribution of Renewable Energy is 5.87%. The company will also focus on other options like use of electric or battery-operated equipment and installation of other energy efficient components like energy efficient motors & lightings encouraging more use of renewable energy in the project.	***Chapter 2,*** *Para 2.7.1.2, Pg no. 82*
1.9	The Project Proponent needs to submit the detailed scientific study on flora and fauna and also to highlight on the endangered species. The Project Proponent needs to verify the list as per the latest Wildlife Protection Amendment Act, 2022 and shall accordingly prepare a Wildlife Conservation Plan. PP needs to submit the proof of submission of Wildlife Conservation Plan to State Authorities.	A detailed biological study has been carried out and detailed inventory of Flora and Fauna found in the study area has been prepared. According to Indian Wildlife Protection Act, 1972 as amended on 19th Dec. 2022, total 29 Schedule I species were found in the study area namely *Canis aureus* (Jackal), *Urva edwardsii* (Indian grey mongoose), *Urva auropunctata* (Small Indian Mongoose), *Gracula religiosa* (Common Hill Myna), *Bubo bubo* (Eurasian Eagle Owl), *Naja naja* (Indian Cobra), *Varnus bengalensis* (Bengal monitor), *Felis chaus* (Jungle Cat), *Prionailurus*	***Chapter 3,*** *Para 3.17.3, Pg no. 145-146* ***Annexure IX B,IXC***

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
		bengalensis (Leopard cat), *Vulpes bengalensis* (Bengal fox), *Canis lupus* (Grey wolf), *Rusa unicolor*(Sambar deer), *Lutrogale perspicillata* (Smooth-coated otter), *Mellivora capensis* (Ratel/Honey Badger), *Melursus ursinus* (Sloth bear), *Ratufa indica* (Indian giant squirrel), *Viverricula indica* (Small Indian civet), *Paradoxurus hermaphroditus* (Asian palm civet), *Moschiola indica* (Mouse deer/ Indian Chevrotain), *Hyaena hyaena* (Hyaena), *Hystrix indica* (Indian Porcupine), *Gallus sonneratii* (Grey junglefowl), *Pavo cristatus* (Indian peafowl), *Anthracoceros coronatus* (Malabar pied hornbill), *Python molurus* (Indian rock python), *Ptyas mucosa* (Indian rat snake/Dhaman), *Daboia russelii* (Russell's viper), *Fowlea piscator* (Checkered Keelback). The authenticated list of flora & fauna has been obtained from Divisional Forest Officer, Koraput Forest Division vide letter 280/4F(Misc.) dt.27.01.2025 and Divisional Forest Officer, Rayagada Forest Division vide letter 216/4F(Misc.) 1367/2025 dt.13.01.2025. Site-Specific Wildlife Conservation Plan (SSWLCP) has been approved from Principal Chief Conservator of Forests (Wildlife) & Chief Wildlife Warden dated 27.01.2010, which was later revised via Memo No. 5845 dated 06.07.2017. Budget earmarked for the conservation of Schedule- I species is Rs. 1240.22 Crore. Site-Specific Wildlife Conservation Plan (SSWLCP) as per Indian Wildlife (Protection) Act,2022 is under approval for active consideration from Divisional Forest Officer, Koraput Forest Division & Divisional Forest Officer Rayagada Forest Division.	

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
1.10	The Project Proponent needs to monitor the ambient air quality and noise level at the mine lease boundary, nearest village, crusher, predominant downwind direction and at other sensitive receptors. Accordingly, Project Proponent shall propose to install Continuous Ambient Air Quality Monitoring Station within certain timeline.	Kodingamali Bauxite Mine is in operation since 2018 and Environmental Clearance for the same has already been granted by MoEFCC. In compliance with the EC conditions, the Ambient air quality (at 6 locations) and Noise level monitoring (8 locations) is being/will be carried out in core zone as well as in the nearby villages. Plan for installation of CAAQMS is enclosed with this EIA/EMP Report.	***Chapter 6,*** *Para 6.4, Table 6.3 Pg no. 246-248* ***Annexure XIV***
1.11	The Project Proponent should prepare the EMP considering the scenario of pollution to be generated for normative and peak total excavation for assessing air pollution, noise level and ground vibration.	The Environment Management Plan has been prepared considering the scenario of pollution to be generated for normative and peak total excavation for air pollution, Noise levels and ground vibration. Proper mitigation measures are being/will be adopted accordingly. The details regarding the same have been incorporated in the EIA/EMP Report.	***Chapter 4,*** *Para 4.5.1.2 Page no 178-179 & 4.5.2, Pg no. 191-197*
1.12	The Project Proponent needs to carry out the Public Hearing as per provisions of EIA Notification, 2006. PP should also submit the time bound action plan on concerns of the public through a separate budget with capital expenditure with a timeline of 3 years. The Project proponent shall ensure that the activities proposed under the public hearing shall be different from the CSR activities. PP needs to submit a tangible and monitorable action plan for meeting the public hearing commitments.	Noted and will be complied with. Public hearing for the expansion project is yet to be conducted and same will be carried out as per provisions of EIA Notification, 2006. Time bound action plan on concerns of the Public along with budget as per MoEF&CC, OM dated 30.09.2020 & 20.10.2020 will be submitted in the Final EIA/EMP Report after conduction of Public Hearing.	--
1.13	The Project Proponent needs to undertake the enumeration of the species within the mine lease area before cutting. The Project Proponent also needs to submit the compensatory afforestation plan for the no. of trees to be cut in the mine lease area and also to explore the possibility of tree transplantation.	In this expansion project, no tree cutting/clearing of vegetation is involved. The total ML area is 428.075 ha, out of which the total excavated area will be 368.684 ha at the conceptual stage. No vegetation is present in the area where excavation is being/will be done, therefore, no clearing of vegetation is involved for the expansion project and hence, no impact on the forest land due to loss of vegetation/tree cover is envisaged.	-

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
1.14	The Project Proponent needs to submit the action plan for undertaking the plantation along the 7.5m barrier, safety zone of tar road/cart tracks, electric line etc., PP should also submit the details no of saplings to be planted (2500/ha), type of saplings proposed and the area to be covered under greenbelt/plantation along with the timeline and budget. PP shall ensure quality planting stock of appropriate height and collar girth. In case of tall seedlings, PP shall plant seedlings with root biomass to commensurate with seedling height so that the seedling can meet the growth parameters after out planting. The greenbelt/plantation plan shall be prepared in such a way that the ecology of the area shall be restored.	At conceptual stage, total area under Greenbelt/Plantation will be 147.867 ha and as on date, 8.97 ha area have been covered under greenbelt and plantation. The total mining lease area is 428.075 ha, out of which 368.684 ha will be excavated (125.60 ha will be backfilled and reclaimed by plantation and re-grassing will be done on remaining 243.034 ha area) at conceptual stage. Total 147.867 ha area will be covered under greenbelt/plantation which comprises of 18.098 ha area under greenbelt along 7.5 m periphery (greenbelt in 8.97 ha area has already been completed & remaining 9.128 ha will be completed up to year 2027-28). Plantation on 125.60 ha on the backfilled area and 4.169 ha area under mineral storage. Presently, 22971 trees have already been planted in 12.87 ha area and survival rate of 90% is being maintained. At conceptual stage, 360464 trees will be planted on 147.867 ha area @ 2500 trees per ha. Rs. 12.7 Crores have been earmarked for greenbelt & plantation up to the end of life of mine @ Rs. 377/sapling. Survival rate will be maintained 90%. Local and fruit bearing Species have been/will be selected with consultation of local Forest Department.	***Chapter 4,*** *Para 4.5.7.5, Pg no 229-231*
1.15	The Project Proponent shall carry out the assessment of impact due to the proposed project as per the guidelines issued by the Central Ground Water Authority from time to time and submit the same as a part of the EIA/EMP.	The peak water demand for the project is estimated at 475 KLD which is being/will be sourced from Surface water (Dharua Nala – 400 KLD) and harvested rainwater, recycled water (75 KLD). The permission for drawl of Surface water has already been obtained from Water Resource Department, Odisha. No abstraction of ground water is involved in the project, hence, the impact on groundwater is not envisaged.	***Chapter 4,*** *Para 4.5.3.2, Pg no. 201-202*

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
		The mine site is situated on top of Kodingamali Plateau having an average height of ~300 m from the ground level and the depth of the workings will be at a maximum 50-60 m bgl from the original surface level. The water table in the area ranges between 6.0 m to 24.0 m bgl from the ground level. As the mine is situated on a plateau, the water table will not be intersected at any stage of mining. Therefore, no impact on groundwater is envisaged. Besides the above, no wastewater will be discharged outside the lease boundary. Therefore, no adverse impact on water quality is envisaged due to the proposed expansion of the mining project.	
1.16	The project proponent shall conduct hydrological study for the project if it involves intersection of ground water table as per the guidelines issued by the Central Ground Water Authority from time to time and submit the same as a part of the EIA/EMP.	The mine is located on Kodingamali Plateau having an average height of ~300 m from the ground level. Thefresh ultimate Mining depth is proposed up to 50 m to 60 m from ground level and the water table is ranges between 6 m to 24 m from the ground level. Hence, the water table will not be intersected at any stage of mining. As no intersection of water table is envisaged, hence, Hydrological study has not been carried out.	***Chapter 4,*** *Para 4.5.3.2, Pg 201-202*
1.17	The Project Proponent shall explore the possibility of reduction of specific water requirement by optimization / technology up gradation, etc. The efforts shall be delineated in the EIA/EMP.	The peak water requirement of the project is 475 KLD. The water requirement will be fulfilled from Dharua Nala, Rain water and recycled water. Following measures are being/will be adopted for reduction in specific water requirement: ➢ The total water requirement after expansion will be 475 KLD which will be met form Surface water, recycled water & rain water. ➢ Treated water will be used for dust suppression. ➢ Use of wetting agents is recommended to reduce water consumption.	***Chapter 4,*** *Para 4.5.3.2.1, Pg No 202*

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
		➢ Rainwater harvesting techniques have been/will be implemented for conservation of water. ➢ The rainwater falling directly into the mine pits will be stored and used for plantation & dust suppression which help in reducing total fresh water requirement. ➢ 6 Nos. of Rain Water Harvesting Structures i.e. Storage Ponds with High Density Polyethylene (HDPE) Lining having capacity of 39124 KL have already been constructed within the ML for storage of water.	
1.18	The Project Proponent shall prepare the scheme for mandatory recycle/re-use of water as specified by the Central Ground Water Authority for different category areas seeking NoC for ground water withdrawal and shall submit as part of EIA/EMP report.	The peak water requirement of the project is 475 KLD, out of which requirement of 400 KLD is being/will be met from surface water and 75 KLD will be met from recycled water, & harvested rain water. 400 KLD of fresh water being/will be sourced form Surface water i.e. Dharua Nala (~20 Km from the Mine site). OMC has already obtained permission from the Department of Water Resources, Government of Odisha, for drawl 400 KLD of surface water from Dharua Nala. As no abstraction of groundwater is involved in the expansion project, NoC from Central Ground Water Authority is not required.	***Chapter 2,*** *Para 2.7.1.1, Pg no 80*
1.19	The Project Proponent shall conduct drone survey of the mine lease area and buffer area and submit during the appraisal for EC.	Real time aerial footage and video of the mine lease area and buffer area through Drone Survey will be submitted during the appraisal of EAC.	--
1.20	The Project Proponent shall provide the details of Special Pollution Control/ Abatement devices that have been installed/ proposed to be installed within the ML area and how does the technology compare with the best available technology in the field.	M/s. OMC Ltd. has planned to use the special pollution control and abatement measures for maximum environmental protection and operational efficiency. For dust suppression, the high efficiency water spraying on haul roads, Mist Fog Cannons/Sprayers, chemical dust suppressants, bag filters with advanced filtration technology will be provided in crusher to minimize airborne particulate matter	***Chapter 4*** *Para 4.5.1.12, 4.5.2.2 & 4.5.3.1 Pg No. 188,192-193 & 198*

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
		generated from mining activities. Huge GI sheet enclosures have been installed around the Crusher. For noise abatement, effective strategies are being/will be adopted to reduce the noise across various frequencies. For water quality management, proper garland drains, HDPE lining storage ponds (6 Nos.), siltation/sedimentation ponds, recycle/ reuse technology are being/will be adopted to ensure proper water management. Use of STP and Grey water treatment Plant for treatment domestic waste water. The company will ensure that the measures adopted for the abatement of pollution in the proposed mine site shall be in line with the best available technology in the field.	
1.21	PP to engage a reputed national institute for conducting both blasting and vibration studies and also a scientific assessment of air overpressure and fly rock distances following blasting.	As this is an existing operational Bauxite Mine, scientific study on Blast Induced Ground Vibration and Fly rock was carried out by IIT-ISM, Dhanbad in August, 2019. A Study on blasting & vibration and also a scientific assessment of air overpressure and fly rock distances following blasting is under process.	***Chapter 4*** *Para 4.5.2.4, Pg No. 195-196*
1.22	The Project Proponent needs to reduce the dependency upon the ground water and it shall plan to construct a water reservoir within the lease area for meeting its day-to-day water needs.	The peak water requirement for the expansion project is 475 KLD which is being/will be fulfilled from Surface water, Rain water and recycled water. M/s. OMC Ltd. has already constructed 6 Nos. of Rain Water Harvesting Structures i.e. Storage Ponds with High Density Polyethylene (HDPE) Lining having capacity of 39124 Cu. m. for storage of water. Besides this, the rainwater falling directly into the mine pits will be stored and used for dust suppression.	***Chapter 2*** *Para 2.7.1.1 Pg No.80* ***Chapter 4*** *Para 4.5.3.2.1 Pg No. 202*

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
1.23	PP needs to submit an action plan as per Ministry's OM dated 24.07.2024 wherein it is stated that the plantation of saplings shall be carried out in the earmarked 33% greenbelt area as part of the tree plantation campaign "EK Ped Ma ke Naam" ( ) and the details of the same shall be uploaded in the MeriLife portal (https://merilife.nic.in).	The mine is situated on top of Kodingamali plateau (~300 m from the ground level). The plateau top is a continuous stretch of flat land intercepted by small saucer shaped depression i.e. The mining lease area consists of undulating land. At the conceptual stage, the total area to be covered under greenbelt of 7.5 m along the lease periphery will be 18.098 ha. Out of this, 8.97 ha area has already been developed under greenbelt and remaining 9.128 ha area will be completed by the year 2027-28. Therefore, greenbelt will be developed in 18.098 ha area as part of the tree plantation campaign "EK Ped Ma ke Naam" and the details of the same will be uploaded in the MeriLife portal (https://merilife.nic.in). However, at the conceptual stage, the total area covered under Greenbelt and plantation will be 147.867 ha.	***Chapter 4,*** *Para 4.5.7.5, Pg 229*
1.24	The Project Proponent needs to submit the detailed R&R plan covering all the components viz. number of Project Affected Families (PAF) and details of the land owned by them, break up of total compensation to be paid including method of calculation including the sources/references adopted and mode of payment etc. The Project Proponent needs to submit the plan for Socio economic development of the neighbourhood habitats based on the need-based survey along with the time bound action plan. Further, PP needs to submit the possession certificate and timeline for acquiring the land at the time of submission of EC proposal	This is an existing mine and expansion in Bauxite production capacity from 3.6 million TPA to 6.0 Million TPA is proposed within existing mining lease area. No habitation is located within the ML area; hence, the mining activities do not involve any displacement of Human Settlement. The mining operations will not disturb/relocate any Village. Therefore, no R&R Plan is required. A Plan for Socio economic development of the neighborhood habitats based on the need-based survey in consultation with the local people has been incorporated in this EIA/EMP Report. Kodingamali Bauxite Mine is in operation since year 2018. Total Mining Lease area is 428.075 ha and the entire ML area is Forest Land. The present lease area comprises of 406.385 ha	***Chapter 4,*** *Para 4.5.5.4, Pg no 213-216* ***Chapter 3,*** *Para 3.18.18, Pg 168*

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
		forest land of Kodingamali Reserve Forest and 21.69 ha forest land of Kodingamali Proposed Reserve Forest and Stage II Forest Clearance for the same has already been accorded by MoEFCC. The mining lease over an area of 428.075 ha was executed on 10.01.2017 for District Koraput and on 11.01.2017 for District Rayagada in favour of M/s. Odisha Mining Corporation Limited for a period of 50 years which is valid up to 09.01.2067 and 10.01.2067 respectively. Copy of the mining lease document is enclosed with this EIA/EMP Report.	***Chapter 1,*** *Para 1.2.1, Pg no 61-62* ***Annexure - I***
1.25	The PP shall ensure compliance of MoEFCC O.M. dated 14.01.2025 regarding streamlining the implementation of GSR 702 and GSR 703 dated 12.11.2024.	Noted and will be complied with.	
1.26	PP should prepare an action plan enumerating measures to be taken so that there is no pilferage of minerals during transportation. Training of supervisors, workers, and operators should be part of the action plan. Route plan for Ore transportation should be submitted.	The bauxite produced from this mine will be transported via road to several Railway sidings (viz. near Kakriguma, Singaram & Rayagada located at a distance of 24.0 Km, 27.0 Km & 70.0 from ML area respectively) from where the ore shall be further dispatched for sale to the prospective buyers (for its use in Alumina & Aluminum Plants). A detailed Mineral Pilferage Prevention Plan has been prepared to prevent pilferage of Mineral during transportation and Training and Awareness Plan for conduction trainings for supervisors, workers, and operators and the same is enclosed with this EIA/EMP Report.	***Chapter 4,*** *Para 4.5.6.2, Pg no 225-226* ***Annexure - XVIII***
1.27	PP should prepare a plan specifying the places where fixed water sprinklers, rain gun/ fog cannon may be deployed in project. PP should also tell the numbers of water tankers that may be utilized in the project and nearby places with proper justification	Fixed Water Sprinklers and Fog Canons have been/will be installed within the lease area. A plan showing location of existing and proposed fixed Water Sprinklers and Fog Canons is enclosed with this EIA/EMP Report. Water tankers (8 nos.) have been/will be deployed for supply of water within and outside the ML Area. In the lease area, total 8 water	***Chapter 4,*** *Para 4.5.1.12, Pg 188* ***Annexure - XV***

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
		tankers are/will be deployed. Water Tankers (2 nos.) are/will be deployed for dust suppression outside the ML area. Details of utilization of water tankers is enclosed with this EIA/EMP Report.	
B.	**STANDARD TERMS OF REFERENCE (Mining of Minerals)**		
1.	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in anyone year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994. The production details need to submit since inception of mine duly authenticated by Department of Mines & Geology, State Government.	This is operational Bauxite Mine. Past production details since inception of mine have been authenticated by Office of the Deputy Director Mines, Koraput Circle, Koraput vide letter No. 620/Mines dated 09.05.2025. The authenticated Past Production Figures are enclosed with this EIA/EMP Report.	***Chapter 2,*** *Para 2.7.4.2, Table 2.16, Pg. 96* ***Annexure - XI***
2.	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in anyone year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994. The production details need to submit since inception of mine duly authenticated by Department of Mines & Geology, State Government.	This is operational Bauxite Mine. Past production details since inception of mine have been authenticated by Office of the Deputy Director Mines, Koraput Circle, Koraput vide letter No. 620/Mines dated 09.05.2025. The authenticated Past Production Figures are enclosed with this EIA/EMP Report.	***Chapter 2,*** *Para 2.7.4.2, Table 2.16, Pg. 96* ***Annexure - XI***
3.	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in anyone year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994. The production details need to submit since inception of mine duly authenticated by Department of Mines & Geology, State Government.	This is operational Bauxite Mine. Past production details since inception of mine have been authenticated by Office of the Deputy Director Mines, Koraput Circle, Koraput vide letter No. 620/Mines dated 09.05.2025. The authenticated Past Production Figures are enclosed with this EIA/EMP Report.	***Chapter 2,*** *Para 2.7.4.2, Table 2.16, Pg. 96* ***Annexure - XI***
4.	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/toposheet, topographic sheet,	**Geology of the Area:** The area around Kondingamali deposit constitutes mostly Khondalites and Charkonites group and	***Chapter - 2,*** *Fig. 2.3 & 2.4,*

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
	geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	associated rocks of Archean age. The area around Kodingamali exposes rocks representing Eastern Ghat Group. The rock types encountered in these deposits are mostly Khondalite, Bauxite, Laterite, Clay and Soil. Khondalites occur as lenticular bodies on the surface as capping and having a trend in NNE-SSW to N–S directions with moderate to steep easterly dip (25^0 – 80^0). They area at places tightly folded into steep northerly plunging isoclinals folds. Map showing Mining Lease Area with Geographical coordinates, Geomorphology and Geology of the area, superimposed on SOI Toposheet has been prepared and incorporated in this EIA/EMP Report. **Land use & Land cover** of study area has been assessed using satellite data. The study area mainly comprises of Agriculture land 15654.07 ha (32.96%), vegetation/Plantation 13241.19 ha (27.88%), Forest 9315.32 ha (19.61%), Open Scrub Land 8239.62 ha (17.35%), Roads 400.27 ha (0.84%), Settlement 316.21 ha (0.67%), area under Railway Line 57.06 ha (0.11%), area under Industry 48.16 ha (0.10%), Quarry Sites with an area of 41.45 ha (0.09%) and Surface Water Bodies/Mine Sump comprises of 183.56 ha i.e. 0.39%. Land use & Land cover map of the study area is given in this EIA/EMP Report. Ecological features: There is no National Park, Wildlife Sanctuary, Biosphere Reserve, Wildlife Corridors, etc. falling within 10 km radius of the Mine site.	*Pg no 71,72* ***Chapter 3,*** *Para 3.6.5, Pg 113 Fig 3.3, 3.4*
5.	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area,	Map showing geomorphology of land forms of the area, soil type, important water bodies, stream, rivers and existing mineral has been prepared and incorporated in this EIA/EMP report.	***Chapter - 2,*** *Fig 2.3, 2.4, Pg no 71, 72*

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
	important water bodies, streams and rivers and soil characteristics.		
6.	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.	The Mining Lease area of Kodingamali Bauxite Mine is 428.075 ha. The entire ML area is Forest Land. Out of the entire forest land, 406.385 ha area falls under Kodingamali Reserve Forest and 21.69 ha falls under Kodingamali Proposed Reserve Forest. Stage I Forest Clearance over 434.935 ha of forest land (428.075 ha ML including 18.098 ha safety zone + 6.860 ha approach road) was accorded by MoEF&CC vide F. No 8-46/2016-FC dated 17.04.2017 and Stage II Forest Clearance for the same area has been accorded by MoEF&CC vide letter no. F. No. 8-46/2016-FC dated 25.09.2017. The final diversion order was obtained from Govt. of Odisha, Forest and Environment Department, Bhubaneshwar vide letter No. 10F (Con)1/2017/20540/F&E, dated 07.10.2017. Copy of Forest Clearance is enclosed with this EIA/EMP Report.	***Chapter 1,*** *Para 1.2.1 Pg 61* ***Annexure VA***
7.	It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA/EMP Report.	Yes, the company has a well laid down Environment Policy adopted by the Board of Directors of M/s. Odisha Mining Corporation Limited. The hierarchical system or administrative order of the company to deal with the environmental issues and for ensuring compliance with the EC conditions etc. has been given in Corporate Environmental Policy of the company. Information of the same is given in this EIA/EMP report.	***Chapter 10,*** *Para 10.3, Pg 274* ***Annexure XIII***

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
8.	Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.	Being an opencast mine, occurrence of Subsidence is not envisaged. Study on Blast induced ground vibration and Fly Rock has been done by Indian Institute of Technology [Indian School of Mines], Dhanbad (IIT-ISM, Dhanbad) and Copy of the same is enclosed with this EIA/EMP Report.	*Chapter 4, Para 4.5.2.4, Pg 195* ***Annexure XVI***
9.	The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.	The study area comprises of 10 km radius zone around the mining lease periphery. Presently, the mineable reserves are 75.79 Million Tonnes (as on 30.06.2021) and 64.54 Million Tonnes (as on 31.03.2025). Based on that the life of mine is ~ 13 Years [Based on Mineable Reserves: 75.79 Million Tonnes (as on 30.06.2021)] and ~ 11 Years [Based on Mineable Reserves: 64.54 Million Tonnes (as on 31.03.2025)] (@ 6.0 MTPA). **Top Soil:** Around 2.16 Million Tonnes of Top Soil (1.2 Million Cu. m.) will be generated during the entire life of mine. Out of this, 0.19 Million Tonnes of Top Soil has already been generated during FY 2022-2025. Therefore, 1.97 Million Tonnes of Top Soil will be generated during the entire life of mine. The Top Soil generated is being/will be utilized for plantation and greenbelt development. **OB/Waste:** Around 44.28 Million Tonnes of OB/Waste (24.60 Million Cu.m) will be generated during the entire life of mine. Out of this, 3.0 Million Tonnes OB/Waste has already been generated during FY 2022-2025. Therefore, 41.23 Million Tonnes of OB/Waste will be generated during the entire life of mine. The OB generated is being/will be backfilled in the mined-out area and it will be rehabilitated with plantation.	***Chapter 2,*** *Table No. 2.13, Pg. No. 90* *Para 2.7.5 Pg No. 97*

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
10.	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post and submitted. Impact, if any, of change of land use should be given.	According to the Land use & Land cover map of the study area: The area comprises mainly Agriculture land 15654.07 ha (32.96%), vegetation/Plantation 13241.19 ha (27.88%), Forest 9315.32 ha (19.61%), Open Scrub Land 8239.62 ha (17.35%), Roads 400.27 ha (0.84%), Settlement 316.21 ha (0.67%), area under Railway Line 57.06 ha (0.11%), area under Industry 48.16 ha (0.10%), Quarry Sites with an area of 41.45 ha (0.09%) and Surface Water Bodies/Mine Sump comprises of 183.56 ha i.e. 0.39%. There is no Wildlife Sanctuary, National Park, Biosphere Reserves, Wildlife Corridors, Tiger Reserves, etc. exists within 10 km radius of lease area. Land use plan of the mine lease area at present, at the end of plan period & at the conceptual period is given in this EIA/EMP Report. Conceptual Plan showing change of land use is enclosed with this EIA/EMP Report.	***Chapter 3,*** *Para 3.6.5, Pg 113 Fig. 3.4* ***Chapter 4,*** *Table 4.19, Pg. 205* **Annexure VIIIC**
11.	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.	This is an existing mine and there is no provision of waste dumping outside the mining lease area existing or proposed, after expansion. There is no habitation within the ML area and no displacement of people is involved. Therefore, R&R issues are not applicable.	-
12.	A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the Project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest	As per revenue records the entire ML area is Forest Land. The present lease area comprises of 406.385 ha forest land of Kodingamali Reserve Forest and 21.69 ha forest land of Kodingamali Proposed Reserve Forest. Stage I Forest Clearance over 434.935 ha of forest land (428.075 ha ML including 18.098 ha safety zone + 6.860 ha approach road) was accorded by MoEF&CC vide F. No 8-46/2016-FC dated 17.04.2017 and Stage II Forest Clearance for the same area has been accorded by MoEF&CC vide letter no. F. No. 8-46/2016-FC	***Chapter 2,*** *Para 2.3.4, Pg. 73* ***Annexure VA***

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
	Department to assist the Expert Appraisal Committees.	dated 25.09.2017. The final diversion order was obtained from Govt. of Odisha, Forest and Environment Department, Bhubaneshwar vide letter No. 10F (Con)1/2017/20540/F&E, dated 07.10.2017. Copy of Forest Clearance is enclosed with this EIA/EMP Report.	
13.	Status of forestry clearance for the broken-up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.	The entire ML area is Forest Land. Stage I Forest Clearance dated 17.04.2017, Stage II Forest Clearance dated 25.09.2017 & final diversion order dated 07.10.2017 has already been accorded. OMC Limited has paid NPV amount of Rs. 26,79,74,950/- on 07.01.2017 for diversion of 428.075 ha ML area and Balance NPV payment of Rs. 42,94,360/- on 02.06.2017 over 6.860 ha of forest area proposed for access road to ML area as per demand raised by DFO Koraput Forest Division, Koraput. CA land already provided under Forest Clearance. Copy of the Forest Clearance is enclosed with this EIA/EMP report.	***Chapter 1,*** *Para 1.2.1 Pg 61* ***Annexure VA & VB***
14.	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.	The complete process for diversion and settlements of rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 has been carried out for the entire forest area for diversion of Forest Land and certificate of the same was obtained from Collector & Chairman of District Level Committees of Koraput and Rayagada Districts.	***Annexure VC***
15.	The vegetation in the RF/PF areas in the study area, with necessary details, should be given.	The Mining Lease area of Kodingamali Bauxite Mine i.e. 428.075 ha falls under Forest Land. Out of the entire forest land, 406.385 ha area falls under Kodingamali Reserve Forest and 21.69 ha falls under Kodingamali Proposed Reserve Forest. There are 9 Reserved Forests and 11 Protected Forests within 10 km radius study area. Details of the same are given in EIA/EMP Report.	***Chapter - 3,*** *Table 3.1, Pg 102-103* *Figure: 3.1 Pg 104*

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
16.	A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.	Detailed Biological study has been done to ascertain the impact of mine on wildlife. There is no National Park, Wildlife Sanctuary, Biosphere Reserves, Tiger Reserves and Wildlife Corridors, etc. within 10 km radius of the mining lease area. According to the field survey of the area, and according to Indian Wildlife (Protection) Amendment Act, 2022, there are 29 schedule-I species within the study area (Core & Buffer zone). The authenticated list of flora & fauna has been obtained from Divisional Forest Officer, Koraput Forest Division vide letter 280/4F(Misc.) dated 27.01.2025 and from Divisional Forest Officer, Rayagada Forest Division, vide letter 216/4F(Misc.) 1367/2025 dated 13.01.2025. Various measures are being/will be undertaken and environment management plan has been/will be implemented to curb pollution of air, noise, water & land environment. Air quality & noise level are being/will be maintained well within the standards prescribed by the MoEF&CC and CPCB. Greenbelt development and plantation will help in creating habitats for local faunal species and to create better environment for various fauna. Activities for creating and developing awareness for nature and wildlife in the nearby villages will also be undertaken. Site-Specific Wildlife Conservation Plan (SSWLCP) has been approved from Principal Chief Conservator of Forests (Wildlife) & Chief Wildlife Warden vide Memo No. 682 dated 27.01.2010, which was later revised via Memo No. 5845 dated 06.07.2017. A Site-Specific Wildlife Conservation Plan (SSWLCP) as per Indian Wildlife (Protection) Act, 2022 is under approval for active consideration from Divisional Forest Officer, Koraput Forest	***Chapter 3*** *Table 3.17.3.2 Pg 146* ***Annexure IXB*** ***Annexure IX C***

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
		Division & Divisional Forest Officer, Rayagada Forest Division.	
17.	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Tiger/Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.	There are no National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Tiger/Elephant Reserves, etc. within 10 km radius study area. Authenticated Location Map showing No National Park, Wildlife sanctuaries, wildlife corridors, Tiger/Elephant reserves within 10 km radius study area has been obtained from Divisional Forest Officer, Koraput Forest Division and Divisional Forest Officer, Rayagada Forest Division.	***Annexure IX A***
18.	A detailed biological study of the study area [core zone and buffer zone] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on. such primary field survey, clearly indicating the Schedule of the fauna present. PP shall submit list of Schedule-1 species present in core and buffer zone duly authenticated by CWLW. In case of any Scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest / Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost. Proof of its submission of conservation plan to the CWLW needs to be submitted.	Detailed biological study has been carried out and detailed inventory has been prepared. Total 29 Schedule I species namely *Canis aureus* (Jackal), *Urva edwardsii* (Indian grey mongoose), *Urva auropunctata* (Small Indian Mongoose), *Gracula religiosa* (Common Hill Myna), *Bubo bubo* (Eurasian Eagle Owl), *Naja naja* (Indian Cobra), *Varnus bengalensis* (Bengal monitor), *Felis chaus* (Jungle Cat), *Prionailurus bengalensis* (Leopard cat), *Vulpes bengalensis* (Bengal fox), *Canis lupus* (Grey wolf), *Rusa unicolor*(Sambar deer), *Lutrogale perspicillata* (Smooth-coated otter), *Mellivora capensis* (Ratel/Honey Badger), *Melursus ursinus* (Sloth bear), *Ratufa indica* (Indian giant squirrel), *Viverricula indica* (Small Indian civet), *Paradoxurus hermaphroditus* (Asian palm civet), *Moschiola indica* (Mouse deer/ Indian Chevrotain), *Hyaena hyaena* (Hyaena), *Hystrix indica* (Indian Porcupine), *Gallus sonneratii* (Grey junglefowl), *Pavo cristatus* (Indian peafowl), *Anthracoceros coronatus* (Malabar pied hornbill), *Python molurus* (Indian rock python), *Ptyas mucosa* (Indian rat snake/Dhaman), *Daboia russelii* (Russell's viper), *Fowlea piscator* (Checkered Keelback).were found in Schedule- I	*Chapter 3 Table 3.17.3.2 Pg 146*

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
		according to Indian Wildlife Protection Act, 1972 as amended on 19th Dec. 2022 in the study area. The authenticated list of flora & fauna has been obtained from Divisional Forest Officer, Koraput Forest Division vide letter 280/4F(Misc.) dt.27.01.2025 and Divisional Forest Officer, Rayagada Forest Division vide letter 216/4F(Misc.) 1367/2025 dt.13.01.2025. Site-Specific Wildlife Conservation Plan (SSWLCP) has been approved from Principal Chief Conservator of Forests (Wildlife) & Chief Wildlife Warden dated 27.01.2010, which was later revised via Memo No. 5845 dated 06.07.2017. Budget earmarked for the conservation of Schedule-I species is Rs. 1240.22 Crore. A Site-Specific Wildlife Conservation Plan (SSWLCP) as per Indian Wildlife (Protection) Act, 2022 is under approval for active consideration from Divisional Forest Officer, Koraput Forest Division & Divisional Forest Officer, Rayagada Forest Division.	***Annexure IXB*** ***Annexure IXC***
19.	Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCS or. State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered.	There are No Critically Polluted Areas (as notified by the Central Pollution Control Board) within 10 km radius study area from the boundary of mining lease. The Expansion project does not come under the Aravalli range, as the Mining Lease area is located in District Koraput & Rayagada of state Odisha.	-
20.	Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL. HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).	The Mining lease area is located in Districts Koraput & Rayagada of State Odisha which are not covered under coastal zone. Therefore, the project area does not come under the purview of CRZ notification.	-

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
21.	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need-based sample survey, family-wise, should be undertaken to assess their requirements, and action programs prepared and submitted accordingly, integrating the sectoral programs of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.	Entire Mining lease area is Forest land which falls under Kodingamali Reserve Forest and Kodingamali Proposed Reserve Forest. There is no habitation within the ML area and no displacement of people is involved. Therefore, R&R issues are not applicable.	*Chapter 4, Para 4.5.5.4, Pg 213-215*
22.	One season (non-monsoon) [i.e. March - May (Summer Season); October - December (post monsoon season); December - February (winter season)} primary baseline data on ambient air quality as per CPCS Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented' date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.	One season primary baseline data for Ambient air quality, (as per CPCB quality Notification, 2009), water quality, noise level, soil and flora & fauna has been collected during Post Monsoon Season (Oct., to Dec., 2024). Photographs of baseline monitoring locations for Air Quality & Noise Level and sampling locations of Ground Water, Surface Water & Soil has been taken and same is enclosed with this EIA/EMP Report. Detailed AAQM data of sampling locations are enclosed with this EIA/EMP Report. Site-specific meteorological data has been recorded. The dominant wind direction is from North East. Location of the monitoring stations were selected keeping in view the pre-dominant downwind direction and location of the sensitive receptors and also that they represent whole of the study area. One location has been selected within 500 m from the ML boundary in downwind direction. The mineralogical composition of PM10 is given in this EIA/EMP Report.	***Chapter 3,*** *Para 3.14 - 3.16, Pg 124-144* ***Annexure XX*** ***Annexure XII*** ***Chapter 3,*** *Table 3.8, Pg 122* ***Chapter 3,*** *Table 3.14, Pg 130* ***Annexure XIX***

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
23.	Air quality modelling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modelling should be provided. The air quality contours may be shown 'on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The windrose showing pre-dominant wind direction may also be indicated on the map.	Air quality modelling has been carried out by AERMOD view 10.2.1 - Model based on steady state Gaussian Plume Dispersion was used for the prediction of incremental value due to proposed expansion project. Impact of movement of vehicles for transportation of mineral has been considered. Impact prediction has been carried out for total excavation of 9.51 Million TPA. At Normative Stage, total Bauxite handling will be 20000 TPD whereas at peak stage it will be 24000. TPD considering exigencies and rainy season. The bauxite produced from the mine shall be transported via road to several Railway sidings (viz. near Kakriguma, Singaram & Rayagada located at a distance of 24.0 Km, 27.0 Km & 70.0 Km from ML area respectively) from where the ore shall be further dispatched for sale to the prospective buyers (for its use in Alumina & Aluminium Plants). Isopleths showing incremental concentration of PM from area source and clearly indicating the air quality contours on a location map indicating the location of the site, location of sensitive receptors and wind roses showing pre-dominant wind direction have been prepared. Detail of same along with details of the model used and input parameters used for modelling is incorporated with this EIA/EMP Report.	***Chapter 4,*** Para 4.5.1.2, Pg 178-179 ***Chapter 4*** *Figure 4.1 to 4.4 Pg No. 184 to 187*
24.	The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.	The peak water demand for the project is estimated at 475 KLD which includes 422 KLD for industrial use and 53 KLD water required for drinking and domestic purposes at the mine. The water requirement for the project encompasses dust suppression on ore stacks and haulage roads through sprinkling, washing of heavy vehicles and machinery, hygienic	*Chapter 2, Para 2.7.1.1, Pg 80*

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
		purposes, and greenbelt development. Out of total water requirement of 475 KLD, 75 KLD will be sourced from recycled water & harvested rainwater and 400 KLD will be sourced from from Dharua Nala, permission regarding the same has been obtained from Water Resources Department, Odisha.	***Annexure VII***
25.	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be secured and copy furnished.	The total water requirement for mining project is 475 KLD which is being/will be met through from Dharua Nala (400 KLD) and Recycled water & harvested rainwater (75 KLD). Permission for drawl of Surface Water 400 m^3/day from Dharua Nala has been obtained from Water Resources Department, Odisha.	***Chapter 2,*** Para 2.7.1.1, Pg 80 **Annexure VII**
26.	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	Water conservation measures adopted/proposed to be adopted for the project. Domestic wastewater will be treated in STP, with the treated water utilized for greenbelt development. Wastewater from equipment and vehicle washing will be processed through an oil-grease separator and recycled for reuse in equipment and vehicle washing. Additionally, wastewater generated from the pit head bath will be treated and used for greenbelt development. Six nos. of Rainwater Harvesting Structures with HDPE Lining and 8 nos. of settling cum percolation ponds are constructed within the ML area.	***Chapter 4,*** *Para 4.5.3.2.1, Pg* 202-205
27.	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.	No water bodies are present within the lease area. However, two Rivers and few Nalas exist within the study area viz. Patagarha Nadi (~4.0 Km in NNE Direction), Murani Nadi (~6.0 Km in SW Direction), Nala (~5.0 Km in ENE Direction), Nala (~5.0 Km in ENE Direction), Patagarha Nala (~7.5 Km in NW Direction), Nala (~8.5 Km in WSW Direction), Baghri Nala (~9.0 Km in West	***Chapter-4,*** *Para 4.5.3.1, Pg* 198

<table>
<tr><th>ToR Point no.</th><th>ToR Condition</th><th>Compliance</th><th>Ref. in Draft EIA / EMP Report</th></tr>
<tr><td></td><td></td><td>Direction) and Debagarha Nala (~9.5 Km in SSW Direction).
No waste water is being/will be discharged outside lease area which may contaminate any surface water body. Waste Water generated after domestic use is being/will be treated in Sewage Treatment Plant (STP).
Waste Water generated from the workshop is being/which will be treated in oil-grease trap and treated water is being/will be used in vehicle washing.
Necessary safeguard measures such as construction of Garland drains, retaining walls, settling cum percolation ponds, check dams, etc. have been/will be adopted to control the surface runoff.
Regular monitoring of Groundwater quality and Surface water quality is being/will be carried out.</td><td></td></tr>
<tr><td>28.</td><td>Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working bench will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished. In case of surface water is proposed to be utilized then Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.</td><td><table><tr><td>Elevation Range</td><td>1089.27 m AMSL to 1276.47 m AMSL</td></tr><tr><td>Ground Water Table</td><td>Pre-Monsoon: 8 m – 24 m bgl
Post Monsoon: 6 m - 22.8 m bgl</td></tr><tr><td>Ultimate Working Depth</td><td>1080 AMSL</td></tr></table>Water table will not be intersected at any stage of the mining. Same information is given in this EIA/EMP report.</td><td>***Chapter 4,*** *Para 4.5.3.2, Pg 201, 202*</td></tr>
<tr><td>29.</td><td>Details of any stream, seasonal or otherwise, passing through the lease area and modification, diversion proposed, if any, and the impact of the same on the hydrology should be.</td><td>No water body or any Seasonal stream (no Nallah, river, etc.) originates from the lease area.</td><td>***Chapter 4,*** Para 4.5.3.1, Pg 198</td></tr>
</table>

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
30.	Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and BGL. A schematic diagram may also be provided for the same.	The Bauxite mine is situated on top of Kodingamali Plateau having an average height of ~300 m from the ground level. The average elevation of the Lease area is 1182.87 AMSL The present working depth of the mining operation (Quarry 1: 1155 AMSL and Quarry-2: 1094 AMSL) and at conceptual stage it will be 1080 m AMSL. Water table during Pre-Monsoon ranges between 8 m – 24 m bgl and during Post Monsoon it ranges between 6 m – 22.8 m bgl from the general ground level. As the Mine is situated on top of the plateau, the water table will not be intersected at any stage of Mining.	***Chapter 4,*** Para 4.5.3.2, Pg 201-202
31.	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.	As on date, 12.87 ha area have been covered under greenbelt and plantation. At the conceptual stage, out of total mining lease area 428.075 ha, 368.684 ha will be excavated out of which 125.60 ha will be backfilled and reclaimed by plantation and regrassing will be done on remaining 243.034 ha area. Total 147.867 ha area will be covered under greenbelt/plantation which comprises of 18.098 ha area under greenbelt along 7.5 m periphery and Plantation on 125.60 ha on the backfilled area and 4.169 ha area under mineral storage. Presently, 22971 trees have already been planted in 12.87 ha area and survival rate of 90% is being maintained. At conceptual stage, 360464 trees will be planted on 147.867 ha area @ 2500 trees per ha. Rs. 12.7 Crores have been earmarked for greenbelt & plantation up to the end of life of mine @ Rs. 377/sapling. Survival rate will be maintained 90%. Local and fruit bearing Species have been/will be selected with consultation of local Forest Department.	***Chapter 4,*** Para 4.5.7.5, Pg 229-231

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
32.	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.	Blasted ore is being/ will be loaded by large size hydraulic excavators into the dumper of capacity 60/35 Tonnes for transportation of Bauxite to 2 nos. of crushers (2 x 500 TPH) have been installed within the mining lease area. During the expansion (6 MTPA), one Crusher of 2400 TPH is proposed to be installed within the ML area {Existing Crusher (2 x 500 TPH) will be phased out after the installation of Proposed Crusher (2400 TPH)}. The bauxite produced from the mine shall be transported via road to several Railway sidings (viz. near Kakriguma, Singaram, Rayagada & Dumuriput located at a distance of 24.0 Km, 27.0 Km, 70.0 Km & 67.0 Km from ML area respectively) from where the ore shall be further dispatched for sale to the prospective buyers (for its use in Alumina & Aluminium Plants). Detailed traffic study has been conducted and the same is given in this EIA/EMP Report.	***Chapter 4,*** Para 4.5.6 Pg 217-224
33.	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.	This is an operational mine. Onsite shelter and facilities such as first aid room, rest shelter, Vocational Training Centre, canteen, Potable water, urinals, lighting arrangements, weigh bridge, workshop, fuel stations, store room, communication equipment, survey equipment etc. have already been established at the mine site. The same facilities/services will be used after expansion also.	***Chapter 2*** *Para 2.4.1, Pg 76-77*
34.	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.	At conceptual stage, out of total mine area i.e. 428.075 ha; 368.684 ha will be excavated. Out of 368.684 ha, 125.60 ha area will be backfilled (Reclaimed & Rehabilitated) and regrassing will be done on remaining 243.084 ha excavated area. 4.169 ha will be used for mineral storage (i.e., plantation on the area earmarked for mineral storage), 3.425 ha under Mineral Separation Plant, Area under Infrastructure	***Chapter 2*** *Para 2.8, Pg 97-98* **Annexure VIIIC**

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
		(Workshop, admin. Building etc.) will be 25.261 ha, area under Roads will be 8.438 ha and 18.098 ha area under Greenbelt along the lease periphery. Conceptual Plan is enclosed with this EIA/EMP Report.	
35.	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	Occupational health impacts have been identified; Preventive health measures are being/will be taken, and is incorporated in this EIA/EMP Report. In accordance with the guideline of DGMS Pre-placement medical examination and periodical medical examinations will be done and records are being/will be maintained in Form O under Mines Rule 1955 and schedule of health examination of workers is being/will be followed. Proper health records are being/will be maintained.	***Chapter 4,*** *Para 4.5.8 Pg 232-239*
36.	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	➢ Public health implications of the project and related activities for the population in the impact zone have been evaluated and common prevailing diseases in the area were identified. ➢ Anticipated impacts have been assessed and corresponding mitigative measures have been suggested and detailed in the EIA/EMP report. ➢ Mining is being/will be carried out as per the provisions outlined in mining plan approved by IBM as well as by abiding to the guidelines of DGMS. An implementation of recommended Environmental Management Plan/mitigation measures during the operation of the mine shall control the impacts significantly and will be confined within the mine boundary. Various measures such as wet drilling with in-built dust collection system, Controlled blasting, Water spray on haulage roads, Sheet cladding at	***Chapter 4,*** *Para 4.5.5.5, Pg 216-217*

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
		crusher is being/will be adopted to control pollution. ➢ Regular Ambient air quality monitoring, noise monitoring & water quality analysis is being/will be carried out. Greenbelt has been/will be developed along the 7.5 m width of lease periphery. ➢ OMC is making efforts for improvement in the socio-economic status in the nearby villages. The company has been continuously working in the area of Education, drinking water supply, providing Solar based Street Lights, providing Infrastructure for community development, construction of Roads, Health Camps, Training Centres, etc. OMC has a medical set-up with infrastructure of dedicated ambulance, medical cabin situated at both Mines and Office at having a dedicated MBBS Doctor, two paramedical staff and two pharmacists. The also serve the local people through mobile Health Units. Along with that, OMC has developed maternity ward and new-born ward in Laxmipur Community Health Centre. The medical facilities & Health camps are being/will be organized regularly in surrounding area.	
37.	Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	The proposed expansion project will result in growth of the surrounding areas by increased direct and indirect employment opportunities in the region including ancillary development and supporting infrastructure. Beside this, Royalty, DMF & NMET etc. are/will be additional benefits which are being/will be utilized by local administration for the development of socioeconomic infrastructure and well-being of the local population.	***Chapter 8,*** *Para 8.2.3.1, Pg 269-270*
38.	Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should	Detailed Environmental Management Plan to mitigate the environmental impacts specific to	***Chapter 4*** *Para 4.5*

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
	inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.	the proposed project along with occupational health impacts due to the proposed project and its management plan is incorporated in this EIA/EMP Report.	*Pg No. 177-240*
39.	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIAIEMP Report of the Project.	The Public Hearing for proposed expansion project is yet to be conducted.	-
40.	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the project should be given.	There is no litigation pending against the project in any court. Undertaking regarding the same is enclosed with this EIA/EMP report	***Annexure XXI***
41.	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	The cost of the expansion Project is Rs. 55.0 Crores. The capital cost of EMP is Rs. 6856.3 Lakh (Rs. 5084.14 Lakh existing + Rs. 1772.16 Lakh proposed). The Recurring cost of EMP is Rs. 905.11 Lakh (Rs. 750.32 lakh existing + Rs. 154.79 Lakh proposed).	***Chapter 10,*** *Para 10.5 Table 10.3 Pg 280-281*
42.	A Disaster Management Plan shall be prepared and included in the EIAIEMP Report.	Disaster Management and Risk Assessment Plan has been prepared and incorporated in this EIA/EMP report.	***Chapter 7*** *Para 7.2 Pg*
43.	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	The benefits of the Project clearly indicating environmental, social, economic, employment potential, etc. have been incorporated in this EIA/EMP Report.	***Chapter 8,*** *Para 8.2 Pg 268-269*
44.	**The general points are also to be followed: -**		
a.	All documents to be properly referenced with index and continuous page numbering.	Complied with	
b.	Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated	Complied with	
c.	Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.	Testing/Analysis results of water, air, soil, noise etc. for the expansion project have been endorsed from JM EnviroLab MoEF&CC/NABL accredited laboratory.	

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
		Original analysis/testing report will be submitted along with Final EIA/EMP Report.	
d.	Where the documents provided are in a language other than English, an English translation should be provided.	Complied with.	
e.	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted	Questionnaire for environmental appraisal of Mining project will be submitted with Final EIA/EMP Report.	--
f.	While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.	Instructions issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, have been followed.	--
g.	Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation	Noted and complied with	-
h.	As per the circular no. J-11011/618/2010-IA. II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.	The Environmental Clearance (EC) for Expansion in Bauxite Production Capacity from 3.0 Million TPA to 3.6 Million TPA under Para 7 (ii) (a) of EIA Notification, 2006 as per MoEF&CC OM dated 11.04.2022 and 30.05.2022 was accorded by MoEFCC, New Delhi vide File No. J-11015/439/2007.IA. II(M) dated 15.04.2025. A request letter regarding issue of Certified EC Compliance Report (for EC Letter dated 15.04.2025, for 3.6 MTPA) has been submitted to MoEFCC, Integrated Regional Office, Bhubaneshwar vide letter dated 24.06.2025.	***Annexure IIIG***

ToR Point no.	ToR Condition	Compliance	Ref. in Draft EIA / EMP Report
		Copy of the same is enclosed with this EIA/EMP Report.	
i.	The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.	Surface plan, Geological plan and sections of the mine area are enclosed with this EIA/EMP Report. No external dumping is involved.	***Annexure VIIIA & VIIIB***



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DRAFT EIA/EMP REPORT

CHAPTER-1
INTRODUCTION

1.1 PURPOSE OF THE REPORT

M/s. Odisha Mining Corporation Limited (OMC) has proposed Expansion in Bauxite Production Capacity from 3.6 Million TPA to 6.0 Million TPA [ROM: 6.0 Million TPA, OB/Waste: 3.29 Million TPA, Top Soil: 0.22 Million TPA (Total Excavation: 9.51 Million TPA)] in Kodingamali Bauxite Mine (ML Area: 428.075 ha) located at Village: Kodingamali, Tehsil(s): Laxmipur & Kashipur, District(s) Koraput & Rayagada, State: Odisha.

Earlier, the Environmental Clearance for 3.0 Million TPA Bauxite Production capacity was accorded by MoEF&CC, New Delhi on 28.05.2008 in favour of M/s. Odisha Mining Corporation Ltd. Further, OMC Ltd. applied for Environmental Clearance (EC) for Expansion in Bauxite Production Capacity from 3.0 Million TPA to 3.6 Million TPA under Para 7 (ii) (a) of EIA Notification, 2006 as per MoEF&CC Office Memorandum No IA 3-22/10/2022-IA.III [E177258] dated 11.04.2022 and 30.05.2022. The Environmental Clearance for expansion in production capacity (from 3.0 Million TPA to 3.6 Million TPA) has been granted by MoEF&CC, New Delhi vide File No. J-11015/439/2007.IA. II(M) dated 15.04.2025.

Now, the present proposal is for Expansion in Bauxite Production Capacity from 3.6 Million TPA to 6.0 Million TPA [ROM: 6.0 Million TPA, OB/Waste: 3.29 Million TPA, Top Soil: 0.22 Million TPA (Total Excavation: 9.51 Million TPA)] in Kodingamali Bauxite Mine (ML Area: 428.075 ha) located at Village: Kodingamali, Tehsil(s): Laxmipur & Kashipur, District(s) Koraput & Rayagada, State: Odisha, under EIA Notification, 2006, as amended from time to time. ToR Application for the proposed expansion project was submitted on Parivesh 2.0 web portal of MoEF&CC on 07.05.2025. The project was considered during 44th Meeting of Expert Appraisal Committee (Non-Coal Mining) & the Technical Presentation for ToR was held on 15.05.2025. Terms of Reference (ToR) was issued by MoEF&CC, New Delhi vide file No.: J-11015/439/2007.IA. II(M) dated 20.06.2025.

This report has been prepared as per Terms of Reference (ToR), issued by the Ministry of Environment, Forest and Climate Change (MoEF&CC) Govt. of India, New Delhi for carrying out the Environmental Impact Assessment study.

Pursuant to the Ministry's OM vide its letter No F No IA3-22/10/2022-IA.III[E177258] dated; 08.06.2022, the baseline data should not be older than 3 years (Point no. 2) and same may be collected at any stage of the EC process or even before the grant of ToR (Point no. 6(i)). Accordingly, the baseline data for the Environmental Impact Assessment Studies has been collected during Post monsoon season (October to December, 2024).

The purpose of this EIA/EMP report is to comprehensively evaluate the environmental and social implications of expansion and to ensure that the project remains sustainable and compliant with all regulations. The present EIA report aims to:

- Present a comprehensive environmental assessment of the proposed expansion project.
- Identify and assess potential environmental and social impacts arising from the expansion in comparison to the previously approved configuration.

- Recommend effective mitigation measures and formulate an updated Environmental Management Plan (EMP), ensuring that all mining activities continue in an environmentally sustainable and legally compliant manner;
- Enable the regulatory authority to take an informed decision regarding the proposed expansion proposal by providing all requisite information on project changes, anticipated impacts and the proposed management measures;
- Facilitate public understanding and transparency by clearly explaining the nature of the expansion and demonstrating that the project will continue to operate within its originally approved lease area with added environmental and economic benefits.

The EIA report contains essential information for:

- The proponent to implement the proposal in an environmentally, economically and socially responsible manner;
- The project proponent to understand the mitigation measures suggested and earmark proper resources & budget for the impacts envisaged;
- The responsible authority to make an informed decision on the proposal, including the terms and conditions that must be attached to an approval or authorization; and
- The public to understand the proposal and its potential impact on people and the environment.

1.2 IDENTIFICATION OF THE PROJECT AND PROJECT PROPONENT

1.2.1 IDENTIFICATION OF THE PROJECT

A. PROPOSED PROJECT

M/s. Odisha Mining Corporation Limited has proposed Expansion in Bauxite Production Capacity from 3.6 Million TPA to 6.0 Million TPA [ROM: 6.0 Million TPA, OB/Waste: 3.29 Million TPA, Top Soil: 0.22 Million TPA (Total Excavation: 9.51 Million TPA)] in Kodingamali Bauxite Mine (ML Area: 428.075 ha) located at Village: Kodingamali, Tehsil(s): Laxmipur & Kashipur, District(s) Koraput & Rayagada, State: Odisha.

B. SCREENING CATEGORY

As per EIA Notification vide S.O. 1533(E) dated 14th September, 2006, as amended from time to time; the project falls under Category "A", Project or Activity 1(a) "Mining of Mineral", s

C. MINING LEASE STATUS

- Initially, the Mining Lease grant order over an area of 715.075 ha was issued by Govt. of Odisha in favour of M/s. Odisha Mining Corporation Limited dated 01.02.1999 for a period of 30 years.
- Director of Mines (Odisha) issued the "Precise Area Map" with boundary descriptions vide their letter no. 3786 dated 22.05.2006
- Subsequently, OMC submitted a revised application of 447.25 ha area deleting the non-mineralized area. Thereafter, Department of Steel and Mines, Govt. of Odisha further reduced the ML area from 447.25 ha to 428.31 ha vide letter dated 11.09.2015. However, after DGPS survey the area came to be 428.075 ha.

- Further, OMC has submitted an application to the Director of Mines, Govt. of Odisha, Bhubaneswar vide Letter No.12268/OMC/2015 dated 23.09.2015 along with the Geo-referenced DGPS Lease Plan over 428.075 ha provided by ORSAC, the nodal agency for DGPS Survey, for issuing the authenticated Geo-referenced Surveyed Lease Plan over 428.31 ha for processing of the modified Lease Plan and other statutory clearances.
- The Kodingamali Lease Area has been revised to 428.075 ha vide letter no. 11071/DM dated 17.12.2015, Director of Mines Odisha.
- On compliance of terms and conditions, State Govt. has issued the grant order in respect of Kodingamali Mining Lease over 428.075 ha in Rayagada and Koraput District for Bauxite vide proceeding no. 303/SM dated 09.01.2017 for a period of 50 years.
- The mining lease over an area of 428.075 ha was executed on 10.01.2017 for District Koraput and on 11.01.2017 for District Rayagada in favour of M/s. Odisha Mining Corporation Limited for a period of 50 years which is valid up to 09.01.2067 and 10.01.2067 respectively.

  Copy the lease documents are enclosed as ***Annexure I.***

D. STATUS OF APPROVAL OF MINING PLAN

- The modification of Mining Plan & Progressive Mine Closure Plan has been approved by Indian Bureau of Mines, Bhubaneswar for two years (FY: 2020-21 & 2021-22) vide Letter no. MPM/A/10-ORI/BHU/2019-20/84 dated 03.04.2020 for Expansion in Bauxite Production Capacity from 3.0 Million TPA to 6.0 Million TPA.
- Now, the Review of Mining Plan & Progressive Mine Closure Plan (FY: 2022-23 to 2026-27) over an area of 428.075 ha for Bauxite Production Capacity: 6.0 Million TPA has been approved by Indian Bureau of Mines, Bhubaneswar vide Letter no. RMP/A/21-ORI/BHU/2021-22/1206 dated 10.11.2021.

  Copy of the mining plan approval letter is enclosed as ***Annexure II.***

E. STATUS OF TERMS OF REFERENCES, ENVIRONMENTAL CLEARANCES AND CONSENTS

Table-1.1

Status Of Existing Terms of Reference, Environmental Clearances and Consents

S. No.	Particular	Letter No. & Date
Existing Terms of Reference		
1.	Terms of References was obtained for Expansion of Kodingamali Bauxite Mine with Bauxite Production Capacity from 3.0 MTPA to 6.0 MTPA over an area of 428.075 ha located at District: Koraput & Rayagada, State: Odisha	Vide F. No. J-11015/439/2007. IA. II(M), Proposal No. IA/OR/MIN/143523/2020 dated 17.06.2020.
Existing Environmental Clearances		
1.	Environmental Clearance for 3.0 Million TPA Bauxite Production capacity was granted in favour of M/s. Odisha Mining Corporation Ltd.	Letter no. J-11015/439/2007-IA.II(M) dated 28.05.2008. Copy of the EC Letter is enclosed as ***Annexure III A.***
2.	Amendment in Environmental Clearance for proposal of inclusion of Road Transport as a mode of mineral transport, incorporating correction in ML	Letter no. J-11015/439/2007-IA.II(M) dated 24.11.2017. Copy of the Amended EC Letter is enclosed as ***Annexure III B.***

	area from 447.15 ha to 428.075 ha, updating the land use pattern in line with the stage I FC granted by MoEF&CC and incorporating supply of 400 KLD water from water resource department, Govt. of Odisha as the source of water for the project in favour of M/s. Odisha Mining Corporation Ltd.	
3.	Amendment in Environmental Clearance for "Transportation of 3.0 MTPA Bauxite ore by Road " in favour of M/s. Odisha Mining Corporation Ltd.	Letter no. J-11015/439/2007-IA.II(M) dated 17.12.2018. Copy of the Amended EC Letter is enclosed as ***Annexure III C.***
4.	Amendment in Environmental Clearance for "Transportation of 0.7 MTPA left over stock of Bauxite Ore through road transportation " in favour of M/s. Odisha Mining Corporation Ltd. (One time permission)	Letter no. J-11015/439/2007-IA.II(M) dated 29.05.2020. Copy of the Amended EC Letter is enclosed as ***Annexure III D.***
5.	Amendment in Environmental Clearance for "Transportation of 1.43 million tons of left over stock of Bauxite Ore by road" in favour of M/s. Odisha Mining Corporation Ltd. (One time permission)	Letter no. J-11015/439/2007-IA.II(M) dated 05.08.2021. Copy of the Amended EC Letter is enclosed as ***Annexure III E.***
6.	Amendment in Environmental Clearance w.r.t to transportation of leftover stock of 7,34,767.4 tonnes of Bauxite by road, over and above the permitted EC capacity of 3.0 MTPA during the FY 2022-23 in favour of M/s. Odisha Mining Corporation Ltd. (One time permission)	Letter no. J-11015/439/2007-IA.II(M) dated 25.02.2022. Copy of the Amended EC Letter is enclosed as ***Annexure III F.***
7.	Certification of existing compliance of EC conditions has been done by IRO, Bhubaneshwar	Request Letter dated 24.06.2025 regarding issue of Certified EC Compliance Report submitted to IRO, Bhubaneshwar. Copy of the Request Letter is enclosed as ***Annexure III G.***
8.	Environmental Clearance for expansion in Bauxite Production capacity from 3.0 Million TPA to 3.6 Million TPA (Phase I – 20%) (under Para 7 (ii) (a) of EIA Notification, 2006) was granted in favour of M/s. Odisha Mining Corporation Ltd.	Letter no. J-11015/439/2007-IA.II(M) dated 15.04.2025. Copy of the EC Letter is enclosed as ***Annexure III H.***
Existing Consent for Establish (CTE)		
1.	Consent to Establish under Water (Prevention & Control of Pollution) Act, 1974 and Air (Prevention & Control of Pollution) Act, 1981 for Bauxite Production Capacity: 3.0 Million TPA over mine lease area of 447.25 ha	Order issued vide Office Memorandum No.: 854/Ind-II-NOC-4373 dated 12.01.2007. Copy of the same is enclosed as **Annexure IV A.**
2.	Consent to Establish under Water (Prevention & Control of Pollution) Act, 1974 and Air (Prevention	Order issued vide Office Memorandum No. 14554/IND-II-CTE-6233 dated 07.12.2018. Copy of

	& Control of Pollution) Act, 1981 for establishment of Crushing Plant of 2 x 500 TPH within the ML area	the same is enclosed as ***Annexure IV B.***
3.	Revision in mining lease area from 447.25 ha to 428.075 ha in Consent to Establish order dated 12.01.2007 and in the revalidation of Consent to Establish dated 15.12.2017.	Order issued vide Office Memorandum No. 465/IND-II-NOC-4373 dated 11.01.2018. Copy of the same is enclosed as ***Annexure IV C.***
4.	Consent to Establish under Water (Prevention & Control of Pollution) Act, 1974 and Air (Prevention & Control of Pollution) Act, 1981 for Expansion in Bauxite Production Capacity from 3.0 Million TPA to 3.6 MTPA (Phase I – 20%) over mine lease area of 428.075 ha.	Order issued vide Office Memorandum No.: 9208/Ind-II-CTE-7440 dated 09.05.2025. Copy of the same is enclosed as ***Annexure IV D.***
Existing Consent for Operation (CTO)		
1.	Consent to Operate granted under section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 and under section 21 of Air (Prevention & Control of Pollution) Act, 1981 in favour of M/s. Odisha Mining Corporation Limited (For Bauxite Production Capacity 3.0 Million TPA and Crushers - 2 x 500 TPH)	Consent Order issued vide letter No. 7076/IND-I-CON-7076 dated. 03.05.2023. Copy of the same is enclosed as ***Annexure IV E.***
2.	Consent to Operate granted under section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 and under section 21 of Air (Prevention & Control of Pollution) Act, 1981 in favour of M/s. Odisha Mining Corporation Limited (For Bauxite Production Capacity 3.0 Million TPA and Crushers - 2 x 500 TPH)	Consent Order issued vide letter No. 6958/INDI-CON-6632 dated. 31.03.2025 which is valid up to 31.03.2026. Copy of the same is enclosed as ***Annexure IV F.***

Source: *M/s. OMC Ltd.*

Table - 1.2

Status of Proposed Expansion Project for Environmental Clearance

S. No.	Project Activity	Date/Duration
1.	ToR Application submitted to MOEF&CC on Parivesh 2.0 Web Portal	07.05.2025
2.	Technical Presentation for grant of ToR was held before 44th EAC (Non-coal Mining) Meeting	15.05.2025
3.	ToR Letter issued by MoEF&CC, New Delhi vide file no. J-11015/439/2007-IA.II (M)	20.06.2025
4.	Baseline Monitoring & Data Collection	Post-monsoon Season (October to December, 2024)

Source: *Parivesh 2.0 Web Portal*

F. STATUS OF FOREST CLEARANCE

The present lease area comprises of 406.385 ha forest land of Kodingamali Reserve Forest and 21.69 ha forest land of Kodinga Proposed Reserve Forest.

- Stage I Forest Clearance was accorded by MoEF&CC over 434.935 ha of forest land (428.075 ha ML + 6.860 ha approach road) vide F. No 8-46/2016-FC dated 17.04.2017.
- Stage II Forest Clearance was accorded by MoEF&CC vide letter no. F. No. 8-46/2016-FC dated 25.09.2017 for an area of 434.935 ha (428.075 ha ML + 6.860 ha approach road).
- The Diversion Order was issued by Forest & Environment Department, Govt. of Odisha Bhubaneswar, vide Letter No. 10F(Con)I/2017 20540/F&E dated 07.10.2017.

Copy of Forest Clearance is enclosed as ***Annexure V A.***

1.2.2 INTRODUCTION OF THE PROJECT PROPONENT

- Odisha Mining Corporation Limited (OMC) was incorporated on 16th May 1956 as a joint venture Company of Government of Odisha and Government of India with the objective of harnessing the mineral wealth of the State of Odisha through exploration, extraction as well as value addition. Four years later, OMC became a wholly State-owned Corporation of Government of Odisha on 17th Nov. 1961.
- OMC is pioneer and is well known for its all-round CSR & Sustainability practices. It has been honoured at national level on several occasions for its outstanding contribution and leadership roles in CSR & Sustainability.
- OMC is classified as a "Gold" Category State PSU, is a 100% debt free profit-making corporation, is a testament to the excellent processes and systems put in place by the management team.
- OMC's major mines include Iron, Chrome, Bauxite and Manganese which cater to the requirement of mineral based industries such as steel, sponge iron, pig iron, ferro-manganese, ferrochrome, and other similar industries.
- Presently, Daitari, Gandhamardan–A & B, Kurmitar, Guali, Jilling, Khandbandh, Banspani, Unchabali and Tiringpahar are OMC's major Iron Ore mines, while South Kaliapani and Sukrangi are the major Chrome ore mines. The Bangur Chrome Ore mine is the first and only underground mine of OMC. Kodingamali is the only Bauxite mine of OMC.
- Further OMC ventured into Khondalite mining for supply of Khondalite stone to Sri Jagannath Temple, Puri & other projects carried out under "ABADHA" scheme.

1.3 BRIEF DESCRIPTION OF NATURE, SIZE, LOCATION OF THE PROJECT AND ITS IMPORTANCE TO THE COUNTRY, REGION

1.3.1 BRIEF DESCRIPTION OF NATURE, SIZE & LOCATION OF PROJECT

The brief description of the nature, size and location of the project has been given in table below:

Table 1.3

Brief Description of the Project

S. No.	PARTICULARS	DETAILS
A.	**Nature of the Project**	Expansion in Bauxite Mining Project
B.	**Size of the Project**	
1.	Mining Lease Area	428.075 ha (Koraput district: 406.385 ha & Rayagada district: 21.69 ha)
2.	Proposal	➢ Bauxite Production Capacity: 3.6 Million TPA to 6.0 Million TPA ➢ OB/Waste: 3.29 Million TPA ➢ Top Soil: 0.22 Million TPA **Total Excavation: 9.51 Million TPA**
C.	**Location Details**	
1.	Village	Kodingamali
2.	Tehsil(s)	Laxmipur & Kashipur
3.	District(s)	Koraput & Rayagada
4.	State	Odisha
5.	Latitude & Longitude	Latitude: 19°01'46"N to 19°05'14"N Longitude: 83°03'22"E to 83°05'12"E
6.	Toposheet No.	Core Zone: E44F4 (65M/4) Buffer Zone: E44F4 (65M/4); E44E16 (65I/16); E44K13 (65J/13), E44L1(65N/1)

Source: *Pre-feasibility Report*

1.3.2 IMPORTANCE OF THE PROJECT TO THE COUNTRY AND REGION

National Importance

India is the second-largest Aluminium producer in the world with a total Aluminium production 10.43 Lakh Tonnes in FY25. The growth in production of Aluminum is driven by strong demand in sectors like energy, infrastructure, automotive, and construction. *(Source: www.ibef.org)*

Aluminium is used in industries like aerospace, automotive, construction, packaging, and electronics due to its light weight, corrosion resistance, and strength.

Bauxite is the principal ore of Aluminium which is one of the most important non-ferrous metals used in the modern industry. It is also an essential ore for Refractory and Chemical industries. Odisha emerged as the leading producing state accounting for about 73% of the total production during 2021-22. The country is endowed with huge quantities metallurgical grade bauxite. Odisha alone accounts for 41% of country's resources of Bauxite followed by Chhattisgarh 20%, Andhra Pradesh (12%), Gujarat (8%), Jharkhand (6%), Maharashtra (5%) and Madhya Pradesh (4%). Major bauxite resources are concentrated in the East Coast bauxite deposits in Odisha and Andhra Pradesh. *Source - [Indian Minerals Year book 2022 (Part- III : MINERAL REVIEWS) 61th Edition].*

Regional Importance

- Alumina and Aluminium Market is expected to witness significant growth in the coming years. To meet the demand of enhanced production of Aluminium, Bauxite production also need to be proportionately increased to maintain adequate supply of bauxite to Aluminium industry.
- After the implementation of this expansion project the Bauxite produced from the Kodingamali Bauxite mine will be sold to the prospective buyers for its use in Alumina and Aluminium Plants.

- The mine is being contributing to the State & Central Govt. exchequers by way of mining revenue.
- Total Manpower requirement after expansion will be 391 (Existing 243 + Additional 148). The mining activity creates lot of indirect employment opportunities to the local people in various activities like, site service facilities, horticulture, canteen, rental vehicles, workshops, grocery shops, utility stores etc. Preference is being/will be given to the locals as per their eligibility.
- Apart from the mining activities, plantation is being/will be carried out in the area which will improve the local environment to a certain extent.
- The project will help in the overall growth of the region.

1.4 SCOPE OF THE STUDY

The scope of this Environmental Impact Assessment (EIA) study encompasses all aspects prescribed in the Terms of Reference (ToR) issued by the MoEF&CC, New Delhi vide File No. J-11015/439/2007-IA.II (M) dated 20.06.2025. The study addresses each item detailed in the ToR, and includes comprehensive baseline data collection, impact assessment and formulation of an environmental management plan relevant to the proposed expansion in the existing mining lease.

The regulatory scoping of the project as per the ToR (1 -27) has been mentioned in "Point wise compliance of ToR" on Page no. 28 to 59 of this EIA/EMP Report.

The data generated from various studies for EIA/EMP are presented and discussed in following chapters of this report prepared as per Appendix-III of the EIA Notification, 2006.

Chapters	Description
Chapter-1	Introduction
Chapter-2	Project Description
Chapter-3	Description of the Environment
Chapter-4	Anticipated Environmental Impacts and Mitigation Measures
Chapter-5	Analysis of Alternatives (Technology & Site)
Chapter-6	Environmental Monitoring Plan
Chapter-7	Additional Studies
Chapter-8	Project Benefits
Chapter-9	Environment Cost Benefit Analysis
Chapter-10	Environment Management Plan
Chapter-11	Summary & Conclusion
Chapter-12	Disclosure of Consultants Engaged

CHAPTER-2

PROJECT DESCRIPTION

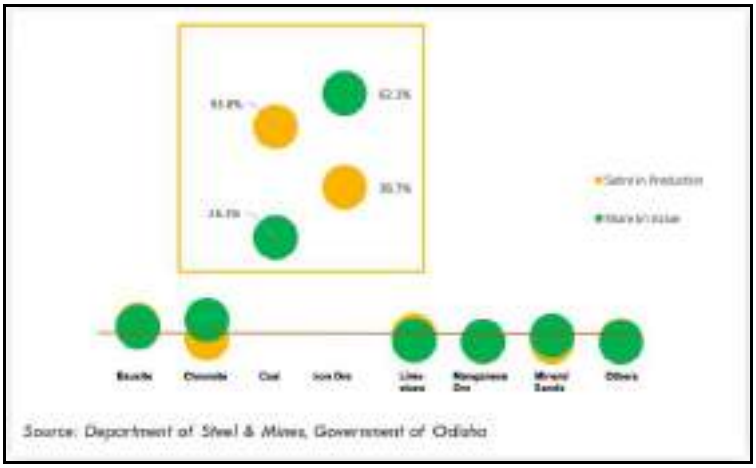
2.1 TYPE OF THE PROJECT

M/s. Odisha Mining Corporation Limited has proposed Expansion in Bauxite Production Capacity from 3.6 Million TPA to 6.0 Million TPA [ROM: 6.0 Million TPA, OB/Waste: 3.29 Million TPA, Top Soil: 0.22 Million TPA (Total Excavation: 9.51 Million TPA)] in Kodingamali Bauxite Mine (ML Area: 428.075 ha) located at Village: Kodingamali, Tehsil(s): Laxmipur & Kashipur, District(s) Koraput & Rayagada, State: Odisha.

As per EIA Notification dated 14th September, 2006, as amended from time to time; the project falls under Category "A", Project or Activity 1(a) "Mining of Mineral."

2.2 NEED FOR THE PROJECT

- Bauxite is the principal ore of Aluminum which is one of the most important non-ferrous metals used in the modern industry. It is also an essential ore for Refractory and Chemical industries.
- Reserves/Resources of Bauxite in the country as on 01.04.2020, as per National Mineral Index (NMI) database, based on UNFC system is around 4958 Million Tonnes. Odisha alone accounts for 41% of country's resources of Bauxite resources. *[Source: Indian Minerals Year book 2023]*.
- The production of Bauxite was 23.84 Million Tonnes in the year 2022-23 increased by 6% as compared to the previous year. Odisha contributes around 73% of total Bauxite production at National Level and it is the leading producer of Bauxite in India. *[Source: Indian Minerals Yearbook 2023]*
- Odisha is a mineral-rich state and is endowed with large varieties of metallic and non-metallic minerals, which include Chromite, Bauxite, Graphite, Iron ore. Bauxite Production from Odisha had increased from 9.2 Million Tonnes (in Year 2014-15) to 17.5 Million Tonnes (in Year 2022-23). M/s. Odisha Mining Corporation Limited (OMC) is one of the major companies involved in the production of Bauxite in Odisha. The value of major Minerals and their share in production, in the state of Odisha is shown in the following figure:



Source: *Odisha Economic Survey, 2023-24, Planning and Convergence Department, Govt. of Odisha*

Figure: 2.1 - Share in Production and Value of Major Minerals in Odisha (2022-23)

- Bauxite mines are concentrated in Kalahandi, Koraput, Rayagada and Bolangir districts of Odisha. Bauxite production increased from 9.2 Million Tonnes to 17.5 Million Tonnes in Odisha with a Compound Annual growth Rate (CAGR) of 8.4%. At District level 60 per cent of the production is shared by the Koraput district and another 40 per cent by the Rayagada district. *(Source: Odisha Economic Survey, 2023-24, Planning and Convergence Department, Govt. of Odisha)*
- Odisha Bauxite deposits have cost advantage due to predominantly Gibbsitic nature, which makes it amenable to low temperature/low pressure digestion. The deposits have low reactive silica, which results in low cost alumina production. These deposits have very little overburden, which make cost of production comparatively low.
- Kodingamali Bauxite Deposit is similar to the other Bauxite deposits of the East- Coast Region, having low lateritic overburden and fairly good Bauxite thickness with low silica content. These deposits with low silica content and high gibbsite bauxite content are highly favourable for Alumina Industry in the country. Highly undulating floor contact with parent rock is a common feature of the East coast Bauxite Deposits.
- As our country is developing, its per capita Aluminium consumption is also increasing day by day. To meet the enhanced capacity production of Aluminium, Bauxite production also need to be proportionately increased to maintain adequate supply of Bauxite to Aluminium industry.
- Kodingamali Bauxite Mine with Bauxite production capacity of 3.0 MTPA; is in operation since 2018. The bauxite produced from the mine is being transported via road to the Railway siding near Kakriguma (~24.0 Km from ML area) from where the ore is being further dispatched for sale to the prospective buyers (for its use in Alumina & Aluminium Plants).
- Further, the company had proposed Expansion in production capacity of Bauxite from 3.0 Million TPA to 3.6 Million TPA within the existing Mining Lease area of 428.075 ha; under Para 7 (ii) (a) of EIA Notification, 2006 as per MoEF&CC OM dated 11.04.2022 and 30.05.2022, to maintain the adequate supply of bauxite to Alumina and Aluminium industry. The Environment Clearance for the same has been granted by MoEFCC, New Delhi on 15.04.2025.
- Now, the company has proposed expansion in Bauxite Production from 3.6 Million TPA to 6.0 Million TPA under EIA Notification, 2006 & as amended from time to time. The Terms of Reference (ToR) has already been issued for the same. In connection to this, the Bauxite produced from the mine is being transported via Road through Trucks to the Railway siding near Kakriguma (~24 Km from the ML area). After expansion, along with Kakriguma Railway siding; the ore will be also be transported to other Railway Sidings namely, Singaram (~27 Km from the ML area) , Rayagada (~70 Km from the ML area) and Dumriput (~67 Km from the ML area). Form the Railway Sidings, the ore is being/will be further dispatched for sale to the prospective buyers (for its used in Alumina & Aluminium Plants/Refinery).

2.3 LOCATION OF THE PROJECT

The mine site is located at Village: Kodingamali, Tehsil(s): Laxmipur & Kashipur & District(s): Koraput & Rayagada, Odisha. The ML Area falls on SoI Toposheet No. Core Zone: E44F4 (65M/4).

The maps showing general location, specific location (Mine Lease boundary) along with geographical coordinates, and geology & geomorphology of the mine site is given on the following pages.

2.3.1 LOCATION MAP (GENERAL AND SPECIFIC)

The map showing general as well as specific location of the mine site is as given below:

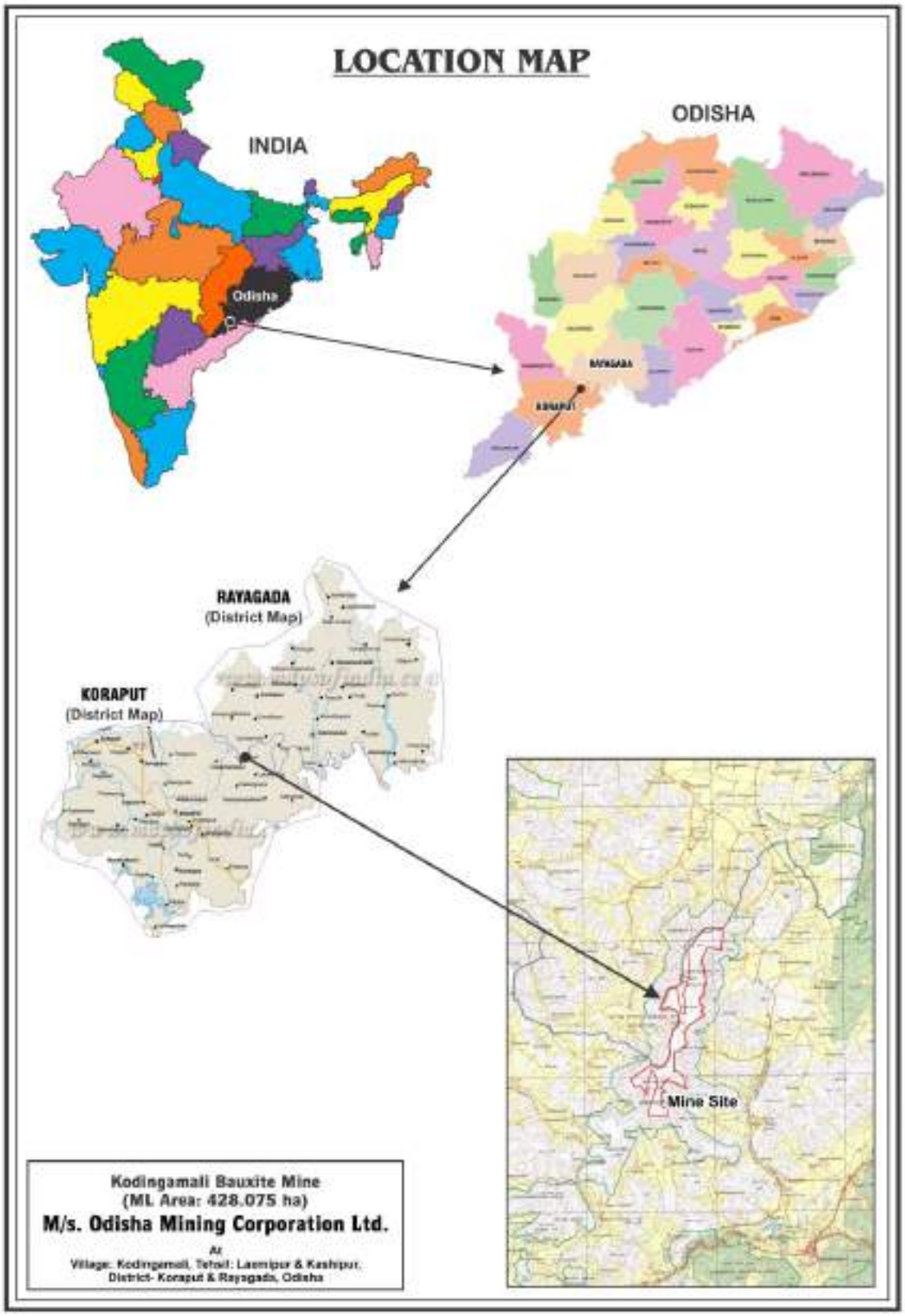


Figure 2.2: Location map (Showing general as well as specific location of the ML area)

2.3.2 MAP SHOWING GEOLOGY OF THE MINE SITE WITH CORDINATES

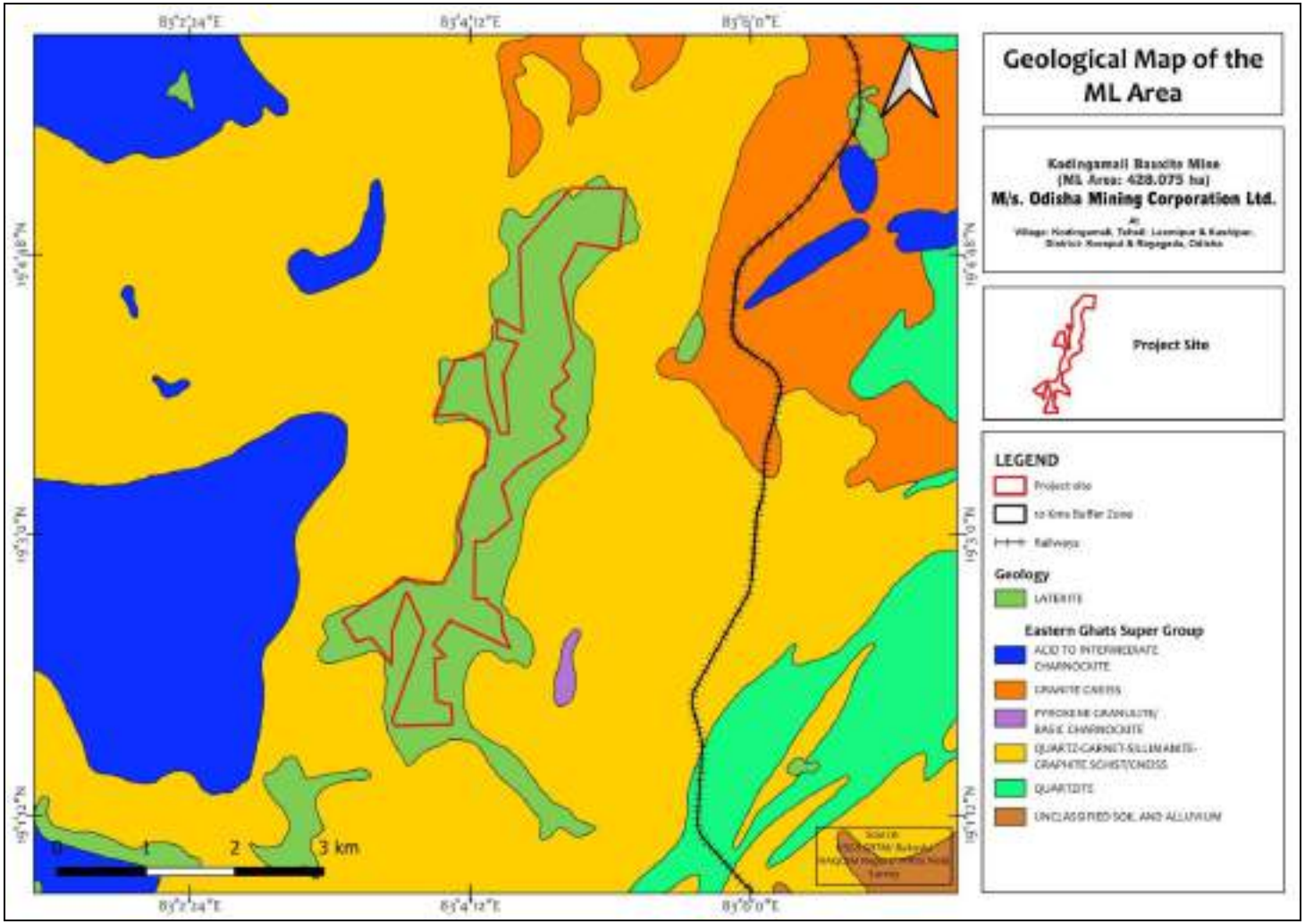


Figure 2.3 Map showing Geology of the Mine Site with Geographical Extents

2.3.3 MAP SHOWING GEOMORPHOLOGY OF THE MINE SITE WITH CORDINATES

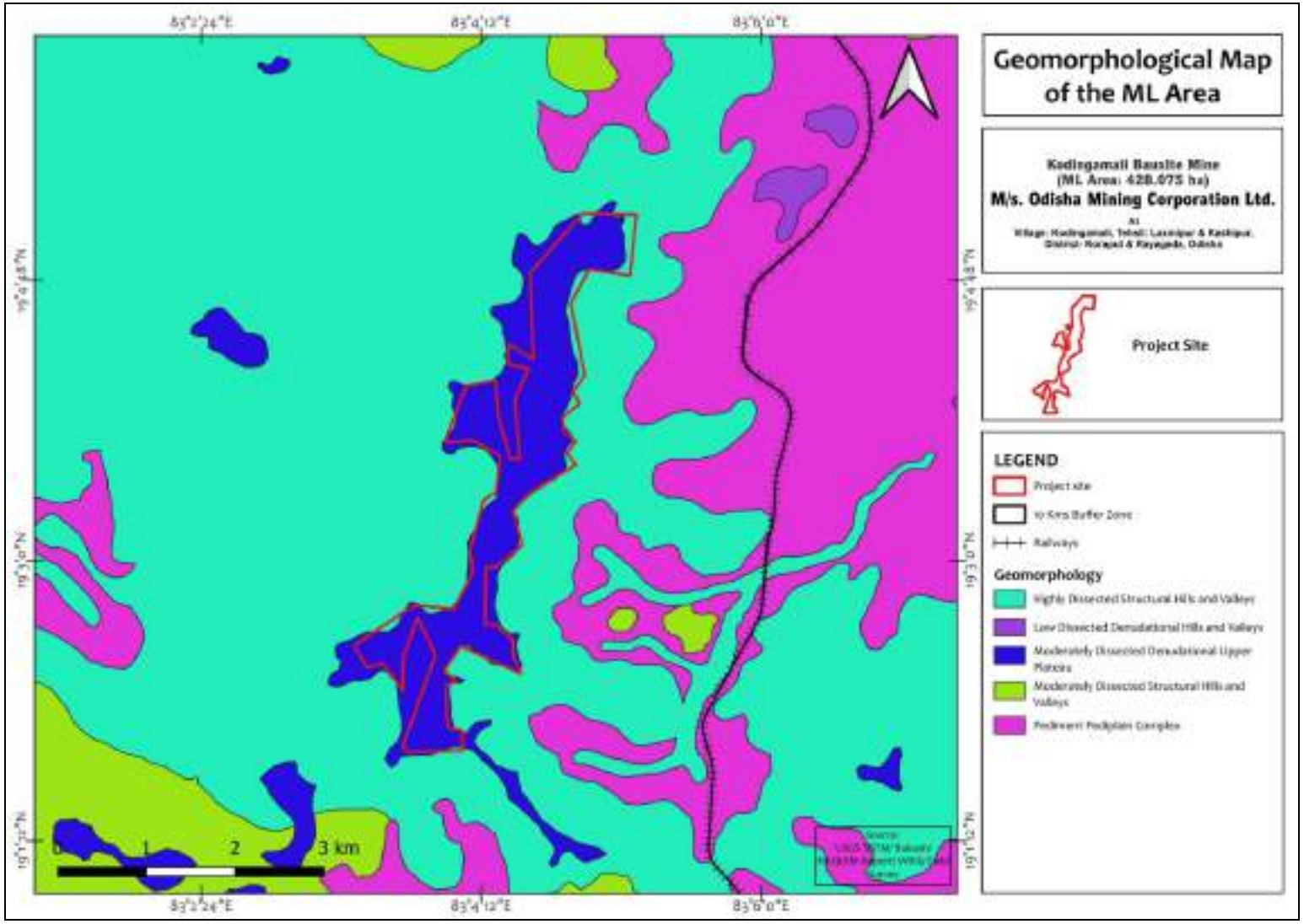


Figure 2.4: Map showing Geomorphology of the Mine Site with Geographical Extents

2.3.4 PROJECT SITE LAYOUT

Land Details

The Mining Lease area of Kodingamali Bauxite Mine is 428.075 ha. The entire ML area is the Forest Land. Out of the entire forest land, 406.385 ha area falls under Kodingamali Reserve Forest and 21.69 ha falls under Kodingamali Proposed Reserve Forest.

Stage I Forest Clearance over 434.935 ha of forest land (428.075 ha ML including 18.098 ha safety zone + 6.860 ha approach road) was accorded by MoEF&CC vide F. No 8-46/2016-FC dated 17.04.2017 and Stage II Forest Clearance for the same area has been accorded by MoEF&CC vide letter no. F. No. 8-46/2016-FC dated 25.09.2017. The diversion order was obtained from Govt. of Odisha, Forest and Environment Department, Bhubaneshwar vide letter No. 10F (Con)1/2017/20540/F&E, dated 07.10.2017. Copy of the Forest Clearance is enclosed as ***Annexure V A.***

This is an existing operational mine and expansion in Bauxite production capacity is proposed within the existing mining lease area i.e. 428.075 ha. Therefore, no additional land acquisition or forest land diversion involved for the proposed expansion.

Table 2.1
Breakup of mining lease area (in ha)

S. No.	Village	Land Area	Type of Land
1.	Kodingamali P.R.F	21.69	Forest Land
2.	Kodingamali R.F	406.385	Forest Land
Total		**428.075**	Forest Land

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

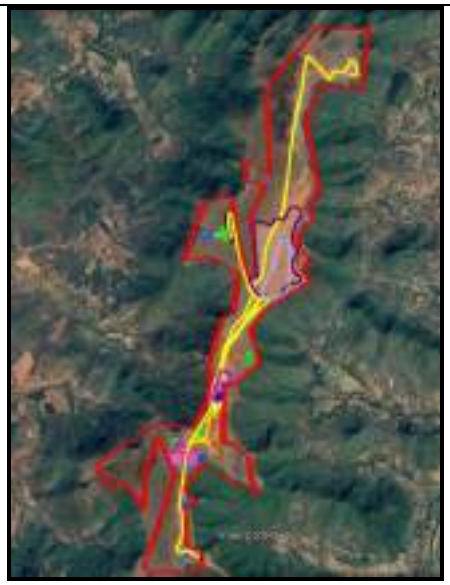
Further, remittance of Rs. 27,22,69,310 towards the **Net Present Value (NPV)** amount with respect to the forest land pertaining to the Kodingamali lease has been duly paid to D.F.O -cum- Wildlife Warden, Koraput Forest Division Koraput. Copy of the NPV paid to DFO is enclosed as ***Annexure V B*** and copy of FRA certificate obtained from Collector, Koraput & Collector Rayagada is enclosed as ***Annexure V C.***

Land Use Pattern

Existing Land use: Presently, out of total mining lease area i.e. 428.075 ha, Area under Mining is 86.433 ha, area under Roads is 17.648 ha, area under Infrastructure, Workshop, admin Building etc.) is 14.591 ha, area under Storage of Top Soil is 1.64 ha, Waste Dump Site is 4.446 ha, Mineral Storage 8.74 ha, area under Mineral Separation Plant is 3.768 ha, area under Safety Zone/Green belt is 8.97 ha and Undisturbed Area is 281.839 ha.

At Conceptual Stage: At the conceptual stage, out of total mining lease area i.e. 428.075 ha, the total excavated area will be 368.684 ha, out of which 125.60 ha area will be backfilled followed by plantation and regrassing will be done on remaining 243.084 ha excavated area. Area under infrastructure (Workshop, Admin. Building, etc.) will be 25.261, area under Roads will be 8.438 ha, area for Mineral Storage will be 4.169 ha, area under Mineral Separation Plant will be 3.425 ha and area under 7.5 m Greenbelt along the Lease periphery will be 18.098 ha.

2.3.5 SAILENT FEATURES OF THE LEASE AREA



Source: *Google Earth & Surface Plan*

Legends	
	Mining Lease Boundary
	Roads
	Existing Infrastructure (Mines Office, Parking Plaza, Workshop, etc.)
	Topsoil Stackyard
	Settling Pond
	Check Dams
	Existing Quarry Area
	Storage Ponds
	OB Dump
	Backfilled Area
	Crusher Area

Figure 2.5: Google Image showing Existing features of Site

Roads: Roads are present in the central and in Western part within the ML area (Total Length ~11.0 Km covering 18.779 ha area) for transportation of mineral from mine faces to the crusher and from crusher up to the loading points within the Mine.





Roads present within the ML Area

Existing Quarry: Existing working pit is present in the central part of mining lease covering 85.10 ha area.





Garland Drains, Siltation pits and Storage Ponds: Garland drain having siltation pits have been constructed at the toe of the dumps, to channelize the runoff water from dumps into mined out pits. Rainwater Harvesting Structures with HDPE Lining and settling cum percolation ponds are constructed within the ML area.



Garland Drains with Check dams and Siltation Pits



Storage Pond within the ML Area

Crushers: 2 nos. of Crushers (2 x 500 TPH) have been installed within the ML area for crushing of Bauxite.





Crusher installed within the Mine Lease Area

Figure 2.6 Photographs of Mine Site

All above mentioned mine site features of core zone marked on Google Image given in Figure no. 2.4 are also shown in Surface Plan. Copy of Surface Plan is enclosed as ***Annexure VIII A***.

2.4 SIZE OR MAGNITUDE OF OPERATION

Table - 2.2

Size or magnitude of operation

S. No.	Particulars	Details
1.	Area (In ha.)	428.075 ha
2.	Type of Mine	Opencast Mine
3.	Method of Mining	Fully Mechanized Opencast mining
4.	Total Geological Resources	79.33 Million Tonnes (as on 30.06.2021) 68.08 Million Tonnes (as on 31.03.2025)
5.	Mineable Reserves	75.79 Million Tonnes (as on 30.06.2021) 64.54 Million Tonnes (as on 31.03.2025)
6.	Production Capacity	6.0 Million TPA
7.	Total Excavation	9.51 Million TPA (ROM: 6.0 Million TPA, OB/Waste: 3.29 Million TPA & Top Soil: 0.22 Million TPA)
8.	Life of Mine	~ 13 Years [Based on Mineable Reserves: 75.79 Million Tonnes (as on 30.06.2021)] ~11 Years [Based on Mineable Reserves: 64.54 Million Tonnes (as on 31.03.2025)]
9.	Mining Lease Period	50 Years (10.01.2017 to 09.01.2067)
10.	Man Power (Nos.)	391 Persons
11.	Estimated Cost of the Project	Rs. 55.0 Crores
12.	Cost of Environment Management Plan	Capital cost of EMP: Rs. 6856.3Lakhs (Existing Rs. 5084.14 Lakh + Proposed Rs.1772.16 Lakh) Recurring Cost of EMP: Rs. 905.11 Lakhs/Annum (Existing Rs.750.32 Lakh/Annum + Proposed Rs. 154.79 Lakh/Annum)

2.4.1 ASSOCIATED ACTIVITIES/ FACILITIES PROVIDED

The existing operational mine has all the necessary infrastructure such as Mine Office, workshop building, mobile service van facility, power supply, water supply sourced by water tankers, Crushers, diesel storage facility, rest shelters, canteen, Parking Plaza, weigh bridge, Vocational Training Centre, etc. within the ML Area.

i. **Crushers:** Presently, 2 nos. of crushers (2 x 500 TPH) have been installed within the mining lease area. However, during the expansion (from 3.6 Million TPA to 6.0 Million), one Crusher of 2400 TPH is proposed to be installed within the ML area {Existing Crusher (2 x 500 TPH) will be phased out after the installation of Proposed Crusher (2400 TPH)}.

ii. **Office Facilities:** A full-fledged office with all facilities has been established within the mine along with Parking Plaza. Other facilities like Security Barrack, Weigh Bridge, Water Treatment Plant (for Domestic & Drinking water) etc. are also present within the lease area.

iii. **Workshop:** A well-equipped maintenance workshop has been established within the existing Mine having qualified and experienced manpower to cater to all maintenance requirements of HEMM. All the required tools and tackles have been provided in the workshop along with Working Bay & overhead crane. A mobile service van has also been deployed for field maintenance facilities.

iv. **Power Supply:** To achieve production capacity for 3.6 MTPA, power supply from 22 nos. of D.G. sets; 1 x 1010 KVA, 1 X 500 KVA, 1 X 250 KVA, 2 X 125 KVA, 2 X 62.5 KVA, 2 X 25 KVA, 7 X 10 KVA, 6 X 5 KVA is being achieved at mine haul roads, excavation faces and other working sites. However, during the expansion, 3 nos. of additional D. G. sets (3 X 500 KVA) will be installed. Hence, after expansion the total D.G. Sets will be 25 nos.

v. **Store:** A store for catering to the needs of mining equipment and allied mining activities has been maintained near the mine office.

vi. **Oil Room:** Storage of various types of oils and lubricants, a well-maintained room has been established.

vii. **Fuel Storage:** To cater the need of fuel for HEMM, the Diesel is being/will be procured from Mythri Diesel petrol pump (Distance: ~8.0 km) and Rayagada Diesel Depot (Distance: ~70 km). Around 2984 KL/Annum of HSD is being utilized with respect to 3.6 MTPA production capacity and total requirement of HSD after expansion (from 3.6 MTPA to 6.0 MTPA) will be 5967 KL/Annum.

viii. **First Aid Room:** First aid room of adequate size equipped with statutorily required necessary Equipment has been established within the ML area.

ix. **Vocational Training Centre:** A full-fledged vocational training center has been established for within the ML area.



Mines Office



Workshop & other Infrastructure within the ML Area



Canteen



Rest Shelter and First Aid Centre



Mines Entrance

Figure 2.7 Photographs of Infrastructure within the ML Area

2.5 STATUS OF STATUTORY CLEARANCES, PERMISSIONS, NO OBJECTION CERTIFICATES AND CONSENTS PROPOSED SCHEDULE FOR APPROVAL AND IMPLEMENTATION

The mining project has been implemented after getting all the Statutory Clearances, Permissions, No Objection Certificates, Consents etc which are required/necessary for this project under various Acts, Rules and Regulations is as given in table below:

Table - 2.3

Status of Statutory Clearances, Permissions, No Objection Certificates and Consents

S. No.	Particulars	Date & Status
A. Statutory Clearances		
I. Mine Lease Status		
1.	The mining lease over an area of 428.075 ha was executed in favour of M/s. Odisha Mining Corporation Limited for a period of 50 years.	Executed on 10.01.2017 (Valid up to 09.01.2067)
II. Mining Plan Approval Status		
1.	Review of Mining Plan & Progressive Mine Closure Plan (FY: 2022-23 to 2026-27) over an area of 428.075 ha approved from IBM, Bhubaneshwar	Vide letter no. RMP/A/21-0RI/BHU/2021-22/1206 dt. 10.11.2021.

III. Status of Forest Clearance		
1.	Stage I Forest Clearance over 434.935 ha of forest land (428.075 ha ML + 6.860 ha approach road) accorded by MoEF&CC	Vide F. No 8-46/2016-FC dated 17.04.2017.
2.	Stage II Forest Clearance for an area of 434.935 ha (428.075 ha ML + 6.860 ha approach road) accorded by MoEF&CC	Vide F. No. 8-46/2016-FC dated 25.09.2017.
3.	Diversion order was obtained from Govt. of Odisha, Forest and Environment Department, Bhubaneshwar	Vide letter No. 10F (Con)1/2017/20540/F&E, dated 07.10.2017. Copy of the Forest Clearance is enclosed as ***Annexure VA.***
IV. Surface Rights		
1.	OMC Ltd. has obtained surface rights from Office of the Collector over an area of 406.385 Ha in Koraput District & 21.69 Ha in Rayagada District	➢ For 21.69 ha area (District: Rayagada) – vide Memo No. 178/Mines dated: 02.02.2018 ➢ For 406.385 ha area (District: Koraput) – vide Memo No. 111/Mines dated: 16.01.2018 Copy of the same is enclosed as ***Annexure VI***
B. Permissions		
1.	Renewal of Authorisation under Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 by SPCB, Odisha	Vide Letter No. IND-IV-HW-1353/7678 dated: 15.04.2025.
2.	Permission for drawl of Surface Water 400 m^3/day from Dharua Nala has been obtained from Water Resources Department, Odisha	Vide Agreement dated 03.04.2025. Copy of the same is enclosed as ***Annexure VII.***
C. No Objection Certificates		
2.	Authentication of Location Map showing features in core zone and within 10 km radius study area.	Authenticated Location Map showing No National Park, Wildlife sanctuaries, wildlife corridors, Tiger/Elephant reserves within 10 km radius study area has been obtained from Divisional Forest Officer, Koraput Forest Division and Divisional Forest Officer, Rayagada Forest Division. Copy of the same is enclosed as ***Annexure IX A.***
3.	Authentication of flora & fauna separately for core zone and buffer zone	Authenticated List of flora & fauna has been obtained from Divisional Forest Officer, Rayagada Forest Division vide letter No. 216 4F (Misc.) 1367/2025 dated 13.01.2025 and from Divisional Forest Officer, Koraput Forest Division vide letter No. 280 4F (Misc.) dated 27.01.2025. Copy of the same is enclosed as ***Annexure IX B.***
4.	Approved Wildlife Conservation Plan	Site-Specific Wildlife Conservation Plan (SSWLCP) has been approved from PCCF (Wildlife) & Chief Wildlife Warden vide Memo No. 682 dated 27.01.2010, which was later revised via Memo No. 5845 dated 06.07.2017. Copy of Site-Specific Wildlife Conservation Plan is enclosed as **Annexure IX C.** SSWLCP as per Indian Wildlife (Protection) Act,2022 is under approval DFO, Koraput & DFO Rayagada and copy of the request Letter submitted to DFO, Koraput and Rayagada enclosed as **Annexure X.**

2.6 PROPOSED SCHEDULE FOR APPROVAL AND IMPLEMENTATION

The mining project with expansion in Bauxite Production capacity will be implemented after obtaining all the statutory clearances and consents from the respective authorities. Proposed schedule for approval for the expansion in mining project is given as under:

2.6.1 SCHEDULE FOR APPROVAL

Table-2.4
Proposed Schedule for Approval

S. No.	Activity Description	Cumulative Duration (Months)
1.	Environment Clearance from MoEF&CC, New Delhi	
	Application submission to MoEF&CC	Completed
	Grant of ToR	Completed
	Baseline Study Conduction (Post-monsoon Season – Oct. to Dec., 2024)	Completed
	Submission of PH documents to SPCB, Odisha	July, 2025
	Conduction of Public Hearing	45 days from date of receipt of the request letter
	Appraisal from MoEF&CC, New Delhi	60 days from the submission of Final EIA/EMP Report
	Grant of EC by MoEF&CC	60 days after recommendation of EAC
2.	Grant of Consent to Establish (CTE)	After Grant of EC
3.	Grant of Consent for Operate (CTO)	After Grant of CTE

Proposed schedule has been prepared as per EIA Notification, 2006

Note: ToR Application was submitted to MoEF&CC on 07.05.2025, ToR was granted by MoEF&CC on 26.06.2025. Baseline data was collected during Post Monsoon Season (October to December, 2024). The documents will be submitted to SPCB, Odisha for conduction of Public Hearing. After conduction of Public Hearing the Final EIA/EMP report will be submitted to MoEF&CC. Further, after obtaining EC from MoEF&CC, CTE and CTO under section 21 of the Air (Prevention and Control of Pollution) Act, 1981 and section 25/26 Water (Prevention and Control of Pollution) Act, 1974 will be obtained from State Pollution Control Board, Odisha (SPCB, Odisha).

2.6.2 IMPLEMENTATION

Implementation of the expansion of mining project will be in accordance with the existing acts and rules applicable on mining operations as well as in accordance with any act/rule/guidelines issued by central or state government time to time and also as per the Approved Mining Plan & Progressive Mine Closure Plan approved by Indian Bureau of Mines, Bhubaneshwar, including the following activities:

- Construction of additional crusher unit
- Mine Development & Production

2.7 TECHNOLOGY AND PROCESS DESCRIPTION

2.7.1 PROJECT REQUIREMENTS

The project requirements such as water, power, man-power, machinery with source of supply, etc. are described in the sections below.

2.7.1.1 WATER SUPPLY & REQUIREMENT

Water Demand

The peak water demand for the project is estimated at 475 KLD which includes 422 KLD for industrial use and 53 KLD water required for drinking and domestic purposes at the mine.

The water requirement for the project encompasses dust suppression on ore stacks and haulage roads through sprinkling, washing of heavy vehicles and machinery, hygienic purposes, and greenbelt development.

Water Supply

To achieve the water demand, water will be sourced from Harvested rainwater, recycled water and surface water from Dharua Nala using water tankers for which OMC has obtained permission from the Government of Odisha, Department of Water Resources, to withdrawl 400 KLD of surface water from Dharua Nalla. Copy of the permission is enclosed as **Annexure VII**.

Achieving Water Demand

The peak water requirement will be 475 KLD. Based on the demand and supply of the water, 400 KLD requirement will be met from Surface water from Dharua Nala and the remaining water requirement will be fulfilled from harvested rain water and recycled water (from STP, Grey water treatment plant & Oil-grease Trap). No wastewater will be discharged outside the premises. The break-up of water requirement, waste water and water balance diagram are given below:

Table: 2.5
Water Requirement

(Unit: in KLD)

S. No.	Purpose	Description	Peak Demand	Water Utilization			Wastewater generation
				Fresh water	Recycled water	Water from RWH	
1.	Domestic	Drinking & Domestic	53	53	0	0	20
2.	Industrial	Dust Suppression	377	311	25	41	-
3.		Equipment/Vehicle washing/Sampling & Analysis	7	7	0	0	5
4.		Greenbelt Development	38	38	0	0	-
Total			**475**	**409**	**25**	**41**	**25**

Source: *M/s. OMC Ltd.*

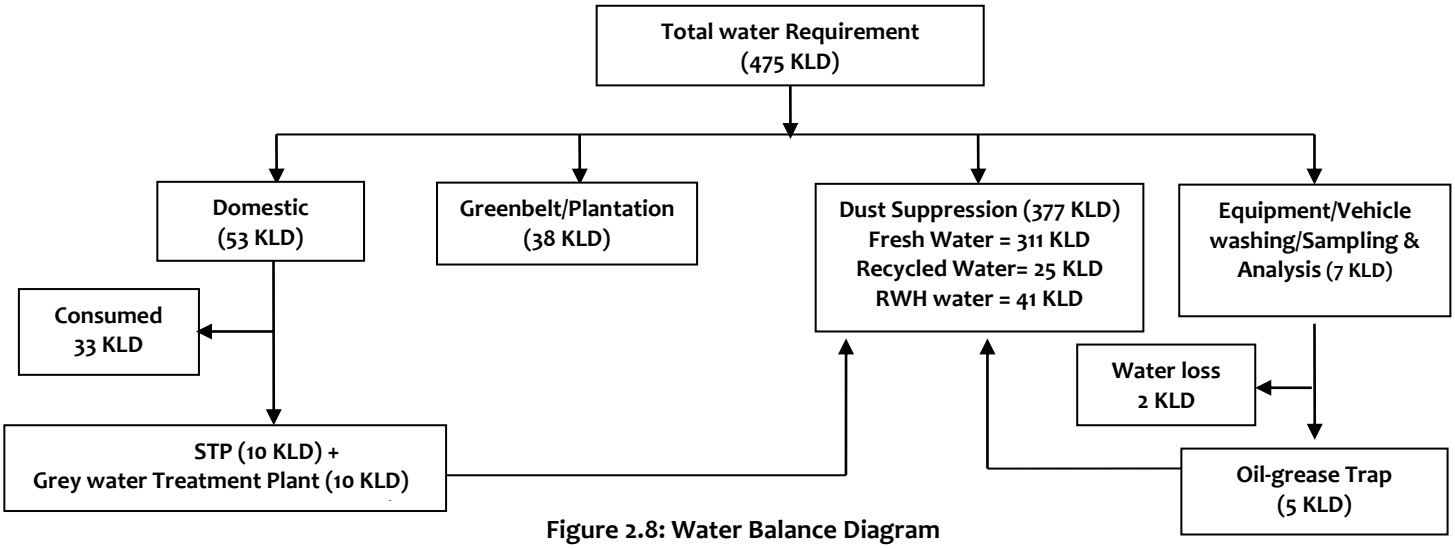


Figure 2.8: Water Balance Diagram

2.7.1.2 POWER REQUIREMENT

Total power requirement of the Project will be met by 25 nos. of D. G. sets; 1 x 1010 KVA, 4 X 500 KVA, 1 X 250 KVA, 2 X 125 KVA, 2 X 62.5 KVA, 2 X 25 KVA, 7 X 10 KVA, 6 X 5 KVA. These details include additional 3 D. G. sets of 500 KVA each, which are proposed during the expansion.

Table – 2.6
Fuel Requirement

Raw Material / Fuel	Unit	Existing (3.6 MTPA)	Additional For Expansion (3.6 to 6.0 MTPA)	Total Requirement after Expansion (6.0 MTPA)	Source	Mode of Transport	Approx. Distance from Project Site (km)
Diesel	Liter per Annum	2984007.5	2982682.5	5966690	Mythri Diesel pump	Diesel Carrier	8.0
					Rayagada Diesel Depot	Camper	70.0
SME	Kg/Annum	1080000	319680	1399680	Koraput	Explosive van	60

Source: *M/s. OMC Ltd.*

Note: *Total Diesel requirement in Tonnes per Annum (after expansion from 3.6 MTPA to 6.0 MTPA) will be ~4982 TPA. [Density of HSD 0.835 Kg/L]*

Steps to be taken for reduction of diesel consumption:

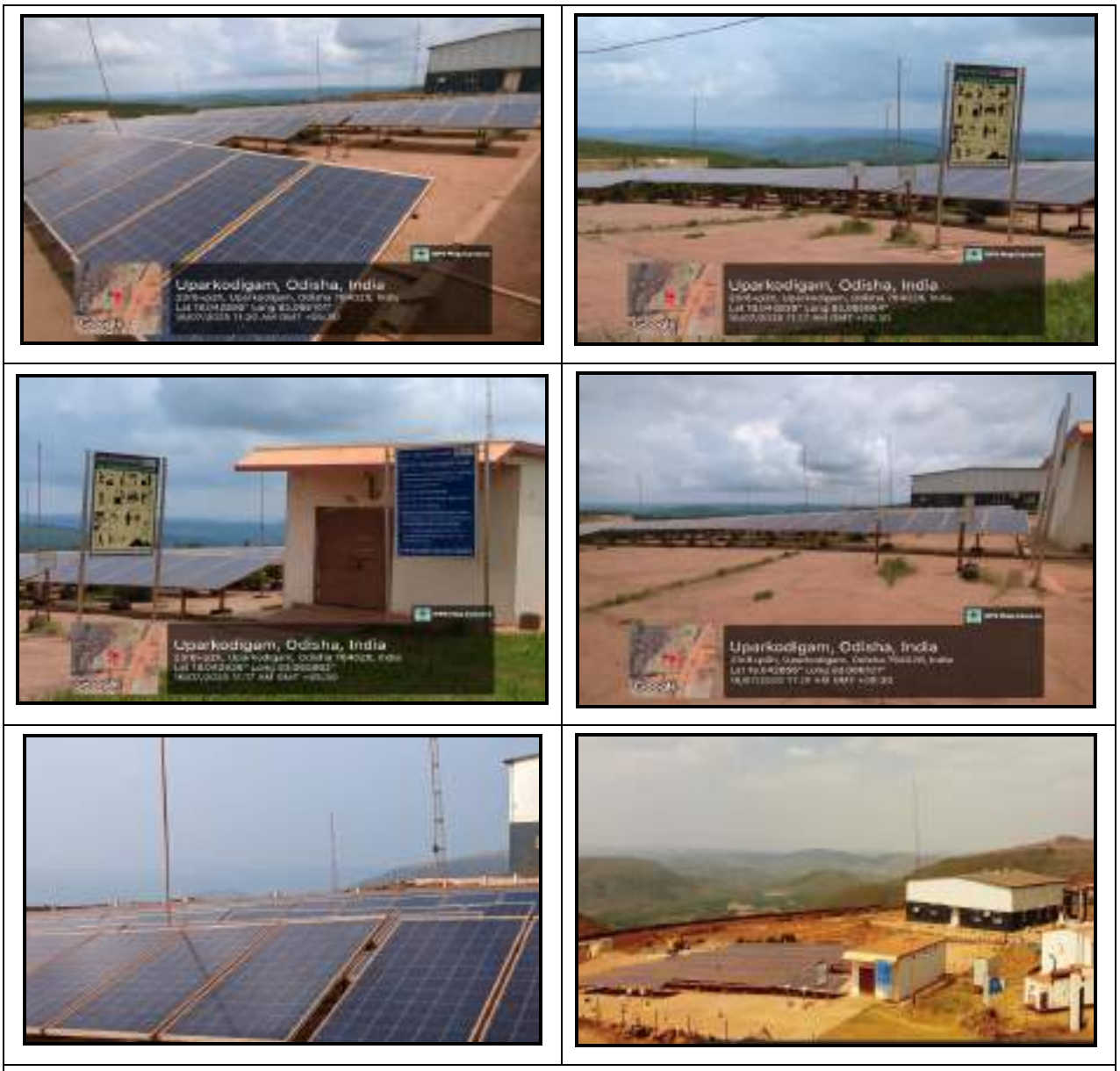
1. Purchase of most fuel-efficient equipment
2. Regular repair and schedule maintenance of equipment
3. Checking and inflation of tyres of dump truck
4. Reduction in idle running of equipment
5. Regular repair and maintenance of haul roads, bench floor, ramps etc.
6. Good fragmentation of blasting material which will help in reduction of specific fuel consumption (Litr/T).

To reduce Diesel consumption, OMC is also exploring a possibility of a 33 KV insulated overhead line along the Ghat Road side. This line will connect from Zero point to Kodingamali Mine which is expected to be installed by March 2026.

The company will explore with all OEMs like Komatsu, BEML, Tata Hitachi, Caterpillar and shall replace the old equipment with suitable electrically operated equipment available in the market after completion of residual life of existing equipment.

Renewable Energy

- Solar Panels of 50 KW capacity have been/will be installed within the ML area.
- To enhance the use of Renewable energy, OMC is also exploring the possibility of using Wind Turbine. The company shall also consider the augmentation of solar power if the Wind Turbine proposal is not found viable.



Photographs of Solar Panels installed within the ML area

Source: *M/s. OMC Ltd.*

2.7.1.3 MAN POWER REQUIREMENT

The total manpower after Expansion of the mining project will be around 391 persons, out of which 18 persons will be Managerial, 32 persons will be supervisory, 186 persons will be Skilled/operators & 155 persons will be Semi skilled workers. Preference is being/will be given to

locals as per their eligibility & experience. Besides this, 8 persons are being/will be engaged in implementation of EMP in Kodingamali Bauxite Mine.

Table: 2.7

Manpower Requirement

S. No.	Particulars	Existing	For Expansion (3.6 to 6.0 MTPA)	Total (After Expansion up to 6.0 MTPA)
Managerial				
1.	Mines manager (1st Class)	1	0	1
2.	Mines manager (2ndClass)	4	0	4
3.	Mining Engineer	1	0	1
4.	Geologists	1	3	4
5.	Mechanical Engineer	1	0	1
6.	Electrical Engineer	1	0	1
7.	Others	5	1	6
	Sub-total	**14**	**4**	**18**
Supervisory				
1.	Mines Foreman	4	11	15
2.	Mining Mate	12	3	15
3.	Blaster	1	1	2
	Sub-total	**17**	**15**	**32**
Skilled Workers/ Operators				
1.	Excavator Operator	24	6	30
2.	Dumper Operator	60	50	110
3.	Loader Operator	12	5	17
4.	Diesel/Water Tanker Operator	2	8	10
5.	Dozer Operator	6	1	7
6.	Grader Operator	3	0	3
7.	Service Van Operator	3	1	4
8.	Crane Operator	2	0	2
9.	Explosive Van Driver	2	1	3
	Sub-total	**114**	**72**	**186**
Others				
1	Semi-Skilled Workers	98	57	155
	Sub-total	**98**	**57**	**155**
Grand Total		**243**	**148**	**391**

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

Table - 2.8

Manpower Required for Environment Management

S. No.	Designation	Requirement
1.	Manager-Mines	01
2.	Manager (Mining)	01
3.	Manager (Mechanical)	01
4.	Manager (Electrical)	01
5.	Manager (Civil)	01
6.	Dy. Manager (Geology)	01
7.	Asst. Manager (Mining)	01
8.	Surveyor	01

Source: *M/s. OMC Ltd.*

Role & responsibilities of persons responsible for implementation of EMP is given in Table 10.1 of Chapter 10.

2.7.1.4 EXTENT OF MECHANIZATION

The following machinery & equipment will be required after Expansion in Bauxite Production Capacity:

Table: 2.9
Machinery & Equipment Required For Mining

S. No	Equipment	Capacity	Existing	Additional (For Expansion from 3.6 to 6.0 MTPA)	Total (After Expansion Up to 6.0 MTPA)
1.	Hydraulic Excavator	4.3 cu.m	5	4	9
2.	Hydraulic Excavator	3.5. cu.m	5	6	11
3.	Hydraulic Drill Machine	115 – 150 mm Dia	2	3	5
4.	Dozer	180 HP	2	2	4
5.	Loader	4.5/3.5 cu.m	5/3	0/0	5/3
6.	Loader	1.5/2.0 cu.m	2/2	0/0	2/2
7.	Dumper	60 T	11	10	21
8.	Dumper	35 T	18	17	35
9.	Diesel Tanker	12 KL	2	0	2
10.	Water Sprinkler	10 KL	5	3	8
11.	Motor Grader	140 KP	2	0	2
12	Explosive van	2.0 Tonnes	2	0	2
13.	Pick up van	--	4	0	4
14.	Rock Breaker	120 Tonnes	2	0	2
15.	Portable Tower Lights	--	20	0	20
16.	Mobile service van	--	2	0	2
17.	Ripper Dozer	220 HP	1	1	2
18.	Crane	100 Tonnes	2	0	2
19.	Tyre Handler	--	2	0	2
20.	Road Sweeping Machine	--	1	0	1

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

2.7.2 GEOLOGY OF THE AREA

2.7.2.1 REGIONAL GEOLOGY

- The Khondalite group of rocks is mainly represented by Quartz-Feldspar-Garnet-Sillimanite-Gneisses, which contain minor amounts of graphite/manganese at places. The Charnockites are represented by hypersthene granulites of acid, intermediate and basic varieties. They are massive and melanocratic and form dome shaped hills.
- The lateritisation of the East Coast Bauxite Deposits was developed at the expense of gneisses and schists. The dominant rock assemblage in the region, comprise khondalites (quartz-garnet-potash-feldspar-sillimanite gneisses with or without graphite) and its variants.
- At places, the tops of the Khondalite hills and in some cases those of charnockites are capped by blankets of laterite/bauxite of varying thickness and look like plateaus. These plateaus are characteristically flat of gently rolling in contrast to the rugged, linear ridges or domical hills in the

surroundings. The bauxite owes its origin to the chemical weathering of the khondalites/charnockites. Its occurrence is mostly confined to the elevations of 1100m to 1400m above mean sea level.

- The bauxite in this region is reddish or brownish red in colour and does not show any pisolitic or oolitic structure. Thus, the colour and the physical nature of the bauxite in these parts are rather different from the features generally known to be typical of bauxite. As a result the bauxite capping can be mistaken for mere ferruginous laterites. Though there is no definite proof as to the age of the bauxitization. It is generally believed that this process took place over one thousands of years.

The area around Kondingamali deposit constitutes mostly Khondalites and Charkonites group and associated rocks of Archean age with following stratigraphy (As per GSI/MECL Reports):

Regional Stratigraphy of the Area

AGE	FORMATION
Recent	Soil / Alluvium
Quaternary/Tertiary	Bauxite/ Laterite
Archean	Pegamititic & Quartz veins
	Migmatities
	Charnockites Group
	Khondalite Group

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

2.7.2.2 LOCAL GEOLOGY

- The area around Kodingamali exposes rocks representing Eastern Ghat Group. The rock types encountered in these deposits are mostly Khondalite, Bauxite, Laterite, Clay and Soil. Khondalites occur as lenticular bodies on the surface as capping and having a trend in NNE-SSW to N – S directions with moderate to steep easterly dip (25° – 80°). They area at places tightly folded into steep northerly plunging isoclinals folds.
- Besides Khondalite there are two types of other varieties of Khondalite i.e., Partially Lateritised Khondalite (PLK) and Weathered/ Kaolinised Khondalite (KK). Presence of PLK or KK indicates absence of Bauxite mineralization below it. Central portion of the Lease area has five outcrops of PLK/KK and similarly SW of Lease has two small outcrops.
- Laterite and bauxite occur as blanket in the northern, central and southern parts of the areas, east of Khondalite ridge. North of the Lease area has a higher elevation than the South, Bauxite ore thickness is more at North and metallurgical grade of Bauxite is also good.
- The Bauxite deposit form a blanket occupying the surface of the tabular landscape, linear in shape, trending almost in NNE –SSW direction for a length of about 7 km with an average width of 800 m. The area of capping is about 5.33 sq. km. The deposit has a maximum height of 1276 m above mean sea level in northern part and 1162 m above mean sea level in southern part. The average height of Kodingamali plateau to the surrounding valley is about 300 m.
- In the southern part, two/three broadly north-south trending khondalite exposures intervene between the laterite / bauxite layer. East of the khondalite ridge, in the southern part of the deposit, laterite and bauxite occupy as triangular area.
- In the western area of the central part bauxite occurs between the central khondalite ridge and the khondalite is exposed at the plateau margin.

Structure and Folds

The strike of the foliation of the Khondalites is in general NNE-SSW direction with dips of 60° to 80° towards EES or WWN. The Khondalites show four discontinuous zones of tight folds and crenulations in the north-western side of the bauxite capping. A similar zone of intense folding is also seen in the SE part of the capping/ plateau.

Lithology

Bauxite capping is linear in nature with limited with and relatively longer strike length. Bards and lenses of Khondalite and mixed zone proximately appear with the capping and give rise to topographic hills. The rock types encountered in these deposits are mostly Khondalite Bauxite, Laterite, Clay and soil.

LITHO UNIT	DESCRIPTION
Soil	Soil of Colour – Grey, Steel grey, buff yellow and brownish is found within the ML area.
Laterite	Laterite of Colour – Brown, dark brown, brick red to pink is found within ML area.
Bauxite	Bauxite of colour – Pale pink, pink, light brown to brick red found within ML area.
Clay (lithomarge)	White, dirty white, creamy buff, pink purple, dirty brown in colour with highly altered khondalite intercalations.
Altered Khondalite	Grey, green, pale brown and pinkish in colour.

The Bauxite is nodular at a few places. Kodingamali bauxite contains minerals like gibbsite (67.34%). Bohemite (1.37%). Haematite (13.07%). Lepidochrosite (1.88%) and kaolinite (3.35%). The most predominant mineral of the bauxite is gibbsite, which accounts for about 90% of the total alumina of the ore. The incidence of Boehmite is negligible. The bauxite zone is interspersed with impersistent minor and thin patches of non-ore, which area essentially lateritic in nature.

Mode of occurrence:

East-coast Bauxites are considered to have been derived by the in-situ chemical weathering of the khondalites. The lateritisation of the East Coast Bauxite deposits was developed at the expense of gneisses and schists. Bauxite of Kodingamali deposit occurs as an integral part of the laterite profile derived from the in-situ chemical weathering of the underlying khondalite. It in the form of a gentle to moderately sloping blanket capping the parent rock and show both lateral and vertical continuity except for a medium ridge of weathered khondalite within the deposit which effects the continuity. The capping is marked by a discontinuous string of scarp faces all-round the peripheries with a length of 29.78 km. and stands as a hold sing-board without any vegetation. The plateau occupies an area of about 5.33 sq. km. of which the laterite / bauxite spread accounts for an aggregate of about 3.5 sq.km. The deposit has a relief of about 300-350 m above the surrounding plains and has steep slopes on east with prominent escarpments. The boundary of the deposit is highly irregular on account of its dissected peripheral edges; bauxite is exposed on the escarpments/slopes. The highest and lowest elevations of the capping area 1276.47 m and 1089.27 m. Highest elevation as 1276.47 (4188') m above MSL is GTS point, situated on the boundary between Koraput and Rayagada districts.

Extent of weathering/alteration:

East-coast Bauxites are considered to have been derived by the in-situ chemical weathering of the khondalites. The litho units are the product of intense sub-aerial rock weathering. They are predominately consists of mineral assemblages of goethite, haematite, aluminous hydroxide, kaolinite and quartz. The weatherability of a rock depends mainly on alteration of its mineralogy, crystallinity, size, porosity, permeability. The lateritisation of the East Coast Bauxite deposits was developed at the expense of gneisses and schists. Bauxite of Kodingamali deposit occurs as an integral part of the laterite profile derived from the in-situ chemical weathering of the underlying khondalite.

The local stratigraphic succession is given as below:

Litho Unit Range	Thickness
Soil	0.1 m to 0.5 m (Top)
Laterite	0.5 m to 13.95 m
Ferruginous Laterite	0.0 to 10.00 m
Bauxite	2.24 m to 44.00 m
Clay (lithomarge)	1.35 m to 36.7 m
Partially LAteritised Khondalite (PLK)/Altered Khondalite/ Weathered Khondalite	45 m to 50.00 m

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

Topography of the Mining Lease Area

Kodingamali Plateau is a part of Eastern ghat hill ranges in Odisha. The Bauxite deposit form a blanket occupying the surface of the tabular landscape, linear in shape, trending almost in NNE-SSW direction for a length of about 7 km with an average width of 780 m.

The area of capping is about 5.33 sq.km. The deposit has a maximum elevation of 1276 m above mean sea level in northern part and 1262 m above mean sea level in southern part. The average height of Kodingamali plateau to the surrounding valley is about 300 m. The capping has gentle slopes to the west, North and south but comparatively steep slope in its eastern part.

The plateau top is a continuous stretch of flat land intercepted by small saucer shaped depression which is filled with soil and humus varying in thickness.

The mining lease area consists of undulating land with elevations ranging from 1089.27 m AMSL to 1276.47 m AMSL with an Average Level as 1182.87 AMSL. North of the Lease area has a higher elevation than the South, Bauxite ore thickness is more at North.

Drainage Pattern of the Area

Few springs originate from the foot hills of the Kodingamali Plateau, the most prominent ones are towards the Eastern margin of the area. Patagarha River, which flows in a north-easterly direction, is about 4.0 Km in NNE Direction from the Mine Site. Few others are Murani Nadi (~6.0 Km in SW Direction), Patagarha Nala located in NW Direction, Baghri Nala and Debagarha Nala in West and SSW Direction respectively. These controls the regional drainage of the terrain.

Surface Geological Plan is enclosed as ***Annexure VIII B*** with this EIA/EMP Report.

2.7.3 DETAILS OF MINING

2.7.3.1 EXPLORATION DETAILS

- During the period 1978-80, 342 nos. boreholes have been drilled with a total meterage of 8165.9 m. Subsequently, in the year 2019-20, 194 nos. of bore holes have been drilled with a total meterage of 5668.5 m.
- Total 536 Core Boreholes have been drilled in the entire area to prove the potential mineralized and non-mineralized area.
- During the period 1978-80, the area covered under exploration in G1 Category was 160.3 ha, in G2 category 125.1 ha, in G3 category 0 and in G4 Category it was 142.675 ha i.e. total 428.075 ha of area was covered under exploration in G1, G2 and G4 Category with geological mapping on a scale of 1:10000.
- During the period 2019-20, the entire lease area i.e. 428.075 ha has been explored in G1 category with a grid spacing of 100 m X 100 m and geological mapping was done on a scale of 1:2000.

  The details of area covered under exploration area are given below in Table 2.10 and 2.11.
- As the entire lease area has already been explored and the resources have been classified under G-1 level, no future exploration is envisaged.

Table - 2.10
Exploration Details

S. No.	Year	Exploration agency	Core Holes		Grand Total	
			Total Bore holes	Total meters	Total Bore holes	Total meters
1.	1978-80	Mineral Exploration Corporation Ltd.	342	8165.9	342	8165.9
2.	2019	APC Drilling & Construction Pvt. Ltd.	110	3531.5	110	3531.5
3.	2020		84	2137	84	2137

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

2.7.3.2 AREA COVERED UNDER EXPLORATION

Table - 2.11
Exploration Details

Level of Exploration	Area in ha		Total Area in ha
	Forest	Non-Forest	
G-1	Kodingamali R.F- 406.385 Kodingamali P.R.F- 21.69	-	428.075
G-2	-	-	-
G-3	-	-	-
G-4	-	-	-
Area proved as non-mineralized	34.06	-	-
Area to be explored	Nil	Nil	Nil
Total	**428.075**	-	**428.075**

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

2.7.3.3 ESTIMATION OF RESERVES

As per Approved Mining Plan, total mineable reserves are 75.79 Million Tonnes (as on 30.06.2021). Presently, the mineable reserves are 64.54 Million Tonnes (as on 31.03.2025) as this is an operational mine. Details of Geological reserves as per UNFC classification are given in following table.

Table -2.12

Bauxite Reserves As Per UNFC as on 30.06.2021

Classification		UNFC Code	Quantity (Million Tonne)			Grade	
			Forest	Non-Forest	Total	Forest	Non-Forest
A	**Mineral Reserves**						
1.	Proved Mineral Reserve (A)	111	75.79	-	75.79	Al_2O_3 – 43.68% SiO2 – 4.83%	-
2.	Probable Mineral Reserve (A)	121	-	-	-	-	-
3.	Probable Mineral Reserve (A)	122	-	-	-	-	-
B	**Remaining Resources**						
1.	Feasibility Mineral Resource (B)	211	3.54	-	3.54	Al_2O_3 – 44.57% SiO2 – 4.15%	-
2.	Prefeasibility mineral Resource (B)	221	-			-	-
3.	Prefeasibility mineral Resource (B)	222	-	-	-	-	-
4.	Measured Mineral Resource (B)	331	-	-	-	-	-
5.	Indicated Mineral Resource (B)	332	-	-	-	-	-
6.	Inferred Mineral Resource (B)	333	-	-	-	-	-
7.	Reconnaissance Mineral Resource (B)	334	-	-	-	-	-
Total Mineral Resources (A+B)			79.33	-	79.33	Al_2O_3 – 43.72% SiO2 – 4.8%	-

Source: *Approved Review of Mining Plan with Progressive Mine Closure Plan, Pg No. 91*

Method of Estimation:

For calculation of ore reserves the following parameters have been considered:

a. Shape, size and continuity of ore zone, as plotted in the Geological Plan and sections

b. The threshold value has been considered as per the IBM guidelines is >30% Al_2O_3, and maximum 7% of total SiO_2, for Bauxite and >20% Al_2O_3, for Aluminous Laterite.

c. The Cutoff grade considered for estimation of resource/reserve is >40% Al_2O_3, & 0 to 7% of total SiO2.

d. Borehole collar, survey, assay & geology data from exploration.

e. Pit exposures data & Ultimate Pit.

f. The influence of the ore body has been taken maximum 50% of the grid spacing.

g. The depth continuity of mineralization has been considered limited to the depth up to which direct evidence of mineralization is established.

h. Entire data has been transferred to create a geological database in an ore body modeling software. Kodingamali Bauxite Mine deposit is uniform in mineralization. It is not erratic in behavior. The coefficient of variation of grades in all the ores are low in the range of 0.03 – 0.1 indicating uniform grade distribution and the deposit has also been explored at almost uniform grid of 100 x 100m both along dip and strike direction, the globally accepted technique of Cross-Sectional Method (ISD) method has been used for ore reserve estimation for different ore types. Further, Bulk density of

individual ore types has been used as a tonnage conversion factor (TCF).

i. The Recovery Factor of 100% for assessment of Ore resource/reserve has been taken in to consideration

Total geological resources with a grade of Al_2O_3 – 43.72% and total SiO2 – 4.8% has been assessed on the basis of thickness of Bauxite intersected in boreholes and chemical analysis.

2.7.3.3.1 MINEABLE RESERVES AND ANTICIPATED LIFE OF MINE

Table 2.13
Mineable Reserves and Life of Mine

S. No.	Particulars	Description
A.	**Total Mineable Reserves (Million Tonnes) (As on 30.06.2021)**	75.79
B.	Life of mine based on above Mineable reserves (S. No. - A) (in Years) Expected Excavation rate @6.0 MTPA	12.6 Years (~13 Years)
C.	**Total Mineable Reserves (Million Tonnes) (As on 31.03.2025)**	64.54
D.	Life of mine based on above Mineable reserves (S. No. - C) (in Years) Expected Excavation rate @ 6.0 MTPA	10.7 Years (~11 Years)

Source: *Approved Review of Mining Plan with Progressive Mine Closure Plan and M/s. OMC Ltd.*

2.7.3.3.2 USE OF MINERAL

The Bauxite produced from the mine is being/will be sold to the prospective buyers for its use in Alumina and Aluminium Plants/ Refinery**.**

2.7.4 PROCESS DESCRIPTION

2.7.4.1 METHOD OF MINING

- Mining operation is being/will be carried out by fully mechanized opencast method using conventional mining technology i.e. Shovel- Dumper combination.
- Drilling & Blasting is being/will be carried out in the hard strata whereas soft ore is being/will be directly excavated hydraulic excavators.
- Drilling is being/will be carried out crawler mounted 115 mm – 150 mm fast drills.
- Controlled blasting method is being/will be practiced. NONEL detonating fuse are being/ will be used to reduce the ground vibration, noise, fly rock etc. due to blasting.
- The blasting is being/will be done using Site Mixed Emulsion (SME).
- Blasted ore is being/ will be loaded by large size hydraulic excavators with 4.3 m^3/3.5 m^3 capacity into the dumper of capacity 60 Tonnes/35 Tonnes for transportation of Bauxite to the crusher (within in Mining Lease area).
- The crushed Bauxite from existing crushers from the mine shall be transported via road to several Railway sidings (viz. near Kakriguma, Singaram, Rayagada & Dumuriput; from where the ore shall be further dispatched for sale to the prospective buyers (for its use in Alumina & Aluminium Plants). The details pertaining to transportation of the Mineral are given below:

  Flow chart showing process of mining given below:

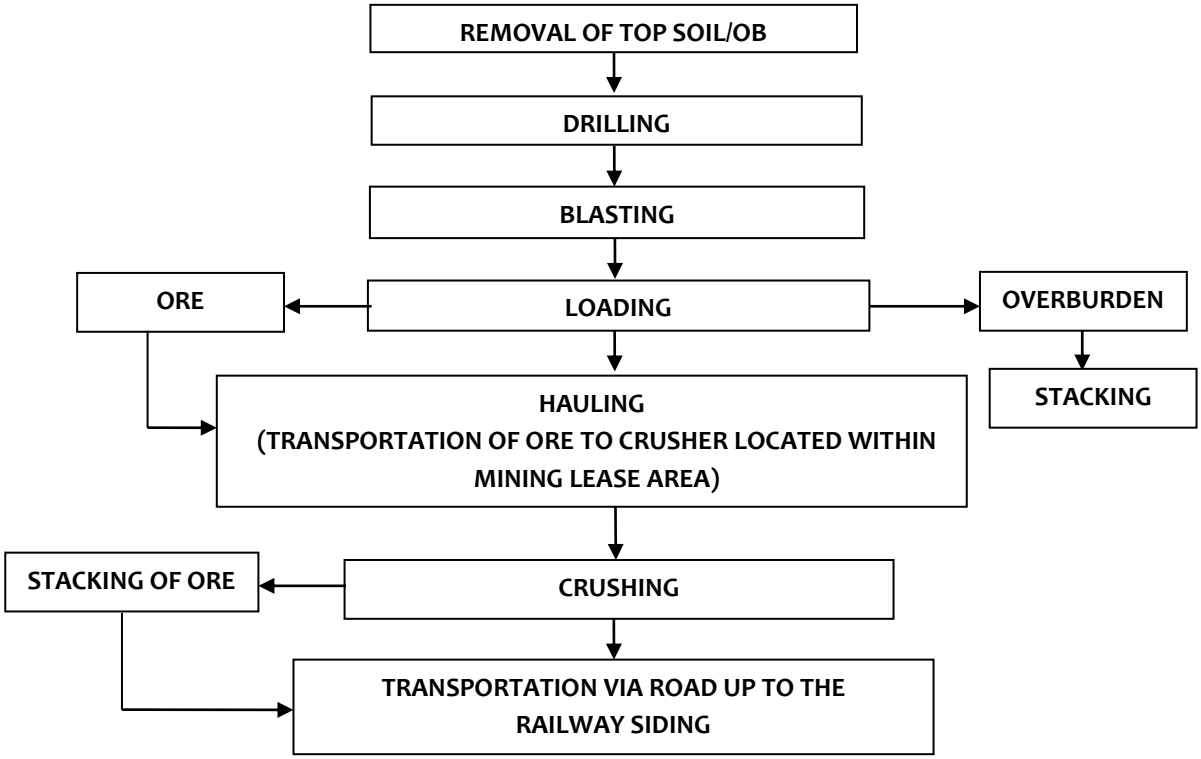


Figure: 2.9 Flow chart for Mining Process

a) Top soil and OB Removal

Top Soil: The mine working involves removal of topsoil. Kodingamali Bauxite Mine is in operation since 2018. Around 2.16 Million Tonnes of Top Soil (1.2 Million Cu. m.) will be generated during the entire life of mine, out of which 0.19 Million Tonnes has already been generated. The top soil generated is being/will be simultaneously used for greenbelt development/plantation

Overburden: Around 44.28 Million Tonnes of OB/Waste (24.60 Million Cu.m) will be generated during the entire life of mine. Out of this, 3.0 Million Tonnes OB/Waste has already been generated during FY 2022-2025. The OB will be temporarily stacked at designated dump location within mining lease area which will be utilized for backfilling in the mined out area.

The details of Waste generation, stacking and its management are given in the following section 2.7.5.

b) Drilling & Blasting

Drilling

Drilling is being/will be carried out by deploying 115-150 mm dia. Drill equipped with in-built arrangement of water sprinkling for dust suppression and separate dust collection system. Blasting operations are being/will be to be carried out in a controlled manner to minimize fly rock generation under the supervision of Assistant Manager (Mines), well versed with technique to ensure quality and safety in the work.

The details of Drilling parameters are as under:

Table - 2.14

Drilling Parameters

S. No.	Particular	Details
1.	Drill holes diameter (mm)	115 - 150
2.	Depth of Hole (m)	11.0
3.	Burden (m)	3.0
4.	Spacing (m)	3.5
5.	Yield per Hole	242 Tonnes
6.	Yield per meter	22 Tonne/m
7.	Rate of Drilling per Hour	15 m/hr

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

Blasting

Blasting operations are being/will be carried out in a controlled manner to minimize fly rock generation. Explosives such as Site Mixed Emulsion are being/ will be used for blasting. NONEL detonating fuse is being/ will be used since multi row system of firing is being/ will be carried to reduce the ground vibration, noise, fly rock etc. due to blasting. Due care is being/will be taken to keep the ground vibrations and air blast levels to the lowest possible limits to avoid any adverse impacts on the surrounding environment.

The details of blasting parameters are as under:

Table - 2.14 (A)

Blasting Parameters in Waste/Development

S. No.	Particular	Details
1.	Drill Pattern	Staggered
2.	Burden (m)	3.0
3.	Spacing (m)	3.5
4.	No. of Rows/Rings	3
5.	Maximum Number of Holes Blasted in a Round	65
6.	Charge per Hole (kg)	72
7.	Charge per Round (kg)	5040
8.	Explosive Requirement Per Month in Development (kg)	56160
9.	Powder Factor in Development / Waste (Kg/Tonne)	2.9
10.	Depth of Hole (m)	11.0

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

Table - 2.14 (B)

Blasting Parameters in Mineral/Ore

S. No.	Particular	Details
1.	Spacing (m)	3.5
2.	Burden (m)	3.0
3.	Number of Rows	3
4.	Yield per Hole in ROM Zone (Cu.m)	1115.5
5.	Frequency of Blasting in a week	3
6.	Maximum Number of Holes Blasted in a Round	70
7.	Charge per Hole (kg)	72
8.	Charge per Round (kg)	4680
9.	Explosive Requirement Per Month for Rom Zone Blasting (kg)	60480
10.	Powder Factor in Ore (Kg/Tonne)	3.4
11.	Depth of Hole (m)	11.0

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

c) Loading

Blasted Bauxite is being/ will be loaded by hydraulic excavators of 4.3 m^3/3.5 m^3 capacity into the dumpers of capacity 60T/35T for onward transportation of Bauxite to the crusher and waste to the waste dump (within ML Area).

d) Crushing

At present, 2 Nos. of crushers (2 x 500 TPH) rated capacity with feed size (500 mm) & product size (0-150 mm) have been installed within the Mining Lease area of Kodingamali Bauxite Mine. One Static Integrated Double Roll Crusher of 2400 TPH rated capacity with feed size (1200 mm) & product size (0-150 mm) will be installed within the Mining Lease area of Kodingamali Bauxite Mine and the existing crushers will be phased out subsequently.

The details of Existing Dump and Stack Yards are given in the following section 2.7.5.

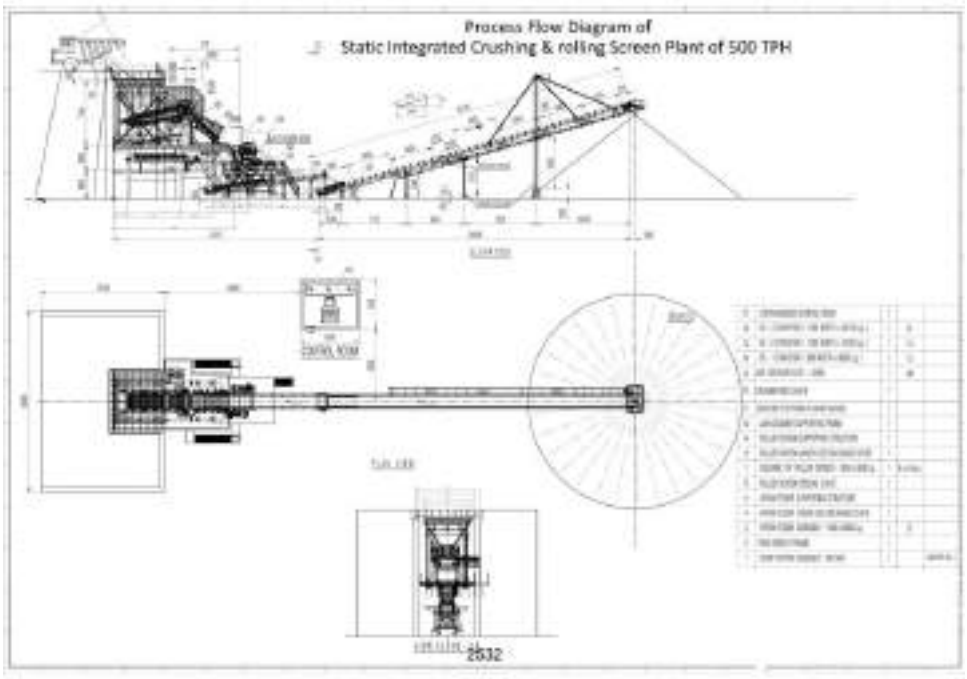


Figure 2.10: Process Flow Sheet of Crusher



Drilling



Loading



Crusher installed within the ML Area



Hauling

Photographs Showing activities involved in the Mining Process

Source: *M/s. OMC Ltd.*

e) Transportation

The excavated Bauxite will be transported to Crushers by heavy duty dumpers having carrying capacity of 60 Tonnes/35 Tonnes. Crushed Bauxite from the mine is being transported via Road through Trucks to the Railway siding near Kakriguma (~24 Km from the ML area). After expansion, along with Kakriguma Railway siding; the ore will be also be transported to other Railway Sidings namely, Singaram (~27 Km from the ML area), Rayagada (~70 Km from the ML area) and Dumriput (~67 Km from the ML area). Form the Railway Sidings, the ore is being/will be further dispatched for sale to the prospective buyers (for its used in Alumina & Aluminium Plants/Refinery).

S. No.	Name of the Railway Station	On Road Distance from ML Area (In Km)		Total Distance (In Km)
		ML area to Zero Point	Zero Point to Railway Siding	
1.	Kakriguma Railway Station	8.0	16.0	**24.0**
2.	Singaram Railway Station	8.0	19.0	**27.0**
3	Rayagada Railway Station	8.0	62.0	**70.0**
4.	Dumuriput Railway Station	8.0	59.0	**67.0**

Source: *M/s. OMC Ltd.*





Photographs Showing Transportation of Ore (Bauxite) outside the ML Area

Source: *M/s. OMC Ltd.*

Table-2.15
Mining Details

S. No.	Particulars	Details
1.	Mining Method	Fully Mechanized Opencast
2.	Bauxite Production Capacity	3.6 Million TPA to 6.0Million TPA
3.	Total Geological Resources	79.33 Million Tonnes (as on 30.06.2021) 68.08 Million Tonnes (as on 31.03.2025)
4.	Mineable reserves	75.79 Million Tonnes (as on 30.06.2021) 64.54 Million Tonnes (as on 31.03.2025)
5.	Life of Mine Expected Excavation rate @6.0 MTPA	~ 13 Years [Based on Mineable Reserves: 75.79 Million Tonnes (as on 30.06.2021)] ~ 11 Years [Based on Mineable Reserves: 64.54 Million Tonnes (as on 31.03.2025)]
6.	Thickness of topsoil	0.1 m to 0.5 m
7.	Average Stripping Ratio (ROM:Waste) (Tonne: Cu.m.)	1: 0.38
8.	Bench Height (max)	10 m (Maximum)
9.	Bench Width (min)	10 m – 15 m
10.	Overall pit slope	36° (Ultimate pit slope)
11.	Elevation Range	1089.27 m AMSL to 1276.47 m AMSL
12.	Average Level	1182.87 AMSL
13.	Present working depth	Quarry 1: ToP RL- 1250 m AMSL, Bottom RL-1155 m AMSL Quarry2: ToP RL- 1145 m AMSL, Bottom RL-1094 m AMSL
14.	Ultimate working depth	1080 m AMSL
15.	Number of Working days	300
16.	Number of Working Shifts	3 shifts (@6 hrs. each)

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

2.7.4.2 YEAR WISE PRODUCTION & EXCAVATION DETAILS

The Environmental Clearance for Bauxite Production Capacity of 3.0 Million TPA was granted by MoEF&CC, New Delhi dated 28.05.2008. The mine operation commenced from 02.02.2018.

Further, the M/s. OMC Ltd. has proposed Expansion in Bauxite Production Capacity from 3.0 Million TPA to 3.6 Million TPA and the Environmental Clearance for the same has already been granted from MoEF&CC on 15.04.2025. Past production details since inception of mine have been authenticated by Office of the Deputy Director Mines, Koraput Circle, Koraput vide letter No. 620/Mines dated 09.05.2025 and enclosed as ***Annexure XI.***

The surface rights were granted as per Office Order Memo No. 178 dated 02.02.2018 from the Collector, Rayagada, for an area of 21.69 ha and Office Order Memo No. 111 dated 16.01.2018 from the Collector, Koraput, for an area of 406.385 ha.

The Year wise excavation details are given as per below:

Table: 2.16
Year-Wise Proposed Excavation Details (In Million Tonnes)

Year	Top Soil	OB	Ore	ROM	Total Excavation
2022-23	0.16	3.26	6.0	6.0	9.42
2023-24	0.22	3.29	6.0	6.0	9.51
2024-25	0.16	2.52	6.0	6.0	8.68
2025-26	0.15	2.97	6.0	6.0	9.12
2026-27	0.15	2.48	6.0	6.0	8.63
Total	**0.84**	**14.52**	**30.00**	**30.00**	**45.36**

Source: *Derived from Approved Review of Mining Plan along with Progressive Mine Closure Plan*
Bulk Density of Bauxite: 2.10 Tonnes/Cu. m and *Bulk Density of OB/Waste: 1.8 Tonnes/Cu. m*
Note: Three years of plan period as per mining plan have passed and actual Bauxite production figures of the same are given in the table below.

The Past production details since inception of mine are given below:

Table: 2.17
Past Production Details Since Inception of Mine (In Million TPA)

S. No.	Year	EC sanctioned capacity	Actual production
1.	2017 -18	3.0	0.053
2.	2018 - 19	3.0	2.70
3.	2019 - 20	3.0	3.0
4.	2020 - 21	3.0	2.99
5.	2021 -22	3.0	3.0
6.	2022-23	3.0	3.0
7.	2023-24	3.0	3.0
8.	2024-25	3.0	3.0
9.	2025-26 (Up to April 2025)	3.6	0.305

Source: *M/s. OMC Ltd.*

2.7.5 TOP SOIL & SOLID WASTE GENERATION & MANAGEMENT

Top Soil:

Around 2.16 Million Tonnes of Top Soil (1.2 Million Cu. m.) will be generated during the entire life of mine. Out of this, 0.19 Million Tonnes of Top Soil has already been generated during FY 2022-2025. Therefore, 1.97 Million Tonnes of Top Soil will be generated during the entire life of mine. The Top Soil generated is being/will be utilized for plantation and greenbelt development.

Overburden/Waste:

Around 44.28 Million Tonnes of OB/Waste (24.60 Million Cu.m) will be generated during the entire life of mine. Out of this, 3.0 Million Tonnes OB/Waste has already been generated during FY 2022-2025. Therefore, 41.23 Million Tonnes of OB/Waste will be generated during the entire life of mine. The OB generated is being/will be backfilled in the mined-out area and it will be rehabilitated with plantation.

Existing Dump/Stack Details:

Presently, 7.07 Million Tonnes of OB has been generated (till 31.05.2025), Out of which, 5.82 Million Tonnes has been utilized for backfilling and 1.25 Million Tonnes has been temporary stacked in a dump and simultaneously used for Backfilling of the mined-out area. The details of Existing OB dump and stacks of the processed ore are given below:

Table 2.18
Existing Dump/Stack Details

S. No.	Dump Id	Type of Dump/Stack	Area covered (ha)	Height (m)	Total Dump/ Stack Quantity (Million Tonne)
Existing Dump					
1.	Temporary waste Dump (Active)	OB	4.446	30.0	1.25
Existing Stack					
1.	Stack Yard-1	Processed Ore	7.0	16.0	1000000
2.	Stack Yard-2	Processed Ore	1.74	11.0	341567.453

Source: Review of Mining Plan & Progressive Mine Closure Plan

Sub Grade/Mineral Reject:

All the generated mineral rejects will be blended with high grade ore for sustainable and optimum use of mineral resources. Hence, separate stacking of mineral reject will not be required. If required Mineral Rejects ore can be sold directly, as per market requirement in future. However, a space has been designated for mineral reject within the lease hold area for temporary storage.

2.8 CONCEPTUAL PLAN

At the conceptual stage, out of total mining lease area i.e. 428.075 ha, the total excavated area will be 368.684 ha, out of which 125.60 ha area will be backfilled followed by plantation and regrassing will be done on remaining 243.084 ha excavated area. Area under infrastructure (Workshop, Admin. Building etc.) will be 25.261 ha, area under Roads will be 8.438 ha, area for Mineral Storage will be 4.169 ha, area under Mineral Separation Plant will be 3.425 ha and area under 7.5 m Greenbelt along the Lease periphery will be 18.098 ha.

At the conceptual stage, total area under greenbelt/plantation will be 147.867 ha (It includes 18.098 ha area under Greenbelt and Plantation on 125.60 ha on the backfilled area & 4.169 ha area under Mineral storage (i.e., plantation on the area earmarked for mineral storage)).

Conceptual Plan is enclosed as ***Annexure VIII C*** with this EIA/EMP Report.

Post-Mining Land Use of Core zone of the mining lease is given in table below:

Table-2.19
Post-Mining Land Use of Core Zone

S. No.	Description	Land Use (ha)		
		Plantation/ Re-grassing	Public Use	Total
1.	Excavation (Rehabilitated by Regrassing)	-	243.084	243.084
	Excavation (Backfilled)	125.60	-	125.60
	Total Excavated Area	**-**	**-**	**368.684**
2.	Roads (Utility services)	-	8.438	8.438
3.	Infrastructure, Workshop, Admin Building etc.)	-	25.261	25.261
4.	Mineral Storage	4.169	-	4.169
5.	Mineral Separation Plant	-	3.425	3.425
6.	Greenbelt on 7.5 m lease periphery	18.098	-	18.098
Total		**147.867**	**280.208**	**428.075**

Source: *Derived from Approved Review of Mining Plan with Progressive Mine Closure Plan*

2.9 DESCRIPTION OF MITIGATION MEASURES

The mitigation measures given in this section are for management of the emissions (particulate matter or gaseous), waste water & surface run-off and Noise pollution generated from the mining operations to meet the environmental standards and environmental operating conditions pertaining to Kodingamali Bauxite Mine.

Table: 2.20
Emissions/ Pollution from the Mining Operations and their Management

Emissions	Source	Mitigation measures incorporated
Particulate matter	Drilling	➢ Drilling machines (15 m/hr.) is being/will be equipped with both Water injection and Dust collector system (DCT) to suppress dust generation at source. ➢ Drilling & Blasting is being/will be carried out in the hard strata whereas soft ore is being/will be directly excavated by 4.3 m^3 /3.5 m^3 capacity of hydraulic excavators.
	Blasting	➢ Controlled blasting is being/will be adopted and optimum use of explosive energy will help in reducing the air pollution. ➢ High efficiency water spray on haulage roads using water tankers on blasted rock before its loading & proper maintenance of haul roads is being/will be done. ➢ Use of Hydraulic Rock Breaker for breaking oversize boulders in place of secondary blasting.
	Loading, haulage & other transport activities	➢ Fugitive dust emissions from all sources is being/will be controlled regularly, Water spraying on haul roads, loading, unloading and transfer points is being/will be provided and maintained. ➢ Mist Fog Cannons/Sprayers have been/will be installed within the ML area ➢ Regular haul road maintenance by deployment of motor grader & soil compactor. ➢ Haul roads and service roads are/will be graded to remove the accumulated loose material. ➢ Overloading of material is being avoided. ➢ Fugitive Emission monitoring is being/will be carried out at 06 locations within the ML Area.
	Crushing	➢ Huge GI sheet enclosures have been installed around the Crusher which acts as a shield for the dust particles getting air-borne. ➢ Bag Filters will be installed at Crusher site. ➢ Crushers are having water-mist spray arrangements.
SO_2& NO_2	Movement of	➢ Maintenance of vehicles is being carried out regularly for minimization of

Emissions	Source	Mitigation measures incorporated
	HEMM & transportation vehicles	generation of gaseous pollutants. ➢ Ambient Air Quality Monitoring is being/will be done at 06 Locations within core zone and study area. ➢ CAAQMS will be established at Mine Site. ➢ In order to reduce air pollution in the surrounding, total 147.867 ha area will be covered under greenbelt/plantation.
Water	Surface Run-Off	➢ Garland drains having siltation pits have been/will be provided at the toe of the dumps, to channelize the runoff water from dumps. ➢ To control the surface run-offs, Retaining Wall around waste dump has been constructed. ➢ A series of settling pits along with a main settling tank at the outlet of the garland drains will be provided to arrest the wash-off solid particles. ➢ Periodical monitoring of ground water quality & water level in core and buffer zone is being carried out. ➢ Surface Run-off Study for Kodingamali Bauxite Mine has already been carried out by NIT, Rourkela and recommendations of the same are being/will be duly implemented within the ML Area.
	Waste Water	➢ Treated/recycled water will be used for dust suppression. ➢ Use of wetting agents is recommended to reduce water consumption. ➢ Rainwater harvesting techniques have been/will be implemented for conservation of water. ➢ 6 Nos. of Rain Water Harvesting Structures i.e. Storage Ponds with High Density Polyethylene (HDPE) Lining having capacity of 40224 Cu. m. have already been constructed for storage of water within the ML Area. ➢ 07 nos. of settling cum percolation have also been constructed.
Noise Generation	Drilling	➢ Drilling is being/will be carried out with the help of sharp drill bits which will help in reducing noise. ➢ Closed cabins are being/will be provided for drill operator.
	Blasting	➢ Secondary blasting is being/will be totally avoided and Hydraulic rock breaker will be used for breaking boulders. ➢ NONEL is being /will be used to control ground vibrations, noise & fly rocks. ➢ Controlled blasting is being/will be adopted. ➢ Proper maintenance, oiling and greasing of machines at regular intervals is being done to reduce generation of noise. ➢ Explosives charge per hole and per delay is being/will be maintained as per

Emissions	Source	Mitigation measures incorporated
		DGMS guidelines. ➢ Work zone Noise level monitoring at 04 locations is being/will be carried out within the ML area.
	Transportation	➢ Adequate silencers with AC cabins are being/will be provided in Heavy Earth Moving Machines. ➢ All Mine employees are being provided with necessary PPEs. ➢ An area of around 18.098 ha will be covered under Green Belt around 7.5 m lease boundary which will act as green muffler and Plantation is being/will be done along the transportation route which will help to reduce the noise pollution. ➢ Ambient Noise Monitoring (04 locations * monthly frequency) is being/will be done.
Greenbelt Development and plantation		➢ Total 18.098 ha area will be covered under greenbelt along 7.5 m periphery of the ML area, out of which 8.97 ha area has already been covered under Greenbelt. ➢ Total 147.867 ha area will be covered under greenbelt/plantation which comprises of 18.098 ha area under greenbelt along 7.5 m periphery and Plantation on 125.60 ha on the backfilled area and 4.169 ha area under mineral storage. ➢ Local species have been/will be planted after consultation with local forest Department namely Karanja (*Pongamia pinnata*), Jamu (*Syzygium cumini*), Mahogony (*Swietenia macrophylla*), Arjuna (*Terminalia arjuna*), Bara (*Ficus bengalensis*), Ashwatha (*Ficus religiosa*), Sissoo (*Dalbergia sissoo*), Bamboo (*Bambusa vulgaris*), Bahada (*Terminalia bellirica*), Panasha (*Artocarpu sheterophyllus*), Mango (*Mangifera indica*), Neem/Mahaneem (*Azadirachta indica*), etc.

2.10 FINANCIAL ASSURANCE FOR PLAN PERIOD

Total Financial Assurance payable till the end of plan period as per rule 27(1) of MCDR 2017, i.e. up to 31.03.2027 is calculated to be Rs 9,11,18,700/- (Rupees Nine Crores Eleven Lakhs Eighteen Thousand Seven Hundred Only) for Category A fully mechanized mine calculated at Rs. 3, 00,000/- per hectare for an area of 303.729 Ha of ML area put to use.

The financial assurance submitted to IBM, is in the form of Bank Guarantee no. 57500IGL0002721 and it is valid up to 31.03.2027.

2.11 ASSESSMENT OF NEW AND TESTED TECHNOLOGY FOR THE RISK OF TECHNOLOGICAL FAILURE

From the nature and extent of the deposit, the reserves and the quality have been proved with adequate degree of reliability. Therefore, opencast mechanized method is the most feasible method for mining in the mining lease area. Since the mining machineries are rapidly upgrading, project proponent has adopted/will adopt more advance equipment and automation for safer and environment friendly mining technology.

CHAPTER - 3

DESCRIPTION OF THE ENVIRONMENT

3.1 INTRODUCTION

The knowledge of present environment of the core and buffer zone of the mining area is important to assess the impact of various project activities on environment. The knowledge of present day environment is also helpful in planning management of environment and planning of mitigation measures. To assess the baseline environmental quality of the area, field assessment has been conducted considering following components of the environment, viz. land, meteorology, air, noise, water, soil, biological and socio-economic.

The baseline monitoring has been carried out during the Post-monsoon Season (October to December, 2024) in accordance with the guidelines of MoEF&CC for undertaking EIA Studies and for preparation of EIA/EMP report.

3.2 STUDY AREA AT GLANCE

Study Area: The study area is an area of 10 km radius (aerial distance) from the Mine site, also known as buffer zone. The area of Mine site (within boundary) is considered as core zone. Mine site is located at Village: Kodingamali, Tehsil: Laxmipur & Kashipur & District- Koraput & Rayagada, Odisha.

- **Core Area :** 428.075 ha
- **Buffer Area:** 47496.91 ha (within 10 Km radius)

The major environmental settings of the study area are given in the table below:

Table - 3.1

Environmental Settings of the Area
(with approx. Aerial Distance & Direction from the Mining Lease boundary)

S. No.	Particular	Details
1.	Nearest Village	Birigurha (~0.8 km in East direction)
2.	Nearest Town/City	➢ Nearest City: Rayagada (~ 35.0 km in NE Direction) ➢ Nearest town: Laxmipur (~ 6.5 km in SE Direction)
3.	Nearest Highways	SH -4 (~4.5 km in SSE Direction)
4.	Nearest Railway Station	Singaramba Railway Station (~3.0 km in NE Direction) Laxmipur Railway Station (~4.5 km in SE Direction)
5.	Nearest Airport	➢ Jeypore Airport (~55 km in SW Direction) ➢ Visakhapatnam International Airport (~145 km in SSE Direction)
6.	Inter distirct Boundary	Koraput & Rayagada (Adjacent in NW Direction)
7.	National Parks, Wildlife Sanctuaries, Wildlife corridors, Tiger/Elephant Reserves, etc. within 10 km radius study area	There is no National Park, Wild Life Sanctuary, Biosphere Reserves, Wildlife corridors, Tiger/Elephant Reserves, etc. within 10 km radius study area.

<table>
<tr><th>S. No.</th><th>Particular</th><th>Details</th></tr>
<tr><td>8.</td><td>Reserve Forests (RF)/ Protected Forests (PF) etc. within 10 km radius study area</td><td>There are 9 Reserved Forests and 11 Protected Forests within 10 km radius study area:
<table>
<tr><th>S.No.</th><th>Name</th><th>Shortest distance from the ML boundary (in Km)</th></tr>
<tr><td>1.</td><td>Kodingamali R.F.</td><td>Core Zone</td></tr>
<tr><td>2.</td><td>Kodingamali Proposed R.F.</td><td>Core Zone</td></tr>
<tr><td>3.</td><td>Champi R.F</td><td>~3.5 Km in SW Direction</td></tr>
<tr><td>4.</td><td>Kendripadar R.F.</td><td>~4.0 Km in NE Direction</td></tr>
<tr><td>5.</td><td>Bamandeba R.F</td><td>~5.5 Km in SSW Direction</td></tr>
<tr><td>6.</td><td>Titigurha R.F</td><td>~6.5 Km in NE Direction</td></tr>
<tr><td>7.</td><td>Lakshmipur R.F</td><td>~8.0 Km in SE Direction</td></tr>
<tr><td>8.</td><td>Shankaraha R.F</td><td>~8.5 Km in NE Direction</td></tr>
<tr><td>9.</td><td>Minapai R.F</td><td>~9.0 Km in ESE Direction</td></tr>
<tr><td>10.</td><td>Lakshmipur P.F</td><td>~4.0 Km in SSE Direction</td></tr>
<tr><td>11.</td><td>Baghamari P.F.</td><td>~4.0 Km in NE Direction</td></tr>
<tr><td>12.</td><td>Sargighati P.F.</td><td>~6.0 Km in East Direction</td></tr>
<tr><td>13.</td><td>Bagriguma P.F.</td><td>~6.5 Km in NE Direction</td></tr>
<tr><td>14.</td><td>Masimandi P.F</td><td>~7.0 Km in NW Direction</td></tr>
<tr><td>15.</td><td>Raishila P.F</td><td>~8.0 Km in SSE Direction</td></tr>
<tr><td>16.</td><td>Kakirimali P.F</td><td>~8.0 Km in South Direction</td></tr>
<tr><td>17.</td><td>Kelar P.F</td><td>~8.0 Km in SW Direction</td></tr>
<tr><td>18.</td><td>Baghaparmar P.F.</td><td>~9.0 Km in SSW Direction</td></tr>
<tr><td>19.</td><td>Kutili P.F</td><td>~9.0 Km in ENE Direction</td></tr>
<tr><td>20.</td><td>Kutinga P.F.</td><td>~9.5 Km in East Direction</td></tr>
</table></td></tr>
<tr><td>7.</td><td>Water Body within 10 km radius study area</td><td>
<table>
<tr><th>S.No.</th><th>Name</th><th>Shortest distance from the ML boundary (in Km)</th></tr>
<tr><td>1.</td><td>Patagarha Nadi</td><td>~4.0 Km in NNE Direction</td></tr>
<tr><td>2.</td><td>Nala</td><td>~4.0 Km in SSE Direction</td></tr>
<tr><td>3.</td><td>Nala</td><td>~5.0 Km in ENE Direction</td></tr>
<tr><td>4.</td><td>Murani Nadi</td><td>~6.0 Km in SW Direction</td></tr>
<tr><td>5.</td><td>Patagarha Nala</td><td>~7.5 Km in NW Direction</td></tr>
<tr><td>6.</td><td>Nala</td><td>~8.5 Km in WSW Direction</td></tr>
<tr><td>7.</td><td>Baghri Nala</td><td>~9.0 Km in West Direction</td></tr>
<tr><td>8.</td><td>Debagarha Nala</td><td>~9.5 Km in SSW Direction</td></tr>
</table></td></tr>
<tr><td>8.</td><td>Seismic Zone</td><td>Zone – II as per IS: 1893 (Part-I): 2002</td></tr>
<tr><td>9.</td><td>CRZ within 10 km radius study area</td><td>None</td></tr>
</table>

Source: *Site Visit & Pre-feasibility Report*

The map showing environmental settings within 10 km from the mine site is given in the below figure:

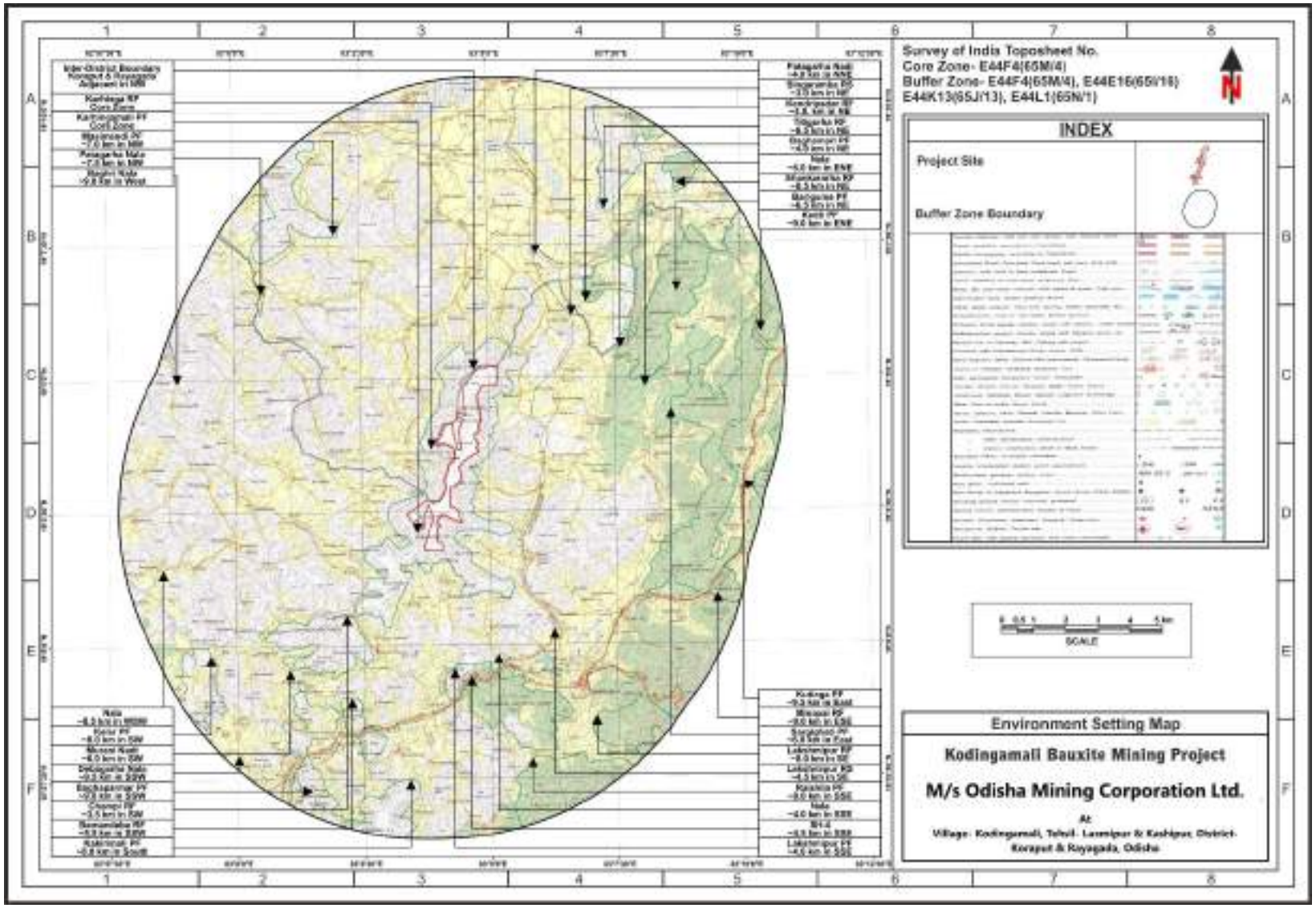


Figure 3.1 Map Showing Environmental Settings of the 10 km Radius of the Study Area

3.3 STUDY PERIOD

The relevant information and data (both Primary & Secondary) were collected in core as well as buffer zone (10 km distance from the mine boundary) during Post- Monsoon Season (October to December, 2024) in accordance with the guidelines for preparation of EIA studies in order to assess the impact of the mine site within the 10 Km study area on existing physical, biological and social environment.

3.4 ENVIRONMENTAL COMPONENTS

Information on the following components/parameters were collected to understand the existing scenario of the core and buffer area:

1. Land Use & Land Cover
2. Meteorology
3. Air Environment
4. Noise Environment
5. Water Environment
6. Soil Environment
7. Biological Environment
8. Socio-economic Environment

3.5 BASELINE DATA COLLECTION

Baseline environment data on various components of the environment in the study area of Kodingamali Bauxite Mine was collected during Post Monsoon Season (Oct., to Dec., 2024) to assess the present scenario of the area.

Sampling, preservation, transportation & storage of samples were carried out by J.M. EnviroLab Pvt. Ltd. under supervision of concerned EC/FAE. J.M. EnviroLab Pvt. Ltd. is NABL accredited (Certificate No. TC-6821, Issue Date 24.05.2025 & valid up to 23.05.2029).

