BEFORE THE NATIONAL GREEN TRIBUNAL EASTERN ZONE AT KOLKATA

MEMORANDUM OF APPEAL

(Under Sections 16(h) read with 18(1) of the National Green Tribunal Act, 2010)

Appeal No. 09 **of 2025**

Ajaya Muduli & Ors. …Appellants

-Vs-

State Level Environment Impact Assessment Authority, Odisha & Anr

…Respondents

INDEX

S. No	Date	Particulars	Page No.
VOLUME I			
1.	29.09.2025	Dates and Events	1
2.	29.09.2025	Synopsis	3
3.	29.09.2025	Memorandum of Application	4-55
4.	-	Vakalatnama	56
5.	-	Authorization Letter	57
6.	01.09.2025	Annexure A1- Impugned Environmental Clearance dated 01.09.2025	58-83
7.	18.04.2013	Annexure A2- Orissa Mining Corporation Ltd vs Ministry Of Environment & Forest & Ors (2013 (6) SCC 476)	84-122
8.	-	Annexure A3- Application form submitted by the 2nd Respondent available on the Parivesh website	123-152
9.	-	Annexure A4- Executive Summary of the draft EIA report	153-164
10.	22.09.2023	Annexure A5- Relevant extracts of Meeting of State Expert Appraisal Committee, Odisha dated 22.09.2023	165-178

11.	01.11.2023	Annexure A6- Relevant extracts of 141th Meeting of the State Environmental Impact Assessment Authority, Odisha	179-185
12.	30.05.2025	Annexure A7- Relevant extracts of 73rd Meeting of State Expert Appraisal Committee, Odisha	186-205
13.	23.07.2025	Annexure A8- Relevant extracts of 82nd Meeting of State Expert Appraisal Committee, Odisha	206-252
14.	-	Annexure A9- Photographs of the project site	253-266
VOLUME II			
15.	May 2025	Annexure A10- EIA report with annexures	267-748
VOLUME III			
16.	May 2025	Annexure A10- EIA report with annexures	749-1358
17.	-	Annexure A11- Acknowledgement receipts of the FRA claims along with translation	1359-1376

//Certified to be True Copies of the respective originals//

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Dates and Events

Date	Events
01.03.2023	The Government of Odisha issued letter of intent vide letter SM-MC2-MC-0007 2023/2143/S&M Bhubaneswar dated 1st March 2023 for grant of mining lease for Ballada bauxite block in Village - Ballada, Taluka – Nandapur, District- Koraput, Odisha for an area of 144.945 ha to M/s Mundra Aluminum Limited (now M/s Kalinga Alumina Limited) for period of 50 years.
08.08.2023	Mining plan along with Progressive Mine Closure Plan has been approved by IBM vide letter MCDR-MiFL0BXT/5/2023-BBS IBM_RO_BBS
01.09.2023	Date of Application for grant of Terms of Reference for the proposed project
22.09.2023	Meeting of State Expert Appraisal Committee, Odisha recommended the proposal for issues of standard and specific ToR
01.11.2023 & 02.11.2023	141th Meeting of the State Environmental Impact Assessment Authority, Odisha, in which the proposed ToR was examined.
06.11.2023	SEIAA issued Terms of reference vide File No. SIA/OR/MIN/439954/2023
04.06.2024	Conservation plan for protection of flora and fauna in Core and Buffer Zone of the Mine has been approved by the PCCF (WL) & CWLW, Odisha
08.11.2024	Permission to source water from Jalaput reservoir obtained from Department of Water Resources, Govt. of Odisha vide letter no. 30630/WR.

23.12.2024	Forest Clearance Stage-I "In-principal" approval has been granted by MoEF & CC (Forest Conservation Division)
04.02.2025	Notice for public hearing published in Sambada (Odia edition) and The New Indian Express (English edition) by the State Pollution Control Board, Odisha dated 01.02.2025 in the notice.
06.03.2025	Public Hearing for the proposed bauxite mine was held at Mouza- Bheja, Khata No. 27, Plot No. 225, under Nandapur Tehsil of Koraput District, Odisha at 11:00 AM in the presence of State Pollution Control Board, Odisha.
04.04.2025	Proceedings of the public hearing for the proposed project was sent to SEIAA, Odisha by SPCB, Odisha dated 04.04.2025 via speed post.
May, 2025	Final EIA Report and Environmental Management Plan was submitted.
13.05.2025	Application for Environmental Clearance for the proposed mining was submitted by the Project Proponent
30.05.2025	73rd Meeting of State Expert Appraisal Committee, Odisha (Hybrid)
23.07.2025	82nd Meeting of State Expert Appraisal Committee, Odisha (Virtual)
19.08.2025	230th Meeting of the State Environmental Impact Assessment Authority, Odisha (Physical)
01.09.2025	Grant of prior Environmental Clearance (EC) to the proposed Mining Project under the provisions of EIA Notification, 2006

SYNOPSIS

The present appeal has been filed seeking to quash the environmental clearance dated 01.09.2025 issued by the 1st respondent SEIAA to the 2nd respondent for mining 4.0 MTPA of Bauxite (Run of Mine (ROM)) over an area of 144.945 Ha of forest lands in Ballada village, Koraput district, Odisha.The hill sought to be mined, within Nagasari reserve forest, locally called the Nageswari Mali Dongar is sacred to the people belonging to the Parenga Paraja, Jhodia Paraja and Kondh tribes and non-tribal traditional forest dwelling communities also entitled to rights under FRA like Mali, Rana, Gouda and Domb living in 82 villages around the foothills and forests surrounding Ballada.

The impugned EC is liable to be set aside inter alia as it has been granted in complete violation of the EIA Notification,2006 and the rights of the Tribal communities under the FRA.

BEFORE THE NATIONAL GREEN TRIBUNAL EASTERN ZONE AT KOLKATA

MEMORANDUM OF APPEAL

(Under Sections 16(h) read with 18(1) of the National Green Tribunal Act, 2010)

Appeal No. of 2025

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Vs.

1.The State Level Environment Impact Assessment Authority, Odisha
Rep by its Member Secretary
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2.M/s Kalinga Alumina Ltd.
Rep by its Managing Director
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Email: kalinga.alumina@adani.com
Phone No: 91 (79) 2555 4412 …Respondents

TO,

THE HON'BLE CHAIRMAN AND HIS COMPANION MEMBER OF THE NATIONAL GREEN TRIBUNAL.

HUMBLE APPEAL SUBMITTED
BY THE APPELLANT ABOVE NAMED

The 1st Appellant is a Parenga Paraja Adivasi leader from Taintar village located at the foothills of Ballada hill. He is 29 years old and is a post graduate in natural resource and governance from TISS, Hyderabad. He is also a farmer and cultivates paddy, millets, oilseeds and vegetables on his family's farm of about 8 acres. He is a member to the Nageswari Mali Dongar Surakhya Mancha, Balda, which is a community organisation of people inhabiting in and around Ballada. He is also trained in GPS mapping and has about 5 years of working experience in Odisha-based NGOs for forest rights act implementation. He has been documenting the religious and cultural practices of the Parenga Adivasi peoples who are the main priests who worship Nageswari and Mauli deities as their

sacred deities protecting Ballada and nearby hills and forests on which the Parenga, Kandha, Gouda, Domb and Paika communities depend on for forest produce and sustenance.

The 2nd Appellant is a Parenga Paraja Adivasi woman leader from Taintar village located at the foothills of Ballada hill. She is 45 years old and has four daughters of whom one is married, one is working as a nurse in Potangi PHC and the other two are helping the family in agriculture and going to the village primary school. She has studied upto class 5 in the village primary school and is a farmer by occupation cultivating 4 acres of upland and lowland and also works as a daily wage labourer. Apart from that she also collects forest foods and medicines for selling at the local weekly market. She is a member of Mahima SHG in her village and a committee member in Nageswari Mali Dongar Surakhya Mancha.

The 3rd Appellant is a Parenga Pareja Adivasi leader from Khanti village located at the foothills of Ballada hill. He is 34 years old and has 2 daughters of whom one is in class 3 in the village primary school and one goes to the village Anganwadi. He has studied upto +2 inter college and is a farmer cultivating 5 acres of upland and lowland. He grows paddy, millets, oilseeds and vegetables and also collects forest foods and medicines for selling at the weekly market. He is a member of the Forest Rights Committee of Khanti village (under FRA) and also a member of Nageswari Mali Dongar Surakhya Mancha.

The 4th Appellant is an environmental activist who has been campaigning at the intersection of advocating for democratic rights of nature, people and wildlife for over the past four decades in Odisha. He was one of the petitioners in the landmark case in Supreme Court on Niyamgiri hills Odisha where the apex Court upheld that the Gram Sabha at the village level has statutory authority to decide on bauxite mining projects impacting their lives, forests and lands. He has also been concerned about the environmental destruction and rights of the people in Ballada and has on been relentlessly sending representations, held press

meets and raised issues on the devastating impacts of bauxite mining on the forests, lands and villages with the Odisha and Union governments. He received prestigious Goldman environmental prize in 2017.

The Appellants are aggrieved by the impugned environmental clearance (EC) issued by the 1st respondent to the 2nd respondent for its proposed bauxite mine over 144.945 Ha of forest lands in Ballada, Nandapur thesil, Koraput district, Odisha in complete violation of the law. The appellants (except Appellant No.4) are Parenga Paraja tribals, which is the largest tribal community inhabiting the foothill regions of Ballada on all its sides. The Parengas are also the main priests of all the sacred abodes of the deities reigning over Ballada's forests and lands like Nageswari, Mauli Ma, Dhangdi Duar, Jhakar Gudi, Dhalkhai, etc. As per tribal tradition only those tribes which were the first to establish a village and call on the deities to reside in the forests, hills, waters, villages, etc. can be the priests of the sacred abides of deities and hence it is the Parengas, known to be the original inhabitants of Ballada, who inherit the position of priests at all the sacred abodes of deities across Ballada hills and forests. The Parengas are also known to be expert settled and hill slope agriculturalists and have a deep knowledge of the forests as they have been foraging the forests for food and medicines since generations. They cultivate 2 crops of paddy by skilfully utilizing the water from the hill streams. The Parengas also have patches of wetlands near Ballada foothills which are largely irrigated by perennial streams flowing from the hills. Apart from cultivating the wetlands for paddy, the Parengas also grow millets, oilseeds, pulses and fruit trees for food and livelihood income.

The address for service on the Appellants is that of their counsel M/s Santanu Chakraborty (KAR 2308/2012), Yogeshwaran.A,(MS 1421/2011) Poongkhulali B. (MS 1373/2009) , Smitha G.S (MS 5596/2025), Advocates, having office at 399/1, Dumdum Road, Kolkatta 700074.

The respondents are

1. The State Level Environment Impact Assessment Authority, Odisha
   Rep by its Member Secretary
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   OPTCL Colony, Anand Bazar, Bhoi Nagar,
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The address for service of service of summons, processes and notices on the Respondent is the same as above.

FACTS IN BRIEF

1. The present appeal has been filed seeking to quash the environmental clearance dated 01.09.2025 issued by the 1st respondent SEIAA to the 2nd respondent for mining 4.0 MTPA of Bauxite (Run of Mine (ROM)) over an area of 144.945 Ha of forest lands in Ballada village, Koraput district, Odisha. The impugned order is annexed as **Annexure A-1**.

2. The hill sought to be mined, within Nagasari reserve forest, locally called the Nageswari Mali Dongar is sacred to the people belonging to the Parenga Paraja, Jhodia Paraja and Kondh tribes and non-tribal traditional forest dwelling communities also entitled to rights under FRA like Mali, Rana, Gouda and Domb living in 82 villages around the foothills and forests surrounding Ballada. The hill which is sought to be mined is worshiped as the sacred abode of the local Adivasi deities Nageswari and Mauli Ma. The forests sought to be diverted are sources of livelihood

as well. However, the EC has been issued based on the false representation of the 2nd respondent in its EIA report that these are barren waste lands.

3. The impugned EC is liable to be set aside inter alia as

   a. The application form submitted by the 2nd respondent is rife with false information and suppression.
   b. The TOR issued was inchoate and not exhaustive, with site specific realities and significance ignored as a result.
   c. The public hearing conducted was in violation of the law and people's right to participation in environmental decision making was defeated.
   d. The EIA report is replete with false information and fails to assess the impact of the project and is tailor made to justify the project of the 2nd respondent and ought not to have been accepted by the 1st respondent.
   e. The 1st respondent and its expert appraisal committee has not applied their mind and have accepted the statements of the 2nd respondent as gospel truth and issued the impugned clearance, in abject failure of their solemn duty to "appraise" the project under the EIA Notification,2006.
   f. The impugned clearance has been issued without considering the fact that the Parenga Paraja, Jhodia Paraja and Kondh scheduled tribes and other traditional forest dwellers of the area have statutory rights under the FRA and no clearance to mine could have been issued in violation of these rights as held by the Hon'ble Supreme Court in Orissa Mining Corporation Ltd vs Ministry Of Environment & Forest & Ors (2013 (6) SCC 476), filed as **Annexure A2.**

Importance of the hill and forests sought to be mine

4. The Ballada hill is the sacred abode of local Adivasi deities Nageswari, Mauli Ma, Dalkhai, Hatipakan, Jakar Gudi, Bimal Gudi and Dhandgdi Duar. The Nageswari and Mauli Ma deities located inside the Ballada cave are worshipped every day by two local priests from Sapu and Chilam villages. The remaining deities are worshipped during the annual agriculture festival Chait Parab (mid-April). During the annual worship rituals, for which ingredients are collected from the forests, the tribal communities, along with other non-tribal groups, offer their rituals to the above deities associated with the local ecological biodiversity. Dalkhai deity is associated with the trees and shrubs on the hill and its forests, Hatipakan is associated with the local fauna, Jakar and Bimal Gudi are associated with the smaller hills in the Ballada range and Dhangdi Duar is associated with the well-being of people who live around Ballada. Nageswari and Mauli are the reigning deities of Ballada hill. The Nageswari cave, Mauli Ma, Dalkhai Ma, Jakar Gudi, Bimal Gudi deities are located in the eastern part of the mining area, Hati Pakan is located in the Northern part and Dhangadi Duar is located in the South, all within the mining lease area.

5. The people of the 82 villages living around the foothills of Ballada not only depend on it for their cultural and religious sustenance but for their economic well-being as well. The tribal and non-tribal women of 82 villages climb Ballada hill every day for collecting dry branches as fuelwood and collect roots, tubers, hillbroom grass, edible insects like sindhikeeda and leaves like siadi along with fruits like amla and char for their domestic consumption and selling at the local weekly market. The 82 villages which are located within 10 km of the reserve forests and yet most find no mention in the EIA report. The villages are tabulated below for convenience.

Sl No	Name of Block	Name of Gram Panchayat	Name of Village
1	Nandapur	Atunda	Barengpalli
2		Atunda	Arangi
3		Atunda	Redeng
4		Atunda	Khilaout
5		Atunda	Dakanput
6		Atunda	Daleiput
7		Atunda	Banur
8		Atunda	Badargad
9		Atunda	Kumiguda
10		Atunda	Kumdaput
11		Atunda	Samli
12		Atunda	Kandhaguda
13		Atunda	Srigamput
14		Atunda	Kichhaiput
15		Bheja	Taintar
16			Gayalput
17			Baraba
18			Sindhiput
19			Kotiaput
20			Badaliguda
21			Andiput
22			H Khillaput
23			Anjar
24			Sukriput
25			Taraliput
26			P. Khillaput
27			Bheja
28			Nuaput
29		Balda	Kadaput
30			Kantasaru
31			Kandhaguda
32			Chilam
33			Balda
34			Tala Balda
35			Uper Balda
36			Kotiaput
37			Kubaput
38			Padalput
39			Parja Ambel
40			Mali Ambel
41			Parja Bimdal

42			Godiput
43			Lulubur
44			Mali Bimdal
45			Dabaput
46			Soput
47			Madeiguda
48		Kulabir	Sublar
49			Maliput
50			Arlaput
51			Talgud
52			Bandaput
53			Dabasput
54			Dumriput
55			Kulabir
56			Anjar
57			Badikaput
58			Banjalaput
59			Atub
60			Pujariput
61			Ektaput
62			Semliput
63			Dipalput
64			Marta
65		Badel	Katlaput
66			Kitba
67			Khanti
68			Gairput
69			Badel
70			Karaiput
71			Godiput
72			Kamara
73			Datunput
74			Adalput
75			Gatanput
76			Majhiput
77			Masuri
78			Pangiput
79			Silpandi
80			Maipaliput
81			Jantaput
82		Atunda	Bairpada

6. During the monsoons they also collect bamboo shoots and different kinds of mushrooms for their own food and also to sell at the local weekly market. On the hill slopes, the tribal and non-tribal families also cultivate millets, pulses and oilseeds.

7. The forests are also sources of medicine for not just the local healers called disaris, but most women also forage the forests for medicinal herbs, plants, leaves and roots to treat everyday common ailments. The disaris in particular, perform special rituals in the forests before beginning the collection of herbs and medicinal plants for preparing their medicines to treat several medical problems of the local populations.

8. The people of 82 villages around Ballada depend on 22 major perennial streams, namely Mundri Jhola, Burichua Jhola, Bada Jhola, Dupa Buta Jhola, Band Jhola, Jamir Jhola, Taimal Jhola, Rabanguda Jhola, Kadam Jhola, Sriram Nandi Jhola, Kadika Jhola, Bada Jhola (Soput), Danga Gad Jhola, Mahu Aam Jhola, Damana Chua Jhola, Kalipasi Jhola, Duaram Jhola, Tamaka Jhola, Kumiguda Jhola, Dangadi Duar Jhola, Gada Gat Jhola and Katlaput Jhola for irrigation and domestic consumption and two big lakes, Bada Bandh and Sua Bandh, for water to the domestic animals grazing on the hilltop. The destruction of the hill will destroy these streams and in turn destroy the livelihood of the people.

9. The top of the hill is a plateau, which is the grazing lands for the cattle in the surrounding villages. The Ballada hill top is used as a perennial grazing ground for cattle, sheep, lambs and buffaloes for people of 25 villages namely Taintar, Gayalput, Kadaput, Kantasaru, Kandhaguda, Kitba, Khanti, Katlaput, Samli, Banur, Badargad, Kumiguda, Bairpada, Atunda, Daleiput, Chilam, Balda, Soput, Madeiguda, Barengpalli, Sublar, Mali Sublar, Talgud, Dumriput, Bandaputnd and few from other villages bring their cattle for grazing as and when needed.

10. The Ballada cave located on the southern part of the area proposed to be mined, is also a place of immense religious significance. The Ballada cave is a complex structure of one big cave and three smaller caves and a maze of low lying tunnels connecting these caves. Dalkhai deity is worshipped inside one of these tunnels called Bayapaar.

11. The biodiversity of the subject forests is not in dispute and the EIA report also acknowledges the faunal diversity present. On the Ballada hilltop there are several small caves which are also used as shelters by animals like bears, porcupines, jackals, snakes, civets, sambhars, foxes, barking deer, wolves, bats, jungle cats, wild dogs, mongoose, peacocks and pangolins. Besides that the Ballada hill top is also home to the critically endangered Jeypore ground gecko.

EC ought not to have been issued without complying with FRA and without obtaining the consent of tribals communities

12. It is submitted that Koraput district is a scheduled area under V Schedule of the Constitution. The Scheduled Areas (states of Bihar, Gujarat, Madhya Pradesh & Odisha) Order 1977 includes Koraput. After reorganisation of districts in the state, 7 districts fully and 6 districts partly are covered under the Scheduled Areas (V Schedule of the Constitution) of the state of Odisha.

13. The subject hill sought to be mined is surrounded by 82 villages, with a total population of about 20,000. The Parenga Paraja, Jhodia Paraja and Kondh tribes, are scheduled tribes in the State of Odisha entitled to rights under the FRA. There are also other traditional forest-dwelling communities like Mali, Rana, Gouda and Domb who are entitled to rights under the FRA.

14. It is submitted that the process of recognition/vesting/settlement of claims under the FRA has not been completed. The consent of the tribal and other traditional forest-dwelling communities dependent on the forest has also not been obtained.

15. It is submitted that in January- February 2025, claims for community forest rights and community forest resource rights under the FRA were submitted for the following villages Taintar and Gayalput, Kantasaru, Kadaput and Kandhguda, Khanti and Katlaput, Samli, Banur, Badargad, Kumiguda and Bahirpada, Chilam and Balda, Soput and Madeigudaout of the total 82 villages and the villages of Atunda and Daleiput, Kitba, Barengpalli have traditional forest resource use rights over the reserve forest and have filed community forest resource rights claims which are pending with the Sub Divisional Level Committee under the FRA. Acknowledgement receipts issued by the authority on receipt of the FRA claims in respect to few villages is annexed along with translation as **Annexure A-11.**

16. It is submitted that the community forest rights claim and community forest resource rights claim filed by the above villages includes the Nagasari reserve forest and the hill sought to be mined, in respect of which clearance has been issued. The fact that these claims were filed and are pending is within the knowledge of the authorities, but they have chosen to defeat the rights of the Tribals and reward the 2nd respondent with the impugned clearance.

17. It is submitted that these rights have to be settled and even before this process is completed, these lands cannot be given to the 2nd respondent for mining. The rights of the tribal communities under FRA will be rendered illusory if their lands are given away to private parties like the 2nd respondent.

18. The Hon'ble Supreme Court in Orissa Mining Corporation Ltd vs Ministry Of Environment & Forest & Ors (2013 (6) SCC 476), has held,

"58. We are, therefore, of the view that the question whether STs and other TFDs, like Dongaria Kondh, Kutia Kandha and others, have got any religious rights i.e. rights of worship over the Niyamgiri hills, known as Nimagiri, near Hundaljali, which is the hill top known as Niyam-Raja, have to be considered by the Gram Sabha. Gram Sabha can also examine whether the proposed mining area Niyama Danger, 10 km away from the peak, would in any way affect the abode of Niyam-Raja. Needless to say, if the BMP, in any way, affects their religious rights, especially their right to worship their deity, known as Niyam Raja, in the hills top of the Niyamgiri range of hills, that right has to be preserved and protected. We find that this aspect of the matter has not been placed before the Gram Sabha for their active consideration, but only the individual claims and community claims received from Rayagada and Kalahandi Districts, most of which the Gram Sabha has dealt with and settled

59. The Gram Sabha is also free to consider all the community, individual as well as cultural and religious claims, over and above the claims which have already been received from Rayagada and Kalahandi Districts. Any such fresh claims be filed before the Gram Sabha within six weeks from the date of this Judgment. State Government as well as the Ministry of Tribal Affairs, Government of India, would assist the Gram Sabha for settling of individual as well as community claims.

60. We are, therefore, inclined to give a direction to the State of Orissa to place these issues before the Gram Sabha with notice to the Ministry of Tribal Affairs, Government of India and the Gram Sabha would take a decision on them within three months and communicate the same to the MOEF, through the State Government. On the conclusion of the proceeding before the Gram Sabha determining the claims submitted before it, the MoEF shall take a final decision on the grant of Stage II clearance for the Bauxite

Mining Project in the light of the decisions of the Gram Sabha within two months thereafter."

19. Therefore, the primacy accorded to the Gram Sabha in these matters is no longer res integra, however, despite the judgment of the Hon'ble Supreme Court, the impugned EC has been issued.

20. The impugned EC is also liable to be set aside since it has been granted in complete violation of the law.

Form – I – false information and suppression

21. It is submitted that the application form submitted by the 2nd Respondent available on the Parivesh website is filed as **Annexure A3.** On several crucial aspects, false information has been furnished. For example,

Sr No. in application	Information sought	Reply of R2	Remarks
8	Whether Rehabilitation and Resettlement (R&R) involved?	No	Suppresses the fact that the forests and hill have religious, cultural significance and the communicates are dependent on the forests for produce and sustenance also.
9	Whether project area involves shifting of watercourse/road/rail/ Transmission line/	No	Streams originating from the hill and the plateau are important water sources, which will be destroyed by the subject mining

	water pipeline, etc. required?		
20.3	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, overwintering or migration	No	The forests are acknowledged habitat of several important, sensitive and endangered flora and fauna
20.5	Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas	No	The forests and hills are of great religious and cultural significance for the people and the Ballada cave, which is both a place of worship and tourism is accessed through the subject area
9.21.	Number of Trees	1000	The actual number of trees present in the area sought to be diverted in exponentially higher
9.22.	Area covered with plantation/ vegetation /greenbelt proposed to be cleared in Ha	25	The entire 144 Ha area is vegetated and the photographs of the plateau during monsoon will show presence of vegetation on the top as well.
9.7	Whether any closure or diversion of water	No	Streams originating from the hill and the plateau are

	bodies present in project area or realignment of water courses passing through project area?		important water sources, which will be destroyed by the subject mining
9.14	Whether any new road, rail, sea, airports, helipad, etc. during construction or operation?	No	The fact that a new road for the proposed mining area is to be constructed is suppressed. The alignment and impact of this is missing in the EIA also.
9.18	Whether any Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?	No	Streams originating from the hill and the plateau are important water sources, which will be destroyed by the subject mining. Catchment of downstream waterbodies and the aquifer will be affected.
9.19	Whether any Stream crossings, temporary and permanent?	No	Presence of Streams suppressed
11.1.	Whether ground water table intersection involved in the project activities ?	No	Groundwater is available at shallow depths in the area and the proposed mining to depth of 30 meters will definitely intersect with groundwater table

14.5.	Could project adversely affect the well being of people in project area e.g.by changing living conditions?	No	The forests on which people are dependent, having cultural and religious significance is sought to be mined, It will affect adversely affect the well-being of people. The pollution from the mining activity and destruction of biodiversity will affect the people.
15.4.	Have cumulative effects due to proximity to other existing or planned projects with similar effects?	No	No disclosure of other projects including the allegedly planned refinery mentioned in the EIA.
15.6.	Is there any threat of the project to the biodiversity (including displacement of fauna-both terestrial and aquatic and avi-fauna or creation of barriers for their movement)?	No	Displacement of flora and fauna because of the mining activity suppressed.
15.9	Wil the proposed project result in any changes to the demographic structure of focal population?	No	The influx of workers for the mine and other activities will affect the demographic structure of this tribal area.
15.10.	Wil the project cause adverse effect on local communities, sacred sites or other cultural values?	No	The significance and importance of these

			forests, the scared sites etc have been suppressed.

22. Because of the suppression of these material facts, the SEIAA was prevented from considering the fact that the proposed site was of cultural and religious significance to the people. The SEIAA was also prevented from framing exhaustive ToRs specific to the site.

23. Clause 7 (i) (II) of the EIA Notification defines "scoping" as "the process to determine detailed and comprehensive Terms of Reference (TOR) addressing all relevant environmental concerns for the preparation of an Environment Impact Assessment (EIA) Report in respect of the project or activity for which prior environmental clearance is sought." and sub clause (ii) provides that " Applications for prior environmental clearance may be rejected by the regulatory authority concerned on the recommendation of the EAC or SEAC concerned at this stage itself."

24. The Supreme Court has held in the case of in **Hanuman Laxman Aroskar Vs Union of India** (2019 SCC Online SC 441)

" *88. The failure on part of a project proponent to disclose material information in Form 1 as stipulated under the 2006 notification has a cascading effect on the salient objective which underlies the 2006 notification. The 2006 notification represents an independent code with the avowed objective of balancing the development agenda with the protection of the environment. An applicant cannot claim an EC, under the 2006 notification, based on substantial or proportionate compliance with the terms stipulated in the notification. The terms of the notification lay down strict standards that must be complied with by an applicant seeking an EC for a proposed project. The burden of establishing environmental compliance rests*

on a project proponent who intends to bring about a change in the existing state of the environment. Whereas, in the present case, there has thus been a patent failure on part of the project proponent to make mandatory disclosures stipulated in Form 1 under the 2006 notification, that must have consequences in law. There can be no gambles with the environment: a 'heads I win, tails you lose' approach is simply unacceptable; unacceptable if we are to preserve environmental governance under the rule of law."

25. However, the 1st respondent, without verifying facts, accepted the statements of the 2nd respondent and issued inadequate ToR for the project based on false assertions, instead of rejecting the application at the threshold itself.

Public hearing proceedings are vitiated

26. It is submitted that the public hearing conducted on 06.03.2025 for the subject project is vitiated as it was conducted in violation of the mandatory procedure prescribed in the EIA Notification,2006.

27. Firstly, the draft EIA report was not placed in public domain as required by Appendix IV of the EIA Notification,2006. It is mandatory to make the draft EIA report available in the Panchayats, which was not done. In fact, the people were given to believe that the executive summary was the only relevant report, and it was the only document that was circulated and made available. Since the draft EIA itself was not available in public domain and communicated as required by law, the public hearing is vitiated.

28. Secondly, it is well known that the executive summary, a 15-page document is not a substitute for the EIA report. In the present case, the executive summary contains no relevant information and contains only

generic statements. The impact of the project, the nature of assessment and baseline data used for the report, methodology etc were not part of the executive summary. Therefore, it cannot be argued that the availability of the draft EIA report cured the crucial illegality of non-availability of the EIA report.

29. Thirdly, the 1st respondent failed to appreciate that the subject area is a tribal area with low literacy rates and merely publishing in the newspapers is insufficient. The law requires information to be disseminated through TV, radio and other means but this was not done in the local affected villages.

30. Fourthly, though the public hearing proceedings states that 1500 people arrived at the venue, it is a fact that numerous locals were not allowed to enter the venue and the project affected persons were denied an opportunity to participate in the public hearing. The public hearing was held under heavy police and paramilitary presence and cannot be termed as free and fair public hearing.

31. Fifthly, nobody was "granted the opportunity to seek information or clarifications on the project from the applicant" as mandated by the EIA Notification,2006. As can be seen from the minutes as well as the public hearing video, people were asked to merely talk, and no clarifications were provided at the public hearing. This is a serious violation as it defeated the very purpose of the public hearing. It is not merely a stage for people to express their thoughts and for the authorities to record it.

32. Sixthly, the EIA Notification at 6.4 of appendix IV mandates that "The summary of the public hearing proceedings accurately reflecting all the views and concerns expressed shall be recorded by the representative of the SPCB

or UTPCC and read over to the audience at the end of the proceedings explaining the contents in the local / vernacular language and the agreed minutes shall be signed by the District Magistrate / District Collector / Deputy Commissioner or his or her representative on the same day and forwarded to the SPCB/UTPCC concerned."

33. However, as can be seen from the proceedings, the minutes were not recorded and read out the participants and the agreed upon minutes were not signed and sent to the 1st respondent. In fact, the minutes were sent almost a month later to the 1st respondent. This is a very serious violation that renders the entire proceedings otiose. Unless the proceeded are accurately recorded and read out to the people to receive their assent, the minutes have no value and are not legally valid. The minutes do not reflect the queries and views expressed and the entire proceedings have been reduced to a formality.

34. Unless public hearing is properly conducted as required by law, the rights of persons to participate effectively in environmental decision making cannot be assured. In the present case, the public hearing conducted is entirely illegal and these aspects have not even been noticed by the 1st respondent SEIAA, who has not even viewed the public hearing video, as is evident from the minutes of their meetings. Copy of the executive summary circulated at the time of public hearing is annexed as **Annexure A4.** Copy of the minutes of the public hearing as recorded by the pollution control board and sent to the 1st respondent is available along with the final EIA report.

35. It is submitted that the Hon'ble Supreme Court in **Hanuman Laxman Aroskar Vs Union of India** (2019 SCC Online SC 441) has recognised the importance of public hearing in the EC process and has held

"The importance of public consultation is underscored by the 2006 notification. Public consultation, as it states, is "the process by which the concerns of local affected persons and others who have a plausible stake in the environmental impacts of the project or activity are ascertained with a view to take into account all the material concerns in the project or activity design as appropriate". This postulates two elements. They have both, an intrinsic and an instrumental character. The intrinsic character of public consultation is that there is a value in seeking the views of those in the local area as well as beyond, who have a plausible stake in the project or activity. Public consultation is a process which is designed to hear the voices of those communities which would be affected by the activity. They may be affected in terms of the air which they breathe, the water which they drink or use to irrigate their lands, the disruption of local habitats, and the denudation of environmental eco-systems which define their existence and sustain their livelihoods.

Underlying public consultation is the important constitutional value that decisions which affect the lives of individuals must, in a system of democratic governance, factor in their concerns which have been expressed after obtaining full knowledge of a project and its potential environmental effects.

Apart from the intrinsic value of public consultation, it serves an instrumental function as well. The purpose of ascertaining the views of stakeholders, is to account for all the material concerns in the design of the proposed project or activity."

36. In the present case, the public hearing was conducted in violation of the EIA Notification,2006 and ought to have been rejected by the 1st respondent.

EIA report ought to have been rejected

37. It is submitted that the EIA report submitted by the 2nd respondent ought to have been rejected by the 1st respondent.

38. It is submitted that the EIA report is based on baseline data that was collected in March to May, 2023. However, the application for ToR itself was filed only on 01.09.2023. Though specific TOR was issued by the 1st respondent on 06.11.2023, the 2nd respondent had already completed baseline data collection for the report and submitted the report without complying with the specific ToR issued by the 1st respondent.

39. For example, the 1st respondent specifically directed that a socio economic study of neighbouring habitation be conducted. The 2nd respondent in its EIA states that compliance is at chapter 3.4.12 and annexure IX but even the names of all the villages surrounding the hill have not been mentioned.

40. It is submitted that though the table at page xviii of the EIA report is titled "compliance to TOR conditions", a reading of the references given in the reply of the 2nd respondent would show that the information sought in the ToR is not present.

ToR Not Complied

41. The ToR prescribed, reply of the 2nd respondent from page xviii of the EIA report and the submissions of the appellants in this regard are tabulated below. This table only contains refences to data / particulars

that are absent in the EIA. It does not mean that the other ToRs have been complied in both form and substance.