Table - 3.2
Baseline data collection
During Post Monsoon Season (October to December, 2024)

S. No.	Environmental component	Primary data				Secondary data
		Parameters	Frequency	Monitoring locations	Methodology	
1.	Land	Water bodies, rivers, nallah, agricultureland, plantation/greenbelt, mine pit, crusher zone, open land, settlement, railway, roads, conveyor belts, industry, etc.	Once in a season	Study area	Primary and secondary data collection using field survey and authenticated credentials Processing using DIP technique and preparation of LULC using ERDAS Imagine 9.2	Satellite data procurement from NRSC, Hyderabad Survey of India Toposheet
2.	Meteorology	Temperature, Relative Humidity, Wind Speed, Wind Direction, rain fall	Hourly (For Study Period)	1 (Mine Site)	Automatic Weather Monitoring Station	IMD book (Climatological normals 1991-2020), Past year Rainfall data for Koraput and Rayagada District
3.	Air	PM_{10}, $PM_{2.5}$, SO_2 and NO_2	(24 hourly), twice a week	11	Sampling: CPCB Guidelines/NAAQS/IS 5182 and Instrument Manual Analysis: CPCB Guidelines/IS 5182	--
		O_3, Pb, CO, NH_3, C_6H_6, BaP, As, Ni	Once in a season			
4.	Noise	Equivalent noise levels in Leq dB (A)	Once in a season (day & night time)	11	Sampling: IS 9989 Analysis: CPCB Guidelines/IS 9989	--
5.	Surface Water	-	Once in a season	06	-	-
	Ground Water/Drinking water	Parameters as per IS 10500-2012	Once in a season	10	Sampling: CPCB Guideline & APHA 22nd edition 2012 Analysis: IS 10500-2012/ IS 3025/APHA 22nd edition 2012	CGWB for ground water level
6.	Soil	Parameters As per IS 2720/USDA	Once in a season	10	Sampling: USDA Analysis: As per IS 2720/USDA	-
7.	Biological Environment	Flora and Fauna	Once in a season	Study area	Quadrat method/random sampling	➢ Forest working plan, Wildlife (Protection) Act, 1972 & its Amendment 2022 ➢ EIA Reports of nearby Mines & Industries
8.	Socio-Economic Environment	Socio- Economic Demography	Once in a season	Study area	Random Sampling of the villages, Group Discussions with local villagers, Site visit, Field survey through questionnaire	➢ Demographic Parameter-Census data, 2011 ➢ List of prevailing diseases from Health and medical Centre. ➢ List of Educational facilities. ➢ Taluka Map ➢ Details on socio- economic developmental activities undertaken

3.5.1 INSTRUMENTS USED FOR ENVIRONMENTAL BASELINE DATA COLLECTION

The following instruments were used at the site for environmental baseline data collection work.

1. Respirable Dust Sampler with attachment for gaseous Pollutants, Envirotech APM 460.
2. Fine Particulate Matter (FPS) Sampler APM 550
3. Sound Level Meter Model Envirotech SLM - 100
4. Digital D.O. Meter Model - 831 E (CPCB Kit)
5. Weather Monitoring Station Model Enviro WM 271
6. Water Level Indicator and
7. Global Positioning System (GPS).

The samples of air, water, noise and soil as given in above section were collected from the representative sampling points. The primary data covering the details such as type of vegetation/ various agricultural crops, type of habitation, their occupation type, existing infrastructure and communication/ medical facilities were also collected by the site visit team through interaction with a large number of local inhabitants from the study area and also with different government departments for preparation of additional studies such as Land use Land cover study; Biological Environment, Hydrogeological study, Socio-economic study etc. Based on the primary and secondary data obtained from the 10 km radius buffer area and the core area, the Analysis interpretation and conclusion of the baseline conditions within the core zone and buffer zone is given in sections below.

3.6 LAND USE / LAND COVER STUDY

The objectives of the LULC study are as follow:

- To develop the Land use & Land cover map using land coordinates of the Mine site (Core Zone) and 10 km radius from the Mine site (Buffer area).
- To Identify and mark the important Land use and Land cover features using the primary and secondary data collected.
- To evaluate the impacts on existing land use/cover features of the buffer area by the Proposed Project activities.
- To identify the mitigative measures for the sustainable use of land and to protect the buffer zone from the adverse impacts.

3.6.1 MODALITIES AND DATA USED

Current vintage data of Indian Remote Sensing Satellite RESOURCESAT-2A (Liss 4) has been used for preparation of Land use/ Land cover thematic map of study area.

Satellite image has been procured from National Remote Sensing Centre, Hyderabad. Survey of India toposheet as a reference map on 1:50,000 scale has been used for preparation of base layer data like road, rail network and villages for geo-referencing of satellite image.

Table - 3.3

Data Used for the Land Use/Land Cover Mapping

S. No.	Particulars	Details
1.	Satellite Image	Resourcesat 2A, Sensor- Liss 4
2.	Vintage Date	06.01.2024
3.	Satellite Data Source	NRSC, Hyderabad
4.	SOI Toposheets No	Core Zone: E44F4 (65M/4) Buffer Zone: E44F4 (65M/4); E44E16 (65I/16); E44K13 (65J/13), E44L1(65N/1)
5.	Software Used	Earth Resources Data Analysis System (ERDAS)

3.6.2 SATELLITE IMAGE OF STUDY AREA

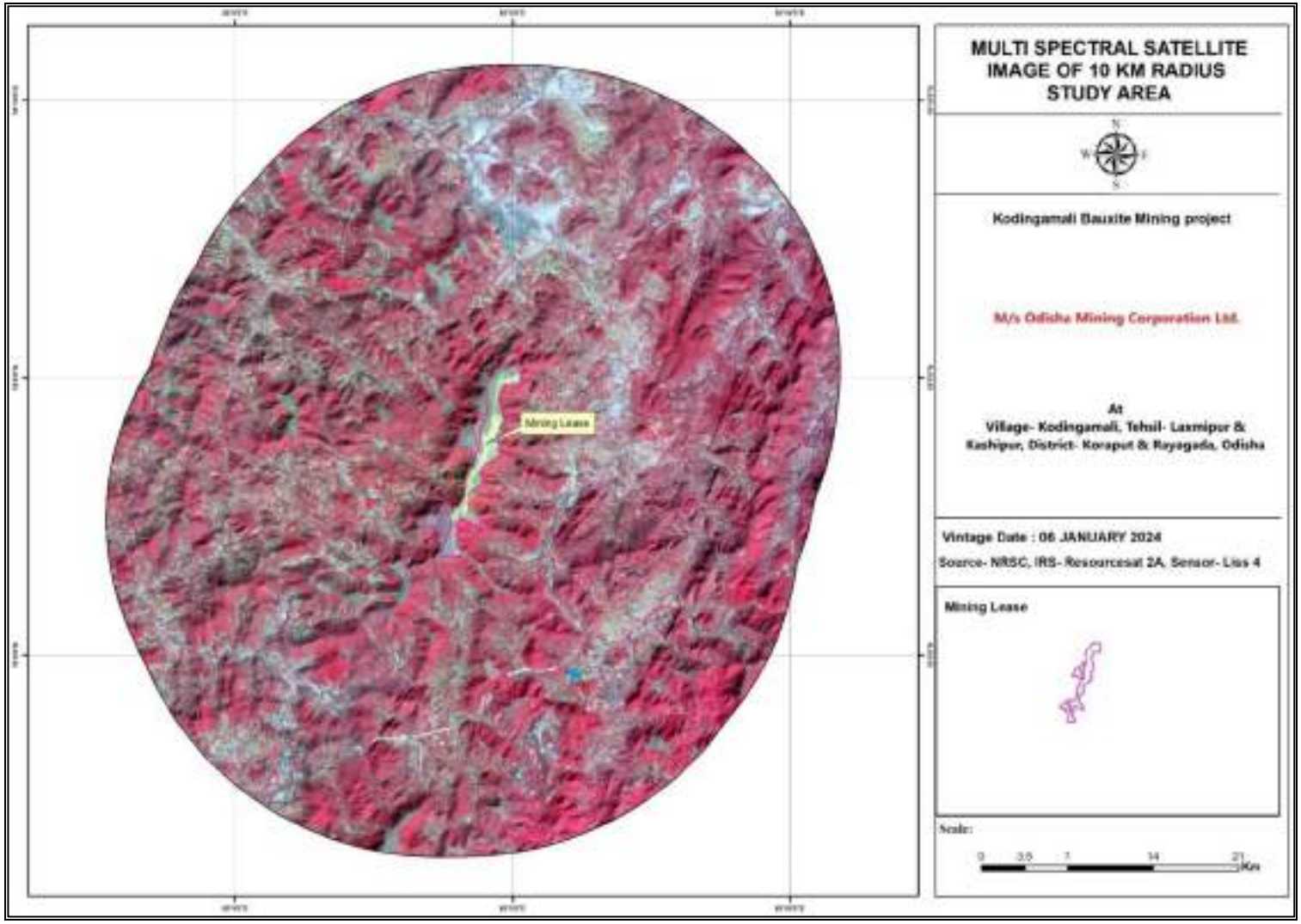


Figure 3.2: Satellite Image of Study Area

3.6.3 METHODOLOGY

The land use/land cover map is prepared by adopting the interpretation techniques of the Satellite image in combination with collateral data such as Survey of India topographical maps. Image classification is done by using visual interpretation techniques and digital classification using any of the image processing software. The various activities for preparation of LULC include preprocessing, rectification, image enhancements and classifying the satellite data for assessing the change in land use land cover due to proposed developmental activities.

The imagery is interpreted and ground checked for corrections. The final map is prepared after ground thruthing. The different land use/land cover categories in the study area has been carried out based on the NRSC land use / land cover classification system.

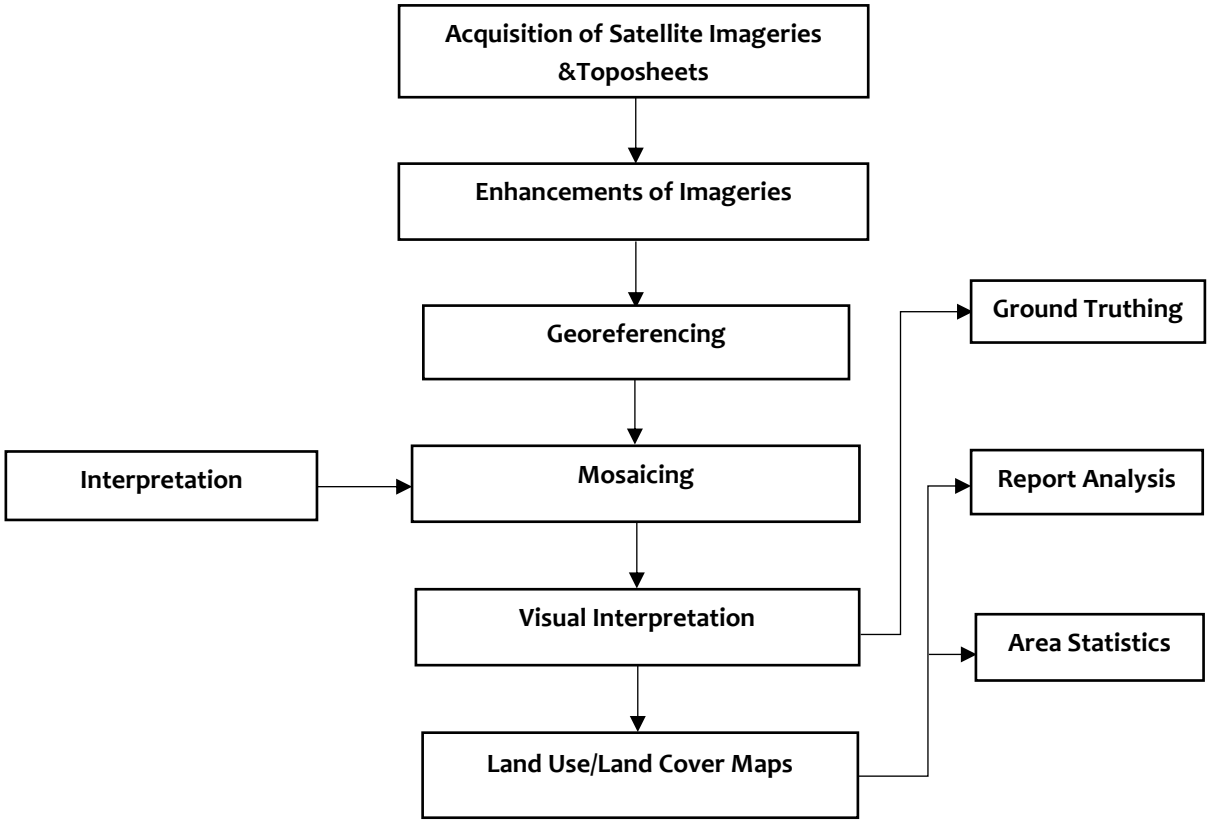


Figure 3.3 Methodology Flowchart for LULC Classification and Mapping

- Preliminary / primary data collection of the study area
  - Satellite data procurement from NRSC, Hyderabad
- Secondary data collection from authorized bodies
  - Survey of India Toposheet (SOI)
  - Cadastral / Khasra map
  - GPS Coordinates of Mine Lease Boundary
  - Mining Maps approved by IBM, Bhubaneswar.
- Processing of satellite data using ERDAS Imagine 9.2 and to prepare the Land use and Land cover maps (e.g. Forest, agriculture, settlements, wasteland, water bodies etc.) by digital image processing (DIP) technique.

- Geo-Referencing of the Survey of India Toposheet
- Geo-Referencing of satellite Imagery with the help of Geo-Referenced Toposheets
- Geo-Referenced Khasara Maps
- Enhancement of the Satellite Imagery
- Base Map layer creation (Roads, Railway, Village Names and others Secondary data etc.)
- Data analysis and Classification using Digital interpretation techniques.
- Ground truth studies or field Verification.
- Error fixing / Reclassification
- Final Map Generation

3.6.4 LAND USE / LAND COVER DETAILS OF STUDY AREA

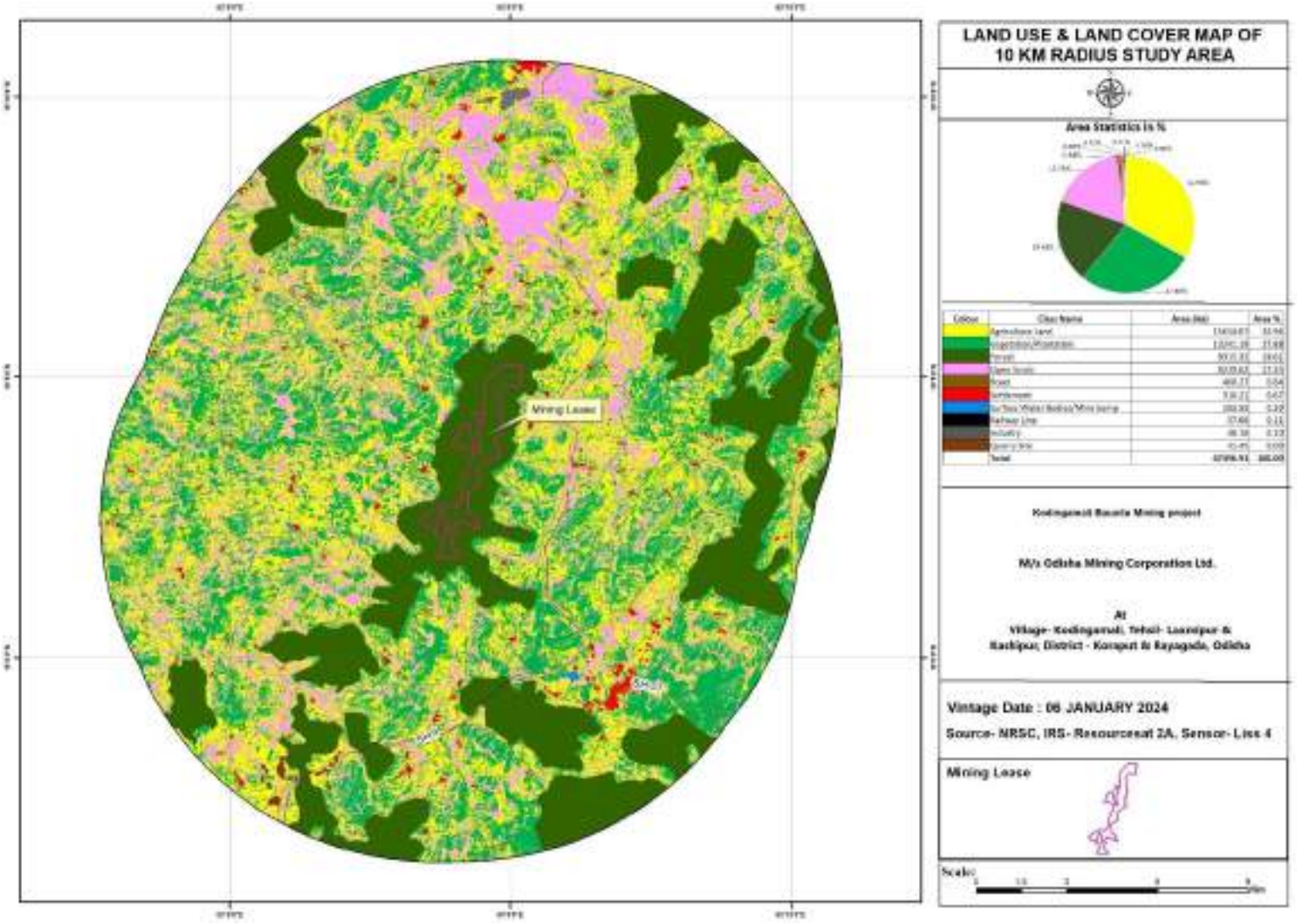


Figure: 3.4 Land Use / Land Cover Map of the Study Area

The land use and land cover details of the Study area are given in Table - 3.4

Table - 3.4

Land Use / Land Cover Details of Study Area

S. No.	Legend	Area (in ha)	Area (in %)
1.	Agriculture Land	15654.07	32.96
2.	Vegetation/Plantation	13241.19	27.88
3.	Forest	9315.32	19.61
4.	Open Scrub	8239.62	17.35
5.	Road	400.27	0.84
6.	Settlement	316.21	0.67
7.	Surface Water Bodies/Mine Sump	183.56	0.39
8.	Railway Line	57.06	0.11
9.	Industry	48.16	0.10
10.	Quarry Site	41.45	0.09
Total		**47496.91**	**100.00**

Source: *LU/LC Map for Buffer Zone*

3.6.5 INTERPRETATION OF THE LULC DATA

- The study area mainly comprises of Agriculture land (15654.07 ha) and Vegetation/Plantation (13241.19 ha) with 32.96% and 27.88% of the total study area respectively.
- About 9315.32 ha (19.61%) area is under Forest, 8239.62 ha (17.35%) area Open Scrub Land, 400.27 ha (0.84%) area under Roads, 316.21 ha (0.67%) area Settlement, 57.06 ha (0.11%) area under Railway Line and 48.16 ha (0.10%) area under Industry.
- Few Quarry Sites with an area of 41.45 ha (0.09%) are also present within 10 km radius study area.
- The Surface Water Bodies/Mine Sump comprises of 183.56 ha i.e 0.39% of the total buffer area. As per the primary Survey and SOI Toposheet, there are Eight water bodies present in the buffer zone viz. Patagarha Nadi, Murani Nadi, Patagarha Nala, Baghri Nala, Debagarha Nala and 3 other Nalas.
- There is no National Park, Wild Life Sanctuary, Biosphere Reserves, Wildlife corridors, Tiger/Elephant Reserves, etc. within 10 km radius study area.
- There are 9 Reserve Forests and 11 Protected Forests present 10 km radius study area.

3.7 SEISMICITY OF THE AREA

Many parts of the Indian subcontinent have historically high seismicity. Seven catastrophic earthquakes of magnitude greater than 8 (Richter scale) have occurred in the western, northern and eastern parts of India and adjacent countries in the past 100 years. Approx. 59 % of the land area of India is vulnerable to seismic hazard damage. In India, seismic zones are divided into four zones i.e. V, IV, III and II. Details of the seismic zones are given in Table - 3.5:

Table - 3.5
Seismic Zones in India

S. No.	Seismic Zone	Risk	Intensity of Earthquake (on Mercalli Intensity Scale)
1.	Zone – V	Very High Risk Zone	IX and above
2.	Zone – IV	High Risk Zone	VIII
3.	Zone – III	Moderate Risk Zone	VII
4.	Zone – II	Low Risk Zone	VI and below

Source: *www.ndma.gov.in/images/guidelines/earthquakes.pdf*

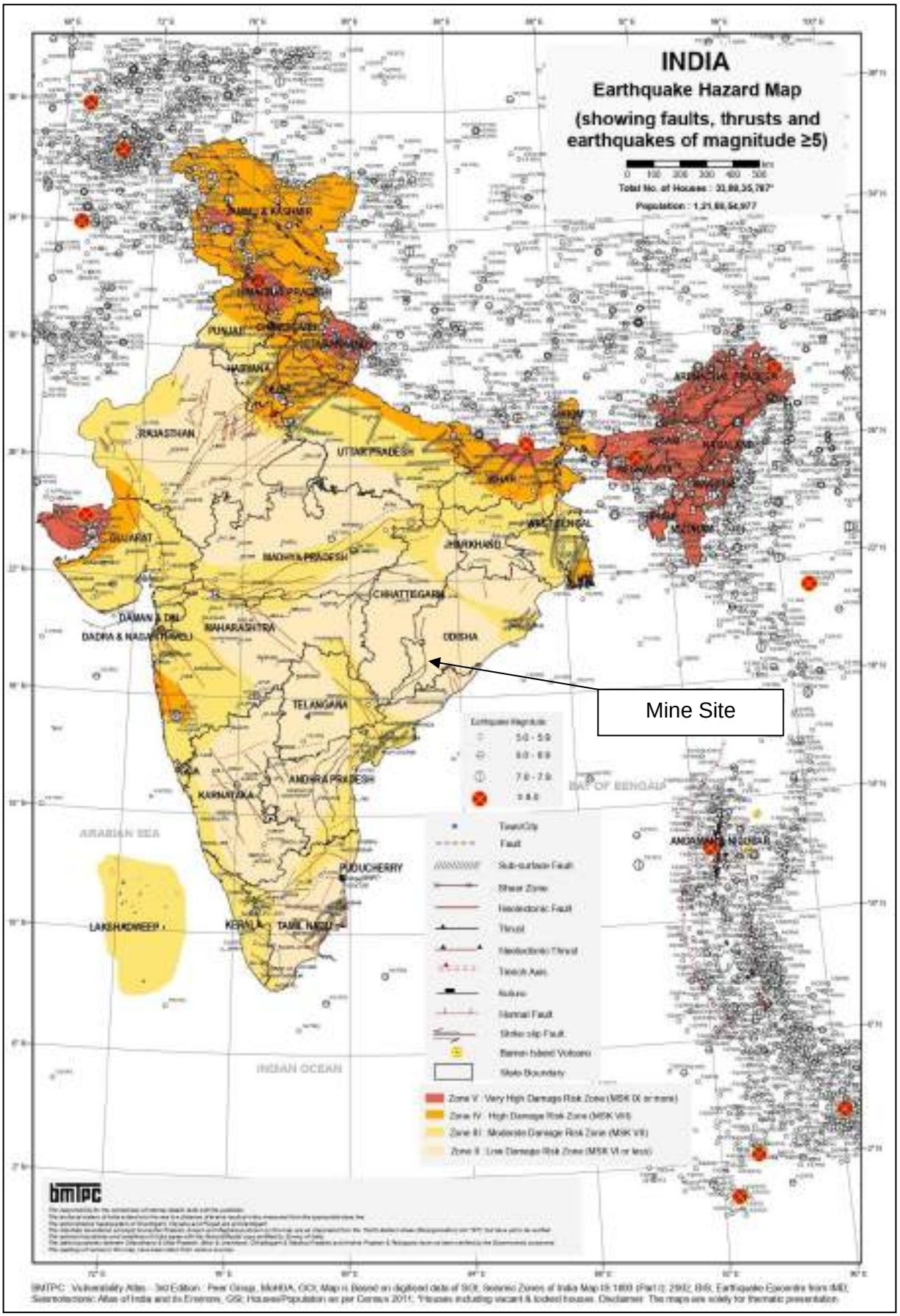


Figure 3.5 Seismic Zone Map Showing Mine Site falls in Zone II



Source: *https://www.osdma.org*

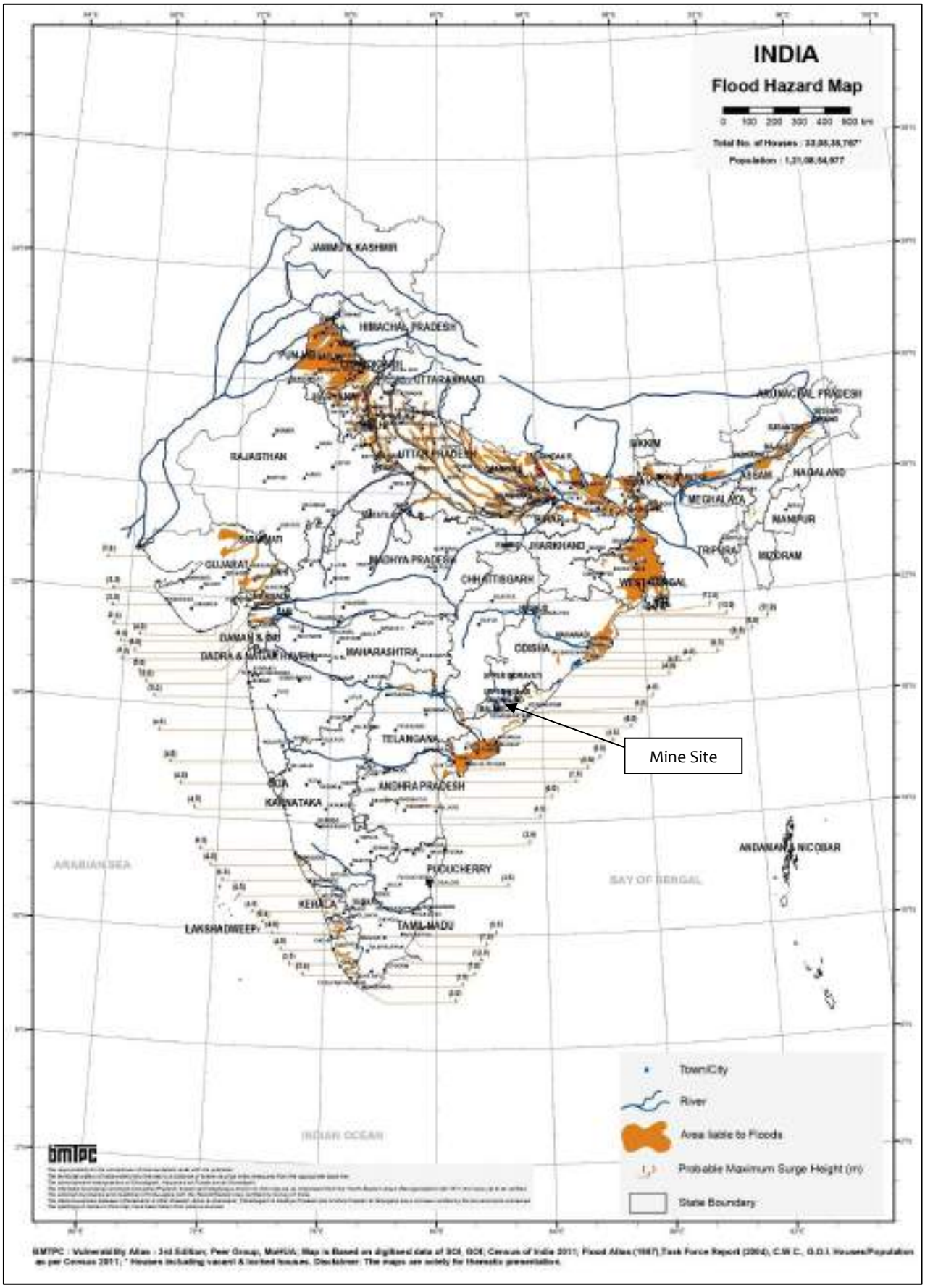
Figure 3.6: Map of Earthquake Zones of Odisha

The above Figure shows that major portion of state of Odisha falls under Low damage risk zone (MSK VI). Major parts of districts such as Puri, Jagatsinghpur, Kendrapara, Cuttak and Dhehkanal and some parts of districts Khurda, Angul, Sampalpur and Jharsaguda falls under moderate damage risk zone-III(MSK VII). Kodingamali Bauxite Mine is located in districts Koraput and Rayagada which fall under low damage risk zone-II (MSK VI).

3.8 FLOOD HAZARD ZONATION OF THE AREA

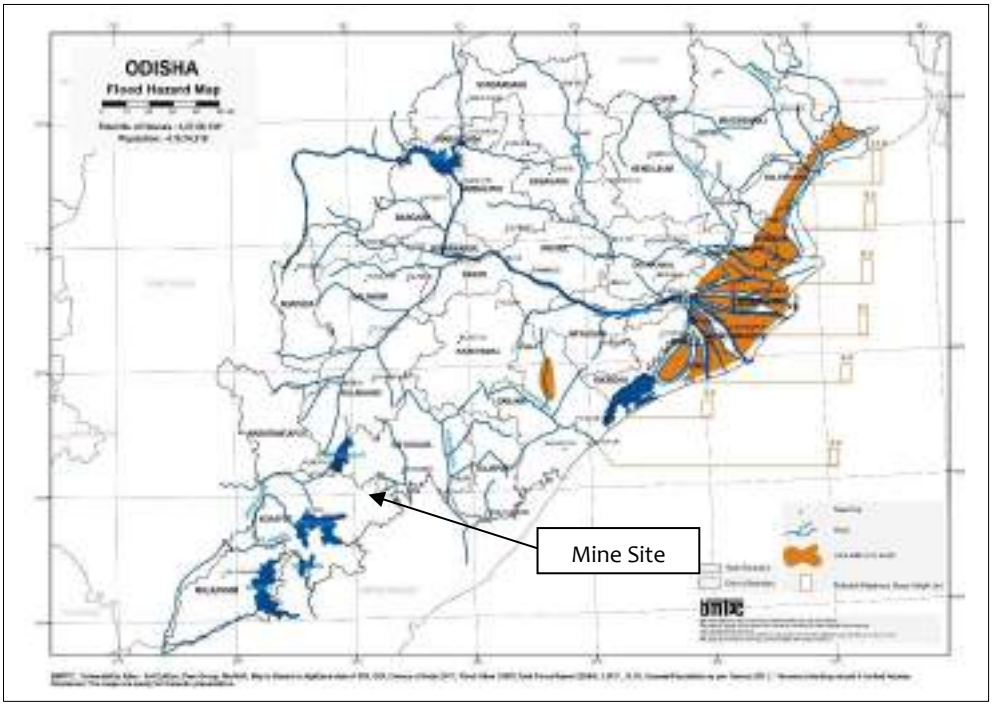
The long of coastline of Odisha exposes the State to flood, cyclones and storm surges. Heavy rainfall during monsoon causes floods in the rivers. Flow of water from neighbouring States of Jharkhand and Chattisgarh also contributes to flooding. The flat coastal belts with poor drainage, high degree of siltation of the rivers, soil erosion, breaching of the embankments and spilling of floodwaters over them, cause severe floods in the river basin and delta areas. In Orissa, rivers such as the mahanadi, Subarnarekha, Brahmani, Baitarani, Rushikulya, Vansadhara and their many tributaries and branches flowing through the State expose vast areas to floods. However, the Mine site lies in districts Koraput and Rayagada and the nearset river is Patagarha Nadi which is approximately 4.0 Km from the Mine site.

As per the "Vulnerability Atlas-3rd Edition; Peer Group, Ministry of Housing (MoH) and UPA (Urban Povery Alleviation); based on digitized data of SOI, GOI; Flood Atlas, Task Force Report, C.W.C., GOI" the mine site does not fall under "area liable to flood". Flood Hazard Zonation Map of India & Odisha showing the mine site are given in Figure 3.7(A) and Figure 3.7(B) respectively.



Source: *BMTPC: Vulnerability Atlas-3rd Edition: peer Group, MoHUA, GOI*

Figure 3.7 (A): Flood Hazard Zonation Map of India



Source: *BMTPC: Vulnerability Atlas-3rd Edition: peer Group, MoHUA, GOI*

Figure 3.7 (B): Flood Hazard Zonation Map of Odisha

3.9 TOPOGRAPHY & DRAINAGE PATTERN

Topography

Kodingamali Plateau is a part of Eastern ghat hill ranges in Odisha. The Bauxite deposit form a blanket occupying the surface of the tabular landscape, linear in shape, trending almost in NNE-SSW direction for a length of about 7 km with an average width of 780 m.

The area of capping is about 5.33 sq.km. The deposit has a maximum elevation of 1276 m above mean sea level in northern part and 1262 m above mean sea level in southern part. The average height of Kodingamali plateau to the surrounding valley is about 300 m. The capping has gentle slopes to the west, North and south but comparatively steep slope in its eastern part.

The plateau top is a continuous stretch of flat land intercepted by small saucer shaped depression which is filled with soil and humus varying in thickness.

The mining lease area consists of undulating land with elevations ranging from 1089.27 m AMSL to 1276.47 m AMSL with an Average Level as 1182.87 AMSL. North of the Lease area has a higher elevation than the South, Bauxite ore thickness is more at North.

Drainage Pattern

The district has many rivers and perennial streams. Almost the entire Koraput district is drained by four rivers namely the Indravati, the Kolab, the Machkund and the Champabati or Jhanjabati, with their tributaries. These rivers flow inland westward and the southward into the valley of the Godavari.

Few springs originate from the foot hills of the Kodingamali Plateau, the most prominent ones are towards the Eastern margin of the area. Patagarha River, which flows in a north-easterly direction, is about 4.0 Km in NNE Direction from the Mine Site. Few others are Murani Nadi (~6.0 Km in SW

Direction), Patagarha Nala located in NW Direction, Baghri Nala and Debagarha Nala in West and SSW Direction respectively. These controls the regional drainage of the terrain.

3.10 CLIMATE AND RAINFALL

CLIMATE

The climate of Odisha is characterized by high temperatures, elevated humidity, moderate to heavy rainfall, and short, mild winters. The state enjoys a sub-tropical climate with three distinct seasons i.e. summer, monsoon and winter. The southwest monsoon rain starts from mid of June and continues till mid of October. Summer season extends from March to early part of June and winter season spreads from November to February.

The state experiences hot summer with temperatures shooting up to 45°C in the east to 50°C in the west. During winter season mornings and nights are cool. However, the mean monthly winter temperature varies from 18°C to 22°C in different parts of the state. The mean monthly summer temperature is 37°C in western parts and 28°C in southern parts. Humidity ranges from 70% to about 100% in the state. During monsoon period the humidity is very high in the eastern parts and during summer it is dry in the western part of the state.

RAINFALL

The normal average rainfall of the state is 1482.2 mm. Nearly 86% of the annual rainfall is contributed by the southwest monsoon. The rainfall is highest in the northern part of coastal tract which reduces westwards in Kandhamal, Angul, Keonjhar districts and also southwards around Gopalpur in Ganjam district.

The average annual rainfall in the Koraput district is 1753.3 mm (average 10 years rainfall data from 2013 - 2022) varying from minimum 1536.1 mm in 2015 to maximum 2015.1 mm in 2019.

The average annual rainfall in the Rayagada district is 1293.8 mm (average 10 years rainfall data from 2012 - 2021) varying from minimum 991.2 mm in 2021 to maximum 1459.5 mm in 2013.

Table - 3.6

Rainfall Data of Koraput and Rayagada Districts

Rainfall Data of District Koraput			Rainfall Data of District Rayagada	
S. No.	**Year**	**Annual Rainfall (mm)**	**Year**	**Annual Rainfall (mm)**
1.	2013	1640.6	2012	1227.8
2.	2014	1892.7	2013	1459.5
3.	2015	1536.1	2014	1313.6
4.	2016	1692.0	2015	1149.9
5.	2017	1566.6	2016	1138.6
6.	2018	1794.0	2017	1419.5
7.	2019	2105.1	2018	1514.5
8.	2020	1682.42	2019	1407.6
9.	2021	1612.1	2020	1315.35
10.	2022	2011.2	2021	991.2
	Average	**1753.3**	**Average**	**1293.8**

Source: *CGWB Year Book 2021-2022*

3.11 LIST OF INDUSTRIES / MINES IN STUDY AREA

The list of existing industries and mines in the 10 km radius of the mine site is summarized in the table given below:

Table - 3.7
List of Industries/ Mines in Study Area

S. No.	Industries/Mines	Approx. Distance (Mine Boundary) and direction from (Centre point of the Mine site)	Status Operational/ Non-operational
1.	Utakal Alumina International Ltd.	~ 10.0 Km in NNW Direction	Operational

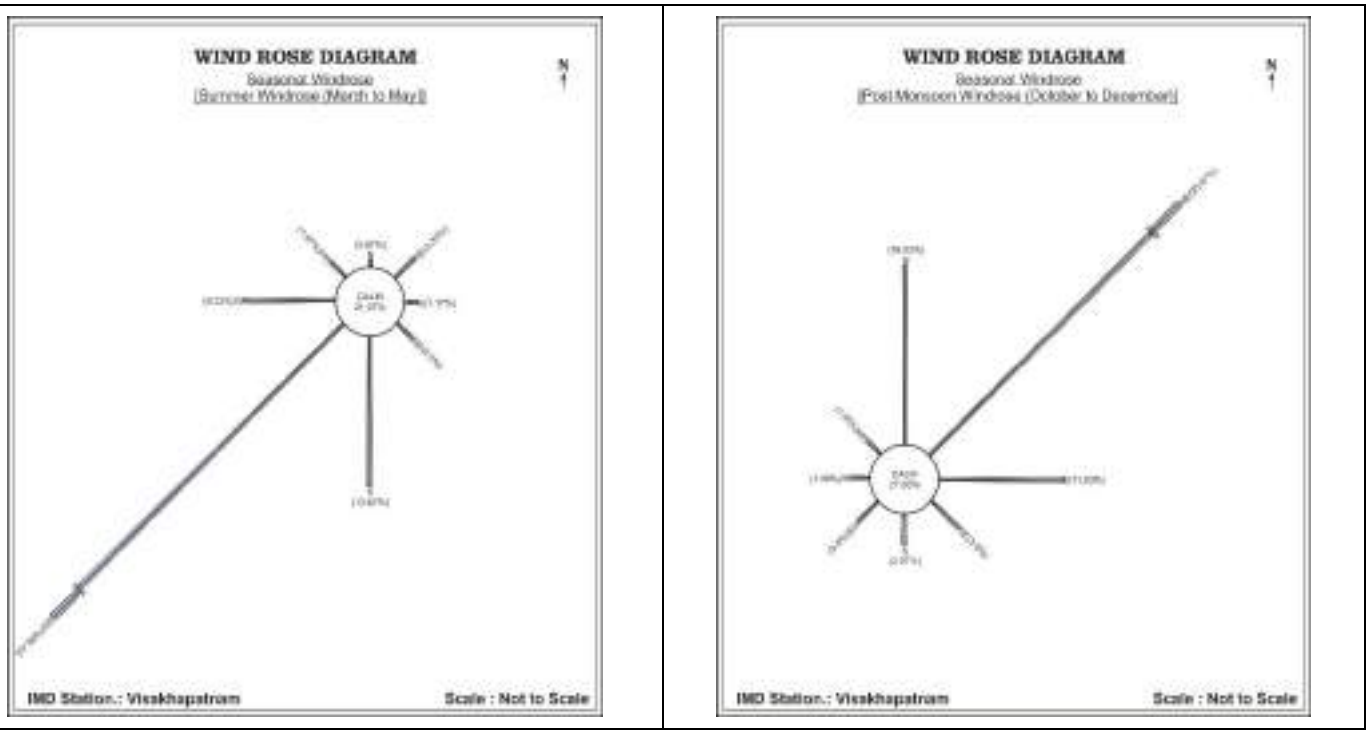
Source: *SOI Toposheet & Field Survey*

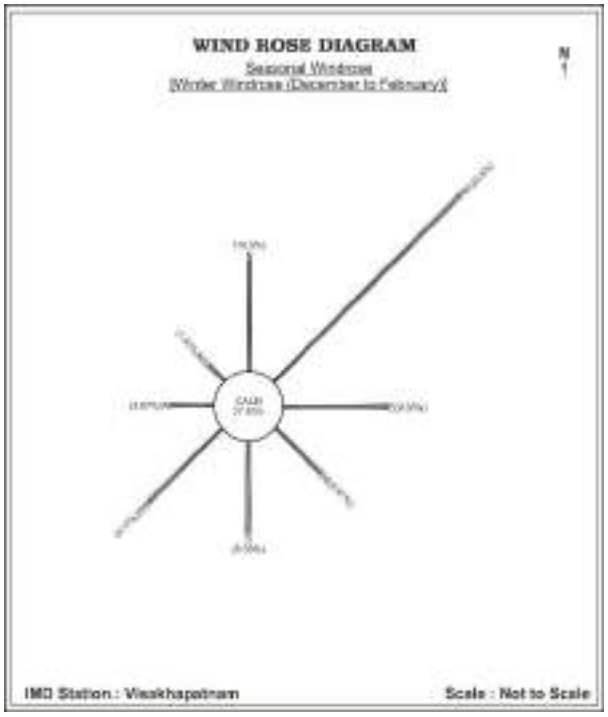
3.12 METEOROLOGY

Meteorology plays a vital role in determining the transport and diffusion pattern of air pollutants released into atmosphere. The principal variables include horizontal convective transport (average wind speed and direction), vertical convective transport (atmospheric stability) and topography of the area.

Meteorological characteristics of an area are very much important in assessing possible environmental impacts and in preparing environmental management plan. Meteorological factors are time dependent and changes with respect to time thus meaningful interpretation can be drawn only from long-term reliable data. For collecting the baseline data, understanding of the meteorological conditions at the Mine site is done through annual records data obtained from India Meteorological Department (IMD) (1991-2020).

The factors like wind speed/wind direction from the IMD data are the most significant and were considered to determine/selecting the baseline monitoring sites for air with respect to the direction of the dominant meteorological factor.





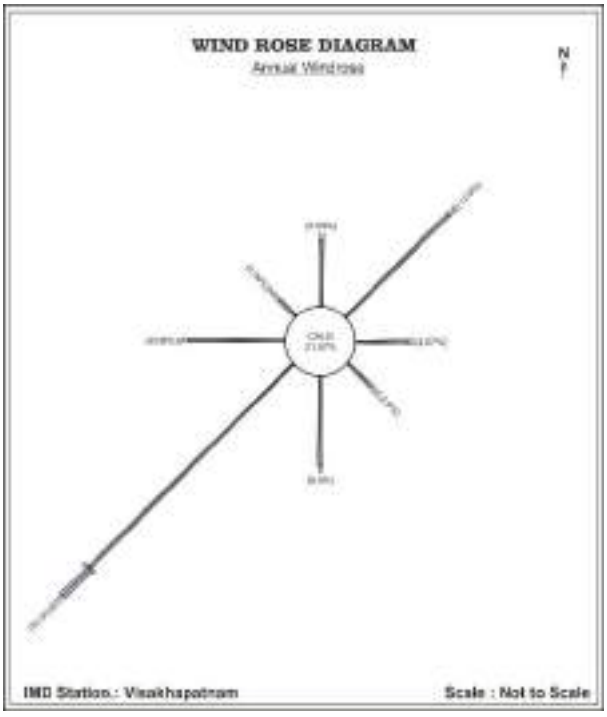


Figure 3.8 Windrose based on secondary Meteorological data of Visakhapatnam (seasonal as well as Annual)

Conslusion: The Nearest IMD Station to the Mine site is located in Visakhapatnam. The pre-dominant wind direction near to the mine site during the Post Monsoon Season is from North East and Second Dominant Wind direction observed to be from North. The Annual pre-dominant wind Direction was observed to be from South West. Thus, the site selection for assessing the ambient air quality within the 10 km from the mine site is done in the upwind and downwind of dominant wind directions.

3.13 METEOROLOGY AT SITE

Meteorological station was set-up at site to record meteorological parameters like wind speed, wind direction etc. during Post Monsoon Season (October to December 2024) which has enabled in identifying the influence of meteorology on the air quality of the area. Based on the collected meteorological data, relative percentage frequencies of different wind directions were calculated and plotted as wind rose diagrams. Maximum and minimum temperatures including percentage relative humidity were also recorded simultaneously.

It was observed that the predominant over all wind patterns for the study period was North East (NE) direction. Summary of the meteorology at site is given in Table - 3.8.

Table- 3.8
Micro-Meteorology at Site
Study Period: Post Monsoon Season (October 2024 to December 2024)

Month	Temperature (^{O}C)		Relative Humidity (%)		Wind Speed (m / sec.)	
	Max.	Min.	Max.	Min.	Max.	Min.
October, 2024	34.0	17.1	77	68	2.3	0.1
November, 2024	31.1	17.0	70	59	2.1	0.1
December, 2024	30.7	13.2	64	53	1.9	0.1

Source: *Meteorology at Site*

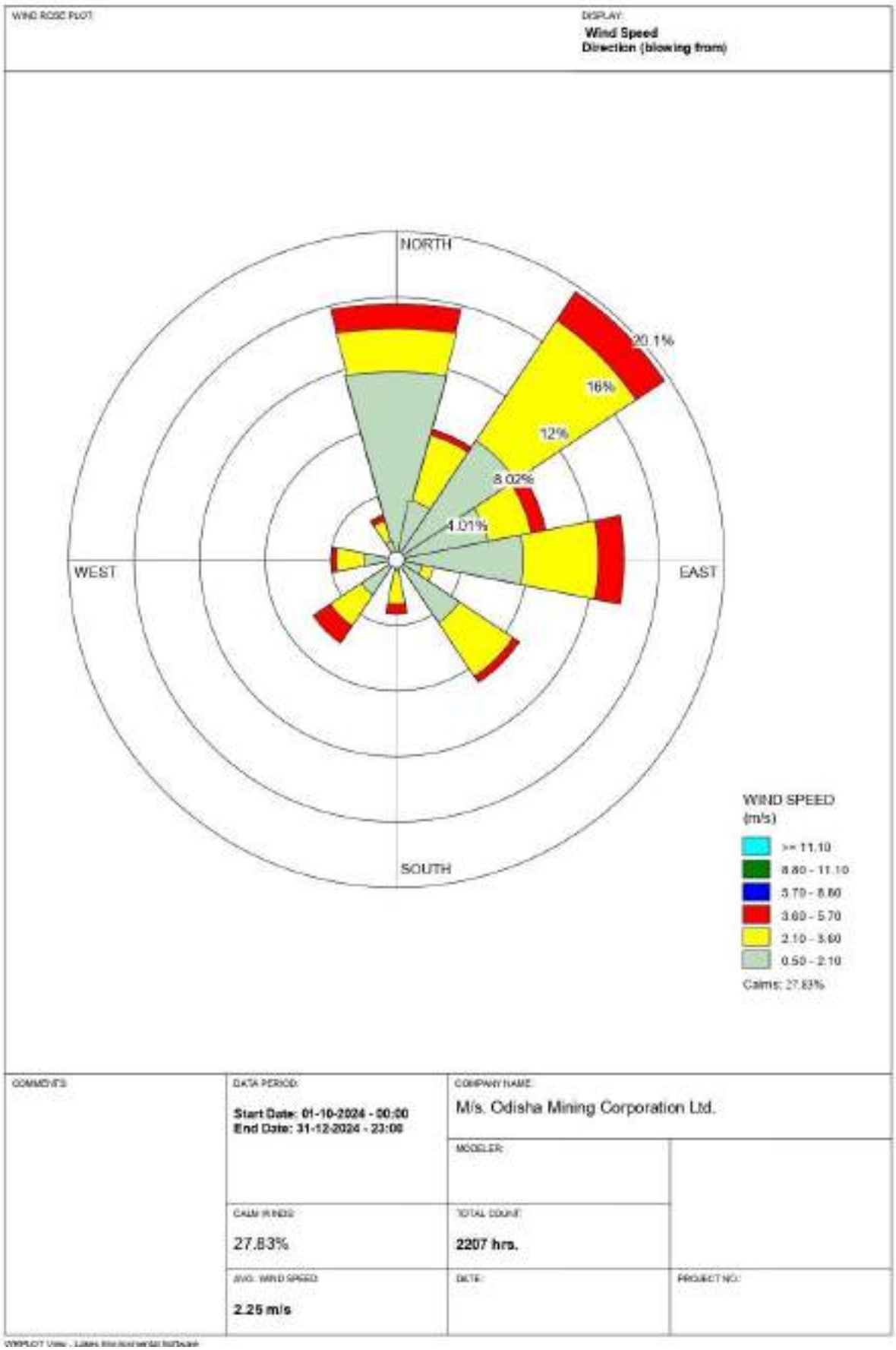


Figure 3.9: Windrose Diagram
Post Monsoon Season (Oct., to Dec., 2024)

Conclusion

It was observed from Figure 3.10 that during the study period the dominant wind direction was from North East. The second dominant wind direction was observed to be from North. The average wind speed during Post-Monsoon Season (Oct. to Dec., 2024) was calculated to be 2.25 m/s.

3.14 AMBIENT AIR ENVIRONMENT

Ambient air quality monitoring has been carried out within the study area to determine the existing baseline concentration of various air pollutants in the ambient air. It helps in providing a data base for predicting impact on the surrounding area due to a project activity. It will also be useful in ascertaining the quality of air environment in conformity to standards of the ambient air quality during operation phase of project.

Monitoring Locations

Monitoring locations were selected for AAQ Monitoring keeping in view the pre-dominant wind direction prevailing in the area based on the annual records data from IMD.

It can be observed from the wind rose diagram that the dominant wind direction prevailing in the area during the study period was from North East Direction followed by North.

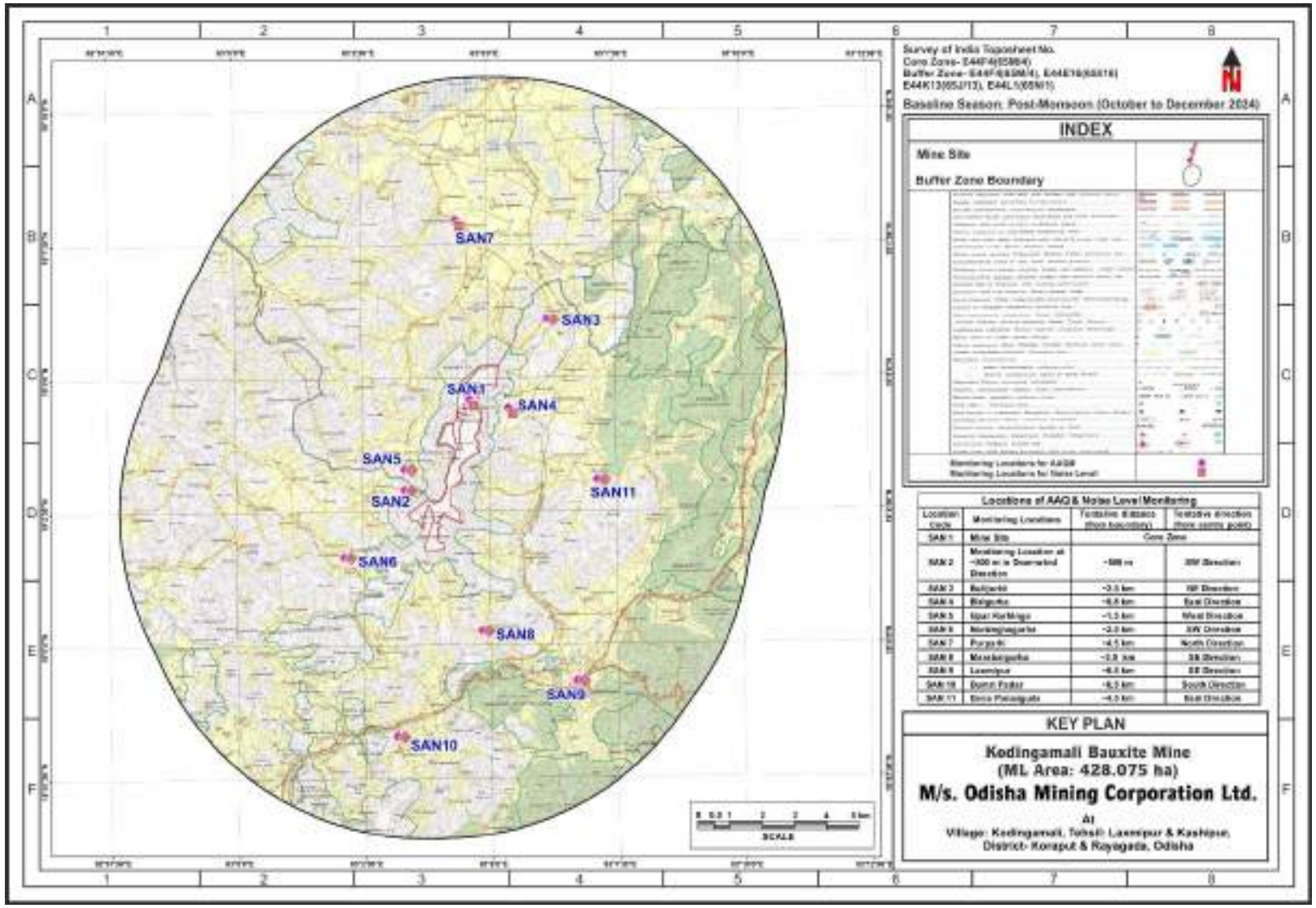
Villages/locations have been selected in the downwind direction as well as in the upwind direction for AAQ monitoring from the mine site.

Monitoring stations selected for Ambient Air Quality Monitoring during the study period are given Table – 3.9.

Table - 3.9
Locations of Ambient Air Quality Monitoring Stations

Station code	Monitoring Stations	Tentative distance (from lease boundary) & direction (from centre point)	Selection Criteria
SAN1	Mine Site	Core Zone	Core Zone
SAN2	Monitoring Location at 500m from Mine Site	~500 m in SW Direction	Downwind of the Pre-dominant wind direction
SAN3	Balijorhii	~2.5 km in NE Direction	Upwind of the Pre-dominant wind direction
SAN4	Birigurha	~0.8 km in East Direction	Habitation near Mine Site (Crosswind)
SAN5	Upar Karhinga	~1.5 km in West Direction	Habitation near Mine Site (Crosswind)
SAN6	Narsinghagurha	~2.5 km in SW Direction	Downwind of the Pre-dominant wind direction
SAN7	Purparhi	~4.5 km in North Direction	Habitation in the study area (Crosswind)
SAN8	Marabalgurha	~3.0 km in SE Direction	Habitation in the study area (Crosswind)
SAN9	Laxmipur	~6.5 km in SE Direction	Habitation in the study area Near NH – 326 (Crosswind)
SAN10	Dumri Padar	~6.5 km in South Direction	Habitation in the study area (Crosswind)
SAN11	Dana Panasguda	~4.5 km in East Direction	Habitation in the study Area (Crosswind)

Source: *SOI Toposheet and field Survey*



Source: *SOI Toposheet and field Survey*

Figure 3.10 Key Plan showing Ambient Air Quality & Noise Level Monitoring Locations

Monitoring Frequency and Schedule

Air quality monitoring has been carried out at 11 locations with a frequency of 24 hours, twice a week for three months. The parameters monitored during the period are given below:

- Particulate Matter (PM_{10} and $PM_{2.5}$)
- Sulphur Dioxide (SO_2)
- Nitrogen dioxide (NO_2)
- Carbon Monoxide (CO)

However, monitoring for remaining parameters viz. Benzene, BaP, As, Ni, Pb, Ozone & Ammonia has been carried out one time during the study period.

Table - 3.10

Details of Test Procedures

S. No.	Parameter	Test Method Specification against which tests are performed	Range of testing	Limit of detection	Equipment used for monitoring	
					Equipment required for Sampling	Equipment required for Analysis
1.	Sulphur Dioxide (SO_2)	IS: 5182, (P-2), 2001 Reaffirmed 2017	5 µg/m^3 to 1050 µg/m^3	4 µg/m^3	Respirable dust sampler/Low flow Pump	UV spectrophotometer
2.	Nitrogen Dioxide (NO_2)	IS: 5182, (P-6), 2006 Reaffirmed 2017	5 µg/m3 to 750 µg/m3	6 µg/m3	Respirable dust sampler/Low flow Pump	UV spectrophotometer
3.	Particulate Matter (PM_{10})	IS: 5182, (P-23), 2006 Reaffirmed 2017	10 µg/m3 to 1000 µg/m3	10 µg/m3	Respirable dust sampler,	Desiccator, high accuracy weighing balance
4.	Particulate Matter ($PM_{2.5}$)	IS: 5182, (P-24), 2019	10 µg/m3 to 500 µg/m3	10 µg/m3	Fine Particulate sampler	Desiccator, high accuracy weighing balance
5.	Carbon Monoxide (CO)	IS: 5182, (P-10), 1999 Reaffirmed 2014	0.5 mg/m3 to 50 mg/m3	0.5 mg/m3	Sampling in Tedlar Bag with low flow pump	Gas chromatography with detector (FID)
6.	*Benzene	IS:5182, (P-11):2006 Reaffirmed 2017	1 µg/m3 to 100 µg/m3	1 µg/m3	Sampling in Charcoal tube with low flow pump,	Gas chromatography with detector (FID)
7.	*Benzo (a) pyrene (BaP) particulate Phase Only	IS:5182, (P-12):2004 Reaffirmed 2014	0.5 ng/m3 to 2000 ng/m3	0.5 ng/m3	Sampling in Charcoal tube with low flow pump,	Gas chromatography with detector (FID)

8.	Arsenic	IS:5182 (Part-22) 2004 Reaffirmed 2014/CPCB Guidelines	0.5 ng/m3 to 100 ng/m3	0.5 ng/m3	Respirable dust sampler with EPM filter paper	Atomic absorption spectroscopy
9.	Nickel	IS:5182 (Part-22) 1979/2004 Reaffirmed 2014/CPCB Guidelines	1 ng/m3 to 100 ng/m3	1 ng/m3	Respirable dust sampler with EPM filter paper	Atomic absorption spectroscopy
10.	Lead	IS:5182 (Part-22) 2004 Reaffirmed 2014	0.02 µg/m3 to 50 µg/m3	0.02 µg/m3	Respirable dust sampler with EPM filter paper	Atomic absorption spectroscopy
11.	Ozone	IS:5182 (Part-9) 1974 Reaffirmed 2014	1.0 µg/m3 to 200 µg/m3	1.0 µg/m3	Respirable dust sampler/Low flow Pump	UV spectrophotometer
12.	Ammonia	Method of Air Sampling & Analysis (3rd Edition – 1988)	1 µg/m3 to 400 µg/m3	1 µg/m3	Respirable dust sampler/Low flow Pump	UV spectrophotometer

***Note*: Protocol Used**: CPCB Guidelines/IS-5182
RDS: Respirable Dust Sampler
FPS: Fine Particulate Sampler

The sources of air pollution in the region are dust emission from unpaved roads, domestic fuel burning, vehicular traffic, agricultural activities etc.

Instruments used for Monitoring

Ambient Air Quality has been carried out using Respirable Dust Sampler with attachment for gaseous Pollutants, Envirotech APM 460 and Fine Particulate Matter (FPS) Sampler APM 550.

Summary of Ambient Air Quality Monitoring

Table - 3.11 shows the maximum and minimum concentration of the air pollutants monitored at different locations during the study period. All 26 observations of pollutants for each location are detailed in Ambient Air Quality Monitoring Tables enclosed as ***Annexure XII*** along with this EIA/EMP Report. Summary of Baseline Monitoring results are given in table No. 3.11.

Table - 3.11

Ambient Air Quality Monitoring Results

Study Period: Post Monsoon Season (October to December 2024)

Station code	Sampling Location	PM_{10}(µg/m³)		$PM_{2.5}$ (µg/m³)		NO_2 (µg/m³)		SO_2 (µg/m³)		CO mg/m³	
		Max.	Min.	Max.	Min	Max.	Min.	Max	Min.	Max.	Min.
SA1	Mine site	71.3	62.8	40.4	32.3	20.7	14.2	10.7	5.3	BDL	BDL
SA2	Monitoring Location at 500m from Mine Site	56.1	43.9	34.0	25.2	13.1	7.2	6.4	BDL	BDL	BDL
SA3	Balijorhi	46.9	30.5	33.5	20.1	13.4	8.0	7.0	BDL	BDL	BDL
SA4	Birigurha	50.2	38.2	31.5	22.9	16.4	9.1	7.2	4.2	BDL	BDL
SA5	Upar Karhinga	61.0	45.5	35.6	28.4	18.0	12.7	9.6	6.0	BDL	BDL
SA6	Narsinghagurha	45.7	27.3	27.2	18.3	10.4	5.4	4.6	BDL	BDL	BDL
SA7	Purphari	50.3	37.6	33.4	24.8	12.9	6.5	6.0	BDL	BDL	BDL
SA8	Marabalgurha	43.7	25.8	31.1	19.7	13.0	7.0	7.0	BDL	BDL	BDL
SA9	Laxmipur	70.5	58.2	42.9	34.5	24.4	15.5	12.1	7.1	0.64	BDL
SA10	Dumri Padar	63.9	51.1	36.4	27.9	19.7	11.8	9.2	4.6	0.57	BDL
SA11	Dana Panasguda	56.3	41.5	32.5	25.6	15.2	9.6	8.1	BDL	BDL	BDL
NAAQS*(24 hours)		**100**		**60**		**80**		**80**		**04****	

Source: Ambient Air Quality Monitoring Results from JM EnviroLab Pvt. Ltd.

**NAAQS - National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009, ** 1 hour*

3.14.1 NATIONAL AMBIENT AIR QUALITY STANDARDS

The National Ambient Air Quality Standards prescribed by CPCB are given below:.

Table - 3.12
National Ambient Air Quality Standards

S. No.	Pollutant	Time Weighted Average	Concentration in Ambient Air		Method of Measurement
			Industrial Area, Residential Rural and Other Areas	Ecologically Sensitive Area (Notified by Central Govt.)	
(1)	(2)	(3)	(4)	(5)	(6)
1	Sulphur Dioxide (SO_2), µg/m³	Annual Average * 24 hours **	50 80	20 80	1. Improved West and Gaeke Method 2. Ultraviolet fluorescence
2	Oxides of Nitrogen as NO_2, µg/m³	Annual Average * 24 hours **	40 80	30 80	1. Modified Jacob andHochheiser (Na-Arsenite) Method 2. Chemiluminescence (Gas phase)
3	Particulate Matter (size less than 10 µm) or PM_{10}, µg/m³	Annual Average * 24 Hours **	60 100	60 100	1. Gravimetric 2. TOEM 3. Beta attenuation
4	Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$, µg/m³	Annual Average* 24 Hours **	40 60	40 60	1. Gravimetric 2. TOEM 3. Beta attenuation
5	Ozone (O_3), µg/m³	8 Hours ** 1 Hours *	100 180	100 180	1. UV Photometric 2. Chemilminescence 3. Chemical Method
6	Lead (Pb), µg/m³	Annual Average * 24 Hours **	0.50 1.0	0.50 1.0	1. AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper 2. ED-XRF using Teflon filter
7	Carbon Monoxide (CO), mg/m³	8 Hours** 1 Hours	02 04	02 04	Non Depressive Infrared (NDIR) Spectroscopy
8	Ammonia (NH_3), µg/m³	Annual Average* 24 hours **	100 400	100 400	1. Chemiluminescence (Gas phase) 2. Indophenol blue method
9	Benzene (C_6H_6), µg/m³	Annual Average*	05	05	1. Gas Chromatography based continuous analyzer, 2. Adsorption and Desorption followed by GC analysis
10	Benzo (α) Pyrene (BaP)- Particulate Phase only, ng/m³	Annual Average*	01	01	Solvent extraction followed by HPLC'GC analysis
11	Arsenic (As), ng/m³	Annual Average*	06	06	AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper
12	Nickel (Ni), ng/m³	Annual Average*	20	20	AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper

***** Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

****** 24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

Note: Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it was considered as adequate reason to institute regular or continuous monitoring and investigation.

3.14.2 INTERPRETATION OF AAQM RESULTS

Ambient Air Quality Monitoring reveals that the concentrations of PM2.5 and PM10 for all the 11 AAQM stations were found between 18.3 µg/m³ to 42.9 µg/m³ and 25.8 µg/m³ to 71.3 µg/m³ respectively. As far as the gaseous pollutants SO2 and NO2 are concerned, the prescribed limit of 80 µg/m³ do not surpassed at any station. The concentrations of SO2 and NO2 were found to be in range from 4.2 µg/m³ to 12.1 µg/m³ and 5.4 µg/m³ to 24.4 µg/m³ respectively. CO concentration was found to be in range of 0.57 mg/m³ to 0.64 mg/m³ in two Villages viz. at Laxmipur Town and Village Dumripadar respectively. At remaining locations the concentration of CO was found to be Below Detection Limit (BDL).

Major contributors of the pollutants in the study area are human activities, vehicular movement, and air borne dust. Maximum concentrations of AAQ parameters $PM_{2.5}$ (42.9 µg/m³), SO2 (12.1 µg/m³), NO2 (24.4 µg/m³) & CO (0.64 mg/m³) were found at Laxmipur Town as it is densely populated with more commercial & human activities and vehicular movement at SH -4. Maximum concentrations of PM_{10} (71.3 µg/m³) was observed at the Mine Site which may be due to the mining activities as this is an operational mine.

Whereas, the minimum values of $PM_{2.5}$ (18.3 µg/m³) and NO2 (5.4 µg/m³) were found at Village Narsinghgurha. The minimun value of PM_{10} (25.8 µg/m³) was found at Village Marabalgurha and minimum value of SO2 (4.2 µg/m³) was found at Village Birigurha as there is no major source of air pollution in these areas. The concentrations of AAQ at all monitoring locations are found well within the prescribed limits of NAAQS.

3.14.3 MINERALOGICAL COMPOSITION FOR PM

RSPM is "defined as the component of inhaled Respirable dust small enough to reach the pulmonary or alveolar region of the lung".

Table - 3.13
Classification of RSPM

Classification	Type of particles	Size of the particles
PM_{10}	Inhalable particles	≤10µm
$PM_{2.5}$	Fine particles	≤2.5µm

Table - 3.14
Mineralogical Composition of PM10

S. No.	Ions	Units	Concentration
1.	Free Silica (SiO2)	µg/m³	8.62
2.	Calcium (Ca)	µg/m³	18.64
3.	Magnesium (Mg)	µg/m³	6.54
4.	Iron (Fe)	µg/m³	12.64
5.	Aluminium (Al)	µg/m³	16.61
6.	Sodium (Na)	µg/m³	8.03
7.	Potassium (K)	µg/m³	1.98

8.	Manganese (Mn)	µg/m³	BDL (DL 1.0)
9.	Chromium (Cr)	µg/m³	BDL (DL 1.0)
10.	Nickel (Ni)	µg/m³	BDL (DL 1.0)
11.	Zinc (Zn)	µg/m³	BDL (DL 1.0)
12.	Copper (Cu)	µg/m³	BDL (DL 1.0)
13.	Cobalt (Co)	µg/m³	BDL (DL 1.0)
14.	Lead (Pb)	µg/m³	BDL (DL 1.0)
15.	Mercury (Hg)	µg/m³	BDL (DL 1.0)
16.	Cadmium (Cd)	µg/m³	BDL (DL 1.0)

Note: BDL- Below Detectable Limit, DL- Detection Limit

Source: Mineralogical Composition of RSPM analysis Results, JM EnviroLab Pvt. Ltd.

3.14.4 NOISE ENVIRONMENT

Noise is often defined as unwanted sound, interferes with speech communication, causes annoyance, distracts from work, and disturbs sleep, thus deteriorating quality of human environment.

There are several sources of noise with in the 10 km radius study area, which contributes to the local noise level of the area. Ambient noise sources in the vicinity of the project include the noise from traffic on road and highways, mining activities, human activities in villages and agricultural fields. Locations were categorized based on industrial/residential / commercial / activities. Monitoring stations selected for Ambient Noise Level Monitoring during the study period are given Table – 3.15 and key Plan showing noise level monitoring locations is given in Figure 3.10.

Table - 3.15

Locations of Ambient Noise Quality Monitoring Stations

Station code	Monitoring Stations	Tentative distance (from lease boundary) & direction (from centre point)
SAN1	Mine Site	Core Zone
SAN2	Monitoring Location at 500 m from Mine Site	~500 m in SW Direction
SAN3	Balijorhii	~2.5 km in NE Direction
SAN4	Birigurha	~0.8 km in East Direction
SAN5	Upar Karhinga	~1.5 km in West Direction
SAN6	Narsinghagurha	~2.5 km in SW Direction
SAN7	Purparhi	~4.5 km in North Direction
SAN8	Marabalgurha	~3.0 km in SE Direction
SAN9	Laxmipur	~6.5 km in SE Direction
SAN10	Dumri Padar	~6.5 km in South Direction
SAN11	Dana Panasguda	~4.5 km in East Direction

Source: *SOI Toposheet and field Survey*

Method of Monitoring and Monitoring Schedule

Sound Pressure Level (SPL) measurements were conducted at all monitoring locations. Readings were recorded hourly over a 24-hour period, once in the study period. Daytime noise levels were monitored from 6:00 a.m. to 10:00 p.m., while night time levels were recorded from 10:00 p.m. to 6:00 a.m. across all locations within the study area. Noise level was monitored Sound Level Meter manufactured by Envirotech (Model SLM – 100).

Noise level monitoring was carried out at 11 locations during the day and night time once in the study period. Locations / stations selected for noise level monitoring are given in table - 3.15.

Ambient Noise Level Monitoring Results

Ambient noise levels monitoring results monitored at different locations during the study period are given in table - 3.15.

Table- 3.16
Ambient Noise Level Monitoring Results
Study Period: Post Monsoon Season (October to December 2024)

Station code	Locations	Noise Levels dB Leq (A)	
		Day Time (06:00 a.m. to 10:00 p.m.)	Night Time (10:00 p.m. to 06:00 a.m.)
SN1	Mine site	56.4	42.6
SN2	Monitoring Location at ~500m from Mine Site	48.8	37.2
SN3	Balijorhil	51.1	41.7
SN4	Birigurha	50.7	41.4
SN5	Upar Karhinga	51.8	42.3
SN6	Narsinghagurha	49.5	40.2
SN7	Purphari	50.9	41.7
SN8	Marabalgurha	50.5	41.1
SN9	Laxmipur	53.7	43.0
SN10	Dumri Padar	52.2	42.4
SN11	Dana Panasguda	50.3	39.5

Source: *Ambient Noise Level Monitoring Results, JM EnviroLab Pvt. Ltd.*

CPCB Noise Standards are given in the Table below:

Table - 3.17
CPCB Noise Standards

Area Code	Category of Area	Limits in Leq. dB (A)	
		Day Time (06.00 am–10.00 pm)	Night Time (10.00 pm–6.00 am)
(A)	Industrial Area	75	70
(B)	Commercial Area	65	55
(C)	Residential Area	55	45
(D)	Silence Zone	50	40

1. Day Time is from 6.00 AM to 10.00 PM.

2. Night Time is reckoned between 10.00 PM to 6.00 AM.

3. Silence Zone is defined as an area up to 100m around premises of Hospitals, Educational Institutions and Courts. Use of vehicle horn, loudspeaker and bursting of crackers is banned in these zones.

Note: Mixed categories of areas be declared as one of the four above mentioned categories by the competent Authority and the corresponding standards shall apply

Source: *Central Pollution Control Board Norms*

3.14.5 INTERPRETATON OF NOISE MONITORING RESULTS

Ambient noise levels were measured at 11 locations in and around the mine site. Noise levels varied from 48.8 Leq dB (A) to 56.4 Leq dB (A) during day time and from 37.2 Leq dB (A) to 43.0 Leq dB(A) during night time.

Maximum noise levels during day time were found at Mine Site which may be due to the mining activities as this is an operational mine. The maximum Noise Level during night time was found at Laxmipur Town as this place is densely populated as compared to other locations, therefore, there may be increased human activities and more vehicular movement alongwith other commercial activities.

The minimum noise levels during day time and night time were found at the Monitoring Station at 500 m from Mine Site as there are no major sources of noise pollution at this place.

3.15 WATER ENVIRONMENT

In order to assess the groundwater quality as well as the water quality of the surface water-bodies present within 10 km radius area study area, a reconnaissance survey was carried out. Groundwater sampling locations have been identified/selected considering the aspects like drainage pattern of the area. Surface water sampling was done from the surface water bodies present within 10 Km radius study area.

Scope of Sampling

Samples were collected manually from various sampling locations with respect to Surface water & Groundwater. The sources of water sampling are as under:

- Surface Water: The samples were collected from Rivers and Nalas.
- Drinking Water/Ground water: Samples have been collected from Borewell and hand pumps.

Methodology of sampling

Further, Grab sampling has been done as single sample collected at a specific spot and at a site over a short period of time in order to assess the properties such as physio-chemical, biological and heavy metals. Grab samples are taken at a single selected location, depth and time.

To assess the physio-chemical properties of sample, water was collected in Plastic containers whereas, sterilized glass bottles were used to collect the water to assess the biological properties.

Protocols used

The water samples were analyzed as per IS:3025 and the procedures specified in 'Standard Methods for the Examination of Water and Wastewater' published by American Public Health Association (APHA) 23rd Edition, 2017).

3.15.1 SURFACE WATER QUALITY

The district has many rivers and perennial streams. Kodingamali Plateau top has no perennial streams flowing down the slope or any water bodies. Two Rivers and few Nalas exist in the study area viz. Patagarha River, Murani River, Patagarha Nala, Baghri Nala, Debagarha Nala & three other Nalas. Surface water sampling was carried out at 6 sampling locations given in the table below:

Table - 3.18

Location of Surface water Quality Monitoring Locations

Study Period: Post Monsoon Season (October to December 2024)

S. No.	Sampling Stations	Tentative distance & direction from Mine Site
SW 1	Patagarha Nadi	~4.0 Km in NNE direction
SW 2	Debagarha Nala	~9.5 Km in SSWdirection
SW 3	Murani Nadi	~6.0 km in SW direction
SW 4	Baghri Nala	~9.0 km in West direction
SW 5	Patagarha Nala	~ 7.5 km in NW direction
SW 6	Nala	~ 8.5 Km in WSW direction

Source: *SOI Toposheet & field Survey*

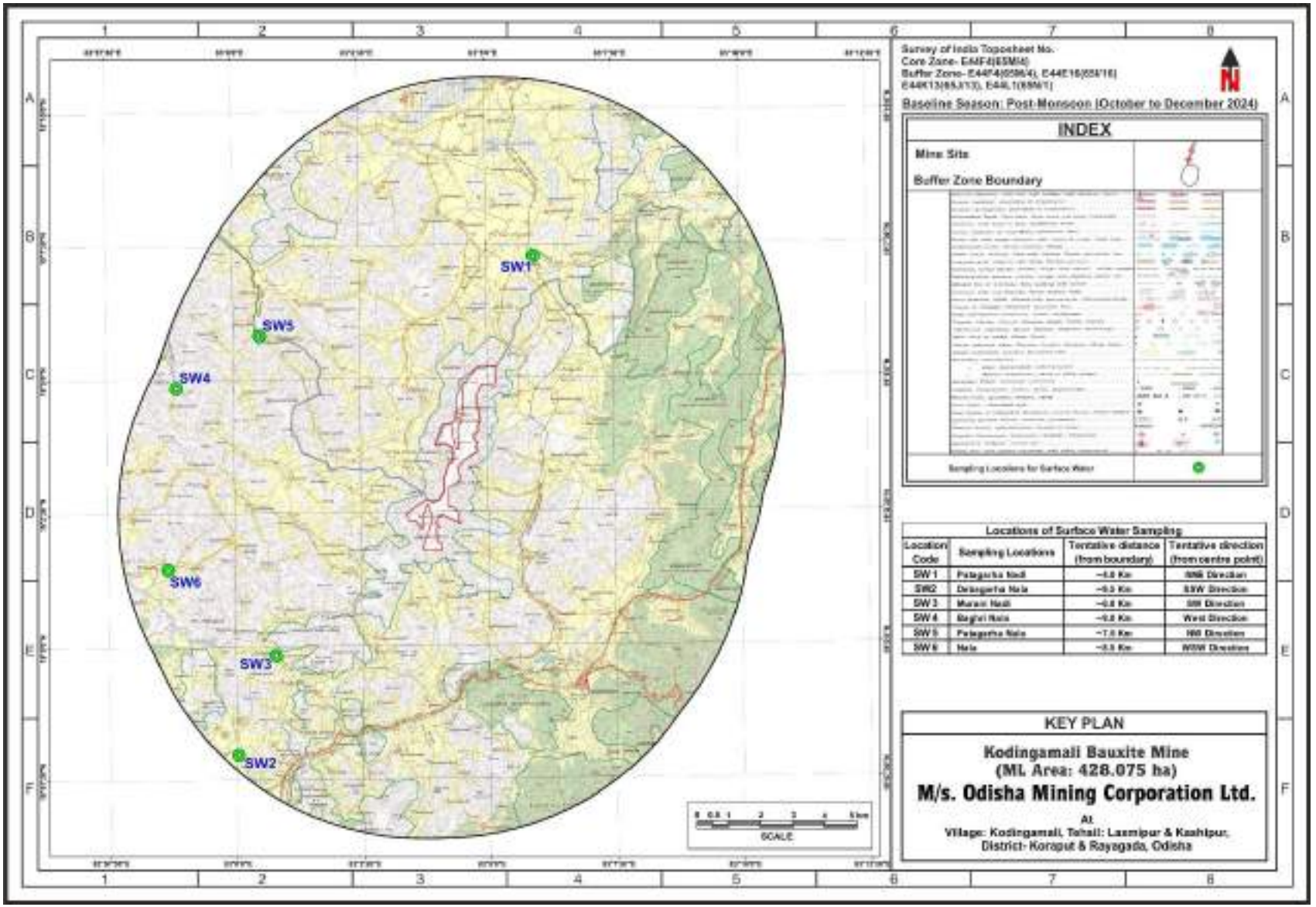


Figure 3.11 Key Plan showing Surface Water Sampling Locations

Table - 3.19

Surface Water Analysis Results

Study Period: Study Period: Post Monsoon Season (October to December 2024)

S. No.	Parameters	Unit	Patagarha Nadi	Debagarha Nala	Murani Nadi	Baghri Nala	Patagarha Nala	Nala
1.	pH (at 25°C)	--	7.17	7.19	6.94	7.25	7.07	7.41
2.	Colour	Hazen Unit	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)
3.	Turbidity	NTU	BDL(DL 1.0)	BDL(DL 1.0)	40.0	BDL(DL 1.0)	BDL(DL 1.0)	BDL(DL 1.0)
4.	Odour	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5.	Total Hardness as CaCO3	mg/l	44.27	53.75	41.28	56	183.9	58.25
6.	Calcium as Ca	mg/l	5.83	8.12	7.43	10.14	43.33	13.61
7.	Alkalinity as CaCO3	mg/l	28.0	33.60	27.8	40.6	162.8	43.6
8.	Chloride as Cl	mg/l	12.46	11.46	9.93	13.46	32.46	10.46
9.	Magnesium as Mg	mg/l	7.22	8.13	5.51	7.44	18.36	5.89
10.	Total Dissolved Solids	mg/l	76.0	81.0	71.0	93.0	251.0	82.0
11.	Sulphate as SO4	mg/l	6.73	8.24	4.98	6.11	14.75	5.74
12.	Fluoride as F	mg/l	0.07	0.23	0.13	0.31	0.28	0.07
13.	Nitrate as NO3	mg/l	1.01	1.22	1.49	0.36	0.95	0.61
14.	Iron as Fe	mg/l	0.09	0.10	0.08	0.22	0.20	0.17
15.	Total Suspended Solid	mg/l	7.2	3.2	22.0	BDL(DL 1.0)	9.8	BDL(DL 1.0)
16.	Biochemical oxygen demand	mg/l	4.2	5.1	2.6	4.2	8.3	2.7
17.	Chemical oxygen demand	mg/l	16.8	23.0	11.3	23.0	29.2	13.2
18.	Sodium as Na	mg/l	4.0	3.0	3.0	5.0	19.0	3.0
19.	Potassium as K	mg/l	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	2.0	BDL (DL 1.0)
20.	Conductivity	µS/cm	120.0	124.0	105.0	147.0	389.0	124.0
21.	Dissolve Oxygen	mg/l	6.9	7.0	7.1	6.8	6.6	7.1

BDL – Below Detection Limit, DL- Detection Limited

***Source**- Surface Water Analysis Report, JM EnviroLab Pvt. Ltd.*

3.15.2 INTERPRETATION OF SURFACE WATER QUALITY RESULTS

The above mentioned chemical analysis of surface water samples reveals that there is a variation in a chemical composition of water samples from the nearby water bodies.

- The pH of the water bodies ranges from 6.94 to 7.41 indicating slightly alkaline in nature. The water bodies are rich in Calcium, potassium, magnesium and sulphates.
- Total hardness ranges from 41.28 to 183.9 mg/l , Total dissolved solids ranges from 71 to 251 mg/l, Alkalinity ranges from 27.8 to 162.8 mg/l and conductivity ranges from 105 to 389 µS/cm.
- The COD (11.3 to 29.2 mg/l) and BOD (2.6 to 8.3 mg/l). The nutrients were also found in sufficient quantity viz. sulphate (4.98 to 14.75 mg/l), nitrate (0.36 to 1.49 mg/l), calcium 5.83 to 43.33 mg/l), magnesium (5.51 to 18.36 mg/l), Iron (0.17 to 0.22 mg/l) indicated clean water bodies. Dissolved oxygen (6.6 to 7.1 mg/l) indicated that the water bodies are safe for aquatic biodiversity.
- Some of the parameters like Residual free Chlorine (DL 0.20 mg/l), Cyanide (DL 0.02 mg/l), Aluminium (DL 0.03 mg/l), Boron (DL 0.2 mg/l), Phenolic Compounds (DL 0.001 mg/l), Anionic Detergents as MBAS (DL 0.02 mg/l), Hexa Chromium as Cr^{+6} (DL 0.03 mg/l), Zinc as Zn (DL 0.0005 mg/l), Copper (DL 0.02 mg/l), Manganese (DL 0.10 mg/l), Lead (DL 0.008 mg/l), Selenium (DL 0.005 mg/l), Nickel (DL 0.005 mg/l), Arsenic (DL 0.002 mg/l), Mercury (DL 0.001 mg/l) were analysed and found to be Below Detection Limit.

3.15.3 GROUND WATER QUALITY

Ground water as well as potable water samples were collected from the available water resources around the mine site i.e. handpumps and Bore-wells. The samples were collected and tested from different sites.

The quality of ground water was studied by collecting 10 water samples. Out of these, at one Location i.e. Mine Site, no Groundwater source was available. Details of ground water sampling locations and their distance and directions are given in table - 3.19. Ground water analysis results are given in table - 3.20.

Table - 3.20
Locations of Ground Water & Soil Sampling Stations
Study Period: Post Monsoon Season (Oct., to Dec., 2024)

Station code	Sampling stations	Tentative distance (from mining lease boundary) & direction (from centre point)
SGWS1	Mine Site	Core Zone
SGWS2	Birigurha	~0.8 m in NE direction
SGWS3	Upar Karhinga	~1.5 Km in West direction
SGWS4	Timajhola	~4.0 Km in South direction
SGWS5	Bakamba	~1.5 Km in NW direction
SGWS6	Narsinghagurha	~ 2.5 Km in SW direction
SGWS7	Pahandi	~2.0 Km in North direction
SGWS8	Dana Panasguda	~4.5 Km in East direction
SGWS9	Marabalgurha	~ 3.0 Km in SE direction
SGWS10	Chindarapadar	~4.0 Km in West direction

***Source**: SOI Toposheet& field Survey*

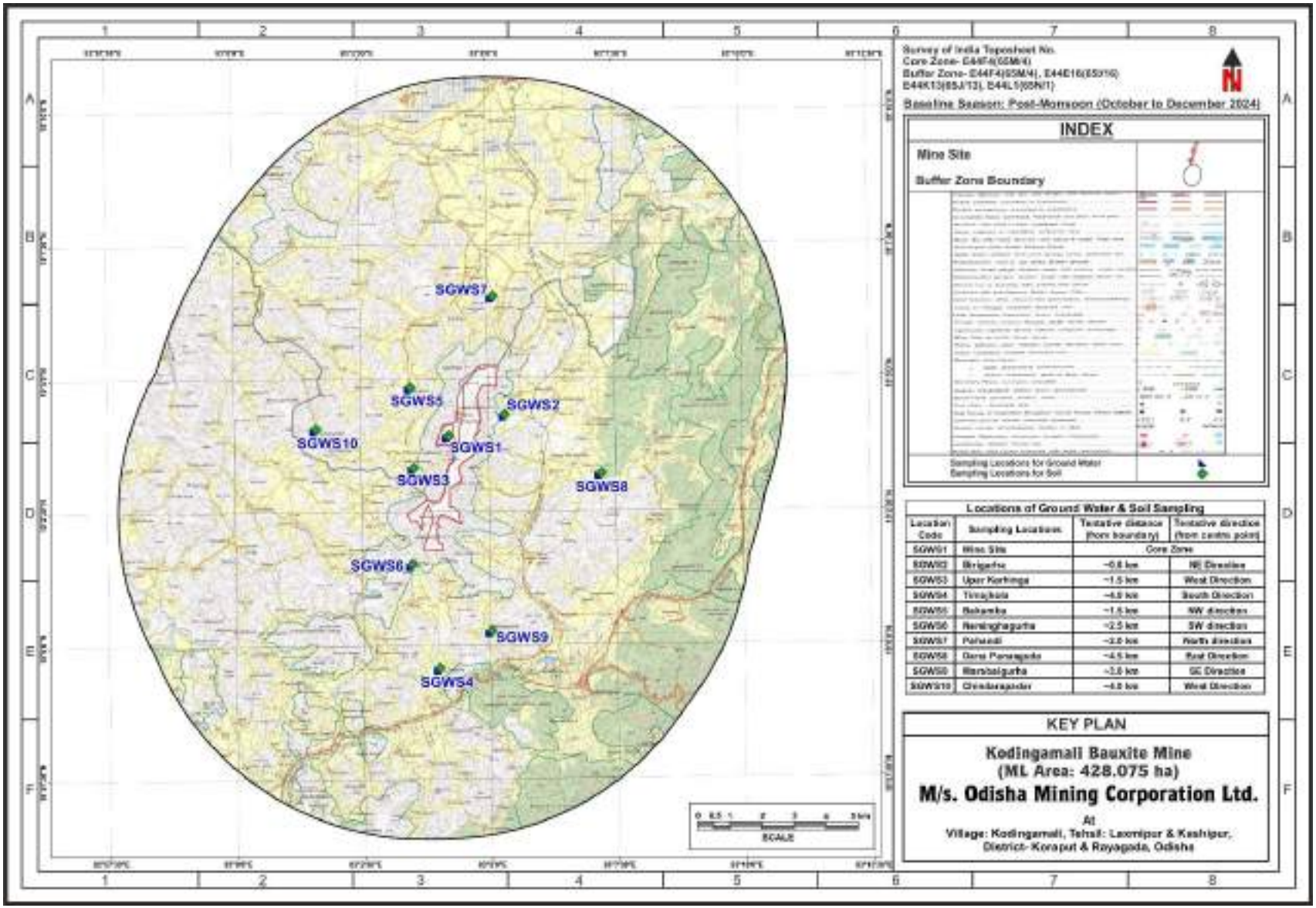


Figure 3.12 Key Plan showing Ground Water & Soil Sampling Locations

Table - 3.21

Ground Water Analysis Study Period: Post Monsoon Season (Oct., to Dec., 2024)

S. No.	Parameters	Unit	Specification as per IS:10500 - 2012		Village Birigurha	Village Upar Karhinga	Village Timajhola	Village Bakamba	Village Narsinghagurha	Village Pahandi	Village Dana Panasguda	Village Marabalgurha	Village Chindarapadar
			Requirement Acceptable Limit	Permissible Limit in the Absence of Alternate Source									
1.	pH (at 25°C)	-	6.5-8.5	No Relaxation	6.51	6.38	6.41	6.85	6.41	6.82	6.40	7.02	6.77
2.	Colour	Hazen Unit	5	15	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)
3.	Turbidity	NTU	1	5	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)
4.	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5.	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
6.	Total Hardness as $CaCO_3$	mg/l	200	600	46.1	55.2	48.54	97.08	42.81	125.6	63.2	45.16	116.5
7.	Calcium as Ca	mg/l	75	200	8.23	10.62	7.83	19.43	7.64	25.27	14.01	8.53	31.1
8.	Alkalinity as $CaCO_3$	mg/l	200	600	33.60	32.40	29.80	72.80	33.60	107.60	46.20	31.93	82.8
9.	Chloride as Cl	mg/l	250	1000	10.45	15.75	10.92	18.39	7.91	27.78	16.46	9.71	32.03
10.	Magnesium as Mg	mg/l	30	100	6.20	6.96	7.03	11.79	5.76	15.17	6.84	5.79	9.44
11.	Total Dissolved Solids	mg/l	500	2000	87.0	90.0	72.0	128.0	76.0	196.0	103.0	67.0	182.0
12.	Sulphate as SO_4	mg/l	200	400	7.16	8.11	8.91	10.04	4.1	10.18	6.26	3.24	16.08
13.	Fluoride as F	mg/l	1.0	1.5	0.12	0.09	0.08	0.11	0.05	0.25	0.05	0.08	0.41
14.	Nitrate as NO_3-N	mg/l	45	No Relaxation	0.83	0.76	0.43	0.83	0.74	2.96	0.77	0.39	4.63
15.	Iron as Fe	mg/l	1.0	No Relaxation	0.09	0.10	0.06	0.31	0.20	0.41	0.13	0.10	0.12
16.	Zinc as Zn	mg/l	5	15	0.05	0.06	0.03	0.09	0.08	0.10	0.04	0.03	0.19
17.	Sodium as Na	mg/l	--	--	5.0	4.0	3.0	6.0	3.0	13.0	6.0	2.0	13.0
18.	Potassium as K	mg/l	--	--	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	4.0	BDL(DL 1.0)	BDL(DL 1.0)	3.0
19.	Conductivity	µS/cm	--	--	123.0	137.0	107.0	192.0	107.0	310.0	154.0	98.0	287.0

BDL - Below Detectable Limit, DL - Detection Level

Source- Ground Water Analysis Report, JM EnviroLab Pvt. Ltd.

Note: Ground water quality was also analyzed for Aluminium, Cyanide, Phenolic Compounds, Anionic Detergents as MBAS, Nickel, Hexa Chromium as Cr+6,Chromium as Cr, Zinc, Copper, Manganese, Cadmium, Lead, Arsenic, Mercury and Phosphate were found below detection limit.

3.15.4 INTERPRETATION OF GROUND WATER QUALITY RESULTS

The physico-chemical quality of groundwater was compared with drinking water standard (IS: 10500- 2012).

- The pH of the water samples ranged from 6.38 to 7.02 indicating slightly alkaline to moderately alkaline nature; maximum pH was observed at the Village Marabalgurha & minimum at Village Upar Karhinga.
- The values of Total hardness ranges between 42.81 to 125.6 mg/l. Maximum value of Hardness was found at Village Narsinghagurha and minimum was found at Village Pahandi.
- Alkalinity ranges between 29.80 to 107.60 mg/l which is considered as safe for drinking. Total dissolved solids were found in the range of 67.0 to 196.0 mg/l.
- The concentration of Chloride was found to be (7.91 to 32.03 mg/l) and Sulphates (3.24 to 16.08 mg/l) were found well within permissible limits.
- The concentrations of other micro and macro nutrients were found to be: Nitrate (0.39 to 4.63 mg/l), Calcium (7.64 to 31.1 mg/l), Magnesium (5.76 to 15.17 mg/l), and Iron (0.06 to 0.41 mg/l).
- The fluoride (0.05 to 0.41 mg/l) concentration is at optimum level which prevents dental health problems of the consumers. Electrical Conductivity (EC) ranges between 98 µS/cm to 310 µS/cm.

  Ground water quality was also analyzed for Cyanide as (CN), Aluminium as (Al), Phenolic Compounds, Anionic Detergents as (MBAS), Hexa Chromium as (Cr+6), Chromium as (Cr), Zinc as (Zn), Copper as (Cu), Manganese as (Mn), Cadmium as (Cd), Lead as (Pb), Arsenic as (As), Mercury as (Hg), Phosphate as (PO_4), Nickel, Total Suspended Solid (TSS) and found Below detection limit at all the sampled locations.

3.16 SOIL ENVIRONMENT

3.16.1 SOIL QUALITY AND CHARACTERISTICS

The information on soil quality has been arrived by collection and analysis of soil samples from representative locations.

In order to assess the base line characteristics of soil profile of thearea representing project and nearby areas, the samples were analyzed for key and chemical parameters.

The sampling locations were finalized with the following considerations:

- To enable information on baseline characteristics,
- To determine the impact of mining activities on soil characteristics and

Sampling Methodology and Schedule

Representative soil samples were collected from 10 different specified locations within the study area of the Mine site. At each location, soil samples were collected from a depth of around 15 cm, below the surface. Standard procedures in line with IS: 2720 and Methods of Soil Analysis of USDA (United States Department of Agriculture) were followed for the sampling and analysis of physico-chemical parameters.

Sampling Locations

Details of Location of soil sampling stations along with the directions are given in Table - 3.22.

Table - 3.22
Locations of Soil Sampling Stations
Study Period: Post Monsoon Season (Oct., to Dec., 2024)

Station code	Sampling stations	Tentative distance (from mining lease boundary) & direction (from centre point)
SGWS1	Mine Site	Core Zone
SGWS2	Birigurha	~0.8 m in NE direction
SGWS3	Upar Karhinga	~1.5 Km in West direction
SGWS4	Timajhola	~4.0 Km in South direction
SGWS5	Bakamba	~1.5 Km in NW direction
SGWS6	Narsinghagurha	~ 2.5 Km in SW direction
SGWS7	Pahandi	~2.0 Km in North direction
SGWS8	Dana Panasguda	~4.5 Km in East direction
SGWS9	Marabalgurha	~ 3.0 Km in SE direction
SGWS10	Chindarapadar	~4.0 Km in West direction

Source: *SOI Toposheet& field Survey*

The summary of soil analysis results are given in Table - 3.23.

Table - 3.23

Soil Quality Analysis Results

Study Period: Post Monsoon Season (Oct., to Dec., 2024)

S. NO.	Parameters	Unit	Sampling Locations									
			Mine Site	Birigurha	Upar Karhinga	Timajhola	Bakamba	Narsinghagurha	Pahandi	Dana Panasguda	Marabalgurha	Chindarapadar
1.	pH (at 25°C) (1:2.5 soil water sus.)	-	7.34	6.21	6.04	6.43	6.39	6.98	6.88	7.41	7.26	6.68
2.	Conductivity (1:2 soil water sus)	mS/cm	0.14	0.15	0.12	0.14	0.16	0.17	0.11	0.13	0.16	0.12
3.	Soil Texture	-	Silty Clay	Silty Clay	Silty Clay	Silty Clay	Silty Clay	Silty Clay	Silty Clay	Silty Clay	Silty Clay	Silty Clay
4.	sand	%	8.0	10.0	9.0	7.0	10.0	8.0	8.0	11.0	8.0	9.0
5.	Silt	%	46.0	46.0	45.0	48.0	47.0	47.0	48.0	47.0	45.0	46.0
6.	clay	%	46.0	44.0	46.0	45.0	43.0	45.0	44.0	42.0	47.0	45.0
7.	Colour	-	Reddish Brown	Bright Brown	Reddish Brown	Yellowish Brown	Brown	Brown	Brown	Yellowish Brown	Brown	Brown
8.	Water holding capacity	%	41.89	33.53	38.68	31.51	29.77	35.38	37.07	30.95	36.77	30.24
9.	Porosity		43.36	42.13	42.52	42.85	41.50	42.69	42.58	41.27	42.06	41.67
10.	Bulk density	gm/cc	1.45	1.47	1.46	1.44	1.48	1.45	1.47	1.48	1.46	1.47
11.	Chloride	mg/kg	555.58	607.19	676.22	527.99	597.37	676.22	703.74	599.23	844.51	818.29
12.	Calcium	mg/kg	1054.90	1138.78	1257.81	1094.34	952.37	1499.71	1092.19	1187.02	1617.02	1015.09
13.	Sodium	mg/kg	39.96	34.86	34.39	49.25	39.92	54.70	49.15	29.75	54.67	44.94
14.	Potassium	kg/hec	524.44	422.72	585.20	606.75	514.15	625.38	701.02	488.72	601.15	458.54
15.	Magnesium as Mg	mg/kg	294.3	309.92	436.59	367.14	268.19	646.58	520.71	419.39	550.42	392.34
16.	Organic matter	%	0.85	0.69	0.73	0.84	0.93	0.80	0.72	0.67	0.93	0.78
17.	Available Nitrogen as N	kg/hec	208.08	177.49	190.0	197.03	207.62	237.94	205.63	191.27	208.87	244.87
18.	Available Phosphorus	kg/hec	32.18	23.97	25.39	19.54	34.69	35.06	24.96	21.79	33.65	39.11
19.	Zinc as Zn	mg/kg	49.25	57.28	53.47	46.35	74.64	65.62	55.66	71.89	63.49	64.30
20.	Manganese as Mn	mg/kg	618.60	648.23	683.45	568.75	757.89	810.15	688.10	546.82	677.03	955.28
21.	Chromium as Cr	mg/kg	BDL(DL-5.0)	BDL(DL-5.0)	BDL(DL-5.0)	BDL(DL-5.0)	BDL(DL-5.0)	14.43	BDL(DL-5.0)	5.78	BDL(DL-5.0)	7.68
22.	Lead as Pb	mg/kg	22.66	19.41	15.72	12.92	19.14	24.05	14.39	24.08	18.19	21.42
23.	Cadmium as Cd	mg/kg	BDL(DL-5.0)	BDL(DL-5.0)	BDL(DL-5.0)	BDL(DL-5.0)	BDL(DL-5.0)	BDL(DL-5.0)	BDL(DL-5.0)	BDL(DL-5.0)	BDL(DL-5.0)	BDL(DL-5.0)
24.	Copper as Cu	mg/kg	16.84	7.76	9.16	8.69	18.18	24.05	16.31	9.87	14.77	20.40
25.	Organic Carbon	%	0.50	0.40	0.42	0.49	0.54	0.46	0.42	0.39	0.54	0.45
26.	SAR Value	-	0.28	0.24	0.21	0.33	0.29	0.30	0.31	0.19	0.30	0.30

Source: *Soil Quality Analysis results from JM EnviroLab Pvt. Ltd.*

Note: Soil Samples were *also analyzed for* Chromium & Total Cadmium *and the same parameters were not detected.*

Table - 3.24
Standard Soil Classification

S. No.	Parameters	Classification
1.	pH	<4.5 extremely acidic 4.51 – 5.0 very strong acidic 5.01 – 5.5 strongly acidic 5.51-6.0 moderately acidic 6.1 - 6.5 slightly acidic 651-7.3 Neutral 7.31-7.8 slightly alkaline 7.81-8.5 moderately alkaline 8.51 – 9.0 strongly alkaline >9.0 Very strongly alkaline
2.	Salinity Electrical Conductivity (mho/cm)	Up to 1.0 average 1-2 harmful to germination 2-3 harmful to crops
3.	Nitrogen (kg/ha)	Up to 50 very less 51-100 less 110-150 good 151-300 better >300 sufficient
4.	Phosphorus (kg/ha)	Up to 15 very less 15 – 30 less 31-50 medium 51-65 on average sufficient 66-80 sufficient >80 more than sufficient
5.	Potassium (kg/ha)	0-120 very less 120-180 less 180-240 medium 241-300 average 301-360 better >360 more than sufficient

Source: *Indian Agricultural Research Institute Handbook*

3.16.2 INTERPRETATION OF SOIL QUALITY RESULTS

- The pH of the soil samples varies from 6.04 at Village Upar Karhinga to 7.41 at Village Dana Panasguda which indicates the soil samples are moderately alkaline in nature.
- The texture of the soil samples is majorly consists of Silty clay. The soil samples exhibit Reddish-Brown, Yellowish-Brown and Brown colour in all the samples collected.

- The indicator such as organic matter varies from 0.67 % to 0.93% and Organic carbon varies from 0.39 % to 0.54 %. The Water holding capacity varies from 29.77% at Village Bakamba to 41.89 % at Mine Site.
- Six essential nutrients required for an ideal plant growth are Examined - Nitrogen, Phosphorus, Potassium, Magnesium, Sodium and calcium. Nitrogen ranges between 177.49 kg/ha at Village Upar Karhinga to 244.87 kg/ha at Village Cindarapadar, Phosphorous ranges between 19.54 kg/ha at Village Timajhola to 39.11 kg/ha at Village Cindarapadar, Potassium 422.72 kg/ha at Village Birigurha to 701.02 kg/ha at Village Pahandi, Magnesium ranges between 268.19 mg/kg at Village Bakamba to 550.42 mg/kg at Village Marabalgurha, Calcium 953.27 mg/kg at Village Bakamba to 1617.02 mg/kg at Village Marabalgurha and Sodium 29.75 mg/kg at Village Dana Panasguda to 54.70 mg/kg at Village Narsinghagurha.
- The SAR value were observed at all the sampling locations with maximum value of 0.33 at Village Dana Timajhola to minimum value 0.19 at Village Dana Panasguda which indicates that soil has good permeability and aeration. This soil is well-suited for plantation and agricultural activities, as it tends to support good plant growth and maintain soil structure.

3.17 BIOLOGICAL ENVIRONMENT

Biological environment is the environment where the life form can exist. Biological environment includes Habitat (Place where the organism lives) and natural surroundings of all species (living organism species) of the particular area.

Biodiversity is the variety among living organisms and their interaction within ecosystems. Species diversity or biodiversity is a key component to healthy ecosystems. Biodiversity is also the basis of innumerable environmental services that keep us and the natural environment alive - from the provision of clean water and watershed services to the recycling of nutrients and pollination. Biodiversity (Species diversity) is the most characteristic feature of the nature which includes ecological communities (viz.: Animals, Plants & Human species).

The main objective of the present study is to observe, document and evaluate, during primary field survey carried out within 10 km radius impact zone in and around the said ML for Proposed Expansion Project and to understand the presence and behaviour of the floral and faunal diversity of the study area with respect to terrestrial and aquatic flora and fauna with special emphasis on Rare, Endangered and Threatened species, as defined in Wildlife Protection Act, 1972, as per Amendment in December, 2022, occurring in the study area.

3.17.1 SCOPE OF WORK

The scope of work for this study includes identification of ecologically sensitive receptors, based on literature survey, field investigations and their mitigation with conservation action plan. The study was carried out in the core as well as buffer zone of the Mine Lease Area. The study was carried out systematically and scientifically using primary and secondary data in order to bring out factual information on the ecological conditions of the mine site and 10 km radius study area.

The study involved assessment of general habitat type, vegetation pattern, preparation of inventory of flora and fauna of terrestrial ecosystem within 10 km radius from the boundary of

existing Mine site. Biological assessment of the site was done to identify ecologically sensitive areas and whether there are any rare, endangered, endemic or threatened (RET) species of flora & fauna in the core area as well its buffer zone to be impacted. The study also designed to suggest suitable mitigation measures if necessary for protection of wildlife habitats and conservation of RET species if any.

3.17.2 OBJECTIVE OF THE STUDY

The Biological study was undertaken with the following objectives:

i. To understand the spectrum of domesticated and wild biodiversity of the study area.
ii. To study the likely impact of the proposed project on the local biodiversity and to suggest mitigation measure, if required, for vulnerable biota.
iii. To assess the nature and distribution of vegetation (Terrestrial and Aquatic) in and around the proposed project area.
iv. Detail of flora and fauna, Endemic, Rare, Endangered and Threatened (RET Species) separately for core and buffer area based on such primary field survey and clearly indicating the Schedule of fauna present. In case of any scheduled- I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished.
v. To devise management & conservation measures for biodiversity.

3.17.3 ANALYSIS OF FLORA & FAUNA

3.17.3.1 ANALYSIS OF FLORA

Biodiversity of the region is significantly influenced by the physiography. Study area consists of parts of two districts i.e. Koraput and Rayagada. These districts have a tropical climate and a diverse topography which supports various types of biodiversity habitats, such as forests, scrublands, River basins, etc.

Trees like *Acacia leucophloea, Albizia procera, Dalbergia latifolia, Vitex penducularis, Boswellia serrata, Caryota urenus, Pterocarpus marsupium, Annona reticulata, Lanneae coromandelica, shrubs like Casearia tomentosa, Hemidesmus indicus, Phoenix acaulis, Ziziphus mauritiana, Xanthium strumarium and* Grasses like *Cynodon dactylon, Aristida setaceae*, *Arundinella setosa* are found in core zone.

As per the authenticated list of flora and fauna obtained from Divisional Forest Officer, Koraput Forest Division and Rayagada Forest Division, there are 17 species of trees, 18 species of shrubs & herbs, 4 species of Climbers, and 3 species of grasses in the core zone. In the buffer area, there are total 40 species of trees, 24 species of shrubs & herbs, and 3 species of Climbers 5 species of Bamboo and 8 species of grasses were found.

During Field Survey, No Endemic, Rare, Endangered and Threatened (RET) species of flora were found in the study area.

3.17.3.2 ANALYSIS OF FAUNA

In order to study the faunal diversity of the terrestrial and aquatic environment in the study area, a primary field survey was conducted within 10 km radius impact zone surrounding the study area. There is no National Park, Wildlife Sanctuary, Biosphere Reserves, Tiger Reserves and Wildlife Corridors, etc. within 10 km radius of the mining lease area. However, there are 9 Reserve Forests and 11 Protected Forests exist in the study area.

Site-Specific Wildlife Conservation Plan (SSWLCP) has been approved from Principal Chief Conservator of Forests (Wildlife) & Chief Wildlife Warden vide Memo No. 682 dated 27.01.2010, which was later revised via Memo No. 5845 dated 06.07.2017. The financial outlay for implementing the plan includes Rs. 880.74 lakh for activities under the Divisional Forest Officer (DFO), Koraput Forest Division, Rs. 302.48 lakh for activities under the DFO, Rayagada Forest Division, and Rs. 57 lakhs for activities to be executed by OMC Ltd. within the project area. OMC Ltd. has also deposited Rs. 1183.22 lakh under CAMPA for the implementation of various mitigation measures in the project impact areas to address the adverse impacts of mining, conserve flora and fauna and safeguard the existing wildlife.

As per Indian Wildlife Protection Act, 1972 as amended on 20th Dec. 2022, there are 29 schedule - I species viz. *Canis aureus* (Jackal), *Urva edwardsii (*Indian grey mongoose), *Urva auropunctata (*Small Indian Mongoose), *Gracula religiosa (*Common Hill Myna), *Bubo bubo (*Eurasian Eagle Owl), *Naja naja (*Indian Cobra), *Varnus bengalensis (*Bengal monitor), *Felis chaus (*Jungle Cat), *Prionailurus bengalensis (*Leopard cat), *Vulpes bengalensis (*Bengal fox), *Canis lupus (*Grey wolf), *Rusa unicolor(*Sambar deer), *Tetracreus quadricornis (Chousingha/Four-horned Antelope), Lutrogale perspicillata (*Smooth-coated otter), *Mellivora capensis (*Ratel/Honey Badger), *Melursus ursinus (*Sloth bear), *Ratufa indica (*Indian giant squirrel), *Viverricula indica (*Small Indian civet), *Paradoxurus hermaphroditus (*Asian palm civet), *Moschiola indica (*Mouse deer/ Indian Chevrotain), *Hyaena hyaena (*Hyaena), *Hystrix indica (*Indian Porcupine), *Gallus sonneratii (*Grey junglefowl), *Pavo cristatus (*Indian peafowl), *Anthracoceros coronatus (*Malabar pied hornbill), *Python molurus (*Indian rock python), *Ptyas mucosa (*Indian rat snake/Dhaman), *Daboia russelii (*Russell's viper), *Fowlea piscator (*Checkered Keelback) found in the study area. The authenticated list of Flora & Fauna has been obtained from Divisional Forest Officer, Koraput Forest Division vide letter 280/4F(Misc.) dated 27.01.2025 and from Divisional Forest Officer, Rayagada Forest Division, vide letter 216/4F(Misc.) 1367/2025 dated 13.01.2025 is enclosed as ***Annexure IX A.***

During Field Survey, No Endemic, Rare, Endangered and Threatened (RET) species of flora were found in the study area. However, among the list of fauna provided by Deputy Conservator of Forest, Bhubaneswar; five species namely *Hyaena hyaena*, *Ducula aenea*, *Anthracoceros coronatus, Python molurus and Varnus bengalensis* are listed as Near Threatened and five species namely *Rusa unicolor, Lutrogale perspicillata, Melursus ursinus* and *Tetracerus quadricornis* are listed as Vulnerable.

3.18 SOCIO-ECONOMIC ENVIRONMENT

3.18.1 INTRODUCTION

An essential part of environmental study is socio-economic environment incorporating various facts related to socio-economic conditions in the area, which deals with the total environment.

The Socio economic study includes demographic structure of the area, provision of basic amenities viz., housing, education, health and medical services, occupation, water supply, sanitation, communication, transportation, prevailing diseases pattern as well as feature of aesthetic significance such as temples, historical monuments etc. at the baseline level. This helps in visualizing and predicting the possible impact depending upon the nature and magnitude of the project.

Socio-economic study of an area provides a good opportunity to assess the socio-economic conditions of an area. This study possibly estimates the change in living and social standards of the particular area benefitted due to this expansion project. The gross economic production of the area is has been/will be increased substantially due to the existence of this project. It can undoubtedly be said that this expansion project will provide direct and indirect employment and improve the infrastructural facilities and living standards of the area.

The fabrics of socio-economic changes are so complicated that this study would seem to be extremely limited, almost superficial and at time subjective in nature. More thorough and quantified socio-economic study will undoubtedly require vastly longer time and resources, and is, therefore, beyond the scope of the present EIA study.

3.18.2 OBJECTIVES OF THE STUDY

The objectives of this socio-economic report consist of:

- To determine the demographic profile of the area.
- To know/identify the current socio-economic condition within the study area by understanding the determinants such as education, health, sanitation, water, employment, transportation, communication, electrification, livelihood etc To recommend practical strategic interventions in the sector.
- To identify the basic needs of the nearby villages within the study area.
- To contribute in the development and growth based on the identified needs of the nearby areas using practical strategic interventions under the CSR activities.
- To increase the employment opportunities and improve the living standards.

3.18.3 SCOPE OF WORK

To study the socio-economic environment of the 10 km study area.

- Data collection through primary field survey and collate it with the secondary sources.
- Identification and prediction of possible impacts from the proposed project.
- Providing solutions and mitigation measures.
- Developing Action plan for implementation based on the mitigation measures.

3.18.4 METHODOLOGY

- **Collection of Data**

Data for this project was collected from secondary sources like Government department, Census 2011, District Census Handbook, Maps, Literature research etc. The study area has been divided into three major segments namely Primary Zone (0 - 3 km), Secondary Zone (3 - 7 km) and Outer Zone (7 - 10 km).

- **Presentation of Data & Analysis**

The data collected were presented in a suitable, concise form for further analysis. The collected data were presented in the form of tabular or diagrammatic or graphic form. These tabulated data were interpreted and analyzed with the help of various qualitative techniques and ideographic approaches.

3.18.5 BACKGROUND INFORMATION OF THE AREA

The entire study area and the Mine Site fall within the area of two Districts of Odisha viz. Koraput and Rayagada.

District Koraput: It is located in the southern part of Odisha and it has a total geographical area of 8807 sq. km. It lies It lies between Latitudes of 18° 15' 00" to 19° 12' 30" North and Longitude of 82° 08′ 04" to 83° 24' 46" East. It is bounded on the north by Nowarangpur, Kalahandi and Rayagada districts of Orissa, Andhra Pradesh in the south and east and Chattishgarh in the West. The district is divided into 2 subdivisions of Koraput & Jeypore.

The district enjoys tropical climate characterized by hot summer, cold winters & rainy seasons. The temperature in winter drops below 1°C at some places otherwise it remians in the range of 10°C to 13.5°C in the valley plains. The average annual rainfall varies between 1320-1520mm. The district is drought prone because of the erratic and uneven pattern of rainfall.

District Rayagada: It is situated in the south western part of Odisha lying between the north latitudes 18°54′ and 20°00′ N and east longitudes 82°54′ and 82°02 E. Rayagada district is bordered by Kalahandi Phulbani district of Orissa in North and Gajapati district of Orissa in the South. The district covers an area of 7073 sq. km. and is divided into 10 administrative blocks.

The climate of the district is typically tropical to subtropical with three distinct seasons i.e. summer, winter, and monsoon. December is the coldest month with mean daily average temperature of 20°C which reaches a maximum of 42°C in May. The rain fall in the area is mostly from the south west monsoon lasts from middle of June to October. The average annual rainfall varies from 1030.21 mm to 1569.50 mm.

A Detailed socio-economic survey was conducted in the study area (buffer zone) within 10 km radius of proposed mine site at Village: Kodingamali, Tehsil: Laxmipur & Kashipur, District: Koraput & Rayagada, Odisha, in order to determine the impact of the proposed expansion project on nature and inhabitant. To get an overview of the villagers and their perspectives about this project,

different demographic parameters and social aspects such population density, sex ratio, literacy rate, worker ratio etc. has been identified, analyzed, studied together. These impacts may be beneficial or detrimental. If detrimental, anticipated suggestions/measures are advocated in order to have collective development.

Broadly the study area (buffer zone) was categorized on the basis of the distance of the villages from mine site into 3 zones. The Primary zone relates to 0 to 3 km radius area, secondary zone 3-7 km and outer zone 7-10 km radius area.

The table below shows the socio-economic profile of the study area as compared to district, state and national level socio-economic profile.

Table -3.25
Socio-Economic & Demographic Profile of Study Area

Particular	Odisha	Koraput	Rayagada	Study Area
Area (in sq. kms.)	155707	8807	7073	474.9691
No. of Households	9605629	3,36,200	225174	14221
Total Population	41974218	13,79,647	9,67,911	59778
Total Scheduled Tribes Population	9590756	1,96,540	1,39,514	8719
Total Scheduled Castes Population	7188463	6,97,583	5,41,905	42783
Literacy Rate (%)	72.87	49.21	49.76	42.07
Male Literacy Rate (%)	81.59	60.32	61.04	54.72
Female Literacy Rate (%)	64.01	38.55	39.19	29.92
Working Population (%)	41.79	50.26	48.26	51.22
Non-Working Population (%)	58.21	49.74	51.74	48.78
Sex Ratio (Females per 1000 Males)	979	1032	1051	1030

Source: *Census of India, 2011*

3.18.6 BASELINE DATA & ANALYSIS

The socio-economic data was collected from Census India Handbook 2011 including demographic, educational, medical & health, occupational, agriculture & cropping pattern, basic amenities and religious rituals details. The study area was categorized on the basis of the distance of the villages from mine site. Primary zone was indentified from 0 to 3 km radius area, Secondary zone in 3 to 7 km, Tertiary zone/outer zone in 7 to 10 km radius area from the existing mine site. Total 102 villages are falling within the study area out of which 14 villages come under 0 to 3 Km radius area, 50 villages come under 3- to 7 Km radius area and 38 villages come under 7 to 10 Km radius area.

The study area was categorized on the basis of the distance of the village from the project site of M/s. Odisha Mining Corporation Ltd.

To understand the socio-demographic profile of the 10 km study area, village wise distribution has been done based on the below given determinants:

1. Number of Household
2. Number and type of Population

3. Sex Ratio
4. Literacy Rate
5. Number and type of workers and Non- workers

The village - wise demographic profile of the study area as per area classification are given in table below.

Table - 3.26

Demographic Profile of study area

S. No.	Name of Village/town	No of household	Total Population	Total Male	Total Female	Sex Ratio	SC Population	ST Population	Male Literate	Female Literate	Total Literate Population	Literacy Rate(%)	Main worker	Marginal Worker	Total Worker	Non-Worker
0 - 3 km																
1.	Kansariguda	25	95	48	47	979	0	94	15	6	21	26.92	1	56	57	38
2.	Kundurusila	39	175	92	83	902	0	172	11	1	12	9.09	45	65	110	65
3.	Bankamba	84	313	155	158	1019	0	232	64	44	108	38.99	93	107	200	113
4.	Mankadajhola	291	1122	572	550	962	371	723	244	108	352	37.85	280	421	701	421
5.	Raulipadar	115	438	221	217	982	0	387	117	47	164	42.71	219	25	244	194
6.	Titijhola	92	392	191	201	1052	0	377	39	14	53	16.26	214	9	223	169
7.	Birigura	367	1385	669	716	1070	232	950	336	211	547	47.44	96	264	360	1025
8.	Rajanpanasgura	142	557	283	274	968	57	363	117	70	187	40.74	261	24	285	272
9.	Bhalujori	111	397	192	205	1068	12	380	110	47	157	48.46	113	152	265	132
10.	Gourachema	167	611	310	301	971	86	473	170	84	254	54.27	51	261	312	299
11.	Darara	29	122	67	55	821	0	0	48	24	72	68.57	28	17	45	77
12.	Uperkaipadar alias (Narasikaipadar)	96	411	199	212	1065	23	388	83	51	134	38.51	199	40	239	172
13.	Talakaipadar	136	609	272	337	1239	0	592	35	21	56	11.11	172	170	342	267
14.	Singaram	77	309	146	163	1116	28	259	91	29	120	46.51	179	41	220	89
Sub Total		**1771**	**6936**	**3417**	**3519**	**1030**	**809**	**5390**	**1480**	**757**	**2237**	**38.93**	**1951**	**1652**	**3603**	**3333**
3 - 7 km																
15.	Phulajuba	94	422	204	218	1069	0	396	40	24	64	18.93	64	128	192	230
16.	Podapadi	116	501	295	206	698	83	209	214	79	293	66.74	76	167	243	258
17.	Tulasichhapara	48	229	111	118	1063	0	228	22	10	32	17.78	53	60	113	116
18.	Dharmaguda	83	333	163	170	1043	234	0	103	74	177	64.36	96	128	224	109
19.	Puhundi	474	1825	895	930	1039	409	1289	404	216	620	42.12	295	707	1002	823
20.	Maliguda	34	142	62	80	1290	0	142	6	2	8	6.35	18	67	85	57
21.	Bajaragarh	57	284	130	154	1185	0	283	38	29	67	28.88	73	98	171	113
22.	Biriguda	185	853	348	505	1451	1059	146	101	182	283	41.74	156	203	359	494

S. No.	Name of Village/town	No of household	Total Population	Total Male	Total Female	Sex Ratio	SC Population	ST Population	Male Literate	Female Literate	Total Literate Population	Literacy Rate(%)	Main worker	Marginal Worker	Total Worker	Non-Worker
23.	Kuntes	410	1638	808	830	1027	1058	205	329	164	493	36.41	502	379	881	757
24.	Upperchampi	326	1604	851	753	885	900	213	537	306	843	59.62	300	180	480	1124
25.	Timajhola	105	439	216	223	1032	912	2	119	61	180	48.13	165	75	240	199
26.	Marbaiguda	109	424	212	212	1000	800	113	135	87	222	60	124	121	245	179
27.	Karagura	120	495	224	271	1210	1353	93	88	61	149	35.9	22	298	320	175
28.	Danapanasgura	58	251	116	135	1164	1333	0	27	12	39	19.31	52	85	137	114
29.	Bishampur	49	203	95	108	1137	1087	0	6	3	9	5.81	48	74	122	81
30.	Sargipadara	70	291	132	159	1205	1579	17	33	12	45	18.6	50	116	166	125
31.	Kindiripadara	26	107	59	48	814	643	14	31	5	36	42.86	59	6	65	42
32.	Phatagarh	105	467	212	255	1203	1286	19	80	26	106	28.57	235	32	267	200
33.	Haridabhata	103	483	231	252	1091	102	375	93	61	154	38.5	125	115	240	243
34.	Anajor	230	939	455	484	1064	100	821	186	97	283	36.99	228	326	554	385
35.	Dharmaguda	83	333	163	170	1043	234	0	103	74	177	64.36	96	128	224	109
36.	Nakatiguda	177	758	340	418	1229	34	723	147	78	225	34.46	17	409	426	332
37.	Mundagan	362	1446	709	737	1039	165	967	271	132	403	33.42	276	530	806	640
38.	Eripiput	19	86	41	45	1098	8	75	8	2	10	15.38	20	24	44	42
39.	Tikiriguda	56	232	113	119	1053	0	232	57	41	98	49.75	38	78	116	116
40.	Mahalingaguda	34	151	71	80	1127	0	151	8	15	23	20.18	49	31	80	71
41.	Sudingaguda	24	110	55	55	1000	0	110	7	6	13	16.05	23	44	67	43
42.	Chhelibeda	51	216	109	107	982	13	203	9	4	13	7.34	65	2	67	149
43.	Talachampi	202	825	446	379	850	116	643	192	98	290	40.9	172	149	321	504
44.	Kutalamari	16	66	35	31	886	2	63	7	2	9	15.52	46	5	51	15
45.	Kurumuli	39	141	70	71	1014	0	141	22	5	27	22.31	79	29	108	33
46.	Tayaput	200	878	465	413	888	14	387	289	138	427	54.26	322	128	450	428
47.	Uskabhata	71	303	151	152	1007	0	302	25	3	28	11.38	3	159	162	141
48.	Doliamba	123	550	279	271	971	280	257	160	88	248	53.56	209	31	240	310
49.	Ambagura	34	142	68	74	1088	0	112	35	16	51	45.13	42	20	62	80
50.	Buruja	355	2036	1092	944	864	926	1050	628	339	967	55.26	727	427	1154	882

S. No.	Name of Village/town	No of household	Total Population	Total Male	Total Female	Sex Ratio	SC Population	ST Population	Male Literate	Female Literate	Total Literate Population	Literacy Rate(%)	Main worker	Marginal Worker	Total Worker	Non-Worker
51.	Khalakana	217	803	379	424	1119	194	520	145	84	229	33.78	93	357	450	353
52.	Kanapai	17	74	38	36	947	0	74	5	0	5	9.26	20	19	39	35
53.	Dumuripadar	296	1151	544	607	1116	78	882	229	149	378	39.42	219	351	570	581
54.	Lakshmipur	768	3292	1740	1552	892	1081	775	1289	777	2066	71.12	1107	172	1279	2013
55.	Ranjitagura	97	551	204	347	1701	19	531	106	179	285	60.38	46	179	225	326
56.	Punjisil	10	39	18	21	1167	0	37	3	1	4	11.11	11	21	32	7
57.	Ghatiguda	40	130	66	64	970	2	23	10	6	16	15.09	3	61	64	66
58.	Bandhapadara	92	366	183	183	1000	22	344	67	37	104	35.49	54	145	199	167
59.	Badamatikana	55	208	99	109	1101	0	208	54	16	70	42.17	16	120	136	72
60.	Kotrakana	30	118	56	62	1107	0	86	24	23	47	47.47	36	20	56	62
61.	Barasanka(Badasankha)	253	1081	520	561	1079	30	1038	191	90	281	32.04	156	466	622	459
62.	Kebiri	132	486	232	254	1095	0	485	29	8	37	9.34	1	423	424	62
63.	Koijhankar	14	79	44	35	795	0	79	7	0	7	12.5	19	17	36	43
64.	Chilisanka	88	393	197	196	995	4	384	75	22	97	30.03	7	180	187	206
Sub Total		**6757**	**28974**	**14346**	**14628**	**1020**	**4972**	**19739**	**6794**	**3944**	**10738**	**44.15**	**6713**	**8090**	**14803**	**14171**
7 - 10 km																
65.	Panchali	311	1213	592	621	1049	566	637	291	172	463	46.44	186	165	351	862
66.	Haridaspur	80	321	168	153	911	0	316	80	20	100	38.46	7	200	207	114
67.	Oshapada	192	718	348	370	1063	102	306	185	110	295	50.6	139	173	312	406
68.	Gokulamunda	121	424	223	201	901	0	195	117	54	171	47.24	106	119	225	199
69.	Sorishapadara	141	560	269	291	1082	143	0	192	110	302	64.81	15	234	249	311
70.	Sanamatikana	226	1066	550	516	938	196	865	237	111	348	38.37	133	500	633	433
71.	Nalamari	76	256	122	134	1098	2	181	62	44	106	52.48	21	152	173	83
72.	murkar	215	835	410	425	1037	54	650	143	73	216	31.49	63	307	370	465
73.	Mundajholla	68	263	124	139	1121	8	253	54	26	80	35.71	65	86	151	112
74.	Gadikhal	102	438	219	219	1000	181	211	124	75	199	56.7	7	191	198	240
75.	Barikanta	181	878	530	348	657	16	598	293	86	379	50.53	158	189	347	531
76.	Pojhar	103	404	193	211	1093	25	358	95	55	150	43.48	75	159	234	170

S. No.	Name of Village/town	No of household	Total Population	Total Male	Total Female	Sex Ratio	SC Population	ST Population	Male Literate	Female Literate	Total Literate Population	Literacy Rate(%)	Main worker	Marginal Worker	Total Worker	Non-Worker
77.	Birijodi	53	199	95	104	1095	6	192	19	20	39	22.41	54	0	54	145
78.	Kusumguda	133	607	347	260	749	53	371	264	121	385	71.3	211	10	221	386
79.	Kuchupar	104	371	188	183	973	13	312	97	63	160	50	17	220	237	134
80.	Kanapadi	125	488	242	246	1017	0	488	116	44	160	36.95	35	213	248	240
81.	Diansili	85	326	119	207	1739	0	321	41	42	83	31.44	4	170	174	152
82.	Chikuguda	21	79	36	43	1194	0	79	9	0	9	14.52	18	35	53	26
83.	Raisili	73	263	129	134	1039	0	263	33	13	46	22.01	71	85	156	107
84.	Tikarapara	70	261	118	143	1212	1	257	1	3	4	1.75	61	101	162	99
85.	Uparakuttinga	280	1252	628	624	994	153	1086	213	103	316	30.15	540	182	722	530
86.	Bilamal	208	810	382	428	1120	97	639	200	81	281	42.07	62	412	474	336
87.	Makapadara	50	241	112	129	1152	1	240	48	16	64	33.51	41	63	104	137
88.	Kampar	347	1366	674	692	1027	309	605	249	123	372	32.92	141	619	760	606
89.	Maliguda	242	1006	467	539	1154	142	855	172	99	271	32.57	177	332	509	497
90.	Kucher	182	724	372	352	946	78	593	133	66	199	34.67	130	285	415	309
91.	Pukesh	55	217	100	117	1170	0	195	27	11	38	22.49	63	76	139	78
92.	Kellar	290	1435	684	751	1098	290	557	406	340	746	60.7	454	134	588	847
93	Sorisapadar	109	444	234	210	897	0	419	85	19	104	29.13	15	226	241	203
94.	Podasankuli	76	272	117	155	1325	0	264	57	36	93	40.43	87	87	174	98
95.	Kegaja	81	302	148	154	1041	0	302	34	14	48	18.68	182	1	183	119
96.	Bandikar	223	993	493	500	1014	27	921	204	84	288	34.16	192	381	573	420
97.	Bhitaragura	57	247	121	126	1041	0	247	17	14	31	14.98	58	74	132	115
98.	Talakuttinga	317	1375	698	677	970	199	1159	369	165	534	47.47	290	449	739	636
99.	Pipalpadar	326	1435	709	726	1024	195	1233	290	162	452	37.67	495	317	812	623
100.	Minapai	163	898	277	621	2242	62	820	58	290	348	44.56	14	406	420	478
101.	Panasapadara	105	434	217	217	1000	0	238	58	24	82	24.4	16	250	266	168
102.	Bariguma	102	447	229	218	952	19	428	58	36	94	24.74	2	206	208	239
Sub Total		**5693**	**23868**	**11684**	**12184**	**1043**	**2938**	**17654**	**5131**	**2925**	**8056**	**40.44**	**4405**	**7809**	**12214**	**11654**
Grand Total		**14221**	**59778**	**29447**	**30331**	**1030**	**8719**	**42783**	**13405**	**7626**	**21031**	**42.07**	**13069**	**17551**	**30620**	**29158**

3.18.7 SURVEY IN STUDY AREA

Socio Economic Household Survey (SEHS) has been conducted by JMEPL team in a the villages falling in the 10 km radius of mine site by proportional random sampling method. Information was collected from Stakeholders like Gramsevak, Aanganbadi karyakarta, school teachers and other recognized persons of the area. To ensure the accuracy of the primary data collected from the study area, all village specific information was compared from the data of census 2011.



Village Birguda



Village Kenduada





Village Talakaipadar





Village Narkaipadar



Village Dumripadar



Village Titijhola



Village Singaram



Village Balijorhi

Photographs of Primary data collection through random sampling in the study area

3.18.8 DEMOGRAPHIC PROFILE OF THE STUDY AREA

The population as per 2011 Census records is 59778 (for the 10 km buffer zone). Total no. of household are 1771, 6757 and 5693 respectively, in primary, secondary and outer zone. Sex ratio is 1030-, 1020 and 1043 (females per 1000 males) observed in primary, secondary and outer zone respectively. SC population distribution is 809, 4972and 2938 respectively in primary, secondary and outer zone. ST population distribution is 5390 , 19739 and 17654 respectively in primary, secondary and outer zone respectively.

Demographic profile of study area is given in the table below:

Table – 3.27

Summary of Demographic Profile of the Study Area

Zone	No. of Villages	Total Household	Total Population	Total Male Population	Total Female Population
Primary Zone (0 – 3 Km)	14	1771	6936	3417	3519
Secondary Zone (3 – 7 Km)	50	6757	28974	14346	14628
Outer Zone (7 – 10 Km)	38	5693	23868	11684	12184
Study Area (0-10 km)	**102**	**14221**	**59778**	**29447**	**30331**

Source: Census of India, 2011

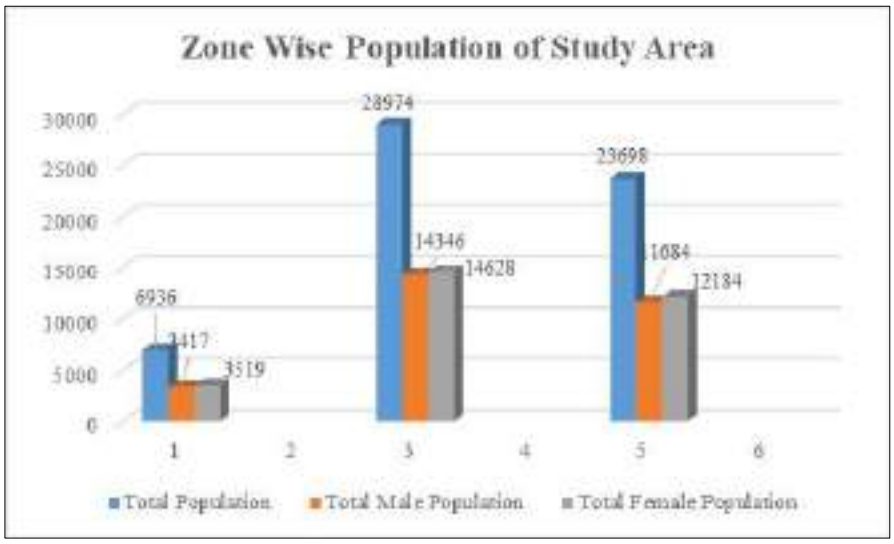


Figure 3.13 Zone wise Population in Study area

Above table identifies the presence of villages and their subsequent population divided under three zones from the mine site (i.e., Primary, secondary and Outer zone).

As per the Above graphs shows that the population of Secondary zone is higher compared to the primary and outer zone. The highest population is of Village Laxmipur i.e. 3292 which is highest among the population of villages of study area. The highest number of Household are 6757 which are of villages falling in the secondary zone.

3.18.9 GENDER /SEX RATIO

Gender & sex ratio determine the Human Development Index (HDI) of an area for understanding the status of women in that region. Census data suggests that the study area is composed of 49.18% of male and 50.82% of female population. Following table entails information about sex ratio of 102 villages lying in study area (buffer zone) as primary, secondary and outer zone.

Table – 3.28
Sex Ratio in Study Area

S. No.	Buffer Zone	Sex Ratio of Study area Female/ 1000 Male
1	Primary Zone (0-3 km)	1030
2	Secondary zone (3-7 km)	1020
3	Outer Zone (7-10 km)	1043
Overall Study Area (0-10 km)		**1030**

Source: *Census of India, 2011*

It is to be noted that the proportion of female population is higher than the male population in th study area whereas, considering the zone-wise population, the proportion of male and female population in secondary zone is more than the male and female population in primary and outer zone.

In the study area, the observed sex ratio is 1030 females per 1000 male reflecting that due to continuous awareness on considering both genders as equal and boon for family's growth and development, improving basic health infrastructure for women, empowering girl child and realizing the importance of women in so ciety these figures have led to prosperous growth.

Despite continuing social welfare schemes and awareness programs run by the government, this variation has been referred to restricted sources of earning. Since families in these villages are mostly involve at working as main workers and men are preferred more over women.

Most of these men are involved in agricultural activities. Other occupations include self-employment, animal husbandary & small-scale businesses for survival while women work at agriculture fields and often take care of household chores.

3.18.10 VULNERABLE GROUP

While developing an action plan, it is very important to identify the population under the marginalized and vulnerable groups and special attention has to be given towards these groups while making action plans. Data in the observed villages schedule caste (S.C.) population is 8719 and Schedule Tribe population is 42783 in study area while 8276 of the population has been observed as others.

Table – 3.29

SC/ST Population of the Study Area

S. No.	No. of Villages	Total Population of the study Area	Vulnerable Groups		Other Groups
			SC Population	ST Population	
Primary Zone (0 – 3 Km)	14	1771	809	5390	737
Secondary Zone (3 – 7 Km)	50	6757	4972	19739	4263
Outer Zone (7 – 10 Km)	38	5693	2938	17654	3276
Study Area (10 Km)	**102**	**14221**	**8719**	**42783**	**8276**

Source: *Census of India, 2011*

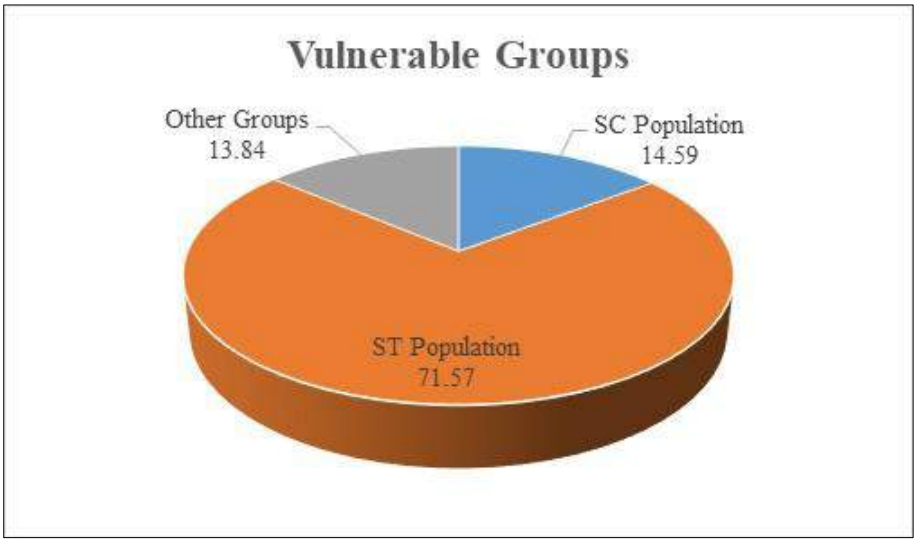


Figure 3.14 ST/ SC Population

3.18.11 LITERACY RATE

The 10 km radius study area demonstrates an overall literacy rate of 42.07% as per census data which is low. The male literacy rate in the study area works out to be 54.72% whereas the female literacy rate, which is an important indicator for social change, is observed to be 29.92% in the study area as per the census data 2011. This indicates that there is a need to focus in sociological aspect in the region and enhance further development.

In the present study, the literacy rate is average level in the study area. Male and Female literacy rate of villages varies from place to place. However female literacy rate in the region is observed to be low as compared to male literacy rate.

Table – 3.30

Literacy Rate in the Study Area

Zone	No. of Villages	Total Literacy Rate (%)	Male Literacy Rate (%)	Female Literacy Rate (%)
Primary Zone (0 – 3 Km)	14	38.53	52.89	25.68
Secondary Zone (3 – 7 Km)	50	44.15	56.43	32.11
Outer Zone (7 – 10 Km)	38	40.44	53.12	28.51
Study Area (0-10 Km)	**102**	**42.07**	**54.72**	**29.92**

Source: *Census of India, 2011*

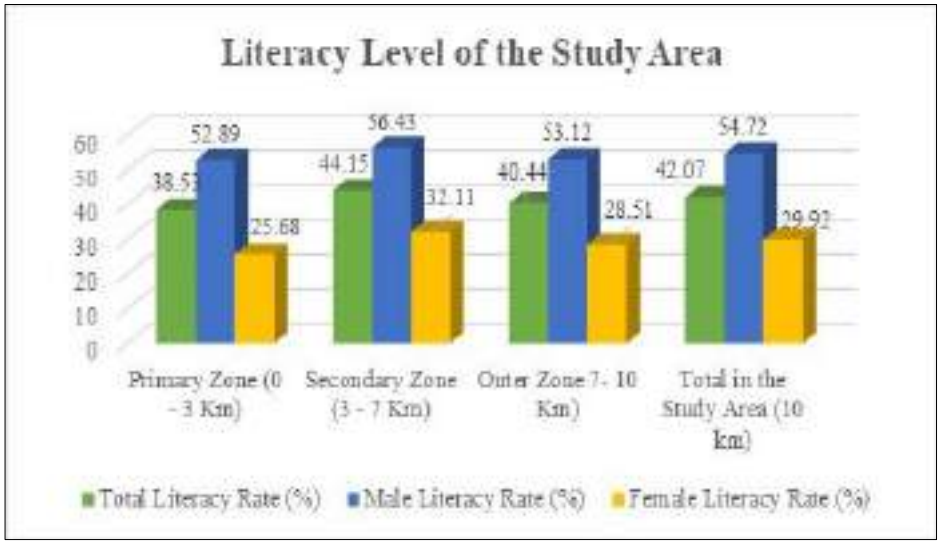


Figure 3.15 Literacy Rate within 10 Km study area

The distribution rate amongst male and female varies with wide gap. It is evident from above graph that this variation is just not limited to one zone; it is very much visible along all the three zones specially in primary zone, thereby giving the decision makers an opportunity to form more focused development approach in providing education and uplifting the current scenario in order to improve literacy rate amongst women and bringing women centric empowerment that limits not just to the population, but reflected in literacy rate also.

3.18.12 ECONOMIC ACTIVITIES

The economy of an area is defined by the occupational pattern and income level of the people in the area. The occupational structure of residents in the study area is studied with reference to work category. The population is divided occupation wise into three categories, viz., main workers, marginal workers and non-workers. The main workers include cultivators, agricultural laborers, those engaged in household industry and other services. The marginal workers are those engaged in some work for a period of less than 180 days during the reference year. The non-workers include those engaged in unpaid household duties like, students, retired persons, dependents, beggars, vagrants etc. besides institutional inmates or all other non-workers who do not fall under the above categories.

Table - 3.31

Work Force of the Study Area

Zone	Total Population	Main Workers	Marginal Worker	Total Workers	Non Worker
Primary Zone (0 - 3 Km)	1771	1951	1652	3603	3333
Secondary Zone (3 - 7 Km)	6757	6713	8090	14803	14171
Outer Zone (7 - 10 Km)	5693	4405	7809	12214	11654
Study Area (10 Km)	**14221**	**13069**	**17551**	**30620**	**29158**

Source: Census of India, 2011

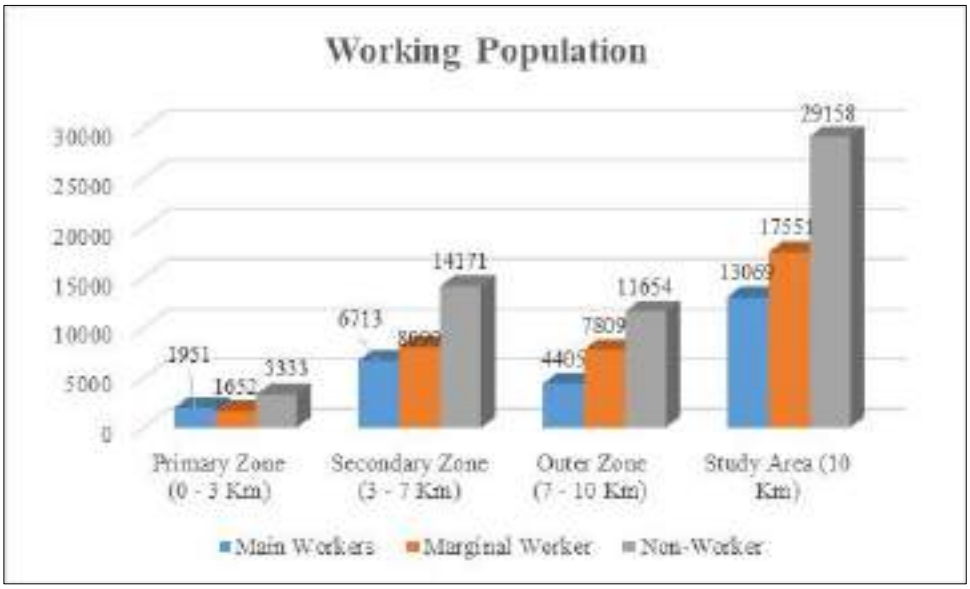


Figure 3.16 Work force in the study area

The above table shows that total marginal workers in the area are 17551 (29.36%), total main workers are 13069 (21.86%) and total non-working population are 29158 (48.78%). As per the analysis of all the villages the ratio of working and non-working population is almost equal which can be identified from the graph given above.

Annual Income from Various Sources

- The Income & Expenditures of an area is defined by the occupational pattern and income level of the people in the area. The occupational structure of residents in the study area is studied with reference to income sources. Most of the people are involved in agriculture and wage labour. The major crops grown in this area are Paddy, Ragi, Maize, Niger, Mustard, Wheat, Millet, Suan, Sweet-potato, Sugarcane, Ground-nut, Jowar, Bazra etc. Among fruits Mango, Guava, Litchi, Orange, Custard apple, Pineapple, Banana, Jack fruit, etc. are cultivated. Spices like, ginger, Turmeric, Chilli, Cardamom, Pepper, Cinnamon, Curry leaves are also cultivated.

3.18.13 EDUCATIONAL FACILITIES

Education is the process of facilitating learning, or the acquisition of knowledge, skills, values, beliefs, and habits. Educational methods include storytelling, discussion, teaching, training and directed research.

As per the socio economic survey, there is one Government Primary School (~1.5 Km in NNE North Direction) and one Govt. Upper Primary School (~ 2.0 Km in NNE Direction) at Biriguda Colony, are present near the Mine site. All basic facilities like Playground, electricity, drinking water, toilets, etc. are available in the school. Facilities provided by Government such as mid-day meal arrangements are already in practice however these practices still face severe problems due to mismanagement and corruption among the organizers.This area still have sectors seeking attention from policy making communities in order to improve prevailing issues regarding employment, education, human development, gender equality.

The Government ITI (Industrial Training Institute) is located in Laxmipur village, providing essential vocational training opportunities for the local population. Government Degree college ,Engineering college located in the Rayagada District at Distance 36.0 km from the mine site which is easy transportation from village to city.

In the study area, senior secondary schools and secondary schools are few in number.Thus, if one has to pursue further in studies he/she has to go to the nearby town or city.

According to the baseline survey conducted for 10 km study area, Education facilities within the buffer area comprise of primary, middle, secondary and senior secondary schools. As observed, all the studied villages have primary schools, middle schools, secondary school and senior secondary schools.



Govt. Higher primary school in Mandaljhola



Primary school in Singaram



Govt. Primary school, Village Birguda



Anganwadi Centre, Village Birguda



Govt. High school , Village Kenduada



Anganwadi Centre, Village Kenduada



Govt. High School, Village Talakaipadar



Upper primary school, Village Dumpripadar



Govt. Priamary school, Village Narikaipadar



Anganwadi Centre, Village Narikaipadar

Photographs showing Schools within the Study Area

The details of some schools present within the study area are given below:

Table - 3.32

Educational Institutes in the Study Area

S. No.	School Name	Details	
		Student	Teachers
1.	Biriguda Colony Proj. Primary School	20	03
2.	Biriguda Project Upper Primary School	51	02
3.	Upperkodinga Ashram School	485	07
4.	Bankambo Upper Primary School School	57	03
5.	Talakaipadar Proj. Upper Primary School	42	03
6.	Govt. U.G. High School, Dharada	429	13
7.	Mankadajhola High School	128	07
8.	Totaguda Proj. Primary School	56	02
9.	Kenduwada Primary School	30	04
10.	Paradiguda Proj. Upper Primary School	163	08
11.	Sukuriput Primary School	15	02
12.	Mankadajhola Project Upper Primary School	104	03
13.	Narsikaipadar Primary School	27	04
14.	Bajargada Project Primary School	27	01
15.	Malichema Proj. Primary School	107	06
16.	R.P. Guda Primary School	21	02
17.	Bhalujodi Proj Upper Primary School	62	03

Souce: *Field Survey, 2024*

Literacy is the essential demographic aspect of the society and the literacy rate of the study area is 42.07%. As per the Socio Economic survey conducted , it can be concluded that majority of the schools in the study area are Primary School whereas Senior Sec./ Secondary schools are few in numbers, there is a need to increase the English medium schools and the schools in the study area lacks the internet facilities, computer labs etc.

3.18.14 HEALTH FACILITIES

Health is a premier asset of human capital which is an important factor for growth of any economy. It is a source of human welfare. Health and nutrition play a major role for developing a healthy society as it impacts the productivity of a person.

The healthcare facilities in the study area consisted of Community health centre, Primary Health Centre, Primary Health Sub-Centre's, Maternity and Child Welfare Centre; Dispensaries and TB Clinic, Veternary hospitals, Non government medical facilities Medicine shops, Sub-Centres and Primary Health Centres. As per the data of 10 km radius study area collected from Census India Handbook 2011, medical facilities are needed to be improved by the Government as satisfactory facilities are not available for any medical emergencies. Patients have to move to Cities for any serious illness.

	
Village Puhundi	**Village Bakamba**
Medical Facilities in Study Area	

In the study area, there are very few Primary Health Centers (PHCs) and health centers, which significantly limit access to healthcare for the local population. This scarcity of healthcare infrastructure often results in delayed treatments and inadequate care, especially for those in need of urgent medical attention. Health infrastructure in the region is comparatively lower than other regional areas as functioning of PHCs, CHCs and other dispensaries are not that well condition.

3.18.15 WATER FACILITIES

As per the data collected from census india handbook 2011, it has been noticed that the requirement of water is being fulfilled mostly by tube wells, borewells, community handpumps and wells with few depending upon household taps in villages Although some other water sources like tanks, ponds are also available in villages within the study area. Two Rivers and few Nalas exist in the study area viz. Patagarha River and Murani River also acts as a source of water along with a few seasonal Nalas viz. Patagarha Nala, Baghri Nala, Debagarha Nala, specifically during monsoon season.





Village Raulipadar



Village Puhundi



Village Biriguda





Village Singaram





Village Mankadajhola



Village Talakaipadar



Village kenduada

Photographs showing Water Facilities available in the Study Area

3.18.16 TRANSPORTATION FACILITIES

- Study area is served by road and rail network mostly.
- NH-326 is passing through the study area.
- These villages are directly and indirectly connected with major road and rail links via thin roads that merge into NH-326 in the region.
- Laxmipur railway station is nearest to the project site in the study area
- Other major road (metalled road) also passes evenly through the study area connecting many of the study area village
- Bus service and auto service are also available in study area.

ROAD FACILITIES IN SURVEYED VILLAGES



Village Mankadajhola



Village Birguda





Village Singaram





Village Kenduada



Village Talakaipadar



Village Narkipadar



Village Puhundi

Photographs showing Water Facilities available in the Study Area

3.18.17 RECOMMENDATION & SUGGESTIONS

The village development plans are made in consultation with the community through Gram Sabha; these appear to address the needs of the community. However, it may be noted that at the implementation stage these plans often are fraught with problem of inadequate funds, lack of proper planning, corruption, vested interests and political agendas. Hence, while ascertaining the scope for convergence with the government activities, care must be taken to ascertain realistic possibilities for implementation.

Women empowerment– Home based income generation activities, vocational training programs, and common education centre for increasing the literacy rate.

Education – Free uniform, construction of common rooms and library, computer education and physical education, additional schools for girls, furniture and equipment in schools, up-gradation

of existing school infrastructure. Opening of new secondary and senior secondary schools in the villages.

Vocational training for disable persons.

Employment – New employment opportunities for the unemployed youth; based on skilled manpower requirement.

Agriculture/livestock – Infrastructure such as agricultural practices, assistance with buying improved tools and equipment, capacity building, supply and/or knowledge of better variety of seeds, pasture land development and trainings on animal husbandry& facility of veterinary doctor.

Health – Improvement in sanitary conditions of villages, assistance with construction of latrines, improvement in drainage system, health camps and awareness campaigns for diseases like malaria, typhoid, tuberculosis, yellow fever and pneumonia. Repairing of existing and opening of new PHCs and Anganwadi centers.

People with disability – Establishment of center for special education, sensitization of the community towards disabled and awareness on Government schemes.

3.18.18 SOCIO-ECONOMIC SURVEY PHOTOGRAPHS

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Village Biriguda</td><td>Village Kenduada</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td colspan="2">Village Talakipadar</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Village Narakaipadar</td><td>Village Singaram</td></tr>
</table>

The socio-economic condition of the study area assessed on the basis of surveyed villages and census data gives clear picture of its population, average household size, literacy rate, sex ratio etc. A part of population is suffering from the lack of permanent job to run their day to day life and get basic facility.

All villages have road connectivity and government bus facilities are also available. The area needs improvement in the basic needs such as transportation services, education and drinking water supply. Inspite being educated up to secondary levels, people lack the understanding of keeping the clean vicinity. It is important for the project proponent to take action for developing proper sanitation facilities to keep the project area disease free. The infrastructure and amenities available in the area denotes the economic well being of the region. The study area as a whole possesses average infrastructural facilities. The expansion of this project would lead to direct and indirect employment opportunities. The unskilled and semi-skilled categories of labour are available from the nearby villages and towns. Further, many of the agricultural laborers are being attracted to take up the steady, round the year employment at industry site.

While people are happy with expansion of this project and the increase in employment opportunities, more attention and care should be taken so that the population get more exposure to modern facilities of education and development for a bright future.

Hence, the long-term positive impacts on socio-economic conditions of the area are anticipated.

Identification of Needs

During the survey the needs of the people were identified and as per their requirement they have been enlisted below. It has been identified that Healthcare facilities, drinking water facilities and employment are amongst the major needs of the area.

Table – 3.33

Need of the Area

Needs	Details
Healthcare facilities	➢ Healthcare facility like a permanent and regular dispensary with doctors and nurses for common ailments and deliveries is a requirement. ➢ Health care centers and sub centers are needed in the villages and medical stores should also be provided. ➢ Ambulance in the villages.
Drinking water	➢ Proper Drinking water supply to the people in the near by area during summers. ➢ Also, water for irrigation is required to improve the production in agriculture.
Sanitation	➢ Proper toilet facilities are required but common toilets will not work due to responsibility issues. Also, behavior modification and awareness regarding hygiene is a must. This should be coupled with awareness and behavior modification exercise for health and hygiene. ➢ Low-income communities which do not have adequate sanitation facilities are exposed to a high risk of infection with Sanitation and hygiene related diseases. Children under the age of 3 are particularly susceptible to diarrheal diseases.

Needs	Details
	➢ Awareness for waste management and proper sanitation with feminine hygiene is necessary among the villagers.
Infrastructural needs	All the basic needs are required in these Villages: ➢ Road development ➢ Drain system in villages ➢ Paved the road and closed Drainage system must be maintained in the villages ➢ Street lights in the villages ➢ Drinking water facility for each household ➢ Private toilets with water facility & sensitization about their use
Electricity	➢ At present electricity has become an essential part of modern life. ➢ A proper electricity would be required in these villages to run basic appliances in a house, which plays a major role in socio-welfare and health community.
Banking facility	➢ Banking systems manage the flow of money between individuals. ➢ Good number of banking systems can improve the lives of these people by accepting deposits and lending out money for investments to encourage small business which paralelly improves the livelihood.
Others	➢ Awareness programme for villages. ➢ Cultural programme for community.

3.19 CONCLUSION

The environment baseline study was conducted in the project area by both secondary data and primary data collections. Abiotic factors including air, water and soil were studied for the core and buffer zone. It was found that most of the parameters were within the limits as per the Standards. Similarly, the study for the biotic factors was conducted. It can be concluded that the present environment status of the study area is good enough for the project expansion activity. Adoption of adequate pollution control measures will protect the surrounding environment.

CHAPTER - 4

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 INTRODUCTION

The environmental parameters likely to be affected by mining are related to many factors, i.e., physical, social, economic, agriculture and aesthetic. The mining operations are being carried out since 2018. The Kodingamali Bauxite Mine is a fully mechanized opencast mine which involves drilling, blasting, excavation, loading, crushing, transportation, unloading etc. The mine adopts conventional mining technology i.e. Shovel-Dumper combination. Being a plateau-top deposit, the mine is amenable to opencast mining with a fairly high degree of mechanization.

Drilling & Blasting is being/will be carried out in the hard strata whereas soft ore is being/will be directly excavated by 4.3 m^3/3.5 m^3 capacity of hydraulic excavators. The excavated Bauxite is being/will be transported to the crusher present within the ML Area. Thereafter, the crushed Bauxite is being/will be transported via Road through Tippers to the Railway siding near Kakriguma from where the ore will be further dispatched for sale to the prospective buyers (for its use in Alumina & Aluminium Plants). After expansion the mineral will also be transported up to Railway Siding Singaram and Rayagada for further sale to the prospective buyers.

The mining operations may disturb environment of the area in various ways such as removal of mass, change of landscape, flora and fauna of the area, surface drainage and change in air, water and soil quality & noise level (mostly localized to the mine area). While for purpose of development and economic upliftment of people, there is need for establishment of mining industries. Therefore, it is essential to assess the impact of mining on different environmental and Socio-economic parameters before starting the mining operations so that abatement measures could be planned in advance for minimizing the impacts wherever feasible.

The likely impacts on different environmental parameters due to the mine site location, possible accidents, mine design, development, operations & final closure of this mining project are discussed below:

4.2 METHODOLOGY OF IMPACT ASSESSMENT

The impact assessment has been undertaken following a systematic process that identifies, predicts and evaluates the impacts the project could have on aspects of the physical, biological, social/ socio-economic and cultural environment, and identifies measures that the project will take to avoid, minimize/reduce, mitigate, offset or compensate for adverse impacts; and to enhance positive impacts where practicable. The stages of the impact assessment process comprise of the following:

- ***Impact identification:*** To identify the potential impact of the project on the various environmental parameters.
- ***Impact prediction:*** To determine what could potentially happen to resources/receptors as a consequence of the project and its associated activities.

- ***Impact evaluation:*** To evaluate the significance of the predicted impacts by considering their magnitude and likelihood of occurrence, and the sensitivity, value and/or importance of the affected resources/ receptors.
- ***Impact mitigation:*** To identify and recommend appropriate, feasible and justified measures for minimizing or mitigating or eliminating adverse impacts while enhancing positive outcomes.

4.3 BASIS OF IMPACT ASSESSMENT

The impact of the proposed expansion project would be assessed on the basis of their characteristics i.e., nature, type, extent, duration, intensity & frequency and its significance.

Characteristics of Impacts

The impact is described in terms of its characteristics such as nature, type etc. Impact characteristics are given in Table - 4.1.

Table - 4.1

Impact Characteristics

Characteristic	Classification	Description
Nature	Positive impact	When impact is considered to represent improvement to baseline or introduce a new positive factor/change.
	Negative impact	When impact is considered to represent adverse change from the baseline or introduce a new undesirable factor/change.
	Neutral	When there is no impact to represent any change from the baseline and not introducing any new factor/change.
Type	Direct impact	Resulting from a direct interaction between a project activity and the receiving environment / receptors.
	Indirect impact	Resulting from other activities that happened as a consequence of the project.
	Cumulative impact	Impacts that act together with other impacts (including those from concurrent or planned future third-party activities) to affect the same resources and/or receptors as the Project.
Extent	Project Area	When impact due to the project related activities is restricted within the premises of project area i.e., core zone.
	Local	When impact due to the project related activities is restricted within the immediate surroundings i.e., up to 3.0 km radius.
	Zonal	When impact due to the project related activities is restricted within the study area i.e., up to 10 km radius.
	Regional	When an impact due to the project activity extends within as well as beyond 10 km radius.
Duration	Short – term	When the impact is usually temporary or last for a short time or will have an effect soon rather than in the distant future.
	Long- term	When impact would occur during the development of the project and either takes a long time or lasts a long time or cause a permanent change in the affected receptor/resource.
Intensity	Low	When resulting in slight changes of prevailing baseline conditions and quality of existing physical environment is good. Ecological environment as well as human receptors are not likely to be affected due to the

Characteristic	Classification	Description
		proposed project activity.
	Medium	When resulting in changes of prevailing baseline conditions which are within the benchmark norms and quality of existing physical environment shows some signs of stress. Ecological environment as well as human receptors could be sensitive to change in quality of prevailing baseline condition, but human receptors retain an ability to adapt to change.
	High	When resulting in changes of prevailing baseline conditions which are exceeding the benchmark norms and quality of existing physical environment is already under stress. Ecological environment as well as human receptors would be impacted to the larger extent and the ability of human receptors to adapt to changes would be undermined.
Frequency	Remote (R)	When resulting in remote or one-off chance of an event due to an activity on a receptor/ resource.
	Occasional (O)	When an impact due to an activity is occurring intermittently from time to time on a receptor/resource.
	Periodic (P)	When an impact due to an activity is resulting on periodic basis for a week or a month on a resource/receptor.
	Continuous (C)	When an impact due to an activity is continuously resulting on a resource/receptor.

Significance of Impacts

Impacts are described in terms of 'significance'. Significance is a function of the magnitude & sensitivity / importance of the impact.

Classification of impact significance is given in Table - 4.2.

Table - 4.2

Significance of Impact

Significance	Description
Insignificant	Negligible impact or where a resource or receptor (including people) will not be affected in any way by a particular activity, or the predicted effect is deemed to be 'negligible' or 'imperceptible' or is indistinguishable from natural background variations.
Minor	Where an effect will be experienced, but the impact is well within accepted standards/guidelines with or without mitigation.
Moderate	Where an effect will be experienced and the impact is within accepted standards/guidelines with mitigation.
Major	Impact where an accepted limit or standard may be exceeded or the impact occur to the highly valued/sensitive resource/receptors.

Irreversible and Irretrievable commitments of environmental components

Determining the irreversible and irretrievable commitment of the resources is one of the major stages of impact evaluation, which gives an understanding about the potential impacts that are likely to affect future generations of the area and facilitates for adoption of proper mitigation measure regarding the same.

Table - 4.3

Irreversible and Irretrievable commitments of environmental components

Commitment of resources	Description
Irreversible	Irreversible commitment of resources refers to the impact or loss of the resources that cannot be recovered or reversed. Irreversible is a term that describes the loss of future options. It applies primarily to the impacts of use of nonrenewable resources or to those factors that are renewable only over long periods of time.
Irretrievable	Irretrievable is a term that applies to the loss of production, harvest, or use of natural resources. Irretrievable commitment of resources may be considered as the loss of resources as a result of change (both reversible & irreversible) due to any project activity that cannot be regained or recovered.

4.4 INTERACTION MATRIX

The interaction matrix enables a methodical identification of the potential interactions each project activity may have on the range of resources/receptors within the Area of Influence for the Project.

The interaction matrix for the project activities and likely impacted resources/receptors is presented in Table - 4.4 which covers potential interactions, regardless of probability of occurrence. The matrix consists of a list of resources/ receptors that could be affected against a list of project activities.

Entries in the matrix cells are tick marked to indicate whether:

- An interaction is not reasonably expected (blank);
- The interaction is reasonably possible and may lead to potential impact (tick marked).

Table - 4.4
Interaction Matrix

S. No.	Project Activity / Likely Impacted Resources / Receptors	*Land Acquisition*				Mine development & Process					*Reclamation and Greenbelt/plantation*			*Miscellaneous*		
		Acquiring land	Displacement of households	Displacement of occupation	Rehabilitation & Resettlement of PAFs	Site Clearing within the project area and leveling of site (removal of vegetation, structures etc.), Storage of soil	Mining Operation (Excavation with Drilling Blasting, etc.)	Loading and unloading of mined out material	Crushing of ROM in the crusher (located within the ML Area)	Transportation of Bauxite via Road to the Railway Siding at Kakriguma (Distance ~24.0 Km from the lease area) and Singaram & Rayagada Railway Siding	Temporary Dump formation (terracing, construction of garland drains & retaining walls)	Reclamation of mined out pits by backfilling	Greenbelt Development and maintaining greenbelt of 7.5 m statutory barrier. Plantation on backfilled area and mineral storage area.	Workshop for HEMM maintenance in mine.	Meeting points of workers/ employees i.e. Rest shelter, canteen, etc.	Handling of explosive in magazine & AN storage shed and fuel
A.	**Physical**															
1.	Air					√	√	√	√	√	√	√	√			
2.	Noise & / Vibration					√	√	√	√	√			√	√	√	
3.	Land Use					√	√				√	√	√	√		
4.	Topography					√	√	√			√	√				
5.	Geology						√				√	√				
6.	Drainage Pattern										√	√				
7.	Surface Water														√	
8.	Ground Water															
9.	Soil					√	√	√		√	√	√	√		√	
B.	**Biological**															
1.	Flora					√	√			√	√	√	√			
2.	Fauna					√	√					√	√			
3.	NP/WLS/BR/reserves/Forests etc.															
C.	**Social / Socio-Economic**															

1.	Demography															
2.	Physical Displacement															
3.	Land Use (w.r.t. Population influx)															
4.	Habitation															
5.	Economy & Livelihood					√										
6.	Social & Cultural Structure														√	
7.	Infrastructure & Public Services					√										
8.	Public Health						√						√			
9.	Agriculture						√									
10.	Transport Infrastructure						√			√						
D.	**Occupational Health**															
1.	Injury					√	√	√	√	√		√		√		√
2.	Health						√	√		√						√
3.	Non - routine risk						√									√
	Legends		Show no interactions.								√	Show interactions reasonably possible with one of the outcomes may lead to potential impact				

According to the interactions identified between project activities and resource/receptors as described in the above table, it is evident that the following aspects are likely to have impact due to the mining project (Table - 4.5) and therefore, to be considered for Impact Assessment:

Table - 4.5

Likely Impacted Resources / Receptors

S. No.	Likely Impacted Resources / Receptors	
A.	**Physical**	Air Quality
		Noise Level, ground vibrations
		Water environment (Surface & Ground water)
		Soil
		Land Use and Land cover
		Geology &Topography
B.	**Biological environment**	Flora
		Fauna
C.	**Socio economic environment**	Habitation & Demography
		Physical Displacement
		Land use (w.r.t. population influx)
		Economy & Livelihood
		Social & Cultural Structure
		Infrastructure & Public Services
		Public Health
		Agriculture
		Transport Infrastructure
D.	**Occupation Health & Safety**	Injury
		Health
		Non-Routine Risk

Source: *Interaction Matrix*

The impacts of mining on various environmental parameters were assessed and are given below:

4.5 ENVIRONMENTAL IMPACT ASSESSMENT & MITIGATION MEASURES

The proposed expansion may disturb environment in various ways such as degradation of land, dust generation, deterioration of water and soil quality, affecting the biological and socio-economic environment of the area. A comprehensive assessment of these impacts for various environmental components has been carried out and is presented below.

4.5.1 IMPACT ON AIR QUALITY AND MITIGATION MEASURES

The proposed expansion project includes various mining operations involving excavation, drilling, blasting, loading, unloading, Crushing of Bauxite, transportation of mineral via road to prospective buyers. These operations generally result in generation of dust (particulate matter) and gaseous emissions (mostly from diesel equipment and vehicles) and thereby pose health hazards. However, adequate control measures will be provided at every stage of operation such as water sprinkling on haul roads, maintaining optimum vehicle speed, proper maintenance of the equipment etc. to reduce fugitive dust emissions.

4.5.1.1 AIR POLLUTION DUE TO BAUXITE MINING PROJECT

(i) Gaseous Pollution

Gaseous pollutants (SO_2, CO and NO_X) are anticipated from blasting operation and movement of machineries like excavator, loaders, dumpers, and other vehicles; while generation of pollutants during blasting is instantaneous and momentary but in other activities from drilling to crushing is of continuous nature.

(ii) Particulate Matter

The generation of dust is anticipated from various mining activities like drilling, blasting, excavation, loading, unloading, crushing and transportation, and other mining related activities. The ambient air quality monitored during Post-monsoon Season (October to December, 2024) shows that the PM concentration in the surrounding villages is within the prescribed limits, which indicates negligible or no impact from existing mining activities on ambient air quality.

4.5.1.2 AMBIENT AIR QUALITY IMPACT PREDICTION MODELING

Impact Prediction is an important part of Environmental Impact Assessment Study. There are various techniques available to predict the impacts. Mathematical modelling is an established and accepted technique for the same. The ambient air quality is influenced by emission sources, meteorological conditions and the topographical features of the study area. The impact of any future emission activities can be accessed through air quality modelling. Air quality modelling is a mathematical replication of how air pollutants disperse and transport to the receptor considering the effect of meteorology and site terrain. It simulates key aspects of pollutant behaviour under specific environmental conditions. Air quality prediction modelling helps identify pollutant source contributions and supports the formulation of appropriate mitigation strategies to manage air quality effectively.

The details of total excavation at normative & peak stage for ambient air quality impact prediction is given below:

Table 4.6(a)

Ambient Air Quality Impact Prediction for Kodingamali Bauxite Mine (At Production capacity: 3.6 MTPA)

S. No	Particular	Capacity (Million TPA)	Normative Capacity (TPD) (300 Days)	Peak Production by increasing 20 % capacity (TPD)
1.	Bauxite	3.6	12000	12240
2.	Top Soil	0.13	433	520
3.	OB/Waste	1.98	6600	7920
	Total excavation	**5.71**	**19033**	**20680**

Total material handling is 5.71 Million TPA which comprises of: Bauxite 3.6 Million TPA, Top soil 0.13 Million TPA and OB/Waste 1.98 Million TPA.

Table 4.6(b)

Ambient Air Quality Impact Prediction for Kodingamali Bauxite Mine (Additional Expansion: 2.4 MTPA)

S. No	Particular	Capacity (Million TPA)	Normative Capacity (TPD) (300 Days)	Peak Production by increasing 20 % capacity (TPD)
1.	Bauxite	2.4	8000	9600
2.	Top Soil	0.09	300	360
3.	OB/Waste	1.31	4367	5240
	Total excavation	**3.8**	**12667**	**15200**

Additional proposed material handling for expansion will be 3.8 Million TPA which comprises of: Bauxite 2.4 Million TPA, Top soil 0.09 Million TPA and OB/Waste 1.31 Million TPA.

Table 4.6(c)

Ambient Air Quality Impact Prediction for Kodingamali Bauxite Mine (After expansion: 6.0 MTPA)

S. No	Particular	Capacity (Million TPA)	Normative Capacity (TPD) (300 Days)	Peak Production by increasing 20 % capacity (TPD)
1.	Bauxite	6.0	20000	24000
2.	Top Soil	0.22	733	880
3.	OB/Waste	3.29	10967	13160
	Total excavation	**9.51**	**31700**	**38040**

Total proposed material handling after expansion will be 9.51 Million TPA which comprises of: Bauxite 6.0 Million TPA, Top soil 0.22 Million TPA and OB/Waste 3.29 Million TPA.

The details of production capacity at peak stage (considering 20% increase) after expansion i.e. 6.0 Million TPA are given below:

At Peak Stage (20%)

In case of shut down/break down/major maintenance in crusher, production of mine may be suspended temporally and short fall may occur in Bauxite stock; therefore, to cover up this short fall, maximum 20% production is considered as compared to daily production & meanwhile in that period development work like removal of Soil, waste etc. is also considered at 20% maximum as compared to daily capacity. However, the annual production will remain same i.e., Bauxite: 6.0 Million TPA, Top Soil: 0.22 Million TPA and OB/Waste: 3.29 Million TPA.

After considering the 20% maximum, the Bauxite production of per day will be 24000 Tonnes & Others (Top Soil and OB/Waste) will be 14040 Tonnes; thus, total handling will be 38040 Tonnes/day (At Peak Stage). The same has been considered for air quality modelling.

This report gives the cumulative peak incremental concentration of Particulate Matter up to a distance of 10 km, due to the mining & allied activity. The concentrations have been predicted in all directions covering study period. Spatial distributions of all the pollutants are also presented in the form of Isopleths**.**

4.5.1.3 ACTIVITIES INVOLVED IN THE PROJECT

This proposed Expansion Project includes removal of Top Soil/OB, drilling, blasting, loading with hydraulic excavators (4.3 m^3/3.5 m^3 capacity) into dumpers and its temporary stacking & transportation to dump yards. Excavated Bauxite is being/will be transported to the crushers of 2 x 500 TPH capacity located within the mine. One Crusher of 2400 TPH is proposed to be installed within the lease area. However, the existing crushers of 2 X 500 TPH will be phased out, subsequently, after installation of 2400 TPH Crusher.

The crushed Bauxite is being/will be transported via Road through Tippers to the Railway siding near Kakriguma, Singaram, Rayagada & Dumuriput from where the ore will be further dispatched for sale to the prospective buyers (for its use in Alumina & Aluminium Plants/Refineries). After expansion the mineral will also be transported up to Railway Siding Singaram and Rayagada for further sale to the prospective buyers.

4.5.1.4 EMISSION RATE AS PER MATERIAL HANDLED

The line source modelling was done by using AERMOD view 10.2.1 Model. Detailed calculation of Emission rate and pollution load due to mining activities are given below:

Table 4.7

Estimated Emission Load of Particulate Matter for the Mine

S. No.	Activity	Category of Source	Emission Load	
			Kg/day	Contribution
1.	Drilling	Point	46.55	0.70
2.	Bauxite loading	Point	43.97	0.66
3.	Overburden Loading	Point	43.34	0.65
4.	Haul Road	Line	6190.76	92.81
5.	Bauxite Unloading	Point	63.01	0.94
6.	Overburden Unloading	Point	5.78	0.09
7.	Exposed O.B. Dump	Area	171.31124	1.58799
8.	Exposed Pit surface Area	Area	105.92934	2.56813
Total SPM Load (kg/day)			6670.65	**100%**
SPM Emission (g/s)			102.94	

Source: *CMFRI, 1998; Chakraborty et al. 2002*

S. No.	Activity	Emission Rate
1.	Total SPM Load (kg/day)	7265.20
Uncontrolled (Without EMP)		
2.	SPM Emission (g/s)	112.1172848
3.	PM_{10} Emission Rate @50 % of SPM	56.06
4.	$PM_{2.5}$ Emission Rate @ 40% of PM_{10}	22.42
Controlled (With EMP)		
5.	PM_{10} Emission Rate @80 % efficient mitigations measures - 20% of PM10	11.21
6.	$PM_{2.5}$ Emission Rate @80 % efficient mitigations measures - 20% of PM2.5	4.48

Source: *CMFRI, 1998; Chakraborty et al. 2002*

S. No.	Activity	Emission Rate (gm/sec)	Emission Rate (kg/day)
Uncontrolled (Without EMP)			
1.	SO_2 Emission Rate	1.023269921	66.307891
2.	NO_2 Emission Rate	0.498986474	32.3343235

Source: *CMFRI, 1998; Chakraborty et al. 2002*

4.5.1.5 MODELING PROCEDURE

Prediction of incremental ground level concentrations (GLC's) due to the proposed expansion in Kodingamali Bauxite Mine has been made by AERMOD view 10.2.1 - Model. It is US-EPA approved model for prediction of the air quality. For this study, uniform polar receptors have been assumed. Modelling has been done considering area source, line source and point source for mine.

4.5.1.6 METEOROLOGICAL DATA/INPUT PARAMETERS FOR AERMOD

a) Meteorological Data

Meteorological inputs are Temperature, Relative Humidity, Wind Speed and Wind Direction etc. which were recorded at site during Post Monsoon Season (October to December, 2024).

b) Stack Emissions

Stack emission details of Crusher of mine.

4.5.1.7 AMBIENT AIR QUALITY STANDARDS

Ambient air quality standards promulgated by National Ambient Air Quality Standards for different areas are as follows:

Table - 4.8
Ambient Air Quality Standards

Area	Time Weighted Average	Concentration (µg/m³)			
		PM_{10}	$PM_{2.5}$	SO_2	NO_2
Industrial Area, Residential Rural and Other Areas	Annual Average*	60	40	50	40
	24 hours**	100	60	80	80
Ecologically Sensitive Area (Notified by Central Govt.)	Annual Average*	60	40	20	30
	24 hours**	100	60	80	80

4.5.1.8 AMBIENT AIR QUALITY MODELLING

Air pollution modeling is a numerical tool used to describe the causal relationships between emissions, meteorology, atmospheric concentrations, deposition and other factors. Air pollution measurements give important quantitative information about ambient concentrations and deposition, but they can only describe air quality at specific locations & time, without giving clear guidance on the identification of the causes of the air quality problem. Air pollution modeling, instead can give a more complete deterministic description of the air quality problem, including an analysis of factors and causes (emission sources, meteorological processes, and physical and chemical changes) and some guidance on the implementation of mitigation measures.

4.5.1.9 POLLUTION EMISSION INVENTORY

Development of pollutant emission inventory is essential part of any dispersion modeling and emission rate is one of the important input parameters. It is necessary to understand the source of emission of air pollution from each mining activity.

In Bauxite mining, most of the major activities contribute to the emission of particulate matter, right from exploration to exploitation including mineral processing. The locations of these activities are Drilling, Bauxite/Waste Loading, Haul Road, Bauxite/Waste Unloading, Crusher, Stock Yard, Exposed Pit Surface, Waste Loading and Unloading etc. Numerous researchers have derived various formulation based on the experimental data and generalized the emission calculation for various opencast mining activities irrespective of type of mining. ***(CIMFR, 1998; Chakraborty et al. 2002)***.

4.5.1.10 ESTIMATED EMISSION OF PARTICULATE MATTER & FOR GASEOUS EMISSION

The excavated Bauxite will be transported from mine face to crushers located within the mine lease area by 60Tonnes/35 Tonnes capacity of dumper via haul road. The crushed ore is being be transported via Road through Tippers to the Railway siding near Kakriguma from where the ore will be further dispatched for sale to the prospective buyers (for its use in Alumina & Aluminium Plants/Refineries).

After expansion, the ore will be transported to Railway Sidings namely Kakriguma, Singaram (~27 Km from the ML area), Rayagada (~70 Km from the ML area) and Dumriput (~67 Km from the ML area). Form the Railway Sidings, the ore is being/will be further dispatched for sale to the prospective buyers.

At Normative stage, total trips of 60 Tonnes capacity of dumper required per day for transport of 20000 TPD Bauxite from mine face to crusher will be 333 numbers. The number of trips per hour will be 19 numbers (3 shifts @ 6.0 effective working hours).

Total trips of 35 Tonnes capacity of dumper required per day for transport of 20000 TPD Bauxite from mine face to crusher will be 571 numbers. The number of trips per hour will be 32 numbers (3 shifts @ 6.0 effective working hours).

At Peak stage, total trips of 60 Tonnes capacity of dumper required for transport of 24000 TPD Bauxite from mine face to crusher will be 400 numbers. The number of trips per hour will be 22 numbers (3 shifts @ 6.0 effective working hours).

Total trips of 35 Tonnes capacity of dumper required per day for transport of 24000 TPD Bauxite from mine face to crusher will be 686 numbers. The number of trips per hour will be 38 numbers (3 shifts @ 6.0 effective working hours)

4.5.1.11 PRESENTATION OF RESULTS

In the present case, air quality impact prediction has been carried out for this mining Project to obtain an optimum description of variations in concentration over the site in 10 km radius study area covering 16 directions.

The incremental concentrations have been estimated based on mathematical emission data-based modelling. Existing value has been covered in the Background Ambient Air Quality Monitoring. The Ground level incremental concentrations are estimated for the monitoring period.

Table - 4.9

Presentation of Results of Baseline Study on Ambient Air quality with EMP (In Control Case)

Particular	Baseline Value ($\mu g/m^3$)	Incremental Value ($\mu g/m^3$)	Resultant Value ($\mu g/m^3$)	Prescribed Standards Value in ($\mu g/m^3$)
PM10	71.3	3.68	74.98	100
PM2.5	40.4	1.47	41.87	60
NO_2	20.7	1.61	22.3	80
SO_2	10.7	1.84	12.54	80

Source: *Isopleths and Ambient Air Quality Monitoring Results*

The incremental concentrations have been estimated based on mathematical emission data-based modelling. For each time scale, i.e. for 24 hrs, the model computes the maximum GLC observed during the period over all the measurement points. Existing values has been covered in the Background Ambient Air Quality Monitoring. The Ground level incremental concentrations are estimated for the monitoring period. For each time scale, i.e. for 24 hr the model computes the highest concentrations observed during the period over all the measurement points.

The maximum predicted incremental concentration for PM_{10} is 3.68 µg/m^3, $PM_{2.5}$ is 1.47 µg/m^3, SO_2 is 1.84 µg/m^3 and NO_2 is 1.61 µg/m^3. Isopleths of the maximum predicted incremental concentration are given below:

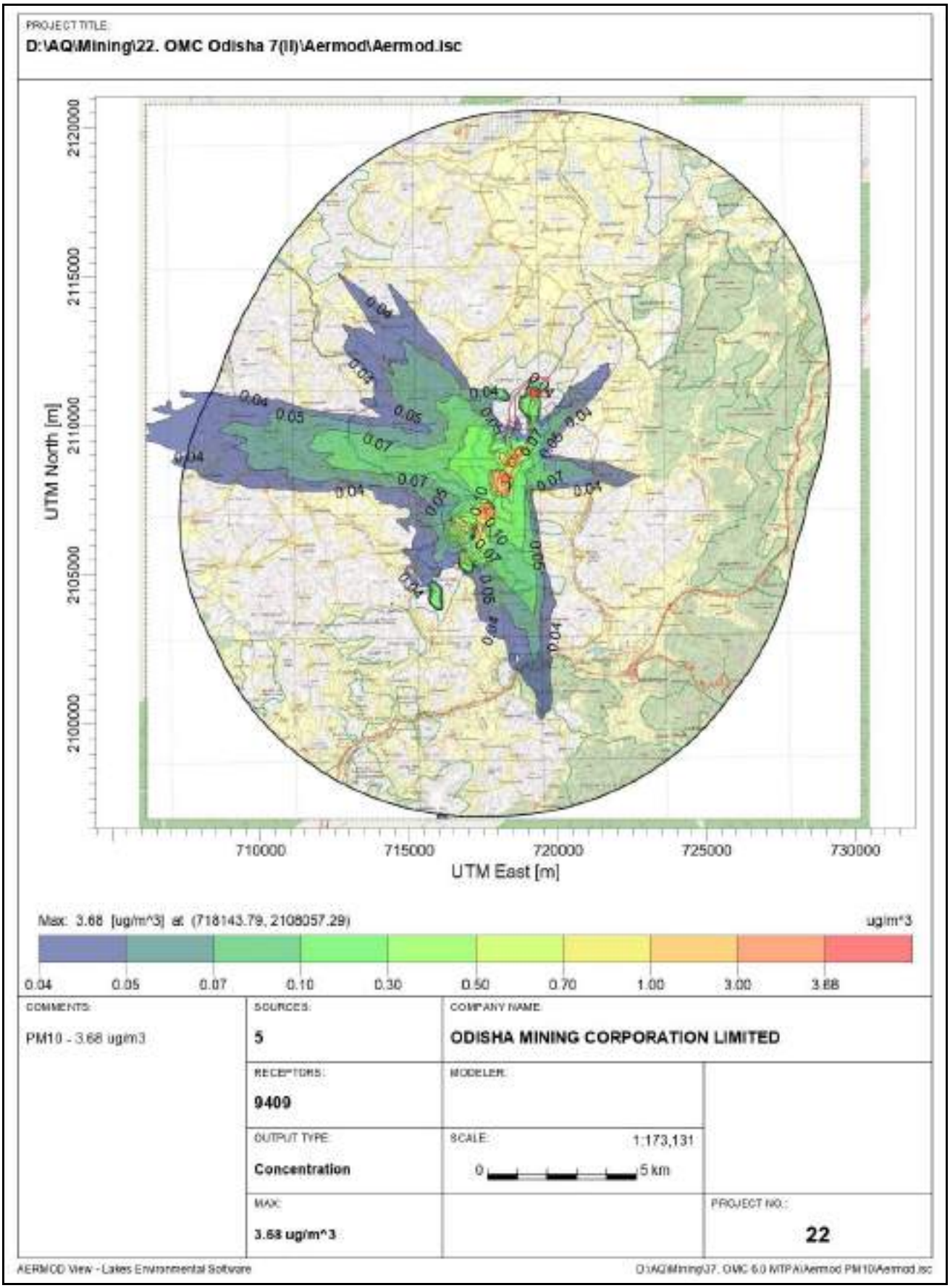


Figure 4.1: Isopleth showing incremental concentration of PM_{10}

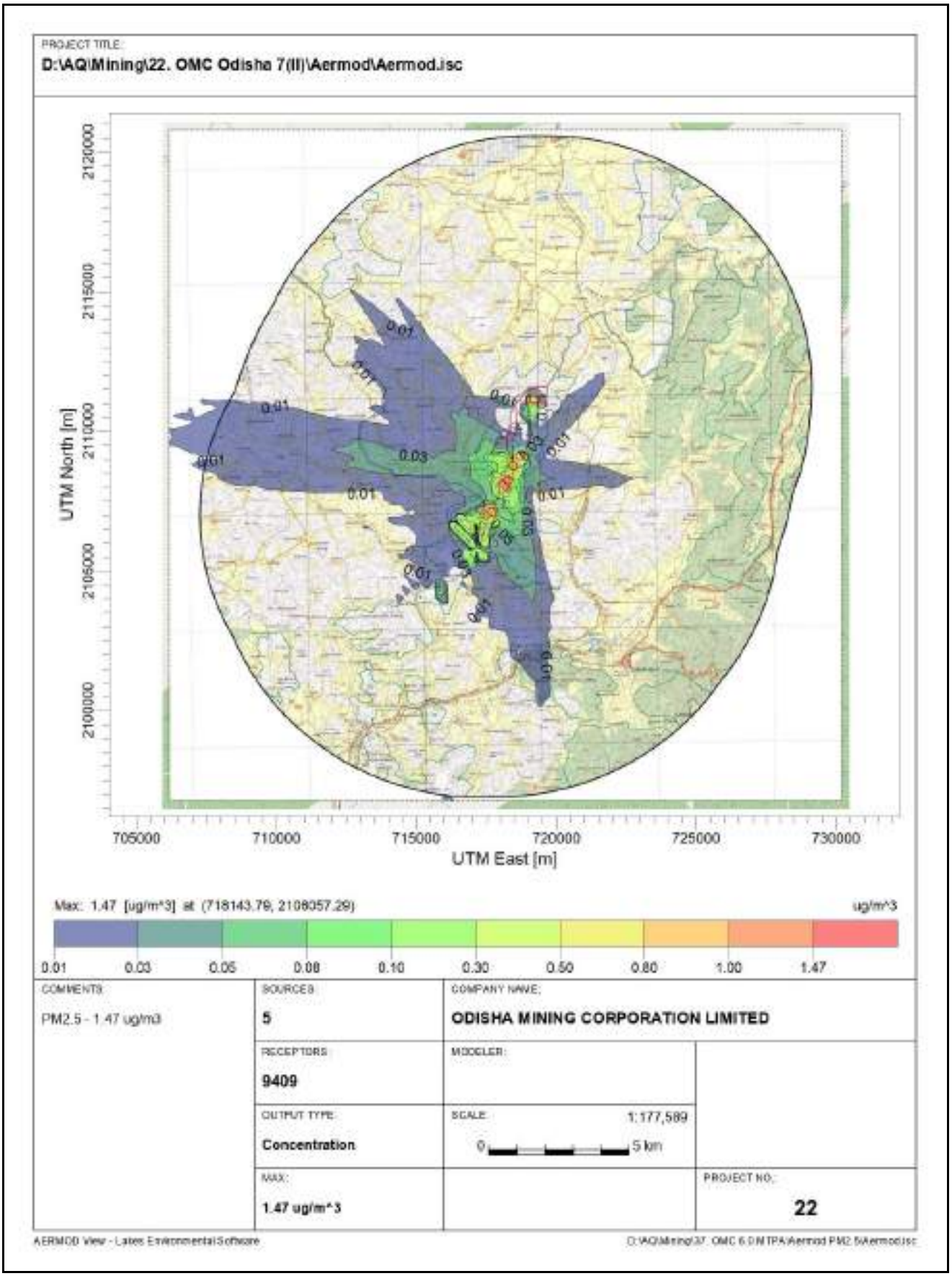


Figure 4.2: Isopleth showing incremental concentration of $PM_{2.5}$

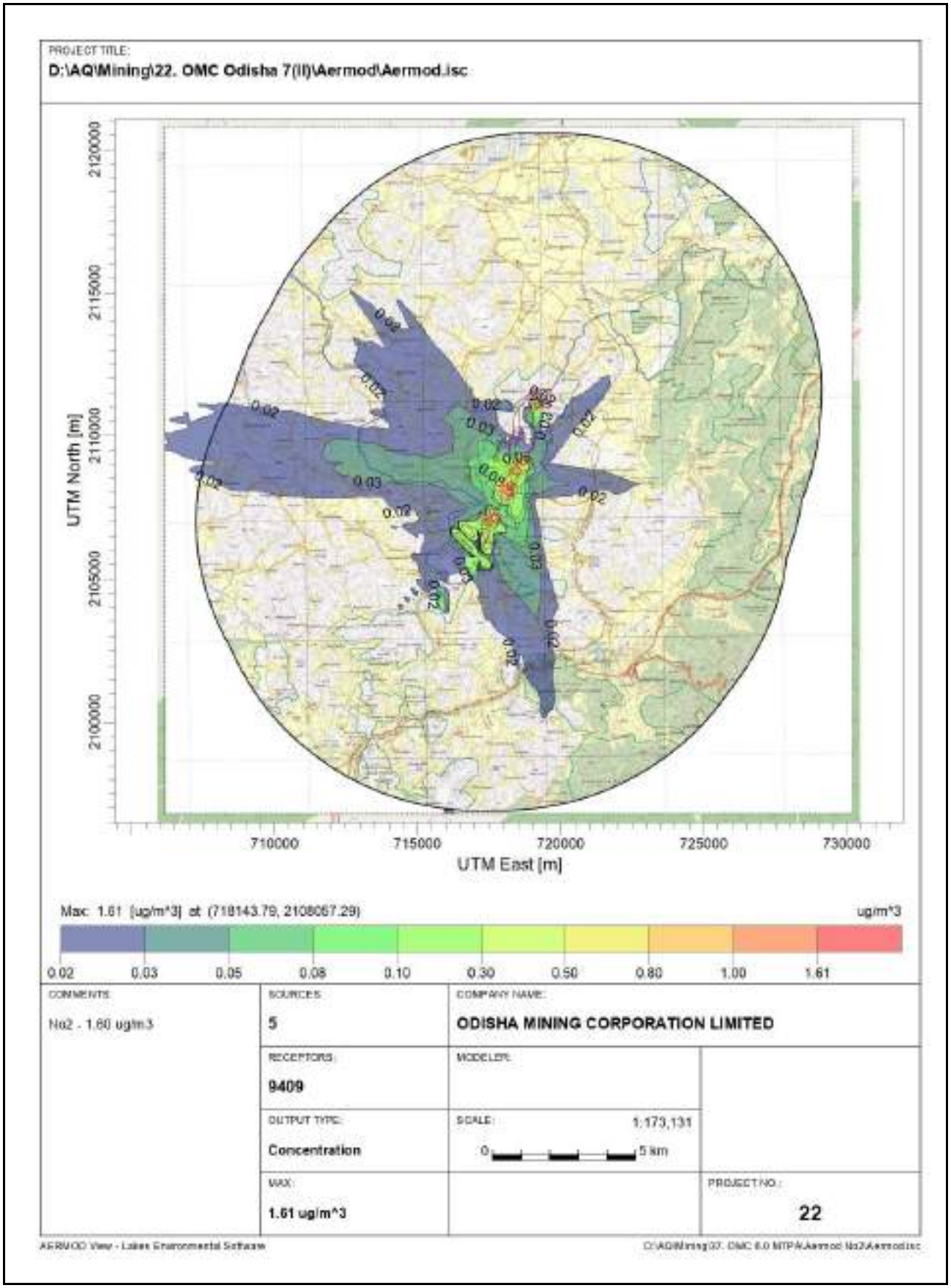


Figure 4.3: Isopleth showing incremental concentration of NO_2

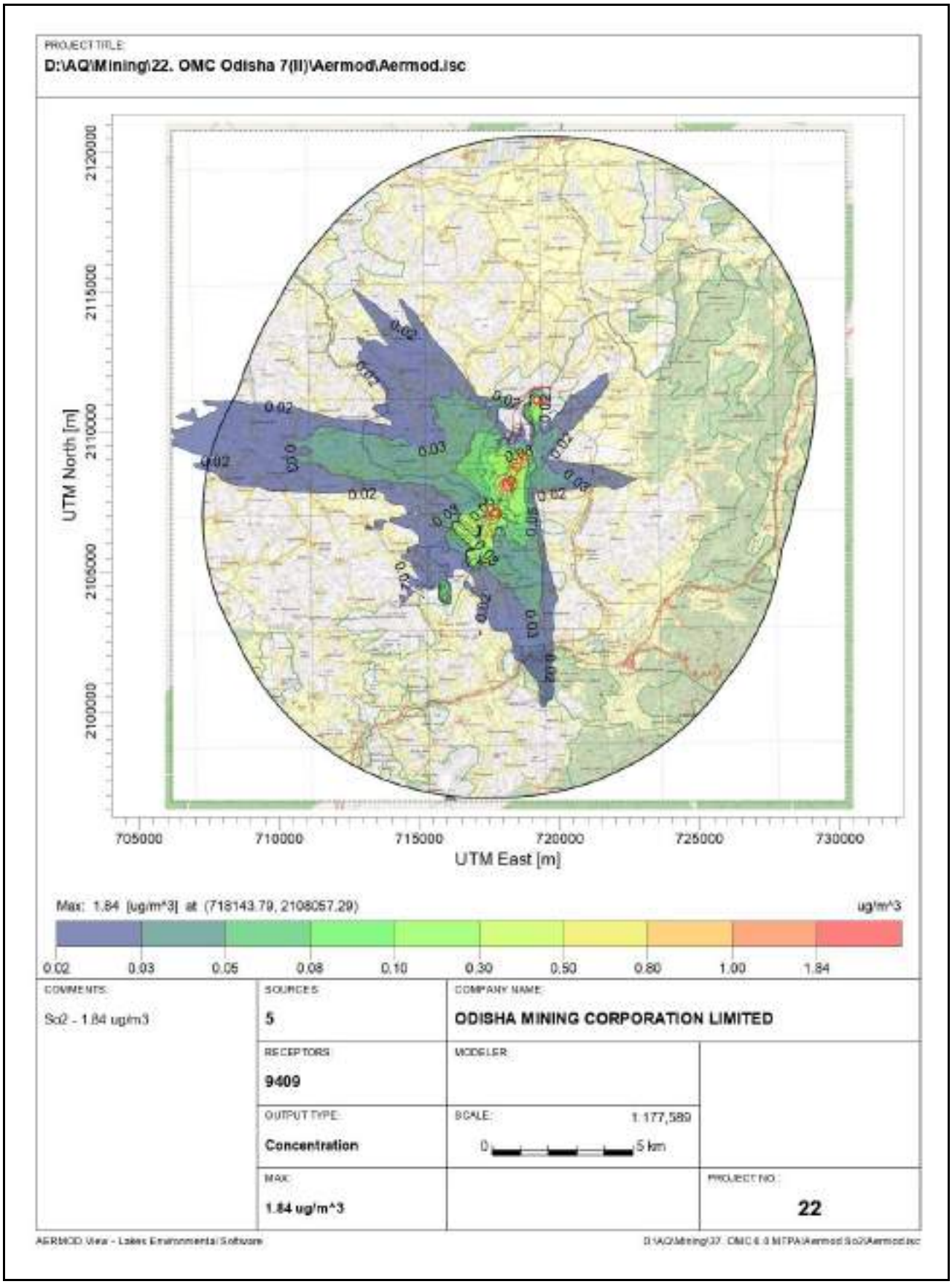


Figure 4.4: Isopleth showing incremental concentration of SO_2

4.5.1.12 MITIGATION MEASURES

The following mitigation measures are being/will be adopted to mitigate air pollution generated due to the mining activities:

- Drilling & Blasting is being/will be carried out in the hard strata whereas soft ore is being/will be directly excavated by 4.3 m^3/3.5 m^3 capacity of hydraulic excavators.
- Drilling machines (15 Mt/hr.) is being/will be equipped with both water injection and dust collector system to suppress dust generation at source.
- Controlled blasting is being/will be adopted and optimum use of explosives helps in reducing the air pollution.
- Blasting is being/will be done by using 100% NONEL detonators & Shock Tubes.
- Blasting is being/will be avoided during high wind speed and night time.
- High efficiency water spray on haulage roads using water tankers on blasted rock before its loading & proper maintenance of haul roads is being/will be done.
- Pollution under control (PUC) checking of mining equipment is being/will be done with the help of Govt. approved agencies in every six months for periodical monitoring.
- Proper maintenance (preventive as well as scheduled maintenance), oiling and greasing of HEMMs & vehicles is being/will be done to minimize gaseous pollutants
- Use of Hydraulic Rock Breaker for breaking oversize boulders in place of secondary blasting.
- Overloading of material is being avoided.
- Fugitive dust emissions from all sources will be controlled regularly, Water spraying on haul roads, loading, unloading and transfer points is being/will be provided and maintained.
- Haul roads and service roads are/will be graded to remove the accumulated loose material.
- Mist Fog Cannons/Sprayers have been/will be installed within the ML area.
- Development of greenbelt/plantation around mine boundary and backfilled area is being/will be carried out to control the air pollution.
- Huge GI sheet enclosures have been installed around the Crusher which acts as a shield for the dust particles getting air-borne.
- Bag Filters will be installed at Crusher site.
- Crushers are having water-mist spray arrangements.
- Vehicular emissions are being kept under control and regularly monitored. Measures shall be taken for maintenance of vehicles used in mining operations and in transportation of mineral. The vehicles are covered with a tarpaulin and shall not be overloaded.
- Total area under Greenbelt of 7.5 m along the lease periphery will be 18.098 ha. Out of which 8.97 ha area has already been covered under Greenbelt (Safety Zone).
- Ambient Air Quality Monitoring is being/will be done at 06 locations.
- Fugitive dust emission monitoring is being/will be done.
- Records of ambient air quality monitoring results are being/will be maintained.
- Continuous Ambient Air Quality Monitoring system will be installed within the ML area. Plan for installation of CAAQMS is enclosed as ***Annexure XIV.***

Details of Water Sprinkling System

Fixed Water Sprinklers and Fog Canons

- Fixed water sprinklers (Length: 1200 m) have already been installed within the lease area from crusher to pit mouth. Besides, this 2 nos. of Rain Guns are also installed. The details of existing fixed sprinklers are given below:

S. No.	Particular	Details
1.	Total number of sprinklers	**110**
2.	Length of fixed water sprinkler	1200 m
3.	Height of water sprinkler	4.0 Feet
4.	Type of Pipe	HDPE Pipe
5.	Diameter of Pipe	90 mm (Main Line), 75 mm (Sub-main Line)
6.	Diameter of Sprinkler Nozzle	10 mm
7.	Space between two Nozzles	15 m

Source: *M/s. OMC Ltd.*

A Plan showing locations of existing and proposed Fixed water sprinklers and Fog Canons is enclosed as ***Annexure - XV.***

Details of utilization of Water Tankers within/outside the ML Area

- The total peak water requirement of the project after expansion will be 475 KLD out of which 400 KLD water will be sourced from Dharua Nala (Surface water) by road through water tankers. Permission for surface water drawl has already been obtained from Water resources Department, Govt. of Odisha.
- **Within the ML area:** Water tankers have been/will be deployed for supply of water for:
  - Collection and distribution of rain harvested water (RWH) & recycled water from STP, ETP & Grey water treatment facility.
  - Supply of water for Dust suppression to Fixed sprinklers and Sprinkling on the haul roads, at Crusher Unit and at Stockyard using Mist Canon.
  - Water for Domestic use.
  - For Greenbelt development & Plantation and for equipment washing.
- Total no. of Water Tankers deployed/to be deployed within the ML area: 10 Nos. and no. of trips: around 45 trips.
- **Outside the ML area:** Water tankers have been/will be deployed outside the ML area for sprinkling of water for dust suppression at the transportation route.
- No. of Water Tankers deployed/to be deployed: 2 Nos. with around 6 trips.

Hence, total number to Water Tankers utilized within and outside the ML area are/will be 10 Nos. (Within lease area: 8 Tankers, 45 trips and outside lease area: 2 Tankers, 6 trips).



Wet Drilling With Dust Collector System



Mist Fog Cannon At Mine Site



Permanent Water Sprinklers Installed At Mine Site



Crusher Enclosed in GI Sheets



Plantation near Mines Office



Greenbelt development along ML Periphery





Plantation along the Roads



Plantation on the Backfilled Area

4.5.1.13 IMPACT EVALUATION

Ambient Air Quality monitoring results are given in Chapter 3 of this EIA/EMP Report. From the results of modelling, it is evident that baseline AAQ results when added in the predicted incremental value, the resultant GLC concentrations were found well within the prescribed norms. Impact evaluation is given in table below.

Table - 4.10

Impact Evaluation for Ambient Air Quality

Impact Evaluation Element	Change of Air Quality Due to Expansion in Bauxite Mining Project			
Potential Effect/ Concern	Impact on health of humans and nearby biological/ecological receptors due to line and point sources of air emissions including fugitive dust emissions during Bauxite mining activities from the expansion Project			
Characteristics of Impacts				
Nature	Positive		***Negative***	Neutral
			√	
Type	***Direct***	Indirect	Cumulative	
	√			
Extent	*Project Area*	***Local***	Zonal	Regional
		√		
Duration	Short – term		Long- term	
			√	
Intensity	Low		***Medium***	High
			√	
Frequency	Remote (R)	Occasional (O)	Periodic (P)	**Continuous (C)**
				√
Significance of Impact				
Significance	Insignificant	Minor	**Moderate**	Major
			√	

4.5.2 IMPACT OF NOISE / VIBRATIONS & SAFEGUARD/MITIGATION MEASURES

4.5.2.1 IMPACT OF NOISE ON WORKING ENVIRONMENT

Mining operations for mine development, drilling, blasting, excavation, crushing and transportation of Bauxite are imperative that noise levels would increase. However, the expected noise levels are not likely to have any adverse effect from the occupational health point of view.

1. Noise Generated due to Mining Activities

Various mining activities i.e., drilling, blasting, loading, Crushing and transportation will increase the noise level in surrounding environment. The noise levels in the working environment will be maintained within the standards prescribed by Central Pollution Control Board.

2. Noise Generated Due to Blasting

Noise generated from blasting is for a short duration and instantaneous. Noise of blast is site specific and depends on type, quantity of explosives, dimensions of drill holes, degree of compaction of explosive in the blast holes. The noise levels tend to decrease significantly with distance. The impact of noise is being/will be restricted to mining activity area only, as plantation/ green belt has been/will be developed around the mine which restricts the propagation of noise.

3. Noise Impact Analysis on Community

Ambient noise levels were measured at 11 locations in and around the mine site. Noise levels varied from 48.8 Leq dB (A) to 56.4 Leq dB (A) during day time and from 37.2 Leq dB (A) to 43.0 Leq dB(A) during night time. Maximum noise levels during day time were found at Mine Site which may be due to the mining activities as this is an operational mine. The maximum Noise Level during night time was found at Laxmipur Town as this place is densely populated as compared to other locations, therefore, there may be increased human activities and more vehicular movement along with other commercial activities.

The minimum noise levels during day time and night time were found at the Monitoring Station at ~500 m from Mine Site as there are no major sources of noise pollution at this place. Over all, it can be stated that the impact on the present noise levels due to mining operations of due to the expansion project will be restricted to the work zone areas only and it will attenuate fast at mine boundary in majority of directions.

Recommended Noise Standards

Based on the recent ILO Code of practice the following standards and guidelines are provisionally recommended for attainment. as far as practicable:

- A warning limit value of 85 dB(A) may be set as the level below which very little risk to an unprotected ear, of hearing impairment exists for an eight-hour exposure.
- The danger limit value shall be 90 dB(A), above which the danger of hearing impairment and deafness may result from an unprotected ear: provided that during emergencies, or because of unforeseen technical reasons, a worker may be temporarily authorized to exceed the daily dose, but only if on the next day he recuperates so that the maximum weekly dose does not exceed the value specified above.
- A worker should not be allowed to enter, without appropriate ear protection, in area in which the noise level is 115 dB (A) or more.
- Personal protective equipment (PPEs) shall be worn, if there are single isolated outbursts of noise which can go above 130 dB (A) Impulse or 120 dB (A) 'Fast'.
- No worker shall be allowed to enter an area where the noise level exceeds 140 dB(A).

Source: *MMR, 1961 (Cir. Tech. 18/1975)*

4.5.2.2 MITIGATION MEASURES TO REDUCE NOISE LEVEL

The following control measures are being/will be adopted to keep the ambient noise levels well below the limits.

- Drilling is being/will be carried out with the help of sharp drill bits achieve optimum drilling performance and to reduce noise generation at source.
- Closed cabins are being/will be provided for drill operator.
- Controlled Blasting is being/will be done in accordance with standards prescribed by DGMS.
- Ambient Overcharging of blast holes is being/will be avoided.
- The charge per delay is being/will be minimized and preferably more number of delays are being/will be used per blasts.
- Hydraulic rock breaker is being/will be used for breaking boulders in place of secondary blasting.
- Blasting is being/will be carried out during day time only.
- Blasting is being/will be carried out through non-electric initiation system and the impact of noise generated due to blasting is/will be momentary.
- Explosives charge per hole and per delay is being/will be maintained as per DGMS guidelines.
- An audible warning signal is being/will be given 15 minutes before actual firing of blast to enable persons to move out of danger zone.
- Optimum delay sequence & stem to column ratio is being/will be maintained to minimize the fly rock distance and ground vibration intensity.
- A danger zone of 500m from the blasting site is being/ will be maintained with red flags or by other appropriate signs and entry of any unauthorized person into this zone is/will be prohibited during blasting operation.
- Use of Closed acoustic systems for controlling the noise within the crusher.
- Proper maintenance, oiling and greasing of machines is being/will be done at regular intervals.
- The administrative control is/will be maintained in suitable rosters of mine workers with the aim of not allowing any one to have noise exposure of 85 dB (A) continuously.
- Earplugs/earmuffs are being/will be provided to mine workers for its utilization in high noise levels immediately near HEMMs whenever required.
- Greenbelt and Plantation will be done on 7.5 m along lease periphery and on the backfilled area. Total 18.098 ha area is being/will be covered under Greenbelt.
- Ambient Noise Monitoring within the ML area (04 locations * monthly frequency) is being/will be done.

4.5.2.3 IMPACT EVALUATION OF NOISE

Ambient Noise Level monitoring results are given in Chapter 3 of this EIA/EMP report. From this it is evident that results are well within the prescribed norms. Impact evaluation is given in table below.

Table - 4.11

Impact Evaluation for Noise

Impact Evaluation Element	Change of Noise Level due to the expansion in Bauxite Mining Project
Potential Effect/ Concern	Impact on health of humans and biological factors/receptors due to noise generated due to mining activities during day and night time and also on occupational health of the workers exposed to noise.
Characteristics of Impacts	

Nature	Positive		***Negative***	Neutral
			√	
Type	***Direct***	Indirect	Cumulative	
	√			
Extent	***Project Area***	*Local*	Zonal	Regional
	√			
Duration	Short - term		Long- term	
	√			
Intensity	Low		***Medium***	High
			√	
Frequency	Remote (R)	Occasional (O)	Periodic (P)	**Continuous (C)**
				√
Significance of Impact				
Significance	Insignificant	Minor	**Moderate**	Major
			√	

4.5.2.4 IMPACT OF VIBRATION DUE TO BLASTING

Ground vibration, fly rock, noise, dust and fumes are the deleterious effects of blasting operation on environment. The explosive energy sets up a seismic wave in the ground, which can cause significant damage to structures and disturbance to human occupants.

When an explosive charge is fired inside the blast hole, it is converted into hot gases, which exert intense pressure on the blast hole walls. High intensity shock waves propagate radially in all directions and cause the rock particles to oscillate. This oscillation is felt as ground vibration. Blasting, in addition to easing the hard strata, generates ground vibrations and instantaneous noise. Ground vibration from mine blasting is expressed by amplitude, frequency and duration of blast. The variables, which influence ground vibrations, are controllable and non-controllable. The non-controllable variables include general surface terrain, type and depth of overburden. Similarly, the controllable variables include type of explosives, charge per delay, delay interval, direction of blast progression, burden, spacing, specific charge and coupling ratio.

The oscillation of rock particles is called Particle Velocity and its value is called Peak Particle velocity (PPV), which is measured in millimeters per second. The standards for safe limit of PPV are established by Director General of Mines Safety for safe level criteria through Circular No. 7 dated 29/8/1997.

The safe level criteria PPV as mentioned in Circular No. 7 of DGMS is presented below:

Table - 4.12

Permissible Peak Particle Velocity (mm/s)

S. No.	Type of Structure	Dominant Excitation Frequency (Hz)		
		< 8 Hz	8 - 25 Hz	> 25 Hz
A)	**Buildings/structures not belonging to the owner**			
1.	Domestic houses/structures (Kuccha brick and cement)	5	10	15
2.	Industrial Buildings (RCC and framed structures)	10	20	25
3.	Objects of historical importance and sensitive structure	2	5	10
B)	**Buildings belonging to the owner with limited life span**			
1.	Domestic houses/structures (Kuccha brick and cement)	10	15	25
2.	Industrial buildings (RCC and framed structures)	15	25	50

***Source**: DGMS Circular No. 7 dated 29.8.1997*

As the distance increases the PPV value is likely to reduce. A ground vibration study due to blasting has been/will be done and based on recommendations of study protection measures are/will be taken to control vibrations.

As this is an existing Bauxite Mine, scientific study on Blast Induced Ground Vibration and Fly rock was carried out by IIT-ISM, Dhanbad.

During the investigation, 10 rounds of blasts comprising a total of 30 events were recorded. On the basis of analysis of the data following conclusions may be drawn:

- The dominant frequencies of ground vibration in the 10 rounds of blasts recorded varied from 2.7 Hz to 34.1 Hz.
- Assuming a safe level of ground vibration as 5 mm/sec for safety of surface structures and 10 mm/sec for concrete structure near the Kodingamali Bauxite Mine, the maximum permissible charge per delay is calculated using site specific empirical equation for various of surface structures from the blast site.
- It was suggested that blast hole initiation pattern should use one delay period of 17 ms between the two holes within the row and 42 ms between the rows.
- It should be noted that not more than 3 rows of blast holes parallel to free face should be detonated in a round and the total number of holes in a round should not be more than 20 to 30.
- In case of hot holes, water should be sprinkled into the holes before charging of explosives so as to reduce the temperature inside the holes.
- For effective control of vertical and back fly rock fragments the height of stemming column at the top must be 1.1 to 1.2 times the burden in all holes. To control front fly rock (fly rock from the free face side) the method of buffer blasting may be adopted in which case a buffer blasted rock of 4-6 m should be left against the next round of blast. This is in addition to the muffling of the entire surface area to be blasted.

Suggestions for Fly rock control

- The fly rock towards high wall side may effectively controlled by maintaining the height of stemming column in blast holes greater than burden wherever possible. The height of stemming column should be 1.1 to 1.2 times the true burden in all holes.
- If fly rock towards the free face side is also to be contained then the blasting should be done using the technique of buffer blasting along with muffling in which case a buffer of blasted rock of 4-6 m thickness should be left against the next round of blast.
- Drill cuttings are a better stemming material; they should be preferred except in case of watery holes.
- In watery holes explosives with density greater than 1.1 should only be used.
- The no. of rows in a blasting round should be restricted to two to three. The length of blast should be more than three times the width.

Combination of muffling and maintaining the stemming column length greater than the burden in all holes should be adopted for effective control of fly rock. Also, inclined hole drilling (15-20 degree inclination) also helps in reducing the travel distance of flying fragments because of more uniform burden in the front row.

Blast Induced Ground Vibration and Fly rock Report by IIT-ISM, Dhanbad is enclosed as ***Annexure XVI.***

Table - 4.13

Peak Particle Velocity Monitoring

S. No.	Location of Blasting	Date of Measurement	Machine Placement Distance (in meter)	Permissible Limit (PPV in mm/ sec)	Actual Measured (PPV in mm/sec)
April - 2025					
1.	Quarry-1	18.04.2025	217	5	2.11
Jan - 2025					
1.	Quarry- 1	07.01.2025	221	5	2.67
2.	Quarry–2	18.01.2025	263	5	3.03
Dec- 2024					
1.	Quarry-1 (North)	04.12.2024	198	5	3.89
2.	Quarry-2	07.12.2024	228	5	3.43
Nov- 2024					
1.	Quarry-1 (North)	20.11.2024	221	5	3.47
2.	Quarry-2	27.11.2024	207	5	3.26
Oct- 2024					
1.	Quarry-1 (North)	24.10.2024	243	5	2.183
Aug- 2024					
1.	Quarry-1	20.08.2024	194	5	1.037
Jul- 2024					
1.	Quarry-2	15.07.2024	211	5	0.986
Jun- 2024					
1.	Quarry-2	01.06.2024	196	5	0.941
2.	Quarry-1	04.06.2024	211	5	0.413

Source*: M/s. OMC Ltd.*

Following mitigation measures are being/will be adopted to combat the ground vibrations due to blasting:

- Ground vibrations will not affect the structures in the vicinity of ML area as blasting is being/will be done within the standards prescribed by DGMS for controlled blasting.
- The recommendations of IIT-ISM followed by approvals from DGMS regarding charge per hole & delay/blasting sequences are being/will be implemented.
- Drilling parameters like over burden, depth, diameter and spacing will be properly designed to ensure proper blast.
- Explosives charge per hole and per delay is being/will be maintained as per DGMS guidelines.
- NONEL is being/will be used to control ground vibrations, noise & fly rocks.
- The Regulations of MMR 1961 are being/will be strictly followed.
- A proper record of every blast showing the size, depth pattern of shot Holes, amount of Charge/delay, sequence of Blasting and observations of fly rocks and ground vibrations including acoustics is being/will be maintained in a bound page book. All entries in this book are being/will be duly signed by assistant Manager possessing First Class Certificate, in charge of the blasting operations, and Countersigned by the Mines Manager.

- No blasting is being/ will be done in crushed, broken sliced or fractured ground.
- A free face is/will always be maintained and blasted material cleared off before commencement of next round of blasting operations.
- Initiation of charge is being/will be done in a manner that detonation waves progress away from the structures.
- Only Milli Second Non-Electric Type detonators with shock tube are being/will be used in the holes and surface trunk lines.
- Every blast is being/will be monitored to ascertain the impact of blasting on nearby habitation and dwelling units. The values of "peak particle velocity" and "Air Over Pressure" shall be maintained below the permissible values prescribed by DGMS from time to time
- Blasting time is fixed and displayed. People are cautioned 30 minutes before the blasting so that they can go into the blasting shelter or far away from the blasting zone/danger zone.
- Regular monitoring of blast induced vibration is being conducted at mine site by seismograph instrument which records all details of vibration caused by blasting. With the regular monitoring of blast induced vibration, blast parameters have been optimized and vibration level is as per prescribed limit.

4.5.2.5 IMPACT SIGNIFICANCE OF GROUND VIBRATIONS

Table - 4.14

Impact Evaluation for Ground Vibrations

Impact Evaluation Element	Blast induced Ground Vibrations due to the Bauxite mining project			
Potential Effect/ Concern	Impact on buildings and other structures and on the workers involved in the blasting process.			
Characteristics of Impacts				
Nature	Positive		***Negative***	Neutral
			√	
Type	***Direct***	Indirect	Cumulative	
	√			
Extent	***Project Area***	*Local*	Zonal	Regional
	√			
Duration	**Short – term**		Long- term	
	√			
Intensity	Low		***Medium***	High
			√	
Frequency	Remote (R)	Occasional (O)	**Periodic (P)**	Continuous (C)
			√	
Significance of Impact				
Significance	Insignificant	**Minor**	Moderate	Major
		√		

4.5.3 IMPACT ON WATER ENVIRONMENT & MITIGATION MEASURES

4.5.3.1 IMPACT ON SURFACE WATER AND MITIGATION MEASURES

There is no perennial surface water body i.e. nalla (s) or streams within the lease area. However, few springs of seasonal nature originates from foothills of Kodingamali plateau.

Besides this, two Rivers and few Nalas exist within the study area viz. Patagarha Nadi (~4.0 Km in NNE Direction), Murani Nadi (~6.0 Km in SW Direction), Nala (~5.0 Km in ENE Direction), Nala (~5.0 Km in ENE Direction), Patagarha Nala (~7.5 Km in NW Direction), Nala (~8.5 Km in WSW Direction), Baghri Nala (~9.0 Km in West Direction) and Debagarha Nala (~9.5 Km in SSW Direction). These water bodies will not be impacted due to the mining activities as these are distantly located.

Possible Impact

- Surface runoff from the mine site can mix with the water bodies, introducing sediment and aluminous lateritic soil particles. During heavy precipitation, the surface runoff carries suspended solids which may increase the turbidity of water.
- Discharge of waste water generated from mining activities to the nearby surface water bodies may deteriorate the quality of water and can affect the aquatic ecology.
- Fugitive emissions released during mining activities may degrade the quality of water.

Protection Measures

No wastewater will be discharged outside ML Area which may contaminate any surface water body. Following mitigation measures have been/will be adopted to control the surface run-off:

- Garland drains and Retaining walls have been/will be provided at the toe of the temporary waste dump to channelize the runoff water from the dumps.
- A series of settling pits along with a main settling tank at the outlet of the garland drains will be provided to arrest the wash-off solid particles.
- Check dams with settling ponds are/will be provided to arrest the silt and suspended solids from surface run-offs.
- Domestic wastewater will be treated in Sewage Treatment plant (STP), with the treated water utilized for greenbelt development. Wastewater from equipment and vehicle washing will be processed through an oil-grease separator and recycled for reuse in equipment and vehicle washing. Additionally, wastewater generated from pit head bath will be treated and used for greenbelt development.
- The rainwater falling directly into the mine pits will be stored and used for plantation & dust suppression.
- Vegetative buffer i.e. Greenbelt will be developed around the periphery of the mine which will act as bio filter or sinks for particulate, fugitive and gaseous emissions generated due to mining activities. In addition to this Greenbelt/Plantation will also prevent soil erosion and minimize sediment runoff.
- Regular monitoring of surface water quality will be carried out.

Table - 4.15
Dimensions of Existing Garland Drains, Retaining Wall, Settling Pond & Check Dams

S. No.	Particulars	Dimensions (L X B X H) (In m)	Latitude	Longitude
A.	**Garland Drains**			
1.	Garland Drain with Check dam (Near Stack yard 1)	277 x 1.50 x 1 m	19º2' 33" N	83º 4'15" E
2.	Garland Drain connected to Settling Pond (Stack Yard 2)	540 x 1.50 x 1 m	19º2' 32" N	83º 4'15" E
3.	Garland Drain with Check dam (Near First Aid Centre)	330 x 1.50 x 1 m	19° 2'37.14"N	83° 3'55.45"E
4.	Garland Drain with Check dam (In NE Direction near Parking Plaza)	56 x 1.50 x 1 m	19° 2'31.81"N	83° 4'5.47"E
5.	Garland Drain with Check dam (In SE Direction near Parking Plaza)	172 x 1.50 x 1 m	19° 2'27.30"N	83° 4'1.53"E
6.	Garland Drain with Check dam (Adjacent to Top Soil Stack yard in in SE Direction)	370 x 1.50 x 1 m	19° 3'6.04"N	83° 4'20.97"E
7.	Garland Drain with Check dam (Adjacent to Top Soil Stack yard in in SE Direction)	345 x 1.50 x 1 m	19° 3'9.88"N	83° 4'22.47"E
8.	Garland Drain with Check dam (adjacent to OB Dump near Western Boundary of ML Area)	1390 x 1.50 x 1 m	19° 3'55.61"N	83° 4'9.47"E
9.	Garland Drain (Near storage cum Percolation Pond and Entry Gate	545 x 1.50 x 1 m	19° 1'53.51"N	83° 3'52.86"E
10.	Garland Drain RHS of haulage road to Quarry-2	500 x 1.75 x 0.75 m	=	=
11.	Garland Drain Quarry-2 area	500 x 1.75 x 0.75 m	=	=
12.	Garland Drain Wheel wash area	103 x 1.50 x 1 m	=	=
13.	Garland Drain W.B 1 &2 area	70 x 1.50 x 1 m	=	=
14.	Garland Drain LHS of LMV road	455 x 1.50 x 1 m	=	=
15.	Garland Drain Eastern side of quarry-1	347 x 1.50 x 1 m	=	=
B.	**Retaining Walls**			
1.	Retaining Wall along Stack Yard 1 & 2 (Near North Eastern boundary of ML Area)	585 x 0.43 x 5.00 560 x 0.45 x 1.10 m	19° 2'42.45"N	83° 4'12.69"E
2.	Retaining Wall) around Settling Pond near stack Yard 2)	420 x 0.45 x 1.10 m 190 x 1.5 x 3 m	19° 2'31.72"N	83° 4'16.49"E
3.	Retaining Wall (Near Parking Plaza)	170 x 0.35 x 4.80 m	19° 2'30.12"N	83° 4'2.98"E
4.	Retaining Wall (Near Security Barrack)	280 x 1.5 x 3 m	19° 2'35.08"N	83° 3'55.07"E
5.	Retaining Wall (around Settling Pond Near Security Barrack)	60 x 1.5 x 3 m	19° 2'36.99"N	83° 3'53.49"E

6.	Retaining Wall (Near Control Room)	195 x 0.6 x 2 m	19° 1'52.27"N	83° 4'0.64"E
7.	Retaining Wall (around Top Soil Stack Yard)	420 x 0.35 x 4.00 m	19° 3'8.66"N	83° 4'22.47"E
8.	Retaining Wall (around OB Dump)	1750 x 1.5 x 3.00 m	19° 4'4.88"N	83° 4'15.40"E
9.	Retaining Wall (Near Backfilled Area) and behind ponds.	515 x 1.75 x 2.00 m 260 x 1.5 x 3.00 m 30 x 1.5 x 3.00 m	19° 3'39.32"N	83° 4'43.77"E
C.	**Check Dams**			
1.	Check Dam 1	15 m x 6 m x 1.5 m	19° 2'14.96"N	83° 3'57.28"E
2.	Check Dam 2 (Near Parking Plaza)	15 m x 6 m x 1.5 m	19° 2'27.56"N	83° 4'2.26"E
3.	Check Dam 3 (Near Stack Yard 3)	15 m x 6 m x 1.5 m	19° 2'31.41"N	83° 4'5.28"E
4.	Check Dam 4 (Near Security Barack)	15 m x 6 m x 1.5 m	19° 2'34.53"N	83° 3'52.84"E
5.	Check Dam 5 (Near First Aid Centre)	15 m x 6 m x 1.5 m	19° 2'36.64"N	83° 3'55.08"E
6.	Check Dam 6 (On SE side of Top Soil Stack Yard)	9 m x 7 m x 1.8 m	19° 3'6.66"	83° 4'21.80"E
7.	Check Dam 7 (On NE side of Top Soil Stack Yard)	15 m x 6 m x 1.5 m	19° 3'9.43"N	83° 4'23.13"E
8.	Check Dam 8 (Near OB Dump)	15 m x 6 m x 1.5 m	19° 3'54.89"N	83° 4'8.21"E
9.	Check Dam 9 (Stackyard-1)	15 m x 6 m x 1.5 m	-	-
10.	Check Dam 10 (Stackyard-1)	6 m x 5 m x 1.8 m	-	-
D.	**Storage cum Percolation Ponds**			
1.	Quarry- 2 area	60 m x 30 m x 4m.		
2.	Storage Pond 3 (Near Security Barrack)	40 m x 20 m x 3 m	19° 2'36.10"N	83° 3'53.17"E
3.	RHS of approach road to quarry-2	80 m x 20 m x 4 m		
4.	Storage Pond 6 (Near OB Dump)	54 m x 32 m x 4 m & 40 m x 20 m x 3m	19° 3'55.32"N	83° 4'6.27"E
5.	Storage cum Recharge Pond (W.B 1 & 2 area)	45 m x 20 m x 3 m	-	-
6.	Storage cum Recharge Pond (Quarry-1 East side)	44 m x 24 m x 4 m	-	-
E.	**HDPE Lining Ponds**			
1.	HDPE Lining Pond 1 (Near Stack Yard 1)	50 m x 30 m x 4 m	19° 2'29.64"N	83° 4'4.82"E
2.	HDPE Lining Pond 2 (Near Parking Plaza)	60 m x 30 m x 4 m	19° 2'13.49"N	83° 3'58.30"E
3.	HDPE Lining Pond (Near Top Soil Stack Yard)	110 m x 20 m x 4 m	19° 3'8.29"N	83° 4'24.24"E
4.	HDPE Lining Pond (Near Entry/Exit Gate)	25 m x 25 m x 4 m	19° 1'52.64"N	83° 3'58.81"E
5.	HDPE Lining Pond (Near Wheel wash system)	40 m x 37 m x 4m	19° 2'39.98"N	83° 4'4.57"E
6.	HDPE Lining Pond (Besides LMV road)	64 m x 34 m x 4m	-	-

Source: M/s. OMC Ltd.



Photographs showing Retaining Walls & Garland Drains within the ML Area

Table - 4.16
Dimensions of Proposed Garland Drains, Retaining Wall

S. No.	Particulars	Dimensions (Lx B x H) (In m)
A.	Garland Drains	4500 x 1.50 x 1 m
B.	Retaining Walls	4500 x 1.50 x 3 m

Source: *M/s. OMC Ltd.*

4.5.3.2 IMPACT ON GROUND WATER AND MITIGATION MEASURES

a) **Ground water pollution by toxic substances:** Ground water pollution can take place only if the mining rejects contain toxic substances which get leached by the precipitation of water and percolate to the ground water table thus polluting it. The mineral Bauxite and associated rocks do not contain any toxic substance. Therefore, there is no significant impact of mining activities on quality of any source of water.

Groundwater Withdrawal: The peak water demand for the project is estimated at 475 KLD which includes 422 KLD for industrial use and 53 KLD for water required for drinking and domestic purposes at the mine. The water requirement for the project encompasses dust suppression on ore stacks and haulage roads through sprinkling, washing of heavy vehicles and machinery, hygienic purposes, and greenbelt development. The water is being/will be sourced from Dharua Nala (~20 Km from Mine Site) through water tankers. The permission for drawl of 400 m^3/Day has been obtained from Resources Department, Odisha.

Ground water intersection due to Mining activity: The mine site is situated on top of Kodingamali Plateau having an average height of ~300 m from the ground level and the depth of the workings will be at a maximum 50-60 m bgl from the original surface level. The water table in the area ranges between 6.0 m to 24.0 m bgl from the ground level. As the mine is situated on a plateau, the water table will not be intersected at any stage of mining.

Ground Water Table (m bgl)	
Pre- Monsoon	8.0 m to 24.0 m bgl
Post- Monsoon	6.0 m to 22.8 m bgl

No wastewater will be discharged outside the lease boundary. Therefore, no adverse impact on water quality is envisaged due to the proposed expansion of the mining project.

4.5.3.2.1 WATER CONSERVATION MEASURES

- Out of the total water requirement, 30 KLD water will be treated to be used for plantation and 45 KLD treated water will be re-used for vehicle washing.
- Mist fog system (Atomized Water Sprinkler) has been installed at crusher hopper.
- Permanent water sprinklers have been installed along main haul roads.
- Use of wetting agents is recommended to reduce water consumption.
- Rainwater harvesting techniques have been/will be implemented for conservation of water. This technique helps in recharging the ground water level of the area. The rainwater falling directly into the mine pits will be stored and used for plantation & dust suppression.
- 6 Nos. of Rain Water Harvesting Structures i.e. Storage Ponds with High Density Polyethylene (HDPE) Lining having capacity of 39124 KL. have already been constructed for storage of water within the ML Area and Storage pond of 25000 Cu. m is proposed to constructed.
- 08 nos. of settling cum percolation ponds having capacity of 33036 Cu. m have been constructed.
- Protective Fencing has been done along the entire periphery of the HDPE Storage Ponds.
- Periodical monitoring of ground water quality & water level in core and buffer zone will be carried out.



Sewage Treatment plant



Grey Water Treatment Plant

Photographs of Waste water Treatment Facilities

Table - 4.17
Dimensions of the existing Storage Ponds

S. No.	Particulars	Dimensions (In m)	Latitude	Longitude
1.	HDPE Lining Pond 1 (Near Stack Yard)	50 m x 30 m x 4 m	19° 2'30.21"N	83° 4'16.63"E
2.	HDPE Lining Pond 2 (Behind Parking Plaza)	60 m x 30 m x 4 m	19° 2'29.72"N	83° 4'4.84"E
3.	HDPE Lining Pond 3	40 m x 37 m x 4m	19° 2'14"N	83° 3'57"E
4.	HDPE Lining Pond 4	110 m x 20 m x 4 m	19° 3'7.87"N	83° 4'23.85"E

	(Near Top Soil Dump)			
5.	HDPE Lining Pond 5 (Besides LMV Road)	64 m x 34 m x 4 m	19° 3'25.65"N	83° 4'21.85"E
6.	HDPE Lining Pond 6 (Near Main Gate)	30 m X 30 m X 4 m	19° 1'52.79"N	83° 3'58.81"E

Source: *M/s. OMC Ltd.*





HDPE Lining Pond No.1 (Dimensions: 50 m x 30 m x 4 m; L*W*D)





HDPE Lining Pond No.2 (Dimensions: 60 m x 30 m x 4 m; L*W*D)



HDPE Lining Pond No.3 (Dimensions: 40 m x 37 m x 4m; L*W*D)





HDPE Lining Pond No.4 (Near LMV Road)

4.5.3.3 IMPACT EVALUATION

Impact evaluation is given in table below.

Table - 4.18

Impact Evaluation for Water Environment

Impact Evaluation Element	Change in the water environment (quantity as well as quality of Surface and Ground water) due to expansion in Bauxite mining project			
Potential Effect/ Concern	Increase in water availability in the area due to development of water storage ponds, water recharge & Rainwater harvesting structures and catch drains in the mine area.			
Characteristics of Impacts				
Nature	**Positive**		*Negative*	Neutral
	√			
Type	*Direct*	**Indirect**	Cumulative	
		√		
Extent	***Project Area***	*Local*	Zonal	Regional
	√			
Duration	**Short – term**		Long- term	
	√			
Intensity	**Low**		*Medium*	High
	√			
Frequency	Remote (R)	Occasional (O)	Periodic (P)	**Continuous (C)**
				√
Significance of Impact				
Significance	Insignificant	Minor	**Moderate**	Major
			√	

4.5.4 IMPACT ON SOIL / LAND USE PATTERN & MITIGATION MEASURES

4.5.4.1 IMPACT ON SOIL ENVIRONMENT & MITIGATION MEASURES

Nature of Top Soil: The soil within the applied area is mainly Grey, Steel grey, Buff Yellow, Brownish and Clay in nature.

Generation of Top Soil: Around 2.16 Million Tonnes of Top Soil (1.2 Million Cu. m.) will be generated during the entire life of mine. Out of this, 0.19 Million Tonnes of Top Soil has already been generated during FY 2022-2025. Therefore, 1.97 Million Tonnes of Top Soil will be generated during the entire life of mine. The Top soil generated is being/will be utilized for plantation/greenbelt development.

Possible Impacts

Mining process may impact the soil in the following ways:

- Drilling/blasting may alter the flow of nitrogen from a stable soil-plant-microbial ecosystem and will cause depletion of soil carbon pool.
- It can cause loss of litter layer which is an integral storage exchange site for nutrients which will cause the infertility of soil.

Other than above, no major impact on soil is envisaged as mining process neither involves any wet mineral beneficiation process or any chemical mineral beneficiation process.

Protection Measures

- Soil generated from mining operations is being/will be simultaneously used for greenbelt development/plantation/ regrassing.
- Water sprinkling is being/will be done along the haul roads to control fugitive emission.
- Garland drains having siltation pits have been/will be provided at the toe of temporary dumps, near Stack Yards and storage cum percolation ponds to channelize the runoff water from dumps/stacks.
- Retaining Walls around temporary OB dumps has been/will be constructed.
- At the conceptual stage, total area under greenbelt/plantation will be 147.867 ha (18.098 ha area under Greenbelt, Plantation on the backfilled area 125.60 ha area & 4.169 ha area under Mineral storage). The green cover will substantially help to prevent the soil erosion and also help in replenishing the carbon pool, flow of nitrogen and exchange of nutrients etc.
- Fugitive dust due to mining activities is confined/will mainly be confined within the lease area and does/will not impact the soil of buffer zone.

4.5.4.2 LAND USE DETAILS

Revenue Record: As per revenue record the total area of the Bauxite mine is 428.075 ha which falls in Village: Kodingamali. Entire Lease area is Forest Land which falls under Kodingamali Reserve Forest and Kodingamali Proposed Reserve Forest. Stage I & Stage-II Forest Clearance have already been accorded from MoEFCC. The details of the land are given in Chapter 2 of this EIA/EMP Report.

There is no National Park, Wild Life Sanctuary, Biosphere Reserve, Tiger/Elephant Reserves, Wildlife Corridors etc. within the core area.

Approved Review of Mining Plan: Land use pattern of the lease area, Existing, operational (at the end of 5th year) and post-operational phases is given in table below:

Table - 4.19

STAGE WISE LAND USE AND RECLAMATION AREA (In Ha)

S. No.	Type of land use	At Present (31.03.2025)	At the end of Plan Period	At the Conceptual Stage
1.	Area under Mining	86.433	165.164	368.684
2.	Roads	17.648	26.573	8.438
3.	Infrastructure, Workshop, admin Building etc.)	14.591	67.295	25.261
4.	Storage of Top Soil	1.64	2.114	0
5.	Waste Dump Site	4.446	14.941	0
6.	Mineral Storage	8.74	21.566	4.169
7.	Mineral Separation Plant	3.768	6.076	3.425
8.	Green belt (7.5 m along lease periphery)	8.97	18.098	18.098
9.	Undisturbed Area	281.839	106.248	0
	Total	**428.075**	**428.075**	**428.075**

Source: *M/s. OMC Ltd.*

4.5.4.2.1 RECLAMATION PLAN FOR LAND USE

At Conceptual Stage: At the conceptual stage, out of total mining lease area i.e. 428.075 ha, the total excavated area will be 368.684 ha, out of which 125.60 ha area will be backfilled followed by plantation and regrassing will be done on remaining 243.084 ha excavated area. Area under infrastructure (Workshop, Admin. Building, etc.) will be 25.261, area under Roads will be 8.438 ha, area for Mineral Storage will be 4.169 ha, area under Mineral Separation Plant will be 3.425 ha and area under 7.5 m Greenbelt along the Lease periphery will be 18.098 ha.

At the conceptual stage, total area under greenbelt/plantation will be 147.867 ha (18.098 ha area under Greenbelt, Plantation on the backfilled area 125.60 ha area & 4.169 ha area under Mineral storage [i.e., plantation on the area earmarked for mineral storage]).

Conceptual Plan showing impact of change in land use is enclosed as ***Annexure VIII C.***

4.5.4.2.2 IDENTIFICATION OF IMPACTS ON LAND USE PATTERN DUE TO THE MINING ACTIVITY

The Mining Lease area of Kodingamali Bauxite Mine is 428.075 ha. The entire ML area is Forest Land. Out of the entire forest land, 406.385 ha area falls under Kodingamali Reserve Forest and 21.69 ha falls under Kodingamali Proposed Reserve Forest.

A. IMPACT ON FOREST AREA AND MITIGATION MEASURES

Status of Forest Clearance

- Stage I Forest Clearance over 434.935 ha of forest land (428.075 ha ML + 6.860 ha approach road) was accorded by MoEF&CC vide F. No 8-46/2016-FC dated 17.04.2017.
- Stage II Forest Clearance for the same area has been accorded by MoEF&CC vide letter no. F. No. 8-46/2016-FC dated 25.09.2017.
- The Diversion Order was issued by Forest & Environment Department, Govt. of Odisha Bhubaneswar, vide Letter No. 10F(Con)I/2017 20540/F&E dated 07.10.2017.

The core zone area does not have any significant flora and fauna. Most part of the lease area was covered by dwarf Date Palm or Stemless Date Palm (*Phoenix acaulis).* Trees like Salap *(Caryota urenus),* Ram-Phala *(Annona reticulata),* Bija/Piasal *(Pterocarpus marsupium),* Chadaigudi *(Vitex peducularis), etc.* Invasive Shrubs like Barokoli *(Ziziphus mauritiana),* and Lantana (*Lantana camara*) are found scattered all along the hill slopes and also in isolated thickets. Arakha *(Calotropis procera)* and Common Cocklebur (*Xanthium strumarium*) are also frequently found.

As per the Land use and Land Cover study, 9315.32 ha (19.61%) of Forest Land is present in the study area. However, other than Forest Land, major part of the study area comprises of Agriculture Land (32.96%) and Vegetation/Plantation (27.88%).

Possible Impacts

- The mining activities may have an impact on forest land due to tree cutting, if any.
- Mining activities result in generation of dust which may cause impact the vegetation.
- It may also alter soil structure & increase erosion rates.
- Land use of the lease area has been altered due to mining activities such as formation of pits, built up areas of office, workshop, crusher, greenbelt, water storage ponds, etc.

- Mining activities may have an impact of the Forest Land, Agriculture Land and Vegetation/Plantation cover falling in the study area due to Fugitive emissions and escaping of mine water from core area.

Protection Measures

- In this expansion project, no tree cutting/clearing of vegetation is involved. Hence, no impact on the forest land due to loss of vegetation is envisaged.
- During the planning stage, identification of waste storage yard and topsoil has been/will be done based on slope and run-off characteristics.
- OMC Ltd. has already planted 8750 nos. of plants on the backfilled area in consultation with Odisha Forest development Corporation, Bhubaneshwar Plantation Division.
- Reclamation and rehabilitation measures is being/will be taken by means of backfilling and rehabilitation by plantation, Greenbelt along the lease periphery, etc. At the conceptual stage, the total excavated area will be 368.684 ha, out of which 125.60 ha area will be backfilled and rehabilitated by Plantation.
- The landscape is going to undergo a change due to mining activities. But yet there has been/will be no loss of any RET flora & fauna on account of both vertical and horizontal expansion of mining.
- The reclamation & afforestation are being/will be done in a manner exploring the growth of fruit bearing trees which will attract fauna and thus maintaining the biodiversity of the area.
- Mining activity is being/will be confined to the mineralized zone and proper pollution control measures are being/will be adopted to restrict the pollution load within the active zone in order to prevent any negative impact on nearby areas.
- Adequate measures are being/will be taken to control the pollutants within active mine area. Therefore, no adverse impact is envisaged in the study area.

B. EXISTING DUMPS & ITS PROTECTION MEASURES

The waste generated from the mines is being/will be dumped in the earmarked place. There is one Temporary OB Dump covering an area of 4.445 ha and two existing Stack Yards covering an area of 8.421 ha within the lease area. At the conceptual stage, there will be no waste Dump. However, the protective measures around the dumps will be maintained throughout life of the mine.

The details of the dumps are given in the table below:

Table 4.20
Existing Dump/Stack Details

S. No.	Dump Id	Type of Dump/Stack	Area covered (ha)	Height (m)
Existing Dump				
1.	Temporary waste Dump (Active)	OB	4.446	30.0
Existing Stack Yard				
1.	Stack Yard-1	Processed Ore	7.0	16
2.	Stack Yard-2	Processed Ore	1.74	11

Source: Review of Mining Plan & Progressive Mine Closure Plan



Source: *Google Earth Pro & Site Visit* *Not to Scale*

	ML Boundary		Dumps & Stack Yards in the ML Area

Figure 4.5 Google Image showing Dumps and Stack Yards in the ML Area

Protection Measures

- The temporary OB Dump is surrounded by retaining wall around the periphery of the dump to arrest the washed fines and garland drains with Check Dams. The existing retaining wall and garland drains will be repaired and maintained if required.
- Any rain cut if developed in terrace slope is proposed to be checked by number of small check dams/catch drain.
- All the garland drains at the toe are proposed to be connected with a series of settling ponds which ultimately allows the setting of silt from the water.

C. EXISITNG QUARRY

This is an operational Mine, at present mining is being done in two Quarries i.e. Quarry 1 and Quarry 2. The total area covered under the existing quarries is 85.10 ha and at the conceptual stage the total excavated area will be 368.684 ha.

Total 125.6 ha area will be Backfilled at the end of life of mine. The details of the existing quarries particularly with respect to their length, breadth area utilized, status of working etc. have been indicated as follows:

Table 4.21
Details of Existing Quarries

S. No	Name of Quarry	Dimensions		Status	Top RL	Bottom RL
		Length	Breadth			
1.	Quarry- I	2047 m	349 m	Active	1250	1155
2.	Quarry- II	407 m	327.5	Active	1145	1094
Source: *M/s. OMC Ltd.*						

Protection Measures

- Reclamation and rehabilitation measures are being/will be carried out by means of backfilling, and plantation & regrassing. At present 85.10 ha area has already been degraded due to mining

and at the end of plan period, 165.164 ha will be utilized for mining. At the conceptual stage, total 368.684 ha area will be excavated utilized for mining out of which 125.60 ha area will be Backfilled.

- An area of 147.867 Ha has been covered under plantation including the Greenbelt and plantation in Backfilled area & area under mineral storage.
- The waste generated from the mine after expansion will used for backfilling of quarry/mined-out area and it will be rehabilitated with the plantation.
- It is proposed to undertake re-grassing over the entire mining lease area viz. along the slopes of benches and terraces of temporary dumps and all other available areas in the conceptual period. The grass proposed to be used shall be fresh free from weed but leaving rhizome with sufficient nodes.



Photographs showing Quarries in the ML Area

D. AGRICULTURE LAND IN THE STUDY AREA AND ITS PROTECTION MEASURES

As per the Land use & Land Cover data by satellite imagery, total 15654.07 ha (32.96%) agricultural land is present in the study area. Kodingamali Mine is located on top of Kodingamali Plateau which is approximately 300 m from the ground level. Parts of Agriculture fields are present at the foothill of the plateau. However, any adverse impact on the agricultural land is not envisaged as following mitigation measures are being/will be adopted:

- Mining activity is being/will be confined to the mineralized zone and pollution control measures are being/will be adopted to restrict the pollution load within the active zone in order to prevent any negative impact on nearby areas.
- Water sprinkling is being/will be done regularly on approach roads & haul road to prevent Fugitive Dust emissions.
- Garland drain having siltation pits and check Dams have been/will be constructed at the toe of the temporary dumps, to channelize the runoff water from dumps into water storage ponds.

- Retaining walls have been constructed around temporary waste dump and stack yard along with a toe wall around stack yard arrest the silt and sediment flow and to control the surface run-off.
- Greenbelt has been/will be developed in 7.5 m along the lease periphery covering a total area of 18.098 ha.

4.5.3.4 IMPACT EVALUATION

Impact significance is given in table below:

Table - 4.22
Impact Evaluation to determine the Significance
(Land use – during operation phase)

Impact Evaluation Element	Change in the land use due to mine development & operation			
Potential Effect/ Concern	Change in the land use of core zone (Forest land) due to mining activities i.e. Bauxite mine development & operation activities.			
Characteristics of Impacts				
Nature	Positive		***Negative***	Neutral
			√	
Type	***Direct***	Indirect	Cumulative	
	√			
Extent	***Project Area***	***Local***	Zonal	Regional
	√			
Duration	Short – term		Long- term	
			√	
Intensity	Low		***Medium***	High
			√	
Frequency	Remote (R)	Occasional (O)	Periodic (P)	Continuous (C)
				√
Significance of Impact				
Significance	Insignificant	Minor	**Moderate**	Major
			√	

4.5.5 SOCIO – ECONOMIC ENVIRONMENT

The potential impact on socio-economic environment due to this mining project is given in following heads.

4.5.5.1 POSITIVE IMPACTS

Employment

Direct and indirect employment opportunities are being/will be generated during mining operations and related ancillary activities. OMC Ltd. is providing/will provide a safe working environment for workers. Preference for employment under the expansion project will be given to local residents, based their eligibility, qualifications and operational requirements. The existing manpower is 243 persons and for expansion in the Mining Project, direct employment opportunity will be given to 148 persons. Thus, the total manpower after expansion will be 391 persons.

Further, additional employment has been/will be generated through transportation of raw material, development of ancillary industries, local enterprises and in marketing in the form of distributors and retailers. Beside this, there is a huge potential for indirect employment

opportunities such as drivers, repair shops etc. which can be availed by local people. Employment benefits are further detailed in Section 8.2.2 of Chapter 8.

Community Skills Development

The local community is being/will be benefitted from the training programmes that are being/will be instituted by OMC Ltd. to enable the community labor force to work for their livelihood/Self-growth. The company has provided Skill training to unemployed youths of Laxmipur and Dasmanthpur Block. Skill development & Vocational Training programmes for local communities has been conducted by OMC at Tehsil Laxmipur and Tehsil Kashipur of Koraput and Rayagada Districts respectively. The training programmes improves their skill sets that not only benefit the company but also the community at large during and after the project life.

Improved Standard of Living

Employment opportunities created by the project and skill development activities carried out under CSR and EMP, is increasing/will increase income of local community and therefore improve the overall standard of living in the area. The livelihood in the area mainly depends on agriculture & industry in the nearby area. Since the inception of this mine, OMC Ltd. has generated employment opportunities and after expansion, additional employment opportunities will be generated which will further help in improving the economic status & living standard of people.

Economic Exposure and Development

Implementation of the expansion project will make opportunities for sustainable livelihood, better infrastructure facilities and services available to the people. This expose and introduce the local population to factors of economic development including the banking system, financial services and credit and investment schemes. The exposure enables/ will enable community members to invest their income and prevent dependency or living a life with a view of "tomorrow will take care of itself."

Impact on Civic Amenities

The impact of the expansion project on the civic amenities has been/will be positive. With improved transportation facilities, educational facilities and other recreational facilities etc. there is/will be an overall improvement in civic amenities. The communications facilities have also been improved in the area. OMC has contributed in Promotion of Literacy & Education in Laxmipur, Village Biriguda, Biriguda Colony, Raulipadar, Titijhola and various other villages in the nearby area. The company has also extended its support to social, cultural, recreational activities in Dasmanthpur Block, Village Champi, Village Malichema, Village Narsinghguda and various other villages. Improvement of Road connectivity & public transport and other infrastructure facilities has been undertaken by OMC in the study area in Village Narsikaipadar, Village Marbaiguda, Village Jholaguda and several other villages falling in the study area.

Population Growth

The proposed expansion of mining operations is expected to contribute to moderate population growth in the project area and its surroundings. This is primarily due to the influx of workforce, both skilled and unskilled, seeking employment and business opportunities created by the project. Improved infrastructure, access to services, and enhanced economic activity may also encourage

migration of support service providers, such as traders, transport operators, and vendors. Over time, this can lead to the development of new residential clusters or the expansion of existing settlements. While such growth can stimulate local economic development, it may also place additional pressure on civic amenities, housing, water supply, healthcare, and sanitation services. Therefore, coordinated planning and investment in local infrastructure will be essential to manage population growth sustainably.

In employment, preference is being/will be given to local people. Hence, the project does not aim to contribute significantly in the population influx & only marginal population influx is designated for expansion in the project.

4.5.5.2 ADVERSE SOCIAL IMPACT

Health Impacts

The project of this nature triggers negative health impacts through increased dust, population influx which introduces new diseases in the area and put pressure on sanitation facilities. However, OMC is being contributing/will contribute in the development of basic infra-structural and sanitation facilities in the area under its socio-economic development activities. Therefore, additional adverse health impacts will not be anticipated.

Noise and Vibration

The process of mining entails drilling, blasting, excavation, crushing and transportation. These activities generate noise and vibration. The impact of noise and vibration from the epicenter of these activities could have effects on the population living around these areas. The excessive vibration could lead to damages of the structures and therefore safe mining operation including controlled blasting is necessary for such projects to minimize adverse impact.

Livelihood Change

The project attracts/will attract the more able-bodied persons i.e., comparatively skilled persons from the community which in turn has been/will lead to reduced labour availability in other sectors of the economy including agricultural etc. However, as on today, the end use plant and other mines are already operational and hence significant additional impact is not expected.

Population Growth

This project does not/will not have any substantial impact on the population growth. The expansion in Bauxite mining project has generated/will generate employment opportunities for the people of nearby villages and rehabilitated families rendering positive impact on the area on the whole.

However, mitigation measures proposed for the project prevents/will prevent any negative impact on health of villagers, population growth and livelihood change.

4.5.5.3 MITIGATION MEASURES

Mitigating Health Impacts

As mentioned in 4.5.1, the incremental GLCs for various air pollutants will be restricted within the lease area and the impacts will be negligible on the nearby villages. Nevertheless, Awareness programmes on health hazards are being/will be conducted to create awareness amongst the employees as well as the local population. OMC Ltd. will extend its EMP activities in the area of Health facilities by means of providing primary health services covering nearby villages through

health extenders, in conjunction with government and NGOs. It is also planned to focus on infrastructure improvement of the existing PHCs and CHCs of the nearby area. The health issues can be monitored and addressed in this manner. The company is considering/will consider Health facilities under its EMP activities.

Health Care Facilities

Proper health care facilities are being/will be provided to the employees of Bauxite mine along with their families. The medical facilities in form of primary medical camps will also be extended to local people in the nearby areas under socio-economic development/CSR activities

Managing Loss of Livelihood and Income

The Company has organized/will organize vocational training, entrepreneur development programmes for the people in the nearby areas and will provide advice for starting suitable small-scale industry. OMC will encourage entrepreneurship contracts for activities such as canteens, vehicle hiring, maintenance of gardens, office services and cleanliness, courier services, and material supplies.

To cushion the population against impacts of mine closure, adequate advance intimation will be given to employees and contractors to allow them to source alternative opportunities. Skills development programs will also be undertaken by OMC Ltd. to ensure sustainable livelihood for people of the nearby areas.

4.5.5.4 IMPACT ON HABITATION AND RESETTLEMENT & REHABILITATION ACTION PLAN

This is an existing mine and expansion in Bauxite production capacity from 3.6 million TPA to 6.0 Million TPA is proposed within existing mining lease area. Total Mining Lease area of Kodingamali Bauxite Mine is 428.075 ha and the entire ML area is Forest Land. The present lease area comprises of 406.385 ha forest land of Kodingamali Reserve Forest and 21.69 ha forest land of Kodingamali Proposed Reserve Forest, Stage II Forest Clearance for the same has already been accorded by MoEFCC.

No habitation is located within the ML area; hence, the mining activities do not involve any displacement of Human Settlement. No public buildings, places, monuments etc., exist within the ML Area or in the vicinity. The mining operations will not disturb/relocate any Village. In view of this, there are no R & R issues. Therefore, no impact on human settlement is envisaged.



Source: *Google Earth Pro & Site Visit* *Not to Scale*

	ML Boundary		**Habitation outside the lease area**
Habitation of Talkaipadar Village		~0.8 km in SE Direction	
Habitation of Biriguda Village		~0.8 km in East Direction	
Habitation of Raulipadar Village		~1.0 km in South direction	
Habitation of Uparkodinga Village		~1.5 km in West Direction	
Habitation of Bakamba Village		~1.5 km in NW direction	

Figure 4.6 Google Image showing Habitation outside the ML Area

Protection Plan for nearby Habitations:

- Mining is being/ will be carried out as per the provisions outlined in mining plan approved by Indian Bureau of Mines (IBM) as well as by abiding to the guidelines of Director General Mines Safety (DGMS) and conditions mentioned in DGMS guidelines is being/will be followed strictly.
- As per the micro-meteorological data, pre-dominant wind direction was observed from North East which means wind is blowing from NE to SW. There is no habitation within 2.0 Km in SW direction from the ML boundary; hence, no impact is envisaged.
- NONEL and bottom hole initiation system is being/will be used to control ground vibrations, noise & fly rocks.
- Blasting is being/will be carried out during day time only & every blast is being/will be monitored.
- Rock breakers are/will be used to avoid secondary blasting.
- The Peak Particle Velocity (PPV) of each blast shall be measured and records of the same shall be maintained. The PPV shall not be more than the limit as mentioned in DGMS Circular No. 7 of 1997.

- Study on Blast induced Ground Vibration and Fly Rock has already been carried out by Indian Institute of Technology [Indian School of Mines], Dhanbad (IIT-ISM, Dhanbad).
- The recommendations of IIT-ISM followed by approvals from DGMS are being/will be strictly implemented.
- Provision of monitoring of each blast has been/will be made so that the impact of blasting on nearby habitation and dwelling units has been/could be ascertained.
- For conducting blasting for mining operations, proper vibration studies are being/will be carried out well before approaching such habitats or other buildings to evaluate the zone of influence and impact of blasting on the neighborhood. Blasting is being/will be done within the permissible distance from habitation as permitted by DGMS.
- The drilling, charging, stemming and blasting operations is being/will be carried out under direct personal supervision of Manager/Asst. Manager. He maintains/will maintain the records of blasting parameters for every blast. Only blasting foreman who is fully trained in controlled blasting has been deputed for blasting operations.
- Regular ambient air quality monitoring and vibration monitoring is being/will be done in and around the Mining Lease area.
- All measures are being/will be adopted to control fugitive dust emission during mining operation and to ensure no impact on nearby habitation.
- Main haulage road and other roads are being/shall be regularly wetted with water tankers fitted with sprinklers. Crusher with G.I. sheet cladding and water sprinkling system at material transfer points has been/will be provided.
- Greenbelt and plantation will be carried out covering a total area of 147.867 ha.
- Ambient Air Quality & Noise Levels are being/will be monitored regularly in the nearby villages.

Mitigative measures for the nearby habitation in compliance of Ministry's O.M. No. Z-11013/57/2014- IA. II (M) dated 29.10.2014:

- Best Mining Practices have been/will be adopted for the given mining conditions.
- Adequate number of check dams, retaining walls /structures have been/will be constructed. Garland drains and settling ponds have been/will be provided in the mining area to arrest the wash-off with rain water in catchment area.
- The natural water bodies and/or streams which are present in the study area have not been disturbed.
- A provision for regular monitoring of water table in open dug wells located in the nearby villages by establishing Piezometer has been incorporated to ascertain the impact of mining over ground water table and to plan mitigative measures.
- Biological clock of the villagers is not being/will not be disturbed by orienting the flood lights/masks away from the village and keeping the noise levels within the prescribed limits for day and night hours so that it does not affect the health in villages located close to mining operations. Regular health surveillance will be undertaken.

- For conducting blasting for mining operations, proper vibration study has already been carried out to evaluate the zone of influence and impact of blasting on the neighbourhood. Within 500 m of such sites vulnerable to blasting vibrations, avoidance of use of explosives will be avoided and alternative means for mineral extraction are being/will be adopted, wherever required. Blasting is being/will be done within the permissible distance from habitation as permitted by DGMS.
- Provision of monitoring of each blast is being/will be made so that the impact of blasting on nearby habitation and dwelling units could be ascertained.
- No mining operations have been/will be carried out within 50 m of public works such as public roads and buildings or inhabited sites.
- Main haulage road in the mine has been/will be provided with permanent water sprinklers and other roads will be regularly wetted with water tankers fitted with sprinklers. Crusher and material transfer points will invariably be provided with Mist Fog canons.
- It will be ensured that the productivity of agricultural crops is not affected due to mining operations.
- No road movement will be undertaken in existing village road network without appropriately increasing the carrying capacity of such roads.
- Socio economic development of the neighbourhood habitats has been planned based on the need-based survey and will be executed as per the recommendation of the plan.

4.5.5.5 PUBLIC HEALTH IMPLICATION

The most common diseases in the region are viral fever, common cold and cough, Diarrhoea stomach disorder, etc. which are prevalent amongst the villagers. None of these can be related to the project and allied activities of the project. However, Proper Preventive/control measures are being/will be taken by the company to reduce the impact of mining activities on public health and to improve the public health of the area.

The following are some of the significant points for consideration under public health:

- Mining is being/will be carried out by adopting all adequate protection measures with advanced techniques; like explore the possibility to use the electrical equipment, use of controlled blasting practices, development of greenbelt/plantation, water sprinkling on haul road etc.
- Peak particle velocity monitoring is being/will be done within the ML area near blasting site mine site.
- PPEs are being/will be provided to the workers working in high dust zone and development of green belt and plantation is being/will be adopted.
- A full-fledged First Aid Centre has already been established to provide medical facilities to the employees/workers.
- Employees when inducted are being/will be medically examined. Further, they will also be medically examined at periodical interval.

- Efforts are being/will be made to improve the hygiene, sanitation, education and infrastructure of the nearby villagers under CSR activities.
- Proper sanitation facilities are being/will be provided to the mine workers organizing camps such as Family planning camp, free medical checkup camp, eye camp, Pulse polio camp etc.
- Organizing vaccination programs such as Hepatitis-B vaccination, Typhoid vaccination, MMR vaccination.
- Construction of toilets in Schools, Public Places, etc.
- Regular Ambient air quality monitoring, noise monitoring & water quality analysis is being/will be carried out.

4.5.5.6 IMPACT EVALUATION

Impact significance is given in table below:

Table - 4.23
Impact Evaluation to determine the Significance
(Socio economic Environment)

Impact Evaluation Element	Impact on socio-economic environment due to the expansion mining project			
Potential Effect/ Concern	Improvements in socio economic conditions of the settlements present in the nearby villages.			
Characteristics of Impacts				
Nature	**Positive**		*Negative*	Neutral
	√			
Type	***Direct***	Indirect	Cumulative	
	√			
Extent	*Project Area*	***Local***	Zonal	Regional
		√		
Duration	Short – term		Long- term	
			√	
Intensity	Low		***Medium***	High
			√	
Frequency	Remote (R)	Occasional (O)	Periodic (P)	Continuous (C)
				√
Significance of Impact				
Significance	Insignificant	Minor	**Moderate**	Major
			√	

4.5.6 IMPACT ON LOCAL TRANSPORT INFRASTRUCTURE

- At present, the total Bauxite Handling in the mine is 3.6 Million TPA i.e. 12000 TPD and after expansion total Bauxite Handling will be 6.0 Million TPA i.e. 20000 TPD.
- Blasted Bauxite is being/will be loaded by large size hydraulic excavators into the dumpers for onward dispatch to the crusher hopper located within the lease area and waste/OB is being/will be transported from working face to temporary dump site by means of dumpers.
- Finally, the crushed Bauxite is being/ will be is being/will be transported via Road through Tippers to the Railway siding near Kakriguma from where the ore will be further dispatched for sale to the prospective buyers (for its use in Alumina & Aluminium Plants/Refineries). After expansion the mineral will also be transported up to Railway Siding Singaram and Rayagada for further sale to the prospective buyers. The details of transportation Route, after expansion is given below:

Table: 4.24

Details of Transportation Route from Mine up to the Railway Sidings

S. No.	Name of the Railway Siding	On Road Distance from the Mine Site (in Km)		Total Distance (In Km)	Length & Width of Road	Length & Width of Road	Type of Road
		Siding to Zero Point	Lease to Zero Point				
1.	Kakriguma Railway Siding	15	8	~ 24.0	~ 3.5	Width - 7.5 m (Shoulders 1.5 m)	Approach Road (Two Lane-Paved Road)
					~3.0	7.5 m (Shoulders 1.5m)	PWD Road (Two Lane -Bituminous Top)
					~16.0	7.0 m (Shoulders 1.5 m)	National Highway (Two Lane -Bituminous Top)
					~ 0.5	8.0 m (Shoulders 2.5 m)	National Highway (Two Lane -Bituminous Top)
	Total Distance				**24.0**		
2.	Singaram Railway Siding	19	8	~ 27.0	~2.5	9.0 m (Shoulders 1.5 m)	National Highway (Two Lane -Bituminous Top)
					~ 24.5	7.0 m (Shoulders 1.5 m)	PWD Road (Two Lane -Bituminous Top)
	Total Distance				**27.0**		
3.	Rayagada Railway Siding	62	8	~ 70.0	~ 66.5	7.0 m (Shoulders 1.5 m)	National Highway (Two Lane -Bituminous Top)
					~ 3.5	7.0 m (Shoulders 1.5 m)	PWD Road (Two Lane -Bituminous Top)
	Total Distance				**70.0**		
4.	Dumuriput Railway Siding	59	8	~ 67.0	~ 22.5	PWD Road - 7.0 m (Shoulders 1.5 m) & NH- 7.0 m (Shoulders 1.5 m)	PWD Road (Two Lane -Bituminous Top) & National Highway (Two Lane -Bituminous Top)
					~ 44.5	7.0 m (Shoulders 1.5 m)	National Highway (Two Lane -Bituminous Top)
	Total Distance				**67.0**		

- Apart from the above, for smooth operation and transportation up to the Railway Sidings, existing transport and other infra-structure is has been/will be strengthened wherever required which will have overall positive impact.



Source: *Google Earth Pro & Site Visit* *Not to Scale*

	Mine Site		
	Railway Siding Rayagada		**Railway Siding Kakriguma**
	Railway Siding Dumuriput		**Railway Siding Singaram**

Figure 4.7 Google Image showing Transportaion Route from ML Area up to the Railway Sidings

TRANSPORTATION STUDY:

In compliance with the Standard Terms of Reference (ToR) Points issued by MoEF&CC, New Delhi, a Traffic Study has been conducted (according to IRC Guidelines (*IRC: 64-1990*):

As per ***Standard ToR Point No. 1.32*** *"Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines".*

A Transportation Study has been carried out for the transportation of Bauxite from Mine site up to Railway Sidings viz. Kakriguma, Singaram, Rayagada & Dumuriput via Approach Road from ML area up to PWD Road, from PWD Road up to NH-326 and from NH-326 to the the Railway sidings.

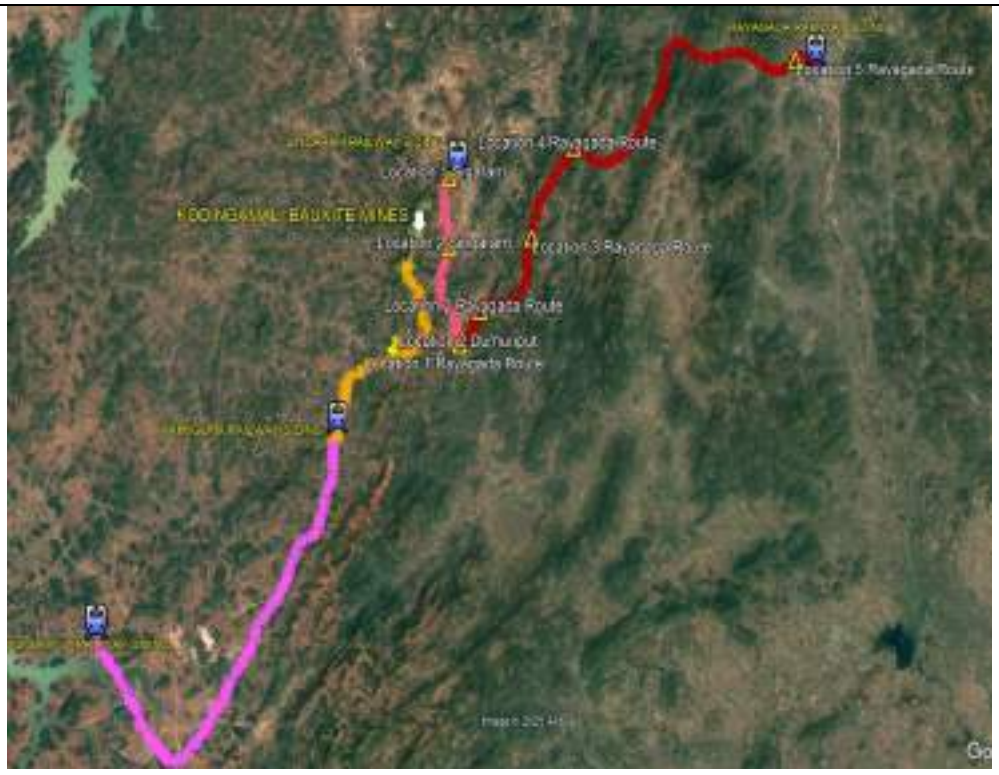
The details of the Transportation Study are given below:







Photographs of Traffic Survey Locations



	ML Boundary		**Railway Siding Kakriguma**
	Traffic Survey Points		**Railway Siding Singaram**
	Railway Siding Dumuriput		**Railway Siding Rayagada**

Figure 4.7 Google image showing Transportation Routes

Methodology:

Traffic survey has been conducted on Four locations namely; Near intersection point of Mine Approach Road from Mine up to PWD Road, PWD Road & NH-326, NH-326 up Railway Siding near Kakriguma and Approach Road up to Kakriguma Railway Siding, at 5 locations on Rayagada Route, at 2 locations on Singaram Route and at 2 locations on Dumuripiut Route. Measurement of Traffic density was monitored continuously for 24 hours by visual observation and counting of vehicles for the six categories, viz., Motor cycle/scooter, Passenger car/van/Auto-rickshaw, Tractors, Buses/Trucks, Trailers and Cycles. In view of the Expansion in Kodingamali Bauxite Mine, the traffic survey was done to review the future traffic growth and the load on the route from the Mine Site to the prospective buyers. Total numbers of vehicles per hour under the six categories were determined.

The Recommended Design Service Volume as per Guidelines for Capacity of Roads in Rura areas - IRC: 64-1990 for Two Lane Roads is given below:

Table – 4.25

Recommended Design Service Volume as per Guidelines for Capacity of Roads in Rura areas - IRC: 64-1990 for Two Lane Roads

S. No.	Terrain	Curvature (Degrees per Kilometer)	Design Service Volume in PCU/Day
1.	Plain	Low (0-50)	15,000
		High (above 51)	12,500
2.	Rolling	Low (0-100)	11,000
		High (above 101)	10,000
3.	Hilly	Low (0-200)	7,000
		High (above 201)	5,000

***** *Recommended Design Service Volumes for Two lane roads (IRC: 64-1990)*

The existing scenario and LOS (Level of Service) has been calculated for the Traffic survey locations for all four routes as per the IRC guidelines and the details are given below:

Table – 4.26 (a)

Existing Traffic Scenario and LOS (Level of Service) for Kakriguma Route

S. No.	Location	V (Volume in PCU/hr)	Design Service Volume in	C (Capacity in PCU/hr)	Existing V/C Ratio	LOS
1.	Approach Road from Mine up to PWD Road PWD Road	159	11,000	458	0.34	B
2.	PWD Road & NH-326	166	11,000	458	0.36	B
3.	NH-326 up Railway Siding near Kakriguma	172	10,000	417	0.41	C
4	Approach Road up to Kakriguma Railway Siding	184	11,000	458	0.40	C

***** *Recommended Design Service Volumes for two lane roads, Terrain- Rolling (IRC: 64-1990)*

Table – 4.26(b)

Existing Traffic Scenario and LOS (Level of Service) for Singaram Route

S. No.	Location	V (Volume in PCU/hr)	Design Service Volume in PCU/Day	C (Capacity in PCU/hr)	Existing V/C Ratio	LOS
1.	**Near Odia on** NH-326 (Zero point to Railway Square)	17	10000	417	0.04	A
2.	**Near Bhalujodi (**Railway Square to Rayagada Railway Siding	13	11000	458	0.02	A

** Recommended Design Service Volumes for two lane roads, Terrain- Rolling (IRC: 64-1990)*

Table – 4.26(c)

Existing Traffic Scenario and LOS (Level of Service) for Rayagada Route

S. No.	Location	V (Volume in PCU/hr)	Design Service Volume in PCU/Day	C (Capacity in PCU/hr)	Existing V/C Ratio	LOS
1.	Near Laxmipur Rly. Junction on Laxmipur Rayagada Road PWD Road	99	11,000	458	0.21	**B**
2.	Near Punijisil on Laxmipur Rayagada Road	61	11,000	458	0.13	A
3.	Near Kulinga on Laxmipur Rayagada Road	38	11000	458	0.08	A
4	Near Kutingiguda on Laxmipur Rayagada Road	147	11,000	458	0.32	B
5	**Near OMC Office at Rayagada Road**	128	11,000	458	0.27	B

** Recommended Design Service Volumes for two lane roads, Terrain- Rolling (IRC: 64-1990)*

Table – 4.26(d)

Existing Traffic Scenario and LOS (Level of Service) for Dumuriput Route

S. No.	Location	V (Volume in PCU/hr)	Design Service Volume in PCU/Day	C (Capacity in PCU/hr)	Existing V/C Ratio	LOS
1.	Near Marbaiguda on NH-326 (Zero point to Toyaput)	110	11000	458	0.24	B
2.	Near Tpyaput (Toyaput to Dumuriput Railway Siding)	95	11000	458	0.20	B

Table – 4.27

Capacity as per IRC: 64-1990

V/C	LOS (Level of Service)	Performance
0.0 - 0.2	A	Excellent
0.2 - 0.4	B	Very Good
0.4 - 0.6	C	Good / Average / Fair
0.6 - 0.8	D	Poor
0.8 - 1.0	E	Very Poor
>1	F	Highly Unstable (Free Flow = 0)

Additional Traffic due to Proposed Mining Project

Transportation of raw material, fuel and finished product will be done by road; details of which are given in table below:

Table - 4.28

Proposed increase in traffic density due to transportation of Bauxite via Road

S. No.	Mineral	Total Required Quantity			Total Number of Vehicles/ Day
		MTPA	TPA	TPD*	
1.	Bauxite	Existing – 3.6 MTPA	3600000	12000	698
		Additional for Expansion	2400000	8000	465
		After Expansion - 6.0 MTPA	6000000	20000	1163

*Note: *Considering No. of days of Transportation – 300*

**For calculation of PCU per hour: 21 hours per day transportation has been considered.*

**For Transportation of Bauxite via Road, Tippers/Trucks of 17.2 Tonnes and 21.0 Tonnes capacity are being/will be used. However, to calculate the V/C Ratio and LOS values after expansion, capacity of 17.2 Tonnes has been considered.*

- Mode of Transportation – By Road (100%)
- Type & capacity of vehicles – Tippers/Trucks (Capacity 17.7 Tonnes)
- Total No. of Vehicles/day – Existing (at 3.6 MTPA) = 698
- Total No. of Vehicles/day – After Expansion (at 6.0 MTPA) = 1163
- Total Additional no. of Tippers/Trucks per Day = 465
- Increase in PCU/day = 465 x 3.0 = 1395
- Increase in PCU/hr. = 1395/21 = 66.42 i.e. ~66

The modified Traffic scenario and LOS values after expansion for traffic survey locations at all four routes namely Kakriguma, Singaram, Rayagada & Dumuriput are given below:

Table – 4.29 (a)
Modified Traffic Scenario & LOS for Kakriguma Route

S. No.	Road	Increased PCUs/ Road	V (Volume In PCU/Hr.)	C (Capacity In PCU/Hr.)	Modified V/C Ratio	LOS
1	Approach Road from Mine up to PWD Road PWD Road	66	159 + 66 = 225	458	0.49	C
2	PWD Road & NH-326	66	166+ 66 = 232	458	0.50	C
3	NH-326 up Railway Siding near Kakriguma	66	172 + 66 = 238	417	0.51	C
4	Approach Road up to Kakriguma Railway Siding	66	184 + 66 = 250	458	0.54	C

Table – 4.29 (b)
Modified Traffic Scenario & LOS for Singaram Route

S. No.	Road	Increased PCUs/ Road	V (Volume In PCU/Hr.)	C (Capacity In PCU/Hr.)	Modified V/C Ratio	LOS
1	T1 - **Near Odia on** NH-326 (Zero point to Railway Square)	66	17 + 66=83	417	0.19	A
2	T2 - **Near Bhalujodi (**Railway Square to Raigada Railway Siding	66	13 + 66=79	458	0.17	A

Table – 4.29 (c)
Modified Traffic Scenario & LOS for Rayagada Route

S. No.	Road	Increased PCUs/ Road	V (Volume In PCU/Hr.)	C (Capacity In PCU/Hr.)	Modified V/C Ratio	LOS
1	Near Laxmipur Rly. Junction on Laxmipur Rayagada Road PWD Road	66	99 + 66=165	458	0.36	B
2	Near Punijisil on Laxmipur Rayagada Road	66	61 + 66=127	458	0.27	B
3	Near Kulinga on Laxmipur Rayagada Road	66	38 + 66=104	458	0.22	B
4	Near Kutingiguda on Laxmipur Rayagada Road	66	147 + 66=213	458	0.46	C
5	Near OMC Office at Rayagada Road	66	128 + 66 =161	458	0.35	B

Table – 4.29(d)
Modified Traffic Scenario & LOS for Dumuriput Route

S. No.	Road	Increased PCUs/ Road	V (Volume In PCU/Hr.)	C (Capacity In PCU/Hr.)	Modified V/C Ratio	LOS
1	T1 - **Near Marbaiguda on** NH-326 (Zero point to Toyaput)	66	110 + 66=176	458	0.38	B
2	T2 - **Near Toyaput (**Toyaput to Dumuriput Railway Siding)	66	95 + 66=161	458	0.35	B

TRAFFIC PROJECTION DUE TO INCREASED TRAFFIC MOVEMENT

Due to the proposed Expansion Project, there will be addition of Heavy and Light motor vehicles in the existing traffic load.

- V/C ratio for the traffic survey conducted on Kakriguma Route is observed to be 0.49, 0.50, 0.51 & 0.54 according to which it falls in LOS 'category C having Good / Average / Fair performance.
- V/C ratio for the traffic survey conducted on Singaram Route is observed to be 0.19 and 0.17, according to which it falls in LOS 'category A having Excellent performance'.
- V/C ratio for the traffic survey conducted on Rayagada Route is observed to be 0.36, 0.27, 0.22, 0.46 & 0.35 according to which it falls in LOS 'category B having Very Good performance' and 'category C having Good / Average / Fair performance'.
- V/C ratio for the traffic survey conducted on Dumuriput Route is observed to be 0.38 and 0.35 according to which it falls in LOS 'category B having Very Good performance'.

Conclusion:

As per the above modified V/C Ratios and LOS values, it can be concluded that the present road network is good enough to bear the increased traffic load.

The internal and nearby roads are being/will be periodically maintained to facilitate the safe and pollution free transportation services, if required. There will be no significant change in the traffic density after the expansion project. However, OMC Ltd. is being taking/will take all the appropriate and adequate mitigation measures to the best possible extent to minimize the

impacts due to Noise, fugitive dust & Gaseous Emissions.

A detailed Traffic Study has been conducted for various locations at all four transportation routes namely Kakriguma, Singaram, Rayagada & Dumuriput. Copy of the same is enclosed as ***Annexure XVII.***

4.5.6.1 MEASURES FOR TRANSPORTATION

The following necessary mitigation measures are being/will be adopted:

- Regular water sprinkling on mine haul roads during transportation and also at transfer points.
- Vehicles with PUC Certificate are being/will be used.
- Overloading is being/will be avoided both within the mine and during transportation.
- Un- necessary blowing of horn is being/will be avoided.
- The speed of heavy duty vehicles are being/will be kept low on the approach Road from Mine up to PWD Road and also near to the densely populated areas.
- Proper maintenance, oiling and greasing of vehicles is being/will be done.
- Greenbelt and Plantation along ML boundary, on backfilled area and mineral storage area.



Transportation within the ML Area



Transportation outside the ML area via Mine Approach Road up to PWD Road

4.5.6.2 MEASURES FOR NO PILFERAGE OF MINERALS DURING TRANSPORTATION

OMC has developed a structured Mineral Pilferage Prevention Action Plan to prevent pilferage of mineral during transportation. It ensures secure, lawful, and transparent handling of mineral and to build awareness and accountability among all stakeholders involved in mineral dispatch.

Presently, the mineral is being transported from ML area through trucks via Road up to Kakriguma Railway siding. After expansion, Bauxite will be transported from ML area to the Railway sidings namely Kakriguma, Singaram, Rayagada & Dumuriput.

Some mitigation measures are being/will be adopted for prevention of pilferage of mineral during transportation which are as follows:

- Verification of vehicle documents and system-generated passes and maintaining detailed gate logs and records of entry/exit.
- Supervision of stacking, weighing, and dispatch operations and CCTV surveillance at control points including gates, stockyards, and weighbridges, etc.
- Real time monitoring for vehicle tracking.
- Regular training for drivers, security personnel and other staff involved in transportation.

A detailed Mineral Pilferage Prevention Plan for prevention of pilferage of mineral during transportation including Training and Awareness Plan is enclosed as ***Annexure XVIII.***

4.5.6.3 IMPACT EVALUATION

Table - 4.30

Impact Evaluation for Transportation Infrastructure

Impact Evaluation Element	Change in traffic density due to transportation of mineral via Road to the Railway siding.			
Potential Effect/ Concern	Increased load on existing transport infrastructure, Noise and air emissions due to transportation of mineral via Road.			
Characteristics of Impacts				
Nature	Positive		***Negative***	Neutral
				√
Type	***Direct***	Indirect	Cumulative	
	√			
Extent	*Project Area*	*Local*	**Zonal**	Regional
		√		√
Duration	**Short – term**		Long- term	
	√			
Intensity	Low		***Medium***	High
			√	
Frequency	Remote (R)	Occasional (O)	Periodic (P)	Continuous (C)
				√
Significance of Impact				
Significance	Insignificant	Minor	**Moderate**	Major
		√		

4.5.7 IMPACT ON BIOLOGICAL ENVIRONMENT

Habitat loss, degradation and fragmentation are important causes of known species-population extinctions. The main cause of degradation and depletion of forests and wildlife are the human activity (anthropogenic pressure). Population explosion, over exploitation of forest resources, urbanization, unscientific management, encroachment of forest land, illicit felling, lack of regeneration of forests and outdated laws are major factors responsible for the degradation and depletion of forests. Detailed biological study has been carried out.

4.5.7.1 IMPACT ON FLORA AND FAUNA

No adverse impact is envisaged on the existing flora, as there is no clearing of Vegetation/Plantation due to mining operations for the proposed expansion project. The core zone does not have any significant Flora. Most part of the lease area was covered by dwarf Date Palm or Stemless Date Palm (*Phoenix acaulis*).

Plantation is being/will be developed in the lease area as per plantation programme. These activities help to improve the floral cover of the area. The greenbelt and plantation development eventually attract micro fauna, birds etc in the area which will also have positive impact.

Assistance has been/will be taken from local forest department in selection of species of plants so that green coverage could improve very fast. The varieties would include those plants, which are suitable to the area.

Detailed Biological Study has been conducted for the study area. There is no National Park, Wild Life Sanctuary, Biosphere Reserve, Tiger Reserve, Elephant Corridor, Wildlife Corridor, Protected Area, etc. within 10 km radius study area.

Site-Specific Wildlife Conservation Plan (SSWLCP) has been approved from Principal Chief Conservator of Forests (Wildlife) & Chief Wildlife Warden vide Memo No. 682 dated 27.01.2010, which was later revised via Memo No. 5845 dated 06.07.2017. Budget earmarked for the conservation of Schedule- I species is Rs. 1240.22 Crore. OMC Ltd. has also deposited Rs. 1183.22 lakh under CAMPA for the implementation of various mitigation measures in the project impact areas to address the adverse impacts of mining, conserve flora and fauna and safeguard the existing wildlife. Since, the Site- Specific Wildlife Conservation Plan has been approved as per the Wild life (Protection) Act, 1972. Therefore, Site-Specific Wildlife Conservation Plan (SSWLCP) as per Indian Wildlife (Protection) Act,2022 is under approval for active consideration from Divisional Forest Officer, Koraput Forest Division & Divisional Forest Officer Rayagada Forest Division.

According to Indian Wildlife Protection Act, 2022, there are 29 schedule - I species namely *Canis aureus* (Jackal), *Urva edwardsii (*Indian grey mongoose), *Urva auropunctata (*Small Indian Mongoose), *Gracula religiosa (*Common Hill Myna), *Bubo bubo (*Eurasian Eagle Owl), *Naja naja (*Indian Cobra), *Varnus bengalensis (*Bengal monitor), *Felis chaus (*Jungle Cat), *Prionailurus bengalensis (*Leopard cat), *Vulpes bengalensis (*Bengal fox), *Canis lupus (*Grey wolf), *Rusa unicolor(*Sambar deer), *Tetracreus quadricornis (Chousingha/Four-horned Antelope), Lutrogale perspicillata (*Smooth-coated otter), *Mellivora capensis (*Ratel/Honey Badger), *Melursus ursinus (*Sloth bear), *Ratufa indica (*Indian giant squirrel), *Viverricula indica (*Small Indian civet), *Paradoxurus hermaphroditus (*Asian palm civet), *Moschiola indica (*Mouse deer/ Indian Chevrotain), *Hyaena hyaena (*Hyaena), *Hystrix indica (*Indian Porcupine), *Gallus sonneratii (*Grey junglefowl), *Pavo cristatus (*Indian peafowl), *Anthracoceros coronatus (*Malabar pied hornbill), *Python molurus (*Indian rock python), *Ptyas mucosa (*Indian rat snake/Dhaman), *Daboia russelii (*Russell's viper), *Fowlea piscator (*Checkered Keelback) were found in the study area.

Authenticated Location Map showing No National Park, Wildlife sanctuaries, wildlife corridors, Tiger/Elephant reserves, etc. within 10 km radius study area has been obtained from D.F.O. Koraput Forest Division dated 21.01.2025 and D.F.O., Rayagada Forest Division dated: 11.01.2025. Authenticated list of flora & fauna has been obtained from Divisional Forest Officer, Koraput Forest Division vide letter 280/4F(Misc.) dated 27.01.2025 and from Divisional Forest Officer, Rayagada Forest Division, vide letter 216/4F(Misc.) 1367/2025 dated 13.01.2025.

Copy of the authenticated location map, authenticated list of flora & fauna & Wildlife Conservation Plan (Approved dated 06.07.2017) is enclosed as ***Annexure IX A, B & C*** respectively.

Proper Environment mitigation measures are being/will be adopted. Therefore, mining is/will not cause any adverse impact on existing wildlife.

However, adequate measures for keeping noise level well within permissible limit are being/will be taken to prevent disturbance to wild life, any.

4.5.7.2 MEASURES FOR MINIMIZING IMPACT ON FLORA & FAUNA

Following measures are being/will be adopted to minimize the impact of mining on biological environment of the area.

- Measures are being/will be taken and environment management plan is being/will be implemented to control and mitigate the pollution of air, water, land and noise environment.
- Greenbelt development and plantation helps in creating habitats for local faunal species and to create better environment for various fauna.
- Wildlife conservation plan has been prepared to minimize the impact of mining on surrounding Bio-diversity and to develop favourable environment for local flora & fauna.
- Increasing plant diversity, especially with native plants, enhances the potential for attracting a greater number of different wildlife species, Habitat components that provide food, cover, water and space are important for self-sustaining ecosystem development.
- Creating and developing awareness for nature and wildlife in the nearby villages.

4.5.7.3 MEASURES FOR IMPROVING BIOLOGICAL ENVIRONMENT & FOREST

Greenbelt development programme has been designed for preventing the soil erosion, improving the greenery and aesthetic beauty of the area. Plantation has been/will be done in consultation of Local Forest Department. Greenbelt development and plantation is beneficial in the following ways:

- Ground covers reduce runoff velocity and filter out suspended soil particles during storms
- Shrub and tree roots provide a restraining web that increases soil cohesion and stabilizes soil
- Provide stabilization to slopes of the waste dumps
- Landscaping and providing shelter
- Improvement in aesthetic environment of site
- Air purification by generation of oxygen
- Allowing PM to settle on the leaves and to attenuate noise generated by movement of vehicles and other machinery
- Live plant foliage reduces the impact of rainfall and increases the absorptive capacity of the soil.

4.5.7.4 GENERAL GUIDELINES FOR GREEN BELT DEVELOPMENT

Vegetation covers in and around the mine workings generally helps in:

- Control of dust.
- Reducing noise.
- Stabilizing erodible slopes to minimize pollution.
- Enhancement of aesthetic value.

I. Native plant species have been/will be planted in consultation with Local Forest Department.

II. Trees growing up to 3 m (10 feet) in height with large canopy cover & leaf area will be planted, if available in market.

III. Plantation of trees will be done in safety barriers along mine boundary and backfilled area.

IV. Since tree trunks are normally devoid of foliage (up to 3 m), it is appropriate to have shrubbery in form of such trees to give coverage to trunk portion of these trees.

V. Fast growing trees with thick perennial foliage have been/will be grown, as it takes many years for trees to grow to their full height.

VI. In order to facilitate the proper growth of vegetation, preparation of seedbed with suitable amount of fertilizers and treatment with mulches are being/will be taken. Topsoil is being/will be used for green belt development / plantation.

The following characteristics have been taken into consideration while selecting plant species for green belt development and plantation.

I. Local, indigenous and drought resistant species.

II. Fast growing and tall trees.

III. Perennial and evergreen.

IV. Thick canopy cover.

V. Stratified layers of Plantation to prevent lateral pollution dispersion.

VI. The trees are being/will be selected so as to maintain regional ecological balance and conform to soil and hydrological conditions.

VII. Plantation will be done as per CPCB guidelines and as per Approved Mining Plan.

4.5.7.5 PLANTATION/GREENBELT DEVELOPMENT PROGRAMME

- Total area to be covered under Greenbelt will be 18.098 ha out of which 8.97 ha area has already been covered under Greenbelt with 8750 nos. of trees.
- At the conceptual stage, total area to be covered under plantation is 147.867 ha out of which 12.87 ha area has already been covered under Greenbelt and plantation with 22971 plants and remaining 134.997 ha area will be covered under Greenbelt/plantation till the end of life of mine.
- The total number of plants up to the conceptual stage will be 360464, out of which 22971 trees have already been planted. The cost of the Greenbelt and Plantation up to the conceptual stage will be around 12.7 Crore.
- Local and fruit bearing species have been/will be planted after consultation with Odisha Forest Development Corporation Limited and as per CPCB guidelines.
- Survival will be maintained more than 90%. Local native species will be planted.
- Plan for greenbelt and plantation up to end of life of mine is given as per below:

Table: 4.31
Plan For Plantation/Greenbelt

Period	7.5 m Safety Barrier Zone		Backfilled Area		Others		Total	
	Area (Ha)	No. of Plants	Area (Ha)	No. of Plants	Area (Ha)	No. of Plants	Area (in ha)	No. of plants
Existing	8.97	14221	3.9	8750	0	0	12.87	22971
2025-26	3.01	7525	-	-	-	-	3.01	7525
2026-27	4.298	10745	-	-	-	-	4.298	10745
2027-28	1.82	4550	-	-	-	-	1.82	4550
Up to Conceptual Period	-	-	121.7	304250	4.169	10422.5	125.869	314673
Total	18.098	37041	125.6	313000	4.169	10422.5	147.867	360464

Source: *M/s. OMC Ltd.*






Photographs of Greenbelt Development along the ML Boundary






Photographs of Plantation carried out on Backfilled Area

- Total area under Greenbelt (Safety Zone Plantation) will be 18.098 ha, out of which plantation of 14221 nos. of saplings over 8.97 Ha. of safety zone area has already been completed.
- The plantation over balance area of 9.128 Ha will be done progressively during FY 2025-26 to FY 2027-28. The Plantation Plan for Plantation over remaining Safety Zone Area is as under:

S. No.	Year	Area to be covered (in Hectare)	Saplings to be Planted (Nos.)	Provision for causality replacement @ 10%
1.	2025-26	3.011	4816	482
2.	2026-27	4.201	6720	672
3.	2027-28	1.918	3068	306
	Total	9.128	14604	1460

4.5.7.6 SPECIES SELECTION FOR PLANTATION/GREEN BELT DEVELOPMENT

- The plants and saplings suitable for the existing soil and site conditions will be considered. Preference is being/will be given for fast growing local plant species, which can adapt to the local climate.
- Native plant species have been/will be planted in consultation with local forest Department such as Karanja (*Pongamia pinnata*), Jamu (*Syzygium cumini*), Mahogony (*Swietenia macrophylla*), Arjuna (*Terminalia arjuna*), Bara (*Ficus bengalensis*), Ashwatha (*Ficus religiosa*), Sissoo (*Dalbergia sissoo*), Bamboo (*Bambusa vulgaris*), Bahada (*Terminalia bellirica*), Panasha (*Artesarry sheterophyllus*), Mango (Mangifera Neem/Mahaneem (Azadirachta indica), etc.

  The above suggested list covers species with thick canopy cover, perennial green nature, native origin and a large leaf area index. The plant species will help in forming an effective barrier between the mine site and the surroundings. All the open spaces, where tree plantation may not be possible, should be covered with shrubs and grass to prevent erosion of topsoil.

4.5.7.7 IMPACT EVALUATION

Table - 4.32
Impact Evaluation for Biological Resources

Impact Evaluation Element	Change in the biological resources of the area due to mine development & operation and generation of emissions			
Potential Effect/ Concern	Loss of habitat, Impact on health of biological receptors due to area and line sources of air emissions including fugitive dust emissions during Bauxite mine operation activities			
Characteristics of Impacts				
Nature	Positive		***Negative***	Neutral
			√	
Type	***Direct***	Indirect	Cumulative	
		√		
Extent	*Project Area*	*Local*	Zonal	Regional
	√			
Duration	Short – term		**Long- term**	
			√	
Intensity	**Low**		*Medium*	High
	√			
Frequency	Remote (R)	Occasional (O)	Periodic (P)	Continuous (C)
				√
Significance of Impact				
Significance	**Insignificant**	Minor	Moderate	Major
	√			

4.5.8 OCCUPATIONAL HEALTH AND SAFETY

Occupational health and safety (OHS) is multidisciplinary field concerned with the safety, health and welfare of people at work. The goal of occupational safety and health programs includes fostering a safe and healthy work environment. OHS may also protect co-workers, family members, employers, customers, and many others who might be affected by the workplace environment.

Occupational Health & Safety is based on the following three aspects: -

- Hazard identification
- Risk assessment
- Determination of applicable controls

A Hazard Identification and Risk analysis is a systematic way to identify and analyze hazards to determine their scope, impact and the vulnerability of the built environment to such hazards and its purpose is to ensure that there is a formal process for hazard identification, risk assessment and control to effectively manage hazards that may occur within the workplaces. Details regarding occupational health hazards as well as mitigation measures have been discussed as under:

4.5.8.1 OCCUPATIONAL HEALTH HAZARD AT MINE SITE

Excessive dust, noise and vibration are the chief health hazards for the miners besides physical hazards as detailed below:

A. Exposure to Dust

Exposure to fine particulates is associated with work in most of the dust-generating stages notably from mineral handling and transportation. Workers with long term exposure to fine particulate dust are at risk of pneumoconiosis, emphysema, bronchitis, and fibrosis.

B. Noise and Vibration Exposure

HEMM operation, transportation and crushing is/will be the main sources of noise and vibrations. Control of noise emissions includes the use of silencers, noise barriers, and personal hearing protection (ear plugs/muffs).

C. Physical Hazards

Injuries during project operation are typically related to slips and fall; contact with falling / moving objects; and lifting/over-exertion. Other injuries may occur due to contact with, or capture in, moving machinery (e.g., dump trucks, belt conveyors, front loaders) etc. Other hazard includes effect of mechanization on fatigue of machinery operators.

4.5.8.2 IMPLEMENTATION OF OCCUPATIONAL HEALTH AND SAFETY MEASURES

Occupational Health and Safety measures result in improving the conditions under which workers are employed it improves not only their physical efficiency but also provides protection to their life. OMC Ltd. has established Kodingamali Dispensary and is adopting/ will adopt the following safety measures:

- Continuous monitoring for compliance of SOPs.

- Pit Safety Committee has been formed and recommendations given by committee are being/will be implemented.
- Suitable measures for publicity and propaganda for safety and occupational health are being/will be implemented like posters, safety films, etc.
- Awareness for safety & occupational health will be implemented like posters, safety films, etc.
- Drug and alcohol awareness program and counseling.
- Stress management and counseling.
- Safety clauses in contract order.
- To depute dedicated safety team.
- Pre-employment Medical check-up for fitness as per standards in Form P-1 of Mines Rules 1955.
- Periodical medical examination as per Mines Rule 1955 and standards laid down in Form P.
- The persons working in dusty environment will be examined every year as per the DGMS circular No. 01 of 21.01.2010.
- All employees will undergo medical examination as per the recommendation of 10th National conference of safety in mines.
- Besides that, to avoid any adverse effect on the health of workers due to various pollutants, sufficient measures relating to safety and health will also be practiced.
- Provision of rest shelters for mine workers with amenities like drinking water etc.
- Training of employees for use of safety appliances and first aid in vocational training center.
- Removal of unsafe conditions and prevention of unsafe acts.
- Detailed analysis of each and every incident.
- Periodic inspection by internal and external safety experts.
- Celebrations of various safety events for awareness.
- An effective and clearly audible means of giving warning, in case of fire, to every person have been/will be provided at the site. A free passage–way giving access to each means of escape in case of fire is being/will be maintained for the use of all workers.
- Regular maintenance and testing of all equipment as per manufacturers guidelines.
- Close surveillance of the factors in working environment and work practices which may affect environment and worker's health.
- Working of mine will be done as per approved mining plan and environmental plans.
- Operator cabins in all items of major HEMM equipment have been/will be enclosed.
- Dust emission control system such as water sprinkling, green belt development
- All safety measures are being/will be taken which includes the use of safety appliances such as:

- ✓ Mask for protection from dust (DGMS approved design, dust free disposable facial mask as per IS: 9473)
- ✓ Ear Muffs
- ✓ Safety Helmets
- ✓ Reflective jackets
- ✓ Safety Belts
- ✓ Hand Gloves
- ✓ Safety Shoes
- ✓ Knee Guard
- ✓ Safety Goggles etc.

- Availability of Medical facilities and First Aid Room equipped with first aid boxes.
- Conduction of internal audits and evaluation of legal compliance.

In order to ensure adequate implementation of the OHS measures suggested, OMC Ltd. will adhere to the pre & periodical medical examination program. Details of the same are given as under.

4.5.8.3 PRE-PLACEMENT AND PERIODICAL MEDICAL EXAMINATION SCHEDULE

Ideally, the pre-employment medical examination (also referred to as a pre-placement examination) strives to place and maintain employees in an occupational environment adapted to their physiological and psychological capacities. The goal of the pre-employment examination is to determine whether an individual is fit to perform his or her job without risk to himself or others and also to record medical history of the person in case employed. This is also conceptualized within the practice of occupational medicine – it is assumed that the examiner is required to have detailed knowledge of both working and health conditions.

Parameters to be monitored:

New employees are being/will be thoroughly medically examined under initial medical examination and thereafter during continuation of employment. Periodic medical examination will be done as suggested by DGMS. The medical examination includes the following parameters -

- Height, weight, body mass index (BMI)
- Cardiovascular examination (heart check, blood pressure, pulse)
- Full musculoskeletal examination including comprehensive range of movement.
- Central nervous system examination.
- Examination for hernia and other abdominal abnormalities
- Urine examination for diabetes or kidney / bladder disorders
- Respiratory examination
- Vision assessment including color blindness
- Medical fitness to work in mines

- Medical examination of drivers
- Drug and alcohol testing
- Spirometry - (Lung Function Test)
- Audiometry (Hearing Test)
- Urine testing
- Vision tests, color vision
- ECG
- CXR (Chest Radiograph)
- Blood glucose
- Strength and mobility screening

Further, Regular Awareness campaign amongst staff/ working about AIDS/ Dengue/Malaria are being/will be done, Ambulance and First Aid facility will be provided.

The medical records of the employees are being/will be maintained. Under initial induction, the workers will be given training related to all safety and health aspects pertaining to their vocation and thereafter, special training courses/ awareness programme for Malaria eradication, STDs and health effects on exposure to mineral dust will be organized regularly for employed persons as well as for nearby villagers. Refresher training will also be arranged as per statutes.

Table - 4.33

IME and PME Details of Employees

S. No	Year	Initial Medical Examination	Periodic Medical Examination
1.	2022	56	8
2.	2023	74	15
3.	2024	100	30

- ***IME (Initial Medical Examination)***
- ***PME (Periodical Medical Examination)***

Table – 4.34

Schedule of Occupational Health & Survey

S. No.	Activity relating to Occupational Health & Survey as per ILO / DGMS guidelines	Frequency (as applicable)	Implementing Agency
1.	➢ Framing of Mine specific Health & safety Policy as per Mines Act and Rules. ➢ Awareness regarding policy with strict enforcement. ➢ Inclusion of Policy's details in Tender documents ➢ Periodic Review of Policy	Awareness – Once in 3 months Review – Once in a year	Top Management, Mine's Manager and Procurement Cell
2.	➢ Adoption of ILO/ ISO 45001 based Health & Safety management system and proper formulation and implementation of the same in totality. ➢ Allocation of necessary resources for implementation of the control measures identified by the risk assessment process.	Risk assessment – quarterly Review of risks and resource allocation - once in a year	Initial gap analysis and implementation by an external expert agency and subsequent routine system maintenance by In-house team
3.	Necessary training of all employees of Mines shall be organized with the help of experts for optimal adoption of health & safety management system.	Once in a year	External expert agencies and in-house team
4.	Suitable clauses shall be included in tender document stating how the risk arising to men and material from the mining operations to be done by the contractors.	-	Mine's Manager & Procurement Cell
5.	It will be ensured that contractors are familiar with the relevant parts of the statutes, health and safety management system and are provided with such information prior to commencing work.	Regular activity	Mine's Manager & Procurement Cell
6.	All persons deployed in mine must undergo vocational training	Once in 3 years	Internal/ External faculties
7.	Biometric system of check-in & check-out system of attendance associated with suitable software shall be introduced in the mine for time management.	-	Mine's manager & HR Deptt
8.	The persons working in dusty environment will be examined for Pneumoconiosis/ Silicosis as per the DGMS circular No. 01 of 21.01.2010.	every year	Qualified Medical Officer trained in Occupational Health
9.	Implementation of project specific comprehensive Hearing Conservation Program covering the aspects of monitoring, testing, evaluation and protection of noise.	-	External /Internal medical experts

10.	Medical Examination of employees/ workmen - All regular employees working in the mine will undergo medical examination as per the recommendation of 10th National conference of safety in mines.		
a)	Pre-employment medical examination with a view to place and maintain employees in an occupational environment adapted to their physiological and psychological capacities so to perform his or her job without risk to himself or others.	Prior to joining	Qualified Medical Officer trained in Occupational Health
b)	Medical examination of employees engaged in driving/ HEMM operation jobs shall be tested for eye refraction test	at least once in a year	
c)	Employees exposed to ionizing radiation shall be tested for blood count.	at least once in a year	
d)	Routine stool test for persons engaged in handling of food and stemming preparation with sputum for AFB (Acid Fast Bacilli)	Once in six months	
e)	➢ New employees when taken are thoroughly medically examined under initial medical examination and thereafter during continuation of employment. ➢ The periodic medical examination will be done as per guidelines of DGMS ➢ The medical records of the employees will be maintained. ➢ Under initial vocational training, the workers will be given training related to all safety and health aspects pertaining to their vocation.	Periodical Medical examination: ➢ Age of workers < 45 years: After every 5 years ➢ Age of workers > 45 years: After every 3 years	Qualified Medical Officers trained in Occupational Health
11.	Necessary facilities for monitoring the environmental parameters in respect of dust (Particulate Matter) and Gaseous emissions shall be provided at mines and regular monitoring shall be carried out at specified intervals	Twice in a week at 3 locations	Environment Manager / 3rd party approved agencies
12.	Noise mapping of various workplaces in the mine premises based on the various machines being used in concerned mines along with personal noise dosimetry of individual workmen exposed to noise level above 85 dB(A). {Regulation 182 of MMR, 1961 under the Mines Act, 1952.}	Noise dosimetry – once in six months	Through National Institute of Miners' Health (NIMH)
13.	Monitoring and measurement of workplace noise levels	Once in a day	In-house
14.	Vibration studies of various mining machineries before their introduction in mining operation as per ISO 2631:1997 (Part 1) Standards. (DGMS circular no. Cir. Tech. 18/1975 Vibration limits 7.1 and 7.2)	Once in a year	Through National Institute of Miners' Health (NIMH)

15.	Portability test of drinking water supplied to the mine employees irrespective of its source.	Quarterly as per IS:10500 – 2012	NABL accredited lab
16.	Monitoring and measurement of workplace dust conc. by means of real time dust monitors (Regulation 124 of MMR 1961)	➢ Static monitoring – once in six months (if the conc. exceeds 50% or 75% of the allowable limits, the frequency will be once in 3 months and once in a month respectively ➢ Measurements shall also be carried on immediately upon the commissioning of any plant, equipment or machinery or upon the introduction or alteration of any new work practice that is likely to bring about any substantial change in the level of airborne respirable dust.	Once in a year by NIMH and routine monitoring by in-house trained person or through 3rd party accredited agency
17.	Operator's Seat in the Vehicle/HEMMs TO be ergonomically designed for driver's comfort and ergonomical assessment of all latest machines before their introduction into mining operation as per ISO standards.	Once in a year for existing fleet	Through National Institute of Miners' Health (NIMH)

Frequency of Medical Examination

a) Pre-Placement Medical examination: Prior to joining

b) Periodical Medical examination:

- Age of workers < 45 years: After every 5 years
- Age of workers > 45 years: After every 3 years

The Budget allocated for implementation of Occupational Health & safety measures, medical equipment, medical examination, etc. for the Year 2025-26 (for one year period) is given in the following table:

Table - 4.35 (A)

Occupational Health & safety Budget

S. No.	Occupation health surveillance	Budget (Rs. In Lakh) FY 2025-2026
1.	Hospital Expenses	5
2.	Medical Reimbursement Expenses	6
3.	Medicine Expenses	36
4.	Safety Equipment Consumption	5
5.	Safety Week Expenses	10
6.	Mine Safety Expenses (V T)	10
7.	VT Equipment	20.6
8.	Electrical Safety Equipment	30
9.	Hospital Equipment	5.59
10.	Control Room Equipment	7.8
	Total	**Rs. 135.99 Lakh**

Source: *M/s. OMC Ltd.*

Table - 4.35 (B)

Yearly Budget earmarked for Occupational Health & safety

S. No.	Parameters	Amount (INR)/ Year (Workers * Cost)
1.	Training on the occupation health and safety	Rs. 420000/ year
2.	Occupational health and safety mitigative measures (Mask, Safety goggle, ear plug etc.)	Rs. 100000/ year
Sub Total		Rs. 520000/ year
3.	Number of Employees	72
4.	Initial Medical/ periodical Medical Examination Chest X Ray, Audiometry, vision Test, ECG, PFT, Urine, Lipid Profile etc.	40000
5.	Audiometry and Eye refraction Test Drivers	35000
6.	No of employees will be subjected to Periodical Medical Examination at least once in a five year	72
Sub Total		**Rs. 75000/ year**

Source: *M/s. OMC Ltd.*

4.5.9 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF ENVIRONMENTAL COMPONENTS

Irreversible commitment of environmental components for the expansion in mining project includes Land use, topography, geology, soil, human settlement, agriculture for mine area.

There will be no irretrievable commitment of environmental components for the said project. However, at the conceptual stage, out of the total ML area, the excavated area will be 368.684 ha, about 125.60 ha area i.e. 29.34% will be backfilled and rehabilitated by plantation, Regrassing will be done on 243.084 ha i.e. 56.78% area, 8.438 ha area i.e. 1.97% will be under Roads, 25.261 ha i.e. 5.9 % will be under Infrastructure, Workshop, admin Building etc., 4.169 ha i.e. 0.97 % will be under Mineral Storage, 3.425 ha .e. 0.80 % will be under Mineral Separation Plant and 18.098 ha i.e. 4.22 % will be under Greenbelt of 7.5 m along lease periphery.

4.5.10 CONCLUSION

As discussed above, it is safe to say that the expansion project will not likely to cause any significant impact on the environment of the surrounding area, as adequate preventive measures are being/will be adopted to contain various pollutants generated due to the mining project within permissible limits. Continuous development of Greenbelt/Plantation in mined out area and around the mining boundary will minimize the environment pollution and improve the aesthetic beauty. The development of water ponds and afforestation remains/will remain useful for local community. The expansion project will also increase direct and indirect employment opportunities and revenue to the Government. Existing and proposed socio-economic measures will be helpful to improve the quality of life of local residents.



CHAPTER-5

ANALYSIS OF ALTERNATIVES (TECHNOLOGY & SITE)

5.1 GENERAL

Consideration of alternatives to a project proposal is a requirement of EIA process. During the scoping process, alternatives to a proposal can be considered, either directly or by reference to the key issues identified. A comparison of alternatives helps to determine the best method of achieving the project objectives with minimum environmental impacts or indicates the most environment friendly and cost-effective options. Every mine needs to be planned in a way that the mineral is extracted to the maximum extent without causing severe irreversible environmental damages.

5.2 ANALYSIS OF SITE

Kodingamali Bauxite Mine is in operation since year 2018. The total Mining Lease area is 428.075 ha and the lease was executed on 10.01.2017 in favour of M/s. Odisha Mining Corporation Limited for a period of 50 years which is valid up to 09.01.2067. The existing Bauxite production capacity is 3.0 Million TPA Environmental Clearance for the same has been accorded by MoEF&CC, New Delhi vide Letter no. J-11015/439/2007-IA.II (M) dated 28.05.2008.

Further, M/s. OMC Ltd. had proposed Expansion in Bauxite Production Capacity from 3.0 Million TPA to 3.6 Million TPA under Para 7 (ii) (a) of EIA Notification, 2006 as per MoEF&CC Office Memorandum No. IA3-22/10/2022-IA.III [E177258] dated 11.04.2022 and 30.05.2022 and the Environmental Clerance for the same has been granted from MoEFCC, New Delhi on 15.04.2025.

Now, the project has been applied for Expansion in Bauxite Production Capacity from 3.6 Million TPA to 6.0 Million TPA under EIA Notification, 2006 & as amended time to time, without change in the area. From the nature & extent of the deposit and exploration done in the deposit, adequate reserves of required quality have been proved with adequate degree of reliability. Therefore, the expansion project will continue in the existing site hence, no change.

5.3 ANALYSIS OF TECHNOLOGY

METHOD OF MINING

Mining is being/will be done by fully opencast mechanized method using conventional mining technology i.e. Shovel- Dumper combination. (As per IBM approved Mining Plan).

Drilling & Blasting

- Drilling & Blasting is being carried out in the hard strata whereas soft ore is being/will be directly excavated hydraulic excavators.
- Drilling is being/will be carried out by deploying 115 mm – 150 mm dia. drill equipped with in-built arrangement of water sprinkling for dust suppression and separate dust collection system and this arrangement makes operations practically dust free.
- Explosives such as Site Mixed Emulsion (SME) are being used for blasting.

- NONEL detonators along with multi row system of firing are being carried to reduce the ground vibration, noise, fly rock etc. due to blasting.
- Transportation of blasted material: Blasted mineral is being/ will be loaded by large size hydraulic excavators with 3.5 m^3 – 4.3 m^3 capacity.

No change shall be done in the Mining method/technology and the same will be continued as per IBM approved Mining Plan. However, a feasibility study for using Ripper dozer & surface miner shall be carried out.

Crushing

Presently, two Nos. of crushers (2 x 500 TPH) have been installed within the ML area. After expansion, one Crusher of 2400 TPH is proposed to be installed {Existing Crusher (2 x 500 TPH) will be phased out after the installation of Proposed Crusher (2400 TPH)}.

Transportation

All the crushed Bauxite from Kodingamali Bauxite Mine is being transported via Road through Trucks to the Railway siding near Kakriguma (~24 Km from the ML area).

After expansion, along with Kakriguma Railway siding; the ore will be also be transported to other Railway Sidings namely, Singaram (~27 Km from the ML area), Rayagada (~70 Km from the ML area) and Dumripadar (~67 Km from the ML area). Form the Railway Sidings, the ore is being/will be further dispatched for sale to the prospective buyers (for its used in Alumina & Aluminium Plants/Refinery).

ENERGY CONSERVATION

M/s. OMC Ltd. has installed Solar Plant of 50 KW within the ML area and the company is sourcing renewable energy to meet around 5% of the total annual energy requirement from Solar energy.

No change shall be done in the existing scenario; in addition, possibility of using Electric vehicles/CNG based vehicles in future shall be explored.

5.4 CONCLUSION

The expansion will be carried out in the existing mining lease area. The mineral mined out from this mine is being/will be sold to the prospective buyers for its use in Alumina and Aluminium Plants/Refineries. No change in use of mineral is envisaged. Fully Mechanized opencast Method of Mining with drilling, blasting, loading by excavators and transportation is adopted.

CHAPTER–6

ENVIRONMENTAL MONITORING PROGRAMME

6.1 INTRODUCTION

Post Project Monitoring is an essential part to check the impact of project related activity. Hence, monitoring of various environmental parameters is being/will be carried out on a regular basis to ascertain the following:

- Status of Pollution within the mine site and in its vicinity.
- To generate data for predictive or corrective purpose in respect of pollution.
- To assess environmental impacts.

Monitoring is being/will be carried out by NABL accredited environmental laboratory the site as per the norms of SPCB, Odisha.

Environmental Monitoring Programme is being/will be conducted for various environmental components as per conditions stipulated in Environment Clearance Letter issued by MoEF&CC & Consent for Operate issued by State Pollution Control Board, Odisha (SPCB, Odisha). Monitoring Report is being/will be submitted to the RO, SPCB, Odisha every month in this regard.

Six monthly compliance reports along with monitoring reports are being/will be submitted on regular basis to all regulatory departments mentioned in granted EC.

6.2 FORMATION OF ENVIRONMENTAL MANAGEMENT CELL (EMC)

In order to maintain the environmental quality within the standards, regular monitoring of various environmental components is necessary. M/s. Odisha Mining Corporation Ltd. (OMC) has a full-fledged Environmental Management Cell (EMC) for environmental monitoring and control. The EMC team is being/will be taking care of pollution monitoring aspects and implementation of control measures.

A group of qualified and efficient engineers with technicians will be deputed for maintenance, up keeping and monitoring the pollution control equipment, to keep them in working mode at the best of their efficiencies. The Organizational structure of EMC is given in Chapter – 10 of this EIA/EMP Report.

6.2.1 RESPONSIBILITIES OF EMC

The responsibilities of the EMC include the following:

- Environmental monitoring of the core and buffer zone.
- Procurement and commissioning of Pollution Control/Monitoring Equipment
- Specification and regulation of maintenance schedules for pollution control equipment.
- Ensuring that prescribed standards are maintained.
- Developing the green belt.
- Ensuring optimum water usage.
- Implementing the Environmental Management Plan

- Conducting regular training programs on various environmental requirements especially sustainable development, climate change, environmental monitoring etc. Reporting of compliances and non–compliances (if any) to management and other stakeholders.

6.3 MEASUREMENT METHODOLOGIES

6.3.1 INSTRUMENTS TO BE USED

The following instruments are being/will be used for data collection work in the monitoring schedule:

1. Respirable Dust Sampler (RDS)
2. Fine Particulate Smapler (FPS)
3. Dry and Wet Bulb Thermometer
4. Sound Level Meter
5. Meteorological Station
6. Water Level Indicator/Piezometer digital water level recorder
7. Global Positioning System (GPS)
8. Blastmate / Minimate for Blast Ground Vibration Monitoring
9. Non-Depressive Infrared (NDIR) Spectroscopy
10. Spectrophotometer
11. pH meter
12. TDS / Conductivity meter
13. Turbidity Meter

In addition to the above instruments, data on land use, vegetation and agricultural crops is being/will be collected by the field team by meeting with a large number of local inhabitants in the study area and different government departments/agencies.

6.3.2 MONITORING PROGRAMME

The post project Monitoring includes details of any major/minor impact in the core zone and area within buffer zone for the following parameters: -

- Micro-Meteorological data
- Ambient Air Quality Monitoring
- Fugitive Dust Emission Monitoring
- Water quality and Level monitoring
- Noise Level Monitoring
- Stack Monitoring
- Ground Vibration Monitoring
- Medical Health check-up of the employees
- Socio Economic Condition of Villagers.

6.3.2.1 MONITORING SCHEDULE

Details of Environmental Monitoring schedule, which is being/will be undertaken for various environmental components, are detailed below:

TABLE: 6.1

Post Project Monitoring

S. No.	Description	Frequency of Monitoring
1.	Micro-Meteorological Data	Hourly (Online)
2.	Ambient Air Quality Monitoring	Manual Twice a week (06 Locations)
3.	Ground Water Quality & Level Monitoring	Quarterly
4.	Surface Water Quality Monitoring	Monthly
5.	Noise Level Monitoring	Monthly
6.	Soil Monitoring	Yearly
7.	Medical Checkup of employees	3 to 5 Year Interval ➢ Age of workers <45 years: After every 5 years ➢ Age of workers >45 years: After every 3 years
8.	Digital Mapping of the ML Area	Once in 3 years

Source: *M/s. OMC Ltd.*

6.3.3 METHODOLOGY ADOPTED

Post project monitoring is being/will be carried out as per conditions stipulated in Environmental Clearance Letter issued by MoEFCC, Consent issued by SPCB, Odisha as well as according to CPCB guidelines. The mine site is considered as core zone and the area lying within 10 km radius from the mine site is considered as the buffer zone where some impacts may be observed on physical and biological environment. In the Buffer zone slight impact may be observed and that too is occasional. The details of Post Project Monitoring programme are given below in table 6.2.

No National Park, Wild Life Sanctuaries, Biosphere Reserve, etc. fall within the study area. The post-project monitoring stations have been established and Ambient Air Quality, Noise Level, Ground Water Level & Quality and Surface Water Quality is being/will be monitored as per schedule given in Table No. 6.2

TABLE: 6.2

POST PROJECT MONITORING PROGRAMME

S. No.	Attributes	Measurement Method	Test Procedure
1.	**Micro-Meteorology**		
	Temperature, Relative Humidity, Wind Speed, Wind Direction, Rain fall	-	-
2.	**Air Environment**		
	• PM_{10}	Gravimetric method	-
	• $PM_{2.5}$	Gravimetric method	-
	• SO_2	EPA Modified West & Gaeke method	Absorption in Potassium Tetra Chloromercurate followed by Colorimetric estimation using P-Rosaniline hydrochloride and Formaldehyde (IS: 5182 Part: II).

	• NO_2	Jacob & Hochheiser modified (NaOH-$NaAsO_2$) Method	Absorption in dill NaOH and then estimated colorimetrically with sulphanilamide and N (I-Nepthyle) Ethylene diamine Dihydrochloride and Hydrogen Peroxide (CPCB Method).
3.	**Water Environment**		
	Colour, Odour, TSS, Turbidity, pH, Temperature, O&G, Total Residual Chlorine, Ammonical Nitrogen, TotalKjeldahl Nitrogen, Free Ammonia, BOD, COD, Arsenic, Mercury, Lead, Cadmium, Chromium(+6), TotalChromium, Copper, Zinc, Selenium, Nickel, Cyanide, Fluoride, Dissolved Phosphate, Sulphide, PhenolicCompounds,Radioactivematerials,Bioassaytest,Manganese,Iron,Vanadium,Nitratenitrogen,Total Hardness,Calcium,Magnesium,Chloride,TDS,Sulphate,Nitrate,AnionicDetergents,Alkalinity, DO,Coliform,EC	As per IS: 10500- 2012	Samples for water quality should be collected and analyzed as per: IS: 2488 (Part 1-5) methods for sampling and testing of Industrial effluents Standard methods for examination of water and wastewater analysis published by American Public Health Association.
4.	**Noise**		
	Noise levels at Day & night time	As per CPCB norms / As per circular no. Tech. 18 of 1975 and 5 of 1990	As per CPCB norms / As per DGMS norms
5.	**Vibration Monitoring** (On every Blast)	As per DGMS record	-

6.4 LOCATIONS OF MONITORING STATIONS

The locations of the AAQ monitoring stations are being/will be selected on the basis of prevailing meteorological conditions of the area like; Wind Direction & Wind Speed, Relative Humidity, Temperature. AAQM stations are being/will be selected to assess the ambient air quality of the area. Noise level monitoring is being/will be carried out within mine boundary & in high noise generating areas of the buffer zone. Water & Soil monitoring is being/will be done on the basis of general slope of the area & drainage pattern. Locations for the post project Monitoring are as under.

Table: 6.3

Locations Of Monitoring Stations

Particular	Monitoring locations			
	Location	Station Code	Latitude	Longitude
Meteorology	Mines Office	M	19° 02'39.42" N	83° 03'59.90" E
Ambient Air Quality	Odia Pent	A1	19°03'12.14" N	83°06'14.02" E
	Biriguda Colony	A2	19°04'45.24" N	83°05'39.60" E
	Mali Chema	A3	19°02'41.27"N	83°02'38.70"E
	Bankamba	A4	19°04'52.01"N	83°03'21.97"E
	Kuntech	A5	19°02'14.07"N	83°01'18.40" E
	Raulipadar	A6	19°00'57.27"N	83°04'03.91"E
Fugitive Emission	Mythri Workers Camp at OMC Hill Top	F1	19°02'29.16"N	83°03',52.87"E
	Weigh Bridge No.1 & 2	F2	19°02'37.22"N	93°04'04.90"E
	Weigh Bridge No.3 & 4	F3	19°02'49,53"N	83°04',09.95"E
	Near LG Security Gate	F4	19°00'52.22"N	83°04'28.18"E
	Security Camp Near Dumping Yard	F5	19°02'37.15"N	83°03'59.35"E
	Near Excavation	F6	19°03',32.09"N	83°04'28.74"E
Work Zone Noise Level Monitoring	Mythri Workers Camp at OMC Hill Top	N1	19°02'29.16"N	83°03'52.87"E
	Weigh Bridge No.1 & 2	N2	19°02'37.22"N	83°04'4.90"E
	Weigh Bridge No.3 & 4	N3	19°02'49.53"N	83°04'9.55"E
	Near Mine pit Area	N4	19°03'32.09"N	83°04'28.74"E
Surface Water Quality	Patagarh River Up Stream	SW1	19°04',13.46"N	83005',51 .1 7"E
	Patagarh River Down Stream	SW2	19°07'18.49"N	83°05'04.95'E
	Kaipadar Nala Up Stream	SW3	19°02'52.80"N	93°02'18.41"E
	Kaipadar Nala Down Stream	SW4	19°02'58.11"N	83°06'04.14"E
Noise Level Monitoring	Odia Pent	SWFM1	19°03'12.14"N	83°06'14.02"E
	Biriguda Colony	SWFM2	19°04'45.24"N	83°05'39.60"E
	Mali Chema	SWFM3	19°02'41.274"N	83°02'38.70"E
	Raulipadar	SWFM4	19°00'57.27"N 8	83°04'03.91"E
Groundwater Quality and Level Monitoring	N.Kaipadar(Bore well)	GW1	21°39'57.30"N	85°27'33.60"E
	Kansariguda(Borewell)	GW2	21°38'24.50"N	85°28'31.60"E
	Bakamba(Borewell)	GW3	19°04'52.01"N	83°03'21.97"E
	Kuntesh(Borewell)	GW4	19°02'14.07"N	83°01'18.40"E
	Tityhola(Dug Well)	GW5	21°40'23.50"N	85°30'06.80"E
Surface Run off	Settling Pit near Stack yard in region R11	SEW1	19°02'29.16"N	83°03'52.87"E
	Settling Pit in region R13	SEW2	19°02'37.22"N	83°04'4.90"E
	Settling Pit in region R5	SEW3	19°02'49.53"N	83°04'9.55"E
	Settling Pit in region R9	SEW4	19°03'32.09"N	83°04'28.74"E

Soil Quality	Upper Kodinga (Cultivated Land)	S1	21°40'23.50"N	85°30'06.80"E
	Tala Kaipadar (Cultivated Land)	S2	-	-
	Bariguda Colony (Cultivated Land)	S3	-	-
	Gaurachema (Cultivated Land)	S4	-	-

Source: *M/s. OMC Ltd.*

A. DATA ANALYSIS

Monitoring data analysis is being/will be done as per CPCB guidelines by laboratory approved under EPA 1986 & is being/will be submitted to concerned authority (specified in Environment Clearance Letter issued by MoEF&CC and Consent issued by SPCB, Odisha) on regular basis.

B. REPORTING SCHEDULE

Environmental Monitoring Program (EMP) is being/will be conducted for various environmental components as per conditions stipulated in the Environmental Clearance issued by the MoEF&CC. Six monthly compliance reports along with monitoring reports are being/will be submitted on regular basis to RO, MoEF&CC by 1st of June and 1st of December. Quarterly compliance Report for conditions stipulated in CTE/CTO is being/will be submitted to SPCB, Odisha on regular basis.

C. CORRECTIVE & PREVENTIVE ACTION PLAN FOR NON – COMPLIANCE / NON-CONFORMANCES

The company has a well laid down process for identification & prevention of non- Conformances. In the eventuality of any non-compliance/ non-conformances, it is addressed on priority through mid – course corrective action plan along with appropriate recording & reporting to stake-holders in line with the company policy duly adopted by the board.

The company would detail the process for identification of non-Conformances and address these through mid–course corrective action plan. The measures include:

- To identify non- compliance/ non- conformances.
- To record non- compliance/non-conformances.
- To evaluate the non-compliance/non-conformation, to determine specific corrective and preventive action.
- To identify senior responsible person of EMC to address the non-compliance/non-conformances.
- To review the corrective actions by the senior Management for effective implementation.

Reporting of any statutory non-compliance if any, to board and other stakeholders at regular interval as per Corporate Environment Policy.

6.5 DETAILED BUDGET

The budget proposed for the Project is as follows:

S. No.	Particulars	Budget
1.	Project Cost	Rs. 55.0 Crore
Cost for EMP		
2.	Capital Cost for Environment Protection Measures	Rs. 6856.3 Lakhs (***Existing:*** Rs. 5084.14 Lakhs + ***Proposed***: Rs. 1772.16 Lakhs)
3.	Recurring Cost for EMP (Per annum)	Rs. 905.11 Lakhs (***Existing:*** Rs. 750.32 lakhs/annum existing + ***Proposed***: Rs. 154.79 Lakhs/annum)

CHAPTER–7
ADDITIONAL STUDIES

7.0 INTRODUCTION

As per EIA Notification dated September 14, 2006 as amended time to time, Ministry of Environment, Forest & Climate Change (MoEF&CC), New Delhi has prescribed Terms of Reference (ToRs) for preparation of the Environmental Impact Assessment (EIA) Report and Environmental Management Plan (EMP) vide File no. J-11015/439/2007.IA. II(M) dated 20.06.2025.

The following Additional Studies are discussed below:

1. Public Hearing
2. Risk Assessment & Disaster Management Plan
3. Resettlement & Rehabilitation Action Plan

7.1 PUBLIC HEARING

- Earlier, the public hearing for existing Bauxite production capacity of 3.0 Million TPA was held on 27.09.2006. Further, the project was applied for Environmental Clearance (EC) under Para 7 (ii) (a) of EIA Notification, 2006 as per MoEF&CC Office Memorandum No IA 3-22/10/2022-IA.III [E 177258] dated 11.04.2022 and 30.05.2022 for Expansion in Bauxite Production Capacity from 3.0 Million TPA to 3.6 Million TPA. Therefore, Public hearing for the project was not applicable.
- The Environmental Clearance for Expansion in Bauxite Production Capacity from 3.0 Million TPA to 3.6 Million TPA has been granted by MoEFCC, New Delhi vide File No. J-11015/439/2007.IA. II(M) dated 15.04.2025.
- Now, the present proposal is for Expansion in Bauxite Production Capacity from 3.6 Million TPA to 6.0 Million TPA under EIA Notification dated September 14, 2006 as amended time to time and the Terms of Reference (ToRs) has already been granted by MoEFCC, New Delhi. The Public Hearing for the proposed expansion project is yet to be conducted.

However, implementation status of issues raised during earlier public hearing held on 27.09.2006 are given below:

7.1.1 IMPLEMENTATION STATUS OF ISSUES RASIED DURING EARLIER PUBLIC HEARING HELD ON 27.09.2006

S. No.	Issues Raised by Public	Status of Compliance	Expenditure (Rs. in Lakh)
1.	Drinking water supply	Solar Pump Based Drinking Water Supply	143.95
2.	Health	Heath camp	10.05
3.	Hygiene and Sanitation	Construction of Solid Waste Management at Laxmipur	42.00
4.	Education	Development of Infrastructure, quality education and soft skills in Sangana High School of Laxmipur	714.63
5.	Skill development	Training on turmeric cultivation	0.25
		Sewing machine training at adpoted village	2.00

6.	Water Scarcity Issues	Development field channel at Doliamba checkdam	5.00
		Construction of field channel at Kargidimaha	5.00
		Const. of Checkdam at Bada Jhola of Malichema	7.00
		Construction of field channel of Mandaput check dam	3.00
		Construction of field channel of Pituajholla check dam.	5.00
		Const. of check dam at Tikiriguda	5.00
		Const. of check dam at Badjore	5.00
		Const. of Check dam at Talakodinga	5.00
		Const. of Check dam at Inabeda, Podapadi	5.00
		Construction of Check dam at Mandaput, Paridiguda	5.00
		Construction of check dam at Doliamba	5.00
		Construction of check dam at Pujarimunda	5.00
		Construction of check dam at Mugurimunda	5.00
		Construction of check dam at Padanmunda	5.00
		Construction of Sitagudi check dam, Narsikaipadar	5.00
		Construction of checkdam at Mundajholla at Biriguda	7.00
7.	Electricity	Solar Based Street Light	23.23
		Street lights in Laxmipur township	65.87
8.	Communication/Improvement of Road connectivity and public transport	PMGSY road leading from NH-326 near village Marbaiguda ro Roulipadar	1395.97
Total			**2480**

Source: *M/s. OMC Ltd.*



Solar Pump Based Drinking Water Supply



Health camp

	
Solid Waste Management Facility	**Development of High School**
	
Sewing machine training	**Construction of field channel**
	
Solar Based Street Light	**Improvement of Road connectivity**
Photographs of facilities provided in compliance to the issues raised during Public Hearing	

7.2 RISK ASSESSMENT AND DISASTER MANAGEMENT PLAN

7.2.1 DEFINITION

A major emergency in a work is one which has the potential to cause serious injury or loss of life. It may cause extensive damage to property and serious disruption both inside and outside the work. It would normally require the assistance of emergency services to handle it effectively.

Emergency may be caused by a number of different factors; it will normally manifest itself in two basic forms viz fire, explosion or toxic release.

7.2.2 SCOPE

An important element of mitigation is emergency planning i.e. recognizing that accidents are possible, assessing the consequences of such accidents and deciding on the emergency procedures, both on site and off site that would need to be implemented in the event of an emergency. Emergency planning is just one aspect of safety and cannot be considered in isolation.

7.2.3 OBJECTIVE

The objective of onsite disaster management plan for the existing mine is in a state of perpetual readiness through training and development to immediately control and arrest any emergency situation so as to avert a full-fledged disaster and the consequence of human and property damage and in the event of a disaster still occurring, to manage the same so that the risk of the damage to life and property is minimized.

OMC has made a document elaborating the procedure for Emergency Preparedness & Responses. The overall objectives of the emergency plan are:

(a) To localize the emergency and eliminate hazards

(b) To minimize the effect of the accident on people and property.

(c) Elimination of hazards by local/supervisory personnel and minimizing effects include rendering. First aid, evacuation, hospitalization, rehabilitation

(d) To seek help from outside sources, if required

(f) To respond immediately and adequately in case of serious accident.

(e) Notice/information to authorities

High risk accidents are not anticipated in the area because the mining in not hazardous. Mining operations may be carried out by taking all the safety measures, but there is always some element of danger or risk in it. Due to deployment of heavy machineries and large scale workings, there are a few chance of un-avoidable accident likely to occur for this, required Safety Engineer's regular inspection is being/will be undertaken. Following risks are anticipated:

- Failure of benches
- Fall of machinery/ person from benches
- Failure of transport machinery
- Heavy rainfall resulting in inundation of mine
- Accidents due to fire
- From Electric line through the area

Standard operating procedures have been made and enforced in case of emergency. To overcome this, provisions reg. 119 of MMR 1961 are being/will be followed:

Inundation

a. For risk of inundation during the heavy rains there is a chance of flood for few days and due to surface water in the open pit, provisions of M.M.R. 1961 reg. 127 are being/will be applied.

b. The working in bench form have been made on a sloping ground and bottom most bench has been provided with a sump to collect water which is being/will be directly pumped out to surface.

c. A flood warning system has been installed near the office. H.FL. ha been marked in the area on a pillar. If water level reaches 0.5 m below HFL mark then all men and machinery shall be withdrawn from the pit and work shall be stopped until water recedes to a safe level.

d. Immediate safety measures are being/will be taken and also the instruments received from Mines Manager are being/will be implemented.

e. In rainy season when there is danger of inrush of water in the pit, mining work is being/shall be carried out on upper-level benches only.

f. Entering of unauthorized person is being/will be restricted in the mine area and surroundings, either by deploying an attendant or by the security department, with red flag.

g. All the rescue operation are being/shall be carried out under supervision of the Mines Manager and safety Engineer.

h. Ambulance and First-aid services are being/shall be kept ready at the site.

i. Normal work can be resumed only after getting permission of the Mines Manager.

2. In case of short circuit of electric line and fire caused due to the mishap, sand bucket and fire extinguishers are being/will be provided and maintained.

Elimination requires well planned process/technology and its effective implementation, so that such situation should either not arise or if it comes, a pre warning is received for timely action in built or by preparedness for zeroing the effects.

Minimizing the effects may include prompt action, rescue, first aid, and evacuation, firefighting and also passing on information promptly to people living nearby.

7.2.4 IDENTIFICATION OF HAZARDS

Major hazards due to the existing Bauxite mining project have been identified & mitigation measures are suggested. Details are given in the table as under:

Table - 7.1

Hazard Identification and Preventive Measures

S. No.	Mining Activity	Occupational Hazard	Potential ill health/ Injury	Preventive Measures	Control Measures
1.	Storage, handling & transport of explosives	Premature Explosion and Fire	Fatality	Handling of explosive materials is to be taken care of as per the Metalliferous Mines Regulations, 1961 and Circulars of DGMS	• Fire extinguisher • Conducting mock drills at regular interval • PPE's like gloves, shoes etc
		Skin Contact	Burn injury, contact disease		• Providing Hand gloves
		Toppling of explosive van	Fatality		• Proper maintenance and regular monitoring of machines.
2.	Drilling	Dust generation	Breathing uneasiness, Lung & eye infection, etc.	• Safety of employees during drilling operation and maintenance of mining equipment should be taken care as per Mine Regulations, 1961 and Circulars of DGMS.	• Wet drilling • Providing Dust masks & goggles
		Noise	(Noise Induced hearing Loss) NIHL, irritation, headache, Loss of appetite	• Noise level Survey	• Acoustic cabins for operators. • Proper maintenance & operation of machine • Operation only on even ground.
		Bursting of hose pipes	Fatality	-	• Daily checking of hose pipes • Replace worn house pipes.
		Vibration	Numbness, Raynaud disease	-	• Ergonomically designed cabin • Proper maintenance of machine • Operation only on level ground
		Operation Hazard (manual rod changing)	Muscular pain, Ergonomics	-	• Training to operators and use of proper tools • Providing helmets, safety goggles and safety shoes
3.	ANFO Mixing	Skin Contact	Contact disease	• Compliance with code of practice specified by DGMS for ANFO Mixing and its uses.	• Providing Gloves • Fire-Extinguisher
		Fire	Injury to person		
4.	Blasting	Fly rock	Disabling injury, loss of body parts & fatality	• Safety of employees during blasting operation and maintenance of mining equipment should be taken care as per Metalliferrous Mines Regulations, 1961 and Circulars of DGMS.	• Controlled blasting • Blasting carried only after evacuating area of 520 m radius from blast site. • Sufficient warning by signal • Proper Blast design • Muffle Blasting

S. No.	Mining Activity	Occupational Hazard	Potential ill health/ Injury	Preventive Measures	Control Measures
				• Control of dust at generation point through water spraying	• Remove loose boulder from bench • Use of delay detonators relay, • Providing Safety Helmets • Proper inspection after shot firing
		Ground Vibration	Damage to property, injury	-	• Proper Blast design • Use of delay detonators relay • Drilling and blasting not at same time
		Noise	NIHL, irritation, headache, loss of appetite	• Noise level Survey	• Covering of detonating fuse with sand, • Use good stemming material use of delay detonators relay Proper Blast design • Providing ear plug
		Premature Blast	Disabling injury/ loss of body parts & fatality	• Preparation of charging and stemming of holes will be done by a qualified blaster	• Restrict use of mobile phone & radio etc near the blasting site. • All charging, stemming connecting up shall be done while, standing "on the solid."
		Misfire	Disabling injury/ loss of body parts & fatality		• Training to deal with misfire according to regulation 167 of MMR, 1961 • The number of shots which exploded shall be counted by the blaster to assess misfire.
5.	Operation of Excavator in Mines	Noise	NIHL, irritation, headache, stress	-	• Proper maintenance & operation of machine. • Providing ear plug, ear muffs
		Fire in HEMM	Burn injury, fatality	-	• Automatic detection & suppression system • Provision of Fire Extinguisher • Daily checking of electrical system
		Heat	Discomfort, stress	• Proper Ventilation	• Thermal barriers • Provision of cool drinking water • Rest shelters • Showers
		Dust generation	Silicosis, respiratory problems & eye infections	• Operation and Maintenance of Tippers.	• Dust suppression on haul roads through water sprinkling • Providing dust mask
		Cabin Vibrations	Numbness, Raynaud disease	• Standard protocol for evaluation of vibration level in HEMMs	• Ergonomically designed seats and operation and controls • Proper maintenance & operation of machine.

S. No.	Mining Activity	Occupational Hazard	Potential ill health/ Injury	Preventive Measures	Control Measures
		Slipping from stairs	Body injury	-	• Good House Keeping
		Operating system failure	Disabling injury/loss of body parts & fatality	• Training & awareness Programmes	• Regular Maintenance
6.	Transportation with Dumpers	Material spillage	Injury to person	-	• Suitable loading profile ensuring proper condition of dumper
		Collision	Fatality	-	• Follow traffic rules • Competent Driver
		Jerks & Vibration	Numbness, Raynaud disease	• Ergonomically designed Cabin	• Proper cushion of Operator Seat • Mounting of Cabins on Rubber Pads
		Dust generation	Silicosis, respiratory problems & eye infections	• Construction and Maintenance of pakka haul rods	Spraying of Water on haul roads
		Brake fails	Fatality / injury	-	• Daily checking of brake system • follow maintenance schedule as manufacturer manual
		Steering fail	Fatality / injury	-	• Daily checking of steering system • Follow maintenance schedule as manufacturer manual
		Bursting of front tyre	Fatality / injury	• Use of Good conditions tyres	• Daily checking of tyre condition & Pressure.
		Reversing Dumpers	Fatality / injury	-	• Authorized driver • Audio visual alarm • Spotter when reversing • Rear view Camera
7.	Movement and Operation of vehicle other than dumpers	Dust generation	Silicosis, respiratory problems & eye infections	-	• Spraying of Water on haul roads • Provide dust masks
		Brake fails	Fatality	• Compliance with operating instructions	• Daily checking of brake system, • Provision of break fail alarm system and alternate break.
		Steering fail	Fatality	• Follow maintenance schedule as manufacture manual	• Daily checking of steering system
		Collision	Fatality	-	• Follow traffic rules, • Competent Driver • Providing Steel belt
		Bursting of front tyre	Fatality	• Use of Good conditions tyres only,	• Daily checking of tyre condition & Pressure

S. No.	Mining Activity	Occupational Hazard	Potential ill health/ Injury	Preventive Measures	Control Measures
		Reversing vehicle	Fatality	-	• Audio visual alarm, • Authorized driver • Spotter when reversing.
8.	Dozing	Vibration	Numbness, Raynaud disease		• Ergonomics cabin and operator seat • Cabins mounted on rubber pads
		Noise	Irritation	-	• Providing Ear Plug
		Dust generation	Silicosis, respiratory problems & eye infections	-	• Control of dust at the point of generation • Use of dust Mask
		Slipping & breaking of tools	Injury to person	-	
9.	Diesel storage	Fire	body injury	-	• Fire extinguisher
		Leakage of oils	Wastage, skin infection	-	• Maintenance & monitoring of machines
10.	Operation & maintenance of DG Set	Noise	NIHL, irritation, loss of appetite, headache	-	• Use of Ear Plugs
		Fire	Burn injury	• Source of fire near diesel generator should be avoided	• Use of Fire Extinguisher
		Electric Shock	Fatality		• Use of hand Gloves
		Slipping due to oil slippage	Injury	• Good housekeeping.	• Use of Safety Shoes
11.	Unloading of diesel	Falling of drums	Injury	-	• Handling of drum carefully
12.	Air Filling on Tyres, Opening Fitting of tyres	Bursting of Tyres	Injury to eyes	-	• checking of pressure gauge properly. • Use of safety goggles
		Slipping of tools	Injury to person	-	• Careful usage of tools. • Use of Safety shoes & helmets
13.	Exploration	Dust generation	Silicosis, respiratory problems & eye infections	-	• Wet drilling • Providing Dust mask & goggles
		Smoke	Lung infection	-	• Providing Dust Mask.
		Flying of Drill Chips	Eye injury	-	• Rubber pads at drill machines • Providing Safety goggles
		Bursting of hose		-	• Regular pipe checking,

S. No.	Mining Activity	Occupational Hazard	Potential ill health/ Injury	Preventive Measures	Control Measures
					• Helmet and shoes.
		Operational hazard (manual rod changing)	Muscular pain, Ergonomics	-	• Surface shouldn't be wet to avoid slip. • Helmet

7.2.5 OBJECTIVE OF DISASTER MANAGEMENT PLAN

The disaster management plan is aimed to ensure safety of human life property & protection of environment. Objective of the disaster management plan are as follows:

- First aid injury.
- Rescue operation and provision of adequate medical facilities to the injured.
- Safety of the human life in the buffer zone if needed.
- Protecting and minimizing damage to property and the environment.
- Initially restrict and ultimately bring the incident under control.
- Identify any dead.
- Inform to the administration, DGMS and statutory persons as per Rules.

7.2.6 EMERGENCY ORGANIZATION

An emergency organization has been set up which is led by the First-class Mines Manager. He has organized a team of responsible and statutory personnel under him for controlling the incidence.

(a) Emergency Communication

Whoever notices an accident, disaster or emergency situation etc. would inform immediately to the Mines Manager. When any accident resulting in serious bodily injury to any person or in loss of life occurs in a mine, the Mines Manger shall inspect the site of accident as soon as possible and have an enquiry into the cause of and circumstances attending the accident. The result of such enquiry with plan of the site of the accident showing details shall be recorded in a bound pages book kept for the purpose. The Manager shall perform such other duties as have been prescribed in that behalf under the Mines Act 1952 and MMR, 1961.

(b) Emergency Facilities

Stretchers and general first aid materials for dealing with fire burns etc. are being/will be maintained in the medical center as well as in the emergency control room. Two medical practitioner have been appointed for the mine's workers. Beside this medical personal, medical facilities in the area have been created & updated. An ambulance with driver has been provided and maintained to transport injured or affected persons. At the end of an emergency, the Mines Manager orders an all clear signal.

(c) Disaster Management

- All safety precautions and provisions of Mines Act 1952, MMR 1961 and Mines Rules 1955 will be strictly followed in all mining operations.
- Avoidance of danger as per Regulation 117 and general precautions and safety as per Regulation 118 and 181 of MMR 1961 will be observed.
- Mining operations are being/will be done under supervision of qualified and statutory personnel as per MMR 1961 and MCDR 2017.
- Mine working is being/will be done as per approved Mining Plan following provisions of MCDR 2017 and Regulation 106, 110, 111 & 115 of MMR 1961.

- General and surface precautions against fire i.e. precautions and provision of firefighting equipment are being/will be taken as per Regulation 119 of MMR 1961.
- Entry of unauthorized persons has been/will be prohibited.
- Provisions of all the safety applications and protective wears such as safety boot, helmets, goggles, hand gloves, ear muffs, etc. as per Regulation 182 are being/will be made available to the employees and regularly checked for their use.
- Cleaning of mine faces are being/will be regularly done.
- Handling of explosive, charging and blasting will be carried out by competent persons only as per MMR.
- Provision of magazine at a safe place with fencing and necessary security arrangement.
- Adequate safety equipment provided at explosive magazine.
- Regular maintenance and testing of all mining equipment as per manufacturer's guidelines.
- Increasing the awareness of safety and disaster through proper training of mining staff.
- The haul roads are being/will be kept sufficiently wide to ensure free and safe movement with proper alignment and gradient.
- Medical appliances/specified First Aid box as per Section 21 of Mines Act 1952 are being/will be maintained in the mine office. The Mine Manager and other qualified persons are available render first aid to injure if needed.

7.2.7 ON SITE EMERGENCIES

The responsible officers for co-ordination in case of emergency has been employed. The following officers are being/will be responsible for co-ordination in case of emergency. They are called as "Key Personnel". Their organisation positions are indicated as below:

Table - 7.2
Responsibilities of Officers

S. No.	Designation	Responsibility
1.	Mines Manager	Site Controller
2.	Shift In-charge/Section In Charge	Accident Controller/ Communication Officer
3.	Employee who gives the first information about the incident/accident	Primary Controller
4.	P & A Department (HOD)	Liaison Officer

Source: *OMC Ltd.*

Structure of the Disaster Management Plan

1) <u>Out Line of Disaster Management Plan</u>

The purpose of disaster management plan is to restore the normalcy for early resumption of mining operation due to an unexpected, sudden occurrence resulting to an abnormality in the course of mining activity leading to a serious danger to workers or any machinery or the environment.

2) **System of Communication**

An internal communication system will be provided for the department head and to their line of command with telephone facility. Telephone no.s and addresses of adjoining mines, rescue station, police station, fire service station, local hospital, electricity supply agency and standing consultative committee members are provided.

3) **Consultative Committee**

A standing consultative committee will be formed under the Mines Manager. The members consists of safety officer / medical officer / Asst. manager/ public relation officer/ Foreman/ and environmental engineer.

4) **Facilities & Accommodation**

Accommodation and facilities for medical centre, rescue room and for various working groups will be provided.

5) **First Aid & Medical Facilities**

The mine management will be having first aid centre for use in emergency situation. All casualties would be registered and will be given first aid. The centre will have facilities for first aid & minor treatment, resuscitation, ambulance and transport. It will have proper telephone / wireless set for quick communication with hospitals where the complicated cases are to be sent.

6) **Stores and Equipment**

A detailed list of equipment available, its type & capacity and items reserved for emergency will be made available.

7) **Transport Services**

A well-defined transport control system is provided to deal with the situation.

8) **Functions of Public Relations Group**

To make a cordial relation with government officials and other social service organization and working groups. To liaise with representatives of the mine to ameliorate, the situation of panic, tension, sentiments, grievances and misgivings created by any disaster. To ameliorate the injured, survivors and family members of the affected persons are provided all the material with required arrangements including, moral support and establishing contact with relatives of victims. This will be made immediately.

9) **Security**: Manning of security posts

10) **Catering & Refreshment**: Arrangement will be made for the victims, rescue teams and others.

7.2.8 KEY PERSONNEL AND THEIR RESPONSIBILITY

The appointment of all the key personnel i.e. Site Controller, Accident Controller/Communication Officer, Primary Controller and Liaison Officer will be taken up after the execution of mining lease and will be intimated to IBM and other concerned authorities as per statute.

(i) Site Controller

- The Site Controller has an overall responsibility for controlling the incident/accident and directing the personnel.
- To prepare a foolproof plan for control of accident like, landslides, subsidence, flood, fire and other natural calamities
- To inform statutory bodies of the State and Central Government.
- To inform Communication Officer about the emergency, Control Centre and assembly point.
- To provide all assistance and call for Fire Squad, Security Officer and other services required for removing/ control of danger.
- To ensure that all necessary personnel assemble at assembly point.
- Make arrangements for medical treatment to the personnel injured.

(ii) Accident Controller

- Mock rehearsal of management plan prepared for accident.
- To withdraw men/ machines from the affected area with priority for safety of personnel, minimize damage to the machines, environment and loss of material.
- To make a report based on the facts and figures and submit to the Site Controller
- To communicate with the Site in charge and make arrangement for transportation of the injured personnel.

(iii) Primary Controller

- To inform the Accident Controller/ shift In-charge from the nearest means of communication about the location and the nature of accident.
- To assist in clearing any obstruction in relief of accident. To carry out all instructions of Accident Controller.
- To provide first aid treatment and communicate with the Shift in charge.

7.2.8.1 QUICK EVACUATION, AMELIORATIVE MEASURES FOR EMERGENCY PLAN

A rescue management Team has been formed to deal with the incidence efficiently and quickly and it would be working in close coordination with systematic & structured emergency plan. Display board has been fixed at mine office/pit mouth, showing no. emergency contact no. Rescue Management team consists of the company officials at position such as Functional Head of (Mines), Head of Department (Mines), Section Head of (Mines operation), HOD (Safety), HOD (Security), HOD (ER), HOD(Electrical), Chief Medical Officer, Hospital & Fire supervisor etc.

Line of Action: Any person notices incident in ML Area; will immediately take steps to give warning by blowing the siren continuously and will communicate to mine officials. Duties & role of rescue team is defined to tackle the situation in quick & systematic manner, which are as under:

Duties of Mine Official: The Mine officials receiving the warning will forthwith inform to team member and take actions for quick evacuation, ameliorative measures at site. Inform to senior management and statutory bodies.

Duties of Head of Department (Safety): Worked in close coordination with the other team members for defensive, systematic & structured process.

Duties of Head of Department (Security): Responsible to depute the security guard at site, barricaded the area, control to entry of unauthorized person at site/nuisance event etc. and for providing transport vehicle at site.

Duties of Head of Department (Employees Relation): Coordination with local authority for statutory obligation or any assistance has been/will be required by local authorities.

Duties of Head of Department (Electrical): Responsible for cutting off power supply and make lighting arrangement for working in night or any assistance regarding electricity.

Duties of Chief Medical Officer, (Hospital): Responsible for making arrangement for medical aid for person.

Duties of Fire Supervisor: On receiving warning, the team will reach the site of fire and depending on its nature, class and extent will take steps to extinguish it and rescue persons if involved in fire.

7.2.8.2 THE CAPABILITY OF LESSEE TO MEET EVENTUALITY

The details of capability of lessee to meet such eventuality are as under

Communication facility available: Communication facilities like telephone mobile phones, email etc. will be available to communicate with the people at working sites.

Alarm System: For raising alarm, hooters to be located at suitable locations.

Fire Brigade: Well-equipped fire brigade has been provided at site with trained firefighting personnel. Beside this, mining personnel have been trained to tackle emergency situations like immediate evacuation of man and machine, operating fire-fighting equipment, giving first aid etc.

Security: Company has got its own security personnel capable of acting in emergency situation.

First Aid Facility: First aid training has been/will be imparted to mining personnel at regular interval. First aid Stations have been established at appropriate locations.