Sr No. of ToR	ToR	Reply of R2	Comments
1 (c)	Status of R&R	No R&R involved as there are no habitations	The statement in the form I has been carried to the EIA and the entire EIA does not contain R&R plan and fails to take into account the significance of the hill and the forests to the community
1 (h)	Blast vibration study & Slope Stability study	States will be done after commencement of operations	The purpose of an EIA is to forecast anticipated impact and study it, so as a decision whether to permit it or not can be taken. Doing Study post commencement serves no purpose.
	Socio economic study	States has been done and refers to chapter 3 of EIA and Annexure IX	Even the name of the surrounding villages are not mentioned. Irrelevant secondary data has been produced with no assessment of socio economic impact. Religious, cultural and livelihood aspects suppressed.

	Surface runoff management	States "detailed hydrology studies" containing provision for groundwater recharge and rainwater harvesting structures	The impact of run off from the mine and its known propensity to pollute water has not even been mentioned or considered by scientific studies.
4	Revenue plan showing mining area, agricultural lands, private lands etc	States that it has been furnished as annexure xv of the EIA	Annexure XV is a drone survey referenced sketch. It is not the revenue plan sought. The surrounding land use has thus been suppressed.
5	Should submit real time Aerial footage and video of mining lease area and transportation route	States will be furnished to SEAC at the time of appraisal	Purpose of the TOR is to make it available in the EIA, which has not been done. Even in the SEAC presentation, footage is not found.
6	Plan to reduce groundwater consumption to to be filed	States that "it will be included"	Admittedly not complied.
15	Photographs of monitoring stations	States that it is annexed as	Annexure XVI is one page with 5 photos – does not satisfy the ToR. Location

	and sampling locations to be filed	Annexure XVI of the EIA	where biodiversity study etc were done is not even known.
41	Bauxite mine is for captive use	States it proposes to sell to existing refineries in India	Government policy is that bauxite mines are only for captive consumption.
11	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 operational phases and submitted. Impact.	States that it has been provided at chapter 3.4.7 and 4.4 of EIA.	At 3.4.7 of the EIA no information on biodiversity, human settlement, ecological features. Etc. have been provided. At 4.4, the change in land use forecast is limited to mine lease area.

	if any. of change of land use should be given.		
15	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.	States that there are no habitations in the mine lease area and mentions "Application for Gram Sabha submitted to Collector & District Magistrate, Koraput for Settle the forest right of the local people under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 is initiated. Copy of application is attached as Annexure-XXII of the EIA/EMP report."	Annexure XXII is a letter from 2nd Respondent to District Collector seeking "FRA certificate" for diversion of 144.945 Ha. It is not any application for settlement for forest rights as contended by the 2nd Respondent.
22	R&R Plan/compensation	Entire Mine Lease area is Forest Land	Completely ignores the cultural religious significance

	details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Résettlement 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	(Nagasari RF) of Koraput Forest Division. The project does not envisage any leasing or acquisition of private land. Hence, R&R is not applicable for the present proposal.	of the lands and the dependence of tribal communities on the subject land for sustenance and resources. ToR not complied.

	departments of the State Government. It may be clearly brought out whether the village(s) located in the mine (ease 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.		
23	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	Primary baseline data has been collected during March 2023 to May 2023 and described in Chapter 3. Primary data of Air, Noise, Water and Soil is attached as Annexures-XVI of EIA/EMP report. Site specific meteorology data	Table 3.5 of the EIA containing the location of AAQ stations, distance, direction. etc. shows that not even one monitoring station was located within 500 metres of the mine lease area in the predominant downward direction. Only 2 of the 10 monitoring station i.e., A5, A6 are said to be downward.

	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	has also been collected during March 2023 to May 2023 and the summary is incorporated in Chapter 3 of EIA/EMP report.	mineralogical composition of PM10 not provided.

	mine lease in the predominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.		
24	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	States that information provided in section 4.4.3 of the EIA.	4.4.3 of the EIA does not even contain the emission from crushing operation and simply assigns values for different emission sources.

	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.		
28	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.	States that information provided in section 4.5 of the EIA.	The impact of water pollution from run-offs have not been accessed and the fact that the ground water table at the mining area not even accessed.
29	Based on actual monitored data, it may clearly be shown whether working will	The mining activity proposed to be carried out during plan period will not interfere anywhere	No data has been monitored for the proposed mine site and ground water figures of surrounding villages provided are all less than 30

	intersect groundwater. Necessary data and documentation in this regard may be provided. In case the 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	with the ground water table. A detailed Hydro-Geological Study has been conducted, report of the same is furnished as annexure of the EIA report. The Hydrogeological report inter-alia includes details of the aquifers present and impact of mining activities on these aquifers, if any.	metres and false to state that ground water table will not be intercepted.

	should also be obtained and copy furnished.		
30	Details of any stream, seasonal or otherwise, passing through the tease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be.	The area has no perennial nalla or stream; hence there will not be any impact of mining on surface water regime.	Presence of seasonal streams originating from the hill have been suppressed and therefore impact of the proposed project on such streams have not been provided as per ToR.
39	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	States that information provided in Chapter 10 of the EIA.	The fact that the top of the hill is an important grazing ground has not even been mentioned under the EIA/EMP report.

	specific to the proposed Project.		

EIA Report falsely characterises the site

42. It is submitted that the EIA report describes the hill i.e., the forest sought to be mined as "barren/waste land" which small bushes and shrubs. An extent of 53.8 Ha is described as land covered with plants. The land under grass cover is described as 0.00 Ha. Photographs taken on 03.05.2023 are produced as photos of the project site at Page 18 of the EIA, in a bid to possibly project a picture as though the site is devoid of vegetation and barren.

43. However, the reality is far from description in the EIA and during monsoon and post-monsoon, the entire plateau transforms into lush grasslands which as stated earlier is the most important grazing land for livestock in the area. The Plateau also contains waterbodies which are the source of water for people and cattle. Figure 2-7 of the EIA report also shows the presence of the waterbody on the plateau.

44. The entire EIA report proceeds on the false assumption that the area proposed for mining is a waste land of no significance to people, which has vitiated the entire EIA. Since, the basic assumption about the project site itself is wrong, the assessment and forecast of the impact also is false. The 1st Respondent has failed to appreciate this fact.

EIA suppresses the religious and cultural significance of the area

45. Elaborate submissions have been made in the preceding portions of this appeal on cultural and religious significance of the hill and the forest to the local, tribal and other traditional communities and these submissions are not repeated for the sake of brevity. The EIA report makes absolutely no mention

of these facts and the so called socio-economic impact chapter in the EIA report does not disclose these crucial fundamental aspects.

46. The EIA report repeatedly states that there is no habitation in the proposed mining area and therefore, there is no impact on the people. This statement is entirely false as not only cultural and religious rights of the people will be destroyed, their livelihood and source of sustenance will be destroyed along with the forest.

47. The rights of tribal communities under the FRA cannot be destroyed by permitting mining in the areas sacred to them by pretending that such rights do not exist. If the 1st Respondent, SEIAA is guilty of complete non-application of mind and due diligence and the EIA report ought to have been rejected for this very serious fundamental omission and suppression.

Improper collection of baseline data

48. The EIA report states that the baseline data was collected between March to May of 2023. The application for ToR itself was filed only on 01.09.2023, which was issued on 06.11.2023. Thus, the entire exercise of collection of baseline data was completed even before the application for ToR was filed. Though standard ToR have been published by MoEF & CC, the collection of baseline data and preparation of EIA report cannot begin before submission of the application. The EIA Notification at 7 (II) clearly states that "These standard TOR shall enable the Project Proponent to commence preparation of an Environment Impact Assessment Report after successful online submission and registration of the application:" and "the Project Proponent shall carry out the EIA study based on the standard TORs as well as the additional TOR, if any, stipulated by EAC/SEAC:"

49. Therefore, the fact that baseline data was collected even before the application was filed shows that the 2nd respondent did not comply with the TOR and collect data to address the ToR issued but has merely provided

justifications sans data to provide lip service to the ToR issued. This is a very serious violation as it has rendered the entire scoping stage of the EIA process nugatory.

50. The collection of baseline data during summer has resulted in a situation where the biodiversity, nature of the landscape etc. during post monsoon and monsoon season being ignored. The mandate to collect data during non-monsoon season is only for ambient air quality as collection of AAQ data during monsoon will provide an incorrect picture. However, in an area that is biodiverse and an important tribal habitat, unless baseline data is observed during other seasons an accurate record of facts cannot be presented.

Secondary data from Vishakaptnam is irrelevant and ought not be have been used

51. It is submitted that it is seen from 3.4.1.1 of the EIA that it is based on secondary data for important parameters like temperature, humidity, rainfall, wind speed and wind direction from the IMD station at Vishakapatnam. It is submitted that Vishakapatnam is a coastal city located more than 150 kms from the proposed mining site, which is the eastern ghats. It is elementary that the meteorological conditions of a coastal city is entirely different. The humidity, wind speed, wind direction, temperature etc recorded in Vishakapatnam cannot be used for the project site. However, the EIA report has used this data extensively in its assessment and analysis of impact, thus rendering the entire exercise otiose. The SEIAA has failed to even notice this basic issue, which vitiates the EIA report and ought to have resulted in its rejection.

52. If comparable secondary data is not available to enable projection and modelling of impact for all seasons, project proponents should collect data at the site for all seasons and cannot use climatological data from a different location that is so different in all respects like proximity to the coast, elevation etc.

Sampling locations for AAQ - contrary to ToR and defeats the purpose of assessment

53. It is submitted that 3.4.2. of the EIA deals with the collection of baseline air quality data. It states that 8 stations were established during March to May 2023, with one station at the project site. Table 3.5 provides the location of AAQ stations. It needs to be noted that the ToR required the establishment of AAQ stations in the downwind direction and at least one within 500 meters in the downwind direction.

54. Air pollution from mining operations impacts its immediate surroundings and areas in the downwind direction based on meteorological conditions at a given time. This is the reason why baseline data needs to be collected from areas that will most likely be impacted by the pollution from the mine.

55. However, as can be seen from table 3.5 only two AAQ stations, i.e., A5 and A6 were located in the downward direction but these are at a distance of 4.1 and 4.2 kms respectively. No AAQ station was set up within 500 metres. The closest AAQ station is at 1.2 kms from the proposed site but located in the upward direction. The other AAQ stations are located quite faraway and not in the downward direction. The data collected from these AAQ stations is presented at table 3.8 of the EIA.

56. The EIA report seeks to justify the project by forecasting the ground level concentration of pollutants post project. This is done by adding the baseline AAQ recorded with the predicted maximum GLC (from the results of its modelling exercise). This data is presented at table 4.8 of the EIA.

57. However, this exercise is meaningless if the AAQ of areas close to the project site that will be impacted due to mining operations, transport, crushing operations etc. is not assessed and the incremental pollution load due to the project in these areas is not modelled. The faulty/illegal AAQ monitoring has vitiated the entire exercise.

58. Noise monitoring was also conducted only from the same locations described above and suffers from the same infirmities.

Water Quality assessment

59. Similarly, the water sampling locations mentioned in table 3.12 show that the samples collected are mostly from faraway places those are not likely to be immediately impacted from the runoff and pollution from the mine. The presence of waterbody at the site is confirmed by this table. The results of water quality analysis of ground water samples shows that the groundwater in the region is unpolluted and fit for drinking.

Agriculture in the hill slopes and vicinity of the forests is suppressed

60. At 3.4.8 of the EIA report, the project proponent has suppressed the fact that surrounding villages cultivate lands on the slopes of the hill and agricultural lands in the vicinity have not been disclosed. Therefore, the impact of the proposed mining on these lands have not been assessed.

Depth of Groundwater table - mining operations will intersect groundwater table

61. It is submitted that the EIA report at 3.4.10 states that the depth of water table varies from 1.3 to 7.64 metres below ground level (mbgl) during pre-monsoon and 0.40 to 5.89 mbgl during post-monsoon. The hydrogeological report submitted by the 2nd Respondent at 3.2.4 provides pre and post monsoonal ground water levels. It states tha groundwater level at Balada is 3.1 mbgl post monsoon and 4.35 mbgl pre monsoon. From the map at page 3.6 of the hydrogeological report shows that the groundwater level at the project site is 2.5 to 4.5 mbgl post monsoon.

62. It is submitted that in the application form filed by the 2nd respondent, an assertion was made that the proposed mining does not intersect with the groundwater table. This assertion while false, was also made even before the studies were conducted and reports were filed. It is evident that tailor made reports with conclusions to suit decisions already made have been submitted and the 1st respondent has failed to even notice this.

63. It is submitted that when mining operations intersect with groundwater table, the aquifer is depleted, and water table is impacted. It directly impacts the availability of water in the surrounding wells. The EIA and other studies submitted by the project proponent do not address this aspect despite specific requirement under the ToR specified.

Impact of increase in truck traffic not assessed

64. It is submitted at 3.4.6 of the EIA, under the head Traffic Study the only assessment that is found pertains to the adequacy of the road and whether there will be efficient movement of trucks. According to Table 3.22 the number of vehicles presently using the highway is 1373 and the number of trucks expected to ply because of the mining operations is 3312. Thus, there is more than 200% increase in vehicular traffic and that too large trucks. The impact of this on road safety and other aspects have not been considered. Though the EIA at 3.4.6.4 mentions that there will be no significant impact on traffic density, since bauxite is proposed to be transported through closed conveyor, the EIA report contains no other particulars of the closed conveyor. However, in the reply in Annexure-II to the EIA report containing a table of issues raised during the public hearing and the response of the proponent (which is prepared and submitted after the EIA report), it has been stated that crushed bauxite from the mine will be transported by the trucks to the Bejah railway station. Therefore, it is safe to assume that 2nd Respondent proposes to employ

thousands of trucks a day to transport the mined mineral and the impact of such transport has been assessed in the EIA report.

Details of proposed closed conveyed not furnished/impact not assessed

65. As submitted above it is claimed in the EIA report that mined minerals will be transported through a closed conveyor to the railway station. However, the proposed alignment of the conveyor from the mine to the railway station located at a distance of more than 6 kms has not been provided and the impact of clearing vegetation, construction of conveyor etc. has not been assessed.

Alignment and impact of proposed roads not assessed

66. It is submitted that apart from the 144.945 Ha which the proposed mine lease area, 12.267 Ha of forest lands have also been sought for formation of roads outside the mine lease area, for which stage I forest clearance has been obtained by the 2nd respondent. However, in the EIA, neither the alignment of the road, its impact on the forest and landscape, hydrology, felling of trees etc have been disclosed or assessed. This is a very significant omission in the EIA report, but true to form, the 1st respondent has not bothered to even notice this.

Socio economic impact – not assessed

67. It is submitted that at 3.4.12.6 of the EIA, the so-called socio-economic survey does not even mention all the villages in the vicinity of the forests, much less in the study area. The survey does not record either the religious, cultural significance nor the fact that the tribals and others are dependent on the forests for sustenance and resources.

68. Further, 4.9 of the EIA, which purports to study and assess the socio economic impact of the project, is bereft of any assessment and falsely asserts

that there is no impact on the people and contains the usual banal excuse that the mine will provide employment for people. It is seen from the documents of the respondent that 126 persons are likely to be employed by the mine but this figure is absent in this one page long chapter.

69. The failure to assess socio economic impact of the project goes to the root of the issue and ought to have resulted in rejection of the proposal.

Pollution from the mine not assessed

Air

70. It is submitted that at 4.4.3 of the EIA report, the 2nd respondent has assigned unrealistic emission factors for the expected emissions from the mine and used it for modelling the anticipated impact.

71. US EPA AP 42 guidelines said to have been used (https://www.epa.gov/system/files/documents/2024-01/toc_kwrd_jan-2024.pdf) does not even contain emission factor for bauxite mining and has an entry for coal fields in the western states of the USA. This is not relevant for assessment of emissions from mining operations in Odisha.

72. Further, the chapter does not even assess the expected emissions from the crushing operation apart from assigning an emission factor.

73. This was used as input for the modelling exercise and results are presented at table 4.8 of the EIA. It is submitted that the baseline data gathered itself is illegal and the assessment of incremental increase for these locations is also irrelevant as it does not pertain to the forecast of expected air pollution to the areas surrounding the mine lease.

Water

74. Likewise, at 4.5 of the EIA, no impact is assessed and the chapter concludes by merely saying that there is no perennial nallah and hence no impact on surface water regime and that the presence of garland drains will present run off. Similarly, the false assertion that the mining will not interfere with groundwater table is repeated to assert that there will be no impact on groundwater.

75. Water pollution from mining activities is an acknowledged fact. Acid mine drainage, mobilisation of sediments, toxic metals, water pollution from the use of chemicals for blasting and other operations, run offs etc are not assessed in the EIA report.

Impact on biodiversity

76. The EIA report at chapter 3.4.11 provides details of floral and faunal diversity recorded in the surveys. At table 3.27 of the EIA, several schedule I species including the Tiger, leopard, sloth bear, Pangolin, Jackal etc have been listed and table 3.29 lists them as species of significance. Though this survey does not list the endangered Jeypore ground gecko, the species of flora and fauna recorded is evidence that this forest and the habitat it presents has to be protected.

77. However, at 4.8, the EIA report ignores the need to leave this ecosystem alone by simply stating that there is no sanctuary or national park and that the wildlife conservation plan formulated will be implemented.

78. When the forest itself is to be converted and mined in its entirety, the ecosystem and habitat will be destroyed. Merely implementing a conservation plan will not aid in preservation the subject ecosystem.

79. Though the SEIAA sought specific studies on biodiversity, they have not even appraised this report and have issued the impugned EC despite the EIA itself recording the biodiversity that will be destroyed.

Alternative sites not assessed – EIA reduced to a formality

80. It is submitted that 5.1 of the EIA report states that no alternative sites were considered. Since the 2nd respondent was chosen as the successful bidder for this site and LoI was issued on 1/3/2023, the entire EIA process was reduced to an exercise to justify the allotment.

81. The decision to mine the site has to be taken after assessment of environmental impact and obtaining clearance, otherwise the exercise holds no meaning. Like in the present case, the decision to mine the subject hill was taken and thereafter reports tailor made to justify the decision were obtained and EC was issued by the 1st respondent. This makes a mockery of the entire EIA process, which is the most important tool to achieve sustainable development.

82. The failure to assess alternative sites is fatal to the EIA process. It is submitted that the EMP report is nothing more than a statement of good intentions sans substance that does not in any manner justify the issuance of the impugned EC.

Appraisal by the SEAC and SIEAA- Non- application of mind

83. It is submitted that the Terms of Reference for the project was considered by the SEAC in its meeting held on 22.09.2023 and the same was recommended. It was thereafter considered by SIEAA in its 141st meeting held on 01.11.2023 & 02.11.2023 and Terms of reference was granted on 06.11.2023.

84. A perusal of the minutes of these meetings indicate that the expert committees merely went by the presentations of the consultants and the project proponent and there has been no detailed deliberation on the siting, desirability, environmental sensitivity of the proposal, the various environmental aspects, issues relating to the diversion of forest lands and the impact on the 82 surrounding villages. The expert bodies have gone on to recommend the issuance of ToR with no detailed consideration or discussion.

85. As stated earlier, the draft EIA was not even available ot the public and was not published. The public hearing itself was conducted in a manner alien to the EIA Notification, 2006. Upon conclusion of the public hearing, the 2nd Respondent submitted the proposal for consideration along with the final EIA report on 13.05.2025.

86. Thereafter, it appears that the proposal was considered by the SEAC in its 73rd meeting held on 30.05.2025. The meeting took place in hybrid mode and a total of 9 proposals have been considered between 10.30 am and 3 pm. An examination of the minutes would once again show that there was no detailed deliberation on the issues, and the minutes only capture the presentation made by the project proponent. The expert body however decided to take a final decision on the proposal upon receipt of further information including a proposal for protection of the cave area used for worship by the local people.

87. It is submitted that the SEAC once again considered the proposal in its 82nd meeting held on 23.07.2025. The meeting took place entirely on virtual mode between **4.36 pm and 5.36 pm and within a span of one hour, a total of 8 proposals have been considered** by the

SEAC. In the Utkarsh Mandal case, the Hon'ble Delhi High Court had observed that even 5 proposals could not be considered in a single meeting of the EAC, which usually is held during the full course of a workday.

88. In the present case, 8 proposals have been considered in a span of one hour in a virtual meeting. This by itself demonstrates the complete lack of diligence and non-application of mind by the expert body. It is impossible that the proposals could have been considered in any depth or rigour in such a short span of time and it is clear that the appraisal process has been nothing but an empty formality.

89. The impugned environmental clearance states that the proposal was finally considered and recommended in the 230th meeting of SIEAA held on 19.08.2025. However, the minutes of this meeting is not available.

90. There are no reasons available in the SEAC minutes or the EC for the acceptance of the proposal based on the reports. The EIA report or other studies submitted have not been discussed in the meetings of the SEIAA or the SEAC.

91. The SEAC has also failed to examine whether the issues raised at the Public Hearing have been addressed satisfactorily. Copies of the minutes of the EAC meetings along with available agenda is produced as **Annexure A5-A8.**

92. The complete lack of stated reasons in the minutes of the SEAC and the impugned EC for the decision to accept the proposal and grant

the impugned clearance, vitiates the entire proposal. Reasons are the crucial link between the decision and the mind of the decision maker. The absence of reasoning and clear statements on why the EAC accepted certain reports or explanations goes to the root of the matter and vitiates the entire proceeding. The SEAC is an expert body entrusted with the solemn duty to scrutinise projects and they should speak in the manner of an expert. In the instant case, they have evidently failed to perform their duties under law. Photographs of the project site are annexed as **Annexure A-9.**

93. It is submitted that the role of the EAC was considered by the Hon'ble High Court of Delhi in the case of **Utkarsh Mandal vs. Union of India (Writ petition Civil 9340 of 2009) dated 26.11.2009**.

- The Court observed that the EAC was performing a public law function and is a delegate of the MoEF and is expected to adhere to the very same standards which the law requires the MoEF to adhere to (para 36)
- The Court further observed that the whole purpose of outsourcing the task to an EAC comprised of experts was to have a proper evaluation based on objective criteria. The EAC is also tasked with considering the objections raised at the public hearing and the response thereto of the project proponent and the failure to give reasons would render the decision vulnerable to attack on the ground of non-application of mind. (para 40)
- On the question of consideration by the EAC of a large number of projects in a single day, the court observed that "the unseemly rush to grant environmental clearances for several mining projects in a single day should not be at the cost of

the environment itself. The spirit of the EAC has to be respected. We do not see how more than five applications for EIA clearance can be taken up for consideration at a single meeting of the EAC." (para 45)

94. The Hon'ble Supreme Court of India, more recently in the case of **Hanuman Laxman Aroskar Vs. Union of India (2019 Scc Online SC 441)** has held that

- the process of appraisal is defined to mean "a detailed scrutiny" by the EAC of the application and all other documents including the EIA report (para 126).
- The EAC is an expert body and "the reasons which are furnished by the EAC constitute a live-link between the processes and the outcome of its adjudicatory function. In the absence of cogent reasons, the process by its very nature, together with the outcome stands vitiated" (para 136).
- "the recommendations of the EAC furnish a guide to the MoEF&CC. Indeed the 2006 notification stipulates that the recommendations of the EAC would normally be accepted. Consequently, a failure of due process before the EAC as in the presence case must lead to the invalidation of the EC" (para 138).

95. Thus, it is abundantly clear that the expert bodies in the present case did not apply their mind to the project, the anticipated environmental impacts etc. and the entire process suffers from non-application of mind. A copy of the EIA report with annexures is marked as **Annexure A-10.**

96. The impugned clearance is liable to be set aside inter alia on the following among other

GROUNDS

a. The impugned clearance has been issued without consideration of the irreversible damage to the environment and ecology of the forests sought to be diverted for mining.

b. The impugned clearance has been issued without regard to the legal prohibitions on diversions of forests in violation of the rights of Tribals and OTFD communities.

c. The impugned clearance has been granted based on inchoate, inadequate impact assessment studies.

d. The absence of a comprehensive EIA study vitiates the entire process as the seasonal variation in biodiversity and meteorological conditions have not been assessed.

e. The project has not been appraised in accordance with the EIA Notification, 2006.

f. The 1st respondent has failed to see that the application submitted by the 2nd respondent is replete with false information and ought to have been rejected.

g. The 1st respondent has failed to see that the EIA report prepared does not conform to the terms of reference issued.

h. The 1st respondent failed to see that the EIA report ought to have been rejected as it neither considers impact nor does it even provide accurate baseline data.

i. The 1st respondent failed to see that the mitigation measures suggested were impractical and not a solution for the large-scale destruction that will be caused by the proposed project.

j. The EIA report fails to even mention crucial issues inter alia such as impact on the tribal communities dependent on the forest, their cultural and religious rights and practices.

k. The 1st respondent has failed to see that the public hearing conducted is vitiated and in violation of the EIA Notification, 2006.

l. The 1st respondent failed to see that the objections raised during public consultation have not been addressed by the 2nd respondent.

m. The 1st respondent has failed to apply their mind and scrutinise the project in accordance with the law.

n. The impugned clearance has been granted without considering the impact of the project on the tribal population dependent on the forests.

o. The EIA report based on which the impugned clearance has been issued is in violation of the Sector Specific Manuals issued by the 1st Respondent.

p. The impugned clearance has been granted without considering the grave impact on the flora and fauna which inhabit the forests sought to be mined.

q. The impugned clearance is in violation of the EIA Notification, 2006, the precautionary principle, the principle of sustainable

development, eco-centric principles, the Environment (Protection) Act, 1986 and Articles 21, 48 A and 51 A of the Constitution of India.

r. The 1st respondent has accepted the statements of the 2nd respondents as gospel truth and has failed in its duty to assess the project in accordance with the law.

s. The 1st respondent has failed to see that the conditions imposed in the impugned EC do not in any manner protect the rights of tribals, their cultural and religious sites and practices and the biodiversity and ecology of the forests which are acknowledged habitat of schedule I species.

LIMITATION

It is submitted that the impugned clearance dated 01.09.2025 has not been communicated as required by law, the clearance is not available with the local panchayat, not been published in newspapers, not available on the website of project proponent and no such website even exists, clearance has also not been displayed at the site. However, the appeal has been filed within 30 days from the date of the clearance and within the period of limitation prescribed under the NGT Act, 2010.

INTERIM RELIEF:

Pending disposal of the present appeal, the appellant prays that this Hon'ble Tribunal be pleased:

A. issue an order of stay of the clearance dated 01.09.2025 bearing EC identification number EC25B0000OR5647645N issued under the EIA Notification,2006 by the 1st respondent to the 2nd respondent.

B. issue such other orders as it deems fit in the interest of the case and render justice.

PRAYER:

It is therefore prayed that this Hon'ble Court be pleased to:

A. Quash / set aside the environmental clearance dated 01.09.2025 bearing EC identification number EC25B0000OR5647645N issued under the EIA Notification, 2006 by the 1st respondent to the 2nd respondent.

B. Pass such further order or orders as may be deemed fit, proper and necessary in the facts and circumstances of the case and thus render justice.

Ajaya Muduli
ଗୋରୀ ସିଶା
Subash Sisa
Prafulla Samanta

Signature Attested
29/09/2025
A. K. SHADANGI
NOTARY (GOVT. OF INDIA)
KORAPUT

COUNSEL FOR THE APPLICANT

APPELLANTS

VERIFICATION

We, Ajaya Muduli S/o Dhana Muduli, Gori Sisa W/o Karttik Sisa, Subash Sisa S/o Ramachandra Sisa, Prafulla Kumar Samantara S/o Late Dinabandhu Samantara, the appellants herein, do hereby verify that the contents of the above paragraphs and grounds are true to the best of our knowledge and based on legal advice and that nothing has been suppressed.

Ajaya Muduli
ଗୋରୀ ସିଶା
Subash Sisa
Prafulla Samanta

Signature Attested
29/09/2025
A. K. SHADANGI
NOTARY (GOVT. OF INDIA)
KORAPUT

APPELLANTS

"V A K A L A T N A M A"

BEFORE THE NATIONAL GREEN TRIBUNAL AT CALCUTTA

State : Odisha

Appeal No. Of 2025

Ajaya Muduli & Ors. — Appellant / Petitioner

- Versus -

State Level Environment Impact Assessment Authority, Odisha & Anr. — Respondent / Opposite Party

Vakalatnama of behlaf of .....Appellants.....Knows all men be these presents that by this Vakalatnama I/We appoint the Advocates Pleaders noted below or any one of them as my/our lawful Advocate or Advocates for filing the memorandum of appeal or Petition / for entering appearance in the above matter for appearing and conducting and arguing the same for depositing or withdrawing any money in connection therewith, for moving the Court in any matter connected therewith for preparing the paper Book in the case and for putting in papers, petition etc. on my/our behalf for filing or taking back any documents for withdrawing suits or appeals or petitions with permission to Institute fresh suits, appeals, petition, etc. for signing and filing the petitions of compromise in connection with the said matter and for taking copies of paper from the Record and I/We further say that any act done by my/our said Advocate or Advocates or by any one of them accepting this Vakalatnama, shall be considered as my/our true and lawful act.

And I/We further hereby agree and undertake to pay the said Advocate or Advocates his or their fees has settled and all others sums that may be necessary to carry out the requisition of the Court and otherwise to enable the said Advocate or Advocates to conduct the case properly, failing which the said Advocate or Advocates after notice to me/us will be at liberty to withdraw from the further conduct of the case

IN WITNESS WHEREOF I/We sign and execute this Vakalatnama on this the 29th day of September 2025

Santanu Chakraborty KAR/2308/201
Yogeshwaran A
Poongkhulali B
Smitha GS
NAME OF THE ADVOCATES

Address: 399/1, Dumdum Road, Kolkata 700074.
Email: santanu.lp@gmail.com. Ph: 9830769753.

MS/1377/2009 MS/142/2011/



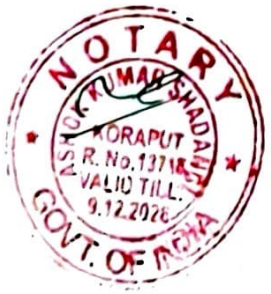
Authorisation Letter

We, Gori Sisa, wife of Karttik Sisa, resident of Taintar, Bheja, Nandapur, Koraput, Pin - 764037 and Subash Sisa, son of Ramachandra Sisa, resident of Kanti, Badel, Padua, Koraput, - 764041 and Prafulla Kumar Samantara, son of Late Dinabandhu Samantara, resident of Polasara, Chhatrapur, Ganjam, Pin - 761105, being the appellant no. 2, 3 and 4, respectively, in an Original Application before the National Green Tribunal, Eastern Zone Bench, concerning the Environmental Clearance dated 01.09.2025 bearing EC identification number EC25B0000OR5647645N issued under the EIA Notification, 2006, do hereby authorize Ajaya Muduli, son of Dhana Muduli, being the appellant no. 1, to represent us. We hereby authorize him to sign petitions, affidavits and applications on behalf of us, in order to pursue the said Original Application.

Gori Sisa
(Appellant no. 2)

Subash Sisa
Subash Sisa
(Appellant no. 3)

Prafulla Samantara
Prafulla Kumar Samantara
(Appellant no. 4)



Signature Attested
29/09/2025
A. K. SHADANGI
NOTARY (GOVT. OF INDIA)
KORAPUT

Annexure A1

सत्यमेव जयते

File No.: 536061/34-MINB1/05-2025

Government of India

Ministry of Environment, Forest and Climate Change

(Issued by the State Environment Impact Assessment Authority(SEIAA), ODISHA)

****

Dated **01/09/2025**

To,

Sri. Kassireddy Anil Kumar, Associate Vice President
M/s Kalinga Alumina Ltd.
Adani Corporate House, Nr. Vaishno Devi Circle, S.G. Highway, Khodiyar, Ahmedabad-382421
Kalinga.Alumina@adani.com

Subject: Grant of prior Environmental Clearance (EC) to the proposed Mining Project under the provisions of EIA Notification 2006-regarding

Sir/Madam,

This is in reference to your application submitted to SEIAA, Odisha vide proposal number SIA/OR/MIN/536061/2025 dated 13/05/2025 for grant of prior Environmental Clearance (EC) to the project for mining of Bauxite from Ballada Bauxite Mine(ML Area-144.945Ha.) for a production Capacity of 4.0 MTPA Bauxite (ROM), being the Peak Rated Capacity, 1,46,508 tonnes of Overburden/waste and 51,564 tonnes (25,782 m3) of top soil over a period of 5 years and setting up of Crushing/ Screening facilities of 800 TPH within the ML area located in Village-Ballada, Tahasil-Nandapur, District-Koraput by M/s Kalinga Alumina Ltd. under the provision of the EIA Notification 2006-and as amended thereof.

2. The particulars of the proposal are as below :

(i) EC Identification No.	EC25B0000OR5647645N
(ii) File No.	536061/34-MINB1/05-2025
(iii) Clearance Type	Fresh EC
(iv) Category	B1
(v) Project/Activity Included Schedule No.	1(a) Mining of minerals
(vii) Name of Project	Environmental Clearance of Ballada Bauxite Mine(ML Area-144.945Ha.) for a production Capacity of 4.0 MTPA Bauxite (ROM)
(viii) Location of Project (District, State)	Village-Ballada, Tahasil-Nandapur, District-Koraput
(ix) Issuing Authority	SEIAA,Odisha
(x) Applicability of General Conditions	No

3. In view of the particulars given in the Para 1 above, the project proposal interalia including Form-1(Part A, B and C)/ EIA & EMP Report, Application for EC were submitted to the SEIAA, Odisha for an appraisal by the State Level Expert Appraisal Committee(SEAC) under the provision of EIA notification 2006 and its subsequent amendments thereto.

4. The above-mentioned proposal has been considered for EC by SEAC in its meeting held on 23.07.2025. The minutes of the meeting and all the project documents as submitted by project proponent are available on Parivesh portal which can be accessed from the Parivesh portal by scanning the QR Code above.