Emergency Control System: In emergency persons to be contacted, location for assembly, telephone numbers for contact, roles and responsibilities of persons etc. have been specified. Emergency telephone numbers have been displayed at the mine site.

7.2.8.3 POST DISASTER ANALYSIS AND EVALUATION

When the emergency is over, the team will carry out a detailed analysis of the cause of accident/occurrence, evaluate the influence of various factors and find out the procedures to minimize them in future. At the same time adequacy of disaster management plan shall also be evaluated and shortcomings shall be rectified to improve the plan.

7.2.8.4 OFF-SITE EMERGENCY PLANNING

The off-site emergency plan is an integral part of any hazard control system. It is based on those incidents identified by the works management, which could affect people and the environment outside the works. Thus, the off-site plan follows logically from the analysis that took place to provide the basis for the on-site plan and the two plans therefore complement each other. The

responsibility for the off-site plan will be likely to rest either with the works management or with the local authority.

Either way, the plan must identify an emergency coordinating officer who would take overall command of the off-site activities. Consideration of evacuation may include the following factors:

a. In the case of a major fire but without explosion risk (e.g. an oil storage tank), only houses close to the fire are likely to need evacuation.

b. If fire is escalating very fast it is necessary to evacuate people nearby as soon as possible.

c. In acute emergency people are advised to stay indoors and shield themselves from the fire.

A. ASPECTS TO BE INCLUDED IN AN OFF-SITE EMERGENCY PLAN

Some of the aspects to be included in off-site emergency plan are as follows:

a) Organization: Details of command structure, warning systems, implementation procedures, emergency control centers, name and appointments of incident controller, site main controller, their deputies and other key personnel.

b) Communications: Identification of personnel involved, communication center, call signs, network, list of telephone numbers.

c) Special Emergency Equipment: Details of availability and location of heavy lifting gear, bulldozers, specified fire-fighting equipment and fireboats.

d) Voluntary Organizations: Details of organizers, telephone numbers, resources, etc.

e) Meteorological information: Arrangements for obtaining details of weather conditions prevailing at the time and weather forecasts will be made.

f) Humanitarian Arrangements: Transport, evacuation centres, emergency feeding, treatment of injured, first aid, ambulances, temporary mortuaries.

g) Public Information: Arrangements for Dealing with the media-press office, Informing relatives etc.

h) Assessment: Arrangements for Collecting information on the causes of the emergency, Reviewing the efficiency and effectiveness of all aspects of the emergency plan etc.

Table - 7.3
Emergency Coordinating Offices/Officers

S. No.	Names	Contact No.
1.	Superintendent of Police, Koraput	06852-250901
2.	Dist. Police Office, Koraput	06852-251593
3.	Koraput Town Police Station	06852-251245
4.	Control Room A.N. Cell, Koraput/Tactical Command Centre	06852-250342
5.	District Headquarter Hospital	06852-251222
6.	District Emergency Helpline (Koraput)	1077
7.	Fire	101
8.	Ambulance Service	108/102
9.	Child Helpline	1098
10.	Women Helpline	1091

Source: *https://koraput.odisha.gov.in/directory/contact-directory*

B. ROLE OF MAJOR HAZARD MANAGEMENTS

Where the local authority has the organization to formulate the plan, the role of management in off-site emergency planning is to establish liaison with those preparing the plans and to provide information appropriate to such plans. This includes a description of possible on-site accidents with potential for off-site harm, together with their consequences and an indication of the relative likelihood of the accidents.

Advice should be provided by works managements to all the outside organizations which may become involved in handling the emergency off-site and first, need to familiarize themselves with some of the technical aspects of the works activities, e.g. emergency services, medical departments, etc.

C. ROLE OF THE EMERGENCY COORDINATING OFFICER

The various emergency services are being/will be coordinated by an Emergency Coordinating Officer (ECO) who is likely be a senior police officer but, depending on the circumstances, could be a senior fire officer. The ECO liaise closely with the site's main controller. Again depending on local arrangements, for very severe incidents with major or prolonged off-site consequences, the external control may pass to a senior local authority administrator or even an administrator appointed by the Central or State Government.

D. ROLE OF THE LOCAL AUTHORITY

In some places the duty to prepare the off-site plan lies with the local authorities. They may have appointed an emergency planning officer (EPO) to carry out all this duty as part of the EPO's roles in preparing for a whole range of different emergencies within the local authority area. The EPO will need to obtain the information to provide the basis for the plan.

Rehearsals for off-site plans are important for the same reasons as on-site plans and will need to be organized by the EPO.

E. ROLE OF THE POLICE

The police normally assume the overall control of an emergency, with a senior officer designated as emergency coordinating officer. Formal duties of the police during an emergency include protecting life and property and controlling traffic movements. The functions include controlling bystanders, evacuating the public, identifying the dead and dealing with casualties and informing relatives of dead or injured.

F. ROLE OF THE FIRE AUTHORITIES

The control of a fire is normally the responsibility of the senior fire brigade officer who would take over the handling of the fire from the site incident controller on arrival at the site. The senior fire brigade officer may also have a similar responsibility for other events. Fire authorities having major hazard works in their area should have familiarized themselves with the location on site of all stores of flammable materials, water and foam supply points and fire-fighting equipment.

G. ROLE OF THE HEALTH AUTHORITIES

Health authorities, including doctors, surgeons, hospitals, ambulances and so on, have a vital part to play following a major accident and they should form an integral part of any emergency plan.

For major fires, injuries will be the result of the effects of thermal radiation to a varying degree and the knowledge and experience to handle this in all, but extreme, cases may be generally available in most hospitals.

7.2.8.5 CARE AND MAINTENANCE DURING TEMPORARY DISCONTINUANCE

When the mine will be temporarily discontinued due to any unforeseen circumstances, the following care and maintenance will be carried out.

- Notice of temporary discontinuance of work in mine shall be given to the Controller General, Controller of Mines and the Regional Controller of Mines, IBM, DGMS & DMG, State Govt. officials under Rule 24 of MCDR 1988 and Reg. 6 of MMR 1961 respectively.
- All mining machineries shall be shifted to a safe place.
- Entrance to the mines or part of the mines to be discontinued shall be fenced off as per DGMS Circular and security Guards shall be posted for the safety and to restrict any unauthorized entry to the area.
- Competent persons shall inspect the area regularly.
- Air, water and other environmental monitoring shall be carried out.
- Care for plantation shall be carried out regularly.
- Measures of care, maintenance and monitoring of status of unplanned, discontinued mining operations expected to reopen in future.

All rules and regulations shall be followed in case of any temporary discontinuance of mine.

7.3 RESETTLEMENT & REHABILITATION ACTION PLAN

Kodingamali Bauxite Mine has been in operation since 2018 and the expansion is proposed within the existing ML area. The total mining lease area is 428.075 ha which is located in Village: Kodingamali, Tehsil: Laxmipur & Kashipur & District- Koraput & Rayagada, Odisha.

Entire Mining lease area is Forest land and Stage I and Stage II Forest Clearance for the same has already been accorded by MoEF&CC, New Delhi. Hence, Resettlement & Rehabilitation Action Plan is not applicable.

CHAPTER–8

PROJECT BENEFITS

8.1 INTRODUCTION

M/s. Odisha Mining Corporation Limited (OMC Ltd.) has proposed Expansion in Bauxite Production Capacity from 3.6 Million TPA to 6.0 Million TPA [ROM: 6.0 Million TPA, OB/Waste: 3.29 Million TPA, Top Soil: 0.22 Million TPA (Total Excavation: 9.51 Million TPA)] in Kodingamali Bauxite Mine (ML Area: 428.075 ha) located at Village: Kodingamali, Tehsil(s): Laxmipur & Kashipur, District(s) Koraput & Rayagada, State: Odisha.

M/s. OMC adopted a strategic approach to address the needs of the local communities by undertaking various CSR initiatives directly and in partnership with Government bodies (State/ District/ Block) and notable organizations across various thematic areas namely health, education, skill development, sports, community infrastructure development, etc.

8.2 PROJECT BENEFITS

Project benefits are attributed in various ways as under:

- Improvement in Physical & Social Infrastructure
- Employment Potential: Skilled, Semi-skilled & Un-skilled
- Other Tangible Benefits

OMC Ltd. has established benchmark with regard to its social responsibility towards the community and has undertaken extensive range of initiatives in the sphere of livelihood, employability, education, health, infrastructure development and Women empowerment etc. The company believes that holistic socioeconomic development of the region is the need of the hour and company's prosperity is linked with that of its neighbouring communities.

8.2.1 IMPROVEMENT IN PHYSICAL & SOCIAL INFRASTRUCTURE

The Mining sector is one of the important sectors in India's economy. The Company is contributing to the State and Central Govt. exchequer which shall be spent for the betterment of the local community. With the existing and proposed development in and around the area, there has been/will be a development of supporting facilities/infrastructure eventually leading to development of the area. The Socio-Economic status of the area has been improved with the implementation of various development programs under Pradhan Mantri Khanij Kshetra Kalyan Yojana (PMKKKY) for welfare of the areas and people affected by mining related operations, using the funds generated by District Mineral Foundations (DMFs) and the same will continue in future also, after the prosed expansion in the mining project.

The socio-economic activities are being/will be implemented based on the community priorities. The areas of the development have been/will be identified through socio-economic study and are being/will be considered. The funds allocated are being/will be spent for various socio-economic development activities proposed to be undertaken in the study area with a priority to villages

falling in the impact zone. This approach strengthens the groups, empower the members and helps in developing a high sense of ownership.

8.2.2 EMPLOYMENT POTENTIAL: SKILLED, SEMI-SKILLED & UN-SKILLED

The proposed expansion in Bauxite Mining project will generate various direct & indirect employment opportunities. The existing manpower requirement is 243 and 148 persons will be employed directly in this existing mine (for Expansion). Hence, the total manpower after expansion will be 391 persons. Managerial, supervisory, Skilled/operators, Semi-skilled/unskilled person have been/will be employed and preference has been/will be given to the local for employment as per their requirement & eligibility. Besides this, 8 persons will be engaged in implementation of EMP.

Apart from the above, various indirect employment opportunities are envisaged by way of transportation, workshops, plantation & horticulture, petty contractors; shopkeepers, network of retailers throughout the state and in its marketing regions.

Mining activities also result in numerous indirect employment avenues for the people such as drivers, repair shops, tea–stalls, horticulturist etc.

The Company has organized vocational training, entrepreneur development programmes for the locals including women and provides advice for starting suitable small-scale industry. OMC Ltd. is being/will be encouraging entrepreneurship amongst locals or their qualified family members by awarding services, contracts for activities such as canteens, vehicle hiring, maintenance of gardens, office services and cleanliness, courier services, and material supplies to the villages falling within the mine area and/impact zone of the mine area under CSR plan.

8.2.3 OTHER TANGIBLE BENEFITS

8.2.3.1 ECONOMIC BENEFITS

The Mining sector is one of the important sectors in India's economy. The mine will be contributing around Rs. 213.252 Crore every year to the State and Central Govt. exchequer by way of mining revenue (Royalty, DMF, NMET etc.).

After the expansion in the mining project, job opportunities for the local people will improve the earning and spending capacity of the people. The people in area will be able to utilize improved facilities with regard to education, health care, hygiene, recreational opportunities, small business opportunities etc.

With the existing and proposed development in and around the area, there has been/will be supporting facilities/ infrastructure eventually leading to the development of the area. The Socio-Economic status of the area will improve with the implementation of various development programs under Pradhan Mantri Khanij Kshetra Kalyan Yojana (PMKKKY) for welfare of the areas and people affected by mining related operations, using the funds generated by District Mineral Foundations (DMFs).

The project is also contributing/will contribute additional revenue to the State and Central Govt. in the form of royalty, cess and other taxes etc. would be additional benefit, particularly in the form

of contribution to the District Mineral Foundation fund (DMF). DMF is being/will be utilized by local administration for the development of socio-economic infrastructure and well-being of the local population.

Table – 8.1
Economic Benefits of the Project

S. No.	Description	Revenue generation/Tonne (In INR)	Revenue generation/Annum (in Crores)
1.	Royalty (Present / prevailing Rate per Tonne)	269.26	161.55
2.	District Mineral Foundation (@30% of Royalty)	80.78	48.468
3.	National Mineral Exploration Trust (@2% of Royalty)	5.39	3.234
Total		**355.43**	**213.252**

Revenue generation at peak production @6.0 MTPA (Rs. 213.252 Crore/Annum)

The mine will be contributing around Rs. 213.252 Crores every year to the State and Central Govt. exchequer by way of mining revenue after operating at proposed expansion capacity. Besides this, various rural development initiatives for the upliftment of the nearby communities have been/will be undertaken.

8.2.3.2 SOCIAL BENEFITS

Proposed expansion project will result in growth of the surrounding areas by increased direct and indirect employment opportunities in the region including ancillary development and supporting infrastructure. Besides this, Royalty and other levies like District Mineral Foundation, National Mineral Exploration Trust etc. are/ would be additional benefits and are being/ will be utilized by local administration for the development of socio-economic infrastructure and well-being of the local population. Odisha Mining Corporation Limited has spent for the upliftment of the living standards and development of nearby areas through CSR activities carried out in project vicinity area and nearby villages which has benefited many beneficiaries.

Details of Expenditure done by the company in last five years under CSR activities carried out in project vicinity area and nearby villages are given below:

Table 8.2

CSR Expenditure from year 2023-24 to 2024-25 and proposed CSR Budget for Year 2025-26 to 2027-28

(Rs. in Lakhs)

		Expenditure	Budget			
S. No.	**Activity**	**2023-24**	**2024-25**	**2025-26**	**2026-27**	**2027-28**
1.	Improvement of Road connectivity and public transport and other infrastructure facilities	60.30	39.03	37.55	34.36	35.55
2.	Livelihood & Socio-Economic standard improvement support	35.43	22.93	22.06	20.19	20.89
3.	Preventive measures for mitigation of mine related health problems	73.50	47.58	45.76	41.88	43.33
4.	Promotion of Hygiene and Sanitation, public health initiatives	42.0	27.19	26.15	23.93	24.76
5.	Promotion of Literacy & Education	213.35	138.10	132.84	121.56	125.78

6.	Skill development & Vocational Training programmes for local communities	99.93	64.68	62.22	56.94	58.91
7.	Support to social, cultural, recreational activities	4.70	3.04	2.93	2.68	2.77
8.	Water storage tanks, drinking water supply facility & irrigation support to agriculture	33.05	21.39	20.58	18.83	19.48
Total		**520.26**	**363.95**	**363.95**	**350.09**	**320.37**

Source: *M/s. OMC Ltd.*

8.2.3.3 ENVIRONMENTAL BENEFITS

Proposed Expansion project will be beneficial with respect to the environment. At conceptual stage, total area under greenbelt/plantation will be 147.867 ha (18.098 ha area under Greenbelt + 125.60 Ha on the backfilled area + 4.169 ha under mineral storage area). Hence, conceptual land use will present a better land use of the Area. Some of the environmental benefits associated with the proposed expansion project are listed below:

S. No.	Benefits	Description
1.	Biodiversity enhancement	Plantation of native species in reclaimed areas create new habitats, promoting local flora and fauna diversity.
2.	Reduced pressure on natural resources	Water harvesting and plantation initiatives reduce reliance on external water resources.
3.	Environmental awareness and community participation	CSR activities and community programs help in raising environmental awareness and involve locals in caring for nature
4.	Resource optimization	Optimum utilization overall resource efficiency.

8.3 CONCLUSION

OMC Ltd. recognizes CSR activities as their social responsibility. The project activity and the management aids with the development of public amenities in the region. The mine management recruited/will recruit semi-skilled & unskilled eligible workers from the nearby villages depending upon requirement in the mines and the eligibility, qualification and experience of local persons. The overall effect will result in higher standard of living viz. better education, improved health and sanitation facilities, housing and acquisition of consumer durables. Housing, transport, medical, educational and other civic amenities will get improved in the future. This is envisaged as a major positive benefit.



CHAPTER–9

ENVIRONMENTAL COST BENEFIT ANALYSIS

9.1 ENVIRONMENTAL COST BENEFIT ANALYSIS

As per EIA Notification dated 14th September, 2006, the Chapter on the 'Environmental Cost Benefit Analysis' is applicable only if the same is recommended at the Scoping stage.

The present proposal is for the Expansion in Bauxite production Capacity from 3.6 Million TPA to 6.0 Million TPA under the EIA Notification, 2006 & its subsequent amendments. As per the Terms of Reference (ToR) issued by MoEFCC, New Delhi vide File No. J-11015/439/2007-IA.II(M) dated 20.06.2025 for the mining project activity; 'Environmental Cost Benefit Analysis' is not required.

CHAPTER – 10

ENVIRONMENTAL MANAGEMENT PLAN

10.1 INTRODUCTION

The Environmental Management Plan (EMP) is required to minimize adverse environmental impacts by implementing suggested mitigation measures with timelines and responsibilities during the project life cycle.

EMP consists of a set of mitigation, management and institutional measures to be taken up during implementation and operation of a project to eliminate adverse environmental impacts or reduce them to an acceptable level. Chapter 4 dealt with environmental impacts of this project and existing & proposed mitigative measures to minimize adverse impacts as well as to improve the existing environment quality. This chapter mainly discusses the administrative aspects of ensuring that mitigative measures are implemented and their effectiveness is monitored after approval of EMP. It comprises of Corporate Environment Policy (CEP) of company, establishment of an Environment Management Cell (EMC) and developing mechanism of reporting of non-compliance, if any to company board, conduct root cause analysis of non-compliances and propose appropriate mitigation measures to ensure avoidance of adverse Penal action arising out of environment and other statutory regulation.

Good practices of EMP ensured to keep all the environmental parameters of the project w.r.t. Air, Water Quality, Soil, Biological Diversity of the area Socio Economic Improvement, Biological Diversity of the area within statutory limits and sustainable manner.

10.1.1 PURPOSE OF EMP

- To control emission and waste minimization and proper disposal of waste so as to meet statutory requirement.
- To support & implement best technology to achieve environmental standards.
- Judicious use of natural resources and water.
- To ensure good working condition for safety, welfare and good health of the work force.
- Ensure effective operation of all control measures.
- Vigilance towards probable disasters and accidents.
- Monitoring of cumulative and long-term impacts.
- To reduce accident hazards.
- Allocation of funds for environment management supplies.
- To promote greenbelt development & Plantation Programme.

Continuous development and search for innovative technologies for better environment

10.2 ELEMENTS OF EMP

EMP includes four major elements: -

1. **Planning**: This includes identification of environmental impacts, legal requirement, commitments and policies, setting environmental objectives and environment, health, safety and social compliance requirements;

2. **Implementation**: This comprises of resources available for the project, accountability of employees , contractors and documentation of measures to be taken;
3. **Checking**: Measurement & Evaluation: This includes regular inspection, audits, monitoring corrective actions and record keeping ; and
4. **Management Review**: Actions are taken to continually improve the environment, health, safety, and social performance of the organization.

The following Policy & programs have been developed to ensure proper implementation of EMP for the mining project (existing & proposed expansion):

- Formulating Corporate Environment Policy (CEP)
- Formation of Environment Management Cell (EMC)
- Greenbelt Development /Plantation Programme
- Occupational Health and Safety
- Budgeting of Environmental Mitigation measures

10.3 CORPORATE ENVIRONMENT POLICY

The importance of environmental management has been recognized by M/s. Odisha Mining Corporation Limited and company has taken necessary steps to identify environmental aspects and mitigate those aspects which generate pollution at the site, respond to impacts of its own population and also in the peripheral areas. It has adopted a strategy to abate pollution as given below:

- Provision of state of the air pollution control equipment at the design stage itself through clean technology initiatives.
- By developing a strong monitoring and inspection setup for statutory compliances.

Company has well laid Corporate Environmental Policy adopted by Board of Directors indicating clear framework to become Environmentally Sustainable organization. The hierarchical system or administrative order of the company to deal with the environmental issues and for ensuring compliance with the conditions stipulated in various clearances like EC Conditions etc. have been given in the Environmental Policy of the company.

The corporate Environmental Policy of OMC emphasizes:

- Integrated sound environmental practices in all its activities.
- Comply with legal and other requirements pertaining to the environment. Forest & wildlife and volunteer to go beyond.
- Contribute towards mitigation of climate change through the adoption of cleaner and energy efficient technologies.
- Promote development of innovative environment-friendly processes and products.
- Integrated the principle of "reduce, recover, recycle and reuse" in its operations for conservation of natural resources to ensure a sustainable future.
- Strive for continual improvement of environmental performance by setting and achieving challenging targets.
- Ensure regular monitoring and review of environmental performance through a robust audit mechanism and a transparent reporting system.

- Continuously monitor emissions, discharges and ambient air quality and make data available in the public domain.
- Communicate environmental performance to all stakeholders.
- Improve employee commitment and responsibility towards environment protection through capacity building.

Promote environmentally responsible behaviour amongst contractual work force and suppliers. Corporate Environment Policy and Integrated Management System Policy of M/s. OMC Ltd. is enclosed as ***Annexure XIII*** with this EIA/EMP Report.

10.3.1 FORMATION OF ENVIRONMENTAL MANAGEMENT CELL (EMC)

In order to maintain the environmental quality, regular inspections, audits & monitoring of various environmental components is necessary. M/s. Odisha Mining Corporation Ltd. (OMC) has a full-fledged Environmental Management Cell (EMC) for environmental monitoring and control. The EMC team has been/will be responsible for pollution monitoring aspects and implementation of control measures as discussed in Chapter 2 & 4 of this EIA/EMP Report.

A group of qualified and efficient engineers with technicians have been deputed for maintenance, up keeping and monitoring the pollution control equipment, to keep them in working mode at the best of their efficiencies. The existing manpower details of the EMC are given in the table below:

Table: 10.1

Details of Environmental Management Cell (EMC) Members

S. No.	Name	Designation
1	Mr. Hemant Kumar Behera	DGM(Mining)
2	Mr. Jatin David Bagh	Manager (Mining)
3	Mr. Bimalendu Behera	Manager (Mechanical)
4	Mr. Shibala Tanti	Manager (Electrical)
5	Mr. Manmohan Routaray	Manager (Civil)
6	Mr. Subhadip Ghosh	Dy. Manager (Geology)
7	Mr. Satyajit Prusty	Asst. Manager (Mining)
8	Mr. Bibhuti Bhusan Mohanty	Surveyor

10.3.2 CORPORATE ENVIRONMENTAL AUDITING

Independent Audit/ evaluation of working of the Policy has been done by the Internal Auditor at least once a year and report the same to the Director, was designated by the Board of Directors as responsible Director for the preparation and implementation of the Corporate Environmental Policy. It is imperative for the Head of Business /Occupier to ensure avoidance of adverse Penal action arising out of Environment and other statutory regulation. Therefore, third party Corporate Environment Compliance Audit (CECA) has been conducted to assess and quantify the environmental performance/compliance of the project with following scope:

- To check any major or minor non-compliances/non-conformities occurring in respect of the statutory clearances.
- To check with the compliance status of the conditions stipulated in the Environment Clearance letter/Consent to Operate/other statutory permissions.

- Evaluation of performance of OHS Policy Implementation.
- Verify selected parameters and methods for internal OMC policies and established environmental performance levels.
- Conduct root cause analysis of non-compliances/deviation and propose appropriate mitigation measures prioritizing the findings as high, medium or low based on potential risk to the organization

10.3.3 RESPONSIBILITIES OF EMC

The EMC oversees and implements the various functions to ensure that environmental status of the area remains well within the statutory standard of MOEF&CC and SPCB, Odisha. The responsibilities of the EMC include the following:

- Environmental monitoring of the core and buffer zone and evaluation of results. Keeping of records to track the surrounding environment quality status.
- Procurement and commissioning of Pollution Control/Monitoring Equipment
- Specification and regulation of maintenance schedules for pollution control equipment.
- Ensuring that prescribed standards are maintained.
- Ensuring optimum water usage.
- Implementation of the mitigation measures suggested in EIA/EMP Report.
- Ensuring greenbelt development/plantation & its maintenance.
- Compliance with guidelines and statutory requirements.
- Coordination with statutory bodies, functional groups of the unit, Corporate Project/Environment & Engineering department etc.
- Interaction with engineering & operation team for implementation of any modification programmes intended to improve the availability/efficiency of pollution control devices/ systems.
- Carry out proactive environmental studies and observe all precautions necessary to avert disasters and emergencies in the mining observations as well as nearby areas.
- Regular environmental review and performance appraisal by Environmental Audits.
- Coordination with the vendors dealing in waste supplies and disposal.
- Ensuring that the waste handling and disposal is carried out as per prescribed conditions.
- Conducting regular training programmes on various environmental requirements especially sustainable development, climate change, environmental monitoring etc.
- Reporting of compliances and non–compliances (if any) to management and other stakeholders.
- Implementation of socio-welfare programmes for economic upliftment.
- Implementation of the Environmental Management Plan and assessment of effectiveness of the same.
- To provide periodic health check-up of workers.

The EMC also co-ordinates with other departments like Occupational Health, Safety Management, Project Engineering, Horticulture, EMP, Water Supply Department etc. and also do the liaison work with external agencies like State & Central Pollution Control Boards as well as other related

departments. EMC sends six monthly progress reports in the prescribed format, as per the prevailing practice to concerned agencies. Any new regulations considered by State/Central Pollution Control Board w.r.t Mines are being taken care of by EMC. Also, half yearly compliance reports send to MOEF&CC as per the guideline.

10.3.4 PERSONS RESPONSIBLE FOR IMPLEMENTATION OF EMP

Manpower Required to execute the Project is given in Chapter 2 of this EIA/EMP Report. Details of persons responsible for implementation of EMP along with their role/responsibilities are given in table below:

Table – 10.2
Role & Responsibilities of Manpower to be deployed

S. No.	Designation	Role/Responsibilities
1.	**Mines Manager**	➢ Responsible for discharging duties as Mines Manager as per Mines Act 1952, MMR 1961, Mines Rules 1955, MCDR 2017 and various circulars issued by regulatory authorities from time to time. ➢ Create awareness on potential environmental aspects & occupational hazards & risk. ➢ Ensure judicious use of all natural resources including energy, minerals, water etc. ➢ Ensure environment friendly operations with a view to keep the emissions/effluents within the prescribed norms. ➢ To Identify and comply with the applicable Statutory & Regulatory requirements. ➢ To identify, control and reduce the EHS hazards and risks. ➢ Training Need Assessment of Employees for effective implementation of the EMP ➢ Incident controller in case of any emergency. ➢ To plan for new equipment, minor modification etc. for betterment of plant (i.e. Quality improvement, reduction of environmental impact & OHS Risk etc.) in consultation with Operations Head. ➢ To ensure effective & continuous operation of pollution control & Safety equipment ➢ Responsible to ensure quality of stacker feed Bauxite as per process requirement. ➢ Overall environmental performance of the Mines. ➢ Liaison with statutory / regulatory bodies. ➢ To ensure effective implementation & adherence to QEHS Criterion at their sub-contracted activities. ➢ Ensure the EMP is implemented and is effective. Assist the Environment Manager with regulatory authorities and/or community consultation (i.e. complaints).
2.	**Manager (Mining)**	➢ Establish, implement and maintain the EMP as stipulated. ➢ Ensure that all the applicable environmental parameters are regularly

		monitored and measured as per defined interval and reports submitted to the concerned regulatory authorities. ➢ Ensure that the environmental objectives and targets are established and achieved. ➢ Liaise with regulators and other agencies as required in unison with the Mines Manager for effective implementation of the EMP. ➢ Regular communication with PAF/ nearby community and establish a feedback system. ➢ Implement appropriate management programs to achieve the management objectives and goals. ➢ Assist operational staff with respect to clarifying or improving existing practices / procedures or adding more stringent requirements / controls) ➢ Ensure that any change in any of the activities/ equipment/ processes are duly evaluated in order to ensure No increase in or introduction of new environmental risks or impacts. ➢ Undertake HSE Manager role in case of an emergency with a potential to degrade environment and/or human health and safety. ➢ Ensure that the requirements of the EMP and related management programs have been addressed in all contractor environmental management documentation. ➢ Undertake regular audits (appoint an appropriately qualified external auditor) for evaluating the environmental performance of the mine.
3.	**Asst. Manager (Mining)**	➢ Undertake routine environment monitoring as per schedule ➢ Daily inspection of the premises, preparing inspection reports ➢ Checking of emission/ noise levels of mining equipment ➢ Ensure that regular water sprinkling is done on the haul roads and around waste dumps for effective control of fugitive emissions ➢ Supervising the overall progress of environmental management programs put in place and ensuring they adhere to all applicable regulations. ➢ Prepare and submit regular reports to concerned authorities ➢ Assist horticulturist in developing greenbelt in mining premises in line with stipulated guidelines ➢ Assist mining engineers in implementing best waste management practices ➢ Coordinate with mining and other concerned engineers for effective implementation of the EMP
4.	**Manager (Mining)**	➢ Planning for plantation and greenbelt development is mining area ➢ Take assistance from local forest department regarding selection of species for plantation ➢ Ensure regular watering of saplings is done as per schedule ➢ Ensure optimum survival of saplings ➢ Development of lawns and gardens around office and other areas ➢ Ensure regular maintenance of saplings planted in mining area

5.	**Manager (Mechanical)**	➢ Construction and maintenance of storm water drains, catch drains, siltation ponds etc. ➢ Construction and maintenance of rainwater harvesting structures within and outside mining area ➢ Provide adequate fencing to safeguard saplings from stray animals ➢ Regular maintenance of soak pits and septic tanks for effective disposal of domestic waste
6.	**Manager (Mechanical)**	➢ Daily inspection of mining machineries ➢ Regular maintenance of equipment as per OEM recommendations ➢ Keeping maintenance logs ➢ Regular monitoring of fuel consumption of vehicles and coordination with suppliers/ OEM if the fuel consumption exceeds the committed values. ➢ Ensure that the mining machineries conform to the applicable environmental norms ➢ Ensure that the emission/noise levels from the mining machineries do not exceed the permissible levels.
7.	**Manager (Electrical)**	➢ Ensure electrical supply in mining area for operation of monitoring and measuring instruments ➢ Troubleshooting, maintenance and periodic calibration of environmental monitoring equipment ➢ Maintain appropriate inventory of spares
8.	**Asst. Manager (Mining)**	➢ Carrying out responsibilities as specified in the Mines Act, Regulations and Rules. ➢ Assisting Manager Mines in running the mine and in the absence of Mines Manager, Assistant Manager shall have the same responsibility, discharge the same duties and be subject to the same liabilities as the manager, but not so as to exempt the manager their form. ➢ Ensuring that all work is carried out in accordance with the provision of the Act and regulations, rules, bye laws made under. ➢ Implementing the Short term / Long term mine planning of Mines. ➢ Preparing & Submitting data required for budget proposal. ➢ Identifying the legal requirements and ensure compliance in respect of all tasks & operations. ➢ Forwarding necessary returns to statutory bodies in time. ➢ Obtaining all necessary statutory permissions. ➢ Ensuring renewal of necessary licenses and permits. ➢ Planning and coordination for Environment and Safety protection measures. ➢ Qualitative and Quantitative Bauxite feeding to plant. ➢ Ensuring implementation of SOPs, emergency preparedness & emergency response. ➢ Checking all reports, registers and other records; countersign the same with date.

9.	**Workmen/ Helpers for housekeeping and Environment Monitoring**	➢ Carrying out general housekeeping of the area. ➢ Regular disposal of office and other municipal waste. ➢ Regular sweeping of roads where water sprinkling is not done. ➢ Assist environment engineer in carrying monitoring equipment at site.

10.4 ORGANISATIONAL SET-UP

The reporting structure (both functional and administrative) is shown in figure below:

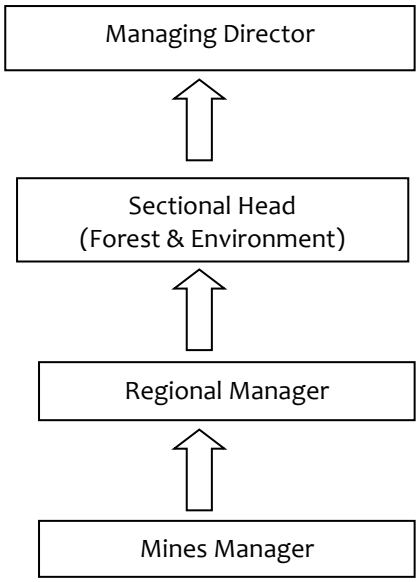


Figure 10.1 Organizational Set-up

10.5 DETAILED BUDGET FOR EMP

The existing and proposed budget for implementation of the pollution control & impact mitigation measures for this Expansion Project is given as below:

Table 10.3

Summary of Proposed EMP Budget for Expansion Project

S. No.	Particulars	Cost (Rs. in lakhs)	
1	**Project Cost**	5500	
Cost of EMP			
	Activities	**Capital Cost (Rs. in lakhs)**	**Recurring Cost (Rs. in lakhs /Year)**
A.	**Pollution Control**		
1.	Installation & Commissioning of Mist Canons/Dry Fog System	18	-
2.	Installation & Commissioning of Wheel Wash System	-	2
3.	Installation of Fixed Sprinkling System	60	1
4.	Deployment of Water Tanker for Dust Suppression System	-	27.53
5.	Dust suppression by Road sweeping machine	-	72

5.	O&M of Mist Canon/Wheel Wash System/Water Tankers	-	10
6.	Construction of Garland Drains/Retaining Walls/Check dams/Settling Ponds	70	5
7.	O&M of STP & Oil & Grease Separation System	-	10
B.	**Pollution monitoring**	-	-
1.	Environmental Monitoring (Air/Water/Noise/Soil, etc.)	-	6
2.	Installation & Commissioning of CAAQMS with CAMC of O&M	291.81	-
3.	Procurement of Environmental Laboratory Related (Chemicals and spares)	10	-
4.	Establishment of Environmental Labs	50	-
C.	**Green belt & plantation**	1272.35	-
D.	**Statutory Levies and Compliance Related**	-	-
1.	Surface Water Charges/Ground Water Charges	-	7.26
E.	**Awareness Events**	-	-
1.	Different awareness programme (World Forest Day, Earth Day, Water Day, Banamahotstaba week, World Environment Day, Ozone Day, Fire Awareness programme), Environmental week celebration, etc.)	-	14
	Total	**1772.16**	**154.79**

Source: *M/s. OMC Ltd.*

Table 10.4

Capital (Cumulative) Cost of Existing EMP (Rs. In Lakhs)

S. No.	Particulars	Quantity/ Dimension	Capital Cost (in Lakhs)
1.	**Retaining Wall**		
	Stack Yard (5m Ht.) 3.5 mtr. Above G. L	415 m*0.43m*5.00m	145.00
	Top Soil (4m avg. Ht.)	420 m	144.39
	Near Crusher (5mtr.)	170m	83.47
2.	Toe wall at stack yard	470m*0.45m*1.10m	24.00
		90m*0.45m*1.10m	5.35
	Near stack yard	420m*0.45m*1.10m	25.00
3.	**Settling Pond**		
	Near Z9 pillar	40m*37m*4m	45.00
	Near stack yard	50m*30m*4m	62.00
	Behind OB dump	54m*32m*4m	65.00
	Behind parking plaza	60m*30m*4m	62.00
	Near Mythri camp	40m*20m*3m	10.00
	Near Z23 pillar	44m*24m*4m	25.00
	Behind OB dump	40m*20m*3m	9.00
	Near Top soil dump	110m*20m*4 m	80.00
	Besides L.M.V road	53m*23m*3 m	22.00
	Near entry gate	40*20*1	3.20
	Pond at RHS of approach road to Quarry-2	80*20*4 m	48.00
	Pond near Quarry-2	60*30*4 m	55.00

S. No.	Particulars	Quantity/ Dimension	Capital Cost (in Lakhs)
	H.D.P.E lining of 06 nos. pond with periodic de silting and beautification of surrounding embankment	6 nos. pond (40 ML capacity)	160.00
4.	Crate boulder wall (Behind OB dump yard, Stack yard & Ponds)	2200m*1.5m*3m	204.00
	Besides Crusher ramp	30m*1.5m*3m	5.00
	Behind proposed extended OB dumps	855m*1.75m*2m	100.81
5.	Development of one park near entry gate and ornamental grill fencing with paver pathway around 4 nos. existing settling pond		111.00
	Herbal Garden	1 no.	10.00
6.	**PQC Road**		
	PQC road from zero point to Crusher area (5.25 Km. long double lane with shoulder and drain),1.00 Km. long C.C circulation road & 120 mtr. X 100 mtr. Size parking plaza	(5.25+1.00) K.M	2375.94
7.	**Rain water harvesting structures**		
	Settling cum percolation pond (Near Z-6 M.L pillar)	30m*30m*4m	35.00
	Storage cum Recharge Pond (Near W.B -1&2)	45m*20m*3m	55.00
8.	Garland Drain (At Various locations)	5000m*1.50m*1.00m	22.70
	Garland Drain (At Various locations)	1000m.*1.75m.*0.75m.	7.00
9.	Check Dam	10 nos.	75.00
10.	Sewage Treatment Plant	1 nos.	40.00
11.	Gray Water Treatment Plant	1 nos.	8.30
12.	Wheel Wash System	-	29.40
13.	Plantation	-	931.58
	Total		**5084.14**

Source: *M/s. OMC Ltd.*

Table 10.5

Recurring (Cumulative) Cost of Existing EMP

S. No.	Particulars	Recurring Cost (Rs. in Lakhs/annum)
1.	Road sweeping Machine for cleaning of roads	299.29
2.	Operation & Maintenance of Wheel washing facilities	5.13
3.	Environment monitoring	72.8
4.	De silting of settling ponds, garland drains, etc.	12.23
5.	Maintenance Plantation	360.87
	Total	**750.32**

Source: *M/s. OMC Ltd.*

CHAPTER–11

SUMMARY & CONCLUSION

11.1 INTRODUCTION

M/s. Odisha Mining Corporation Limited has proposed Expansion in Bauxite Production Capacity from 3.6 Million TPA to 6.0 Million TPA [ROM: 6.0 Million TPA, OB/Waste: 3.29 Million TPA, Top Soil: 0.22 Million TPA (Total Excavation: 9.51 Million TPA)] in Kodingamali Bauxite Mine (ML Area: 428.075 ha) located at Village: Kodingamali, Tehsil(s): Laxmipur & Kashipur, District(s) Koraput & Rayagada, State: Odisha.

Earlier, the Environment Clearance for 3.0 Million TPA Bauxite Production capacity was granted in favour of M/s. Orissa Mining Corporation Ltd. on 28.05.2008. Further, M/s. OMC Ltd. applied for Environmental Clearance (EC) for Expansion in Bauxite Production Capacity from 3.0 Million TPA to 3.6 Million TPA under Para 7 (ii) (a) of EIA Notification, 2006 as per MoEF&CC OM dated 11.04.2022 and 30.05.2022. The Environment Clearance for the same has been granted by MoEFCC, New Delhi vide File No. J-11015/439/2007.IA. II(M) dated 15.04.2025.

Now, the present proposal is for Expansion in Bauxite Production from 3.6 Million TPA to 6.0 Million TPA under EIA Notification, 2006, as amended from time to time. ToR Application for the proposed expansion project was submitted on Parivesh Web portal of MoEFCC on 07.05.2025. The project was considered during 44th Meeting of Expert Appraisal Committee (Non-Coal Mining) & the Technical Presentation for ToR was held on 15.05.2025. The Terms of Reference (ToR) was issued by MoEFCC, New Delhi vide file No.: J-11015/439/2007.IA. II(M) dated 20.06.2025.

As per EIA Notification dated 14th September, 2006, as amended from time to time; the project falls under Category "A", Project or Activity 1(a) "Mining of Mineral".

Opencast Mechanized Method of Mining is being/will be adopted which includes drilling, blasting, loading, crushing and transportation. The excavated Bauxite is being/will be transported via Road through Tippers to the Railway sidings near Kakriguma, Singaram, Rayagada & Dumuriput from where the ore is being/will be further dispatched for sale to the prospective buyers (for its use in Alumina & Aluminium Plants/Refineries).

11.2 MINING LEASE STATUS

The mining lease over an area of 428.075 ha was executed on 10.01.2017 for District Koraput and on 11.01.2017 for District Rayagada in favour of M/s. Odisha Mining Corporation Limited for a period of 50 years which is valid up to 09.01.2067 and 10.01.2067 respectively. Copy the lease document are enclosed as ***Annexure I.***

11.3 STATUS OF APPROVAL OF MINING PLAN

The Review of Mining Plan & Progressive Mine Closure Plan (FY: 2022-23 to 2026-27) over an area of 428.075 ha for Bauxite Production Capacity: 6.0 Million TPA has been approved by Indian Bureau of Mines, Bhubaneswar vide Letter no. Letter no. RMP/A/21-ORI/BHU/2021-22/1206 dated 10.11.2021. Copy of the mining plan approval letter is enclosed as ***Annexure II.***

11.4 PROJECT DETAILS

Table: 11.1
Project Details

S. No.	Particulars	Details
A.	**Nature of project**	Fully Mechanized Opencast mining
B.	**Size of project**	
1.	ML area	428.075 ha
2.	Production Capacity	➢ Bauxite: 3.6 million TPA to 6.0 million TPA ➢ OB/Waste: 3.29 Million TPA ➢ Top Soil: 0.22 Million TPA ➢ **Total Excavation: 9.51 Million TPA**
C.	**Project Location**	
1.	Village~~s~~	Kodingamali
2.	Tehsil(s)	Laxmipur & Kashipur
3.	District(s)	Koraput & Rayagada
4.	State	Odisha
5.	Coordinates	Latitude: 19°01'46"N to 19°05'14"N Longitude: 83°03'22"E to 83°05'12"E
6.	Toposheet No.	Core Zone: E44F4 (65M/4) Buffer Zone: E44F4 (65M/4); E44E16 (65I/16); E44K13 (65J/13), E44L1(65N/1)
D.	**Environmental Setting Details**	
1.	Habitation	Village Biriguda: ~0.8 km in East Direction
2.	State/ National Highway in proximity	SH-4 (~ 4.5 Km in SSE direction)
3.	Railway Station in proximity	➢ Singaramba Railway Station (~3.0 Km in NE direction) ➢ Laxmipur Railway Station (~4.5 km in SE Direction)
4.	Nearby Airports	➢ Jeypore Airport (~55 km in SW Direction) ➢ Visakhapatnam International Airport (~145 Km in SSE Direction)
5.	Nearest Town/City	➢ Nearest City: Rayagada (~ 35.0 km in NE Direction) ➢ Nearest town: Laxmipur (~ 6.5 km in SE Direction)
6.	Inter district Boundary	Koraput & Rayagada (Adjacent in NW Direction)
7.	National Park, Wild Life Sanctuaries, Biosphere Reserves, Wildlife corridors, Tiger/ Elephant Reserves, within 10 km radius study area	There is no National Park, Wild Life Sanctuary, Biosphere Reserves, Wildlife corridors, Tiger/Elephant Reserves, etc. within 10 km radius study area.

<table>
<tr><th>S. No.</th><th>Particulars</th><th colspan="3">Details</th></tr>
<tr><td>8.</td><td>Reserve/Protected Forests within 10 km radius study area</td><td>S.No.</td><td>Name</td><td>Shortest distance from the ML boundary (in Km)</td></tr>
<tr><td></td><td></td><td>1.</td><td>Kodingamali R.F.</td><td>Core Zone</td></tr>
<tr><td></td><td></td><td>2.</td><td>Kodingamali Proposed R.F.</td><td>Core Zone</td></tr>
<tr><td></td><td></td><td>3.</td><td>Champi R.F</td><td>~3.5 Km in SW Direction</td></tr>
<tr><td></td><td></td><td>4.</td><td>Kendripadar R.F.</td><td>~4.0 Km in NE Direction</td></tr>
<tr><td></td><td></td><td>5.</td><td>Bamandeba R.F</td><td>~5.5 Km in SSW Direction</td></tr>
<tr><td></td><td></td><td>6.</td><td>Titigurha R.F</td><td>~6.5 Km in NE Direction</td></tr>
<tr><td></td><td></td><td>7.</td><td>Lakshmipur R.F</td><td>~8.0 Km in SE Direction</td></tr>
<tr><td></td><td></td><td>8.</td><td>Shankaraha R.F</td><td>~8.5 Km in NE Direction</td></tr>
<tr><td></td><td></td><td>9.</td><td>Minapai R.F</td><td>~9.0 Km in ESE Direction</td></tr>
<tr><td></td><td></td><td>10.</td><td>Lakshmipur P.F</td><td>~4.0 Km in SSE Direction</td></tr>
<tr><td></td><td></td><td>11.</td><td>Baghamari P.F.</td><td>~4.0 Km in NE Direction</td></tr>
<tr><td></td><td></td><td>12.</td><td>Sargighati P.F.</td><td>~6.0 Km in East Direction</td></tr>
<tr><td></td><td></td><td>13.</td><td>Bagriguma P.F.</td><td>~6.5 Km in NE Direction</td></tr>
<tr><td></td><td></td><td>14.</td><td>Masimandi P.F</td><td>~7.0 Km in NW Direction</td></tr>
<tr><td></td><td></td><td>15.</td><td>Raishila P.F</td><td>~8.0 Km in SSE Direction</td></tr>
<tr><td></td><td></td><td>16.</td><td>Kakirimali P.F</td><td>~8.0 Km in South Direction</td></tr>
<tr><td></td><td></td><td>17.</td><td>Kelar P.F</td><td>~8.0 Km in SW Direction</td></tr>
<tr><td></td><td></td><td>18.</td><td>Baghaparmar P.F.</td><td>~9.0 Km in SSW Direction</td></tr>
<tr><td></td><td></td><td>19.</td><td>Kutili P.F</td><td>~9.0 Km in ENE Direction</td></tr>
<tr><td></td><td></td><td>20.</td><td>Kutinga P.F.</td><td>~9.5 Km in East Direction</td></tr>
<tr><td>9.</td><td>Water Bodies within 10 km radius of the mine site</td><td>S. No.</td><td>Name</td><td>Shortest distance from the project boundary in Km</td></tr>
<tr><td></td><td></td><td>1.</td><td>Patagarha Nadi</td><td>~4.0 Km in NNE Direction</td></tr>
<tr><td></td><td></td><td>2.</td><td>Nala</td><td>~4.0 Km in SSE Direction</td></tr>
<tr><td></td><td></td><td>3.</td><td>Nala</td><td>~5.0 Km in ENE Direction</td></tr>
<tr><td></td><td></td><td>4.</td><td>Murani Nadi</td><td>~6.0 Km in SW Direction</td></tr>
<tr><td></td><td></td><td>5.</td><td>Patagarha Nala</td><td>~7.5 Km in NW Direction</td></tr>
<tr><td></td><td></td><td>6.</td><td>Nala</td><td>~8.5 Km in WSW Direction</td></tr>
<tr><td></td><td></td><td>7.</td><td>Baghri Nala</td><td>~9.0 Km in West Direction</td></tr>
<tr><td></td><td></td><td>8.</td><td>Debagarha Nala</td><td>~9.5 Km in SSW Direction</td></tr>
<tr><td>10.</td><td>Seismic Zone</td><td colspan="3">Zone – II as per IS: 1893 (Part-I): 2002</td></tr>
<tr><td>E</td><td>Cost Details</td><td colspan="3"></td></tr>
<tr><td>1.</td><td>Project Cost</td><td colspan="3">Rs. 55.0 Crores</td></tr>
<tr><td>2.</td><td>Cost of EMP</td><td colspan="3">Capital Cost: Rs. 6856.3 Lakhs (Existing: Rs. 5084.14 Lakhs + Proposed: Rs. 1772.16 Lakhs)
Recurring Cost: Rs. 905.11 Lakhs (Existing: Rs. 750.32 lakhs/annum existing + Proposed: Rs. 154.79 Lakhs/annum)</td></tr>
<tr><td>F.</td><td>Requirements of the Project</td><td colspan="3"></td></tr>
<tr><td>1.</td><td>Water Requirement</td><td colspan="3">475 KLD (Surface water: 400 KLD + Recycled & Rainwater: 75 KLD)</td></tr>
<tr><td>2.</td><td>Power Requirement</td><td colspan="3">1.0 MW</td></tr>
<tr><td>3.</td><td>Man Power Requirement</td><td colspan="3">391 (Existing 243 + 148 Additional)</td></tr>
</table>

Source: *Site Visit & Pre- Feasibility Report*

11.5 MINING DETAILS

Table: 11.2
Mining Details

S. No.	Particulars	Details
1.	Mining Method	Fully Mechanized Opencast Mining
2.	Bauxite Production Capacity	3.6 Million TPA to 6.0 Million TPA
3.	Total Geological Resources	79.33 Million Tonnes (as on 30.06.2021) 68.08 Million Tonnes (as on 31.03.2025)
4.	Mineable reserves	75.79 Million Tonnes (as on 30.06.2021) 64.54 Million Tonnes (as on 31.03.2025)
5.	Life of Mine Expected Excavation rate @ 6.0 MTPA	~ 13 Years [Based on Mineable Reserves: 75.79 Million Tonnes (as on 30.06.2021)] ~ 11 Years [Based on Mineable Reserves: 64.54 Million Tonnes (as on 31.03.2025)]
6.	Bench Height	10 m (Maximum)
7.	Bench Width	10 m – 15 m
8.	Overall pit slope	36° (Ultimate pit slope)
9.	Elevation Range	1089.27 m AMSL to 1276.47 m AMSL
10.	Average Level	1182.87 m AMSL
11.	Present working depth	Quarry 1: 1155 m AMSL Quarry2: 1094 m AMSL
12.	Ultimate working depth	1080 m AMSL
13.	Number of Working days	300
14.	Number of Working Shifts	3 shifts (@6 hrs. each)

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

11.6 METHOD OF MINING

Mining is being/will be carried out by fully mechanized opencast method for excavation of Bauxite by using conventional mining technology i.e. Shovel- Dumper combination. Drilling & Blasting is being/will be carried out in the hard strata whereas soft ore is being/will be directly excavated hydraulic excavators. Drilling is being/will be carried out crawler mounted 115 mm–150 mm fast drills. Controlled blasting method is being/will be practiced. The blasting is being/will be done using explosives like Site Mixed Emulsion (SME). Blasted ore is being/ will be loaded by large size hydraulic excavators with 4.3 m^3/3.5 m^3 capacity into the dumper of capacity 60 Tonnes/35 Tonnes for transportation of Bauxite to the crushers 2 x 500 TPH (installed within in Mining Lease area). One Crusher of 2400 TPH is proposed to be installed {Existing Crusher (2 x 500 TPH) will be phased out after the installation of Proposed Crusher (2400 TPH)}. All the crushed Bauxite from existing crushers is being/will be transported via Road through tippers to the Railway siding near Kakriguma, Singaram, Rayagada & Dumuriput from where the ore is being/will be further dispatched for sale to the prospective buyers (for its used in Alumina & Aluminium Plants/Refineries).

11.7 YEARWISE PRODUCTION AND EXCAVATION DETAILS

Table-11.3
Year-wise Proposed Excavation Details (in Million Tonnes)

Year	Top Soil	OB	Ore	ROM	Total Excavation
2022-23	0.16	3.26	6.0	6.0	9.42
2023-24	0.22	3.29	6.0	6.0	9.51
2024-25	0.16	2.52	6.0	6.0	8.68
2025-26	0.15	2.97	6.0	6.0	9.12
2026-27	0.15	2.48	6.0	6.0	8.63
Total	**0.84**	**14.52**	**30.00**	**30.00**	**45.36**

Source: *OMC Ltd.*

11.8 DESCRIPTION OF THE ENVIRONMENT

Baseline study of the study area has been conducted during Post Monsson Season (October to December, 2024).

Ambient Air Quality: The concentrations of PM10 and PM2.5 for all the 11 AAQM stations were found between 25.8 to 71.3 µg/m^3 and 18.3 to 42.9 µg/m^3 respectively. The concentrations of SO2 and NO2 were found to be in range of 4.2 to 12.1 µg/m^3 and 5.4 to 24.4 µg/m^3, respectively. The concentration of CO has been observed 0.57 mg/m^3 and to 0.64 mg/m^3 at Laxmipur Town and Village Dumripadar respectively. At remaining 9 locations, the concentration of CO was BDL (Below Detectable Limit).

Ambient Noise Levels: Ambient noise levels were measured at 11 locations around the study area. Noise levels varied from 48.8 to 56.4 Leq dB (A) during day time and from 37.2 to 43.0 Leq dB (A) during night time. From the above study and discussions, it can be concluded that noise levels in the study area are well within the prescribed limits as prescribed by the CPCB.

Surface Water Quality: The pH of collected surface water samples varied from 6.94 to 7.41 Total hardness varied from 41.28 mg/l to 183.9 mg/l, Total dissolved solids varied from 71.0 mg/l to 251.0 mg/l, BOD varied from 2.6 mg/l to 8.3 mg/l, COD varied from 11.3 mg/l to 29.2 mg/l.

Ground Water Quality: The ground water analysis for all the 10 sampling stations shows that pH varied from 6.38 to 7.02, total hardness varied from 42.81 to 125.6 mg/l & total dissolved solids varied from 67.0 to 196.0 mg/l. The water samples contain chloride from 7.91 to 32.03 mg/l, SO4 varied from 3.24 to 16.08 mg/l, calcium varied from 7.64 to 31.1 mg/l, Magnesium varied from 5.76 to 15.17 mg/l.

Soil Quality: Samples collected from identified soil locations indicate pH value ranging from 6.04 to 7.41. The soil texture is Silty Clay. Organic Matter ranges from 0.67 % to 0.93% in the soil samples. Nitrogen ranges from 177.49 to 244.87 kg/ha and Phosphorous ranges from 19.54 to 39.11 kg/ha, whereas the Potassium is found to be ranging from 422.72 to 701.02 kg/ha.

11.9 ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

Ambient Air Environment

The key air emissions from the mining activities (drilling, blasting, loading, unloading and transportation) are Particulate Matter, Oxides of Nitrogen (NO_2) and Sulphur dioxide (SO_2). Gaseous emissions get generated from HEMM & transportation of vehicles. The key emissions due to crushing in the mine is Particulate Matter.

Proper mitigation measures are being/will be taken like wet drilling, controlled blasting, water sprinkling before drilling, blasting & during transport activities, wetting of blasted muck pile and development of greenbelt/plantation area to control the fugitive emission. Better maintenance of equipment also helps to reduce such emissions. At crushing site Mist Canon, Dry Fog System, Air Blaster, etc. have been installed to arrest dust from becoming air-borne and to avoid fugitive emission. Development of greenbelt and plantation is being/will be done along the lease periphery, backfilled area, along the Road, etc.

Water Environment

Surface Water

- No water body falls within the Mining lease area. However, two Rivers and few Nalas exist within the study area viz. Patagarha Nadi, Murani Nadi, Patagarha Nala, Baghri Nala, Debagarha and several other nalas.
- Garland drains have been/will be provided for surface run off outside working pits to collect the surface runoff in mine sump which eventually be used for plantation and dust suppression. Catch drains and siltation ponds have been/will be constructed to check flow of surface runoff as well as to prevent siltation of natural courses.
- Domestic wastewater will be treated in Sewage Treatment Plant (STP), with the treated water utilized for Dust suppression. Wastewater from equipment and vehicle washing will be processed through an oil-grease separator and recycled for reuse in Dust suppression.
- There is being/will be no discharge of wastewater outside the lease area. Therefore, no significant impact of proposed mining on surface water in the nearby area.
- Regular monitoring of surface water quality is being/will be carried out.

Ground Water

The mine site is situated on top of Kodingamali Plateau having an average height of ~300 m from the ground level and the depth of the workings will be at a maximum 50 m to 60 m bgl from the original surface level. The water table in the area ranges between 6.0 m to 24.0 m bgl from the ground level. As the mine is situated on a plateau, the water table will not be intersected at any stage of mining.

The mineral Bauxite and associated rocks do not contain any toxic substances so there will not be any adverse impact on ground water quality. Regular monitoring of ground water level & its quality will be carried out in the nearby areas.

Noise & Vibration

Major noise generating sources of the mining activity are drilling, blasting and HEMM deployed for loading & transportation of Bauxite. All DGMS guidelines are being/will be followed strictly to reduce the impact of blasting on nearby habitation. Drilling is being/will be carried out with the help of sharp drill bits. Controlled blasting techniques through proper blast design and explosive selection will be used to reduce the vibrations to a greater extent. PPEs like earplugs/earmuffs are being/will be provided to mine workers. HEMMs equipped with acoustic cabins are being/will be provided for the operators.

Proper maintenance, oiling and greasing of HEMMs is being/will be done. Development of green belt/plantation along the mine periphery and around the areas of mining activities help in reducing noise level.

Land Environment

The land use of the mine area will be altered from Forest land to mining area including pits, temporary dumps, greenbelt etc. but will not have any significant effect on the surface features of the surrounding areas.

At conceptual stage, out of total ML area i.e. 428.075 ha; 368.684 ha will be excavated. Out of 368.684 ha, 125.60 ha area will be backfilled (Reclaimed & Rehabilitated) and regrassing will be done in remaining 243.084 ha area, 4.169 ha will be used for mineral storage, 3.425 ha under Mineral Separation Plant, Area under Infrastructure (Workshop, admin. Building etc.) will be 25.261 ha, area under Roads will be 8.438 ha and 18.098 ha area under 7.5 m Greenbelt along the lease periphery. Plantation will be done on 125.60 ha on backfilled area and 4.169 ha area under mineral storage (i.e., plantation on the area earmarked for mineral storage). Thus, total area under Greenbelt/Plantation will reach up to 147.867 ha. Local & fruit bearing species will be planted in consultation with local forest Department and as per CPCB Guidelines. The total cost for Greenbelt & Plantation up to the conceptual stage will be around Rs. 12.7 Crore.

Top Soil & Solid Waste Generation and Management

Top Soil

Around 2.16 Million Tonnes of Top Soil (1.2 Million Cu. m.) will be generated during the entire life of mine. Out of this, 0.19 Million Tonnes of Top Soil has already been generated during FY 2022-2025. Therefore, 1.97 Million Tonnes of Top Soil will be generated during the entire life of mine.

OB/Waste

Around 44.28 Million Tonnes of OB/Waste (24.60 Million Cu.m) will be generated during the entire life of mine. Out of this, 3.0 Million Tonnes OB/Waste has already been generated during FY 2022 2025. Therefore, 41.23 Million Tonnes of OB/Waste will be generated during the entire life of mine.

Mineral Reject

All the generated mineral rejects will be blended with high grade ore for sustainable and optimum use of mineral resources. Hence, separate stacking of mineral reject is not required. If required Mineral Rejects ore can be sold directly, as per market requirement in future. However, a space has been designated for mineral reject within the lease hold area for temporary storage.

11.10 ANALYSIS OF ALTERNATIVES (TECHNOLOGY & SITE)

This is an expansion project and the Mine site is selected on the basis of occurrence of mineral for suitable end use. The evidence of Bauxite and associated mineral contents have been proved and site has been selected based on detailed exploration under G1 level. The mined-out mineral at this mine i.e. Bauxite is being/will be sold to the prospective buyers for its use in Alumina and Aluminium Plants/Refineries. Hence, no alternative site has been considered.

11.11 POST PROJECT ENVIRONMENTAL MONITORING PROGRAMME

Table - 11.4
Post Project Monitoring Programme

S. No.	Description	Frequency of Monitoring
1.	Micro-Meteorological Data	Hourly
2.	Ambient Air Quality Monitoring	Twice a week
3.	Ground Water Quality & Level Monitoring	Quarterly
4.	Surface Water Quality Monitoring	Monthly
5.	Noise Level Monitoring	Monthly
6.	Soil Monitoring	Yearly
7.	Medical Checkup of employees	3 to 5 Year Interval ➢ Age of workers <45 years: After every 5 years ➢ Age of workers >45 years: After every 3 years
8.	Digital Mapping of ML Area	Once in 3 years

11.12 ADDITIONAL STUDIES

Additional Studies i.e., Biological Study & Wildlife Conservation Plan, Land Use Land Cover Study, Risk Assessment & Disaster Management Plan are covered in this EIA/EMP Report as per the Terms of References (ToRs) granted by MOEFCC, New Delhi vide File No. J-11015/439/2007.IA. II(M) dated 20.06.2025.

11.12.1 BIOLOGICAL ENVIRONMENT

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

Site-Specific Wildlife Conservation Plan (SSWLCP) has been approved from Principal Chief Conservator of Forests (Wildlife) & Chief Wildlife Warden vide Memo No. 682 dated 27.01.2010, which was later revised via Memo No. 5845 dated 06.07.2017. Budget earmarked for the conservation of Schedule- I species is Rs. 1240.22 Crore. OMC Ltd. has also deposited Rs. 1183.22 lakh under CAMPA for the implementation of various mitigation measures in the project impact areas to address the adverse impacts of mining, conserve flora and fauna and safeguard the

existing wildlife. Since, the Site- Specific Wildlife Conservation Plan has been approved as per the Wild life (Protection) Act, 1972. Therefore, Site-Specific Wildlife Conservation Plan (SSWLCP) as per Indian Wildlife (Protection) Act,2022 is under approval for active consideration from Divisional Forest Officer, Koraput Forest Division & Divisional Forest Officer Rayagada Forest Division.

There are 29 schedule - I species found in study area according to Indian Wildlife Protection Act, 2022.

Authenticated Location Map showing No National Park, Wildlife sanctuaries, wildlife corridors, Tiger/Elephant reserves, etc. within 10 km radius study area has been obtained from D.F.O. Koraput Forest Division dated 21.01.2025 and D.F.O., Rayagada Forest Division dated: 11.01.2025. Authenticated list of flora & fauna has been obtained from Divisional Forest Officer, Koraput Forest Division vide letter 280/4F(Misc.) dated 27.01.2025 and from Divisional Forest Officer, Rayagada Forest Division, vide letter 216/4F(Misc.) 1367/2025 dated 13.01.2025. Copy of the authenticated location map, authenticated list of flora & fauna & Wildlife Conservation Plan (Approved dated 06.07.2017) is enclosed as ***Annexure IXA, IXB & IXC*** respectively.

11.12.2 RESETTLEMENT & REHABILITATION

Entire Mining lease area is Forest land and Forest Clearance for the same has already been accorded by MoEF&CC, New Delhi. There is no Human Settlement within the ML area. Hence, Resettlement & Rehabilitation Action Plan is not applicable.

11.12.3 RISK ASSESSMENT & DISASTER MANAGEMENT PLAN

A Hazard Identification and Risk analysis is a systematic way to identify and analyse hazards to determine their scope, impact and the vulnerability of the built environment to such hazards and its purpose is to ensure that there is a formal process for hazard identification, risk assessment and control to effectively manage hazards that may occur within the workplaces. Excessive dust, noise and vibration are the chief health hazards for the miners besides physical hazards.

The objective of disaster management plan for the proposed expansion project is to be in a state of perpetual readiness through training and development to immediately control and arrest any emergency situation so as to avert a full-fledged disaster and the consequence of human and property damage and in the event of a disaster still occurring, to manage the same so that the risk of the damage to life and property is minimized.

11.13 PROJECT BENEFITS

The project activity help in meeting the growing demand of Bauxite & hence help in the economic growth of the country. The mine is being/will be contributing around Rs. 213.252 Crore every year to the State and Central Govt. exchequer by way of mining revenue (Royalty, DMF, NMET etc.) after mine is operated at proposed capacity.

Total direct employment, envisaged after the proposed expansion project is 391 persons. Preference is being/will be given to the locals as per their requirement & eligibility. Apart from that, various indirect employment opportunities will be generated like workshops establishment, transportation etc.

With the existing and proposed development in and around the area, there has been/will be development of supporting facilities/ infrastructure eventually leading to the development of the area. The Socio- Economic status of the area has been improved/will improve with the implementation of various development programs under Pradhan Mantri Khanij Kshetra Kalyan Yojana (PMKKKY) for welfare of the areas and people affected by mining related operations, using the funds generated by District Mineral Foundations (DMFs).

11.14 ENVIRONMENT MANAGEMENT PLAN

M/s. OMC Ltd. will have a full-fledged Environmental Management Cell (EMC) for environmental monitoring and control. A group of qualified and efficient engineers with technicians are available for maintenance, up keeping and monitoring of mining machinery & equipment, to keep them in working mode at the best of their efficiencies. The EMC oversees and implements various functions with mining team to ensure that environmental status of the area remains well within the statutory standard of MoEF&CC and SPCB. Total Cost of the expansion project is Rs. 55.0 Crores. For proposed expansion the Capital cost for EMP is Rs. 1772.16 Lakhs and recurring cost for the EMP is Rs. 154.19 Lakhs per Annum.

The study area as a whole possesses average of infrastructural facilities however more attention and care will be taken so that the needs and demand of the population of the influence area should be met and can get more exposure to modern facilities of education and development to a bright future.

11.15 POST MINING LAND USE DETAILS

Table -11.5
Post-Mining Land use of Core Zone

S. No.	Description	Land Use (ha)		
		Plantation/ Re-grassing	Public Use	Total
1.	Excavation (Rehabilitated by Regrassing)	-	243.084	243.084
	Excavation (Backfilled)	125.60	-	125.60
	Total Excavated Area	**-**	**-**	**368.684**
2.	Roads (Utility services)	-	8.438	8.438
3.	Infrastructure, Workshop, Admin Building etc.)	-	25.261	25.261
4.	Mineral Storage	4.169	-	4.169
5.	Mineral Separation Plant	-	3.425	3.425
6.	Greenbelt on 7.5 m lease periphery	18.098	-	18.098
Total		**147.867**	**280.208**	**428.075**

***Source**: Derived from Approved Review of Mining Plan with Progressive Mine Closure Plan*

11.16 CONCLUSION

The EIA/ EMP study was conducted as per the approved ToR issued by MoEF&CC, New Delhi. Baseline data of land, air, water, noise, biological and socio-economic environment was duly assessed by conducting field investigation as well as by having an access to the available secondary information. The prediction of impacts was identified & evaluated and EMP is suggested to mitigate the environmental concerns arising from the proposed expansion project.

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



CHAPTER - 12

DISCLOSURE OF CONSULTANTS ENGAGED

12.1 DISCLOSURE OF CONSULTANTS ENGAGED

This EIA/EMP Report has been prepared by J.M. EnviroNet Pvt. Ltd. (JMEPL). JMEPL is one of the companies of JM Group, established in the year 1993. 'JM' in the name of the Company is derived from the name of 'Lord Shiva' - the Temple of 'Jharkhand Mahadev' (JM). The Temple is located at Queens Road, Vaishali Nagar, Jaipur (Rajasthan).

The Registered office of JMEPL is at Jaipur Centre, 403, 4th Floor, B2 Bye Pass, Tonk Road, Jaipur, 302018 (Rajasthan). Its Delhi-NCR Corporate office is at Emmar Digital Greens, Tower – B, Unit No. 1517, Golf Course Ext. Road, Sector – 61, Gurugram (Haryana) – 122011.

J.M. EnviroNet Pvt. Ltd. is accredited with ISO-9001: 2015 for EIA Division. EIA Division is also approved by National Accreditation Board for Education & Training (NABET) formerly NRBPT (Quality Council of India), Certificate no. NABET/EIA/2326/RA 0308, dated 29.11.2023 which is valid up to 07.08.2026.

J.M. EnviroNet Pvt. Ltd. is listed at serial no. "127" of the List of Accredited EIA Consultant Organization displayed on MoEF&CC website *(eia.nabet.qci.org.in/ Accredited_EIA_Consultant.aspx)*, updated on 04.06.2025.

JMEPL is offering Environmental Consultancy Services in various sectors viz Industrial Projects / Chemical Industries / Cement Plants / Thermal Power Plants / Mining Projects/ Coal Washery Projects/ Real Estate Projects / Distilleries / Steel Plants/Mineral Beneficiation plants etc.

In the Mining sector, JMEPL have covered mines of minerals viz. Limestone, Bauxite, Chromite, Coal, Zinc Ore, Copper ore, Gypsum, Soapstone, Iron & Manganese ore, Clay, Silica Sand, Marble, Khanda, Gitti, boulders, Feldspar, Quartz, Lignite, Magnesite and minor mineral etc.

JMEPL has a highly qualified team of Functional Area Experts (FAE). As Faculty Heads of the EIA Division, company has Retd. General Managers of the Reputed Cement Companies, Ex-Head EIA Division of big Business Group, STP & ETP Designing Experts, Retd. Mining & Geology Experts with vast experience in their respective fields.

JM Group's business is spread over 22 States viz. Andhra Pradesh, Kerala, Gujarat, Maharashtra, Odisha, Tamil Nadu, Goa, Jammu & Kashmir, Himachal Pradesh, Punjab, Haryana, Delhi, Rajasthan, Uttar Pradesh, Madhya Pradesh, Chhattisgarh, Assam, West Bengal, Karnataka, Jharkhand, Bihar & Uttarakhand.

The JM Group has its own Environmental Laboratory i.e. JM Envirolab Pvt. Ltd. Gurugram (Haryana) approved under EPA (Environment Protection Act) by the Ministry of Environment & Forests, Govt. of India, New Delhi and by the National Accreditation Board for Testing and Calibration Laboratories, Govt. of India (NABL accredited Laboratory: - TC-6821).

Besides this, MoEF&CC and NABL approved Environmental Laboratory of JM Group is also providing Analytical Laboratory Services of various elements and environmental parameters.

Annual monitoring as per MoEF&CC / CPCB / SPCB guidelines, Risk Assessment and Disaster Management Plan, consultancy for Rain Water Harvesting Plan, detailed Hydro-geological Study, preparation of Environmental Statement Reports (Environmental Clearance Compliance Conditions) and Statutory Mining Plan etc. are amongst the various other consultancy services offered by the Company.



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ANNEXURES

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एक सौ रुपये Rs. 100

रु. 100 ONE HUNDRED RUPEES

भारत INDIA

INDIA NON JUDICIAL

उड़ीसा ORISSA D 339055

10/7/2017
Registering Officer
KORAPUT



Sudhanshu Kumar Das

SCHEDULE VII
See rules 7(11).8(4).9(2).12(i)(d)
FORMAT OF MINING LEASE

THIS DEED FOR GRANT OF MINING LEASE IS MADE BY AND BETWEEN THE FOLLOWING:
PARTIES

This deed for grant of a mining lease "Kodingamali Mining Lease for Bauxite" is made by and between the following:

PARTIES:

The Governor of Odisha (hereinafter referred to as the "State Government" which expression shall where the context so admits, be deemed to include the successors and assigns) of the one part

AND

Odisha Mining Corporation Ltd (Name of the Company) a company registered under Indian Companies Act, 1956 (Act under which incorporated) and having its registered office at Post Box No. 34, OMC House, Bhubaneswar, District Khurda, Odisha- 751001

S.K. Das
Dy General Manager (Geo)
Power of Attorney Holder

COLLECTOR,

DISTRICT TREASURY
KORAPUT (STAMPS)
11 NOV 2016
A.T.O. (K)

No. 1572 Dt. 02/01/17
Name
Address
ANANDA TAKRI
Stamp Vendor, Koraput

(Sudhanshu Kumar Das)

Endorsement of the certificate of admissibility

Admissible under rule 25; duly stamped under the Indian Stamp (Orissa Amendment act 1 of 2008) Act 1899, Schedule 1-A No. 25(b) Fees Paid : A5(b)-47771702 ,, User Charges-200 ,Total 47771902

Date: **10/01/2017**

Signature of Registering Officer

Registering Officer
KORAPUT

Endorsement under section 52

Presented for registration in the office of the Sub-Registrar **Sub-Registrar KORAPUT** between the hours of 10:30 AM and 2:30 PM on the **10/01/2017** by **COLLECTOR KORAPUT(GOVT)** , son/wife of , of **AT/PO/PS KORAPUT** , by caste , profession and finger prints affixed.

Signature of Presentor / Date: **10/01/2017**

Signature of Registering Officer

Registering Officer
KORAPUT

Endorsement under section 58

Execution is admitted by :

Name	Photo	Thumb Impression	Signature	Date of Admission of Execution

being represented through their Power of Attorney Holder Shri Sudhansu Kumar Das, S/O Sri Prahallad Chandra Das, aged about 59 years, residing at Qr. No. C-8, OMC colony, Unit-8, Bhubaneswar, working as Dy. General Manager (Geo), Odisha Mining Corporation Limited, Bhubaneswar. (Hereinafter referred to as "the lessee" which expression shall where context so admits be deemed to include his/its/their successors and permitted assigns) of the other part.

BACKGROUND:

A. The Lessee had obtained terms and conditions that would govern the grant of Mining Lease in respect of the Mining Lease application dt.3.8.1996 from the State Govt. vide letter No.653/SM dt.1.2.1999.Subsequently Kodingamali mining lease area has been revised to 428.075 Hect (406.385 Hect in Koraput District and 21.69 Hect in Rayagada District) vide letter NO 11071/DM, Dated 17.12.2015 of Director of Mines, Odisha. On compliance of the terms and conditions, State Govt. has issued the grant and execution order in respect of Kodingamalli mining lease over 428.075 hects in Rayagada and Koraput district for Bauxite vide proceeding No.303/SM, Dated.9.1.2017 for a period of 50 (Fifty) years.

B. Accordingly, the State Government is now executing this deed for grant of a Lease to the Lessee in consideration of the fee, royalties, covenants and agreements hereinafter reserved and contained on the part of the Lessee to be paid, observed and performed.

1. DEFINITIONS

The expressions used in this Lease shall have the same meaning as ascribed to them under the Act and the rules made thereunder.

2. GRANT OF LEASE

2.1 The State Government hereby grants the Lease to the Lessee over an area described in Schedule B, **"428.075 Hect"** (406.385 Hect in Koraput District and 21.69 Hects in Rayagada District)) for conducting mining operations for a period of 50 years, commencing from the date on which this duly executed mining lease deed is registered with respect to Bauxite.

2.2 The Lease shall be with respect to all those the mines beds / nveins seams of the Minerals situated lying and being in or under the Lease Area.

2.3 Subject to the Lessee paying the royalties and making other payments required to be paid and observing and performing all the covenants and agreements herein contained and on the part of the Lessee to be observed and performed shall and may quietly hold and enjoy the rights and premises of the lease area for and during the term hereby granted without any unlawful interruption from or by the State Government or any person rightfully claiming under it.

S.K. Das
Dy. General Manager (Geo)
Power of Attorney Holder
Odisha Mining Corporation Ltd
Bhubaneswar-751001

COLLECTOR,
KORAPUT

COLLECTOR KORAPUT (GOVT)	Execution by DLR&S Board Of Revenue Cuttack Who is Exempt from personal Appearance in this office U/S 88 Act XVI of 1908 is proved by his seal & signature.	Execution by DLR&S Board Of Revenue Cuttack Who is Exempt from personal Appearance in this office U/S 88 Act XVI of 1908 is proved by his seal & signature.	Execution by DLR&S Board Of Revenue Cuttack Who is Exempt from personal Appearance in this office U/S 88 Act XVI of 1908 is proved by his seal & signature.	------
SUDHANSU KUMAR DAS DY. GENERAL MANAGER GEO ODISHA MINING CORPORATION LTD. BHUBANESWAR		 240786971		10-Jan-2017

Identified by **BIBHUTI BHUSAN MISHRA** Son/Wife of **HARIHAR MISHRA** of **AT/PO Q NO 2D 12 LIC COLONY PS C.S PUR PS BBSR KORAPUT** by profession **Service**

Name	Photo	Thumb Impression	Signature	Date of Admission of Execution
BIBHUTI BHUSAN MISHRA		 40346264		10-Jan-2017

Date: 10/01/2017

Signature of Registering officer

Endorsement of certificate of registration under section 30

Registered and true copy filed in : Office of the Sub-Registrar, KORAPUT

Registering Officer
KORAPUT

3. RIGHTS AND OBLIGATIONS

3.1 The rights and obligations of the State Government and the Lessee shall be as specified in the Act and the rules made thereunder including without limitation the Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules. 2015 and the Mine Development and Production Agreement dated. .1.2017

3.2 Without prejudice to the generality of the foregoing.

(a) The Lessee shall:

(i) at all times comply with the provisions of the Act and the rules made thereunder and any other applicable law:

(ii) make prompt payment of royalty and any other payment required to be made by the lessee:

(iii) pay such compensation as may be assessed by lawful authority in accordance with the law in force on the subject for all damage, injury, or disturbance which may be done by the Lessee in exercise of the powers granted by this Lease and to indemnify and keep indemnified fully and completely the State Government against all claims which may by any person or persons in respect of any such damage, injury or disturbance and all costs and expenses in connection therewith:

(iv) take measures at his own expense for the protection of environment like planting of trees, reclamation of mined land, use of pollution control devices and such other measures as may be prescribed by the Central or State Government from time to time:

(v) without delay send to the Deputy Commissioner/Collector a report of any accident causing death or serious bodily injury or serious injury to property or seriously affecting or endangering life or property which may occur in the course of the operations under this Lease:

(vi) weigh or cause to be measured or weighed upon some part of the Lease Area all minerals from time to time won from the Lease Area with [number of days] prior notice being given to the Deputy Commissioner/Collector every such measuring or weighing in order that he or some person on his behalf may be present thereat:

(vii) submit to the State Government a full report of the work done by the Lessee and disclose all information acquired by the Lessee in the course of the operations carried on under this Lease regarding the geology and mineral resources of the area covered by the Lease and

(viii) Pay stamp duty and registration charges as may be applicable in respect of this deed.

S.K. Das
Dy General Manager (Geo)
Power of Attorney Holder
Odisha Mining Corporation Ltd
Bhubaneswar-751001

COLLECTOR,
KORAPUT

Book Number : 1 || Volume Number : 1
Document Number : 11191700006
For the year : 2017
Seal :
Date: 11/01/2017



Signature of Registering officer
Registering Officer
KORAPUT

This is a Computer Generated Certificate

(b) The State Government shall:

(i) have the right to at all times to enter into and upon and to grant or demise to any person or persons whomsoever liberty to enter into and upon the Lease Area for all or any purposes other than those for which sole rights and Lease are hereby expressly conferred upon the Lessee including without limitation to make on over or through the said lands such roads tramways and ropeways as shall be considered necessary or expedient for any purposes and to obtain from and out of the said lands such stone earth or other materials as may be necessary or requisite for making repairing or maintaining such roads, tramways, railways and ropeways to pass and re-pass at all times over and along such roads, tramways, railways and ropeways for all purposes and as occasion shall require

(ii) have the right to appropriate any performance security provided by the Lessee in accordance with terms of such performance security and require the Lessee to replenish the performance security. In case the performance security has been provided through a security deposit after termination of the Lease and fulfilment of all obligations of the Lessee such security deposit shall be returned to the Lessee after appropriate deduction. It is clarified that the security deposit shall not carry any interest and

(iii) have the right to carry out or perform any work or matters which in accordance with the covenants in that behalf are to be carried out or performed by the Lessee but have not been so carried out or performed within the time specified. In that behalf and the Lessee shall pay the State Government on demand all expenses which shall be incurred in such carrying out or performance of the same.

3.3 If the State Government is desirous of exercising its right of pre-emption with respect to any mineral(s) the State Government shall pay the average sale price of such minerals as published by IBM prevailing at the time of pre-emption.

3.4 In the event of the existence of a state of war or emergency (of which existence the President of India shall be the sole judge and a notification to this effect in the Gazette of India shall be conclusive proof) the State Government with the consent of the Central Government shall from time to time and at all time during the said term have the right (to be exercised by a notice in writing to the Lessee/Lessees forthwith take possession and control of the works, plant, machinery and premises of the Lessee on or in connection with the Lease Area or the operations under this Lease and during such possession or control the Lessee shall conform to and obey all directions given by or on behalf of the Central or State Government regarding the use of employment of such works plants premises and minerals and minerals provided that fair compensation which shall be determined in default of agreement by the State Government shall be paid to the Lessee for all loss or damage sustained by him them by reason or in consequence of the exercises of the powers conferred by this clause and provided also that the exercise of such power shall not determine the said term hereby granted or affect the terms and provisions of the clause.

S.K. Das
Dy. General Manager (Geo)
Power of Attorney Holder
Odisha Mining Corporation Ltd
Bhubaneswar-751001

COLLECTOR,
KORAPUT



Registering Officer
KORAPUT

3.5 If after the receipt of an offer of compensation for any damage with is likely to arise from the proposed operation of the Lessee the occupier of the surface of any part of the said lands shall refuse his consent to the exercise of the rights and powers reserved to the State Government and granted by this Lease the Lessee shall report the matter to the State Government and shall deposit with it the amount offered as compensation and if the State Government is satisfied that the amount of compensation is reasonable or if it is not satisfied and the Lessee shall have deposited with it such further amount as the State Government may consider reasonable the State Government shall order the occupier to allow the Lessee to enter upon the said land and carry out such operations as may be necessary for the purpose of the Lease. In assessing the amount of such compensation the State Government shall he guided by the principles of the Right to Fair Compensation and Transparency in Land Acquisition. Rehabilitation & Resettlement Act.

3.6 Every notice required to be given to the Lessee shall be given in writing to such person as may be nominated by Lessee and such nomination shall be informed to the State Government in writing. If no such nomination is made then the notice shall be sent to the Lessee by registered post/speed post addressed to the Lessee at the address shown in the application for the Lease or at such other address in India as the Lessee may designate from time to time and every such service shall be deemed to be proper and valid service upon the Lessee and shall not be questioned or challenged by him.

3.7 If in any event the orders of the State Government are revised, reviewed or cancelled by the Central Government in pursuance of proceedings under the Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2015, the Lessee shall not be entitled to compensation for any loss sustained by the lessee in exercise of the powers and privileges conferred upon the Lessee by these presents.

4. GOVERNING LAW

This Lease and all questions of its interpretation shall be construed in accordance with the laws of India. In the event of any dispute in relation to this Lease and in respect of all matters touching the relationship of the Lessee and the State Government suits of petitions shall be filed in civil courts at |name of the city| and it is hereby expressly agreed that neither party shall file a suit or appeal or bring any actions at any place other than the courts named above.

In witness where of there presents have been executed at the [name of place] on [date]

SCHEDULE A – LIST OF PERSONS

Sl No	Name	PAN Number	Address
1	Janum Sing Bagra	ADYPB0558K	D.D.M (I/C) Koraput
2.	Dharanidhar Nayak	AKAPN8836F	Mining Officer Koraput
3	Pallabanti Ashwasan Mi	AGFPM8862P	O.M.C. Ltd
4.	Suresh chandra Sethi	CXEPS5326L	OMC Ltd.

S.K. Das
Dy. General Manager (Geo)
Power of Attorney Holder
Odisha Mining Corporation Ltd
Bhubaneswar-751001

COLLECTOR,
KORAPUT



Registering Officer
KORAPUT

SCHEDULE B – Details of Mining Lease area.

1. DGPS surveyed precise Area Mining Lease Plan of Kodingamali Mining Lease for Bauxite.
2. DGPS surveyed Mining Lease Boundary pillar co-ordinates of Kodingamali MI for Bauxite.
3. Land Schedule of Kodingamali for Bauxite over 428.075 Hect. in Rayagada and Koraput District

S.K. Das
Dy. General Manager (Geo)
Power of Attorney Holder
Odisha Mining Corporation Ltd
Bhubaneswar-751001

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KORAPUT



LAND SCHEDULE

LAND SCHEDULE OF KODINGAMALI ML FOR BAUXITE OVER 428.075 HECTS IN RAYAGADA AND KORAPUT DISTRICTS

Sl_No	District	RF_PRF	Map area_Ac	Map area_Ha	Patch
1	RAYAGADA DISTRICT	KODINGA P.R.F	0.007	0.003	Patch-A
2		KODINGA P.R.F	0.010	0.004	
3		KODINGA P.R.F	0.413	0.167	
4		KODINGA P.R.F	1.406	0.569	
5		KODINGA P.R.F	2.620	1.06	
6		KODINGA P.R.F	3.007	1.217	
7		KODINGA P.R.F	5.004	2.025	
8		KODINGA P.R.F	19.106	7.732	
9		KODINGA P.R.F	22.024	8.913	
Total P R F area =			**53.597**	**21.69**	
1	KORAPUT DISTRICT	KODINGAMALI R.F	1004.197	406.385	Patch-B
Total R F area =			**1004.197**	**406.385**	
Grand total area =			**1057.774**	**428.075**	

S.K. Das
Dy General Manager (Geo)
Power of Attorney Holder
Odisha Mining Corporation Ltd
Bhubaneswar-751001

COLLECTOR,
KORAPUT

10/7/2012

Registering Officer
KORAPUT



BG
one

MDPA
2 nos.

BOUNDARY DESCRIPTION

DGPS SURVEYED ML BOUNDRY PILLAR CO-ORDINATES OF KODINGAMALI ML FOR BAUXITE OVER 428.075 HECTS IN RAYAGADA AND KORAPUT DISTRICTS

SL_No	Pillar_No	Easting	Northing	Longitude	Latitude
1	1-P	717708.199	2107765.726	83°04'07.55357"	19°03'03.98751"
2	2-P	717720.966	2107706.134	83°04'07.96610"	19°03'02.04501"
3	3-P	717739.054	2107628.95	83°04'08.55344"	19°02'59.52852"
4	4-P	717738.289	2107517.902	83°04'08.48253"	19°02'55.91818"
5	5-P	717730.721	2107466.949	83°04'08.20321"	19°02'54.26438"
6	6-P	717557.43	2107110.931	83°04'02.13466"	19°02'42.75513"
7	7-P	716567.163	2106360.964	83°03'27.97559"	19°02'18.74879"
8	8-P	718038.233	2106887.039	83°04'18.48351"	19°02'35.29116"
9	9-P	717890.419	2106883.66	83°04'13.42827"	19°02'35.23799"
10	10-P	717891.975	2107571.635	83°04'13.75900"	19°02'57.60632"
11	A	718405.74	2110039.13	83°04'32.32416"	19°04'17.63724"
12	B	718117.359	2110208.84	83°04'22.53108"	19°04'23.26584"
13	C	718107.119	2109980.64	83°04'22.08864"	19°04'15.85020"
14	D	718347.403	2109925.488	83°04'30.28332"	19°04'13.96452"
15	E	718191.127	2109555.086	83°04'24.78936"	19°04'01.98156"
16	E-1	718227.865	2109189.923	83°04'25.89780"	19°03'50.09436"
17	F	718261.319	2108857.411	83°04'26.90724"	19°03'39.27024"
18	G	718156.437	2108851.81	83°04'23.31876"	19°03'39.12840"
19	G-1	718087.9	2109094.243	83°04'21.07308"	19°03'47.03724"
20	H	718012.198	2109362.021	83°04'18.59268"	19°03'55.77300"
21	I	717973.619	2109783.722	83°04'17.44392"	19°04'09.49908"
22	J	717648.113	2109715.822	83°04'06.28536"	19°04'07.41612"
23	J-1	717561.605	2109472.655	83°04'03.22932"	19°03'59.54292"
24	K	717408.005	2109040.897	83°03'57.80268"	19°03'45.56376"
25	L	717730.117	2109072.168	83°04'08.82984"	19°03'46.45692"
26	M	718039.601	2108886.049	83°04'19.33752"	19°03'40.28652"

S.K. Das
Dy General Manager (Geo)
Power of Attorney Holder
Odisha Mining Corporation Ltd
Bhubaneswar-751001

COLLECTOR,
KORAPUT



Registering Officer
KORAPUT

DGPS SURVEYED ML BOUNDRY PILLAR CO-ORDINATES OF KODINGAMALI ML FOR BAUXITE OVER 428.075 HECTS IN RAYAGADA AND KORAPUT DISTRICTS

SL_No	Pillar_No	Easting	Northing	Longitude	Latitude
27	N	717994.69	2108453.931	83°04'17.62716"	19°03'26.25408"
28	O	717860.141	2108365.686	83°04'12.99108"	19°03'23.43636"
29	O-1	717765.817	2107986.537	83°04'09.61284"	19°03'11.14488"
30	P	717536.819	2107066.579	83°04'01.41204"	19°02'41.32104"
31	Q	717089.937	2107109.045	83°03'46.14984"	19°02'42.87264"
32	Q-1	716909.756	2106979.266	83°03'39.93696"	19°02'38.72184"
33	Q-2	716695.046	2106823.691	83°03'32.53356"	19°02'33.74520"
34	Q-3	716573.205	2106735.584	83°03'28.33236"	19°02'30.92712"
35	Q-4	716416.042	2106622.475	83°03'22.91364"	19°02'27.30912"
36	T	716735.099	2106413.977	83°03'33.73848"	19°02'20.40828"
37	U	716860.114	2106259.593	83°03'37.95084"	19°02'15.34092"
38	X	716973.254	2106091.295	83°03'41.75172"	19°02'09.82572"
39	Y	716971.732	2106488.8	83°03'41.85900"	19°02'22.75080"
40	Z	717130.734	2106967.807	83°03'47.48796"	19°02'38.26464"
41	Z-1	717335.522	2106515.368	83°03'54.30780"	19°02'23.47584"
42	Z1-A	717176.772	2106029.592	83°03'48.68496"	19°02'07.74168"
43	Z-2	716981.906	2105434.675	83°03'41.78376"	19°01'48.47304"
44	Z-3	717023.006	2105369.762	83°03'43.16292"	19°01'46.34652"
45	Z3-A	717319.234	2105381.545	83°03'53.29512"	19°01'46.61652"
46	Z3-B	717486.597	2105386.818	83°03'59.01912"	19°01'46.72416"
47	Z-4	717661.09	2105393.385	83°04'04.98720"	19°01'46.87068"
48	Z-5	717651.34	2105624.468	83°04'04.74708"	19°01'54.38784"
49	Z-6	717481.676	2105667.794	83°03'58.96368"	19°01'55.86168"
50	Z6-A	717468.195	2105925.724	83°03'58.60656"	19°02'04.25328"
51	Z-7	717456.686	2106168.612	83°03'58.31100"	19°02'12.15492"
52	Z-8	717578.526	2106201.949	83°04'02.48988"	19°02'13.19208"
53	Z-9	717438.429	2106338.871	83°03'57.75516"	19°02'17.69784"
54	Z-10	717618.743	2106630.178	83°04'04.03752"	19°02'27.10032"

S.K. Das
Dy General Manager (Geo)
Power of Attorney Holder
Odisha Mining Corporation Ltd
Bhubaneswar-751001

COLLECTOR,
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Registering Officer
KORAPUT

DGPS SURVEYED ML BOUNDRY PILLAR CO-ORDINATES OF KODINGAMALI ML FOR BAUXITE OVER 428.075 HECTS IN RAYAGADA AND KORAPUT DISTRICTS

SL_No	Pillar_No	Easting	Northing	Longitude	Latitude
55	Z10-A	717985.986	2106458.199	83°04'16.52412"	19°02'21.36768"
56	Z-11	718311.424	2106304.74	83°04'27.58872"	19°02'16.25316"
57	Z-12	718217.761	2106504.236	83°04'24.46716"	19°02'22.77564"
58	Z13	718203.474	2106716.838	83°04'24.06432"	19°02'29.69376"
59	Z-14	718053.719	2106843.839	83°04'18.99552"	19°02'33.88056"
60	Z-17	717999.744	2107568.269	83°04'17.44248"	19°02'57.45552"
61	Z-18	718303.486	2107833.911	83°04'27.93540"	19°03'05.97600"
62	Z-19	718189.611	2108236.743	83°04'24.20436"	19°03'19.11744"
63	Z-20	718365.114	2108444.062	83°04'30.28944"	19°03'25.79076"
64	Z20-A	718552.724	2108571.042	83°04'36.75576"	19°03'29.84724"
65	Z20-B	718750.104	2108699.101	83°04'43.55688"	19°03'33.93468"
66	Z-21	718898.8	2108796.467	83°04'48.68076"	19°03'37.04328"
67	Z-22	718788.733	2108929.818	83°04'44.97132"	19°03'41.42160"
68	Z-23	718894.037	2109073.751	83°04'48.63036"	19°03'46.06056"
69	Z-24	718755.925	2109182.76	83°04'43.95180"	19°03'49.65840"
70	Z-25	718735.552	2109352.358	83°04'43.32396"	19°03'55.18044"
71	Z-26	718927.904	2109519.84	83°04'49.96956"	19°04'00.55164"
72	Z-27	718854.35	2109657.82	83°04'47.51040"	19°04'05.06640"
73	Z-28	718981.879	2109860.604	83°04'51.95352"	19°04'11.61048"
74	Z28-A	718921.686	2110163.222	83°04'50.01816"	19°04'21.47304"
75	Z28-B	718865.132	2110451.288	83°04'48.20088"	19°04'30.86076"
76	Z-29	718816.184	2110704.958	83°04'46.63020"	19°04'39.12744"
77	Z29-A	718914.41	2110907.695	83°04'50.07144"	19°04'45.68124"
78	Z-30	719014.952	2111114.07	83°04'53.59368"	19°04'52.35276"
79	Z30-A	719168.742	2111090.589	83°04'58.84356"	19°04'51.52980"
80	Z30-B	719375.117	2111059.169	83°05'05.88840"	19°04'50.42820"
81	Z-31	719478.635	2111043.956	83°05'09.42216"	19°04'49.89360"
82	Z31-A	719494.18	2111221.888	83°05'10.02624"	19°04'55.67268"

S.K. Das
Dy General Manager (Geo)
Power of Attorney Holder
Odisha Mining Corporation Ltd
Bhubaneswar-751001

COLLECTOR,
KORAPUT



Registering Officer
KORAPUT

DGPS SURVEYED ML BOUNDRY PILLAR CO-ORDINATES OF KODINGAMALI ML FOR BAUXITE OVER 428.075 HECTS IN RAYAGADA AND KORAPUT DISTRICTS

SL_No	Pillar_No	Easting	Northing	Longitude	Latitude
83	Z31-B	719511.708	2111423.303	83°05'10.70772"	19°05'02.21496"
84	Z31-C	719529.568	2111626.702	83°05'11.40144"	19°05'08.82096"
85	Z-32	719542.136	2111768.254	83°05'11.88888"	19°05'13.41852"
86	Z32-A	719333.114	2111770.238	83°05'04.74108"	19°05'13.56396"
87	Z32-B	719091.682	2111772.884	83°04'56.48556"	19°05'13.74360"
88	Z-33	718936.569	2111774.207	83°04'51.18132"	19°05'13.84656"
89	Z33-A	718792.702	2111598.59	83°04'46.18992"	19°05'08.19204"
90	Z33-B	718645.858	2111421.98	83°04'41.09628"	19°05'02.50656"
91	Z33-C	718507.613	2111252.646	83°04'36.29964"	19°04'57.05400"
92	Z-34	718352.831	2111065.453	83°04'30.93060"	19°04'51.02724"
93	Z34-A	718364.473	2110809.468	83°04'31.22508"	19°04'42.69972"
94	Z34-B	718377.041	2110521.072	83°04'31.53792"	19°04'33.31812"
95	Z34-C	718392.519	2110241.539	83°04'31.95408"	19°04'24.22344"

S.K. Das
Dy. General Manager (Geo)
Power of Attorney Holder
Odisha Mining Corporation Ltd
Bhubaneswar-751001

COLLECTOR,
KORAPUT



10/1/2017

Registering Officer
KORAPUT

N.B. Stamp duty determined at Rs. 11,94,29,255/- (Rupees Eleven Crores ninety four lakhs twenty nine thousand one hundred fifty five) only. and the party paid Rs. 11,94,29,255/- (Rupees Eleven Crores ninety four lakhs twenty nine thousand two hundred fifty five) only Vide D.D. No. 738422 dtd. 9.1.2017. Now the document is Properly Stamped.

10/1/2017

Stamp Collector
Koraput

015

भारतीय गैर न्यायिक

एक सौ रुपये

Rs. 100

रु. 100

ONE HUNDRED RUPEES

सत्यमेव जयते

भारत INDIA

INDIA NON JUDICIAL

ଓଡ଼ିଶା ओड़िशा ODISHA

G 593527



Sudhangsu Kumar Das

SCHEDULE VII

See rules 7(11).8(4).9(2).12(i)(d)

FORMAT OF MINING LEASE

THIS DEED FOR GRANT OF MINING LEASE IS MADE BY AND BETWEEN THE FOLLOWING:

PARTIES

This deed for grant of a mining lease "Kodingamali Mining Lease for Bauxite" is made by and between the following:

PARTIES:

The Governor of Odisha (hereinafter referred to as the "State Government" which expression shall where the context so admits, be deemed to include the successors and assigns) of the one part

AND

Odisha Mining Corporation Ltd (Name of the Company) a company registered under Indian Companies Act, 1956 (Act under which incorporated) and having its registered office at Post Box No. 34, OMC House, Bhubaneswar, District Khurda, Odisha- 751001

S. K. Das
Dy General Manager (Geo)
Power of Attorney Holder
Odisha Mining Corporation Ltd

COLLECTOR
RAYAGADA

- 3 JAN 2017

DISTRICT TREASURY
RAYAGADA

No. 58 Date 03/01/17
Stamps worth Rupees 100/-
Issued to Sri Siddhartha Das Advocate
through Sri DMC Rgda

Sri
Stamp Vendor, Rayagada

(Suhansu Kumar Das)

Endorsement of the certificate of admissibility

Admissible under rule 25 duly stamped under the Indian stamp (Orissa Amendment act 1 of 2008) Act 1899, Schedule 1-A No. 35(b) Form Nos: Article100 ,, User Charges-250 ,Total 350

Date: 10/01/2017 Signature of Registering officer

Endorsement under section 52

Presented for registration in the office of the **Sub-Registrar KASIPUR** between the hours of 10:30 AM and 2:30 PM on the 10/01/2017 by **COLLECTOR RAYAGADA(GOVT)** , son/wife of , of **AT-RAYAGADA, PO/PS/TAH/DIST-RAYAGADA, ODISHA** , by caste , profession and finger prints affixed.

Signature of Presenter / Date: **10/01/2017** Signature of Registering officer

This is a Computer Generated Certificate

10-01-2017
Registering Officer
Kashipur.

being represented through their Power of Attorney Holder Shri Sudhansu Kumar Das, S/O Sri Prahallad Chandra Das, aged about 59 years, residing at Qr. No. C-8, OMC colony, Unit-8, Bhubaneswar, working as Dy. General Manager (Geo), Odisha Mining Corporation Limited, Bhubaneswar. (Hereinafter referred to as "the lessee" which expression shall where context so admits be deemed to include his/its/their successors and permitted assigns) of the other part.

BACKGROUND:

A. The Lessee had obtained terms and conditions that would govern the grant of Mining Lease in respect of the Mining Lease application dt.3.8.1996 from the State Govt. vide letter No.653/SM dt.1.2.1999.Subsequently Kodingamali mining lease area has been revised to 428.075 Hect (406.385 Hect in Koraput District and 21.69 Hect in Rayagada District) vide letter NO 11071/DM, Dated 17.12.2015 of Director of Mines, Odisha. On compliance of the terms and conditions, State Govt. has issued the grant and execution order in respect of Kodingamalli mining lease over 428.075 hects in Rayagada and Koraput district for Bauxite vide proceeding No.303/SM, Dated.9.1.2017 for a period of 50 (Fifty) years.

B. Accordingly, the State Government is now executing this deed for grant of a Lease to the Lessee in consideration of the fee, royalties, covenants and agreements hereinafter reserved and contained on the part of the Lessee to be paid, observed and performed.

1. DEFINITIONS

The expressions used in this Lease shall have the same meaning as ascribed to them under the Act and the rules made thereunder.

2. GRANT OF LEASE

2.1 The State Government hereby grants the Lease to the Lessee over an area described in Schedule B, **"428.075 Hect"** (406.385 Hect in Koraput District and 21.69 Hects in Rayagada District)) for conducting mining operations for a period of 50 years, commencing from the date on which this duly executed mining lease deed is registered with respect to Bauxite.

2.2 The Lease shall be with respect to all those the mines beds / nveins seams of the Minerals situated lying and being in or under the Lease Area.

2.3 Subject to the Lessee paying the royalties and making other payments required to be paid and observing and performing all the covenants and agreements herein contained and on the part of the Lessee to be observed and performed shall and may quietly hold and enjoy the rights and premises of the lease area for and during the term hereby granted without any unlawful interruption from or by the State Government or any person rightfully claiming under it.

S.K. Das
Dy. General Manager (Geo)
Power of Attorney Holder
Odisha Mining Corporation Ltd
Bhubaneswar-751001

COLLECTOR
RAYAGADA

Endorsement under section 58

Execution is admitted by :

Name	Photo	Thumb Impression	Signature	Date of Admission of Execution
COLLECTOR RAYAGADA (GOVT)	Execution By COLLECTOR RAYAGADA(GOVT) Who is Exempt from personal Appearance in this office U/S 88 Act XVI of 1908 approved by	Execution By COLLECTOR RAYAGADA(GOVT) Who is Exempt from personal Appearance in this office U/S 88 Act XVI of 1908 approved by	Execution By COLLECTOR RAYAGADA(GOVT) Who is Exempt from personal Appearance in this office U/S 88 Act XVI of 1908 approved by **Signature of the Registering officer**	.....
SUDHANSU KUMAR DAS DY. GENERAL MANAGER GEO ODISHA MINING CORPORATION LTD. BHUBANESWAR		 240797104		10-Jan-2017

Identified by **GANGADHAR NAYAK** Son/Wife of **LATE NILAKANTHA NAYAK** of **AT-MADHAPADHI SASANA, PS-BALIAPAL, TAH-BALIAPAL, DIST-BALASORE, ODISHA BALASORE** by profession **Cultivation**

Name	Photo	Thumb Impression	Signature	Date of Admission of Execution
GANGADHAR NAYAK		 40346395		10-Jan-2017

Date: 10/01/2017

Signature of Registering officer

11.01.2017

Registering Officer
Rayagada

This Is a Computer Generated Certificate

3. RIGHTS AND OBLIGATIONS

3.1 The rights and obligations of the State Government and the Lessee shall be as specified in the Act and the rules made thereunder including without limitation the Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules. 2015 and the Mine Development and Production Agreement dated. .1.2017

3.2 Without prejudice to the generality of the foregoing.

(a) The Lessee shall:

(i) at all times comply with the provisions of the Act and the rules made thereunder and any other applicable law:

(ii) make prompt payment of royalty and any other payment required to be made by the lessee:

(iii) pay such compensation as may be assessed by lawful authority in accordance with the law in force on the subject for all damage, injury, or disturbance which may be done by the Lessee in exercise of the powers granted by this Lease and to indemnify and keep indemnified fully and completely the State Government against all claims which may by any person or persons in respect of any such damage, injury or disturbance and all costs and expenses in connection therewith:

(iv) take measures at his own expense for the protection of environment like planting of trees, reclamation of mined land, use of pollution control devices and such other measures as may be prescribed by the Central or State Government from time to time:

(v) without delay send to the Deputy Commissioner/Collector a report of any accident causing death or serious bodily injury or serious injury to property or seriously affecting or endangering life or property which may occur in the course of the operations under this Lease:

(vi) weigh or cause to be measured or weighed upon some part of the Lease Area all minerals from time to time won from the Lease Area with |number of days| prior notice being given to the Deputy Commissioner/Collector every such measuring or weighing in order that he or some person on his behalf may be present thereat:

(vii) submit to the State Government a full report of the work done by the Lessee and disclose all information acquired by the Lessee in the course of the operations carried on under this Lease regarding the geology and mineral resources of the area covered by the Lease and

(viii) Pay stamp duty and registration charges as may be applicable in respect of this deed.

S. K. Das
Dy. General Manager (Geo)
Power of Attorney Holder
Odisha Mining Corporation Ltd
Bhubaneswar-751001

COLLECTOR
RAYAGADA

Registering Officer
Kashipur.



Registering Officer
Kashipur.

(b) The State Government shall:

(i) have the right to at all times to enter into and upon and to grant or demise to any person or persons whomsoever liberty to enter into and upon the Lease Area for all or any purposes other than those for which sole rights and Lease are hereby expressly conferred upon the Lessee including without limitation to make on over or through the said lands such roads tramways and ropeways as shall be considered necessary or expedient for any purposes and to obtain from and out of the said lands such stone earth or other materials as may be necessary or requisite for making repairing or maintaining such roads, tramways, railways and ropeways to pass and re-pass at all times over and along such roads, tramways, railways and ropeways for all purposes and as occasion shall require

(ii) have the right to appropriate any performance security provided by the Lessee in accordance with terms of such performance security and require the Lessee to replenish the performance security. In case the performance security has been provided through a security deposit after termination of the Lease and fulfilment of all obligations of the Lessee such security deposit shall be returned to the Lessee after appropriate deduction. It is clarified that the security deposit shall not carry any interest and

(iii) have the right to carry out or perform any work or matters which in accordance with the covenants in that behalf are to be carried out or performed by the Lessee but have not been so carried out or performed within the time specified. In that behalf and the Lessee shall pay the State Government on demand all expenses which shall be incurred in such carrying out or performance of the same.

3.3 If the State Government is desirous of exercising its right of pre-emption with respect to any mineral(s) the State Government shall pay the average sale price of such minerals as published by IBM prevailing at the time of pre-emption.

3.4 In the event of the existence of a state of war or emergency (of which existence the President of India shall be the sole judge and a notification to this effect in the Gazette of India shall be conclusive proof) the State Government with the consent of the Central Government shall from time to time and at all time during the said term have the right (to be exercised by a notice in writing to the Lessee/Lessees forthwith take possession and control of the works, plant, machinery and premises of the Lessee on or in connection with the Lease Area or the operations under this Lease and during such possession or control the Lessee shall conform to and obey all directions given by or on behalf of the Central or State Government regarding the use of employment of such works plants premises and minerals and minerals provided that fair compensation which shall be determined in default of agreement by the State Government shall be paid to the Lessee for all loss or damage sustained by him them by reason or in consequence of the exercises of the powers conferred by this clause and provided also that the exercise of such power shall not determine the said term hereby granted or affect the terms and provisions of the clause.

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Bhubaneswar-751001

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Kashipur
11.01.2017

3.5 If after the receipt of an offer of compensation for any damage with is likely to arise from the proposed operation of the Lessee the occupier of the surface of any part of the said lands shall refuse his consent to the exercise of the rights and powers reserved to the State Government and granted by this Lease the Lessee shall report the matter to the State Government and shall deposit with it the amount offered as compensation and if the State Government is satisfied that the amount of compensation is reasonable or if it is not satisfied and the Lessee shall have deposited with it such further amount as the State Government may consider reasonable the State Government shall order the occupier to allow the Lessee to enter upon the said land and carry out such operations as may be necessary for the purpose of the Lease. In assessing the amount of such compensation the State Government shall he guided by the principles of the Right to Fair Compensation and Transparency in Land Acquisition. Rehabilitation & Resettlement Act.

3.6 Every notice required to be given to the Lessee shall be given in writing to such person as may be nominated by Lessee and such nomination shall be informed to the State Government in writing. If no such nomination is made then the notice shall be sent to the Lessee by registered post/speed post addressed to the Lessee at the address shown in the application for the Lease or at such other address in India as the Lessee may designate from time to time and every such service shall be deemed to be proper and valid service upon the Lessee and shall not be questioned or challenged by him.

3.7 If in any event the orders of the State Government are revised, reviewed or cancelled by the Central Government in pursuance of proceedings under the Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2015, the Lessee shall not be entitled to compensation for any loss sustained by the lessee in exercise of the powers and privileges conferred upon the Lessee by these presents.

4. GOVERNING LAW

This Lease and all questions of its interpretation shall be construed in accordance with the laws of India. In the event of any dispute in relation to this Lease and in respect of all matters touching the relationship of the Lessee and the State Government suits of petitions shall be filed in civil courts at |name of the city| and it is hereby expressly agreed that neither party shall file a suit or appeal or bring any actions at any place other than the courts named above.

In witness where of there presents have been executed at the [name of place] on [date]

SCHEDULE A – LIST OF PERSONS

Sl No	Name	PAN Number	Address
1	Rugi Sibe Durgaya	AEOPD7906C	By. Collector (Revenue) Rayagada Collectorate
2	Sales/Transaction party	AREPP2952P	Head Clerk Revenue Collectorate, Rayagada
3	Bibhuti Bhusan Mishra	AGFPM8862P	OMC Ltd
4.	Gangadhar Nyale	ABYPN9718P	OMC Ltd.

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01.2017

SCHEDULE B – Details of Mining Lease area.

1. DGPS surveyed precise Area Mining Lease Plan of Kodingamali Mining Lease for Bauxite.
2. DGPS surveyed Mining Lease Boundary pillar co-ordinates of Kodingamali Ml for Bauxite.
3. Land Schedule of Kodingamali for Bauxite over 428.075 Hect in Rayagada and Koraput District

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LAND SCHEDULE

LAND SCHEDULE OF KODINGAMALI ML FOR BAUXITE OVER 428.075 HECTS IN RAYAGADA AND KORAPUT DISTRICTS

Sl_No	District	RF_PRF	Map area_Ac	Map area_Ha	Patch
1	RAYAGADA DISTRICT	KODINGA P.R.F	0.007	0.003	Patch-A
2		KODINGA P.R.F	0.010	0.004	
3		KODINGA P.R.F	0.413	0.167	
4		KODINGA P.R.F	1.406	0.569	
5		KODINGA P.R.F	2.620	1.06	
6		KODINGA P.R.F	3.007	1.217	
7		KODINGA P.R.F	5.004	2.025	
8		KODINGA P.R.F	19.106	7.732	
9		KODINGA P.R.F	22.024	8.913	
Total P R F area =			**53.597**	**21.69**	
1	KORAPUT DISTRICT	KODINGAMALI R.F	1004.197	406.385	Patch-B
Total R F area =			**1004.197**	**406.385**	
Grand total area =			**1057.774**	**428.075**	

S.K. Das
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BOUNDARY DESCRIPTION

DGPS SURVEYED ML BOUNDRY PILLAR CO-ORDINATES OF KODINGAMALI ML FOR BAUXITE OVER 428.075 HECTS IN RAYAGADA AND KORAPUT DISTRICTS

SL_No	Pillar_No	Easting	Northing	Longitude	Latitude
1	1-P	717708.199	2107765.726	83°04'07.55357"	19°03'03.98751"
2	2-P	717720.966	2107706.134	83°04'07.96610"	19°03'02.04501"
3	3-P	717739.054	2107628.95	83°04'08.55344"	19°02'59.52852"
4	4-P	717738.289	2107517.902	83°04'08.48253"	19°02'55.91818"
5	5-P	717730.721	2107466.949	83°04'08.20321"	19°02'54.26438"
6	6-P	717557.43	2107110.931	83°04'02.13466"	19°02'42.75513"
7	7-P	716567.163	2106360.964	83°03'27.97559"	19°02'18.74879"
8	8-P	718038.233	2106887.039	83°04'18.48351"	19°02'35.29116"
9	9-P	717890.419	2106883.66	83°04'13.42827"	19°02'35.23799"
10	10-P	717891.975	2107571.635	83°04'13.75900"	19°02'57.60632"
11	A	718405.74	2110039.13	83°04'32.32416"	19°04'17.63724"
12	B	718117.359	2110208.84	83°04'22.53108"	19°04'23.26584"
13	C	718107.119	2109980.64	83°04'22.08864"	19°04'15.85020"
14	D	718347.403	2109925.488	83°04'30.28332"	19°04'13.96452"
15	E	718191.127	2109555.086	83°04'24.78936"	19°04'01.98156"
16	E-1	718227.865	2109189.923	83°04'25.89780"	19°03'50.09436"
17	F	718261.319	2108857.411	83°04'26.90724"	19°03'39.27024"
18	G	718156.437	2108851.81	83°04'23.31876"	19°03'39.12840"
19	G-1	718087.9	2109094.243	83°04'21.07308"	19°03'47.03724"
20	H	718012.198	2109362.021	83°04'18.59268"	19°03'55.77300"
21	I	717973.619	2109783.722	83°04'17.44392"	19°04'09.49908"
22	J	717648.113	2109715.822	83°04'06.28536"	19°04'07.41612"
23	J-1	717561.605	2109472.655	83°04'03.22932"	19°03'59.54292"
24	K	717408.005	2109040.897	83°03'57.80268"	19°03'45.56376"
25	L	717730.117	2109072.168	83°04'08.82984"	19°03'46.45692"
26	M	718039.601	2108886.049	83°04'19.33752"	19°03'40.28652"

S.K. Das
Dy General Manager (Geo)
/ Power of Attorney Holder
Odisha Mining Corporation Ltd
Bhubaneswar-751001

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RAYAGADA



Registering Officer
Kashipur. 11.01.2017

DGPS SURVEYED ML BOUNDRY PILLAR CO-ORDINATES OF KODINGAMALI ML FOR BAUXITE OVER 428.075 HECTS IN RAYAGADA AND KORAPUT DISTRICTS

SL_No	Pillar_No	Easting	Northing	Longitude	Latitude
27	N	717994.69	2108453.931	83°04'17.62716"	19°03'26.25408"
28	O	717860.141	2108365.686	83°04'12.99108"	19°03'23.43636"
29	O-1	717765.817	2107986.537	83°04'09.61284"	19°03'11.14488"
30	P	717536.819	2107066.579	83°04'01.41204"	19°02'41.32104"
31	Q	717089.937	2107109.045	83°03'46.14984"	19°02'42.87264"
32	Q-1	716909.756	2106979.266	83°03'39.93696"	19°02'38.72184"
33	Q-2	716695.046	2106823.691	83°03'32.53356"	19°02'33.74520"
34	Q-3	716573.205	2106735.584	83°03'28.33236"	19°02'30.92712"
35	Q-4	716416.042	2106622.475	83°03'22.91364"	19°02'27.30912"
36	T	716735.099	2106413.977	83°03'33.73848"	19°02'20.40828"
37	U	716860.114	2106259.593	83°03'37.95084"	19°02'15.34092"
38	X	716973.254	2106091.295	83°03'41.75172"	19°02'09.82572"
39	Y	716971.732	2106488.8	83°03'41.85900"	19°02'22.75080"
40	Z	717130.734	2106967.807	83°03'47.48796"	19°02'38.26464"
41	Z-1	717335.522	2106515.368	83°03'54.30780"	19°02'23.47584"
42	Z1-A	717176.772	2106029.592	83°03'48.68496"	19°02'07.74168"
43	Z-2	716981.906	2105434.675	83°03'41.78376"	19°01'48.47304"
44	Z-3	717023.006	2105369.762	83°03'43.16292"	19°01'46.34652"
45	Z3-A	717319.234	2105381.545	83°03'53.29512"	19°01'46.61652"
46	Z3-B	717486.597	2105386.818	83°03'59.01912"	19°01'46.72416"
47	Z-4	717661.09	2105393.385	83°04'04.98720"	19°01'46.87068"
48	Z-5	717651.34	2105624.468	83°04'04.74708"	19°01'54.38784"
49	Z-6	717481.676	2105667.794	83°03'58.96368"	19°01'55.86168"
50	Z6-A	717468.195	2105925.724	83°03'58.60656"	19°02'04.25328"
51	Z-7	717456.686	2106168.612	83°03'58.31100"	19°02'12.15492"
52	Z-8	717578.526	2106201.949	83°04'02.48988"	19°02'13.19208"
53	Z-9	717438.429	2106338.871	83°03'57.75516"	19°02'17.69784"
54	Z-10	717618.743	2106630.178	83°04'04.03752"	19°02'27.10032"

S.K. Das
Dy General Manager (Geo)
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Bhubaneswar-751001

COLLECTOR
RAYAGADA



Registering Officer
Kashipur.

DGPS SURVEYED ML BOUNDRY PILLAR CO-ORDINATES OF KODINGAMALI ML FOR BAUXITE OVER 428.075 HECTS IN RAYAGADA AND KORAPUT DISTRICTS

Sl_No	Pillar_No	Easting	Northing	Longitude	Latitude
55	Z10-A	717985.986	2106458.199	83°04'16.52412"	19°02'21.36768"
56	Z-11	718311.424	2106304.74	83°04'27.58872"	19°02'16.25316"
57	Z-12	718217.761	2106504.236	83°04'24.46716"	19°02'22.77564"
58	Z-13	718203.474	2106716.838	83°04'24.06432"	19°02'29.69376"
59	Z-14	718053.719	2106843.839	83°04'18.99552"	19°02'33.88056"
60	Z-17	717999.744	2107568.269	83°04'17.44248"	19°02'57.45552"
61	Z-18	718303.486	2107833.911	83°04'27.93540"	19°03'05.97600"
62	Z-19	718189.611	2108236.743	83°04'24.20436"	19°03'19.11744"
63	Z-20	718365.114	2108444.062	83°04'30.28944"	19°03'25.79076"
64	Z20-A	718552.724	2108571.042	83°04'36.75576"	19°03'29.84724"
65	Z20-B	718750.104	2108699.101	83°04'43.55688"	19°03'33.93468"
66	Z-21	718898.8	2108796.467	83°04'48.68076"	19°03'37.04328"
67	Z-22	718788.733	2108929.818	83°04'44.97132"	19°03'41.42160"
68	Z-23	718894.037	2109073.751	83°04'48.63036"	19°03'46.06056"
69	Z-24	718755.925	2109182.76	83°04'43.95180"	19°03'49.65840"
70	Z-25	718735.552	2109352.358	83°04'43.32396"	19°03'55.18044"
71	Z-26	718927.904	2109519.84	83°04'49.96956"	19°04'00.55164"
72	Z-27	718854.35	2109657.82	83°04'47.51040"	19°04'05.06640"
73	Z-28	718981.879	2109860.604	83°04'51.95352"	19°04'11.61048"
74	Z28-A	718921.686	2110163.222	83°04'50.01816"	19°04'21.47304"
75	Z28-B	718865.132	2110451.288	83°04'48.20088"	19°04'30.86076"
76	Z-29	718816.184	2110704.958	83°04'46.63020"	19°04'39.12744"
77	Z29-A	718914.41	2110907.695	83°04'50.07144"	19°04'45.68124"
78	Z-30	719014.952	2111114.07	83°04'53.59368"	19°04'52.35276"
79	Z30-A	719168.742	2111090.589	83°04'58.84356"	19°04'51.52980"
80	Z30-B	719375.117	2111059.169	83°05'05.88840"	19°04'50.42820"
81	Z-31	719478.635	2111043.956	83°05'09.42216"	19°04'49.89360"
82	Z31-A	719494.18	2111221.888	83°05'10.02624"	19°04'55.67268"

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Kashipur. 11.01.2017

DGPS SURVEYED ML BOUNDRY PILLAR CO-ORDINATES OF KODINGAMALI ML FOR BAUXITE OVER 428.075 HECTS IN RAYAGADA AND KORAPUT DISTRICTS

SL_No	Pillar_No	Easting	Northing	Longitude	Latitude
83	Z31-B	719511.708	2111423.303	83°05'10.70772"	19°05'02.21496"
84	Z31-C	719529.568	2111626.702	83°05'11.40144"	19°05'08.82096"
85	Z-32	719542.136	2111768.254	83°05'11.88888"	19°05'13.41852"
86	Z32-A	719333.114	2111770.238	83°05'04.74108"	19°05'13.56396"
87	Z32-B	719091.682	2111772.884	83°04'56.48556"	19°05'13.74360"
88	Z-33	718936.569	2111774.207	83°04'51.18132"	19°05'13.84656"
89	Z33-A	718792.702	2111598.59	83°04'46.18992"	19°05'08.19204"
90	Z33-B	718645.858	2111421.98	83°04'41.09628"	19°05'02.50656"
91	Z33-C	718507.613	2111252.646	83°04'36.29964"	19°04'57.05400"
92	Z-34	718352.831	2111065.453	83°04'30.93060"	19°04'51.02724"
93	Z34-A	718364.473	2110809.468	83°04'31.22508"	19°04'42.69972"
94	Z34-B	718377.041	2110521.072	83°04'31.53792"	19°04'33.31812"
95	Z34-C	718392.519	2110241.539	83°04'31.95408"	19°04'24.22344"

COLLECTOR,
RAYAGADA

S.K. Das
Dy General Manager (Geo)
Power of Attorney Holder
Odisha Mining Corporation Ltd
Bhubaneswar-751001

Endorsement of certificate of registration under section 60

Registered and true copy filed in : Office of the Sub-Registrar, KASIPUR

Book Number : 1 || Volume Number : 1

Document Number : 11611700011

For the year : 2017

Seal :

Signature of Registering officer

Date: 11/01/2017

This is a Computer Generated Certificate

Registering Officer
Kashipur
11.01.2017

N.B.: Stamp duty determined at Rs. 63,741,302/- (Rupees Sixty three lakh Seventy four thousand three hundred two) only and the party paid Rs. 63,741,402/- (Rupees Sixty three lakh Seventy four thousand four hundred two) only vide D.D No. 7334120 dtd. 9.1.2017. Now the document is properly stamped.

Stamp Collector, Kashipur
11.01.2017

DGPS SURVEYED FOREST AREA PROPOSED TO BE DIVERTED WITHIN M L BOUNDARY (REVISE)
OF KODINGAMALI BAUXITE MINES OF M/s O M C Ltd.IN KORAPUT AND RAYAGADA DISTRICT



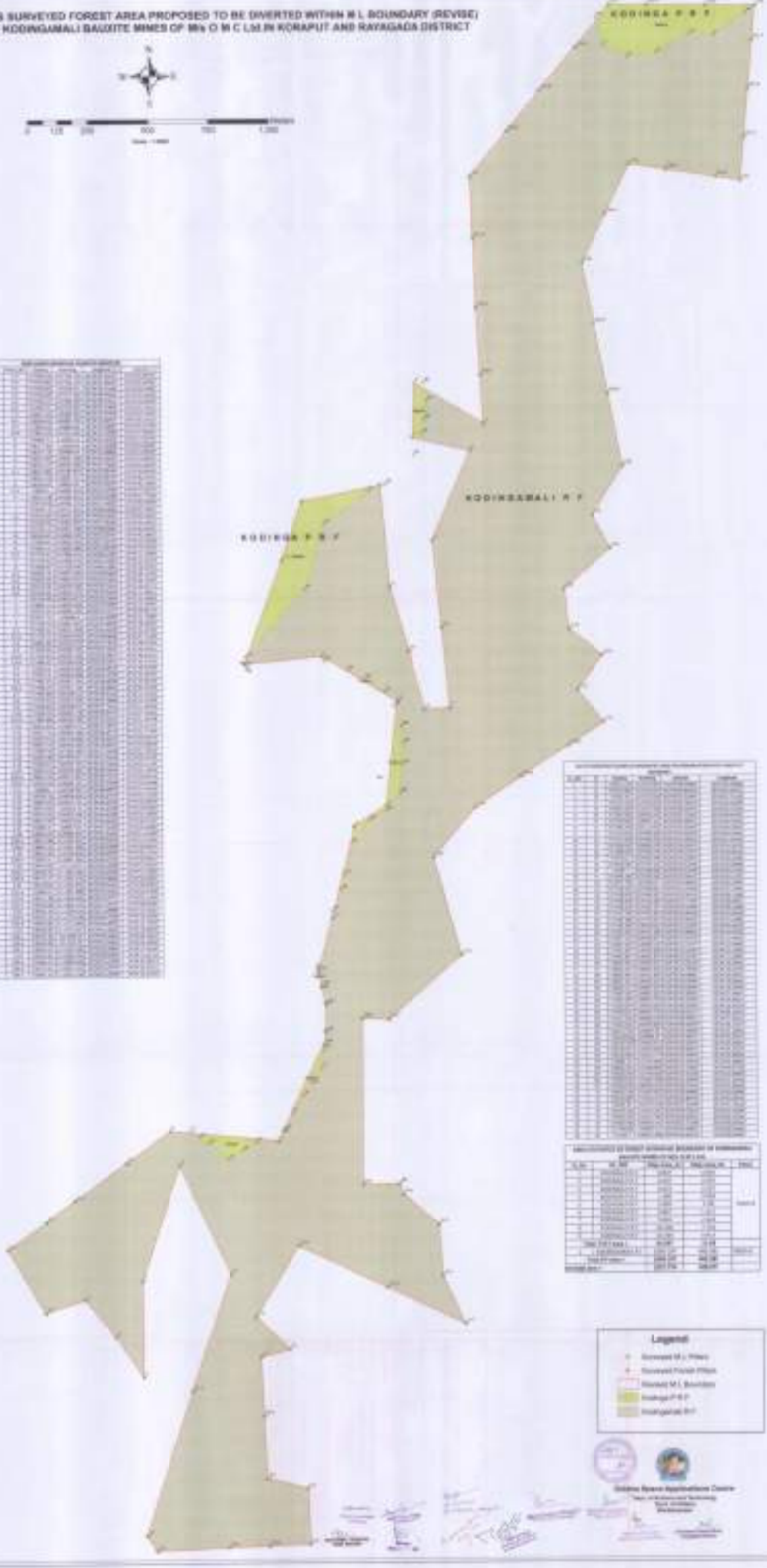


PLATE NO.-1.2

ANNEXURE II_APPROVAL LETTER OF MINING PLAN

भारत सरकार GOVERNMENT OF INDIA
खान मंत्रालय MINISTRY OF MINES
भारतीय खान ब्यूरो INDIAN BUREAU OF MINES
क्षेत्रीय खान नियंत्रक के कार्यालय
OFFICE OF THE REGIONAL CONTROLLER OF MINES

आज़ादी का अमृत महोत्सव

BY REGD PARCEL

Phone: 0674-2352463
Tele Fax: 0674-2352490
E-mail:ro.bhubaneshwar@ibm.gov.in
Plot No.149, Pokhariput
BHUBANESWAR-751020

No. RMP/A/21-ORI/BHU/2021-22 Date: 10.11.2021

1206

To

The Managing Director & Nominated Owner,
M/s Odisha Mining Corporation Ltd.
OMC House, Bhubaneswar- 751001

Sub: Approval of Review of Mining Plan of Kodingamali Bauxite Mine along with Progressive Mine Closure Plan (PMCP), over an area of 428.075 ha in Rayagada & Koraput district of Odisha State, submitted by M/s Odisha Mining Corporation Ltd under Rule 17 of Mineral Concession Rules, 2016.

Ref: - i) Your letter No. 14806/OMC/PMC/2021 dated 30.09.2021 received on 01.10.2021.
ii) This office letter of even no. dated 01.10.2021.
iii) This office letter of even no. dated 01.10.2021 addressed to the Director of Mines, Govt. of Odisha, copy endorsed to you.
iv) This office letter of even no. dated 11.10.2021.
v) Your letter No. 15900/OMC/PMC/2021 dated 25.10.2021.
vi) Your letter No. 16908/OMC/PMC/2021 dated 09.11.2021.

Sir,

In exercise of the power delegated to me vide Gazette Notification No. S.O. 1857(E) dated 18.05.2016, I hereby **Approve** the Review of Mining Plan including Progressive Mine Closure Plan of Kodingamali Bauxite Mine over an area of 428.075 ha of M/s Odisha Mining Corporation Ltd in Rayagada & Koraput district of Odisha State submitted under Rule 17 of Mineral Concession Rules, 2016. This approval is subject to the following conditions:

I. The Review of Mining Plan is approved without prejudice to any other law applicable to the mine area from time to time whether made by the Central Government, State Government or any other authority and without prejudice to any order or direction from any court of competent jurisdiction.

II. The proposals shown on the plates and/or given in the document is based on the lease map /sketch submitted by the applicant/ lessee and is applicable from the date of approval.

III. It is clarified that the approval of aforesaid Review of Mining Plan does not in any way imply the approval of the Government in terms of any other provision of Mines & Minerals (Development & Regulation) Act, 1957, or the Mineral Concession Rules, 2016 and any other laws including Forest (Conservation) Act, 1980, Environment (Protection) Act, 1986 or the rules made there under, the Occupational Safety, Health and Working Conditions Code, 2020 and Rule & Regulations made there under.

IV. Indian Bureau of Mines has not undertaken verification of the mining lease boundary on the ground and does not undertake any responsibility regarding correctness of the

boundaries of the leasehold shown on the ground with reference to lease map & other plans furnished by the applicant / lessee.

V. At any stage, if it is observed that the information furnished, data incorporated in the document are incorrect or misrepresent facts, the approval of the document shall be revoked with immediate effect.

VI. If this approval conflicts with any other law or court order/ Direction under any statute, it shall be revoked immediately.

VII. Validity of this document shall expire on 31.03.2027.

VIII. Next Financial Assurance shall be due for submission on 31.03.2027.

भवदीय / ~~yours~~ faithfully,

Encl: - One copy of Review of Mining Plan

(HARKESH MEENA)
क्षेत्रीय खान नियंत्रक / Regional Controller of Mines

Copy for kind information to:-

1. The Director of Mines, Directorate of Mines, Government of Odisha, Heads of the Department Building, Bhubaneswar– 751001, Odisha along with one copy of Review of Mining Plan by REGISTERED PARCEL.
2. Shri P K Sahoo & Shri S K Behera, M/s Odisha Mining Corporation Ltd, OMC House, Bhubaneswar- 751001.

(HARKESH MEENA)
क्षेत्रीय खान नियंत्रक / Regional Controller of Mines

F.No.J-11015/439/2007-IA.II(M)
Government of India
Ministry of Environment & Forests

Paryavaran Bhawan,
C.G.O. Complex, Lodi Road,
New Delhi – 110 003

4412
09/6/08

Dated the 28th May, 2008

To

M/s Orissa Mining Corporation Limited
OMC House, Bhubanswar-751 001
Orissa
E-mail: info@orissamining.com

Subject: Kodingamali Bauxite Mining Project of M/s Orissa Mining Corporation Limited located in Kodingamali, Tehsil Koraput, District Koraput, Orissa- Environmental Clearance regarding.

Sir,

This has reference to your letter No.10636/OMC/2007 dated 15.05.2007 and subsequent letters dated 26.12.2007 and 21.02.2008 on the subject mentioned above. The proposal is for opening of a new mine for production of 3million tonnes per annum (million TPA) of bauxite, which will be supplied to the alumina refinery of M/s Hindalco Industries Limited located at Kansari- gurha, District Raygada at a distance of about 3km from the mine lease. The total mine lease area of the project is 447.25ha, which is a forestland falling under Kodingamali Reserve Forest of Koraput Forest Division. The Kodingamali plateau is a part of Eastern Ghat Hill Range in Orissa. Area proposed for mining is 222.21ha, an area of 18.94ha is kept for green belt development and 206.1ha is others (future prospecting). The Patagarha River is located at a distance of 3.5km in the north direction from the mine lease boundary. No national park/wildlife sanctuary/biosphere reserve/elephant reserve/tiger reserve etc. is reported to be located in the core and buffer zone of the mine and that the area does not report to form corridor for Schedule-I fauna. There are 12 protected forests and 6 reserve forests in the buffer zone of the mine. The mine working will be opencast by mechanized method involving blasting. The targetted production capacity of the mine will be 3million TPA of bauxite and the life of mine will be 20years. The transportation of mineral will be through pipe conveyor. There is no population in the core zone on plateau top, therefore, no displacement of population and R&R is envisaged. The topography of the area is a plateau top at an elevation of 1276m AMSL. The general ground level is at 900m AMSL. The ultimate working depth of mine will be 40m from the hill top i.e., upto 1236AMSL. The mine working will be much above the groundwater table and it will not intersect the ground water table. The peak water requirement of the project is estimated as 200m^3 per day, which will be met from the treated waste water

..2/-

from alumina refinery during the initial years and later on from the rainwater harvested in the mine pits. No groundwater or surface water will be sourced for the mining operation. There will be zero discharge from the mine. Approximately 23240m^3 per month of solid waste comprising 240m^3 per month of topsoil (soil/clay/murram), 8600m^3 per month of over burden and 14400m^3 per month of subgrade ore will be generated, which will be temporarily stacked at the earmarked site(s). It is estimated that 2.06million m^3 of over burden will be generated during the mine life, which will be stored in the earmarked areas for the first five years and thereafter concurrently backfilled. Backfilled will start from the 6th year onwards. There will no external dump at the end of the mine life. Plantation will be raised in an area of 243.65ha at the end of the mine life and there will be no water body left during the post mining stage. The State Pollution Control Board, Orissa had issued Consent to Establish to the project on 12.01.2007 for production of 3million TPA of bauxite involving lease area of 447.25ha. The Public hearing of the project was held on 27.09.2006 for production of 3million TPA of bauxite over an area of 447.25ha. The Indian Bureau of Mines had approved mining plan along with the progressive mine closure plan of the project on 15.09.2006 for lease area of 447.25ha. The forestry clearance for the project has not been obtained as yet. The capital cost of the project is Rs.28,290Lakhs.

2. The Ministry of Environment and Forests has examined the application in accordance with Section 12 of the EIA Notification 2006 read with para 2.2.1(i)(a) of Circular No.J-11013/41/2006-IA.II(I) dated 13.10.2006 and hereby accords environmental clearance under the provisions thereof to the above mentioned Kodingamali Bauxite Mining Project of M/s Orissa Mining Corporation Limited for an annual production capacity of 3000,000tonnes (3 millions tonnes) of bauxite by opencast mechanized method involving lease area of 447.25ha, subject to implementation of the following conditions and environmental safeguards.

A. Specific conditions

(i) All the conditions stipulated by the State Pollution Control Board in the Consent to Establish shall be effectively implemented.

(ii) Necessary forestry clearance under the Forest (Conservation) Act, 1980 for an area of 447.25ha forestland shall be obtained before starting mining operation in that area. Environmental clearance is subject to grant of forestry clearance.

(iii) The mining operations shall be restricted to above ground water table and it should not intersect groundwater table. In case of working below ground water table, prior approval of the Ministry of Environment & Forests and Central Ground Water Authority shall be obtained for which a detailed hydro-geological study shall be carried out.

..3/-

(iv) The project proponent shall ensure that no natural watercourse/or water resources shall be obstructed due to any mining operations.

(v) The top soil should temporarily be stored at earmarked site(s) only and it should not be kept unutilized for a period more than 3years. The topsoil should be used for land reclamation and plantation.

(vi) The solid waste generated during the initial five years due to mining operation shall temporarily be stacked at earmarked dump site(s) only and thereafter concurrently backfilled. Backfilling shall start from the 6th year onwards. There shall be no external over burden dump at the end of the mine life. The backfilled area shall be reclaimed and rehabilitated by plantation. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Compliance status should be submitted to the Ministry of Environment & Forests and its Regional Office located at Bhubaneswar on six monthly basis.

(vii) Catch drains and siltation ponds of appropriate size shall be constructed around the working pit, soil, mineral and temporary OB dumps to prevent run off of water and flow of sediments directly into the river and water bodies. The water so collected should be utilized for watering the mine area, roads, green belt development etc. The drains should be regularly desilted particularly after monsoon and maintained properly.

Garland drains, settling tanks and check dams of appropriate size, gradient and length shall be constructed both around the mine pit and temporary over burden dumps to prevent run off of water and flow of sediments directly into the river and water bodies and sump capacity should be designed keeping 50% safety margin over and above peak sudden rainfall (based on 50 years data) and maximum discharge in the area adjoining the mine site. Sump capacity should also provide adequate retention period to allow proper settling of silt material. Sedimentation pits should be constructed at the corners of the garland drains and desilted at regular intervals.

(viii) Dimension of the retaining wall at the toe of temporary dumps and OB benches within the mine to check run-off and siltation should be based on the rain fall data.

(ix) Plantation shall be raised in an area of 243.65ha including a 7.5m wide green belt in the safety zone around the mining lease, backfilled area, roads etc. by planting the native species in consultation with the local DFO/Agriculture Department. The density of the trees should be around 2500 plants per ha.

..4/-

(x) Effective safeguard measures such as regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels of SPM and RPM such as haul road, loading and unloading point and transfer points. It should be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard.

(xi) The project authority shall implement suitable conservation measures to augment ground water resources in the area in consultation with the Regional Director, Central Ground Water Board.

(xii) Regular monitoring of ground water level and quality should be carried out in and around the mine lease by establishing a network of existing wells and constructing new piezometers during the mining operation. The monitoring should be carried out four times in a year – pre-monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to Ministry of Environment and Forests and its Regional Office, Bhubaneswar, Central Ground Water Authority and Regional Director, Central Ground Water Board.

(xiii) Appropriate mitigative measures should be taken to prevent pollution of Patagarha River in consultation with the State Pollution Control Board.

(xiv) The project proponent shall obtain necessary prior permission of the competent authorities for drawl of ground water and/or surface water if any, required for the project.

(xv) Suitable rainwater harvesting measures on long term basis shall be planned and implemented in consultation with Regional Director, Central Ground Water Board.

(xvi) Vehicular emissions shall be kept under control and regularly monitored. Measures shall be taken for maintenance of vehicles used in mining operations and in transportation of mineral. The vehicles should be covered with a tarpaulin and shall not be overloaded.

(xvii) Blasting operation should be carried out only during the daytime. Controlled blasting should be practiced. The mitigative measures for control of ground vibrations and to arrest fly rocks and boulders should be implemented.

(xviii) Drills shall either be operated with dust extractors or equipped with water injection system.

(xix) Consent to operate shall be obtained from State Pollution Control Board prior to start of production from the mine.

..5/-

(xx) Sewage treatment plant should be installed for the colony. ETP should also be provided for workshop and wastewater generated during mining operation.

(xxi) Digital processing of the entire lease area using remote sensing technique should be done regularly once in three years for monitoring land use pattern and report submitted to the Ministry of Environment and Forests and its Regional Office, Bhubneswar.

(xxii) The project proponent should take all precautionary measures during mining operation for conservation and protection of endangered fauna such as tiger, four horned antelope, leopard cat, leopard, wolf, python etc. spotted in the study area. Action plan for conservation of flora and fauna prepared shall be implemented in consultation with the State Forest and Wildlife Department. Necessary allocation of funds for implementation of the conservation plan shall be made and the funds so allocated shall be included in the project cost. A copy of action plan if so revised by the State Government, if any, shall be submitted to the Ministry and its Regional Office, Bhubneswar within 3 months.

(xxiii) A Final Mine Closure Plan along with details of Corpus Fund should be submitted to the Ministry of Environment & Forests 5 years in advance of final mine closure for approval.

B. General conditions

(i) No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment & Forests.

(ii) No change in the calendar plan including excavation, quantum of mineral bauxite and waste should be made.

(iii) Four ambient air quality-monitoring stations should be established in the core zone as well as in the buffer zone for RPM, SPM, SO_2 & NOx monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets and frequency of monitoring should be undertaken in consultation with the State Pollution Control Board.

(iv) Data on ambient air quality (RPM, SPM, SO_2 & NOx) should be regularly submitted to the Ministry including its Regional office located at Bhubneshwar and the State Pollution Control Board / Central Pollution Control Board once in six months.

(v) Fugitive dust emissions from all the sources should be controlled regularly. Water spraying arrangement on haul roads, loading and unloading and at transfer points should be provided and properly maintained.

..6/-

(vi) Measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operations of HEMM, etc. should be provided with ear plugs / muffs.

(vii) Industrial waste water (workshop and waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May, 1993 and 31st December, 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of workshop effluents.

(viii) Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects.

Occupational health surveillance program of the workers should be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed.

(ix) A separate environmental management cell with suitable qualified personnel should be set-up under the control of a Senior Executive, who will report directly to the Head of the Organization.

(x) The project authorities should inform to the Regional Office located at Bhubneshwar regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.

(xi) The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry and its Regional Office located at Bhubneshwar.

(xii) The Regional Office of this Ministry located at Bhubneshwar shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information / monitoring reports.

(xiii) The project proponent shall submit six monthly report on the status of the implementation of the stipulated environmental safeguards to the Ministry of Environment and Forests, its Regional Office, Bhubneshwar, Central Pollution Control Board and State Pollution Control Board.

(xiv) A copy of clearance letter will be marked to concerned Panchayat / local NGO, if any, from whom and suggestion / representation has been received while processing the proposal.

..7/-

(xv) State Pollution Control Board should display a copy of the clearance letter at the Regional office, District Industry Centre and Collector's office/ Tehsildar's Office for 30 days.

(xvi) The project authorities should advertise at least in two local newspapers widely circulated, one of which shall be in the vernacular language of the locality concerned, within 7 days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and also at web site of the Ministry of Environment and Forests at **http://envfor.nic.in** and a copy of the same should be forwarded to the Regional Office of this Ministry located at Bhubneshwar.

3. The Ministry or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.

4. Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.

5. The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rules made thereunder and also any other orders passed by the Hon'ble Supreme Court of India/ High Court of Orissa and any other Court of Law relating to the subject matter.

6. Any appeal against this environmental clearance shall lie with the National Environment Appellate Authority, if preferred within a period of 30 days as prescribed under Section 11 of the National Environment Appellate Act, 1997.

(SATISH C. GARKOTI)
Additional Director (S)

Copy to:

(i) The Secretary, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.

(ii) The Secretary, Department of Environment, Government of Orissa, Secretariat, Bhubaneswar.

..8/-

(iii) The Secretary, Department of Mines and Geology, Government of Orissa, Secretariat, Bhubaneswar.

(iv) The Secretary, Department of Forests, Government of Orissa, Secretariat, Bhubaneswar.

(v) The Chief Wildlife Warden, Government of Orissa, Bhubaneswar.

(vi) The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi-110032.

(vii) The Chief Conservator of Forests, Regional Office (EZ), Ministry of Environment and Forests, A-3 Chandrashekharpur, Bhubaneshwar-751023.

(viii) The Chairman, Orissa State Pollution Control Board, Parivesh Bhawan, A/118 Nilkantha Nagar, Unit-VIII, Bhubaneshwar-751012.

(ix) The Member Secretary, Central Ground Water Authority, A2, W3 Curzon Road Barracks, K.G. Marg, New Delhi-110001.

(x) The District Collector, Koraput District, Orissa.

(xi) EI Division, Ministry of Environment & Forests, EI Division, New Delhi.

(xii) Monitoring File.

(xiii) Guard File.

(xiv) Record File.

161

By Speed Post

No. J-11015/439/2007-IA.II(M)
Government of India
Ministry of Environment, Forest & Climate Change
Impact Assessment Division

3rd Floor, Vayu Wing,
Indira Paryavaran Bhawan,
Jorbagh Road, Aliganj,
New Delhi-110 003
E-mail: s.kumar1958@gov.in
Tele: 011-24695304

Dated: November 24, 2017

To

M/s Orissa Mining Corporation Limited,
OMC House, Bhubneswar-751001
E-mail: info@orissamining.com

Sub.: Amendment of EC granted for Kodingamali Bauxite Mining Project of M/s Odisha Mining Corporation Limited with production capacity of 3.0 MTPA Bauxite ore located at Kodingamali, Tehsil Koraput, District Koraput, Odisha (MLA: 428.075 Ha) - Amendment of Environment Clearance regarding.

Sir,

Kindly refer to your proposal seeking amendment in the EC granted by the MoEFCC vide letter No. J-11015/439/2007-IA-II(M) dated 28.05.2008 for Kodingamali Bauxite Mining Project located at Kodingamali, Tahasil Koraput, District Koraput, Odisha in mininig lease area of 447.25 Ha. The project is for mining of Bauxite with production capacity of 3.0 million TPA. The Environmental Clearance to the project was granted vide no. J-11015/439/2007-IA.II(M) dated on 28.05.2008. The amendments are sought with respect to (1) Inclusion of Road transportation as a mode of mineral transport; (2) Incorporating correction in M.L. area from 447.15 Ha to 428.075 Ha; (3) Updating the land use pattern in line with the Stage 1 FC granted by MoEFCC; and (4) Incorporating supply of 400 KLD from the Water Resources Department, Govt. of Odisha as the source of water for the project.

2. The proposal for amendment of Environmental Clearance was considered by the Expert Appraisal Committee in its Meeting held during May 29-30, 2017; July 24, 2017 and August 29-30, 2017. The proposal was recommended for amendment of EC in August 29-30, 2017. The PP during project appraisal submitted that the EC granted by MoEFCC dated 28.05.2008 was for production of 3.0 MTPA Bauxite ore for supply to the proposed Alumina refinery of M/s. Hindalco Industries Ltd. located at Village Kansariguda in Rayagada District at a distance of about 3.00 Km from the ML wherein the transportation of mineral was mentioned through pipe conveyor; however, post the MMDR (Amendment) Act, 2015, the JV with M/s Hindalco was cancelled by Govt. of Odisha on 18.02.2015 due to issues related to Joint Venture Companies.

3. During appraisal, PP submitted that 18.94 Ha of forest area of the M.L. was surrendered by OMC being non-mineral bearing and the land use plan was modified accordingly. The forest diversion proposal was revised to 434.395 Ha including 6.86 Ha of approach road connecting the ML area and submitted on 13.06.2016 under section 2 (ii) of FC Act, 1980. The proposal was approved by MoEF&CC under Section 2(iii) of FC Act, 1980 vide letter dated 06.01.2017. The Stage-I FC under section 2 (ii) of FC Act, 1980 of the said proposal including approach road has been granted by the Ministry on dated 17.04.2017. The EAC during May 29-30, 2017 meeting asked PP for the following:

- Conduct study to assess the environmental impact (air/ water/ noise/ soil etc.) of ore transportation by road
- Revise the timelines mentioned for undertaking ore transportation by Railway siding
- Conduct Carrying Capacity Study to assess adequacy of existing infrastructure to handle the traffic load that may be generated as a result of ore transportation by road.
- Furnishing permission details from concerned authority for meeting requirement of 400KLD water.

3. During the EAC meeting held on July 24, 2017, PP submitted and presented the information sought by the Committee during the earlier meeting. The EAC made observations as below:

- *Environmental Impact Assessment Study to Evaluate the Impact of Ore Transportation by Road from Kodingamali Bauxite Mining Project* – The Committee observed that the anticipated incremental concentration of air quality parameters is not realistic considering PP's submission that a minimum of 800 trucks are likely to ply in a day once the project gets operational. Hence, the modeling for anticipating impact due to transporting ore by road needs to be done on realistic basis considering an identical scenario. The Committee, accordingly, opined the PP to collect data from a representative road/ highway and use the same as an input for deriving incremental concentrations through modelling and predict Ground Level Concentrations (GLCs). Similarly, observations were made w.r.t. conducting Noise quality and Soil quality monitoring. The Committee asked the PP to highlight the anticipated Heavy Metal concentration in soil due to truck movement.
- *Permission to abstract ground water up to 400m^3/day for Kodingamali Bauxite Mining Project* – The Committee noted the submission made by the PP.
- *Carrying Capacity Study for assessing adequacy of existing transport infrastructure to handle traffic load* – The Committee noted that the existing infrastructure can carry 1.26 Million TPA, after minor modifications which may require 2-3 months. It was also noted that further strengthening of carriageway to 7m width and 2.5m shoulder width may increase the carriage capacity to 3.7 Million TPA. The PP submitted that all the necessary modifications shall be carried out by State PWD department/ National Highways and the PP is already coordinating with them.
- *The PP also requested for reduction in M.L. area from 447.25 Ha to 428.075 Ha* - The Committee noted the submissions of the PP that Govt. of Odisha issued conditional grant order of ML over 715.075 ha of bauxite mine on dt. 01.02.1999 for a period of 30 years in accordance with the letter of Ministry of Mines, Govt. of India dt 11.01.1999. Mining operation in the ML area has never been carried out previously. Subsequently, OMC submitted a revised application over 447.25 ha deleting the non-mineralized area. Department of Steel and

Mines, Govt. of Odisha on dated 11.09.2015 further reduced the ML area from 447.25 ha to 428.31 ha which, after DGPS survey came to 428.075 Ha. The Committee noted the submissions made by the PP and asked the PP to submit M.L. deed indicating 428.075 Ha, Approved mining plan for the same area and a communication from Department of Steel and Mines, Government of Odisha stating 428.075 Ha mine lease area for the project.

4. During the EAC meeting held on August 29-30, 2017, PP submitted and presented the information sought by the Committee during the earlier meetings. The PP has mentioned that no mining activity has been started till date during EAC deliberations and hence, past production details were not sought for ascertaining violation. The EAC made observations as below:

- *Environmental Impact Assessment Study to Evaluate the Impact of Ore Transportation by Road from Kodingamali Bauxite Mining Project* – The Committee observed that the anticipated incremental concentration of air quality parameters have been calculated based on a similar/ representative transport route viz. Sambalpur – Sundargarh – Rourkela. The modeling carried out for anticipating impact due to ore transportation indicates that the cumulative concentrations of air quality parameters are within the NAAQS 2009. Similarly, the observations have been presented w.r.t. Noise quality and Soil quality monitoring. The Committee noted that the concentration of heavy metals in soil samples along the Sambalpur – Sundargarh – Rourkela route are higher due to vehicular movement which clearly indicates the projected trajectory of soil contamination in the instant case. However, the Committee asked the PP to ensure that the proposed transportation route be metalled/ concretized before being used for full capacity i.e. 3.6 Million TPA. The Committee also noted the anticipated noise levels and asked the PP to take required measures for containing noise pollution in consultation with State Pollution Control Board.
- *Carrying Capacity Study for assessing adequacy of existing transport infrastructure to handle traffic load* – The Committee deliberated on the study presented by the PP and noted that the existing infrastructure can carry 1.26 Million TPA, after minor modifications which may require 2-3 months. It was also noted that further strengthening of carriageway to 7m width and 2.5m shoulder width may increase the carriage capacity to 3.7 Million TPA. The PP submitted that all the necessary modifications shall be carried out by State PWD department/ National Highways and the PP is already coordinating with them. Based on the deliberations, the Committee recommended for the following:-
  - Amendment may be considered for transportation of 1.26 Million TPA of ore by road *in the interim* subject to required strengthening of carriageway.
  - For increasing the transportation of ore by road from 1.26 Million TPA to 3.7 Million TPA, *a prior confirmation from the State PWD Department regarding preparedness of the 7 meter wide carriageway*, may be sought.
  - Amendment for change in land use plan, in line with the Stage - I Forest clearance, may be considered subject to submission of Stage-1 FC by PP.

6. The matter was examined in the Ministry and based on the observations and recommendations of the EAC during May 29-30, 2017; July 24, 2017 and August 29-30, 2017, the following amendments are granted:

i. The mining project shall use 400 KLD of water for its operations as per the permission granted by Water Supply department, Government of Odisha.

ii. The land-use for the project shall be governed as per the Stage-1 FC granted by MoEFCC vide its letter dated 17.04.2017. The operations shall be started only after obtaining required approvals under Forest (Conservation) Act, 1980.

iii. The PP shall carryout mineral transportation of only up to 1.26 Million TPA of Bauxite ore by road subject to required strengthening of carriageway at present. As the EC permits production of 3 Million TPA of Bauxite ore, transportation beyond 1.26 Million TPA by road shall be allowed only on prior confirmation from the State PWD Department regarding preparedness of the 7 meter wide carriageway. At present, the PP is allowed to carry out transportation limited to 1.26 Million TPA.

iv. The M.L. area shall be read as 428.075 Ha in placed of 447.15 Ha, based on executed lease deed and approved mining plan submitted by PP.

7. All other terms and conditions mentioned in this Ministry's letter of even no dated 28.05.2008 shall remain the same. The instant amendment shall be subject to orders passed by the Hon'ble Supreme Court of India/ High Court of Odisha and any other Court of Law.

8. This issues with the approval of the Competent Authority.

29/11/17

(Surendra Kumar)
Scientist 'G'

Copy to:

(i) The Secretary, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.
(ii) The Secretary, Department of Environment, Government of Odisha, Secretariat, Bhubaneswar.
(iii) The Secretary, Department of Mines and Geology, Government of Odisha, Secretariat, Bhubaneswar.
(iv) The Secretary, Department of Forests, Government of Odisha, Secretariat, Bhubaneswar.
(v) The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi-110032.
(vi) The Additional Principal Chief Conservator of Forests (C), Ministry of Environment, Forest and Climate Change, Regional Office (EZ), A/3, Chandersekharpur, Bhubaneswar – 751023.
(vii) The Chairman, Odisha State Pollution Control Board, Parivesh Bhawan, A/118 Nilakantha Nagar, Unit-VIII, Bhubaneshwar-751012.
(viii) The Controller General, Indian Bureau of Mines, Indira Bhavan, Civil Lines, Nagpur-440 001.
(ix) The Member Secretary, Central Ground Water Authority, West Block-2, Wing-3, Sector-1, R. K. Puram, New Delhi-110066.
(x) The District Collector, Koraput District, State of Odisha.
(xi) Guard File/ MoEFCC website

29/11/17

(Surendra Kumar)
Scientist 'G'

By Speed Post/Online

No. J-11015/439/2007-IA.II(M)
Government of India
Ministry of Environment, Forest & Climate Change
Impact Assessment Division

3rd Floor, Vayu Wing,
Indira Paryavaran Bhawan,
Jorbagh Road, Aliganj,
New Delhi-110 003

Dated: 17th December, 2018

To

M/s Orissa Mining Corporation Limited,
OMC House, Bhubneswar-751001
E-mail: info@orissamining.com

Sub.: Amendment of Environmental Clearance vide letter no J-11015/439/2007-IA.II(M) dated 28.05.2008 w.r.t. "Transportation of 3 MTPA bauxite ore by Road" for Kodingamali Bauxite Mining Project of M/s Odisha Mining Corporation Limited with production capacity of 3.0 MTPA Bauxite ore located at Kodingamali, Tehsil Koraput, District Koraput, Odisha (MLA: 428.075 Ha) - Amendment of Environment Clearance regarding.

Sir,

This has reference to your online application for amendment in Environmental Clearance vide letter no J-11015/439/2007-IA-II(M),dated 28.05.2008 w.r.t. "Transportation of 3 MTPA bauxite ore by Road". The mine is located at Kodingamali, Tehsil Koraput, District Koraput, Odisha in mining lease area of 447.25 Ha.

2. The Ministry has granted the Environmental Clearance vide letter no – 110115/439/2007-IA-II(M) dated 28.05.2008 for Kodingamali Bauxite Mining Project with production capacity of 3.0 million TPA located at Kodingamali, Tahasil Koraput, District Koraput, Odisha in mining lease area of 447.25 Ha.

3. The proposal was considered before the EAC in its meeting held during the October 23-24, 2018 wherein the Committee recommended for amendment in EC w.r.t. "transportation of 3.0 million TPA of bauxite ore by road" subject to examination of the proposal w.r.t. judgment of Hon'ble Supreme Court dated the 2nd August 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause versus Union of India and Ors". Project Proponent vide letter no 17794/OMC/F&E/2018 dated 26.11.2018 had submitted the past production details vide letter No. III(k) 06/19966717/DM, dated 01.10.2018, authenticated by the Joint Director of Mines, Directorate of Mines, Odisha, as per submission of PP w.r.t.

past production details PP did not enhance the Production beyond the EC vide letter of Even no dated 28.05.2008. PP also submitted an undertaking by the way of affidavit (K 141114 dated 09.08.2018) to comply with all the statutory requirements and judgment of Hon'ble Supreme Court Order dated the 2nd August, 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause versus Union of India and Ors."

4. During the Presentation the Committee noted that the Ministry has granted the EC, vide letter No. J-11015/439/2007-IA-II(M),dated 28.05.2008 for mining of Bauxite with production capacity of 3.0 million TPA by opencast mechanized method involving lease area of 447.25ha. Further, based on the recommendations of the EAC in its meeting held during August 29-30, 2017, the Ministry has amended the EC, vide letter No. J-11015/439/2007-IA-II(M), dated 24.11.2017 w.r.t. (i) The mining project shall use 400 KLD of water for its operations as per the permission granted by Water Supply department, Government of Odisha.(ii) The land-use for the project shall be governed as per the Stage-1 FC granted by MoEFCC vide its letter dated 17.04.2017. The operations shall be started only after obtaining required approvals under Forest (Conservation) Act, 1980.(iii) The PP shall carryout mineral transportation of only up to 1.26 Million TPA of Bauxite ore by road subject to required strengthening of carriageway at present. As the EC permits production of 3 Million TPA of Bauxite ore, transportation beyond 1.26 Million TPA by road shall be allowed only on prior confirmation from the State PWD Department regarding preparedness of the 7 meter wide carriage way. At present, the PP is allowed to carry out transportation limited to 1.26 Million TPA.(iv) The M.L. area shall be read as 428.075 Ha in placed of 447.15 Ha, based on executed lease deed and approved mining plan submitted by PP.

5. Now, Project Proponent has requested to amend the condition i.e. "The PP shall carryout mineral transportation of only up to 1.26Million TPA of Bauxite ore by road subject to required strengthening of carriageway at present. As the EC permits production of 3 Million TPA of Bauxite ore, transportation beyond 1.26 Million TPA by road shall be allowed only on prior confirmation from the State PWD Department regarding preparedness of the 7-meter-wide carriageway. At present, the PP is allowed to carry out transportation limited to 1.26 Million TPA" as the carriageway has now been widened to 7m. The State PWD Department, vide letter dated 01.08.2018 stated that the road from NH-326 to Marbaiguda village to Raulipadar in Laxmipur block in the district is improved to 7 m carriage way.

6. The Committee deliberated on the proposal recommended the amendment in EC w.r.t. transportation of 3.0 million TPA of bauxite ore by road subject to examination of the proposal w.r.t. judgment of Hon'ble Supreme Court dated the 2nd August 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause versus Union of India and Ors.

7. The matter has been examined in the Ministry and the undersigned is hereby directed to say that the Ministry is hereby amended the EC letter No. J-11015/439/2007-IA.II (M) dated 28.05.2008 w.r.t. transportation of 3 MTPA bauxite ore by Road.

8. All other terms and conditions mentioned in this Ministry's EC letter no J-11015/439/2007-IA.II (M) dated 28.05.2008 and Amended EC letter No. J-11015/439/2007-IA.II (M) dated 24.11.2017 shall remain the same. PP shall also comply the following conditions as applicable:-

I. The Environmental Clearance will not be operational till such time the Project Proponent complies with all the statutory requirements and judgment of Hon'ble Supreme Court dated the 2nd August 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause versus Union of India and Ors.

II. Department of Mining & Geology, State Government shall ensure that mining operation shall not commence till the entire compensation levied, for illegal mining paid by the Project Proponent through their respective Department of Mining & Geology in strict compliance of judgment of Hon'ble Supreme Court dated the 2nd August 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause versus Union of India and Ors.

9. This issues with the approval of the Competent Authority.

Yours faithfully

(Dr. R.B. Lal)
Additional Director/Scientist 'E'

Copy to:

(i) The Secretary, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.
(ii) The Secretary, Department of Environment, Government of Odisha, Secretariat, Bhubaneswar.
(iii) The Secretary, Department of Mines and Geology, Government of Odisha, Secretariat, Bhubaneswar.
(iv) The Secretary, Department of Forests, Government of Odisha, Secretariat, Bhubaneswar.
(v) The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi-110032.

(vi) The Additional Principal Chief Conservator of Forests (C), Ministry of Environment, Forest and Climate Change, Regional Office (EZ), A/3, Chandersekharpur, Bhubaneswar - 751023.

(vii) The Chairman, Odisha State Pollution Control Board, Parivesh Bhawan, A/118 Nilakantha Nagar, Unit-VIII, Bhubaneshwar-751012.

(viii) The Controller General, Indian Bureau of Mines, Indira Bhavan, Civil Lines, Nagpur-440 001.

(ix) The Member Secretary, Central Ground Water Authority, 18/11, Jam Nagar House, Man Singh Road, New Delhi-110011.

(x) The District Collector, Keonjhar District, State of Odisha.

(xi) Guard file.

(Dr. R.B. Lal)
Additional Director/Scientist 'E'

F. No. J-11015/439/2007-IA II (M)
Government of India
Ministry of Environment, Forests and Climate Change

3rd Floor, Vayu Block,
Indira Paryavaran Bhawan,
Jor Bagh Road,
Aliganj, New Delhi-110003

Dated: 29th May, 2020

To,

M/s. Orissa Mining Corporation Limited
OMC House, Bhubaneswar – 751001
Odisha.

Sub: Transportation of 0.7 MTPA left over stock of Bauxite Ore through road transportation at Kodingamali Bauxite Mine (3.0 MTPA) of M/s Odisha Mining Corporation limited located in Koraput & Rayagada districts of Odisha–EC Amendment –regarding.

Sir,

This has reference to letter dated 12th February, 2020 and online proposal No. IA/OR/MIN/151193/2020 seeking amendment "to provide one-time permission to transport 0.7 MTPA stack lying the mine premises through road during a period of 4-6 months" in the Environmental clearance granted vide letter no. J- 11015 /439/2007-IA. II (M) dated 28.05.2008.

2. The Environment Clearance for Kodingamali Bauxite mining project of M/s Odisha Mining Corporation has been accorded by Ministry vide letter no. J- 11015 /439/2007-IA. II (M) dated 28.05.2008 for a production capacity of 3.0 MTPA. Amendment of EC for transportation Bauxite Ore via road for 1.26 MTPA was granted vide letter dated 24.11.2017 subject to the condition to upgrade the road. Subsequently, on 17.12.2018 further amendment to EC for transportation of 3.00 MTPA of Bauxite ore through road was granted.

3. In the present application, M/s OMC further requested to provide one-time permission to transport 0.7 MTPA stack lying the mine premises through road during a period of 4-6 months. It was informed that all the pollution control measures including maintenance of the roads will be done during the dispatch of this additional quantity.

4. M/s OMC submitted the carrying capacity study carried during July, 2017. As per the carrying capacity study, about 3.7 Million tonnes per annum (Mtpa) can be transported, if the entire route (all stretches) are converted to 7m wide carriageway with 2.5m shoulder on either side configuration. Also the structures are needed to be suitably modified in terms of strengthening and widening as per IRC standards, wherever required. Further, for all stretches, the pavement thickness of the widening part & overlay thickness on the existing carriageway should be as per IRC standards for the additional traffic volume.

5. The proposal has been appraised in the 16th EAC held during 5th – 6th May, 2020. During the deliberations, the project proponent has submitted following before the committee: -

1) It was proposed to use the 18T payload trucks in lieu of 15 T pay load trucks.

2) No. of PCUs in two directions will increase from 3636 to 3738.

3) Carrying capacity of 7m wide road in hilly terrain (PCU) is 8050

4) The type of the road is as follows:

Road	Description	Length (Km)	Type of Road	Width (M)	Each Shoulder (M)
R1	Mine to R2	3.5	Concrete	7.0 - 20	1.5
R2	Link road (Govt Road)	3.9	Bitumen	7.5	1.5
R3	NH- 326	16.0	Bitumen	7.0	1.5
R4	NH-326 to Kakiriguma Rly Siding	0.5	Bitumen	7.5	1.5

5) The proponent has also informed and presented the photographs of plantation activity started in the safety zone of the mine as observed the committee in the previous meeting during the appraisal for ToR for expansion of the project capacity.

6) The project proponent presented the letter of State Rural Works division dated 29th April, 2020, that the carriage way width of the road is 7.50 m with 1.50 m shoulder, both the side, i.e. 10.50 m total width and has the capacity of 11500 PCU.

6. After detailed deliberations the Committee is of the view that material already stacked is leftover as the rate of production is not same as rate of dispatch due to restriction on transportation of the mineral. The Stack handling does not include drilling and blasting and same needs to be distributed over the financial year (i.e. not more than 58333 tons/month) which will have less impact on environment as compared to transporting entire left over material in short span of time. Therefore, the committee **recommended** for one-time permission for dispatch of 0.7 million ton leftover stock of bauxite ore mined during 2018-19, in the current FY 2020-2021, in the distributed manner over the financial year, as a special case, in addition to the approved EC capacity with additional conditions mentioned in para 7 below: -

7. The Ministry of Environment, Forest and Climate Change has examined the application in accordance with the EIA Notification, 2006 and based on the recommendation of EAC hereby accords the amendment in environmental clearance as per provision of EIA Notification 2006 (as amended) and in pursuant to Ministry's O.M No. 22-1/2019-IA.III dated 11.06.2019, for dispatch of 0.7 Million Tonne of leftover stock of bauxite ore mined during 2018-19, in the current FY 2020-2021 in the distributed manner subject to compliance of following additional conditions. The other terms and conditions prescribed earlier shall remain the same.

1) PP shall distribute the dispatch over the financial year i.e. not more than 58333 tons/month.

2) PP shall deploy 18 T payload trucks in lieu of 15 T pay load trucks, as proposed, for reduction of number of PUCs.

3) PP shall take intensive water sprinkling arrangements at the loading point of the left over stock.

4) The transportation road shall be maintained including sweeping of the roads at periodical interval.

5) The avenue plantation shall be carried all along the road from mine to link road during the ensuing monsoon and shall complete with in a year. The compliance for the same shall be submitted to the regional office with supporting documents / photographs.

6) In pursuant to Ministry's O.M No 22-34/2018-IA.III dated 16.01.2020 to comply with the direction made by Hon'ble Supreme Court on 8.01.2020 in W.P. (Civil) No 114/2014 in the matter Common Cause vs Union of India, the mining lease holder shall after ceasing mining operations, undertake re-

grassing the mining area and any other area which may have been disturbed due to other mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc.

8. This issues with the approval of the Competent Authority.

Yours faithfully,

29/5/2020

(Sharath Kumar Pallerla)
Director/Scientist 'F'
Email: sharath.kr@gov.in
Phone/Fax: 011-26495325

Copy to:

1). **The Secretary**, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.
2). **The Secretary,** Department of Environment, Government of Odisha, Secretariat, Bhubaneswar.
3). **The Secretary,** Department of Mines and Geology, Government of Odisha, Secretariat, Bhubaneswar.
4). **The Secretary,** Department of Forests, Government of Odisha, Secretariat, Bhubaneswar.
5). **The Chairman**, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi-110032.
6). **The Additional Principal Chief Conservator of Forests (C),** Ministry of Environment, Forest and Climate Change, Regional Office (EZ), A/3, Chandersekharpur, Bhubaneswar – 751023.
7). **The Chief Wildlife Warden**, Prakruti Bhawan, 5th floor, BDA Apartment Nilakanthanagar, Nayapalli, Bhubaneswar-751012, Odisha
8). **The Member Secretary,** Odisha State Pollution Control Board, Parivesh Bhawan, A/118 Nilakantha Nagar, Unit-VIII, Bhubaneswar-751012.
9). **The Controller General,** Indian Bureau of Mines, Indira Bhavan, Civil Lines, Nagpur-440 001.
10). **The Member Secretary,** Central Ground Water Board Ministry of Agriculture and Irrigation, 12/1 Jam Nagar House, Shahjahan Road, New Delhi 110011.
11). **The District Collector,** District- Koraput & Rayagada, State of Odisha.
12). **Guard File.**
13). **Parivesh Website.**

File No. J-11015/439/2007-IA.II(M)

Government of India
Ministry of Environment, Forest and Climate Change
Impact Assessment Division

Indira Paryavaran Bhavan,
Prithivi Wing, 2nd Floor, Aliganj,
Jor Bagh Road, New Delhi-110 003

Dated: 5th August, 2021

To

M/s Odisha Mining Corporation Ltd
OMC House, Bhubaneswar-751001,
Odisha.

Subject: Amendment in Environmental Clearance (EC) granted vide letter dated 28.05.2008 w.r.t. "Transportation of 1.43 million tons of left over stock of Bauxite Ore by road" for Kodingamali Bauxite Mine of M/s Odisha Mining Corporation Ltd, with production capacity of 3.0 MTPA Bauxite ore in the mine lease area of 428.075 ha, located at Kodingamali Village, Tehsil and District Koraput, Odisha - Amendment in EC regarding.

Sir,

This has reference online proposal no. IA/OR/MIN/202346/2021 seeking amendment in Environmental Clearance granted vide letter no J-11015/439/2007-IA.II(M) dated 28.05.2008 w.r.t. "Transportation of 1.59 million tons of left over stock of Bauxite Ore by road" for Kodingamali Bauxite Mine (MLA:428.075 ha) of M/s Odisha Mining Corporation Ltd, with production capacity of 3.0 MTPA Bauxite ore, located at Kodingamali Village, Tehsil and District Koraput, Odisha. The mine lease area located between Latitude 19° 01' 46.35" N to 19° 05' 13.85" N and Longitude: 83° 03' 22.91" to 83° 05' 11.89" E. The mine lease area falls under the Survey of India Toposheet No. 65 M/4. The PP presented the KML file during the presentation to indicate the location of mine lease on Google Earth/ DSS.

2. M/s Odisha Mining Corporation Ltd has made an online application vide proposal no. IA/OR/MIN/202346/2021 dated 31.03.2021 along with Form 4 under the provisions of EIA Notification, 2006 as amended from time to time for the project mentioned above. The proposed project activity is listed at schedule no. 1(a) Mining of Minerals under Category 'A' of the schedule of the EIA Notification, 2006 as the mining lease area is greater than 100 ha and appraised at Central level. The proposal for amendment in EC was considered in the 31st EAC meeting held during 9th - 15th June, 2021. Wherein PP submitted the following.

3. The Project Proponent submitted that the EC vide letter no J-11015/439/2007- IA.II(M) dated 28.05.2008 was granted to M/s Odisha Mining Corporation Ltd for Kodingamali Bauxite Mine (MLA: 447.25 ha) with production

capacity of 3.0 MTPA Bauxite ore and transportation through pipe conveyor. The EC was amended on 24.11.2017 regarding use of 400 K.D water, reducing the lease area from 447.25 to 428.075 and transportation by road limited to 1.26 Million TPA subject to required strengthening of carriageway. Subsequently PP obtained the amended in EC on 17.12.2018 w.r.t. transportation of 3 MTPA bauxite ore by road Further, PP again obtained in the amendment in Environment Clearance on 29.05.2020 for dispatch of 0.7 million ton of leftover stock of bauxite ore mined during 2018- 19, in the current FY 2020-2021, in the distributed manner over the financial year (58333tons/month), as a special case. PP now submitted that from FY 2017-18 to FY 2020-21, total 8.752 MnT of bauxite was produced out of which 1.43 MnT remains unsold and submitted application for amendment in EC to allow for transportation of additional 1.43 MnT left over stock of Bauxite Ore in the Stock Pile within the Mining Lease Area, which could not be sold and dispatched due to Covid-19 in the Year FY 21-22 as one-time measure keeping total production limited to the already approved EC capacity 3.0 MTPA.

4 The Project Proponent submitted that State Govt. has granted the ML under Rule 8 (2) of Minerals (Other than Atomic and Hydro Carbon Energy Minerals) Concession Rules, 2016 vide letter no. III (BX) SM-06/2003/303/ SM dt. 09.01.2017. The ML has been executed on dt. 10.01.2017 and is valid till the Year 2067.

5. The Project Proponent submitted that Mining Plan along with progressive mine closure plan has been approved by IBM, Bhubaneswar vide letter no. MPM/A/LOOR1/BHU/2019-20 dt.03.04.2020.

6. The Project Proponent submitted that the Stage-II Forest Clearance of the mine has been accorded vide letter no F.No. 846/2016-FC dt 25th Sept, 2017 for an area of 434.935 ha including 428.075 ha ML area including 18.098 Ha of forest land in Safety Zone & 6.860 ha of forest land out-side the ML area for construction of for approach road to the mining lease.

7. The Project Proponent reported that as per the Revised RTO Guidelines issued by the Ministry of Transport, Government of India dated 16.07.2018: Truck Carrying Capacity of the 3-Axle Rigid Truck is increased from net 15 Ton per trip to net 18 Ton per Trip. PP submitted that considering 330 day of transportation- R-1 road belonging to OMC exclusively used for bauxite transportation only from Kodingamali mines. PP reportec that due to proposed amendment there will be increase in transportation and submitted that normal and worst case scenario of air pollutants and the predicted maximum concentrations of PM2.5, NO2 and CO found to be in the range of 34.8 µg/m3 , 24.0 µg/m3 and 1.689 mg/m3 which is within the limits of NAAQS.

8. The Project Proponent submitted that Current Consent to Operate (CTO) have also been granted by the State Pollution Control Board, Odisha under the Air & Water (Prevent & Control of Pollution) Act vide letter no. 3846/IND-I-CON-6632 dated 26.03.2021 valid till 31.03.2022. PP also submitted that the EC compliance report certified by IRO, Bhubaneswar on 01.03.2021.

9. After detailed deliberations the Committee observed that the permission granted last year for transportation of storage materials of 0.7 MT over and

above the production and transport of 3.0 MTPA of Bauxite ore by road. The permission is lying for Total 3.7 MTPA for FY 2020-21. Since due to COVID-19, this material could not be transported and there is further accumulation of 0.7 MT. The PP requested for amendment in EC seeking for transport of 1.43 MT left over bauxite over and above the 3.7 MTPA. The Committee after detailed deliberations **recommended** the proposal for Amendment in Environmental Clearance by keeping the transport of 0.7 MTPA as cap. The Project Proponent is permitted to access 1.43 MT as well also the production capacity of 3.0 MTPA. However, the total dispatch from the mines during 2021-22 should not exceed in 3.7 MT in pursuant to permission already granted in FY 2020-21 as a one-time measure. For the subsequent year the total dispatch from the mines should not be more than 3.0 Million Tonne as already approved in EC dated 28.05.2008 The all other terms and conditions mentioned in the Ministry's EC letter no J-11015/439/2007-IA. II(M) dated 28.05.2008 and Amendment in EC letter no J-11015/439/2007-IA. II(M) dated 24.11.2007, 17.12.2018 and 29.05.2020 shall remain the same.