5. The details of the project along with the salient features of the project as submitted by the project proponent in Form-1(Part A, B and C)/ EIA & EMP Report and as presented before SEAC are annexed to this EC as Annexure-2.

6. The SEAC, after detailed deliberations made by the Project Proponent and the EIA Consultant, in its meeting held on 23.07.2025 under the provisions of EIA Notification 2006 and its subsequent amendments, recommended for grant of Environmental Clearance valid for a period of 10 years, stipulating various conditions(standard & specific).

7. The matter was again examined in the State Environment Impact Assessment Authority (SEIAA), Odisha in its 230th meeting held on 19.08.2025 for grant of EC based on the recommendation of SEAC and in accordance with the EIA Notification, 2006 and further amendments thereto. After detailed deliberation, the authority approved the EC valid for a period of 10 years from the date of issue of this letter for a production capacity of 4.0 MTPA Bauxite (ROM) and Crushing/ Screening facilities of 800 TPH capacity along with standard and specific conditions as recommended by SEAC.

8. Environmental Clearance (EC) is granted to the project valid for a period of 10 years from the date of issue of this letter under the provisions of EIA Notification No. S.O. 1533 (E) dated the 14th September, 2006 of the Government of India in the erstwhile Ministry of Environment and Forests, as amended from time to time for proposed mining of Bauxite from Ballada Bauxite Mine(ML Area-144.945Ha.) for a production Capacity of 4.0 MTPA Bauxite (ROM), being the Peak Rated Capacity, 1,46,508 tonnes of Overburden/waste and 51,564 tonnes (25,782 m3) of top soil over a period of 5 years and setting up of Crushing/ Screening facilities of 800 TPH within the ML area located in Village-Ballada, Tahasil-Nandapur, District-Koraput by M/s Kalinga Alumina Ltd.'' with the following stipulations, environmental conditions and safeguards as given in Annexure- 1.

9. The Validity of EC shall be for a period of 10 years from the date of issue of this letter.

10. The SEIAA, Odisha reserves the right to alter /modify the above conditions or stipulate any further condition in the interest of environment protection.

11. The Environmental Clearance to the aforementioned project is under provisions of EIA Notification, 2006. 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.

12. The PP is under obligation to implement commitments made in the Environment Management Plan, which forms part of this EC.

13. This issue with an approval of the Competent Authority.

Copy To

1. Joint Secretary (IA Division), Ministry of Environment, Forests and Climate Change Govt. of India, Indira Paryavaran Bhavan, Jor Bagh Road, Aliganj, New Delhi-110003 for information.
2. Additional Chief Secretary, Forests & Environment Dept., Government of Odisha for information.
3. Additional Secretary to Govt, Steel & Mines Department, Government of Odisha for Information and necessary action.
4. Member Secretary, State Pollution Control Board, Odisha, Paribesh Bhawan, A/118, Nilakantha Nagar, Unit-8, Bhubaneswar for Information and necessary action.
5. Deputy Director General of Forests (C), Ministry of Environment, Forest and Climate Change, Regional Office, A/3, Chandersekharpur, Bhubaneswar – 751023 for Information and necessary action.

6. Regional Director, CGWA, South Eastern Region, Bhujal Bhawan, Khandagiri, Bhubaneswar, Pin-751030 for Information and necessary action.
7. The Director of Mines, Odisha, Bhubaneswar for information and necessary action.
8. Director General, Directorate General of Mines Safety, Hirapur, Dhanbad, Jharkhand, 826001
9. Collector & DM, Koraput, District-Koraput/DDM, Koraput for Information and necessary action.
10. Guard file for record/Website/Parivesh Portal.

Annexure 1

Specific EC Conditions for (Mining Of Minerals)

1. Specific Condition

S. No	EC Conditions
1.1	The proponent shall take all precautionary measures to protect Nageswari Hill / Cave as approved in mining plan and as proposed in EIA / EMP report. No mining activity will be carried out within 100m distance from the Cave.
1.2	The proponent shall obtain permission from the Archaeological Department before going for mining activity and take all protective measures to protect the Nageswari Cave in consultation with Archaeological Department.
1.3	The proponent shall use conveyor for mineral transportation and submit a detailed proposal with timeline for construction of conveyor within a month of issue of EC. Till the establishment of conveyor, they can go for mineral transportation 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.
1.4	As proposed by the project proponent, a feasibility study shall be carried out at the earliest from an institute of repute for the application of ripper-dozer and/or surface miner at Ballada Bauxite Mine 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.
1.5	The project proponent shall develop greenbelt in the lease area as proposed in the EMP. The greenbelt developed shall be under the campaign "Ek Ped Maa Ke Naam" and the plantation shall be carried out in the earmarked greenbelt area as a part of tree plantation campaign and the details of the same shall be uploaded in the MeriLiFE Portal (https://merilife.nic.in).
1.6	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 Regional Office of Ministry as part of Six-Monthly Compliance report.
1.7	The Project Proponent needs to complete the entire peripheral plantation under green belt, safety barrier plantation and gap plantation within three years from the start of mining operations. The PP should plant quality sampling of appropriate height of native and fruit bearing species. Plantation shall be undertaken in consultation with the State Forest Dept. PP needs to undertake the adequate

S. No	EC Conditions
	bench plantation and on the terrace of the waste dumps to prevent the soil erosion.
1.8	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.
1.9	The EMP shall be implemented in a time bound manner. 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 Regional Office of Ministry as a part of six-monthly compliance report.
1.10	Bench and dump slopes are to be designed based on scientific studies by subject experts from Institute of repute and maintained so that their failure is avoided.
1.11	The PP shall ensure proper surface runoff management and adopt adequate water conservation measures to augment the water resources of the area. Also, 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.
1.12	Proper Air Pollution Control measures shall be provided to control dust emission and local dust generation. Dust suppression and extraction system shall be provided in the crushing and screening units to control fugitive emission. The Project Proponent shall 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
1.13	OB dump sites shall be managed properly as proposed.
1.14	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.
1.15	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.
1.16	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 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. Statutory Compliance

S. No	EC Conditions
1.1	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.
1.2	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.
1.3	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.
1.4	The project proponent shall obtain authorization under the Hazardous and other Waste Management Rules, 2016 as amended from time to time.
1.5	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.
1.6	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).
1.7	The project proponent shall obtain clearance from the National Board for Wildlife, if applicable.
1.8	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.
1.9	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.
1.10	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.
1.11	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.

S. No	EC Conditions
1.12	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.

S. No	EC Conditions
2.1	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.
2.2	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.
2.3	The mining lease holders shall, after ceasing mining operations, undertake re-grassing 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

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 outside the ML area at least at four locations (one within and three outside the ML area at an angle of 120 each).covering upwind and downwind directions.
3.2	The project proponent shall monitor fugitive emissions in the ML area 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 ML area at least at four locations (one within and three outside the ML area at an angle of 120 each). covering upwind and downwind directions.
3.3	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

S. No	EC Conditions
	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.
3.4	Design the ventilation system for adequate air changes as per ACGIH document for all tunnels, motor houses, Oil Cellars.
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 ML area 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 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	Adhere to Zero Liquid Discharge
4.2	Industrial waste water (workshop and waste water from the mine) should be properly collected and

S. No	EC Conditions
	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.
4.3	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.
4.4	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.
4.5	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.
4.6	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.
4.7	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.
4.8	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.
4.9	Sewage Treatment Plant shall be provided for treatment of domestic wastewater to meet the prescribed standards.

S. No	EC Conditions
4.10	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.
4.11	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.
4.12	The project proponent shall practice rainwater harvesting to maximum possible extent.
4.13	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.
4.14	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 lease area and adjacent areas through labs recognised under Environment (Protection) Act, 1986 and NABL accredited laboratories.

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 floodlights/ masks away from the villagers and keeping the noise levels well within the prescribed limits for day /night hours.
5.2	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.
5.3	The peak particle velocity at 500m distance or within the nearest habitation, whichever is closer shall be monitored periodically as per applicable DGMS guidelines.

6. Noise Monitoring And Prevention

S. No	EC Conditions
6.1	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.
6.2	Noise level survey shall be carried as per the prescribed guidelines and report in this regard shall be

S. No	EC Conditions
	submitted to Regional Officer of the Ministry as a part of six-monthly compliance report.

7. Mining Plan

S. No	EC Conditions
7.1	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 the MoEFCC and its concerned Regional Office.
7.2	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. Energy Conservation Measures

S. No	EC Conditions
8.1	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;
8.2	Provide LED lights in their offices and residential areas.

9. Land Reclamation

S. No	EC Conditions
9.1	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.
9.2	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.

S. No	EC Conditions
9.3	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.
9.4	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. Waste Management

S. No	EC Conditions
10.1	The waste oil, grease and other hazardous waste shall be disposed of as per the Hazardous & Other waste (Management & Transboundary Movement) Rules, 2016.

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. Public Hearing And Human Health Issues

S. No	EC Conditions
12.1	Emergency preparedness plan based on the Hazard identification and Risk Assessment (HIRA) and Disaster Management Plan shall be implemented.
12.2	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.
12.3	Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.
12.4	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.
12.5	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.

13. Green Belt

S. No	EC Conditions
13.1	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.

14. Corporate Environment Responsibility

S. No	EC Conditions
14.1	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 SEAC, 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.
14.2	Self-environmental audit shall be conducted annually. 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.
14.3	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

S. No	EC Conditions
	Organization. Adequate number of qualified Environmental Scientists and Mining Engineers shall be appointed and submit a report to RO, MoEF&CC.
14.4	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 Regional Office of MoEF&CC as a part of six-monthly report.
14.5	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 Regional Office of Ministry, SPCB,Odisha along with the Six Monthly Compliance Report.
14.6	All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Mineral Beneficiation plants shall be implemented.

15. Miscellaneous

S. No	EC Conditions
15.1	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.
15.2	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.
15.3	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.
15.4	The project authorities must strictly adhere to the stipulations made by the State Pollution Control Board and the State Government.
15.5	The project proponent shall inform the Regional Office of MoEF & CC,GOI, SPCB, Odisha , 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.
15.6	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
15.7	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 State Expert Appraisal Committee.
15.8	No further expansion or modifications in the project shall be carried out without prior approval of the SEIAA,Odisha.
15.9	It shall be mandatory for the project management to submit half yearly compliance reports on the status of implementation of the above stipulated environmental safeguards to the SEIAA, Odisha / Integrated Regional Office of the MoEF & CC, Bhubaneswar in soft copies on 1st day of June and December of each calendar year. No hard copy of six monthly compliance report shall be accepted to SEIAA. The proponent shall also upload the compliance report including results of monitored data, in the website of the Ministry(www.parivesh.nic.in) for monitoring of EC Conditions, failing which EC is liable to be revoked.
15.10	The SEIAA may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.
15.11	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.
15.12	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.
15.13	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.
15.14	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.
15.15	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.

Annexure-2

1. Proposal in Brief:

The highlights of the proposal as ascertained from the application and as revealed from proceedings/discussion held during the meeting of SEAC/SEIAA, are given as under:-

(i) This is a proposal of M/s Kalinga Alumina Ltd. for obtaining Environmental Clearance of proposed mining of Bauxite from Ballada Bauxite Mine(ML Area-144.945Ha.) for a production Capacity of 4.0 MTPA Bauxite (ROM), being the Peak Rated Capacity, 1,46,508 tonnes of Overburden/waste and 51,564 tonnes (25,782 m3) of top soil over a period of 5 years and setting up of Crushing/ Screening facilities of 800 TPH within the ML area located in Village-Ballada, Tahasil-Nandapur, District-Koraput filed by Sri. Kassireddy Anil Kumar, Associate Vice President.

(ii) Category: This is a Category – B project which falls under schedule 1(a): Mining of Minerals as per the EIA Notification 2006 and amendments thereafter.

(iii) Project details: The present proposal is a greenfield project for mining of major mineral (Bauxite) with peak production capacity of 4.0 MTPA in Mine Lease area of 144.945 Ha. ToR has been granted vide File No. SIA/OR/MIN/439954/2023 on 06.11.2023 by SEIAA, Odisha and Public Hearing held on 06.03.2025. Subsequently, the application has now been submitted for grant of Environmental Clearance (EC).

(iv) List of statutory clearances:

Sl. No.	Clearance	Date
i)	The letter of Intent for Mining lease of bauxite block has been issued vide letter no. SM-MC2-MC-0007-2023/2143/S&M Bhubaneswar	01.03.2023
ii)	Mining plan along with Progressive Mine Closure Plan has been approved by IBM vide Letter No. MCDR-MiFL0BXT/5/2023-BBS-IBM_RO_BBS	08.08.2023
iii)	The Site-Specific Wildlife Conservation plan received approval from PCCF (WL) & CWLW, Odisha. An amount of Rs 457.546 lakhs has been allocated towards conservation of wildlife in the study area.	04.06.2024
iv)	Permission for use of surface water from Jalaput Reservoir obtained from the Department of Water Resources, Govt. of Odisha vide letter no. 30630/WR	08.11.2024
v)	Forest Clearance Stage-I “In-principal” approval has been granted by MoEF & CC (Forest Conservation Division).	23.12.2024

(v) Forest Application details: Forest application has been submitted vide proposal no. FP/OR/MIN/QRY/456733/2023; dated 30.12.2023. Ballada Block is a virgin bauxite block located in Nandapur Tehsil of Koraput district in Odisha, total mining lease area is 144.945 ha, located entirely within Nagasari reserve forest. The project contemplates to develop the mine and surrounding infrastructures for commercial production of

bauxite of 4 MTPA peak rated capacity using opencast mining. In addition to ML area 12.267 ha area to be required for evacuation of minerals. Hence forest diversion application has been submitted for 157.212 ha. Forest Clearance Stage-I "In-principal" approval has been granted by MoEF&CC (Forest Conservation Division) dated 23.12.2024.

(vi) ToR details: Terms of Reference (TOR) was granted by SEIAA, Odisha vide letter dtd. 06.11.2023.

(vii) Public hearing details: The Public Hearing for the proposed bauxite mine was held at Mouza- Bheja, Khata No. 27, Plot No. 225, under Nandapur Tehsil of Koraput District, Odisha, dated: 06.03.2025, Time: 11:00 AM. Issues raised during public hearing are resettlement and rehabilitation plan, Education Renovation of Primary school/Higher Secondary School, Free education in schools, Healthcare facilities like provision of Ambulance, Distribution of free medicine, conducting health Camps, Construction of road, Water coolers and purifier, for Drinking water, maintenance of village roads, rainwater harvesting at Community Area, Provision of Plantation and Streetlights in Community Area, Provision of Water Cooler for Potable Drinking water, skill development and employment, about the Ballada Cave, that might be destroyed due to mining activity, agriculture of villages will be affected, The Forest Right Act is to be adopted for diversion of forest and R&R plan, Applicability & Implementation of the PESA Act, Stream Water Affect, measures to control air pollution, overburden protection and subsequent plantation, cutting down trees, increase of DMF fund for development.

(viii) Location and connectivity: Ballada Bauxite Block is located at Village - Ballada, Tehsil – Nandapur, District – Koraput, Odisha. Block covers an area of about 144.945 ha. bounded by latitudes 18°26'05.61588" N / 18°27'13.34448" N and Longitudes 82°39'32.39136" / 82°40'25.36716" E. The lease area is covered under Survey of India toposheet no. E44K11 (65J/11). 144.945 Ha. of Mine Lease area is Forest Land (Nagasari RF) under Koraput Forest Division. The mineral bearing plateau is situated about one kilometer west of Ballada village and about 8 km north of Padwa in Koraput district, Odisha. Jeypore, a major town in the Koraput district, is about 82 km NNW of the Ballada deposit and is approachable by major district road No.52. Koraput, the district headquarters is 60 km north of the deposit and is connected by a metalled road via Similiguda on NH 26. Bheja, the nearest Railway Station is about 5 km due north-east. The nearest airport is at Visakhapatnam, about 140 km SE from the lease area. The Nearest Water body is Jalaput reservoir located at a distance of 3 km south. Nearest reserve forest is Nagasari RF i.e., entire mine lease area of 144.945 Ha. Nearest habitation is Ballada village, about 1 km in East. The Nearest Wild life Sanctuary is "Karlapat Wildlife Sanctuary" at a distance of 139.8 km in NNE direction. The Nearest Water body is Jalaput reservoir located at a distance of 3 km South.

(ix) Product details:

Units	Products and by Products	Existing	Additional	After Expansion
Million Tonnes Per Annum (MTPA)	Product: Bauxite	0.00	4.00	Not Applicable

Equipment details:

S No	Particulars	Make	Capacity	No. of equipment
i)	Diesel hydraulic shovel	Volvo EC480/Komatsu PC 450/TATA Hitachi ZX 670	3.1 cum	4
ii)	Dumper	Bharat Benz 3528	16 m^3	11
iii)	DTH drill	Epiroc-T40	Hole Dia -115 mm	3
iv)	Dozer	BEML D-155	324 (hp)	1

(x) Mining method and production: The deposit lies on surface, and it is proposed to be mined by mechanized opencast method of mining with excavator/ dumper combination. Deep hole drilling/Short hole drilling and blasting is proposed after taking prior permission from DGMS. Further, it is proposed to mine with Ripping-Dozing method and/or deployment of Surface Miner at a later date, based on feasibility. Mineable reserve is 19.96 Mt.

Year	Top Soil (m3)	Over Burden/ Waste (m3)	Over Burden/ Waste Quantity (t)	ROM Volume (m3)	ROM Quantity (t)	Recovery	Mineral Reject (t)	Production Main (t)	Production Associated (t)	OB to Ore Ratio (m^3/ton)
Year 1	24072	0	0	500060	1000120	100%	-	1000120	0	0.0
Year 2	1710	24783	49566	1012010	2024020		-	2024020	0	0.012
Year 3	0	44671	89342	1000741	2001482		-	2001482	0	0.022
Year 4	0	3800	7600	1001207	2002414		-	2002414	0	0.002
Year 5	0	0	0	2000934	4001868		-	4001868	0	0.0
Total	25782	73254	146508	5514952	11029904			11029904		0.0067

(xi) Transportation details: Mined bauxite (R.O.M) shall be transported to the crushing/screening plant through mine haul trucks. Evacuation of crushed bauxite is planned through a combination of conveyor and rail route. The crushed bauxite will be transported by a closed conveyor system to the nearest “Bheja Railway Siding” from where it will be loaded on railway wagons using front end loaders and subsequently

dispatched to destination. OB within the lease will be transported through rear-dump trucks to the dump area within the lease.

(xii) Ground water depth: Pre-monsoon depth to water level ranges between 2.25 mbgl to 7.22 mbgl and post-monsoonal water level ranges from 1.22 mbgl to 6.21 mbgl, in the study area.

(xiii) Details of Drilling & Blasting: The primary activity in mining operation, i.e. fragmentation/ loosening of in-situ rock mass, is conventionally carried out by drilling and blasting. The slurry/emulsion explosives will be used. The top of the blast holes will be subjected to stemming with drill cuttings to prevent generation of fly rocks. A minimum of one-third of the hole depth will be subjected to stemming. To minimize the vibration due to blasting NONEL with cord relay will be used and whenever blasting is to be done near any village or permanent structure muffle blasting will be done. The peak rated production capacity of mine will be 4 Mt per annum (2 Mm3 per annum).

(xiv) Soil dump details: The waste generated in course of pre-mining development and subsequent mining operation will consist of topsoil and laterite with occasional occurrences of khondalite. During the first five years the rate of generation of waste is expected to be of the order of 0.073 Mm3 or 0.15 MT of along with generation of 0.026 Mm3 of Topsoil. Considering this, an average ore to waste ration of 1:0.018 is estimated. It is planned to stack topsoil and waste separately on ground during the initial 4 years of plan period. From 5th year onwards, waste material will be dumped systematically. Topsoil, stacked separately, would be spread over the reclaimed areas, to enable planting and growing of trees. The waste stacked on ground during the initial years of operation will be utilized to fill the worked-out areas at the end of the working life of the mine as well as during the interim period, as and when practicable. The generation of waste during the 5 year plan period will be very less and shall be dumped systematically. No backfilling is proposed during the initial 5 year period.

(xv) Crusher and screen details: For 4 million tons per annum peak rated capacity the crushing/ Screening plant requirement would be 800 TPH. It is proposed to install crushing and screening plants in phases 400 TPH (1 no.) for 2 MTPA RoM production and 400 TPH (2 nos.) for 4 MTPA production. The crushing plant and conveyor systems have been designed for 305 days operation per year with 3 shifts operation per day. The size of the product to be obtained after crushing in the plant will be minus 150 mm (d85).

Type of Crusher	Capacity, TPH	Feed Size, mm	Product size, mm
Crushing & Screening Plant	800	600-800	Minus 150

(xvi) Land use details:

	Head	At Present (Ha.)	At the end of SOM period (Ha.)	At the end of conceptual period (Ha.)

a)	Area under Mining	0.00	42.78	81.82
b)	Topsoil stacking	0.00	0.28	-
c)	Overburden / Waste Dumping	0.00	1.94	1.95
d)	Mineral Storage	0.00	1.93	-
e)	Infrastructure (Workshop, Administrative Building etc.)	0.00	0.18	-
f)	Roads	0.00	0.38	-
g)	Mineral Separation Plant	0.00	0.13	-
h)	Others	0.00	3.92	-
i)	Undisturbed	0.00	-	61.18
	Total	0.00	51.54	144.945

(xvii) Details of waste generated:

Year	Top Soil Volume (m^3)	Overburden/ Waste Volume (m^3)
Year 1	24072	0
Year 2	1710	24783
Year 3	0	44671
Year 4	0	3800
Year 5	0	0

(xviii) Mitigation of waste produced: It is planned to stack topsoil and waste separately on ground during the initial 4 years of plan period. From 5th year onwards, waste material will be dumped systematically. Topsoil, stacked separately, would be spread over the reclaimed areas, to enable planting and growing of trees. The waste stacked on ground during the initial years of operation will be utilized to fill the worked-out areas at the end of the working life of the mine as well as during the interim period, as and when practicable. The generation of waste during the 5 year plan period will be very less and shall be dumped systematically. No backfilling is proposed during the initial 5 year period.

(xix) Baseline study details: Baseline Study has been conducted during March 2023 to May 2023.

Parameters	Baseline status
Ambient Air Quality	PM_{10} – 50.4 – 76.9 ($\mu g/m^3$) $PM_{2.5}$ – 28.7 – 50.9 ($\mu g/m^3$) NO_X – 16.1– 34.8 ($\mu g/m^3$) SO_2 – 9.4 – 21.8 ($\mu g/m^3$) CO – 0.5 – 1.0 (mg/m3)
Noise Level	Noise Level during Day Time -- 41.59 – 52.2 Leq.(dB)A Noise Level during Night Time -- 34.2 – 43.38 Leq.(dB)A

Water Quality	Ground Water : All the Parameters like TDS (320.0–380.0mg/L). pH (7.55 – 8.24), Total Hardness (142.20-300.42 mg/L) etc. are found within the permissible limits.
	Surface Water : All the Parameters like TDS (236.0- 400.0 mg/L). pH (7.51 - 7.72), Total Hardness (70.0- 81.0 mg/L) etc. are found within the permissible limits.
Soil Quality	pH – 7.58 – 7.82 Organic Matter – 0.31 – 0.69 (%) Water Holding Capacity – 32.21 – 37.64 (%)
Socio Economic Study	The proposed project will provide positive impact to the nearby area. The project will provide direct and indirect employment to nearby villagers. Project will generate employment for about 126 persons.
Ecology and Biodiversity	There is no wildlife sanctuary/biosphere reserve/national parks present within 10 Km radius of the study area. A Site-specific Wildlife Conservation Plan has been prepared and is approved by PCCF (WL) & CWLW for conservation of schedule-I species of the study area.

(xx) Water requirement and wastewater management: Water requirement during construction phase (domestic and construction activity) is estimated as average 15 KLD with a peak consumption of 30 KLD.The water requirement of the project during operation phase is 690 KLD. Water will be sourced from nearby Jalaput lake located at distance of 3 km. Permission has been obtained from the Department of Water Resources, Govt. of Odisha vide letter no. 30630/WR. dated 08.11.2024 Wastewater generated from workshop will be treated using oil-water separator and treated water will be used in vehicle washing. Waste water generated from mine office, rest shelters etc. will be disposed in soak pit via septic tank.

S. No.	Consuming Area	Water requirement, (KLD)
i)	Haul road dust suppression including maintenance of topsoil	600
ii)	Washing and cleaning of earthmoving equipment	45
iii)	Drinking system	10
iv)	Afforestation	15
v)	Miscellaneous	20
	Total	690

(xxi) Power Requirement and solar power details: The estimated average power requirement is 1 MW, the peak requirement being 1.5 MW. Power shall be sourced from nearest

substation located at a distance of 8 km at Padwa. Renewable energy source proposed to install is around 160 KW, which will be about 10 % contribution for the total power requirement.

(xxii) Rainwater Harvesting Details: As per the CGWA Manual for Recharge (GEC Norms-2015), the recharge structures like Check Dam/ Percolation Pond will contribute 20% of the stored volume in the monsoon and 20% in the non-monsoon to the recharge of groundwater system. The mine pits are considered as ponds (manmade structures). Hence, the above percentage is considered as ground water recharge from the mining pits. The estimated ground water recharge through mine pit will be 253341 m3/month.

(xxiii) Green belt Development: The details of proposed greenbelt are given below:

Sr. No	Year	Green Belt Location (s)	Area Proposed to be Covered (Ha)	Number of Plants Proposed	Expected Survival Rate (%)	Estimated Expenditure (INR)
i)	Year 1	Statutory Barrier, Dump & haul roads	0.72	1440	75	2,01,600
ii)	Year 2	Statutory Barrier, Dump & haul roads	0.86	1720	75	2,40,800
iii)	Year 3	Statutory Barrier, Dump & haul roads	1.16	2320	75	3,24,800
iv)	Year 4	Statutory Barrier, Dump & haul roads	0.68	1360	75	1,90,400
	Year 5	Statutory Barrier, Dump & haul roads	0.80	1600	75	2,24,000
Total			4.22	8440		11,81,600

(xxiv) Total employment: Project will generate employment for about 126 persons directly, besides its potential to generate considerable indirect employment and livelihood opportunities.

(xxv) Project Cost: Estimated cost of the project is Rs. 23000 Lakhs, EMP cost includes Capital Cost of Rs. 220 Lakhs and Recurring Cost of Rs. 60 Lakhs/year; CSR cost is Rs. 532.5 Lakhs.

Sl. No.	Environmental Protection Measures	Capital Cost (Rs. In lakhs)	Recurring Cost (Rs. In lakhs/year)
i)	Air Pollution Control Measures	100.00	25.00
ii)	Water Pollution Control Measures	25.00	5.00
iii)	Noise Pollution Control Measures	15.00	1.00
iv)	Greenbelt Development	20.00	5.00
v)	Rainwater Harvesting	10.00	2.00

vi)	Health & Safety measures	20.00	2.00
vii)	Environment Monitoring	30.00	20.00
	Total	220.00	60.00

(xxvi) Environment Consultant: The Environment consultant M/s Vardan Environet LLP, Gurugram along with the proponent made a presentation on the proposal before the Committee on 30.05.2025. The SEAC decided to take the decision on the proposal after receipt of certain information / documents from the proponent:

(xxvii) The SEAC in its meeting held on dated 30.05.2025 decided to take decision after receipt of the following information and documents from the proponent. The proponent has furnished the compliance and the SEAC verified the same as follows:

Sl. No.	Information Sought by SEAC	Compliance furnished by the proponent	Views of SEAC
i)	Status of stage-I Forest Clearance and copy of stage-I Clearance, if obtained.	FC Stage-1 has been granted vide file no. FP/OR/MIN/QRY/456733/2023 on 23.12.2024. Copy of FC stage-1 approval is attached as Annexure 1.	Complied
ii)	Copy of Letter of Intent in name of Kalinga Alumina.	The Letter of Intent (LOI) has been issued in the name of Mundra Alumina Ltd. vide letter no.2143/SM-MC2-MC007-2023, S&M, Bhubaneswar on 01.03.2023 from the Steel & Mines Department, Govt. of Odisha. However, change in name of entity from "Mundra Alumina Ltd." to "Kalinga Alumina Ltd.)" has been approved by the Department of Steel & Mines, Govt. of Odisha vide letter no. 5995 SM-MC2-MC-0012-2023/SM, Bhubaneswar on 09.06.2023. The Copy of Letter of Intent is attached as Annexure 2.	-----
iii)	Explore the possibility of implementing the sprinkling system all along the conveyor line.	Provision of sprinkling system for dust suppression will be provided at the loading end, discharge end and at all the transfer points of the long-distance conveyor.	Complied
iv)	Provision for continuous water sprinkling facility to be adopted all along the road during transportation of minerals.	Provision for continuous water sprinkling facility will be adopted all along the Haul Road during transportation of minerals. An adequate number of water sprinkler and fog cannon shall be installed at appropriate locations to prevent air pollution during internal transportation of mineral from pit to crusher.	
v)	Note on Management of reactive silica.	Reactive Silica refers to a mineralogical form of silica, primarily present as Kaolinite, with the chemical formula $Al_2O_3 \cdot 2SiO_2 \cdot 2H_2O$. It is termed "Reactive" due to its chemical reactivity with caustic solutions used in the Bayer Process, the standard method employed by	Complied

Sl. No.	Information Sought by SEAC	Compliance furnished by the proponent	Views of SEAC
		alumina refineries to extract alumina from bauxite. During the Bayer Process, Reactive Silica reacts with the caustic soda and precipitates as a solid by-product known as Desilication Product (DSP). This DSP becomes part of the red mud, a residue that requires careful management by alumina refinery operators. As such, Reactive Silica does not pose any environmental or processing concerns during the mining and crushing stages. Further, its presence in bauxite does not impact on the operations of Kalinga Alumina Limited, whose responsibilities are limited to the extraction, crushing, and sale of bauxite ore to various alumina refineries.	
vi)	Parking Plaza details.	Designated parking plot for HEMM will be inside the mining lease area for Intra mine transportation. Since Bauxite will be transported through the long-distance conveyor system, therefore, no transportation of bauxite by road is envisaged.	Complied
vii)	Details on the exploration of minerals with respect to critical minerals.	As per the tender documents, exploratory drilling was carried out during the year 1976-77 by Geological Survey of India. A total of 15 boreholes (BB-1 to BB-15) have been drilled with a total meterage of 291.65 meters. Based on the grades, Bauxite has been categorized into 5 types such as Metallurgical grade bauxite, Low grade Bauxite, Beneficiable grade Bauxite High Silica Bauxite and Aluminous Laterite and the resources have been estimated accordingly. The geological setting of the area, being part of the Eastern Ghats hill ranges and predominantly composed of Khondalite and Charnockite group of rocks, significantly reduces the likelihood of encountering critical mineral deposits. As per the Geological Report, the absence of known mineralization zones or geochemical anomalies in the region further supports that the possibility of occurrence of critical minerals in this bauxite deposit is very remote. Geological report is attached as Annexure-3.	-----
viii)	During public hearing, local people made complaint about protection of cave, which is a place	Regarding the protection of the Cave, we have proposed no mining activity will be carried out within 100m distance from the Cave. Hence the cave shall remain undisturbed and on the contrary, the cave and its vicinity shall be	Complied

Sl. No.	Information Sought by SEAC	Compliance furnished by the proponent	Views of SEAC
	of worship in that locality and same is falling within the lease area. A detailed proposal for protection of the cave area used for worship by the local people including earmarking a no mining / safety zone in a layout to be submitted.	developed and beautified so as to attract tourism. District administration is also intent for the Beautification of Cave. The layout plan mentioning Safety zone is attached as Annexure 4. The protection plan of Cave is attached as Annexure 5.	

(xxviii) Following issues have been raised by the public during Public Hearing for Ballada Bauxite Mines for M/s Kalinga Alumina Limited, Koraput held on 06.03.2025 at 11.00 am at Mouza Bheja (Khata no. 27. Plot no. 225 area -2,48 ac, kissam-d-111) under Nandapur Tehsil, District – Koraput.

i) Resettlement and Rehabilitation (R&R) Plan/Compensation details for the Project Affected People (PAP) should be furnished.
ii) Education Renovation of Primary school/Higher Secondary School, Free education in schools.
iii) Healthcare facilities like provision of Ambulance, Distribution of free medicine and conducting health Camps
iv) Infrastructure Development; Construction of road, Water coolers and purifier, for Drinking water
v) Physical Work: Strengthening/maintenance of village roads, Rainwater Harvesting at Community Area, Provision of Plantation and Streetlights in Community Area, Provision.
vi) Water Cooler for Potable Drinking water
vii) Skill Development and Employment; Wick making, Stitching, Mushroom Production and Computer Training.
viii) Ballada Cave will be destroyed due to mining activity.
ix) Agriculture of villages will be affected.
x) The Forest Right Act is to be adopted for diversion of forest and R&R plan
xi) Applicability & Implementation of the Panchayats Extension to Scheduled Areas (PESA) Act, 1996
xii) Stream Water Affect
xiii) Measures need to be taken to prevent Air Pollution in this project.
xiv) Overburden protection & subsequent plantation
xv) Felling of trees
xvi) Increase of DMF fund for development

- About 2420 Nos. of written representations have been received by the Board in connection with the public hearing and most of them are related to the above issues along with issues related to destruction of Nageswari Hill, Destruction of natural habitats of 23

different types of Animals and Birds, Affect the crops and millets grown at the foothill of the Balda Hill, affect the 23 perennial streams and 15 ponds and lakes around the Balda Hills and destruction of medicinal trees etc.

- Further, a representation from Sri Rama Chandra Kadam, Hon'ble MLA, Pottangi has been submitted to Hon'ble Chief Minister, Odisha raising following issues

i) The villagers of Balda Gram Panchayat, along with five other panchayats and about 30 villages, are associated with the Nageswari Hills. The forests, jungles and springs of nature are the beliefs and emotions of their tribal people. This hill is associated with the memories of our ancestors and our livelihood.

ii) On the other hand, the State Tourism Department has also arranged an eco-retreat very close to this hill to attract tourists, which is the oldest cave in this area, known as Nageswari Cave. If the hill is excavated by the Adani Company, the tourism of the State, the natural beauty of the Nageswari Cave and the hill will be completely affected.

iii) All the perennial streams and springs in this area will be dried up.

iv) The medicinal trees that were thousands of years ago will also disappear, which is an irreparable loss.

(xxix) The Committee observed that most of the points raised by the public during public hearing as well as raised by Hon'ble MLA have been addressed by the proponent in the EIA report. The proponent has also submitted a detailed proposal for protection of the Nageswari Cave such as maintaining no mining zone from the cave, beautification of the cave area to attract tourists and other pollution control measures as per concerns of public.

(xxx) Any deficiencies/omission have been noticed in the above documents- Nil

2. Deliberation in SEAC Meeting: – The proposal was placed in the SEAC meeting held on 23.07.2025 and the Considering the information furnished and the presentation made by the consultant, M/s Vardan Environet LLP, Gurugram along with the project proponent, the SEAC recommended for grant of Environmental Clearance to the project valid for 10 years with stipulated conditions in addition to the following specific conditions.

i) The proponent shall take all precautionary measures to protect Nageswari Hill / Cave as approved in mining plan and as proposed in EIA / EMP report.

ii) The issues raised during the public hearing shall be addressed by the proponent as proposed in EIA/EMP report.

iii) The proponent shall obtain permission from the Archaeological Department if applicable before going for mining activity and take all protective measures to protect the Nageswari Cave in consultation with Archaeological Department if required.

iv) The proponent shall use conveyor for mineral evacuation and submit a detailed proposal with timeline for construction of conveyor within a month of issue of EC. Till the establishment of conveyor, they can go for mineral evacuation by road.

v) As proposed by the project proponent, a feasibility study shall be carried out at the earliest from an institute of repute for the application of ripper-dozer and/or surface miner at Ballada Bauxite Mine.

3. Decision of Authority: Approved :-The proposal was placed in the 230th meeting of SEIAA held on 19.08.2025 for consideration of EC. After detailed deliberation, the authority approved the EC valid for a period of 10 years from the date of issue of this letter for a

production capacity of 4.0 MTPA Bauxite (ROM) and Crushing/ Screening facilities of 800 TPH capacity along with standard and specific conditions as recommended by SEAC.

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Annexure A2

(2013) 6 Supreme Court Cases 476

(BEFORE AFTAB ALAM, K.S.P. RADHAKRISHNAN AND RANJAN GOGOI, JJ.)

ORISSA MINING CORPORATION LIMITED .. Petitioner;

Versus

MINISTRY OF ENVIRONMENT AND FORESTS AND OTHERS .. Respondents.

Writ Petition (C) No. 180 of 2011†, decided on April 18, 2013

A. **Environment Protection and Pollution Control — Environmental clearance/NOC/Environmental Impact Assessment — Stage-wise grant of clearance to ensure compliance with environmental safeguards — Rejection of final clearance (Stage II Clearance) due to non-compliance with preconditions imposed in preliminary clearance (Stage I Clearance) — Rejection, if proper — Further opportunity, if to be given for compliance with said preconditions for grant of final clearance**

— Diversion of forest land for mining — Grant of clearance for — Protection of rights of Scheduled Tribes (STs) and Other Traditional Forest Dwellers (TFDs) under STOTFD Act, 2006, including any customary/religious rights of such persons in respect of forest area/land in question — Consideration of

— Environmental clearance sought for diversion of forest land for alumina refinery project (ARP)/bauxite mining project (BMP) in area concerned — Violation of conditions of Stage I Environmental Clearance — Resultant rejection of Stage II Clearance — Relief

— Supreme Court in *T.N. Godavarman Thirumulpad (104)*, (2008) 2 SCC 222 (*Vedanta case*) granting clearance for diversion of forest land for ARP/BMP on acceptance of "Rehabilitation package" as specified therein by SIL, OMC (petitioner herein) and State of Orissa while leaving it to Ministry of Environment and Forests (MoEF), Government of India to grant its approval in accordance with law — MoEF granting Stage I Environmental Clearance agreeing in principle for diversion of forest land, subject to compliance with various conditions and environmental safeguards and prior forestry clearance as specified therein — For Final Stage II Clearance, expert committees constituted by MoEF to ascertain whether there was violation of tribal rights and community rights in respect of forest land in question, noticing prima facie violation of Forest Act, 1927 and Forest (Conservation) Act, 1980 recommending temporary withdrawal of In-principle/Stage I Clearance — On recommendations of FAC, MoEF rejecting Stage II Clearance for the project — Validity of — Held, ARP/BMP to take steps to correct and rectify alleged violations of terms of Stage I Environmental Clearance granted by MoEF — While taking final decision, MoEF to take into consideration any corrective measures taken by ARP/BMP

† Under Article 32 of the Constitution of India

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— Question whether STs and other TFDs have got any religious rights i.e. customary rights of worship in the mountains, especially a hilltop known as Niyam-Raja had not been considered by the Gram Sabha — Hence, Gram Sabha directed to examine if the mining project, in any way, affects their religious rights, which have to be preserved and protected — Proceedings of Gram Sabha shall be attended by a judicial officer of rank of District Judge as an observer, nominated by Chief Justice of High Court who shall certify that proceedings of Gram Sabha took place independently and completely uninfluenced either by project proponents or by Central/ State Government — On conclusion of proceedings before Gram Sabha determining the claims submitted before it, MoEF shall take a final decision on grant of Stage II Clearance in light of decisions of Gram Sabha — Forest (Conservation) Act, 1980 — S. 2 — Stage-wise clearance under— Grant of — Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 — Ss. 3(1)(j) & (l), (2), 4, 5 & 6 — Protection of religious rights/customary rights of worship — Environment (Protection) Act, 1986 — S. 3 — Constitution of India — Arts. 21, 25 and 26 — Forest Act, 1927, S. 27 (Paras 29 to 35 and 67 to 71)

T.N. Godavarman Thirumulpad (104) v. *Union of India*, (2008) 2 SCC 222; *T.N. Godavarman Thirumulpad (106)* v. *Union of India*, (2008) 9 SCC 711, *followed*

T.N. Godavarman Thirumulpad v. *Union of India*, Review Petition No. 100 of 2008 in WP (C) No. 549 of 2007, order dated 7-5-2008 (SC), *referred to*

B. **Environment Protection and Pollution Control — Forests — Diversion of forest land for alumina refinery project (ARP) and bauxite mining project (BMP) in area concerned — ARP and BMP, prima facie held, are not two separate and independent projects as there is sufficient material on record to show that two projects make an integrated unit — In two earlier orders in *Vedanta case*, (2008) 2 SCC 222 and *T.N. Godavarman Thirumulpad (106)*, (2008) 9 SCC 711 (*Sterlite case*) also the two projects are seen as comprising a single unit (Paras 36 and 37)**

C. **Constitution of India — Arts. 244(1), 366(25), 342, 366 and Schs. V & VI — Indigenous people/Tribals/Scheduled Tribes/"Traditional Forest Dwellers" (TFDs) — Preservation of social, political and cultural rights of, under Indian Constitution and International Conventions, examined — Tribal autonomy and administration and control of Scheduled Areas provided for under Schs. V and VI to Constitution — Object of preservation of tribal autonomy, their cultures and economic empowerment to ensure social, economic and political justice for preservation of peace and good governance in Scheduled Areas — Extension of democratic decentralisation by Panchayats (Extension to the Scheduled Areas) Act, 1996 to Scheduled Areas — India signatory to various international conventions for protection of social, political and cultural rights of indigenous people — Right of STs and other TFDs residing in Scheduled Areas to maintain their distinctive spiritual relationship with their traditionally owned or otherwise occupied and used lands, emphasised — Difficulties of STs and other TFDs in obtaining effective access to justice, being totally unaware of their rights, lacking financial resources to take any legal action against development projects undertaken in their abode or forest in which they stay, highlighted — State's duty in this regard to recognise and support their identity, culture**

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and interest pointed out — (ILO) Convention on Indigenous and Tribal Populations, 1957 (No. 107) — Convention on Biological Diversity (CBD) adopted at Earth Summit (1992) — Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 — Ss. 2(o) and 3 to 6 — Panchayats (Extension to the Scheduled Areas) Act, 1996, S. 4 (Paras 39 to 47)

Samatha v. *State of A.P.*, (1997) 8 SCC 191, *relied on*

Union of India v. *Rakesh Kumar*, (2010) 4 SCC 50 : (2010) 1 SCC (L&S) 961, *considered*

D. **SCs, STs, OBCs and Minorities — Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 — Generally — Object, reasons, nature of enactment — Held, it is a social welfare or remedial statute — 2006 Act recognises and vests forest rights and other rights over forest land in forest dwelling STs and other TFDs who have been residing in such forests for generations and to provide for a framework for recording, recognition and vesting of rights in respect of forest land — Act confers powers on Gram Sabha to protect community resources, individual rights, cultural and religious rights — Act protects rights of forest dwellers and STs including customary rights to use forest land as a community forest resource and is not restricted merely to property rights or to areas of habitation — Aforementioned objects and reasons are to be kept in mind while interpreting the various provisions of the 2006 Act which is a social welfare or remedial statute — Constitution of India — Arts. 25 to 30 — Cultural and religious rights of Scheduled Tribes and Traditional Forest Dwellers — Protection of (Paras 48 to 52)**

E. **Mines and Minerals — Mines and Minerals (Development and Regulation) Act, 1957 — Ss. 2 to 5 and 11 — Mines and mineral deposits beneath forest land — Right of ownership vests in State under MMDR Act, 1957 — S. 3, STOTFD Act, 2006 neither expressly nor impliedly takes away nor interferes with said rights of State — Held, State holds natural resources as a trustee for the People — S. 3, STOTFD Act, 2006 does not vest such rights in the STs or other TFDs — Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 — Ss. 13 and 3 to 6 — Property Law — Ownership and Title — Mining rights — Panchayats (Extension to the Scheduled Areas) Act, 1996, S. 4**

Held :

The State of Orissa has rightly maintained the stand that the State has the ownership over the mines and mineral deposits beneath the forest land and that the STs and other TFDs cannot raise any claim or rights over them, nor has the Gram Sabha any right to adjudicate such claims. The Forest Rights Act, neither expressly nor impliedly, has taken away or interfered with the right of the State over mines or minerals lying underneath the forest land, which stand vested in the State. The State holds the natural resources as a trustee for the people. Section 3 of the Forest Rights Act, 2006 does not vest such rights on the STs or other TFDs. The PESA Act, 1996 speaks only of minor minerals, which says that the recommendation of the Gram Sabha shall be made mandatory prior to grant of prospecting licence or mining lease for minor minerals in the Scheduled Areas. Therefore, the State Government has the power to reserve any particular area for bauxite mining for a public sector corporation. (Para 58)

Amritlal Nathubhai Shah v. *Union Govt. of India*, (1976) 4 SCC 108, *relied on*

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F. SCs, STs, OBCs and Minorities — Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 — Ss. 3 to 6 — Powers of Gram Sabha of determination of "individual" or "community rights" of forest dwelling STs and TFDs — Scope of — Religious or spiritual rights guaranteed under Arts. 25 and 26 of the Constitution, held, are included and must be preserved and protected — Thus, further held, Gram Sabha under STOTFD Act, 2006 r/w S. 4(d), PESA Act, 1996 has an obligation to safeguard and preserve traditions and customs of STs and other TFDs, their cultural identity, community resources, etc. — In present matter, question whether STs and other TFDs, like Dongaria Kondh, Kutia Kandha and others, have got any religious rights i.e. customary rights of worship in the mountains, especially re a hilltop known as Niyam-Raja, have not been considered by Gram Sabha — Gram Sabha directed to examine whether Bauxite Mining Project concerned in present case, in any way, affects their religious rights, especially their right to worship their deity, Niyam-Raja, in the hilltops of Niyamgiri range of hills — If so, that right has to be preserved and protected — Panchayats (Extension to the Scheduled Areas) Act, 1996 — S. 4(d) — Constitution of India — Arts. 25 to 30 — Cultural and religious rights of Scheduled Tribes and Traditional Forest Dwellers — Protection of — Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Rules, 2007 (before and after amendment in 2012) — Generally (Paras 59 to 66)

B-D/51787/C

Advocates who appeared in this case :

Mohan Parasaran, Solicitor General, Sidharth Luthra, Additional Solicitor General, K.K. Venugopal, C.U. Singh, C.A. Sundaram and Raj Panjwani, Senior Advocates [Prashanto Chandra Sen, P.S. Sudheer, Ms Sara Sundram, Rishi Maheshwari, Ms Anne Mathew, Abu John Mathew, Ms Ekta Kapil, Ms Anubha Singh, Ms Atishree Sood, Ms Vijayalakshmi Menon, R.S. Jena, Ms Rohini Musa, A.D.N. Rao, Siddhartha Choudhury, D.L. Chidananda, Haris Beeran, Ms Asha G. Nair, Aditya Singla, Gurmohan Bedi, Amer Musthaq Salim, Zoheb Hossain, Alok Prasanna Kumar, Ms Aarthi Rajan (for S.N. Terdal), Ms Binu Tamta, Rahul Chaudhary, Ritwick Dutta, Ms Anitha Shenoy, Sanjay Parikh, Mamta Saxena, Ms Bushra Parveen and A.N. Singh, Advocates] for the appearing parties.

Chronological list of cases cited ***on page(s)***

1. (2010) 4 SCC 50 : (2010) 1 SCC (L&S) 961, *Union of India* v. *Rakesh Kumar* 500*e-f*
2. (2008) 9 SCC 711, *T.N. Godavarman Thirumulpad (106)* v. *Union of India* 480*c*, 484*f*, 485*e-f*, 485*f-g*, 485*g*, 486*b*, 487*a-b*, 488*a*, 492*a-b*, 493*c*, 494*f*, 495*a-b*, 497*f-g*, 498*e-f*
3. (2008) 2 SCC 222, *T.N. Godavarman Thirumulpad (104)* v. *Union of India* 480*b-c*, 481*g-h*, 484*b-c*, 484*d*, 484*f-g*, 485*e-f*, 485*f-g*, 485*g*, 486*b*, 487*a-b*, 488*a*, 493*c*, 494*f*, 496*c-d*, 496*d*, 496*e*, 498*e-f*
4. Review Petition No. 100 of 2008 in WP (C) No. 549 of 2007, order dated 7-5-2008 (SC), *T.N. Godavarman Thirumulpad* v. *Union of India* 484*e-f*, 493*f*
5. (1997) 8 SCC 191, *Samatha* v. *State of A.P.* 499*d-e*
6. (1976) 4 SCC 108, *Amritlal Nathubhai Shah* v. *Union Govt. of India* 511*e*, 512*a*

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Page 5 Wednesday, October 01, 2025
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The Judgment of the Court was delivered by

K.S.P. RADHAKRISHNAN, J.— Orissa Mining Corpn. (OMC), a State of Orissa undertaking, has approached this Court seeking a writ of certiorari to quash the order passed by the Ministry of Environment and Forests (MoEF) dated 24-8-2010 rejecting the Stage II forest clearance for diversion of 660.749 ha of forest land for mining of bauxite ore in Lanjigarh bauxite mines in Kalahandi and Rayagada Districts of Orissa and also for other consequential reliefs.

2. OMC urged that the above order passed by MoEF has the effect of neutralising two orders of this Court passed in *T.N. Godavarman Thirumulpad (104)* v. *Union of India*[1] dated 23-11-2007 (hereinafter referred to as *Vedanta case*) and the order passed by this Court in *T.N. Godavarman Thirumulpad (106)* v. *Union of India*[2] on 8-8-2008 (hereinafter referred to as *Sterlite case*). In order to examine the issues raised in this writ petition, it is necessary to examine the facts at some length.

Facts

3. M/s Sterlite (parent company of Vedanta) filed an application on 19-3-2003 before MoEF for environmental clearance for the purpose of starting an alumina refinery project (ARP) in Lanjigarh Tehsil of District Kalahandi, stating that no forest land was involved within an area of 10 km. The fourth respondent, Vedanta, in the meanwhile, had also filed an application on 6-3-2004 before this Court seeking clearance for the proposal for use of 723.343 ha of land (including 58.943 ha of reserve forest land) in Lanjigarh Tehsil of District Kalahandi for setting up an alumina refinery. Noticing that forest land was involved, the State of Orissa submitted a proposal dated 16-8-2004 to MoEF for diversion of 58.90 ha of forest land which included 26.1234 ha of forest land for the said ARP and the rest for the conveyor belt and a road to the mining site. The State of Orissa, later, withdrew that proposal.

4. MoEF, as per the application submitted by M/s Sterlite, granted environmental clearance on 22-9-2004 to ARP on 1 million ton per annum capacity of refinery along with 75 MW coal-based CPP at Lanjigarh on 720 ha land, by delinking it with the mining project. Later, on 24-11-2004, the State of Orissa informed MoEF about the involvement of 58.943 ha of forest land in the project as against "nil" mentioned in the environmental clearance and that the Forest Department of Orissa had, on 5-8-2004, issued a show-cause notice to the fourth respondent for encroachment of 10.41 acres of forest land (out of 58.943 ha for which FC clearance proposal was sent) by way of land-breaking and levelling.

5. The State of Orissa, on 28-2-2005 forwarded the proposal to MoEF for diversion of 660.749 ha of forest land for mining bauxite ore in favour of OMC in Kalahandi and Rayagada Districts. The Central Empowered

1 (2008) 2 SCC 222
2 (2008) 9 SCC 711

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Page 6 Wednesday, October 01, 2025
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Committee (CEC), in the meanwhile, addressed a letter dated 2-3-2005 to MoEF stating that pending the examination of the project by CEC, the proposal for diversion of forest land and/or mining be not decided.

6. Vedanta, however, filed an application IA No. 1324 of 2005 before this Court seeking a direction to MoEF to take a decision on the application for forest clearance for bauxite mining submitted by the State Government on 28-2-2005 for the refinery project. The question that was posed by this Court while deciding the abovementioned IA was whether Vedanta should be allowed to set up its refinery project, which involved the proposal for diversion of 58.943 ha of forest land. CEC had, however, objected to the grant of clearance sought by Vedanta on the ground that the refinery would be totally dependent on mining of bauxite from Niyamgiri Hills, Lanjigarh, which was the only vital wildlife habitat, part of which constituted elephant corridor and also on the ground that the said project would obstruct the proposed wildlife sanctuary and the residence of tribes like Dongaria Kondha.

7. The Court on 3-6-2006 directed MoEF to consult the experts/organisations and submit a report. MoEF appointed Central Mining Planning and Design Institute (CMPDI), Ranchi to study the social impact of ground vibration on hydrogeological characteristics, including ground propensity, permeability, flow of natural resources, etc. CMPDI submitted its report on 20-10-2006. MoEF appointed Wildlife Institute of India (WII), Dehradun to study the impact of the mining project on biodiversity. WII submitted its report dated 14-6-2006 and the supplementary report dated 25-10-2006 before MoEF. Reports of CMPDI and WII were all considered by the Forest Advisory Committee (FAC) on 27-10-2006, which after perusing the abovementioned reports, approved the proposal of OMC, for diversion of 660.749 ha of forest land for the mining of bauxite in Kalahandi and Rayagada Districts subject to the conditions laid down by WII.

8. The State of Orissa had brought to the notice of this Court the lack of basic infrastructure facilities in the tribal areas of both the districts, so also the abject poverty in which the local people were living in Lanjigarh Tehsil, including the tribal people, and also the lack of proper housing, hospitals, schools, etc. But this Court was not agreeable to clear the project, at the instance of Vedanta, however, liberty was granted to M/s Sterlite to move the Court if they would agree to comply with the modalities suggested by the Court.

9. Following were the modalities suggested by the Court, while disposing of *Vedanta case*[1] on 23-11-2007: (SCC pp. 227-29, paras 11-12)

> "(*i*) State of Orissa shall float a Special Purpose Vehicle (SPV) for scheduled area development of Lanjigarh Project in which the stakeholders shall be State of Orissa, OMC Ltd. and M/s SIIL. Such SPV shall be incorporated under the Companies Act, 1956. The accounts of

1 *T.N. Godavarman Thirumulpad (104)* v. *Union of India*, (2008) 2 SCC 222

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Page 7 Wednesday, October 01, 2025
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SPV will be prepared by the statutory auditors of OMC Ltd. and they shall be audited by the Auditor General for State of Orissa every year. M/s SIIL will deposit, every year commencing from 1-4-2007, 5% of its annual profits before tax and interest from Lanjigarh Project or Rs 10 crores *whichever is higher* for Scheduled Area Development with the said SPV and it shall be the duty of the said SPV to account for the expenses each year. The annual report of SPV shall be submitted to CEC every year. If CEC finds non-utilisation or misutilisation of funds the same shall be brought to the notice of this Court. While calculating annual profits before tax and interest M/s SIIL shall do so on the basis of the market value of the material which is sold by OMC Ltd. to M/s SIIL or its nominee.

(*ii*) In addition to what is stated above, M/s SIIL shall pay NPV of Rs 55 crores and Rs 50.53 crores towards Wildlife Management Plan for Conservation and Management of Wildlife around Lanjigarh bauxite mine and Rs 12.20 crores towards tribal development. In addition, M/s SIIL shall also bear expenses towards compensatory afforestation.

(*iii*) A statement shall be filed by M/s SIIL with CEC within eight weeks from today stating number of persons who shall be absorbed on permanent basis in M/s SIIL including land-losers. They shall give categories in which they would be permanently absorbed. The list would also show particulars of persons who would be employed by the contractors of M/s SIIL and the period for which they would be employed.

(*iv*) The State Government has the following suggestions on this issue:

(*1*) The user agency shall undertake demarcation of the lease area on the ground using four feet high cement concrete pillars with serial number, forward and back bearings and distance from pillar to pillar.

(*2*) The user agency shall make arrangements for mutation and transfer of equivalent non-forest land identified for compensatory afforestation to the ownership of the State Forest Department.

(*3*) The State Forest Department will take up compensatory afforestation at Project cost with suitable indigenous species and will declare the said area identified for compensatory afforestation as '*protected forest*' under the Orissa Forest Act, 1972 for the purpose of management.

(*4*) The user agency shall undertake *rehabilitation* of Project-affected families, if any, as per the Orissa Rehabilitation and Resettlement Policy, 2006.

(*5*) The user agency shall undertake *phased reclamation* of mined-out area. All overburden should be used for back-filling and reclamation of the mined-out areas.

(*6*) The user agency shall undertake *fencing of the safety zone* area and endeavour for protection as well as regeneration of the said

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Page 8 Wednesday, October 01, 2025
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area. It shall deposit funds with the State Forest Department for the protection and regeneration of the safety zone area.

(*7*) Adequate *soil conservation measures* shall be undertaken by the lessee on the overburdened dumps to prevent contamination of stream flow.

(*8*) The user agency should undertake comprehensive *study on hydrogeology* of the area and the impact of mining on the surrounding water quality and stream flow at regular interval and take effective measures so as to maintain the pre-mining water condition as far as possible.

(*9*) The user agency should undertake a comprehensive study of the wildlife available in the area in association with institutes of repute like Wildlife Institute of India, Dehradun, Forest Research Institute, Dehradun, etc. and shall prepare a *site specific comprehensive wildlife management plan* for conservation and management of the wildlife in the Project impact area under the guidance of the Chief Wildlife Warden of the State.

(*10*) The user agency shall *deposit the NPV* of the forest land sought for diversion for undertaking mining operations.

(*11*) The user agency shall prepare a comprehensive plan for the *development of tribals* in the Project impact area taking into consideration their requirements for health, education, communication, recreation, livelihood and cultural lifestyle.

(*12*) As per the policy of the State Government, the user agency shall earmark *5% of the net profit* accrued in the Project to be spent for the development of health, education, communication, irrigation and agriculture of the said scheduled area within a radius of 50 km.

(*13*) *Controlled blasting* may be used only in exigencies wherever needed to minimise the impact of noise on wildlife of the area.

(*14*) The user agency shall undertake *development of greenery* by way of plantation of suitable indigenous species in all vacant areas within the Project.

(*15*) *Trees shall be felled from* the diverted area *only when it is necessary* with the strict supervision of the State Forest Department at the cost of the Project.

(*16*) The forest land diverted shall be *non-transferable*. Whenever the forest land is not required, the same shall be surrendered to the State Forest Department under intimation to Ministry of Environment and Forests, Government of India.

If M/s SIIL, State of Orissa and OMC Ltd. jointly agree to comply with the above rehabilitation package, this Court may consider granting of clearance to the Project.

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Conclusion

12. If M/s SIIL is agreeable to the aforestated rehabilitation package then they shall be at liberty to move this Court by initiating a proper application. This Court is not against the Project in principle. It only seeks safeguards by which we are able to protect nature and subserve development. IAs are disposed of accordingly. However, we once again reiterate that the applications filed by M/s VAL stand dismissed."

(emphasis in original)

The Court opined that if Sterlite, State of Orissa and OMC jointly agree to comply with the "Rehabilitation Package", the Court might consider granting clearance to the project. Stating so, all the applications were disposed of, the order of which is reported in *T.N. Godavarman Thirumulpad (104)* v. *Union of India*[1].

10. M/s Sterlite, third respondent herein, then moved an application being IA No. 2134 of 2007 before this Court, followed by affidavits, wherein it was stated that M/s Sterlite, State of Orissa and OMC had unconditionally accepted the terms and conditions and modalities suggested by this Court under the caption "Rehabilitation Package" in its earlier order dated 23-11-2007[1]. Siddharth Nayak, who was the petitioner in WP No. 549 of 2007, then filed Review Petition No. 100 of 2008 and sought review of the order dated 23-11-2007[1] passed by this Court stating that this Court had posed a wrong question while deciding IA No. 2134 of 2007 and pointed out that alumina refinery was already set up by Vedanta and production had commenced and the principal question which came up before this Court was with regard to the ecological and cultural impact of mining in Niyamgiri Hills. Further, it was also pointed out that if Sterlite was allowed to mine in Niyamgiri Hills, it would affect the identity, culture and other customary rights of Dongaria Kondh. Review petition was, however, dismissed by this Court on 7-5-2008[3].

11. This Court then passed the final order in *Sterlite case*[2] on 8-8-2008, the operative portion of which reads as follows: (SCC p. 718, para 13)

"*13*. For the above reasons and in the light of the affidavits filed by SIIL, OMCL and the State of Orissa, accepting the rehabilitation package, suggested in our order dated 23-11-2007[1], we hereby grant clearance to the forest diversion proposal for diversion of 660.749 ha of forest land to undertake bauxite mining on Niyamgiri Hills in Lanjigarh. The next step would be for MoEF to grant its approval in accordance with law."

12. MoEF, later, considered the request of the State of Orissa dated 28-2-2005 seeking prior approval of MoEF for diversion of 660.749 ha of forest land for mining of bauxite ore in Lanjigarh bauxite mines in favour of

1 (2008) 2 SCC 222

3 *T.N. Godavarman Thirumulpad* v. *Union of India*, Review Petition No. 100 of 2008 in WP (C) No. 549 of 2007, order dated 7-5-2008 (SC)

2 *T.N. Godavarman Thirumulpad (106)* v. *Union of India*, (2008) 9 SCC 711

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Page 10 Wednesday, October 01, 2025
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OMC, in accordance with Section 2 of the Forest (Conservation) Act, 1980. MoEF, after considering the proposal of the State Government and referring to the recommendations of FAC dated 27-10-2006, agreed in principle for diversion of the abovementioned forest land, subject to various conditions which are as follows:

12.1. Compensatory afforestation shall be raised over non-forest land, equal in extent to the forest land proposed to be diverted, at the project cost. The user agency shall transfer the cost of compensatory afforestation to the State Forest Department.

12.2. The non-forest land identified for compensatory afforestation shall be declared as reserved forests under the Forest Act, 1927.

12.3. The user agency shall create fence and maintain a safety zone around the mining area. The user agency will deposit fund with the Forest Department for creation, protection and regeneration of safety zone area and also will have to bear the cost of afforestation over one-and-a-half times of the safety zone area in degraded forest elsewhere.

12.4. The reclamation of mines shall be carried out concurrently and should be regularly monitored by the State Forest Department.

12.5. RCC pillars of 4 ft height shall be erected by the user agency at the project cost to demarcate the area and the pillars will be marked with forward and back bearings.

12.6. The State Government shall charge net present value (NPV) from the user agency for the entire diverted forest land, as directed by the Hon'ble Supreme Court and as per the guidelines issued vide Ministry of Environment and Forests Letter No. 5-1/98-FC(Pt.II) dated 18-9-2003 and 22-9-2003.

12.7. As per the Hon'ble Supreme Court's orders dated 23-11-2007[1] and 8-8-2008[2], M/s SIIL shall pay NPV of Rs 55 crores.

12.8. An undertaking from the user agency shall also be obtained stating that in case the rates of NPV are revised upwards, the additional/differential amount shall be paid by the user agency.

12.9. As per the Hon'ble Supreme Court's orders dated 23-11-2007[1] and 8-8-2008[2], M/s SIIL shall pay Rs 50.53 crores towards Wildlife Management Plan for Conservation and Management of Wildlife around Lanjigarh bauxite mine.

12.10. As per the Hon'ble Supreme Court's orders dated 23-11-2007[1] and 8-8-2008[2], M/s SIIL is required to contribute Rs 12.20 crores towards tribal development apart from payment of NPV and apart from contribution to the management of wildlife around Lanjigarh bauxite mine. Moreover, while allocating CAMPA Funds the said amount of Rs 12.20 crores shall be earmarked specifically for tribal development.

1 *T.N. Godavarman Thirumulpad (104)* v. *Union of India*, (2008) 2 SCC 222
2 *T.N. Godavarman Thirumulpad (106)* v. *Union of India*, (2008) 9 SCC 711

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Page 11 Wednesday, October 01, 2025
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12.11. The State Government shall deposit all the funds with the ad hoc body of the Compensatory Afforestation Fund Management and Planning Authority (CAMPA) in Account No. CA 1585 of Corporation Bank (a Government of India enterprise), Block II, Ground Floor, CGO Complex, Phase I, Lodhi Road, New Delhi 110 003, as per the instructions communicated vide Letter No. 5-2/2006-PC dated 20-5-2006.

12.12. As per the Hon'ble Supreme Court's orders dated 23-11-2007[1] and 8-8-2008[2], M/s SIIL shall deposit 5% of its annual profits before tax and interest from Lanjigarh Project of Rs 10 crores, whichever is higher as contribution for scheduled area development. The contribution is to be made every year commencing from 1-4-2007. The State of Orissa shall float a special purpose vehicle (SPV) for scheduled area development of Lanjigarh Project in which the stakeholders shall be State of Orissa, OMC Ltd. and M/s SIIL. Such SPV shall be incorporated under the Companies Act, 1956. The accounts of SPC shall be prepared by the statutory auditors of OMC Ltd. and they shall be audited by the Auditor General for the State of Orissa every year.

12.13. The permission granted under the FC Act shall be coterminous with the mining lease granted under the MMDR Act or any other relevant Act.

12.14. Tree felling shall be done in a phased manner to coincide with the phasing of area to be put to mining with a view to minimising clear felling. The felling will always be carried out under strict supervision of the State Forest Department.

12.15. All efforts shall be made by the user agency and the State Government to prevent soil erosion and pollution of rivers/nallas/streams, etc.

12.16. The Wildlife Management Plan (WMP) shall be modified accordingly as suggested by Wildlife Institute of India (WII), Dehradun and shall be implemented by the State Government/user agency at the project cost. The progress of implementation of WMP shall be regularly monitored by WII and Regional Office, Bhubaneshwar.

12.17. Any other condition that CCF (Central), Regional Office, Bhubaneshwar/State Forest Department may impose from time to time for protection and improvement of flora and fauna in the forest area, shall also be applicable.

12.18. All other provisions under different Acts, rules and regulations including environmental clearance shall be complied with before transfer of forest land.

12.19. The lease will remain in the name of Orissa Mining Corpn. (OMCL) and if any change has to be done, it will require prior approval of the Central Government as per guidelines.

1 *T.N. Godavarman Thirumulpad (104)* v. *Union of India*, (2008) 2 SCC 222

2 *T.N. Godavarman Thirumulpad (106)* v. *Union of India*, (2008) 9 SCC 711

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Page 12 Wednesday, October 01, 2025
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12.20. The present forest clearance will be subject to the final outcome of Writ Petition No. 202 of 1995 from the Hon'ble Supreme Court and the Court's orders dated 23-11-2007[1] and 8-8-2008[2].

12.21. Other standard conditions as applicable to proposals related to mining shall apply in the instant case also.

13. MoEF, then, vide its Letter dated 11-12-2008 informed the State of Orissa that it had, in principle, agreed for diversion of 660.749 ha of forest land for mining bauxite in favour of OMC, subject to fulfilment of the abovementioned conditions, and after getting the compliance report from the State Government. Order dated 11-12-2008 was slightly modified on 31-12-2008. It was further ordered that the transfer of forest land to the user agency should not be effected by the State Government till formal orders approving diversion of forest land were issued.

14. MoEF then granted environmental clearance to OMC vide its proceedings dated 28-4-2009 subject to various conditions including the following conditions:

> "(*iii*) Environmental clearance is subject to grant of forestry clearance. Necessary forestry clearance under the Forest (Conservation) Act, 1980 for diversion of 672.018 ha forest land involved in the project shall be obtained before starting mining operation in that area. No mining shall be undertaken in the forest area without obtaining requisite prior forestry clearance."