10. The Ministry of Environment Forest and Climate Change has been examined the application in accordance with the EIA Notification, 2006 and based on the recommendation of EAC hereby accords the amendment in environmental clearance as per provisions of EIA Notification, 2006(as amended) and in pursuant to Ministry's O.M No.22-1/2019-IA.III dated 11.06.2019, for Amendment in Environmental Clearance by keeping the transport of 0.7 MTPA as cap. The Project Proponent is permitted to access 1.43 MT as well also the production capacity of 3.0 MTPA. However, the total dispatch from the mines during 2021-22 should not exceed in 3.7 MT in pursuant to permission already granted in FY 2020-21 as a one-time measure. For the subsequent year the total dispatch from the mines should not be more than 3.0 Million Tonne as already approved in EC dated 28.05.2008. The all other terms and conditions mentioned in the Ministry's EC letter no J-11015/439/2007-IA.II(M) dated 28.05.2008 and Amendment in EC letter no J-11015/439/2007-IA.II(M) dated 24.11.2007, 17.12.2018 and 29.05.2020 shall remain the same.

11. This issue with the approval of the Competent Authority.

Yours faithfully,

Pankaj Verma

(Pankaj Verma)
Scientist 'E'
Email- pankaj.verma@nic.in
Tel./Fax- 011- 24695264.

Copy to:

1. The Secretary, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi
2. The Secretary, Department of Environment, Government of Odisha, Secretariat, Bhubaneswar.
3. The Secretary, Department of Mines and Geology, Government of Odisha, Secretariat, Bhubaneswar.

4. The Secretary, Department of Forests, Government of Odisha, Secretariat, Bhubaneswar.
5. The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi-110032.
6. The Deputy Director General of Forests (C), Ministry of Env., Forest and Climate Change, Integrated Regional Office, A/3, Chandersekharpur, Bhubaneswar - 751023.
7. The Chairman, Odisha State Pollution Control Board, Parivesh Bhawan, A/118 Nilakantha Nagar, Unit-VIII, Bhubaneshwar-751012.
8. The Controller General, Indian Bureau of Mines, Indira Bhavan, Civil Lines, Nagpur-440 001.
9. The Member Secretary, Central Ground Water Authority, A2, W3 Curzon Road Barracks, K.G. Marg, New Delhi-110001.
10. The District Collector, Koraput District, State of Odisha.
11. Guard File.

Pankaj Verma

(Pankaj Verma)
Scientist 'F'

No. J-11015/439/2007-IA-II(M)
Government of India
Ministry of Environment, Forest and Climate Change
Impact Assessment Division
***

2nd Floor, Prithvi Wing,
Indira Paryavaran Bhavan,
Jor Bagh Road, Aliganj,
New Delhi-110 003

Dated: 25th February, 2022

To,

M/s Odisha Mining Corporation Limited,
OMC House, Post Box No.: 34,
Bhubaneswar – 751001, Odisha.

Subject:- Proposal for amendment in EC dated 28.05.2008 w.r.t. transportation of leftover stock of 7,34,767.4 tonnes of Bauxite by road, over and above the permitted EC capacity of 3.0 MTPA during the FY 2022-23 for M/s Odisha Mining Corporation Limited for Kodingamali Bauxite Mine with production capacity of 3.0 MTPA Bauxite ore in the mine lease area of 428.075 ha, located at Kodingamali Village, Tehsil and District Koraput, Odisha – [File. No: J- 11015/439/2007-IA.II(M), Proposal No: IA/OR/MIN/245821/2021; Consultant: Ind Tech House Consult] - Amendment in EC regarding.

Sir,

This has reference to the online proposal no. IA/OR/MIN/245821/2021 of M/s Odisha Mining Corporation Limited is for amendment in EC dated 28.05.2008 w.r.t. transportation of leftover stock of 7,34,767.4 tonnes of Bauxite by road, over and above the permitted EC capacity of 3.0 MTPA during the FY 2022-23 for Kodingamali Bauxite mine with production capacity of 3.0 MTPA Bauxite ore in the mine lease area of 428.075 ha, located at Kodingamali Village, Tehsil and District Koraput, Odisha. The mine lease area located between Latitude 19°01'46.35" N to 19°05'13.85" N and Longitude: 83°03'22.91"E to 83°05'11.89" E. The mine lease area falls under the Survey of India Toposheet No. 65 M/4. The Project Proponent presented the KML file during the presentation to indicate the location of mine lease on Google Earth.

2. M/s Odisha Mining Corporation Ltd has made an online application vide proposal no. IA/OR/MIN/245821/2021 dated 18.12.2021 along with Form 4 under the provisions of EIA Notification, 2006. The proposed project activity is listed at schedule no.1 (a) Mining of Minerals under Category "A" of the schedule of the EIA Notification, 2006 as the mining lease area is greater than 100 ha and appraised at Central level.

3. **The details of the previous Environmental Clearance (EC) are furnished as below:**

Date of application	Proposal No	Consideration	Details	Date of accord
15.05.2007	IA/OR/MIN/ 6980/2007	-	Environmental clearance for production capacity of 3.0 MTPA of Bauxite by opencast mechanized method involving lease area of 447.25 ha.	28.05.2008
10.11.2016	IA/OR/MIN/ 6980/2007	May 29-30, 2017, July 24, 2017 & August 29-30, 2017	Amendment in EC w.r.t. i. use of 400 KLD of water for its operations as per the permission granted by Water Supply Department, Govt.. of Odisha ii. The land-use for the project shall be governed as per the Stage-I FC granted by MoEFCC vide its letter dated 17.04.2017. The operations shall be started only after obtaining required approvals under Forest (Conservation) Act, 1980 iii. The PP shall carryout mineral transportation of only up to 1.26 million TPA of Bauxite ore by road subject to required strengthening of carriageway. As	24.11.2017

			the EC permits production of 3 MTPA of Bauxite ore, transportation beyond 1.26 MTPA by road shall be allowed only on prior confirmation from the State PWD Department regarding preparedness of the 7m wide carriageway. At present, the PP is allowed to carry out transportation limited to 1.26 MTPA and iv. The ML area shall be read as 428.075 ha in place of 447.25 ha, based on executed lease deed and approved mining plan submitted by PP.	
09.10.2018	IA/OR/MIN/ 6980/2007	23rd – 24th Oct, 2018	Amendment in EC w.r.t. transportation of 3.0 MTPA of bauxite ore by road.	17.12.2018
09.04.2020	IA/OR/MIN/ 151193/2020	5th – 6th May, 2020	Amendment in EC for dispatch of 0.7 million ton of leftover stock of bauxite ore mined during 2018- 19, in the current FY 2020-21, in the distributed manner over the financial year (58333 tons/month), as a special case	29.05.2020
31.03.2021	IA/OR/MIN/ 202346/2021	9th – 15th June, 2021	Amendment in EC by keeping the transport of 0.7 MTPA as cap. The Project Proponent is	05.08.2021

			permitted to access 1.43 MT as well also the production capacity of 3.0 MTPA. However, the total dispatch from the mines during 2021-22 should not exceed in 3.7 MT in pursuant to permission already granted in FY 2020-21 as a one-time measure. For the subsequent year the total dispatch from the mines should not be more than 3.0 MTPA as already approved in EC dated 28.05.2008.	

4. The Project Proponent submitted that the Department of Steel and Mines, Govt., of Odisha vide letter no. III (BX) SM-06/2003/303/ SM dt. 09.01.2017 in exercise of powers conferred u/s 10 A (2) (c) of MMDR Amendment Act, 2015 read with Rule 8 (2) of MC Rules, 2016 granted the mine lease over an area of 428.075ha (406.385ha in Koraput Disirict and 21.69 ha in Rayagada District) for a period of 50 years. PP also submitted the lease deed bearing no. G593527 executed on 10.01.2017 between the Governor of Odisha and M/s Odisha Mining Corporation Ltd for a period of 50 years.

5. Now, the Project Proponent requested to amendment the EC to despatch the leftover stock of 0.73 MT (expected upto 31.03.2022) of bauxite ore by road during the FY 2022-2023. PP reported that there is a further accumulation of 6,93,586.677 MT (as on 31.12.2021) and it is expected that left over stock upto 31.03.2022 will be 7,34,767.392 Tons and the production will be 3.0 MTPA. PP also reported that it is proposed to use 18 T trucks in lieu of 15 T trucks, No. of PCUs in two directions will increase from 3636 to 3780 and Carrying capacity of 7m wide road in hilly terrain (PCU) is 8050.

6. The Project Proponent submitted that the Stage-II Forest Clearance accorded by MoEF&CC vide letter no F.No. 8-46/2016-FC dt 25th Sept, 2017 for diversion of 434.935 ha of forest land (428.075 ha of forest land within Kodingamali Bauxite mine lease area including 18.098 ha of forest land in Safety Zone and 6.860 ha of forest land out-side the ML area for construction of for approach road to the mining lease) for mining of Bauxite in Kodingamali Bauxite mines.

7. The Project Proponent submitted that Consent to Operate (CTO) issued by the State Pollution Control Board, Odisha vide letter no. 5116/IND-I-CON-6632 dated 26.03.2021 for the production of 3.0 MTPA of Bauxite and crushing plant of capacity 2 x 500 TPH for the period ending up to 31.03.2022. PP also submitted that the EC compliance report certified by IRO, Bhubaneswar on 01.03.2021.

8. The Project Proponent submitted the past production details duly authenticated by the Deputy Director of Mines, Koraput Circle vide Letter No: 74/Mines, dated 13.01.2022 for the period 2017-18 to 2021-22 (i.e., March 2018 to December, 2021).

9. **Observation and Recommendation of the Committee:**

The proposal for amendment in Environmental Clearance was considered in the 45th EAC (Non-Coal Mining) meeting held during 24th, 25th and 27th January, 2022. After detailed deliberations made by the Project Proponent and the Consultant, the Committee noted that the Initially PP obtained EC on 28.05.2008 for production capacity of 3.0 MTPA of Bauxite.

Further, PP sought amendment in EC stating to inclusion of road transportation as a mode of mineral transport, incorporating correction in M.L area from 447.15 ha to 428.075 ha, updating the land use pattern in line with the Stage I FC granted by MoEF&CC and incorporating supply of 400 KLD from the Water Resources Department, Govt. of Odisha as a source of water for this project and accordingly amendment in EC was issued on 24.11.2017 regarding use of 400 KLD water, reducing the lease area from 447.25 to 428.075 and transportation by road limited to 1.26 Million TPA subject to required strengthening of carriageway.

Subsequently, PP sought amendment in EC stating to amend the condition that the PP shall carryout mineral transportation of only up to 1.26 million TPA of Bauxite ore by road as the PP widened the carriageway to 7m and obtained the letter from the State PWD Department dated 01.06.2018 and accordingly amendment in EC was issued on 17.12.2018 for transportation of 3.0 MTPA of bauxite ore by road.

PP again sought amendment in EC stating to provide one-time permission to transport 0.7 MTPA stack lying in the mine premises through road for a period of 4-6 months and accordingly amendment in EC was issued on 29.05.2020 for dispatch of 0.7 million ton of leftover stock of bauxite ore mined during 2018-19, in the FY 2020-21, in the distributed manner over the financial year (58333 tons/month) as a special case and

Thereafter, PP sought amendment in EC by stating that the 1.43 MnT of bauxite remains unsold and not dispatched due to COVID-19 and amendment in EC was issued on 05.06.2021 by keeping the transport of 0.7 MTPA as cap. The Project Proponent is

permitted to access 1.43 MT as well also the production capacity of 3.0 MTPA. However, the total despatch from the mines during 2021-22 should not exceed in 3.7 MT in pursuant to permission already granted in FY 2020-21 as a one-time measure. For the subsequent year the total dispatch from the mines should not be more than 3.0 MTPA as already approved in EC dated 28.05.2008.

The Committee stringently viewed the amendment obtained by the PP over and over again and noted that the as per the authenticated past production details submitted by the PP, it was observed that the opening balance of leftover stock of bauxite during April, 2021 was 14,83,271.938 MT and closing balance of leftover stock of bauxite during December, 2021 (as on 31.12.2021) was 6,93,586.677 MT. The Committee also observed that the PP produced 19,65,000 MT and despatched 27,08,180.715 MT till 31.12.2021. During the meeting, PP informed that due to COVID-19, the entire material could not be transported and there is a further accumulation of 6,93,586.677 MT (as on 31.12.2021) and it is expected that left over stock upto 31.03.2022 will be 7,34,767.392 MT. Hence, the Committee permitted to access the leftover stock of 0.7 MTPA for further period of one year i.e., during the FY 2022-23 and opined that no further amendment in this regard will be considered beyond the EC capacity of 3.0 MTPA. Based on the above discussions held, the Committee recommended the proposal for amendment in EC by keeping the transport of left over stock 0.7 MTPA as cap. The Project Proponent is permitted to access 0.7 MTPA as well also the production capacity of 3.0 MTPA. However, the total dispatch from the mines during the FY 2022-23 should not exceed 3.7 MTPA in pursuant to permission already granted in FY 2021-22. For the subsequent year the total dispatch from the mines should not be more than 3.0 MTPA as already approved in EC dated 28.05.2008. The all other terms and conditions mentioned in the Ministry's EC letter no J-11015/439/2007-IA. II(M) dated 28.05.2008 and amendment in EC letter no J-11015/439/2007-IA. II(M) dated 24.11.2017, 17.12.2018, 29.05.2020 and 05.08.2021 shall remain the same with the following additional specific conditions:

10. The matter has been examined in the Ministry in accordance with the Environmental Impact Assessment Notification, 2006 and further amendments thereto and the undersigned is directed to say that the Ministry of Environment, Forest & Climate Change after accepting the recommendation of EAC during its 45th EAC (Non-Coal Mining) meeting held during 24th, 25th and 27th January, 2022, hereby accords the amendment in Environmental Clearance (EC) by keeping the transport of left over stock 0.7 MTPA as cap. The Project Proponent is permitted to access 0.7 MTPA as well also the production capacity of 3.0 MTPA. However, the total dispatch from the mines during the FY 2022-23 should not exceed 3.7 MTPA in pursuant to permission already granted in FY 2021-22. For the subsequent year the total dispatch from the mines should not be more than 3.0 MTPA as already approved in EC dated 28.05.2008. The all other terms

and conditions mentioned in the Ministry's EC letter no J-11015/439/2007-IA.II(M) dated 28.05.2008 and amendment in EC letter no J-11015/439/2007-IA.II(M) dated 24.11.2017, 17.12.2018, 29.05.2020 and 05.08.2021 shall remain the same with the following additional specific conditions:

ADDITIONAL SPECIFIC CONDITIONS

i. The Project Proponent should explore the feasibility of establishing conveyor belt from mine lease to railway siding for dispatch of 3.0 MTPA and suggest a suitable time frame for the implementation.

ii. The Project Proponent needs to monitor the air and noise quality during the additional transportation of the material by road and shall submit a report to the Ministry's Integrated Regional Office, Bhubaneswar.

11. The issues with the approval of the Competent Authority.

Yours faithfully,

(Pankaj Verma)
Scientist 'E'

Copy to:

1. **The Secretary,** Ministry of Mines, Government of India Shastri Bhawan, New Delhi.
2. **The Chief Secretary,** Government of Odisha, Secretariat, Bhubaneswar.
3. **The Secretary**, Department of Environment, Government of Odisha, Secretariat, Bhubaneswar.
4. **The Secretary,** Department of Mines and Geology, Government of Odisha, Secretariat, Bhubaneswar.
5. **The Secretary,** Department of Forests, Government of Odisha, Secretariat, Bhubaneswar.
6. **The Secretary,** Department of Steel and Mines, Government of Odisha, Secretariat, Bhubaneswar.
7. **The Member Secretary,** Odisha Pollution Control Board, Parivesh Bhawan, A/118 Nilakantha Nagar, Unit-VIII, Bhubaneswar-751012.
8. **The Deputy Director General of Forests (C),** Ministry of Environment, Forest and Climate Change, Integrated Regional Office, A/3, Chandersekharpur, Bhubaneswar – 751023.

9. The **Chief Wildlife Warden,** Prakurti Bhawan, 5th floor, BDA Apartment, Nilakanthanagar. Nayapalli, Bhubaneswar-751012, Odisha.
10. The **Chairman**, Central Pollution Control Board, Parivesh Bhawan, CBD-Cum-Office Complex, East Arjun Nagar, New Delhi-110 032.
11. The **Controller General,** Indian Bureau of Mines. Indira Bhavan, Civil Lines, Nagpur-440001.
12. The **Member Secretary**, Central Ground Water Board, Ministry of Agriculture and Irrigation, 12/1 Jam Nagar House, Shahjahan road, New Delhi 110011.
13. The **District Collector,** Koraput District. Govt. of Odisha.
14. **Guard File.**
15. **PARIVESH** Portal.

(Pankaj Verma)
Scientist 'E'

Annexure -III G_Request Letter to IRO dated 24.06.2025

OMC | ODISHA NEW OPPORTUNITIES

Mining Happiness

Letter No. 10053/OMC/F&E/2025
June 24, 2025

To

The Deputy Director General of Forest(C),
Ministry of Environment Forests & Climate Change,
Integrated Regional Office,
A/3, Chandrasekharpur,
Bhubaneswar – 751023

Sub.: Request for Certified EC Compliance Report for Kodingamali Bauxite Mine of M/s Odisha Mining Corporation Limited located in Kodingamali village, Laxmipur& Kashipur Tehsil(s), Koraput & Rayagada District(s), Odisha (ML Area: 428.075 ha.)

Ref:
i. EC grant order for 3.0 to 3.6 MTPA vide proposal no. IA/OR/MIN/523482/2025 dt. 15.04.2025
ii. ToR grant order for 3.6 to 6.0 MTPA vide letter dt. 20.06.2025

Sir,

OMC has proposed for expansion in Bauxite Ore Production capacity from 3.6 MTPA to 6.0 MTPA at Kodingamali Bauxite Mine. In this connection, as per the application submitted to the Ministry vide proposal no. IA/OR/MIN/535212/2025 dt. 07.05.2025, ToR has been issued by MoEF&CC vide letter cited under reference (ii).

Further, in accordance to the Office Memorandum issued by MoEF&CC dt. 08.06.2022, a certified compliance report on the status of adherence to the condition stipulated in the EC cited under reference (i) is required for further consideration of the captioned expansion proposal.

Therefore, in view of the above, it is sincerely requested to kindly issue a certified EC compliance report for the EC in respect of 3.6 MTPA Bauxite production at Kodingamali Mine.

Yours faithfully,
24/06/2025
General Manager (F&E)

Memo No. 10054/OMC/F&E/2025 June 24, 2025

Copy to Regional Manager, Rayagada South Zone for kind information and necessary action

24/06/2025
General Manager (F&E)

GOVT. OF INDIA MoEF & CC Integrated R.O Bhubaneswar-751003
26 JUN 2025 RECEIVED

Odisha Mining Corporation Ltd.
(A Gold Category State PSU)
Registered Office : OMC House, Bhubaneswar - 751001, India
Tel : 0674-2377400/2377401, Fax : 0674-2396889, 2391629, www.omcltd.in
CIN : U13100OR1956SGC000313

File No.: J-11015/439/2007-IA.II(M)
Government of India
Ministry of Environment, Forest and Climate Change
IA Division
****

Dated **15/04/2025**

To,

Mr. Debendra Kumar Nanda
M/s. ODISHA MINING CORPORATION LIMITED
OMC House, Post Box No. 34, Bhubaneswar, KHORDHA, ODISHA, Adjacent to Odisha legislative Assembly, 751001
parivesh@odishamining.in

Subject: **Expansion of Kodingamali Bauxite Mine with enhancement in Production Capacity from 3.0 MTPA to 3.6 MTPA (Phase I - 20%) in the Mine Lease area of 428.075ha by M/s Odisha Mining Corporation Limited located at Village Kodingamali, Tehsil Laxmipur & Kashipur, District Koraput & Rayagada, Odisha under para 7 (ii) (a) of EIA Notification, 2006 as per MoEFCC OM dated 11.04.2022 & 30.05.2022 - For Environmental Clearance reg.**

Sir/Madam,

This is with reference to the online application No. IA/OR/MIN/523482/2025 dated 14.02.2025 submitted to this Ministry for prior Environmental Clearance (EC) under the provisions of the Environmental Impact Assessment (EIA) Notification, 2006, and its subsequent amendments. The application pertains to the proposed expansion of the Kodingamali Bauxite Mine, seeking an increase in production capacity from 3.0 MTPA to 3.6 MTPA (Phase I - 20%) within a mine lease area of 428.075 ha by M/s Odisha Mining Corporation Limited. The project is located in Village Kodingamali, Tehsil Laxmipur & Kashipur, Districts Koraput & Rayagada, Odisha, and is being considered under para 7(ii)(a) of the EIA Notification, 2006, in accordance with the Ministry's Office Memoranda dated 11.04.2022 and 30.05.2022.

2. The particulars of the proposal are as below :

(i) EC Identification No.	EC25A0000OR5363980N
(ii) File No.	J-11015/439/2007-IA.II(M)
(iii) Clearance Type	Fresh EC
(iv) Category	A
(v) Project/Activity Included Schedule No.	1(a) Mining of minerals
(vi) Sector	Non-Coal Mining
(vii) Name of Project	Kodingamali Bauxite Mine (ML Area: 428.075 ha) with Expansion in Bauxite Production Capacity

	from 3.0 Million TPA to 3.6 Million TPA (Phase I - 20%) at Village: Kodingamali, Tehsil: Laxmipur & Kashipur, District- Koraput & Rayagada, Odisha under Para 7 (ii) (a) of EIA Notification, 2006 as per MoEFCC OM dated 11.04.2022 & 30.05.2022 of M/s. Odisha Mining Corporation Limited.
(ix) Location of Project (District, State)	KORAPUT, ODISHA
(x) Issuing Authority	MoEF&CC
(xii) Applicability of General Conditions	No

3. In view of the particulars given in the Para 1 above, the project proposal *interalia* including Form-2 (Part A, B and C)/ EIA & EMP Reports were submitted to the MoEF&CC for an appraisal by the EAC under the provision of EIA notification 2006 and its subsequent amendments.

4. The above-mentioned proposal has been considered by EAC in the meeting held on 27/02/2025. The minutes of the meeting and all the project documents are available on PARIVESH portal which can be accessed from the PARIVESH portal by scanning the QR Code above.

5. Observation and Recommendation of the Committee: -

The proposal seeks Environmental Clearance under Para 7(ii)(a) of the EIA Notification, 2006, in accordance with the Ministry of Environment, Forest and Climate Change (MoEFCC) Office Memoranda dated 11.04.2022 and 30.05.2022. The project involves the expansion of the Kodingamali Bauxite Mine, with an increase in production capacity from 3.0 MTPA to 3.6 MTPA (Phase I - 20%), within the mine lease area of 428.075 hectares. The project is being undertaken by M/s Odisha Mining Corporation Limited and is located in Village Kodingamali, Tehsil Laxmipur & Kashipur, Districts Koraput & Rayagada, Odisha.

The project falls under Category "A" as per Item 1(a) of the Schedule of the EIA Notification, 2006, pertaining to the "Mining of Minerals."

The project proponent and the consultant presented key site characteristics using a KML file. The site is situated 4.5 km SSE of a State Highway, with Birigurha Village located 800 meters in the eastern direction. The mine lease area spans in two Districts, 406.385 hectares in Koraput and 21.69 hectares in Rayagada. The Singaramba Railway Station lies 3.0 km to the northeast, while the Laxmipur Railway Station is 4.5 km to the southeast. The project proponent has reported the absence of any perennial surface water bodies, streams, or natural drainage channels within the lease area. PP also submitted that there are no National Park, Wild Life Sanctuaries; Biosphere Reserves & Tiger Reserves present within the 10 km study area. However there are 9 Reserved Forests and 11 Protected Forests within 10 km radius study area namely Kodingamali RF, Kodingamali PRF, Champi RF, kendripadar RF, Bamandeba RF, Titigurha RF, Lakshmipur RF, Shankaraha RF, Minapai RF, Lakshmipur PF, Baghamari PF, Sargighati PF, Bagriguma PF, Masimandi PF, Raishila PF, Kakirimali PF, Kelar PF, Baghaparmar PF Kutili P.F & Kutinga P.F (0 to 9.5 km) Patagarha Nadi and Murani Nadi are present in the study area. Apart from these, Patagarha Nala, Baghri Nala, Debagarha Nala and few other Nalas exist within the study area (4.0 to 9.5 km). Stage I & Stage II Forest Clearance was accorded by MoEF&CC over 434.935 ha of forestland (428.075 ha ML + 6.860 ha approach road) vide F. No 8-46/2016-FC dated 25.09.2017

PP further reported that lease deed over an area of 428.075 ha was executed for District Koraput and District Rayagada for a period of 50 years on 10.01.2017. Review of Mining Plan & Progressive Mine Closure Plan for (Bauxite Production Capacity: 6.0 MTPA), approved by IBM, Bhubaneswar Vide letter No. RMP/A/21-ORI/BHU/2021-22/1206, dated 10.11.2021 (Valid up to 2026-27).

To ensure ecological restoration and environmental sustainability, the post-mining land-use plan includes 368.684 hectares of reclaimed excavated area, 8.438 hectares for roads, 25.261 hectares for infrastructure, 4.169 hectares for mineral storage, 3.425 hectares for a mineral separation plant, and 18.098 hectares dedicated to green belt plantation.

Baseline environmental data has been collected for the post-monsoon season (October to December 2024). Ambient Air Quality Monitoring has been conducted for PM10, PM2.5, SO_2, NO_2, and CO. Water quality analysis includes parameters such as pH, Total Hardness, Total Dissolved Solids, Alkalinity, and Chloride for both surface and groundwater. Soil quality assessment covers pH, Organic Matter, Organic Carbon, Nitrogen, Phosphorus, Potassium, and soil texture classification.

The project proponent has stated that the total water requirement for the project is 400 KLD, which will be sourced from surface water (Dharua Nala) as per the permission obtained from the Water Resources Department, Odisha. Additionally, 75 KLD of water will be recycled to promote sustainable water management.

To enhance ecological restoration and biodiversity, the project proponent has undertaken greenbelt and plantation initiatives. Currently, 12.87 hectares have been covered with greenbelt and plantation, with 22,971 saplings planted along the lease periphery and backfilled areas. At the conceptual stage, a total of 147.867 hectares will be developed under greenbelt/plantation, with approximately 360,464 saplings planted at a density of 2,500 saplings per hectare. The total expenditure allocated for the greenbelt and plantation activities is 9.31 crore, with a proposed budget of 1,272.35 lakh. EAC members recommended to complete the remaining safety belt/zone plantation till next monsoon (i.e., till October 2025)

The public hearing for the project was conducted on 27.09.2006, for the existing Environmental Clearance (EC) capacity of 3.0 MTPA.

The Committee has emphasized the adoption of environmentally sustainable mining practices, recommending the use of a combination of ripper dozers and surface miners for the excavation of soft bauxite deposits. Furthermore, the Committee has advised the deployment of advanced mining machinery and minimize drilling and blasting within the mine lease area.

Regarding transportation of mined out mineral, PP submitted that the excavated Bauxite is being/will be transported from mine face to crushers located within the mine lease area by dumpers via haul road. The crushed ore is being/will be transported via Road through Tippers to the Railway siding near Kakriguma (~24.0 km from ML area) from where the ore is being/will be further dispatched from direct selling to the prospective buyers.

The project proponent has submitted a wildlife conservation plan, which was approved by the Office of the Principal Chief Conservator of Forests (Wildlife) & Chief Wildlife Warden, Odisha, on 6th July 2017. The Committee has further stressed the need for enhanced conservation measures to protect elephants identified within or in proximity to the mine lease area. PP further vide email dated 27.02.2025 stated that the above-mentioned plan is under Revision by State Forest Department as per amended Wildlife Protection Act, 2022 and the DFOs of Koraput and Rayagada Forest Divisions have been requested vide letter no. 19033/OMC/F&E/2024 dated 04.11.2024 to expedite the process of approval of the revised Wildlife Conservation Plan.

6. Based on the above discussions and presentation by Project Proponent and the consultant, the EAC **recommended** the proposal of Environmental Clearance under para 7 (ii) (a) of EIA Notification, 2006 as per MoEFCC OM dated 11.04.2022 & 30.05.2022 for expansion of Kodingamali Bauxite Mine with enhancement in Production Capacity of Bauxite from 3.0 MTPA to 3.6 MTPA (Phase I - 20%) and total excavation as approved and renewed by IBM from time to time in the Mine Lease area of 428.075ha by M/s Odisha Mining Corporation Limited located at Village Kodingamali, Tehsil Laxmipur & Kashipur, District Koraput & Rayagada, Odisha subject to the certain specific conditions in addition to the existing standard condition applicable for non-coal mining projects (Annexure - I).

7. The details of the project as per the information submitted by the Project Proponent are enclosed as Annexure (II)

8. The Ministry has examined the proposal in accordance with the provisions of the Environmental Impact Assessment (EIA) Notification, 2006, and its subsequent amendments. Based on the recommendations of the Expert Appraisal Committee (EAC), Environmental Clearance (EC) is hereby granted for the expansion of the Kodingamali Bauxite Mine, enhancing production capacity from 3.0 MTPA to 3.6 MTPA (Phase I - 20%) and total excavation as approved and renewed by IBM from time to time within a mine lease area of 428.075 ha by M/s Odisha Mining Corporation Limited, located at Village Kodingamali, Tehsil Laxmipur & Kashipur, Districts Koraput & Rayagada, Odisha. The clearance is

subject to compliance with the specific conditions prescribed for this project, along with the standard conditions applicable to non-coal mining projects, as detailed in Annexure I.

9. The Environmental Clearance to the aforementioned project is under provisions of EIA Notification, 2006, as amended. It does not tantamount to approvals/consent/permissions etc. required to be obtained under any other Act/Rule/regulation. The Project Proponent is under obligation to obtain approvals /clearances under any other Acts/ Regulations or Statutes, as applicable, to the project.

10. The Ministry reserves the right to stipulate additional conditions, if found necessary at subsequent stages and the project proponent shall implement all the said conditions in a time bound manner. The Ministry may revoke or suspend the environmental clearance, if implementation of any of the above conditions is not found satisfactory.

11. The above conditions will be enforced, inter-alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, the Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2016 and the Public Liability Insurance Act, 1991 read with subsequent amendments therein.

12. The PP is under obligation to implement commitments made in the Environment Management Plan, which forms part of this EC.

13. General Instructions:

a. The project proponent shall prominently advertise it at least in two local newspapers of the District or State, of which one shall be in the vernacular language within seven days indicating that the project has been accorded environment clearance and the details of MoEF&CC/ SEIAA website where it is displayed.

b. The copies of the environmental clearance shall be submitted by the project proponents to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the Government who in turn has to display the same for 30 days from the date of receipt.

c. The project proponent shall have a well laid down environmental policy duly approved by the Board of Directors (in case of Company) or competent authority, duly prescribing standard operating procedures to have proper checks and balances and to bring into focus any infringements/deviation/violation of the environmental/ forest / wildlife norms / conditions.

d. Action plan for implementing EMP and environmental conditions along with responsibility matrix of the project proponent (during construction phase) and authorized entity mandated with compliance of conditions (during operational phase) shall be prepared. The year wise funds earmarked for environmental protection measures shall be kept in separate account and not to be diverted for any other purpose. Six monthly progress of implementation of action plan shall be reported to the Ministry/Regional Office along with the Six-Monthly Compliance Report.

e. Concealing factual data or submission of false/fabricated data may result in revocation of this environmental clearance and attract action under the provisions of Environment (Protection) Act, 1986.

f. The Regional Office of this Ministry shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information/monitoring reports.

g. Any appeal against this EC shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

h. PP needs to comply the OM dated 24.07.2024 of MoEFCC, where it is stated that the plantation of saplings shall be carried out in the earmarked 33% greenbelt area as part of the tree plantation campaign " EK Ped Ma ke Naam" (एक पेड़ माँ के नाम (and the details of the same shall be uploaded in the MeriLife portal (https://merilife.nic.in).

14. This issues with the approval of the Competent Authority.

Copy To

i. **The Secretary,** Ministry of Mines, Government of India Shastri Bhawan, New Delhi.
ii. **The Chief Secretary,** Government of Odisha, Secretariat, Bhubaneswar.
iii. **The Secretary,** Department of Environment, Government of Odisha, Secretariat, Bhubaneswar.
iv. **The Secretary,** Department of Mines and Geology, Government of Odisha, Secretariat, Bhubaneswar.
v. **The Secretary,** Department of Forests, Government of Odisha, Secretariat, Bhubaneswar.
vi. **The Secretary,** Department of Steel and Mines, Government of Odisha, Secretariat, Bhubaneswar.
vii. **The Member Secretary,** Odisha Pollution Control Board, Parivesh Bhawan, A/118 Nilakantha Nagar, Unit-VIII, Bhubaneswar-751012.
viii. **The Deputy Director General of Forests (C),** Ministry of Environment, Forest and Climate Change, Regional Office, A/3, Chandersekharpur, Bhubaneswar – 751023.
ix. **The Chief Wildlife Warden,** Prakurti Bhawan, 5th floor, BDA Apartment, Nilakanthanagar, Nayapalli, Bhubaneswar-751012, Odisha.
x. **The Chairman,** Central Pollution Control Board, Parivesh Bhawan, CBD-Cum-Office Complex, East Arjun Nagar, New Delhi-110 032.
xi. **The Controller General,** Indian Bureau of Mines, Indira Bhavan, Civil Lines, Nagpur-440001.
xii. **The Member Secretary,** Central Ground Water Board, Ministry of Agriculture and Irrigation, 12/1 Jam Nagar House, Shahjahan road, New Delhi 110011.
xiii. **Director General,** Directorate General of Mines Safety, Hirapur, Dhanbad, Jharkhand, 826001
xiv. **The District Collector,** Koraput District, Govt. of Odisha.
xv. **The District Collector,** Rayagada District, Govt. of Odisha.
xvi. **Guard File.**
xvii. **PARIVESH Portal.**

Annexure 1

Specific EC Conditions for (Mining Of Minerals)

1. Specific Conditions

S. No	EC Conditions
1.1	PP needs to explore mining/excavation with the help of ripper dozer, surface miner within the ML area to excavate the Bauxite so that drilling and blasting is minimized. PP should submit the study report for the feasibility of using ripper dozer, surface miner in this project to Regional Office in its six-monthly compliance report.
1.2	PP should consult with State Forest department with respect to the protection and conservation the elephant cited within/near to ML area in order to avoid any human-wildlife conflict.
1.3	PP needs to submit the latest approved wildlife conservation plan after incorporating the provisions for conservation of Elephant within 6 months from the date of issuance of the EC. PP should follow up the implementation of the Wildlife Conservation Plan with the State Forest Department and submit an implementation report to Ministry's Regional office on half-yearly basis.
1.4	PP shall organize community awareness programs in local villages to educate residents about co-

S. No	EC Conditions
	existing with elephants and preventing human-wildlife conflicts. Emergency response teams comprising local community members and experts shall be established to handle Human-Elephant Conflict situations effectively.
1.5	The natural water bodies and or streams which are flowing in and around the mine lease area should not be disturbed. PP shall consult state Water Resource department and SPCB regarding Nallah/Stream and follow their instructions for the safeguards. Implementation status of this condition should be communicated to Regional Office, Bhubaneswar. Check dams, gabion structures should be constructed in consultation with State Forest Department to prevent any silt flow in the natural stream/nallahs around the mine lease area.
1.6	PP shall carryout the blasting in a controlled manner such that the direction of the blasting should be perpendicular to the village/ habitations. PP needs to strictly adhere to MMR (Metalliferous Mines Regulation) 1961 / DGMS guidelines for undertaking blasting activity so that safety is ensured and chances of ground vibration and overpressure are minimized. PP shall ensure that there is no damage to the nearby villagers due to blasting and their houses.
1.7	The Project Proponent shall continue to monitor the air quality, noise level, water quality, water level and ground vibration during drilling and blasting at the edge of the mine, near the village, at crusher and at other sensitive receptors and such collected data shall be submitted quarterly to the Ministry's Regional Office
1.8	The Project Proponent should install Continuous Ambient Air Quality Monitoring Stations (CAAQMS) as per the scientific study and in consultation with CPCB/SPCB. The real time data so generated should be displayed digitally at entry and exit gate of mine lease area for public display and shall be linked to server of CPCB/SPCB.
1.9	The Project Proponent needs to use modern equipment's such as Camera Traps for ensuring presence and movement of wild animals in the study area in consultation with Wildlife Wing of Forest Department. Appropriate interventions shall be taken to minimise stress conditions for wild animals and to avoid Man-Animal conflict.
1.10	The Project Proponent shall take adequate measures to prevent the pilferage of mineral. The Project Proponent needs to implement all possible mitigation measures while transporting the mineral by Road. Tarpaulins covered trucks should be used to prevent spillage and emission of dust. Mechanically covered trucks should also be explored. Operators, Supervisors, contractor personal should be properly trained on environmental aspects of Ore/waste spillage and resultant air and water pollution. Record of above training of the personal, supervisor/officials should be submitted to Regional office of MoEF&CC.
1.11	The Project Proponent needs to install the permanent water sprinklers in addition to mobile water tankers along the haul road and the approach road. Further, 6 nos. of fog canon/mist sprayer of atleast 40 m throw shall be installed at various locations in the mine area. Effective dust suppression system shall also be adopted at other parts of the mining lease to arrest the fugitive dust emission.
1.12	The Project Proponent shall explore the possibility of using atleast 20% of Electric vehicles/CNG/Solar instead of diesel operation within three years.
1.13	The air pollution control equipment like bag filters, vacuum suction hoods, dry fogging system etc. shall be installed at areas prone to air pollution. PP shall take necessary measures to avoid

S. No	EC Conditions
	generation of fugitive dust emissions.
1.14	The Project Proponent should adopt the proper mitigation measures as proposed under EMP. The adoption of mitigation measures and monitoring of the same as proposed in the EMP shall be done under the supervision of the qualified environmental personnel. The implementation status of the same shall be submitted to the Ministry's Regional Office.
1.15	The Project Proponent should establish in house (at project site) environment laboratory for measurement of environment parameter with respect to air quality and water (surface and ground). A dedicated team to oversee environment management shall be setup at site which should comprise of Environment Engineers, Laboratory chemist and staff for monitoring of air, water quality parameters on routine basis instead of engaging environment monitoring laboratories/consultants. Any non-compliance or infringement should be reported to the concerned authority.
1.16	The Project Proponent shall conduct third party audit of compliance of EC condition at an interval one year and its report shall be submitted to RO, MoEF&CC.
1.17	The Project Proponent shall ensure the survival rate of 95% for planting the gap plantation and new plantation. The Project Proponent shall make the actual count on the saplings planted and its survival rate and in case of failure of achievement of 95% survival rate, action plan for achieving the target survival rate shall be submitted to the Ministry's Regional Office. Density of plantation should be 2500 plants/ ha. PP shall make provision for drip irrigation to conserve the water. PP should plant fruit bearing trees along with Sal and allied species within the ML area and also distribute fruit saplings to the local villagers during monsoon. PP should complete the remaining safety zone plantation till next monsoon (i.e., till October 2025).
1.18	To address the concerns raised by the public in the public hearing, PP should complete its public hearing commitments. PP shall comply with all action plans made for public hearing concerns and make regular maintenance and record the progressive activity outcomes. The Project proponent shall ensure that the activities proposed under the public hearing is different from the CSR activities.
1.19	The Project Proponent needs to provide the good quality drinking water supply by laying network of pipelines to the nearby village namely Kodingamali at free of cost.
1.20	The Project Proponent shall provide the rainwater harvesting structure at mine offices and quarters/colonies to recharge the ground water. Consultation in this regard shall be done by CGWA/SGWB. Piezometer should be installed in the project till the end of the year 2025. PP should submit water level readings of the well in the surrounding villages. Year wise fluctuations of the ground water levels in the surrounding wells and season wise data should also be furnished to Regional office.
1.21	PP needs to construct sedimentation ponds, check dam, gabion structures, retaining wall, catch drains, etc., bond the dumps (OB, Ore, top soil) to prevent any silt flow outside.
1.22	The Project Proponent shall also organize employment-based apprenticeship/ internship training program every year with appropriate stipend for the youth and other programs to enhance the skill of the local people. The data should be maintained for the training imparted to the persons and the outcome of the training, for the assessment of the training program should be analyzed periodically and improved accordingly.

S. No	EC Conditions
1.23	The Project Proponent should periodically monitor and maintain the health records of the mineworkers digitally prior to mining operations, at the time of operation of mine and post mining operations. Regular surveillance shall be carried through regular occupational health check-up every year for mine workers. PP shall also organize medical camp for the benefit of the local people and also monitor the health impacts due to mining activity.
1.24	The mobile water tankers should be used in the ML area for dust suppression and control. A logbook of water tankers should be maintained mentioning running hours, kilometer reading, maintenance hours of water tankers for each shift. Copy of logbook should be submitted to Regional Office of MoEF&CC. PP shall use non-toxic chemicals for dust suppression in order to reduce the total water requirement.
1.25	The Project Proponent should take adequate measures to prevent the fly rock falling onto the nearby habitations and also the Project Proponent needs to set up a permanent monitoring in the nearby village to monitor the blast induced ground vibration and air over pressure.
1.26	The Project Proponent needs to reduce the dependency upon the ground water, surface water (water from rivers, etc.) and it shall construct water reservoirs within the lease area for meeting its day-to-day water needs. An implementation report in this regard needs to submitted to Ministry's Regional Office. PP needs to reduce water consumption by 20% from present level.
1.27	The Project Proponent shall ensure that the transportation shall not occur through village road.
1.28	The mining lease holders shall, after ceasing mining operations, undertake regrassing the mining area and any other area which may have been disturbed due to their mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc. The implementation report of the above said condition shall be submitted to the Ministry's Regional Office.
1.29	Approval/permission of the CGWA/SGWA shall be obtained before drawing ground water for the project activities, if applicable. State Pollution Control Board (SPCB) concerned shall not issue Consent to Operate (CTO) till the project proponent obtains such permission.
1.30	Project proponent shall take necessary other clearances/permissions under various Acts and Rules, if any, from the respective authorities / department.
1.31	PP shall consult State Forest Department and Chief Wildlife Warden about the additional steps to be taken for conservation and free movement of Elephants near the Mine Lease area.
1.32	PP should utilise the Oil & Grease Trap/ETP for washing of trucks, HEMM operational in their mine project. Disposal of the used oil & drums should be through authorised recyclers and as per rules. Copy of logbook of Oil withdrawn from Oil & Grease Trap should be submitted to the Regional Office of the Ministry.
1.33	PP needs to comply the OM dated 24.07.2024 of MoEFCC, wherein it is stated that the plantation of saplings shall be carried out in the earmarked 33% greenbelt area as part of the tree plantation campaign " EK Ped Ma ke Naam" (एकपेड़माँकेनाम) and the details of the same shall be uploaded in the Meri Life portal(https://merilife.nic.in).
1.34	PP shall ensure that all type of plastic waste generated from the mines shall be stored separately in isolated area and disposed of strictly adhering to the Plastic Waste Management Rules 2016. In

S. No	EC Conditions
	pursuant to Ministry's OM dated 18/07/2022, PP shall also create awareness among the people working in the project area as well as in its surrounding area on the ban on Single Use Plastic (SUP) in order to ensure compliance of Ministry's Notification published by the Ministry on 12/08/2021. A report along with photograph on the measures taken shall also be included in the six monthly compliance report.

Standard EC Conditions for (Mining of minerals)

1.

S. No	EC Conditions
1.1	The Project Proponent shall carryout plantation/ afforestation in backfilled and reclaimed area of mining lease, around water body, along the roadsides, in community areas etc. by planting the native species in consultation with the State Forest Department/ Agriculture Department/ Rural development department/ Tribal Welfare Department/ Gram Panchayat such that only those species be selected which are of use to the local people. The CPCB guidelines in this respect shall also be adhered. The density of the trees should be around 2500 saplings per Hectare. Adequate budgetary provision shall be made for protection and care of trees.
1.2	The Project Proponent shall make necessary alternative arrangements for livestock feed by developing grazing land with a view to compensate those areas which are coming within the mine lease. The development of such grazing land shall be done in consultation with the State Government. In this regard, Project Proponent should essentially implement the directions of the Hon'ble Supreme Court with regard to acquisition of grazing land. The sparse trees on such grazing ground, which provide mid-day shelter from the scorching sun, should be scrupulously guarded/ protected against felling and plantation of such trees should be promoted.

2. Statutory Compliance

S. No	EC Conditions
2.1	The project proponent shall obtain authorization under the Hazardous and other Waste Management Rules, 2016 as amended from time to time.
2.2	The Project Proponent shall follow the mitigation measures provided in MoEFCC's Office Memorandum No. Z-11013/57/2014-IA.II (M), dated 29th October, 2014, titled "Impact of mining activities on Habitations-Issues related to the mining Projects wherein Habitations and villages are the part of mine lease areas or Habitations and villages are surrounded by the mine lease area."
2.3	The Project proponent complies with all the statutory requirements and judgment of Hon'ble Supreme Court dated 2nd August, 2017 in Writ Petition (Civil) No. 114 of 2014 in matter of Common Cause versus Union of India &Ors before commencing the mining operations.
2.4	The State Government concerned shall ensure that mining operation shall not be commenced till the entire compensation levied, if any, for illegal mining paid by the Project Proponent through their respective Department of Mining & Geology in strict compliance of Judgment of Hon'ble Supreme Court dated 2nd August, 2017 in Writ Petition (Civil) No. 114 of 2014 in matter of Common Cause versus Union of India & Ors.

S. No	EC Conditions
2.5	The Project Authorities should widely advertise about the grant of this EC letter by printing the same in at least two local newspapers, one of which shall be in vernacular language of the concerned area. The advertisement shall be done within 7 days of the issue of the clearance letter mentioning that the instant project has been accorded EC and copy of the EC letter is available with the State Pollution Control Board/Committee and web site of the Ministry of Environment, Forest and Climate Change (www.parivesh.nic.in). A copy of the advertisement may be forwarded to the concerned MoEFCC Regional Office for compliance and record.
2.6	State Pollution Control Board/Committee shall be responsible for display of this EC letter at its Regional office, District Industries Centre and Collector's office/ Tehsildar's Office for 30 days.
2.7	A copy of EC letter will be marked to concerned Panchayat / local NGO etc. if any, from whom suggestion / representation has been received while processing the proposal.
2.8	The project proponent shall obtain Consent to Establish / Operate under the provisions of Air (Prevention & Control of Pollution) Act, 1981 and the Water (Prevention & Control of Pollution) Act, 1974 from the concerned State Pollution Control Board/ Committee.
2.9	The project proponent shall prepare a Site-Specific Conservation Plan & Wildlife Management Plan and approved by the Chief Wildlife Warden. The recommendations of the approved Site-Specific Conservation Plan / Wildlife Management Plan shall be implemented in consultation with the State Forest Department. The implementation report shall be furnished along with the six-monthly compliance report. (in case of the presence of Schedule-I species in the study area).
2.10	The project proponent shall obtain clearance from the National Board for Wildlife, if applicable.
2.11	The project proponent shall obtain forest clearance under the provisions of Forest (Conservation) Act, 1986, in case of the diversion of forest land for non-forest purpose involved in the project.
2.12	This Environmental Clearance (EC) is subject to orders/ judgment of Honble Supreme Court of India, Honble High Court, Honble NGT and any other Court of Law, Common Cause Conditions as may be applicable.
2.13	The project proponent shall obtain the necessary permission from the Central Ground Water Authority, in case of drawl of ground water / from the competent authority concerned in case of drawl of surface water required for the project.
2.14	The Project Proponent shall inform the MoEF&CC for any change in ownership of the mining lease. In case there is any change in ownership or mining lease is transferred. PP needs to apply for transfer of EC as per provisions of the para 11 of EIA Notification, 2006 as amended from time to time.

3. Air Quality Monitoring And Preservation

S. No	EC Conditions
3.1	The project proponent shall install system to carryout Continuous Ambient Air Quality monitoring for common/criterion parameters relevant to the main pollutants released (e.g., PM10 and PM2.5 in reference to PM emission, and SO2 and NOx in reference to S02 and NOx emissions) within and

S. No	EC Conditions
	outside the plant area at least at four locations (one within and three outside the plant area at an angle of 120 each).covering upwind and downwind directions.
3.2	The Project Proponent shall install a minimum of 3 (three) online Ambient Air Quality Monitoring Stations with 1 (one) in upwind and 2 (two) in downwind direction based on long term climatological data about wind direction such that an angle of 120° is made between the monitoring locations to monitor critical parameters, relevant for mining operations, of air pollution viz. PM10, PM2.5, NO2, CO and SO2 etc. as per the methodology mentioned in NAAQS Notification No. B-29016/20/90/PCI/I, dated 18.11.2009 covering the aspects of transportation and use of heavy machinery in the impact zone. The ambient air quality shall also be monitored at prominent places like office building, canteen etc. as per the site condition to ascertain the exposure characteristics at specific places. The above data shall be digitally displayed within 03 months in front of the main Gate of the mine site.
3.3	Design the ventilation system for adequate air changes as per ACGIH document for all tunnels, motor houses, Oil Cellars.
3.4	The project proponent shall monitor fugitive emissions in the plant premises at least once in every quarter through labs recognised under Environment (Protection) Act, 1986. 9) The project proponent shall install system to carryout Continuous Ambient Air Quality monitoring for common/criterion parameters relevant to the main pollutants released (e.g., PM10 and PM2.5 in reference to PM emission, and SO2 and NOx in reference to S02 and NOx emissions) within and outside the plant area at least at four locations (one within and three outside the plant area at an angle of 120 each). covering upwind and downwind directions.
3.5	Effective safeguard measures for prevention of dust generation and subsequent suppression (like regular water sprinkling, metalled road construction etc.) shall be carried out in areas prone to air pollution wherein high levels of PM10 and PM2.5 are evident such as haul road, loading and unloading point and transfer points. The Fugitive dust emissions from all sources shall be regularly controlled by installation of required equipments/ machineries and preventive maintenance. Use of suitable water-soluble chemical dust suppressing agents may be explored for better effectiveness of dust control system. It shall be ensured that air pollution level conform to the standards prescribed by the MoEFCC/ Central Pollution Control Board.
3.6	The project proponent shall install 24x7 continuous emission monitoring system at process stacks to monitor stack emission with respect to standards prescribed in Environment (Protection) Rules 1986 as amended from time to time and connected to SPCB and CPCB online servers and calibrate these system from time to time according to equipment supplier specification through labs recognised under Environment (Protection) Act, 1986 or NABL accredited laboratories. Monitor fugitive emissions in the plant premises.
3.7	Appropriate Air Pollution Control (APC) system shall be provided for all the dust generating points including fugitive dust from all vulnerable sources, so as to comply prescribed stack emission and fugitive emission standards.
3.8	Wind shelter fence and chemical spraying shall be provided on the raw material stock piles.
3.9	The project proponent shall submit monthly summary report of continuous stack emission and air quality monitoring and results of manual stack monitoring and manual monitoring of air quality /fugitive emissions to Regional Office of MoEF&CC, Zonal office of CPCB and Regional Office of

S. No	EC Conditions
	SPCB along with six-monthly monitoring report.
3.10	The project proponent use leak proof trucks/dumpers carrying ore and other raw materials and cover them with tarpaulin.

4. Water Quality Monitoring And Preservation

S. No	EC Conditions
4.1	The project proponent shall submit monthly summary report of continuous effluent monitoring and results of manual effluent testing and manual monitoring of ground water quality to Regional Office of MoEF&CC, Zonal office of CPCB and Regional Office of SPCB along with six-monthly monitoring report.
4.2	The project proponent shall install 24x7 continuous effluent monitoring system with respect to standards prescribed in Environment (Protection) Rules 1986 as amended from time to time and connected to SPCB and CPCB online servers and calibrate these system from time to time according to equipment supplier specification through labs recognised under Environment (Protection) Act, 1986 or NABL accredited laboratories.
4.3	The water balance/water auditing shall be carried out and measure for reducing the consumption of water shall be taken up and reported to the Regional Office of the MoEF&CC and State Pollution Control Board/Committee.
4.4	In case, immediate mining scheme envisages intersection of ground water table, then Environmental Clearance shall become operational only after receiving formal clearance from CGWA. In case, mining operation involves intersection of ground water table at a later stage, then PP shall ensure that prior approval from CGWA and MoEFCC is in place before such mining operations. The permission for intersection of ground water table shall essentially be based on detailed hydro-geological study of the area.
4.5	The Project Proponent shall undertake regular monitoring of natural water course/ water resources/ springs and perennial nallahs existing/ flowing in and around the mine lease including upstream and downstream. Sufficient number of gullies shall be provided at appropriate places within the lease for management of water. The parameters to be monitored shall include their water quality vis-à-vis suitability for usage as per CPCB criteria and flow rate. It shall be ensured that no obstruction and/ or alteration be made to water bodies during mining operations without justification and prior approval of MoEFCC. The monitoring of water courses/ bodies existing in lease area shall be carried out four times in a year viz. pre- monsoon (April May), monsoon (August), post-monsoon (November) and winter (January) and the record of monitored data may be sent regularly to Ministry of Environment, Forest and Climate Change and its Regional Office, Central Ground Water Authority and Regional Director, Central Ground Water Board, State Pollution Control Board and Central Pollution Control Board. Clearly showing the trend analysis on six-monthly basis.
4.6	Sewage Treatment Plant shall be provided for treatment of domestic wastewater to meet the prescribed standards.
4.7	The project proponent shall practice rainwater harvesting to maximum possible extent.

S. No	EC Conditions
4.8	Project Proponent shall plan, develop and implement rainwater harvesting measures on long term basis to augment ground water resources in the area in consultation with Central Ground Water Board/ State Groundwater Department. A report on amount of water recharged needs to be submitted to Regional Office MoEFCC annually.
4.9	The project proponent shall monitor regularly ground water quality at least twice a year (pre and post monsoon) at sufficient numbers of piezometers/sampling wells in the plant and adjacent areas through labs recognised under Environment (Protection) Act, 1986 and NABL accredited laboratories.
4.10	The project proponent shall provide the slime disposal facility with impervious lining and collection wells for seepage. The water collected from the slime pond shall be treated and recycled.
4.11	Adhere to Zero Liquid Discharge
4.12	Garland drains and collection pits shall be provided for each stock pile to arrest the run-off in the event of heavy rains and to check the water pollution due to surface run off.
4.13	Industrial waste water (workshop and waste water from the mine) should be properly collected and treated so as to conform to the notified standards prescribed from time to time. The standards shall be prescribed through Consent to Operate (CTO) issued by concerned State Pollution Control Board (SPCB). The workshop effluent shall be treated after its initial passage through Oil and grease trap.
4.14	Project Proponent shall regularly monitor and maintain records w.r.t. ground water level and quality in and around the mine lease by establishing a network of existing wells as well as new piezo-meter installations during the mining operation in consultation with Central Ground Water Authority/ State Ground Water Department. The Report on changes in Ground water level and quality shall be submitted on six-monthly basis to the Regional Office of the Ministry, CGWA and State Groundwater Department / State Pollution Control Board.
4.15	The project proponent shall make efforts to minimise water consumption in the steel plant complex by segregation of used water, practicing cascade use and by recycling treated water.
4.16	Quality of polluted water generated from mining operations which include Chemical Oxygen Demand (COD) in mines run-off; acid mine drainage and metal contamination in runoff shall be monitored along with Total Suspended Solids (TDS), Dissolved Oxygen (DO), pH and Total Suspended Solids (TSS). The monitored data shall be uploaded on the website of the company as well as displayed at the project site in public domain, on a display board, at a suitable location near the main gate of the Company. The circular No. J- 20012/1/2006-IA.II (M) dated 27.05.2009 issued by Ministry of Environment, Forest and Climate Change may also be referred in this regard.

5. Noise And Vibration Monitoring And Prevention

S. No	EC Conditions
5.1	The illumination and sound at night at project sites disturb the villages in respect of both human and animal population. Consequent sleeping disorders and stress may affect the health in the villages located close to mining operations. Habitations have a right for darkness and minimal noise levels at night. PPs must ensure that the biological clock of the villages is not disturbed; by orienting the

S. No	EC Conditions
	floodlights/ masks away from the villagers and keeping the noise levels well within the prescribed limits for day /night hours.
5.2	The peak particle velocity at 500m distance or within the nearest habitation, whichever is closer shall be monitored periodically as per applicable DGMS guidelines.
5.3	The Project Proponent shall take measures for control of noise levels below 85 dBA in the work environment. The workers engaged in operations of HEMM, etc. should be provided with ear plugs /muffs. All personnel including laborers working in dusty areas shall be provided with protective respiratory devices along with adequate training, awareness and information on safety and health aspects. The PP shall be held responsible in case it has been found that workers/ personals/ laborers are working without personal protective equipment.

6. Noise Monitoring And Prevention

S. No	EC Conditions
6.1	Noise level survey shall be carried as per the prescribed guidelines and report in this regard shall be submitted to Regional Officer of the Ministry as a part of six-monthly compliance report.
6.2	The ambient noise levels should conform to the standards prescribed under E(P)A Rules, 1986 viz. 75 dB(A) during day time and 70 dB(A) during night time.

7. Energy Conservation Measures

S. No	EC Conditions
7.1	Provide solar power generation on roof tops of buildings, for solar light system for all common areas, street lights, parking around project area and maintain the same regularly;
7.2	Provide LED lights in their offices and residential areas.

8. Mining Plan

S. No	EC Conditions
8.1	The Project Proponent shall adhere to approved mining plan, inter alia, including, total excavation (quantum of mineral, waste, over burden, inter burden and top soil etc.); mining technology; lease area; scope of working (method of mining, overburden & dump management, O.B& dump mining, mineral transportation mode, ultimate depth of mining, concurrent reclamation and reclamation at mine closure; land-use of the mine lease area at various stages of mining scheme as well as at the end-of-life; etc.).
8.2	The land-use of the mine lease area at various stages of mining scheme as well as at the end-of-life shall be governed as per the approved Mining Plan. The excavation vis-à-vis backfilling in the mine lease area and corresponding afforestation to be raised in the reclaimed area shall be governed as per approved mining plan. PP shall ensure the monitoring and management of rehabilitated areas until the vegetation becomes self-sustaining. The compliance status shall be submitted half-yearly to

S. No	EC Conditions
	the MoEFCC and its concerned Regional Office.

9. Waste Management

S. No	EC Conditions
9.1	Kitchen waste shall be composted or converted to biogas for further use.(to be decided on case to case basis depending on type and size of plant)
9.2	The waste oil, grease and other hazardous waste shall be disposed of as per the Hazardous & Other waste (Management & Transboundary Movement) Rules, 2016.

10. Land Reclamation

S. No	EC Conditions
10.1	Check dams of appropriate size, gradient and length shall be constructed around mine pit and OB dumps to prevent storm run-off and sediment flow into adjoining water bodies. A safety margin of 50% shall be kept for designing of sump structures over and above peak rainfall (based on 50 years data) and maximum discharge in the mine and its adjoining area which shall also help in providing adequate retention time period thereby allowing proper settling of sediments/ silt material. The sedimentation pits/ sumps shall be constructed at the corners of the garland drains.
10.2	Catch drains, settling tanks and siltation ponds of appropriate size shall be constructed around the mine working, mineral yards and Top Soil/OB/Waste dumps to prevent run off of water and flow of sediments directly into the water bodies (Nallah/ River/ Pond etc.). The collected water should be utilized for watering the mine area, roads, green belt development, plantation etc. The drains/ sedimentation sumps etc. shall be de-silted regularly, particularly after monsoon season, and maintained properly.
10.3	The Overburden (O.B.), waste and topsoil generated during the mining operations shall be stacked at earmarked OB dump site(s) only and it should not be kept active for a long period of time. The physical parameters of the OB / waste dumps / topsoil dump like height, width and angle of slope shall be governed as per the approved Mining Plan and the guidelines/circulars issued by D.G.M.S. The topsoil shall be used for land reclamation and plantation.
10.4	The slope of dumps shall be vegetated in scientific manner with suitable native species to maintain the slope stability, prevent erosion and surface run off. The selection of local species regulates local climatic parameters and help in adaptation of plant species to the microclimate. The gullies formed on slopes should be adequately taken care of as it impacts the overall stability of dumps. The dump mass should be consolidated with the help of dozer/ compactors thereby ensuring proper filling/ leveling of dump mass. In critical areas, use of geo textiles/ geo-membranes / clay liners / Bentonite etc. shall be undertaken for stabilization of the dump.

11. Transportation

S. No	EC Conditions
11.1	No Transportation of the minerals shall be allowed in case of roads passing through villages/ habitations. In such cases, PP shall construct a 'bypass' road for the purpose of transportation of the minerals leaving an adequate gap (say at least 200 meters) so that the adverse impact of sound and dust along with chances of accidents could be mitigated. All costs resulting from widening and strengthening of existing public road network shall be borne by the PP in consultation with nodal State Govt. Department. Transportation of minerals through road movement in case of existing village/ rural roads shall be allowed in consultation with nodal State Govt. Department only after required strengthening such that the carrying capacity of roads is increased to handle the traffic load. The pollution due to transportation load on the environment will be effectively controlled and water sprinkling will also be done regularly. Vehicular emissions shall be kept under control and regularly monitored. Project should obtain Pollution Under Control (PUC) certificate for all the vehicles from authorized pollution testing centers. [If applicable in case of road transport].
11.2	The Main haulage road within the mine lease should be provided with a permanent water sprinkling arrangement for dust suppression. Other roads within the mine lease should be wetted regularly with tanker-mounted water sprinkling system. The other areas of dust generation like crushing zone, material transfer points, material yards etc. should invariably be provided with dust suppression arrangements. The air pollution control equipments like bag filters, vacuum suction hoods, dry fogging system etc. shall be installed at Crushers, belt-conveyors and other areas prone to air pollution. The belt conveyor should be fully covered to avoid generation of dust while transportation. PP shall take necessary measures to avoid generation of fugitive dust emissions.

12. Green Belt And Emp

S. No	EC Conditions
12.1	Green belt shall be developed in an area equal to 33% of the plant area with a native tree species in accordance with CPCB guidelines. The greenbelt shall inter alia cover the entire periphery of the plant
12.2	The project proponent shall prepare GHG emissions inventory for the plant and shall submit the programme for reduction of the same including carbon sequestration including plantation.

13. Public Hearing And Human Health Issues

S. No	EC Conditions
13.1	Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.
13.2	Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, creche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.
13.3	Emergency preparedness plan based on the Hazard identification and Risk Assessment (HIRA) and Disaster Management Plan shall be implemented.

S. No	EC Conditions
13.4	The project proponent shall carry out heat stress analysis for the workmen who work in high temperature work zone and provide Personal Protection Equipment (PPE) as per the norms of Factory Act.
13.5	Project Proponent shall make provision for the housing for workers/labors or shall construct labor camps within/outside (company owned land) with necessary basic infrastructure/ facilities like fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche for kids etc. The housing may be provided in the form of temporary structures which can be removed after the completion of the project related infrastructure. The domestic waste water should be treated with STP in order to avoid contamination of underground water.

14. Green Belt

S. No	EC Conditions
14.1	The Project Proponent shall develop greenbelt in 7.5m wide safety zone all along the mine lease boundary as per the guidelines of CPCB in order to arrest pollution emanating from mining operations within the lease. The whole Green belt shall be developed within first 5 years starting from windward side of the active mining area. The development of greenbelt shall be governed as per the EC granted by the Ministry irrespective of the stipulation made in approved mine plan.

15. Corporate Environment Responsibility

S. No	EC Conditions
15.1	Action plan for implementing EMP and environmental conditions along with responsibility matrix of the company shall be prepared and shall be duly approved by competent authority. The year wise funds earmarked for environmental protection measures shall be kept in separate account and not to be diverted for any other purpose. Year wise progress of implementation of action plan shall be reported to the Ministry/Regional Office along with the Six Monthly Compliance Report.
15.2	Self-environmental audit shall be conducted annually. Every three years third party environmental audit shall be carried out.
15.3	The company shall have a well laid down environmental policy duly approve by the Board of Directors. The environmental policy should prescribe for standard operating procedures to have proper checks and balances and to bring into focus any infringements/deviation/violation of the environmental / forest /wildlife norms/ conditions. The company shall have defined system of reporting infringements / deviation / violation of the environmental / forest I wildlife norms / conditions and / or shareholders / stake holders. The copy of the board resolution in this regard shall be submitted to the MoEF&CC as a part of six-monthly report.
15.4	All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Mineral Beneficiation plants shall be implemented.
15.5	The Project Proponent shall submit the time- bound action plan to the concerned regional office of the Ministry within 6 months from the date of issuance of environmental clearance for undertaking the activities committed during public consultation by the project proponent and as discussed by the EAC, in terms of the provisions of the MoEF&CC Office Memorandum No.22-65/2017-IA.III

S. No	EC Conditions
	dated 30 September, 2020. The action plan shall be implemented within three years of commencement of the project.
15.6	A separate Environmental Cell both at the project and company head quarter level, with qualified personnel shall be set up under the control of senior Executive, who will directly to the head of the organization.

16. Corporate Environment Responsibility (Cer)

S. No	EC Conditions
16.1	The Project Proponent shall submit the time- bound action plan to the concerned regional office of the Ministry within 6 months from the date of issuance of environmental clearance for undertaking the activities committed during public consultation by the project proponent and as discussed by the EAC, in terms of the provisions of the MoEF&CC Office Memorandum No.22-65/2017-IA.III dated 30 September, 2020. The action plan shall be implemented within three years of commencement of the project.

17. Miscellaneous

S. No	EC Conditions
17.1	The project proponent shall submit the environmental statement for each financial year in Form-V to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently and put on the website of the company.
17.2	The project authorities must strictly adhere to the stipulations made by the State Pollution Control Board and the State Government.
17.3	The project proponent shall abide by all the commitments and recommendations made in the EIA/EMP report, commitment made during Public Hearing and also that during their presentation to the Expert Appraisal Committee.
17.4	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MoEF&CC).
17.5	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and update the same on half-yearly basis.
17.6	The project proponent shall submit six-monthly reports on the status of the compliance of the stipulated environmental conditions on the website of the ministry of Environment, Forest and Climate Change at environment clearance portal.
17.7	Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

S. No	EC Conditions
17.8	The copies of the environmental clearance shall be submitted by the project proponents to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the Government who in turn has to display the same for 30 days from the date of receipt.
17.9	The project proponent shall make public the environmental clearance granted for their project along with the environmental conditions and safeguards at their cost by prominently advertising it at least in two local newspapers of the District or State, of which one shall be in the vernacular language within seven days and in addition this shall also be displayed in the project proponents website permanently.
17.10	The project proponent shall monitor the criteria pollutants level namely; PM10, S02, NOx (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the projects and display the same at a convenient location for disclosure to the public and put on the website of the company.
17.11	The project proponent shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities, commencing the land development work and start of production operation by the project.
17.12	The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rules made there under and also any other orders passed by the Hon'ble Supreme Court of India/High Court and any other Court of Law relating to the subject matter.
17.13	The Project Authorities should inform to the Regional Office regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.
17.14	The Project Proponent shall prepare digital map (land use & land cover) of the entire lease area once in five years purpose of monitoring land use pattern and submit a report to concerned Regional Office of the MoEF&CC.
17.15	Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.
17.16	In pursuant to Ministrys O.M No 22-34/2018-IA.III dated 16.01.2020 to comply with the direction made by Honble Supreme Court on 8.01.2020 in W.P. (Civil) No 114/2014 in the matter Common Cause vs Union of India, the mining lease holder shall after ceasing mining operations, undertake regrassing the mining area and any other area which may have been disturbed due to other mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc.
17.17	The Project Proponent shall submit six monthly compliance reports on the status of the implementation of the stipulated environmental safeguards to the MOEFCC & its concerned Regional Office, Central Pollution Control Board and State Pollution Control Board.
17.18	The concerned Regional Office of the MoEF&CC shall randomly monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the MoEF&CC officer(s) by furnishing the requisite data / information / monitoring reports.

S. No	EC Conditions
17.19	A separate 'Environmental Management Cell' with suitable qualified manpower should be set-up under the control of a Senior Executive. The Senior Executive shall directly report to Head of the Organization. Adequate number of qualified Environmental Scientists and Mining Engineers shall be appointed and submit a report to RO, MoEF&CC.
17.20	The Ministry or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.
17.21	The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rules made there under and also any other orders passed by the Hon'ble Supreme Court of India/High Court and any other Court of Law relating to the subject matter.
17.22	Concealing factual data failure to comply with any or submission of false/ fabricated data and of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.

Additional EC Conditions

The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rules made there under and also any other orders passed by the Hon'ble Supreme Court of India/High Court and any other Court of Law relating to the subject matter.

Annexure - II

Expansion of Kodingamali Bauxite Mine with enhancement in Production Capacity from 3.0 MTPA to 3.6 MTPA (Phase I - 20%) in the Mine Lease area of 428.075ha by M/s Odisha Mining Corporation Limited located at Village Kodingamali, Tehsil Laxmipur & Kashipur, District Koraput & Rayagada, Odisha.

Details of the Project:

The details of the project as per the document/ information submitted by the Project Proponent is given as under:

i. Project details:

Name of the Proposal	Expansion of Kodingamali Bauxite Mine with enhancement in Production Capacity from 3.0 MTPA to 3.6 MTPA (Phase I - 20%) in the Mine Lease area of 428.075ha by M/s Odisha Mining Corporation Limited located at Village Kodingamali, Tehsil Laxmipur & Kashipur, District Koraput & Rayagada, Odisha under para 7 (ii) (a) of EIA Notification, 2006 as per MoEFCC OM dated 11.04.2022 & 30.05.2022	
Location	Village	Kodingamali
	Tehsil/Taluka	Laxmipur & Kashipur
	District	Koraput & Rayagada
	State / UT	Odisha
	Latitudes	19º01'46" N to 19º05'14" N
	Longitudes	83º03'22" E to 83º05'12" E
	SoI Toposheet No.	Core Zone: E44F4(65M/4) Buffer Zone: E44F4 (65M/4); E44E16 (65I/16); E44K13 (65J/13), E44L1 (65N/1)
Company's Name	Odisha Mining Corporation Limited	
Accredited Consultant and certificate no. and Validity	J.M. EnviroNet Pvt. Ltd. Accredited EIA Consultant by NABET (QCI) Certificate no. NABET/EIA/2326/RA 0308, dated 29.11.2023 which is valid up to 07.08.2026.	
KML file	KML has been uploaded in Form 1 & same is enclosed.	
Seismic zone	Zone – II as per IS: 1893 (Part-I): 2002	

ii. Category details:

Category of the project	Category "A"
Schedule No.	Project or Activity 1 (a) – 3 for "Mining of Mineral"

Mining lease Area (MLA) (In ha.)	428.075 ha
General Conditions (if any)	Not Applicable

iii. ToR/EC Details:

Date of application	Proposal No/ File No	Consideration by EAC	Details of EC	Date of accord
15.05.2007	File No. J-11015/439/2007. IA. II(M) Proposal No. IA/OR/MIN/6980/2007	-	EC for 3.0 Million TPA Bauxite Production capacity was granted in favour of M/s. Orissa Mining Corporation Ltd.	28.05.2008
10.11.2016	File No. J-11015/439/2007. IA. II(M) Proposal No. IA/OR/MIN/6980/2007	May 29-30, 2017, July 24,2017 & August 29-30, 2017	Amendment in EC for proposal of inclusion of Road Transport as a mode of mineral transport, incorporating correction in ML area from 447.15 ha to 428.075 ha, updating the land use pattern in line with the stage I FC granted by MoEF&CC and incorporating supply of 400 KLD water from water resource department,	24.11.2017

			Govt. of Odisha as the source of water for the project in favour of M/s. Orissa Mining Corporation Ltd.	
09.10.2018	File No. J-11015/439/2007. IA. II(M) Proposal No. IA/OR/MIN/6980/2007	23rd -24th October, 2018	Amendment in EC for "Transportation of 3.0 MTPA Bauxite ore by Road" in favour of M/s. Orissa Mining Corporation Ltd.	17.12.2018
09.04.2020	File No. J-11015/439/2007. IA. II(M) Proposal No. IA/OR/MIN/151193/2020	16th EAC Meeting held during 5th- 6th May, 2020	Amendment in Environment Clearance for "Transportation of 0.7 MTPA left over stock of Bauxite Ore through road transportation" in favour of M/s. Orissa Mining Corporation Ltd. (*One time permission*)	29.05.2020
31.03.2021	File No. J-11015/439/2007. IA. II(M) Proposal No. IA/OR/MIN/202346/2021	9th- 15th June, 2021	Amendment in Environment Clearance for "Transportation of 1.43 million tons of	05.08.2021

			left over stock of Bauxite Ore by road" in favour of M/s. Odisha Mining Corporation Ltd. (*One time permission*)	
18.12.2021	File No. J-11015/439/2007. IA. II(M) Proposal No. IA/OR/MIN/245821/2021	--	Amendment in Environment Clearance w.r.t to transportation of leftover stock of 7,34,767.4 Tonnes of Bauxite by road, over and above the permitted EC capacity of 3.0 MTPA during the FY 2022-23 in favour of M/s. Odisha Mining Corporation Ltd. (*One time permission*)	25.02.2022
14.02.2025	MoEF&CC File No. J-11015/439/2007. IA. II(M) Proposal No. IA/OR/MIN/523482/2025	41st meeting of the Expert Appraisal Committee (Non-Coal Mining Sector) to be held on 27.02.2025	The present proposal is for expansion under Para 7 (ii) (a) of EIA Notification, 2006 as per MoEF&CC OM dated 11.04.2022 & 30.05.2022.	-

iv. Details of Mine Lease in chronological manner:

S. No.	Prospecting License/Letter of Intent (LoI)/ Grant of Mine lease and Lr No	Date of the grant	Name of the Mineral & (Major/Minor)	Period of Grant	Granted by	Mine lease area in Ha
1.	Initially, the Mining Lease grant order over an area of 715.075 ha in favour of M/s. Odisha Mining Corporation Limited.	01.02.1999	Bauxite (Major)	30 years	Govt. of Odisha	715.075 ha
2.	The ML area was further reduced from 447.25 ha to 428.31 ha (Deleting the non-mineralized area).	11.09.2015	Bauxite (Major)	-	Department of Steel and Mines, Govt. of Odisha	428.31 ha
3.	ML Area has been revised to 428.075 ha vide letter no. 11071/DM.	17.12.2015	Bauxite (Major)	-	Director of Mines, Govt. of Odisha	428.075 ha
4.	The mining lease over an area of 428.075 ha was executed for District Koraput and for District Rayagada in favour of M/s. Odisha Mining Corporation Limited.	10.01.2017 & 11.01.2017	Bauxite (Major)	50 years	Govt. of Odisha	428.075 ha

		Period of Grant		

S. No.	Details of grant of Mine Lease deed execution	From	To	Name of the Mineral	Mine lease area in Ha
1.	The Mining Lease over an area of 428.075 ha was executed on 10.01.2017 for District Koraput and on 11.01.2017 for District Rayagada in favour of M/s. Odisha Mining Corporation Limited	10.01.2017	09.01.2067	Bauxite	428.075 ha

v. Land Use/Land Cover of the Mine Lease Area:

Private land	0
Government land	0
Forest land	428.075 ha (406.385 ha under Kodingamali Reserve Forest + 21.69 ha under Kodingamali Proposed Reserve Forest)
Total Mining lease area (MLA), ha	428.075 ha
Private land for crusher, workshop & other infrastructure outside the MLA	No infrastructure is existing/proposed outside the ML area.
Additional information (if any)	Stage I Forest Clearance over 434.935 ha of forest land (428.075 ha ML including 18.098 ha safety zone + 6.860 ha approach road) was accorded by MoEF&CC vide F. No 8-46/2016-FC dated 17.04.2017. Stage II Forest Clearance for the same area has been accorded by MoEF&CC vide letter no. F. No. 8-46/2016-FC dated 25.09.2017. Final diversion order was obtained from Govt. of Odisha, Forest and Environment Department, Bhubaneshwar vide letter No. 10F (Con) 1/2017/20540/F&E, dated 07.10.2017.

vi. Mining Plan details

Mining Plan including Progressive Mine Closure Plan (approved by Indian Bureau of Mines/DMG)	Letter No.	RMP/A/21-ORI/BHU/2021-22/1206
	Date	10.11.2021
	Mineral (Major/ Minor)	Bauxite (Major)

<table>
<tr><td></td><td>Mine Lease Area, Ha</td><td>428.075 ha</td></tr>
<tr><td></td><td>Validity</td><td>31.03.2027</td></tr>
<tr><td>Additional information (if any)</td><td colspan="2">The Review of Mining Plan & Progressive Mine Closure Plan (FY: 2022-23 to 2026-27) over an area of 428.075 ha for Bauxite Production Capacity: 6.0 Million TPA has been approved by Indian Bureau of Mines, Bhubaneswar vide Letter no. RMP/A/21-ORI/BHU/2021-22/1206 dated 10.11.2021.</td></tr>
<tr><td>Mining Parameters</td><td colspan="2">Quantitative Description</td></tr>
<tr><td>Method of Mining</td><td colspan="2">Fully Mechanized Opencast Mining Method</td></tr>
<tr><td>Drilling/Blasting</td><td colspan="2">Drilling is being/will be carried out by sharp drill bits. Drill equipped with in-built arrangement of water sprinkling for dust suppression and separate dust collection system.
<table>
<tr><td>S. No.</td><td colspan="2">Drilling & Blasting Parameters</td></tr>
<tr><td>1.</td><td>Diameter of Hole</td><td>115-150 mm</td></tr>
<tr><td>2.</td><td>Burden</td><td>3 m</td></tr>
<tr><td>3.</td><td>Spacing</td><td>3.5m</td></tr>
<tr><td>4.</td><td>Depth of Blast hole</td><td>11 m</td></tr>
<tr><td>5.</td><td>Charge per hole</td><td>72 Kg</td></tr>
<tr><td>6.</td><td>Yield per Hole</td><td>242 Tonnes</td></tr>
<tr><td>7.</td><td>Powder Factor</td><td>2.9 Tonne/Kg</td></tr>
</table>
Controlled Blasting is being/will be carried out using NONEL detonating fuse as multi -row system of firing is being/will be done to reduce the ground vibration, noise, fly rock etc. due to blasting.</td></tr>
<tr><td>Geological Reserves</td><td colspan="2">71.09 Million Tonnes (as on 31.03.2024)</td></tr>
<tr><td>Mineable Reserves</td><td colspan="2">67.55 Million Tonnes (as on 31.03.2024)</td></tr>
<tr><td>Breakup of Total Excavation (Topsoil/OB/SB/IB/Mineral Rejects/Waste, MTPA)</td><td colspan="2">Total Excavation: 5.71 Million TPA (After Expansion 20% in Phase - I)
1. Bauxite: 3.6 Million TPA
2. OB/Waste: 1.98 Million TPA
3. Top Soil: 0.13 Million TPA</td></tr>
<tr><td>Life of mine</td><td colspan="2">~19 years (production capacity 3.6 MTPA)</td></tr>
<tr><td>Mine Bench Height & Bench Width</td><td colspan="2">Bench Height: 10 m (maximum)
Bench Width 10 m (minimum)</td></tr>
<tr><td>No. of Mine Benches</td><td colspan="2">10</td></tr>
<tr><td>Existing Depth, m bgl</td><td colspan="2">Quarry 1: 1155 AMSL
Quarry 2: 1094 AMS</td></tr>
</table>

Ultimate Depth of Mining, m bgl	1080 m AMSL
Ground Water Table, m bgl	Pre-Monsoon: 8.0 m bgl to 24.0 m bgl Post- Monsoon: 6.0 m bgl to 22.8 m bgl
Details of ground water intersection	The mine site is situated on top of Kodingamali Plateau having an average height of ~300 m from the ground level and the depth of workings will be at a maximum 50-60 m bgl from the original surface level. The water table in the area ranges between 6.0 m to 24.0 m bgl from ground level. Hence, the water table is not intersected at any stage of mining.
Individual bench slope	70-80°
Overall pit slope	38°
Details of existing/ proposed Crusher	2 nos. of crushers (2 x 500 TPH) have been installed within the ML Area.
Mineral Beneficiation	None
RoM output size	< 150 mm
Transportation details including capacity of dumper/tipper, mode of transport and distance	The excavated Bauxite is being/will be transported from mine face to crushers located within the mine lease area by dumpers via haul road. The crushed ore is being/will be transported via Road through Tippers to the Railway siding near Kakriguma (~24.0 km from ML area) from where the ore is being/will be further dispatched from direct selling to the prospective buyers.
Generation of Topsoil/OB & its Management during plan period & conceptual period	<u>Top Soil:</u> During plan period, 0.25 Million Tonnes of Topsoil generated is being/will be used for Greenbelt Development & Plantation. At conceptual stage, 1.97 Million Tonnes of Top soil generated will be utilized for Greenbelt Development & Plantation. <u>OB/Waste:</u> During plan period, 4.46 Million Tonnes of OB/waste generated is being/will be directly backfilled in mined out area. At conceptual stage, 39.02 Million Tonnes of OB/waste will be generated which will be backfilled in 125.60 ha area and it will be rehabilitated with the plantation.
Generation of Mineral Rejects/ Waste & its Management	All the generated mineral rejects will be blended with high grade ore for sustainable and optimum use of mineral resources. Hence, separate

during plan period & conceptual period	stacking of mineral reject is not required. If required Mineral Rejects ore can be sold directly, as per market requirement in future. However, a space has been designated for mineral reject within the lease hold area for temporary storage.

vii. Water requirement:

Total water requirement	475 KLD	Fresh Water	400 KLD
		Treated Water	75 KLD
Source	Water is being/will be sourced from Dharua Nala (Surface water: 400 KLD) and Treated water (75 KLD).		
Permission for withdrawal/intersection along with details of grant and its validity	The permission for drawl of Surface water from Dharua Nala has been obtained from the Department of Water Resources, Government of Odisha, vide letter No. 1785/WR dated 19.01.2018. There is no possibility of groundwater table intersection by mine workings at any stage of mining operation.		

viii. Nearest village/ town/ highway/ interstate boundary/ railway station/ water bodies/ monument/ forest

Particular	Particular's Name	Distance &Directions
Nearest Village	Biriguda	~0.8 km in East direction
Nearest Town/City	Rayagada	~35.0 km in NE direction
	Laxmipur	~6.5 km ins SE direction
Nearest State/National Highway	SH-4	~4.5 km in SSE direction
Interstate Boundary	Koraput & Rayagada	ML area falls under two Districts: Koraput and Rayagada
Railway Station/Railway line	Singaramba Railway Stations	~3.0 km in NE Direction
	Laxmipur Railway Stations	~4.5 km in SE Direction
Water Bodies	Patagarha Nadi	~4.0 Km in NNE Direction
	Nala	~4.0 Km in SSE Direction
	Nala	~5.0 Km in ENE Direction
	Murani Nadi	~6.0 Km in SW Direction
	Patagarha Nala	~7.5 Km in NW Direction
	Nala	~8.5 Km in WSW Direction
	Baghri Nala	~9.0 Km in West Direction

	Debagarha Nala	~9.5 Km in SSW Direction
Forests	There are 9 Reserved Forests and 11 Protected Forests within 10 km radius study area:	
	Kodingamali R.F.	Core Zone
	Kodingamali Proposed R.F.	Core Zone
	Champi R.F	~3.5 Km in SW Direction
	Kendripadar R.F.	~4.0 Km in NE Direction
	Bamandeba R.F	~5.5 Km in SSW Direction
	Titigurha R.F	~6.5 Km in NE Direction
	Lakshmipur R.F	~8.0 Km in SE Direction
	Shankaraha R.F	~8.5 Km in NE Direction
	Minapai R.F	~9.0 Km in ESE Direction
	Lakshmipur P.F	~4.0 Km in SSE Direction
	Baghamari P.F.	~4.0 Km in NE Direction
	Sargighati P.F.	~6.0 Km in East Direction
	Bagriguma P.F.	~6.5 Km in NE Direction
	Masimandi P.F	~7.0 Km in NW Direction
	Raishila P.F	~8.0 Km in SSE Direction
	Kakirimali P.F	~8.0 Km in South Direction
	Kelar P.F	~8.0 Km in SW Direction
	Baghaparmar P.F.	~9.0 Km in SSW Direction
	Kutili P.F	~9.0 Km in ENE Direction
	Kutinga P.F.	~9.5 Km in East Direction

ix. Presence of Environmentally Sensitive areas in the study area

Forest Land/Protected Area/Environmental Sensitivity Zone	Yes/No	Details of Certificate/ letter issued by the concerned Department mentioning the Lr no, date of grant and remarks
Forest Land within the mine lease area and (if yes) status of Forest Clearance	Yes	The Mining Lease area of Kodingamali Bauxite Mine is 428.075 ha and the entire ML area is Forest Land. Out of 428.075 ha, 406.385 ha area falls under Kodingamali Reserve Forest and 21.69 ha falls under Kodingamali Proposed Reserve Forest. Stage I Forest Clearance over 434.935 ha of forest land (428.075 ha ML including 18.098 ha safety zone + 6.860 ha approach road)

		was accorded by MoEF&CC vide F. No 8-46/2016-FC dated 17.04.2017. Stage II Forest Clearance for the same area has been accorded by MoEF&CC vide letter no. F. No. 8-46/2016-FC dated 25.09.2017. Final diversion order was obtained from Govt. of Odisha, Forest and Environment Department, Bhubaneshwar vide letter No. 10F (Con) 1/2017/20540/F&E, dated 07.10.2017.
National Park	No	No National Park, Wildlife Sanctuaries, Eco Sensitive Zone (ESZ)/ Eco-Sensitive Area (ESA) etc. within 10 km radius study area.
Wildlife Sanctuary	No	
Elephant/Tiger Reserve	No	
Eco-Sensitive Zone(ESZ)/Eco-Sensitive Area(ESA)	No	
Coastal Regulation Zone (CRZ)	No	-
Schedule-I species (Nos. and name of schedule-I species with authenticated letter)	Yes	Detailed biological study has been carried out. There are 29 schedule - I species *Canis aureus* (Jackal), *Urva edwardsii (*Indian grey mongoose*), Urva auropunctata (*Small Indian Mongoose*), Gracula religiosa (*Common Hill Myna*), Bubo bubo (*Eurasian Eagle Owl*), Naja naja (*Indian Cobra*), Varnus bengalensis (*Bengal monitor*), Felis chaus (*Jungle Cat*), Prionailurus bengalensis (*Leopard cat*), Vulpes bengalensis (*Bengal fox*), Canis lupus (*Grey wolf*), Rusa unicolor(*Sambar deer*), Tetracreus quadricornis (Chousingha/Four-horned Antelope), Lutrogale perspicillata (*Smooth-coated otter*), Mellivora capensis (*Ratel/Honey Badger*), Melursus ursinus (*Sloth bear*), Ratufa indica (*Indian giant squirrel*), Viverricula indica (*Small Indian civet*), Paradoxurus hermaphroditus (*Asian palm civet*), Moschiola indica (*Mouse deer/ Indian Chevrotain*), Hyaena hyaena (*Hyaena*), Hystrix indica (*Indian Porcupine*),*

		*Gallus sonneratii (*Grey junglefowl*), Pavo cristatus (*Indian peafowl*), Anthracoceros coronatus (*Malabar pied hornbill*), Python molurus (*Indian rock python*), Ptyas mucosa (*Indian rat snake/Dhaman*), Daboia russelii (*Russell's viper*), Fowlea piscator (*Checkered Keelback*)* were found in Schedule- I according to Indian Wildlife Protection Act, 1972 as amended on 20th Dec. 2022 in the study area . The authenticated list of Flora & Fauna has been obtained from Divisional Forest Officer, Koraput Forest Division vide letter 280/4F(Misc.) dated 27.01.2025 and from Divisional Forest Officer, Rayagada Forest Division vide letter 216/4F(Misc.) 1367/2025 dated 13.01.2025.
Wildlife Conservation Plan	Yes	Site-Specific Wildlife Conservation Plan (SSWLCP) has been approved from Principal Chief Conservator of Forests (Wildlife) & Chief Wildlife Warden vide Memo No. 682 dated 27.01.2010, which was later revised via Memo No. 5845 dated 06.07.2017. The Budget earmarked for the conservation of Schedule- I species is Rs. 1240.22 Lakh. Presently, the above-mentioned plan is under Revision by State Forest Department as per amended Wildlife Protection Act, 2022 and the DFOs of Koraput and Rayagada Forest Divisions have been requested to expedite the process of approval of Wildlife Conservation Plan. OMC request letter no. 19033/OMC/F&E/2024 dated 04.11.2024

x. Greenbelt/Plantation details:

Proposed area for green belt/plantation and no. of saplings proposed	At conceptual stage, total area covered under greenbelt/plantation will be 147.867 ha (which comprises of 18.098 ha area under 7.5 m greenbelt along lease periphery, Plantation on 125.60 ha on the backfilled area and 4.169 ha area under mineral storage). The total numbers of saplings proposed to be planted are 360464.

Budget for greenbelt & plantation till the end of life of mine.	Budget proposed for greenbelt & plantation till the end of life of mine is Rs. 12.7 Crore.
Budget for nursery	N/A
Details of existing plantation and its survival rate	Presently, 22971 trees have already been planted in 12.87 ha area with a survival rate of 90% which is being maintained.
No. of tree cuts in the mine lease area and compensatory afforestation	No cutting of tree is envisaged for the proposed expansion project.
Particulars for Green belt/plantation	Area covered (In Ha)
7.5 m barrier & non-mineralized zone	18.098 ha
50 m safety zone of nallah, roads, electric lines	Nil
500 m safety zones of nearest habitation villages	Nil

xi. Baseline detail:

Baseline Data (Air / Water / Noise / Soil / Hydro geological study/ Traffic Study/ others)	
Period of baseline data collection	October to December 2024
Season (Summer/ Pre-monsoon/ Post-monsoon/ Winter)	Post Monsoon Season
Predominant Wind direction (From)	North East
Ambient Air Quality (no. of locations) and results	11
Noise level (no. of locations) and results	11
Water Quality (no. of locations) and results	Ground water: 09
	Surface water: 06
Soil Quality (no. of locations) and results	10
Hydro geological study and results	PP has mentioned in the EIA-EMP report that the mining will not intersect at any stage of mining.
Traffic study (no. of locations) and results	PP has submitted the Traffic study report with the EIA-EMP.

xii. Public Hearing (PH) Details: The proposal is for expansion under Para 7 (ii) (a) of EIA Notification, 2006 under MoEF&CC Office Memorandum No IA 3-

22/10/2022-IA.III dated 11.04.2022 and 30.05.2022. Therefore, Public Hearing is exempted for this project.

xiii. Details of CTE/CTO, Certified Compliance Report, Certified Production Details from the inception of the mine:

<table>
<tr><td>Particulars</td><td>Details of Letter along with date of grant and validity</td></tr>
<tr><td>Consent to Establish</td><td>CTE issued vide OM No.: 1620/IND-II-NOC-4373 dated 15.12.2017 and its revalidation issued vide OM No. 465/IND-II-NOC-4373 dated 11.01.2018.</td></tr>
<tr><td>Consent to Operate</td><td>CTO issued vide letter No. 7076/INDI-CON-6632, dated. 03.05.2023.</td></tr>
<tr><td>Certified Compliance Report and Inspection date</td><td>The site visit by IRO, MoEF&CC, Bhubaneswar has been done 15.01.2025. The Certification of Compliance Report of existing EC conditions has been obtained from IRO, MoEFCC vide File No: 101-1122/2025/EPE/ dated: 07.02.2025.
The Action Taken Report for “Partially complied” conditions has been submitted to IRO vide Letter No. 275/OMC/KBM/2025 dated 13.02.2025.</td></tr>
<tr><td>Certified Production Details from the inception of the mine (in tabular form against the EC capacity)</td><td>
<table>
<tr><td>S. No.</td><td>Year</td><td>EC sanctioned capacity (In MTPA)</td><td>Actual Production (MTPA)</td></tr>
<tr><td>1.</td><td>2017-18</td><td>3.0</td><td>0.053</td></tr>
<tr><td>2.</td><td>2018-19</td><td>3.0</td><td>2.7</td></tr>
<tr><td>3.</td><td>2019-20</td><td>3.0</td><td>3.0</td></tr>
<tr><td>4.</td><td>2020-21</td><td>3.0</td><td>2.9</td></tr>
<tr><td>5.</td><td>2021-22</td><td>3.0</td><td>3.0</td></tr>
<tr><td>6.</td><td>2022-23</td><td>3.0</td><td>3.0</td></tr>
<tr><td>7.</td><td>2023-24</td><td>3.0</td><td>3.0</td></tr>
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xiv. Rehabilitation & Resettlement (R&R):

R & R details	This mine has been in operation since 2018 and the expansion is proposed within the existing ML area. The total mining lease area i.e. 428.075 ha is Forest land and Stage I and Stage II Forest Clearance for the same has already been accorded by MoEF&CC, New Delhi. Hence, Resettlement & Rehabilitation Action Plan is not applicable.

xv. Court case details:

Court Case, No and its present status	No court case is pending for this mining project.
Undertaking by Project Proponent w.r.t court case	Project Proponent has submitted an undertaking vide letter dated 12.02.2025 regarding no Litigation pending against the project.

xvi. Affidavit/Undertaking details:

Affidavit as per Ministry's OM dated 30.05.2018	Project Proponent has submitted an affidavit vide affidavit no. R908600 and enclosed with the EIA/ EMP Report.
Undertaking by Project Proponent in EIA/EMP report	Project Proponent has submitted an Undertaking dated 12.02.2025 and enclosed with the EIA/EMP Report.
Undertaking by Consultant in EIA/EMP report	Consultant has submitted an Undertaking and enclosed with the EIA/EMP Report.
Plagiarism Certificate	Project Proponent has submitted the Plagiarism Certificate dated 11.02.2025) and enclosed with the EIA/EMP Report.

xvii. Details of the Environmental Management Plan (EMP):

Activities	Capital cost (Lakh)	Recurring cost (Lakhs/annum)
EMP for Air, Noise, Water, etc.), Occupational Safety, Greenbelt & Plantation etc.	6406.45	855.43

xviii. Details of project cost and employment:

Particular	(Rs. In Crore)
Total cost of EMP (Capital Cost of EMP + capital cost of Public Hearing)	Rs. 97.6145 Crore
Project Cost	Rs.49 Crore
Employment	279 persons

xix. Compliance of OM dated 11th April, 2022:

The proposal is for expansion in Bauxite production capacity from 3.0 MTPA to 3.6 MTPA (20%) in first phase under para 7(ii) of EIA Notification, 2006, as per the

Provision given in MoEF&CC Office Memorandum No. IA 3- 22/10/2022-IA.III [E 177258] dated 11.04.2022. The Project Proponent has submitted the point-wise compliance of the criteria given in MOEFCC, OM dated 11th April, 2022, para 4 (i - ix) is as under:

S.No.	Criteria as per OM dated 11th April, 2022	Reply
1.	Project should have gone through the public hearing process, at least once, for its existing EC capacity on which expansion is being sought, except those category projects which have been exempted as per para 7 III(i) of EIA Notification 2006 and its amendments.	The existing EC capacity of Kodingamali Bauxite Mine is 3.0 Million TPA located at Village: Kodingamali, Tehsil: Laxmipur & Kashipur, District: Koraput & Rayagada, Odisha. Public Hearing of the project for existing EC capacity was already conducted on 27.09.2006.
2.	There should not be change in category of the project from 'B2' to 'B1' or 'A' due to proposed modernization or expansion.	As per EIA Notification dated 14th September, 2006, as amended from time to time; the project falls under Category “A”, Project or Activity 1(a) - (3) “Mining of Mineral”. There is No Change in the Category of the project due to proposed expansion.
3.	There is no additional land acquisition or forest land diversion involved for the proposed expansion or there is no increase in lease area with regard to mining vis-a-vis the area mentioned in the EC, based on which public hearing has been held earlier.	Total ML area of Kodingamali Bauxite Mine is 428.075 ha. There is No additional land acquisition, Forest Land diversion and no increase in ML area due to the proposed expansion.
4.	The proposed expansion shall not be more than 50% of production capacity as mentioned in the prior EC, issued on the basis of public hearing held and the same shall be allowed in minimum three phases.	The Expansion in the project will be done in phase- wise manner with Bauxite Production Capacity from 3.0 Million TPA to 3.6 Million TPA (20%) in first phase and 3.6 Million TPA to 4.2 Million TPA (20%) in second phase. Total expansion of 40% (in two phases – 20% + 20%) is

		envisaged in the production capacity.
5.	Predicted environmental quality parameters arising out of proposed expansion/ modernization shall be within the prescribed norms and the same shall be maintained as per prescribed norms.	Predicted environmental quality parameters arising out of proposed expansion are within the prescribed norms and the same will be maintained.
6.	The proposed expansion should not result in reduction in greenbelt area as stipulated in earlier EC, or if the existing ratio of greenbelt is more than 33%, after expansion it should not reduce below 33%.	Noted and being complied with.
7.	The project proponent should have satisfactorily complied the conditions stipulated in the existing EC(s) and satisfactorily fulfilled all the commitments made during the earlier public hearing/ consultation proceedings and also the commitments given while granting previous expansion, as may be applicable. This shall be duly recorded in the certified compliance report issued by the IRO/CPCB/SPCB, which should not be more than one year old at the time of submission of application.	The conditions stipulated in the existing EC and subsequent amendments are being regularly complied with. The Public Hearing for the project at the Existing EC capacity of 3.0 Million TPA was conducted on 27.09.2006. The company has satisfactorily fulfilled the commitments made during earlier Public Hearing. The status of Implementation of the commitments made during earlier Public Hearing have been incorporated in Chapter – 7 of this EIA/EMP Report. The latest Certified Compliance Report of the conditions stipulated in the EC letter has been obtained from IRO, Bhubaneshwar, Odisha which is enclosed with this EIA/EMP Report.

8.	Public consultation shall be undertaken (if applicable as per table below) by obtaining response in writing, as per para 7 III (ii) (b) of EIA Notification 2006, except those categories of projects which have been exempted as per para 7 III (i) of EIA Notification 2006 and its amendments.	The total expansion will be 40% (in two phases – 20% + 20%) as per OM dated 11.04.2022. Therefore, public consultation is not applicable.

ANNEXURE - II

ANNEXURE-IC

BY REGD POST

ORISSA

OFFICE OF THE
STATE POLLUTION CONTROL BOARD, ORISSA
Parivesh Bhawan, A/118, Nilakantha Nagar, Unit-VIII,
Bhubaneswar - 751 012

No. 854 /Ind-II-NOC-4373 Date 12.1.07

OFFICE MEMORANDUM

In consideration of the application for obtaining Consent to Establish for M/s. Kodingamali Bauxite Mine of M/s. Orissa Mining Corporation Ltd the State Pollution Control Board has been pleased to convey its Consent to Establish under section 25 of Water (Prevention & Control of Pollution) Act, 1974 and section 21 of Air (Prevention & Control of Pollution) Act, 1981 for production of Bauxite ore of quantity 3.0 million ton/Annum, (over mine lease hold area of 447.25 Ha.) at Kodingamali Hills near Kalpadar, PO - Laxmipur in the district of Koraput with the following conditions.

GENERAL CONDITIONS.

1. This Consent to establish is valid for the product, quantity manufacturing process and raw materials as mentioned above & for a period of five years from the date of issue of this letter, provided commencement of production of the proposed project has not taken place in the meantime.
2. If the proponent fails to start operation of the project but substantial physical progress has been made then a renewal of this consent shall be sought by the proponent.
3. If the proponent fails to initiate construction of the project and no significant physical progress is made then, the proponent has to apply for consent to establish afresh after expiry of 5 years from the date of issue of this order.
4. Adequate effluent treatment facilities are to be provided such that the quality of sewage and trade effluent satisfies the standards as prescribed under EP Rule or as prescribed by the Central Pollution Control Board and/or State Pollution Control Board or otherwise stipulated in the special conditions.
5. All emission from the industry as well as the ambient air quality and noise are to conform to the standards as laid down under EP Rule/Central Pollution Control Board/State Pollution Control Board of otherwise stipulated in the special conditions.
6. Adequate method of disposal of solid waste is to be adopted to avoid environmental pollution.

7. The Industry is to comply to the provisions of EP Act, 1986 and the rules made thereunder with their amendments from time to time such as the Hazardous Chemical/Manufacture, Storage and Import Rule, 1989 etc. The industry is also to comply to the provisions of Public Liability Insurance Act, 1991, if applicable.

8. The Industry is to apply for grant of Consent to operate under section 25/26 of Water(Prevention & Control of Pollution)Act, 1974 & Air (Prevention & Control of Pollution)Act, 1981 (if coming under air pollution control area) at least 3 (three) months before the commercial production and obtain Consent to Operate.

9. **This consent to establish is subject to other statutory clearances from Govt. of Orissa and / or Govt. of India as and when applicable.**

SPECIAL CONDITIONS : -

1. This consent to establish is granted subject to Environmental Clearance from Ministry of environment & Forest, Govt. of India, New Delhi.

2. No change in mining technology and scope of working shall be made without prior approval of the Board.

3. Top soil should be stacked properly with proper slope at earmarked site(s) with adequate measures and shall be used for reclamation and rehabilitation of mined out areas.

4. Concurrent back-filling should be started from the fourth year of operation. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Compliance status should be submitted to the Ministry of Environment & Forests with a copy to the Board on yearly basis.

5. Dimension of the retaining wall at the toe of dumps and Ob benches within the mine to check run-off and siltation shall be based on the rainfall data. The detail specification shall be worked out and submitted to the Board.

6. A green belt of adequate width shall be raised for suppression of dust by planting the native species around to ML area, roads, OB dump sites, etc., in consultation with the local DFO/Agriculture Department.

7. Reclamation programme along with the post closure plan is to be submitted within 06 months from the date of issue of this order.

8. Catch drains, and siltation ponds of appropriate size should be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The drains should be regularly de-silted and maintained properly. The garland drains (size, gradient and length) and sump capacity should be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine site. Sump capacity should also provide adequate retention period to allow proper settling of silt material.

9. Regular monitoring of ground water level and quality should be carried out by establishing a net work of existing wells. The monitoring should be done four times a year in pre-monsoon (April/May), Monsoon (August), Post-monsoon(November) and winter (January) seasons. Data thus collected should be submitted to the Board quarterly.

10. Sewage treatment plant should be installed for the treatment of domestic effluent generated from the colony and mines so as to meet the prescribed standard of the Board for discharge to inland surface water.

11. Wastewater (workshop and wastewater from the mine) should be properly collected, treated so as to conform the prescribed standard i.e pH = 5.5 – 9.0,

SS = 100 mg/l, & O & G = 10 mg/l or as amended from time to time. Oil and grease trap should be installed before discharge of effluents from workshop.

12. Mine drainage water, if any has to be treated and disposed of after conforming to the standard prescribed by the Board i.e ph – 5.5 – 9.0, Total SS ≠'100 mg/l & O & G = 10 mg/l.

13. Rain water harvesting practice shall be followed by utilizing the rain water collected from the roof of the buildings for recharging of ground water within the premises and other large structures as per the concept and practices prescribed by CPCB, New Delhi and details of which is available in the web-site.

14. Drill should be wet operated or with dust extractors and controlled blasting should be practices.

15. Six ambient air quality monitoring stations for 24 hours operation should be established in the core zone as well as in the buffer zone for RPM, SPM, SO2, NOx and CO monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board (I) Data on ambient air quality (RPM, SPM, SO2, NOx and CO) should be regularly submitted to the State Pollution Control Board once in six months.

16. Adequate measures to control fugitive emission shall be taken during loading and transportation of minerals, haul roads etc.

17. The haulage roads and arterial roads shall be made black topped / concrete with avenue plantation. Appropriate plan to this effect shall be submitted to the board within a month. Initially 50% of haul road shall be black topped/concrete surfaced.

18. Adequate measures shall be taken for control of noise levels below 85 dBA in the work environment.

19. Project authority shall undertake sample survey to generate data on pre-project community health status within a radius of 1 km. from proposed mine. The report shall be submitted within 06 months from the date of issue of this order.

20. Consent to operate shall be obtained from this Board before commencing the mining activities of proposed expansion project.

21. Environmental laboratory should be established with adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board.

22. A separate environmental management cell with suitable qualified personnel should be set up under the control of a Senior Executive, who will report directly to the Head of the organization.

23. The above conditions will be enforced, inter-allia, under the provisions of the water 9Prevention & Control of pollution)Act, 1974 and Air(Prevention & Control of Prevention)Act, 1981 and Environment(Protection)Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rule.

24. All efforts shall be taken to protect the existing water bodies in the surrounding. A definite plan in this regard shall be submitted to the Board within 06 month from the date of issue of this order.

25. This consent to establish is granted subject to grant of Explosive License from competent Authority. The valid Explosive License must be submitted to this Board while applying for consent to operate to this Board.

26. This consent to establish is granted subject to implementation of all recommendation made during public hearing held on 27.9.06.

27. The Board may impose further conditions or modify the conditions stipulated in this order during Installation and/or at the time of obtaining consent to operate and may revoke this clearance in case the stipulated conditions are not implemented.

28. The industry shall abide by all the provisions of Environment (Protection) Act, 1986 and rules framed thereunder.

29. The unit shall provide adequate dust suppression measures at all potential dust generating points of Bauxite ore crusher plants and screening plants to control fugitive emission. Ambient air quality with respect to SPM concentration shall not exceed 500 µg/m3.

30. The mine shall obtain forest clearance under Forest (Conservation) Act, 1980 if there is involvement of forest land in the mining lease area.

MEMBER SECRETARY

To,

Sri Janardan Mishra, (Dy. General Manager, Geology)
M/s. Kodingamali Bauxite Mine of
M/s. Orissa Mining Corlporation Ltd.
PO – Box No. 34, OMC House, Bhubaneswar-1

Memo No._____/Dt.

Copy forwarded to ;

1. Secretary Steels & Mines , Govt. of Orissa, Bhubaneswar
2. Collector, Koraput
3. District Industries Centre, Koraput
4. Consent Section, Environment Scientist-III
5. Director, Factories & Boiler, Bhubaneswar
6. Regional Officer, O.S.P.C.Board, Rayagada
7. DFO, Koraput
8. Copy to Guard file/Consent to establish register

SR. ENV.ENGINEER

Tel : 2564033/2503924
EPABX : 2561909/2562847
E-mail: paribesh1@ospcboard.org
Web site : www.ospcboard.org

OFFICE OF THE
STATE POLLUTION CONTROL BOARD, ODISHA

(Department of Forest & Environment, Govt. of Odisha)
Paribesh Bhawan, A/118, Nilakantha Nagar, Unit-VIII
Bhubaneswar – 751012

BY REGD POST

No. 14554 / **IND-II-CTE - 6233** Date 07-12-2018

OFFICE MEMORANDUM

In consideration of the online application no. **2231926** for obtaining Consent to Establish of **Kodingamali Bauxite Mine of M/s Odisha Mining Corporation Ltd.**, the State Pollution Control Board is pleased to convey its Consent to Establish under section 25 of Water (Prevention & Control of Pollution) Act, 1974 and section 21 of Air (Prevention & Control of Pollution) Act, 1981 for **establishment of crushing plant of capacity 2x500 TPH with total project cost ₹ 10 crores inside the lease hold area of 428.075 ha. of Kodingamali Bauxite Mine of M/s OMC, At- Kodingamali, Laxmipur** in the district of **Koraput** with the following conditions.

GENERAL CONDITIONS

1. **This Consent to establish is valid for the raw materials, product, manufacturing process and capacity mentioned in the application form. This order is valid for five years. The proponent shall commence construction of the project within a period of five years from the date of issue of this order. If the proponent fails to do substantial physical progress of the project within five years then a renewal of this consent to establish shall be sought by the proponent.**
2. The industry is to apply for grant of Consent to operate under section 25/26 of Water(Prevention & Control of Pollution) Act, 1974 & Air (Prevention & Control of Pollution)Act, 1981 at least 3 (three) months before the commercial production and obtain Consent to Operate from this Board.
3. **This consent to establish is subject to statutory and other clearances from Govt. of Odisha and/or Govt. of India, as and when applicable.**

SPECIAL CONDITIONS:

1. This consent to establish is granted for the capacity as mentioned above and any expansion in the capacity, change or modification in the process addition, alternation any nature has to be undertaken with prior approval of the Board. For any change in the site or area fresh consent to establish has to be obtained from the Board.
2. **Total production of Bauxite Ore shall not exceed the approved production capacity of mines (i.e. capacity as approved in environmental clearance as well as consent to operate of the Board).**

3. The crushing activity shall be carried out within the mining lease area only.
4. The crushers and the conveyors shall be placed under cover.
5. Both dust suppression (dry fog) and extraction (bag filter) system shall be provided at all dust generating source such as crushing, screening & material transfer points to control fugitive emission.
6. The suction points of dust extraction system shall be provided at primary crusher discharge chute, screen, all transfer points, secondary crusher discharge chutes and any other dust generating sources. This system shall be connected to bag filters so that particulate matter emission from the stack shall not exceed 100 mg/Nm^3.
7. Metalled/Concrete road shall be constructed around the crusher unit inside the premises to minimize dust emission.
8. Regular cleaning and wetting of the ground shall be under taken within the premises.
9. A thick green belt of tall long foliage trees shall be developed around the crusher unit.
10. All the product conveyor of the crushers shall discharge the product into a hopper and chute arrangement fitted with dust extraction and bag filter system. Chute shall be maximum 3 meter height from the ground level. Fixed auto sprinklers shall be provided
11. Fine products shall not be kept open. The ore fines shall be stacked properly and systematically with retaining wall at the toe to avoid washings during rain. Fine transportation shall be done in covered truck.
12. Adequate measures shall be taken for control of noise levels in the work environment of unit area so that noise levels at the boundary line of M.L area shall not exceed 75 dB (A) during day time (6.00 AM to 10.00 PM) and 70 dB(A) during night time (10.00 PM to 6.00 AM).
13. The Domestic effluent shall be discharged to soak pit through septic tank constructed as per BIS specification.
14. Garland drains along with settling pit shall be provided around the fines stock yard to control washout of fines from the stockyard along with surface runoff.
15. The operation of the mine in whose lease hold the crushing & screening plant is to be located shall be governed under the provision of Air (PCP) Act, 1981, Water (PCP) Act, 1974 and Env. Protection Act, 1986. The mine shall not be operated without valid consent to operate of the Board.
16. No production activity shall commence prior to installation of all pollution control measures. In case it is found that the industry is operated without installation of adequate pollution control equipment, direction for closure shall be issued u/s 31 (A) of Air (PCP) Act, 1981 and / or u/s 33 (A) of Water (PCP) Act, 1974 as the case may be without any further notice.
17. The unit shall abide by the provisions of Environment (Protection) Act, 1986 and Rules framed thereunder.

18. The Board may impose further condition or modify the conditions are stipulated in this order during installation and / or at the time of obtaining consent to operate and may revoke this order in case the stipulated conditions are not implemented and / or information is found to have been suppressed / wrongly furnished in the application form.

4/12/18

MEMBER SECRETARY

To

The Mines Manager,
Kodingamali Bauxite Mine of
M/s OMC Ltd.,
At/Po- Laxmipur
District - Koraput

Memo No._____/Date_____/
Copy forwarded to:

1. The Collector and District Magistrate, Koraput.
2. The DDM, Koraput.
3. Consent to Operate Cell, SPC Board, Bhubaneswar.
4. Hazardous Waste Management Cell, SPC Board, Odisha, Bhubaneswar
5. The DFO, Koraput.
6. The Regional Officer, SPC Board, Rayagada.
7. Copy to Guard file

CHIEF ENV. ENGINEER

Annexure - IV C_Consent to Establish dated: 11.01.2018

FAX : 2562822/2560955
Tel : 2564013/2563924
EPABX : 2561909/2562847
E-mail: paribesh1@ospcboard.org
Web site : www.ospcboard.org

STATE POLLUTION CONTROL BOARD, ODISHA

(Department of Forest & Environment, Govt. of Odisha)
Paribesh Bhawan, A/118, Nilakanthanagar, Unit-VIII
Bhubaneswar – 751012

By Regd. Post

No. 465 / **IND-II-NOC-4373** **Date** 11-01-2018 /

OFFICE MEMORANDUM

In consideration to the request of the proponent vide letter No.17702/OMC/F&E/2017, dtd. 16.12.2017, the State Pollution Control Board is pleased to revise the mining lease area from 447.25 Ha to 428.075 Ha in Consent to Establish order issued vide Office Memorandum No.854, Dt: 12.01.2007 and in the revalidation of Consent to Establish order issued vide Office Memorandum No. 16201, dated 15.12.2017 to Kodingamali Bauxite Mining project of M/s Orissa Mining Corporation Ltd., for production of Bauxite Ore of quantity 3.0 MTPA, At – Kodingamali Hills near Kalpadar, Post – Laxmipur in the district of Koraput.

All other matter / conditions as given in the consent to establish order issued vide O.M. No. 854, dated 12.01.2007 and in revalidation of Consent to Establish order issued Vide Office Memorandum No.16201 Dtd: 15.12.2017 shall be remain unchanged.

MEMBER SECRETARY

To

The General Manager, Geology,
Kodingamali Bauxite Mine of
M/s Orissa Mining Corporation Ltd.,
Post Box No. – 34, OMC House,
Bhubaneswar - 751001.

Memo No. 466 **/Date** 11-01-2018

Copy forwarded to:

1. The Secretary, Steel and Mines, Govt. of Odisha, Bhubaneswar.
2. The Collector & District Magistrate, Koraput.
3. Consent to Operate Cell, SPC Boards, BBSR
4. Hazardous Waste Management Cell, SPC Boards, BBSR.
5. The DFO, Koraput.
6. The Regional Officer, SPC Board, Rayagada.
7. Copy to Guard file.

SR. ENV. SCIENTIST, L-I (N)

FAX : 2562822/2560955
Tel : 2564033/2563924
EPABX : 2561909/2562847
E-mail: paribesh1@ospcboard.org
Web site : www.ospcboard.org

STATE POLLUTION CONTROL BOARD, ODISHA

(Department of Forest & Environment, Govt. of Odisha)
Paribesh Bhawan, A/118, Nilakanthanagar, Unit-VIII
Bhubaneswar – 751012

By Regd. Post

No. 16201 / **IND-II-NOC-4373** **Date** 15.12.2017 /

OFFICE MEMORANDUM

Consent to establish was granted vide letter no. 854, dated 12.01.2007 to Kodingamali Bauxite Mining project of M/s Orissa Mining Corporation Ltd., for production of Bauxite Ore of quantity 3.0 MTPA over mining lease area of 447.25 ha., At – Kodingamali Hills near Kalpadar, Post – Laxmipur in the district of Koraput. The proponent has made an appeal through online application no. 1889283 for revalidation of consent to establish as per guidelines of the Board.

In consideration to the request of the proponent and recommendation of the Consent Committee in its meeting held on 30.11.2017, the State Pollution Control Board, Odisha is pleased to extend the validity period of consent to establish order issued vide letter No. 854, dated 12.01.2007 to Kodingamali Bauxite Mining project of M/s Orissa Mining Corporation Ltd. for production of Bauxite Ore of quantity 3.0 MTPA over mining lease area of 447.25 ha, for a period of ten years till 11.01.2022 (i.e. from the date of expiry of earlier Consent to Establish i.e. on 12.01.2012) At – Kodingamali Hills near Kalpadar, Post – Laxmipur in the district of Koraput, Odisha.

All other matter / conditions as given in the consent to establish order issued vide letter No. 854, dated 12.01.2007 shall be remain unchanged.

15/12/17

MEMBER SECRETARY

To

The General Manager, Geology,
Kodingamali Bauxite Mine of
M/s Orissa Mining Corporation Ltd.,
Post Box No. – 34, OMC House,
Bhubaneswar - 751001.

Memo No. 16202 **/Date** 15.12.2017 /

Copy forwarded to:

1. The Secretary, Steel and Mines, Govt. of Odisha, Bhubaneswar.
2. The Collector & District Magistrate, Koraput.
3. Consent to Operate Cell, SPC Boards, BBSR
4. Hazardous Waste Management Cell, SPC Boards, BBSR.
5. The DFO, Koraput.
6. The Regional Officer, SPC Board, Rayagada.
7. Copy to Guard file.

15/12/17

SR. ENV. SCIENTIST, L-I (N)

E-mail: paribesh1@ospcboard.org
Website: www.ospcboard.org

STATE POLLUTION CONTROL BOARD, ODISHA

[DEPARTMENT OF FOREST, ENVIRONMENT & CLIMATE CHANGE, GOVERNMENT OF ODISHA]
Paribesh Bhawan, A/118, Nilakantha Nagar, Unit - VIII
Bhubaneswar - 751012

No. 9208 / IND-II-CTE-7440 Date 09.05.2025

Through online/
By speed post

To,

The Mines Manager
KodingamaliBuxite Mines of OMC Ltd.
At: Kodingamali, PO: Laxmipur,
District: Korapur, PIN-765013

Sub: Environmental Safeguards for Kodingamali Bauxite Mines with enhancement in Production Capacity from 3.0MTPA to 3.6 MTPA (Phase I - 20%) in the Mine Lease area of 428.075ha by M/s Odisha Mining Corporation Limited located at Village Kodingamali, Tehsil Laxmipur & Kashipur, District-Koraput & Rayagada, Odisha under para 7 (ii) (a) of EIA Notification, 2006 as per MoEFCC OM dated 11.04.2022 & 30.05.2022.

Ref: 1. MoEF&CC, Government of India, Environment Clearance File No.: J-11015/439/2007-IA.II (M), Dt. 15-04-2025.

2. MoEF&CC, Government of India, Office Memorandum, Dt. 14-01-2025

Sir,

In consideration of the online application No. **6239195** read with MoEF&CC, Government of India, Office Memorandum, dtd. 14.01.2025, the State Pollution Control Board has been pleased to issue Environmental Safeguards in place of its Consent of Establish under section 25 of Water (Prevention & Control of Pollution) Act, 1974 and section 21 of Air (Prevention & Control of Pollution) Act, 1981 for **enhancement of production of Bauxite Ore from 3.0 MTPA to 3.6 MTPA with existing crushing plant of capacity (2x500 TPH) within the mine lease area of 428.075 Ha.**, located at Village Kodingamali, Tehsil-Laxmipur & Kashipur, District Koraput & Rayagada, Odisha, with the following conditions.

A. GENERAL SAFEGUARD:

1. The mine shall apply for grant of Consent to Operate under section 25 of Water (Prevention & Control of Pollution) Act, 1974 and section 21 of Air (Prevention & Control of Pollution) Act, 1981 at least 3 (three) months before commencement of production and obtain Consent to Operate from this Board.
2. The proponent shall comply with stipulations and carryout mining activity as per the Environmental Clearance granted by MoEF&CC, Govt. of India vide EC Identification

No. EC25A0000OR5363980N dtd. 15.04.2025 for Kodingamali Bauxite Mines with enhancement in Production Capacity from 3.0 MTPA to 3.6 MTPA (Phase I - 20%) in the Mine Lease area of 428.075 ha by M/s Odisha Mining Corporation Limited located at Village Kodingamali, Tehsil Laxmipur & Kashipur, District Koraput & Rayagada, Odisha under para 7 (ii) (a) of EIA Notification, 2006 as per MoEFCC OM dated 11.04.2022 & 30.05.2022.

3. No change in mining technology and scope of working shall be made without prior approval of the Board.

4. The mines safety guidelines as prescribed by DGMS for opencast operations shall be strictly followed.

5. The mine shall ensure that all natural water bodies and or streams which are flowing in and around the mine lease area should not be disturbed. The proponent shall consult State Water Resource Department and SPCB regarding Nallah/Stream and follow their instructions for the safeguards.Surface run-off management measures shall be implemented as per the study carried out by Institution of National repute.

6. The project proponent shall abide by the Wildlife Management Plan or wildlife clearance wherever applicable.

7. The project proponent shall obtain forest clearance under the provisions of Forest (Conservation)Act, 1980, in case of the diversion of forest land for non-forest purpose involved in the project.

8. The project proponent shall obtain permission from the CGWA for drawal of ground water for project activities if applicable for obtaining consent to operate from the Board.

9. The project proponent shall obtain requisite permission from the Water Resources Department, Govt. of Odisha for drawl of Surface Water and Ground Water.

10. The proponent shall comply to the provisions of E-Waste (Management) Rules, 2022 and amendment thereafter and shall handover e-waste to registered producers/ recyclers/ re-furbishers for proper disposal of e-waste.

11. The proponent shall comply with the provision made under Plastic Waste Management Rules, 2016 and amendment made thereafter and shall ensure prohibition and use of Single Use Plastics within the premises.

12. The plastic waste generated from the premises shall be collected and sent for co-processing to the nearby cement kilns and/or registered recyclers under Plastic Waste Management Rules, 2026.

13. The Project Proponent shall develop greenbelt in 7.5m wide safety zone all along the mine lease boundary as per the guidelines of CPCB in order to arrest pollution emanating from mining operations within the lease. The whole Green belt (safety zone) shall be developed within first 5 years starting from windward side of the active mining area. The development of greenbelt shall be governed as per the EC granted by the Ministry irrespective of the stipulation made in approved mine plan.

14. The project proponent shall carryout plantation/ afforestation in backfilled and reclaimed area of mining lease, around water body, along the roadsides, in community areas etc. by planting the native species in consultation with the State Forest Department/ Agriculture Department/ Rural development department/ Tribal Welfare Department/

Gram Panchayat such that only those species be selected which are of use to the local people. The CPCB guidelines in this respect shall also be adhered. The density of the trees should be around 2500 saplings per Hectare. Adequate budgetary provision shall be made for protection and care of trees.

15. The construction material which has potential to be air borne, shall be transported in covered trucks.

16. Good house keeping practice shall be followed to improve the work environment.

17. The construction and demolition wastes, if any, to be generated from the proposed mining activity shall be disposed of in accordance with the provision under "Construction & Demolition Wastes Management Rules 2016".

18. The mine shall install digital display board at mines main gate for display of environmental information for public view.

19. A separate environment management cell with suitable qualified personnel shall be set up under the control of a Senior Executive, who will report directly to the Head of the Organization.

20. The Board may impose further conditions or modify the conditions stipulated in this order during installation and/or at the time of obtaining consent to operate and may revoke this clearance in case the stipulated conditions are not implemented.

21. The above conditions will be enforced, inter-allia, under the provisions of the water (Prevention & Control of pollution) Act, 1974 and Air (Prevention & Control of Prevention) Act, 1981 and Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and Rule.

B. WATER POLLUTION SAFEGUARDS:

22. The mine shall undertake all such measures to protect the natural springs and streams within the mine lease area and its vicinity.

23. Project Proponent shall regularly monitor and maintain records w.r.t. ground water level and quality in and around the mine lease by establishing a network of existing wells as well as new piezo-meter installations during the mining operation in consultation with Central Ground Water Authority/ State Ground Water Department. The Report on changes in Ground water level and quality shall be submitted on six-monthly basis to the Regional Office of the Ministry, CGWA and State Groundwater Department / State Pollution Control Board.

24. The domestic wastewater generated from the mines shall be treated in sewage treatment plant to meet the following standards as notified by the MoEF&CC, Govt. of India vide G.S.R. 1265 (E), dated 13.10.2017. The treated water shall be reused for gardening and plantation. Under no circumstances the treated wastewater shall be discharged outside the mines premises.

Sl. No.	Parameters	Standards
1.	pH	6.5-9.0
2.	BOD(mg/l)	30
3.	TSS(mg/l)	<100
4.	Fecal Coliform (MPN/100ml)	< 1000

25. Garland drains along with settling pit shall be provided around the stockyard to control washout of fines from the stockyard along with surface runoff.

26. Dimension of the retaining wall at the toe of dumps and OB benches within the mine to check run-off and siltation shall be based on the rainfall data. The detail specification shall be worked out and submitted to the Board.

27. Surface run-off from OB dump area, mineral stock yard, top soil storage area and rain water to be pumped from quarry shall be routed through adequate settling pond (designed maximum hourly rain fall basis) to meet prescribed standard of SS - 100 mg/l and Oil & Grease-10 mg/l before discharge into natural stream/water courses during monsoon.

28. Catch drains, and siltation ponds of appropriate size shall be constructed to arrest silt and sediment flows from soil, OB and mineral dump. The drain shall be regularly desilted and maintained property. The Garland drains (size, gradient and length) and sump capacity shall be designed keeping 50% safety margin over and above the peak for sudden rainfall and maximum discharge in the area adjoining the mine site. Sump of adequate capacity shall be provided for adequate retention period to allow proper settling of silt material.

29. The unit shall provide storm water drain around raw material stock yard, product stock yard and surface run-off generated from this area shall be treated in settling tanks/ sedimentation ponds of adequate capacity and same shall be stored in rain water harvesting pond for reuse in dust suppression, green belt etc.

30. Wastewater (workshop and wastewater from the mine) shall be properly collected, treated so as to conform the prescribed standard i.e. pH = 5.5- 9.0, SS = 100 mg/l & O & G-10 mg/l or as amended from time to time. Oil and grease trap shall be installed before discharge of effluents from workshop.

31. Rain water harvesting shall be followed by utilizing the rain water collected from the roof of the administrative buildings for recharging of ground water within the premises as per the concept and practices prescribed by CPCB.

32. The Mine shall provide mechanized wheel washing system along with effluent treatment and recycling facilities at the exit point of the mine.

C. <u>AIR POLLUTION SAFEGUARDS:</u>

33. Ambient Air Quality shall be maintained as per National Ambient Air Quality standard prescribed for industrial and mixed used area under E (P) Act, 1986.

34. Drill shall be wet operated or with dust extractors and controlled blasting shall be practiced.

35. Advance blasting technology shall be adopted to minimize the damage on subsurface strata and aquifers. Ripping method shall be followed as far as possible and controlled blasting shall be done when it is absolutely essential.

36. The Project Proponent shall install a minimum of 3 (three) online Ambient Air Quality Monitoring Stations with 1 (one) in upwind and 2 (two) in downwind direction based on long term climatological data about wind direction such that an angle of 120° is made between the monitoring locations to monitor critical parameters, relevant for mining

operations, of air pollution viz. PM_{10}, $PM_{2.5}$, NO_2, CO and SO_2 etc. as per the methodology mentioned in NAAQS Notification No. B- 29016/20/90/PCI/I, dated 18.11.2009 covering the aspects of transportation and use of heavy machinery in the impact zone. The CAAQMS shall be installed within the mine lease area at suitable location for online real time monitoring and data transmission through GPRS system to SPCB RTDAS Server and also upload the data for use by CPCB. The locations of CAAQMS shall be decided in consultation with the concerned Regional Officer of the SPC Board.

37. The project proponent shall monitor fugitive emissions in the mine's premises at least once in every quarter through labs recognised under Environment (Protection) Act, 1986.

38. The primary crusher, screen and secondary crusher shall be placed in covered shed. All the conveyor shall be covered with corrugated GI Sheets.

39. Both dust suppression (dry fog) and extraction (bag filter) system shall be provided at all dust generating source such as crushing, screening & material transfer points etc.

40. All the product conveyor of the screens shall discharge the product into a hopper and chute arrangement fitted with dust extraction and bag filter system. Chute shall be maximum 3 meter height from the ground level.

41. The haulage roads and arterial roads shall be made black topped / concrete with avenue plantation. The speed of dumpers / trucks on haul roads shall be controlled as increased speed increases dust emission. Overloading of transport vehicles shall be avoided. Further, during transportation of ore by trucks through public roads, the truck shall be properly covered with tarpaulin sheets / leak proof coverings and shall ply at safe speed.

42. Dust suppression on mine haul roads, active OB dumps and mine working benches shall be done by spraying water through water sprinklers along with chemical binders/wetting agents at frequent interval in order to reduce water consumption and to improve retention and re-absorption capacity of water.

43. Fixed auto sprinklers on both sides of major haul road and approach roads of the mine shall be installed and frequency of water sprinkling through mobile water tankers shall be deployed at the said areas till installation of fixed auto sprinklers.

44. Adequate measures shall be taken for control of noise levels in the work environment of mine area so that noise levels at the boundary line of mining lease area shall not exceed 75 dB (A) during day time (06:00 AM to 10:00 PM) and 70 dB(A) during night time (10:00 PM to 06:00 AM).

45. Adequate noise barriers shall be provided surrounding the crushing and screening plants to control noise pollution and avoid impact on wildlife due to operation of crushing and screening plants during night hours.

46. Protective barriers shall be provided for the lights to prevent illumination towards the forest area during night hours.

47. The trucks carrying fines shall be covered with tarpaulin and over loading shall be avoided to minimize fugitive emission.

48. Regular collection of spilled over fines from haul roads shall be practiced to prevent the generation of dust to be air borne.

D. SOLID AND HAZARDOUS WASTE SAFEGUARDS:

49. Hazardous waste storage area shall be earmarked before disposal of hazardous waste as per guidelines.

50. Top soil shall be stacked properly with proper slope at earmarked site(s) with adequate measures and shall be used for reclamation and rehabilitation of mined out areas.

51. Solid waste to be generated during course of mining shall be dumped temporarily in the earmarked dump area as per approved mining plan during first three years and subsequently concurrent back-filling shall be started as envisaged under mining plan. Monitoring and management of rehabilitated areas shall continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the Board and other concerned authorities on yearly basis.

52. The OB waste dumps shall be properly dressed benched stopped at low angle (37°) with terracing and coir matting in the slopes making retaining walls stone barriers at the toe of the dumps gully plugging etc. to prevent the soil erosion during monsoon.

53. The proponent shall comply to the provisions of Hazardous and Other Wastes (Management and Trans boundary Movement) Rules, 2016 and amended thereafter.

9/5/2025

MEMBER SECRETARY

Memo No._____/Date_____/

Copy forwarded to:

1. The Director, Directorate of Mines, Govt. of Odisha, Bhubaneswar
2. The Collector and District Magistrate, Koraput
3. The DFO, Koraput
4. The CTO (Mines), SPCB, Odisha, Bhubaneswar
5. The HWM Cell, SPCB, Odisha, Bhubaneswar
6. The Regional Officer, SPCB, Odisha, Koraput
7. Guard file

ADDL. CHIEF ENV. ENGINEER



BY REGD. POST WITH AD

STATE POLLUTION CONTROL BOARD, ODISHA

[DEPARTMENT OF FOREST, ENVIRONMENT & CLIMATE CHANGE, GOVERNMENT OF ODISHA]
A/118, Nilakantha Nagar, Unit-VIII, Bhubaneswar-751012
Phone-2561909, Fax: 2562822, 2560955 E-mail: paribesh1@ospcboard.org, Website: www.ospcboard.org

CONSENT ORDER

No. 7076 / IND-I-CON-6632 Dt. 03.05.2023 /

CONSENT ORDER NO. 2850

Sub: Consent for discharge of sewage and trade effluent under section 25/26 of Water (PCP) Act, 1974 and for existing / new operation of the plant under section 21 of Air (PCP) Act, 1981.

Ref: Your online application **No.4543127, dated 22.03.2023 and online reply dated 05.04.2023.**

Consent to operate is hereby granted under section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 and under section 21 of Air (Prevention & Control of Pollution) Act, 1981 and rules framed thereunder to

Name of the Industry: **KODINGAMALI BAUXITE MINES OF M/S. OMC LTD.**

Name of the Occupier & Designation: **SRI HEMANT KUMAR BEHERA, MINES MANAGER**

Address: **AT: KODINGAMALI, PO: LAXMIPUR, DIST: KORAPUT, PIN-765013.**

This consent order is valid for the period up to **31.03.2025**.

This consent order supersedes the earlier consent order issued vide letter No.4979, Dated 29.03.2022.

Details of Products Manufactured

Sl. No	Product	Quantity
01.	*Bauxite*	*3 MTPA*

Details of Mineral Handling Plants /Units

01	*Crushing plant of capacity 2 X 500 TPH*

This consent order is valid for the specified outlets, discharge quantity and quality, specified chimney/stack, emission quantity and quality of emissions as specified below. This consent is granted subject to the general and special conditions stipulated therein.

A. Discharge permitted through the following outlet subject to the standard

Outlet No.	Description of outlet	Point of discharge	Quantity of discharge KL/hr	Prescribed Standard				
				pH	TSS (mg/l)	Oil & Grease (mg/l)	BOD (mg/l)	COD (mg/l)
01.	*Mine drainage water/ surface runoffs/ other wastewater*	*On land/inland surface water body*	--	*5.5-9.0*	*100*	*10*	--	--

B. Emission permitted through the following stack subject to the prescribed standard

Chimney Stack No.	Description of Stack	Stack height (m)	Quantity of emission	Prescribed Standard			
				PM (mg/Nm^3)	SO_2	NO_x	
					--	--	

C. Disposal of solid waste permitted in the following manner

Sl. No.	Type of Solid waste	Quantity generated (TPD)	Quantity to be reused on site(TPD)	Quantity to be reused off site(TPD)	Quantity disposed off (TPD)	Description of disposal site.
01	*Top soil & over burden*	*As per approved mining plan*	--	--	--	*As per approved mining plan*

D. GENERAL CONDITIONS FOR ALL UNITS

1. The consent is given by the Board in consideration of the particulars given in the application. Any change or alternation or deviation made in actual practice from the particulars furnished in the application will also be the ground liable for review/variation/revocation of the consent order under section 27 of the Act of Water (Prevention & Control of Pollution) Act, 1974 and section 21 of Air (Prevention & Control of Pollution) Act, 1981 and to make such variations as deemed fit for the purpose of the Acts.

2. The industry would immediately submit revised application for consent to operate to this Board in the event of any change in the quantity and quality of raw material / and products / manufacturing process or quantity /quality of the effluent rate of emission / air pollution control equipment / system etc.

3. The applicant shall not change or alter either the quality or quantity or the rate of discharge or temperature or the route of discharge without the previous written permission of the Board.

4. The application shall comply with and carry out the directives/orders issued by the Board in this consent order and at all subsequent times without any negligence on his part. In case of non-compliance of any order/directives issued at any time and/or violation of the terms and conditions of this consent order, the applicant shall be liable for legal action as per the provisions of the Law/Act.

5. The applicant shall make an application for grant of fresh consent at least 90 days before the date of expiry of this consent order.

6. The issuance of this consent does not convey any property right in either real or personal property or any exclusive privileges nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Central, State laws or regulation.

7. This consent does not authorize or approve the construction of any physical structure or facilities or the undertaking of any work in any natural water course.

8. The applicant shall display this consent granted to him in a prominent place for perusal of the public and inspecting officers of this Board.

9. An inspection book shall be opened and made available to Board's Officers during the visit to the factory.

10. The applicant shall furnish to the visiting officer of the Board any information regarding the construction, installation or operation of the plant or of effluent treatment system / air pollution control system / stack monitoring system any other particulars as may be pertinent to preventing and controlling pollution of Water / Air.

11. Meters must be affixed at the entrance of the water supply connection so that such meters are easily accessible for inspection and maintenance and for other purposes of the Act provided that the place where it is affixed shall in no case be at a point before which water has been taped by the consumer for utilization for any purposes whatsoever.

12. Separate meters with necessary pipe-line for assessing the quantity of water used for each of the purposes mentioned below:

    a) Industrial cooling, spraying in mine pits or boiler feed;
    b) Domestic purpose
    c) Process

13. The applicant shall display suitable caution board at the place where the effluent is entering into any water-body or any other place to be indicated by the Board, indicating therein that the area into which the effluents are being discharged is not fit for the domestic use/bathing.

14. Storm water shall not be allowed to mix with the trade and/or domestic effluent on the upstream of the terminal manholes where the flow measuring devices will be installed.

15. The applicant shall maintain good house-keeping both within the factory and the premises. All pipes, valves, sewers and drains shall be leak-proof. Floor washing shall be admitted into the effluent collection system only and shall not be allowed to find their way in storm drains or open areas.

16. The applicant shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems install or used by him to achieve with the term(s) and conditions of the consent.

17. Care should be taken to keep the anaerobic lagoons, if any, biologically active and not utilized as mere stagnation ponds. The anaerobic lagoons should be fed with the required nutrients for effective digestion. Lagoons should be constructed with sides and bottom made impervious.

18. The utilization of treated effluent on factory's own land, if any, should be completed and there should be no possibility of the effluent gaining access into any drainage channel or other water courses either directly or by overflow.

19. The effluent disposal on land, if any, should be done without creating any nuisance to the surroundings or inundation of the lands at any time.

20. If at any time the disposal of treated effluent on land becomes incomplete or unsatisfactory or create any problem or becomes a matter of dispute, the industry must adopt alternate satisfactory treatment and disposal measures.

21. The sludge from treatment units shall be dried in sludge drying beds and the drained liquid shall be taken to equalization tank.

22. The effluent treatment units and disposal measures shall become operative at the time of commencement of production.

23. The applicant shall provide port holes for sampling the emissions and access platform for carrying out stack sampling and provide electrical outlet points and other arrangements for chimneys/stacks and other sources of emissions so as to collect samples of emission by the Board or the applicant at any time in accordance with the provision of the Act or Rules made therein.

24. The applicant shall provide all facilities and render required assistance to the Board staff for collection of samples / stack monitoring / inspection.

25. The applicant shall not change or alter either the quality or quantity or rate of emission or install, replace or alter the air pollution control equipment or change the raw material or manufacturing process resulting in any change in quality and/or quantity of emissions, without the previous written permission of the Board.

26. No control equipments or chimney shall be altered or replaced or as the case may be erected or re-erected except with the previous approval of the Board.

27. The liquid effluent arising out of the operation of the air pollution control equipment shall be treated in the manner and to ion of standards prescribed by the Board in accordance with the provisions of Water (Prevention and Control of Pollution) Act, 1974 (as amended).

28. The stack monitoring system employed by the applicant shall be opened for inspection to this Board at any time.

29. There shall not be any fugitive or episodal discharge from the premises.

30. In case of such episodal discharge/emissions the industry shall take immediate action to bring down the emission within the limits prescribed by the Board in conditions/stop the operation of the plant. Report of such accidental discharge /emission shall be brought to the notice of the Board within 24 hours of occurrence.

31. The applicant shall keep the premises of the industrial plant and air pollution control equipments clean and make all hoods, pipes, valves, stacks/chimneys leak proof. The air pollution control equipments, location, inspection chambers, sampling port holes shall be made easily accessible at all times.

32. Any upset condition in any of the plant/plants of the factory which is likely to result in increased effluent discharge/emission of air pollutants and / or result in violation of the standards mentioned above shall be reported to the Headquarters and Regional Office of the Board by fax / speed post within 24 hours of its occurence.

33. The industry has to ensure that minimum three varieties of trees are planted at the density of not less than 1000 trees per acre. The trees may be planted along boundaries of the industries or industrial premises. This plantation is stipulated over and above the bulk plantation of trees in that area.

34. The solid waste such as sweeping, wastage packages, empty containers residues, sludge including that from air pollution control equipments collected within the premises of the industrial plants shall be disposed off scientifically to the satisfaction of the Board, so as no to cause fugitive emission, dust problems through leaching etc., of any kind.

35. All solid wastes arising in the premises shall be properly classified and disposed off to the satisfaction of the Board by
   i) Land fill in case of inert material, care being taken to ensure that the material does not give rise to leachate which may percolate into ground water or carried away with storm run-off.
   ii) Controlled incineration, wherever possible in case of combustible organic material.
   iii) Composting, in case of bio-degradable material.

36. Any toxic material shall be detoxicated if possible, otherwise be sealed in steel drums and buried in protected areas after obtaining approval of this Board in writing. The detoxication or sealing and burying shall be carried out in the presence of Board's authorized persons only. Letter of authorization shall be obtained for handling and disposal of hazardous wastes.

37. If due to any technological improvement or otherwise this Board is of opinion that all or any of the conditions referred to above requires variation (including the change of any control equipment either in whole or in part) this Board shall after giving the applicant an opportunity of being heard, vary all or any of such condition and thereupon the applicant shall be bound to comply with the conditions so varied.

38. The applicant, his/heirs/legal representatives or assignees shall have no claim whatsoever to the condition or renewal of this consent after the expiry period of this consent.

39. The Board reserves the right to review, impose additional conditions or condition, revoke change or alter the terms and conditions of this consent.

40. Notwithstanding anything contained in this conditional letter of consent, the Board hereby reserves to it the right and power under section 27(2) of the Water (Prevention & Control of Pollution) Act, 1974 to review any and/or all the conditions imposed herein above and to make such variations as deemed fit for the purpose of the Act by the Board.

41. The conditions imposed as above shall continue to be in force until revoked under section 27(2) of the Water (Prevention & Control of Pollution) Act, 1974 and section 21 A of Air (Prevention & Control of Pollution) Act, 1981.

42. In case the consent fee is revised upward during this period, the industry shall pay the differential fees to the Board (for the remaining years) to keep the consent order in force. If they fail to pay the amount within the period stipulated by the Board the consent order will be revoked without prior notice.

43. The Board reserves the right to revoke/refuse consent to operate at any time during period for which consent is granted in case any violation is observed and to modify/ stipulate additional conditions as deemed appropriate.

GENERAL CONDITIONS FOR UNITS WITH INVESTMENT OF MORE THAN Rs 50 CRORES, AND 17 CATEGORIES OF HIGHLY POLLUTING INDUSTRIES (RED A).

1. The applicant shall analyse the emissions every month for the parameters indicated in TABLE B & C as mentioned in this order and shall furnish the report thereof to the Board by the 10th of the succeeding month.

2. The applicant shall provide and maintain at his own cost three ambient air quality monitoring stations for monitoring Suspended Particulate Matter, Sulphur Dioxide, Oxides of Nitrogen, Hydro-Carbon, Carbon-Monoxide and monitor the same once in a day/week/fortnight/month. The data collected shall be maintained in a register and a monthly extract be furnished to the Board.

3. The applicant shall provide and maintain at his own cost a meteorological station to collect the data on wind velocity, direction, temperature, humidity, rainfall, etc. and the daily reading shall be recorded and the extract sent to the Board once in a month.

4. The applicant shall forward the following information to the Member Secretary, State Pollution Control Board, Odisha, Bhubaneswar regularly
   a. Report of analysis of stack monitoring, ambient air quality monitoring meteorological data as required every month.
   b. Progress on planting of trees quarterly.

5. The applicant shall install mechanical composite sampling equipment and continuous flow measuring / recording devices on the effluent drains of trade as well as domestic effluent. A record of daily discharge shall be maintained.

6. The following information shall be forwarded to the Member Secretary on or before 10th of every month.

   a. Performance / progress of the treatment plant.
   b. Monthly statement of daily discharge of domestic and/or trade effluent.

7. Non-compliance with effluent limitations

   a) If for any reason the applicant does not comply with or is unable to comply with any effluent limitations specified in this consent, the applicant shall immediately notify the consent issuing authority by telephone and provide the consent issuing authority with the following information in writing within 5 days of such notification.

      i) Causes of non-compliance.

      ii) A description of the non-compliance discharge including its impact on the receiving waters.

      iii) Anticipated time of continuance of non-compliance if expected to continue or if such condition has been corrected the duration or period of non-compliance.

      iv) Steps taken by the applicant to reduce and eliminate the non-complying discharge and

      v) Steps to be taken by the applicant too prevent the condition of non-compliance.

   b) The applicant shall take all reasonable steps to minimize any adverse impact to natural waters resulting from non-compliance with any effluent limitation specified in this consent including such accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying discharge.

   c) Nothing in this consent shall be construed to relieve the applicant from civil or criminal penalties for non-compliance whether or not such non-compliance is due to factors beyond his control, such as break-down, electric failure, accident or natural disaster.

8. The applicant shall at his own cost get the effluent samples collected both before and after treatment and get them analysed at an approval laboratory every month for the parameters indicated in Part-D and shall submit in duplicate the report thereof to the Board.

9. The addition of various treatment chemicals should be done only with mechanical dosers and proper equipment for regulation of correct dosages determined daily and for proper uniform feeding. Crude practices such as dumping of chemicals in drains or sumps or trickling of acids or alkalies arbitrarily and utilizing poles for stirring etc. should not be resorted to.

10. In the disposal of treated effluent on land for irrigation, the industry shall keep in view of the need for;

    a) Rotation of crops

    b) Change of point of application of effluent on land

    c) A portion of land kept fallow

11. The adoption of these would avoid soil becoming sick or slate, the industry may ensure this in consultation with the Agriculture Department.

12. It is the sole responsibility of the industry to ensure that there are no complaints at any time from the royats in the surrounding areas as a result of discharge of sewage or trade effluent if any.

13. Proper housekeeping shall be maintained by a dedicated team.

14. The industry must constitute a team of responsible and technically qualified personnel who will ensure continuous operation of all pollution control devices round the clock (including night hours) and should be in a position to explain the status of operation of the pollution control measures to the inspecting officers of the Board at any point of time. The name of these persons with their contact telephone numbers shall be intimated to the concerned Regional Officer and Head Office of the Board and in case of any change in the team it shall be intimated to the Board immediately.

E. SPECIAL CONDITIONS:

1. Mining operation is subject to availability of all other statutory clearances.
2. Drills shall either be operated with dust extractors or equipped with water injection system to minimize dust generation in the work environment.
3. Controlled blasting shall be practiced to minimize generation of dust and fly rocks. No blasting shall be carried out after the sunset.
4. Water sprinkling shall also be carried out on haul roads at desired interval and should always be in wet condition. Haulage roads shall be devoid of ruts and potholes and shall be maintained properly to avoid generation of dust during movement of vehicles.
5. The approach road of length 1.5 km road from main gate to weigh bridge and internal road to weighbridge of length 0.8 km shall be concreted.
6. Fixed sprinklers alongside major haul road shall be installed and more fog canons for control of fugitive dust shall be deployed to keep AAQ level within the prescribed limit. The air pollution control measures shall be efficiently operated to keep the PM_{10} level in ambient air within permissible limit at Maitri Infra Agency Camp towards Talakodinga.
7. Arrangement of supply of water to hilltop mining site from bottom hill shall be done through pipeline to avoid fetching of water through mobile water tanker for adequate use for different purposes.
8. Mechanized wheel washing facility for the ore transport vehicles shall be provided at the exit point of the mine. The wheel washing facility shall be integrated with complete recirculation system.
9. The vehicles carrying ore for transportation from the mine shall be covered with tarpaulin.
10. Regular water sprinkling on mineral transportation roads passing through the habitation area as well as other strategic point on the National Highway shall be done by the mining lessee. Mechanized road sweeping shall also be done to avoid re-suspension of dust.
11. The mineral handling plants (crushing plants) shall be installed with adequate pollution control measures.
12. The existing 2 x 250 TPH Mobile Crusher plants shall be dismantled and intimated to Regional Office, Koraput as well as Head Office of SPCB, Odisha and verification. A declaration to this effect shall be submitted within 7 days from the date of issue of this order.
13. The conveyor belts of the fixed crusher plants shall be covered with GCI sheets.

14. At least six Ambient Air Quality Monitoring Stations shall be established in core zone and buffer zone for monitoring of ambient air quality and location of the stations shall be decided in consultation with the Regional Officer, State Pollution Control Board based on the metrological data, topographical features and environmentally and ecologically sensitive targets.

15. Monitoring of Ambient Air Quality and fugitive dust emission of the mine shall be done twice in a week (24 hourly) at a particular site and consolidated data shall be submitted to the State Pollution Control Board, once in a year.

16. Ambient air quality of the mine shall meet the standards prescribed for industrial area.

17. The project proponent shall ensure that no natural watercourse and / or water resources are obstructed due to any mining operations.

18. A study on quantification and management of surface runoff and other wastewater generated in the mine is done by NIT, Rourkela. The action taken report for implementation of recommendations of the study report shall be submitted.

19. Adequate numbers of check dams, check weirs and settling ponds shall be constructed at appropriate places including east and south-east side, of the mine lease area to prevent direct flow of runoff to nearby water bodies in consultation with Regional Officers, SPCB. The surface run off water from the runoff management system shall meet the prescribed standards as stated in Part-A of the consent order.

20. Retention wall shall be constructed at the toe of topsoil dump and OB dump. Garland drain shall be constructed around topsoil dumps, over burden dumps and mineral stack yards terminating at settling pit to prevent direct disposal of runoff to nearby water bodies. Garland drain and sedimentation pit shall be de-silted after monsoon or as and when required. The runoff discharge quality from runoff management system shall meet the standards prescribed as stated in Part-A of the consent order.

21. Appropriate mitigative measures shall be taken to prevent pollution of the nearby water bodies.

22. Regular monitoring of ground water level and quality should be carried out by establishing a network of existing wells. The monitoring should be done four times a year in pre-monsoon (April/May), monsoon (August), post-monsoon (November) and winter (January) seasons. Data thus collected should be submitted to the Board annually.

23. Domestic effluents shall be treated in a sewage treatment plant (STP) and or shall be discharged to soak pit via septic tank constructed as BIS specification. The treated wastewater quality of STP shall remain within the following standards and shall be used for plantation:

pH	-	6.5 -9.0
TSS	-	<100 mg/l
BOD	-	30 mg/l
Fecal Coliform	-	<1000 MPN/100 ml.

24. ETP shall be operated all the time for workshop and wastewater generated during mining operation. The quality of the treated wastewater shall remain within the following standards and shall be re-used for washing of vehicles:

pH	-	6.5 -8.5
TSS	-	50 mg/l
Oil & grease	-	10 mg/l
COD	-	150 mg/l

25. Regular monitoring of water quality of upstream and downstream of surface water bodies existed if any within 5 Km shall be carried out once in every month and record shall be maintained and submitted to the State Pollution Control Board once in every year. Monitoring shall be carried out through MoEF & CC accredited laboratory.

26. The topsoil generated shall be stored at earmarked site (s) only and stabilized or shall be used for land reclamation and plantation.

27. The over burden generated during the course of mining shall be stacked at earmarked dump site (s) and stabilized or used for reclamation of excavated land followed by plantation.

28. Adequate measures shall be taken for control of noise levels in the work environment of mine area so that noise levels at the boundary line of mining lease area shall not exceed 75 dB(A) during daytime (6.00 AM to 9.00 PM) and 70 dB(A) during nighttime (9.00 PM to 6 AM).

29. Adequate noise barriers shall be provided surrounding the crushing and screening plants to control noise pollution and avoid impact on wildlife due to operation of crushing and screening plants during night hours.

30. Online noise monitoring system shall be installed to monitor noise level during night hours.

31. Protective barriers shall be provided for the lights to prevent illumination towards the forest area during night hours.

32. Ambient air quality monitoring data, noise monitoring data and water / wastewater quality monitoring data shall be electronically displayed at the entry point of the mine or at a suitable location of the mine.

33. Plantation of trees shall be undertaken in the colony/ township, over topsoil dumps, OB dumps, backfilled areas, along the side of haul road and in other areas of the mines not being utilized for mining activities. The mine shall take up avenue plantation and plantation in nearby village areas in consultation with DFO/Horticulture Department. The plantation details shall be submitted to the Board before end of April every year.

34. A copy of the annual return (annual return submitted to IBM, Govt. of India/ Directorate of Mines, Govt. of Odisha) shall be submitted every year.

35. The environmental statement report in prescribed Format-V shall be submitted to the Board in prescribed format every year on or before 30th September every year.

MEMBER SECRETARY
STATE POLLUTION CONTROL BOARD, ODISHA

TO,

SRI HEMANT KUMAR BEHERA, MINES MANAGER
KODINGAMALI BAUXITE MINES OF M/S. OMC LTD.
AT: KODINGAMALI, PO: LAXMIPUR,
DIST: KORAPUT, PIN-765013.

Memo No._____/Dt._____/

Copy forwarded to :

i) Regional Officer, State Pollution Control Board, **Koraput**
ii) District Collector, **Koraput / Rayagada**
iii) Director of Mines, Govt. of Odisha, Bhubaneswar
iv) Director, Environment-cum-Special Secretary, F & E. Dept. Govt. of Odisha, Bhubaneswar.
v) D.F.O, **Koraput / Rayagada**
vi) Dy. Director of Mines, **Koraput**
vii) Chief Env. Scientist, Central Lab., SPCB, Bhubaneswar
viii) Addl. Chief Env. Engineer (Hazardous Waste Management Cell)
ix) Consent Register

CHIEF ENV. ENGINEER(M)
STATE POLLUTION CONTROL BOARD, ODISHA

GENERAL STANDARDS FOR DISCHARGE OF ENVIRONMENT POLLUTANTS

GENERAL STANDARDS FOR DISCHARGE OF ENVIRONMENTAL POLLUTANTS PART – A : EFFLUENTS

Sl. No.	Parameters	Standards			
		Inland surface	Public sewers	Land for irrigation	Marine Costal Areas
		(a)	(b)	(c)	(d)
1.	Colour & odour	Colourless/ Odourless as far as practible	------	See 6 of Annex-1	See 6 of Annex-1
2.	Suspended Solids (mg/l)	100	600	200	a. For process wastewater – 100 b. For cooling water effluent 10% above total suspended matter of influent.
3.	Particular size of SS	Shall pass 850	-----	------	------
5.	pH value	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
6.	Temperature	Shall not exceed 5°C above the receiving water temperature	-------	--------	Shall not exceed 5°C above the receiving water temperature
7.	Oil & Grease mg/l max.	10	20	10	20
8.	Total residual chlorine	1.0	----	------	1.0
9.	Ammonical nitrogen (as N) mg/l max.	50	50	------	50
10.	Total Kajeldahl nitrogen (as NH_3) mg/1 max.	100	----	------	100
11.	Free ammonia (as NH_3) mg/1 max.	5.0	----	------	5.0
12.	Biochemical Oxygen Demand (5 days at (20°C) mg/1 max.	30	350	100	100
13.	Chemical Oxygen Demand, mg/1 max.	250	----	------	250
14.	Arsenic (as As) mg/1 max.	0.2	0.2	0.2	0.2
15.	Mercury (as Hg) mg/1 max.	0.01	0.01	------	0.001
16.	Lead (as pb) mg/1 max.	01.	1.0	------	2.0
17.	Cardmium (as Cd) mg/1 max.	2.0	1.0	------	2.0

Sl. No.	Parameters	Standards			
		Inland surface	Public sewers	Land for irrigation	Marine Costal Areas
		(a)	(b)	(c)	(d)
18.	Hexavalent Chromium (as Cr + 6) mg/l max.	0.1	2.0	-------	1.0
19.	Total Chromium (as Cr) mg/l max.	2.0	2.0	-------	2.0
20.	Copper (as Cu) mg/l max.	3.0	3.0	-------	3.0
21.	Zinc (as Zn) mg/l max.	5.0	15	-------	15
22.	Selenium (as Sc) mg/l max.	0.05	0.05	-------	0.05
23.	Nickel (as Nil) mg/l max.	3.0	3.0	-------	5.0
24.	Cyanide (as CN) mg/l max.	0.2	2.0	0.2	0.02
25.	Fluoride (as F) mg/l max.	2.0	15	-------	15
26.	Dissolved Phosphates (as P) mg/l max.	5.0	-------	-------	-------
27.	Sulphide (as S) mg/l max.	2.0	-------	-------	5.0
28.	Phennolic compounds as (C_6H_5OH) mg/l max.	1.0	5.0	-------	5.0
29.	Radioactive materials a. Alpha emitter micro curie/ml. b. Beta emitter micro curie/ml.	10^{-7} 10^{-8}	10^{-7} 10^{-8}	10^{-8} 10^{-7}	10^{-7} 10^{-8}
30.	Bio-assay test	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent
31	Manganese (as Mn)	2 mg/l	2 mg/l	-------	2 mg/l
32.	Iron (Fe)	3 mg/l	3 mg/l	-------	3 mg/l
33.	Vanadium (as V)	0.2 mg/l	0.2 mg/l	-------	0.2 mg/l
34.	Nitrate Nitrogen	10 mg/l	-------	-------	20 mg/l

NATIONAL AMBIENT AIR QUALITY STANDARDS

Sl. No.	Pollutants	Time Weighed Average	Concentrate of Ambient Air		
			Industrial Residential, Rural and other Area	Ecologically Sensitive Area (notified by Central Government)	Methods of Measurement
(1)	(2)	(3)	(4)	(5)	(6)
1.	Sulphur Dioxide (SO_2), $\mu g/m^3$	Annual *	50	20	-Improved west and Gaeke
		24 Hours **	80	80	- Ultraviolet fluorescence
2.	Nitrogen Dioxide (NO_2), $\mu g/m^3$	Annual *	40	30	- Modified Jacob & Hochheiser (Na-Arsenite)
		24 Hours **	80	80	- Chemiluminescence
3.	Particulate Matter (size less than 10μm) or $PM_{10}\mu g/m^3$	Annual *	60	60	-Gravimetric - TOEM
		24 Hours **	100	100	- Beta Attenuation
4.	Particulate Matter (size less than 2.5μm) or $PM_{2.5}\ \mu g/m^3$	Annual *	40	40	-Gravimetric - TOEM
		24 Hours **	60	60	- Beta Attenuation
5.	Ozone (O_3) $\mu g/m^3$	8 Hours **	100	100	- UV Photometric - Chemiluminescence
		1 Hours **	180	180	- Chemical Method
6.	Lead (Pb) $\mu g/m^3$	Annual *	0.50	0.50	-AAS/ICP method after sampling on EMP 2000 or equivalent filter paper. - ED-XRF using Teflon filter
		24 Hours **	1.0	1.0	
7.	Carbon Monoxide (CO) mg/m^3	8 Hours **	02	02	- Non Dispersive Infra Red (NDIR) Spectroscopy
		1 Hours **	04	04	
8.	Ammonia (NH_3) $\mu g/m^3$	Annual*	100	100	-Chemiluminescence - Indophenol Blue Method
		24 Hours**	400	400	
9.	Benzene (C_6H_6) $\mu g/m^3$	Annul *	05	05	-Gas Chromatography based continuous analyzer - Adsorption and Desorption followed by GC analysis
10.	Benzo (a) Pyrene (BaP)-Particulate phase only, ng/m^3	Annual*	01	01	-Solvent extraction followed by HPLC/GC analysis
11.	Arsenic (As), ng/m^3	Annual*	06	06	-AAS/ICP method after sampling on EPM 2000 or equivalent filter paper
12.	Nickel (Ni),ng/m^3	Annual*	20	20	-AAS/ICP method after sampling on EPM 2000 or equivalent filter paper

* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

** 24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be complied with 98% of the time in a year, 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

BY REGD. POST WITH AD

STATE POLLUTION CONTROL BOARD, ODISHA

[DEPARTMENT OF FOREST, ENVIRONMENT & CLIMATE CHANGE, GOVERNMENT OF ODISHA]
A/118, Nilakantha Nagar, Unit-VIII, Bhubaneswar-751012
Phone-2561909, Fax: 2562822, 2560955 E-mail: paribesh1@ospcboard.org, Website: www.ospcboard.org

CONSENT ORDER

No. 4979 / IND-I-CON- 6632 Dt. 29.03.2022 /

CONSENT ORDER NO. 2850

Sub: Consent for discharge of sewage and trade effluent under section 25/26 of Water (PCP) Act, 1974 and for existing / new operation of the plant under section 21 of Air (PCP) Act, 1981.

Ref: Your online application No.2892010, dated 16-01-2020, and online reply dated 01-03-2022 and Letter No.1889/OMC/KBM/2022, Dated 01.03.2022.

Consent to operate is hereby granted under section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 and under section 21 of Air (Prevention & Control of Pollution) Act, 1981 and rules framed thereunder to

Name of the Industry: **KODINGAMALI BAUXITE MINES OF M/S. OMC LTD.**

Name of the Occupier & Designation: **SRI MANOJ KUMAR SETHY, MINES MANAGER**

Address: **AT: KODINGAMALI, PO: LAXMIPUR, DIST: KORAPUT, PIN-765013.**

This consent order is valid for the period up to **31.03.2025**.

This consent order supersedes the earlier consent order issued vide letter No.5116, Dated 26.03.2021.

Details of Products Manufactured

Sl. No	Product	Quantity
01.	*Bauxite*	*3 MTPA*

Details of Mineral Handling Plants /Units

01	Crushing plant of capacity 1 X 500 TPH & 2 X 250 TPH

This consent order is valid for the specified outlets, discharge quantity and quality, specified chimney/stack, emission quantity and quality of emissions as specified below. This consent is granted subject to the general and special conditions stipulated therein.

A. Discharge permitted through the following outlet subject to the standard

Outlet No.	Description of outlet	Point of discharge	Quantity of discharge KL/hr	Pre-scribed Standard				
				pH	TSS (mg/l)	Oil & Grease (mg/l)	BOD (mg/l)	COD (mg/l)
01.	*Mine drainage water/ surface runoffs/ other wastewater*	*On land/inland surface water body*	--	*5.5-9.0*	*100*	*10*	--	--

B. Emission permitted through the following stack subject to the prescribed standard

Chimney Stack No.	Description of Stack	Stack height (m)	Quantity of emission	Prescribed Standard			
				PM (mg/Nm^3)	SO_2	NO_x	
					--	--	

C. Disposal of solid waste permitted in the following manner

Sl. No.	Type of Solid waste	Quantity generated (TPD)	Quantity to be reused on site(TPD)	Quantity to be reused off site(TPD)	Quantity disposed off (TPD)	Description of disposal site.
01	*Top soil & over burden*	*As per approved mining plan*	--	--	--	*As per approved mining plan*

D. GENERAL CONDITIONS FOR ALL UNITS

1. The consent is given by the Board in consideration of the particulars given in the application. Any change or alternation or deviation made in actual practice from the particulars furnished in the application will also be the ground liable for review/variation/revocation of the consent order under section 27 of the Act of Water (Prevention & Control of Pollution) Act, 1974 and section 21 of Air (Prevention & Control of Pollution) Act, 1981 and to make such variations as deemed fit for the purpose of the Acts.

2. The industry would immediately submit revised application for consent to operate to this Board in the event of any change in the quantity and quality of raw material / and products / manufacturing process or quantity /quality of the effluent rate of emission / air pollution control equipment / system etc.

3. The applicant shall not change or alter either the quality or quantity or the rate of discharge or temperature or the route of discharge without the previous written permission of the Board.

4. The application shall comply with and carry out the directives/orders issued by the Board in this consent order and at all subsequent times without any negligence on his part. . In case of non-compliance of any order/directives issued at any time and/or violation of the terms and conditions of this consent order, the applicant shall be liable for legal action as per the provisions of the Law/Act.

5. The applicant shall make an application for grant of fresh consent at least 90 days before the date of expiry of this consent order.

6. The issuance of this consent does not convey any property right in either real or personal property or any exclusive privileges nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Central, State laws or regulation.

7. This consent does not authorize or approve the construction of any physical structure or facilities or the undertaking of any work in any natural water course.

8. The applicant shall display this consent granted to him in a prominent place for perusal of the public and inspecting officers of this Board.

9. An inspection book shall be opened and made available to Board's Officers during the visit to the factory.

10. The applicant shall furnish to the visiting officer of the Board any information regarding the construction, installation or operation of the plant or of effluent treatment system / air pollution control system / stack monitoring system any other particulars as may be pertinent to preventing and controlling pollution of Water / Air.

11. Meters must be affixed at the entrance of the water supply connection so that such meters are easily accessible for inspection and maintenance and for other purposes of the Act provided that the place where it is affixed shall in no case be at a point before which water has been taped by the consumer for utilization for any purposes whatsoever.

12. Seperate meters with necessary pipe-line for assessing the quantity of water used for each of the purposes mentioned below:

    a) Industrial cooling, spraying in mine pits or boiler feed.
    b) Domestic purpose
    c) Process

13. The applicant shall display suitable caution board at the place where the effluent is entering into any water-body or any other place to be indicated by the Board, indicating therein that the area into which the effluents are being discharged is not fit for the domestic use/bathing.

14. Storm water shall not be allowed to mix with the trade and/or domestic effluent on the upstream of the terminal manholes where the flow measuring devices will be installed.

15. The applicant shall maintain good house-keeping both within the factory and the premises. All pipes, valves, sewers and drains shall be leak-proof. Floor washing shall be admitted into the effluent collection system only and shall not be allowed to find their way in storm drains or open areas.

16. The applicant shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems install or used by him to achieve with the term(s) and conditions of the consent.

17. Care should be taken to keep the anaerobic lagoons, if any, biologically active and not utilized as mere stagnation ponds. The anaerobic lagoons should be fed with the required nutrients for effective digestion. Lagoons should be constructed with sides and bottom made impervious.

18. The utilization of treated effluent on factory's own land, if any, should be completed and there should be no possibility of the effluent gaining access into any drainage channel or other water courses either directly or by overflow.

19. The effluent disposal on land, if any, should be done without creating any nuisance to the surroundings or inundation of the lands at any time.

20. If at any time the disposal of treated effluent on land becomes incomplete or unsatisfactory or create any problem or becomes a matter of dispute, the industry must adopt alternate satisfactory treatment and disposal measures.

21. The sludge from treatment units shall be dried in sludge drying beds and the drained liquid shall be taken to equalization tank.

22. The effluent treatment units and disposal measures shall become operative at the time of commencement of production.

23. The applicant shall provide port holes for sampling the emissions and access platform for carrying out stack sampling and provide electrical outlet points and other arrangements for chimneys/stacks and other sources of emissions so as to collect samples of emission by the Board or the applicant at any time in accordance with the provision of the Act or Rules made therein.

24. The applicant shall provide all facilities and render required assistance to the Board staff for collection of samples / stack monitoring / inspection.

25. The applicant shall not change or alter either the quality or quantity or rate of emission or install, replace or alter the air pollution control equipment or change the raw material or manufacturing process resulting in any change in quality and/or quantity of emissions, without the previous written permission of the Board.

26. No control equipments or chimney shall be altered or replaced or as the case may be erected or re-erected except with the previous approval of the Board.

27. The liquid effluent arising out of the operation of the air pollution control equipment shall be treated in the manner and to ion of standards prescribed by the Board in accordance with the provisions of Water (Prevention and Control of Pollution) Act, 1974 (as amended).

28. The stack monitoring system employed by the applicant shall be opened for inspection to this Board at any time.

29. There shall not be any fugitive or episodal discharge from the premises.

30. In case of such episodal discharge/emissions the industry shall take immediate action to bring down the emission within the limits prescribed by the Board in conditionsstop the operation of the plant. Report of such accidental discharge /emission shall be brought to the notice of the Board within 24 hours of occurrence.

31. The applicant shall keep the premises of the industrial plant and air pollution control equipments clean and make all hoods, pipes, valves, stacks/chimneys leak proof. The air pollution control equipments, location, inspection chambers, sampling port holes shall be made easily accessible at all times.

32. Any upset condition in any of the plant/plants of the factory which is likely to result in increased effluent discharge/emission of air pollutants and / or result in violation of the standards mentioned above shall be reported to the Headquarters and Regional Office of the Board by fax / speed post within 24 hours of its occurence.

33. The industry has to ensure that minimum three varieties of trees are planted at the density of not less than 1000 trees per acre. The trees may be planted along boundaries of the industries or industrial premises. This plantation is stipulated over and above the bulk plantation of trees in that area.

34. The solid waste such as sweeping, wastage packages, empty containers residues, sludge including that from air pollution control equipments collected within the premises of the industrial plants shall be disposed off scientifically to the satisfaction of the Board, so as no to cause fugitive emission, dust problems through leaching etc., of any kind.

35. All solid wastes arising in the premises shall be properly classified and disposed off to the satisfaction of the Board by :

    i) Land fill in case of inert material, care being taken to ensure that the material does not give rise to leachate which may percolate into ground water or carried away with storm run-off.
    ii) Controlled incineration, wherever possible in case of combustible organic material.
    iii) Composting, in case of bio-degradable material.

36. Any toxic material shall be detoxicated if possible, otherwise be sealed in steel drums and buried in protected areas after obtaining approval of this Board in writing. The detoxication or sealing and burying shall be carried out in the presence of Board's authorized persons only. Letter of authorization shall be obtained for handling and disposal of hazardous wastes.

37. If due to any technological improvement or otherwise this Board is of opinion that all or any of the conditions referred to above requires variation (including the change of any control equipment either in whole or in part) this Board shall after giving the applicant an opportunity of being heard, vary all or any of such condition and thereupon the applicant shall be bound to comply with the conditions so varied.

38. The applicant, his/heirs/legal representatives or assignees shall have no claim whatsoever to the condition or renewal of this consent after the expiry period of this consent.

39. The Board reserves the right to review, impose additional conditions or condition, revoke change or alter the terms and conditions of this consent.

40. Notwithstanding anything contained in this conditional letter of consent, the Board hereby reserves to it the right and power under section 27(2) of the Water (Prevention & Control of Pollution) Act, 1974 to review any and/or all the conditions imposed herein above and to make such variations as deemed fit for the purpose of the Act by the Board.

41. The conditions imposed as above shall continue to be in force until revoked under section 27(2) of the Water (Prevention & Control of Pollution) Act, 1974 and section 21 A of Air (Prevention & Control of Pollution) Act, 1981.

42. In case the consent fee is revised upward during this period, the industry shall pay the differential fees to the Board (for the remaining years) to keep the consent order in force. If they fail to pay the amount within the period stipulated by the Board the consent order will be revoked without prior notice.

43. The Board reserves the right to revoke/refuse consent to operate at any time during period for which consent is granted in case any violation is observed and to modify/ stipulate additional conditions as deemed appropriate.

GENERAL CONDITIONS FOR UNITS WITH INVESTMENT OF MORE THAN Rs 50 CRORES, AND 17 CATEGORIES OF HIGHLY POLLUTING INDUSTRIES (RED A)

1. The applicant shall analyse the emissions every month for the parameters indicated in TABLE .B & C as mentioned in this order and shall furnish the repot thereof to the Board by the 10th of the succeeding month.

2. The applicant shall provide and maintain at his own cost three ambient air quality monitoring stations for monitoring Suspended Particulate Matter, Sulphor Dioxide, Oxides of Nitrogen, Hydro-Carbon, Carbon-Monixide and monitor the same once in a day/week/fortnight/month. The data collected shall be maintained in a register and a monthly extract be furnished to the Board.

3. The applicant shall provide and maintain at his own cost a meteorological station to collect the data on wind velocity, direction, temperature, humidity, rainfall, etc. and the daily reading shall be recorded and the extract sent to the Board once in a month.

4. The applicant shall forward the following information to the Member Secretary, State Pollution Control Board, Odisha, Bhubaneswar regularly.
   a. Report of analysis of stack monitoring, ambient air quality monitoring meteorological data as required every month.
   b. Progress on planting of trees quarterly.

5. The applicant shall install mechanical composite sampling equipment and continuous flow measuring / recording devices on the effluent drains of trade as well as domestic effluent. A record of daily discharge shall be maintained.

6. The following information shall be forwarded to the Member Secretary on or before 10th of every month.
   a. Performance / progress of the treatment plant.
   b. Monthly statement of daily discharge of domestic and/or trade effluent.

7. **Non-compliance with effluent limitations**

   a) If for any reason the applicant does not comply with or is unable to comply with any effluent limitations specified in this consent, the applicant shall immediately notify the consent issuing authority by telephone and provide the consent issuing authority with the following information in writing within 5 days of such notification.

      i) Causes of non-compliance

      ii) A description of the non-compliance discharge including its impact on the receiving waters.

      iii) Anticipated time of continuance of non-compliance if expected to continue or if such condition has been corrected the duration or period of non-compliance.

      iii) Steps taken by the applicant to reduce and eliminate the non-complying discharge and

      iv) Steps to be taken by the applicant too prevent the condition of non-compliance.

   b) The applicant shall take all reasonable steps to minimize any adverse impact to natural waters resulting from non-compliance with any effluent limitation specified in this consent including such accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying discharge.

   c) Nothing in this consent shall be construed to relieve the applicant from civil or ciminal penalties for non-compliance whether or not such non-compliance is due to factors beyond his control, such as break-down, electric failure, accident or natural disaster.

8. The applicant shall at his own cost get the effluent samples collected both before and after treatment and get them analysed at an approval laboratory every month for the parameters indicated in Part-D and shall submit in duplicate the report thereof to the Board.