15. The State Government then forwarded the final proposal to MoEF vide its Letter dated 10-8-2009 stating that the user agency had complied with all the conditions stipulated in the Letter of MoEF dated 11-12-2008. On the Forest Rights Act, the government letter stated as follows:

> "*Provisions of Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006*
>
> The Government of India, MoEF vide their Letter dated 28-4-2009 have accorded environmental clearance to Lanjigarh Bauxite Mining Project. This letter of the Government of India, MoEF puts on record that there is no habitation in the mining lease area on the plateau top and no resettlement and rehabilitation is involved. Public hearing for the project was held on 7-2-2003 for Kalahandi District and on 17-3-2003 for Rayagada District. In both the cases, the project has been recommended. Copies of the public hearing proceedings have already been submitted to the Government of India, MoEF along with forest diversion proposal. This project was also challenged in the Hon'ble Supreme Court of India on the ground that it violates the provisions of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006. WP (C) No. 549 of 2007 was filed in the Hon'ble Supreme Court of India by one Shri Siddharth Nayak challenging the project on the above issue. After examining different aspects of the writ petition in IAs Nos. 2081-82 in WP (C) No. 549 of 2007, the Hon'ble Supreme Court of India had cleared the project by way of disposing of the

1 *T.N. Godavarman Thirumulpad (104)* v. *Union of India*, (2008) 2 SCC 222
2 *T.N. Godavarman Thirumulpad (106)* v. *Union of India*, (2008) 9 SCC 711

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Page 13 Wednesday, October 01, 2025
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writ petition vide their order dated 23-11-2007[1]. Subsequently, the Hon'ble Supreme Court had finally cleared the project vide their order dated 8-8-2008[2]. In view of the above position and orders of the Hon'ble Supreme Court of India, no further action in this regard is proposed."

16. The State of Orissa's final proposal was then placed before FAC on 4-11-2009. FAC recommended that the final clearance would be considered only after ascertaining of the community rights on forest land and after the process for establishing such rights under the Forest Rights Act was completed. FAC also decided to constitute an expert group to carry out a site inspection. Consequently, on 1-1-2010, a three-member team composed of Dr Usha Ramanathan and two others, was constituted to consider and make recommendations to MoEF on the proposal submitted by OMC. The team carried out the site inspection during the months of January and February 2010 and submitted three individual reports to MoEF on 25-2-2010 which were not against the project as such, but suggested an in-depth study on the application of the Forest Rights Act. FAC also, on 16-4-2010, considered all the three reports and recommended that a Special Committee, under the Ministry of Tribal Affairs, be constituted to look into the issues relating to the violation of tribal rights and the settlement of forest rights under the Forest Rights Act.

17. MoEF then met on 29-6-2010 and decided to constitute a team composed of specialists to look into the settlement of rights on forest dwellers and the "primitive tribal groups" under the Forest Rights Act and the impact of the project on wildlife and biodiversity in the surrounding areas. Consequently, a four-member Committee was constituted, headed by Dr Naresh Saxena to study and assess the impacts of various rights and to make a detailed investigation. The Committee, after conducting several site visits and making detailed enquiries submitted its report to MoEF on 16-8-2010.

18. The State Government then submitted their written objection on 17-8-2010 to MoEF on the Saxena Committee Report and requested that an opportunity of hearing be given to it before taking any decision on the report. MoEF, however, called a meeting of FAC on 20-8-2010 and placed the Saxena Committee Report before FAC, for consideration. The minutes of the Committee meeting were released on 23-8-2010, stating that the primitive tribal groups were not consulted in the process of seeking project clearance and also noticed the violation of the provisions of the Forest Rights Act, the Forest (Conservation) Act, 1980, the Environment (Protection) Act, 1986 and also the impact on ecological and biodiversity values of Niyamgiri Hills upon which Dongaria Kondh and Kutia Kondh depend. FAC opined that it was a fit case for applying the precautionary principle to obviate the irreparable damage to the affected people and recommended for the temporary withdrawal of the In-principle/Stage I approval accorded. FAC recommended that the State Government be heard before a final decision is taken by MoEF.

1 *T.N. Godavarman Thirumulpad (104)* v. *Union of India*, (2008) 2 SCC 222

2 *T.N. Godavarman Thirumulpad (106)* v. *Union of India*, (2008) 9 SCC 711

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Page 14 Wednesday, October 01, 2025
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19. The recommendations of FAC dated 23-8-2010 and the Saxena Committee Report were considered by MoEF and the request for Stage II clearance was rejected on 24-8-2010, stating as follows:

"*VIII. Factors dictating decision on Stage II clearance*

I have considered three broad factors while arriving at my decision.

1. The violation of the rights of the tribal groups including the primitive tribal groups and the Dalit population

The blatant disregard displayed by the project proponents with regard to rights of the tribals and primitive tribal groups dependent on the area for their livelihood, as they have proceeded to seek clearance is shocking. Primitive tribal groups have specifically been provided for in the Forest Rights Act, 2006 and this case should leave no one in doubt that they will enjoy full protection of their rights under the law. The narrow definition of the project affected people by the State Government runs contrary to the letter and spirit of the Forest Rights Act, 2006. Simply because they did not live on the hills does not mean that they have no rights there. The Forest Rights Act, 2006 specifically provides for such rights but these were not recognised and were sought to be denied.

Moreover, the fate of the primitive tribal groups need some emphasis, as very few communities in India in general and Orissa in particular come under the ambit of such a category. Their dependence on the forest being almost complete, the violation of the specific protections extended to their 'habitat and habitations' by the Forest Rights Act, 2006 are simply unacceptable.

This ground by itself has to be foremost in terms of consideration when it comes to the grant of forest or environmental clearance. The four-member Committee has highlighted repeated instances of violations.

One also cannot ignore the Dalits living in the area. While they may technically be ineligible to receive benefits under the FRA, 2006, they are such an inextricable part of the society that exists that it would be impossible to disentitle them as they have been present for over five decades. The Committee has also said on p. 40 of their report that 'even if the Dalits have no claims under the FRA the truth of their de facto dependence on Niyamgiri Forests for the past several decades can be ignored by the Central and State Governments only at the cost of betrayal of the promise of inclusive growth and justice and dignity for all Indians'. This observation rings true with MoEF and underscores MoEF's attempt to ensure that any decision taken is not just true to the law in letter but also in spirit.

2. Violations of the Environment (Protection) Act, 1986

(i) Observations of the Saxena Committee and MoEF records

In addition to its findings regarding the settlement of rights under the FRA, 2006, the four-member Committee has also observed, with reference to the environmental clearance granted

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Page 15 Wednesday, October 01, 2025
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for the aluminium refinery, on p. 7 of its report dated 16-8-2010 that:

> 'The company(s) Vedanta Alumina Ltd. has already proceeded with construction activity for its enormous expansion project that would increase its capacity sixfold from 1 Mtpa to 6 Mtpa without obtaining environmental clearance as per the provisions of the EIA Notification, 2006 under the EPA. This amounts to a serious violation of the provisions of the Environment (Protection) Act. This expansion, its extensive scale and advanced nature, is in complete violation of EPA and is an expression of the contempt with which this company treats the laws of the land.'

I have reviewed the records of MoEF and have found no documentation which establishes such activity to have been granted clearance. Nor is there any evidence to suggest that such requirement was waived by the Ministry. The TORs for the expansion of the project from 1 million tonnes to 6 million tonnes were approved in March 2008. No further right has been granted in any form by the Ministry to the project proponents to proceed with the expansion. While any expansion without prior EC is a violation of the EIA Notification/EPA, 1986 this, itself, is not a minor expansion and is therefore a most serious transgression of EPA, 1986.

There also appear to have been other acts of violation that emerge from a careful perusal of the evidence at hand. This is not the first act of violation. On 19-3-2003 M/s Sterlite filed an application for environmental clearance from MoEF for the refinery. In the application it was stated that no forest land is involved in the project and that there was no reserve forest within a radius of 10 km of the project site.

Thereafter on 22-9-2004, environmental clearance was granted by MoEF for the refinery project. While granting the environmental clearance, MoEF was unaware of the fact that the application for forest clearance was also pending since the environmental clearance letter clearly stated that no forest land was involved in the project.

In March 2005, in proceedings before itself, the Central Empowered Committee (CEC) too questioned the validity of the environmental clearance granted by MoEF and requested the Ministry to withhold the forest clearance on the project till the issue is examined by CEC and report is submitted to the Hon'ble Supreme Court.

(*ii*) *Case before MEAA by Dongaria Kondhs*

After the grant of environment clearance, the local tribals and other persons concerned including Dongaria Kondhs challenged the project before the National Environment Appellate Authority (NEAA). (*Kumati Majhi* v. *Ministry of Environment and Forest*, *Srabbu Sikka* v. *Ministry of Environment and Forests*, *R. Sreedhar* v. *Ministry of Environment and Forest*, *Prafulla Samantara* v. *Ministry of Environment and Forests* Appeals Nos. 18, 19, 20 and 21 of 2009).

SCC Online Web Edition, © 2025 EBC Publishing Pvt. Ltd.
Page 16 Wednesday, October 01, 2025
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It is brought to my attention that this is the first time that Dongaria Kondhs have directly challenged the project in any court of law. The appeals highlighted the several violations in the environmental clearance process. Some of the key charges raised were that the full environmental impact assessment report was not made available to the public before the public hearing, different EIA reports were made available to the public and submitted to the Ministry of Environment and Forests, EIA conducted was a rapid EIA undertaken during the monsoon months. The matter is reserved for judgment before NEAA.

(*iii*) *Monitoring Report of the Eastern Regional Office dated 25-5-2010*

On 25-5-2010, Dr V.P. Upadhyay (Director 'S') of the Eastern Regional Office of the Ministry of Environment and Forests submitted his report to MoEF which listed various violations in Para 2 of the Monitoring Report. They observed:

> (*a*) 'M/s Vedanta Alumina Ltd. has already proceeded with construction activity for expansion project without obtaining environmental clearance as per the provisions of the EIA Notification, 2006 that amounts to violation of the provisions of the Environment (Protection) Act.
>
> (*b*) The project has not established piezometers for monitoring of ground water quality around red mud and ash disposal ponds; thus, Condition 5 of the specific conditions of the clearance letter is being violated.
>
> (*c*) Condition II of the general conditions of environmental clearance has been violated by starting expansion activities without prior approval from the Ministry.'

Furthermore all bauxite for the refinery was to be sourced from mines which have already obtained environmental clearance. The report listed 14 mines from which bauxite was being sourced by the project proponents. However, out of these 11 had not been granted a mining licence while 2 had only received TORs and only 1 had received clearance.

3. Violations under the Forest (Conservation) Act

The Saxena Committee has gone into great detail highlighting the various instances of violations under the Forest (Conservation) Act, 1980. All these violations coupled with the resultant impact on the ecology and biodiversity of the surrounding area further condemn the actions of the project proponent. Not only are these violations of a repeating nature but they are instances of wilful concealment of information by the project proponent.

IX. The decision on Stage II clearance

The Saxena Committee's evidence as reviewed by FAC and read by me as well is compelling. The violations of the various legislations, especially the Forest (Conservation) Act, 1980, the Environment

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Page 17 Wednesday, October 01, 2025 100
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(Protection) Act, 1986, and the Scheduled Tribes and Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, appear to be too egregious to be glossed over. Furthermore, a mass of new and incriminating evidence has come to light since the Apex Court delivered its judgment on 8-8-2008[2]. Therefore, after careful consideration of the facts at hand, due deliberation over all the reports submitted and while upholding the recommendation of FAC, I have come to the following conclusions:

1. The Stage II forest clearance for OMC and Sterlite bauxite mining project on Niyamgiri Hills in Lanjigarh, Kalahandi and Rayagada Districts of Orissa cannot be granted. Stage II forest clearance therefore stands rejected.

2. Since forest clearance is being rejected, the environmental clearance for this mine is inoperable.

3. It appears that the project proponent is sourcing bauxite from a large number of mines in Jharkhand for the one million tonne alumina refinery and are not in possession of valid environmental clearance. This matter is being examined separately.

4. Further, a show-cause notice is being issued by MoEF to the project proponent as to why the environmental clearance for the one million tonnes per annum alumina refinery should not be cancelled.

5. A show-cause notice is also being issued to the project proponent as to why the terms of reference (TOR) for the EIA report for the expansion from one million tons to six million tons should not be withdrawn. Meanwhile, the TOR and the appraisal process for the expansion stands suspended.

Separately MoEF is in the process of examining what penal action should be initiated against the project proponents for the violations of various laws as documented exhaustively by the Saxena Committee.

On the issues raised by the Orissa State Government, I must point out that while customary rights of the primitive tribal groups are not recognised in the National Forest Policy, 1988 they are an integral part of the Forest Rights Act, 2006. An Act passed by Parliament has greater sanctity than a policy statement. This is apart from the fact that the Forest Rights Act came into force eighteen years after the National Forest Policy. On the other points raised by the State Government officials, on the procedural aspects of the Forest Rights Act, 2006, I expect that the Joint Committee set up by MoEF and the Ministry of Tribal Affairs would give them due consideration. The State Government officials were upset with the observations made by the Saxena Committee on their role in implementing the Forest Rights Act, 2006. Whether the State Government officials have connived with the violations is a separate issue and is not relevant to my decision. I am prepared to believe that the State Government officials were attempting to discharge their obligations to the best of their abilities and with the best of intentions. The State Government could well contest many of the observations made by the Saxena Committee. But this will not

2 *T.N. Godavarman Thirumulpad (106)* v. *Union of India*, (2008) 9 SCC 711

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Page 18 Wednesday, October 01, 2025
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fundamentally alter the fact that serious violations of various laws have indeed taken place.

The primary responsibility of any Ministry is to enforce the laws that have been passed by Parliament. For MoEF, this means enforcing the Forest (Conservation) Act, 1980, the Environment (Protection) Act, 1986, the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 and other laws. It is in this spirit that this decision has been taken."

The Order dated 24-8-2010 was communicated by MoEF to the State of Orissa vide its Letter dated 30-8-2010; the legality of those orders are the subject-matter of this writ petition.

20. Shri K.K. Venugopal, learned Senior Counsel appearing for OMC, referred to the earlier judgments of this Court in *Vedanta*[1] as well as *Sterlite*[2] and submitted that those judgments are binding on the parties with regard to the various questions raised and decided and also to the questions which ought to have been raised and decided. The learned Senior Counsel also pointed out that MoEF itself, after the abovementioned two judgments, had accorded Stage I clearance vide its proceeding dated 11-12-2008 and that the State of Orissa vide its Letter dated 10-8-2009 had informed MoEF of the compliance with the various conditions stipulated in Stage I clearance dated 11-12-2008. Consequently, there is no impediment in MoEF granting Stage II clearance for the project.

21. The learned Senior Counsel also submitted that the reasons stated by FAC as well as the Saxena Committee are all untenable and have nothing to do with the Bauxite Mining Project (BMP) undertaken by OMC. The learned Senior Counsel also submitted that the constitution of, initially, a three-member committee and, later, a four-member committee, was intended only to cancel the Stage I clearance granted to the BMP in compliance with the judgment of this Court. The learned counsel also pointed out that the claim under the Forest Rights Act was also raised by Siddharth Nayak through a review petition, which was also rejected by this Court on 7-5-2008[3]. Consequently, it would not be open to the parties to again raise the issues which fall under the Forest Rights Act.

22. Shri C.A. Sundaram, learned Senior Counsel appearing for the State of Orissa, submitted that various reasons stated by MoEF for rejecting Stage II clearance are unsustainable in law as well as on facts. The learned Senior Counsel pointed out that the reasons stated by the Saxena Committee as well as MoEF alleging violation of the Environment (Protection) Act, 1986, are totally unrelated to the BMP. The learned Senior Counsel pointed out that alumina refinery is an independent project and the violation, if any, in respect of the same ought not to have been relevant criteria for the

1 *T.N. Godavarman Thirumulpad (104)* v. *Union of India*, (2008) 2 SCC 222
2 *T.N. Godavarman Thirumulpad (106)* v. *Union of India*, (2008) 9 SCC 711
3 *T.N. Godavarman Thirumulpad* v. *Union of India*, Review Petition No. 100 of 2008 in WP (C) No. 549 of 2007, order dated 7-5-2008 (SC)

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Page 19 Wednesday, October 01, 2025
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consideration of the grant of Stage II clearance to the BMP, being granted to OMC. Referring to the Monitoring Report of Eastern Regional Office dated 25-5-2010, the learned Senior Counsel pointed out that the findings recorded in that report are referable to the fourth respondent and not to the mining project granted to OMC.

23. The learned Senior Counsel also submitted that the Saxena Committee as well as MoEF has committed a factual error in taking into account the alleged legal occupation of 26.123 ha of village forest lands enclosed within the factory premises which has no connection with regard to the mining project, a totally independent project. The learned Senior Counsel also submitted that in the proposed mining area, there is no human habitation and that the individual habitation rights as well as the community forest resource rights for all villages located on the hill slope of the proposed mining lease area, have already been settled. The learned Senior Counsel also pointed out that the Gram Sabha has received several individual and community claims from Rayagada and Kalahandi Districts and they have settled by giving alternate lands.

24. Shri Sundaram also submitted that the Forest Rights Act deals with individual and community rights of the tribals and which does not, in any manner, expressly or impliedly, make any reference to the religious or spiritual rights protected under Articles 25 and 26 of the Constitution of India and does not extend to the property rights. The learned Senior Counsel also submitted that the State Government continues to maintain and have ownership over the minerals and deposits beneath the forests and such rights have not been taken away by the Forest Rights Act and neither the Gram Sabha nor the tribals can raise any ownership rights on minerals or deposits beneath the forest land.

25. Shri C.U. Singh, learned Senior Counsel appearing for the third respondent Sterlite, submitted that various grounds stated in the Saxena Committee Report as well as in the order of MoEF dated 24-8-2010, were urged before this Court when *Vedanta*[1] and *Sterlite*[2] cases were decided and, it was following those judgments, that MoEF granted Stage I approval on 11-12-2008 on the basis of the recommendation of FAC. In compliance with Stage I clearance accorded by MoEF, SPV (OMC and Sterlite) undertook various works and completed, the details of the same have been furnished along with the written submissions filed on 21-1-2013. The learned Senior Counsel submitted that the attempt of MoEF is to confuse the issue mixing up the Alumina Refinery Project with that of the Bauxite Mining Project undertaken by Sterlite and OMC through an SPV. The issues relating to expansion of refinery and alleged violation of the Environment (Protection) Act, 1986, the Forest (Conservation) Act, 1980, etc. have nothing to do with the mining project undertaken by OMC and Sterlite. The learned Senior

1 *T.N. Godavarman Thirumulpad (104)* v. *Union of India*, (2008) 2 SCC 222
2 *T.N. Godavarman Thirumulpad (106)* v. *Union of India*, (2008) 9 SCC 711

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Page 20 Wednesday, October 01, 2025
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Counsel, therefore, submitted that the rejection of Stage II clearance by MoEF is arbitrary and illegal.

26. Shri Mohan Parasaran, Solicitor General of India, at the outset, referred to the judgment of this Court in *Sterlite*[2] and placed considerable reliance on para 13 of the judgment and submitted that while granting clearance for the diversion of 660.749 ha of forest land to undertake bauxite mining in Niyamgiri Hills, this Court left it to MoEF to grant its approval in accordance with law. Shri Parasaran submitted that it is in accordance with law that MoEF had constituted two committees and the reports of the committees were placed before FAC, which is a statutory body constituted under Section 3 of the Forest (Conservation) Act. It was submitted that it was on the recommendation of the statutory body that MoEF had passed the impugned order dated 24-8-2010. Further, it was pointed out that, though MoEF had granted Stage I clearance on 11-12-2008, it can still examine as to whether the conditions stipulated for the grant of Stage I clearance had been complied with or not. For the said purpose, two committees were constituted and the Saxena Committee in its report has noticed the violation of various conditions stipulated in Stage I clearance granted by MoEF on 11-12-2008. Shri Parasaran also submitted that the petitioner as well as the third respondent have also violated the provisions of the Forest Rights Act, the violation of which had been specifically noted by the Saxena Committee and accepted by MoEF. Referring to various provisions of the Forest Rights Act under Sections 3(1)(*i*), 3(1)(*e*) and Section 5 of the Act, it was submitted that forest dwellers concerned be treated not merely as right-holders as statutorily empowered with the authority to protect Niyamgiri Hills. Shri Parasaran also pointed out that Section 3(1)(*e*) recognises the right to community tenures of habitat and habitation for "primitive tribal groups" and that Dongaria Kondhs have the right to grazing and the collection of mineral forest of the hills and that they have the customary right to worship the mountains in exercise of their traditional rights, which they would be robbed off if mining is permitted in Niyamgiri Hills.

27. Shri Raj Panjwani, learned Senior Counsel appearing for the applicants in IAs Nos. 4 and 6 of 2012, challenged the environmental clearance granted to OMC on 28-4-2009 by MoEF before the National Environment Appellate Authority (NEAA) under Section 4(1) of the NEAA Act, 1997, by filing Appeals Nos. 20 of 2009 and 21 of 2009 before NEAA. NEAA vide its order dated 15-5-2010 allowed the appeals and remitted the matter to MoEF to revisit the grant of environmental clearance to OMC on 28-4-2009. Later, MoEF by its order dated 11-7-2011 has withdrawn the environmental clearance dated 28-4-2009 granted in favour of OMC and that OMC, without availing of the statutory remedy of the appeal, filed IA No. 2 of 2011 in the present writ petition.

2 *T.N. Godavarman Thirumulpad (106)* v. *Union of India*, (2008) 9 SCC 711

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Page 21 Wednesday, October 01, 2025
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28. Shri Sanjay Parekh, learned counsel appearing for the applicants in IAs Nos. 5 and 6 of 2011, referred to the various provisions of the Forest Rights Act and the Rules and submitted that the determination of rights of Scheduled Tribes (STs)/other traditional forest dwellers (TFDs) have to be done by the Gram Sabha in accordance with the machinery provided under Section 6 of the Act. The learned counsel also submitted that the forest wealth vests in the STs and other TFDs and can be diverted only for the purpose mentioned in Section 3(3). The learned counsel also referred to the Saxena Committee Report and submitted that the report clearly reveals the community rights as well as the various rights and claims of the primitive traditional forest dwellers. The learned counsel also submitted that if the mining is undertaken in Niyamgiri Hills, it would destroy more than 7 sq km of undisturbed forest land on the top of the mountain which is the abode of Dongaria Kondhs and their identity depends on the existence of Niyamgiri Hills.

Judicial evaluation

29. We may, at the outset, point out that there cannot be any doubt that this Court in *Vedanta case*[1] had given liberty to Sterlite to move this Court if they were agreeable to the "suggested rehabilitation package" in the order of this Court, in the event of which it was ordered that this Court might consider granting clearance to the project, but not to Vedanta. This Court in *Vedanta case*[1] had opined that this Court was not against the project in principle, but only sought safeguards by which the Court would be able to protect the nature and subserve development.

30. Sterlite, State of Orissa and OMC then unconditionally accepted the terms and conditions and modalities suggested by this Court in *Vedanta*[1] under the caption "Rehabilitation Package" and they moved this Court by filing IA No. 2134 of 2007 and this Court accepted the affidavits filed by them and granted clearance to the diversion of 660.749 ha of forest land to undertake bauxite mining in Niyamgiri Hills and ordered that MoEF would grant its approval in accordance with law.

31. MoEF, then considered the proposal of the State Government made under Section 2 of the Forest (Conservation) Act, 1980 and also the recommendations of FAC and agreed in principle for the diversion of 660.749 ha of forest land for mining of bauxite ore in Lanjigarh Bauxite Mines in favour of OMC, subject to 21 conditions vide its order 11-12-2008. One of the conditions was with regard to implementation of the Wildlife Management Plan (WMP) suggested by WII and another was with regard to the implementation of all other provisions of different Acts, including environmental clearance, before the transfer of the forest land. Further, it was also ordered that after receipt of the compliance report on fulfilment of the 21 conditions from the State of Orissa, formal approval would be issued under Section 2 of the Forest (Conservation) Act, 1980.

1 *T.N. Godavarman Thirumulpad (104)* v. *Union of India*, (2008) 2 SCC 222

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Page 22 Wednesday, October 01, 2025
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32. MoEF examined the application of OMC for environmental clearance under Section 12 of the EIA Notification, 2006 read with Para 2.1.1(*i*) of the Circular dated 13-10-2006 and accorded environmental clearance for the "Lanjigarh Bauxite Mining Project" to OMC for an annual production capacity of 3 million tonnes of bauxite by opencast mechanised method involving total mining lease area of 721.323 ha, subject to the conditions and environmental safeguards, vide its Letter dated 28-4-2009. 32 special conditions and 16 general conditions were incorporated in that letter. It was ordered that failure to comply with any of the conditions might result in withdrawal of the clearance and attract action under the provisions of the Environment (Protection) Act, 1986. It was specifically stated that the environmental clearance would be subject to grant of forestry clearance and that necessary clearance for diversion of 672.018 ha of forest land involved in the project be obtained before starting operation in that area and that no mining be undertaken in the forest area without obtaining prior forestry clearance. Condition 30 also stipulated that the project proponent shall take all precautionary measures during mining operation for conservation and protection of flora and fauna spotted in the study area and all safeguard measures brought out by WMP prepared specific to the project site and considered by WII shall be effectively implemented. Further, it was also ordered that all the recommendations made by WII for wildlife management be effectively implemented and that the project proponent would also comply with the standards prescribed by the State and the Central Pollution Control Boards. Later, a corrigendum dated 14-7-2009 was also issued by MoEF adding two other conditions—one special condition and another general condition.

33. The State of Orissa vide its Letter dated 10-8-2009 informed MoEF that the user agency had complied with the stipulations of Stage I approval. Specific reference was made point by point to all the conditions stipulated in the Letters of MoEF dated 11-12-2008 and 30-12-2008 and, in conclusion, the State Government has stated in their letter as follows:

> "In view of the above position of compliance with the user agency to the direction of the Hon'ble Supreme Court of India dated 8-8-2008[2] and stipulations of the Government of India, MoEF vide their Stage I approval Order dated 30-12-2008, the compliance is forwarded to the Government of India, MoEF to kindly examine the same and take further necessary steps in matters of according final approval for diversion of 660.749 ha of forest land for the project under Section 2 of the Forest (Conservation) Act, 1980."

34. MoEF, it is seen, then placed the Letter of the State Government dated 10-8-2008 before FAC and FAC on 4-11-2009 recommended that the final clearance be considered only after ascertaining the community rights of forest land and after the process for establishing such rights under the Forest Rights Act is completed. Dr Usha Ramanathan Committee Report was placed before FAC on 16-4-2010 and FAC recommended that a Special Committee

2 *T.N. Godavarman Thirumulpad (106)* v. *Union of India*, (2008) 9 SCC 711

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Page 23 Wednesday, October 01, 2025
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under the Ministry of Tribal Affairs be constituted to look into the issue relating to violation of tribal rights and the settlement of various rights under the Forest Rights Act, which led, as already indicated, to the constitution of the Saxena Committee Report, based on which MoEF passed the impugned order dated 24-8-2010.

35. FAC, in its meeting, opined that the final clearance under the Forest (Conservation) Act would be given, only after ascertaining the "community rights" on forest land and after the process of establishing such rights under the Forest Rights Act. After perusing the Usha Ramanathan Committee Report, FAC on 16-4-2010 recommended that a Special Committee be constituted to look into the issues relating to the alleged violation of rights under the Forest Rights Act. MoEF, then on 29-6-2010 constituted the Saxena Committee and the Committee after conducting an enquiry submitted its report which was placed before FAC on 20-8-2010 and FAC noticed prima facie violation of the Forest Rights Act and the Forest (Conservation) Act.

36. The petitioner has assailed the order of MoEF dated 24-8-2010 as an attempt to reopen matters that had obtained finality. Further, it is also submitted that the order wrongly cites the violation of certain conditions of environmental clearance by the "Alumina Refinery Project" as grounds for denial of Stage II clearance to OMC for its "Bauxite Mining Project". The contention is based on the premise that the two projects are totally separate and independent of each other and the violation of any statutory provision or a condition of environmental clearance by one cannot be a relevant consideration for grant of Stage II clearance to the other.

37. The petitioner's assertion that the Alumina Refinery Project and the Bauxite Mining Project are two separate and independent projects, cannot be accepted as such, since there are sufficient materials on record to show that the two projects make an integrated unit. In the two earlier orders of this Court (in *Vedanta case*[1] and *Sterlite case*[2]) also the two projects are seen as comprising a single unit. Quite contrary to the case of the petitioner, it can be strongly argued that the Alumina Refinery Project and the Bauxite Mining Project are interdependent and inseparably linked together and, hence, any wrongdoing by the Alumina Refinery Project may cast a reflection on the Bauxite Mining Project and may be a relevant consideration for denial of Stage II clearance to the Bauxite Mining Project. In this judgment, however, we do not propose to make any final pronouncement on that issue but we would keep the focus mainly on the rights of the Scheduled Tribes and the "Traditional Forest Dwellers" under the Forest Rights Act.

STs and TFDs

38. Scheduled Tribe, as such, is not defined in the Forest Rights Act, but the words "Traditional Forest Dweller" has been defined under Section 2(*o*) as any member or community who has at least three generations prior to the 13th day of December, 2005 primarily resided in and who depends on the

1 *T.N. Godavarman Thirumulpad (104)* v. *Union of India*, (2008) 2 SCC 222
2 *T.N. Godavarman Thirumulpad (106)* v. *Union of India*, (2008) 9 SCC 711

SCC Online Web Edition, © 2025 EBC Publishing Pvt. Ltd.
Page 24 Wednesday, October 01, 2025
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forest or forests land for bona fide livelihood needs. Article 366(25) of the Constitution states that STs mean such tribes or tribal communities or parts of or groups within such tribes or tribal communities as are defined under Article 342 to be the Scheduled Tribes. The President of India, in exercise of the powers conferred by clause (1) of Article 342 of the Constitution, has made the Constitution (Scheduled Tribes) Order, 1950. Part XII of the Order refers to the State of Orissa. Serial No. 31 refers to Dongaria Kondh, Kutia Kandha, etc.

39. Before we examine the scope of the Forest Rights Act, let us examine, how the rights of indigenous people are generally viewed under our Constitution and the various international conventions.

Constitutional rights and International Conventions

40. Article 244(1) of the Constitution of India which appears in Part X provides that the administration of the Scheduled Areas and Scheduled Tribes in States (other than Assam, Meghalaya and Tripura) shall be according to the provisions of the Fifth Schedule and clause (2) states that the Sixth Schedule applies to the tribal areas in Assam, Meghalaya, Tripura and Mizoram. Evidently, the object of the Fifth Schedule and the Regulations made thereunder is to preserve tribal autonomy, their cultures and economic empowerment to ensure social, economic and political justice for the preservation of peace and good governance in the scheduled area. This Court in *Samatha* v. *State of A.P.*[4] ruled that all relevant clauses in the Schedule and the Regulations should harmoniously and widely be read as to elongate the constitutional objectives and dignity of person to the Scheduled Tribes and ensuring distributive justice as an integral scheme thereof. The Court noticed that: (SCC p. 215, para 10)

> "*10*. Agriculture is the only source of livelihood for the Scheduled Tribes apart, from collection and sale of minor forest produce to supplement their income. Land is their most important natural and valuable asset and imperishable endowment from which the tribals derive their sustenance, social status, economic and social equality, permanent place of abode, work and living. … [Consequently], the tribes too have great emotional attachment to their lands."

41. Part B of the Fifth Schedule [Article 244(1)] speaks of the administration and control of Scheduled Areas and Scheduled Tribes. Para 4 thereof speaks of the Tribes Advisory Council. The Tribes Advisory Council used to exercise the powers for those Scheduled Areas where Panchayat Raj system had not been extended. By way of the Constitution (73rd Amendment) Act, 1992, Part IX was inserted in the Constitution of India. Article 243-B of Part IX of the Constitution mandated that there shall be panchayats at village, intermediate and district levels in accordance with the provisions of that Part. Article 243-C of Chapter IX refers to the composition of panchayats. Article 243-M(4)(*b*) states that Parliament may, by law, extend

4 (1997) 8 SCC 191

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Page 25 Wednesday, October 01, 2025
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the provisions of Part IX to the Scheduled Areas and the tribal areas and to work out the modalities for the same.

42. The Central Government appointed the Bhuria Committee to undertake a detailed study and make recommendations as to whether the Panchayat Raj system could be extended to Scheduled Areas. The Committee submitted its report on 17-1-1995 and favoured democratic decentralisation in Scheduled Areas. Based on the recommendations, the Provisions of the Panchayats (Extension to the Scheduled Areas) Act, 1996 (for short "the PESA Act") was enacted by Parliament in the year 1996, extending the provisions of Part IX of the Constitution relating to panchayats to the Scheduled Areas. The Statement of Objects and Reasons of the Act reads as follows:

> "There have been persistent demands from prominent leaders of the Scheduled Areas for extending the provisions of Part IX of the Constitution to these areas so that Panchayati Raj institutions may be established there. Accordingly, it is proposed to introduce a Bill to provide for the extension of the provisions of Part IX of the Constitution to the Scheduled Areas with certain modifications providing that, among other things, the State legislations that may be made shall be in consonance with the customary law, social and religious practices and traditional management practices of community resources;.... The offices of the Chairpersons in the panchayats at all levels shall be reserved for the Scheduled Tribes; the reservations of seats at every panchayat for the Scheduled Tribes shall not be less than one-third of the total number of seats."

43. This Court had the occasion to consider the scope of the PESA Act when the constitutional validity of the proviso to Section 4(*g*) of the PESA Act and few sections of the Jharkhand Panchayat Raj Act, 2001 were challenged in *Union of India* v. *Rakesh Kumar*[5], and this Court upheld the constitutional validity.

44. Section 4 of the PESA Act stipulates that the State legislation on panchayats shall be made in consonance with the customary law, social and religious practices and traditional management practices of community resources:

44.1. Clause (*d*) of Section 4 states that every Gram Sabha shall be competent to safeguard and preserve the traditions and customs of the people, their cultural identity, community resources and the customary mode of dispute resolution.

44.2. Further, it also states in clause (*i*) of Section 4 that the Gram Sabha or the panchayats at the appropriate level shall be consulted before making the acquisition of land in the Scheduled Areas for development projects and before resettling or rehabilitating persons affected by such projects in the Scheduled Areas and that the actual planning and implementation of the projects in the Scheduled Areas, shall be coordinated at the State level.

5 (2010) 4 SCC 50 : (2010) 1 SCC (L&S) 961

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Page 26 Wednesday, October 01, 2025
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44.3. Clause (*k*) of Section 4 states that the recommendations of the Gram Sabha or the panchayats at the appropriate level shall be made mandatory prior to grant of prospecting licence or mining lease for minor minerals in the Scheduled Areas. Panchayat has also endowed with the powers and authority necessary to function as institutions of self-government.

45. The customary and cultural rights of indigenous people have also been the subject-matter of various international conventions. The International Labour Organisation (ILO) Convention on Indigenous and Tribal Populations Convention, 1957 (No. 107) was the first comprehensive international instrument setting forth the rights of indigenous and tribal populations which emphasised the necessity for the protection of social, political and cultural rights of indigenous people. Following that there were two other conventions, the ILO Convention (No. 169) and Indigenous and Tribal Peoples Convention, 1989 and the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), 2007. India is a signatory only to the ILO Convention (No. 107).

46. Apart from giving legitimacy to the cultural rights by the 1957 Convention, the Convention on Biological Diversity (CBA) adopted at the Earth Summit (1992) highlighted the necessity to preserve and maintain knowledge, innovation and practices of the local communities relevant for conservation and sustainable use of biodiversity; India is a signatory to CBA. The Rio Declaration on Environment and Development Agenda 21 and the Forestry Principle also encourage the promotion of customary practices conducive to conservation. The necessity to respect and promote the inherent rights of indigenous peoples which derive from their political, economic and social structures and from their cultures, spiritual traditions, histories and philosophies, especially their rights to their lands, territories and resources have also been recognised by the United Nations in the United Nations Declaration on Rights of Indigenous Peoples. STs and other TFDs residing in the Scheduled Areas have a right to maintain their distinctive spiritual relationship with their traditionally owned or otherwise occupied and used lands.

47. Many of the STs and other TFDs are totally unaware of their rights. They also experience lot of difficulties in obtaining effective access to justice because of their distinct culture and limited contact with mainstream society. Many a times, they do not have the financial resources to engage in any legal actions against development projects undertaken in their abode or the forest in which they stay. They have a vital role to play in the environmental management and development because of their knowledge and traditional practices. The State has got a duty to recognise and duly support their identity, culture and interest so that they can effectively participate in achieving sustainable development.

48. We notice, bearing in mind the above objects, that the Forest Rights Act has been enacted conferring powers on the Gram Sabha constituted under the Act to protect the community resources, individual rights, cultural and religious rights.

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Page 27 Wednesday, October 01, 2025
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The Forest Rights Act

49. The Forest Rights Act was enacted by Parliament to recognise and vest the forest rights and occupation in forest land in forest dwelling STs and other TFDs who have been residing in such forests for generations but whose rights could not be recorded and to provide for a framework for recording the forest rights so vested and the nature of evidence required for such recognition and vesting in respect of forest land. The Act also states that the recognised rights of the forest dwelling STs and other TFDs include the responsibilities and authority for sustainable use, conservation of biodiversity and maintenance of ecological balance and thereby strengthening the conservation regime of the forests while ensuring livelihood and food security of the forest dwelling STs and other TFDs. The Act also noticed that the forest rights on ancestral lands and their habitat were not adequately recognised in the consolidation of State forests during the colonial period as well as in independent India resulting in historical injustice to them, who are integral to the very survival and sustainability of the forest ecosystem.

50. The Statement of Objects and Reasons of the Act states that forest dwelling tribal people and forests are inseparable and that the simplicity of tribals and their general ignorance of modern regulatory framework precluded them from asserting their genuine claims to resources in areas where they belong and depended upon and that only recently that forest management regimes have initiated action to recognise the occupation and other right of the forest dwellers. Of late, we have realised that forests have the best chance to survive if communities participate in their conservation and regeneration measures. The legislature also has addressed the long-standing and genuine felt need of granting a secure and inalienable right to those communities whose right to life depends on right to forests and thereby strengthening the entire conservation regime by giving a permanent stake to the STs dwelling in the forests for generations in symbiotic relationship with the entire ecosystem.

51. We have to bear in mind the above objects and reasons, while interpreting the various provisions of the Forest Rights Act, which is a social welfare or remedial statute. The Act protects a wide range of rights of forest dwellers and STs including the customary rights to use forest land as a community forest resource and not restricted merely to property rights or to areas of habitation.

52. Forest rights of forest dwelling STs and other TFDs are dealt with in Chapter II of the Act. Section 3 of that Chapter lists out what are the forest rights for the purpose of the Act. Following are some of the rights which have been recognised under the Act:

> "**3. (1)(*a*)** right to hold and live in the forest land under the individual or common occupation for habitation or for self-cultivation for livelihood by a member or members of a forest dwelling Scheduled Tribe or other traditional forest dwellers;

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Page 28 Wednesday, October 01, 2025
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(*b*) community rights such as nistar, by whatever name called, including those used in erstwhile Princely States, Zamindari or such intermediary regimes;

(*c*) right of ownership access to collect, use, and dispose of minor forest produce which has been traditionally collected within or outside village boundaries;

(*d*) other community rights of uses or entitlements such as fish and other products of water bodies, grazing (both settled or transhumant) and traditional seasonal resource access of nomadic or pastoralist communities;

(*e*) rights, including community tenures of habitat and habitation for primitive tribal groups and pre-agricultural communities;

(*f*)-(*g*) * * *

(*h*) rights of settlement and conversion of all forest villages, old habitation, unsurveyed villages and other villages in forests, whether recorded, notified, or not, into revenue villages;

(*i*) right to protect, regenerate or conserve or manage any community forest resource which they have been traditionally protecting and conserving for sustainable use;

(*j*) rights which are recognised under any State law or laws of any Autonomous District Council or Autonomous Regional Council or which are accepted as rights of tribals under any traditional or customary law of the tribes concerned of any State;

(*k*) right of access to biodiversity and community right to intellectual property and traditional knowledge related to biodiversity and cultural diversity;

(*l*) any other traditional right customarily enjoyed by the forest dwelling Scheduled Tribes or other traditional forest dwellers, as the case may be, which are not mentioned in clauses (*a*) to (*k*) but excluding the traditional right of hunting or trapping or extracting a part of the body of any species of wild animal;"

53. The above section has to be read along with a definition clause:

53.1. Section 2(*a*) defines "community forest resource" as:

"**2. (*a*) 'community forest resource**' means customary common forest land within the traditional or customary boundaries of the village or seasonal use of landscape in the case of pastoral communities, including reserved forests, protected forests and protected areas such Sanctuaries and National Parks to which the community had traditional access;"

53.2. "Critical wildlife habitat" is defined under Section 2(*b*) of the Act, which reads as follows:

"**2. (*b*) 'critical wildlife habitat**' means such areas of National Parks and Sanctuaries where it has been specifically and clearly established, case by case, on the basis of scientific and objective criteria, that such areas are required to be kept as inviolate for the purposes of wildlife conservation as may be determined and notified by the Central Government in the Ministry of Environment and Forests after open process of consultation by an Expert Committee, which includes experts from the locality appointed by that

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Page 29 Wednesday, October 01, 2025
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Government wherein a representative of the Ministry of Tribal Affairs shall also be included, in determining such areas according to the procedural requirements arising from sub-sections (1) and (2) of Section 4;"

53.3. "Forest dwelling Scheduled Tribes" is defined under Section 2(*c*) of the Act, which reads as follows:

"**2. (*c*) 'forest dwelling Scheduled Tribes'** means the members or community of the Scheduled Tribes who primarily reside in and who depend on the forests or forest lands for bona fide livelihood needs and includes the Scheduled Tribe pastoralist communities;"

53.4. "Forest land" is described under Section 2(*d*), which reads as follows:

"**2. (*d*) 'forest land'** means land of any description falling within any forest area and includes unclassified forests, undemarcated forests, existing or deemed forests, protected forests, reserved forests, sanctuaries and National Parks;"

53.5. "Gram Sabha" is defined under Section 2(*g*), which reads as follows:

"**2. (*g*) 'Gram Sabha'** means a village assembly which shall consist of all adult members of a village and in case of States having no Panchayats, Padas, Tolas and other traditional village institutions and elected village committees, with full and unrestricted participation of women;"

53.6. "Habitat" is defined under Section 2(*h*), which reads as follows:

"**2. (*h*) 'habitat'** includes the area comprising the customary habitat and such other habitats in reserved forests and protected forests of primitive tribal groups and pre-agricultural communities and other forest dwelling Scheduled Tribes;"

53.7. "Scheduled Areas" is described under Section 2(*m*), which reads as follows:

"**2. (*m*) 'Scheduled Areas'** means the Scheduled Areas referred to in clause (1) of Article 244 of the Constitution;"

53.8. "Sustainable use" is described under Section 2(*n*), which reads as follows:

"**2. (*n*) 'sustainable use'** shall have the same meaning as assigned to it in clause (*o*) of Section 2 of the Biological Diversity Act, 2002 (18 of 2003);"

54. Chapter III of the Act deals with recognition, restoration and vesting of forest rights and related matters. Section 4 of that Chapter deals with recognition of, and vesting of, forest rights in forest dwelling STs and other TFDs. Section 5 lists out duties in whom the forest rights vest and also the holders of forest rights empowers them to carry out duties. Those duties include preservation of habitat from any form of destructive practices affecting their cultural and natural heritage.

55. The definition clauses read with the abovementioned provisions give emphasis to customary rights, rights to collect, use and dispose of minor forest produce, community rights like grazing cattle, community tenure of habitat and habitation for primitive tribal groups, traditional rights

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Page 30 Wednesday, October 01, 2025
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customarily enjoyed, etc. Legislative intention is, therefore, clear that the Act intends to protect custom, usage, forms, practices and ceremonies which are appropriate to the traditional practices of forest dwellers.

56. Chapter IV of the Act deals with the authorities and procedure for vesting of forest rights. That Chapter has only one section i.e. Section 6, which has to be read along with the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Rules, 2007 and the Amendment Rules, 2012.

57. The Ministry of Tribal Affairs has noticed several problems which are impeding the implementation of the Act in its letter and spirit. For proper and effective implementation of the Act, the Ministry has issued certain guidelines and communicated to all the States and UTs vide their Letter dated 12-7-2012. The operative portion of the same reads as follows:

"*Guidelines*

(*i*) *Process of recognition of rights*

(*a*) The State Governments should ensure that on receipt of intimation from the Forest Rights Committee, the officials of the Forest and Revenue Departments remain present during the verification of the claims and the evidence on the site.

(*b*) In the event of modification or rejection of a claim by the Gram Sabha or by the Sub-Divisional Level Committee or the District-Level Committee, the decision on the claim should be communicated to the claimant to enable the aggrieved person to prefer a petition to the Sub-Divisional Level Committee or the District-Level Committee, as the case may be, within the sixty days' period prescribed under the Act and no such petition should be disposed of against the aggrieved person, unless he has been given a reasonable opportunity to present his case.

(*c*) The Sub-Divisional Level Committee or the District-Level Committee should, if deemed necessary, remand the claim to the Gram Sabha for reconsideration instead of rejecting or modifying the same, in case the resolution or the recommendation of the Gram Sabha is found to be incomplete or prima facie requires additional examination.

(*d*) In cases where the resolution passed by the Gram Sabha, recommending a claim, is upheld by the Sub-Divisional Level Committee, but the same is not approved by the District-Level Committee, the District-Level Committee should record the reasons for not accepting the recommendations of the Gram Sabha and the Sub-Divisional Level Committee, in writing, and a copy of the order should be supplied to the claimant.

(*e*) On completion of the process of settlement of rights and issue of titles as specified in Annexures II, III and IV of the Rules, the Revenue/ Forest Departments shall prepare a final map of the forest land so vested and the authorities concerned shall incorporate the forest rights so vested

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Page 31 Wednesday, October 01, 2025
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in the Revenue and forest records, as the case may be, within the prescribed cycle of record updation.

(*f*) All decisions of the Sub-Divisional Level Committee and the District-Level Committee that involve modification or rejection of a Gram Sabha resolution/recommendation should be in the form of speaking orders.

(*g*) The Sub-Divisional Level Committee or the District-Level Committee should not reject any claim accompanied by any two forms of evidence, specified in Rule 13, and recommended by the Gram Sabha, without giving reasons in writing and should not insist upon any particular form of evidence for consideration of a claim. Fine receipts, encroacher lists, primary offence reports, forest settlement reports, and similar documentation rooted in prior official exercises, or the lack thereof, would not be the sole basis for rejection of any claim.

(*h*) Use of any technology, such as, satellite imagery, should be used to supplement evidence tendered by a claimant for consideration of the claim and not to replace other evidences submitted by him in support of his claim as the only form of evidence.

(*i*) The status of all the claims, namely, the total number of claims filed, the number of claims approved by the District-Level Committee for title, the number of titles actually distributed, the number of claims rejected, etc. should be made available at the village and panchayat levels through appropriate forms of communications, including conventional methods, such as, display of notices, beat of drum, etc.

(*j*) A question has been raised whether the four hectare limit specified in Section 4(6) of the Act, which provides for recognition of forest rights in respect of the land mentioned in clause (*a*) of sub-section (1) of Section 3 of the Act, applies to other forest rights mentioned in Section 3(1) of the Act. It is clarified that the four hectare limit specified in Section 4(6) applies to rights under Section 3(1)(*a*) of the Act only and not to any other right under Section 3(1), such as conversion of pattas or leases, conversion of forest villages into revenue villages, etc.

(*ii*) *Minor forest produce*

(*a*) The State Government should ensure that the forest rights relating to MFPs under Section 3(1)(*c*) of the Act are recognised in respect of all MFPs, as defined under Section 2(*i*) of the Act, in all forest areas, and State policies are brought in alignment with the provisions of the Act. Section 2(*i*) of the Act defines the term "minor forest produce" to include "all non-timber produce of plant origin, including bamboo, brush wood, stumps, cane, tussar, cocoons, honey, wax, lac, tendu or kendu leaves, medicinal plants and herbs, roots, tubers, and the like".

(*b*) The monopoly of the Forest Corporations in the trade of MFP in many States, especially in case of high value MFP, such as, tendu patta, is against the spirit of the Act and should henceforth be done away with.

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Page 32 Wednesday, October 01, 2025
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(*c*) The forest right-holders or their cooperatives/federations should be allowed full freedom to sell such MFPs to anyone or to undertake individual or collective processing, value addition, marketing, for livelihood within and outside forest area by using locally appropriate means of transport.

(*d*) The State Governments should exempt movement of all MFPs from the purview of the transit rules of the State Government and, for this purpose, the transit rules be amended suitably. Even a transit permit from the Gram Sabha should not be required. Imposition of any fee/charges/royalties on the processing, value addition, marketing of MFP collected individually or collectively by the cooperatives/federations of the right-holders would also be ultra vires the Act.

(*e*) The State Governments need to play the facilitating role in not only transferring unhindered absolute rights over MFP to forest dwelling Scheduled Tribes and other traditional forest dwellers but also in getting them remunerative prices for MFP, collected and processed by them.

(*iii*) *Community rights*

(*a*) The District-Level Committee should ensure that the records of prior recorded *nistari* or other traditional community rights (such as *khatian* Part II in Jharkhand, and traditional forest produce rights in Himachal and Uttarakhand) are provided to Gram Sabhas, and if claims are filed for recognition of such age-old usufructuary rights, such claims are not rejected except for valid reasons, to be recorded in writing, for denial of such recorded rights;

(*b*) The District-Level Committee should also facilitate the filing of claims by pastoralists before the Gram Sabha(s) concerned since they would be a floating population for the Gram Sabha(s) of the area used traditionally.

(*c*) In view of the differential vulnerability of particularly vulnerable tribal groups (PTGs) amongst the forest dwellers, District-Level Committee should play a proactive role in ensuring that all PTGs receive habitat rights in consultation with the PTGs' traditional institutions concerned and their claims for habitat rights are filed before the Gram Sabhas concerned.

(*d*) The forest villages are very old entities, at times of pre-Independent era, duly existing in the forest records. The establishment of these villages was in fact encouraged by the forest authorities in the pre-Independent era for availability of labour within the forest areas. The well-defined record of each forest village, including the area, number of inhabitants, etc. exists with the State Forest Departments. There are also unrecorded settlements and old habitations that are not in any government record. Section 3(1)(*h*) of the Act recognises the right of forest dwelling Scheduled Tribes and other traditional forest dwellers relating to settlement and conversion on forest villages, old habitation,

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Page 33 Wednesday, October 01, 2025
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unsurveyed villages and other villages and forests, whether recorded, notified or not into revenue villages. The conversion of all forest villages into revenue villages and recognition of the forest rights of the inhabitants thereof should actually have been completed immediately on enactment of the Act. The State Governments may, therefore, convert all such erstwhile forest villages, unrecorded settlements and old habitations into revenue villages with a sense of urgency in a time-bound manner. The conversion would include the actual land use of the village in its entirety, including lands required for current or future community uses, like, schools, health facilities, public spaces, etc. Records of the forest villages maintained by the Forest Department may thereafter be suitably updated on recognition of this right.

(*iv*) *Community forest resource rights*

(*a*) The State Government should ensure that the forest rights under Section 3(1)(*i*) of the Act relating to protection, regeneration or conservation or management of any community forest resource, which forest dwellers might have traditionally been protecting and conserving for sustainable use, are recognised in all villages and the titles are issued as soon as the prescribed forms for claiming rights to community forest resource and the form of title for community forest resources are incorporated in the Rules. Any restriction, such as, time-limit, on use of community forest resources other than what is traditionally imposed would be against the spirit of the Act.

(*b*) In case no community forest resource rights are recognised in a village, the reasons for the same should be recorded. Reference can be made to existing records of community and joint forest management, van panchayats, etc. for this purpose.

(*c*) The Gram Sabha would initially demarcate the boundaries of the community forest resource as defined in Section 2(*a*) of the Act for the purposes of filing claims for recognition of forest right under Section 3(1)(*i*) of the Act.

(*d*) The Committees constituted under Rule 4(*e*) of the Forest Rights Rules, 2008 would work under the control of the Gram Sabha. The State agencies should facilitate this process.

(*e*) Consequent upon the recognition of forest right in Section 3(*i*) of the Act to protect, regenerate or conserve or manage any community forest resource, the powers of the Gram Sabha would be in consonance with the duties as defined in Section 5(*d*), wherein the Gram Sabha is empowered to regulate access to community forest resources and stop any activity which adversely affects the wild animals, forest and the biodiversity. Any activity that prejudicially affects the wildlife, forest and biodiversity in forest area would be dealt with under the provisions of the relevant Acts.

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Page 34 Wednesday, October 01, 2025
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(*v*) *Protection against eviction, diversion of forest lands and forced relocation*

(*a*) Section 4(5) of the Act is very specific and provides that no member of a forest dwelling Scheduled Tribe or other traditional forest dwellers shall be evicted or removed from the forest land under his occupation till the recognition and verification procedure is complete. This clause is of an absolute nature and excludes all possibilities of eviction of forest dwelling Scheduled Tribes or other traditional forest dwellers without settlement of their forest rights as this section opens with the words "Save as otherwise provided". The rationale behind this protective clause against eviction is to ensure that in no case a forest dweller should be evicted without recognition of his rights as the same entitles him to a due compensation in case of eventuality of displacement in cases, where even after recognition of rights, a forest area is to be declared as inviolate for wildlife conservation or diverted for any other purpose. In any case, Section 4(1) has the effect of recognising and vesting forest rights in eligible forest dwellers. Therefore, no eviction should take place till the process of recognition and vesting of forest rights under the Act is complete.

(*b*) The Ministry of Environment and Forests, vide their Letter No. 11-9/1998-FC(pt.) dated 30-7-2009, as modified by their subsequent letter of the same number dated 3-8-2009, has issued directions, requiring the State/UT Governments to enclose certain evidences relating to completion of the process of settlement of rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, while formulating unconditional proposals for diversion of forest land for non-forest purposes under the Forest (Conservation) Act, 1980. The State Government should ensure that all diversions of forest land for non-forest purposes under the Forest (Conservation) Act, 1980 take place in compliance with the instructions contained in the Ministry of Environment and Forest's Letter dated 30-7-2009, as modified on 3-8-2009.

(*c*) There may be some cases of major diversions of forest land for non-forest purposes under the Forest (Conservation) Act, 1980 after the enactment of the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 but before the issue of Ministry of Environment and Forests' Letter dated 30-7-2009, referred to above. In case, any evictions of forest dwelling Scheduled Tribes and other traditional forest dwellers have taken place without settlement of their rights due to such major diversions of forest land under the Forest (Conservation) Act, 1980, the District-Level Committees may be advised to bring such cases of evictions, if any, to the notice of the State-Level Monitoring Committee for appropriate action against violation of the provisions contained in Section 4(5) of the Act.

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Page 35 Wednesday, October 01, 2025
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(*d*) The Act envisages the recognition and vesting of forest rights in forest dwelling Scheduled Tribes and other traditional forest dwellers over all forest lands, including national parks and sanctuaries. Under Section 2(*b*) of the Act, the Ministry of Environment and Forests is responsible for determination and notification of critical wildlife habitats in the national parks and sanctuaries for the purpose of creating inviolate areas for wildlife conservation, as per the procedure laid down. In fact, the rights of the forest dwellers residing in the national parks and sanctuaries are required to be recognised without waiting for notification of critical wildlife habitats in these areas. Further, Section 4(2) of the Act provides for certain safeguards for protection of the forest rights of the forest right-holders recognised under the Act in the critical wildlife habitats of national parks and sanctuaries, when their rights are either to be modified or resettled for the purposes of creating inviolate areas for wildlife conservation. No exercise for modification of the rights of the forest dwellers or their resettlement from the national parks and sanctuaries can be undertaken, unless their rights have been recognised and vested under the Act. In view of the provisions of Section 4(5) of the Act, no eviction and resettlement is permissible from the national parks and sanctuaries till all the formalities relating to recognition and verification of their claims are completed. The State/UT Governments may, therefore, ensure that the rights of the forest dwelling Scheduled Tribes and other traditional forest dwellers, residing in national parks and sanctuaries are recognised first before any exercise for modification of their rights or their resettlement, if necessary, is undertaken and no member of the forest dwelling Scheduled Tribe or other traditional forest dweller is evicted from such areas without the settlement of their rights and completion of all other actions required under Section 4(2) of the Act.

(*e*) The State-Level Monitoring Committee should monitor compliance with the provisions of Section 3(1)(*m*) of the Act, which recognises the right to in situ rehabilitation including alternative land in cases where the forest dwelling Scheduled Tribes and other traditional forest dwellers have been illegally evicted or displaced from forest land without receiving their legal entitlement to rehabilitation, and also of the provisions of Section 4(8) of the Act, which recognises their right to land when they are displaced from their dwelling and cultivation without land compensation due to State development interventions.

(*vi*) *Awareness—raising, monitoring and grievance redressal*

(*a*) Each State should prepare suitable communication and training material in local language for effective implementation of the Act.

(*b*) The State nodal agency should ensure that the Sub-Divisional Level Committee and the District-Level Committee make district-wise plans for trainings of Revenue, Forest and Tribal Welfare Departments' field staff, officials, Forest Rights Committees and panchayat representatives. Public meetings for awareness generation in those villages where process of recognition is not complete need to be held.

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Page 36 Wednesday, October 01, 2025
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(*c*) In order to generate awareness about the various provisions of the Act and the Rules, especially the process of filing petitions, the State Government should organise public hearings on local bazaar days or at other appropriate locations on a quarterly basis till the process of recognition is complete. It will be helpful if some members of the Sub-Divisional Level Committee are present in the public hearings. The Gram Sabhas also need to be actively involved in the task of awareness raising.

(*d*) If any forest dwelling Scheduled Tribe in case of a dispute relating to a resolution of a Gram Sabha or Gram Sabha through a resolution against any higher authority or committee or officer or member of such authority or committee gives a notice as per Section 8 of the Act regarding contravention of any provision of the Act or any rule made thereunder concerning recognition of forest rights to the State-Level Monitoring Committees, the State-Level Monitoring Committee should hold an inquiry on the basis of the said notice within sixty days from the receipt of the notice and take action, if any, that is required. The complainant and the Gram Sabha should be informed about the outcome of the inquiry."

The Forest Rights Act and the MMDR Act

58. The State of Orissa has maintained the stand that the State has the ownership over the mines and mineral deposits beneath the forest land and that the STs and other TFDs cannot raise any claim or rights over them, nor has the Gram Sabha any right to adjudicate such claims. This Court in *Amritlal Nathubhai Shah* v. *Union Govt. of India*[6], while dealing with the scope of the Mines and Minerals (Development and Regulation) Act, 1957 held as follows: (SCC p. 110, para 3)

> "*3.* … the State Government is the 'owner of minerals' within its territory, and the minerals 'vest' in it. There is nothing in the Act or the Rules to detract from this basic fact. That was why the Central Government stated further in its revisional orders that the State Government had the 'inherent right to reserve any particular area for exploitation in the public sector'. It is therefore quite clear that, in the absence of any law or contract, etc. to the contrary, bauxite, as a mineral, and the mines thereof, vest in the State of Gujarat and no person has any right to exploit it otherwise then in accordance with the provisions of the Act and the Rules."

The Forest Rights Act, neither expressly nor impliedly, has taken away or interfered with the right of the State over mines or minerals lying underneath the forest land, which stand vested in the State. The State holds the natural resources as a trustee for the people. Section 3 of the Forest Rights Act does not vest such rights on the STs or other TFDs. The PESA Act speaks only of minor minerals, which says that the recommendation of the Gram Sabha

6 (1976) 4 SCC 108

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Page 37 Wednesday, October 01, 2025
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shall be made mandatory prior to grant of prospecting licence or mining lease for minor minerals in the Scheduled Areas. Therefore, as held by this Court in *Amritlal*[6], the State Government has the power to reserve any particular area for bauxite mining for a public sector corporation.

Gram Sabha and other authorities

59. Under Section 6 of the Act, the Gram Sabha shall be the authority to initiate the process for determining the nature and extent of individual or community forest rights or both and that may be given to the forest dwelling STs and other TFDs within the local limits of the jurisdiction. For the said purpose it receives claims, and after consolidating and verifying them it has to prepare a plan delineating the area of each recommended claim in such manner as may be prescribed for exercise of such rights. The Gram Sabha shall, then, pass a resolution to that effect and thereafter forward a copy of the same to the Sub-Divisional Level Committee. Any aggrieved person may move a petition before the Sub-Divisional Level Committee against the resolution of the Gram Sabha. Sub-section (4) of Section 6 confers a right on the aggrieved person to prefer a petition to the District-Level Committee against the decision of the Sub-Divisional Level Committee. Sub-section (7) of Section 6 enables the State Government to constitute a State-Level Monitoring Committee to monitor the process of recognition and vesting of forest rights and to submit to the nodal agency. Such returns and reports shall be called for by that agency.

60. Functions of the Gram Sabha, Sub-Divisional Level Committee, District-Level Committee, State-Level Monitoring Committee and procedure to be followed and the process of verification of claims, etc. have been elaborately dealt with in the 2007 Rules read with the 2012 Amendment Rules. Elaborate procedures have therefore been laid down by the Forest Rights Act read with the 2007 and 2012 Amendment Rules with regard to the manner in which the nature and extent of individual or customary forest rights or both have to be decided. Reference has already been made to the details of forest rights which have been conferred on the forest dwelling STs as well as TFDs in the earlier part of the judgment.

Individual/Community rights

61. The Forest Rights Act prescribed various rights to tribals/forest dwellers as per Section 3 of the Act. As per Section 6 of the Act, power is conferred on the Gram Sabha to process for determining the nature and the extent of individual or community forests read with or both that may be given to the forest dwelling STs and other TFDs, by receiving claims, consolidate it, and verifying them and preparing a map, delineating the area of each recommended claim in such a manner as may be prescribed. The Gram Sabha has received a large number of individual claims and community claims from Rayagada District as well as Kalahandi District. From Rayagada District, the Gram Sabha received 185 individual claims, of which 145 claims have been considered and settled by granting alternate rights over 263.5 acres

6 *Amritlal Nathubhai Shah* v. *Union Govt. of India*, (1976) 4 SCC 108

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of land. 40 individual claims pending before the Gram Sabha pertain to areas which fall outside the mining lease area. In respect of Kalahandi District, 31 individual claims have been considered and settled by granting alternate rights over an area of 61 acres.

62. The Gram Sabha has not received any community claim from the district of Rayagada. However, in respect of Kalahandi District 6 community claims had been received by the Gram Sabha, of which 3 had been considered and settled by granting an alternate area of 160.55 acres. The balance three claims are pending consideration.

Customary and Religious rights (sacred rights)

63. Religious freedom guaranteed to STs and TFDs under Articles 25 and 26 of the Constitution is intended to be a guide to a community of life and social demands. The abovementioned articles guarantee them the right to practise and propagate not only matters of faith or belief, but all those rituals and observations which are regarded as integral part of their religion. Their right to worship the deity Niyam-Raja has, therefore, to be protected and preserved.

64. The Gram Sabha has a role to play in safeguarding the customary and religious rights of STs and other TFDs under the Forest Rights Act. Section 6 of the Act confers powers on the Gram Sabha to determine the nature and extent of "individual" or "community rights". In this connection, reference may also be made to Section 13 of the Act coupled with the provisions of the PESA Act, which deal with the powers of the Gram Sabha. Section 13 of the Forest Rights Act reads as under:

> "**13.** ***Act not in derogation of any other law***.—Save as otherwise provided in this Act and the provisions of the Panchayats (Extension of the Scheduled Areas) Act, 1996 (40 of 1996), the provisions of this Act shall be in addition to and not in derogation of the provisions of any other law for the time being in force."

65. The PESA Act has been enacted, as already stated, to provide for the extension of the provisions of Part IX of the Constitution relating to panchayats to the Scheduled Areas. Section 4(*d*) of the Act says that every Gram Sabha shall be competent to safeguard and preserve the traditions, customs of the people, their cultural identity, community resources and community mode of dispute resolution. Therefore, the Gram Sabha functioning under the Forest Rights Act read with Section 4(*d*) of the PESA Act has an obligation to safeguard and preserve the traditions and customs of the STs and other forest dwellers, their cultural identity, community resources, etc., which they have to discharge following the guidelines issued by the Ministry of Tribal Affairs vide its Letter dated 12-7-2012.

66. We are, therefore, of the view that the question whether STs and other TFDs, like Dongaria Kondh, Kutia Kandha and others, have got any religious rights i.e. rights of worship over Niyamgiri Hills, known as Nimagiri, near Hundaljali, which is the hilltop known as Niyam-Raja, have to be considered by the Gram Sabha. The Gram Sabha can also examine whether the proposed

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mining area Niyama Danger, 10 km away from the peak, would in any way affect the abode of Niyam-Raja. Needless to say, if the BMP, in any way, affects their religious rights, especially their right to worship their deity, known as Niyam-Raja, in the hilltop of the Niyamgiri range of hills, that right has to be preserved and protected. We find that this aspect of the matter has not been placed before the Gram Sabha for their active consideration, but only the individual claims and community claims received from Rayagada and Kalahandi Districts, most of which the Gram Sabha has dealt with and settled.

67. The Gram Sabha is also free to consider all the community, individual as well as cultural and religious claims, over and above the claims which have already been received from Rayagada and Kalahandi Districts. Any such fresh claims be filed before the Gram Sabha within six weeks from the date of this judgment. The State Government as well as the Ministry of Tribal Affairs, Government of India, would assist the Gram Sabha for settling of individual as well as community claims.

68. We are, therefore, inclined to give a direction to the State of Orissa to place these issues before the Gram Sabha with notice to the Ministry of Tribal Affairs, Government of India and the Gram Sabha would take a decision on them within three months and communicate the same to MoEF, through the State Government. On the conclusion of the proceeding before the Gram Sabha determining the claims submitted before it, MoEF shall take a final decision on the grant of Stage II clearance for the Bauxite Mining Project in the light of the decisions of the Gram Sabha within two months thereafter.

69. The Alumina Refinery Project is well advised to take steps to correct and rectify the alleged violations by it of the terms of the environmental clearance granted by MoEF. Needless to say that while taking the final decision, MoEF shall take into consideration any corrective measures that might have been taken by the Alumina Refinery Project for rectifying the alleged violations of the terms of the environmental clearance granted in its favour by MoEF.

70. The proceedings of the Gram Sabha shall be attended as an observer by a judicial officer of the rank of the District Judge, nominated by the Chief Justice of the High Court of Orissa who shall sign the minutes of the proceedings, certifying that the proceedings of the Gram Sabha took place independently and completely uninfluenced either by the project proponents or the Central Government or the State Government.

71. The writ petition is disposed of with the above directions. Communicate this order to the Ministry of Tribal Affairs, Gram Sabhas of Kalahandi and Rayagada Districts of Orissa and the Chief Justice of the High Court of Orissa, for further follow-up action.

Common Application Form

Project Details

Annexure A3

1. Details of Project

1.1. Name of the Project	Ballada Bauxite Mining Project
1.2. Project Proposal For	New
1.3. Project ID (Single Window Number)	SW/139582/2023
1.4. Description of Project	Ballada block is a virgin bauxite block located in Nandapur Tehsil of Koraput district in Odisha. Total mining lease area is 144.945 Ha, located entirely within Nagasari reserve forest. The project contemplates to develop the mine and surrounding infrastructures for commercial production of bauxite @ PRC of 4 MTPA using opencast mining.