9. The addition of various treatment chemicals should be done only with mechanical dosers and proper equipment for regulation of correct dosages determined daily and for proper uniform feeding. Crude practices such as dumping of chemicals in drains or sumps or trickling of acids or alkalies arbitrarily and utilizing poles for stirring etc. should not be resorted to.

10. In the disposal of treated effluent on land for irrigation, the industry shall keep in view of the need for;

    Rotation of crops

    Change of point of application of effluent on land

    A portion of land kept fallow.

11. The adoption of these would avoid soil becoming sick or alate, the industry may ensure this in consultation with the Agriculture Department.

12. It is the sole responsibility of the industry to ensure that there are no complaints at any time from the royats in the surrounding areas as a result of discharge of sewage or trade effluent if any.

13. Proper housekeeping shall be maintained by a dedicated team.

14. The industry must constitute a team of responsible and technically qualified personnel who will ensure continuous operation of all pollution control devices round the clock (including night hours) and should be in a position to explain the status of operation of the polution control measures to the inspecting officers of the Board at any point of time. The name of these persons with their contact telephone numbers shall be intimated to the concerned Regional Officer and Head Office of the Board and in case of any change in the team it shall be intimated to the Board immediately.

E. SPECIAL CONDITIONS:

1. Mining operation is subject to availability of all other statutory clearances.
2. Drills shall either be operated with dust extractors or equipped with water injection system to minimize dust generation in the work environment.
3. Controlled blasting shall be practiced to minimize generation of dust and fly rocks. No blasting shall be carried out after the sunset.
4. Water sprinkling shall also be carried out on haul roads at desired interval and should always be in wet condition. Haulage roads shall be devoid of ruts and potholes and shall be maintained properly to avoid generation of dust during movement of vehicles.
5. The concreting of approach road of length 1.5 km road from main gate to weigh bridge and internal road to weighbridge of length 0.8 km shall be completed.
6. Expedite action to be taken for installation of fixed sprinklers alongside major haul road and use more fog canons for control of fugitive dust during the ore handling activity to bring down AAQ level within the prescribed limit. The air pollution control measures shall be augmented to bring down the PM_{10} level in ambient air at Maitri Infra Agency Camp towards Talakodinga.
7. Arrangement of supply of water to hilltop mining site from bottom hill shall be done through pipeline to avoid fetching of water through mobile water tanker for adequate use for different purposes.
8. Mechanized wheel washing facility for the ore transport vehicles shall be provided at the exit point of the mine. The wheel washing facility shall be integrated with complete recirculation system.
9. The vehicles carrying ore for transportation from the mine shall be covered with tarpaulin.
10. Regular water sprinkling on mineral transportation roads passing through the habitation area as well as other strategic point on the National Highway shall be done by the mining lessee. Mechanized road sweeping shall also be done to avoid re-suspension of dust.
11. The mineral handling plants (crushing plants) shall be installed with adequate pollution control measures.
12. You have installed 1 x 500 TPH crushing plant and 1 x 250 TPH crushing plant within ML area. Hence, operation of second 250 TPH mobile crushing plants shall be done with intimation to Regional Officer, Rayagada and verification of pollution control measures adopted there.
13. At least six Ambient Air Quality Monitoring Stations shall be established in core zone and buffer zone for monitoring of ambient air quality and location of the stations shall

be decided in consultation with the Regional Officer, State Pollution Control Board based on the metrological data, topographical features and environmentally and ecologically sensitive targets.

14. Monitoring of Ambient Air Quality and fugitive dust emission of the mine shall be done twice in a week (24 hourly) at a particular site and consolidated data shall be submitted to the State Pollution Control Board, once in a year.

15. Ambient air quality of the mine shall meet the standards prescribed for industrial area.

16. The project proponent shall ensure that no natural watercourse and / or water resources are obstructed due to any mining operations.

17. A study on quantification and management of surface runoff and other wastewater generated in the mine is done by NIT, Rourkela. The action taken report for implementation of recommendations of the study report shall be submitted by 31.03.2022.

18. Adequate numbers of check dams, check weirs and settling ponds shall be constructed at appropriate places including east and south-east side, of the mine lease area to prevent direct flow of runoff to nearby water bodies in consultation with Regional Officers, SPCB. The surface run off water from the runoff management system shall meet the prescribed standards as stated in Part-A of the consent order.

19. Retention wall shall be constructed at the toe of topsoil dump and OB dump. Garland drain shall be constructed around topsoil dumps, over burden dumps and mineral stack yards terminating at settling pit to prevent direct disposal of runoff to nearby water bodies. Garland drain and sedimentation pit shall be de-silted after monsoon or as and when required. The runoff discharge quality from runoff management system shall meet the standards prescribed as stated in Part-A of the consent order.

20. Appropriate mitigative measures shall be taken to prevent pollution of the nearby water bodies.

21. Regular monitoring of ground water level and quality should be carried out by establishing a network of existing wells. The monitoring should be done four times a year in pre-monsoon (April/May), monsoon (August), post-monsoon (November) and winter (January) seasons. Data thus collected should be submitted to the Board annually.

22. Domestic effluents shall be treated in a sewage treatment plant (STP) and or shall be discharged to soak pit via septic tank constructed as BIS specification. The treated wastewater quality of STP shall remain within the following standards and shall be used for plantation:

pH	-	6.5 -9.0
TSS	-	<100 mg/l
BOD	-	30 mg/l
Fecal Coliform	-	<1000 MPN/100 ml.

23. ETP shall be operated all the time for workshop and wastewater generated during mining operation. The quality of the treated wastewater shall remain within the following standards and shall be re-used for washing of vehicles:

pH	-	6.5 -8.5
TSS	-	50 mg/l
Oil & grease	-	10 mg/l
COD	-	150 mg/l

24. Regular monitoring of water quality of upstream and downstream of surface water bodies existed if any within 5 Km shall be carried out once in every month and record shall be maintained and submitted to the State Pollution Control Board once in every year. Monitoring shall be carried out through MoEF & CC accredited laboratory.

25. The topsoil generated shall be stored at earmarked site (s) only and stabilized or shall be used for land reclamation and plantation.

26. The over burden generated during the course of mining shall be stacked at earmarked dump site (s) and stabilized or used for reclamation of excavated land followed by plantation.

27. Adequate measures shall be taken for control of noise levels in the work environment of mine area so that noise levels at the boundary line of mining lease area shall not exceed 75 dB(A) during daytime (6.00 AM to 9.00 PM) and 70 dB(A) during nighttime (9.00 PM to 6 AM).

28. Adequate noise barriers shall be provided surrounding the crushing and screening plants to control noise pollution and avoid impact on wildlife due to operation of crushing and screening plants during night hours.

29. Online noise monitoring system shall be installed to monitor noise level during night hours.

30. Protective barriers shall be provided for the lights to prevent illumination towards the forest area during night hours.

31. Ambient air quality monitoring data, noise monitoring data and water / wastewater quality monitoring data shall be electronically displayed at the entry point of the mine or at a suitable location of the mine.

32. Plantation of trees shall be undertaken in the colony/ township, over topsoil dumps, OB dumps, backfilled areas, along the side of haul road and in other areas of the mines not being utilized for mining activities. The mine shall take up avenue plantation and plantation in nearby village areas in consultation with DFO/Horticulture Department. The plantation details shall be submitted to the Board before end of April every year.

33. A copy of the annual return (annual return submitted to IBM, Govt. of India/ Directorate of Mines, Govt. of Odisha) shall be submitted every year.

34. The environmental statement report in prescribed format-V shall be submitted to the Board in prescribed format every year on or before 30th September every year.

MEMBER SECRETARY
STATE POLLUTION CONTROL BOARD, ODISHA

TO,

SRI MANOJ KUMAR SETHY, MINES MANAGER
KODINGAMALI BAUXITE MINES OF M/S. OMC LTD.
AT: KODINGAMALI, PO: LAXMIPUR,
DIST: KORAPUT, PIN-765013.

Memo No._____/Dt._____/

Copy forwarded to :

i) Regional Officer, State Pollution Control Board, **Rayagada**
ii) District Collector, **Koraput /Rayagada**
iii) Director of Mines, Govt. of Odisha, Bhubaneswar
iv) Director, Environment-cum-Special Secretary, F & E. Dept. Govt. of Odisha, Bhubaneswar.
v) D.F.O, **Koraput/Rayagada**
vi) Dy. Director of Mines, **Koraput**
vii) Addl. Chief Env. Engineer (Hazardous Waste Management Cell)
viii) Sr. Env. Scientist, Central Lab. SPCB, Bhubaneswar
ix) Consent Register

CHIEF ENV. ENGINEER(M)
STATE POLLUTION CONTROL BOARD, ODISHA

GENERAL STANDARDS FOR DISCHARGE OF ENVIRONMENT POLLUTANTS

GENERAL STANDARDS FOR DISCHARGE OF ENVIRONMENTAL POLLUTANTS PART –A : EFFLUENTS

Sl.No.	Parameters	Standards			
		Inland surface	Public sewers	Land for irrigation	Marine Costal Areas
		(a)	(b)	(c)	(d)
1.	Colour & odour	Colourless/Odourless as far as practible	------	See 6 of Annex-1	See 6 of Annex-1
2.	Suspended Solids (mg/l)	100	600	200	For process wastewater – 100 b. For cooling water effluent 10% above total suspended matter of influent.
3.	Particular size of SS	Shall pass 850	-----	------	------
5.	pH value	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
6.	Temperature	Shall not exceed 5°C above the receiving water temperature	-------	--------	Shall not exceed 5°C above the receiving water temperature
7.	Oil & Grease mg/l max.	10	20	10	20
8.	Total residual chlorine	1.0	----	------	1.0
9.	Ammonical nitrogen (as N) mg/l max.	50	50	------	50
10.	Total Kajeldahl nitrogen (as NH_3) mg/1 max.	100	----	------	100
11.	Free ammonia (as NH_3) mg/1 max.	5.0	----	------	5.0
12.	Biochemical Oxygen Demand (5 days at (20°C) mg/1 max.	30	350	100	100
13.	Chemical Oxygen Demand, mg/1 max.	250	----	------	250
14.	Arsenic (as As) mg/1 max.	0.2	0.2	0.2	0.2
15.	Mercury (as Hg) mg/1 max.	0.01	0.01	------	0.001
16.	Lead (as pb) mg/1 max.	01.	1.0	------	2.0

17.	Cardmium (as Cd) mg/1 max.	2.0	1.0	------	2.0
18.	Hexavalent Chromium (as Cr + 6) mg/l max.	0.1	2.0	--------	1.0
19.	Total Chromium (as Cr) mg/l max.	2.0	2.0	---------	2.0
20.	Copper (as Cu) mg/l max.	3.0	3.0	---------	3.0
21.	Zinc (as Zn) mg/l max.	5.0	15	---------	15
22.	Selenium (as Sc) mg/l max.	0.05	0.05	---------	0.05
23.	Nickel (as Nil) mg/l max.	3.0	3.0	---------	5.0
24.	Cyanide (as CN) mg/l max.	0.2	2.0	0.2	0.02
25.	Fluoride (as F) mg/l max.	2.0	15	---------	15
26.	Dissolved Phosphates (as P) mg/l max.	5.0	-------	---------	--------
27.	Sulphide (as S) mg/l max.	2.0	--------	---------	5.0
28.	Phennolic compounds as (C_6H_5OH) mg/l max.	1.0	5.0	---------	5.0
29.	Radioactive materials a. Alpha emitter micro curie/ml. b. Beta emitter micro curie/ml.	10^{7} 10^{6}	10^{7} 10^{6}	10^{8} 10^{7}	10^{7} 10^{6}
30.	Bio-assay test	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent
31	Manganese (as Mn)	2 mg/l	2 mg/l	---------	2 mg/l
32.	Iron (Fe)	3 mg/l	3 mg/l	---------	3 mg/l
33.	Vanadium (as V)	0.2 mg/l	0.2 mg/l	---------	0.2 mg/l
34.	Nitrate Nitrogen	10 mg/l	--------	---------	20 mg/l

NATIONAL AMBIENT AIR QUALITY STANDARDS

Sl. No.	Pollutants	Time Weighed Average	Concentrate of Ambient Air		
			Industrial Residential, Rural and other Area	Ecologically Sensitive Area (notified by Central Government)	Methods of Measurement
(1)	(2)	(3)	(4)	(5)	(6)
1.	Sulphur Dioxide (SO_2), $\mu g/m^3$	Annual *	50	20	-Improved west and Gaeke
		24 Hours **	80	80	- Ultraviolet fluorescence
2.	Nitrogen Dioxide (NO_2), $\mu g/m^3$	Annual *	40	30	- Modified Jacob & Hochheiser (Na-Arsenite)
		24 Hours **	80	80	- Chemiluminescence
3.	Particulate Matter (size less than 10μm) or $PM_{10}\mu g/m^3$	Annual *	60	60	-Gravimetric - TOEM
		24 Hours **	100	100	- Beta Attenuation
4.	Particulate Matter (size less than 2.5μm) or $PM_{2.5}\ \mu g/m^3$	Annual *	40	40	-Gravimetric - TOEM
		24 Hours **	60	60	- Beta Attenuation
5.	Ozone (O_3) $\mu g/m^3$	8 Hours **	100	100	- UV Photometric - Chemiluminescence
		1 Hours **	180	180	- Chemical Method
6.	Lead (Pb) $\mu g/m^3$	Annual *	0.50	0.50	-AAS/ICP method after sampling on EMP 2000 or equivalent filter paper. - ED-XRF using Teflon filter
		24 Hours **	1.0	1.0	
7.	Carbon Monoxide (CO) mg/m^3	8 Hours **	02	02	- Non Dispersive Infra Red (NDIR) Spectroscopy
		1 Hours **	04	04	
8.	Ammonia (NH_3) $\mu g/m^3$	Annual*	100	100	-Chemiluminescence - Indophenol Blue Method
		24 Hours**	400	400	
9.	Benzene (C_6H_6) $\mu g/m^3$	Annul *	05	05	-Gas Chromatography based continuous analyzer - Adsorption and Desorption followed by GC analysis
10.	Benzo (a) Pyrene (BaP)-Particulate phase only, ng/m^3	Annual*	01	01	-Solvent extraction followed by HPLC/GC analysis
11.	Arsenic (As), ng/m^3	Annual*	06	06	-AAS/ICP method after sampling on EPM 2000 or equivalent filter paper
12.	Nickel (Ni),ng/m^3	Annual*	20	20	-AAS/ICP method after sampling on EPM 2000 or equivalent filter paper

* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

** 24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be complied with 98% of the time in a year, 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

BY REGD. POST WITH AD

STATE POLLUTION CONTROL BOARD, ODISHA

[DEPARTMENT OF FOREST, ENVIRONMENT & CLIMATE CHANGE, GOVERNMENT OF ODISHA]
A/118, Nilakantha Nagar, Unit-VIII, Bhubaneswar-751012
Phone-2561909, Fax: 2562822, 2560955 E-mail: paribesh1@ospcboard.org, Website: www.ospcboard.org

CONSENT ORDER

No. 6958 / IND-I-CON-6632 Dt. 31.03.2025 /

CONSENT ORDER NO. 2850

Sub: Consent for discharge of sewage and trade effluent under section 25/26 of Water (PCP) Act, 1974 and for existing / new operation of the plant under section 21 of Air (PCP) Act, 1981.

Ref: Your online application **No.6044142, dated 31-12-2024.**

Consent to operate is hereby granted under section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 and under section 21 of Air (Prevention & Control of Pollution) Act, 1981 and rules framed thereunder to

Name of the Industry: **KODINGAMALI BAUXITE MINES OF M/S. OMC LTD.**

Name of the Occupier & Designation: **SRI HEMANT KUMAR BEHERA, MINES MANAGER**

Address: **AT: KODINGAMALI, PO: LAXMIPUR, DIST: KORAPUT, PIN-765013.**

This consent order is valid for the period from **01.04.2025 to 31.03.2026**

Details of Products Manufactured

Sl. No	Product	Quantity
01.	*Bauxite*	*3 MTPA*

Details of Mineral Handling Plants /Units

01	*Crushing plant of capacity 2 X 500 TPH*

This consent order is valid for the specified outlets, discharge quantity and quality, specified chimney/stack, emission quantity and quality of emissions as specified below. This consent is granted subject to the general and special conditions stipulated therein.

A. Discharge permitted through the following outlet subject to the standard

Outlet No.	Description of outlet	Point of discharge	Quantity of discharge KL/hr	Prescribed Standard				
				pH	TSS (mg/l)	Oil & Grease (mg/l)	BOD (mg/l)	COD (mg/l)
01.	*Mine drainage water/ surface runoffs/ other wastewater*	*On land/inland surface water body*	--	*5.5-9.0*	*100*	*10*	--	--

B. Emission permitted through the following stack subject to the prescribed standard

Chimney Stack No.	Description of Stack	Stack height (m)	Quantity of emission	Prescribed Standard			
				PM (mg/Nm^3)	SO_2	NO_x	
					--	--	

C. Disposal of solid waste permitted in the following manner

Sl. No.	Type of Solid waste	Quantity generated (TPD)	Quantity to be reused on site(TPD)	Quantity to be reused off site(TPD)	Quantity disposed off (TPD)	Description of disposal site.
01	*Top soil & over burden*	*As per approved mining plan*	--	--	--	*As per approved mining plan*

D. GENERAL CONDITIONS FOR ALL UNITS

1. The consent is given by the Board in consideration of the particulars given in the application. Any change or alternation or deviation made in actual practice from the particulars furnished in the application will also be the ground for liable to review/variation/revocation of the consent order under section 27 of the Water (Prevention & Control of Pollution) Act, 1974 and section 21 of Air (Prevention & Control of Pollution) Act, 1981 and to make such variations as deemed fit for the purpose of the Acts.
2. The occupier would immediately submit revised application for consent to operate to this Board in the event of any change in the quantity and quality of raw material / products / manufacturing process or quantity /quality of the effluent rate of emission / air pollution control equipment / system etc.
3. The applicant shall not change or alter either the quality or quantity or the rate of discharge or temperature or the route of discharge without the previous written permission of the Board.
4. The application shall comply with and carry out the directives/orders issued by the Board in this consent order without any negligence on his/her part. In case of non-compliance of any order/directives issued at any time and/or violation of the terms and conditions of this consent order, the applicant shall be liable for legal action as per the provisions of the Law.
5. The applicant shall make an application for grant of fresh consent at least 90 days before the date of expiry of this consent order.
6. The issuance of this consent does not convey any property right in either real or personal property or any exclusive privileges nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Central, State laws or regulation.
7. This consent does not authorize or approve the construction of any physical structure or facilities or the undertaking of any work in any natural water course.
8. The applicant shall display this consent granted to him in a prominent place for perusal of the public and inspecting officers of this Board.
9. An inspection book shall be opened and made available to Board's Officers during the visit to the factory.
10. The applicant shall furnish to the visiting officer of the Board any information regarding the construction, installation or operation of the plant or of effluent treatment system / air pollution control system / stack monitoring system any other particulars as may be pertinent to preventing and controlling pollution of Water / Air.
11. The applicant shall display suitable caution board at the place where the effluent is entering into any water-body or any other place to be indicated by the Board, indicating therein that the area into which the effluents are being discharged is not fit for the domestic use/bathing.
12. Storm water shall not be allowed to mix with the trade and/or domestic effluent on the upstream of the terminal manholes where the flow measuring devices will be installed.
13. The applicant shall maintain good house-keeping both within the factory and the premises. All pipes, valves, sewers and drains shall be leak-proof. Floor washing shall be admitted into the effluent collection system only and shall not be allowed to find their way in storm drains or open areas.
14. The applicant shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems install or used by him to achieve with the term(s) and conditions of the consent.
15. Care should be taken to keep the anaerobic lagoons, if any, biologically active and not utilized as mere stagnation ponds. The anaerobic lagoons should be fed with the required nutrients for effective digestion. Lagoons should be constructed impervious.
16. The utilization of treated effluent on factory's own land, if any, should be completed and there should be no possibility of the effluent gaining access into any drainage channel or other water courses either directly or by overflow.
17. The effluent disposal on land, if any, should be done without creating any nuisance to the surroundings or inundation of the lands at any time.
18. If at any time the disposal of treated effluent on land becomes incomplete or unsatisfactory or create any problem or becomes a matter of dispute, the occupier must adopt alternate satisfactory treatment and disposal measures.
19. The sludge from treatment units shall be dried in sludge drying beds and the drained liquid shall be taken to equalization tank.
20. The effluent treatment units and disposal measures shall become operative at the time of commencement of production.
21. The applicant shall provide port holes for sampling the emissions and access platform for carrying out stack sampling and provide electrical outlet points and other arrangements for chimneys/stacks and other sources of emissions so as to collect samples of emission by the Board or the applicant at any time in accordance with the provision of the Acts or Rules made therein.

22. The applicant shall provide all facilities and render required assistance to the Board staff for collection of samples / stack monitoring / inspection.
23. The applicant shall not change or alter either the quality or quantity or rate of emission or install, replace or alter the air pollution control equipment or change the raw material or manufacturing process resulting in any change in quality and/or quantity of emissions, without the previous written permission of the Board.
24. No control equipments or chimney shall be altered or replaced or as the case may be erected or re-erected except with the previous approval of the Board.
25. The liquid effluent arising out of the operation of the air pollution control equipment shall be treated in the manner so as to meet the standards prescribed by the Board in accordance with the provisions of Water (Prevention and Control of Pollution) Act, 1974 (as amended).
26. The stack monitoring system employed by the applicant shall be opened for inspection to this Board at any time.
27. There shall not be any fugitive or episodal discharge from the premises.
28. In case of such episodal discharge/emissions the occupier shall take immediate action to bring down the emission within the limits prescribed by the Board and stop the operation of the plant if required. Report of such accidental discharge /emission shall be brought to the notice of the Board within 24 hours of occurrence.
29. The applicant shall keep the premises and air pollution control equipments clean and make all hoods, pipes, valves, stacks/chimneys leak proof. The air pollution control equipments, location, inspection chambers, sampling port holes shall be made easily accessible at all times.
30. Any upset condition in any of the plant/plants of the factory which is likely to result in increased effluent discharge/emission of air pollutants and / or result in violation of the standards mentioned shall be reported to the Headquarters and Regional Office of the Board by E-mail within 2 hours of its occurrence.
31. The occupier has to ensure that minimum three varieties of trees are planted at the density of not less than 1000 trees per acre. The trees may be planted along boundaries of the premises. This plantation is stipulated over and above the bulk plantation of trees in that area.
32. The solid waste such as sweeping, wastage packages, empty containers residues, sludge including that from air pollution control equipments collected within the premises of the shall be disposed off scientifically to the satisfaction of the Board.
33. All solid wastes arising in the premises shall be properly classified and disposed off to the satisfaction of the Board by
    i) Land fill in case of inert material, care being taken to ensure that the material does not give rise to leachate which may percolate into ground water or carried away with storm run-off.
    ii) Controlled incineration, wherever possible in case of combustible organic material.
    iii) Composting, in case of bio-degradable material.
34. Any toxic material shall be detoxicated if possible, otherwise be sealed in steel drums and buried in protected areas after obtaining approval of this Board in writing. The detoxication or sealing and burying shall be carried out in the presence of Board's authorized persons only. Letter of authorization shall be obtained for handling and disposal of hazardous wastes.
35. If due to any technological improvement or otherwise this Board is of opinion that all or any of the conditions referred to above requires variation (including the change of any control equipment either in whole or in part) this Board shall after giving the applicant an opportunity of being heard, vary all or any of such condition and thereupon the applicant shall be bound to comply with the conditions so varied.
36. The applicant, his/heirs/legal representatives or assignees shall have no claim whatsoever to the condition or renewal of this consent after the expiry period of this consent.
37. The Board reserves the right to review, impose additional conditions or condition, revoke change or alter the terms and conditions of this consent.
38. Notwithstanding anything contained in this conditional letter of consent, the Board hereby reserves to it the right and power under section 27(2) of the Water (Prevention & Control of Pollution) Act, 1974 to review any and/or all the conditions imposed herein above and to make such variations as deemed fit for the purpose of the Act by the Board.
39. The conditions imposed as above shall continue to be in force until revoked under section 27(2) of the Water (Prevention & Control of Pollution) Act, 1974 and section 21 A of Air (Prevention & Control of Pollution) Act, 1981.
40. The occupier shall comply to the conditions stipulated in CTE order issued by Odisha State Pollution Control Board and conditions stipulated in Environmental Clearances issued by MoEF&CC, Govt. of India.
41. The occupier shall abide by E(P) Act, 1986 and Rules framed there-under.
42. In case the consent fee is revised upward during this period, the industry shall pay the differential fees to the Board (for the remaining years) to keep the consent order in force. If they fail to pay the amount within the period stipulated by the Board the consent order will be revoked without prior notice.

GENERAL CONDITIONS FOR UNITS WITH INVESTMENT OF MORE THAN Rs.50 CRORES, AND 17 CATEGORIES OF HIGHLY POLLUTING INDUSTRIES (RED A).

1. The applicant shall analyse the emissions every month for the parameters indicated in TABLE B & C as mentioned in this order and shall furnish the report thereof to the Board by the 10th of the succeeding month.

2. The applicant shall provide and maintain at his own cost three ambient air quality monitoring stations for monitoring Suspended Particulate Matter, Sulphur Dioxide, Oxides of Nitrogen, Hydro-Carbon, Carbon-Monoxide and monitor the same once in a day/week/fortnight/month. The data collected shall be maintained in a register and a monthly extract be furnished to the Board.

3. The applicant shall provide and maintain at his own cost a meteorological station to collect the data on wind velocity, direction, temperature, humidity, rainfall, etc. and the daily reading shall be recorded and the extract sent to the Board once in a month.

4. The applicant shall forward the following information to the Member Secretary, State Pollution Control Board, Odisha, Bhubaneswar regularly.

   a) Report of analysis of stack monitoring, ambient air quality monitoring meteorological data as required every month.
   b) Progress on planting of trees quarterly.

5. The applicant shall install mechanical composite sampling equipment and continuous flow measuring / recording devices on the effluent drains of trade as well as domestic effluent. A record of daily discharge shall be maintained.

6. The following information shall be forwarded to the Member Secretary on or before 10th of every month.

   a) Performance / progress of the treatment plant.
   b) Monthly statement of daily discharge of domestic and/or trade effluent.

7. Non-compliance with effluent limitations

   a) If for any reason the applicant does not comply with or is unable to comply with any effluent limitations specified in this consent, the applicant shall immediately notify the consent issuing authority by telephone and provide the consent issuing authority with the following information in writing within 5 days of such notification.

      i) Causes of non-compliance.

      ii) A description of the non-compliance discharge including its impact on the receiving waters.

      iii) Anticipated time of continuance of non-compliance if expected to continue or if such condition has been corrected the duration or period of non-compliance.

      iv) Steps taken by the applicant to reduce and eliminate the non-complying discharge and.

      v) Steps to be taken by the applicant too prevent the condition of non-compliance.

   b) The applicant shall take all reasonable steps to minimize any adverse impact to natural waters resulting from non-compliance with any effluent limitation specified in this consent including such accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying discharge.

   c) Nothing in this consent shall be construed to relieve the applicant from civil or criminal penalties for non-compliance whether or not such non-compliance is due to factors beyond his control, such as break-down, electric failure, accident or natural disaster.

8. The applicant shall at his own cost get the effluent samples collected both before and after treatment and get them analysed at an approval laboratory every month for the parameters indicated in Part-D and shall submit in duplicate the report thereof to the Board.

9. The addition of various treatment chemicals should be done only with mechanical dozers and proper equipment for regulation of correct dosages determined daily and for proper uniform feeding. Crude practices such as dumping of chemicals in drains or sumps or trickling of acids or alkalies arbitrarily and utilizing poles for stirring etc. should not be resorted to.

10. In the disposal of treated effluent on land for irrigation, the industry shall keep in view of the need for

    a) Rotation of crops
    b) Change of point of application of effluent on land
    c) A portion of land kept fallow.

11. The adoption of these would avoid soil becoming sick or slate, the industry may ensure this in consultation with the Agriculture Department.

12. It is the sole responsibility of the industry to ensure that there are no complaints at any time from the royats in the surrounding areas as a result of discharge of sewage or trade effluent if any.

13. Proper housekeeping shall be maintained by a dedicated team.

14. The industry must constitute a team of responsible and technically qualified personnel who will ensure continuous operation of all pollution control devices round the clock (including night hours) and should be in a position to explain the status of operation of the pollution control measures to the inspecting officers of the Board at any point of time. The name of these persons with their contact telephone numbers shall be intimated to the concerned Regional Officer and Head Office of the Board and in case of any change in the team it shall be intimated to the Board immediately.

E. SPECIAL CONDITIONS:

1. Mining operation is subject to availability of all other statutory clearances.
2. Drills shall either be operated with dust extractors or equipped with water injection system to minimize dust generation in the work environment.
3. Controlled blasting shall be practiced to minimize generation of dust and fly rocks. No blasting shall be carried out after the sunset.
4. Water sprinkling shall also be carried out on haul roads at desired interval and should always be in wet condition. Haulage roads shall be devoid of ruts and potholes and shall be maintained properly to avoid generation of dust during movement of vehicles.
5. The approach road of length 1.5 km road from main gate to weigh bridge and internal road to weighbridge of length 0.8 km shall be concreted.
6. Fixed sprinklers alongside major haul road shall be installed and more fog canons for control of fugitive dust shall be deployed to keep AAQ level within the prescribed limit.
7. Arrangement of supply of water to hilltop mining site from bottom hill shall be done through pipeline to avoid fetching of water through mobile water tanker for adequate use for different purposes.
8. Mechanized wheel washing facility for the ore transport vehicles shall be provided at the exit point of the mine. The wheel washing facility shall be integrated with complete recirculation system.
9. The vehicles carrying ore for transportation from the mine shall be covered with tarpaulin.
10. Fog cannon of at least 40 m throw shall be deployed at fine ore stock piles and loading areas in the mine.
11. A truck parking plaza shall be developed with its runoff management facilities.
12. Regular water sprinkling on mineral transportation roads passing through the habitation area as well as other strategic point on the National Highway shall be done by the mining lessee. Mechanized road sweeping shall also be done to avoid re-suspension of dust.
13. The mineral handling plants (crushing plants) shall be installed with adequate pollution control measures.
14. The conveyor belts of the fixed crusher plants shall be covered with GCI sheets.
15. At least six Ambient Air Quality Monitoring Stations shall be established in core zone and buffer zone for monitoring of ambient air quality and location of the stations shall be decided in consultation with the Regional Officer, State Pollution Control Board based on the metrological data, topographical features and environmentally and ecologically sensitive targets.
16. Monitoring of Ambient Air Quality and fugitive dust emission of the mine shall be done twice in a week (24 hourly) at a particular site and consolidated data shall be submitted to the State Pollution Control Board, once in a year.
17. Ambient air quality of the mine shall meet the standards prescribed for industrial area.

18. The project proponent shall ensure that no natural watercourse and / or water resources are obstructed due to any mining operations.
19. A study on quantification and management of surface runoff and other wastewater generated in the mine is done by NIT, Rourkela. The action taken report for implementation of recommendations of the study report shall be submitted.
20. Adequate numbers of check dams, check weirs and settling ponds shall be constructed at appropriate places including east and south-east side, of the mine lease area to prevent direct flow of runoff to nearby water bodies in consultation with Regional Officers, SPCB. The surface run off water from the runoff management system shall meet the prescribed standards as stated in Part-A of the consent order.
21. Retention wall shall be constructed at the toe of topsoil dump and OB dump. Garland drain shall be constructed around topsoil dumps, over burden dumps and mineral stack yards terminating at settling pit to prevent direct disposal of runoff to nearby water bodies. Garland drain and sedimentation pit shall be de-silted after monsoon or as and when required. The runoff discharge quality from runoff management system shall meet the standards prescribed as stated in Part-A of the consent order.
22. Appropriate mitigative measures shall be taken to prevent pollution of the nearby water bodies.
23. Regular monitoring of ground water level and quality should be carried out by establishing a network of existing wells. The monitoring should be done four times a year in pre-monsoon (April/May), monsoon (August), post-monsoon (November) and winter (January) seasons. Data thus collected should be submitted to the Board annually.
24. Domestic effluents shall be treated in a sewage treatment plant (STP) and or shall be discharged to soak pit via septic tank constructed as BIS specification. The treated wastewater quality of STP shall remain within the following standards and shall be used for plantation:

pH	-	6.5 -9.0
TSS	-	<100 mg/l
BOD	-	30 mg/l
Fecal Coliform	-	<1000 MPN/100 ml.

25. ETP shall be operated all the time for workshop and wastewater generated during mining operation. The quality of the treated wastewater shall remain within the following standards and shall be re-used for washing of vehicles:

pH	-	6.5 -8.5
TSS	-	50 mg/l
Oil & grease	-	10 mg/l
COD	-	150 mg/l

26. Regular monitoring of water quality of upstream and downstream of surface water bodies existed if any within 5 Km shall be carried out once in every month and record shall be maintained and submitted to the State Pollution Control Board once in every year. Monitoring shall be carried out through MoEF & CC accredited laboratory.

27. The topsoil generated shall be stored at earmarked site (s) only and stabilized or shall be used for land reclamation and plantation.
28. The over burden generated during the course of mining shall be stacked at earmarked dump site (s) and stabilized or used for reclamation of excavated land followed by plantation.
29. Adequate measures shall be taken for control of noise levels in the work environment of mine area so that noise levels at the boundary line of mining lease area shall not exceed 75 dB(A) during daytime (6.00 AM to 9.00 PM) and 70 dB(A) during nighttime (9.00 PM to 6.00 AM).
30. Adequate noise barriers shall be provided surrounding the crushing and screening plants to control noise pollution and avoid impact on wildlife due to operation of crushing and screening plants during night hours.
31. Online noise monitoring system shall be installed to monitor noise level during night hours.
32. Protective barriers shall be provided for the lights to prevent illumination towards the forest area during night hours.
33. Ambient air quality monitoring data, noise monitoring data and water / wastewater quality monitoring data shall be electronically displayed at the entry point of the mine or at a suitable location of the mine.
34. The height of the stack connected to DG sets of capacity more than 800 KW (1000 KVA) shall conform to the following:
    i) $14Q^{0.3}$, Q = Total SO_2 emission from the plant in kg/hr.
    ii) Minimum 6m. above the building where generator set is installed.
    iii) 30 m.
35. The height of the stack connected to DG set of capacity less than and upto 800 KW (1000 KVA) shall conform to the following:
    i) $H = h+0.2\sqrt{KVA}$
    ii) h= Height of the building where it is installed in meter
    iii) KVA = Capacity of DG set
    iv) H = Height of the stack in meter above ground level.
36. All DG sets installed before 1.7.2004 shall be scrapped. DG sets complying with either State-I or Stage-II emission norms shall reduce Particulate Matter Emission by 70% by installing RECD without affecting any other emission parameters as per the CPCB guidelines and Board's letter vide No.17927, dated 14.11.2023 and letter No.7146, dated 10.05.2024, in this regard.
37. Plantation of trees shall be undertaken in the colony/ township, over topsoil dumps, OB dumps, backfilled areas, along the side of haul road and in other areas of the mines not being utilized for mining activities. The mine shall take up avenue plantation and plantation in nearby village areas in consultation with DFO/Horticulture Department. The plantation details shall be submitted to the Board before end of April every year.

38. A copy of the annual return (annual return submitted to IBM, Govt. of India/ Directorate of Mines, Govt. of Odisha) shall be submitted every year.
39. The environmental statement report in prescribed Format-V shall be submitted to the Board in prescribed format every year on or before 30th September every year.

29/3/2024

MEMBER SECRETARY
STATE POLLUTION CONTROL BOARD, ODISHA

TO,

THE MINES MANAGER
KODINGAMALI BAUXITE MINES OF M/S. OMC LTD.
AT: KODINGAMALI, PO: LAXMIPUR,
DIST: KORAPUT, PIN-765013.

Memo No._____/Dt._____/

Copy forwarded to :

i) Regional Officer, State Pollution Control Board, **Koraput**
ii) District Collector, **Koraput / Rayagada**
iii) Director of Mines, Govt. of Odisha, Bhubaneswar
iv) Director, Environment-cum-Special Secretary, F, E & CC Dept., Govt. of Odisha, Bhubaneswar.
v) D.F.O, **Koraput / Rayagada**
vi) Dy. Director of Mines, **Koraput**
vii) Chief Env. Scientist, Central Lab., SPCB, Bhubaneswar
viii) Addl. Chief Env. Engineer (Hazardous Waste Management Cell)
ix) Guard File

CHIEF ENV. ENGINEER(M)
STATE POLLUTION CONTROL BOARD, ODISHA

GENERAL STANDARDS FOR DISCHARGE OF ENVIRONMENT POLLUTANTS

GENERAL STANDARDS FOR DISCHARGE OF ENVIRONMENTAL POLLUTANTS PART – A : EFFLUENTS

Sl. No.	Parameters	Standards			
		Inland surface	Public sewers	Land for irrigation	Marine Costal Areas
		(a)	(b)	(c)	(d)
1.	Colour & odour	Colourless/ Odourless as far as practible	--	See 6 of Annex-1	See 6 of Annex-1
2.	Suspended Solids (mg/l)	100	600	200	a. For process wastewater – 100 b. For cooling water effluent 10% above total suspended matter of influent
3.	Particular size of SS	Shall pass 850	--	--	--
5.	pH value	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
6.	Temperature	Shall not exceed 5°C above the receiving water temperature	--	--	Shall not exceed 5°C above the receiving water temperature
7.	Oil & Grease mg/l max.	10	20	10	20
8.	Total residual chlorine	1.0	--	--	1.0
9.	Ammonical nitrogen (as N) mg/l max.	50	50	--	50
10.	Total Kajeldahl nitrogen (as NH_3) mg/1 max.	100	--	--	100
11.	Free ammonia (as NH_3) mg/1 max.	5.0	--	--	5.0
12.	Biochemical Oxygen Demand (5 days at (20°C) mg/1 max.	30	350	100	100
13.	Chemical Oxygen Demand, mg/1 max.	250	--	--	250
14.	Arsenic (as As) mg/1 max.	0.2	0.2	0.2	0.2
15.	Mercury (as Hg) mg/1 max.	0.01	0.01	--	0.001
16.	Lead (as pb) mg/1 max.	1.0	1.0	--	2.0
17.	Cardmium (as Cd) mg/1 max.	2.0	1.0	--	2.0

Sl. No.	Parameters	Standards			
		Inland surface	Public sewers	Land for irrigation	Marine Costal Areas
		(a)	(b)	(c)	(d)
18.	Hexavalent Chromium (as Cr + 6) mg/l max.	0.1	2.0	--	1.0
19.	Total Chromium (as Cr) mg/l max.	2.0	2.0	--	2.0
20.	Copper (as Cu) mg/l max.	3.0	3.0	--	3.0
21.	Zinc (as Zn) mg/l max.	5.0	15	--	15
22.	Selenium (as Sc) mg/l max.	0.05	0.05	--	0.05
23.	Nickel (as Nil) mg/l max.	3.0	3.0	--	5.0
24.	Cyanide (as CN) mg/l max.	0.2	2.0	0.2	0.02
25.	Fluoride (as F) mg/l max.	2.0	15	--	15
26.	Dissolved Phosphates (as P) mg/l max.	5.0	--	--	--
27.	Sulphide (as S) mg/l max.	2.0	--	--	5.0
28.	Phennolic compounds as (C_6H_5OH) mg/l max.	1.0	5.0	--	5.0
29.	Radioactive materials a. Alpha emitter micro curie/ml. b. Beta emitter micro curie/ml.	10^{-7} 10^{-6}	10^{-7} 10^{-6}	10^{-8} 10^{-7}	10^{-7} 10^{-6}
30.	Bio-assay test	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent
31.	Manganese (as Mn)	2 mg/l	2 mg/l	--	2 mg/l
32.	Iron (Fe)	3 mg/l	3 mg/l	--	3 mg/l
33.	Vanadium (as V)	0.2 mg/l	0.2 mg/l	--	0.2 mg/l
34.	Nitrate Nitrogen	10 mg/l	--	--	20 mg/l

NATIONAL AMBIENT AIR QUALITY STANDARDS

Sl. No.	Pollutants	Time Weighed Average	Concentrate of Ambient Air		
			Industrial Residential, Rural and other Area	Ecologically Sensitive Area (notified by Central Government)	Methods of Measurement
(1)	(2)	(3)	(4)	(5)	(6)
1.	Sulphur Dioxide (SO_2), $\mu g/m^3$	Annual *	50	20	-Improved west and Gaeke
		24 Hours **	80	80	- Ultraviolet fluorescence
2.	Nitrogen Dioxide (NO_2), $\mu g/m^3$	Annual *	40	30	- Modified Jacob & Hochheiser (Na-Arsenite)
		24 Hours **	80	80	- Chemiluminescence
3.	Particulate Matter (size less than 10µm) or $PM_{10}\mu g/m^3$	Annual *	60	60	-Gravimetric - TOEM
		24 Hours **	100	100	- Beta Attenuation
4.	Particulate Matter (size less than 2.5µm) or $PM_{2.5}\ \mu g/m^3$	Annual *	40	40	-Gravimetric - TOEM
		24 Hours **	60	60	- Beta Attenuation
5.	Ozone (O_3) $\mu g/m^3$	8 Hours **	100	100	- UV Photometric - Chemiluminescence
		1 Hours **	180	180	- Chemical Method
6.	Lead (Pb) $\mu g/m^3$	Annual *	0.50	0.50	-AAS/ICP method after sampling on EMP 2000 or equivalent filter paper. - ED-XRF using Teflon filter
		24 Hours **	1.0	1.0	
7.	Carbon Monoxide (CO) mg/m^3	8 Hours **	02	02	- Non Dispersive Infra Red (NDIR) Spectroscopy
		1 Hours **	04	04	
8.	Ammonia (NH_3) $\mu g/m^3$	Annual*	100	100	-Chemiluminescence - Indophenol Blue Method
		24 Hours**	400	400	
9.	Benzene (C_6H_6) $\mu g/m^3$	Annul *	05	05	-Gas Chromatography based continuous analyzer - Adsorption and Desorption followed by GC analysis
10.	Benzo (a) Pyrene (BaP)-Particulate phase only, ng/m^3	Annual*	01	01	-Solvent extraction followed by HPLC/GC analysis
11.	Arsenic (As), ng/m^3	Annual*	06	06	-AAS/ICP method after sampling on EPM 2000 or equivalent filter paper
12.	Nickel (Ni),ng/m^3	Annual*	20	20	-AAS/ICP method after sampling on EPM 2000 or equivalent filter paper

* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

** 24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be complied with 98% of the time in a year, 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

Annexure - VA_FOREST CLEARANCE

Annexure-1

PRINCIPAL SECRETARY TO GOVT. * FOREST & E&W DEPARTMENT * 29 APR 17

F. No. 8-46/2016-FC
Government of India
Ministry of Environment, Forests & Climate Change
(Forest Conservation Division)
****

Indira Paryavaran Bhawan,
Jor Bagh Road, Aliganj,
New Delhi: 110003,
Dated: 17th April, 2017

To

The Principal Secretary,
Government of Odisha,
Bhubaneswar.

Stage - I approval order

Sub: Diversion of 434.935 ha of forest land (428.075 ha forest land within Kodingamali Bauxite Mining lease area including 18.098 ha of forest land in safety zone and 6.860 ha of forest land out- side the ML area for construction of approach road to the mining lease) for mining of bauxite in Kodingamali Bauxite Mines located in Koraput & Rayagada districts of Odisha by Odisha Mining Corporation Ltd.

Sir,

I am directed to refer to the Government of Odisha's letter No10F (Cons) 196/2016/17202/F&E dated 16.09.2016 on the above mentioned subject seeking prior approval of the Central Government under Section 2 of the Forest (Conservation) Act, 1980, and to say that the said proposal has been examined by the Forest Advisory Committee constituted by the Central Government under Section-3 of the aforesaid Act.

2. After careful consideration of the proposal of the State Government of Odisha and on the basis of the recommendations of the Forest Advisory Committee, the Central Government hereby granted In-principle/Stage-I Clearance under the Forest (Conservation) Act, 1980 for the diversion of 434.935 ha of forest land (428.075 ha forest land within Kodingamali Bauxite Mining lease area including 18.098 ha of forest land in safety zone and 6.860 ha of forest land out- side the ML area for construction of approach road to the mining lease) for mining of bauxite in Kodingamali Bauxite Mines located in Koraput & Rayagada districts of Odisha by Odisha Mining Corporation Ltd subject to the following conditions:

(i) Legal status of the diverted forest land shall remain unchanged;

(ii) Compensatory afforestation over the non-forest land equal in extent to the forest land being diverted shall be raised within three years from the date of issue of Stage –II Clearance and maintained thereafter as per approved plan by the State Forest Department at the cost of the User Agency;

(iii) The land identified for the purpose of CA shall be clearly depicted on a Survey of India toposheet of 1:50,000 scale;

(iv) The non-forest land identified for raising compensatory afforestation shall be transferred and mutated in favour of the State Forest Department before issue of the Stage-II clearance;

(v) The non-forest land identified for raising Compensatory Afforestation shall be notified by the State Government as RF under Section-4 or PF under Section-20 of the Indian Forest Act, 1929 or under the relevant Section(s) of the local Forest Act, as the case may be, within a period of six months. The Nodal Officer (Forest Conservation) shall report compliance in this regard;

(vi) The User Agency shall transfer the cost of raising and maintaining the compensatory afforestation at the current wage rate in consultation with State Forest Department in the

account of Ad-hoc Campa of the concerned State through online portal. The scheme may include appropriate provision for anticipated cost increase for works scheduled for subsequent years;

(vii) The User Agency shall transfer online, the Net Present Value (NPV) of the forest land being diverted under this proposal, as per the orders of the Hon'ble Supreme Court of India dated 28.03.2008, 24.04.2008 and 09.05.2008 in Writ Petition (Civil) No. 202/1995 and the guidelines issued by this Ministry vide its letter No. 5-3/2007-FC dated 05.02.2009. The requisite funds shall be transferred through online portal into Ad-hoc CAMPA account of the State Concerned;

(viii) At the time of payment of the Net Present Value (NPV) at the then prevailing rate, the User Agency shall furnish an undertaking to pay the additional amount of NPV, if so determined, as per the final decision of the Hon'ble Supreme Court of India;

(ix) **No residential buildings shall be allowed within the diverted forest land.**

(x) **State Government shall submit detail soil conservation plan before Stage-II approval. The cost of implementation shall be borne by user agency.**

(xi) Fencing, protection and regeneration of the safety zone area [7.5 meters strip all along the outer boundary of the mining lease area as recommended by the state govt.] shall be done within three year at the project cost from the issue of Stage-II Clearance. Besides this afforestation on degraded forest land to be selected elsewhere measuring one & a half times the area under safety zone shall also be done at the project cost; The degraded forest land (DFL) so selected will be informed to the MoEF & CC with shape files and afforestation will be done within three years from the date of Stage-II clearance;

(xii) Period of diversion of the said forest land under this approval shall be for a period co-terminus with the period of the mining lease proposed to be granted under the Mines and Minerals (Development and Regulation) Act, 1957, as amended and the Rules framed there-under;

(xiii) Any fund received from the user agency under the project and deposited in the State Forest Department account, except the funds realized for regeneration/ demarcation of safety zone, shall be transferred through online portal into Ad-hoc CAMPA account of the State Concerned;

(xiv) The User Agency shall obtain the Environment Clearance as per the provisions of the Environmental (Protection) Act, 1986, if required;

(xv) No labour camp shall be established on the forest land;

(xvi) The User Agency shall provide fuels preferably alternate fuels to the labourers and the staff working at the site so as to avoid any damage and pressure on the nearby forest areas;

(xvii) The boundary of the diverted forest land, mining lease and safety zone, as applicable, shall be demarcated on ground at the project cost, by erecting four feet high reinforced cement concrete pillars, each inscribed with its serial number, distance from pillar to pillar and GPS co-ordinates;

(xviii) The User Agency shall undertake mining in a phased manner after taking due care for reclamation of the mined over area. The concurrent reclamation plan as per the approved mining plan shall be executed by the User Agency from the very first year, and an annual report on implementation thereof shall be submitted to the Nodal Officer, Forest (Conservation) Act, 1980, in the concerned State Government and the concerned Regional Office of the Ministry. If it is found from the annual report that the activities indicated in the concurrent reclamation plan are not being executed by the User Agency, the Nodal Officer or the Chief Conservator of Forests (Central) may direct that the mining activities shall remain suspended till such time, such reclamation activities area satisfactorily executed.

(xix) The layout plan of the mining plan/ proposal shall not be changed without the prior approval of the Central Government;

(xx) The forest land shall not be used for any purpose other than that specified in the proposal;

(xxi) The forest land proposed to be diverted shall under no circumstances be transferred to any other agency, department or person without prior approval of the Central Government;

(xxii) No damage to the flora and fauna of the adjoining area shall be caused;

(xxiii) Any tree felling shall be done only when it is unavoidable and that too under strict supervision of the State Forest Department;

(xxiv) The user agency will abide by the applicable recommendations of the State Government;

(xxv) Following activities, as per approved plan / schemes, shall be undertaken by the User Agency under the supervision of the State Forest Department:

(a) Mitigative measures to minimize soil erosion and choking of stream shall be implemented within a period of three year with effect from the issue of Stage-II clearance in accordance with the approved Plan in consultation with the State Forest Department.

(b) Planting of adequate drought hardy plant species and sowing of seeds, in the appropriate area within the mining lease to arrest soil erosion in accordance with the approved scheme;

(c) Construction of check dams, retention /toe walls to arrest sliding down of the excavated material along the contour in accordance with the approved scheme;

(d) Stabilize the overburden dumps by appropriate grading/benching, in accordance with the approved scheme, so as to ensure that angles of repose at any given place is less than 28o; and

(e) No damage shall be caused to the top-soil and the user agency will follow the top soil management plan.

(xxvi) The State Government shall complete settlement of rights, in terms of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, if any, on the forest land to be diverted and submit the documentary evidence as prescribed by this Ministry in its letter No. 11-9/1998-FC (pt.) dated 03.08.2009 read with 05.07.2013, in support thereof;

(xxvii) User agency either himself or through the State Forest Department shall undertake gap planting and soil & moisture conservation activities to restock and rejuvenate the degraded open forests (having crown density less than 0.40), if any, located in the area within 100 m. from outer perimeter of the mining lease. The plan for plantation and SMC activities will be prepared and submitted to MoEF &CC before Stage-II Clearance;

(2)

(xxviii) The User Agency shall undertake mining in a phased manner after taking due care for reclamation of the mined over area. The concurrent reclamation plan as per the approved mining plan shall be executed by the User Agency from the very first year, and an annual report on implementation thereof shall be submitted to the Nodal Officer, Forest (Conservation) Act, 1980, in the concerned State Government and the concerned Regional Office of the Ministry. If it is found from the annual report that the activities indicated in the concurrent reclamation plan are not being executed by the User Agency, the Nodal Officer or the Chief Conservator of Forests (Central) may direct that the mining activities shall remain suspended till such time, such reclamation activities area satisfactorily executed.

(xxix) The User Agency shall prepare a list of existing village tanks and other water bodies with GPS co-ordinates located within five km. from the mine lease boundary. This list is to be duly verified by the concerned Divisional Forest Officer. The User Agency shall regularly undertake desilting of these village tanks and other water bodies so as to mitigate the impact of siltation of such tanks/water bodies. A detailed plan for desilting of identified ponds and water bodies to be prepared in consultation with forest department and shall be submitted to MoEF & CC before Stage-II approval;

(xxx) The User Agency shall submit the annual self- compliance report in respect of the above stated conditions to the State Government, concerned Regional Office of MoEF&CC and this Ministry by the end of March every year;

(xxxi) Any other condition that the concerned Regional Office of this Ministry may stipulate, from time to time, in the interest of conservation, protection and development of forests & wildlife; and

(xxxii) The user agency shall comply all the provisions of the all Acts, Rules, Regulations, Guidelines & Hon'ble Court Order (s) pertaining to this project, if any, for the time being in force, as applicable to the project

After receipt of the report on compliance to the conditions stipulated in the paragraph-2 above from the State Government of Odisha, final/ stage-II approval for diversion of the said forest under Section-2 of the Forest (Conservation) Act, 1980 will be issued by this Ministry. Transfer of to the said forest land to the user agency shall not be affected by the State Government of Odisha till final/stage-II approval for its diversion is issued by this Ministry.

Yours faithfully,

(Sandeep Sharma)
Assistant Inspector General of Forests (FC)

Copy to:

1. The PCCF, Government of Orissa, Bhubaneswar.
2. The Addl. Principal Chief Conservator of Forests (Central) Regional Office, Bhubaneswar.
3. The Nodal Officer, O/o PCCF Government of Orissa, Bhubaneswar.
4. The User Agency
5. The Monitoring Cell, FC Division, MoEF, New Delhi.
6. Guard File.

(Sandeep Sharma)
Assistant Inspector General of Forests (FC)

Annexure-2

F. No. 8-46/2016-FC
Government of India
Ministry of Environment, Forests & Climate Change
(Forest Conservation Division)

Indira Paryavaran Bhawan,
Jor Bagh Road, Aliganj,
New Delhi: 110003,
Dated: 25th September, 2017

To,

The Principal Secretary,
Government of Odisha,
Bhubaneswar.

Stage-II forest clearance order

Sub: Diversion of 434.935 ha of forest land (428.075 ha forest land within Kodingamali Bauxite Mining lease area including 18.098 ha of forest land in safety zone and 6.860 ha of forest land out- side the ML area for construction of approach road to the mining lease) for mining of bauxite in Kodingamali Bauxite Mines located in Koraput & Rayagada districts of Odisha by Odisha Mining Corporation Ltd.

Sir,

I am directed to refer to the State Government of Odisha's letter No 10F (Cons) 99/2013/17199/F&E dated 19th August 2013 on the subject cited above seeking prior approval of the Central Government under the Forest (Conservation) Act, 1980. After careful consideration of the proposal by the Forest Advisory Committee (FAC) constituted under section-3 of the said Act, ***In-principle approval /Stage-I*** Clearance was granted vide this Ministry's letter of even number dated 17.04.2017 subject to fulfilment of certain conditions. The State Government has furnished compliance report in respect of the conditions stipulated in the approval and has requested the Central Government to grant final approval.

In this connection, I am directed to say that on the basis of the compliance report furnished by the Government of Odisha vide their letter No. 19261/9F (MG)- 400/2016 dated 01.09.2017, **Final/Stage-II approval** of the Central Government is hereby granted under Section-2 of the Forest (Conservation) Act, 1980 for diversion of 434.935 ha of forest land (428.075 ha forest land within Kodingamali Bauxite Mining lease area including 18.098 ha of forest land in safety zone and 6.860 ha of forest land out- side the ML area for construction of approach road to the mining lease) for mining of bauxite in Kodingamali Bauxite Mines located in Koraput & Rayagada districts of Odisha by Odisha Mining Corporation Ltd subject to fulfilment of the following conditions:

(i) Legal status of the diverted forest land shall remain unchanged;

(ii) Compensatory afforestation over the non-forest land equal in extent to the forest land being diverted shall be raised on the identified land within three years from the date of issue of Stage –II Clearance by the State Forest Department and maintained thereafter as per approved plan at the cost of the User Agency;

(iii) The non-forest land to be transferred and mutated in favour of the State Forest Department for raising Compensatory Afforestation shall be notified as reserved Forest under Section-4 or Protected Forest under Section-29 of the Indian Forest Act, 1927 or under the relevant Section(s) of the local Forest Act. The Nodal officer must report compliance within a period of 6 months from the date of grant

25.9.17

of final approval and send a copy of the notification declaring the non-forest land under Section 4 or Section 29 of the Indian Forest Act, 1927, or under the relevant section of the local Forest Act as the case may be, to this Ministry for information and record;

(iv) The State Government shall ensure that no residential buildings shall be allowed within the diverted forest land;

(v) State Government shall implement the approved soil conservation plan at the cost of user agency;

(vi) Fencing, protection and regeneration of the safety zone area [7.5 meters strip shall be kept within the mining lease boundary and area of the safety zone shall be part of the total area of mining lease as per the Ministry's guidelines dated 27.05.2015] shall be done within three years at the project cost as per approved scheme. In addition, afforestation as selected towards one & a half times the area under safety zone on identified degraded forest land of 27.174 ha shall also be done at the project cost;

(vii) Period of diversion of the said forest land under this approval shall be for a period co-terminus with the period of the mining lease proposed to be granted under the Mines and Minerals (Development and Regulation) Act, 1957, as amended and the Rules framed there-under;

(viii) The User Agency shall obtain the Environment Clearance as per the provisions of the Environmental (Protection) Act, 1986, if required;

(ix) State Government shall ensure that no labour camp shall be established on the forest land;

(x) State Government shall ensure that the User Agency shall provide fuels preferably alternate fuels to the labourers and the staff working at the site so as to avoid any damage and pressure on the nearby forest areas;

(xi) State Government shall ensure that the boundary of the diverted forest land, mining lease and safety zone, as applicable, shall be demarcated on ground at the project cost, by erecting four feet high reinforced cement concrete pillars, each inscribed with its serial number, distance from pillar to pillar and GPS co-ordinates;

(xii) State Government shall ensure that the User Agency shall undertake mining in a phased manner after taking due care for reclamation of the mined over area. The concurrent reclamation plan as per the approved mining plan shall be executed by the User Agency from the very first year, and an annual report on implementation thereof shall be submitted to the Nodal Officer, Forest (Conservation) Act, 1980, in the concerned State Government and the concerned Regional Office of the Ministry. If it is found from the annual report that the activities indicated in the concurrent reclamation plan are not being executed by the User Agency, the Nodal Officer or the Chief Conservator of Forests (Central) may direct that the mining activities shall remain suspended till such time, such reclamation activities area satisfactorily executed;

25.9.17

(xiii) State Government shall ensure that the layout plan of the mining plan/ proposal shall not be changed without the prior approval of the Central Government;

(xiv) State Government shall ensure that the forest land shall not be used for any purpose other than that specified in the proposal;

(xv) State Government shall ensure that the forest land proposed to be diverted shall under no circumstances be transferred to any other agency, department or person without prior approval of the Central Government;

(xvi) State Government shall ensure that no damage to the flora and fauna of the adjoining area shall be caused;

(xvii) State Government shall ensure that any tree felling shall be done only when it is unavoidable and that too under strict supervision of the State Forest Department;

(xviii) State Government shall ensure that the following activities/plan, as per approved plan / schemes, shall be undertaken by the State Forest Department at the cost provided by the user agency;

(a) Mitigative measures to minimize soil erosion and choking of stream shall be implemented within a period of three year with effect from the issue of Stage-II clearance in accordance with the approved Plan in consultation with the State Forest Department.

(b) Planting of adequate drought hardy plant species and sowing of seeds, in the appropriate area within the mining lease to arrest soil erosion in accordance with the approved scheme;

(c) Construction of check dams, retention /toe walls to arrest sliding down of the excavated material along the contour in accordance with the approved scheme;

(d) Stabilize the overburden dumps by appropriate grading/benching, in accordance with the approved scheme, so as to ensure that angles of repose at any given place is less than 28o; and

(e) No damage shall be caused to the top-soil and the user agency will follow the top soil management plan.

(xix) State Government shall ensure that the State Forest Department shall undertake gap planting and soil & moisture conservation activities to restock and rejuvenate the degraded open forests (having crown density less than 0.40), if any, located in the area within 100 m. from outer perimeter of the mining lease at the cost provided by the user agency;

(xx) State Government shall ensure that the User Agency shall implement the plan for de-silting on identified existing village tanks and other water bodies for which GPS co-ordinates provided within five km. from the mine lease boundary to mitigate the impact of siltation of such tanks/water bodies;

25.5.17

(xxi) State Government shall ensure that the User Agency shall submit the annual self-compliance report in respect of the above stated conditions and also to the conditions stipulated in Stage-I Clearance to the State Government, concerned Regional Office of MoEF&CC and this Ministry by the end of March every year;

(xxii) Any other condition that the concerned Regional Office of this Ministry may stipulate, from time to time, in the interest of conservation, protection and development of forests & wildlife; and

(xxiii) The user agency shall comply all the provisions of the all Acts, Rules, Regulations, Guidelines, Hon'ble Court Order (s) and NGT Order(s) pertaining to this project, if any, for the time being in force, as applicable to the project.

Yours faithfully,

25.9.17

(Sandeep Sharma)
Assistant Inspector General of Forests (FC)

Copy to:

1. The PCCF, Government of Orissa, Bhubaneswar.
2. The Addl. Principal Chief Conservator of Forests (Central) Regional Office, Bhubaneswar.
3. The Nodal Officer, O/o PCCF Government of Orissa, Bhubaneswar.
4. The User Agency
5. The Monitoring Cell, FC Division, MoEF, New Delhi.
6. Guard File.

25.9.17

(Sandeep Sharma)
Assistant Inspector General of Forests (FC)

Government of Odisha
Forest & Environment Department
-0-
No.10F (Con) 1/2017 20540 /F&E. Bhubaneswar, dated the 07.10.17

ORDER

Sub: Diversion of 434.935 ha of forest land (428.075ha. of forest land within Kodingamali Bauxite Mining lease area including 18.098ha. of forest land in safety zone and 6.860ha. of forest land outside the ML area for construction of approach road to the mining lease) for mining of bauxite in Kodingamali Bauxite Mines located in Koraput & Rayagada districts of Odisha by Odisha Mining Corporation Ltd.

WHEREAS, the Odisha Mining Corporation Ltd. had applied for diversion of 434.935 ha of forest land (428.075ha. of forest land within Kodingamali Bauxite Mining lease area including 18.098ha. of forest land in safety zone and 6.860ha. of forest land outside the ML area for construction of approach road to the mining lease) for mining of bauxite in their Kodingamali Bauxite Mines located in Koraput & Rayagada districts of Odisha.

And whereas, the Ministry of Environment, Forests and Climate Change (hereinafter referred to as MoEF&CC) , Government of India, had accorded 'in-principle' approval for diversion of 434.935 ha of forest land (428.075ha. of forest land within Kodingamali Bauxite Mining lease area including 18.098ha. of forest land in safety zone and 6.860ha. of forest land outside the ML area for construction of approach road to the mining lease) for mining of bauxite in Kodingamali Bauxite Mines located in Koraput & Rayagada districts of Odisha by Odisha Mining Corporation Ltd vide its letter F.No. 8-46/2016-FC dt. 17.4.2017(ANNEXURE-1).

And whereas, the MoEF&CC , Government of India, in consideration of the compliance of the conditions of the 'in-principle' approval, has accorded final approval for diversion of the said 434.935ha. of forest land in favour of above mentioned lessee vide its letter F.No. 8-46/2016-FC dt. 25.9.2017 **(Annexure-2)** under Section 2 of the Forest (Conservation) Act, 1980 subject to compliance of conditions prescribed therein.

Now therefore, the Governor of Odisha, do hereby allow diversion of forest land of 434.935ha. in favour of Odisha Mining Corporation Ltd, as per approved land use pattern, statements showing boundary descriptions of Kodingamali Bauxite Mines in Kodingamali RF of Koraput district & Rayagada district, boundary descriptions of access road in Kodingamali RF to Kodingamali Bauxite Mines duly authenticated by the Divisional Forest Officers of Koraput and Rayagada Forest Division and detailed land schedule of revenue forest land existing in the access road duly authenticated by Tahasildar, Laxmipur as received from PCCF, Odisha vide his Memo No. 19263 dt. 1.9.2017 appended herewith as **Annexure-3**, subject to fulfillment of the conditions stipulated by the MoEF&CC, Government of India.

1

The Divisional Forest Officers of Koraput Forest Division & Rayagada Forest Division and Collectors of Koraput/Rayagada are authorized to handover the forest land, as has been diverted, to the user agency **subject to having valid lease** following due procedure of law. Before handing over the forest land to the user agency, it shall be ensured that Net Present Value for forest land for this project as well as for any other projects, belonging to same user agency, is deposited, in full, at applicable rates.

The Divisional Forest Officers of Koraput Forest Division & Rayagada Forest Division are also directed to monitor compliance to the conditions stipulated for such diversion in the respective forest/Wildlife clearance order and to report violations, if any, to the Nodal Officer, O/O Pr. CCF, Odisha and to the Forest & Environment Department.

Execution of project activities will be subject to having valid lease and availability of all other statutory clearances required under relevant Act/Rules for this mining project, deposit of requisite funds and compliance of Court's order, if any.

By order of Governor

(Debidutta Biswal)
Special Secretary to Government

Memo No. 20541 /F&E, Dated: 07.10.17

Copy along with the copy of Annexure 1 , Annexure-2 and Annexure-3 above forwarded to the Principal Chief Conservator of Forests, Odisha for kind information and necessary follow up action.

Appropriate instruction to the Divisional Forest Officers of Koraput Division/Rayagada Forest Division and user agency may be imparted for required follow up action at their end. It may be ensured by the Divisional Forest Officer that Net Present Value for the forest land involved in this project of user agency as well as for any other projects of the same user agency, is deposited by them in appropriate head of account in Adhoc-CAMPA in full, at applicable rates. The user agency may also be instructed to furnish compliance to the conditions of forest/Wild life clearance pertaining to the project in every quarter to the Divisional Forest Officers of Koraput and Rayagada Forest Division for facilitating monitoring of compliances.

Special Secretary to Government

Memo No. 20542 /F&E, Dated: 07.10.17

Copy along with the copy of annexures as above forwarded to the Asst. Inspector General of Forests, Government of India, MoEF&CC(FC Division), Indira Paryavaran Bhawan, Jor Bagh ,Aliganj Road, New Delhi, Pin-110003/Addl. Principal Chief Conservator of Forests(Central), MoEF&CC, Government of India, A/3, Chandrasekharpur, Bhubaneswar for kind information and necessary follow up action in compliance to the order of Hon'ble NGT dt. 7.11.2012 in Appeal No. 7/2012 communicated by the MoEF, Government vide their letter F. No.7-23/2012-FC dt. 24.7.2013.

Special Secretary to Government

Memo No. 20543 /F&E, Dated: 07.10.17

Copy along with the copy of annexures as above forwarded to the Pr. CCF(WL)&CWLW, Odisha/Director, Environment, F&E department/ Member Secretary, State Pollution Control Board, Odisha for information and necessary action.

Special Secretary to Government

Memo No. 20544 /F&E, Dated: 07.10.17

Copy along with the copy of annexures as above forwarded to the Regional Chief Conservator of Forests, Koraput/ Collector, Koraput /Collector, Rayagada/Divisional Forest Officer, Koraput Forest Division /Divisional Forest Officer, Rayagada Forest Division for information and immediate necessary compliance.

It may be ensured by the Divisional Forest Officers that Net Present Value for the forest land involved in this project of user agency as well as for any other projects of the same user agency, shall be deposited by them in full at applicable rates in appropriate head of account in Adhoc-CAMPA before handing over of the forest land to user agency. Besides, funds, if any, due to be deposited by the lessee in this project shall also be deposited by the lessee before the forest land is handed over to him. The user agency may also be instructed to furnish compliance to the conditions of forest/Wild life clearance pertaining to the project in every quarter to the Divisional Forest Officers concerned for facilitating monitoring of compliances by them.

The Divisional Forest Officers of Koraput and Rayagada Division are **also instructed to ensure that the direction given to the user agency are executed immediately.**

Special Secretary to Government

Memo No. 20545 /Dated. 07.10.17

Copy along with the copy of annexures as above forwarded to the Steel & Mines Department /Revenue & Disaster Management Department for information and necessary follow action.

Special Secretary to Government

Memo No. 20546 /Dated. 07.10.17

Copy along with the copy of annexures as above forwarded to the Private Secretary to Minister of Forest & Environment Department for kind information of Hon'ble Minister.

Special Secretary to Government

Memo No. 20547 /Dated. 07.10.17

Copy along with the copy of the enclosures forwarded to Managing Director, Odisha Mining Corporation Ltd, OMC House, Bhubaneswar for information and immediate necessary action.

The user agency shall take following actions immediately as per orders of Hon'ble National Green Tribunal dt. 7.11.2012 in Appeal No. 7/2012 communicated by the MOEF, Government vide their letter F. No.7-23/2012-FC dt. 24.7.2013.

(i) ***They shall publish the entire forest clearance granted in verbatim along with conditions and safeguards imposed by the Central Government in Stage-I/II forest clearance in two widely circulated daily newspapers, one in vernacular language and the other in English language so as to make people aware of the permission granted to the Project for use of forest land for non-forest purposes.***

(ii) *They shall submit the copies of forest clearance orders granted by the Central Government/State Government to the Heads of local bodies and Municipal bodies along with the relevant offices of the State Government, who in turn, shall display the same for 30 days from date of receipt.*

(iii) *Detailed action taken in compliance to the above order of State Government shall be intimated to the DFO, Koraput Division/DFO, Rayagada Division/RCCF, Koraput/Pr. CCF, Odisha/F&E Department for reference.*

Besides the above, the user agency is also asked to deposit Net Present Value of forest land for this project and for any other projects belonging to him in full, if not deposited yet, at applicable rates. Also requisite funds due for deposit by the user agency on account of this project shall also be deposited in Adhoc-CAMPA Account.

The user agency shall furnish compliances to the conditions prescribed in the forest/wildlife clearance order to the Divisional Forest Officers of Koraput and Rayagada Division in every quarter, for the purpose of monitoring by him.

Special Secretary to Government

Memo No. 20548 Dated- 07/10/17

Copy with copy of enclosure forwarded to the O.I.C., State Portal, N.I.C., I.T., Department, Odisha Secretariat, Bhubaneswar/ M/s Luminous Infoways Pvt. Ltd, Sadhana, N-6/373, Nayapalli, Jayadev Vihar, Bhubaneswar-15 for information and necessary action. They are requested to upload this letter along with enclosed forest clearance order of Government of India, MoEF&CC, in the website of Forest & Environment Department **immediately** for information of all concerned. **This is required in compliance to order of Hon'ble National Green Tribunal dt. 7.11.2012 in Appeal No. 7/2012. Hence this may be done unfailingly.**

Special Secretary to Government.

Memo No. 20549 Dated- 07/10/17

Copy with copy of enclosure forwarded to the Under Secretary to Government, Office Establishment Section, F&E Department for information and necessary action with reference to their letter No.21646/F&E Dt. 22.11.2016.

Special Secretary to Government

ANNEXURE-XVII

Annexure-3

BOUNDARY DESCRIPTION OF KODINGAMALI RF OF KORAPUT DISTRICT

PILLAR NO.	Latitude	Longitude
A	E19°4'17.63724"	N83°04'32.32416"
54r	N19°04'20.84452"	E83°04'24.32292"
53f	N19°04'18.26970"	E83°04'23.90856"
52r	N19°04'16.40315"	E83°04'23.52672"
51f	N19°04'13.46508"	E83°04'22.28616"
D	E19°4'13.96452"	N83°04'30.28332"
E	E19°4'1.98156"	N83°04'24.78936"
E-1	E19°3'50.09436"	N83°04'25.8978"
F	E19°3'39.27024"	N83°04'26.90724"
G	E19°3'39.1284"	N83°04'23.31876"
G-1	E19°3'47.03724"	N83°04'21.07308"
H	E19°3'55.773"	N83°04'18.59268"
I	E19°4'9.49908"	N83°04'17.44392"
49f	N19°04'09.66509"	E83°04'18.17597"
8F	N19°03'44.93153"	E83°03'58.04092"
7F	N19°04'04.49857"	E83°04'09.35994"
6f	N19°02'41.25387"	E83°03'58.31282"
41f	N19°03'46.48516"	E83°03'57.93223"
8F	N19°03'44.93153"	E83°03'58.04092"
L	E19°3'46.45692"	N83°04'8.82984"
33r	N19°03'44.59206"	E83°04'12.34754"
32f	N19°03'43.35300"	E83°04'14.84412"
31r	N19°03'41.59025"	E83°04'17.56441"
M	E19°3'40.28652"	N83°04'19.33752"
29rf	N19°03'36.97086"	E83°04'19.83365"
28f	N19°03'34.64881"	E83°04'20.06741"
27r	N19°03'31.76466"	E83°04'19.97185"
26f	N19°03'27.93518"	E83°04'19.55653"
25r	N19°03'25.53761"	E83°04'17.54987"
24f	N19°03'24.23435"	E83°04'15.14595"
22f	N19°03'21.17917"	E83°04'12.54483"
20f	N19°03'14.98822"	E83°04'10.95339"
19r	N19°03'12.23330"	E83°04'09.64578"
O-1	E19°3'11.14488"	N83°04'9.61284"
1-P	N19°03'03.98751"	E83°04'07.55357"
2-P	N19°03'02.04501"	E83°04'07.96610"
3-P	N19°02'59.52852"	E83°04'08.55344"
4-P	N19°02'55.91818"	E83°04'08.48253"
5-P	N19°02'54.26438"	E83°04'08.20321"
12f	N19°02'53.59479"	E83°04'08.12499"
11r	N19°02'51.10448"	E83°04'07.75434"
10f	N19°02'49.08060"	E83°04'06.25934"
9r	N19°02'47.44647"	E83°04'05.22781"
8f	N19°02'45.11568"	E83°04'03.54100"
6-P	N19°02'42.75513"	E83°04'02.13466"
P	E19°2'41.32104"	N83°04'1.41204"

6f	N19°03'55.71584"	E83°04'06.64794"
5p	N19°02'40.17873"	E83°03'56.36515"
4f	N19°02'39.01653"	E83°03'54.32976"
3p	N19°02'41.20842"	E83°03'51.63708"
2f	N19°02'42.01396"	E83°03'50.41645"
1r	N19°02'42.93340"	E83°03'49.23873"
Q	E19°2'42.87264"	N83°03'46.14984"
Q-1	E19°2'38.72184"	N83°03'39.93696"
Q-2	E19°2'33.7452"	N83°03'32.53356"
Q-3	E19°2'30.92712"	N83°03'28.33236"
Q-4	E19°2'27.30912"	N83°03'22.91364"
7-P	N19°02'18.74879"	E83°03'27.97559"
T	E19°2'20.40828"	N83°03'33.73848"
U	E19°2'15.34092"	N83°03'37.95084"
X	E19°2'9.82572"	N83°03'41.75172"
Y	E19°2'22.7508"	N83°03'41.859"
Z	E19°2'38.26464"	N83°03'47.48796"
Z-1	E19°2'23.47584"	N83°03'54.3078"
Z1-A	E19°2'7.74168"	N83°03'48.68496"
Z-2	E19°1'48.47304"	N83°03'41.78376"
Z-3	E19°1'46.34652"	N83°03'43.16292"
Z3-A	E19°1'46.61652"	N83°03'53.29512"
Z3-B	E19°1'46.72416"	N83°03'59.01912"
Z-4	E19°1'46.87068"	N83°04'4.9872"
Z-5	E19°1'54.38784"	N83°04'4.74708"
Z-6	E19°1'55.86168"	N83°03'58.96368"
Z6-A	E19°2'4.25328"	N83°03'58.60656"
Z-7	E19°2'12.15492"	N83°03'58.311"
Z-8	E19°2'13.19208"	N83°04'2.48988"
Z-9	E19°2'17.69784"	N83°03'57.75516"
Z-10	E19°2'27.10032"	N83°04'4.03752"
Z10-A	E19°2'21.36768"	N83°04'16.52412"
Z-11	E19°2'16.25316"	N83°04'27.58872"
Z-12	E19°2'22.77564"	N83°04'24.46716"
Z-13	E19°2'29.69376"	N83°04'24.06432"
Z-14	E19°2'33.88056"	N83°04'18.99552"
8-P	N19°02'35.29116"	E83°04'18.48351"
9-P	N19°02'35.23799"	E83°04'13.42827"
10-P	N19°02'57.60632"	E83°04'13.75900"
Z-17	E19°2'57.45552"	N83°04'17.44248"
Z-18	E19°3'5.976"	N83°04'27.9354"
Z-19	E19°3'19.11744"	N83°04'24.20436"
Z-20	E19°3'25.79076"	N83°04'30.28944"
Z20-A	E19°3'29.84724"	N83°04'36.75576"
Z20-B	E19°3'33,93468"	N83°04'43.55688"
Z-21	E19°3'37.04328"	N83°04'48.68076"
Z-22	E19°3'41.4216"	N83°04'44.97132"
Z-23	E19°3'46.06056"	N83°04'48.63036"
Z-24	E19°3'49.6584"	N83°04'43.9518"
Z-25	E19°3'55.18044"	N83°04'43.32396"

Z-26	E19°4'0.55164"	N83°04'49.96956"
Z-27	E19°4'5.0664"	N83°04'47.5104"
Z-28	E19°4'11.61048"	N83°04'51.95352"
Z28-A	E19°4'21.47304"	N83°04'50.01816"
Z28-B	E19°4'30.86076"	N83°04'48.20088"
Z-29	E19°4'39.12744"	N83°04'46.63020"
Z29-A	E19°4'45.68124"	N83°04'50.07144"
Z-30	E19°4'52.35276"	N83°04'53.59368"
Z30-A	E19°4'51.5298"	N83°04'58.84356"
Z30-B	E19°4'50.4282"	N83°05'5.8884"
Z-31	E19°4'49.8936"	N83°05'9.42216"
Z31-A	E19°4'55.67268"	N83°05'10.02624"
Z31-B	E19°5'2.21496"	N83°05'10.70772"
Z31-C	E19°5'8.82096"	N83°05'11.40144"
Z-32	E19°5'13.41852"	N83°05'11.88888"
B7f	N19°05'12.51268"	E83°05'10.54893"
5f	N19°05'09.55873"	E83°05'05.79744"
4F	N19°05'09.78310"	E83°05'02.54289"
3f	N19°05'07.31099"	E83°04'57.76118"
2F	N19°05'06.83443"	E83°04'53.63552"
1f	N19°05'08.44880"	E83°04'50.28088"
77f	N19°05'12.29549"	E83°04'49.26869"
Z33-A	E19°5'8.19204"	N83°04'46.18992"
Z33-B	E19°5'2.50656"	N83°04'41.09628"
Z33-C	E19°4'57.054"	N83°04'36.219964"
Z-34	E19°4'51.02724"	N83°04'30.9306"
Z34-A	E19°4'42.69972"	N83°04'31.22508"
Z34-B	E19°4'33.31812"	N83°04'31.53792"
Z34-C	E19°4'24.22344"	N83°04'31.95408"

Forester
Laxmipur Section

Forest Range Officer
Laxmipur

Divisional Forest Officer
Koraput Division

420

BOUNDARY DESCRIPTION OF KODINGA PRF IN KODINGAMALI BAUXITE MINES OF OMC UNDER RAYAGADA DISTRICT

ID	Latitude	Longitude	Patch
14f	19°02'59.42489"	83°04'08.53386"	PATCH-1
15r	19°03'01.90626"	83°04'07.99138"	
16f	19°03'04.40465"	83°04'07.50365"	
8F	19°03'44.93153"	83°03'58.04092"	PATCH-2
41f	19°03'46.48516"	83°03'57.93223"	
K	83°03'57.80268"	19°3'45.56376"	
30f	19°03'39.69006"	83°04'18.87080"	PATCH-3
31r	19°03'41.59025"	83°04'17.56441"	
32f	19°03'43.35300"	83°04'14.84412"	
33r	19°03'44.59206"	83°04'12.34754"	
34f	19°03'45.82227"	83°04'09.10243"	
7p	19°02'42.63149"	83°04'02.08580"	PATCH-4
8f	19°02'45.11568"	83°04'03.54100"	
9r	19°02'47.44647"	83°04'05.22781"	
10f	19°02'49.08060"	83°04'06.25934"	
11r	19°02'51.10448"	83°04'07.75471"	
12f	19°02'53.59479"	83°04'08.12499"	
13r	19°02'55.77295"	83°04'08.48927"	
GP	83°04'08.20321"	19°02'54.26483"	
51f	19°04'13.46508"	83°04'22.28616"	PATCH-5
52r	19°04'16.40315"	83°04'23.52672"	
53f	19°04'18.26970"	83°04'23.90856"	
54r	19°04'20.84452"	83°04'24.32292"	
55f	19°04'23.29445"	83°04'23.86906"	
B	83°04'22.53108"	19°4'23.26584"	
C	83°04'22.08864"	19°4'15.8502"	
1r	19°02'42.93340"	83°03'49.23873"	PATCH-6
2f	19°02'42.01396"	83°03'50.41645"	
3p	19°02'41.20842"	83°03'51.63708"	
4f	19°02'39.01653"	83°03'54.32976"	
5p	19°02'40.17873"	83°03'56.36515"	
6f	19°03'55.71584"	83°04'06.64794"	

ID	Latitude	Longitude	Patch
19r	19°03'12.23330"	83°04'09.64578"	PATCH-7
20f	19°03'14.98822"	83°04'10.95339"	
21r	19°03'17.04729"	83°04'11.44019"	
22f	19°03'21.17917"	83°04'12.54483"	
24f	19°03'24.23435"	83°04'15.14595"	
25r	19°03'25.53761"	83°04'17.54987"	
26f	19°03'27.93518"	83°04'19.55653"	
27r	19°03'31.76466"	83°04'19.97185"	
28f	19°03'34.64881"	83°04'20.06741"	
29rf	19°03'36.97086"	83°04'19.83365"	
N	83°04'17.62716"	19°3'26.25408"	
O	83°04'12.99108"	19°3'23.43636"	
41f	19°03'46.48516"	83°03'57.93223"	PATCH-8
6f	19°02'41.25387"	83°03'58.31282"	
7F	19°04'04.49857"	83°04'09.35994"	
9F	19°04'08.75345"	83°04'15.69238"	
49f	19°04'09.66509"	83°04'18.17587"	
J	83°04'6.28536"	19°4'7.41612"	
J-1	83°04'3.2[illegible]32"	19°3'59.54292"	
77f	19°05'12.[illegible]9549"	83°04'49.26869"	PATCH-9
1f	19°05'08.44880"	83°04'50.28088"	
2F	19°05'06.83443"	83°04'53.63552"	
3f	19°05'07.31099"	83°04'57.76118"	
4F	19°05'09.78310"	83°05'02.54289"	
5f	19°05'09.55873"	83°05'05.79744"	
87f	19°05'12.51268"	83°05'10.54893"	
88r	19°05'14.44909"	83°05'12.53546"	
Z-32	83°05'11.88888"	19°5'13.41852"	
Z32-A	83°05'4.74108"	19°5'13.56396"	
Z32-B	83°04'56.48556"	19°5'13.7436"	
Z-33	83°04'51.18132"	19°5'13.84656"	

ANNEXURE-XVIII

BOUNDARY DESCRIPTION OF 5.89 HA OF KODINGAMALI RF PROPOSED FOR ACCESS ROAD TO KODINGAMALI BAUXITE MINING LEASE OF OMC.					
PILLAR NO.	LATITUDE	LONGITUDE	PILLAR NO.	LATITUDE	LONGITUDE
1	19°01'53.00533"	83°04'03.56191"	42	19°01'22.17706"	83°04'34.35822"
2	19°01'51.64980"	83°04'05.57293"	43	19°01'21.45922"	83°04'35.00920"
3	19°01'51.16491"	83°04'06.48089"	44	19°01'20.67600"	83°04'35.63331"
4	19°01'50.54291"	83°04'07.29746"	45	19°01'19.83305"	83°04'36.17263"
5	19°01'49.60338"	83°04'08.43885"	46	19°01'19.04032"	83°04'36.74945"
6	19°01'49.11470"	83°04'09.27088"	47	19°01'17.80490"	83°04'37.62290"
7	19°01'48.70355"	83°04'10.16102"	48	19°01'17.00169"	83°04'38.13712"
8	19°01'48.05685"	83°04'11.00969"	49	19°01'16.14939"	83°04'38.69505"
9	19°01'47.12823"	83°04'12.19612"	50	19°01'15.35589"	83°04'39.32015"
10	19°01'46.11396"	83°04'13.37083"	51	19°01'14.48466"	83°04'39.85628"
11	19°01'45.41301"	83°04'14.05805"	52	19°01'13.57576"	83°04'40.30700"
12	19°01'44.76087"	83°04'14.79237"	53	19°01'13.08516"	83°04'40.28113"
13	19°01'44.13626"	83°04'15.54359"	54	19°01'12.29839"	83°04'40.66552"
14	19°01'43.24188"	83°04'16.72949"	55	19°01'11.34904"	83°04'41.00252"
15	19°01'42.67015"	83°04'17.54389"	56	19°01'10.43941"	83°04'41.40082"
16	19°01'41.69818"	83°04'18.68518"	57	19°01'09.88994"	83°04'41.53147"
17	19°01'41.11014"	83°04'19.44700"	58	19°01'08.95678"	83°04'40.83038"
18	19°01'40.02402"	83°04'20.53517"	59	19°01'08.11200"	83°04'40.30526"
19	19°01'39.34164"	83°04'21.23499"	60	19°01'07.78184"	83°04'40.38208"
20	19°01'38.24777"	83°04'22.20551"	61	19°01'07.33845"	83°04'40.23711"
21	19°01'37.43404"	83°04'22.80144"	62	19°01'06.60383"	83°04'39.82706"
22	19°01'36.59063"	83°04'23.37664"	63	19°01'05.70441"	83°04'39.07954"
23	19°01'35.35009"	83°04'24.14540"	64	19°01'05.01646"	83°04'38.81855"
24	19°01'34.51441"	83°04'24.67403"	65	19°01'04.32360"	83°04'38.34821"
25	19°01'33.62570"	83°04'25.17866"	66	19°01'03.70258"	83°04'37.97775"
26	19°01'32.32645"	83°04'25.82702"	67	19°01'03.38843"	83°04'37.84306"
27	19°01'31.85151"	83°04'26.04191"	68	19°01'03.00434"	83°04'37.55018"
28	19°01'31.38783"	83°04'26.19650"	69	19°01'02.40045"	83°04'36.87184"
29	19°01'30.90062"	83°04'26.27839"	70	19°01'02.20345"	83°04'36.58910"
30	19°01'29.61738"	83°04'26.79914"	71	19°01'01.95666"	83°04'36.39697"
31	19°01'29.30595"	83°04'27.07172"	72	19°01'01.36933"	83°04'36.09371"
32	19°01'28.64655"	83°04'27.89119"	73	19°01'01.07858"	83°04'35.96115"
33	19°01'27.71785"	83°04'28.37689"	74	19°01'00.78961"	83°04'35.78944"
34	19°01'26.97479"	83°04'28.88171"	75	19°01'00.53153"	83°04'35.53385"
35	19°01'25.93493"	83°04'29.87282"	76	19°01'00.35189"	83°04'35.41095"
36	19°01'25.64684"	83°04'30.21446"	77	19°01'00.13035"	83°04'35.37138"
37	19°01'25.42158"	83°04'30.61756"	78	19°00'59.71244"	83°04'35.22445"
38	19°01'24.81348"	83°04'31.43150"	79	19°00'59.55641"	83°04'34.97432"
39	19°01'24.22184"	83°04'32.23202"	80	19°00'59.64784"	83°04'34.70462"
40	19°01'23.58027"	83°04'32.96576"	81	19°00'59.99176"	83°04'34.44457"
41	19°01'22.88105"	83°04'33.66976"	82	19°01'00.39803"	83°04'34.30758"

PILLAR NO.	LATITUDE	LONGITUDE
83	19°01'00.78628"	83°04'34.26441"
84	19°01'01.31888"	83°04'34.34937"
85	19°01'01.43116"	83°04'34.32400"
86	19°01'01.48571"	83°04'34.21021"
87	19°01'01.43291"	83°04'34.11164"
88	19°01'01.17134"	83°04'34.03789"
89	19°01'00.81261"	83°04'33.94309"
90	19°01'00.45666"	83°04'33.80603"
91	19°01'00.09928"	83°04'33.68219"
92	19°00'59.31590"	83°04'33.49118"
93	19°00'59.10495"	83°04'33.35013"
94	19°00'59.12691"	83°04'33.17147"
95	19°00'59.36921"	83°04'32.88025"
96	19°00'59.91195"	83°04'32.50715"
97	19°01'00.30403"	83°04'32.32211"
98	19°01'01.27043"	83°04'32.03435"
99	19°01'01.61421"	83°04'31.89481"
100	19°01'01.65416"	83°04'31.79557"
101	19°01'01.59476"	83°04'31.71948"
102	19°01'01.22924"	83°04'31.68089"
103	19°01'00.51825"	83°04'31.72369"
104	19°00'59.91988"	83°04'31.91920"
105	19°00'59.77203"	83°04'31.85114"
106	19°00'59.75559"	83°04'31.66132"
107	19°00'59.95650"	83°04'30.91493"
108	19°01'00.63824"	83°04'30.31572"
109	19°01'01.64738"	83°04'29.99474"
110	19°01'01.68535"	83°04'29.87498"
111	19°01'01.60835"	83°04'29.76273"
112	19°01'00.74563"	83°04'29.61657"
113	19°01'00.25580"	83°04'29.61859"
114	19°00'59.61370"	83°04'29.80544"
115	19°00'59.46458"	83°04'29.71900"
116	19°00'59.45922"	83°04'29.52621"
117	19°00'59.62465"	83°04'29.18650"
118	19°00'59.96165"	83°04'28.68158"
119	19°01'00.27826"	83°04'28.20706"
120	19°01'00.49800"	83°04'27.87731"
121	19°01'00.90320"	83°04'27.43662"
122	19°01'01.15059"	83°04'27.24527"
123	19°01'01.23116"	83°04'27.10350"
124	19°01'01.13844"	83°04'27.00582"
125	19°01'00.71390"	83°04'27.01919"

PILLAR NO.	LATITUDE	LONGITUDE
126	19°01'00.22188"	83°04'27.28718"
127	19°00'59.90626"	83°04'27.56578"
128	19°00'59.48568"	83°04'27.89213"
129	19°00'59.05076"	83°04'28.13117"
130	19°00'58.63713"	83°04'28.22288"
131	19°00'57.81516"	83°04'28.67181"
132	19°00'57.52855"	83°04'28.56577"
133	19°00'57.22870"	83°04'28.31345"
205	19°00'58.34750"	83°04'27.40430"
206	19°00'58.00799"	83°04'27.69652"
207	19°00'57.88636"	83°04'27.80737"
208	19°00'57.87161"	83°04'27.91509"
209	19°00'57.95685"	83°04'27.94369"
210	19°00'58.40836"	83°04'27.57218"
211	19°00'58.83127"	83°04'27.48171"
212	19°00'59.15604"	83°04'27.29961"
213	19°00'59.49439"	83°04'27.02813"
214	19°00'59.90373"	83°04'26.68402"
215	19°01'00.60806"	83°04'26.32750"
216	19°01'01.57979"	83°04'26.48407"
217	19°01'02.34586"	83°04'27.10833"
218	19°01'02.56265"	83°04'27.58942"
219	19°01'02.41599"	83°04'27.73069"
220	19°01'01.54308"	83°04'27.72498"
221	19°01'01.01438"	83°04'28.29382"
222	19°01'00.86115"	83°04'28.52236"
223	19°01'00.79701"	83°04'28.69813"
224	19°01'00.86846"	83°04'28.84950"
225	19°01'01.58020"	83°04'28.94336"
226	19°01'02.45935"	83°04'29.23017"
227	19°01'02.90243"	83°04'29.50567"
228	19°01'03.03817"	83°04'29.71018"
229	19°01'02.86241"	83°04'30.02394"
230	19°01'02.55578"	83°04'30.26116"
231	19°01'02.02980"	83°04'30.45967"

PILLAR NO.	LATITUDE	LONGITUDE	PILLAR NO.	LATITUDE	LONGITUDE
232	19°01'01.60983"	83°04'30.63398"	274	19°01'09.98320"	83°04'40.81705"
233	19°01'01.29000"	83°04'30.79215"	275	19°01'10.24889"	83°04'40.74378"
234	19°01'01.23819"	83°04'30.90578"	276	19°01'11.17209"	83°04'40.34395"
235	19°01'01.30497"	83°04'31.01748"	277	19°01'12.03267"	83°04'40.03958"
236	19°01'02.04543"	83°04'31.19339"	278	19°01'13.00248"	83°04'39.59049"
237	19°01'03.26996"	83°04'31.66281"	279	19°01'13.43635"	83°04'39.62429"
238	19°01'03.49688"	83°04'31.87125"	280	19°01'14.21565"	83°04'39.23482"
239	19°01'03.54298"	83°04'32.09169"	281	19°01'15.00544"	83°04'38.74420"
240	19°01'03.44488"	83°04'32.31818"	282	19°01'15.79010"	83°04'38.12757"
241	19°01'03.16607"	83°04'32.45669"	283	19°01'16.64315"	83°04'37.56579"
242	19°01'01.74562"	83°04'32.47896"	284	19°01'17.46807"	83°04'37.03437"
243	19°01'00.90186"	83°04'32.86356"	285	19°01'18.67720"	83°04'36.17980"
244	19°01'00.66926"	83°04'32.94202"	286	19°01'19.50673"	83°04'35.57812"
245	19°01'00.60858"	83°04'33.05099"	287	19°01'20.27723"	83°04'35.09405"
246	19°01'00.67515"	83°04'33.16199"	288	19°01'21.03304"	83°04'34.49044"
247	19°01'01.03219"	83°04'33.29883"	289	19°01'21.73824"	83°04'33.85291"
248	19°01'02.31557"	83°04'33.71542"	290	19°01'22.43926"	83°04'33.16869"
249	19°01'02.92333"	83°04'33.99664"	291	19°01'23.10544"	83°04'32.50223"
250	19°01'03.40238"	83°04'34.24201"	292	19°01'23.73014"	83°04'31.78266"
251	19°01'03.45441"	83°04'34.41375"	293	19°01'24.30817"	83°04'31.00168"
252	19°01'03.38371"	83°04'34.54028"	294	19°01'24.87142"	83°04'30.25252"
253	19°01'02.93625"	83°04'34.68422"	295	19°01'25.13761"	83°04'29.79048"
254	19°01'01.24050"	83°04'34.97656"	296	19°01'25.48755"	83°04'29.37378"
255	19°01'01.12861"	83°04'35.03959"	297	19°01'26.57475"	83°04'28.34163"
256	19°01'01.10723"	83°04'35.14030"	298	19°01'27.41935"	83°04'27.77001"
257	19°01'01.15277"	83°04'35.21991"	299	19°01'28.22630"	83°04'27.35638"
258	19°01'01.35418"	83°04'35.34163"	300	19°01'28.86601"	83°04'26.56950"
259	19°01'01.62617"	83°04'35.46559"	301	19°01'29.28598"	83°04'26.20235"
260	19°01'02.28848"	83°04'35.80893"	302	19°01'30.70955"	83°04'25.62281"
261	19°01'02.66692"	83°04'36.10406"	303	19°01'31.21542"	83°04'25.53826"
262	19°01'02.91729"	83°04'36.45590"	304	19°01'31.63757"	83°04'25.39450"
263	19°01'03.41581"	83°04'37.02022"	305	19°01'32.06239"	83°04'25.20302"
264	19°01'03.67426"	83°04'37.22719"	306	19°01'33.36240"	83°04'24.55421"
265	19°01'04.01938"	83°04'37.37871"	307	19°01'34.18381"	83°04'24.08074"
266	19°01'04.63776"	83°04'37.74908"	308	19°01'35.03032"	83°04'23.54772"
267	19°01'05.28725"	83°04'38.19587"	309	19°01'36.24492"	83°04'22.79414"
268	19°01'06.00795"	83°04'38.46573"	310	19°01'37.06235"	83°04'22.23938"
269	19°01'06.94060"	83°04'39.24125"	311	19°01'37.84110"	83°04'21.67053"
270	19°01'07.57435"	83°04'39.59874"	312	19°01'38.89003"	83°04'20.74335"
271	19°01'07.80570"	83°04'39.68355"	313	19°01'39.61054"	83°04'20.00819"
272	19°01'08.19465"	83°04'39.59460"	314	19°01'40.61431"	83°04'19.00474"
273	19°01'09.29976"	83°04'40.24581"	315	19°01'41.20582"	83°04'18.23917"

PILLAR NO.	LATITUDE	LONGITUDE	PILLAR NO.	LATITUDE	LONGITUDE
316	19°01'42.15446"	83°04'17.12589"	324	19°01'48.13128"	83°04'09.83441"
317	19°01'42.72396"	83°04'16.31657"			
318	19°01'43.64088"	83°04'15.10080"	325	19°01'48.55206"	83°04'08.92651"
319	19°01'44.27258"	83°04'14.34057"	326	19°01'49.09523"	83°04'08.01063"
320	19°01'44.95334"	83°04'13.57470"	327	19°01'50.03522"	83°04'06.87007"
321	19°01'45.67213"	83°04'12.86888"	328	19°01'50.62699"	83°04'06.09748"
322	19°01'46.64162"	83°04'11.74255"	329	19°01'51.07063"	83°04'05.25951"
323	19°01'47.56706"	83°04'10.55996"	330	19°01'52.50362"	83°04'03.12682"

Forester
Laxmipur Sectoin

Forest Range Officer
Laxmipur

Divisional Forest Officer
Koraput Division

BOUNDARY DESCRIPTION OVER 0.97 HA OF REVENUE FOREST PROPOSED FOR ACCESS ROAD IN VILLAGE RAULIPADAR					
PILLAR NO.	LATITUDE	LONGITUDE	PILLAR NO.	LATITUDE	LONGITUDE
134	19°00'57.20917"	83°04'27.75871"	170	19°00'50.34879"	83°04'29.30435"
135	19°00'57.53097"	83°04'27.32635"	171	19°00'50.74827"	83°04'29.26794"
136	19°00'57.81356"	83°04'26.99493"	172	19°00'51.06434"	83°04'29.23802"
137	19°00'57.95620"	83°04'26.67417"	173	19°00'51.36129"	83°04'29.20891"
138	19°00'58.02235"	83°04'26.54617"	174	19°00'51.48604"	83°04'29.11725"
139	19°00'57.92175"	83°04'26.58402"	175	19°00'51.72710"	83°04'28.74748"
140	19°00'57.65269"	83°04'26.78284"	176	19°00'52.02758"	83°04'28.40835"
141	19°00'57.07425"	83°04'27.02898"	177	19°00'52.57375"	83°04'27.76134"
142	19°00'56.79218"	83°04'27.28705"	178	19°00'53.19813"	83°04'26.86979"
143	19°00'56.48881"	83°04'27.54931"	179	19°00'53.41178"	83°04'26.60636"
144	19°00'56.34441"	83°04'27.88148"	180	19°00'53.45942"	83°04'25.75175"
145	19°00'56.10096"	83°04'28.42123"	181	19°00'53.75727"	83°04'25.20593"
146	19°00'55.77351"	83°04'28.56592"	182	19°00'53.83845"	83°04'25.14604"
147	19°00'55.53007"	83°04'28.35493"	183	19°00'54.62336"	83°04'25.09270"
148	19°00'55.98134"	83°04'27.62814"	184	19°00'54.81782"	83°04'25.25390"
149	19°00'55.56125"	83°04'27.11789"	185	19°00'54.84300"	83°04'25.83093"
150	19°00'55.39597"	83°04'27.40900"	186	19°00'54.91200"	83°04'26.27768"
151	19°00'55.07254"	83°04'27.94972"	187	19°00'54.96978"	83°04'26.82080"
152	19°00'54.83251"	83°04'28.07029"	188	19°00'55.08564"	83°04'26.61958"
153	19°00'54.55771"	83°04'27.91331"	189	19°00'55.36279"	83°04'26.17698"
154	19°00'54.39760"	83°04'27.36159"	190	19°00'55.71928"	83°04'25.76868"
155	19°00'54.31656"	83°04'26.84636"	191	19°00'56.03863"	83°04'25.56675"
156	19°00'54.26890"	83°04'26.37738"	192	19°00'56.31197"	83°04'25.54123"
157	19°00'54.19745"	83°04'25.91512"	193	19°00'56.52077"	83°04'25.80291"
158	19°00'54.10045"	83°04'25.76613"	194	19°00'56.35634"	83°04'26.41371"
159	19°00'54.07491"	83°04'25.98616"	195	19°00'56.21555"	83°04'26.78842"
160	19°00'53.96847"	83°04'26.43216"	196	19°00'56.21402"	83°04'26.89840"
161	19°00'53.92579"	83°04'26.87276"	197	19°00'56.36895"	83°04'26.76221"
162	19°00'53.08876"	83°04'28.17945"	198	19°00'56.74609"	83°04'26.43557"
163	19°00'52.51106"	83°04'28.86603"	199	19°00'57.33725"	83°04'26.18325"
164	19°00'52.21954"	83°04'29.19351"	200	19°00'57.60970"	83°04'25.98033"
165	19°00'51.96090"	83°04'29.59354"	201	19°00'58.05098"	83°04'25.82322"
166	19°00'51.35105"	83°04'29.97508"	202	19°00'58.59101"	83°04'25.98567"
167	19°00'51.00437"	83°04'29.98801"	203	19°00'58.73682"	83°04'26.56520"
168	19°00'50.73074"	83°04'30.00154"	204	19°00'58.52576"	83°04'26.99635"
169	19°00'50.48645"	83°04'30.02555"			

Tehasildar
Lanjipur, Koraput

ANNEXURE:-XIX

DETAILED LAND SCHEDULE OF 0.97 HA OF REVENUE FOREST LAND IN VILLAGE RAULIPADAR FOR PROPOSED ACCESS ROAD TO KODINGAMALI BAUXITE ML OF OMC LTD IN RAYAGADA AND KORAPUT DISTRICT OF ODISHA.

Plot No.	Khata No.	Name of the Tenant	Kissam	Area in Acres	Remarks
574	51	Anabadi	Patra Jungle	2.39	
				2.39 Acr Or 0.97 ha.	

29/4/17

Tahasildar
Laxmipur

TAHASILDAR
LAXMIPUR

29/4/17
R. I. Chandili

ANNEXURE V B_NPV PAID TO DFO

OFFICE OF THE DIVISIONAL FOREST OFFICER -CUM-WILDLIFE WARDEN, KORAPUT FOREST DIVISION, KORAPUT

କୋରାପୁଟ ବନଖଣ୍ଡ ଅଧିକାରୀ ଓ ବନ୍ୟପ୍ରାଣୀ ରକ୍ଷାଧିକାରୀଙ୍କ କାର୍ଯ୍ୟାଳୟ

Contact no. 06852-251270. Fax No.-06852-251270. e-mail: ID-dfokoraput@rediffmail.com

Letter No. 138 Dated 05.01.2017

To

The Deputy General Manager (Geo),
M/s Odisha Mining Corporation Ltd,
OMC House, Bhubaneswar-751022.

Sub: - Proposal for diversion of 428.075 Ha. of forest land for Bauxite Mining by M/s OMC Ltd, Bhubaneswar in Kodingamali RF and Kodinga PRF in Koraput and Rayagada District.

Ref: - Forestry Advisory Committee Meeting held on 26.12.2016 under chairmanship of Mr Sandeep Sharma, AIGF(FC) and letter No.198 dated 05.01.2017 of Executive Director, OMC Ltd.

Sir,

As the recommendation of the Forest Advisory Committee (FAC) in the above meeting on the subject cited above, you have to deposit an amount of Rs.26,79,74,950/- towards Net Present Value in mining lease area only Diversion of 428.075 ha. as detailed below for Bauxite Mining by M/s OMC Ltd, Bhubaneswar in Kodingamali RF and Kodinga PRF in Koraput and Rayagada District.

Name of Division	Area in Ha.	Eco. Class	Amount per Ha.	Total Amount
1	2	3	4	5
Koraput	406.385	Class-III	Rs.6,26,000/-	Rs.25,43,97,010/-
Rayagada	21.69	Class-III	Rs.6,26,000/-	Rs.1,35,77,940/-
Total: -	428.075			Rs.26,79,74,950/-

In this connection, this is to inform you that, as per guidelines laid down that point No.4 of the Compensatory Afforestation fund management & planning authority which has been communicated by the Addl. P.C.C.F. Forest Diversion & Nodal Office, F.C. Act vide his memo No.13681 dated 18.7.2016 (Copy enclosed) that "After considering all relevant factors it has been decided that no payments by any mode other then the e-payment should be accepted after 13.06.2016. the payments made other then through the e-payment module on or after 1st July,2016 shall not be taken in to account, the account for the grant of final clearance and/ or working permission under the provisions of the forest (Conservation) Act,1980"

In view of the above facts, you are requested to make payment through e-payment module an amount of Rs.26,79,74,950/- to Ad-hoc-CAMPA Account under intimation to this office for taking necessary action at this end.

The Bank details of Ad-hoc CAMPA are furnished below for your ready reference.

1. Name of Bank : – Corporation Bank CGO Complex
   Lodhi Road New Delhi-110003.
2. Account No. : - CAF Odisha SB A/C No. SB0125222.
3. IFSC No. :- CORP0000371
4. In favour of : – Ad-hoc CAMPA.

Yours faithfully,

06/01/2017

Divisional Forest Officer,
Koraput Division.

Memo No. 139 / Dated 06/01/2017
Copy forwarded to Addl. Principal Chief Conservator of Forests, Forest Diversion & Nodal Officer, F.C. Act, O/O P.C.C.F. Odisha, Bhubaneswar for favour of kind information.

Divisional Forest Officer,
Koraput Division.

Memo No. 140 / Dated 06/01/2017
Copy forwarded to Regional Chief Conservator of Forests, Koraput Circle, Koraput for favour of kind information.

Divisional Forest Officer,
Koraput Division.

Memo No. 141 / Dated 06/01/2017
Copy forwarded to the Divisional Forest Officer, Rayagada Forest Division for favour of kind information.

Divisional Forest Officer,
Koraput Division.

AGENCY COPY

NEFT / RTGS CHALLAN for Ad-HOC CAMPA

Date : 07-01-2017

Agency Name.	ODISHA MINING CORPORATION LTD
Application No.	MIN94412015857
Location.	ORRISA
Address.	OMC HouseKhordha
Amount(in Rs)	267974950/-

Amount in Words :Twenty-Six Crore Seventy-Nine Lakh Seventy-Four Thousand Nine Hundred and Fifty Rupees Only

NEFT/RTGS to be made as per following details;

Beneficiary Name:	ORRISA CAMPA
IFSC Code:	CORP0000633
Pay to Account No.	15082MIN94412015857
Bank Name & Address:	Corporation Bank FCS Bangalore 21/1, 3rd floor Jellita Towers Mission Road Bangalore -560027

This Challan is strictly to be used for making payment to CAMPA by NEFT/RTGS only

BANK COPY

NEFT / RTGS CHALLAN for Ad-HOC CAMPA

Date : 07-01-2017

Agency Name.	ODISHA MINING CORPORATION LTD
Application No.	MIN94412015857
Location.	ORRISA
Address:	OMC House Khordha
Amount(in Rs)	267974950/-

Amount in Words :Twenty-Six Crore Seventy-Nine Lakh Seventy-Four Thousand Nine Hundred and Fifty Rupees Only

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Pay to Account No.	15082MIN94412015857
Bank Name & Address:	Corporation Bank FCS Bangalore 21/1, 3rd floor Jellita Towers Mission Road Bangalore -560027

This Challan is strictly to be used for making payment to CAMPA by NEFT/RTGS only

After making successful payment, User Agencies may send a line of confirmation through Email: helpdeskcampa@corpbank.co.in

UTR NO.- ANDBR52017010700241269

ANDBR

OFFICE OF THE DIVISIONAL FOREST OFFICER -CUM-WILDLIFE WARDEN, KORAPUT FOREST DIVISION, KORAPUT

କୋରାପୁଟ ଡିଭିଜନାଲ ଅଫିସର ଓ ବନ୍ୟପ୍ରାଣ ରକ୍ଷାବାରଙ୍କ କାର୍ଯ୍ୟାଳୟ

Contact no. 06852-251270. Fax No.-06852-251270. e-mail: ID-dfokoraput@rediffmail.com

Letter No. 2182 Dated 22/04/2017

To

The Deputy General Manager (Geo),
M/s Odisha Mining Corporation Ltd,
OMC House, Bhubaneswar-751022.

Sub:- Proposal for Diversion of 434.935 Ha. of forest land (428.075 Ha forest land within Kodingamali Bauxite Mining lease area including 18.098 ha. of Forest land in Safety Zone and 6.860 ha. of forest land out side the ML area for construction of approach road to Mining lease) for mining of Bauxite in Kodingamali Bauxite Mines located in Koraput and Rayagada District of Odisha Mining Corporation Ltd..

Ref:- 1.Order No.8-46/2016-FC, GOI, MoEF and Climate Change (FC Division) Dated 17.04.2017 of Govt. of India, Ministry of Environment, Forest & Climate change(Forest Conservation Division),
2. No.10F(Con)4/2017-8356/F&E dated 22.04.2017 of Govt. of Odisha, F&E Department..
3. Letter No.5459/OMC/2017 Dtd.21.04.2017 of Executive Director(F&E).

Sir,

As stipulated in the above referred stage-I approval forest clearance order on the subject cited above, you are requested to deposit an amount of Rs.42, 94,360/- towards balance Net Present Value (NPV) over 6.860 ha. of forest area proposed for access road to mining lease area as detailed below for the Diversion of 434.935 Ha Bauxite Mining by M/s OMC Ltd, Bhubaneswar in Kodingamali RF and Kodinga PRF in Koraput and Rayagada District. As per condition No.(vii) of stage-I approval forests clearance as detailed below:-

: The User Agency shall transfer online, the Net Present Value (NPV) of the forest land being diverted under this proposal, as per the order of the Hon' Supreme Court of India dated 28.03.2008, 24.04.2008 and 09.05.2008 in writ petition (Civil) No.202/1995 and the guidelines issued by this Ministry vide its letter No.5-3/2007-FC dated 05.02.2009. The requisite funds shall be transferred through online portal into Ad-hoc CAMPA Account of the State concerned.

Name of Division	Area in Ha.	Eco. Class	Amount per Ha.	Total Amount
1	2	3	4	5
Koraput	6.860	Class-III	Rs.6,26,000/-	Rs.42,94,360/-
Total:-	6.860			Rs.42,94,360/-

Receipt No : 5924/2017/F & E

In this connection, this is to inform you that, as per guidelines laid down that point No.4 of the Compensatory Afforestation fund management & planning authority which has been communicated by the Addl. P.C.C.F. Forest Diversion & Nodal Office, F.C. Act vide his memo No.13681. dated 18.7.2016 (Copy enclosed) that "After considering all relevant factors it has been decided that no payments by any mode other then the e-payment should be accepted, on account for the grant of final clearance and/ or working permission under the provisions of the forest (Conservation) Act, 1980"

In view of the above facts, you are requested to make payment through e-payment module an amount of Rs.42,94,360/- to Ad-hoc-CAMPA Account under intimation to this office for taking necessary action at this end.

The Bank details of Ad-hoc CAMPA are furnished below for your ready reference.

1. Name of Bank : – Corporation Bank CGO Complex-
   Lodhi Road New Delhi-110003.
2. Account No. : - CAF Odisha SB A/C No. SB0125222
3. IFSC No. :- CORP0000371
4. In favour of : – Ad-hoc CAMPA.

Yours faithfully,

Divisional Forest Officer,
Koraput Division.

Memo No. 2183 / Dated 22/04/2017
Copy forwarded to Addl. Principal Chief Conservator of Forests, Forest Diversion & Nodal Officer, F.C. Act, O/O P.C.C.F, Odisha, Bhubaneswar for favour of kind information.

Divisional Forest Officer,
Koraput Division.

Memo No. 2184 / Dated 22/04/2017
Copy forwarded to Regional Chief Conservator of Forests, Koraput Circle, Koraput for favour of kind information.

Divisional Forest Officer,
Koraput Division.

Receipt No : 5993/2017/F & E

AGENCY COPY

NEFT / RTGS CHALLAN for Ad-HOC CAMPA

Date : 02-06-2017

Agency Name.	ODISHA MINING CORPORATION LTD
Application No.	10994412015267
Location.	ORRISA
Address.	OMC HouseKhordha
Amount(in Rs)	98698910/-

Amount in Words :Nine Crore Eighty-Six Lakh Ninety-Eight Thousand Nine Hundred and Ten Rupees Only

NEFT/RTGS to be made as per following details;

Beneficiary Name:	ORRISA CAMPA
IFSC Code:	CORP0000633
Pay to Account No.	150821059441201526?'
Bank Name & Address:	Corporation Bank FCS Bangalore, * Note : The proceeds of the payment will be ereadited to the respective CAMPA State Account.

This Challan is strictly to be used for making payment to CAMPA by NEFT/RTGS only

BANK COPY

NEFT / RTGS CHALLAN for Ad-HOC CAMPA

Date : 02-06-2017

Agency Name.	ODISHA MINING CORPORATION LTD
Application No.	10994412015267
Location.	ORRISA
Address:	OMC House Khordha
Amount(in Rs)	98698910/-

Amount in Words :Nine Crore Eighty-Six Lakh Ninety-Eight Thousand Nine Hundred and Ten Rupees Only

NEFT/RTGS to be made as per following details;

Beneficiary Name:	ORRISA CAMPA
IFSC Code:	CORP0000633
Pay to Account No.	150821059441201526?
Bank Name & Address:	Corporation Bank FCS Bangalore, * Note : The proceeds of the payment will be ereadited to the respective CAMPA State Account.

This Challan is strictly to be used for making payment to CAMPA by NEFT/RTGS only

After making successful payment, User Agencies may send a line of confirmation through
Email: helpdeskcampa@corpbank.co.in

Manager (Finance)
Mining Corporation Ltd

ANDBR52017060700096215
7-6-17

Manager (Finance)
Mining Corporation Ltd

Sl. No.	Particulars	Demand raised by DFO vide Letter No./Date	Amount
1	CA Scheme over 274.031 ha in Mushupal & Chuchukona	2094/4F (Misc.) 1367/2017 dt 21.04.2017	3,70,60,300/-
2	CA scheme over 96.419 ha in village Pipalpadar	2179/ dt 22.04.2017	1,51,00,600/-
3	CA scheme over 13.806 ha in Hatimati DPF	1747/3F / dt 26.04.2017	14,72,000/-
4	CA Scheme over 46.387 ha village Kandolguda	2583/ dt 11.05.2017	1,59,43,500/-
5	Regional Wildlife Management plan over 438.075 ha	2182/ dt 22.04.2017	2,48,28,350/-
6	NPV over 6.860 ha of forest land.		42,04,360/-
	Total		9,86,98,910/-

Annexure V C_FRA Certificate

CONCERNED DISTRICT

Koraput

1. It is certified that the complete process for diversion and settlement of rights under the Scheduled Tribe and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 has been carried out for the entire forest area of 466.39 hectares proposed for diversion for Kodingamali (R.F.) for Bauxite Mining Project of Orissa Mining Corporation Ltd.. The concerned record of all consultations and meetings held are annexed.
2. It is certified that the proposals for such diversion have been placed before each of the Gram Sabhas of forest dwellers who are eligible under the Forest Rights Act. Details of the projects and its implications have been explained to them in vernacular,Local language
3. It is certified that discussions and decisions on such proposals has taken place only when there was a quorum of minimum 50% of members of the Gram Sabha Present.
4. It is certified that the rights of the primitive tribal groups and pre agricultural communities have been specifically safeguarded as per Section 3(1)(e) of the Forest Rights Act.
5. It is certified that the diversion of forest land for facilities managed by Government as require under Section 3(2) of the Forest Rights Act(if any) have been completed and that the Gram Sabhas have consented to it.

(Signature)
(Name illegible),
Collector,Koraput District,
& Chairman District Level Committee

Enclosed the Gram Sabha Resolution
Of nine surrouding viliages in local Oriya Language,
alongwith its English Translated copies giving
Consent for diversion of Forest Lands

(Signature)
BLOCK DEVELOPMENT OFFICER
LAXMIPUR

CONCERNED DISTRICT

Rayagada

1. It is certified that the complete process for diversion and settlement of rights under The Scheduled Tribe and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 has been carried out for the entire forest area of 21.92 hectares proposed for diversion for Kodingamali (P.R.) for Bauxite Mining project of Orissa Mining Corporation Ltd. The concerned record of all consultations and meetings held are annexed.
2. It is certified that the proposals for such diversion have been placed before each of the Gram Sabhas of forest dwellers who are eligible under the Forest Rights Act. Details of the projects and its implications have been explained to them in vernecular,Local language.
3. It is certified that discussions and decisions on such proposals had taken place only when there was a quorum of minimum 50% of members of the Gram Sabha Present.
4. It is certified that the rights of the primitive tribal groups and pre agr cultural communities have been specifically safeguarded as per Section 3(1),(e) of the Forest Rights Act.
5. It is certified that the diversion of forest land for facilities managed by Government as required under Section 3(2) of the Forest Rights Act(if any) have been completed and that the Gram Sabhas have consented to it.

Collector,Rayagada District,
& Chairman,District Level Committee

Enclosed the Gram Sabha Resolution of seven villages in local Oriya Language, along with its English Translated copies giving consent for diversion of Forest Lands in their respective villages where in more than 50% of the members were present and have given their consent.

B.D.O, Kashipur

ANNEXURE VI_SURFACE RIGHTS

19

OFFICE OF THE COLLECTOR:RAYAGADA

(Mining Section)

No. /Mines. Date.

OFFICE ORDER

The Surface right Permission over 21.69 Hectares out of the total granted area over 428.075 Hects(406.385 Hects in Koraput district & 21.69 Hects in Rayagada district) for Bauxite as per land schedule detailed below in the Mining Lease area in village KodingamaliPR.F under Kashipur tahsil of Rayagada district, which is executed & registered on 10.01.2017 for 50 (Fifty) years in favour of M/s.Odisha Mining Corporation Limited is hereby accorded to carry out mining operation subject to the observance of the following terms and conditions.

1. The Lessee shall compliance to the conditions prescribed in the forest/Wildlife clearance order,
2. Surface boundary pillars shall be maintained properly.
3. Mining operation shall be carried out as per terms & conditions of Mining Lease deed and relevant Rules and Regulations made there under.
4. The lessee shall make and pay such reasonable amount for satisfaction and compensation for all damages, injury or disturbance to persons or property, which may be done by or on the part of the lessee.

Village: KODINGAMALIPR.F.

Plot No.	Khata No.	Name of the Tenant	Kissam	Area recommended for Surface Right permission.
		Forest land		21.69
			Total-	**21.69 Hects**

Sd/-

COLLECTOR: RAYAGADA.

Memo No. 178 /Mines. Date. 2.2.18

Copy forwarded to M/s.Odisha Mining Corporation Limited, Post Box No.34, OMC House, Bhubaneswar, for information and necessary action with reference to his application dated 07.12.2017.

COLLECTOR: RAYAGADA.

Memo No. (2)/Mines. 19.2.18 Date.

Copy to the Divisional Forest Officer, Rayagada/ Tahsildar, Kashipur, for information and necessary action.

COLLECTOR: RAYAGADA.

OFFICE OF THE COLLECTOR:KORAPUT

(Mining Section)

No. /Mines. Date.

OFFICE ORDER

The Surface right Permission over 406.385 Hectares out of the total granted area over 428.075 Hects(406.385 Hects in Koraput district & 21.69 Hects in Rayagada district) for Bauxite as per land schedule detailed below in the Mining Lease area in village Kodingamalil R.F under Laxmipur tahsil of Koraput district, which is executed & registered on 10.01.2017 for 50 (Fifty) years in favour of M/s.Odisha Mining Corporation Limited is hereby accorded to carry out mining operation subject to the observance of the following terms and conditions.

1. The Lessee shall compliance to the conditions prescribed in the forest/Wildlife clearance order,
2. Surface boundary pillars shall be maintained properly.
3. Mining operation shall be carried out as per terms & conditions of Mining Lease deed and relevant Rules and Regulations made there under.
4. The lessee shall make and pay such reasonable amount for satisfaction and compensation for all damages, injury or disturbance to persons or property, which may be done by or on the part of the lessee.

Village: KODINGAMALI R.F.

Plot No.	Khata No.	Name of the Tenant	Kissam	Area recommended for Surface Right permission.
		Forest land		406.385
			Total-	**406.385 Hects**

Sd/-

COLLECTOR: KORAPUT.

Memo No. 111 /Mines. Date. 16.01.18

Copy forwarded to M/s.Odisha Mining Corporation Limited, Post Box No.34, OMC House, Bhubaneswar, for information and necessary action with reference to his application dated 07.12.2017.

COLLECTOR: KORAPUT.

Memo No. (2)/Mines. Date. 19.12.17

Copy to the Divisional Forest Officer, Koraput/ Tahsildar, Laxmipur, for information and necessary action.

COLLECTOR: KORAPUT.

Annexure VII_Permission for Drawl of Surface water

भारतीय गैर न्यायिक

एक सौ रुपये

Rs. 100

ONE HUNDRED RUPEES

रु. 100

भारत INDIA

INDIA NON JUDICIAL

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S 252314

"FORM 'K'

See rule 23-A (2) &rule-26]

AGREEMENT FOR SUPPLY OF WATER FOR THE PURPOSE OF INDUSTRIAL USE

THIS AGREEMENT is made on the 03.04.2025 BETWEEN M/S. Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur in the District of Koraput, Odisha represented by Sri Kathi Pradhan, S/o-Late Debananda Pradhan, resident of village-Katarapada, PS- Samal Barrage, Dist-Angul, State-Odisha aged about 51 Years by profession Regional Manager of M/s. Odisha Mining Corporation Ltd., South Zone, Rayagada, Dist-Rayagada State-Odisha (hereinafter called the "Applicant") of the First Part AND (1) Sri Hemanta Kumar Behera, S/o Late Kulamani Behera, resident of Village - Rasol, PS- Rasol, Dist- Dhenkanal, State-Odisha aged about 56 years by profession Dy. General Manager (Mining) of M/s. Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur, Dist-Koraput, State-Odisha and (hereinafter referred to as the "Sureties") of the Second Part; AND The Governor of Odisha represented by the Superintending Engineer, Upper Kolab Head Works Division, Kolab Nagar, Dist-Koraput, State-Odisha which expression unless repugnant to the context, shall include his successors and Assigns (hereinafter called the 'The Government") of the Third Party.

M/s Odisha Mining Corporation Ltd.
Kodingamali Bauxite Mines
Laxmipur, Dist-Koraput.

Regional Manager
O.M.C Ltd., South Zone
RAYAGADA

Mines Manager
Kodingamali Bauxite Mines
Odisha Mining Corporation Ltd

Superintending Engineer
U.K. Head Works Division
Kolab Nagar, Dist-Koraput.

DISTRICT TREASURY
RAYAGADA

No. 1545 Dt. 05/04/2025

Regional Manager
O.M.C Ltd., South Zone
RAYAGADA

SUPERINTENDING ENGINEER
U.K.H.W. DIVISION
KOLABNAGAR

भारतीय गैर न्यायिक

एक सौ रुपये

Rs. 100

रु. 100

ONE HUNDRED RUPEES

सत्यमेव जयते

भारत INDIA

INDIA NON JUDICIAL

ଓଡ଼ିଶା ओड़िशा ODISHA

S 252315

WHEREAS, the applicant has made an application for supply of water from Government water source (Surface water from water reservoir on the U/S of Dharua Nallah) for the period as mentioned in the Schedule; hereto annexed;

AND, WHEREAS, the sureties have agreed to stand surety for payment of rates charges for such supply in the manner hereinafter appearing and the Government has agreed to supply water for the purpose specified in the schedule annexed hereto;

SCHEDULE

Purpose for which water is to be supplied.	Volume of water if any.	Period of Supply.	The place at which it will be supplied.
1	2	3	4
Environmental Protection i.e. dust suppression on roads.	0.16 Cusecs surface water	Up to 20.12.2026	From U/S of Water Harvesting Structure of Dharua nallah to Kodingamali Bauxite Mines, Laxmipur, Dist- Koraput.

M/s Odisha Mining Corporation Ltd.
Kodingamali Bauxite Mines
Laxmipur, Dist-Koraput.
Regional Manager
O.M.C Ltd., South Zone
RAYAGADA

Mines Manager
Kodingamali Bauxite Mines
Odisha Mining Corporation Ltd

Superintending Engineer
U.K.H.W. Division
Kolab Nagar, Dist-Koraput.
SUPERINTENDING ENGINEER
U.K.H.W. DIVISION
KOLABNAGAR

DISTRICT TREASURY
RAYAGADA

Rs. 15644 dtd. 23/12/2025
Stamps worth Rs. 1100/-
Issued to Sri/Smt. K Prasanna Reddy
Through ....
L. P. K. SAHU
Stamp Vender RAYAGADA

Regional Manager
O.M.C Ltd., South
RAYAGADA

SUPERINTENDING ENGINEER
U.K.H.W. DIVISION
KOLABNAGAR



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NOW THIS AGREEMENT witnesses follows: -

1. In pursuance of the said agreement and in consideration of supply of water to the applicant, the applicant and the sureties hereby jointly and severally covenant with the Government as follows :-

(a) The applicant shall pay Rs 6.12 per one cum of water on or before last day of the month to S.E., U.K. Head Works Division, Kolabnagar, Dist- Koraput.

(b) M/s. Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur shall make suitable arrangement to take the water from the Government water source/ irrigation works at which it will be supplied.

(c) M/s. Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur shall not use the water supplied to him for any purpose other than that which is specified in the schedule.

2. If the water rate/license fees for the aforesaid quantity of water or any part thereof, is not paid on or before the date specified in this agreement it shall become payable at once. (unless the Government sanctions for specialness on an extension of time) and M/s Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur and the sureties shall be liable jointly and severally to pay the same with compound **interest at the rate of two percent per mensem from the date of default.** All amount due to the Government under terms of these presents shall if not paid in time, be recoverable as a public demand under the Orissa Public Demands Recovery Act, 1962.

M/s Odisha Mining Corporation Ltd.
Kodingamali Bauxite Mines
Dist-Koraput
Regional Manager
O.M.C Ltd., South Zone
RAYAGADA

Mines Manager
Kodingamali Bauxite Mines
Odisha Mining Corporation Ltd

Superintending Engineer
U.K.H.W DIVISION
Kolab Nagar, Dist-Koraput
KOLABNAGAR

DISTRICT TREASURY
RAYAGADA

Regional Manager
O.M.C Ltd., South Zone
RAYAGADA

SUPERINTENDING ENGINEER
U.K.H.W DIVISION
KOLABNAGAR



ଓଡ଼ିଶା ओड़िशा ODISHA

$ 252317

3. (i) The applicant M/s. Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur shall be liable for criminal and civil action if by drawl of water, the rights of any third party are affected and shall indemnify the Government against all claims for damage preferred by person or persons affected by the permission granted.

(ii) M/s. Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur shall not without prior permission in writing from the Government, lay pipeline on Government or communal lands. If the pipe lines have to pass through Government lands permission of the Government for this shall be taken separately which may be granted subject to the protection & of rights of Government or community, as the case may be.

(iii) M/s. Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur shall not draw or lift water more than the quantity mentioned in the requisition or order and not exceeding the volume mentioned in the Schedule except with the prior approval of the Government. The Superintending Engineer shall assess the fees to be charged as per Unit quantity of water drawn or allocated whichever is higher. If drawl is more than the allocation, a penal rate at six times the rate specified in Schedule II &III shall be charged on the quantity of excess drawl, in addition to the normal bill on allocated quantity. The excess drawl is permissible for a maximum period of six months, within which licensee shall have to apply for a higher allocation of water with reasons where the licensee fails of so apply for such higher allocation or where the licensee is refused for such higher allocation, the agreement shall be liable to cancellation and the water supplied shall be stopped thereafter.

(iv) The permission granted shall not be deemed to exempt M/s. Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur from liability to payment of water charges lawfully assessable at the rate as may be prescribed by Govt. from time to time.

M/s Odisha Mining Corporation Ltd.
Kodingamali Bauxite Mines
Laxmipur, Koraput
Regional Manager
O.M.C Ltd., South Zone
RAYAGADA

Mines Manager
Kodingamali Bauxite Mines
Odisha Mining Corporation Ltd

03.04.25
Superintending Engineer
SUPERINTENDING ENGINEER
U.K.H.W. DIVISION
Kolab Nagar, Koraput
KOLABNAGAR

DISTRICT TREASURY
RAYAGADA
2025

No. 1542 Date. 03/04/2025
Stamps worth Rs. 100/-
issued to Sri Smt. K Prasanna Reddy

L.P.K. SAHU
Stamp Vendor RAYAGADA

Regional Manager
O.M.C Ltd., South Zone
RAYAGADA

03.04.25
SUPERINTENDING ENGINEER
U.K.H.W. DIVISION
KOLABNAGAR



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(v) Government reserves the right to suspend or cancel the permission in case of violation of any of the covenants.

4. M/s. Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur at his own cost shall install a Flow Meter or a suitable measuring device for measurement of water drawn or lifted by him from the Govt. water source / irrigation works as per the procedure laid down in rule 23-A(b). The Superintending Engineer shall visit the location of drawl or lifting of water, verify the quantities of water drawn or lifted by M/s. Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur ensure such control as may be necessary for administering the drawl or lifting of water. Assessment of water rate shall be made as per the quantity of water drawn or allocated whichever is higher. The testing certificate of the installed flow meter duly certified by the appropriate authority of the Dept. of weights and measures may be submitted to this office quarterly. In case of any defect or non-functioning of the Flow Meter, the licensee shall bring the fact to the notice of the Superintending Engineer forthwith and take appropriate steps to remove the defects in the Meter or for replacement thereof within a period of three months and in such cases the fees shall be charged on the quantity of water allocated for the said period of three months or till the defect in the Meter is removed or the Meter replaced, as the case may be whichever is earlier, and where the licensee fails to bring the defect or non-functioning of the Meter to the notice of the Superintending Engineer or fails to remove the defects in the Meter or to replace the same, as the case may be, within a period of three months, the agreement shall be liable to cancellation and thereafter the water supply shall be stopped.

5. M/s. Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur shall construct full proof effluent discharge plant before commissionihg of the project. For proper test of such effluent there shall be computerized testing system and M/s. Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur shall give details of effluent discharged in the natural source in river or nala).

M/s Odisha Mining Corporation Ltd.
Kodingamali Bauxite Mines
Regional Manager
O.M.C Ltd., South Zone
RAYAGADA

Mines Manager
Kodingamali Bauxite Mines
Odisha Mining Corporation Ltd

03-04-25
Superintending Engineer
U.K.H.W DIVISION
KOLABNAGAR

DISTRICT TREASURY
RAYAGADA

Rs. 15841 dtd. 03/04/2025-
Stamp worth Rs. 100/-
Issued to Sri/Smt. K Parakrama Reddy
Through Sri .....

L. P. K. SAHU
Stamp Vendor RAYAGADA

Regional Manager
O.M.C Ltd., South Zone
RAYAGADA

03-04-25
SUPERINTENDING ENGINEER
U.K.H.W DIVISION
KOLABNAGAR



ଓଡ଼ିଶା ओड़िशा ODISHA S 252319

6. For construction of head works and control mechanism i.e., intake well, pump house and other related facilities, M/s. Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur will get the land leased in their favour through IDCO as is done in respect of any other government land required by the industry. IDCO will make available land on long term lease to M/s. Odisha Mining Corporation Ltd., Kodingamali Baixite Mines, Laxmipur. The continuance of the lease agreement will subject to the condition that the industry shall pay water rates as per prevailing water rate and all other dues of Government and IDCO from time to time.

7. M/s. Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur would be required to pay 3 (three) months advance water charges in favour of Superintending Engineer, Upper Kolab Head Works Division, Kolabnagar in shape of Bank Draft or FDR duly discharged by the company as non-interest bearing security deposit and for 9 (nine) months a Bank Guarantee duly pledged in favour of concerned Superintending Engineer. Onus of maintaining the Bank Guarantee lies with the company. In this connection M/s Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur has submitted TDR No 43730061349 dated 18.01.2025 from SBI, Laxmipur Branch, Laxmipur for Rs. 2,15,650.00 (Rupees Two Lakh Fifteen Thousand Six Hundred Fifty) only and Bank Guarantee No.068BGF007823824 amounting to Rs. 6,61,250.00 (Rupees Six Lakh sixty-one Thousand two Hundred fifty) only.

8. In case of water supply for M/s. Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur is to be met from a common source through a sharing mechanism, such common infrastructure for drawl of water will be constructed, maintained and operated either by IDCO or Special Purpose Vehicle (SPV) after taking due clearance from IDCO. Water will be supplied to Industry by IDCO/SPV and they would also be liable for payment of water rate to the Govt. and will in turn have arrangements as similar therein as clauses (6) and (7) detailed earlier.

M/s Odisha Mining Corporation Ltd.
Kodingamali Bauxite Mines
Laxmipur, Dist-Koraput
Regional Manager
O.M.C Ltd., South Zon
RAYAGADA

Mines Manager
Kodingamali Bauxite Mines
Odisha Mining Corporation Ltd.

03.04.25
Superintending Engineer
U.K Head Works Div.
Kolab Nagar, KOLABNAGAR
SUPERINTENDING ENGINEER
U.K.H.W DIVISION

2 6 FEB 2025
DISTRICT TREASURY
RAYAGADA

No. 15840 Date. 26/02/2025
Through Voucher No. 1001D
Received the Rs. K pradhan y Party
L. P. K. SAHU
Treasury Voucher RAYAGADA

Regional Manager
O.M.C Ltd., South Zon
RAYAGADA

03.04.25
SUPERINTENDING ENGINEER
U.K.H.W DIVISION
KOLABNAGAR



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9. M/s. Odisha Mining Corporation Ltd., Kodingamali Bauxite, Mines, Laxmipur will not disturb the normal flow of water so that riparian rights in the downstream will be affected and the company shall have no claim on the account.

10. The drawl mechanism for raw water and disposal system of effluent to be established by the industry without disturbing existing eco system and environmental set up.

11. The Rehabilitation and Resettlement Action Plan/ Welfare Action Plan, if so required will be prepared in conformity with the current Orissa Rehabilitation and Resettlement policy and executed by the company at its own cost under the supervision of the Water Resources Department and the Collector of the District.

12. M/s. Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur should not claim as a matter of right to get the desired quantity of water during non-monsoon and lean period to meet their full industrial use and the Company has to make adequate storage facility in their own land for supply of water to their plant during such period.

13. The safety design of all the structures lies fully on the company.

14. In case of any dispute arising out of this agreement, the same shall be refereed to Govt. in DOWR and the decision of the Government in Water Resources Department shall be final.

15. Any surplus power from the Captive Power Plant shall be sold by M/s. Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur to GRIDCO or any other entity to be notified by the State Government under mutual acceptable terms & conditions.

16. The allocation of water will automatically lapse if the company does not use the water for the purpose applied for within One year of allotment.

M/s Odisha Mining Corporation Ltd.
Kodingamali Bauxite Mines
Laxmipur, Dist-Koraput
Regional Manager
O.M.C Ltd., South Zone
RAYAGADA

Mines Manager
Kodingamali Bauxite Mines
Odisha Mining Corporation Ltd

03.04.25
SUPERINTENDING ENGINEER
U.K.H.W DIVISION
KOLABNAGAR

DISTRICT TREASURY
R...A

No. 15839 Date. 03/04/2025
Charge worthRs. 100/-
Received by Sri/Smt. K Panda, Peon
Through Sri

L. P. K. SAHU
Stamp Vendor RAYAGADA

Regional Manager
O.M.C Ltd., South Zone
RAYAGADA

03.04.25
SUPERINTENDING ENGINEER
U.K.H.W DIVISION
KOLABNAGAR



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17. This agreement shall be valid for a period of three years i.e. from 21.12.2023 to 20.12.2026 retrospectively subject to the renewal of agreement by the Superintending Engineer. For renewal of the agreement, the concerned drawee has to apply minimum three months before the expiry of the agreement.

18. If it is found that the industry is drawing water unauthorizedly before signing the agreement, installation of flow-meter, the Superintending Engineer will charge a penal rate at six times the normal rate as provided in Schedule III of the Rule.

19. Government shall be at liberty to review the water allocation unilaterally in case of exigencies.

20. The Superintending Engineer or his authorized representative reserves the right to inspect all installations of drawl and disposal mechanism during and after construction including intake structure, flow meter and treatment plant.

21. M/s. Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur will have to show clearly in water management plan as to what storage facility the company will create for the lean season and to what extent and how the water is going to be recycled which shall be a part of the project report of the unit.

22. M/s. Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur may engage at their own cost consultant(s) experienced in the field to take up field investigations, prepare design and drawing to set up the water supply scheme for drawing water from the Govt. water source for their proposed plant. The actual work will start after approval of the scheme by the competent authority of Water Resources Department who can inspect work during the construction.

M/s Odisha Mining Corporation Ltd.
Kodingamali Bauxite Mines
At, Laxmipur, Dist-Koraput
Regional Manager
O.M.C Ltd., South Zone
RAYAGADA

Mines Manager
Kodingamali Bauxite Mines
Odisha Mining Corporation Ltd.

Superintending Engineer
U.K Head Works Division
Kolab Nagar

SUPERINTENDING ENGINEER
U.K.H.W. DIVISION
KOLABNAGAR

DISTRICT TREASURY

No. 1583 Date. 03/04/2025
Stamps worth Rs. 100/-
Issued to Sri/Smt. K Pradhan, Adv
L. P. K. SAHU
Stamp Vendor RAYAGADA

Regional Manager
O.M.C Ltd.
Regional Manager
O.M.C Ltd., South Zone
RAYAGADA

SUPERINTENDING ENGINEER
U.K.H.W. DIVISION
KOLABNAGAR



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23. The exact place for lifting will be decided in consultation with the competent authority of Water Resources Department.

24. Department of Water Resources (DoWR) will not be held responsible for non-availability of water due to dry season, disruption, repair & maintenance of Canal/Reservoir.

25. The agreement to be executed by the industry/ commercial establishment with local authority/ Superintending Engineer must be approved by the DoWR before drawl of water.

(ii) ADITIONAL TERMS & CONDITIONS

26. M/s. Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur will have to adopt water harvesting, rooftop water harvesting, ground water recharge and recycling of waste water measures in its plant premises as per the approved water management plan.

27. M/s. Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur shall follow the zero effluent discharge principle and satisfy State Pollution Control Board (SPCB) norms and obtain requisite permissions from the SPCB, Odisha before drawl of operational water.

28. In case, M/s. Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur intends to supply bulk water to Municipalities, Notified Area Councils, other local authorities and cluster of villages, M/s. Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur shall install separate flow meter or measuring device, as the case may be, at a suitable place along the pipe line to ensure quantum of water supplied to such Municipalities, Notified Area Councils, other local authorities and cluster of villages for drinking and washing etc. in addition to installation of the flow meter under clause 23-A (1) (b) which shall be treated as industrial or commercial use and license fee for such industrial or commercial use shall be at the rate double the existing rate as provided in item 3 (ii) of schedule-III.

29. M/s. Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur shall abide by the conditions laid down by the competent authority of DOWR during approval of scheme of drawl.

M/s Odisha Mining Corporation Ltd.
Kodingamali Bauxite Mines
Laxmipur, Dist-Koraput
Regional Manager
O.M.C Ltd., South Zone
RAYAGADA

Mines Manager
Kodingamali Bauxite Mines
Odisha Mining Corporation Ltd.

03.04.25
Superintending Engineer
U.K Head Works Division
U.K.H.W. Division
Kolab Nagar, Dist-Koraput
SUPERINTENDING ENGINEER
U.K.H.W DIVISION
KOLABNAGAR

DISTRICT TREASURY
RAYAGADA

No. ...15837 Date. 03/04/2025
Challan Worth Rs. ...100/-
Issued to Sri/Smt. K. Parakram / Proj
L. P. K. SAHU
Sheristadar RAYAGADA

Regional Manager
O.M.C Ltd., South Zone
RAYAGADA

03.04.25
SUPERINTENDING ENGINEER
U.K.H.W DIVISION
KOLABNAGAR



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30. M/s. Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur shall undertake water utilization audit in every three years and make the report available for scrutiny by the competent authority of DoWR.

31. License fees shall be charged and collected at the rate as specified in the Schedule-III per unit or quantity of water actually drawn or allocated whichever is higher and shall be enhanced at the rate as notified by Govt. from time to time.

32. In no circumstances, M/s. Odisha Mining Corporation Ltd., Kodingamali Bauxite Mines, Laxmipur shall be allowed to draw ground water for operation purpose.

IN WITNESS WHEREOF the Parties hereto have put their hands and seals the day and year first above-written.

In the presence of witnesses:

1. Tripathi Narayan Panchanan DGM (Geo)

2. Junior Engineer (Civil)

Signature of applicant

Regional Manager
O.M.C Ltd., South Zone
RAYAGADA

In the presence of witnesses:

1.

2.

Signature of sureties

Mines Manager
Kodingamali Bauxite Mines
Odisha Mining Corporation Ltd

Odisha Mining Corporation Ltd.
Kodingamali Bauxite Mines
Laxmipur, Dist-Koraput
Regional Manager
O.M.C Ltd., South Zone
RAYAGADA

SUPERINTENDING ENGINEER
SIGNATURE OF THE Superintending Engineer
Acting in the premise
Of the Governor of Odisha

DISTRICT TREASURY
R A

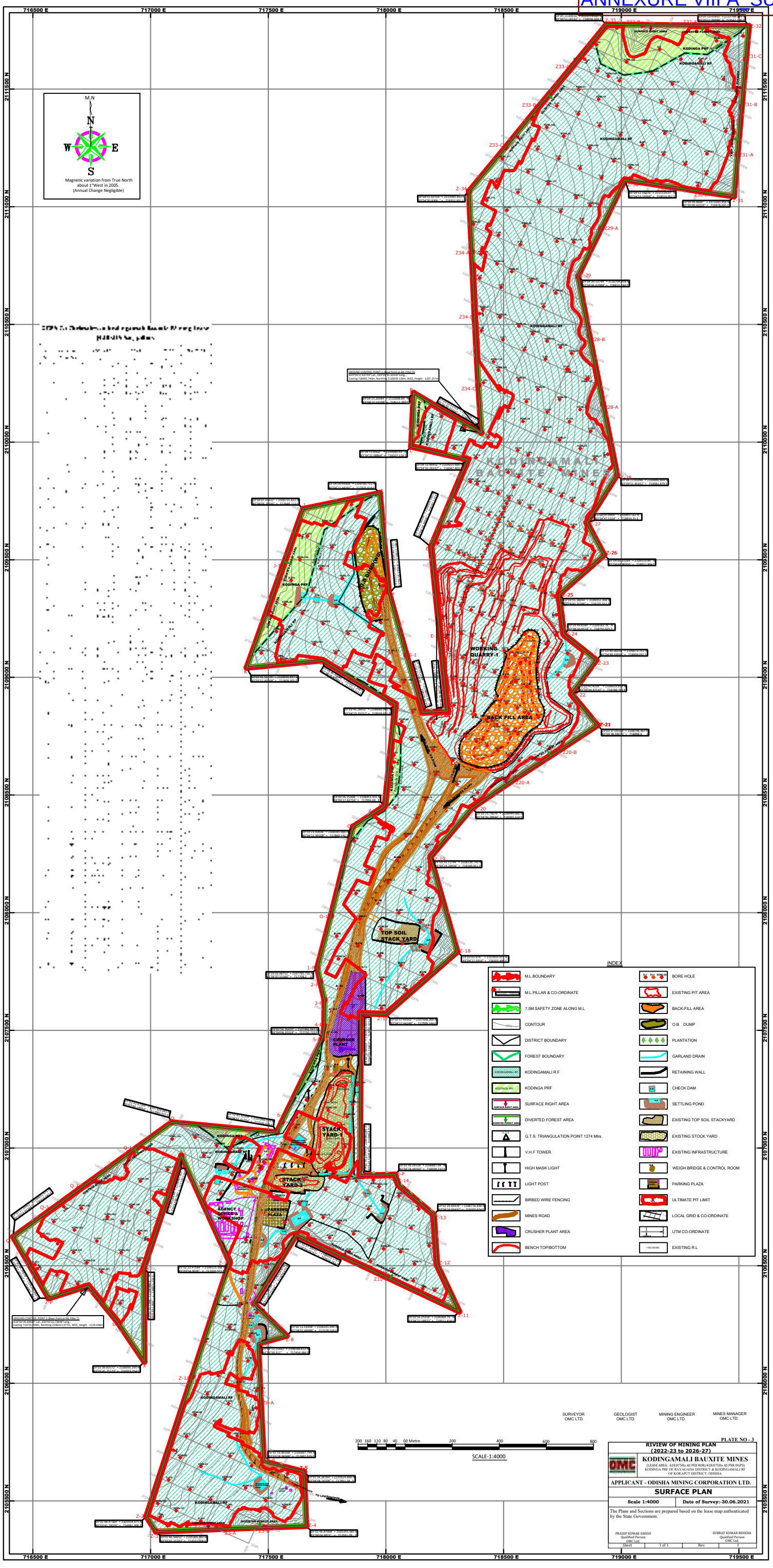
No. 15836 Date 03/04/2025
Stamps worth Rs. 100/-
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Through Sri

L. P. K. SAHU
Stamp Vendor RAYAGADA

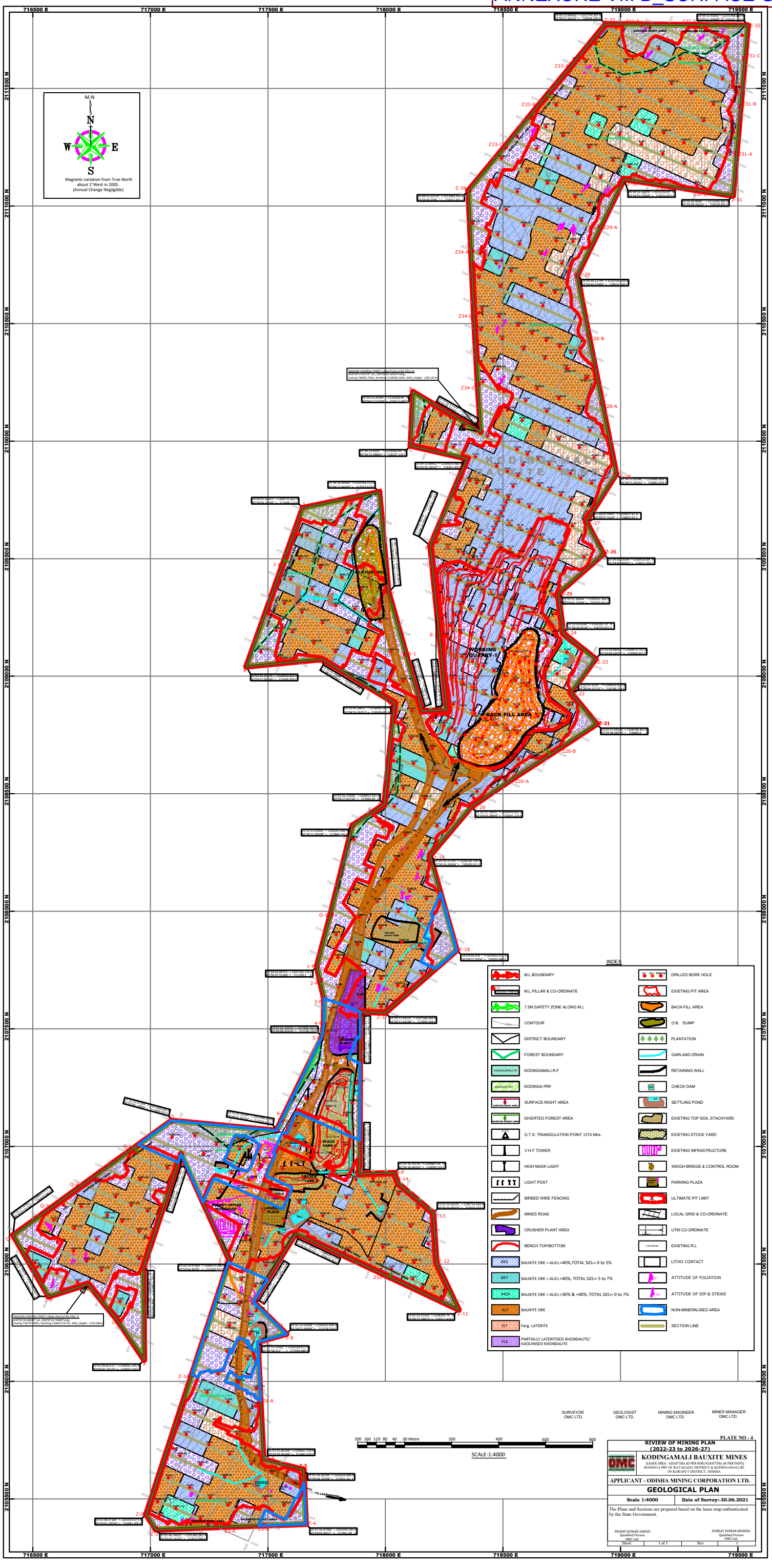
Regional Manager
O.M.C Ltd., South Zone
RAYAGADA

03.04.25
SUPERINTENDING ENGINEER
U.K.H.W. DIVISION
KOLABNAGAR

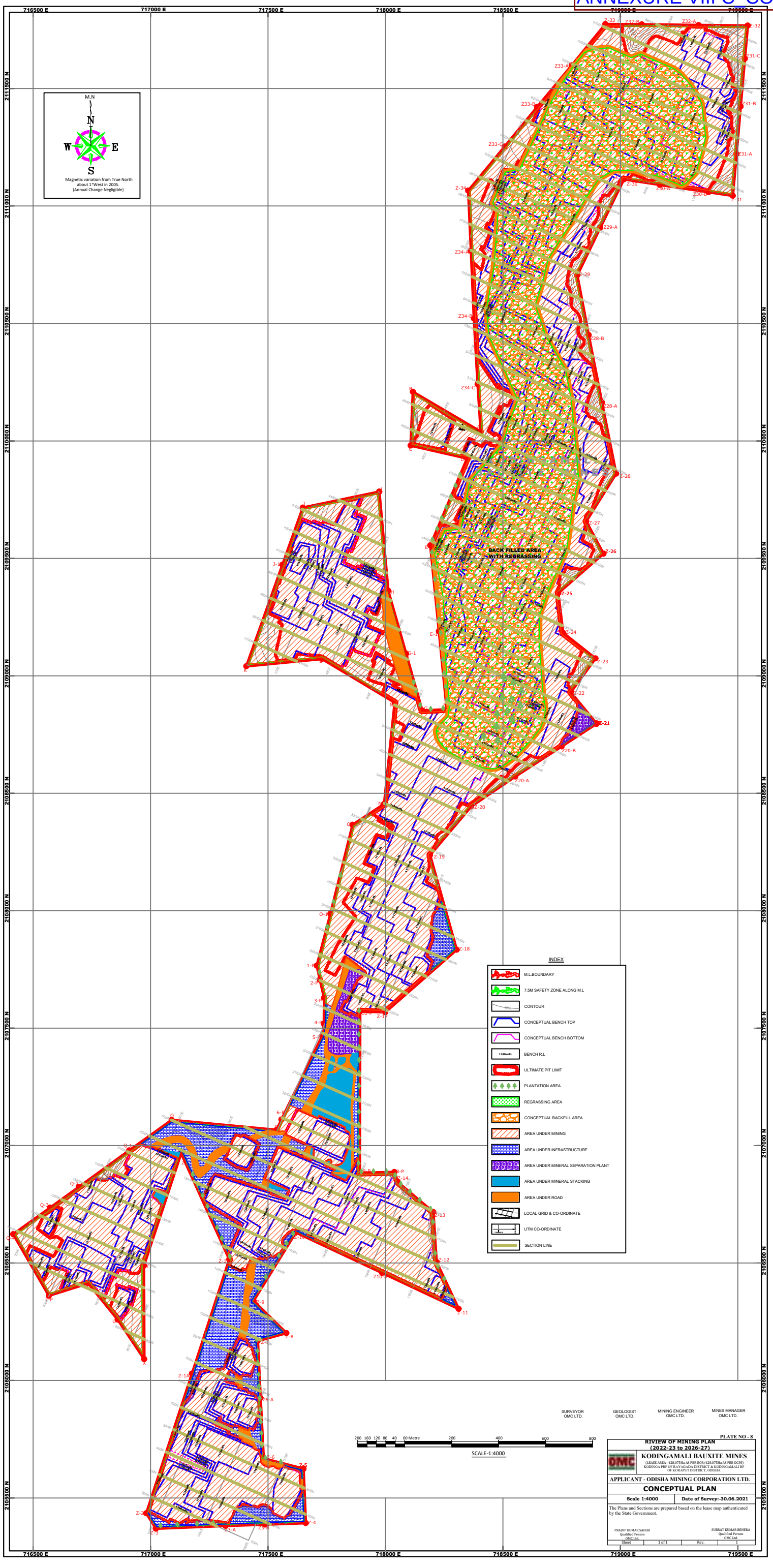
ANNEXURE VIII A SURFACE PLAN



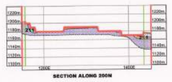
ANNEXURE VIII B_SURFACE GEOLOGICAL PLAN

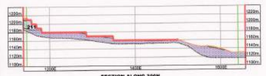


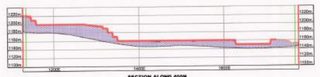
ANNEXURE VIII C CONCEPTUAL PLAN

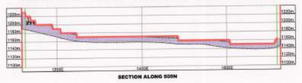


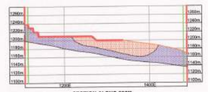
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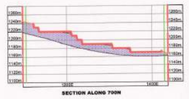

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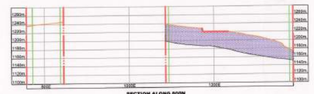

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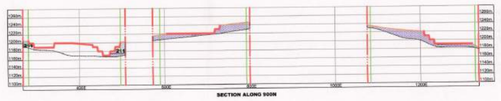

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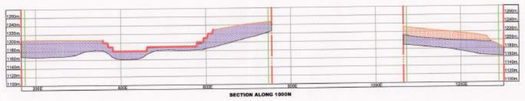

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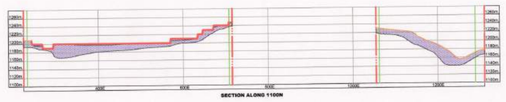

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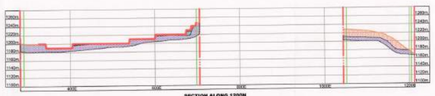

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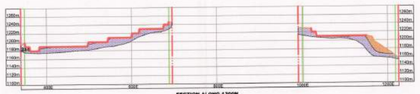

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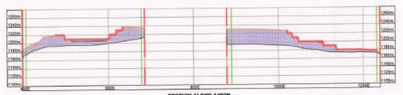

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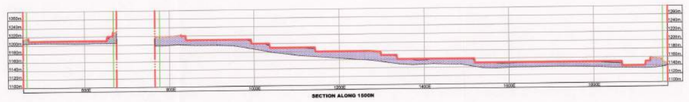

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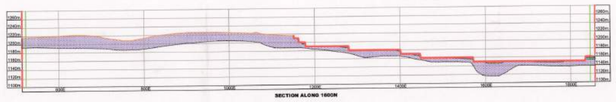

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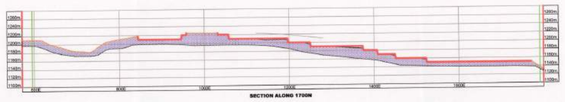

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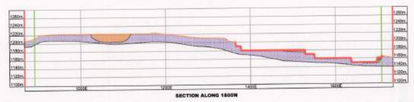

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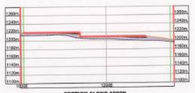

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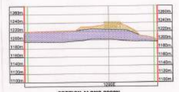

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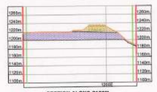

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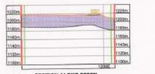

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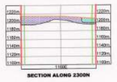

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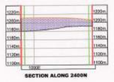

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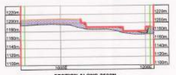

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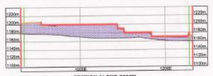

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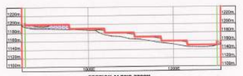

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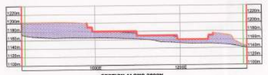

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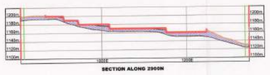

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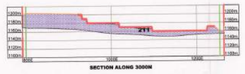

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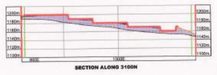

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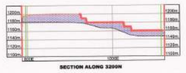

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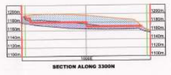

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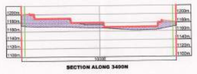

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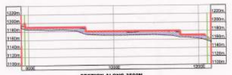

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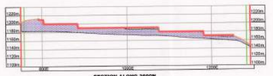

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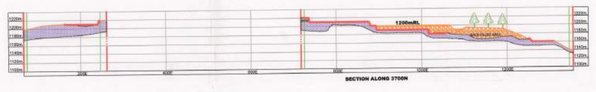

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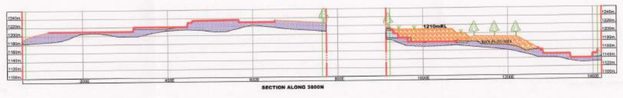

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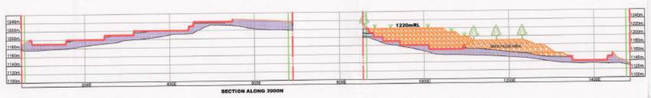

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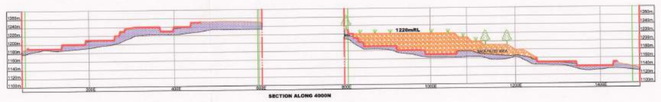
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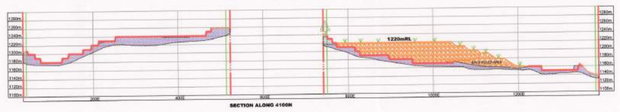
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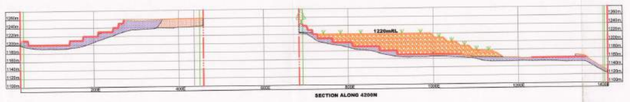
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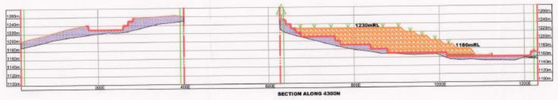
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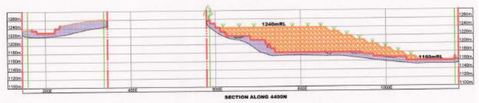
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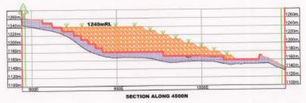
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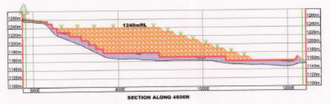
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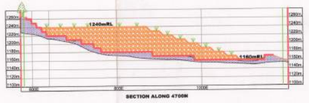
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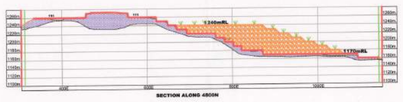
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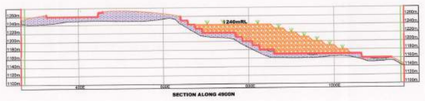
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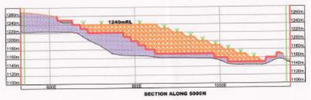
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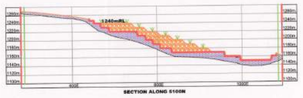
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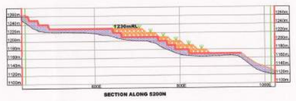
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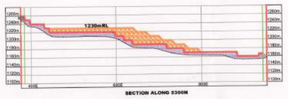
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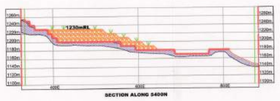
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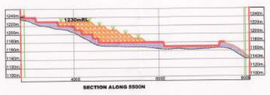
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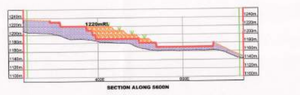
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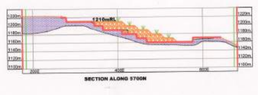
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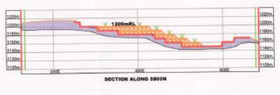
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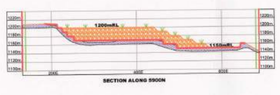
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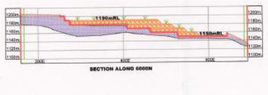
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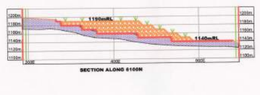
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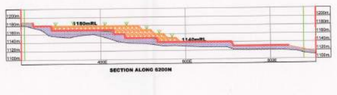
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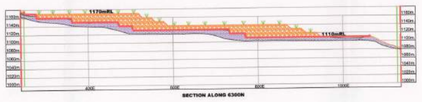
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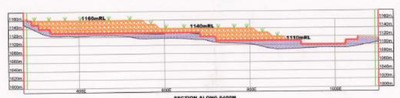
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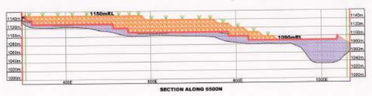
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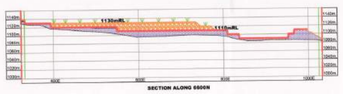
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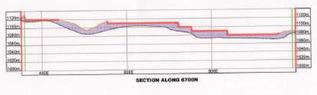
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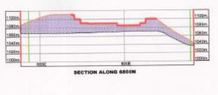


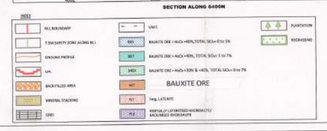
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SECTION ALONG 6600N


SECTION ALONG 6700N


SECTION ALONG 6800N



200 160 120 80 40 00 Metre 200 400 600 800

SCALE-1:4000

SURVEYOR OMC LTD.

GEOLOGIST OMC LTD.

MINING ENGINEER OMC LTD.

MINES MANAGER OMC LTD.

PLATE NO - 9

RIVIEW OF MINING PLAN (2022-23 to 2026-27)

KODINGAMALI BAUXITE MINES

(LEASE AREA : 428.075Hs AS PER ROR/428.075Hs AS PER DGPS)
KODINGA PRF OF RAYGADA DISTRICT & KODINGAMALI RF OF KORAPUT DISTRICT, ODISHA

APPLICANT - ODISHA MINING CORPORATION LTD.

CONCEPTUAL SECTIONS

Scale 1:4000 | **Date of Survey:-30.06.2021**

The Plans and Sections are prepared based on the lease map authenticated by the State Government.

PRADIP KUMAR SAHOO
Qualified Person
OMC Ltd.

SUBRAT KUMAR BEHERA
Qualified Person
OMC Ltd.

Sheet 1 of 1 | Rev. 1

ANNEXURE IX A_AUTHEN. LOCATION MAP FROM DFO KORAPUT & DFO RAYGADA

MAP SHOWING THE BUFFER ZONE OF 10 KM ARROUND KODINGAMALI BAUXITE MINES OF OMC LTD.

REF-TOPOSHEET-E44E16,E44F4,E44K13, E44L1

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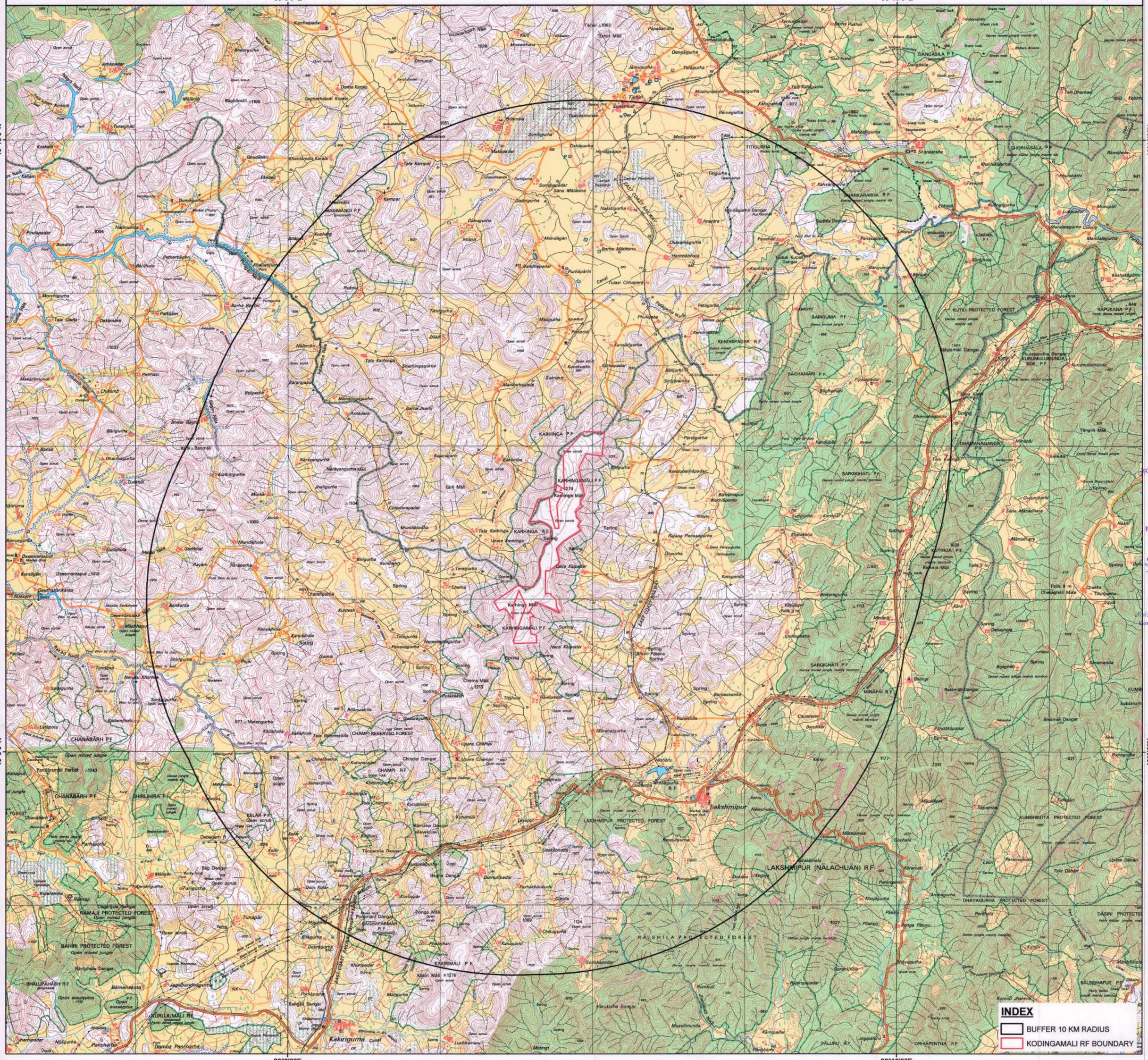
1:50,000

83°0'0"E

83°10'0"E

19°10'0"N

19°0'0"N


KODINGAMALI RF BOUNDARY
BUFFER 10 KM RADIUS
INDEX
KARHINGA R.F
KARHINGAMALI P.F
CHAMPI RESERVED FOREST
CHAMPI RF
CHANABARH PF
JHIRJHIRA PF
KELAR PF
BAGHAPANMAR P F (proposed)
KAKIRIMALI P.F
KURUJUMALI RF
BHALUPAHARH RF
BAHIRI PROTECTED FOREST
RAMAJI PROTECTED FOREST
LAKSHMIPUR PROTECTED FOREST
LAKSHMIPUR (NALACHUAN) R.F
RAISHILA PROTECTED FOREST
DHAYAGURHA PROTECTED FOREST
KUTILI PROTECTED FOREST
KUMBHIKOTA PROTECTED FOREST
DASINI PROTECTED
BARIGUMA PF
KENDRIPADAR R F
BAGHAMARI P F
DHAMANAGANDA P F
SARGIGHATI P F
MINAPAI R F
KUTINGA P F
PALURU R F
ORHAPENTHA R F
BAUNSHAPUR P F
TITIGURHA R F
SHANKARAHA R F
DANGASILA P F
GHORHASALA P F
RAPUKANA P F
KARIMOL P F
Lakshmipur
Laxmipur
Tikhiri
Tikhiri Mali
Girli Mali
Karhinga Mali
Chema Mali
Kakirimali
Kakiriguma Canal
EAST COAST RAILWAY
Tala Karhinga
Upara Karhinga
Upara Champi
Tala Champi
Tala Kampar
Tala Dhamshila
Tala Gadia
Tala Kalipparha
Tala Dharhasa
Tala Kusuma
Tala Dabari
Upara Dabari
Tala Kusuma
Falls 3 m
Falls 8 m
Chakaghati Mala
Spring
Open scrub
Open mixed jungle
Open eucalyptus
Dense mixed jungle mainly sal
Dense jungle mainly bamboo
Sheet rock
Rocky knob
Cashew Plantation
Ford
Ford (Now to Jun)
Causeway
Bridge
Canal
Market (Thurs)
Panchali
Dhamanaganda
Kendupas
Kendubeshapadar
Kendrijadar
Kansarigurha
Kanhapadar
Sargipadar
Pipalapadar
Baghghari
Baliparhi Dangar
Phuabandha Dangar
Kurumulamunda
Sana Kinjir
Tangiri Mali
Minapai
Kumuka
Kendupas
Bhitaragurha
Kanapal
Kutinga
Bhaskara Mali
Chhilsankha
Bhaskara Mali
Bhaskara Mali
Bhaskara Mali

MAP SHOWING ALL THE SANCTUARIES, BIOSPHERE RESERVE, ELEPHANT RESERVES &ELEPHANT CORRIDORS OF ODISHA WITH DISTANCE FROM MINE SITE OF OMCL- ODISHA MINING CORPORATION LIMITED

WILDLIFE SANCTUARIES		
SL NO	PROTECTED AREAS	DISTANCE FROM MINING LEASE BOUNDARY (in KM)
1	DEBRIGARH	274 Km
2	BADARAMA	284 Km
3	KULDIHA	433 Km
4	HADAGARH	404 Km
5	KHALASUNI	288 Km
6	SATKOSIA GORGE	243 Km
7	BHITARKANIKA	412 Km
8	SUNABEDA	162 Km
9	GAHIRRMATHA	409 Km
10	BAISIPALLI	216 Km
11	CHANDAKA DAMAPARA	297 Km
12	NANDANKANAN	316 Km
13	KOTAGARH	94.8 Km
14	BALUKHANDA-KONARK	321 Km
15	KARLAPAT	64 Km
16	NALABAN	239 Km
17	LAKHARI VALLEY	129 Km
18	KAPILASH	319 Km
19	SIMILIPAL	421 Km

ELEPHANT CORRIDOR		
SL NO	PROTECTED AREAS	DISTANCE FROM MINING LEASE BOUNDARY (in KM)
1	MALUABJANA JIRIDIMALI ANANTAPUR	338 Km
2	KARLAPAT URLADANI	72.1 Km
3	KOTAGARH CHANDRAPUR	109 Km
4	BADAMPAHAD KARIDA EAST	459 Km
5	BADAMPAHAD DHOBADHOBIN	446 Km
6	KARO KARMPADA	394 Km
7	WEST BESNGAL DEULI SULIAPADA	510 Km
8(b)	HADGARH KULDIHA	414 Km
8(a)	SIMILIPAL HADGARH	414 Km
9	BUGUDA CENTRAL RF	224 Km
10	NUAGAON BARUNI	240 Km
11	BARPAHAR TARAVA KANTAMAL	196 Km
12	TALA KHOLAGARH	242 Km
12	TALA KHOLAGARH	251 Km
13	TELKOI PALAHARA	333 Km
14	KANHEIJENA ANANTAPUR	306 Km

TIGER RESERVE		
SL NO	PROTECTED AREAS	DISTANCE FROM MINING LEASE BOUNDARY (in KM)
1	SIMILIPAL TIGER RESERVE	399 km
2	SATKOSIA TIGER RESERVE	216 km

NATIONAL PARK		
SL NO	PROTECTED AREAS	DISTANCE FROM MINING LEASE BOUNDARY (in KM)
1	SIMILIPAL NATIONAL PARK	433 km
2	BHITARKANIKA NATIONAL PARK	433 km

BIOSPHERE RESERVE		
SL NO	PROTECTED AREAS	DISTANCE FROM MINING LEASE BOUNDARY (in KM)
1	SIMILIPAL BIOSPHERE RESERVE	395 km

ELEPHANT RESERVES		
SL. NO.	NAME	DISTANCE FROM MINING LEASE BOUNDARY (in KM)
1	MAHANADI ELEPHANT RESERVE(PROPOSED)	216 km
2	SAMBALPUR ELEPHANT RESERVE(PROPOSED)	268 km
3	MAYURBHANJ ELEPHANT RESERVE	399 KM
4	MAHANADI ELEPHANT RESERVE(EXISTING)	216 km
5	SAMBALPUR ELEPHANT RESERVE(EXISTING)	296 KM

RAMSAR SITES		
SL. NO.	NAME	DISTANCE FROM MINING LEASE BOUNDARY (in KM)
1	CHILKA LAKE RAMSAR SITE (CHILKA WL)	218 km
2	SATKOSIA GORGE RAMSAR SITE	406 km

Kilometers
0 34 68 102 136 170 204
1 cm = 17 km

JHARKHAND
WEST BENGAL
CHHATTISGARH
ANDHRA PRADESH
BAY OF BENGAL

SUNDARGARH, JHARSUGUDA, SAMBALPUR, DEOGARH, KEONJHAR, MAYURBHANJ, BALASWAR, BARAGARH, SONEPUR, BOUDH, ANUGUL, DHENKANAL, BHADRAK, JAJPUR, BOLANGIRI, NUAPARA, KANDHAMAL, CUTTACK, KENDRAPARA, JAGATSINGPUR, KALAHANDI, NAYAGARH, KHURDA, PURI, NABARANGPUR, RAYAGADA, GANJAM, GAJAPATI, KORAPUT, MALKANGIRI

1 DEBRIGARH, 2 BADARAMA, 3 KULDIHA, 4 HADAGARH, 5 KHALASUNI, 7 BHITARKANIKA, 8 SUNABEDA, 9 GAHIRRMATHA, 10 BAISIPALLI, 11 CHANDAKA DAMAPARA, 12 NANDANKANAN, 13 KOTAGARH, 14 BALUKHANDA-KONARK, 15 KARLAPAT, 16 NALABAN, 17 LAKHARI VALLEY, 18 KAPILASH, 19 SIMILIPAL

1. SIMILIPAL NATIONAL PARK
SIMILIPAL BIOSPHERE RESERVE
7 BHITARKANIKA NATIONAL PARK
Satkosia Gorge Ramsar site
Chilika Lake Ramsar Site (Chilka WS)

2 Sambalpur Elephant Reserve (proposed)
3 Mayurbhanj Elephant Reserve
4 Mahanadi Elephant Reserve (existing)
5 Sambalpur Elephant Reserve (Existing)
1 Maluabanja Jiridimali Anantapur
2 Karlapat Urladani
3 Kotagarh Chandrapur
11 Barpahar Tarava Kantamal
12 Tala Kholagarh
13 Telkoi Palahara
14 Kanheijena Anantapur
6 Karo Karmpada
5 Badamphad Dhobadhobin
4 Badampahad Karida East

Kodingamali Bauxite Mine
(ML Area: 428.075 ha)
M/s. Odisha Mining Corporation Ltd.
At
Village: Kodingamali, Tehsil: Laxmipur & Kashipur,
District- Koraput & Rayagada, Odisha

MAHANADI ELEPHANT RESERVE(PROPOSED)
SAMBALPUR ELEPHANT RESERVE(PROPOSED)
MAYURBHANJ ELEPHANT RESERVE
MAHANADI ELEPHANT RESERVE(EXISTING)
SAMBALPUR ELEPHANT RESERVE(EXISTING)

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NATIONAL PARK(SIMILIPAL & BHITARKANIKA)
SANCTUARY
RAMSAR SITES
ELEPHANT CORRIDOR
SIMILIPAL BIOSPHERE RESERVE
DISTANCE

REF. SOURCE: WILDLIFE ODISHA 2022



Divisional Forest Officer
Koraput Forest Division

FOREST RANGE OFFICE
LAXMIPUR

Forester
Laxmipur Section

MAP SHOWING THE BUFFER ZONE OF 10 KM ARROUND KODINGAMALI BAUXITE MINES OF OMC LTD.

N

1:50,000

REF-TOPOSHEET-E44E16,E44F4,E44K13, E44L1

83°0'0"E

83°10'0"E

19°0'0"N

INDEX

- BUFFER 10 KM RADIUS
- KODINGAMALI RF BOUNDARY

Arnej Kumar Nayak
Deputy Ranger
I/C Tikiri Range

Ashok
Asst. Conservation of Forests
Rayagada Division

Divisional Forest Officer
Rayagada Division

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6 SATKOSIA GORGE
Satkosia Gorge Ramsar site
Chilka Lake Ramsar Site (Chilka WS)

Kodingamali Bauxite Mine
(ML Area: 428.075 ha)
M/s. Odisha Mining Corporation Ltd.
At
Village: Kodingamali, Tehsil: Laxmipur & Kashipur,
District- Koraput & Rayagada, Odisha

MAHANADI ELEPHANT RESERVE(PROPOSED)
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SIMILIPAL BIOSPHERE RESERVE
DISTANCE

REF. SOURCE: WILDLIFE ODISHA 2022

Asis Kumar Panigrahi
Deputy Ranger
I/C Tikiri Range

Ashok
Asst. Conservator of Forests
Rayagada Division

Divisional Forest Officer
Rayagada Division

ANNEXURE IX B_LIST OF FLOR A& FAUNA FROM DFO KORAPUT AND DFO RAYGADA

ବନଖଣ୍ଡ ଅଧିକାରୀ ଓ ବନ୍ୟପ୍ରାଣୀ ତତ୍ତ୍ୱାବଧାରକଙ୍କ କାର୍ଯ୍ୟାଳୟ, କୋରାପୁଟ

OFFICE OF THE DIVISIONAL FOREST OFFICER -CUM-WILDLIFE WARDEN, KORAPUT FOREST DIVISION, KORAPUT

ଅଭିଯୋଗ କକ୍ଷ (SMS) ନଂ. 9437011270 ଇ-ମେଲ୍ : ID-dfo.koraput@odisha.gov.in

Letter No. 280 4F (Misc.)/ Dated. 27 / 01 / 2025.

To

The Executive Director (F&E),
OMC, Odisha, Bhubaneswar.

Sub: - Diversion of 434.935 Ha. of forest land (**428.075** Ha forest land within Kodingamali Bauxite Mining lease area including 18.098 ha. of Forest land in Safety Zone and 6.860 ha. of forest land out side the ML area for construction of approach road to Mining lease) for mining of Bauxite in Kodingamali Bauxite Mines located in Koraput and Rayagada District of Odisha Mining Corporation Ltd.-Regarding authentication of (i) list of Flora & Fauna within 10 Km radius area and (ii) a location map showing 10 Km around Kodingamali Bauxite Ore Mines of OMC.

Ref: - Your office Letter No.21371/OMC/F&E/2024 Dated 17.12.2024.

Sir,

With reference to the above cited letter, this is to inform you that the, the common trees, herbs, shrubs, commercial crops, and mammals within a 10 Km radius of the mining lease area covering 428.075 Ha. of Kodingamali Bauxite Ore Mines have been verified as per the Working Plan of this Division. A copy of the above flora & fauna in the core and buffer zones is enclosed for your reference.

Additionally, it is confirmed that there are no National Parks, Wildlife Sanctuaries, Biosphere Reserves, Wildlife Corridors of Tiger and Elephant Reserves within the 10 Km radius of the mining lease area. A map depicting this information is also enclosed for your kind perusal and necessary action.

Encl: - As above.

Yours faithfully,
24/01/2025
Divisional Forest Officer,
Koraput Forest Division.

Memo No. 281 / Dated 27/01/ /2025.

Copy forwarded to the Regional Manager, South Zone, Rayagada for information and necessary action.

24/01/2025
Divisional Forest Officer,
Koraput Forest Division.

Table - 1

INVENTORY OF FLORAL DIVERSITY IN CORE ZONE

Based on Actual Sighting, inputs from locals and Perused from Secondary Data

S. No.	Scientific Name	Family	Common Name	IUCN Status
		Trees		
1	*Acacia leucophloea*	Mimosaceae	Gohria	LC
2	*Albizia lebbeck*	Mimosaceae	Sirisa	LC
3	*Albizia procera*	Mimosaceae	Safed siris	LC
4	*Annona reticulata*	Annonaceae	Ram-Phala	LC
5	*Artocarpus heterophyllus*	Moraceae	Panas	NE
6	*Buchanania lanzan*	Anacardiaceae	Bhalia	LC
7	*Boswellia serrata*	Burseraceae	Salai	NE
8	*Caryota urenus*	Arecaceae	Salap	LC
9	*Dalbergia latifolia*	Fabaceae	Pahadi sisoo	VU
10	*Diospuiros melanoxylon*	Ebenaceae	Kendu	NE
11	*Lanneae coromandelica*	Anacardiaceae	Mai	NE
12	*Morinda tinctoria*	Rubiaceae	Achhu	NE
13	*Sterculia urenus*	Sterculianceae	Genduli	LC
14	*Strebulus aspera*	Sterculianceae	Sahada	NE
15	*Vitex peducularis*	Verbenaceae	Chadaigudi	LC
16	*Wrightia tomentosa*	Apocynaceae	Bod-kurhein	NE
17	*Pterocarpus marsupium*	Fabaceae	Bija/Piasal	NT
		Shrubs and Herbs		
1	*Andrographis paniculata*	Acanthaceae	Bhuin-Neem	NE
2	*Calotropis procera*	Apocynaceae	Arakha	NE
3	*Casearia tomentosa*	Flacourtiaceae	Khokhoda	NE
4	*Cassia tora*	Leguminosae	Dhola chakunda	NE
5	*Datura stramonium*	Solanaceae	Datura	NE
6	*Hemidesmus indicus*	Asclepiadaceae	Antala-mula	NE
7	*Holarrhena pubescens*	Apocynaneae	Kurei	LC
8	*Jatropha gossypifolia*	Euphorbiaceae	Nonkakalo	NE
9	*Lantana camara*	Verbenaceae	Nagauiri	NE
10	*Phoenix acaulis*	Arecaceae	Ban-Khajuri	NE
11	*Rouwolfia serpentine*	Apocynaceae	Patala goruda	LC
12	*Sida cordifolia*	Malvaceae	Mallow/Berala	NE
13	*Solanum virginianum*	Solanaceae	Bejari (Ankranti)	NE
14	*Ziziphus mauritiana*	Rhamnaceae	Barokoli	LC
15	*Ziziphus oenoplia*	Rhamnaceae	Kantaikoli	NE
16	*Jatropha curcas*	Euphorbiaceae	Jode/Dumiba	NE
17	*Withania somnifera*	Solanaceae	Aswagandha	NE

S. No.	Scientific Name	Family	Common Name	IUCN Status
18	*Xanthium strumarium*	Asteraceae	Common Cocklebur	NE
		Climbers		
1	*Asperagus racemosus*	Liliaceae	Satabari	LC
2	*Bauhinia vahlii*	Caesalpiniaceae	Sialia	NE
3	*Cassytha filiformis*	Lauraceae	Nirmuli	NE
4	*Smilax zeylanica*	Smilaceae	Mutur	NE
		Grasses		
1	*Aristida setaceae*	Poaceae	Broom Grass	NE
2	*Arundinella setosa*	Poaceae	Jharu	NE
3	*Cynodon dactylon*	Poaceae	Durba	NE

Table -2

INVENTORY OF FAUNAL DIVERSITY IN CORE ZONE

Based on Actual Sighting, Inputs from locals and Perused from Secondary Data

S. No.	Scientific Name	Common Name	IUCN Status	Schedule as per WL(P)AA, 2022
		Mammals		
Family: Canidae				
1	*Canis aureus*	Jackal	LC	I
		Family: Muridae		
2	*Rattus rattus*	House/Black rat	LC	IV
3	*Vandeleuria oleracea*	Asiatic long-tailed climbing mouse	LC	-
Family: Sciuridae				
4	*Funambulus palmarum*	Common Palm Squirrel	LC	-
Family: Herpestidae				
5	*Urva edwardsii*	Indian grey mongoose	LC	I
6	*Urva auropunctata*	Small Indian Mongoose	LC	I
		Birds		
Family: Caprimulgidae				
1	***Caprimulgus indicus***	Jungle Night Jar	LC	II
Family: Pycnonotidae				
2	*Pycnonotus jocosus*	Red-whiskered bulbul	LC	II
Family: Accipitridae				
3	*Milvus migrans*	Black kite	LC	II
Family: Sturnidae				
4	*Gracula religiosa*	Common Hill Myna	LC	I
Family: Strigidae				

S. No.	Scientific Name	Common Name	IUCN Status	Schedule as per WL(P)AA, 2022
5	*Bubo bubo*	Eurasian Eagle Owl	LC	I
		Snake		
1	*Naja naja*	Indian Cobra	LC	I
		Lizards		
Family: Varanidae				
1	*Varnus bengalensis*	Bengal monitor	NT	I
Family: Agamidae				
2	*Calotes versicolor*	Oriental garden lizard	LC	IV
Family: Gekkonidae				
3	*Hemidactylus brookii*	Brook's House Gecko	LC	IV

Table - 3

INVENTORY OF FLORAL DIVERSITY IN BUFFER ZONE

Based on Actual Sighting, Inputs from locals and Perused from Secondary Data

S. No.	*Scientific Name*	Family	Common Name	IUCN Status
		Trees		
1	*Acacia leucophloea*	Mimosaceae	Gohria	LC
2	*Albizia lebbeck*	Mimosaceae	Sirisa	LC
3	*Albizia procera*	Mimosaceae	Safed siris	LC
4	*Anacardium occidentale*	Anacardiaceae	Kaju (Lanka Badam)	LC
5	*Annona reticulata*	Annonaceae	Ram-Phala	LC
6	*Aegle marmelos*	Rutaceae	Bael Tree	NT
7	*Bauhinia racemosa*	Fabaceae	Ambalata	LC
8	*Cochlospermum religiosum*	Cochlospermaceae	Ganiyari	LC
9	*Cassia fistula*	Fabaceae	Sunari	LC
10	*Dalbergia latifolia*	Fabaceae	Pahadi sisoo	VU
11	*Dalbergia paniculata*	Fabaceae	Bara Koli	NE
12	*Diospyros malabarica*	Ebenaceae	Mankada kendu	NE
13	*Emblica officinalis*	Euphorbiaceae	Aonala	LC
14	*Erythrina suberosa*	Fabaceae	Balthia(Paldhua)	LC
15	*Ficus benghalensis*	Moraceae	Bara	NE
16	*Ficus racemosa*	Moraceae	Dimri	LC
17	*Ficus religiosa*	Moraceae	Pipal	LC
18	*Holoptelia integripholia*	Ulmaceae	Dauranja	NE
19	*Lagerstroemia parviflora*	Lythraceae	Sennha (Sidha)	LC
20	*Madhuka indica*	Sapotaceae	Mahul/Mahua	NE
21	*Mallotus phillippensis*	Euphorbiaceae	Kamalgundi	NE
22	*Mangifera indica*	Anacardiaceae	Amba	DD
23	*Oroxylum indicum*	Bignoniaceae	Phemphana	LC
24	*Phoenix sylvestrius*	Arecaceae	Khajuri	NE
25	*Schleichera oleosa*	Sapindaceae	Kusum	LC
26	*Semecapus anacardium*	Anacardiaceae	Bhalia	LC

S. No.	Scientific Name	Family	Common Name	IUCN Status
27	*Shorea robusta*	Dipeterocarpaceae	Sal	LC
28	*Spondius mangifera*	Anacardiaceae	Ambada	LC
29	*Terminalaeae bellirica*	Combertaceae	Baheda	LC
30	*Terminalea tomantosa*	Combertaceae	Sahaja (Asan)	NE
31	*Terminaleae chebula*	Combertaceae	Hardia	LC
32	*Tamarindus indica*	Caesalpiniaceae	Tentuli	LC
33	*Xylia xylocarpa*	Mimosaceae	Tangini	LC
34	*Acacia auriculiformis*	Fabaceae	Babool/Teak	LC
35	*Azadirachta indica*	Meliaceae	Neem/Limba	LC
36	*Dalbergia sisoo*	Fabaceae	Sisoo/simsapa	NE
37	*Eucalyptus hybrid*	Myrtaceae	Nilgiri/Patas	NE
38	*Santalum album*	Santalaceae	Chandan	VU
39	*Tectona grandis*	Verbenaceae	Teak/Saguan	NE
40	*Pterocarpus marsupium*	Fabaceae	Bijsaal	NT
	Shrubs and Herbs			
1	*Achyranthus aspera*	Amaranthaceae	Aparnarga	NE
2	*Andrographis paniculata*	Acanthaceae	Bhuin-Neem	NE
3	*Calotropis procera*	Apocynaceae	Arakha	NE
4	*Casearia tomentosa*	Flacourtiaceae	Khokhoda	NE
5	*Cassia tora*	Leguminosae	Dhola chakunda	NE
6	*Centella asiatica*	Apiaceae	Talkuni	LC
7	*Datura stramonium*	Solanaceae	Datura	NE
8	*Eupatorium odoratum*	Asteraceae	Bitter/Chritsmas Bush	NE
9	*Hemidesmus indicus*	Asclepiadaceae	Antala-mula	NE
10	*Holarrhena pubescens*	Apocynaneae	Kurei	LC
11	*Jatropha gossypifolia*	Euphorbiaceae	Nonkakalo	NE
12	*Lantana camara*	Verbenaceae	Nagauiri	NE
13	*Murraya koenigii*	Rutaceae	Bhursunga/Mitha Neem	LC
14	*Ocimum basilium*	Lamiaceae	Tulsi (Dhala)	NE
15	*Ocimum gratissimum*	Lamiaceae	Bana-Tulsi	NE
16	*Ocimum sanctum*	Lamiaceae	Tulsi (Kala)	NE
17	*Woodfordia fructicosa*	Lythraceae	Dhatki	LC
18	*Ziziphus mauritiana*	Rhamnaceae	Barokoli	LC
19	*Ziziphus oenoplia*	Rhamnaceae	Kantaikoli	NE
20	*Bixa orellana*	Bixaceae	Sakta/Sundri	NE
21	*Jatropha curcas*	Euphorbiaceae	Jode/Dumiba	NE
22	*Chromolaena odorata*	Asteraceae	Devil weed	NE
23	*Hyptis suaveolens*	Lamiaceae	Pignut	NE
24	*Xanthium strumarium*	Asteraceae	Common Cocklebur	NE
	Climbers			
1	*Acacia torta*	Mimosaceae	Dantari	NE
2	*Combretum dicandrum*	Combretaceae	Atundi	NE

S. No.	Scientific Name	Family	Common Name	IUCN Status
3	*Entada acandens/ E.pursaitha*	Fabaeceae	Gilo	NE
	Bamboos			
1	*Bambusa bambos*	Poaceae	Daba	NE
2	*Bambusa nutans*	Poaceae	Badia	NE
3	*Bambusa tulda*	Poaceae	Taleda	NE
4	*Bambusa vulgaris*	Poaceae	Sundarkani	NE
5	*Dendrocalamus strictus*	Poaceae	Salia	NE
	Grasses			
1	*Aristida setaceae*	Poaceae	Broom Grass	NE
2	*Arundinella setosa*	Poaceae	Jharu	NE
3	*Chrysopogon gryllus*	Poaceae	Guguchia	NE
4	*Cymbopogon flexuosus*	Poaceae	Dhanwantari (Lemon grass)	NE
5	*Cynodon dactylon*	Poaceae	Durba	NE
6	*Eragrostis uniolioides*	Poaceae	Phuri Phuri	LC
7	*Imperata cylindrica*	Poaceae	Chhana	LC
8	*Thysanolaena maxima*	Poaceae	Phulochanchuni	NE

Table - 4

INVENTORY OF FAUNAL DIVERSITY IN BUFFER ZONE

Based on Actual Sighting, Inputs from locals and Perused from Secondary Data

S. No.	Scientific Name	Common Name	IUCN Status	Schedule as per WL(P)AA, 2022
	Mammals			
Family: Felidae				
1	*Felis chaus*	Jungle Cat	LC	I
2	*Prionailurus bengalensis*	Leopard cat	LC	I
Family: Pteropodidae				
3	*Cynopterus sphinx*	Short nosed Fruit Bat	LC	IV
Family: Canidae				
4	*Canis aureus*	Jackal	LC	I
5	*Vulpes bengalensis*	Bengal fox	LC	I
6	*Canis lupus*	Grey wolf	LC	I
Family: Cercopithecidae				
7	*Semnopithecus entellus*	Hanuman langur	LC	II
8	*Macaca mulatto*	Rhesus macaque	LC	IV
Family: Cervidae				
9	*Axis axis*	Chital/Spotted dear	LC	II
10	*Muntiacus muntjak*	Barking deer	LC	IV
11	*Rusa unicolor*	Sambar deer	VU	I
Family: Muridae				
12	*Rattus rattus*	House/Black rat	LC	IV
13	*Madromys blanfordi*	White-tailed wood rat	LC	-

S. No.	Scientific Name	Common Name	IUCN Status	Schedule as per WL(P)AA, 2022
14	*Vandeleuria oleracea*	Asiatic long-tailed climbing mouse	LC	-
Family: Mustelidae				
15	*Lutrogale perspicillata*	Smooth-coated otter	VU	I
16	*Mellivora capensis*	Ratel/Honey Badger	LC	I
Family: Leporidae				
17	*Lepus nigricollis*	Indian hare	LC	II
Family: Ursidae				
18	*Melursus ursinus*	Sloth bear	VU	I
Family: Sciuridae				
19	*Funambulus palmarum*	Common Palm Squirrel	LC	-
20	*Ratufa indica*	Indian giant squirrel	LC	I
Family: Suidae				
21	*Sus scrofa*	Wild boar/Pig	LC	II
Family: Bovidae				
22	*Tetracerus quadricornis*	Chousingha/ Four-horned Antelope	VU	I
Family: Viverridae				
23	*Viverricula indica*	Small Indian civet	LC	I
24	*Paradoxurus hermaphroditus*	Asian palm civet	LC	I
Family: Soricidae				
25	*Suncus murinus*	House Shrew	LC	-
Family: Tragulidae				
26	*Moschiola indica*	Mouse deer/ Indian Chevrotain	LC	I
Family: Hyaenidae				
27	*Hyaena hyaena*	Hyaena	NT	I
Family: Hystricidae				
28	*Hystrix indica*	Indian Porcupine	LC	I
Family: Herpestidae				
29	*Urva edwardsii*	Indian gray mongoose	LC	I
30	*Urva auropunctata*	Small Indian Mongoose	LC	I
Birds				
Family: Ardeidae				
1	*Ardeola grayill*	Indian pond heron	LC	II
2	*Bubulcus ibis*	Cattle egret	LC	II
Family: Phasianidae				
3	*Gallus sonneratii*	Grey junglefowl	LC	I
4	*Pavo cristatus*	Indian peafowl	LC	I
Family: Ploceidae				
5	*Ploceus phillipinus*	Baya weaver	LC	II
Family: Caprimulgidae				

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S. No.	Scientific Name	Common Name	IUCN Status	Schedule as per WL(P)AA, 2022
6	*Caprimulgus indicus*	Jungle Night Jar	LC	II
Family: Pycnonotidae				
7	*Pycnonotus cafer*	Red-vented bulbul	LC	II
8	*Pycnonotus jocosus*	Red-whiskered bulbul	LC	II
Family: Accipitridae				
9	*Milvus migrans*	Black kite	LC	II
Family: Corvidae				
10	*Corvus macrorhycnhos*	Large-billed crow	LC	II
11	*Corvus splenedens*	House crow	LC	IV
Family: Columbidae				
12	*Columba livia (Gmelin)*	Rock dove	LC	IV
13	*Streptopelia decaocto*	Eurasian collared dove	LC	II
14	*Streptopelia chinensis*	Spotted Dove	LC	II
15	*Ducula aenea*	Green imperial pigeon	NT	II
Family: Passeridae				
16	*Passer domesticus*	House sparrow	LC	II
Family: Sturnidae				
17	*Gracupica contra*	Indian pied myna/Asian Pied Starling	LC	II
Family: Turnicidae				
18	*Turnix suscitator*	Barred buttonquail	LC	II
Family: Oriolidae				
19	*Oriolus xanthornus*	Black-hooded oriole	LC	II
Family: Picidae				
20	*Yungipicus nanus*	Brown-capped/Indian Pygmy Woodpecker	LC	II
21	*Dinopium benghalense*	Black-rumped flameback	LC	II
Family: Cuculidae				
22	*Cuculus micropterus*	Indian cuckoo	LC	II
23				
24	*Hierococcyx varius*	Common Hawk Cuckoo	LC	II
Family: Bucerotidaehornbills				
25	*Anthracoceros coronatus*	Malabar pied hornbill	NT	I
Family: Leiothrichidae				
26	*Argya caudatus*	Common babbler	LC	II
Family: Alcedinidae				
27	*Ceryle rudis*	Pied kingfisher	LC	II
Family: Strigidae				
28	*Bubo bubo*	Eurasian Eagle Owl	LC	I
Family: Phasianidae				
29	*Francolinus pondicerianus*	Grey francolin	LC	II
30	*Perdicula asiatica*	Jungle bush quail	LC	II
31	*Perdicula erythrorhyncha*	Painted bush quail	LC	II

S. No.	Scientific Name	Common Name	IUCN Status	Schedule as per WL(P)AA, 2022
Family: Dicruridaess				
32	*Dicrurus macrocercus*	Black drongo	LC	II
		Snakes		
Family: Pythonidaes				
1	*Python molurus*	Indian rock python	NT	I
Family: Boidae				
2	*Boa constrictor*	Red-tailed boa	LC	IV
Family: Elapidae				
3	*Bungarus caeruleus*	Indian krait	LC	II
4	*Naja naja*	Indian Cobra	LC	I
5	*Bungarus candidus*	Malayan krait	LC	II
Family: Colubridae				
6	*Ptyas mucosa*	Indian rat snake/Dhaman	LC	I
7	*Ahaetulla nasuta*	Long-nosed Tree Snake	LC	II
8	*Ahaetulla prasina*	Gunther's Whip Snake	LC	II
Family: Viperidae				
9	*Daboia russelli*	Russell's viper	LC	I
10	*Echis carinatus*	Indian saw-scaled viper	LC	II
Family: Natricidae				
11	*Fowlea piscator*	Checkered Keelback	LC	I
		Lizards		
Family: Varanidae				
1	*Varnus bengalensis*	Bengal monitor	NT	I
Family: Scincidae				
2	*Eutropis carinata*	Keeled Indian Mabuya	LC	IV
3	*Eutropis macularia*	Bronze mabuya	LC	IV
Family: Agamidae				
4	*Calotes versicolor*	Oriental garden lizard	LC	IV
5	*Psammophilus blafordanus*	Blanford's rock agama	LC	IV
Family: Gekkonidae				
6	*Hemidactylus brookii*	Brook's House Gecko	LC	IV

Divisional Forest Officer
Koraput Forest Division

S. Sahoo, FG

FOREST RANGE OFFICER
LAXMIPUR

Forester
Laxmipur Section

OFFICE OF THE DIVISIONAL FOREST OFFICER : RAYAGADA FOREST DIVISION

E.Mail: dforgda17@gmail.com, dfo.rayagada@odisha.gov.in

Letter **Memo No** 216 **4F (Misc.) 1367/2025.**

Dated, Rayagada the 13 **th January, 2025.**

To

The Executive Director (F & E),
OMC, Odisha, Bhubaneswar.

Sub: - Diversion of 434.935 ha of Forest land (428.075 ha of forest land within Kodingamali Bauxite Mining lease area including 18.098 ha of forest land in safety zone for and 6.860 ha of forest land outside the ML area for construction of approach road to the mining lease) for mining of bauxite in Kodingamali Bauxite Mines located in Koraput and Rayagada district of Odisha Mining Corporation Ltd.- **Regarding authentication of (i) list of Flora & Fauna found within 10 Km radius area and (ii) a location map shoeing 10 Km around Kodingamali Bauxite Ore Mines of OMC.**

Ref: Your Letter No.21373 Dt.17.12.2024.

Sir,

With reference to the above-cited letter, this is to inform you that the Assistant Conservator of Forests of this division, along with the Range Officer, Tikiri Range, and the concerned Forester, conducted a joint verification of common trees, herbs, shrubs, commercial crops, and mammals within a 10 km radius of the mining lease area covering 21.69 hectares of Kodingamali Bauxite Ore Mines. A copy of the verification report detailing the flora and fauna in the core and buffer zones is enclosed for your reference.

Additionally, it is confirmed that there are no National Parks, Wildlife Sanctuaries, Biosphere Reserves, Wildlife Corridors, or Tiger and Elephant Reserves within the 10 km radius of the mining lease area. A map depicting this information is also enclosed for your kind perusal and necessary action.

Yours Faithfully,

Encl:- as above.

Divisional Forest Officer,
Rayagada Division.

Memo No 217 Date 13-01-2025

Copy forwarded to the Regional Manager, South zone, Rayagada for information and necessary action.

Divisional Forest Officer,
Rayagada Division

15/01/25

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Table - 1

INVENTORY OF FLORAL DIVERSITY IN CORE ZONE

Based on Actual Sighting, inputs from locals and Perused from Secondary Data

S. No.	Scientific Name	Family	Common Name	IUCN Status
		Trees		
1	*Acacia leucophloea*	Mimosaceae	Gohria	LC
2	*Albizia lebbeck*	Mimosaceae	Sirisa	LC
3	*Albizia procera*	Mimosaceae	Safed siris	LC
4	*Annona reticulata*	Annonaceae	Ram-Phala	LC
5	*Artocarpus heterophyllus*	Moraceae	Panas	NE
6	*Buchanania lanzan*	Anacardiaceae	Bhalia	LC
7	*Boswellia serrata*	Burseraceae	Salai	NE
8	*Caryota urenus*	Arecaceae	Salap	LC
9	*Dalbergia latifolia*	Fabaceae	Pahadi sisoo	VU
10	*Diospuiros melanoxylon*	Ebenaceae	Kendu	NE
11	*Lanneae coromandelica*	Anacardiaceae	Mai	NE
12	*Morinda tinctoria*	Rubiaceae	Achhu	NE
13	*Sterculia urenus*	Sterculianceae	Genduli	LC
14	*Strebulus aspera*	Sterculianceae	Sahada	NE
15	*Vitex peducularis*	Verbenaceae	Chadaigudi	LC
16	*Wrightia tomentosa*	Apocynaceae	Bod-kurhein	NE
17	*Pterocarpus marsupium*	Fabaceae	Bija/Piasal	NT
		Shrubs and Herbs		
1	*Andrographis paniculata*	Acanthaceae	Bhuin-Neem	NE
2	*Calotropis procera*	Apocynaceae	Arakha	NE
3	*Casearia tomentosa*	Flacourtiaceae	Khokhoda	NE
4	*Cassia tora*	Leguminosae	Dhola chakunda	NE
5	*Datura stramonium*	Solanaceae	Datura	NE
6	*Hemidesmus indicus*	Asclepiadaceae	Antala-mula	NE
7	*Holarrhena pubescens*	Apocynaneae	Kurei	LC
8	*Jatropha gossypifolia*	Euphorbiaceae	Nonkakalo	NE
9	*Lantana camara*	Verbenaceae	Nagauiri	NE
10	*Phoenix acaulis*	Arecaceae	Ban-Khajuri	NE
11	*Rouwolfia serpentine*	Apocynaceae	Patala goruda	LC
12	*Sida cordifolia*	Malvaceae	Mallow/Berala	NE
13	*Solanum virginianum*	Solanaceae	Bejari (Ankranti)	NE
14	*Ziziphus mauritiana*	Rhamnaceae	Barokoli	LC
15	*Ziziphus oenoplia*	Rhamnaceae	Kantaikoli	NE
16	*Jatropha curcas*	Euphorbiaceae	Jode/Dumiba	NE
17	*Withania somnifera*	Solanaceae	Aswagandha	NE

S. No.	Scientific Name	Family	Common Name	IUCN Status
18	Xanthium strumarium	Asteraceae	Common Cocklebur	NE
		Climbers		
1	Asperagus racemosus	Liliaceae	Satabari	LC
2	Bauhinia vahlii	Caesalpiniaceae	Slalia	NE
3	Cassytha filiformis	Lauraceae	Nirmuli	NE
4	Smilax zeylanica	Smilaceae	Mutur	NE
		Grasses		
1	Aristida setaceae	Poaceae	Broom Grass	NE
2	Arundinella setosa	Poaceae	Jharu	NE
3	Cynodon dactylon	Poaceae	Durba	NE

Table -2
INVENTORY OF FAUNAL DIVERSITY IN CORE ZONE
Based on Actual Sighting, Inputs from locals and Perused from Secondary Data

S. No.	Scientific Name	Common Name	IUCN Status	Schedule as per WL(P)AA, 2022
		Mammals		
Family: Canidae				
1	Canis aureus	Jackal	LC	I
		Family: Muridae		
2	Rattus rattus	House/Black rat	LC	IV
3	Vandeleuria oleracea	Asiatic long-tailed climbing mouse	LC	-
Family: Sciuridae				
4	Funambulus palmarum	Common Palm Squirrel	LC	-
Family: Herpestidae				
5	Urva edwardsii	Indian grey mongoose	LC	I
6	Urva auropunctata	Small Indian Mongoose	LC	I
		Birds		
Family: Caprimulgidae				
1	**Caprimulgus indicus**	Jungle Night Jar	LC	II
Family: Pycnonotidae				
2	Pycnonotus jocosus	Red-whiskered bulbul	LC	II
Family: Accipitridae				
3	Milvus migrans	Black kite	LC	II
Family: Sturnidae				
4	Gracula religiosa	Common Hill Myna	LC	I
Family: Strigidae				
5	Bubo bubo	Eurasian Eagle Owl	LC	I

S. No.	Scientific Name	Common Name	IUCN Status	Schedule as per WL(P)AA, 2022
		Snake		
1	*Naja naja*	Indian Cobra	LC	I
		Lizards		
Family: Varanidae				
1	*Varnus bengalensis*	Bengal monitor	NT	I
Family: Agamidae				
2	*Calotes versicolor*	Oriental garden lizard	LC	IV
Family: Gekkonidae				
3	*Hemidactylus brookii*	Brook's House Gecko	LC	IV

Table - 3
INVENTORY OF FLORAL DIVERSITY IN BUFFER ZONE
Based on Actual Sighting, inputs from locals and Perused from Secondary Data

S. No.	Scientific Name	Family	Common Name	IUCN Status
		Trees		
1	*Acacia leucophloea*	Mimosaceae	Gohria	LC
2	*Albizia lebbeck*	Mimosaceae	Sirisa	LC
3	*Albizia procera*	Mimosaceae	Safed siris	LC
4	*Anacardium occidentale*	Anacardiaceae	Kaju (Lanka Badam)	LC
5	*Annona reticulata*	Annonaceae	Ram-Phala	LC
6	*Aegle marmelos*	Rutaceae	Bael Tree	NT
7	*Bauhinia racemosa*	Fabaceae	Ambalata	LC
8	*Cochlospermum religiosum*	Cochlospermaceae	Ganiyari	LC
9	*Cassia fistula*	Fabaceae	Sunari	LC
10	*Dalbergia latifolia*	Fabaceae	Pahadi sisoo	VU
11	*Dalbergia paniculata*	Fabaceae	Bara Koli	NE
12	*Diospyros malabarica*	Ebenaceae	Mankada kendu	NE
13	*Emblica officinalis*	Euphorbiaceae	Aonala	LC
14	*Erythrina suberosa*	Fabaceae	Balthia(Paldhua)	LC
15	*Ficus benghalensis*	Moraceae	Bara	NE
16	*Ficus racemosa*	Moraceae	Dimri	LC
17	*Ficus religiosa*	Moraceae	Pipal	LC
18	*Holoptelia integrifolia*	Ulmaceae	Dauranja	NE
19	*Lagerstroemia parviflora*	Lythraceae	Sennha (Sidha)	LC
20	*Madhuka indica*	Sapotaceae	Mahul/Mahua	NE
21	*Mallotus phillippensis*	Euphorbiaceae	Kamalgundi	NE
22	*Mangifera indica*	Anacardiaceae	Amba	DD
23	*Oroxylum indicum*	Bignoniaceae	Phemphana	LC
24	*Phoenix sylvestrius*	Arecaceae	Khajuri	NE
25	*Schleichera oleosa*	Sapindaceae	Kusum	LC
26	*Semecapus anacardium*	Anacardiaceae	Bhalia	LC
27	*Shorea robusta*	Dipeterocarpaceae	Sal	LC
28	*Spondius mangifera*	Anacardiaceae	Ambada	LC
29	*Terminalaeae bellirica*	Combertaceae	Baheda	LC

S. No.	Scientific Name	Family	Common Name	IUCN Status
30	*Terminalea tomantosa*	Combertaceae	Sahaja (Asan)	NE
31	*Terminaleae chebula*	Combertaceae	Hardia	LC
32	*Tamarindus indica*	Caesalpiniaceae	Tentuli	LC
33	*Xylia xylocarpa*	Mimosaceae	Tangini	LC
34	*Acacia auriculiformis*	Fabaceae	Babool/Teak	LC
35	*Azadirachta indica*	Meliaceae	Neem/Limba	LC
36	*Dalbergia sisoo*	Fabaceae	Sisoo/simsapa	NE
37	*Eucalyptus hybrid*	Myrtaceae	Nilgiri/Patas	NE
38	*Santalum album*	Santalaceae	Chandan	VU
39	*Tectona grandis*	Verbenaceae	Teak/Saguan	NE
40	*Pterocarpus marsupium*	Fabaceae	Bijsaal	NT
	Shrubs and Herbs			
1	*Achyranthus aspera*	Amaranthaceae	Apamarga	NE
2	*Andrographis paniculata*	Acanthaceae	Bhuin-Neem	NE
3	*Calotropis procera*	Apocynaceae	Arakha	NE
4	*Casearia tomentosa*	Flacourtiaceae	Khokhoda	NE
5	*Cassia tora*	Leguminosae	Dhola chakunda	NE
6	*Centella asiatica*	Apiaceae	Talkuni	LC
7	*Datura stramonium*	Solanaceae	Datura	NE
8	*Eupatorium odoratum*	Asteraceae	Bitter/Chritsmas Bush	NE
9	*Hemidesmus indicus*	Asclepiadaceae	Antala-mula	NE
10	*Holarrhena pubescens*	Apocynaneae	Kurei	LC
11	*Jatropha gossypifolia*	Euphorbiaceae	Nonkakalo	NE
12	*Lantana camara*	Verbenaceae	Nagauiri	NE
13	*Murraya koenigii*	Rutaceae	Bhursunga/Mitha Neem	LC
14	*Ocimum basilium*	Lamiaceae	Tulsi (Dhala)	NE
15	*Ocimum gratissimum*	Lamiaceae	Bana-Tulsi	NE
16	*Ocimum sanctum*	Lamiaceae	Tulsi (Kala)	NE
17	*Woodfordia fructicosa*	Lythraceae	Dhatki	LC
18	*Ziziphus mauritiana*	Rhamnaceae	Barokoli	LC
19	*Ziziphus oenoplia*	Rhamnaceae	Kantaikoli	NE
20	*Bixa orellana*	Bixaceae	Sakta/Sundri	NE
21	*Jatropha curcas*	Euphorbiaceae	Jode/Dumiba	NE
22	*Chromolaena odorata*	Asteraceae	Devil weed	NE
23	*Hyptis suaveolens*	Lamiaceae	Pignut	NE
24	*Xanthium strumarium*	Asteraceae	Common Cocklebur	NE
	Climbers			
1	*Acacia torta*	Mimosaceae	Dantari	NE
2	*Combretum dicandrum*	Combretaceae	Atundi	NE
3	*Entada acandens/ E.pursaitha*	Fabaeceae	Gilo	NE
	Bamboos			
1	*Bambusa bambos*	Poaceae	Daba	NE
2	*Bambusa nutans*	Poaceae	Badia	NE

S. No.	Scientific Name	Family	Common Name	IUCN Status
3	Bambusa tulda	Poaceae	Taleda	NE
4	Bambusa vulgaris	Poaceae	Sundarkani	NE
5	Dendrocalamus strictus	Poaceae	Salia	NE
		Grasses		
1	Aristida setaceae	Poaceae	Broom Grass	NE
2	Arundinella setosa	Poaceae	Jharu	NE
3	Chrysopogon gryllus	Poaceae	Guguchia	NE
4	Cymbopogon flexuosus	Poaceae	Dhanwantari (Lemon grass)	NE
5	Cynodon dactylon	Poaceae	Durba	NE
6	Eragrostis uniolioides	Poaceae	Phuri Phuri	LC
7	Imperata cylindrica	Poaceae	Chhana	LC
8	Thysanolaena maxima	Poaceae	Phulochanchuni	NE

Table - 4

INVENTORY OF FAUNAL DIVERSITY IN BUFFER ZONE

Based on Actual Sighting, inputs from locals and Perused from Secondary Data

S. No.	Scientific Name	Common Name	IUCN Status	Schedule as per WL(P)AA, 2022
		Mammals		
Family: Felidae				
1	Felis chaus	Jungle Cat	LC	I
2	Prionailurus bengalensis	Leopard cat	LC	I
Family: Pteropodidae				
3	Cynopterus sphinx	Short nosed Fruit Bat	LC	IV
Family: Canidae				
4	Canis aureus	Jackal	LC	I
5	Vulpes bengalensis	Bengal fox	LC	I
6	Canis lupus	Grey wolf	LC	I
Family: Cercopithecidae				
7	Semnopithecus entellus	Hanuman langur	LC	II
8	Macaca mulatto	Rhesus macaque	LC	IV
Family: Cervidae				
9	Axis axis	Chital/Spotted dear	LC	II
10	Muntiacus muntjak	Barking deer	LC	IV
11	Rusa unicolor	Sambar deer	VU	I
Family: Muridae				
12	Rattus rattus	House/Black rat	LC	IV
13	Madromys blanfordi	White-tailed wood rat	LC	-
14	Vandeleuria oleracea	Asiatic long-tailed climbing mouse	LC	-
Family: Mustelidae				
15	Lutrogale perspicillata	Smooth-coated otter	VU	I
16	Mellivora capensis	Ratel/Honey Badger	LC	I
Family: Leporidae				
17	Lepus nigricollis	Indian hare	LC	II

S. No.	Scientific Name	Common Name	IUCN Status	Schedule as per WL(P)AA, 2022
Family: Ursidae				
18	*Melursus ursinus*	Sloth bear	VU	I
Family: Sciuridae				
19	*Funambulus palmarum*	Common Palm Squirrel	LC	-
20	*Ratufa indica*	Indian giant squirrel	LC	I
Family: Suidae				
21	*Sus scrofa*	Wild boar/Pig	LC	II
Family: Bovidae				
22	*Tetracerus quadricornis*	Chousingha/ Four-horned Antelope	VU	I Not available
Family: Viverridae				
23	*Viverricula indica*	Small Indian civet	LC	I
24	*Paradoxurus hermaphroditus*	Asian palm civet	LC	I
Family: Soricidae				
25	*Suncus murinus*	House Shrew	LC	-
Family: Tragulidae				
26	*Moschiola indica*	Mouse deer/ Indian Chevrotain	LC	I
Family: Hyaenidae				
27	*Hyaena hyaena*	Hyaena	NT	I
Family: Hystricidae				
28	*Hystrix indica*	Indian Porcupine	LC	I
Family: Herpestidae				
29	*Urva edwardsii*	Indian gray mongoose	LC	I
30	*Urva auropunctata*	Small Indian Mongoose	LC	I
		Birds		
Family: Ardeidae				
1	*Ardeola grayili*	Indian pond heron	LC	II
2	*Bubulcus ibis*	Cattle egret	LC	II
Family: Phasianidae				
3	*Gallus sonneratii*	Grey junglefowl	LC	I
4	*Pavo cristatus*	Indian peafowl	LC	I
Family: Ploceidae				
5	*Ploceus phillipinus*	Baya weaver	LC	II
Family: Caprimulgidae				
6	***Caprimulgus indicus***	Jungle Night Jar	LC	II
Family: Pycnonotidae				
7	*Pycnonotus cafer*	Red-vented bulbul	LC	II
8	*Pycnonotus jocosus*	Red-whiskered bulbul	LC	II
Family: Accipitridae				
9	*Milvus migrans*	Black kite	LC	II
Family: Corvidae				
10	*Corvus macrorhycnhos*	Large-billed crow	LC	II

S. No.	Scientific Name	Common Name	IUCN Status	Schedule as per WL(P)AA, 2022
11	*Corvus splenedens*	House crow	LC	IV
Family: Columbidae				
12	*Columba livia (Gmelin)*	Rock dove	LC	IV
13	*Streptopelia decaocto*	Eurasian collared dove	LC	II
14	*Streptopelia chinensis*	Spotted Dove	LC	II
15	*Ducula aenea*	Green imperial pigeon	NT	II
Family: Passeridae				
16	*Passer domesticus*	House sparrow	LC	II
Family: Sturnidae				
17	*Gracupica contra*	Indian pied myna/Asian Pied Starling	LC	II
Family: Turnicidae				
18	*Turnix suscitator*	Barred buttonquail	LC	II
Family: Oriolidae				
19	*Oriolus xanthornus*	Black-hooded oriole	LC	II
Family: Picidae				
20	*Yungipicus nanus*	Brown-capped/Indian Pygmy Woodpecker	LC	II
21	*Dinopium benghalense*	Black-rumped flameback	LC	II
Family: Cuculidae				
22	*Cuculus micropterus*	Indian cuckoo	LC	II
23				
24	*Hierococcyx varius*	Common Hawk Cuckoo	LC	II
Family: Bucerotidaehornbills				
25	*Anthracoceros coronatus*	Malabar pied hornbill	NT	I
Family: Leiothrichidae				
26	*Argya caudatus*	Common babbler	LC	II
Family: Alcedinidae				
27	*Ceryle rudis*	Pied kingfisher	LC	II
Family: Strigidae				
28	*Bubo bubo*	Eurasian Eagle Owl	LC	I
Family: Phasianidae				
29	*Francolinus pondicerianus*	Grey francolin	LC	II
30	*Perdicula asiatica*	Jungle bush quail	LC	II
31	*Perdicula erythrorhyncha*	Painted bush quail	LC	II
Family: Dicruridaess				
32	*Dicrurus macrocercus*	Black drongo	LC	II
		Snakes		
Family: Pythonidaes				
1	*Python molurus*	Indian rock python	NT	I
Family: Boidae				
2	*Boa constrictor*	Red-tailed boa	LC	IV
Family: Elapidae				
3	*Bungarus caeruleus*	Indian krait	LC	II

S. No.	Scientific Name	Common Name	IUCN Status	Schedule as per WL(P)AA, 2022
4	*Naja naja*	Indian Cobra	LC	I
5	*Bungarus candidus*	Malayan krait	LC	II
Family: Colubridae				
6	*Ptyas mucosa*	Indian rat snake/Dhaman	LC	I
7	*Ahaetulla nasuta*	Long-nosed Tree Snake	LC	II
8	*Ahaetulla prasina*	Gunther's Whip Snake	LC	II
Family: Viperidae				
9	*Daboia russelii*	Russell's viper	LC	I
10	*Echis carinatus*	Indian saw-scaled viper	LC	II
Family: Natricidae				
11	*Fowlea piscator*	Checkered Keelback	LC	I
Lizards				
Family: Varanidae				
1	*Varnus bengalensis*	Bengal monitor	NT	I
Family: Scincidae				
2	*Eutropis carinata*	Keeled Indian Mabuya	LC	IV
3	*Eutropis macularia*	Bronze mabuya	LC	IV
Family: Agamidae				
4	*Calotes versicolor*	Oriental garden lizard	LC	IV
5	*Psammophilus blafordanus*	Blanford's rock agama	LC	IV
Family: Gekkonidae				
6	*Hemidactylus brookii*	Brook's House Gecko	LC	IV

Divisional Forest Officer
Rayagada Division

11.01.2025
Asst. Conservator of Forests
Rayagada Division

Anil Kumar Panigrahi
11/1/25
Deputy Ranger
I/C Tikiri Range

ANNEXURE IX C_WILDLIFE CONSERVATION PLAN

OFFICE OF THE PRINCIPAL CHIEF CONSERVATOR OF FORESTS
(WILDLIFE) & CHIEF WILDLIFE WARDEN, ODISHA
BDA APARTMENT, 5TH FLOOR, PRAKRUTI BHAWAN, NILAKANTHA NAGAR, BBSR-12
Ph. No.0674-2564587, FAX No.0674-2565062
(Website:odishawildlife.org, E. mail: odishawildlife@gmail.com)

Memo No. 5845 /1WL-SSP-196/2016
Dated, Bhubaneswar, the 7 July, 2017

To

The Managing Director,
Odisha Mining Corporation Ltd.,
OMC House, Bhubaneswar – 751001

Sub: ***Proposal for diversion of 434.935 ha. of forest land (428.075 ha of forest land within Kodingamali Bauxite Mining lease area including 18.098 ha of forest land in safety zone for and 6.680 ha of forest land outside the ML area for construction of approach road to the mining lease) for mining of bauxite in Kodingamali Bauxite Mines located in Koraput & Rayagada districts of Odisha by Odisha Mining Corporation Ltd.***

Sir,

It is to inform you that a Site Specific Wildlife Conservation Plan for your Kodingamali Bauxite Mines in Koraput and Rayagada districts was approved in this office memo No.682 dt 27.01.2010 at a financial outlay of ₹438.00 lakh for implementation in the project as well as impact area, in compliance to Specific Condition No.(xxii) stipulated in Govt. of India, MoEF letter in their letter in F. No.J-11015/439/2007-IA.II(M) dt 28.05.2008 while granting environmental clearance for an annual production capacity of 3MTA of bauxite by opencast mechanized method. The conservation plan so approved is yet to be implemented due to non-deposit of impact area implementation cost of ₹408.00 lakh by the user agency.

In the meanwhile, while conveying the stage-I forest clearance granted by Govt. of India, MoEF&CC vide their letter in F. No.8-46/2016-FC dt 17.04.2017 for diversion of 434.935 ha. of forest land (428.075 ha of forest land within Kodingamali Bauxite Mining lease area including 18.098 ha of forest land in safety zone for and 6.680 ha of forest land outside the ML area for construction of approach road to the mining lease) for mining of bauxite in Kodingamali Bauxite Mines located in Koraput & Rayagada districts of Odisha by Odisha Mining Corporation Ltd., State Govt. in F&E Deptt. have put an additional condition for revisiting the SSWLCP earlier approved by the PCCF (WL) & CWLW, Odisha at the current wage rate for implementation both within project area and project impact area at project cost, as communicated to this office vide memo No.8157/F&E dt 22.04.2017.

P.T.O.

In this regard, the Regional Chief Conservator of Forests, Koraput Circle in his memo No.2182 dt 03.06.2017 has submitted a proposal revising the SSWLCP to this office for approval of the PCCF (WL) & CWLW, Odisha.

On consideration of the above proposal, the Site Specific Wildlife Conservation Plan in respect of the above project has been revised and the financial cost is approved at **₹1240.22 lakh** (Rupees twelve crore forty lakh twenty-two thousand) only for the following activities.

a.	For activities to be implemented by the user agency within project area	₹57.00 lakh
b.	For activities to be implemented by DFO, Koraput Division in project impact area	₹880.74 lakh
c.	For activities to be implemented by DFO, Rayagada Division in project impact area	₹302.48 lakh
Grand Total:		**₹1240.22 lakh**

2. Various activities in the diverted area will be executed by the Project proponent under the guidance of the Divisional Forest Officer, Koraput Division. A sum of ₹1183.22 lakh only may be deposited in the CAMPA fund meant for the purpose for implementation of various activities within the project impact area by the Forest Deptt. as envisaged in the plan.

3. You may please note the following conditions for future compliance.

- This Plan may be revisited after 5 years and the User Agency will give undertaking to contribute towards the revised cost of the conservation plan till the project period, if any.
- The project proponent has to prepare and submit the Conservation Plan for the next 10 years of their lease period (balance period for which forest land remains diverted) at least one year before the expiry of the present Conservation Plan and deposit the outlay amount upon its approval. In case of delay, it will be dealt as per law for violations of Forest Conservation Act, 1980 and Environment (Protection) Act, 1986.
- The project proponent has to give an undertaking to bear the differential cost in case of enhancement of wage rate at the time of implementation of this plan.

Yours faithfully

Encl: Copy of approved revised financial statements

Principal Chief Conservator of Forests (WL)
& Chief Wildlife Warden, Odisha

contd. to p/3

Memo No. 5716 /date 24.10.09

Copy forwarded for information and necessary action to –

1. Special Secretary to Govt. of Odisha, F&E Deptt., Bhubaneswar with reference to that Deptt. memo No.10F(Cons)1/2017-8157/F&E dt 22.04.2017
2. Principal Chief Conservator of Forests, Odisha with reference to F&E Deptt. letter No.10F(Cons)1/2017-8156/F&E dt 22.04.2017
3. Regional Chief Conservator of Forests, Koraput Circle with reference to his memo No.2182 dt 03.06.2017 alongwith a copy of approved revised financial statements. It is requested that copies of the same may be provided to DFO, Koraput/ Rayagada Division. It is further requested to submit GPS co-ordinates of proposed site of interventions in respect of both Divisions immediately.
4. Divisional Forest Officer, Koraput Division
5. Divisional Forest Officer, Rayagada Division

Principal Chief Conservator of Forests (WL)
& Chief Wildlife Warden, Odisha

OFFICE OF THE PRINCIPAL CCF (WILDLIFE) & CHIEF WILDLIFE WARDEN,ORISSA[TM] FLO[illegible] D.A. APARTMENT, PRAKRUTI BHAWAN, NILAKANTHA[illegible], BHUBANESWAR- 751012.

Memo No. 682 Dt. 27.1.10
IWL-C-FC- 430/09

To

The Chief Conservator of Forests (Nodal),
O/o the Principal CCF, Orissa, Bhubaneswar.

Sub: Approval of Site Specific Wildlife Conservation Plan for Kodingamali Bauxite mining Project in Koraput district of M/s Orissa Mining Corporation (OMC) Ltd.

Sir,

I am directed to inform you that the Site Specific Wildlife Conservation Plan for Kodingamali Bauxite mining Project of M/s Orissa Mining Corporation (OMC) Ltd in the district of Koraput has been approved by PCCF(WL) & Chief Wildlife Warden, Orissa with financial forecast of Rs.438.00 lakhs for the following activities.

1. For activities to be implemented by User agency in Project area — Rs. 30.00 lakhs.
2. For activities to be implemented by DFO, Rayagoda & Koraput division in project impact area. — Rs.408.00 lakhs.

Total Rs. 438.00 lakhs

Various activities in the lease hold area will be executed by User Agency under the guidance of DFO, Rayagoda and Koraput Division. Rs.408.00 may be deposited with DFO, Rayagoda & Koraput divisions for implementation of various activities with in the project impact area.

Conservator of Forests (WL)

Memo No. 683 dt. 27-1-10

Copy forwarded to the DFO, Rayagoda and Koraput Division for information & necessary action with reference to Memo No. 4350 dt. 4.11.09 and 4071 dt. 15.10.09 respectively of C.F., Koraput Circle.

Conservator of Forests (WL)

Memo No. 684 dt. 27-1-10

Copy forwarded to RCCF, Koraput Circle for information & necessary action with reference to his office Memo No. 4350 dt. 4.11.09 and 4071 dt. 15.10.09

Conservator of Forests (WL)

Memo No. 685 dt. 27-1-10

Copy forwarded to the Dy. General Manager(M)-Projects of Orissa Mining Corporation Ltd(OMC), OMC House, Bhubaneswar for information & necessary action with reference to his office Memo No.14633 dt. 28.8.09.

Conservator of Forests (WL)

SITE SPECIFIC CONSERVATION PLAN FOR KODINGAMALI BAUXITE MINING LEASE AREA AND ITS IMMEDIATE SURROUNDING

KORAPUT DISTRICT, ORISSA



M/s. ORISSA MINING CORPORATION LTD.

Prepared by:

SRI S.K. PATNAIK, I.F.S. (Retd.)

&

SRI S.K. MOHANTY, O.F.S. (Retd.)

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Sri S. K. Patnaik, I.F.S. (Retd.)

PREFACE

The discovery of 'East Coast Bauxte deposit in Orissa and Andhra Pradesh in 1975-'76 tremendously increased the known reserve of the country. Orissa presently accounts for half the bauxite deposit of the country. While the Damanjodi deposit is being worked by NALCO for quite some time others are likely to be worked soon. OMC Ltd has been granted lease in Kodingamali R.F.. This is quite a rich deposit lying in Lakshmipur Range of Koraput Forest Division in Koraput revenue district This 47.25 Ha mine on the top of the plateau located at about 1276 m. above MSL is proposed to cater to the aluminim plat to be set up near Lapanga of Jharsuguda district.

As the mine shall be located entirely on the hill top and lies in a R.F. the wildlife there is likely to be threatened due to various activities associated with mining and generated anthropogenic pressures. In order to minimize this site specific conservation plan is insisted upon by the government.

I have analyzed the threats to wildlife in and around the bauxite mine area and suggested required remedial measures to betaken. Hope, these measures shall not only save the wildlife within the lease area to the extent possible but also help the wild animals and plants in the 10Km 'Zone of Influence' to improve their status further without getting unduly disturbed. I shall be happy if this plan shall be implemented in letter and spirit to give an ideal habitat for the wildlife to live in.

My sincere thanks are due to Sri Atish Behera, I.F.S., D.F.O., Koraput Division, Sri S. Popli, I.F.S., Working Plan officer, Koraput Circle for their valuable suggestions for preparation of this plan. My thanks are also due to Sri Anil Roy, Range Officer,Tikiri Range, Sri Ranjan, Range officer, Laxmipur Range an their field staff for providing lots of field information at the site.

I am grateful to Sri S.K. Mohanty, A.C.F. (Retd.) for taking all the pains to provide field inputs and in preparation of this report.

I also convey my thanks to Sri S.N.Jena, Chief Operating Officer, Sri S.K.Tripathy, Dy. Manager I/C Kodingamali Project,Mr. S.M.Arshad, Dy. General manager of M/s. Aditya Aluminum Ltd representing the O.M.C.Ltd and their field and office staff for their involvement in preparation of this plan.

(S.K. Patnaik)

EXECUTIVE SUMMMARY

ANNEXURE-VIII

OFFICE OF THE PRINCIPAL CCF (WILDLIFE) & CHIEF WILDLIFE WARDEN,ORISSA 5TH FLO[illegible] D.A. APARTMENT, PRAKRUTI BHAWAN, NILAKANTHA[illegible] BHUBANESWAR- 751012.

Memo No. 683 Dt. 27.1.10
1WL-C-FC- 430 /09

To

The Chief Conservator of Forests (Nodal),
O/o the Principal CCF, Orissa, Bhubaneswar.

Sub: Approval of Site Specific Wildlife Conservation Plan for Kodingamali Bauxite mining Project in Koraput district of M/s Orissa Mining Corporation (OMC) Ltd.

Sir,

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1. For activities to be implemented by User agency in Project area — Rs. 30.00 lakhs.
2. For activities to be implemanted by DFO, Rayagoda & Koraput division in project impact area. ----- Rs.408.00 lakhs.

Total Rs. 438.00 lakhs

Various activities in the lease hold area will be executed by User Agency under the guidance of DFO, Rayagoda and Koraput Division. Rs.408.00 may be deposited with DFO, Rayagoda & Koraput divisions for implementation of various activities with in the project impact area.

Conservator of Forests (WL)

Memo No. 683 dt. 27.1.10

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Conservator of Forests (WL)

128 121

EXECUTIVE SUMMERY

0.0.0. Orissa is quite rich in its mineral resources including iron ore, coal, bauxite, manganese and lime stone etc. The state boasts of half of country's bauxite deposit. The finding of East Coast Bauxite deposit of Orissa and neighbouring Andhra Pradesh has catapulted the country to the 5th place of Worlds' Bauxite producing countries.

0.1.0. M/s Orissa Mining Corporation Ltd after prospecting in Kodingamali R.F. in 1994 & 95. After completion, they have applied for 447.25 Ha for forest diversion after authentication. It entirely lies on the plateau of Kodingamali R.F. OMC has signed an agreement with M/s. Aditya Alumina, a division of HINDALCO for supply of refined alumina to its proposed plant at Lapanga in Sambalpur district. Annual production is expected to be in the order of 3.0m tons and the mineable ore shall be completely exploited within 20 years in four phases of 5 years each. There shall be direct employment to 330 people while 4000 persons shall be getting indirect employment in the mine and ancillary activities.

0.2.0. This lease area lies in Kodingamali R.F. of Lakshmipur Range of Koraput Revenue district in Topo Sheet No. 65-M/4 of Koraput – Rayagada Road, 1276m above MSL. The zone of impact lies in 2 watersheds of Vansadhara & Nagabali, while the area drains to Vansadhara through Pathagarh River. It has a tropical climate and becomes quite cold in winter due to its elevation, while summer is mild. The average rainfall is 1648 mm. Most plateaus have bauxite deposits of varying depths. The major forest types represented here are Tropical Moist Deciduous Forest and Tropical Dry Deciduous Forest. According to the working plan the entire R.F. has been placed in protection working circle. Because of anthropogenic pressures and podu, wildlife is sparse.

0.3.0. It is a virgin mine. It is proposed to be mined in East-West direction through surface mining. About 50% shall be scrapped with tipper and dozer. Balance, which can not be loosened through tipper, shall be blasted. They shall be loaded

by shovels and carried by 50 ton dumpers to the conveyor site for carrying to the washery. Blasting shall be done between 12.00 noon and 2.00 pm using ANFO. Steep roads shall be avoided. The benches shall be within 10m is height.

0.4.0. The lease area, its surrounding hill slope and the rest of Zone of Influence shall be subjected to many types of threats due to mining. They shall include loss of forest, forest fire, poaching, noise, dust, garbage problem, liquid wastes, soil erosion, moisture loss, lighting, fall of animals etc.

0.5.0. In order to mitigate the above threats the area is divided into 3 zones i.e. lease area, rest of the Kodingamali R.F. and the remaining part of the Zone of Influence of 10 Kms in radius.

0.5.1. It is proposed to protect the grass land & scrubby vegetation beyond the active mine and support with planting of indigenous species. Two Bana Sahayaks(retired army or forest personnel) shall be appointed, fire protection measures shall be taken from the 4th year after the vegetation grows. Two fire watchers shall be appointed for 5 months every year. Dust shall be suppressed through sprinkling twice on non rainy days. Thick vegetation should be grown around the roads and loading points. Noise of blasts should be muffled and at fixed time. Vehicle lights should be shaded and fixed lights focused only towards the mine. Photo voltaic fencing shall be provided around pit mouth to prevent fall of animals. Soil & moisture conservation measures like check damming, gully plugging and counter trenching shall be done on slopes. The accumulated garbage shall be collected, taken out and segregated for proper disposal. Conservation awareness should be promoted among the work force.

0.5.2. The rest of Kodingamali R.F. shall be affected due to the mining operation. This mainly constitutes of the remaining portion of the plateau and hill slopes with fairly good forest diversity. Protection, 150 Ha of plantation, fire protection, soil and moisture conservation measures forming & strengthening of V.S.S shall be taken up there. Four watch towers shall be constructed on the rim of the plateau, 4 Bana Sahayaks shall be engaged with 4 seasonal fire watchers.

0.5.3. The third part shall constitute of rest of ZoI outside the Kodingamali R.F. The measures shall include protection of

forest patches and raising 150 Ha of plantation to fill up the gaps there and 4 fire watchers can be appointed for 5 months every year. The V.S.S. should be formed and strengthened, social and farm forestry be taken up in the villages to meet the need for forest materials of villagers. Alternate avocations shall be provided to those not finding employment in the mine or otherwise. To prevent grazing and reduce fuel wood need, livestock should be upgraded, stall fed and biogas be promoted. Podu should be prevented by promoting permanent cash crop and fixed agriculture. The people of the area should be made aware about the need for wildlife conservation through different means.

0.5.4. The plan period shall be 10 years and it shall be monitored by a committee headed by the Conservator of Forests, Koraput as the ZoI lies in both Koraput and Raygada Divn.

0.6.1. The total cost of the project is estimated to be Rs.300.00 lakhs. Out of this the activities within the lease area to cost Rs.80.00 Lakhs shall be taken up by OMC Ltd, while the rest amounting to Rs. 230.00 lakhs for both Kodingamali R.F. and outside in ZoI shall be placed with the DFO, Koraput/Raygada Divisions.



CHAPTER–I

INTRODUCTION

CHAPTER – I
INTRODUCTION

1.1.1 The State of Orissa is committed to Industrial development and stress is being laid on the on the exploitation of the rich agricultural, marine, mineral resources and tourism potential to provide leverage for accelerated industrialization. A substantial industrial base is already existing comprising of large, medium and small-scale enterprises in steel, almunium, chrome, power, textile, handicraft and a host of other sectors. The thrust is on agro processing, electronics, software, aluminium industries, gems and jewellery, automobile, basic drugs and pharmaceuticals, petro-chemicals and export oriented units. Orissa is one of the country's richest states in mineral resources. The mineral belt is spread over an area of more than 6,000 sq.kms. The chief minerals found in the state area iron, coal, bauxite, manganese, nickel, chromite, lime stone, dolomite, graphite, decorative stones and beach sand.

1.1.2 Discovery of East Coast Bauxite deposits in Orissa and Andhra Pradesh during 1976-79 increased the bauxite resources of the country to more than 2 billion tons and India occupied 5th place in the world. Country's bauxite production is around 10 million tons, out of which Orissa's share is 50%. Requirement of bauxite for the existing industries of the country is much more than the bauxite produced as on to-day. Thus development of East-coast Bauxite is essential to bridge the present requirement of industries as well as industries of the future and the production as on today.

1.1.3 Bauxite deposits so far explored in this state are mostly in backward KBK districts i.e. Panchpatmali in Koraput district, Gandhmardan in Bargarh district, Niyamgiri and Kodingamali in Rayagada/Koraput district. NALCO has developed mining in Panchpatmali. Rests of the sites are yet to be explored.

1.1.4 Kodingamali Bauxite deposit is part of East Coast Bauxite deposit named after Kodingamali plateau spread over 715.075 Ha. M/s. Orissa Mining Corporation Ltd (OMC) had executed

prospecting of this area for a period of 2 years during 1994 and 1995. On completion of P.L., OMC applied for mining lease. Government of India, Ministry of Steel & Mines vide their letter No. 1/75/98-M.IV Dt.11.01.1999 **(Annexure-III)** has approved mining lease over 715.075 Ha. Thereafter State Government in Department of Steel & Mines **(Annexure-IV)** in their letter No. 653 dated 01.02.1999 issued conditional grant order for 30 years. OMC accepted all the conditions except approval of MoEF for diversion of forest land involved in the lease and approval of Mining Plan by IBM.

1.1.4.1 Since the total lease area is located in Kodingamali R.F. anticipating difficulty in obtaining forest diversion approval, OMC wanted to limit the area to the ore bearing zone only. Therefore, OMC requested Director of Geology, Orissa to conduct prospecting. Director of Geology, Orissa authenticated only 447.25 Ha of forest land in Kodingamali R.F. of Rayagada Division as ore bearing zone.

1.1.5 OMC then applied to the State Government for revision of the lease area and in turn the lease area was reduced to 447.25 Ha. Accordingly OMC has prepared the Mining Plan which has been approved by IBM vide their letter No.314(3)/2006-MCCM(C)/MP-4 Dt.15.09.2006 **(Annexure-I)**. OMC has also submitted the Forest Diversion Proposal to State Forest Department. The State Pollution Control Board has also issued consent letter for operation of the mine **(Annexure-II).**

1.1.6 Since in every forest diversion proposal it has become mandatory to prepare a Site Specific Conservation Plan, OMC has entrusted us to prepare this plan.

1.1.7 OMC has signed an agreement with M/s HINDALCO Industries Ltd to supply Bauxite ore from Kodingamali deposit to the integrated Aditya Alumina which is a Diversion of M/s HINDALCO Industries Ltd. The refinery will be set up at village Kansariguda of Rayagada district and the smelter plant as well as Captive Power Plant will be at Lapanga of Sambalpur district of Orissa.

1.1.8 According to the approved mining plan, there is a mineable deposit of 59.84 million tons of bauxite. This estimated reserve has been based on exploration over a part of the lease area i.e. 222.21 ha and on further exploration of the balance area the reserve position may increase further. The rate of annual production has been estimated to be 3.0 million tons and hence the explored reserve can be mined out in 20 years.

1.1.9 On implementation of this project, it will generate employment for 330 people and around 4,000 people will be benefited indirectly.

1.1.9 This lease area is located in Survey of India Topo Sheet No. 65/4 and bounded by latitude 19° 00' 58" to 19° 05° 11" north and longitude 83° 03' 231" to 83° 05' 17" east.

1.1.10 During visit to the site by us and the representatives of Aditya Aluminium Ltd, we found that, the leasehold area is totally barren, devoid of any water source and major portion has been filled with grasses and Date-Palm shrubs (*Phoenix aculis*). Although the lessee has set aside 206.10 Ha of forest land to be explored later-on, but there is hardly any vegetation where the wildlife still thriving in the area can sustain, grow and propagate. But nature has still protected some vegetation on the slope on the down hill side of the lease area, which can serve as wildlife habitat. A beautiful photograph of this site has been taken which has been furnished in this plan.

1.1.11 At present the site is calm and quiet and does not appear to suffer due to any anthropogenic pressure. But the sooner preliminary work for mining work commences and mining work starts change in environment like dust pollution, vehicular traffic, change in landscape, construction of dwellings, movement of heavy machineries and thus creating noise, lighting of the area by movement of vehicles as well as street/domestic lights of the colonies, garbage dumping, presence of domestic animals like cattle/dog etc., poisonous smoke emerging from machineries of mines and from cooking gas/cooking coal from domesticated areas, depletion of vegetation from the valley, exposure of soil puncturing ground

water table by bore wells, planting of indigenous/exotic trees in the amelioration centers/kitchen garden, development of lawns and gardens etc shall take place. This will create adverse impact on the biodiversity of this area in general and to the wildlife in particular.

1.1.12 Since development of mine to explore Bauxite and benefaction of the same by the refinery is a must to add to the industrialization of the area, mitigation measures as mentioned in Chapter V are also essential to be followed scrupulously to overcome a situation at a later stage when the adversities created will be out of control and ultimately the site will be declared as critically immune to pollution as has happened at Angul.

1.1.13 In the next chapter the topography and land use pattern has been discussed in detail.



CHAPTER – II
TRACT DEALT WITH

CHAPTER – II
TRACT DEALT WITH

2.0.1 **Location:**
Kodingamali Bauxite Deposit named after Kodingamali plateau is a part of East Coast Bauxite deposit. The mining lease area covering an area of 447.25 ha comes under Kodingamali Reserved Forests of Koraput Forest Division. The total area of this Reserved Forest is 1495.366 ha having a boundary length of 36.487 Kms. This R.F. is within the administrative jurisdiction of Laxmipur Forest Range. This has been allocated to two Water Sheds i.e. 4F 1D7 (Vansadhara) 1200.00 ha and 4E2 G5 (Nagabali). The area applied for diversion by M/s. O.M.C. Ltd comes within the Watershed of Vansadhara (4F1 D7).

2.0.2 Although 3 VSS s have been formed in this R.F. namely Babu Budharaja in 1998-99 over 20 Ha bearing No.391/1999, Malicheua in 1998-99 over 15 Ha bearing No.351/1999 and Narsikaipadar in 1998-99 over 50 ha bearing No.110/4.11.1998, the applied forest land for diversion by O.M.C. has not been allocated to any VSS since there is no tree growth on the top of this plateau.

2.0.3 Kodingamali has been declared as a Reserved Forest vide Notification No.25/82-64636/R Dt.06.10.1982 of Revenue Department, Government of Orissa.

2.0.4 The R.F. is surrounded by villages Darakaipadar (East), Upar Karhinga (West), Karhapadar (North) and Raulipadar (South).

2.0.5 **Natural features:**
This R.F. is located in Survey of India Topo Sheet No.65 M/4 and bounded by latitude 19° 00' 58" to 19° 05' 11" north and longitude 83° 03' 21" to 83° 05' 17" east.

2.0.6 Bauxite deposit, occurring in the mining lease area has a linear shape along NNE – SSW over a length of 7 Kms and width of 600 meters. The highest altitude of the lease area

is 1276 m above MSL lies between the villages Karhapadar and Raulipadar.

2.0.7 This lease area is located at a road distance of 12 Kms NNE of Panchpatmali bauxite deposit and 7 Kms north-west of Laxmipur Tahasil Hqrs. The deposit is easily accessible by a 7 Km. long fair-weather road from Laxmipur which is 57 Kms from the district headquarters of Koraput and 51 Kms from Rayagada on Koraput-Rayagada State Highway No.4. There is an all weather road from Laxmipur to the village Narsi-Kaipadar which is located at the eastern side foot hills of Kodingamali hill. Koraput is the district headquarters and also a rail head on Kirindul-Kottavasla section of East Coast Railway, lies 58 Kms away on south-west of Laxmipur. The nearest rail head is at Singaram. Kansariguda village near Laxmipur is the proposed site for the bauxite refinery, which is located at a distance of 3.0 Kms from the mine.



2.0.8 Physiography

Kodingamali plateau is a part of Eastern Ghats hill range in Orissa. Bauxite deposit forms blanket occupying the surface of the flat landscape in a linear in strip, lying

almost in NNE-SSW direction. The area of capping is about 5.33 Sq.Km. The deposit occurs at a maximum height of 1276m above MSL in the northern part and 1262 m in the southern part. The capping has gentle slope to the west, north and south but comparatively steep on the eastern side. The plateau top is a continuous stretch of flat land intercepted by small saucer shaped depressions, which have been filled up with soil and humus varying in thickness of 5 cm to 30 cm.

2.0.9 Drainage

Kodingamali plateau top has no perennial streams flowing down the slope. But a number of springs originate from the foot hills of this plateau, the most prominent ones are towards the eastern margin of the area. Pathgarha river, which flows in a north-easterly direction is about 3.5 Kms from the northern end of the hill. This river controls the regional drainage of this terrain. The first order streams originating from this plateau join the second order streams to ultimately join the river Pathgarha which drains into Vansadhara, that discharges ultimately to the Bay of Bengal.

2.0.10 **Climate**

This area has a tropical climate with monsoon rains from June to September and occasional rains during winter are a regular feature. The area experiences cold weather between November-January when the temperature drops to less than 10^0 C. The temperature rises steadily from January onwards reaching 32^0 C to 40^0 C in summer (May). This area also experiences occasional gusty winds to heavy thunder storms during summer season (April to June). Monsoon breaks out in early to middle of June and continues up to September. The average annual rainfall is about 1648 mm under the influence of south west monsoon. On an average there are about 100 rainy days. The humidity is maximum in the months of July to August (90 %) and minimum in February (36 %). The wind velocity varies between 40 KMPH and 80 KMPH although occasional

higher values have also been reported. Lightening incidence is rarely reported from this area.

2.1.0 **Geology, rock and soil**

Aluminium is the third most abundant element in the earth's crust after oxygen and silicon. Because of its chemical reactivity, aluminium is never found in nature as an element but always in its oxidized form, as one of a selection of about 250 different minerals. The most prominent groups of such minerals are the silicates and the products of their weathering, the clays. Other important compounds include the hydroxides, a group which includes **Bauxite**, the base raw material for primary aluminium product.

Bauxite occurs in three main forms e.g. Gibbsite, Bohmite and Diaspore. Gibsite is a true aluminium hydroxite and Bohmite and Diaspore are both aluminium-oxide-hydroxites. The main difference between the later two is that, Diaspore has a different crystalline structure of Bohmite and requires even higher temperatures for rapid dehydration.

Bauxite is found in four types of deposits e.g. blanket, Pocket, inter-layered and detrital. The major bauxite deposits of the world are found in the tropics, in the Caribean and Mediterranean regions. To-day most bauxite mining locations are in the Caribbean area, South America, Australia and Africa. Large blanket deposits occur in West Africa, Australia, South America and India. These deposits occur as flat layers lying near the surface and may extend over an area covering many kilometers. Thickness may vary from a meter or less to 40 meters in exceptional cases although 4 to 6 meters is more common.

Eighty percent of world's bauxite production, mainly from large blanket type deposits which is from surfaces mine and the rest is explored through underground excavation. On some surface deposits there is no overburden, but in others, the bauxite may be covered with 70 meters or more

of rock and clay. Deposits that are hardened may require blasting in order to release the ore. Once the bauxite is loosened into manageable pieces it is generally loaded into trucks, rail etc. and transported to crushing or washing plants or to stock piles. Bauxite does not require complex processing because most of the bauxite mined is of an acceptable grade or can be improved by a relatively simple and inexpensive process of removing clay. In Bauxites, clay is removed by some combination of washing, wet screening and cycloning, even by hand picking or sorting.

2.1.1 **Local geology**

The area around Kodingamali exposes rocks representing Eastern Ghats Group. The rock types encountered in these deposits are mostly Khondalite, Bauxite, Laterite, Clay and Soil. Laterite and Bauxite occur as blanket in the northern, central and southern part of the lease area. North of the lease area has a higher elevation than the south. Bauxite ore thickness is more on the north.

2.1.2 **Forest & forest type**

Kodingamali Reserved Forest is within the administrative boundary of Laxmipur Range of Koraput Forest Division. Forests of this division are mainly tropical deciduous type and can be broadly classified into two major groups e.g. Moist Tropical Forests and Dry Tropical Forests. There is no clear dividing line between these two forest groups. One group of forest gradually merges with the other. According to Champian & Seth's revised classification of Forest types of India, these forests have been further classified, as detailed below, into different types and sub-types depending upon physiognomy, moisture conditions, floral composition and other variables.

Group – 3	Tropical Moist Deciduous Forests
Group 5	Tropical Dry deciduous forests.
Sub Group 5A	Southern Tropical dry deciduous forests.
Sub Group 5B	Northern tropical dry deciduous Forests.
Type 5B/ C	Dry Sal bearing Forests.
Sub Type 5/DS_1	Dry deciduous scrub forests (Biotic climax type)

Sub Type 5/ DS_2	*Dry deciduous savannah forests (Biotic climax type)*

Kodingamali R.F.(Plateau) comes under forest type ***5/DS₂***. The second degradation stage of dry deciduous forest is this type of forest. It is an open forest but typically, formation of original forest is lost and the trees stand apart singly or in small groups particularly in valleys in more or less heavy grass in which certain fire resistant plants persist. These fire resistant plants gradually and slowly try to establish themselves as trees. However, in most of the cases such plants do not get established as trees because of fire and other biotic factors.

All the above described climatic types are susceptible to be reduced to open savannah type. The intensive biotic interference in such forest areas causes conspicuous presence of grass which is otherwise a secondary feature in those forests (Climatic type). Some of the grass species encountered in these types of forests are *Oryza rufipogon, Eragrostis unioloides, Heteropogon contortus, Arundinella setos and Saccharum spontaneum.*

Though the preponderance of the grasses is the characteristic features in these forests, the tree species found to be occurring here are *Emblica officinalis, Bridelia retusa, Dillenia indica, Carea arborea* etc. These trees have very short boles and are mostly crooked and unsound. In fact, scattered bushes and such low trees among grasses are a very common composition observed in these savannah forests of this Division. Most of these degraded forest blocks are the result of long and continued over exploitation, heavy grazing and other maltreatments including repeated short rotational podu cultivation. The resultant effect has been reduction in natural regeneration of many tree species leading to complete wiping out of established seedlings of dominant species.

Kodingamali has been notified as a Reserved Forest vide Notification No.FS-25/82-64636/R Dt.06.10.1982 and finds

place in Survey of India Topo Sheet No.65 M/4-SW covering an area of 1495.3665 ha. This area has been allocated to two Working circles i.e. 774.366 ha to Rehabilitation Working Circle and 721 ha in Protection Working Circle. The mining lease area of Bauxite mine of OMC comes under Protection Working Circle as concluded from the discussion held with Sri S.K.Popli, I.F.S., Working Plan officer, Koraput Circle in February 2007 during our field visit. Therefore, the objects of management of Protection working circles have been described here as detailed below:



Protection working circle

This working circle includes all ecologically fragile area of Kodingamali R.F. and those situated in catchment of Nagavali river (4F 1D 7). This area need protection and crop improvement measures without much intervention. These areas are already in a stage where excess interventions will disturb the soil stability leading to even increase in the siltation of river beds and reservoir. Regular biotic interference has led to decrease in vegetation cover leading to high run-off. The overall density of vegetation is 0.1 though areas in cooler aspect (north of the lease area) have comparatively better vegetative growth. Soil erosion is

severe due to absence of vegetative cover. This area is having a scrubby vegetation which consists of mainly miscellaneous species like Amla (*Emblica officinalis*), Siris (*Albizzia procera*), Oou (*Dillenia aurea*), *Macaranga peltata*, Bheru (*Chlorosylon swietenia*), Mankar kendu (*Diospyros montana*) and Katrang (*Gardenia latifolia*).

Special Objects of Management

1. To keep delicate and eco-fragile areas ecologically intact by maintaining adequate vegetative cover.
2. To arrest further degradation and enhance the natural regeneration adopting appropriate Silvicultural interventions including soil and moisture conservation measures to even check siltation down stream.
3. To protect these forests from fire and grazing and also to provide strict vigil against illicit felling, encroachment and shifting cultivation.

Silvicultural system

a. The area shall be rigidly protected from all sorts of biotic interference so as to keep it under nature's own care and nursing. Even, collection of NTFP is also prohibited.

b. Inadequate vegetative area and/or steep precipitous slopes would be attended to by appropriate soil and moisture conservation measures including the vegetative methods.

c. Existing growing stock shall be improved by adopting appropriate tending operations.

d. Natural rotation has been prescribed.

Soil and Moisture Conservation measures

(i) Check dams are required to be erected across the gullies by dry rubble masonry. (Field experience- Although enough of rubble is available here but availability of water is doubtful and it is difficult to do the masonry work on the foot-hills).

(ii) The run-off in the gully shall be obstructed and diverted. The gully beds should be planted with soil binding species like Sabai grass (*Eulaliopsis binata*), Vetiver grass (*Vetiveria zizanoides*), Agave (*Agave sisilana*), Dodonea (*Dodonia viscosa*) etc.

(iii) For drainage line treatment along the stream, a series of check dams are required at intervals. Steeper the slopes, more check dams are required.

(iv) Staggered or continuous contour trenches and contour bunds shall be prepared along the contour in order to arrest water speed, to divert direction of flow and to harvest water.

(v) Vegetative barriers on contour based structures shall be created. A number of species which act as soil binders e.g. Babul (*Acacia nilotica*), Ber (*Zyziphus jujuba*), Agave (*Agave sisilana*) etc. shall be planted for the purpose. This may be planted on the ridges of contour bunds, contour trenches including sowing of seeds on ridges.

2.1.3 Flora and Fauna

The common species noticed in Koraput Forest Division has been furnished in **Annexure-V & VI.**

Flora:

However, the common species noticed in the applied area is listed below:

Local name	Botanical name	Family
TREE		
Bela	*Aegle marmelos*	*Rutaceae*
Amla	*Emblica officinalis*	*Euphorbiaceae*
Genduli	*Sterculia urens*	*Sterculiaceae*
Kamalagundi	*Mallatos phillipinensis*	*Euphorbiaceae*
Kendu	*Diospyrus melanoxylon*	*Ebinaceae*
SHRUB		
Bana Khajuri	*Phonix acualis*	*Arecaceae*
Dhatiki	*Woodfordia fruticosa*	*Lytheraceae*
Bana tulasi	*Ocimum gratissimum*	*Lamiaceae*
Kurei	*Holarrhena antidysenterica*	*Apocynaceae*
Naguari	*Lantana camara*	*Verbenaceae*
GRASSES		
Chhana	*Imperata arundinaceae*	*Poaceae*
Guguchia	*Chrysopogon gryllus*	*Poaceae*
Jharu	*Arundinella setosa*	*Poaceae*

Fauna:

The applied area does not form part of any National Park, Wildlife Sanctuary or Biosphere Reserve nor the breeding ground of any migrating fauna. The area is dominated by

grass, date-palm and a few species with stunted growth. So, there is hardly any possibility of existence of any major wildlife. But evidences gathered during field visit like droppings, scratch mark, digging and information from local people indicate existence of following species within the lease and neighbouring areas:

Local Name	English Name	Zoological Name
ANIMAL		
Bilua	Jackal	*Canis aureus*
Neula	Common mongoose	*Herpestes edwardi*
Kuji neula	Small Indian Mongoose	*Herpestes auropunctatus*
REPTILE		
Chiti	Common Indian Krait	*Bangarus caeruleus*
Dhuli nag	Saw scale viper	*Echis carinatus*
Naga	Indian Cobra	*Naja Naja*
Rana	Banded Krait	*Bungarus fasciatus*
LIZARDS		
Sorisia Godhi	Indian Monitor lizard	*Varanus bengalensis*
Champei neula	Common skink	*Mabuya carinata*
Champei neula	Little skink	*Mabuya macularia*
Endua	Indian garden lizard	*Calotes versicolor*
Bana endua	Rock lizard	*Psammophilus blafordamus*
Jhitipiti	Brook'ss Gecko	*Hemidactylus brookii*
BIRDS		
Kapta	Indian ringed dove	*Streptopelia decaocto*
Kapta	Indian spotted Dove	*Streptopelia chinensis*
Bulbul	Red whiskered Bulbul	*Pycnonatus jocosus*
Gundri	Grey patridge	*Francolinus pondicerianus*
Bhuin pecha	Indian Jungle Night Jar	*Caprimulgus indicus*

2.1.4 **Population**

Although in the lease area no human habitation exists, there are 130 No. of villages having a population of 53211

persons within the zone of influence of 10 Kms. The detailed demographic feature has been furnished in **Annexure-VII.**

2.1.4 **Employment**

On execution of this mine, employment generation will be to the tune of 330 people during the entire lease period of 30 years. However, it will provide indirect employment for around 4,000 people.

2.1.5 **Land use pattern**

The land use pattern of this lease area has been furnished below in a tabular form. The pattern has been designed to accommodate mining and ancillary uses like overburden dumping, construction of road, Safety Zone etc. This is virgin mine and hence no broken up area exists. The geological reserve of Bauxite has been estimated to be 79.34 million tons and mineable reserve 59.84 million tons. The annual rate of production has been fixed at 3.0 million tons and hence the life of the mine has been estimated to be 20 years provided further exploration is made over the unexplored area of 206.10 Ha that production level may increase.

Land use pattern

Sl. No.	Pattern of Utilization	Use of Forest Land in Ha
01	Mining	222.21
02	Sub-grade storage	6.90
03	Dumping of over burden	11.70
04	Mobile crusher	0.50
05	Conveyor loading station	0.04
06	Construction of rest shade/ office Building/Work shop etc.	0.55
07	Construction of road	15.59
08	Settling tank, check dam etc.	0.36
09	Area set aside for future exploration	170.46
	Sub Total	***428.31***
10	Safety Zone	18.94
	Grand Total	**447.25**

2.1.6 **Agriculture**

The area proposed for mining is located at the hill top where there is no scope for agricultural practice due to poor

soil depth and want of water. However, on the foot hill on the north side particularly on the valley one hamlet exists who are cultivating paddy etc. due to good soil depth ample flow of water throughout the year. Likewise on the eastern aspect, the existing villagers are cultivating paddy. Although there is no dearth of water in the valleys throughout the year, the inhabitants do not cultivate mostly any other crop like cereals, vegetable etc. excepting paddy. The 'Jhola' cultivation of terracing the stream bed and irrigating it from the perennial flow is a very common practice in the area. Some people grow vegetables also. Coffee plantations are coming up in the area taking advantage of the winter blossom showers. Oilseeds like Alsi and Mustard are also grown as rabi crop.

2.1.7 **Industries**

No industry has yet been developed in this area or within the zone of impact.



CHAPTER – III

MINING PROCESS

CHAPTER – III
MINING PROCESS

3.1.0 **Process of mining:**

Kodingamali bauxite mine is a virgin one. Considering the topography, estimated reserve, grade, thickness and nature of overburden as well as Bauxite ore and annual production rate etc. it has been concluded by the mining experts to adopt opencast bench mining method on two- shift basis. For this purpose heavy earth moving machineries, ripper, dozer, blast-hole drill, tipper, toothed double roll mobile crusher and belt conveyors will be installed. In the land use plan of the lease area three distinct zones have been earmarked i.e. overburden, bauxite zone and base rock zone.

3.1.1 Opencast mining unit operations like exploration, development, extraction and processing shall be having different adverse impacts on land used for agriculture, living space, recreation and industry. Non-renewability of mineral deposit makes mining a temporary phenomena that leaves behind the features like mine, dump and other degraded areas. Therefore, it is always essential to carryout timely reclamation to comply with the environmental regulations.

3.1.2 **Mining process:**

The Bauxite zone of this lease area is divided into five blocks. Of these blocks mining has been proposed to be carried out first in the central part which is comparatively flatter and advantageous for deployment of heavy machineries and transporting vehicles. The elevation of this part varies from 1250 m to 1160 m above MSL. Slope of this site is due east. Therefore, mining has been prescribed to start in west-east direction. It is pertinent to mention here that, the thickness of ore is more in western side than east.

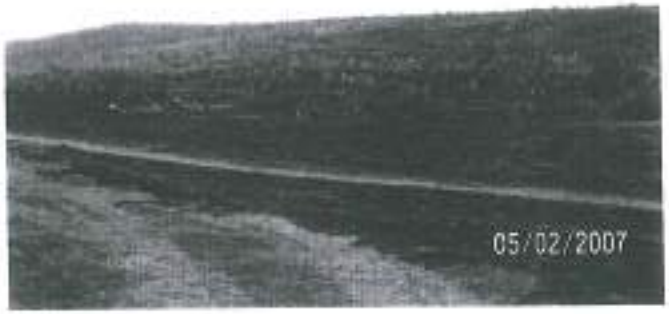
3.1.3 By adopting west-east mining, direct precipitated water dropped in the concurrent back filled waste cannot carry

the sediments due west to cause dilution with ore of bottom bench. Besides, during rains water will be accumulated in eastern side giving scope for development of a check dam which can be utilized by wildlife visiting the area.

3.1.4 **Approach road & ore transportation**

Before the mining commences, roads connecting the mine from township and quarry roads need to be developed. While planning the network of road, the User Agency still minimize the road length to minimum required to help in reduction of dust pollution.

3.1.5 The conveyor belt will be installed for carrying ore from the mine to the refinery located at Kansariguda village. The conveyor belt should be so designed to create minimum noise in the area so that, tranquility can be maintained. It should also trap the dust from the ore.



3.1.6 **Top soil storage**

The top soil wherever available shall be scrapped and stored in a conspicuous place for use at a later period during covering the reclaimed area, so that it will help establishment of planted trees.

3.1.7 **Reclamation**

As a part of eco-friendly mining, concurrent reclamation has been proposed to be adopted after initial mining. After 5 years of mining it has been aimed at to backfill at least 50% of the mined out area with mined out waste and sub-grades. Top soil collected earlier and stored elsewhere need to be scrapped-off and will be used for the plantation programme. Since the volume of top soil is very less and the fertility is also low, all precaution need to be taken during scrapping of top soil. Blasting should not be carried out in hard strata along with top soil for avoiding spreading of residual chemicals which can destroy the fertility of top soil. Use of heavy machineries may be regulated to minimize the leakage of oil and grease which when mixed with the top soil degrades the soil quality.

3.1.8 Removal of overburden

About 50% of overburden is proposed to be scrapped off with the help of ripper dozer. Average length and width of the ripper cut are proposed to be 50m and 25m respectively. Balance 50% of overburden, which cannot be loosened by ripper, will be drilled and blasted.

3.1.9 Excavation of bauxite ore

An amount of 50% bauxite from top bench will be loosened through ripper and balance quantity shall be extracted by drilling and blasting. Total quantity of Bauxite from bottom ore bench will be loosened through drilling and blasting. Blasted Bauxite will be excavated and loaded by shovels. Run-off-mine Bauxite ore loaded by shovels will be transported to the conveyor loading station through 50t dumpers. Height of benches will be kept at 10m or less depending upon the thickness of the Bauxite zone.

3.1.10 Development of ramp

In order to open the mine, it is required to cut top-soil, sub-grade and bauxite strata with the help of ripping or drilling and blasting. Depending upon the thickness of overburden and bauxite zone, drills are to be used for ramp development. Ramp will be formed between OB bench floor

and pit top and another one is to be developed for providing access to top Bauxite bench floor from overburden bench.

3.1.11 Road designing

Steep graded road increases the speed in downward journey, requires frequent gear changing, consumes more fuel, wears out the components and demands more maintenance in vehicle running. Alternatively, suitable/ gentle grade roads favour stoppage of the vehicles within probable stopping distance and production economics. Therefore, a longer flatter road is more economical than short steep road. Therefore, haul road slope is proposed to be kept at 1:16 to 1:20. Width of haul road is proposed to be kept equivalent to 4 times the tipper width.

3.1.12 Opening of the mine

Benches of 10m height is proposed to be developed preferably along west-east and will be widened easterly considering the working convenience, production requirement and maneuverability of the earth moving machineries. It has been proposed to adopt mechanical open-cast method for mining on two-shift basis with the deployment of major earth moving machineries as 150mm dia rotary blast hole drill, 4.2 cum capacity hydraulic shovels and 2.8 cum capacity back-hoe, 400 HP bull dozer, ROM hopper 150t capacity, apron feeder of capacity 1200 tph variable speed, Mobile Crusher of 400-1000 tph capacity, 770 HP ripper dozer, 50t & 32t dumpers and 1100 tph belt conveyor.

3.1.13 Drilling and blasting

Up to 3m thick overburden or Bauxite zone will be drilled in two phases by the use of 32mm dia jack hammer drills fed by compressed air of about 2.25 to 2.5 cum/min. at 3.39 kg/sq. cm. ANFO is an explosive formed by ammonium nitrate (94.5%) with diesel (5.5%) as fuel oil. Ammonium nitrate is cheap, easy to handle and stable. It will be mixed with diesel oil at site to produce the explosive mixture just prior to blasting. Combination of these two types of explosives will be best suited for effective blasting in the area. Minimum delay interval between holes will be kept at 5.5m. Blasting hours will be restricted to between 12 Noon to 2 P.M.

CHAPTER – IV

THE THREATS TO WILDLIFE

CHAPTER – IV
THREATS TO WILDLIFE AND ITS HABITAT

4.0.0. As on today the forest area applied for diversion by M/s OMC Limited in Kodingamali Reserved Forests is mostly devoid of forest growth excepting a few like Bela, Amla, Genduli, Kamalagundi, Kendu etc. But mostly the area has been covered with wild date palm, Bana Tulasi (*Ocimum*) and grasses like *Imperata* and *Chrysopogon* (Guguchia). There is no doubt that if adequate protection is given the dormant root-stocks will sprout and the area can be covered with vegetation within no time. But contrary to it, when mining of Buxite will be taken up in full swing, the landscape of the area will be changed and the vegetation will degrade. The anthropogenic pressure will increase. Since lease has been granted mining operation shall commence and continue. But unless the threats caused to the existing wildlife in the area is studied properly and mitigative measures are prescribed and taken, the site conditions will degrade further. The expected threats are discussed below:

4.1.1 Habitat degradation:

The herbivores need leaf, fruit and flowers etc of various plants to browse. The wild animals also need vegetation as a cover. But there is hardly any tree growth. Besides, whatever date palm exist they are regularly cut and collected by the surrounding villagers for cottage industry purpose (Jhadu making). They also collect the grasses like *Imperata*, *Arundinacea* and *Arundinella setosa* for thatching purpose and Jhadu(broom) making. If this process continues, degradation of the site will proceed in a galloping speed. This need to be checked and suitable alternatives should be found out and sites having some depth of soil deposit need to be afforested by species suitable to the site condition. M/s OMC Limited has proposed to retain 170.46 Ha of forest land for future exploration. Care should be taken to protect this area, safety zone and area to be mined in later years through a protection squad and other means. Besides, this area should be enriched by gap planting of suitable species.

4.1.2. **Soil erosion and loss of moisture :**

The area shall be prone to erosion due to absence of vegetation; steeper slope; activities due to mining operation besides grazing of cattle and movement of vehicles. Moisture loss shall also be acute unless the ground is clothed and other measures are taken. Intensive soil conservation measures are to be adopted to restore the site condition. If these conditions are allowed to continue and further aggravate due to mining and other ancillary activities unchecked, the hill slopes shall further degrade to a point of no return. The wild animals shall suffer due to want of water, cover and food. The perennial and seasonal streams shall dry up not only to the detriment of wild animals but also the natural vegetation and cultivation in 'Jholas'. The surrounding area within the Zone of Influence of 10Kms also shall also suffer similar fate if remedial measures are not taken.

4.1.3. **Forest fire:**

Due to presence of grass in extensive scale and drier condition due to absence of water sourse, forest fire is an annual phenomenon here during late winter and summer. The local villagers visiting the site for grazing, honey collection, collection of date-palm leaf and thatching grass leave lighted fire sources which ultimately develops to cause ground fire. The velocity of wind is so high here due to elevation and absence of trees, it is difficult to control such fire. More combustible biomass shall fall on the ground from the planted trees in the form of leaf litter. However, engagement of local youth as fire watchers during fire season and adequate training for fire fighting will reduce the damage caused due to such fire. In addition watch towers need to be constructed to watch and monitor the incidence of fire.

4.1.4. **Fall of animals in the mining pits**

The ultimate pit depth will be 45 mtrs. Wildlife now existing in the area and in the zone of impact as well as the wildlife that will prefer to migrate to this area after development of the site with suitable afforestation, soil and moisture conservation measures may fall in the pit and get seriously injured or even

die.. To prevent such short-comings it is better to have suitable fencing arrangement all around the mining pits.

4.1.5. **Road designing:**

It is required to lay large stretches of haul roads and roads for other purposes for smooth functioning of mining activities. But unless they are properly planned and suitable gradient provided, they may generate lot of dust and create lot of noise, thereby unduly disturbing the wild animals and reducing the cover to maintain their privacy. The generated dust may affect the animal health and reproduction and cover the leaf surfaces of plants and affect their photosynthesis.

4.1.6. **Lighting:**

Excess lighting affects the tranquility of the place and scares the wildlife especially during night time. The vehicles moving at night and other mining machinery operating in the mine area have to use light for their movement and operation. Besides, different establishments within the lease like, office, work site, magazine, conveyor station, loading points also need lighting. These lights affect the health of wild animals and sometimes they are disoriented.



4.1.7. **Dust pollution:**

Besides movement of vehicles, blasting, operation of crusher and beneficiation plant etc are the sources of dust pollution.

More dust is usually the cause of respiratory problem besides spreading tuberculosis among the ungulates (deer, barking deer etc). Suitable measures are needed to suppress such dust through both preventive and curative measures.

4.1.8. Water conservation:

The requirement of water for the wildlife is limited excepting the elephant. At present only a few species exist in the area like jackal, mongoose, snakes, rats, lizards etc. But gradually when adequate measures are ensured to grow vegetation and protection is provided more wildlife may prefer this area. But with mining water shall be scarce for them. To meet their water requirement, few existing seasonal streams should be taken care and managed to the possible extent to conserve rain water till summer season is over.

4.1.9. Poaching:

Since the area is surrounded by tribal villages, poaching can not be ruled out. This may rise with induction of more people to the area due to the mining operation unless prevented through different means.

4.1.10. Dependence on forest:

Local people shall continue to depend on the small depleted forest patches of the area for their fuel, fencing, construction, food, fodder and heating needs. Once good vegetation comes up may be due to protection or afforestation, the local tribal will collect fuelwood, small timber etc for their bonafied use. Therefore, while planning for gap planting or protection to the existing vegetation it should be ensured that they should not be illicitly felled. For this purpose farm and social forestry with suitable species mix need be taken up in villages of the ZoI. They should also serve as niches for wild animals.

4.1.11. Man wild animal conflict:

According to information gathered from the Forest Range Officer, Laxmipur Range and from the local villagers, during site visit, it transpired that during last one decade no such confrontation of wild animal with the local villagers has been reported. However, considering the elephant damage now a days taking place in areas having no trace of elephant in

decades, some emergent fund is required to be made available with the DFO, Koraput. This may help in meeting exigencies to be utilized for the treatment of victims or can be disbursed as ex-gratia to the affected persons.

4.1.12. Lack of awareness :

All the above measures need involvement of local villagers, VSS members, youth, women of the locality and employees of various government and non-government department. But at present such awareness is lacking. Besides lot of people shall be inducted to the area who are not aware of the need for conservation of wildlife. Unless such awareness is promoted through different means any effort in this direction shall be futile.

4.1.13. Release of contaminated water:

There is likelihood of water from the mine, washery and mineral dumps finding its way in to the natural streams , cultivated fields and other water bodies there by contaminating them or silting them up. This will either render them un-potable by wild animals or fill the water bodies with mud and reduce their water holding capacity.

4.1.14. Garbage & liquid wastes:

Due to daily congregation of huge work force and others lots of solid as well as liquid wastes shall accumulate in and around the mine. They shall not only cover the ground, they may be ingested by wild animals causing their death. Regeneration shall also be affected. They may even choke the streams and water bodies. The liquid wastes shall contaminate the soil and if drunk by thirsty animals may cause diseases in them or even death. This may even trigger epidemics.

4.1.15. Mitigation measures:

To prevent the above threats, mitigative measures has been discussed and suggested in the next chapter.

CHAPTER – V

CONSERVATION PLAN FOR WILDLIFE IN & AROUND KODINGAMALI BAUXITE MINE

CHAPTER – V
CONSERVATION PLAN FOR WILDLIFE IN & AROUND KODINGAMALI BAUXITE MINE

5.0.0 This mine which is a part of East Coast Bauxite deposit is the second richest deposit of bauxite in Orissa and is located on the plateau on the top of Kodingamali hill. This 428.31 Ha lease is entirely located in the Kodingamali R.F. of Laxmipur Range of Koraput Forest Division. The highest elevation goes up to 1276.71m above MSL. Rainfall is very high. Though the hill top, which shall be mined is mostly covered with grass and some stunted vegetation, the hill slopes have much richer vegetation. There are evidences of many species of flora and fauna which has been mentioned elsewhere (Chapter-II) in the report. The threats that are anticipated from the proposed mining activity have been elaborated in Chapter-IV of the report.

5.0.1. The impact of mining on the wildlife and its habitat shall be more pronounced in the immediate vicinity of the mine located on the hill slopes all around the mine. Of course its impact shall also be felt in the Zone of Impact (ZoI) of 10 Kms in radius covering large number of villages, hillocks, streams and valleys, lying in both Koraput and Raygada Divisions.

5.0.2. This plan aims at minimizing all the threats both within the mine, on the immediate neighbouring hill slopes and rest of ZoI despite the mining operation to be taken up and all other ancillary activities.

5.1.0. **Mitigation measures:**

According to the mining plan the entire lease has been divided into 5-year phases, safety zone, conveyor belt loading point, office building and O.B. dumps etc. The mining shall be taken up in phased manner, but safety zone shall continue to be intact. While first phase and 2nd phase shall be mined during the period of 10 years, the rest shall not be touched. Hence the wild animals can find shelter

there if they are made conducive to their stay with proper food, water cover and safety from fire and poaching. Hence the following steps are recommended for providing the same.

5.1.1. **Protection and impact of forest patches:**

The entire lease area is a grass land with some parts with *Phoenix* bushes. But evidences of different wild animals were found there, as they came for grazing from down the hill slopes. Hence these patches need be fully protected and planted up with species that can establish there in order to provide food, cover and safety for them. Of course, rain fall appears to be quite sufficient. Domestic livestock also do visit the area, though in small number. Two persons, preferably ex-army Jawans/Retd. Forest Guards can be engaged to provide protection to the area and prevent fire to the grass land during dry months. They can seek support from the mining work force if needed. As it is fairly flat ground, fire watchers or additional staff may not be needed. Mixed plantations of indigenous species, preferably with edible fruit, flower, leaves etc. should be grown over 150 Ha (effective). The following planting technique shall be adopted.



5.1.2. **Raising plantation:**

Plantation of hardy indigenous species, preferably those found in the neighbouring hill slopes can be planted up in 0.5 m^3 pits, filled with borrowed valley soil and organic manure. Application of Rhizobium or Azotobactor shall also be used for establishment of seedlings. They should be planted up with 2 years old healthy saplings immediately after the onset of monsoon at a spacing of 2.5mX2.5m. Bio-pesticides like neem oil cake etc can be applied, as the area is white ant prone. For all plants grown on the sloping ground, half moon trenches may be provided. Planting can also be taken up on 0.5m width x 0.5m deep x 5m length staggered trenches dug up along the contour at 5m intervals. This will help soil and moisture conservation and

make water available to the plants. Clod mulching can be done immediately after the rains to prevent evaporation losses due to capillary action. The species recommended are Amla, Harida, Bahada, Bara, Jari, Neem, Moi, Kusum, Chhatian, Kumbhi, Kanchan, Patuli, Jack fruit, Mango, Gambhari, Siris, Simuli etc. Seeds of edible grass or berries may be sown embedded in soil/cow dung pellets or slips may be planted for improving fodder availability. Causalities should be replaced in 1st, 2nd and 3rd year with well grown seedlings in later part of July in 1st year and late June succeeding years. The plantation should be maintained for 5 years.

5.1.3. **Fire protection:**

Fire is not likely to be as destructive as in other forested areas, as it is only grass land and can be controlled with less effort. But, plantations need to be protected from 3rd year onwards, when leaf litter is likely to fall on the ground. Two fire watchers shall be sufficient to handle this if fire lines are cleared before the fire season, as fire caused by grazers shall not occur.

5.1.4. Dust suppression:

In order to reduce dust, the roads and extraction paths should be planned to minimize their length. They should be sprinkled with water at least twice on non-rainy days. In

the areas not to be mined, 5m wide strip of vegetation may be raised on both sides of the road to arrest dust. The benches should also be similarly treated. The loading points should be planted up with thick vegetation all around them and if possible the bauxite ore may be sprayed with water before transportation. While being carried by earth movers, if dusty, they can be covered with tarpaulin. Conveyor belt be covered to prevent blowing up of dust.



5.1.3. Noise suppression:

Blasting should be avoided as much as possible. But, when this is a must, muffled blasting technique with non-electric initiation can be practiced. It will be done between 12.00 noon and 2.00 p.m. according to the mining plan. Higher gradients should be avoided while aligning the roads, so that noise due to vehicles/earth movers plying with higher gear can be reduced. Proper maintenance of vehicles and machineries shall also help minimizing the noise level.

5.1.4. Lighting:

As the mining is proposed to be carried out in 2 shifts, late night mining shall be avoided. But some lighting shall continue to be there at various points. Care should be taken to see that the lights are shaded and focused towards the mining pit or where it should be focused. But, such lights should not be directed outside the pit and planted areas,

where the wildlife may come to live. All head lights of mining vehicles should be shaded and dipper should only be used.

5.1.5. Preventing fall of animals:

As the mining pit shall attain considerable depth and shall have steep slope, any fall by straying animals can be fatal. To prevent this, the pit mouth should be protected with 3 strands of photo-voltaic fencing which should be provided all along the upper lip of the pit.



5.1.6. Soil and moisture conservation measures:

Soil erosion and moisture loss due to unchecked runoff during torrential rains may increase further, thereby depleting the hill slopes and affecting agriculture in the surrounding valley. Hence they should be checked. Hence, all gullies should be check dammed with rubble and vegetative barriers. This will also provide drinking water for smaller wild animals like hares, snakes, lizards, ground birds. Staggered contour trenches of 0.5x0.5x5.0m dimention at suitable intervals depending on the slope with vegetation on slopes shall also be quite useful. Garland drain should be provided on the higher side of the mining pit, so that, the surface water does not enter the mining pit. This should be channeled to a slime/siltation pond so that

it does not pollute the natural streams and silt them up. On completion of mining in any bench it should be planted up with erosion resisting grasses like Sabai, *Imperata* sp., *Cymbopogan* sp. or Khas khas (*Vertiver*),preferably through slip planting.



5.1.7. Garbage:

There is likelihood of accumulation of both bio-degradable and non-degradable solid wastes, as more than 300 strong work force and others like drivers, helpers, mechanics etc shall be operating in the area. This garbage should be removed from the lease area, segregated and degraded through vermiculture or incineration. Principle of 'reduces, reuse and recycle' should be adopted. The work force should be sensitized not to leave any garbage within the lease hold area.

Care should also be taken to see that leaking oil & lubricants or discarded stuff is not drained in the mine area and contaminate the soil.

5.1.8. Awareness promotion:

Awareness should be created among the mining work force through different programmes on wildlife and forest conservation so that they do not harm the wild animals and

their habitat. This can be done through observation of different functions like Vana Mahotsava and wildlife week etc. Talk by prominent people, film shows and visit to PA's, Zoos and Museums etc.

5.2.0. Measures to be taken in the immediate surrounding of the lease:

The mining and other ancillary activities like refinery, conveyor belt, road transportation etc shall definitely have adverse impact of the surrounding area of 10 km radius (Zone of Influence). Of course, its impact beyond this zone can not be completely ruled out. But, there is bound to be much pronounced impact on the immediate vicinity, particularly the slopes of the plateau on which the lease shall be operational. Hence, it is proposed to separately indicate remedial measures for the hill slope and other surrounding areas including villages.

5.2.1. Measures is to be taken on the Kodingamali(R.F.) hill slope and foot hills:

The Kodingamali hill slopes and the area of the plateau outside the lease are likely to be most affected due to mining and related anthropogenic pressure. And due to its topography it is needed to be handled with care. On its protection and other measures, not only the wildlife, but also the water availability in the surrounding areas shall depend. Hence, the following measures are suggested there.

5.2.1.1. Forest protection:

The slopes flanking the Kodingamali plateau is quite steep, though quite rich in floral diversity. Of course the vegetation is sparsely distributed due to human pressure. There are pronounced gullies descending down the slopes. There are also perennial streams. Shifting/fixed cultivation is also practiced in pockets. Hence it is not only essential to protect whatever vegetation exists, but also to enrich the same. Of course the soil depth appears to be quite good, as seen from the plantations raised on hill slopes of other neighbouring hills. As the field staff position of Forest Department is rather poor, due to number of vacancies, 4

Bana Sahayaks (preferably Ex-Army Jawans/Retd Forest Guards) preferably from the district may be appointed to help in protection measures. There are only 3 V.S.S. now. More VSS may be formed to cover the entire hill slope and they should be strengthened and incentive may be provided to them. The blank areas may be planted up with indigenously occurring species. Similar planting technique may be adopted as indicated for the area within the lease. Weeding operation should always be done along the contour.

5.2.1.2. Fire protection:

With protection and additional plantation, lot of leaf litter shall be generated and grass shall dry up during summer months to make them combustible. This will not only affect the ground vegetation, this may create drier conditions and burn the young ground dwelling animals and birds, their young ones and eggs. As most fire is man made and accidental, the local people may be sensitized regarding adverse effect of fire. Fire lines may be cleared before summer months and six fire watchers may be engaged out of local youth in fire protection work during 5 months from February to May. Four watch posts at vantage points along the lip of the plateau may be erected for providing clear view of the entire hill slope. The watchers may be provided with simple fire fighting tools like spades, bill hooks, axes, buckets and brooms etc. The mining force may provide help to fight fire when required.

5.2.1.3. Soil and moisture conservation:

All gullies should be plugged through check dams of rubble, masonry or vegetation at suitable intervals depending on the slope to reduce the velocity of flowing water and to recharge the ground water. This shall also arrest soil loss. In other slopes, staggered contour trenches of 0.5m x 0.5m x 5.0m may be dug at suitable intervals depending on slope. The dug out soil should be placed on down hill side partly covering the trench and planting can be taken up on the deposited soil.

5.2.1.4. Poaching:

With the strengthening of protection machinery the vegetation shall improve and with that the wildlife shall proliferate. Unless suitable measures are taken involving the V.S.S. and the Forest Department, the wild animals can not be protected. Hence, local people should be sensitized against poaching of animals. The local staff may be trained to collect intelligence in order to prevent poaching and to properly investigate poaching cases.

5.2.1.5. Podu (shifting cultivation) control measures:

Podu is a very common practice of cultivation in the district. In this process, the vegetation on the hill slope is hacked and burnt to sow seeds of different crops. When the soil fertility declines, they shift to other areas, where secondary vegetation has established. This results in denudation of hill slopes and soil erosion. The people should be weaned away from this practice and encouraged to take up cash crops like coffee, cashew, rubber etc., which can provide better economic benefit to them and provide soil cover. Of course, such cash crops can be encouraged out side the forest land. They should be trained to take up such cultivation, processing of the produce and its marketing. They need initial support for the inputs for such cultivation. They should be persuaded not to practice shifting cultivation by providing necessary support and motivation to take up fixed agriculture on gentler slopes.

5.2.1.6. Grazing:

As stall feeding is not in practice for the livestock here, they roam freely destroying forests and compacting the soil. The cattle breed can be improved through Artificial Insemination and stall feeding encouraged. Besides, the V.S.S. should sensitize people not to allow grazing of cattle in the forest areas. Such grazing causes spread of communicable disease to the wild animals.

5.2.2.0. Measures outside Kodingamali R.F.:

The 'Zone of Influence (Zol)' of this bauxite mine 10 Kms in radius spreads much beyond the R.F. limit and covers villages, highway, roads, hillocks, forest patches and cultivated fields. As there shall be massive mining operation that will affect the entire area to a varying degree,

particularly the forest and wildlife, it is necessary to suggest measures to mitigate such adverse impact.

5.2.2.1. Protection and improvement of forest patches:

In this district, forests are more or less confined to hill slopes. But most of them have been laid barren due to different human activities including 'Podu' or shifting cultivation. In order to provide habitat for wildlife it is essential not only to protect them, but also clothe them with vegetation of indigenous species. While V.S.S. should be formed and strengthened all around the forest patches, R.F. or otherwise, they should be planted up following the techniques indicated for the area within the lease. Similar soil and moisture conservation measures besides fire prevention measures may be taken. For this 4 fire watchers out of local youth should be appointed for 5 months every year. These measures shall help in improving much needed water requirement of the area. The 'Jhola' cultivators are very much dependant on such water flowing in perennial streams.

5.2.2.2. Social forestry:

Due to efforts made through SIDA assisted Social Forestry Project in the past many good village woodlots are still seen in the district. In order to improve wildlife status it will be necessary to raise village woodlots, institutional planting, planting on farm bunds, back yards, road avenues and village commons. Different ornamental, fuel, fodder, fruit, flower trees like Mango, Baula, Jack fruit, Gambhari, Siris, Babul, Kanchan, Patali, Kadamba, Rain tree, Ficus, Chhatian, Gulmohar, Peltoforum, Mahagony, Cashew nut, Karanja, Neem, Red sanders, Sandal wood, Paladhua(*Erithrina*), Teak, Akasmalli, Spathodia, Jacaranda, Bara Koli (*Zyzyphus*), Aswattha, Simuli, Sunari and tropical pines etc can be taken up depending on its suitability and site conditions. Two year old healthy seedlings should be planted on 0.5 m3 pits with the involvement of individuals, Panchayat, V.S.S., concerned institutions, Forest Department or NGOs, who should also take care of their maintenance. This will also help bring down pressure on the forest patches occurring in the area, while providing 'niches' for different wild animals and birds.



5.2.2.3. **Providing alternate avocation (Eco-development):**

Forests are usually depleted due to dependence of the people on them for their livelihood. If alternate avocations are provided to those not finding employment in the mines, particularly elderly, women and physically challenged persons they shall continue to depend on these depleted forests. They can be provided support for vegetable/mushroom growing, horticulture, diary, apiary, poultry, tailoring, embroidery, indigenous food processing etc and their marketing. These products shall find market in the industrialized belt here. Similarly support for small technical jobs like repairs to household equipments, radio, T.V., bicycle, two-wheeler, electric wiring etc can be provided to those who have aptitude for the same. They can also be encouraged to set up small shops, tea-stalls etc. For all these they may be linked to SHGs (self-help group) and/or financial institutions.

5.2.2.4. **Watershed approach:**

The Zol is divided into 2 major watershed and many mini-watersheds. The entire area needs to be treated keeping the concerned watershed in mind, so that optimum result shall be obtained from all measures, particularly soil and moisture conservation measures.

5.2.2.5. **Stall feeding – Biogas:**

For the purpose of diary development mentioned in sub-para 5.2.2.3 it is essential to improve the cattle breed. Once this is done through A.I. or other means, it will be easy to induce stall feeding of cattle. With stall feeding, it will be easy to set up individual or community bio-gas plant that can provide both fuel as well as manure for cultivation. This will considerably reduce pressure of grazing on the newly regenerated forest patches, while meeting the fuel need.

5.2.2.6. **Prevention of Podu:**

Koraput is one of the most Podu ravaged districts, with bald hills every where. This results in heavy soil erosion and moisture loss and reduces fertility of the land. It silts up the rivers and triggers up flood. Hence massive effort need be made to prevent podu through sensitization of people and giving support for settled cultivation or tree cropping of economic species now practiced in 'Jhum' areas of Nagaland.



5.2.2.7. **Awareness promotion:**

The wildlife, whose status may improve due to different measures suggested above, shall not be safe unless the local people, particularly the younger ones are made aware of the need for conservation. Hence efforts should be made in schools and colleges and V.S.S. to promote awareness. This can be done by celebrations of different conservation functions, talks, film shows, audio-visual aids, brochures, posters, competitions, photography and visit to PA's, Zoos, Museums and other wildlife areas etc.

5.3. **Corpus Fund**

Though man animal conflict is not quite common in the area there is possibilities of its occurrence in later years after the forests are recreated. Hence, it is proposed that, a Corpus Fund of Rs.3.0 lakhs may be placed with the D.F.O., Koraput to meet exigencies of such attack to be replenished after the funds for the purpose is received from Govt.

5.4. **Plan period:**

This plan is prepared for 10 years and may undergo revision after completion of that period, based on experience gathered during the plan period and changes that would have taken place, change of thrust, if required and prevailing labor and other rates.

5.5. **Monitoring Committee:**

A monitoring committee may be set up with Conserator of Forests, Koraput as the Chairperson with the DFO, Koraput as convenor. The Dfo ,Raygada shall also be a member as a large chunk of Zol shall be a part of that division. This can have representative of the OMC Ltd., local BDO's, Range Officers, Lakhimpur and Tikiri Chairpersons of VSS etc. Any other person can be co-opted if his/her presence is likely to help the monitoring process at the discretion of the Chairperson. The committee may sit as often as needed, but not less than twice every year. This can guide the implementation of different activities and make course correction if required.

5.6. **Funding:**

Though the cost of the plan is Rs310.0 lakhs; Rs230.0-lakhs for activities in the surrounding area shall be placed with the Forest Department to be utilized both in , Koraput and Raygada Division. Of course the entire Rs1.20 lakhs meant to be spent in Kodingamali R.F shall be spent in Koraput division, while rest shall be apportioned between the two divisions by the C.F., Koraput Circle based on activities to be taken up by them. The balance is to be utilized for activities within the mine shall be spent by the OMC Ltd through its own agency.

5.7. While implementing this plan in letter and spirit, it should be borne in mind not to infringe upon the provisions of Wildlife (Protection) Act, 1972, Orissa Forest Act, 1972, Forest (Conservation) Act, 1980, Environment (Protection) Act, 1986 and rules made there under. The stipulations of MOEF, State Pollution Control Board, Forest & Environment Department, Orissa and Executive Institutions of other statutory authorities like Chief Wildlife Warden, Orissa are not violated.



CHAPTER –VI

FINANCIAL FORECAST

CHAPTER – VI
FINANCIAL FORECAST

6.0.0. Based on activities suggested in the Chapter-V broad financial estimate for activities within the lease, in the balance of Kodingamali R.F. and in the rest of 'Zone of Influence' has been worked out in 3 different tables given in paragraphs below.

6.1.0. The following table indicates the cost estimate of different activities to be taken up within the lease hold area on the Kodingamali plateau top during the plan period of 10 years.

Sl. No.	Particulars of Activities	Cost in Rupees	Remarks
1.	Plantation over 150 Ha with maintenance for 5 years @ Rs.30,000/-	45,00,000/-	
2.	Wages of 2 retired Jawan/F.G. @ Rs.5,000/- p.m.with uniforms and other tools etc	14,00,000/-	
3.	Soil & moisture conservation measures	10,00,000/-	
4.	Photo-voltaic fencing-3Km including maintenance.	3,00,000/-	
5.	Two Fire Watchers for 7 years – 2,100/- x 5 x 7 x 2 including equipments	2,00,000/-	
6.	Awareness promotion among the work force	4,00,000/-	
7.	Garbage disposal	2,00,000/-	
	Total	**80,00,000/-**	

(Rupees Eighty Lakhs Only)

This cost excludes cost of noise suppression, regulation oflighting, dust suppression and other measures including reclamation which are part of mining process. Some of them form part of Mining plan and Environ management plan.

6.2.0. The following measures, which shall be taken up within the ZoI has been divided into those to be taken up within Kodingamali R.F. and outside.

6.2.1. Measures within Kodingamali R.F.(Outside the lease):

Sl. No.	Particulars of Activities	Cost in Rupees	Remarks
1.	Forest protection 4 Bana Sahayaks @ Rs.5,000/- x 4 x 12 x 10+ uniforms, mobility, equipments etc.	28,00,000/-	
2.	Plantation over 150 Ha including 5 years maintenance @ Rs.30,000/-	45,00,000/-	
3.	Soil & moisture conservation measures	12,00,000/-	
4.	Fire protection – Rs.2,100/- x 6 x 5 x 10 including fire line & equipments	8,00,000/-	
5.	Watch posts 4 nos	4,00,000/-	
6.	Incentive to V.S.S.	5,00,000/-	
	Total	**1,02,00,000/-**	

(Rupees One Crore & Two Lakhs Only)

The above amount is to be utilized by Koraput Forest Division

6.2.2. Measures outside Kodingamali R.F.:

Sl. No.	Particulars of activities	Cost in Rupees	Remarks
1.	Forest protection including plantation over 100 Ha (effective)	40,00,000/-	
2.	Social Forestry Operation	20,00,000/-	
3.	Soil & moisture conservation measures	20,00,000/-	
4.	Income generating activities	15,00,000/-	
5.	Awareness promotion	10,00,000/-	
6.	Cattle breed up gradation stall feeding & biogas plants	5,00,000/-	
7.	Podu prevention	8,00,000/-	
8.	Wages of 4 fire watchers including equipments etc Rs.2,100/- x 4 x 5 x 10	5,00,000/-	
9.	Exigency fund for meeting man-animal conflict Awareness Promotion	3,00,000/- 2.00,000/-	
	Total	**1,28,00,000/-**	

(Rupees One Crore & Twenty-eight Lakhs Only)

The above amount shall be apportioned between Koraput and Raygada Divisions as the Zol lies in parts of both the divisions. This can be done by the C.F., Koraput Circle depending on activities to be carried by individual divisions.

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OFFICE OF THE PRINCIPAL CCF (WILDLIFE) & CHIEF WILDLIFE WARDEN,ORISSA5TH FLOOR, D.A. APARTMENT, PRAKRUTI BHAWAN, NILAKANTHA NAGAR, BHUBANESWAR- 751012.

Memo No. 689 Dt. 27-1-10
1WL-C-FC- 430 /09

To

The Chief Conservator of Forests (Nodal),
O/o the Principal CCF, Orissa, Bhubaneswar.

Sub: Approval of Site Specific Wildlife Conservation Plan for Kodingamali Bauxite mining Project in Koraput district of M/s Orissa Mining Corporation (OMC) Ltd.

Sir,

I am directed to inform you that the Site Specific Wildlife Conservation Plan for Kodingamali Bauxite mining Project of M/s Orissa Mining Corporation (OMC) Ltd in the district of Koraput has been approved by PCCF(WL) & Chief Wildlife Warden, Orissa with financial forecast of Rs.438.00 lakhs for the following activities.

1. For activities to be implemented by User agency in Project area — Rs. 30.00 lakhs.
2. For activities to be implemented by DFO, Rayagoda & Koraput division in project impact area. — Rs.408.00 lakhs.

Total **Rs. 438.00 lakhs**

Various activities in the lease hold area will be executed by User Agency under the guidance of DFO, Rayagoda and Koraput Division. Rs.408.00 may be deposited with DFO, Rayagoda & Koraput divisions for implementation of various activities with in the project impact area.

Conservator of Forests (WL)

Memo No. 683 dt. 27-1-10

Copy forwarded to the DFO, Rayagoda and Koraput Division for information & necessary action with reference to Memo No. 4350 dt. 4.11.09 and 4071 dt. 15.10.09 respectively of C.F., Koraput Circle.

Memo No. 684 dt. 27-1-10 Conservator of Forests (WL)

Copy forwarded to RCCF, Koraput Circle for information & necessary action with reference to his office Memo No. 4350 dt. 4.11.09 and 4071 dt. 15.10.09

Memo No. 685 dt. 27-1-10 Conservator of Forests (WL)

Copy forwarded to the Dy. General Manager(M)-Projects of Orissa Mining Corporation Ltd(OMC), OMC House, Bhubaneswar for information & necessary action with reference to his office Memo No.14633 dt. 28.8.09.

Conservator of Forests (WL)

CHAPTER-VI

FINANCIAL FORECAST

6.0.0 Based on activities suggested in the Chapter-V & V(A) broad financial estimate for activities within the lease hold area and in the adjoining forest etc. areas are as under.

6.1.0 The activities proposed to be taken up inside the leasehold area are to be executed by the User agency under the supervision and monitoring of DFO, Rayagoda and Koraput Division.

6.2.0 The following table indicates the cost estimate for measures to be taken outside the project area within 10-years. The cost of activities to be taken up in the project impact area (ZoI) i.e. outside leasehold area **shall be deposited with the Forest Department** to be utilized by the Divisional Forest Officer, Rayagoda and Koraput Division for execution of works under the guidance of Regional Chief Conservator of Forests, Koraput Circle. User agency will deposit Rs.408.00 lakhs with DFO, Rayagada Division under CAMPA for implementation of the plan.

6.3.0 No vehicle is to be received from User agency.

6.0.1 Activities within Project area.

Sl. No.	Item of work	Amount approved
1	Photo voltaic fencing-2 kms/maintenance @2.8 lac/km.	5.00
2	Salt lick, maintainance-2 nos @5000each	1.00
3	Garbage Management	It may be dealt as per pollution control board directions separately.
4	Anti-poaching measures	12.00
5	Awareness promotion in work force	5.00
6	Game tanks @3.5 lacs/tank-2 nos	7.00
	TOTAL	**30.00**

6.0.2 Activities within the Project impact area.

Sl. No.	Item of work	Amount approved
1	Protection watchers/ Banasahayaks @Rs.5000/ PM	28.00
2	Plantation over 300 ha /5yr maintenance-5ha. @ 35,000/- in ZOI	105.00
3	Plantation over 150+30 ha on slopes of kodingamali RF with 5 yrs maintenance @43,740/ha-@1000 plants/ha	79.00
4	Soil & Moisture conservation	12.00
5	Soil & moisture conservation measures/check dams in ZOI	12.00
6	Creation of water body (3 nos)and maintenance for 5-years & soil conservation measures/ ponds/ bird bath / temporary water holes/wallowing grounds creation.	20.00
7	Watch towers-4 nos	4.00
8	Incentive to VSS for forest protection etc.	5.00
9	Incentive to 10 village coordinators	10.00
10	Fire protection/ line tracing	20.00
11	Fire watchers-4 Nos 3000X4X5months X 10years	
12	Salt lick and maintenance.	3.00
13	Status survey/monitoring/wild life population. Development of communication network / GIS based maps Sabellite maps on GIS domain should be procured every year to know the changing profile of the project area in both dry season and wet season for 10 years preferably using the GIS lab of PCCF(WL), Orissa	20.00
14	Social/farm forestry	50.00
15	Podu prevention/cash crop introduction	10.00
16	Awareness promotion	5.00
17	Cattle immunization	10.00
18	Corpus fund- man animal conflict	10.00
19	Capacity building/field visits	5.00
	Total	**408.00**

N.B: All measures for dump redamation, dust suppression, garbage bins, soil erosion measures should be taken up including retaining walls , plantation etc. as per the redamation plan etc to be prepared in terms of the approved mining plan and other guidelines. This component is to be dealt separately as per the above guidelines. Hence no financial forecast on this account is indicated in the conservation plan.

Approved by PCCF(WL)& CWLW, Orissa.

Conservator of Forests (WL)

REFERENCES

- Working Plan of Rayagada Forest Division.
- District Statistical Hand Book of Koraput District.
- Forest Diversion Proposal prepared by the User Agency.
- Environmental Impact Assessment & Environment Management Plan prepared for the Kodingamali bauxite mine.
- District Gazetteer of Koraput District.
- National Wildlife Action Plan prepared by Govt. of India.
- Wildlife (Protection) Act, 1972.
- Forest (Conservation) Act, 1980 amended up to 2004.
- Orissa Forest Act, 1972.
- Environment (Protection) Act, 1986.
- Mining Plan for Kodingamali Bauxite Mines.
- Mammals of India by S.H. Prater
- Indian Birds by Salim Ali
- Reptiles of India by J. C. Daniel.
- Wildlife Wealth of Orissa (Govt. of Orissa Publication).
- Notes on Forest Protection (Govt. of Orissa Publication).
- Wild Orissa prepared by Wildlife Wing, Forest Dept., Orissa.

ANNEXURES

ANNEXURE – I

भारत सरकार
खान मंत्रालय
भारतीय खान ब्यूरो
खान नियंत्रण और खनिज संरक्षण प्रभाग
(मध्य क्षेत्र)

GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES
Mines Control & Conservation of Minerals Division (Central Zone)

संख्या/No. 6141(2)/2006-MCC/Ch1(C)/RP-4

दिनांक/Dated 15-9-06

To,

Shri I. Mishra,
Deputy General Manager(Geology),
Power of Attorney Holder,
The Orissa Mining Corporation Ltd.,
OMC House, Bhubaneswar-751001

Sub. : Approval of Mining Plan alongwith Progressive Mine Closure Plan in respect of Kodalgaraafi Bauxite Deposit over an area of 447.25 hectares in Koraput District of Orissa State in favour of M/s Orissa Mining Corporation Ltd. submitted under rule 22 of MCR, 1960.

Reference: 1.Your RQP's letter No. Nil dated 3.1.2006 received on 31.5.2006.
2.This office letter of even no. dated 10.8.06.
3.Your letter No. 1708/OOR/CC/2006 dated 29.8.06.
4. This office letter of even no. dated 1.9.06.
5.Your letter No.1788/OOR/CC/Gen dated 5.9.06.

Sir,

In exercise of the powers conferred by Clause (b) of Sub Section(2) of Section 5 of Mines & Minerals (Development & Regulation) Act, 1957 read with Government of India Order No.S.O 44(SE) dated 26.4.1967, I hereby approve the Mining Plan in respect of Kodalgaraafi Bauxite Deposit over an area of 447.25 ha. in Koraput District of Orissa in favour of M/s Orissa Mining Corporation Ltd. submitted under Rule 22 of MCR, 1960 on the following conditions :-

i) This mining plan is approved without prejudice to any other laws applicable to the mine/area from time to time whether made by the Central Government, State Government or any other authority.

ii) It is clarified that this approval of the mining plan does not in any way imply the approval of the Government in terms of any other provisions of the Mines and Minerals (Development & Regulation) Act, 1957 or the Mineral Concession Rules, 1960 and any other laws.

iii) It is clarified that this approval of the mining plan is subject to the provisions of Forest (Conservation) Act 1980, Forest Conservation Rule 1981 and other relevant statutes, order and guidelines as may be applicable to the lease area from time to time.

iv) It is further clarified that the approval of Mining Plan is subject to the provisions of the Mines Act 1952 and Rules & Regulations made there under including submission of notice of opening, appointment of Manager and other statutory officials.

v) The mining plan is approved without prejudice to any order or direction from the Court of competent jurisdiction.

vi) Your attention is invited to the Supreme Court interim order in W.P.(C.) No.202 dated 12.12.96 for compliance. The approval of Mining Plan is, therefore, issued without prejudice to and is subject to the said directions of the Supreme Court as applicable.

vii) The lessee should submit the financial assurance to the Regional Controller of Mines, Indian Bureau of Mines, Bhubaneswar before executing the mining lease deed as per Rule 23(5)(c) of Mineral Conservation & development Rules, 1988.

viii) A copy of Environment Impact Assessment – Environment Management Plan (EIA/EMP) as approved by MOEF (Ministry of Environment & Forest) shall be submitted to IBM immediately after approval of MOEF.

ix) The feasibility study of beneficiation of partially leached Khondalite and Kaolinised Khondalite which have high alumina content should be taken up within a period of three years of commencement of mining operation from its mutual reports.

x) The Environment Monitoring Cell shall be established by the company. The Environmental Monitoring Cell of the company shall continue monitoring ambient air quality, dust-fall rate, water quality, soil sample analysis and noise level measurements at various stations established for the purpose both in the core zone and buffer zone as per requirement of Environment Guidelines and keeping in view MM's circular No.3/92 & 2/93 season-wise every year or by engaging the services of an Environmental Laboratory approved by MOEF/CPCB. The data so generated shall be maintained in a bound paged register kept for the purpose and the same shall be made available to the inspecting officer, on demand.

Yours faithfully,

(C.S. Kulkarni)
Chief Controller of Mines

Encl. Two copies of approved mining plan.

Copy for information to :

1. The Director of Mines, Directorate of Mines, Govt. of Orissa, Heads of Department Building, New Capital, Bhubaneswar-751001.

2. The Director of Mines Safety, Directorate General of Mines Safety, Bhubaneswar Region, Plot No.L-1, Nayapalli, P.O. RRL, Complex, Bhubaneswar-751013, alongwith a copy of approved Mining Plan.

3. Shri Anushree Dash, RQP, M/s. Alpine Consultants, B-423, Dhirbag Enclave, Lower Negra, Ganesh Road, Bhubaneswar-751009.

(S.P. Gupta)
Asst. Controller of Mines

ANNEXURE – II

BY SPEED POST

OFFICE OF THE
STATE POLLUTION CONTROL BOARD, ORISSA
Paresh Bhawan, A/118, Nilakantha Nagar, Unit-VIII,
Bhubaneswar - 751 012

No. 854 /Ind-II-NOC-4373 Date 27.07

OFFICE MEMORANDUM

In consideration of the application for obtaining Consent to Establish **for M/s. Kodingamali Bauxite Mine of M/s. Orissa Mining Corporation Ltd** the State Pollution Control Board has been pleased to convey its Consent to Establish under section 25 of Water (Prevention & Control of Pollution) Act, 1974 and section 21 of Air (Prevention & Control of Pollution) Act, 1981 for production of Bauxite ore of quantity 3.0 million tons/Annum, (over mine lease hold area of 447.25 Ha.) at Kodingamali Hills near Kaspadar, PO – Laxmipur in the district of **Koraput** with the following conditions.

GENERAL CONDITIONS.

1. This Consent to establish is valid for the product, quantity manufacturing process and raw materials as mentioned above & for a period of five years from the date of issue of this letter, provided commencement of production of the proposed project has not taken place in the meantime.
2. If the proponent fails to start operation of the project but substantial physical progress has been made then a renewal of this consent shall be sought by the proponent.
3. If the proponent fails to initiate construction of the project and no significant physical progress is made then, the proponent has to apply for consent to establish afresh after expiry of 5 years from the date of issue of this order.
4. Adequate effluent treatment facilities are to be provided such that the quality of sewage and trade effluent satisfies the standards as prescribed under EP Rule or as prescribed by the Central Pollution Control Board under State Pollution Control Board or otherwise stipulated in the special conditions.
5. All samples from the industry as well as the incident of spoilt and ruin are to conform to the standards as laid down under EP Rules/Central Pollution Control Board/State Pollution Control Board or otherwise stipulated in the special conditions.
6. Adequate method of disposal of solid waste is to be adopted to avoid environmental pollution.
7. The industry is to comply to the provisions of EP Act, 1986 and the rules made thereunder with their amendments from time to time such as the Hazardous Chemical(Manufacture, Storage and Import) Rule, 1989 etc. The industry is also to comply to the provisions of Public Liability Insurance Act, 1991, if applicable.
8. The industry is to apply for grant of Consent to operate under section 25(2)b of Water(Prevention & Control of Pollution)Act, 1974 & Air (Prevention & Control of Pollution)Act, 1981 (if comby under air pollution control area) at least 3 (three) months before the commercial production and obtain Consent to Operate.
9. **This consent to establish is subject to other statutory clearances from Govt. of Orissa and / or Govt. of India as and when applicable.**

SPECIAL CONDITIONS : -

1. The consent to establish is granted subject to Environmental Clearance from Ministry of environment & Forest, Govt. of India, New Delhi.
2. No change in mining technology and scope of working shall be made without prior approval of the Board.
3. Top soil should be stacked properly with proper slope at suitable site(s) with adequate measures and shall be used for reclamation and rehabilitation of mined out areas.
4. Consistent back filling should be started from the fourth year of operation. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self sustaining. Compliance status should be submitted to the Ministry of Environment & Forests with a copy to the Board on yearly basis.
5. Dimension of the retaining wall at the toe of slopes and OB benches within the mine to check run off and siltation shall be based on the rainfall data. The detail specification shall be worked out and submitted to the Board.
6. A green belt of adequate width shall be raised for suppression of dust by planting the native species around to ML area, roads, OB dump sites, etc., in consultation with the local DFO/Agriculture Department.
7. Reclamation programme along with the post closure plan is to be submitted within 03 months from the date of issue of this order.
8. Catch drains, and siltation ponds of adequate size should be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The drains should be regularly de-silted and maintained properly. The garland drains (size, gradient and length) and sump capacity should be designed keeping 50% safety margin over and above the peak rainfall intensity and maximum discharge in the area adjoining the mine site. Sump capacity should also provide adequate retention period to allow proper settling of silt material.
9. Regular monitoring of ground water level and quality should be carried out by establishing a net work of existing wells. The monitoring should be done four times a year in pre-monsoon (April/May), Monsoon (August), Post-monsoon(November) and winter (January) seasons. Data thus collected should be submitted to the Board quarterly.
10. Sewage treatment plant should be installed for the treatment of domestic effluent generated from the colony and others so as to meet the prescribed standard of the Board for discharge in inland surface water.
11. Wastewater (workshop and washeries) from the mines should be properly collected, treated so as to confirm the prescribed standard i.e.pH – 5.5 - 9.0,

SS = 100 mg/l, A O & G – 10 mg/l or as amended from time to time. Oil and grease trap should be installed before discharge of effluents from workshop.

12. Mine drainage water, if any has to be treated and disposed of after conforming to the standard prescribed by the Board i.e ph – 5.5 – 9.0, Total SS = 100 mg/l & O & G = 10 mg/l.

13. Rain water harvesting practice shall be followed by utilizing the rain water collected from the roof of the buildings for recharging of ground water within the premises and other large structures as per the concept and practices prescribed by CPCB, New Delhi and details of which is available in the web-site.

14. Drill should be wet operated or with dust extraction and controlled blasting should be practices.

15. Six ambient air quality monitoring stations for 24 hours operation should be established in the core zone as well as in the buffer zone for RPM, SPM, SO2, NOx and CO monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board (i) Data on ambient air quality (RPM, SPM, SO2, NOx and CO) should be regularly submitted to the State Pollution Control Board once in six months.

16. Adequate measures to control fugitive emission shall be taken during loading and transportation of minerals, haul roads etc.

17. The haulage roads and arterial roads shall be made black topped / concrete with avenue plantation. Appropriate plan to this effect shall be submitted to the board within a month. Initially 50% of haul road shall be black topped/concrete surfaced.

18. Adequate measures shall be taken for control of noise levels below 85 dBA in the work environment.

19. Project authority shall undertake sample survey to generate data on pre-project community health status within a radius of 1 km. from proposed mine. The report shall be submitted within 06 months from the date of issue of this order.

20. Consent to operate shall be obtained from this Board before commencing the mining activities of proposed expansion project.

21. Environmental laboratory should be established with adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board.

22. A separate environmental management cell with suitable qualified personnel should be set up under the control of a Senior Executive, who will report directly to the Head of the organization.

23. The above conditions will be enforced, inter-alia, under the provisions of the water (Prevention & Control of pollution)Act, 1974 and Air(Prevention & Control of Prevention)Act, 1981 and Environment(Protection)Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rule.

24. All efforts shall be taken to protect the wildlife and forest habitat in the surrounding. A detailed plan in this respect shall be submitted to the Board within 06 month from the date of issue of this order.

25. This consent to establish is granted subject to grant of Explosive License from competent Authority. The valid Explosive License must be submitted to this Board while applying for consent to operate to this Board.

26. This consent to establish is granted subject to implementation of all recommendation made during public hearing held on 27.9.06.

27. The Board may impose further conditions to modify the conditions stipulated in this order during installation and/or at the time of obtaining consent to operate and may revoke this clearance in case the stipulated conditions are not implemented.

28. The industry shall abide by all the provision of Environment (Protection) Act, 1986 and rules framed thereunder.

29. The unit shall provide adequate dust suppression measures at all potential dust generating points of Bauxite ore crusher plants and screening plants to control fugitive emission. Ambient air quality with respect to SPM concentration shall not exceed 500 µg/m3.

30. The mine shall obtain forest clearance under Forest (Conservation) Act, 1980 if there is involvement of forest land in the mining lease area.

MEMBER SECRETARY

To,

Sri Jaroslav Mishra, (Dy. General Manager, Geology)
M/s. Kudingamali Bauxite Mines of
M/s. Orissa Mining Corporation Ltd.
PO – Box No. 34, OMC House, Bhubaneswar - 1

Memo No._____/EN.

Copy forwarded to:

1. Secretary (Steels & Mines), Govt. of Orissa, Bhubaneswar
2. Collector, Koraput
3. District Industries Centre, Koraput
4. Consent Section, Environment Scientist-III
5. Director, Factories & Boiler, Bhubaneswar
6. Regional Officer, O.S.P.C.Board, Rayagada
7. DFO, Koraput
8. Copy to Guard file/Consent to establish register

SR. ENV.ENGINEER

ANNEXURE - III

BY SPEED POST

GOVERNMENT OF INDIA
MINISTRY OF STEEL AND MINES
DEPARTMENT OF MINES

No. 6/15/98-M.IV New Delhi, the 11th Jan., 1999

To

The Secretary to the Govt. of Orissa,
Deptt. of Steel and Mines,
BHUBANESWAR-751 001.

Subject: Grant of mining lease for Iron ore over an area of 715.075 hects. in village Kodingamali, Distt. Keonjhar(Orissa) in favour of M/s. Orissa Mining Corpn. Ltd.

Sir,

I am directed to refer to your letter No. 900/III(M)-10/98 dated 23.12.98 on the above mentioned subject and to convey the approval of the Central Govt. under Section 5(1) of the Mines and Minerals (Regulation and Development) Act, 1957 and in relaxation of Section 8(1)(b) of the Act to the grant of mining lease for Quartz-Iron ore ranges of 715.075 hects. in village Kodingamali, Distt. Keonjhar (Orissa) in favour of M/s. Orissa Mining Corporation Ltd. for a period of 30(thirty) years.

2. Before allowing grant of mining lease, the State Govt. may kindly ensure the compliance of the amended provisions of the Act and Rules, and other applicable Acts and Rules including Forest (Conservation) Act, 1980 and Notification dated 27.1.1994 as issued/amended by Ministry of Environment and Forest.

3. A copy of the order passed by the State Govt. in the matter may kindly be furnished to this Department for record.

Yours faithfully,

(S.M. Sahney)
Under Secretary to the Govt. of India.

Regd.
Copy to :
1. The Controller General, Indian Bureau of Mines, Indira Bhavan, Civil Lines, Nagpur 440001.
2. The CMD, Mineral Exploration Corporation Ltd., Nagpur.
3. FC in CMM.
4. Copy for Guard file.

(S.M. Sahney)
Under Secretary to the Govt. of India

SRI ARUNAM SIKSHI
Consulting Geologist
Regn No.WP/MN/2001/

ANNEXURE – IV

Government of Orissa
Department of Steel & Mines

From

Shri A. Patnaik, OAS(I)
Under Secretary to Government.

To

The Director of Mines,
Orissa, Bhubaneswar.

Sub: Supply of proviso area exp over 447.25 hects. (from 715.075 hects.) in Kodingamali of Keonjhar district in favour of OMC for preparation of Mining Plan.

Sir,

I am directed to invite a reference to this Department Memo No.6750 dt. 25.6.99 on the subject cited above and to say that the M.L. applied by OMC over 715.075 hects. in Kodingamali of Keonjhar district was finally approved to 447.25 h

In view, therefore, I am to supply proviso area exp over 447.25 hects. applied for grant in favour of OMC Ltd. in Kodingamali of Keonjhar district for preparation of Mining Plan o the area.

Yours faithfully,

15/7/2004

Under Secretary to Government

Memo No. /Dt.

Copy forwarded to M/s. O.M.C. Ltd., Bhubaneswar for information and necessary action with reference to his letter No.OMC/Mining/Plan/2004 dt.8.6.04.

Under Secretary to Government

APPROVED

Sd/-

Musa	Long tailed tree mouse	*Vandeleuria oleracea*	V
Neula	Common mongoose	*Herpestes edwardsi*	II
Kuji Neula	Small Indian mongoose	*Herpestes auropunctatus*	II
B:FAUNA = SNAKES			
Local Name	**English Name**	**Scientific Name**	**Schedule**
Chiti	Common Indian Krait	*Bungarus coeruleus*	IV
Dhulinag	Saw scale viper	*Echis carinatus*	IV
Naga	Indian cobra	*Naja naja*	IV
Rana	Banded Krait	*Bungarus candidus*	IV
C:FAUNA = LIZARDS			
Local Name	**English Name**	**Scientific Name**	**Schedule**
Sorisia Godhi	Indian Monitor Lizard	*Varnus bengalensis*	II
Chamapi Neula	Common Skink	*Mabuya carinata*	-
Chamapi Neula	Little skink	*Mabuya macularia*	-
Endua	Indian Garden Lizard (Blood sucker)	*Calotes versicolor*	-
Bana Endua	Rock Lizard	*Psammophilus blaforduanus*	-
Spotted Indian Gecko (Jhitipiti)	Brook's Gecko	*Hemidactylus brookii*	-
D:FAUNA = BIRDS			
Local Name	**English Name**	**Scientific Name**	**Schedule**
Kapota	Indian Ringed Dove	*Streptopelia decaocto*	IV
Kapota	Indian Spotted Dove	*Streptopelia chinensis*	IV
Pahadi Bulbul	Red whiskered Bulbul	*Pycnonotus jocosus*	IV
Gunduri Chadhei	Grey Patridges	*Francolinus pondicerianus*	IV
Bhuin Pecha	Indian Jungle Night Jar	*Caprimulgus indicus*	IV

Floristic & Faunal compositions are assessed through a rapid field survey and referral inputs from: (1) Flora of Orissa by H.O. Saxena and M. Brahmam, published by RRL Bhubaneswar and OFDC Ltd Bhubaneswar, (2) Wild Life Wealth of Orissa published by Forest Department of Orissa, (3) Gazetteer of Koraput District,(4) Outgoing working plan of Rayagada Forest Division (which includes the present Koraput Forest Division) (5) Revised working plan of Koraput Forest Division for the period of 2006-07 to 2015-16 and (6) other standard references on Forestry and Wild Life.

Range Officer

Forest Range Officer, Laxmipur Range,
Koraput Forest Division

Divisional Forest Officer

Countersigned & Authenticated
by

DFO, Koraput Forest Division

ANNEXURE-V(B)

FLORA IN BUFFER ZONE

Within a 10 Km. Buffer Radius from Mining Lease Boundary of M/s OMC Ltd in Koraput District, Orissa

Forest Types: Tropical Dry and Mixed Deciduous Forests, having sub groups: $5B/C_2$, $5/DS_1$ and $5/DS_2$

A: FLORA = COMMON TREES				
Common / Local Name	**Botanical Name**	**Family**	**Habitat**	**Extent of Distribution**
Achu	*Morinda tinctoria*	Rubiacea	MT	Moderate
Amba	*Mangifera indica*	Anacardiacea	LT	Moderate
Ambada	*Spondias mangifera*	Anacardiacea	MT	Sparse
Ambalata	*Bauhinia racemosa*	Caesalpiniaceae	ST	Sparse
Aonala	*Emblica officianalis*	Euphorbiaceae	ST	Moderate
Bahada	*Terminaleae*	Combretaceae	LT	Moderate
Balthia(Paldhua)	*Erythrina suberosa*	Fabaceae	MT	Moderate
Barbakulia	*Dalbergia paniculata*	Fabaceaea	MT	Moderate
Baro	*Ficus benghalensis*	Moraceaea	LT	Moderate
Bhalia	*Semecapus anacardium*	Anacardeaceae	LT	Moderate
Bod-kurbein	*Wrightia tomentosa*	Apocynaceae	MT	Moderate
Chadaigudi	*Vitex peduncularis*	Verbenaceae	MT	Moderate
Chir	*Buchanania lanzan*	Anacardiaceae	MT	Moderate
Dauranja	*Holoptelia integrifolia*	Ulmaceae	MT	Moderate
Dimiri	*Ficus glomerata*	Moraceae	MT	Moderate
Genduli	*Sterculia urens*	Sterculianceae	MT	Sparse
Gohira	*Acacia leucophloea*	Mimosaceae	MT	Moderate
Goniari(Kantapalas)	*Cochlospermum gossipium*	Cochlospermaceae	MT	Sparse
Harida	*Terminaleae chebula*	Combreaceae	MT	Moderate
Kaju(Lanka Badam)	*Anacardium occidentale*	Anacardiaceae	MT	Sparse(Not endemic)
Kalasiris	*Albizia lebbeck*	Mimosaceae	MT	Sparse
Kamalgundi	*Mallotus phillippensis*	Euphorbiaceae	MT	Moderate
Kendu	*Diospuiros melanoxylon*	Ebenaceae	LT	Moderate
Khajuri	*Phoenix Sylvestirs*	Arecaceae	MT	Moderate
Kusum	*Schleichera oleasa*	Sapindaceae	MT	Moderate
Mahul	*Madhuka indica*	Sapotaceae	LT	Moderate
Mankada kendu	*Diospyros malabarica*	Ebenaceae	LT	Moderate
Moi	*Lannea coromandelica*	Anacardiaceae	MT	Moderate
Phadi sisoo	*Dalbergia latifolia*	Fabaceae	MT	Sparse
Panas	*Artocarpus heterophyllus*	Moraceae	LT	Moderate
Phenphana	*Oroxylum indicum*	Bignoniaceae	LT	Moderate
Pipal	*Ficus religiosa*	Moraceae	LT	Moderate
Ram phala	*Annona reticulata*	Annonaceae	ST	Sparse
Safed siris	*Albizzia procera*	Mimosaceae	MT	Sparse
Sahada	*Strebulus aspero*	Moraceae	MT	Sparse
Sahaja(Asan)	*Terminalea tomentosa*	Combretaceae	LT	Moderate
Sal	*Shorea robusta*	Dipterocarpaceae	LT	Moderate

Range Officer
Laxmipur

Salai	*Boswellia serrata*	Burseraceae	MT	Moderate
Salap(Toddypalm)	*Caryota urens*	Arecaceae	MT	Moderate
Sennha(Sidha)	*Lagerstroemia parviflora*	Lythraceae	MT	Moderate
Sunari	*Cassia fistula*	Caesalpiniaceae	MT	Moderate
Tangini	*Xylia xylocarpa*	Mimosaceae	MT	Moderate
Tentuli	*Tamarindus indica*	Caesalpiniaceae	LT	Moderate
B: FLORA =HERBS & SHRUBS				
Antala-mula	*Hemidesmus indicus*	Asclepiadaceae	SH	Moderate
Apamarsnga	*Achyranthes aspera*	Amaranthaceae	SH	Moderate
Arukha (arka)	*Calotropis procera*	Asclepiadaceae	SH	Moderate
Bana-tulasi	*Ocimum gratissimum*	Lamiaceae	SH	Moderate
Bana-Khajuri	*Phoenix acaulis*	Arecaceae	SH	Moderate
Barkoli	*Ziziphus mauritiana*	Rhamnaceae	SH	Moderate
Bheji Baigana(Ankaranti)	*Solanum xanthocarpum*	Solanaceae	SH	Moderate
Bhuin-Nim(Chirecta) (Kala-megh)	*Andrographis paniculata*	Acanthaceae	SH	Moderate
Bhursunga(Mirsinga pattra)	*Murraya koenigii*	Rutaceae	SH	Moderate
Bisalya-karani/Bhumi poksungo	*Tridax procumbens*	Asteraceae	SH	Moderate
Bisiripi/Bajramuli	*Sida cordifolia*	Malvaceae	SH	Moderate
Brahmi/Thalkuni	*Hydrocotyle asiatica*	Apiaceae	SH	Moderate
Datura (Duddura)	*Datura stramonium*	Solanaceae	SH	Moderate
Dhatiki	*Woodfordia fruticosa*	Lythraceae	SH	Moderate
Dhola chakunda	*Cassia tora*	Caesalpiniaceae	SH	Moderate
Kanteoikoli	*Zizyphus oenoplea*	Rhamnaceae	SH	Moderate
Khakada(Kakali)	*Casearia tomentosa*	Flacourtiaceae	SH	Moderate
Kurei/Kurmi	*Holarrhena antidysenterica*	Apocynaceae	SH	Moderate
Nagauiri(Nagaboiri)	*Lanatana camara*	Verbenaceae	SH	Moderate
Nilabaigaba	*Jatropha gossypifolia*	Euphorbiaceae	SH	Moderate
Patala garuda	*Rauvolfia serpentine*	Apocynaceae	SH	Moderate
Pokusunga	*Eupatorium odoratum*	Asteraceae	SH	Moderate
Tulasi(Kala)	*Ocimum sanctum*	Lamiaceae	SH	Moderate
Tulasi(Dhala)	*Ocimum bacilicum*	Lamiaceae	SH	Moderate
C:FLORA = CLIMBERS				
Atundi	*Combretum dicandrum*	Combretaceae	CL	Moderate
Dantari(Nali-kantia)	*Acacia sinuata*	Mimosaceae	CL	Moderate
Gilo	*Entada acandens/ E. pursaitha*	Mimosaceae	CL	Moderate
Muturi	*Smilax macrophylla*	Smilaceae	CL	Moderate
Nirmuli	*Cassytha filiformis*	Cassytha	CL	Moderate
Satawari	*Asperagus racemosus*	Liliaceae	CL	Moderate
Siali	*Bauhinia vahlii*	Caesalpiniaceae	CL	Moderate

Range Officer
Lasnipur

D:FLORA = BAMBOO				
Badi Baunsa	*Bambusa nutans*	Poaceae	BMB	Sparse
Salia Baunsa	*Dendrocalamus stricius*	Poaceae	BMB	Moderate
Daba/Kanta Baunsa	*Bambusa arundinacea*	Poaceae	BMB	Moderate
Sundarkani	*Bambusa vulgaris*	Poaceae	BMB	Sparse
Taleda Baans	*Bambusa tulda*	Poaceae	BMB	Sparse
E:FLORA = GRASSES				
Chhana	*Imperata arundinaceae*	Poaceae	GR	Moderate
Dhanwaritari (Lemon grass)	*Cymbopogon flexuosus*	Poaceae	GR	Sparse/Cultivated
Duba Ghasa	*Cynodon dactylon*	Poaceae	GR	Moderate
Ghodalanji	*Aristida setaceae*	Poaceae	GR	Moderate
Guguchia	*Chrysopogon gryllus*	Poaceae	GR	Moderate
Jharu	*Aristimella setosa*	Poaceae	GR	Moderate
Phul jhadu	*Thysanolaena maxima*	Poaceae	GR	Moderate
Phuri phuri	*Eragrostis unioloides*	Poaceae	GR	Moderate
F:PLANTATIONS				
Teak	*Tectona grandis*	Verbenaceae	LT	
Acacia	*Acacia auriculiformis*	Mimosaceae	MT	
Aonla	*Emblica officianalis*	Euphorbiaceae	ST	
Neem	*Azadiracta indica*	Meliaceae	LT	
Nilgri	*Eucaliptus sps.*	Myrtaceae	LT	
Safed siris	*Albizzia procera*	Mimosaceae	MT	
Bahada	*Terminalia bellrica*	Combretaceae	LT	
Bija	*Pterocarpus marsupium*	Fabaceae	LT	
Chandan	*Santalum album*	Santalaceae	ST	
Japhra	*Bixa orellana*	Bixaceae	ST	
Sisoo	*Dalbergia sisoo*	Fabaceae	MT	
Japhra	*Bixa orellana*	Bixaceae	ST	
G:COMMERCIAL CROPS				
Kaju	*Anacardium occidentale*	Anacardiaceae	ST	
Japhra	*Bixa orellana*	Bixaceae	ST	
Nilagiri	*Eucaliptus sps.*	Myrtaceae	LT	
Salia Baunsa	*Dendrocalamus strictus*	Poaceae	BMB	
Badi Baunsa	*Bambusa nutans*	Poaceae	-do-	
Sundarkani	*Bambusa vulgaris*	Poaceae	-do-	
Baigaba	*Jatropha curcus*	Euphorbiaceae	ST	
Akhu	*Sugar Cane*			
Dhanwaritari (Lemon grass)	*Cymbopogon flexuosus*	Poaceae	GR	
Aswagandha	*Withania somnifera*	Solanaceae	SH	

LT=Large Tree, MT=Medium Tree, ST=Small Tree, SH= Shrub/Herb, GR= Grass, BMB = Bamboo

Contd...

Range Officer
Lasnipur

ANNEXURE-VI

FAUNA IN BUFFER ZONE

Within a 10 Km. Buffer Radius from Mining Lease Boundary of M/s OMC Ltd in Koraput District, Orissa

II:FAUNA = MAMMALS			
Local Name	**English Name**	**Scientific Name**	**Schedule as per WP(P) Act,1972**
Bagha	Tiger	*Panthera trigris*	I
Banbiradi	Jungle cat	*Felis chaus*	II
Barha	Wild boar	*Sus scrofa cristamus*	III
Badudi	Shortnosed fruitbat	*Cynopterus sphinx*	V
Bhalu	Sloth bear	*Melursus ursinus*	II
Bilua	Jackal	*Canis aureus*	II
Chausingha	The four horned antelope	*Tetracerus quadricornis*	I
Cheetah Biradi	Leopard cat	*Felis bengalensis*	I
Chhuchhundra	Grey musk shrew	*Suncus murinus*	
Gada Bhalu	Ratel	*Mellivora capensis*	I
Gunduchimusa	3 stripped palm squirrel	*Funambulus palmarum*	
Gurandi	Mouse deer	*Tragulus memmina*	I
Harina	Spotted dear	*Axis axis*	III
Heta Bagha	Hyaena	*Hyaena hyaena*	III
Jhinka	Porcupine	*Hystrix indica*	IV
Kalarapatria Bagha	Leopard (Panther)	*Panthera pardus*	I
Kokisiali	Fox	*Vupes bengalensis*	II
Kutura	Barking deer	*Muntiacus muntijak*	III
Mankada (Hanu)	Monkey	*Presbytis entellus*	II
Mankada (Pati)	Rhesus monkey	*Macaca mulatta*	II
Musa	Rat	*Ratus rattus*	V
Musa	White tailed wood rat	*Ratus blanfordi*	V
Musa	Long tailed tree mouse	*Vandeleuria oleracea*	V
Musa (Nepali)	Giant Indian squirrel	*Ratufa indica*	II
Musa (Hatia)	Common mongoose	*Herpestes edwardsi*	II
Musa (Kuji)	Small Indian mongoose	*Herpestes auropunctatus*	III
Odha	Smooth Indian otter	*Lutra perspicillata*	III
Ramsiali	Wolf	*Canis lupus*	I
Saliapatani	Small Indian civet	*Viverricula indica*	III
Saliapatani	Toddycat	*Paradoxurus hermaphroditus*	III
Sambar	Sambar	*Cervus unicolor*	III
Thekua	Hare	*Lepus nigricollis*	IV

I:FAUNA = SNAKES			
Local Name	**English Name**	**Scientific Name**	**Schedule**
Ajagarh	Indian python	*Pynthon molurus*	I
Boda	Common boa	*Boa constrica*	IV
Chiti	Common Indian Krait	*Bungarus coeruleus*	IV
Dhamana	Rat snake	*Ptyas mucosus*	IV

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Dhandaboda	Russels viper	*Viper russeli*	IV
Dhalinag	Saw scale viper	*Echis carinatus*	IV
Kandanali	Tree snake	*Ahetulla spp*	IV
Laudankia	Common green whipsnake	*Dryophis nasutrus*	IV
Naga	Indian cobra	*Naja naja*	IV
Pani dhanda	Checkeered keel back	*Natrix piscator*	IV
Rana	Krait	*Bungarus candidus*	IV

J:FAUNA = LIZARDS			
Local Name	**English Name**	**Scientific Name**	
Sorisia Godhi	Indian Monitor Lizard	*Varanus bengalensis*	II
Chamapi Neula	Common Skink	*Mabuya carinata*	-
Chamapi Neula	Little skink	*Mabuya macularia*	-
Endua	Indian Garden Lizard (Blood sucker)	*Calotes versicolor*	-
Bana Endua	Rock Lizard	*Psammophilus blafordanus*	-
Spotted Indian Gecko (Jhitipiti)	Brook's Gecko	*Hemidactylus brookii*	-

K:FAUNA = BIRDS			
Local Name	**English Name**	**Scientific Name**	
Baga	Cattle Egret	*Babulcus*	IV
Banakukuda	Grey Jungle fowl	*Gallus sonnerati*	IV
Baya	Baya (weaver bird)	*Ploceus phillipinus*	IV
Bhadbhadalia	Roller or blue jay	*Coracias benghalensis*	IV
Bhaliakhai	Common Grey Hornbill	*Tockus birostris*	IV
Bulbul or Gobrachadhei	Red Vented Bulbul	*Pycnonotus cafer*	IV
Chilla	Common Pariak Kite	*Milvus migrans*	IV
Damara kao	Jungle Crow	*Corvus macrorhynchos*	IV
Deuliapara	Blue rock Pigeon	*Columba livia(Gmelin)*	IV
Gharchatia	House Sparrow	*Passer domesticus*	IV
Ghukalika	Pied Myna	*Sturnus contra*	IV
Gunduri	Blue Legged Quail	*Turnix suscitator*	IV
Haladi Basanta	Black Headed Oriole	*Oriolus xanthornus*	IV
Kajalapati	Black Drongo	*Dicrurus macrocerus*	IV
Kantiabaga	Pond Heron	*Ardeola grayili*	IV
Kapota	Ring Dove	*Streptopelia decaocto*	IV
Kapota	Dove spotted	*Streptopelia chinensis*	IV
Kathkhumpa	Wood pecker	*Picoides nanus*	IV
Kathakhumpa	Golden backed Woodpecker	*Dinopium benghalense*	IV
Kau	House Crow	*Corvus splenedens*	IV
Koili	Common Cuckoo	*Cuculus varius*	IV
Koili	Indian Cuckoo	*Cuculus micropterus*	IV
Kuchilakhai	Malabar pied Hornbill	*Anthracoceros coronatus*	I
Kumbhatua	Crow pheasant	*Centopus sinensis*	IV
Kuncha	Common Babbler	*Turdoides caudatus*	IV

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Machharanka	Pied King fisher	*Ceryle rudis*	IV
Mayur	Common Peafowl	*Pavo cristatus(Linnaeus)*	IV
Nilkantha	Magpie Robin	*Copsychus saularis*	IV
Pahadi Bulbul	Bulbul (red whiskered)	*Pyonomotus jocosus*	IV
Para	Imperial Green Pigeon	*Ducula aenea*	IV
Pecha	Indian Owl	*Bubo bubo*	IV
Sari	Hill Myna	*Gracula religiosa*	IV
Sua	Indian Parakeet	*Psittacula eupatria*	IV
Teetiri/Gunduri	Grey Patridge	*Francolinus pondicerianus*	IV
Teetiri/Gunduri	Bush Quail	*Perdicula asiatica*	IV
Teetiri/Gunduri	Bushpainted Quail	*Perdicula erythrorhyncha*	IV

Floristic & Faural compositions are assessed through a rapid field survey and referral inputs from: (1) Flora of Orissa by H.O. Saxena and M. Brahmam, published by RRL Bhubaneswar and OFDC Ltd Bhubaneswar, (2) Wild Life Wealth of Orissa published by Forest Department of Orissa, (3) Gazetteer of Koraput District,(4) Outgoing working plan of Rayagada Forest Division (which includes the present Koraput Forest Division) (5) Revised working plan of Koraput Forest Division for the period of 2006-07 to 2015-16 and (6) other standard references on Forestry and Wild Life.

Forest Range Officer, Laxmipur Range,
Koraput Forest Division

Countersigned & Authenticated
by
DFO, Koraput Forest Division

ANNEXURE – VII

DEMOGRAPHIC FEATURES OF 10 KMS SURROUNDING THE MINE

Population Distribution Pattern

Particulars	Numbers
No. of households	12784
Male population	26632
Female population	26579
Total population	53211
Average household size	4
Male (%)	50.05
Female (%)	49.95

Population Category

Particulars	Numbers
Schedule Caste	850
% to the total population	10.99
Schedule Tribe	38600
% to the total population	72.54
Total SC & ST population	44450
% to total population	83.54
Other Caste population	8761
% to total population	16.46
Total population	53211

Literacy Level

Particulars	Numbers
Total literate	11874
Average literacy (%)	22.31
Male literate	8488
% to total male population	71.48
Female literate	3386
% to total female population	28.52
Total population	53211

Occupational Structure

Particulars	Numbers
Total main workers	14509
% to study area	27.27
Marginal workers	11616
% to study area	21.83
Non – workers	27086
% to study area	50.90
Total population	53211

PLATES

PLATE-7

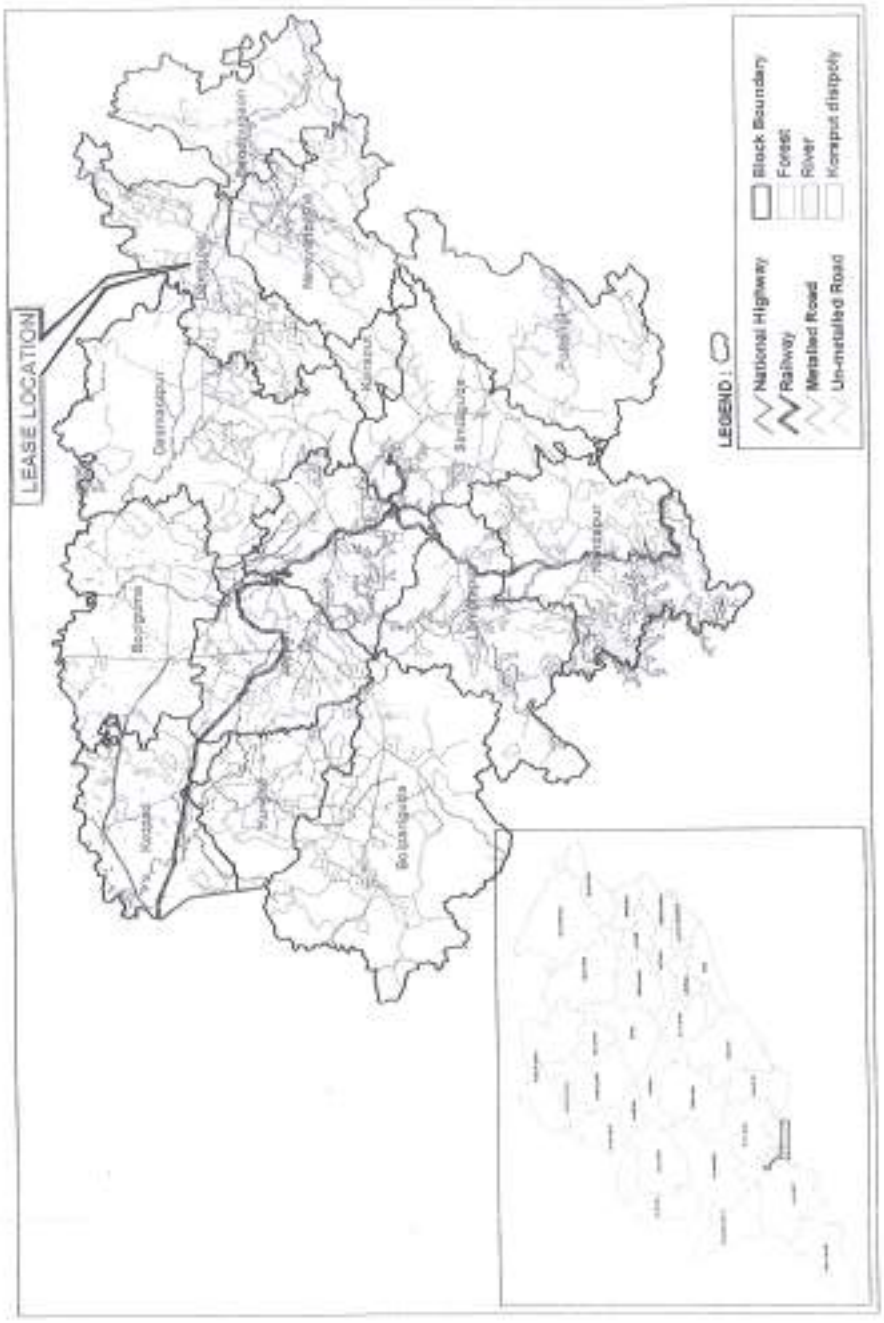


PLATE-II:
MAP OF ZONE OF IMPACTPLATE-II: MAP OF ZONE OF IMPACT

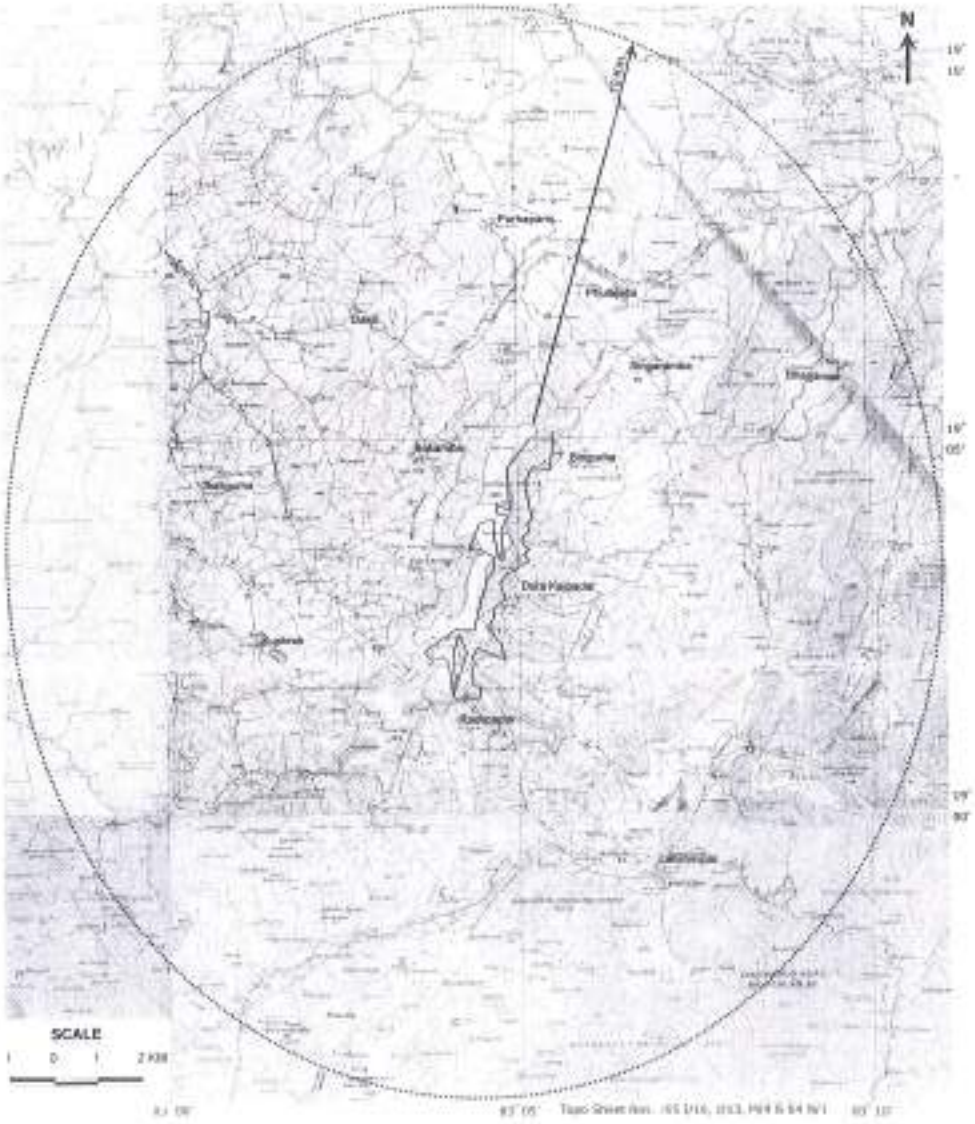
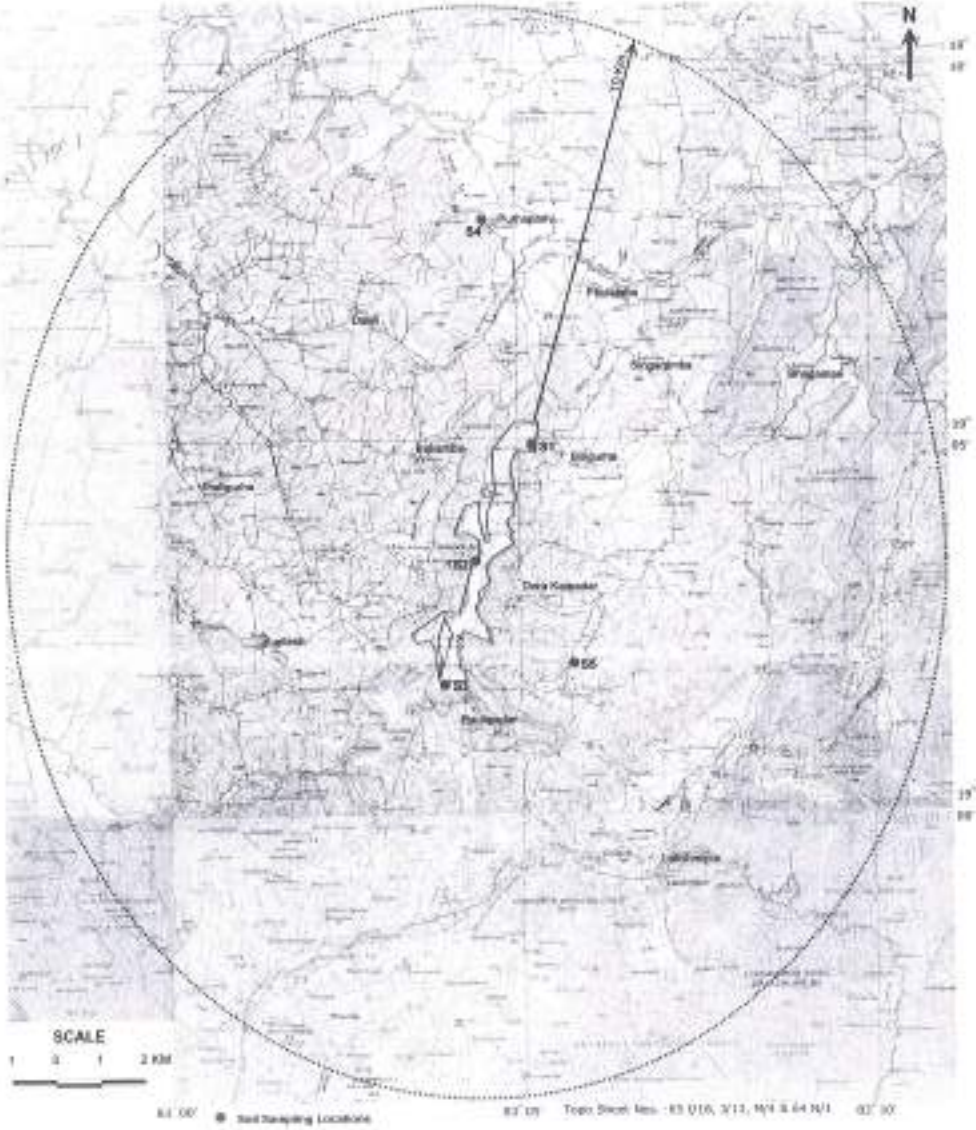


PLATE-III:
LOCATION OF BAUXITE MINE SHOWN ON TOPO SHEET



Annexure-X_ Letter to DFO dated 28.03.2025

OMC | ODISHA NEW OPPORTUNITIES

Mining Happiness

Letter No. 4704/ OMC/F&E/2025
March 29, 2025

To

The Divisional Forest Officer
Koraput Forest Division

The Divisional Forest Officer
Rayagada Forest Division

Sub.: Expansion of Kodingamali Bauxite Mine with enhancement in Production Capacity from 3.0 MTPA to 3.6 MTPA (Phase I - 20%) in the Mine Lease area of 428.075ha by M/s Odisha Mining Corporation Limited located at Village Kodingamali, Tehsil Laxmipur & Kashipur, District Koraput & Rayagada, Odisha under para 7 (ii) (a) of EIA Notification, 2006 as per MoEFCC OM dated 11.04.2022 & 30.05.2022 - For Environmental Clearance reg.