2. Details of the Company/Organization/User Agency making application

2.1. Legal Status of the Company/Organization/User Agency	Company
2.2. Name of the Company/ Organization/User agency	KALINGA ALUMINA LIMITED

Registered address

2.3. Address	Adani Corporate House, Nr. Vaishno Devi Circle, S.G. Highway, Khodiyar, Ahmedabad-382421
2.4. Village /Town / City	Khodiyar
2.5. State	GUJARAT
2.6. District	AHMADABAD
2.7. Pin Code	382421
2.8. Landmarks	Adani House
2.9. E-mail address	Kalinga.Alumina@adani.com
2.10. Mobile number	7752021010

3. Details of the person making application

3.1. Name	Kassireddy Anil Kumar
3.2. Designation	Associate Vice President

Correspondence address

3.3. Address	Adani Corporate House, Nr. Vaishno Devi Circle, S.G. Highway, Khodiyar, Ahmedabad-382421
3.4. Village /Town / City	Khodiyar
3.5. State	GUJARAT
3.6. District	AHMADABAD
3.7. Pin Code	382421
3.8. Landmarks	Adani House
3.9. E-mail address	Kalinga.Alumina@adani.com
3.10. Mobile number	7752021010

Project Location

4. Location of the Project or Activity

4.1. Upload KML	0_ML and APPROACH ROADS.kml
4.2. Whether the project/activity falling in the state/UT sharing international borders	NO
5. Shape of the Project	Non - Linear

Location Details

Toposheet No	State/UT	District	Sub District	Village	Plot/Survey/Khasra No.
E44K11	ODISHA	Koraput	Padua	BALDA	Compartment No I-1/VII,I-1/VIII,I-1/IX,I-1/X

Remarks
N/A

6. Land Requirement (in Ha) of the project or activity

6.1. Nature of Land involved	
6.2. Non-Forest Land [A]	0
6.3. Forest Land [B]	157.212
6.4. Total Land [A+B]	157.212

Project Activity Cost

6. Project/Activity Cost

6.1. Total Cost of the Project at current price level (in Lakhs)	23000 Amount in Words : **Twenty Three Thousand Lakh(s) Only**

7. Employment likely to be generated

7.1. During construction phase

Permanent employment

7.1.1. No. of permanent employment (No.s) [A]	20
7.1.2. Period of employment (No. of days) [B]	180
7.1.3. No. of man-days [X]=[A]*[B]	3600

Temporary employment

7.1.4. Temporary / Contractual employment (No. of Man days) [Y]	27000
7.1.5. Total [X] +[Y]	30600

7.2. During operational phase

Permanent employment

7.2.1. No. of permanent employment (No.s) [A]	30
7.2.2. Period of employment (No. of days) [B]	3650
7.2.3. No. of man-days [X]=[A]*[B]	109500

Temporary employment

7.2.4. Temporary / Contractual employment (No. of Man	350000

7.2.4. Temporary / Contractual employment (No. of Man days) [Y]	350000
7.2.5. Total [X] +[Y]	459500

Others

8. Whether Rehabilitation and Resettlement (R&R) involved?	NO
9. Whether project area involves shifting of watercourse/road/rail/Transmission line/water pipeline, etc. required?	NO
10. Whether any alternative site(s) examined or part thereof for the non-site-specific component?	Not applicable as the project or activity is site specific
11. Whether there is any Government Order or Policy/ Court order relevant or restricting to the site?	NO
12. Whether there is any litigation pending against the project and/or land in which the project is proposed to be set up?	NO
13. Whether the proposal involves violation of Act/Rule/Regulation/Notification of Central/State Government?	NO

Application for ToR (Category A, B1, and B2 Violation)/EC (Category B2) - Form 1

Basic Information

1. Category of the Project/Activity

1.1. Name of the project proposal	Ballada Bauxite Mining Project	
1.2. Type of Proposal	New	
1.3. Whether the Project Activity (Construction/ Operation) has been undertaken without obtaining **prior** Environmental Clearance under the provision of EIA Notification 1994/ 2006?	No	
1.4. Whether multiple items (Components) as per the notification involved in the proposal?	No	
1.4.1. Item No. as per schedule to EIA Notification, 2006	1(a) Mining of minerals	Non-Coal Mining (Major Minerals)-Opencast
Capacity	144.945	Ha

2. Whether project/activity attracts the General Condition specified in the Schedule of EIA Notification?	No
3. Whether any Protected Areas Notified Under the Wild Life (Protection) Act, 1972 are located within 10 km of the project site	No
4. Whether any Severely Polluted Areas as identified by the CPCB from time to time located in proximity to the project site	No
5. Whether any Critically Polluted Areas as identified by the CPCB from time to time located in proximity to the project site	No
6. Whether any Notified Eco-Sensitive area notified under Environmental (Protection) Act, 1986 located in proximity to the project site	No
7. Whether any Inter-State Boundaries and International Boundaries located in proximity to the project site	No
8. Whether any Eco-sensitive Zone notified/proposed to be notified under Environment (Protection) Act, 1986 located within 10 km of the project site	No
9. Whether any forest land present within 10 km of the project site	Yes
9.1. Whether located within/outside Forest land	Within

Name of Forest	Remarks
Nagasari RF under Ballada Range	Inside ML Area

10. Category of the Project as per EIA Notification, 2006	B1
10.1. Whether proposal is required to be appraised at Central level?	No

11. Whether Proposal has interlinked / interdependent projects or activities?	No
11.1. Reason thereof	Not Applicable
12. Whether any Forest Land involved in the project or part thereof	Yes
12.1. Whether In-principle approval (Stage-I) or Final approval (Stage-II) of Forest Clearance under Forest (Conservation) Act, 1980 available for the entire forestland involved in the project?	No
12.2. Proposal No./Project ID	FP/OR/MIN/QRY/456733/2023
12.3. Date of submission of Application	26/12/2023
12.4. Forest Area applied for diversion (in Ha)	157.212
13. Whether NBWL recommendation is required?	No

14. Land Acquisition Details

Type of Land	In case of non-forest land, please specify	Type of privately owned land	Type of land in terms of ownership	Supporting documents			Status of Land Acquisition
				Document Name	Remarks	Document	

Project Details

14. Details of CTE

14.1. Whether consent under Air & Water Act has been obtained from SPCB / UTPCC?	No
14.1.1. Reason thereof	CTE will be obtained after receipt of EC
15. Whether the project/activity located in Notified Industrial Area?	No
16. Whether the project/activity located in CRZ or ICRZ area?	No
17. Whether the project proposed to be located in Territorial waters (Off-shore)	No
18. Whether project/activity attracts the Specific Condition specified in the Schedule of EIA Notification?	No

Product Details

19. Details of Products & By-products

Name of Product	Product / By Product	Quantity / Capacity	Unit	Mode of Transport / Transmission	Remarks
Bauxite	Product	4000000	Tons per Annum	Rail	Crushed bauxite will be transported by closed conveyor system upto railway siding and

Bauxite	Product	4000000	Annum (TPA)	Rail	conveyor system upto railway siding and thereafter by rail.

20. Whether any other Environmental Sensitive area exists within 10 Km from the project/activity boundary?	Yes	
20.1. Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value	No	
20.2. Areas which are important or sensitive for ecological reasons- Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests	Yes	
Name	Shortest distance from the project boundary in Km	Remarks
Nagasari RF	0	RF is within the Site
20.3. Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, overwintering, migration	No	
20.4. Inland, coastal, marine or underground waters	Yes	
Name	Shortest distance from the project boundary in Km	Remarks
Jalaput Water Reservoir	3	N/A
20.5. Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas	No	
20.6. Defence installations	No	
20.7. Densely populated or built-up area	Yes	
Name	Shortest distance from the project boundary in Km	Remarks
Ballada Village	1.5	N/A
20.8. Areas occupied by sensitive man-made land uses	Yes	
Name	Shortest distance from the project boundary in Km	Remarks
Government Highschool Ballada	1.5	N/A
20.9. Areas containing important, high quality or scarce resources	No	
20.10. Areas susceptible to natural hazards which could cause the project to present environmental problems similar effects	No	

21. Status of collection of baseline data	Already collected
Period of baseline data collection	
21.1. From	01/03/2023
21.2. To	31/05/2023

22. Seasons of collection	Summer

23. Number of Monitoring locations for

23.1. Meteorology (Nos.)	1
23.2. Ambient Air Quality (Nos.)	10
23.3. Surface Water Quality (Nos.)	8
23.4. Ground Water Quality (Nos.)	8
23.5. Ground water level (Nos.)	8
23.6. Noise Level (Nos.)	10
23.7. Soil Quality (Nos.)	8
23.8. Summary on the baseline situation	baseline monitoring status.pdf
23.9. Map showing the monitoring locations	Monitoring Map.pdf

Consultant Details

24. Whether QCI/NABET Accredited EIA Consultant engaged?	Yes
24.1. Accreditation No. / Organization Id	ORG000368
24.2. Name of the EIA Consultant Organization	Vardan Environet LLP (formerly Vardan Environet)
24.3. Address	Plot No. 82-A, Sector 5 IMT Manesar, Gurugram (Haryana-122051)
24.4. Mobile No.	9953147268
24.5. E-mail Id	anshul@vardan.co.in
24.6. Category of Accreditation (Eligible for Category A / Eligible for Category B)	A
24.7. Sector(s) of Accreditation	1,2,7,8,11,31,21,22,25,27,28,34,38,39,3,29,9,4,6,16,18
24.8. Validity of Accreditation	05/04/2026

Project Details

1. Introduction of Project or Activity

1.1. Need for the project or activity and its importance to the country/region	Bauxite Produced from the mine shall be sold to alumina refineries and/or used for captive purpose
1.2. Demand - Supply Gap and Domestic and export markets, if any	Bauxite Produced from the mine shall be sold to alumina refineries and/or used for captive purpose for proposed alumina refinery project of the company

2. Social Infrastructure

2.1. Readily available	The site is well connected with social infrastructure facilities like school, Bank and hospitals
2.2. Proposed to be developed	Good social infrastructure is already available in the study area and further will be developed in the lease area as per approved mining plan

3. Connectivity to the project or activity

3.1. Nearest railway station and its distance (in Km)	Bheja	5
3.2. Nearest Airport and its distance (in Km)	Visakhapatnam	140
3.3. Nearest Town/City/District head quarter and its distance (in Km)	Koraput	40
4. Soil classification	Alfilsols and Ultisols	
5. Distance from the HFL of the river in m, if any	N/A	

6. Benefits of the project

6.1. Social benefits of project or activity	The proposed project will help in improving the socio economic status of the nearby villages by generating direct and indirect employment opportunities
6.2. Financial benefits of project or activity	Proposed mine will contribute to state and central Government exchequer by way of mining revenue (DMF, Royalty, NMET etc)

7. Project/ Activity Construction Status	To be Started
7.1. Likely date of start of construction activity (start of mining operations in case of mining proposals)	01/01/2026
7.2. Likely date of completion of construction activity (end of mining operations in case of mining proposals)	31/03/2035

Resource Utilization

8. Use of resources for construction or operation of the project

8.1. Whether requirement of water involved in the project?	Yes

Details of Water requirement during Construction stage

Details of Water requirement during Construction stage

Sr.No.	Source	Quantity in KLD Present	Quantity in KLD with Expansion	Method of water withdrawal	Distance from Source in mtr	Mode of Transport	Details of Permission	Competent Authority	Upload a copy of the permission letter/NOC	Status of Permission/I
1	Surface	30	N/A	Reservoir	3000	Pipeline	N/A	Yes	approved application for surface water drawal from jalaput.pdf Preview	N/A

Details of Water requirement during Operational stage

Sr.No.	Source	Quantity in KLD Present	Quantity in KLD with Expansion	Method of water withdrawal	Distance from Source in mtr	Mode of Transport	Details of Permission	Competent Authority	Upload a copy of the permission letter/NOC	Status of Permission/I
1	Surface	690	N/A	Others	3000	Pipeline	N/A	Yes	approved application for surface water drawal from jalaput.pdf Preview	N/A

8.2. Other information, if any — N/A

8.3. Whether requirement of Minerals and/or fuels involved in the project? — Yes

Details thereof

Name of Minerals / Fuel	Quantity per annum in MT	Source	Mode of transport	Distance from source in Km	Details of linkage / supply agreement
HSD	1265	Open Market	Road	50	1487 KL per annum (1265 MT/Annum) at Peak rated capacity

8.4. Other information, if any — N/A

8.5. Construction material — Yes

Construction material	Quantity in MT	Source	Mode of transport	Distance from source in Km
Cement	12	Open Market	Road	50
Steel	10	Open Market	Road	50
Aggregates	30	Open Market	Road	50
Sand	50	Open Market	Road	50

8.6. Timber — No

8.7. Electric Power: — Yes

8.7.1. Total Electricity requirement (MW):	15
8.7.2. Main Source:	Nearby Substation
8.7.3. Renewable energy proposed to install (KW):	160
8.7.4. Percentage contribution of renewable energy:	10
8.7.5. Standby arrangements (details of DG Sets):	250 KVA
8.7.6. Stack height in m (DG set):	6
8.7.7. Energy conservation measures:	For energy conservation LED lights will be used, Renewable power like solar power use will be explored in the mine lease
8.8. Whether any other natural resources / other raw materials required?:	No
8.9. Whether any use of substances or materials, which are hazardous (as per MSIHC rules) to human health or the environment (flora, fauna, and water supplies) required?	Yes
8.10. Whether any resource efficiency / optimization / recycling and reuse envisaged in the project?	Yes
8.10.1. Details	reuse of treated water, reuse of OB and soil

Physical Changes

9. Construction, operation or decommissioning of the Project involving actions, which will cause physical changes in the locality:

9.1. Whether any permanent or temporary change in land use, land cover or topography due to project activity?	Yes

Current Land Use	Area in Ha	Remarks
9.1.1. Forest Land	144.945	N/A
9.1.2. Agriculture land	0	N/A
9.1.3. Grazing Land	0	N/A
9.1.4. Barren Land	0	N/A
9.1.5. Waste Land	0	N/A
9.1.6. Surface water bodies	0	N/A
9.1.7. Marshy land	0	N/A
9.1.8. Mangroves	0	N/A
9.1.9. Settlements	0	N/A
9.1.10. Roads / Other infrastructure	0	N/A
9.1.11. Plantation / Green belt	0	N/A
9.1.12. Industrial use	0	N/A

9.1.13. Other land use

Please Specify	Area in Ha	Remarks
9.1.14. Total	144.945	

9.1.15. Proposed/Post-project land use

Please Specify	Area in Ha	Remarks
Quarry Area	11.82	
OB Dump Area	1.95	
undistrubed area	56.945	

9.1.16. Green belt	4.23	N/A
9.1.17. Total	144.945	

9.2. Whether any clearance of existing vegetation due to project activity?	Yes
9.2.1. No. of Trees	1000
9.2.2. Area covered with plantation/ vegetation / greenbelt proposed to be cleared in Ha	25
9.2.3. No. of trees proposed for transplantation	0
9.2.4. Other information, if any	N/A
9.3. Whether any loss of native species or genetic diversity?	No
9.4. Whether any demolition works involved in project activity?	No
9.5. Whether any linear structures proposed for diversion or demolition due to project activity? (e.g. roads, transmission lines, rail line, pipeline, conveyor, etc.)	No
9.6. Whether any closure or diversion of existing transport routes or infrastructure due to project leading to changes in traffic movements?	No
9.7. Whether any closure or diversion of water bodies present in project area or realignment of water courses passing through project area?	No
9.8. Whether any dismantling or decommissioning or restoration works or reclamation works (Long-term/ short-term)?	No
9.9. Whether any construction works for temporary use for project activity?	No
9.10. Whether any cut and fill excavations proposed for the project activity?	Yes
9.10.1. Quantity of cutting material in Cu.m	99036
9.10.2. Proposed utilization / dispose of cutting material	OB will be used for backfilling and soil for greenbelt development
9.10.3. Quantity of filling material in Cu.m	73254
9.10.4. Source of filling material	OB generated from mining
9.10.5. Other information, if any	25782 m3 soil will be used for plantation

9.11. Whether any underground works including tunnelling	No
9.12. Whether any dredging involved in project?	No
9.13. Whether any offshore structures involved in project?	No
9.14. Whether any new road, rail, sea, airports, helipad, etc. during construction or operation?	No
9.15. Whether any construction of new linear structures? (e.g. transmission lines, pipelines, etc.)	No
9.16. Whether any Facilities for storage of goods or raw materials?	No
9.17. Whether any Facilities for long term/ permanent housing of operational workers/ staff?	No
9.18. Whether any Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?	No
9.19. Whether any Stream crossings, temporary and permanent?	No
9.20. Whether any Influx of people to an area in either temporarily or permanently?	Yes
9.20.1. No. of people likely to influx to an area temporarily	126
9.20.2. No. of people likely to influx to an area Permanently	0
9.20.3. Other information, if any	N/A
9.21. Whether any other information would like to submit?	No

Pollution Details

10. Release of pollutants to Air and Mitigation measures

10.1. Whether any probable air pollutants generated?	Yes

Air Pollution Source	Probable Pollutants	Mitigation Measures
Blasting	PM10, PM2.5	controlled blasting will be adopted and optimum use of explosive will reduce air pollution
Crushing	PM10, PM2.5,	Water Sprinkler will be provided at crusher and transfer points
Transport of raw material/products	PM10, PM2.5, SO2 & NOx	Water Sprinkling, greenbelt development and maintenance of vehicles

10.2. Other information, if any	N/A

10.3. Generation of Noise & Vibration and mitigation measures

10.3.1. Whether any probable generation of Noise and vibration from the proposed project?	Yes
10.3.1.1. Sources of Noise	Drilling, blasting, loading /unloading, vehicle movement and crushing
10.3.1.2. Sources of Vibration	Blasting
10.3.1.3. Details of blasting, if any	N/A
10.3.1.4. Other information, if any	N/A
10.3.1.5. Whether any mitigation measures proposed for Noise & Vibration?	Yes
10.3.1.5.1. Mitigation measures proposed for control of Noise	Controlled blasting, Vehicle maintenance, greenbelt development, provision of PPE
10.3.1.5.2. Mitigation measures proposed for control of vibration	Controlled Blasting
10.3.1.5.3. Other information, if any	N/A
10.3.2. Whether any probable generation of Light and Heat?	No

10.4. Discharge of pollutants to water and mitigation measures

10.4.1. Whether any probable water pollutants generated?	Yes
10.4.1.1. Organic Pollutants	Oil and grease
10.4.1.2. Inorganic pollutants	SS & TDS
10.4.1.3. Micro-organism	NO
10.4.1.4. Sediments	Silt of soil and waste
10.4.1.5. Heavy metals	No
10.4.1.6. Others (Specify)	N/A

10.5. Probable sources of water pollutant	Yes
10.5.1. Details of sources of water pollution	sediments and silts carried through surface runoff during rain from dumps and pits, domestic activities and washing
10.5.2. Other information, if any	N/A

Details of reuse / recycle of wastewater

Details	**Qty / Capacity**
10.6. Quantity of waste water generation per day (KLD)	45
10.7. Quantity of treated water proposed to use per day (KLD)	35
10.8. Quantity of treated water proposed to discharge outside the premises (KLD)	0
10.9. Purpose for which treated water is proposed to use	washing
10.10. Whether it is proposed to opt/avail common off-site Sewage Treatment Plant (CSTP)/Effluent Treatment Plant (CETP) facility?	No
10.11. Whether it is proposed to setup on-site Sewage	No

Treatment Plant (STP)/Effluent Treatment Plant (ETP) facility?	No
10.12. Whether the adequacy of the Sewage Treatment Plant (STP) or Effluent Treatment Plant certified by an independent expert?	No
10.12.1. Reasons thereof	Waste water generated from washing will be treated using oil water separator and treated water will be used for vehicle washing
10.13. Whether any other mitigation measures proposed?	No
10.14. Whether Dual Plumbing System proposed to be implemented?	No
10.14.1. Reasons thereof	NA
10.15. Whether any discharge of treated effluent involved?	No

Water Requirements

11. Ground water intersection and water conservation measures:

11.1. Whether ground water table intersection involved in the project activities?	No
11.2. Area category from Groundwater availability perspective?	Safe
11.3. Whether Rainwater harvesting proposed	No
11.4. Whether any other water conservation measures proposed?	Yes
11.4.1. Details thereof	Waste water from workshop vehicle washing will be treated and reused
11.5. Whether the ZLD is proposed?	Yes
11.5.1. Details of ZLD	No discharge of industrial waste water

12. Greenbelt

12.1. Area proposed for green belt (in Ha)	4.23
12.2. Width of green belt (in m) along the boundaryof the project or activity	7.5
12.3. Percentage of the total area covered under green belt	2.91
12.4. Details of the species proposed for plantation	Local species
12.5. No. of tree saplings to be planted	8440
12.6. Funds allocated for plantation in Lakhs.	1181600

Waste Generation

13. Production of wastes during construction or operation or decommissioning

13.1. Whether any generation of Solid waste (domestic wastes)?	Yes

Name of the waste	Source	Qty (TPA)	Mode of disposal	Mode of Transport
Domestic Waste	Domestic Population	9	as per Solid waste Management rules	Road

13.2. Whether any generation of plastic waste?	No
13.3. Whether any generation of e-waste?	No
13.4. Whether any generation of batteries waste?	Yes

Name of the waste	Source	Qty (TPA)	Mode of disposal	Mode of Transport
Used Batteries	Vehicles	0.2	As per Batteries rules	Road

13.5. Whether any generation of Bio-medical waste?	No
13.6. Whether any generation of hazardous wastes (as per Hazardous Waste Management Rules)?	Yes

Name of the waste	Source	Qty (TPA)	Mode of disposal	Mode of Transport
Used oil, waste oil and empty oil barrels	workshop and crusher house	1	Authorized recycler	Road

13.7. Whether any generation of construction or demolition wastes?	No
13.8. Whether any generation of other wastes?	No
13.9. Whether any generation of surplus products?	No
13.10. Whether measures for waste minimization proposed?	Yes
13.10.1. Details thereof	OB will be used for backfilling and soil for greenbelt development

Risk Assessment

14. Whether any risks associated with project activities which could affect human health or the environment, -

14.1. From explosions, spillages, fires etc. from storage, handling, use or production of hazardous substances?	Yes
14.1.1. Details thereof	Use of explosives shall be done in line with the guidelines as prescribed by PESO. Measures will be taken for safe handling & use of explosives as laid down under Explosive Rule, 2008 and other hazardous substances (Used oil, cotton etc.) as prescribed rules/Guidelines of MoEF&CC/CPCB/SPCB
14.2. From any other causes?	Yes
14.2.1. Details thereof	Risk of accidents are expected: a) During loading. b) During transportation c) handling of Machineries
14.3. Could the project be affected by natural disasters	

14.3. Could the project be affected by natural disasters causing environmental damage (e.g. floods, earthquakes, landslides, cloudburst etc)?	No
14.4. Changes in occurrence of disease or affect disease vectors (e.g. insect or water borne diseases)	No
14.5. Could project adversely affect the wellbeing of people in project area e.g. by changing living conditions?	No
14.6. Vulnerable groups of people who could be adversely affected by the project e.g. hospital patients, children, the elderly etc.	No
14.6.1. Has cumulative risk assessment been performed?	No
14.6.1.1. Reason thereof	Risk assessment and mitigation measures are proposed in Chapter-7 of the Final EIA/EMP Report.
14.7. Whether any likely impacts of the proposed activity on the existing facilities adjacent to the proposed site due to generation of dust, smoke, odorous fumes or other hazardous gases?	No

15. Factors which should be considered (such as consequential development) which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality

15.1. Whether lead to development of supportive facilities, ancillary development or development stimulated by the project which could have impact on the environment e.g.: Supportive infrastructure (roads, power supply, waste or waste water treatment, etc.); housing development; industries in supply chain and downstream; any other?	Yes
15.1.1. Details there of	Proposed project will further lead to development of infrastructure in the area
15.2. Whether lead to after-use of the site, which could have an impact on the environment? (e.g. mine void, dump sites, etc.)	Yes
15.2.1. Details thereof	Post mine land use as per approved mining plan will create positive impact on the environment
15.3. Whether set a precedent for later developments?	Yes
15.3.1. Details thereof	A better after use scenario, which is likely to increase aesthetic beauty of the area
15.4. Have cumulative effects due to proximity to other existing or planned projects with similar effects?	No
15.5. Whether lead to growth of alien species, if any?	No
15.6. Is there any threat of the project to the biodiversity (including displacement of fauna-both terrestrial and aquatic and avi-fauna or creation of barriers for their movement)?	No
15.7. Will the proposed project in any way result in the obstruction of a view, scenic amenity or landscapes?	No

15.8. Is there any impact on anthropological or archaeological sites or any important site feature in the vicinity of the proposed site have been considered?	No
15.9. Will the proposed project result in any changes to the demographic structure of local population?	No
15.10. Will the project cause adverse effect on local communities, disturbance to sacred sites or other cultural values?	No

16. Mining Proposals

16.1. Details of Letter of Intent (LoI) / Vesting order / Mining Lease

16.1.1. Date of issue of LoI/Vesting order/Mining Lease	01/03/2023
16.1.2. Validity of the LoI/Vesting order	28/02/2026
16.1.3. Lease Period	50/00
16.1.4. Date of expiry of lease	28/02/2073
16.1.5. Lease area (in Ha) as per LoI/Vesting order/Mining Lease	144.945
16.1.6. Production capacity (in MTPA) as per LoI / Vesting Order / Mining lease, if any prescribed	4
16.1.7. Details of Lease renewal(s), if any	not applicable
16.1.8. Other information, if any	

16.2. Status of approval of Mining plan	Approved

16.3. Minerals to be mined

Name of the Mineral to be mined	Classification	Production Capacity	Remarks
• Bauxite	Major	4	N/A

16.4. Details of Total excavation (RoM) including Topsoil, Overburden, Mining waste, Rejects, etc.

16.4.1. Total excavation in MTPA	4
16.4.2. Total Excavation in M.Cu.m/Annum	2
16.4.3. Enter stripping Ratio	01:01
16.4.4. Other information, if any	Stripping ration 1: 0.018

16.5. Mineral Reserves

Name of Mineral	Proved Reserves	Indicated Reserves	Inferred Reserves	Mineable Reserves	Remarks
Bauxite	22.13	0	0	19.96	

16.6. Life of Mine (Years)

16.6.1. Life of the mine as per approved mining plan	09/00
16.6.2. Life of the mine as per total estimated reserves, if any	09/00
16.6.3. Other information, if any	

16.7. Type and method of Mining Method

16.7.1. Type of mining	Opencast
16.7.2. Method of mining	Mechanized
16.7.3. Other information, if any	

16.8. Type of blasting, if any, to be adopted

16.8.1. Type of blasting	Controlled Blasting
16.8.2. Mitigation measures for control of blast induced vibrations	Controlled blasting with proper blast design and charge
16.8.3. Other information, if any	

16.9. Whether it is proposed to install beneficiation plant/Coal washery within the mining lease area?	No

16.10. Whether it is proposed to install crusher within the mining lease area?	Yes	
16.10.1. No. Of crushers	2	
16.10.2. Capacity of crushers	400	
16.10.3. Capacity of crushers	400	TPA
16.10.4. Total capacity of crushers	800	TPA

16.11. Dumping strategy

Description	Area in Ha	Maximum height in m	Remarks
External dump	1.95	8	N/A
Internal dump	0	0	N/A
Topsoil dump/ storage	0	0	N/A

16.12. Topsoil management

16.12.1. Total Topsoil excavated during the entire life of the mine (in Million Cubic Meter)	0.026
16.12.2. Utilization strategy of topsoil	Greenbelt development and plantation
16.12.3. Other information, if any	

16.13. Details of the Quarry/Mine Pit

16.13.1. Total Quarry Area (Ha)	81.82
16.13.2. Enter Area of final void (in Hectare)	1.08
16.13.3. Maximum Depth of final void (in meter)	30
16.13.4. Other information, if any	water body depth will be maximum upto 30 m.

16.14. Details of Transportation

16.14.1. Mode of transportation upto pit head	Dumper
16.14.2. Mode of transportation from pit head to siding/loading	Conveyor
16.14.3. Mode of transport from loading point to consumers	Railway
16.14.4. Other information, if any	

16.15. Details of reclamation/post mining land use

16.15.1. Plantation area (ha)	4.23
16.15.2. Water body in Ha	1.08
16.15.3. Public use in Ha	1.95
16.15.4. Enter Other uses in Ha	80.74

16.16. Whether road/river /seasonal nallah /irrigation canal passes through project site

S.No.	Type of Road/Waterway	Any diversion is proposed	No Object Certificate obtained	Application for NOC has been submitted	NOC from the concerned department or authority	Proof of application for NOC	Reason thereof (No Object Certificate obtained - Not Applicable)	Reason thereof (NOC has not been submitted)
1	Road	No	N/A	No	N/A	N/A	N/A	N/A

Enclosures

17. Layout Plan showing the components of the project and green belt proposed; general location and specific location of the project along with coordinates	Layout Drawing.pdf
18. Letter of Intent / Mining Lease	2143 - Letter of Intent for Ballada Bauxite Block 01032023.pdf
19. Schematic representation of the feasibility drawings which give information for EIA purpose	Feasibility Drawing.pdf

19. Additional Information

S. No.	Document Name	Remark	Document
1	EDS cover Letter	Response to online EDS dated. 22nd Aug 2023 on TOR	Cover Letter.pdf

1	EDS cover Letter	Response to online EDS dated: 22nd Aug 2023 on TOR application of Ballada Bauxite Mining Project.	Cover Letter.pdf
2	Pre feasibility Report	Pre feasibility Report	Final PFR Report01-09-2023.pdf
3	Declaration	Declaration by Project Proponent and Consultant	c. Declaration.pdf
4	SEIAA Fees Payment Challan	Internet Banking Reference No: 717085344 dated 11.08.23	SEIAA Fees Payment Challan.pdf
5	Approved Mining plan	Approved mining plan	IBM Approved MP_Ballada Bauxite Block.pdf
6	Authorization letter for Consultant	Authorization letter	b. Authorization Letter Consultant.pdf
7	Cover Letter	Cover letter for Tor Application	d. Submission Letter for TOR.pdf

20. Document CheckList

20.1. Land-Related Documents	Ownership document	Yes
	Mine lease document (in case of mining)	No
	Letter of Intent (in case of mining)	Yes
	Project layout	Yes
	Gazette notification of notified industrial area (if applicable)	Not Applicable
20.2. Public Hearing-Related Details	Public hearing proceedings	Yes
	Advertisements	Yes
20.3. EIA/EMP - Related Details	Pre-feasibility report	Yes
	EIA/EMP report (in case of Cat A, B1)	Yes
	EMP report (in case of Cat B2)	Not Applicable
	Budgetary provision table for EMP	Yes
	Mining plan (in case of mining)	Yes
	DSR in case of minor minerals	Not Applicable
20.4. Water Permission-Related Details	Permission for withdrawal of surface water	Yes
	Permission for abstraction of ground water	Not Applicable
20.5. Compliance and Monitoring Documents	Certified compliance report (in case of Expansion Proposals)	Not Applicable
	Action Taken Report (if any)	Not Applicable
	Closure report from RO (if any)	Not Applicable
20.6. Previous Clearances	Previous TOR granted (if any)	Not Applicable
	Previous EC granted (if any)	Not Applicable
	Previous EC transferred (if any)	Not Applicable
20.7. Wildlife and Forest Related Documents	Conservation plan for Schedule-I species	Yes
	NBWL/SBWL recommendation	Not Applicable
	In principle (stage-I) forest clearance	Yes
	Final (stage-II) forest clearance	Not Available
20.8. NOC from Other Departments/Ministries	Existing CTE/CTO	Not Available
	NOC from airport authority on the permissible height of the building (if applicable)	Not Applicable
20.9. Others	Court case details (if any)	No
	Violation details (if any)	No
	Summary of the project	Yes

21. ☑ I certify that I have uploaded all the required documents and correctly indicated them in the checklist. In case any discrepancy is found, or any required document is missing, the application shall be liable to be rejected at our own risk and cost.