Ref.: (i) Minutes of Meeting of 41st EAC (Non-Coal Mining Sector) held on dt. 27.02.2025(copy enclosed)
(ii) OMC Letter no. 19033/OMC/F&E/2024 dt. 04.11.2024

Sir,

OMC has applied for the expansion of bauxite ore production capacity from 3.0 MTPA to 3.6 MTPA (Phase I - 20%) within the mine lease area of 428.075 ha for Kodingamali Bauxite Mines. The 41st Expert Appraisal Committee (EAC) of MoEF&CC, Govt. of India, has recommended the Environmental Clearance (EC) proposal, subject to specific conditions related to the preparation of the Site-Specific Wildlife Conservation Plan (SSWLCP), which reads as under:

1) The Project Proponent (PP) consult with State Forest department with respect to the protection and conservation the elephant cited within/near to ML area in order to avoid any human-wildlife conflict.
2) PP needs to submit the latest approved wildlife conservation plan after incorporating the provisions for conservation of Elephant within 6 months from the date of issuance of the EC.
3) The PP needs to use modern equipment's such as Camera Traps for ensuring presence and movement of wild animals in the study area in consultation with Wildlife Wing of Forest Department. Appropriate interventions shall be taken to minimise stress conditions for wild animals and to avoid Man-Animal conflict
4) PP shall consult State Forest Department and Chief Wildlife Warden about the additional steps to be taken for conservation and free movement of Elephants near the Mine Lease area.

In context to the above, it is requested to kindly incorporate the above-mentioned EAC-specific conditions in the SSWLCP pertaining to Kodingamali Bauxite Mines of OMC Ltd. for approval by PCCF(WL) & CWLW, Odisha.

An early action is highly solicited.

Yours faithfully,

28/03/2025

General Manager (F&E)

Memo No. 4705 Date 28.03.2025

Copy submitted to Regional Manager, South-zone, Rayagada for kind information and necessary action.

28/03/2025

General Manager (F&E)

Annexure XI_Authenticated Past Production Figures

OFFICE OF THE DEPUTY DIRECTOR OF MINES, KORAPUT CIRCLE, KORAPUT.

Main Road, Koraput-764020.
Mail: ddm.koraput@orissaminerals.gov.in ,Phone: 06852-251283.

No: 620 /Mines, Dt: 09 /05/2025.

From

Deputy Director of Mines,
Koraput Circle, Koraput..

To,

The Mines Manager,
Kodingamali Bauxite Mines,
At/Post. Laxmipur, Dist Koraput.

Sub: Authentication of production quantity of Kodingamali Bauxite Mines from 1993-94 to 2025-26.(up to April-2025).

Ref: Your letter No.1008/OMC/KBM/2025, Dt.09.05.2025.

Sir,

In inviting a reference to the letter cited above, I am to furnish herewith the duly authenticated production of Kodingamali Bauxite Mines over 428.075 Hects for the period from 1993-94 to 2025-26 (up to April-2025), which was duly verified by Sri Krushna Chandra Khuntia Mining Officer, Koraput, in separate sheet.

This is for favour of your kind information and necessary action.

Encl: As above.

Yours faithfully,

9/5/2025

Deputy Director of Mines,
Koraput Circle, Koraput.

PRODUCTION REPORT OF KODINGAMALI BAUXITE ORE MINES, M/S OMC LIMITED FOR THE YEAR 1993-94 TO 2025-26(upto April 2025)

(All figures are in Metric Tonnes)

Sl.No.	FINANCIAL YEAR	QUANTITY
1	1993-94	Nil
2	1994-95	Nil
3	1995-96	Nil
4	1996-97	Nil
5	1997-98	Nil
6	1998-99	Nil
7	1999-20	Nil
8	2000-01	Nil
9	2001-02	Nil
10	2002-03	Nil
11	2003-04	Nil
12	2004-05	Nil
13	2005-06	Nil
14	2006-07	Nil
15	2007-08	Nil
16	2008-09	Nil
17	2009-10	Nil
18	2010-11	Nil
19	2011-12	Nil
20	2012-13	Nil
21	2013-14	Nil
22	2014-15	Nil
23	2015-16	Nil
24	2016-17	Nil
25	2017-18	53,000.000
26	2018-19	27,00,000.000
27	2019-20	30,00,000.000
28	2020-21	29,99,500.000
29	2021-22	30,00,000.000
30	2022-23	30,00,000.000
31	2023-24	30,00,000.000
32	2024-25	30,00,000.000
33	2025-26(Upto April 2025)	3,05,000.000
Total		**2,10,57,500.000**

9/5/2025
Chief Clerk
Odisha Mining Corp. Ltd.
Kodingamali Bauxite Mines

9/5/2025
Sr.Manager(Mining)
Kodingamali Bauxite Mines
Sr.Manager (Mining)
Kodingamali Bauxite Mines
OMC Ltd

9/5/2025
Mines Manager
Kodingamali Bauxite Mines
Odisha Mining Corporation Ltd

9/5/25
Mining Officer
Koraput Circle, Koraput
Mining Officer
Koraput Circle,Koraput

9/5/2025
Dy.Director of Mines
Deputy Director of Mines,
Koraput Circle,Koraput.

Ambient Air Quality Monitoring Table

1. LOCATION: Mine Site **(Unit µg/m³)**

Date	CLOCK HOURS							
	00-08		08-16		16-24		24 HOURS	24 HOURS
	SO_2	NO_2	SO_2	NO_2	SO_2	NO_2	PM_{10}	$PM_{2.5}$
03.10.2024	6.9	15.4	10.3	20.2	8.5	17.6	69.4	38.5
04.10.2024	6.8	14.2	9.3	19.2	7.4	17.3	67.5	37.8
10.10.2024	6.0	14.6	8.0	20.4	7.7	16.5	64.4	35.2
11.10.2024	5.5	15.2	9.4	20.1	8.1	16.8	63.2	38.7
17.10.2024	6.4	15.2	10.2	18.4	7.8	16.4	65.2	32.3
18.10.2024	6.9	14.5	9.2	18.6	6.9	17.9	67.6	36.9
24.10.2024	6.4	15.0	8.7	18.9	7.1	17.1	64.4	35.9
25.10.2024	6.2	14.7	9.1	20.1	7.9	17.5	67.2	40.4
31.10.2024	6.1	15.7	8.4	19.9	8.3	17.9	64.1	33.8
01.11.2024	5.3	14.3	8.1	18.4	6.5	16.2	62.8	33.1
07.11.2024	7.0	15.3	10.4	19.4	7.4	17.6	71.3	39.1
08.11.2024	6.2	15.4	8.5	20.2	7.8	16.3	64.4	36.1
14.11.2024	6.1	15.9	8.9	18.4	8.3	17.2	66.7	35.7
15.11.2024	5.4	15.5	8.5	19.2	7.5	17.6	69.0	36.1
21.11.2024	5.9	15.7	9.3	18.6	6.1	16.1	66.3	39.2
22.11.2024	6.1	15.8	8.8	19.1	6.8	16.5	65.6	35.5
28.11.2024	6.9	14.9	9.5	19.6	7.7	17.2	67.5	35.1
29.11.2024	5.8	14.8	9.9	19.4	8.4	16.7	69.1	36.8
05.12.2024	5.3	14.6	8.3	18.1	7.1	17.9	70.1	34.5
06.12.2024	5.9	15.9	10.0	18.4	7.7	16.4	65.7	33.7
12.12.2024	5.5	14.3	8.1	18.3	6.9	16.1	63.4	33.9
13.12.2024	6.1	14.5	10.4	19.4	7.8	16.4	65.4	35.6
19.12.2024	6.3	14.9	9.6	18.8	6.8	16.9	63.8	37.4
20.12.2024	6.7	15.7	10.7	20.7	8.5	16.3	66.5	39.1
26.12.2024	5.8	14.9	9.9	20.1	8.0	17.5	64.3	36.2
27.12.2024	5.5	14.2	8.1	18.5	6.6	16.1	63.1	33.6

	NO_2	SO_2	PM_{10}	$PM_{2.5}$
	(Unit µg/m³)			
Max.	20.7	10.7	71.3	40.4
Min.	14.2	5.3	62.8	32.3
95%tile	20.1	10.3	69.9	39.2
98%tile	20.3	10.4	70.7	39.8

Ambient Air Quality Monitoring Table

2. Monitoring Location at ~500 m in Downwind Direction **(Unit µg/m³)**

Date	CLOCK HOURS							
	00-08		08-16		16-24		24 HOURS	24 HOURS
	SO_2	NO_2	SO_2	NO_2	SO_2	SO_2	PM_{10}	$PM_{2.5}$
04.10.2024	4.3	8.0	5.7	12.0	4.6	10.8	47.1	31.1
05.10.2024	4.1	7.9	5.9	12.3	5.0	10.0	44.3	33.4
11.10.2024	4.5	7.3	6.4	13.1	4.7	10.5	51.5	34.0
12.10.2024	4.1	8.9	5.9	11.5	4.9	11.0	55.2	33.6
18.10.2024	4.7	8.5	5.3	12.8	5.1	10.9	53.7	31.5
19.10.2024	4.5	9.0	5.6	11.3	4.9	11.0	50.9	27.3
25.10.2024	4.1	8.7	5.3	12.7	5.5	10.9	51.6	26.9
26.10.2024	4.1	7.6	5.1	12.9	5.6	10.2	56.1	27.7
01.11.2024	4.6	7.3	5.5	12.9	5.1	9.4	44.7	30.3
02.11.2024	4.1	7.2	4.9	11.1	4.4	9.2	43.9	25.8
08.11.2024	4.8	7.9	5.7	12.5	4.5	10.5	49.6	31.8
09.11.2024	4.4	7.6	5.3	13.0	4.9	9.4	50.8	32.1
15.11.2024	4.4	8.0	5.4	12.6	5.1	11.0	54.1	27.5
16.11.2024	4.8	8.2	6.1	11.7	5.3	10.9	44.9	30.3
22.11.2024	4.2	7.7	6.0	12.4	5.1	9.6	49.3	28.7
23.11.2024	4.5	8.6	5.4	12.6	4.7	9.6	50.5	28.9
29.11.2024	4.7	8.2	6.1	12.5	4.7	10.3	44.9	27.8
30.11.2024	4.2	7.5	5.3	12.9	5.3	9.6	50.7	30.4
06.12.2024	4.6	8.0	5.9	11.6	5.5	9.6	51.5	32.7
07.12.2024	4.1	7.3	4.8	11.2	4.4	9.2	43.9	25.2
13.12.2024	4.1	7.2	5.0	11.5	4.6	9.5	44.2	26.1
14.12.2024	4.2	7.3	6.4	12.0	5.0	9.8	52.4	34.0
20.12.2024	4.5	7.9	5.4	11.3	5.2	10.3	55.1	27.8
21.12.2024	4.5	7.6	4.9	11.4	5.0	9.8	53.2	32.1
27.12.2024	4.3	8.4	5.8	11.8	5.2	9.6	49.2	32.9
28.12.2024	4.1	7.2	4.7	11.2	4.3	9.2	45.1	26.3

	NO_2	SO_2	PM_{10}	$PM_{2.5}$
	(Unit µg/m³)			
Max.	13.1	6.4	56.1	34.0
Min.	7.2	4.1	43.9	25.2
95%tile	12.9	6.0	55.2	33.9
98%tile	13.0	6.2	55.7	34.0

Ambient Air Quality Monitoring Table

3. LOCATION: Balijorhi

Date	CLOCK HOURS							
	00-08		08-16		16-24		24 HOURS	24 HOURS
	SO_2	NO_2	SO_2	NO_2	SO_2	SO_2	PM_{10}	$PM_{2.5}$
01.10.2024	4.2	9.0	6.6	13.0	5.5	10.7	40.5	22.9
02.10.2024	4.5	8.5	6.7	11.9	5.7	10.4	44.7	23.5
08.10.2024	4.7	8.1	6.0	12.4	5.2	9.9	34.1	21.4
09.10.2024	4.4	8.2	6.8	12.3	5.8	10.2	35.9	23.1
15.10.2024	4.9	9.4	5.9	12.1	5.2	9.8	36.4	29.5
16.10.2024	4.6	8.9	6.6	11.9	5.5	10.9	32.2	24.2
22.10.2024	4.7	8.7	6.7	12.2	5.3	9.7	39.4	26.4
23.10.2024	4.4	9.2	6.7	12.1	5.7	10.3	40.8	26.3
29.10.2024	5.0	9.5	5.6	12.6	5.1	10.1	35.6	33.5
30.10.2024	4.2	8.0	6.1	11.8	4.5	9.8	30.5	20.1
05.11.2024	5.3	9.1	6.1	13.3	5.5	10.6	44.7	28.1
06.11.2024	4.5	8.2	6.7	13.0	4.9	9.8	30.5	27.4
12.11.2024	4.6	9.4	6.8	12.4	5.1	10.9	40.6	23.6
13.11.2024	4.7	8.9	6.2	12.8	5.0	10.7	46.9	24.8
19.11.2024	4.8	9.5	6.9	13.4	5.7	9.7	43.4	30.1
20.11.2024	5.4	9.8	6.6	11.9	5.5	10.6	40.1	28.5
26.11.2024	4.7	9.3	6.4	12.8	5.0	10.0	46.4	26.4
27.11.2024	4.5	8.9	7.0	13.0	4.9	9.9	43.2	31.7
03.12.2024	4.7	8.5	6.6	12.0	5.5	10.9	35.7	24.6
04.12.2024	4.3	8.1	6.3	11.7	5.5	10.1	31.4	22.3
10.12.2024	4.1	8.3	6.0	11.9	5.4	9.8	30.9	21.6
11.12.2024	5.2	8.6	5.8	12.6	5.7	10.2	38.5	32.4
17.12.2024	5.0	8.8	6.5	11.9	5.4	11.5	41.3	30.1
18.12.2024	4.6	9.0	6.5	12.2	5.3	9.8	37.6	22.5
24.12.2024	4.3	9.4	6.3	13.2	5.6	11.1	36.2	29.2
25.12.2024	4.0	8.2	6.1	11.7	5.5	9.8	31.1	20.8

	NO_2	SO_2	PM_{10}	$PM_{2.5}$
	(Unit µg/m^3)			
Max.	13.4	7.0	46.9	33.5
Min.	8.0	4.0	30.5	20.1
95%tile	13.0	6.7	46.0	32.2
98%tile	13.2	6.9	46.6	33.0

Ambient Air Quality Monitoring Table

4. LOCATION: Birigurha

Date	CLOCK HOURS							
	00-08		08-16		16-24		24 HOURS	24 HOURS
	SO_2	NO_2	SO_2	NO_2	SO_2	SO_2	PM_{10}	$PM_{2.5}$
04.10.2024	4.9	10.1	6.9	14.3	5.9	12.0	40.3	28.7
05.10.2024	5.1	9.8	7.1	14.5	5.9	12.8	39.2	25.5
11.10.2024	4.6	9.3	6.5	14.6	6.0	13.1	43.1	26.1
12.10.2024	4.8	9.5	6.3	15.8	5.8	13.5	39.5	28.4
18.10.2024	5.1	9.5	7.1	16.0	5.7	12.7	47.8	29.5
19.10.2024	5.0	11.4	6.7	15.6	6.1	12.1	45.2	30.7
25.10.2024	4.7	9.8	6.9	14.5	5.2	11.7	43.9	31.5
26.10.2024	4.9	9.9	7.1	15.7	5.5	12.3	40.7	29.8
01.11.2024	4.5	10.7	6.5	14.7	6.0	13.3	42.9	27.6
02.11.2024	4.4	9.1	6.0	14.4	5.2	11.5	38.2	23.1
08.11.2024	5.0	11.3	5.9	14.3	5.9	12.7	46.4	24.4
09.11.2024	4.9	10.5	6.2	16.0	5.1	14.0	47.8	28.9
15.11.2024	5.0	9.9	5.8	16.4	5.9	13.4	45.6	25.6
16.11.2024	4.7	10.3	6.9	15.9	6.2	13.3	39.1	24.5
22.11.2024	4.9	10.7	6.3	15.5	5.8	12.4	48.5	27.1
23.11.2024	5.0	9.8	6.9	15.1	6.0	13.7	46.2	28.5
29.11.2024	5.1	10.1	6.7	15.7	5.7	11.5	49.3	24.8
30.11.2024	4.8	10.9	7.1	15.6	5.5	12.1	38.6	31.2
06.12.2024	4.7	9.5	6.2	15.2	5.4	12.1	42.3	25.8
07.12.2024	4.5	9.3	6.3	16.1	5.0	13.7	44.2	24.1
13.12.2024	4.2	9.5	6.0	14.2	5.2	11.8	39.7	22.9
14.12.2024	4.8	9.9	7.0	16.0	5.2	11.5	38.5	23.5
20.12.2024	4.5	9.2	7.1	16.4	5.9	11.6	45.5	23.5
21.12.2024	4.7	9.5	6.4	15.8	6.1	11.9	50.2	26.8
27.12.2024	5.1	9.6	7.0	14.8	5.6	12.9	39.2	25.6
28.12.2024	4.2	9.1	6.1	14.1	5.3	11.7	38.4	23.2

	NO_2	SO_2	PM_{10}	$PM_{2.5}$
	(Unit µg/m^3)			
Max.	7.1	16.4	50.2	31.5
Min.	4.2	9.1	38.2	22.9
95%tile	7.1	16.0	49.1	31.1
98%tile	7.1	16.2	49.7	31.4

Ambient Air Quality Monitoring Table

5. LOCATION: Upar Karihanga

Date	CLOCK HOURS							
	00-08		08-16		16-24		24 HOURS	24 HOURS
	SO_2	NO_2	SO_2	NO_2	SO_2	SO_2	PM_{10}	$PM_{2.5}$
05.10.2024	6.1	13.9	8.7	17.1	7.8	14.6	53.1	34.1
06.10.2024	6.6	14.1	8.9	18.0	7.6	16.1	55.7	31.7
12.10.2024	6.9	13.7	8.6	16.6	7.9	14.6	49.3	31.5
13.10.2024	6.6	13.8	9.0	16.9	8.0	16.1	55.5	32.4
19.10.2024	7.0	13.9	9.1	18.0	8.3	15.6	57.4	35.1
20.10.2024	6.7	14.3	8.6	16.9	7.6	15.5	48.3	29.3
26.10.2024	6.9	12.7	8.8	16.5	7.7	15.1	50.2	35.3
27.10.2024	7.1	14.1	9.6	17.2	8.2	14.7	53.7	34.8
02.11.2024	6.4	13.5	8.8	17.5	7.9	14.9	49.7	29.6
03.11.2024	6.2	12.7	8.5	16.4	7.3	14.5	46.9	28.6
09.11.2024	7.1	13.3	8.6	16.9	8.1	16.2	58.9	30.9
10.11.2024	6.6	14.0	8.8	17.2	7.9	15.4	57.2	29.4
16.11.2024	6.8	13.7	9.2	17.7	7.7	14.7	52.3	29.6
17.11.2024	7.1	13.7	9.4	16.6	7.5	15.2	48.4	30.9
23.11.2024	6.1	14.0	8.9	17.1	7.8	15.8	46.7	33.3
24.11.2024	6.2	13.2	8.5	16.7	8.3	14.9	47.2	34.8
30.11.2024	6.3	12.9	9.4	17.6	7.5	15.2	58.6	32.6
01.12.2024	7.0	12.9	8.5	16.5	8.2	14.8	49.7	33.5
07.12.2024	7.1	13.4	9.3	16.6	8.2	15.8	49.3	35.1
08.12.2024	6.3	12.7	8.5	16.5	7.4	14.5	46.1	28.4
14.12.2024	6.0	12.9	8.7	16.7	7.2	14.7	45.5	29.1
15.12.2024	6.0	14.4	9.1	17.4	7.6	14.6	48.5	32.3
21.12.2024	6.9	13.5	8.9	16.3	7.8	14.2	55.7	35.6
22.12.2024	7.2	13.5	9.2	17.3	8.1	16.1	54.3	31.1
28.12.2024	6.7	13.5	8.9	16.8	7.4	14.9	61.0	29.6
29.12.2024	6.0	12.7	8.5	16.3	7.2	14.5	45.6	28.9

	NO_2	SO_2	PM_{10}	$PM_{2.5}$
	(Unit µg/m^3)			
Max.	9.6	18.0	61.0	35.6
Min.	6.0	12.7	45.5	28.4
95%tile	9.2	17.5	58.8	35.3
98%tile	9.4	17.9	59.9	35.5

Ambient Air Quality Monitoring Table

6. Narsinghagurha

Date	CLOCK HOURS							
	00-08		08-16		16-24		24 HOURS	24 HOURS
	SO_2	NO_2	SO_2	NO_2	SO_2	SO_2	PM_{10}	$PM_{2.5}$
01.10.2024	3.7	6.6	4.5	10.1	4.3	7.4	41.5	22.1
02.10.2024	4.6	6.9	4.5	10.4	4.4	7.3	39.3	19.9
08.10.2024	4.3	5.4	4.2	9.3	4.1	7.1	37.5	20.7
09.10.2024	4.5	6.1	4.1	9.5	4.4	8.5	35.1	24.8
15.10.2024	3.6	5.9	4.5	9.9	4.1	7.5	39.7	26.6
16.10.2024	4.2	6.7	4.3	10.1	4.3	7.7	43.3	27.2
22.10.2024	4.4	6.5	4.1	9.5	4.2	7.2	32.9	22.6
23.10.2024	4.2	5.7	4.5	10.2	4.1	8.3	43.5	21.3
29.10.2024	4.4	5.4	4.3	8.9	4.2	7.1	27.3	18.5
30.10.2024	3.9	6.3	3.9	10.1	3.3	7.7	33.7	18.9
05.11.2024	4.5	5.8	4.2	9.4	4.5	7.5	45.7	27.1
06.11.2024	4.2	6.5	4.0	9.1	4.3	7.9	39.1	26.8
12.11.2024	4.4	6.4	4.1	9.8	4.4	8.2	43.5	25.2
13.11.2024	3.6	5.9	4.3	10.2	4.4	7.5	40.7	23.6
19.11.2024	4.4	5.6	4.4	10.2	4.1	7.3	31.6	25.2
20.11.2024	4.5	5.9	4.4	9.7	4.2	8.1	36.9	22.4
26.11.2024	4.3	5.7	4.4	9.2	4.3	8.6	37.7	22.9
27.11.2024	4.4	6.0	4.5	10.2	4.2	7.7	29.8	24.2
03.12.2024	4.3	5.4	4.1	8.8	4.4	7.5	27.9	18.3
04.12.2024	3.2	5.6	3.2	9.0	4.1	7.1	28.5	19.9
10.12.2024	3.4	5.8	3.7	10.3	3.4	7.7	31.7	23.7
11.12.2024	4.2	6.2	4.4	9.9	4.0	8.6	33.9	20.9
17.12.2024	4.1	6.9	4.2	9.2	4.3	7.2	31.5	25.1
18.12.2024	4.3	5.5	4.6	9.8	4.4	7.4	28.7	20.5
24.12.2024	4.5	5.4	4.4	8.8	4.4	7.1	27.6	18.6
25.12.2024	3.9	5.7	4.0	10.4	3.6	8.5	31.3	21.9

	NO_2	SO_2	PM_{10}	$PM_{2.5}$
	(Unit µg/m^3)			
Max.	4.6	10.4	45.7	27.2
Min.	3.2	5.4	27.3	18.3
95%tile	4.5	10.2	43.5	27.0
98%tile	4.6	10.3	44.6	27.2

Ambient Air Quality Monitoring Table

7. Purparhi

Date	CLOCK HOURS							
	00-08		08-16		16-24		24 HOURS	24 HOURS
	SO_2	NO_2	SO_2	NO_2	SO_2	SO_2	PM_{10}	$PM_{2.5}$
04.10.2024	4.4	6.5	5.6	12.2	5.2	10.1	43.6	33.2
05.10.2024	4.3	8.3	5.9	11.1	4.7	9.4	45.3	25.9
11.10.2024	4.5	7.8	5.7	11.9	5.0	10.6	44.8	29.1
12.10.2024	4.6	6.6	5.6	12.3	5.3	9.7	42.3	27.3
18.10.2024	4.6	8.4	6.0	11.0	4.7	10.1	45.1	32.3
19.10.2024	3.6	6.9	5.8	12.1	4.9	8.8	38.1	24.8
25.10.2024	4.2	7.1	5.9	11.1	5.1	8.6	37.6	25.1
26.10.2024	4.4	7.9	5.3	11.5	4.9	9.5	40.3	31.5
01.11.2024	4.3	8.5	6.0	11.1	5.0	10.1	45.5	28.1
02.11.2024	4.3	7.4	5.0	10.9	4.9	10.8	49.7	33.3
08.11.2024	4.4	7.0	5.8	12.0	5.2	10.3	41.2	26.7
09.11.2024	4.2	6.7	5.9	10.9	5.0	9.1	39.8	29.3
15.11.2024	3.8	8.5	5.5	11.7	4.9	10.5	42.8	25.1
16.11.2024	3.1	6.6	5.6	12.6	4.8	9.9	45.2	31.6
22.11.2024	3.6	6.9	5.7	12.9	5.3	10.7	41.6	27.1
23.11.2024	4.3	8.3	5.3	12.7	5.2	9.5	46.0	26.9
29.11.2024	3.8	8.5	5.1	12.5	5.0	10.1	44.7	29.5
30.11.2024	4.5	7.6	5.6	11.6	4.8	10.6	42.4	30.6
06.12.2024	4.3	7.9	5.4	11.2	4.8	8.9	46.6	31.6
07.12.2024	3.7	6.5	5.6	10.9	5.1	8.6	37.9	25.1
13.12.2024	4.4	6.6	5.8	12.8	5.1	8.6	40.9	33.4
14.12.2024	4.4	8.0	5.7	11.7	4.9	10.4	38.9	31.2
20.12.2024	4.3	7.6	5.4	11.9	5.2	8.8	50.3	30.5
21.12.2024	3.8	8.4	5.2	12.3	5.0	10.5	40.8	25.8
27.12.2024	4.3	6.7	5.8	11.1	5.3	9.2	39.3	27.1
28.12.2024	4.4	7.9	5.7	12.3	4.9	8.7	45.5	29.2

	NO_2	SO_2	PM_{10}	$PM_{2.5}$
	(Unit µg/m^3)			
Max.	6.0	12.9	50.3	33.4
Min.	3.1	6.5	37.6	24.8
95%tile	5.9	12.5	48.9	33.3
98%tile	5.9	12.8	50.0	33.4

Ambient Air Quality Monitoring Table

8. Marabaigurha

Date	CLOCK HOURS							
	00-08		08-16		16-24		24 HOURS	24 HOURS
	SO_2	NO_2	SO_2	NO_2	SO_2	SO_2	PM_{10}	$PM_{2.5}$
07.10.2024	5.0	8.0	5.9	11.8	5.4	10.3	40.9	28.9
08.10.2024	4.9	7.3	6.8	11.5	5.9	10.9	38.6	22.0
14.10.2024	5.2	7.5	5.7	12.2	6.0	9.5	34.8	24.5
15.10.2024	4.5	7.8	6.4	13.0	5.1	11.0	26.2	27.1
21.10.2024	4.7	8.1	6.8	12.7	5.3	9.1	29.4	24.9
22.10.2024	3.7	7.7	6.1	12.2	5.0	9.3	26.1	19.9
28.10.2024	4.4	7.9	5.6	13.0	4.5	9.4	25.8	20.7
29.10.2024	5.2	8.3	6.0	12.7	5.7	9.7	38.1	21.8
04.11.2024	5.5	7.4	6.9	12.6	5.1	9.8	43.7	25.2
05.11.2024	4.3	8.4	6.2	12.9	5.2	9.0	39.2	19.7
11.11.2024	5.1	7.2	5.7	11.7	4.7	9.6	30.9	21.0
12.11.2024	4.9	8.1	6.7	12.5	5.6	10.9	41.5	25.5
18.11.2024	5.3	7.0	6.1	12.8	5.2	10.7	34.6	28.9
19.11.2024	4.2	7.4	6.9	11.4	5.9	10.2	40.7	27.8
25.11.2024	4.5	8.0	6.5	11.8	4.7	9.9	35.4	24.1
26.11.2024	4.8	8.6	7.0	12.7	5.9	10.6	29.2	21.4
02.12.2024	5.0	8.3	6.9	12.1	4.9	9.3	38.4	27.3
03.12.2024	4.5	7.9	5.8	12.5	5.6	10.8	31.1	23.0
09.12.2024	4.3	7.7	6.1	12.4	4.8	10.2	29.8	21.7
10.12.2024	3.7	7.0	6.9	11.1	5.1	9.0	25.9	20.1
16.12.2024	5.2	7.1	6.5	12.7	4.5	10.0	35.4	31.1
17.12.2024	4.4	7.2	6.1	12.3	5.4	9.9	27.5	24.5
23.12.2024	4.5	8.3	6.9	11.9	5.1	10.6	34.8	28.8
24.12.2024	5.1	7.5	5.9	12.1	4.6	9.2	27.3	23.3
30.12.2024	5.4	8.4	6.7	11.4	5.5	9.4	30.0	27.4
31.12.2024	4.3	8.7	6.5	11.8	5.9	9.5	26.9	22.7

	NO_2	SO_2	PM_{10}	$PM_{2.5}$
	(Unit µg/m^3)			
Max.	7.0	13.0	43.7	31.1
Min.	3.7	7.0	25.8	19.7
95%tile	6.9	12.7	41.3	28.9
98%tile	6.9	12.9	42.6	30.0

Ambient Air Quality Monitoring Table

9. Laxmipur

Date	CLOCK HOURS							
	00-08		08-16		16-24		24 HOURS	24 HOURS
	SO_2	NO_2	SO_2	NO_2	SO_2	SO_2	PM_{10}	$PM_{2.5}$
04.10.2024	8.5	17.0	10.8	21.9	9.1	20.6	68.3	38.6
05.10.2024	7.7	16.8	11.5	24.0	9.9	19.3	62.7	37.1
11.10.2024	7.4	15.6	11.3	23.1	10.2	21.5	65.9	35.9
12.10.2024	7.8	17.4	11.9	21.4	10.5	20.1	68.5	36.3
18.10.2024	8.0	18.2	10.5	23.7	10.0	19.6	63.5	40.5
19.10.2024	7.2	17.9	11.7	22.6	9.0	18.8	60.9	35.2
25.10.2024	8.3	18.3	10.1	21.2	8.8	18.6	58.2	34.5
26.10.2024	7.6	17.6	11.6	22.9	9.0	18.7	64.2	42.9
01.11.2024	8.5	16.7	11.2	21.7	9.3	21.2	59.6	39.6
02.11.2024	8.1	18.3	12.1	20.5	9.8	19.0	67.4	41.9
08.11.2024	7.3	16.5	11.1	21.4	10.1	19.7	63.8	37.8
09.11.2024	8.2	18.1	11.9	22.9	9.5	18.6	60.1	39.2
15.11.2024	8.9	16.8	11.6	23.7	9.7	19.5	62.8	40.8
16.11.2024	8.4	16.1	11.1	22.2	9.6	19.4	60.0	34.5
22.11.2024	8.1	16.5	10.9	20.8	10.3	18.8	64.2	36.2
23.11.2024	8.8	17.2	10.7	22.6	9.8	20.0	70.5	38.0
29.11.2024	7.6	15.7	11.6	23.6	9.6	20.6	62.0	40.8
30.11.2024	8.4	17.3	10.1	23.0	8.8	19.2	60.4	42.1
06.12.2024	7.9	16.0	11.5	23.4	10.0	19.8	68.5	37.5
07.12.2024	7.1	15.5	10.6	21.5	8.8	18.5	61.4	34.9
13.12.2024	7.3	15.7	11.9	22.6	9.6	19.1	61.1	39.2
14.12.2024	7.8	16.3	12.1	23.1	9.5	20.9	63.5	40.3
20.12.2024	8.2	17.2	11.9	23.9	9.3	18.7	66.6	35.1
21.12.2024	8.5	16.5	11.5	21.7	10.0	21.5	60.8	37.3
27.12.2024	7.8	17.2	12.1	24.4	9.3	20.2	63.4	34.6
28.12.2024	7.1	18.2	11.8	23.7	9.4	21.0	60.7	37.2

	NO_2	SO_2	PM_{10}	$PM_{2.5}$
	(Unit µg/m^3)			
Max.	12.1	24.4	70.5	42.9
Min.	7.1	15.5	58.2	34.5
95%tile	11.9	23.7	68.5	42.1
98%tile	12.1	24.0	69.5	42.5

Ambient Air Quality Monitoring Table

10. Dumri Padar

Date	CLOCK HOURS							
	00-08		08-16		16-24		24 HOURS	24 HOURS
	SO_2	NO_2	SO_2	NO_2	SO_2	SO_2	PM_{10}	$PM_{2.5}$
07.10.2024	4.6	12.9	8.8	18.8	7.4	17.0	59.7	30.1
08.10.2024	5.5	12.2	8.3	19.0	6.9	15.2	53.4	28.9
14.10.2024	5.9	13.6	8.6	19.7	7.1	15.5	62.7	31.8
15.10.2024	5.6	13.0	9.1	19.3	7.7	16.3	57.3	32.6
21.10.2024	5.9	12.3	8.1	17.9	7.1	15.8	52.8	28.4
22.10.2024	6.0	13.5	9.2	18.8	6.1	14.4	51.1	27.9
28.10.2024	5.3	14.1	9.0	19.1	7.1	15.0	52.8	29.9
29.10.2024	5.7	12.3	8.7	17.9	7.4	15.9	55.9	31.4
04.11.2024	5.0	13.9	8.7	19.0	7.7	15.4	51.2	36.4
05.11.2024	4.9	14.0	9.2	18.5	7.2	15.8	58.9	32.3
11.11.2024	5.4	13.5	8.6	19.2	6.9	16.7	52.0	34.4
12.11.2024	5.4	14.3	8.8	19.6	7.3	15.9	55.3	35.3
18.11.2024	5.7	12.1	8.1	17.7	6.7	15.5	58.7	31.8
19.11.2024	6.0	12.8	8.7	19.3	7.5	15.0	53.3	33.1
25.11.2024	5.4	13.9	8.7	18.6	6.4	14.9	56.3	35.6
26.11.2024	5.1	13.7	8.6	17.5	7.6	15.7	55.2	32.3
02.12.2024	4.7	12.9	9.2	19.0	7.5	17.0	61.7	29.4
03.12.2024	5.8	13.5	8.2	19.4	7.2	15.2	60.5	34.1
09.12.2024	4.9	12.0	8.2	17.8	6.4	14.9	52.3	29.2
10.12.2024	4.6	11.8	7.8	17.3	6.1	14.4	51.1	28.8
16.12.2024	5.3	14.0	7.8	18.4	6.4	15.9	53.2	33.5
17.12.2024	5.9	12.4	9.1	18.8	7.6	16.7	59.5	31.2
23.12.2024	5.1	12.9	9.0	17.3	6.2	15.3	51.8	28.6
24.12.2024	5.5	13.7	8.6	18.0	6.1	14.8	63.9	35.7
30.12.2024	5.9	13.4	8.3	19.6	6.7	15.5	58.1	28.4
31.12.2024	6.1	14.1	8.3	19.1	7.4	16.1	54.6	35.6

	NO_2	SO_2	PM_{10}	$PM_{2.5}$
	(Unit µg/m^3)			
Max.	9.2	19.7	63.9	36.4
Min.	4.6	11.8	51.1	27.9
95%tile	9.1	19.3	62.5	35.7
98%tile	9.2	19.6	63.3	36.1

Ambient Air Quality Monitoring Table

11. Danapanasguda

Date	CLOCK HOURS							
	00-08		08-16		16-24		24 HOURS	24 HOURS
	SO_2	NO_2	SO_2	NO_2	SO_2	SO_2	PM_{10}	$PM_{2.5}$
07.10.2024	4.5	9.8	7.8	15.2	6.0	12.2	41.5	30.7
08.10.2024	4.3	10.9	8.0	14.5	5.9	12.7	45.5	32.5
14.10.2024	5.2	11.2	7.7	14.2	6.5	12.5	44.6	29.9
15.10.2024	4.7	11.2	7.3	13.5	6.7	13.1	49.2	31.8
21.10.2024	5.2	11.0	7.8	14.9	6.3	11.9	41.9	25.6
22.10.2024	4.1	10.3	7.3	13.6	6.1	11.7	42.1	26.1
28.10.2024	4.5	10.4	6.9	14.0	5.5	11.5	41.5	25.9
29.10.2024	4.3	9.9	7.6	13.5	5.7	12.1	54.7	32.2
04.11.2024	4.1	10.0	7.9	14.5	6.4	12.5	42.1	26.5
05.11.2024	4.9	10.4	7.7	14.9	5.9	12.9	41.5	29.3
11.11.2024	4.5	9.8	7.2	15.0	6.0	13.3	43.6	31.7
12.11.2024	5.7	10.2	6.9	14.8	6.7	13.1	45.2	29.8
18.11.2024	5.2	11.4	7.2	13.7	6.4	12.2	46.5	30.2
19.11.2024	5.1	10.4	7.6	13.5	5.7	12.5	55.1	28.5
25.11.2024	4.9	10.8	8.1	13.9	5.9	12.9	41.8	26.7
26.11.2024	4.2	10.7	7.5	14.5	6.6	13.1	54.6	29.1
02.12.2024	5.5	11.4	7.9	13.1	6.3	11.7	51.2	26.3
03.12.2024	5.9	10.1	8.0	15.0	5.4	13.5	49.5	30.8
09.12.2024	4.6	9.9	7.2	13.8	6.1	11.7	42.2	27.5
10.12.2024	4.1	9.6	6.8	13.4	6.0	11.6	41.6	25.6
16.12.2024	4.7	11.3	7.6	14.2	6.1	12.9	47.1	27.2
17.12.2024	4.1	9.7	7.2	13.9	5.8	12.2	44.4	29.1
23.12.2024	5.2	10.3	7.1	14.5	6.0	12.7	56.3	30.7
24.12.2024	4.2	9.9	8.0	14.3	6.5	11.6	53.1	26.5
30.12.2024	4.7	11.0	7.3	15.2	6.3	13.0	49.0	28.4
31.12.2024	5.0	10.5	7.9	13.4	6.7	12.6	53.9	31.2

	NO_2	SO_2	PM_{10}	$PM_{2.5}$
	(Unit µg/m^3)			
Max.	8.1	15.2	56.3	32.5
Min.	3.2	9.6	41.5	25.6
95%tile	7.9	14.9	55.0	32.1
98%tile	8.0	15.1	55.7	32.3

OMC | ODISHA NEW OPPORTUNITIES

Corporate Environmental Policy

Odisha Mining Corporation Limited, A Gold Category State PSU, in its Endeavour to maintain a clean and sustainable environment in and around its mines, is committed to:

- Integrate sound environmental practices in all its activities.
- Comply with legal and other requirements pertaining to the environment, Forests and wildlife and volunteer to go beyond.
- Contribute towards mitigation of climate change through the adoption of cleaner and energy efficient technologies.
- Promote development of innovative environment-friendly processes and products.
- Restore ecosystems in mined out landscapes and abandoned sites through ecological restoration.
- Integrate the principle of "reduce, recover, recycle and reuse" in its operations for conservation of natural resources to ensure a sustainable future.
- Strive for continual improvement of environmental performance by setting and achieving challenging targets.
- Ensure regular monitoring and review of environmental performance through a robust audit mechanism and a transparent reporting system.
- Continuously monitor emissions, discharges and ambient air quality and make data available in the public domain.
- Communicate environmental performance to all stakeholders.
- Improve employee commitment and responsibility towards environment protection through capacity building.
- Promote environmentally responsible behavior amongst contractual work force and suppliers.

Date: 01.02.2018

Managing Director
Odisha Mining Corporation Limited

The Odisha Mining Corporation Ltd.
A Gold Category State PSU
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CIN : U13100OR1956SGC000513

OMC | ODISHA NEW OPPORTUNITIES

INTEGRATED MANAGEMENT SYSTEM (IMS) POLICY

In pursuit of our vision and mission to emerge as the leading mining company of the country, we are committed to continual improvement with due regard to all aspects of health & safety of our employees, quality, energy efficiency, environment and promote socially accountable ethical business practices.

In keeping with our business philosophy of sustainable mining and growth, we shall strive towards :

- Meeting customers' requirement with regard to quantity, quality of our product & services.
- Optimizing the mineral resources through sustainable mining and conservation technique.
- Provide safe, healthy workplace and safe working environment.
- Continual improvement in occupational health, safety, productivity, environmental performance and energy efficiency.
- Preserving the environment & ecological balance in and around the mines.
- Developing system / mechanism for strict adherence to all statutory and regulatory norms with respect to health, safety, occupational health, environment, energy in conformity with applicable international standards.
- Making all our employees and contractors responsible for ensuring effective implementation of IMS through awareness & training.
- Making this policy available to all stakeholders.

The IMS will be subject to regular audit & formal management review to assess its continuing relevance, adequacy and effectiveness.

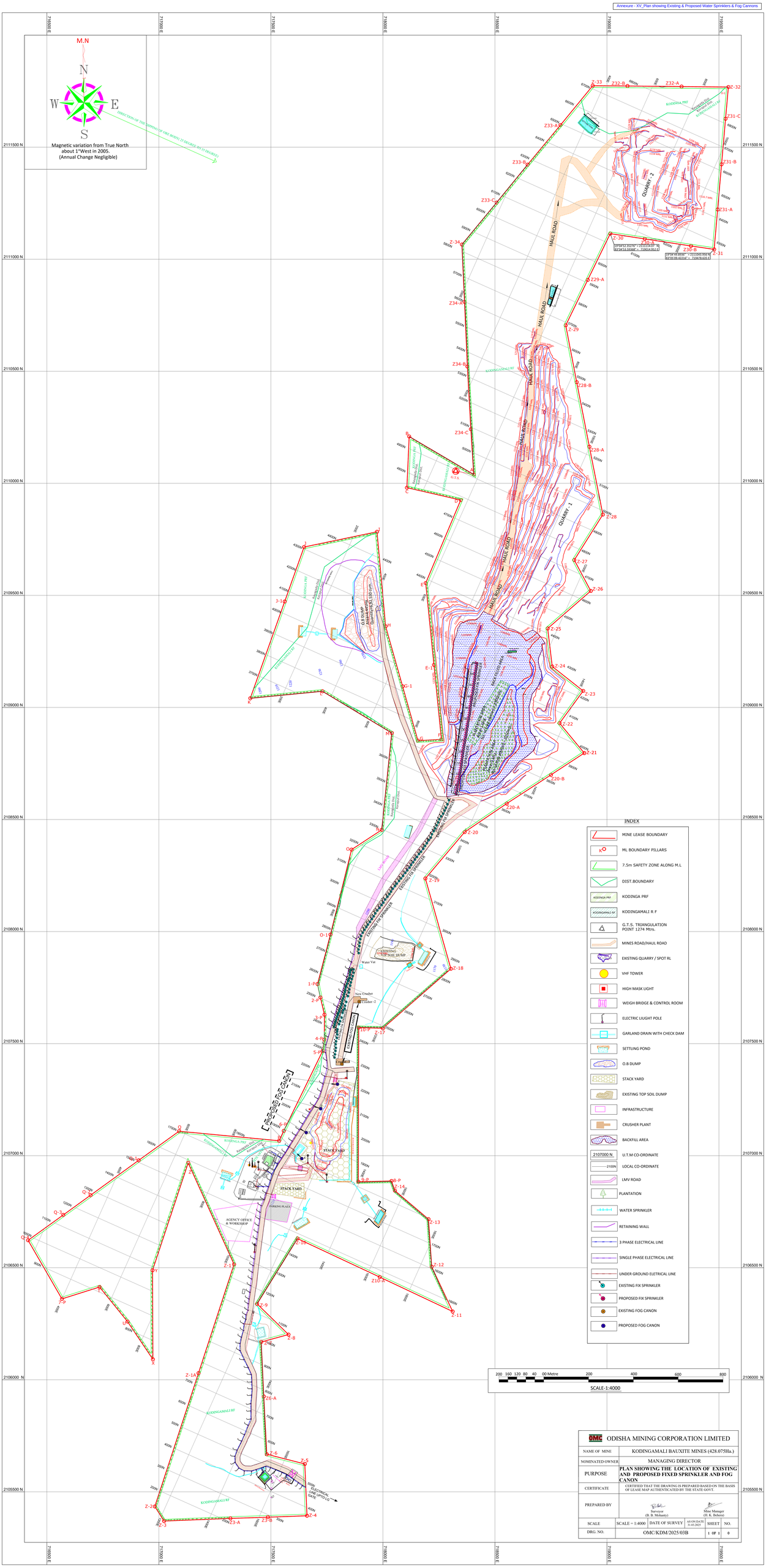
Date : 29.01.2018

Managing Director

Timeline for installation of CAAQMS

S. No.	Activity	Activity Description	Timeline
1	Identification of locations on the Google Map	To be done as per the modalities defined in the condition nos. 3.1 & 3.2 mentioned in the EC order.	Completed
2	Reconnaissance survey and Ground-truthing of the identified locations	During the Reconnaissance survey several things to be ensured: 1. Easy access to the electrical connectivity 2. Internet availability 3. Clear line of sight	Completed
3	Application for Site key to SPCB	Application to be submitted for obtaining the Site key to SPCB.	Completed
4	Site finalization by SPCB	Locations to be authenticated in consultation with SPCB	Completed
5	Purchase Order Placement	Purchase Order to be issued to the selected Vendor.	August 2025
6	Solar power supply to two locations	Within lease & Solid waste management facility	September 2025
7	Delivery of CAAQMS	CAAQMS will be delivered by the Vendor at the Mine.	October 2025
8	Foundation	Based on the dimensions of CAAQMS, foundations will be constructed.	October 2025
9	Power supply arrangement	Arrangement of the power supply to be provided from the nearby area.	November 2025
10	Installation of CAAQMS	CAAQMS will be installed along with the several analyzers and sensors. Further, integration with the SPCB servers to be done.	January 2026
11	Commissioning of CAAQMS	CAAQMS will be commissioned and data will be transmitted to the SPCB servers.	February 2026

Annexure - XV_Plan showing Existing & Proposed Water Sprinklers & Fog Cannons



SCIENTIFIC STUDY ON BLAST INDUCED GROUND VIBRATION AND FLYROCK IN KODINGAMALI BAUXITE MINES OF THE ODISHA MINING CORPORATION LIMITED

Consultant In-Charge
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AUGUST 2019

EXECUTIVE SUMMARY

Kodingamali Bauxite ore mines of Odisha Mining Corporation Limited (OMC Ltd.) are located in District Koraput and Rayagada of Odisha State. The nearest railway station are Singarama to NE and Laxmipur (at the foot hill of the deposit) on the south, and Kakriguma to the south west, all of them on the Koraput- Rayagada Section of East Coast Railways. The Odisha Mining Corporation Limited (OMC Ltd.) vide its email letter dated 14.01.2019 [planningcellomc@gmail.com] assigned a scientific study to the Department of Mining Engineering, Indian Institute of Technology (Indian School of Mines), Dhanbad, for assessment of the Blast Induced Ground Vibration and Flyrock in Kodingamali Bauxite ore Mines as per the guidelines of the DGMS (Technical) Circular No.7 of 1997 and suggest an optimum blast design with safe maximum explosive charge per delay.

The mine management desired to know a safe methodology to control blast induced ground vibration and flying fragments while blasting in the vicinity of inhabited area within safe limits at Kodingamali Bauxite ore mines specifying the safe permissible explosive charge per delay and per round along with the blast design parameters which should be used while blasting. Keeping in view the above-mentioned requirements of the management, IIT-ISM monitored 10 rounds of production blasts constituting all together 30 blast events recorded by Micromate seismographs of Instantel, Inc. make, Canada and three Mini Seis III seismographs of White Industrial Seismology, Inc. make, USA. The recorded data were statistically analyzed and based on the analysis the recommendations for controlled blasting are presented in this report. The report also details the measures to be adopted for controlling ground vibration and fly rock within safe limits.

Depth of blast holes, in various round of blasts, in general varied from 4.0 m to 6.0 m. True burden was kept 3.0 m and true spacing was kept 3.0 m. The charge per round varied from 540 kg to 4810 kg and the maximum charge per delay varied from 30 kg to 130 kg. The number of blast holes per round varied from 18 to 37. These variations were aimed at generating relevant scaling data as mentioned earlier. All the blasts were connected with Shock Tube initiation system. The circuit was fired using electric delay detonators and exploder from a safe blasting shelter/location.

During trial blasts the parameters recorded were peak and resultant peak particle velocity in the three orthogonal directions (mm/sec), dominant frequency (because of the complex nature of waveforms), air overpressure, wave form, maximum charge per delay, per hole and per round, distance of vibration recording instruments from the blast site (coordinates), initiation sequence and tie-ins, delay periods, charge distribution in holes, rock fragmentation etc.. Digital high-speed video recording was also conducted to observe the flying fragments.

The maximum allowable Peak Particle Velocity (PPV) has been fixed at 5 and 10 mm/s for the mud houses and the framed concrete structures respectively which are not belonging to owners present near the OCP workings. While fixing the maximum allowable Peak Particle Velocity, relevant DGMS guidelines have been kept in mind. The conclusions on permissible charges are drawn based on these allowable Peak Particle Velocities.

The site-specific ground attenuation equation, where blasts were conducted relating vibration (V), distance (D) and maximum quantity of explosive per delay (Q) for non- electric initiation systems (NONEL) of blast, at 95% confidence level, has been suggested as,

$$V = 1593.3\left(\frac{D}{\sqrt{Q}}\right)^{-1.606}$$

Suggested maximum charge per delay for the safety of structures at various distances from the blast site can be estimated using the above equation or may be directly read from Table 10 of this report. Summary of the blasts monitored are presented in Appendix I. Ground vibration monitored during trial blasts is enclosed in Appendix II. The values recorded are well below the permissible limits. During trial blasts the distance of flying fragments in general ranged between 20 - 50 m. Suitable measures to be adopted to control the flying fragments are discussed in Section 7.2 of this report, particularly when blasting proceeds within the close proximity of structures to be safeguarded. From the observed blasts it appears that the secondary blasting requirement for breaking boulders does not seem to be significant though it cannot be avoided due to the preformed boulders and widely spaced joints/bedding planes present in the strata. Suggested drilling pattern, blast design, tie-ins and initiation sequences are shown in Appendix III.

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INTRODUCTION

1.1 Salient features of the mine

Kodingamali Bauxite ore mines of the Odisha Mining Corporation Limited (OMC Ltd.) are located in District Koraput and Rayagada of Odisha State. Kodingamali Bauxite Deposit is located about 8 Km north of Laxmipur town (on National Highway No. 326 linking Koraput and Rayagada). The deposit lies between latitude $19^0 01' 46"$ N to $19^0 05' 14"$ N and longitudes $83^0 03' 22"$ E to $83^0 05' 12"$ E. the deposit area falls under Kodingamali Reserve forest (R.F.) under Laxmipur Forest range of Koraput Forest Division, Odisha and Kodinga Proposed Reserve Forest (P.R.F.) of Tikri forest Range of Rayagada district, Odisha. The deposit is surrounded on it's foothills by villages Darakaipadar (east), Upar Karhinga (west), Karhapadar (north) and Raulipadar (south). The deposit is at a distance of about 30 Kms from the prestigious Panch patmali Bauxite mine of NALCO. The nearest railway station are Singarama to NE and Laxmipur (at the foot hill of the deposit) on the south, and Kakriguma to the south west, all of them on the Koraput- Rayagada Section of East Coast Railways. Laxmipur Block on the South and Tikri on the North are the nearest townships from the deposit which have infrastructure facilities like Bank, Post Office, Police station and primary health dispensary of the State Government.



Figure 1 Location of Study

1.2 Geology

The Kodingamali plateau is a part of Eastern Ghat hill ranges in Odisha. The Bauxite deposit form a blanket occupying the surface of the tabular landscape, linear in shape, trending almost in NNE - SSW direction for a length of about 7 km with an average width of 780 m. The area of capping is about 5.33 sq. km. The deposit has a maximum height of 1276 m above mean sea level in northern part and 1262 m above mean sea level in southern part. The average height of Kodingamali plateau to the surrounding valley is about 300 m. The capping has gentle slopes to the west, north and south but comparatively steep slope in its eastern part. The entire eastern margin of capping as well as part of the western margin is marked by development of prominent escarpments. The plateau top is a continuous stretch of flat land intercepted by small saucer shaped depression which is filled with soil & humus varying in thickness of few ems to about 0.5 m. Kodingamali plateau top has no perennial streams flowing down the slope. But a number of springs originate from the foot hills of the plateau, the most prominent ones are towards the eastern margin of the area. Pathgarha river, which flows in a north - easterly direction is about 3.5 km from the northern end of the area. It controls the regional drainage of the terrain.

The plateau top is generally devoid of any substantial vegetation giving the hill a bald look. The plateau top is marked by thorny bushes and dwarf variety of date palm plant. The dwarf date palm is being considered lately as a botanical indicator for the aluminous deposits. At least a couple of varieties of grass thrive on the plateau surfaces by taking advantage of the thin layer of humus overlying the hard lateritic capping. Occasional sight of Murga and Kosala plants are also visible on the plateau top. Moreover, Khondalitic exposures support growth of trees and shrubs in the slopes and valleys only, not on the plateau top.

The area has a tropical climate with monsoon rains from June to September and occasional winter rains. The area experiences cold weather between November to January when the temperature drops to less than 10° C. The temperature rises steadily from January onwards reaching 32°C - 40°C in summer i.e., the month of May. It experiences occasional gusty winds to heavy thunderstorms during Summer (April to June). June). Monsoon breaks out in early to mid-June and continues upto September. The average Rainfall of Koraput district is about 1648 mm under the influence of southwest monsoon. On an average, there are about 100 rainy days. The humidity is maximum (90%) in the months of July - August and minimum in February (36%). The wind velocity varies between 40 kmph and 80 kmph although occasional higher values have been reported. Lightening incidences are rarely reported in the area.

The area around Kodingamali deposit constitutes mostly Khondalites and Charkonite group and associated rocks of Archean age with following stratigraphy (As per GSI/ MECL Reports):

Recent	: Soil & Alluvium
Quaternary/ Tertiary	: Bauxite/Laterite
Archean	: a) Pegmatitic & Quartz veins b) Migmatites c) Charnockites Group d) Khondalite Group

Table 1 Rock-mass Classification of Kodingamali Bauxite Ore Mines

The Khondalite group of rocks is mainly represented by Quartz-Feldspar- Garnet- Sillimanite-Gneisses, which contain minor amounts of graphite/ manganese at places.

The Charnockites are represented by hypershtene granulites of acid, intermedia & basic varieties. They are massive Archean & melanocratic and form dome shaped hills.

The lateritisation of the East Coast Bauxite deposits was developed at the expense of gneisses and schists. The dominant rock assemblage in the region, comprise khondalites (quartz-garnet-potash-feldspar-sillimanite gneisses with or without graphite) and its variants.

The area around Kodingamali exposes rocks representing Eastern Ghat Group. The rock types encountered in these deposits are mostly Khondalite, Bauxite, Laterite, Clay and Soil. Khondalites

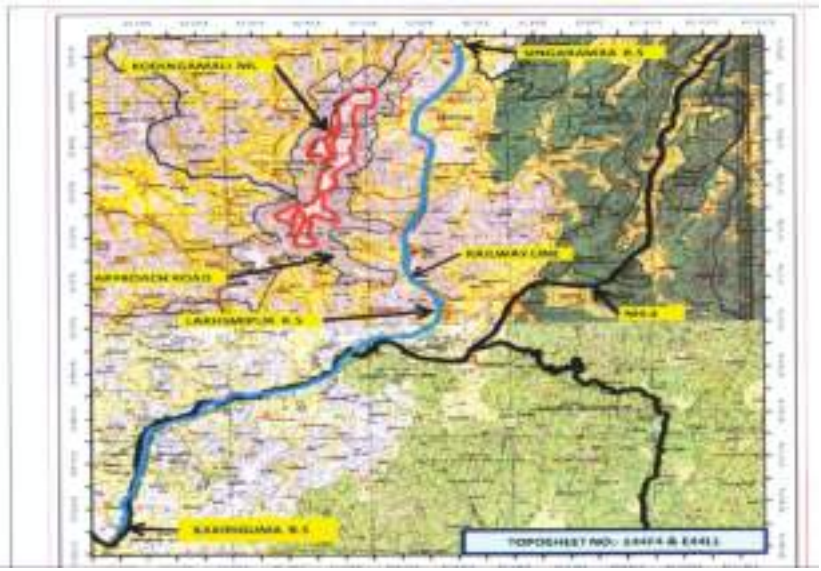


Figure 2 Toposheet of Kodingamali Bauxite Deposit

occur as lenticular bodies on the surface as capping and having a trend in NNE-SSW to N - S directions with moderate to steep easterly dip (25° - 80°). They are at places tightly folded into steep northerly plunging isoclinals folds. Besides Khondalite there are two types of other varieties of Khondalite i.e., Partially Lateritised Khondalite (PLK) and Weathered/ Kaolinised Khondalite (KK).

Presence of PLK or KK indicates absence of Bauxite mineralization below it Central portion of the Lease area has five outcrops of PLK/KK and similarly SW of Lease has two small outcrops. Laterite and bauxite occur as blanket in the northern, central and southern parts of the areas, east of Khondalite ridge. North of the Lease area has a higher elevation than the South, Bauxite ore thickness is more at North and metallurgical grade of Bauxite is also good. In the southern part, two/ three broadly north-south trending Khondalite exposures intervene between the laterite/ bauxite layer. East of the central Khondalite ridge, in the southern part of the deposit, laterite and bauxite occupy as triangular area. In the western area of the central part bauxite occurs between the central khondalite ridge and the khondalite is exposed at the plateau margin.

The Bauxite deposit form a blanket occupying the surface of the tabular landscape, linear in shape, trending almost in NNE - SSW direction for a length of about 7 Km with an average width of 800 m. The area of capping is about 5.33 sq. km. The deposit has a maximum height of 1276 m above

mean sea level in northern part and 1262 m above mean sea level in southern part. The average height of Kodingamali plateau to the surrounding valley is about 300 m.

1.3 Blasting practice

Blasting is the primary method of breakage of the in-situ ore and waste rock in Kodingamali Bauxite ore Mines. Usually, 4 m to 6 m deep blastholes of diameter 150 mm are drilled into the rock mass and charged with Bulk Emulsion of density (after gassing) about 1.1 g/cc. Blastholes are drilled in staggered pattern keeping burden of 3 m and spacing of 3 m.

Properties	Solar Prime Bulk Emulsion	Booster
Sensitivity	Sensitive to No.6 strength detonator and detonating cord	Cap-Sensitive
Density (g/cc)	1.1-1.3	1.20±0.05
Velocity of detonation (m/s) (Unconfined)	4500±500	3500±400
Water resistance	Excellent	Excellent
Application	As explosive charge	As column charge

Table 2 Specifications of the explosive charge used

SRIDET Non electric (NONEL) shock tube system initiated with electric detonator is used for firing the blast. SRIDET of Economic explosives limited (Solar Group) is used as trunk line delay with delays of 17 ms while SolarDet DTH™ is used as down-the-hole delay of 250 ms and varying lengths depending on the depth of the hole.

OBJECTIVES OF THE STUDY

The objective of the study was to suggest the maximum charge per delay (MCPD) and maximum charge per round for keeping the Peak Particle Velocity (PPV) within permissible limits and reducing the flyrock generation for NONEL system of blasting with bulk emulsion explosive.

THEORY

3.1 Blast induced Ground vibration

When an explosive charge detonates in the blast hole, intense strain waves are transmitted to the surrounding rock. The energy carried by these strain waves known as strain energy, fragments the rock medium due to different breakage mechanisms such as crushing, radial cracking and reflection breakage in the presence of a free face. Combined, the crushed zone and radial fracture zone encompass a volume of permanently deformed rock. When the strain wave intensity diminishes to the level where no permanent deformation occurs in the rock mass (i.e. beyond the fragmentation zone), strain waves propagate through the medium in the form of elastic waves, oscillating the particles through which they travel. These waves in the elastic zone are known as ground vibrations, which closely conform to visco-elastic behavior (Ricker, 2012). (Wiss & Linehan, 1978) made studies to evaluate the influence of 14 blast variables considered to have an effect on the amplitude of ground vibrations. They found that the charge weight per delay and length of delay to have the most significant influence on ground vibrations.

Table 3 Parameters influencing ground vibrations (Wiss & Linehan, 1978)

Parameters	Influence on PPV		
	Significant	**Moderately significant**	**Insignificant**
Controllable variables			
1. Charge weight per delay	X		
2. Length of delay	X		
3. Burden and spacing		X	
4. Stemming amount			X
5. Type of stemming			X
6. Charge length and diameter			X
7. Angle of bore hole			X
8. Direction of initiation		X	
9. Charge weight per blast			X
10. Charge depth			X
11. Bare Vs Covered detonating cord			
Uncontrollable variables			
1. General surface terrain			X
2. Type and depth of overburden (Confinement)		X	
3. Wind			X

Charge weight per delay is a very important parameter which controls the intensity of ground vibrations. The intensity of vibrations increases as the quantity of charge detonated per delay increases. The selection of suitable delay interval is extremely important in multi-row blasts. Proper burden relief should be provided to each row for effective movement of the burden rock. If the delay between rows is not enough, the front row burden cannot move forward to sufficient distance to provide free face to the next subsequent row to move out. This adds to more confinement of charges in subsequent rows leading to increased ground vibrations and fly rock. It was found that the ground vibration levels could be reduced effectively by arranging delays between rows in such a manner so as to separate the wave fronts emanating from corresponding charges avoiding the superimposition of waves (Wu, 1984). The probability study made by (Dowding, 1985) revealed that no cosmetic or threshold cracking takes place below a particle velocity of 12 mm/s (0.5 in/s). The data considered by him for the study included the low frequencies of below 4 Hz collected by (Dvorak, 1962). Residential structures typically resonate at frequencies in the range of 3 Hz to 8 Hz indicating a problem. However, the above study indicated no danger even up to 12 mm/s PPV with such low frequencies. To substantiate this (Siskind, 1981) conducted studies and observed no blast induced cracking up to 19 mm/s PPV. The probabilistic data provided above may not be valid in specific cases as total time history of vibration event is more important for response spectrum of the structure.

The damage that results from vibration will depend on the nature of source, transmission characteristics of the intervening medium/strata, inherent strength of the subject structure, height and rigidity of the structure and foundation design etc. Damage caused by ground vibration is dependent on the amplitude of the ground velocity and on the frequency of the ground motion.

All the vibration standards till date are based on the resultant peak particle velocity of ground vibration because this is accepted as the best criterion for assessing levels of vibration damage. The recent trend is to refer to the frequency of the ground motion also. Low frequency waves cause more damage to structures particularly in case of multi-storied buildings. Different countries adopt different standards of safe limits of vibration in terms of peak particle velocity (PPV) for various types of structures. A few standards widely accepted are given in the tables below.

(Mines & Siskind, 1980) in more recent studies suggests safe levels of PPV, as mentioned in the table below, for less than 40 Hz also applicable for dominant frequencies of less than 10 Hz.. In India DGMS suggested standards of blast vibrations vide their circular No.7 of 1997 are being implemented. Accordingly, the permissible peak particle velocity (PPV) at the foundation level of structures in mining area is detailed in Table 4.

Table 4 USBM standards for safe level of ground vibration (USBM-RI-8507) (Siskind, 1981)

Type of structure	**Ground peak particle velocity (mm/sec)**	
	High Frequency > 40 Hz	Low Frequency < 40 Hz
Modern homes (dry wall)	50.8	19.1
Older homes (plaster)	50.8	12.7

The German standards are more stringent and are given in the table below,

Table 5 German standards Din 4150 of 1938 (revised in 1984)

Type of structure	**Peak Particle Velocity PPV (mm/sec)**			
	At foundation level Frequency range (Hz)			**At floor level of top most story (all frequencies)**
	< 10	10-50	50-100	
(i) Building used as offices & industrial structures	20	20-40	40-50	40
(ii) Domestic houses & associated constructions, structures with plasters	5	5-15	15-20	15
Buildings which do not fall under (i) &(ii) and objects of historic interest or other sensitive structures	3	3-8	8-10	8

3.2 Flyrock

Flyrock in rock blasting has been a very serious problem. During blasting, in addition to the desirable displacement of broken fragments some stone pieces get torn off and travel to very large distances with a high velocity. These projectiles are termed as flyrock. Flyrock is a major environmental hazard of blasting in surface mines and has caused serious injury and death to employees, visitors, and neighbours in the mining industry and damage to plant and equipment. The hazard becomes more serious in case of bigger quarry blasts with large diameter holes. The major causes of flyrock generation include;

a) Inadequate burden and spacing
b) Overcharged blastholes
c) Inadequate stemming
d) Presence of zones of weakness and voids
e) Faulty delay timings and initiation sequence
f) Secondary blasting, toe blasting or presence of boulders and loose fragments near the slope of the face to be blasted.

3.3 DGMS guidelines

As per the statutes mentioned in DGMS (Technical) Circular No.7 of 1997, in a particular mining area with built-up structures where deep hole blasting is done scientific study shall be carried out to measure the blast induced ground vibration and determine the safe charges for different zones. DGMS has laid down permissible standards for different type of structures considering their importance. The buildings of historical importance and multi- storied structures are likely to get damaged with low level of vibration and therefore permissible standards have been kept the lowest. Similarly buildings not belonging to the owner but with mud/brick in cement construction and others with good construction (RCC and framed structures) should also be protected but higher permissible standards than that of the level fixed for first category has been allowed. The buildings belonging to the owner of the mine are constructed for a limited period generally equal to the life of the project. The management accept that these buildings constructed within the

mining area are likely to suffer some damages during the extraction of minerals, but the damages should be repairable. Therefore, slightly higher permissible levels of vibrations have been allowed in such cases. Depending on the type of structures and the dominant excitation, the permissible standards of peak particle velocity (PPV) on the ground adjacent to the structure, as recommended by the DGMS, are given in the table below.

Table 6 Permissible Peak Particle Velocity (PPV) at the foundation level of structures as recommended in DGMS (Tech.) Circular No.7 of 1997

TYPE OF STRUCTURE	FOR DOMINANT EXCITATION FREQUENCY (Hz)		
	<8 Hz	8-25 Hz	>25 Hz
	THE PPV (mm/s) AT THE FOUNDATION LEVEL OF THE STRUCTURE SHALL NOT EXCEED		
(A) Buildings/structures not belonging to the owner			
1. Domestic houses/structures (kuchha brick & cement)	5	10	15
2. Industrial Buildings (RCC & Framed structures)	10	20	25
3. Objects of historical importance & sensitive structures	2	5	10
(B) Buildings/structures belonging to the owner with limited span of life			
1. Domestic houses/structures (kuchha brick & cement)	10	15	25
2. Industrial Buildings (RCC & Framed structures)	15	25	50

METHODOLOGY

To meet the aforementioned objectives, field reconnaissance was done to identify the different formations. During the study 10 production blasts with non-electric delay (NONEL) were monitored to measure ground vibration and air overpressure with the help of one Micromate seismograph of Instantel, Inc. make, Canada and three Mini Seis III seismographs of White Industrial Seismology, Inc. make, USA. A total of 30 events were recorded by these seismographs at various blast monitoring stations nearest to the blast site. The details of blasting induced ground vibration monitoring carried out are discussed in the following sections.

4.1 Measurement of Ground vibration

During the blast, all the three seismographs were placed behind the blasting site at distance of about 57 m to 266 m. Geophone of each seismograph was properly coupled to the ground with the help of sand bags. The details of the instruments used are shown in the table below.

Table 7 List of Instruments for measurement of Ground vibration and AoP

S. No.	Instrument model	Serial No.	Make
1	Micromate®	UM10559	Instantel, Inc.
2	Mini Seis III	7728	White Industrial Seismology, Inc.
3	Mini Seis III	7729	White Industrial Seismology, Inc.
4	Mini Seis III	7730	White Industrial Seismology, Inc.



Figure 3 Seismograph set-up for monitoring Ground vibration and AoP

4.2 Flyrock

Every blast event was video-graphed with High resolution high frame-rate video camera. Panasonic AG-DVX200 4K movie camera was used and the recording was performed with a frame rate of 120 frames per second at 1080p Full HD mode. Recording was done from suitable location to get as perfect angle of vision as possible to monitor the projectiles. Analysis of the high speed videos was done with state of the art motion analysis software to determine the velocity and range of flyrock.



Figure 4 Digital videography of a Blast event from distant location

OBSERVATIONS

5.1 Ground vibration

The observations of ground vibration recorded in the seismographs have been tabulated below. The data set of ground vibration records as presented in the table reveals that the Peak Vector sum of the Peak particle velocities in three orthogonal directions range between 0.977 mm/s (@3.300 Hz) to 10.21 mm/s (@9.100 Hz) and the dominant frequencies of the ground vibrations have varied from 2.7 to 34.1 Hz. It may be noted that all the frequencies are ranging between <8 and <25 Hz.

Table 8 Ground Vibration Observations

GROUND VIBRATION		
PVS (mm/s)	**Dominant Frequency (Hz)**	**Monitoring Distance (m)**
3.54	12.800	265.81
5.871	9.500	187.67
6.32	16.000	158.92
9.91	15.100	130.05
5.91	10.700	235.54
7.816	18.000	184.59
7.93	11.100	188.49
11	13.800	151.55
8.14	22.300	205.37
9.87	10.000	185.83
2.8	11.100	220.5
10.4	13.100	178.34
10.9	22.300	172.86
12.05	7.750	193.69
3.5	10.200	259.32
9.27	13.800	212.54
28.8	21.300	133.83
9.6	21.750	209.18
12.1	8.400	113.56
42.6	8.500	57.87
9.2	8.400	155.49
10.5	7.200	127.1
22.9	5.100	68
10.7	10.200	148.33
19.7	8.100	86.08
8.01	9.300	168.99
4.51	34.100	148.46
6.62	15.100	138.41
15.6	11.400	98.75
9.552	14.000	90.83

5.2 Flyrock observations

Observations from the high-speed video of blast events have been presented in this section. Stemming ejections and few flyrock generation have been observed in some blasts while in other blasts proper face movement with no stemming ejection have been observed. Following are the snapshots of the stemming ejection and flyrock from the blasts.



Figure 5 Flyrock observed in Kodingamali

ANALYSIS

1.4 6.1 Analysis of Ground vibration

Table 9 Predicted PPV values for MCPD and TCPR at 95% confidence level

Distance to Monitor (m)	Maximum Charge per Delay (MCPD) (kg)	Scaled Distance for MCPD (m/kg^1/2)	Total Charge per Round (TCPR) (kg)	Scaled Distance for TCPR (m/kg^1/2)	Dominant Frequency (Hz)	Peak Vector Sum (mm/s)	Predicted PPV for MCPD (95%) (mm/s)	Predicted PPV for TCPR (95%) (mm/s)
265.81	130	23.31	2340	5.495	12.80	3.540	10.138	7.726
187.67	130	16.46	2340	3.880	9.50	5.871	17.731	11.913
158.92	130	13.94	3900	2.545	16.00	6.320	23.159	20.131
130.05	130	11.41	3900	2.082	15.10	9.910	31.955	25.833
235.54	130	20.66	3900	3.772	10.70	5.910	12.310	12.339
184.59	130	16.19	3900	2.956	18.00	7.816	18.209	16.709
188.49	130	16.53	4160	2.922	11.10	7.930	17.607	16.947
151.55	130	13.29	4160	2.350	13.80	11.000	24.994	22.230
205.37	130	18.01	4160	3.184	22.30	8.140	15.342	15.232
185.83	130	16.30	4160	2.881	10.00	9.870	18.014	17.250
220.5	130	19.34	3900	3.531	11.10	2.800	13.686	13.394
178.34	130	15.64	3900	2.856	13.10	10.400	19.244	17.441
172.86	130	15.16	3900	2.768	22.30	10.900	20.233	18.131
193.69	130	16.99	3900	3.102	7.75	12.050	16.854	15.738
259.32	130	22.74	4810	3.739	10.20	3.500	10.548	12.473
212.54	130	18.64	4810	3.065	13.80	9.270	14.519	15.975
133.83	130	11.74	4810	1.930	21.30	28.800	30.518	28.402
209.18	130	18.35	4810	3.016	21.75	9.600	14.895	16.295
113.56	60	14.66	1680	2.771	8.40	12.100	21.354	18.110
57.87	60	7.47	1680	1.412	8.50	42.600	63.047	41.892
155.49	60	20.07	1680	3.794	8.40	9.200	12.891	12.250
127.1	60	16.41	1560	3.218	7.20	10.500	17.820	15.033
68	60	8.78	1560	1.722	5.10	22.900	48.658	32.731
148.33	60	19.15	1380	3.993	10.20	10.700	13.905	11.494
86.08	60	11.11	1380	2.317	8.10	19.700	33.320	22.619
168.99	60	21.82	1500	4.363	9.30	8.010	11.278	10.293
148.46	30	27.10	540	6.389	34.10	4.510	7.959	6.405
138.41	30	25.27	540	5.956	15.10	6.620	8.907	6.989
98.75	30	18.03	540	4.250	11.40	15.600	15.318	10.637
90.83	30	16.58	540	3.909	14.00	9.552	17.519	11.803

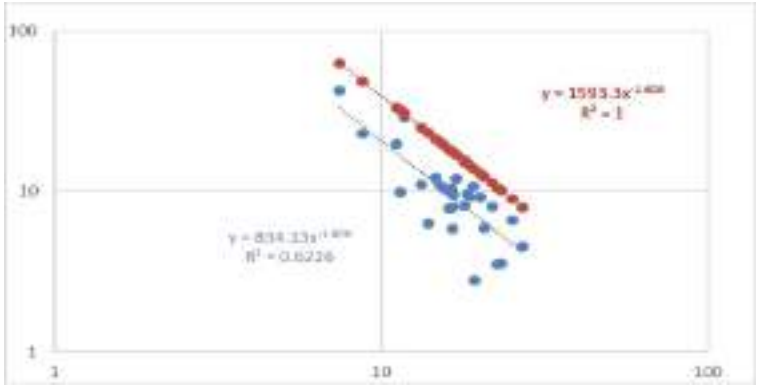


Figure 6 Scatter plot between Log-Square root scaled distance and Log-PPV for MCPD

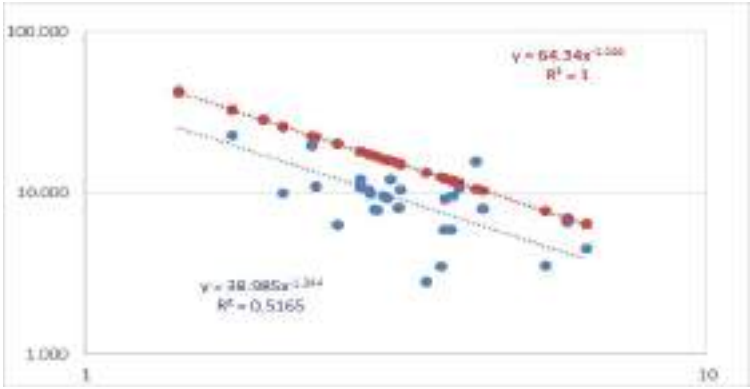


Figure 7 Scatter plot between Log-Square root scaled distance and Log-PPV for TCPR

Based on the data obtained from the seismographs the scaled distance for MCPD and TCPR were calculated. Thereafter, the scatter plots were created between the observed PVS and SD (MCPD) & SD (TCPR) respectively and predictor equations were established at 95% confidence level. The predictor equations at 95% confidence level obtained from the plots are given below.

$$PPV_{MCPD} = 1593.3\ (SD_{MCPD})^{-1.606}$$

$$PPV_{TCPR} = 64.34\ (SD_{TCPR})^{-1.244}$$

1.5 6.2 Analysis of Flyrock

The observations from the high-speed videos of blast events have revealed that where the Stemming to Burden ratio is less than 1, stemming ejection and few flyrock have been occurred. It may also be observed that in blast no.8 there is a boulder which has been pop-shooted which was a source of flyrock. However, the range of flyrock in all the four blasts was less than 30 m from the blast site.

While in the remaining blasts, proper face movement with very little to no stemming ejection have been noticed. Flyrock is also not generated in these blasts.

SUGGESTIONS

1.6 7.1 Suggestions to control ground vibration and recommendation for safe maximum explosive charge

Statistically, the established predictor equation for ground vibration has reasonable index of determination with 95 % of confidence level and therefore, can be accepted for prediction of ground vibration and estimation of safe maximum charge per delay for various distances of structures from the blasting sites. The suggested maximum charge per delay using NONEL initiating systems (TLD & DTH) for the safety of surface structures nearby the Kodingamali Bauxite ore mines has been given in the table below.

Table 10 Recommended safe Maximum explosive charge per delay and per round

Distance	Maximum charge per delay-W (kg)		Total charge per round TW (kg)	
	Allowable PPV (5)	Allowable PPV (10)	Allowable PPV (5)	Allowable PPV (10)
50	1.908	4.523	41.130	125.353
100	7.630	18.090	164.520	501.410
150	17.168	40.703	370.170	1128.173
200	30.520	72.360	658.080	2005.640
250	47.688	113.063	1028.250	3133.813
300	68.670	162.810	1480.680	4512.690
350	93.468	221.603	2015.370	6142.273
400	122.080	289.440	2632.320	8022.560
450	154.508	366.323	3331.530	10153.553
500	190.750	452.250	4113.000	12535.250
550	230.808	547.223	4976.730	15167.653
600	274.680	651.240	5922.720	18050.760
650	322.368	764.303	6950.970	21184.573
700	373.870	886.410	8061.480	24569.090
750	429.188	1017.563	9254.250	28204.313
800	488.320	1157.760	10529.280	32090.240
850	551.268	1307.003	11886.570	36226.873
900	618.030	1465.290	13326.120	40614.210
950	688.608	1632.623	14847.930	45252.253
1000	763.000	1809.000	16452.000	50141.000

1.7 7.2 Suggestions for flyrock control

In addition to the blast induced vibrations, fly rock is another important hazard of blasting operation, particularly, if it is conducted in the vicinity of mines/ structure /machines/equipment. The factors which influence the distance of flying of fragments include:

- Height of stemming column and the type/quality of stemming material
- Irregular shape of free face, particularly, for an old mine being reorganized or blasting above developed galleries
- Excessive toe burden or blasting without a free face
- Muffling of the blasting area
- Scattering and overlapping of delay timings of delay detonators/relays
- Presence of water in blast holes

The first four parameters can be controlled by properly designing the blasting pattern whereas the last two parameters are not easily controllable. Muffling or covering of holes including entire area to be blasted is one of the most common methods to contain the distance of travel of flying fragments, particularly, when blasting is done within the danger zone as specified by DGMS. However, the most common practice in mines is to cover only the blast hole mouths with a 1-1.5 m wide expandable wire mesh nets of 30 x 30 mm to 50 x 50 mm openings. Gunny bags and the cartridge empty boxes of 4 to 5 numbers filled with sand or drill cuttings are placed around each blast hole. Though the method is effective in containing a major part of flying fragments, however, a considerable area between the rows of blast holes remains uncovered and at times a few rock fragments fly from this uncovered portion. In addition, there is always possibility of small pieces of rock fragments flying through the holes in the wire net. It was observed in other mines that covering of holes including the entire area to be blasted by old belt conveyors over the wire nets was much more effective as compared to wire nets alone. Gunny bags filled with sand, free of pebbles, weighing at least 30-40 kg should be placed over the belt conveyor which is placed over the wire nets at an interval of 2 m between and within the rows. This method will contain the vertical fly to a significant extent.

Another effective and reliable method of controlling the flying of rock fragments from the mouth of the blast hole (vertical fly rock) is the height of stemming column in blast holes. It has been observed that the fly rock, particularly, towards high wall side, was effectively controlled by maintaining the height of stemming column in all holes greater than the effective burden wherever possible. The height of stemming column should be 1.1 to 1.2 times the true burden in all holes.

Therefore, it is appropriate to mention here that if the height of stemming column is less than burden even in one hole out of several holes which are to be blasted the fly rock will be generated from that particular hole and, therefore, it should be ensured that stemming column height should be greater than burden in all the holes to be blasted in any round.

If fly rock towards the free face side is also to be contained then the blasting should be done using the technique of buffer blasting along with muffling in which case a buffer of blasted rock of 4-6 m thickness should be left against the next round of blast.

Drill cuttings are a better stemming material as compared to sand and should be preferred except in case of watery holes. It is suggested that in case of watery holes only sand free of clayey materials should be used as stemming material. Drill cuttings are not good stemming material in watery holes as they form mud with water. Combination of muffling and

maintaining the stemming column length greater than the burden in all holes should be adopted for effective control of fly rock. In watery holes sand free of clay/soil should only be used. It should be preferable if water is pumped out of holes before charging. In watery holes explosives with density greater than 1.1 should only be used.

In addition, inclined hole drilling (15 - 20 degree inclination) also helps in reducing the travel distance of flying fragments because of more uniform burden in the front row. Also the number of rows in a blasting round should be restricted to two to three. The length of blast should be more than three times the width.

Above practices in blasting will considerably reduce the quantum and distance of flying fragments and will improve the fragmentation.

1.8 7.3 Suggested blast design

The suggested blast design with tie-ins and initiation sequence for Kodingamali Bauxite ore mines. The tie-ins and initiation system should be such that the direction of throw is always towards free face side. Every tie-in/pattern should confirm to the restrictions imposed with regard to the quantity of explosive per delay, delay interval between rows and within rows, total time of blast duration and the size of blasts which depend upon the desired production and the number of blasts per week/month. The sub-grade drilling to avoid toe formation should be 0.2 times the burden. Based on degree of compactness in formations slight reduction in burden and spacing are recommended as felt necessary.

Whenever two free faces are available the diagonal tie-ins should be preferred unless there is some basic advantage with other designs. The total period of blast from the initiation of the first hole to the last hole should preferably be not more than 600 ms to minimize cut-offs. It should be noted that not more than 3 rows of blast holes parallel to free face should be detonated in a round and the total number of holes in a round should not be more than 20 to 25 particularly when the blasting face approaches near 100 m from the inhabitant site. It may be noted that there could be several permutations and combinations of initiation sequence/tie-ins for the same situation. However, the general guidelines given in earlier paras may be followed for avoiding misfires. Holes can be drilled either in a square or a staggered pattern. Blasting with staggered pattern of holes on the equilateral triangular fashion is reported to give better fragmentation as compared to square pattern. The position/location of holes where drilling is to be done should be clearly marked on the bench surface indicating the depth to which drilling should be done. Uneven depth of holes on a bench must be avoided as it will result in a very bad and inefficient blast and will give rise to excessive fly rock, vibrations, boulders and toe problems. This must be given due priority in mines. Often the bench surface was found thoroughly fractured which is the results of drill depth variations vis-à-vis bench height mismatch. Drill cuttings in dry holes and river sand free of clay in watery holes will suit as the best stemming material.

Muffling of holes including the area to be blasted must be done as discussed in the earlier sections. This is very much necessary considering the proximity of structures to the mine. Permissible charge per delay must confirm to Table 10 for various distances of blast site from structures to be protected. Length of blast depends on the total number of holes which can be blasted in a round while observing the restrictions of the above-mentioned guidelines in terms of number of rows and holes in a round. Each blast should be carefully planned, checked, executed and observed by responsible officials. Records of each blast should be maintained in a register which should include distance of structure to be protected, if any, from the blast site, rock type, location details, minimum, maximum and average burden and spacing, depth of each hole, height of stemming column in each hole dry or watery holes, quantity of explosive per hole and per delay, total number of holes, rows, volume of in-situ rock, blast size, total explosive, type of explosive, distribution and powder factor.

Post-blast observations should also be recorded for each blast round in a bound register which should include degree of fragmentation, flying of rock fragments, magnitude of vibration in quantitative or qualitative terms, complaint from neighbors if any, boulders in the previous blast if any and any other remark which is useful for describing the blast results.

CONCLUSIONS

This report relates to the scientific investigations on the assessment of ground vibration and fly rock travel and suggested measures to control ground vibration and fly rock while blasting in Kodingamali Bauxite ore Mines. During the investigation 10 rounds of blasts comprising a total of 30 events were recorded. On the basis of analysis of the data following conclusions may be drawn:

- The site-specific empirical equation relating vibration, distance and maximum explosive quantity per delay for the blast site is,

$$V = 1593.3\,(\frac{D}{\sqrt{Q}})^{-1.606}$$

- The dominant frequencies of ground vibration in the 10 rounds of blasts recorded varied from 2.7 Hz to 34.1 Hz.
- Assuming a safe level of ground vibration as 5 mm/sec for safety of surface structures (mud houses, brick works and dwellings) and 10 mm/sec for concrete structure near the Kodingamali Bauxite ore Mines, the maximum permissible charge per delay is calculated using site specific empirical equation for various distances of surface structures from the blast site and the results are tabulated in Table 10 which must be adhered to.
- Using a high delay interval of 450 ms down-the-hole delay with 17 ms surface delay ensures that the detonation of the surface hook up would be several rows or drill holes ahead before the first drill hole gets initiated (after 450 ms) and ground movement starts subsequently. This greatly reduces the possibility of misfires due to cut-off of inhole initiator (downline) due to ground movement. It is suggested that blast hole initiation pattern should use one delay period of 17 ms between the two holes within the row and 42 ms between the rows.
- It should be noted that not more than 3 rows of blast holes parallel to free face should be detonated in a round and the total number of holes in a round should not be more than 20 to 30. Precautions as detailed in section 7.3 should be followed.
- The required burden, spacing and sub-grade drilling is already mentioned in section 7.3 of this report.
- Suggestions for flyrock control for the area to be blasted described in section 7.2 of this report. Gunny bags filled with sand and weighing 30 - 40 kg each should be kept over the wire nets/belt conveyor at an interval of 2 m. In addition, 2 - 3 sand bags should also be put-up over the mouth of each hole. The size of opening in wire nets should preferably be 30 mm x 30 mm.
- In case of hot holes, water should be sprinkled into the holes before charging of explosives so as to reduce the temperature inside the holes.
- For effective control of vertical and back fly rock fragments the height of stemming column at the top must be 1.1 to 1.2 times the burden in all holes. To control front fly rock (fly rock from the free face side) the method of buffer blasting may be adopted in which case a buffer a blasted rock of 4-6 m should be left against the next round of blast. This is in addition to the muffling of the entire surface area to be blasted.

BIBLIOGRAPHY

1. Dowding, C. H. (1985). *Blast Vibration Monitoring & Control*. Prentice-Hall.
2. Dvorak, A. (1962). Seismic effects of blasting on brick houses. *Proce Geofyrikeniha Ustance Ceskoslavenski Academic*, *169*, 189–202.
3. Mines, U. S. B. of, & Siskind, D. E. (1980). *Structure response and damage produced by ground vibration from surface mine blasting*. US Department of the Interior, Bureau of Mines New York.
4. Ricker, N. (2012). *Transient waves in visco-elastic media* (Vol. 10). Elsevier.
5. Siskind, D. E. (1981). Open file report of responses to questions raised by RI 8507. *Available for Inspection, US Bureau of Mines, Minneapolis, MN*.
6. Wiss, J. F., & Linehan, P. W. (1978). Control of vibration and blast noise from surface coal mining, volume 4: Executive Report[Final Report, 1 Jul. 1975- 28 Feb. 1978].
7. Wu, W. (1984). The effect of simulated detonator scatter on rock fragmentation and ground vibrations in single-row bench blasting.

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APPENDICES

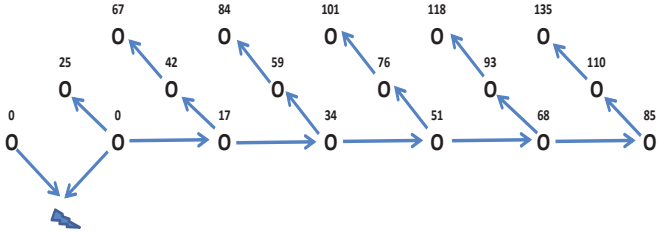
APPENDIX – I

1.9 Summary of the blasts monitored

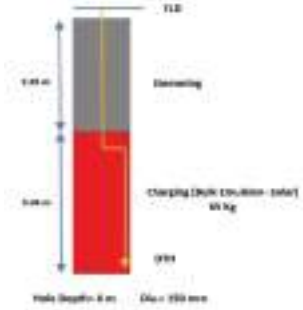
Blast No.	1	2	3	4	5	6	7	8	9	10
Location	Kodingamali Bauxite Ore Mines									
Date	12-04-2019	12-04-2019	12-04-2019	12-04-2019	12-04-2019	14-04-2019	14-04-2019	14-04-2019	14-04-2019	14-04-2019
No. of holes	18	30	32	30	37	28	26	23	25	18
Average Depth (m)	6	6	6	6	6	4	4	4	4	4
Diameter (mm)	150	150	150	150	150	150	150	150	150	150
Drilling Pattern	Staggered	Staggered	Staggered	Staggered	Staggered	Staggered	Staggered	Staggered	Staggered	Staggered
Average Burden (m)	3	3	3	3	3	3	3	3	3	3
Average Spacing (m)	3	3	3	3	3	3	3	3	3	3
Average Stemming (m)	2.65	2.65	2.65	2.65	2.65	2.45	2.45	2.45	2.45	2.45
Stemming: Burden	0.88	0.88	0.88	0.88	0.88	0.82	0.82	0.82	0.82	0.82
Average charge per hole (kg)	65	65	65	65	65	30	30	30	30	30
In-situ volume (m^3)	972	1620	1728	1620	1998	1008	936	828	900	648
Total Charge per round	2340	3900	4160	3900	4810	1680	1560	1380	1500	540
Powder factor (m^3/kg)	0.415	0.415	0.415	0.415	0.415	0.600	0.600	0.600	0.600	1.200

1.10 Designs of the blasts

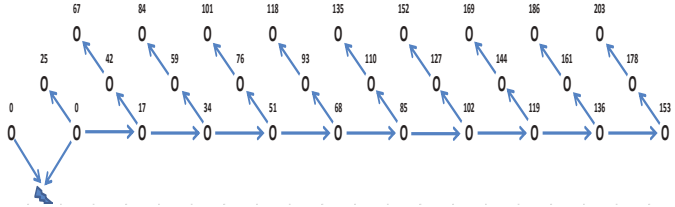
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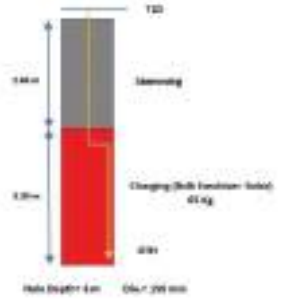
Date	12-04-2019
No. of holes	18
Average Depth (m)	6
Diameter of holes (mm)	150
Burden (m) x Spacing (m)	3x3
Average Charge per hole (Kg)	65



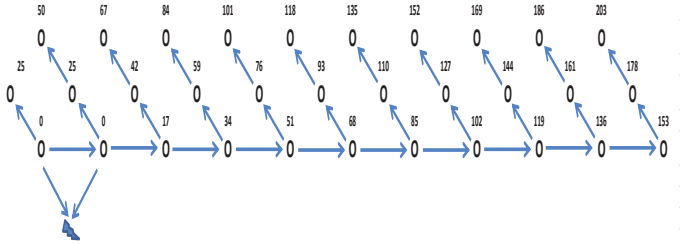
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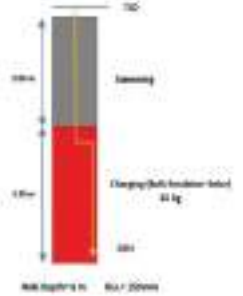
Date	12-04-2019
No. of holes	30
Average Depth (m)	6
Diameter of holes (mm)	150
Burden (m) x Spacing (m)	3x3
Average Charge per hole (Kg)	65



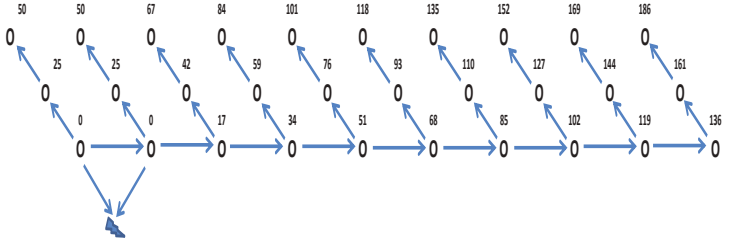
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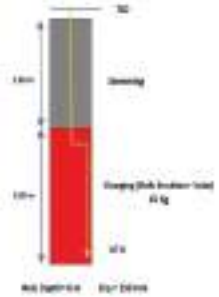
Date	12-04-2019
No. of holes	32
Average Depth (m)	6
Diameter of holes (mm)	150
Burden (m) x Spacing (m)	3x3
Average Charge per hole (Kg)	65



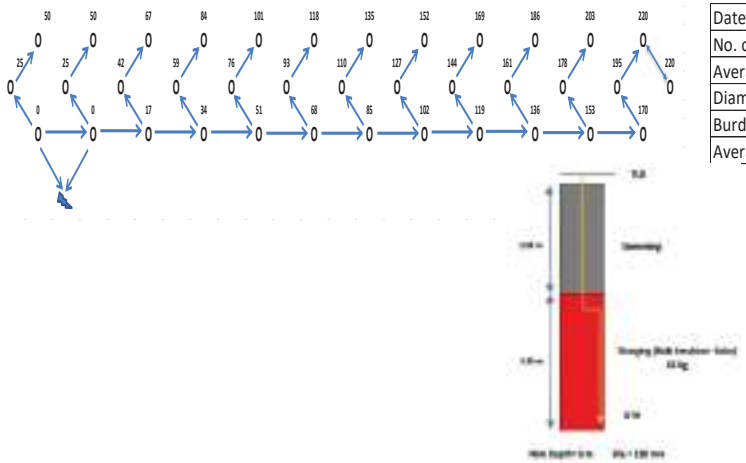
BLAST NO.4



Date	12-04-2019
No. of holes	30
Average Depth (m)	6
Diameter of holes (mm)	150
Burden (m) x Spacing (m)	3x3
Average Charge per hole (Kg)	65

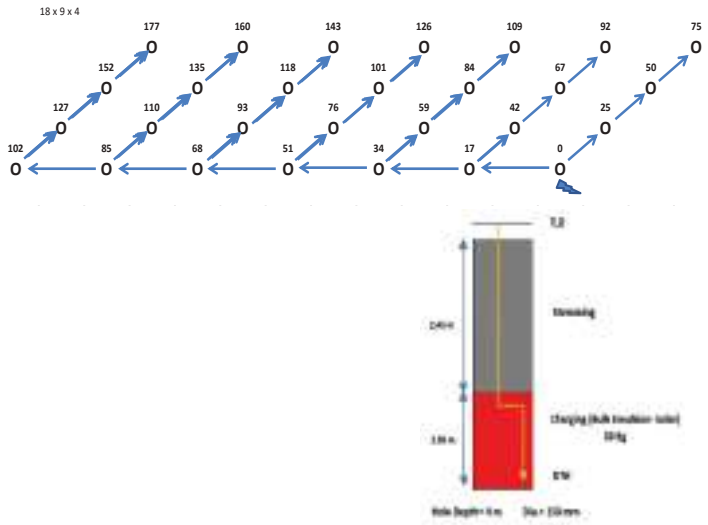


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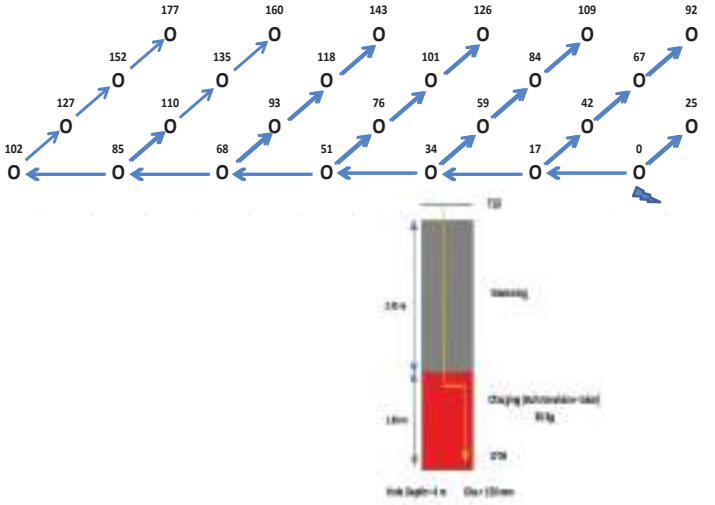
Date	12-04-2019
No. of holes	37
Average Depth (m)	6
Diameter of holes (mm)	150
Burden (m) x Spacing (m)	3x3
Average Charge per hole (Kg)	65

BLAST NO.6



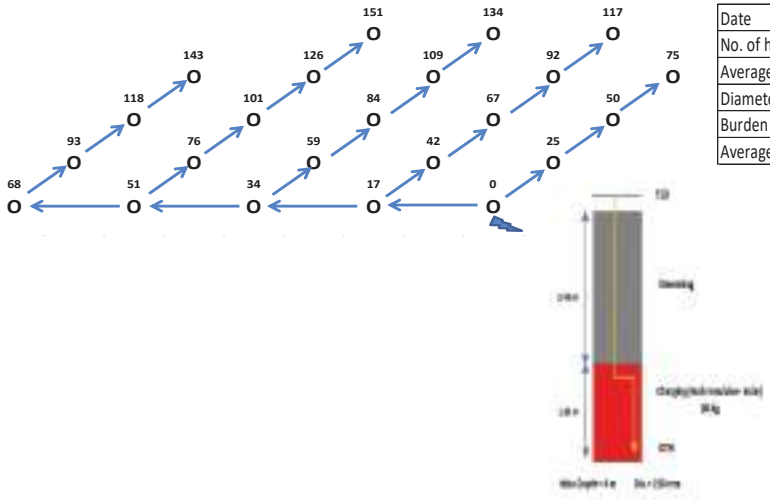
Date	14-04-2019
No. of holes	28
Average Depth (m)	4
Diameter of holes (mm)	150
Burden (m) x Spacing (m	3x3
Average Charge per hole	30

BLAST NO.7



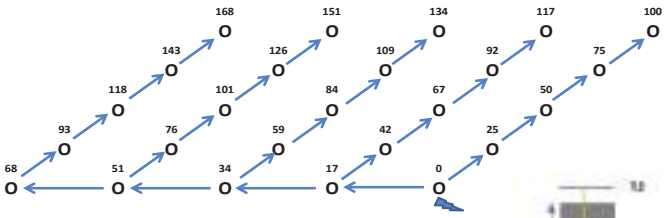
Date	14-04-2019
No. of holes	26
Average Depth (m)	4
Diameter of holes (mm)	150
Burden (m) x Spacing (m	3x3
Average Charge per hole	30

BLAST NO.8

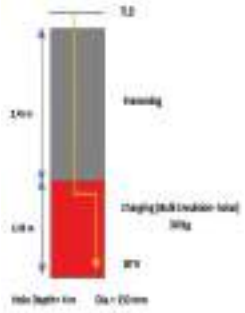


Date	14-04-2019
No. of holes	23
Average Depth (m)	4
Diameter of holes (mm)	150
Burden (m) x Spacing (m	3x3
Average Charge per hole	30

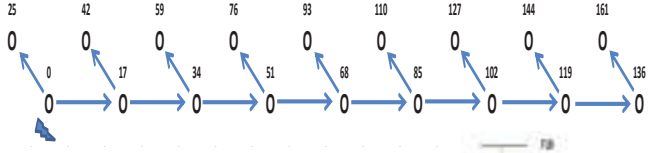
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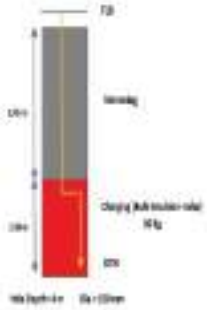
Date	14-04-2019
No. of holes	25
Average Depth (m)	4
Diameter of holes (mm)	150
Burden (m) x Spacing (m	3x3
Average Charge per hole	30



BLAST NO.10



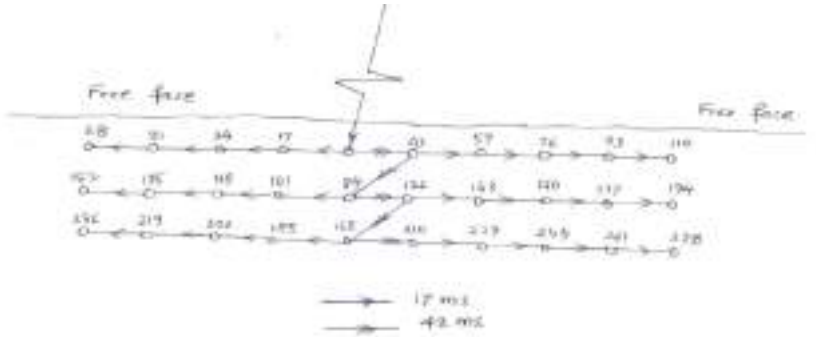
Date	14-04-2019
No. of holes	18
Average Depth (m)	4
Diameter of holes (mm)	150
Burden (m) x Spacing (m	3x3
Average Charge per hole	30

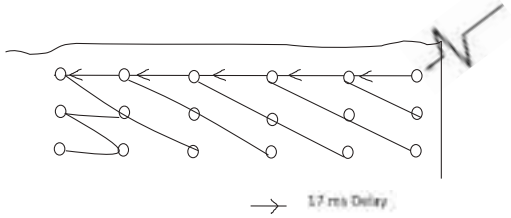


1.11 Details of Ground vibration measurement

Date	Blast No.	Distance to Monitor (m)	Maximum Charge per Delay (MCPD) (kg)	Scaled Distance for MCPD (m/kg^1/2)	Total Charge per Round (TCPR) (kg)	Scaled Distance for TCPR (m/kg^1/2)	Peak Vector Sum (mm/s)	Longitudinal Dominant Frequency (Hz)	Vertical Dominant Frequency (Hz)	Transverse Dominant Frequency (Hz)	Minimum Frequency (Hz)	Maximum Frequency (Hz)	Predicted PPV for MCPD (95%) (mm/s)	Predicted PPV for TCPR (95%) (mm/s)
12-04-2019	1	265.81	130	23.31308	2340	5.494945	3.54	8.300	3.600	12.800	3.600	12.800	10.138	7.726
		187.67	130	16.45975	2340	3.8796	5.871	3.500	5.500	9.500	3.500	9.500	17.731	11.913
	2	158.92	130	13.93821	3900	2.544757	6.32	14.200	11.400	16.000	11.400	16.000	23.159	20.131
		130.05	130	11.40614	3900	2.082467	9.91	6.000	5.000	15.100	5.000	15.100	31.955	25.833
		235.54	130	20.65822	3900	3.771659	5.91	8.100	5.300	10.700	5.300	10.700	12.31	12.339
		184.59	130	16.18961	3900	2.955806	7.816	2.500	7.000	18.000	2.500	18.000	18.209	16.709
	3	188.49	130	16.53167	4160	2.922413	7.93	9.700	10.900	11.100	9.700	11.100	17.607	16.947
		151.55	130	13.29181	4160	2.349683	11	9.500	9.500	13.800	9.500	13.800	24.994	22.23
		205.37	130	18.01214	4160	3.184127	8.14	9.700	6.300	22.300	6.300	22.300	15.342	15.232
		185.83	130	16.29837	4160	2.881172	9.87	3.250	10.000	8.750	3.250	10.000	18.014	17.25
	4	220.5	130	19.33913	3900	3.530826	2.8	11.100	7.200	11.100	7.200	11.100	13.686	13.394
		178.34	130	15.64145	3900	2.855725	10.4	11.600	13.100	12.500	11.600	13.100	19.244	17.441
		172.86	130	15.16082	3900	2.767975	10.9	19.000	8.700	22.300	8.700	22.300	20.233	18.131
		193.69	130	16.98774	3900	3.101522	12.05	2.750	5.250	7.750	2.750	7.750	16.854	15.738
	5	259.32	130	22.74387	4810	3.739069	3.5	9.700	6.900	10.200	6.900	10.200	10.548	12.473
		212.54	130	18.64099	4810	3.06456	9.27	9.100	13.800	9.000	9.000	13.800	14.519	15.975
		133.83	130	11.73767	4810	1.929661	28.8	17.700	8.100	21.300	8.100	21.300	30.518	28.402
		209.18	130	18.3463	4810	3.016113	9.6	8.750	21.750	7.750	7.750	21.750	14.895	16.295
14-04-2019	6	113.56	60	14.66053	1680	2.77058	12.1	7.600	7.600	8.400	7.600	8.400	21.354	18.11
		57.87	60	7.470985	1680	1.411883	42.6	3.500	4.200	8.500	3.500	8.500	63.047	41.892
		155.49	60	20.07367	1680	3.793568	9.2	7.900	6.600	8.400	6.600	8.400	12.891	12.25
	7	127.1	60	16.40854	1560	3.217979	10.5	7.200	4.500	6.500	4.500	7.200	17.82	15.033
		68	60	8.778762	1560	1.721657	22.9	3.800	3.300	5.100	3.300	5.100	48.658	32.731
	8	148.33	60	19.14932	1380	3.992909	10.7	7.300	8.400	10.200	7.300	10.200	13.905	11.494
		86.08	60	11.11288	1380	2.317196	19.7	5.200	5.000	8.100	5.000	8.100	33.32	22.619
	9	168.99	60	21.81652	1500	4.363303	8.01	4.000	2.800	9.300	2.800	9.300	11.278	10.293
	10	148.46	30	27.10496	540	6.388701	4.51	7.900	10.900	34.100	7.900	34.100	7.959	6.405
		138.41	30	25.27009	540	5.956218	6.62	15.100	8.700	14.200	8.700	15.100	8.907	6.989
		98.75	30	18.0292	540	4.249523	15.6	11.400	9.800	10.900	9.800	11.400	15.318	10.637
		90.83	30	16.58321	540	3.908701	9.552	3.500	5.000	14.000	3.500	14.000	17.519	11.803

1.12 Suggested Blast design for Kodingamali Bauxite ore mines





TRAFFIC STUDY REPORT

for

Expansion in Bauxite Production Capacity from 3.6 Million TPA to 6.0 Million TPA [ROM: 6.0 Million TPA, OB/Waste: 3.29 Million TPA, Top Soil: 0.22 Million TPA (Total Excavation: 9.51 Million TPA)] in Kodingamali Bauxite Mine (ML Area: 428.075 ha)

located at

Village: Kodingamali, Tehsil(s): Laxmipur & Kashipur,

District(s)- Koraput & Rayagada, State: Odisha

Project Proponent

M/s. Odisha Mining Corporation Limited

OMC House, Post Box No.34, Khurdha, Bhubaneshwar, Odisha

Pincode-751001,

E-Mail: parivesh@odishamining.in

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TRAFFIC STUDY REPORT

1.1 INTRODUCTION

M/s. Odisha Mining Corporation Limited (OMC) has proposed Expansion in Bauxite Production Capacity from 3.6 Million TPA to 6.0 Million TPA [ROM: 6.0 Million TPA, OB/Waste: 3.29 Million TPA, Top Soil: 0.22 Million TPA (Total Excavation: 9.51 Million TPA)] in Kodingamali Bauxite Mine (ML Area: 428.075 ha) located at Village: Kodingamali, Tehsil(s): Laxmipur & Kashipur, District(s) Koraput & Rayagada, State: Odisha.

Earlier, the Environmental Clearance for 3.0 Million TPA Bauxite Production capacity was accorded by MoEFCC, New Delhi on 28.05.2008 in favour of M/s. Odisha Mining Corporation Ltd. Further, OMC Ltd. applied for Environmental Clearance (EC) for Expansion in Bauxite Production Capacity from 3.0 Million TPA to 3.6 Million TPA under Para 7 (ii) (a) of EIA Notification, 2006 as per MoEF&CC Office Memorandum No IA 3-22/10/2022-IA.III [E177258] dated 11.04.2022 and 30.05.2022. The Environment Clearance for expansion in production capacity (from 3.0 Million TPA to 3.6 Million TPA) has been granted by MoEFCC, New Delhi vide File No. J-11015/439/2007.IA. II(M) dated 15.04.2025.

Now, the present proposal is for Expansion in Bauxite Production Capacity from 3.6 Million TPA to 6.0 Million TPA [ROM: 6.0 Million TPA, OB/Waste: 3.29 Million TPA, Top Soil: 0.22 Million TPA (Total Excavation: 9.51 Million TPA)] in Kodingamali Bauxite Mine (ML Area: 428.075 ha) located at Village: Kodingamali, Tehsil(s): Laxmipur & Kashipur, District(s) Koraput & Rayagada, State: Odisha, under EIA Notification, 2006, as amended from time to time. ToR Application for the proposed expansion project was submitted on Parivesh 2.0 web portal of MoEFCC on 07.05.2025. The project was considered during 44th Meeting of Expert Appraisal Committee (Non-Coal Mining) & the Technical Presentation for ToR was held on 15.05.2025. The Terms of Reference (ToR) was issued by MoEFCC, New Delhi vide file No.: J-11015/439/2007.IA. II(M) dated 20.06.2025.

The study has been carried out in compliance with the Standard ToR Condition no. 1.32*" Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines."* As per ToR letter issued by Ministry of Environment, Forest and Climate Change (MoEF&CC) Govt. of India, New Delhi.

2.1 PROJECT DETAILS

Table 1
Details of the project

S. No.	PARTICULARS	DETAILS
A.	**Nature of the Project**	Expansion in Bauxite Mining Project
B.	**Size of the Project**	
1.	Mining Lease Area	428.075 ha (Koraput district: 406.385 ha & Rayagada district: 21.69 ha)
2.	Proposal	➢ Bauxite Production Capacity: 3.6 Million TPA to 6.0 Million TPA ➢ OB/Waste: 3.29 Million TPA ➢ Top Soil: 0.22 Million TPA **Total Excavation: 9.51 Million TPA**
C.	**Location Details**	

Expansion in Bauxite Production Capacity from 3.6 Million TPA to 6.0 Million TPA [ROM: 6.0 Million TPA, OB/Waste: 3.29 Million TPA, Top Soil: 0.22 Million TPA (Total Excavation: 9.51 Million TPA)] in Kodingamali Bauxite Mine (ML Area: 428.075 ha) located at Village: Kodingamali, Tehsil(s): Laxmipur & Kashipur, District(s)- Koraput & Rayagada, State: Odisha

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S. No.	PARTICULARS	DETAILS
1.	Village	Kodingamali
2.	Tehsil(s)	Laxmipur & Kashipur
3.	District(s)	Koraput & Rayagada
4.	State	Odisha
5.	Latitude & Longitude	Latitude: 19°01'46"N to 19°05'14"N Longitude: 83°03'22"E to 83°05'12"E
6.	Toposheet No.	Core Zone: E44F4 (65M/4) Buffer Zone: E44F4 (65M/4); E44E16 (65I/16); E44K13 (65J/13), E44L1(65N/1)

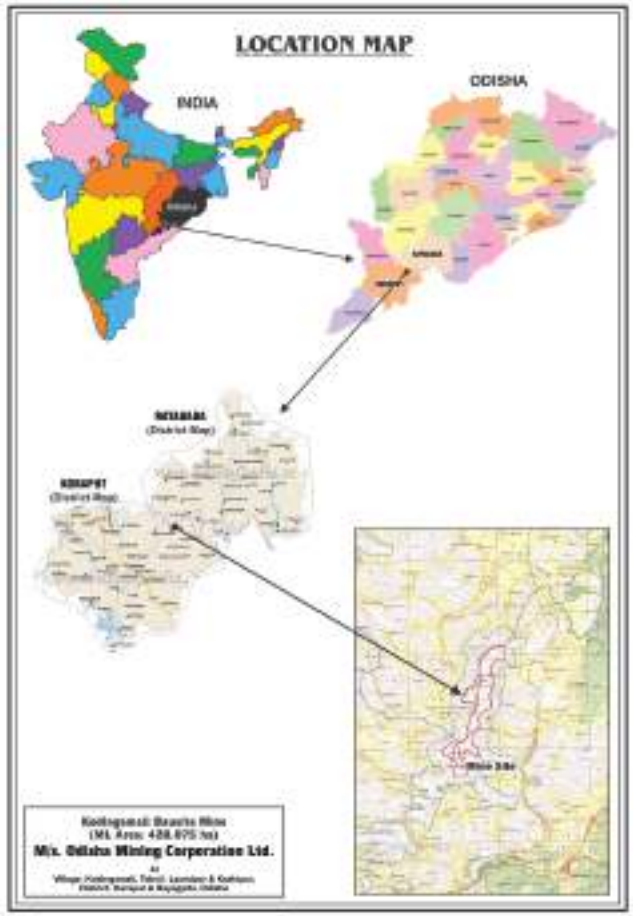


Figure 1: Location Map showing general and specific location of Mine Site

3.1 PROPOSED MINING TECHNOLOGY & TRANSPORTATION DETAILS

- Mining operation is being/will be carried out by fully mechanized opencast method using conventional mining technology i.e. Shovel- Dumper combination.
- Drilling & Blasting is being/will be carried out in the hard strata whereas soft ore is being/will be directly excavated hydraulic excavators.
- Drilling is being/will be carried out crawler mounted 115 mm – 150 mm fast drills.
- Controlled blasting method is being/will be practiced. NONEL detonating fuse are being/ will be used to reduce the ground vibration, noise, fly rock etc. due to blasting.
- The blasting is being/will be done using Site Mixed Emulsion (SME).
- Blasted ore is being/ will be loaded by large size hydraulic excavators with 4.3 m^3/3.5 m^3 capacity into the dumper of capacity 60 Tonnes/35 Tonnes for transportation of Bauxite to the crusher (within in Mining Lease area).
- The crushed Bauxite from existing crushers from the mine shall be transported via road to several Railway sidings (viz. near Kakriguma, Singaram, Rayagada & Dumuriput; from where the ore shall be further dispatched for sale to the prospective buyers (for its use in Alumina & Aluminium Plants).

4.1 PROPOSED TRANSPORTATION ROUTE

The excavated Bauxite will be transported to Crushers by heavy duty dumpers having carrying capacity of 60 Tonnes/35 Tonnes. Crushed Bauxite from the mine is being transported via Road through Trucks to the Railway siding near Kakriguma (~24 Km from the ML area). After expansion, along with Kakriguma Railway siding; the ore will be also be transported to other Railway Sidings namely, Singaram (~27 Km from the ML area), Rayagada (~70 Km from the ML area) and Dumriput (~67 Km from the ML area). Form the Railway Sidings, the ore is being/will be further dispatched for sale to the prospective buyers (for its used in Alumina & Aluminium Plants/Refinery).

S. No.	Name of the Railway Station	On Road Distance from ML Area (In Km)		Total Distance (In Km)
		ML area to Zero Point	Zero Point to Railway Siding	
1.	Kakriguma Railway Station	8.0	16.0	**24.0**
2.	Singaram Railway Station	8.0	19.0	***27.0***
3	Rayagada Railway Station	8.0	62.0	**70.0**
4.	Dumuriput Railway Station	8.0	59.0	**67.0**

Source: *M/s. OMC Ltd.*

The Bauxite is being/will be transported from mine face to crusher located within the ML area by 35 Tonnes/60 Tonnes capacity of dumper via haul roads. Total trips of 60 Tonnes capacity of dumper required per day for transport of 20000 TPD Bauxite from mine face to crusher will be 333 numbers. The number of trips per hour will be 19 numbers (3 shifts @ 6.0 effective working hours).

Total trips of 35 Tonnes capacity of dumper required per day for transport of 20000 TPD Bauxite from mine face to crusher will be 571 numbers. The number of trips per hour will be 32 numbers (3 shifts @ 6.0 effective working hours).

The crushed Bauxite is being/ will be is being/will be transported via Road through Tippers to the Railway siding near Kakriguma from where the ore will be further dispatched for sale to the prospective buyers (for its use in Alumina & Aluminium Plants/Refineries). After expansion the mineral will also be transported up to Railway Siding Singaram and Rayagada for further sale to the prospective buyers.

Expansion in Bauxite Production Capacity from 3.6 Million TPA to 6.0 Million TPA [ROM: 6.0 Million TPA, OB/Waste: 3.29 Million TPA, Top Soil: 0.22 Million TPA (Total Excavation: 9.51 Million TPA)] in Kodingamali Bauxite Mine (ML Area: 428.075 ha) located at Village: Kodingamali, Tehsil(s): Laxmipur & Kashipur, District(s)- Koraput & Rayagada, State: Odisha

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Proper measures will be taken for the transportation of mineral in order to arrest fugitive emission. The details of Route of transportation from the proposed Mine Site (via Road) are given in the following table:

Table: 2
Details of Route for Transportation

S. No.	Name of the Railway Siding	On Road Distance from the Mine Site (in Km)		Total Distance (In Km)	Length & Width of Road	Length & Width of Road	Type of Road
		Siding to Zero Point	Lease to Zero Point				
1.	Kakriguma Railway Siding	15	8	~ 24.0	~ 3.5	Width - 7.5 m (Shoulders 1.5 m)	Approach Road (Two Lane-Paved Road)
					~3.0	7.5 m (Shoulders 1.5m)	PWD Road (Two Lane -Bituminous Top)
					~16.0	7.0 m (Shoulders 1.5 m)	National Highway (Two Lane -Bituminous Top)
					~ 0.5	8.0 m (Shoulders 2.5 m)	National Highway (Two Lane -Bituminous Top)
	Total Distance				**24.0**		
2.	Singaram Railway Siding	19	8	~ 27.0	~2.5	9.0 m (Shoulders 1.5 m)	National Highway (Two Lane -Bituminous Top)
					~ 24.5	7.0 m (Shoulders 1.5 m)	PWD Road (Two Lane -Bituminous Top)
	Total Distance				**27.0**		
3.	Rayagada Railway Siding	62	8	~ 70.0	~ 66.5	7.0 m (Shoulders 1.5 m)	National Highway (Two Lane -Bituminous Top)
					~ 3.5	7.0 m (Shoulders 1.5 m)	PWD Road (Two Lane -Bituminous Top)
	Total Distance				**70.0**		
4.	Dumuriput Railway Siding	59	8	~ 67.0	~ 22.5	PWD Road - 7.0 m (Shoulders 1.5 m) & NH- 7.0 m (Shoulders 1.5 m)	PWD Road (Two Lane -Bituminous Top) & National Highway (Two Lane -Bituminous Top)
					~ 44.5	7.0 m (Shoulders 1.5 m)	National Highway (Two Lane -Bituminous Top)
	Total Distance				**67.0**		

Google Image showing all four Transportation Routes is given below:

Source: Google Earth Pro & Site Visit *Not to Scale*

Figure 4.1 Google Image showing Transportaion Route from ML Area up to the Railway Sidings

5.1 TOTAL MATERIAL HANDLING

The total handling at Normative stage (considering 300 working days) & Peak Stage (considering 250 working days) of Kodingamali Bauxite Mine at 6.0 MTPA capacity is given as below:

Table – 3
Details of Excavation at Normative & Peak Stages

S. No	Particular	Capacity (Million TPA)	Normative Capacity (TPD) (300 Days)	Peak Production by increasing 20 % capacity (TPD)
1.	Bauxite	6.0	20000	24000
2.	Top Soil	0.22	733	880
3.	OB/Waste	3.29	10967	13160
	Total excavation	**9.51**	**31700**	**38040**

In case of shut down/break down/major maintenance in crusher, production of mine may be suspended temporarily and a short fall may occur in Bauxite stock; therefore, to cover up this short fall, maximum 20% production is considered as compared to daily production & meanwhile in that period development work like removal of Soil, waste etc. is also considered at 20% maximum as compared to daily capacity. However, the annual production will remain same i.e., Bauxite: 6.0 Million TPA, Top Soil: 0.22 Million TPA and OB/Waste: 3.29 Million TPA.

Transportation within the Lease Area:

At Normative Stage: total trips of 60 Tonnes capacity of dumper required per day for transport of 20000 TPD Bauxite from mine face to crusher will be 333 numbers. The number of trips per hour will be 19 numbers (3 shifts @ 6.0 effective working hours).

Total trips of 35 Tonnes capacity of dumper required per day for transport of 20000 TPD Bauxite from mine face to crusher will be 571 numbers. The number of trips per hour will be 32 numbers (3 shifts @ 6.0 effective working hours).

At Peak Stage: total trips of 60 Tonnes capacity of dumper required for transport of 24000 TPD Bauxite from mine face to crusher will be 400 numbers. The number of trips per hour will be 22 numbers (3 shifts @ 6.0 effective working hours).

Total trips of 35 Tonnes capacity of dumper required per day for transport of 24000 TPD Bauxite from mine face to crusher will be 686 numbers. The number of trips per hour will be 38 numbers (3 shifts @ 6.0 effective working hours.

The crushed Bauxite is being/will be transported to Railway Sidings namely Kakriguma, Singaram (~27 Km from the ML area), Rayagada (~70 Km from the ML area) and Dumriput (~67 Km from the ML area). Form the Railway Sidings, the ore is being/will be further dispatched for sale to the prospective buyers.

6.1 IMPACTS DUE TO INCREASE IN TRAFFIC DENSITY AND MITIGATION MEASURES

In context of transportation of Mineral, **Traffic Density Study** has been carried out to analyse the density of vehicles for transportation of Bauxite from the specific Mine Site to the to the end users mainly the prospectives buyers. This study is crucial for optimizing transportation routes, reducing congestion, and minimizing environmental impacts.

Impacts

Increased traffic density, may have several types of impacts on the nearby local population and transport infrastructure:

Environmental Impacts:

- Increase in Traffic Density may contribute in increasing the vehicle emission levels which in turn may result in higher levels of Particulate matter and gaseous pollutants which can cause degradation in air quality and respiratory problem.
- Noise levels may also increase due to constant movement of heavy trucks and other vehicles which can cause sleep disturbances, stress and other health issues.

Health Impacts:

- Increase in Traffic Density may aggravate the respiratory diseases like Bronchitis, Asthma, etc. Increased risk of heart diseases and stroke may also be linked with long-term exposure to the particulate and gaseous pollutants.

Social Impacts:

- High Traffic Density in a particular region can affect the quality of life of the local people in terms of longer commutation timings and reduced accessibility to the desired locations.
- More traffic in an area can led to increase in risk of road accidents and arising Safety issues for pedestrians and drivers.

Economic Impacts:

- Increase in number of heavy vehicles with respect to transportation may cause damage to the road infrastructure subsequently, having higher maintenance costs. Areas with Higher Traffic congestion could also have reduced costs of the Property values.

Mitigation Measures:

- Traffic flow and congestion can be reduced by upgrading roads and creating dedicated lanes for heavy vehicles.
- Adhering to the emission standards for vehicles can help reduce air pollution.
- Concerns of Local communities shall be addressed by involving them in planning and decision-making processes.

7.1 ROAD TRAFFIC COUNT METHODOLOGY

Traffic survey has been conducted on several locations i.e. four locations each on Rayagada and Kakriguma Route and two locations each on Singaram and Dumuriput Route. Measurement of Traffic density was monitored continuously for 24 hours by visual observation and counting of vehicles for the six categories, viz., Motor cycle/scooter, Passenger car/ van/Auto-rickshaw, Tractors, Buses/Trucks, Trailers and Cycles. The traffic survey monitoring was done to review the future traffic growth and the load on the route w.r.t. transportation of mineral from the ML area to the prospective buyers.

Expansion in Bauxite Production Capacity from 3.6 Million TPA to 6.0 Million TPA [ROM: 6.0 Million TPA, OB/Waste: 3.29 Million TPA, Top Soil: 0.22 Million TPA (Total Excavation: 9.51 Million TPA)] in Kodingamali Bauxite Mine (ML Area: 428.075 ha) located at Village: Kodingamali, Tehsil(s): Laxmipur & Kashipur, District(s)- Koraput & Rayagada, State: Odisha
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I. TRAFFIC VOLUME COUNT AT KAKRIGUMA ROUTE

Table - 4
Details of Traffic Survey Points at Kakriguma Route

S. No.	Name of Location	Coordinates	Length (in km)	Width (m)	Type of Road
1.	Traffic Survey Point No.1 (T1) – Near intersection point of Mine Approach Road & PWD Road	19°0'51"N to 83°04'30"E	~ 3.5	7.5 m (Shoulders 1.5 m)	Approach Road (Two Lane-Paved Road)
2.	Traffic Survey Point No. 2 (T2) – Near intersection point of PWD Road & NH-326	18°59'39"N to 83°05'19"E	~ 4.0	7.0 m (Shoulders 2.0m)	PWD Road (Two Lane -Bituminous Top)
3.	Traffic Survey Point No. 3 (T3) –NH-326 near Dumripadar	18°58'28"N to 83°03'06"E	~ 8.5	8.0 m (Shoulders 2.5 m)	National Highway (Two Lane -Bituminous Top)
4.	Traffic Survey Point No. 4 (T4) - NH-326 near Kudripadar (up to Railway Siding near Kakriguma)	18°57'12.24"N to 83°0'50.67"E	~ 8.0	8.0 m (Shoulders 2.5 m)	National Highway (Two Lane -Bituminous Top)

Total numbers of vehicles per hour under the six categories were determined. The traffic volume count at Traffic survey points is given below:

Table – 5
No. of Vehicles w.r.t PCU at Location
T1- Near Intersection point of Mine Approach Road & PWD Road

S. No.	Vehicle Type	Number of Vehicles / day	Passenger Car Unit (PCU) Factor	Total Number of Vehicle (PCU) / day
1	Motor Cycle /Scooter	867	0.5	433.5
2	Passenger Car/Van/ Auto Rickshaw	765	1.0	765
3	Agricultural Tractors	42	1.5	63
4	Buses/Trucks	823	3.0	2469
5	Truck-Trailers	16	4.5	72
6	Cycles	25	0.5	12.5
Total		**2538**	**-**	**3815**
Avg. PCU / Hour = 3815/24				**1 58.95 = ~ 159**

Source: *Field Survey*

Table – 6
No. of Vehicles w.r.t PCU at Location
T2- Near Intersection Point of PWD Road & NH-326

S. No.	Vehicle Type	Number of Vehicles / day	Passenger Car Unit (PCU) Factor	Total Number of Vehicle (PCU) / day
1	Motor Cycle /Scooter	897	0.5	448.5
2	Passenger Car/Van/ Auto Rickshaw	803	1.0	803
3	Agricultural Tractors	52	1.5	78.0
4	Buses/Trucks	798	3.0	2394
5	Truck-Trailers	57	4.5	256.5
6	Cycles	15	0.5	7.5
Total		**2622**	**-**	**3987.5**
Avg. PCU / Hour = 3987.5/24				**166.14 = ~ 166**

Source: *Field Survey*

Table – 7
No. of Vehicles w.r.t PCU at Location T3- NH-326 near Dumripadar

S. No.	Vehicle Type	Number of Vehicles / day	Passenger Car Unit (PCU) Factor	Total Number of Vehicle (PCU) / day
1	Motor Cycle /Scooter	1131	0.5	565.5
2	Passenger Car/Van/ Auto Rickshaw	863	1.0	863
3	Agricultural Tractors	259	1.5	388.5
4	Buses/Trucks	649	3.0	1947
5	Truck-Trailers	76	4.5	342
6	Cycles	22	0.5	11.0
Total		**3000**	-	**4117**
Avg. PCU / Hour =4117/24				**171.54 = ~ 172**

Source: *Field Survey*

Table – 8
No. of Vehicles w.r.t PCU at Location
T4- NH-326 near Kudripadar-up to Railway Siding near Kakriguma

S. No.	Vehicle Type	Number of Vehicles / day	Passenger Car Unit (PCU) Factor	Total Number of Vehicle (PCU) / day
1.	Motor Cycle /Scooter	1101	0.5	550.5
2.	Passenger Car/Van/ Auto Rickshaw	998	1.0	998
3.	Agricultural Tractors	153	1.5	230.25
4.	Buses/Trucks	526	3.0	1578
5.	Truck-Trailers	229	4.5	1030.5
6.	Cycles	65	0.5	32.5
Total		**3954**	-	**4149.75**
Avg. PCU / Hour = 4149.75/24				**184.15 = ~ 184**

Source: *Field Survey*

Table – 9
Recommended Design Service Volume as per Guidelines for Capacity of Roads in Rura areas - IRC: 64-1990 for Two Lane Roads

S. No.	Terrain	Curvature (Degrees per Kilometer)	Design Service Volume in PCU/Day
1.	Plain	Low (0-50)	15,000
		High (above 51)	12,500
2.	Rolling	Low (0-100)	11,000
		High (above 101)	10,000
3.	Hilly	Low (0-200)	7,000
		High (above 201)	5,000

** Recommended Design Service Volumes for Two lane roads (IRC: 64-1990)*

Expansion in Bauxite Production Capacity from 3.6 Million TPA to 6.0 Million TPA [ROM: 6.0 Million TPA, OB/Waste: 3.29 Million TPA, Top Soil: 0.22 Million TPA (Total Excavation: 9.51 Million TPA)] in Kodingamali Bauxite Mine (ML Area: 428.075 ha) located at Village: Kodingamali, Tehsil(s): Laxmipur & Kashipur, District(s)- Koraput & Rayagada, State: Odisha

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Table – 10
Existing Traffic Scenario and LOS (Level of Service) at Kakriguma Route

S. No.	Location	V (Volume in PCU/hr)	Design Service Volume in PCU/Day	C (Capacity in PCU/hr)	Existing V/C Ratio	LOS
1.	Near Intersection point of Mine Approach Road & PWD Road	159	11,000	458	0.34	B
2.	Near Intersection Point of PWD Road & NH-326	166	11,000	458	0.36	B
3.	NH-326 near Dumripadar	172	10,000	417	0.41	C
4	NH-326 near Kudripadar-up to Railway Siding near Kakriguma	184	11,000	458	0.40	C

** Recommended Design Service Volumes for two lane roads -Rolling (IRC: 64-1990)*

Table – 11
Capacity as per IRC: 64-1990

V/C	LOS (Level of Service)	Performance
0.0 - 0.2	A	Excellent
0.2 - 0.4	B	Very Good
0.4 - 0.6	C	Good / Average / Fair
0.6 - 0.8	D	Poor
0.8 - 1.0	E	Very Poor
>1	F	Highly Unstable (Free Flow = 0)

II. TRAFFIC VOLUME COUNT AT RAYAGADA ROUTE

Table - 12
Details of Traffic Survey Points of Rayagada Route

S. No.	Name of Location	Coordinates	Length (in km)	Width (m)	Type of Road
1.	T1 - Near Laxmipur on NH-326 (Zero point to Koraput Square)	18.986441°N to 83.110374°E	~66.5	7.0 m (Shoulders 1.5 m)	National Highway (Two Lane -Bituminous Top)
2.	T2 - Near Punijisil on NH-326 (Zero point to Koraput Square)	19.009624°N to 83.12738°E		7.0 m (Shoulders 1.5 m)	National Highway (Two Lane -Bituminous Top)
3.	T3 - Near Kulinga on NH-326 (Zero point to Koraput Square)	19.060636°N to 83.17092°E		7.0 m (Shoulders 1.5 m)	National Highway (Two Lane -Bituminous Top)
4.	T4 – Kutingiguda on NH-326 (Zero point to Koraput Square)	19.12319°N to 83.206252°E		7.0 m (Shoulders 1.5 m)	National Highway (Two Lane -Bituminous Top)
5.	T5 - Near OMC Office (Koraput Square to Koraput Railway Siding	19°11'2.03'' N to 83°23'35.61'' E	~3.5	7.0 m (Shoulders 1.5 m)	PWD Road (Two Lane -Bituminous Top)

Total numbers of vehicles per hour under the six categories were determined. The traffic volume count at Traffic survey points is given below:

Table – 13

No. of Vehicles w.r.t PCU at Location

T1- Near Laxmipur on NH-326 (Zero point to Koraput Square)

S. No.	Vehicle Type	Number of Vehicles / day	Passenger Car Unit (PCU) Factor	Total Number of Vehicle (PCU) / day
1	Motor Cycle /Scooter	1038	0.5	519
2	Passenger Car/Van/ Auto Rickshaw	1022	1.0	1022
3	Agricultural Tractors	22	1.5	33
4	Buses/Trucks	220	3.0	660
5	Truck-Trailers	33	4.5	148.5
6	Cycles	3	0.5	1.5
Total		**2338**	**-**	**2384**
Avg. PCU / Hour = 2384/24				**99.33 = ~ 99**

Source: *Field Survey*

The traffic volume count at Traffic survey point no. 2, **Near Punijisil on NH-326 (Zero point to Koraput Square) is** shown in table 14:

Table 14

No. of Vehicles w.r.t PCU at Location

T2- Near Punijisil on NH-326 (Zero point to Koraput Square)

S. No.	Vehicle Type	Number of Vehicles / day	Passenger Car Unit (PCU) Factor	Total Number of Vehicle (PCU) / day
1	Motor Cycle /Scooter	421	0.5	210.5
2	Passenger Car/Van/ Auto Rickshaw	483	1.0	483
3	Agricultural Tractors	45	1.5	67.5
4	Buses/Trucks	168	3.0	504
5	Truck-Trailers	44	4.5	198
6	Cycles	6	0.5	3
Total		**1167**	-	**1466**
Avg. PCU / Hour = 1466/24				**61**

Source: *Field Survey*

The traffic volume count at Traffic survey point no. 3, **Near Kulinga on NH-326 (Zero point to Koraput Square)** shown in table 15:

Table – 15

No. of Vehicles w.r.t PCU at Location

T2- Near Kulinga on NH-326 (Zero point to Koraput Square)

S. No.	Vehicle Type	Number of Vehicles / day	Passenger Car Unit (PCU) Factor	Total Number of Vehicle (PCU) / day
1	Motor Cycle /Scooter	272	0.5	136
2	Passenger Car/Van/ Auto Rickshaw	268	1.0	268
3	Agricultural Tractors	21	1.5	31.5

Expansion in Bauxite Production Capacity from 3.6 Million TPA to 6.0 Million TPA [ROM: 6.0 Million TPA, OB/Waste: 3.29 Million TPA, Top Soil: 0.22 Million TPA (Total Excavation: 9.51 Million TPA)] in Kodingamali Bauxite Mine (ML Area: 428.075 ha) located at Village: Kodingamali, Tehsil(s): Laxmipur & Kashipur, District(s)- Koraput & Rayagada, State: Odisha

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4	Buses/Trucks	82	3.0	246
5	Truck-Trailers	63	4.5	238.5
6	Cycles	0	0.5	0
Total		**706**	-	
Avg. PCU / Hour =920/24				**38.33 = ~ 38**

Source: *Field Survey*

The traffic volume count at Traffic survey point no. 4, **Near Kutingiguda on NH-326 (Zero point to Koraput Square)** shown in table 16:

Table – 16

No. of Vehicles w.r.t PCU at Location T4- Near Kutingiguda on NH-326 (Zero point to Koraput Square)

S. No.	Vehicle Type	Number of Vehicles / day	Passenger Car Unit (PCU) Factor	Total Number of Vehicle (PCU) / day
1.	Motor Cycle /Scooter	228	0.5	114
2.	Passenger Car/Van/ Auto Rickshaw	292	1.0	292
3.	Agricultural Tractors	15	1.5	22.5
4.	Buses/Trucks	275	3.0	2325
5.	Truck-Trailers	171	4.5	770
6.	Cycles	2	0.5	1
Total		**983**	-	
Avg. PCU / Hour = 3524.75/24				**146.85 = ~ 147**

Source: *Field Survey*

The traffic volume count at Traffic survey point no. 5, **Near OMC Office (Koraput Square to Koraput Railway Siding**) shown in table 17:

Table – 17

No. of Vehicles w.r.t PCU at Location

T5- Near OMC Office (Koraput Square to Koraput Railway Siding

S. No.	Vehicle Type	Number of Vehicles / day	Passenger Car Unit (PCU) Factor	Total Number of Vehicle (PCU) / day
1.	Motor Cycle /Scooter	652	0.5	326
2.	Passenger Car/Van/ Auto Rickshaw	204	1.0	204
3.	Agricultural Tractors	99	1.5	148.5
4.	Buses/Trucks	577	3.0	1731
5.	Truck-Trailers	141	4.5	635
6.	Cycles	55	0.5	27.5
Total		**1728**	-	
Avg. PCU / Hour = 3072/24				**128**

Source: *Field Survey*

Table – 18
Recommended Design Service Volume as per Guidelines for Capacity of Roads in Rura areas - IRC: 64-1990 for Two Lane Roads

S. No.	Terrain	Curvature (Degrees per Kilometer)	Design Service Volume in PCU/Day
1.	Plain	Low (0-50)	15,000
		High (above 51)	12,500
2.	Rolling	Low (0-100)	11,000
		High (above 101)	10,000
3.	Hilly	Low (0-200)	7,000
		High (above 201)	5,000

** Recommended Design Service Volumes for Two lane roads (IRC: 64-1990)*

Table – 19
Existing Traffic Scenario and LOS (Level of Service) at Rayagada Route

S. No.	Location	V (Volume in PCU/hr)	Design Service Volume in PCU/Day	C (Capacity in PCU/hr)*	Existing V/C Ratio	LOS
1.	Near Laxmipur Rly. Junction on Laxmipur Rayagada Road	99	11,000	458	0.21	B
2.	Near Punijisil on Laxmipur Rayagada Road	61	11,000	458	0.13	A
3.	Near Kulinga on Laxmipur Rayagada Road	38	11000	458	0.08	A
4	Near Kutingiguda on Laxmipur Rayagada Road	147	11,000	458	0.32	B
5	Near OMC Office at Rayagada Road	128	11,000	458	0.27	B

** Recommended Design Service Volumes for two lane roads -Rolling (IRC: 64-1990)*

Table – 20
Capacity as per IRC: 64-1990

V/C	LOS (Level of Service)	Performance
0.0 - 0.2	A	Excellent
0.2 - 0.4	B	Very Good
0.4 - 0.6	C	Good / Average / Fair
0.6 - 0.8	D	Poor
0.8 - 1.0	E	Very Poor
>1	F	Highly Unstable (Free Flow = 0)

Expansion in Bauxite Production Capacity from 3.6 Million TPA to 6.0 Million TPA [ROM: 6.0 Million TPA, OB/Waste: 3.29 Million TPA, Top Soil: 0.22 Million TPA (Total Excavation: 9.51 Million TPA)] in Kodingamali Bauxite Mine (ML Area: 428.075 ha) located at Village: Kodingamali, Tehsil(s): Laxmipur & Kashipur, District(s)- Koraput & Rayagada, State: Odisha

Traffic Study Report

III. TRAFFIC VOLUME COUNT AT SINGARAM ROUTE

Table - 21
Details of Traffic Survey Points of Singaram Route

S. No.	Name of Location	Coordinates	Length (in km)	Width (m)	Type of Road
1.	T1 - Near Odia on NH-326 (Zero point to Railway Square)	19.053416°N to 83.102237°E	~2.5	9.0 m (Shoulders 1.5 m)	National Highway (Two Lane -Bituminous Top)
2.	T2 - Near Bhalujodi (Railway Square to Raigada Railway Siding	19.102805°N to 83.101903°E	~24.5	7.0 m (Shoulders 1.5 m)	PWD Road (Two Lane -Bituminous Top)

Total numbers of vehicles per hour under the six categories were determined. The traffic volume count at Traffic survey points is given below:

Table – 22
No. of Vehicles w.r.t PCU at Location
T1- Near Odia on NH-326 (Zero point to Railway Square)

S. No.	Vehicle Type	Number of Vehicles / day	Passenger Car Unit (PCU) Factor	Total Number of Vehicle (PCU) / day
1	Motor Cycle /Scooter	361	0.5	180.5
2	Passenger Car/Van/ Auto Rickshaw	188	1.0	188
3	Agricultural Tractors	9	1.5	13.5
4	Buses/Trucks	3	3.0	9
5	Truck-Trailers	4	4.5	18
6	Cycles	0	0.5	0
Total		**565**	-	**409**
Avg. PCU / Hour = 409/24				**17.04 = ~ 17**

Source: *Field Survey*

Table – 23
No. of Vehicles w.r.t PCU at Location
T2- Near Bhalujodi (Railway Square to Rayagada Railway Siding)

S. No.	Vehicle Type	Number of Vehicles / day	Passenger Car Unit (PCU) Factor	Total Number of Vehicle (PCU) / day
1	Motor Cycle /Scooter	344	0.5	172
2	Passenger Car/Van/ Auto Rickshaw	119	1.0	119
3	Agricultural Tractors	9	1.5	13.5
4	Buses/Trucks	2	3.0	6
5	Truck-Trailers	1	4.5	4.5
6	Cycles	1	0.5	0.5
Total		**476**	-	**315.5**
Avg. PCU / Hour = 315.5/24				**13.14 = ~ 13**

Source: *Field Survey*

Table – 24
Recommended Design Service Volume as per Guidelines for Capacity of Roads in Rura areas - IRC: 64-1990 for Two Lane Roads

S. No.	Terrain	Curvature (Degrees per Kilometer)	Design Service Volume in PCU/Day
1.	Plain	Low (0-50)	15,000
		High (above 51)	12,500
2.	Rolling	Low (0-100)	11,000
		High (above 101)	10,000
3.	Hilly	Low (0-200)	7,000
		High (above 201)	5,000

** Recommended Design Service Volumes for Two lane roads (IRC: 64-1990)*

Table – 25
Existing Traffic Scenario and LOS (Level of Service) at Singaram Route

S. No.	Location	V (Volume in PCU/hr)	Design Service Volume in PCU/Day	C (Capacity in PCU/hr)	Existing V/C Ratio	LOS
1.	T1 - **Near Odia on** NH-326 (Zero point to Railway Square)	17	10000	417	0.04	A
2.	T2 - **Near Bhalujodi (**Railway Square to Raigada Railway Siding	13	11000	458	0.02	A

TRAFFIC VOLUME COUNT AT DUMURIPUT ROUTE

Total numbers of vehicles per hour under the six categories were determined. The traffic volume count at Traffic survey points is given below:

Table - 26
Details of Traffic Survey Points of Dumuriput Route

S. No.	Name of Location	Coordinates	Length (in km)	Width (m)	Type of Road
1.	T1 - Near Marbaiguda on NH-326 (Zero point to Toyaput)	18.994107°N to 83.088733°E	~67.0	9.0 m (Shoulders 1.5 m)	National Highway (Two Lane -Bituminous Top)
2.	T2 - Near Toyaput (Toyaput to Dumuriput Railway Siding)	18.97224°N to 83.059409°E		7.0 m (Shoulders 1.2 m)	PWD Road (Two Lane -Bituminous Top)

Table – 27
No. of Vehicles w.r.t PCU at Location
T1- Near Marbaiguda on NH-326 (Zero point to Toyaput)

S. No.	Vehicle Type	Number of Vehicles / day	Passenger Car Unit (PCU) Factor	Total Number of Vehicle (PCU) / day
1	Motor Cycle /Scooter	976	0.5	488
2	Passenger Car/Van/ Auto Rickshaw	783	1.0	783
3	Agricultural Tractors	32	1.5	48
4	Buses/Trucks	356	3.0	1068
5	Truck-Trailers	54	4.5	243

6	Cycles	3	0.5	1.5
Total		**2204**	-	
Avg. PCU / Hour = 2631.5/24				**109.64 = ~ 110**

Source: *Field Survey*

Table – 28
No. of Vehicles w.r.t PCU at Location
T2- Near Tpyaput (Toyaput to Dumuriput Railway Siding)

S. No.	Vehicle Type	Number of Vehicles / day	Passenger Car Unit (PCU) Factor	Total Number of Vehicle (PCU) / day
1	Motor Cycle /Scooter	680	0.5	340
2	Passenger Car/Van/ Auto Rickshaw	697	1.0	697
3	Agricultural Tractors	27	1.5	40.5
4	Buses/Trucks	356	3.0	1068
5	Truck-Trailers	29	4.5	130.5
6	Cycles	2	0.5	1
Total		**1791**	-	
Avg. PCU / Hour = 2277/24				**94.87 = ~ 95**

Source: *Field Survey*

Table – 29
Recommended Design Service Volume as per Guidelines for Capacity of Roads in Rura areas - IRC: 64-1990 for Two Lane Roads

S. No.	Terrain	Curvature (Degrees per Kilometer)	Design Service Volume in PCU/Day
1.	Plain	Low (0-50)	15,000
		High (above 51)	12,500
2.	Rolling	Low (0-100)	11,000
		High (above 101)	10,000
3.	Hilly	Low (0-200)	7,000
		High (above 201)	5,000

** Recommended Design Service Volumes for Two lane roads (IRC: 64-1990)*

Table – 30
Existing Traffic Scenario and LOS (Level of Service) at Dumuriput Route

S.No.	Location	V (Volume in PCU/hr)	Design Service Volume in PCU/Day	C (Capacity in PCU/hr)	Existing V/C Ratio	LOS
1.	T1 - Near Odia on NH-326 (Zero point to Railway Square)	17	10000	417	0.04	A
2.	T2 - Near Bhalujodi (Railway Square to Raigada Railway Siding	13	11000	458	0.02	A

Table – 31
Capacity as per IRC: 64-1990

V/C	LOS (Level of Service)	Performance
0.0 - 0.2	A	Excellent
0.2 - 0.4	B	Very Good
0.4 - 0.6	C	Good / Average / Fair
0.6 - 0.8	D	Poor
0.8 - 1.0	E	Very Poor
>1	F	Highly Unstable (Free Flow = 0)

8.1 ADDITIONAL TRAFFIC DUE TO TRANSPORTATION BAUXITE VIA ROAD AFTER EXPANSION

The excavated Bauxite IS BEING/will be transported from mine face to crusher located within the mine lease area by 60Tonnes/35 Tonnes capacity of dumper via haul road. The crushed ore is being transported via Road through Tippers to the Railway siding near Kakriguma from where the ore is being further dispatched for sale to the prospective buyers (for its use in Alumina & Aluminium Plants/Refineries).

After expansion, the ore will be transported to Railway Sidings namely Kakriguma, Singaram (~27 Km from the ML area), Rayagada (~70 Km from the ML area) and Dumuriput (~67 Km from the ML area). Form the Railway Sidings, the ore is being/will be further dispatched for sale to the prospective buyers.

After expansion, the production capacity of Bauxite will be 6.0 Million TPA. Therefore, the calculation for tentative increase in the traffic density due to the transportation of Bauxite has been done.

The mineral from Kodingamali Bauxite Mine transported via Road will be ~20000 Tonnes per Day. The details of additional traffic due to Proposed expansion Project are given below:

Table – 32
Proposed increase in traffic density due to transportation of Bauxite via Road

S. No.	Mineral	Total Required Quantity			Total Number of Vehicles/ Day
		MTPA	TPA	TPD*	
1.	Bauxite	Existing – 3.6 MTPA	3600000	12000	698
		Additional for Expansion	2400000	8000	465
		After Expansion - 6.0 MTPA	6000000	20000	1163

*Note: *Considering No. of days of Transportation – 300*
**For calculation of PCU per hour: 21 hours per day transportation has been considered.*
**For Transportation of Bauxite via Road, Tippers/Trucks of 17.2 Tonnes and 21.0 Tonnes capacity are being/will be used. However, to calculate the V/C Ratio and LOS values after expansion, capacity of 17.2 Tonnes has been considered.*

- Mode of Transportation – By Road (100%)
- Type & capacity of vehicles – Tippers/Trucks (Capacity 17.7 Tonnes)
- Total No. of Vehicles/day – Existing (at 3.6 MTPA) = 698
- Total No. of Vehicles/day – After Expansion (at 6.0 MTPA) = 1163
- Total Additional no. of Tippers/Trucks per Day = 465

- Increase in PCU/day = 465 x 3.0 = 1395
- Increase in PCU/hr. = 1395/21 = 66.42 i.e. ~66

The modified Traffic scenario and LOS values after expansion for traffic survey locations at all four routes namely Kakriguma, Singaram, Rayagada & Dumuriput are given below:

Table – 33
Modified Traffic Scenario & LOS for Kakriguma Route

S. No.	Road	Increased PCUs/ Road	V (Volume In PCU/Hr.)	C (Capacity In PCU/Hr.)	Modified V/C Ratio	LOS
1	Approach Road from Mine up to PWD Road PWD Road	66	159 + 66 =225	458	0.49	C
2	PWD Road & NH-326	66	166+ 66 = 232	458	0.50	C
3	NH-326 up Railway Siding near Kakriguma	66	172 + 66 = 238	417	0.51	C
4	Approach Road up to Kakriguma Railway Siding	66	184 + 66 =250	458	0.54	C

Table – 34
Modified Traffic Scenario & LOS for Rayagada Route

S. No.	Road	Increased PCUs/ Road	V (Volume In PCU/Hr.)	C (Capacity In PCU/Hr.)	Modified V/C Ratio	LOS
1	Near Laxmipur Rly. Junction on Laxmipur Rayagada Road PWD Road	66	99 + 66=165	458	0.36	B
2	Near Punijisil on Laxmipur Rayagada Road	66	61 + 66=127	458	0.27	B
3	Near Kulinga on Laxmipur Rayagada Road	66	38 + 66=104	458	0.22	B
4	Near Kutingiguda on Laxmipur Rayagada Road	66	147 + 66=213	458	0.46	C
5	Near OMC Office at Rayagada Road	66	128 + 66 =161	458	0.35	B

Table – 35
Modified Traffic Scenario & LOS for Singaram Route

S. No.	Road	Increased PCUs/ Road	V (Volume In	C (Capacity In	Modified V/C Ratio	LOS
1	T1 - **Near Odia on** NH-326 (Zero point to Railway Square)	66	17 + 66=83	417	0.19	A
2	T2 - **Near Bhalujodi (**Railway Square to Raigada Railway Siding	66	13 + 66=79	458	0.17	A

Table – 36
Modified Traffic Scenario & LOS for Dumuriput Route

S. No.	Road	Increased PCUs/ Road	V (Volume In PCU/Hr.)	C (Capacity In PCU/Hr.)	Modified V/C Ratio	LOS
1	T1 - **Near Marbaiguda on** NH-326 (Zero point to Toyaput)	66	110 + 66=176	458	0.38	B
2	T2 - **Near Toyaput (**Toyaput to Dumuriput Railway Siding)	66	95 + 66=161	458	0.35	B

9.1 TRAFFIC PROJECTION AND IMPACT DUE TO INCREASED TRAFFIC MOVEMENT

Due to the proposed Expansion Project, there will be addition of Trucks/Tippers in the existing traffic load.

- V/C ratio for the traffic survey conducted on Kakriguma Route is observed to be 0.46, 0.47, 0.48 & 0.51 according to which it falls in LOS 'category C having Good / Average / Fair performance'.
- V/C ratio for the traffic survey conducted on Singaram Route is observed to be 0.19 and 0.17, according to which it falls in LOS 'category A having Excellent performance'.
- V/C ratio for the traffic survey conducted on Rayagada Route is observed to be 0.36, 0.27, 0.22, 0.46 & 0.35 according to which it falls in LOS 'category B having Very Good performance' and 'category C having Good / Average / Fair performance'.
- V/C ratio for the traffic survey conducted on Dumuriput Route is observed to be 0.38 and 0.35 according to which it falls in LOS 'category B having Very Good performance'.

Conclusion:

As per the above modified V/C Ratios and LOS values, it can be concluded that the present road network is good enough to bear the increased traffic load.

The internal and nearby roads are being/will be periodically maintained to facilitate the safe and pollution free transportation services, if required. There will be no significant change in the traffic density after the expansion project. However, OMC Ltd. is being taking/will take all the appropriate and adequate mitigation measures to the best possible extent to minimize the impacts due to Noise, fugitive dust & Gaseous Emissions.

10.1 MITIGATION MEASURES FOR MINERAL TRANSPORTATION

The following necessary mitigation measures are being/will be adopted:

- Regular water sprinkling on mine haul roads during transportation and also at transfer points.
- Vehicles with PUC Certificate are being/will be used.
- Overloading is being/will be avoided both within the mine and during transportation.
- Un- necessary blowing of horn is being/will be avoided.
- The speed of heavy-duty vehicles are being/will be kept low on the approach Road from Mine up to PWD Road and also near to the densely populated areas.
- Proper maintenance, oiling and greasing of vehicles is being/will be done.
- Greenbelt and Plantation along ML boundary, on backfilled area and mineral storage area.

Expansion in Bauxite Production Capacity from 3.6 Million TPA to 6.0 Million TPA [ROM: 6.0 Million TPA, OB/Waste: 3.29 Million TPA, Top Soil: 0.22 Million TPA (Total Excavation: 9.51 Million TPA)] in Kodingamali Bauxite Mine (ML Area: 428.075 ha) located at Village: Kodingamali, Tehsil(s): Laxmipur & Kashipur, District(s)- Koraput & Rayagada, State: Odisha

Traffic Study Report

11.1 CONCLUSION

Due to the Proposed expansion project, there will be addition of tippers in the existing traffic. Transportation of Bauxite from working face to crusher hopper will be carried out by dumpers of capacity 35Tonnes/60 Tonnes Tonnes via internal haul roads. The crushed Bauxite will be transported to the Railway Sidings viz. Kakriguma, Rayagada, Singaram & Dumuriput for further dispatch for sale to the prospective buyers.

The existing V/C Ratio at all traffic locations on respective routes and after considering the increased traffic load due to the transportation of Bauxite after expansion, it was observed that the Level of Service (LOS) at all locations falls under category 'A' having *Excellent* Performance and category 'B' having *Very Good Performance and in* 'category C having Good / Average / Fair performance'. It can be said that the existing Road network is sufficient enough to sustain the increased traffic load due to expansion. However, M/s. OMC Ltd. is/will be contributing by making efforts in strengthening and maintenance of road infrastructure as and when needed to facilitate transportation.

As per the above Traffic Projection calculation at traffic survey locations, it can be concluded that the present road network is good enough to bear the increased traffic load.

During the road transportation adequate measures are being/will be taken to keep the pollution under control. Hence there will not be any significant impact on transport infrastructure due to the proposed expansion project.

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MINERAL PILFERAGE PREVENTION & ACTION PLAN

1.1 Introduction

Odisha Mining Corporation Ltd. (OMC), in its commitment to responsible mining, is undertaking the expansion of production capacity at Kodingamali Bauxite Mine from 3 MTPA to 6 MTPA. As part of this enhancement, a structured **Mineral Pilferage Prevention Action Plan** has been developed to ensure the secure, lawful, and transparent handling of mineral dispatch. While legal responsibility for the material post-mine exit rests with the buyer and their designated transporter, OMC maintains proactive control within the mining lease area through robust system design, stakeholder awareness, and rigorous monitoring protocols.

1.2 Objectives

- To prevent unauthorized lifting and pilferage of bauxite.
- To ensure secure, compliant, and traceable mineral transportation from mine to railway siding.
- To build awareness and accountability among all stakeholders involved in mineral dispatch.
- To uphold regulatory compliance as per IBM Guidelines, OMPTS Rules, and best practices in mining logistics.

1.3 Transportation Setup

- **Buyers:** M/s Vedanta, M/s Hindalco, M/s Pioneer
- **Mode of Transport:** Trucks operated by transporters appointed by the respective buyers
- **Linked Railway Sidings:** Kakriguma, Singaram, Rayagada, Dumuriput
- **Weighbridge Facilities:**
    - **Within Mining Lease:** Operated and maintained by OMC
    - **At Siding/Plant End:** Operated by respective buyers for revalidation and final reconciliation

1.4 Stakeholder Roles and Responsibilities

A. Security Personnel (OMC)

- Verify vehicle documents and system-generated passes
- Operate boom barriers and validate RFID tags
- Monitor CCTV footage and report anomalies
- Maintain detailed gate logs and records of entry/exit

B. Mine Transport Team (OMC)

- Generate and issue I3MS-linked transit passes, delivery challan for each trip
- Supervise stacking, weighing, and dispatch operations
- Coordinate with buyer representatives and transporter teams
- Conduct routine audits and ensure adherence to internal SOPs

C. Transporter (Appointed by Buyer)

- Deploy only RFID-tagged trucks tagged in i3ms against particular permit with valid documentation
- Ensure drivers carry transit pass
- Adhere to designated routes from mine to siding
- Promptly report delays or route deviations to concerned parties

D. Buyer

- Legally accountable for the material post mine-exit
- Operate and maintain weighbridge at siding/plant for reconciliation
- Ensure transporter compliance with legal and operational requirements

E. Transporting In-charge (OMC)

- Engage with local transport unions and stakeholders
- Conduct periodic meetings to address concerns and enhance awareness
- Disseminate regulatory updates and reinforce compliance culture

F. Quick Response Team (QRT)

- Investigate any route deviation or suspected pilferage
- Liaise with enforcement agencies as required
- Maintain incident records and initiate corrective actions

G. Government Authorities

- Conduct inspections at check posts and along transport routes
- Verify documentation, weighments, and mineral conformity
- Seize material and initiate legal proceedings in case of violations

1.5 Technical and Physical Control Measures

A. Route and Movement Control

- **One-Way Route Plan:** Defined unidirectional routes for inbound (empty) and outbound (loaded) trucks
- **Traffic Associate Deployment:** Positioned outside ML area to monitor movement and guide trucks
- **Transporter Representative Checkpoints:** Deployed to validate vehicle direction and buyer alignment
- **Buyer Identification Codes**:
    - VEDANTA, HINDALCO, PIONEER etc.
    - Trucks labeled with color-coded stickers or digital tags for quick visual identification

B. Digital and Physical Controls

- **RFID-Based Vehicle Tracking:** Real-time monitoring integrated with I3MS
- **Boom Barriers:** Automated, linked with system-authenticated passes (LMS)
- **CCTV Surveillance:** 24x7 monitoring at all critical control points including gates, stockyards, and weighbridges

C. Weighbridge Controls

- **Integration with I3MS** for transparent data flow
- **Periodic Calibration and Certification** to ensure accuracy
- **Cross-verification** with buyer-end weighbridge records

D. Surveillance & Documentation

- Mandatory checking of transit passes, challans, and permits
- **GPS alerts** for route deviation, delay, or unauthorized stops
- Scheduled and surprise **internal audits** for reconciliation

1.6 Compliance and Awareness Measures

- Regular training for drivers, security personnel, and transporter staff on applicable rules and SOPs
- Monthly coordination meetings with buyers, transporters, and unions
- Awareness campaigns on seizure/confiscation provisions under OMPTS Rules
- Circulation of updated SOPs, route maps, and responsibilities to all stakeholders

1.7 Incident Management Protocol

- Immediate reporting of any incident to transporter, buyer, and OMC control room
- Deployment of QRT for real-time investigation
- Maintenance of detailed incident logs and root cause analysis
- Escalation to district or regulatory authorities in case of repeated violations or legal non-compliance

1.8 Legal Compliance and Cooperation

- Full cooperation with inspections and audits conducted by statutory authorities
- Provision of documents, digital logs, surveillance records, and access to weighbridge data
- Active facilitation of enforcement actions beyond the lease area, when necessary

1.9 Training and Awareness Plan

Stakeholder Group	Training Content	Frequency
Truck Drivers	Route plan, legal compliance, RFID usage, penalties for pilferage	Monthly
Security Staff	Document verification, RFID/barcode check, suspicious behavior reporting	Monthly
Mine Operators	SOP for loading, slip issuance, communication protocols	Monthly
Supervisors & Transport Team	System audit readiness, emergency protocols, stakeholder coordination	Bi-Monthly
Transporter Representatives	Documentation, reporting formats, coordination with buyers & OMC	Bi-Monthly
Buyers' Liaison Officers	Legal obligations post-mine exit, reconciliation procedures, review sales performance, key concerns etc.	Weekly
Transporting team, Foreman, Mate, buyer's liaison officers	System, Procedures, Key check points, review performance of Logistics Management System	Quarterly

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CIN No.: U74220HR2011PTC085755

J. M. ENVIROLAB PVT. LTD.

30 years of success

Approved from MoEF&CC & Certified - ISO 9001:2015, ISO 14001:2015, ISO 45001:2018

TEST REPORT

Issued to:	J. M. EnviroNet Pvt. Ltd. Emaar Digital Greens, Tower- B, Unit No. 1517, Golf Course Ext. Road, Sector-61, Gurugram- 122001 (Haryana)	Report No.:	JME/RSPM/241231001
		Date of Reporting:	07/01/2025
Project:	M/s. Odisha Mining Corporation Limited Kodingamali Bauxite Mining Project (ML Area: 428.075 ha) located at Kodingamali, Tehsil: Koraput, District: Koraput, Odisha	Date of Monitoring: Sample Receipt Date:	27/12/2024 31/12/2024
		Equipment Used:	RDS
Sample Description:	MINERALOGICAL COMPOSITION OF RSPM	Protocol Used	CPCB Guidelines/ JMELPL/STOP/03
Sample Collected by:	Mr. Suresh Mahapatra		

MINERALOGICAL COMPOSITION

S. No.	Ions	Units	Concentration
1.	Free Silica (SiO_2)	$\mu g/m^3$	8.62
2.	Calcium (Ca)	$\mu g/m^3$	18.64
3.	Magnesium (Mg)	$\mu g/m^3$	6.54
4.	Iron (Fe)	$\mu g/m^3$	12.64
5.	Aluminium (Al)	$\mu g/m^3$	16.61
6.	Sodium (Na)	$\mu g/m^3$	8.03
7.	Potassium (K)	$\mu g/m^3$	1.98
8.	Manganese (Mn)	$\mu g/m^3$	BDL (DL 1.0)
9.	Chromium (Cr)	$\mu g/m^3$	BDL (DL 1.0)
10.	Nickel (Ni)	$\mu g/m^3$	BDL (DL 1.0)
11.	Zinc (Zn)	$\mu g/m^3$	BDL (DL 1.0)
12.	Copper (Cu)	$\mu g/m^3$	BDL (DL 1.0)
13.	Cobalt (Co)	$\mu g/m^3$	BDL (DL 1.0)
14.	Lead (Pb)	$\mu g/m^3$	BDL (DL 1.0)
15.	Mercury (Hg)	$\mu g/m^3$	BDL (DL 1.0)
16.	Cadmium (Cd)	$\mu g/m^3$	BDL (DL 1.0)

Note: BDL- Below Detectable Limit, DL- Detection Limit

End of Report

Deepak Singh
Tested by

Abhishek Tiwari
Checked by

Sita Ram Yadav
Authorized Signatory

Note:
1. This test report has been at your request and test results pertain to the tested sample received.
2. This report is for your reference only and not to be used for any legal purpose.
3. Any discrepancy in the test report or any remarks regarding the test results shall be brought to our knowledge within 7 days of the issue of this report.
4. Total liability or any claim in case of dispute is limited to the invoice raised by the laboratory.
5. The sample will be destroyed after retention time unless otherwise specified specially.
6. Endorsement of the product tested by the laboratory is neither intended nor implied.
7. Report shall not be reproduce except in full without approval of the laboratory.
8. All disputes are subject to exclusive jurisdiction of Jaipur court only.

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Corporate Office
Emaar Digital Greens, Tower-B, Unit No.1517,
Golf Course Ext. Road, Sector-61,
Gurugram-122011(Haryana)

Kodingamali Bauxite Mine (ML Area: 428.075 ha)
at Village: Kodingamali, Tehsil: Laxmipur & Kashipur & District- Koraput & Rayagada, Odisha
of M/s. Odisha Mining Corporation Limited

Baseline Monitoring/Sampling Photographs

AMBIENT AIR QUALITY MONITORING PHOTOGRAPHS	
	
Mine Site	**~500 m in Downwind Direction**
	
Village Balijorhii	**Village Birigurha**
	
Village Upar Karhinga	**Village Narsinghagurha**
	
Village Purparhi	**Village Marabaigurha**



Village Laxmipur



Village Dumri Padar



Near Dana Panasguda

NOISE MONITORING PHOTOGRAPHS



Mine Site



~500 m in Downwind Direction



Village Balijorhii



Village Birigurha



Village Upar Karhinga



Village Narsinghagurha



Village Purparhi



Village Marabaigurha



Village Laxmipura



Village Dumri Padar



Near Dana Panasguda

SURFACE WATER SAMPLING LOCATIONS	
	
Patagarha Nadi	Debagarha Nala

	
Murani Nadi	**Baghri Nala**
	
Patagarha Nala	**Nala**

GROUND WATER SAMPLING PHOTOGRAPHS	
	
Village Birigurha	
	
Village Upar Karhinga	**Village Timajhola**
	
Village Bakamba	**Village Narsinghagurha**

	
Near Pahandi	Near Dana Panasguda
	
Village Marabaigurha	Village Chindarapadar

SOIL SAMPLING PHOTOGRAPHS	
	
Mine Site	Village Birigurha
	
Village Upar Karhinga	Village Timajhola

	
Village Bakamba	**Village Narsinghagurha**
	
Near pahandi	**Near Dana Panasguda**
	
Village Marabaigurha	**Village Chindarapadar**

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Annexure XXI_Undertaking Reg. No Litigation

OMC | ODISHA NEW OPPORTUNITIES

Mining Happiness

UNDERTAKING

I, hereby give this undertaking that M/s. Odisha Mining Corporation Limited is proposing Expansion in Bauxite Production Capacity from 3.6 Million TPA to 6.0 Million TPA [ROM: 6.0 Million TPA, OB/Waste: 3.29 Million TPA, Top Soil: 0.22 Million TPA (Total Excavation: 9.51 Million TPA)] in Kodingamali Bauxite Mine (ML Area: 428.075 ha) located at Village: Kodingamali, Tehsil(s): Laxmipur & Kashipur, District(s): Koraput & Rayagada, State: Odisha. There is no litigation pending against the project and/or any direction/order passed by any Court of Law against the project and/or land in which the project is proposed and that for any such litigation whatsoever, the sole responsibilities will be borne by the company.

Date: 09.05.2025

Place: Bhubaneswar

9/5/25

Executive Director (F&E)

Odisha Mining Corporation Ltd.
(A Gold Category State PSU)
Registered Office : OMC House, Bhubaneswar - 751001, India
Tel : 0674-2377400/2377401, Fax: 0674-2396889, 2391629, www.omcltd.in
CIN : U13100OR1956SGC000313

Annexure XXII_Affidavit_Common cause

04 JAN 2025



ଓଡ଼ିଶା ओड़िशा ODISHA

R 908600

Before the **Public Notary, Bhubaneswar**

AFFIDAVIT

I, Sri Debendra Kumar Nanda, OAS, aged about 49 years, son of Late Krushna Chandra Nanda,at present working as Chief Vigilance Officer and Land Officer, Odisha Mining Corporation Ltd, (hereinafter mentioned as OMC), Bhubaneswar, District: Khurda, Odisha, do hereby state as follows:

1. That, OMC shall comply with all the statutory requirements and judgment of Hon'ble Supreme Court dated 2nd August 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause versus Union of India and Ors. before grant of ToR/EC pertaining to Kodingamali Bauxite Mining Project of OMC.
2. That, no violation with respect to the provisions of EIA Notification 2006 shall be committed in future.
3. That, the declaration made above is true and in best of my knowledge.

Debendra Kumar Nanda

Deponent

(Debendra Kumar Nanda)
Chief Vigilance Officer & Land Officer

Bhubaneswar
Dt.

NOTARY * P.K. DALABEHERA * BHUBANESWAR REGD. No. ON 46/2009 EXPIRY DATE. 02/03/2029 * GOVERNMENT OF ODISHA *

Debendra Kumar Nanda, OAS
Chief Vigilance Officer
AUTHORISED SIGNATORY
Odisha Mining Corporation Ltd.

PK DALABEHERA
NOTARY, BHUBANESWAR
REGD. NO. ON-46/05

DISTRICT TREASURY
10 SEP 2024