Undertaking

22. ☑ I hereby give undertaking that the data and information given in the application and enclosures are true to be best of my knowledge and belief and I am aware that if any part of the data and information is found to be false or misleading at any stage, the project will be rejected and clearance given if any to the project will be revoked at our risk and cost. In addition to the above, I hearby give undertaking that no activity/construction/expansion has been taken up

22.1. Name	Kassireddy Anil Kumar
22.2. Designation	Associate Vice President
22.3. Company	KALINGA ALUMINA LIMITED
22.4. Address	Adani Corporate House, Nr. Vaishno Devi Circle, S.G. Highway, Khodiyar, Ahmedabad-382421
22.5. Date	12/08/2023

Application for EC (Category A, B1 and B2 Violation)- Form 1

1. Details of Terms of Reference (ToR)

2. Select nature of the ToR	ToR prescribed by EAC and Ministry
Note: Please select option "Standard ToR available on website" in case of Expansion under 7 (ii) (a).	
2.1. Date of issuance of ToR/Standard ToR	06/11/2023
2.2. Date of issuance of Additional ToR, if any	
2.3. MoEF&CC / SEIAA File No.	SIA/OR/MIN/439954/2023
2.4. Upload ToR letter (PDF only)	tor letter_ballada.pdf **Preview**
2.5. Whether any amendment to ToR has been obtained	No

3. Details of Public Consultation

3.1. Whether the Project has been exempted from Public Hearing?	No

Details of Public Hearing

Date of advertisement	Date of Public Hearing (PH)	Venue				Distance from project boundary (Km)	No. of People attended	Designation of Presiding Officer	Copy of duly signed Proceedings of Public Hearing in English
		State	District	Sub District	Village				
04/02/2025	06/03/2025	ODISHA	KORAPUT	Nandapur	Sindhiput	11	109	Additional District Magistrate	spcb_ballada ph_ltr 2 seiaa_dt-04-04-2025_.pdf **Preview**

No. of written comments / suggestions / objections received: 2420

Major issues raised	Response of Project Proponent	Whether addressed in Final EIA/EMP	Reference of Final EIA/EMP
Employment Generation, Health Facility, Agricultural Activity, Infrastructure, Education Facility	Rs. 532.50 Lakhs budgetary provision has been proposed for Employment Generation, Health Facility, Agricultural Activity, Infrastructure, Education Facility	Yes	Chapter-7

Action Plan on issues raised during public hearing & written submissions as per MoEF&CC OM dated 30/09/2020	ballada action plan.pdf **Preview**
Upload documents if any	ph proceedings_04.04.2025.pdf **Preview**

Baseline Details

4. Summary of Baseline Data

Details of Baseline data collection

4.1. Season	Summer

Period of collection

4.2. From	01/03/2023
4.3. To	31/05/2023

Number of monitoring locations

4.4. Meteorology (Nos.)	1
4.5. Ambient Air Quality (Nos.)	10
4.6. Surface Water Quality (Nos.)	8
4.7. Ground Water Quality (Nos.)	8
4.8. Ground Water Level (Nos.)	8
4.9. Noise Level (Nos.)	10
4.10. Soil Quality (Nos.)	8

5. Meteorological Parameters

Parameter	Min. Value	Max. Value	Mean Value
5.1. Temperature (°C)	13	36.9	24.95
5.2. Wind Speed (m/s)	0.1	0.1	0.1
5.3. Relative Humidity (%)	9	90	49.5
5.4. Solar Radiation (W/m^2)	0.1	0.1	0.1
	Total rainfall (mm)	**No. of rainy days**	**Average annual rainfall (mm)**
5.5. Rainfall	0.1	15.39	7.745
5.6. Predominant Wind direction	West (W)		

6. Ambient Air Quality

Note: Please Specify range in case of data monitored at multiple locations

Monitoring Location			Observed Value			
Buffer Zone	**Criteria Pollutant**	**Unit**	**From**	**To**	**Mean Value**	**Prescribed Standard**
Buffer Zone	PM10	Micro Gram per Meter Cube	50.4	76.9	63.65	100
Buffer Zone	PM2.5	Micro Gram per Meter Cube	28.7	50.9	39.8	60
Buffer Zone	SO2	Micro Gram per Meter Cube	9.4	21.8	15.6	80
Buffer Zone	NOx	Micro Gram per Meter Cube	16.1	28.8	22.45	80
Buffer Zone	CO	Milli Gram per Meter Cube	0.5	0.8	0.65	02

Monitoring Location			Observed Value			
Core Zone	**Criteria Pollutant**	**Unit**	**From**	**To**	**Mean Value**	**Prescribed Standard**
Core Zone	PM10	Micro Gram per Meter Cube	50.5	57.5	54	100
Core Zone	PM2.5	Micro Gram per Meter Cube	30.2	40.9	35.55	60
Core Zone	SO2	Micro Gram per Meter Cube	10.8	13.9	12.35	80
Core Zone	NOx	Micro Gram per Meter Cube	19.8	27	23.4	80
Core Zone	CO	Milli Gram per Meter Cube	0.5	0.79	0.645	02

7. Surface Water Quality

Note: Please Specify range in case of data monitored at multiple locations

Monitoring Location			Observed Value			CPCB Water Quality Criteria	
Buffer Zone	Criteria Pollutant	Unit	From	To	Standard as per IS: 2296-1982	Class	Standard
Buffer Zone	pH	..	7.51	7.68	6.5-8.5	..	..
Buffer Zone	TDS	mg/L	236.0	400.0	1500 (max)	..	..
Buffer Zone	Total Coliform	MPN/1000 ml	900	1500	5000	..	..
Buffer Zone	Total Hardness	mg/L	70.0	80.0	..	..	..
Buffer Zone	TSS	mg/L	12.0	41.21	..	..	..
Buffer Zone	BOD	mg/L	4.00	14.0	..	..	..
Buffer Zone	COD	mg/L	16.0	60.0	..	..	..
Buffer Zone	DO	mg/L	5.2	7.2	4 (min)	..	..
Buffer Zone	Fluoride	mg/L	0.20	0.32	1.5 (max)	..	..
Buffer Zone	Heavy Metal	mg/L	0.02	1.72	0.5 (max)	..	..
Buffer Zone	Chlorides	mg/L	32.0	36.0	600 (max)	..	..

Monitoring Location			Observed Value			CPCB Water Quality Criteria	
Core Zone	Criteria Pollutant	Unit	From	To	Standard as per IS: 2296-1982	Class	Standard
Core Zone	pH	..	7.72	7.72	6.5-8.5	..	..

8. Ground Water Quality

Note: Please Specify range in case of data monitored at multiple locations

Monitoring Location			Observed Value			
Buffer Zone	Criteria Pollutant	Unit	From	To	Standard as per IS: 10500 Desired Limits	Standard as per IS: 10500 Permissible Limits
Buffer Zone	Fluoride	mg/L	0.40	1.20	1.0	1.5
Buffer Zone	Heavy Metals	mg/L	0.11	0.40	0	0
Buffer Zone	pH	..	7.55	8.24	8.5	..
Buffer Zone	Total Hardness	mg/L	238.64	327.81	200	600
Buffer Zone	Sulphate	mg/L	97.38	140.81	.	.
Buffer Zone	TDS	mg/L	320	380	500	2000
Buffer Zone	Chlorides	mg/L	74	101.36	250	1000

Monitoring Location			Observed Value			

Core Zone	Criteria Pollutant	Unit	From	To	IS: 10500 Desired Limits	IS: 10500 Permissible Limits
Core Zone	Chlorides	mg/L	0	0	.	.

9. Ground Water Level (Phreatic Surface)

Monitoring Location	Range of Water Table Pre-monsoon Season (in m below ground level)		Range of Water Table Post-monsoon Season (in m below ground level)	
Buffer Zone	**From (Pre-monsoon)**	**To (Pre-monsoon)**	**From (Post-monsoon)**	**To (Post-monsoon)**
Buffer Zone	1.3	7.64	0.4	5.89

Monitoring Location	Range of Water Table Pre-monsoon Season (in m below ground level)		Range of Water Table Post-monsoon Season (in m below ground level)	
Core Zone	**From (Pre-monsoon)**	**To (Pre-monsoon)**	**From (Post-monsoon)**	**To (Post-monsoon)**
Core Zone	0	0	0	0

10. Whether Ground Water Intersection will be there? No

11. Noise Level

Monitoring Location		Observed Noise Level(dB(A))				Prescribed Standard(dB(A))	
Buffer Zone		**Day Time Level**		**Night Time Level**		**Day Time Level**	**Night Time Level**
	Category	**From**	**To**	**From**	**To**		
Buffer Zone	Residential area	41.59	52.2	34.2	43.38	55	45

Monitoring Location		Observed Noise Level(dB(A))				Prescribed Standard(dB(A))	
Core Zone		**Day Time Level**		**Night Time Level**		**Day Time Level**	**Night Time Level**
	Category	**From**	**To**	**From**	**To**		
Core Zone	Residential area	49.8	49.8	38.4	38.4	55	45

12. Soil Quality

Physical Characteristics

Note: Please Specify range in case of data monitored at multiple locations

Monitoring Location		Particle Size Distribution (%)				
Buffer Zone	**Soil Texture**	**Sand**	**Silt**	**Clay**	**Water Holding Capacity (%)**	**Porosity (%)**
Buffer Zone	Silty Clay	42	30	15	33.25	0.1

Monitoring Location		Particle Size Distribution (%)				
Core Zone	**Soil Texture**	**Sand**	**Silt**	**Clay**	**Water Holding Capacity (%)**	**Porosity (%)**
Core Zone	Silty Clay	53	35	12	32.21	0.1

13. Chemical Properties

Note: Please Specify range in case of data monitored at multiple locations

Monitoring Location		Observed Value	

Monitoring Location		Observed Value			
Buffer Zone	**Criteria Parameter**	**From**	**To**	**Unit**	**Permissible Standard**
Buffer Zone	Calcium	16.82	24.26	mg/kg	..
Buffer Zone	Magnesium	5.96	11.89	mg/100g	..
Buffer Zone	Nitrogen	116.25	212.41	kg/hec.	..
Buffer Zone	Phosphorus	22.26	42.72	kg/hec.	..
Buffer Zone	Potassium	103.12	198.26	kg/hec.	..

Monitoring Location		Observed Value			
Core Zone	**Criteria Parameter**	**From**	**To**	**Unit**	**Permissible Standard**
Core Zone	Calcium	0	15.41	mg/kg	..
Core Zone	Phosphorus	0	28.23	kg/hec.	..
Core Zone	Nitrogen	0	150.21	kg./hec	..
Core Zone	Magnesium	0	3.12	mg/100g	..
Core Zone	Potassium	0	127.62	kg/hec.	..

14. Whether Traffic study has been conducted?	Yes

Meteorological Parameters

Parameter	Existing	Proposed
14.1. Road	MDR-52	MDR-52
14.2. V (volume in PCU/day)	1573	4885
14.3. C (capacity in PCU/day)	15000	15000
14.4. Existing V/C Ratio	0.1	0.32
14.5. LOS	0.1	0.2

`

15. Whether any Schedule-I Species found in the study area?	Yes
15.1. Details of Schedule-I Species	Leopard, Sloth Beer, Grey Wolf,Jungle cat, Jackal etc
15.2. Whether conservation plan for Schedule-I Species has been prepared?	Yes
15.2.1. Copy of conservation plan	approved sswlcp.pdf
15.2.2. Fund Provision made (In Lakhs)	457.546
15.2.3. Period of Implementation	10/00
15.3. Whether conservation plan for Schedule-I Species has been approved by competent authority?	Yes
15.3.1. Copy of approval (Upload PDF Only)	approved sswlcp.pdf
15.3.2. Letter No.	..
15.3.3. Date of issue	04/06/2024
15.3.4. Recommendations if any	NA

16. Impact Prediction

Air Quality Impact Prediction

Monitoring Location			Criteria Pollutant	Unit	Baseline Concentration [A]	Predicted incremental value considering worst case stability class [B]	Total GLC [A]+[B]	Prescribed Standard
Lat	Long	Core/Buffer						
18° 26' 35"N	82° 39' 53" E	Core Zone	PM10	Microgram per m3	57.5	50.5	108	100
18° 26' 35"N	82° 39' 53" E	Core Zone	PM 2.5	Microgram per m3	32.2	40.9	73.1	60
18° 26' 35"N	82° 39' 53" E	Core Zone	NOx	Microgram per m3	19.8	27	46.8	80
18° 26' 35"N	82° 39' 53" E	Core Zone	SO2	Microgram per m3	10.8	13.9	24.7	80
18° 26' 35"N	82° 39' 53" E	Core Zone	CO	NA	0.5	0.79	1.29	02
18° 25' 17"N	82° 37' 22" E	Buffer Zone	PM10	Microgram per m3	51	76.9	127.9	100
18° 25' 17"N	82° 37' 22" E	Buffer Zone	PM2.5	Microgram per m3	28.7	50.9	79.6	60
18° 25' 17"N	82° 37' 22" E	Buffer Zone	NOx	Microgram per m3	16.1	34.8	50.9	80
18° 25' 17"N	82° 37' 22" E	Buffer Zone	SO2	Microgram per m3	9.4	21.8	31.2	80
18° 25' 17"N	82° 37' 22" E	Buffer Zone	CO	NA	0.5	1	1.5	02

17. Funds Allocated for Environment Management

17.1. Funds Allocated for Environment Management (Capital) (in Lakhs)	220
17.2. Funds Allocated towards Corporate Environmental Responsibility (in Lakhs)	532.5
17.3. Funds Allocated for Environment Management Plan (EMP) (Recurring per Annum) (in Lakhs)	60

Summary of allocation of fund for EMP

EMPs	Capital Cost (INR)	Recurring Cost per Annum (INR)
Water Pollution Control Measures	25	5
Noise Pollution Control Measures	15	1
Greenbelt Development	20	5
Rainwater Harvesting	10	2

Health & Safety measures	20	2
Environment Monitoring	20	20
Air Pollution Control Measures	100	25
Total	220	60

18. Details of Post-project monitoring program

Parameters to be monitored during construction and operation of the unit

Attribute	Parameters proposed for monitoring	Monitoring		Mode of Monitoring	Frequency of Monitoring	Project phase in which monitoring is required	Monitoring Agency
		Lat	Long				
Air Quality	PM10, PM2.5, SOx, NOx, CO	18° 28' 43"	82° 40' 56"	Online Continuous	Continuous	All phases	Third Party
Noise Quality	Noise levels in dB(A)	18° 27' 27"	82° 37' 24"	Manual	Once in year	All phases	Third Party
Water Quality	pH, DO, BOD etc.	18° 31' 31"	82° 37' 10"	Manual	Once in year	All phases	Third Party
Soil quality	Physical and chemical parameters with organic content.	18° 28' 8"	82° 35' 27"	Manual	Once in year	All phases	Third Party

19. Whether Environmental cell is proposed for implementation and monitoring of EMP	Yes
19.1. Organizational structure of the Environmental Management Cell	Given in Chapter - 06 & Chapter-10 of the Final EIA/EMP Report
19.2. Details of responsibilities and scope of work, assigned to each member in the organizational structure of the Environmental Management Cell	Given in Chapter - 06 & Chapter-10 of the Final EIA/EMP Report
19.3. Details on procedure to report observation of Environmental Management Cell to Project Head	Given in Chapter - 06 & Chapter-10 of the Final EIA/EMP Report
20. Whether compliance report from regional office on existing EC is obtained?	Not applicable as proposal is new project

Enclosures

21. Document to be attached

21.1. Upload Copy of Final EIA/EMP Report	final eia report with annexures.pdf
21.2. Executive summary of feasibility report/project report	executive summary.pdf
☐ URL of the MoC or IBM or DMG where it is available?	
Copy of approved mining plan (in case of mining project)	ibm approved mp_ballada bauxite block.pdf
22. Upload Copy of Final Layout Plan (Upload pdf only)	layout drawing.pdf
☐ URL of the site where it is available?	
23. Upload copy of District Survey Report (for mining of minor minerals only)	not applicable.pdf
☐ URL of the MoC or IBM or DMG where it is available?	

24. Upload copy of Replenishment Study Report	not applicable.pdf	

24. Additional Information

S. No.	Document Name	Document	Remark
1	Permission- Surface Water from Jalaput Reservoir	approved application for surface water drawal from jalaput.pdf	Approval letter for use of Surface Water from Jalaput Reservoir
2	FC Stage-I Approval Letter	fc stage-i approval letter.pdf	Forest Clearance Stage-I Approval Letter
3	PH Written submission_Part 12	ph written submission_part 12.pdf	PH Written submission_Part 12
4	PH Written submission_Part 11	ph written submission_part 11.pdf	PH Written submission_Part 11
5	PH Written submission_Part 10	ph written submission_part 10.pdf	PH Written submission_Part 10
6	PH Written submission_Part 9	ph written submission_part 9.pdf	PH Written submission_Part 9
7	PH Written submission_Part 8	ph written submission_part 8.pdf	PH Written submission_Part 8
8	PH Written submission_Part 7	ph written submission_ part 7.pdf	PH Written submission_Part 7
9	PH Written submission_Part 6	ph written submission_part 6.pdf	PH Written submission_Part 6
10	PH Written submission_Part 5	ph written submission_ part 5.pdf	PH Written submission_Part 5
11	PH Written submission_Part 4	ph written submission_ part 4.pdf	PH Written submission_Part 4
12	PH Written submission_Part 3	ph written submission_ part 3.pdf	PH Written submission_Part 3
13	PH Written submission_Part 2	ph written submission_part 2.pdf	PH Written submission_Part 2
14	PH Written submission_Part 1	ph written submission_part 1.pdf	PH Written submission_Part 1
15	Cover Letter	cover letter.pdf	Cover Letter
16	EC Presentation	ec presentation.pdf	EC Presentation
17	Letter of Intent	loi_ballada bauxite.pdf	Letter of Intent (LoI)
18	ToR Letter	tor letter.pdf	ToR letter
19	IBM Approved MP_Ballada Bauxite Block	ibm approved mp_ballada bauxite block.pdf	IBM Approved MP_Ballada Bauxite Block

25. Document CheckList

25.1. Land-Related Documents	Ownership document	Yes
	Mine lease document (in case of mining)	Not Available
	Letter of Intent (in case of mining)	Yes
	Project layout	Yes
	Gazette notification of notified industrial area (if applicable)	Not Applicable
25.2. Public Hearing-Related Details	Public hearing proceedings	Yes
	Advertisements	Yes
25.3. EIA/EMP - Related Details	Pre-feasibility report	Yes
	EIA/EMP report (in case of Cat A, B1)	Yes
	EMP report (in case of Cat B2)	Not Applicable
	Budgetary provision table for EMP	Yes
	Mining plan (in case of mining)	Yes
	DSR in case of minor minerals	Not Applicable
	Permission for withdrawal of surface water	Yes

25.4. Water Permission-Related Details	Permission for withdrawal of surface water	Yes
	Permission for abstraction of ground water	Not Applicable
25.5. Compliance and Monitoring Documents	Certified compliance report (in case of Expansion Proposals)	Not Applicable
	Action Taken Report (if any)	Not Applicable
	Closure report from RO (if any)	Not Applicable
25.6. Previous Clearances	Previous TOR granted (if any)	Not Applicable
	Previous EC granted (if any)	Not Applicable
	Previous EC transferred (if any)	Not Applicable
25.7. Wildlife and Forest Related Documents	Conservation plan for Schedule-I species	Yes
	NBWL/SBWL recommendation	Not Applicable
	In principle (stage-I) forest clearance	Yes
	Final (stage-II) forest clearance	Not Available
25.8. NOC from Other Departments/Ministries	Existing CTE/CTO	Not Applicable
	NOC from airport authority on the permissible height of the building (if applicable)	Not Applicable
25.9. Others	Court case details (if any)	No
	Violation details (if any)	Not Applicable
	Summary of the project	Yes

26. ☑ I certify that I have uploaded all the required documents and correctly indicated them in the checklist. In case any discrepancy is found, or any required document is missing, the application shall be liable to be rejected at our own risk and cost.

Undertaking

27. ☑ I hereby give undertaking that the data and information given in the application and enclosures are true to be best of my knowledge and belief and I am aware that if any part of the data and information is found to be false or misleading at any stage, the project will be rejected and clearance given if any to the project will be revoked at our risk and cost. In addition to the above, I hearby give undertaking that no activity/construction/expansion has been taken up

27.1. Name	Kassireddy Anil Kumar
27.2. Designation	Associate Vice President
27.3. Company	KALINGA ALUMINA LIMITED
27.4. Address	Adani Corporate House, Nr. Vaishno Devi Circle, S.G. Highway, Khodiyar, Ahmedabad-382421
27.5. Date	13/05/2025

Executive Summary

1.0 INTRODUCTION

M/s Kalinga Alumina Limited (formerly known as M/s Mundra Aluminum Limited), a wholly owned subsidiary of Adani Enterprises Limited, has a vision of setting up an integrated greenfield alumina refinery of 4.0 MTPA capacity and also to develop bauxite mines in the vicinity for captive / commercial use. Recently M/s Kalinga Alumina Limited has secured two bauxite blocks in Odisha, viz. Ballada in Koraput district and Kutrumali in Kalahandi/Rayagada district through an auction process.

Adani Group is currently embarking on a strategic growth plan to diversify into mines and metals space. Strong parentage in power, infrastructure, logistics, mining and global presence puts it in a pre-eminent position to make it a globally competitive player in this field.

Adani Group is a global multinational and a front runner with its strong ESG principles. It has vast experience in mining operations of various major minerals such as Coal, Iron Ore, limestone, beach sand, among others and therefore, is in a pre-eminent position to conduct scientific and environment friendly mining

The Government of Odisha, issued letter of intent vide letter SM-MC2-MC-0007-2023/2143/S&M Bhubaneswar dated 1st March 2023 for grant of mining lease for Ballada bauxite block in Village - Ballada, Taluka – Nandapur, District- Koraput, Odisha for an area of 144.945 ha to M/s Mundra Aluminum Limited (now M/s Kalinga Alumina Limited) for period of 50 years.

1.1 PROJECT DESCRIPTION

The proposed project entails mining of Bauxite by opencast mining method with an annual Peak Rated Capacity of ~ 4.0 MTPA of Bauxite (ROM). The project also involves generation of 146508 tonnes (73254 m^3) of Overburden/waste and 51564 tonnes (25782 m^3) of top soil during initial 5 years of operations. Besides, it is envisaged to have crushing/Screening facilities within the lease area with a capacity of 800 TPH at rated production level over an area of 144.945 Ha located at Village - Ballada, Taluka – Nandapur, District- Koraput, Odisha between latitudes 18°26'05.61588" N to 18°27'13.34448" N and Longitude 82°39'32.39136" to 82°40'25.36716" E. & is covered under the Survey of India toposheet no. No. E44K11 (65J/11). The proposed project falls in schedule 1 (a) (i) Mining of Minerals of Category 'B1'.

The mining operation will be carried out as per the approved Mining Plan. Detail of the project is summarized in below attached table:

Table 1.1: Detail of the Project

<table>
<tr><th>S. No.</th><th>Description</th><th>Particulars</th></tr>
<tr><td>1.</td><td>Name of the Project</td><td>Mining of 4.0 MTPA Bauxite (ROM), being the Peak Rated Capacity, 146508 tonnes (73254 m³) of overburden/waste and 51564 tonnes (25782 m³) of top soil over a period of 5 years and setting up of Crushing/ Screening facilities of 800 TPH capacity within the lease area spanning over an area of 144.945 ha</td></tr>
<tr><td>2.</td><td>Production for Plan period</td><td>
<table>
<tr><th>Year</th><th>Top Soil in m³</th><th>O.B. in m³</th><th>OB in Tonnes</th><th>Total Bauxite in Tonnes</th><th>OB to Ore Ratio</th></tr>
<tr><td>Y1</td><td>24072</td><td>0</td><td>0</td><td>1000120</td><td>0</td></tr>
<tr><td>Y2</td><td>1,710</td><td>24,783</td><td>49566</td><td>2024020</td><td>0.012</td></tr>
<tr><td>Y3</td><td>0</td><td>44,671</td><td>89342</td><td>2001482</td><td>0.022</td></tr>
<tr><td>Y4</td><td>0</td><td>3,800</td><td>7600</td><td>2002414</td><td>0.02</td></tr>
<tr><td>Y5</td><td>0</td><td>0</td><td>0</td><td>4001868</td><td>0</td></tr>
<tr><td>Total</td><td>25,782</td><td>73,254</td><td>146508</td><td>11029904</td><td></td></tr>
</table>
</td></tr>
<tr><td>3.</td><td>Mining lease area</td><td>144.945 Ha</td></tr>
<tr><td>4.</td><td>Land use Area</td><td>Forest Land</td></tr>
<tr><td>5.</td><td>New / Expansion</td><td>New</td></tr>
<tr><td>6.</td><td>Category as per EIA Notification</td><td>“B”</td></tr>
<tr><td>7.</td><td>Lease Validity</td><td>28.02.2073</td></tr>
<tr><td>8.</td><td>Proposed Capacity</td><td>4.0 MTPA Bauxite (ROM)</td></tr>
<tr><td>9.</td><td>Life of mine</td><td>9 years</td></tr>
<tr><td>10.</td><td>Type of the Project</td><td>Opencast Mechanized Mining with drilling and blasting</td></tr>
<tr><td>11.</td><td>Probable Mineral Reserve</td><td>19.96 Mt</td></tr>
<tr><td>12.</td><td>Prefeasibility Mineral Resource</td><td>2.17 Mt</td></tr>
<tr><td>13.</td><td>Total Mineable Resource</td><td>22.13 Mt</td></tr>
<tr><td>14.</td><td>Waste to ratio over initial 5 years of</td><td>0.018:1</td></tr>
</table>

S. No.	Description	Particulars
	operation (m^3/t)	
15.	**Bench height and bench width in OB & Mineral**	6.0 m x 10 m
16.	**Slope of Bench in OB and Mineral**	70 degrees
17.	**Overall pit slope**	30 degrees
18.	**Area under mining (Plan Period)**	42.78 Ha.
19.	**Max Depth of working**	30 m
20.	**OB to be Generated**	0.073 Mm^3 (During 5-year Plan period)
21.	**Top Soil to be generated**	0.026 Mm^3 (During 5-year Plan period)
22.	**Waste generation and disposal**	The waste generated in course of pre-mining development and subsequent mining operations will consist of topsoil and laterite with occasional occurrences of khondalite. During the first five years, the rate of generation of waste is expected to be of the order of 0.073 Mm3 or 0.15 MT along with generation of top soil of 0.026 Mm3 The average waste to ore ratio during the first 5 years of operations is estimated to be about 0.018:1. The waste materials will be dumped systematically, as per prudent industry practice. The waste stacked on ground during the initial years of operation will be utilized to partially fill the worked-out areas from time to time as per provisions of the approved mining plan
23.	**Top soil Management**	During initial five-years, top soil generation would be of the order of 0.026 Mm3. Topsoil, stacked separately, would be spread over the reclaimed areas, to enable planting and growing of trees
24.	**Crushing**	The crushing plant and conveyor systems have been designed for 305 days operation per year with 3 shifts operation per day. The size of the product to be obtained after crushing in the plant will be minus 150 mm (d85). For 4 million tons per annum peak rated capacity, the crushing/ Screening plant requirement would be 800 TPH. It is proposed to

S. No.	Description	Particulars
		install crushing and screening plants in phases, 400 TPH (1 no.) for 2 MTPA RoM production and 400 TPH (2 nos.) for 4 MTPA production. One RoM ore stockpile of about 50,000 tonnes capacity will be maintained near the crusher plant
25.	**Transportation**	The crushed bauxite from Ballada mine will be transported by closed conveyor system to Bheja railway station, located at a distance of about 3 KM from the lease boundary. Intra-mine movement of ore and OB shall be carried out using dumpers of appropriate capacity as per provisions of the approved mine plan.
26.	**Infrastructure**	Requisite infrastructure will be developed for mining operation & allied activities such as Rest shelters, Fast-aid center, drinking water supply, Site-offices, and toilets within the mining lease as per requirement.
27.	**Working Regime**	305 days/ year, 3 shifts/day, 8 hours/shift
28.	**Man power**	126 nos
29.	**Power requirement**	The estimated average power requirement is 1 MW, the peak requirement being 1.5 MW. The power shall be sourced from nearest substation located at a distance of 8 km
30.	**Fuel requirement**	HSD: 1487 KL/Annum at peak rated capacity
31.	**Explosive Consumption**	113400 kg per month (ROM Zone Blasting)
32.	**Water requirement**	Total water requirement is 690 KLD in which the Dust Suppression: 600 KLD, Washing and cleaning: 45 KLD Drinking: 10 KLD Afforestation: 15 KLD Miscellaneous: 20 KLD Source: Jalaput Reservoir located at distance of 3 km
33.	**No of tress to be planted and area of greenbelt**	8,440 nos. during plan period, Greenbelt: 4.23 ha
34.	**Total cost of the project**	Rs 230 /- Crore
35.	**Fund Provision for EMP**	Capital - 220.00 Lakhs

S. No.	Description	Particulars
		Recurring - 60.00 Lakhs/year
36.	**Name of the EIA Consultant Organization**	M/s Vardan EnviroNet LLP
37.	**QCI / NABET Accreditation**	Certificate No. QCI/NABET/EIA/2326/RA 0284_Rev.01, Valid up to 04.05.2026

1.2 DESCRIPTION OF THE ENVIRONMENT

Environmental data have been collected in relation to proposed mining for Air, Noise, Water, Soil, Ecology and Biodiversity. The generation of primary data, as well as collection of secondary data and information from the site and surroundings was carried out during summer season, i.e. March 2023 to May 2023 by Vardan EnviroLab, NABL Accredited Lab, in accordance with the guidelines of EIA issued by the Ministry of Environment Forests and Climate Change, Govt. of India and CPCB, New Delhi. Secondary data was collected from different Government sources. The scope of the study has been done as per ToR letter. The EIA study is being done for the Mine Lease (core zone) and area within 10 Km distance from the mine lease boundary (buffer zone), both of which together comprise the study area.

Table 0.2: Baseline Environment Status

Parameters	Baseline Status
Ambient Air Quality	PM10 – 50.4 – 76.9 (µg/m3) PM 2.5 – 28.7 – 50.9 (µg/m3) NOX – 16.1– 34.8 (µg/m3) SO2 – 9.4 – 21.8 (µg/m3) CO – 0.5 – 1.0 (mg/m3)
Noise Level	Noise Level during Day Time - 41.59 – 52.2 Leq.(dB)A Noise Level during Night Time - 34.2 – 43.38 Leq.(dB)A
Water Quality	**Ground Water :** All the Parameters like TDS (320.0– 380.0mg/L). pH (7.55 – 8.24), Total Hardness (142.20- 300.42 mg/L) etc. are found within the permissible limits.
	Surface Water : All the Parameters like TDS (236.0- 400.0 mg/L). pH (7.51 - 7.72), Total Hardness (70.0- 81.0 mg/L) etc. are found within the permissible limits.
Soil Quality	pH – 7.58 – 7.82 Organic Matter – 0.31 – 0.69 (%) Water Holding Capacity – 32.21 – 37.64 (%)

Parameters	Baseline Status
Socio Economic	The proposed project will provide positive impact to the nearby area. The project will provide direct and indirect employment to nearby villagers. Project will generate employment for about 126 persons.
Ecologu and Biodiversity	There is no wildlife sanctuary/biosphere reserve/national parks present within 10 Km radius of the study area. A Site-specific Wildlife Conservation Plan has been prepared and is approved by PCCF (WL) & CWLW for conservation of schedule-I species of the study area.

1.3 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The proposed mining operations are not anticipated to raise the concentration of the pollutants beyond prescribed limits. However, the measures are suggested to mitigate any harmful impacts of pollutants, like the plantation of trees along haul roads, to help reduce the impact of dust on the nearby villages; planning, transportation of mineral by series of conveyors and closed conveyor system, to significantly reduce the dust generation due to transportation; regular water sprinkling on approach roads to avoid dust generation etc. The mining activities is likely to increase the per capita income of local people by which the socioeconomic status of the people will be improved. The local people will be provided with either direct employments or indirect employment such as transport & other business, contract works and development work like roads, etc. and other welfare amenities such as medical facilities, conveyance, free education, drinking water supply etc. Except dust generation, there is no source which can show a probability for health related diseases. Regular water sprinkling will be done with water sprinklers and dust masks will be provided to the workers. All workers will be subjected to a medical examination as per Mines Rule 1955 both at the time of appointment and at least once in a year. Medical camps will be organized for this activity. Insurance for all employees as per the rules will also be carried out.

Table 0.3: Anticipated Environmental impacts and mitigation

Activity	Environmental Aspects	Impact	Impact characteristics	
			Significance	Mitigative measures
Mining				
Excavation	Excavation of area by Drilling, blasting and excavator and dumper combination	Air Pollution,	Significant	Dust curtains will be installed on drill rigs. Water injector will be used on drill rigs to minimize dust emission. Blast will only be conducted when meteorological conditions are favorable. Thick greenbelt will be developed.
	Mine runoff	Water Pollution	Significant	All the fines will be arrested in a very systematic established framework of protective measures like Garland drain, Gabion wall, retaining wall, check dam, settling tank, ETP and STP.
	Due to Drilling, blasting and excavator and dumper	Noise Pollution	Significant	Provision and maintenance of thick tree belts Proper maintenance of noise generating machinery including the transport vehicles. Provision of protective devices like ear muffs/ear plugs to workers. Confining the noise by isolating the source of noise
	Excavation of Bauxite	Land use	Significant	Land will be covered with plantation after backfilling and stabilisation after due technical and biological reclamation.
Drilling	Generation of dust	Air pollution	Significant	Wet drilling method Introduction of dust suppression system Installation of permanent pipe water sprinkler along mine haul road and Development of green belt

Activity	Environmental Aspects	Impact	Impact characteristics	
			Significance	Mitigative measures
	Generation of Gaseous emissions	Air pollution (SO2/NOx/CO)	Insignificant	Regular maintenance of Drilling M/c to reduce gaseous emissions.
	Generation of Noise	Noise Pollution	Insignificant	Operator Cabin is enclosed. Ear muff shall be also be provided to the operator. Confining the noise by isolating the source of noise. Reducing the exposure time of workers to the higher noise levels.
Blasting	Dust generation	Air pollution	Significant	Controlled blasting with proper burden, spacing, safe charge and adequate stemming shall be done. Non electric (NONEL) initiation system shall be used.
	Gaseous emission	Air pollution NOx / CO	Insignificant	Emulsion/slurry explosive/ ammonium nitrate fuel oil mixture (ammonium nitrate: fuel oil = 94:6 by weight) will be used.
	Vibration & Air blast	Damage to nearby structures & buildings	Significant	Safe explosive charge will be decided based on Vibration study
	Fly rock generation	Potential for accidents (damage to equipment etc.)	Significant	Blasting Shelters will be provided Warning Signal will be placed Danger Zone shall be marked with Red Flag
Transportation of mineral	Dust generation	Air pollution	Significant	Water sprinkling will be done on haul road and use of closed conveyor system for mineral transport. Transportation of mineral (Bauxite) within mining lease area will be done by series of conveyors & upto the railway siding by closed conveyor system, which will significantly reduce dust generation.
	Gaseous emission	Air pollution SO2/NOx/CO/HC	Insignificant	Regular maintenance of Dumper / Tippers to keep emissions under control

Activity	Environmental Aspects	Impact	Impact characteristics	
			Significance	Mitigative measures
Transportation of waste to Waste Dump	Dust generation	Air pollution	Significant	Water sprinkling will be done on haul road, greenbelt development within lease area. The small quantity of excavated waste would be transported to dump through dumpers, with water sprinkling arrangements and plantation, dust generation would be reduced significantly.
	Gaseous emission	Air pollution SO_2/NOx/HC	Insignificant	Regular maintenance of Dumper / Tippers to keep emissions under control.
Grading of Haul Road	Dust generation	Air pollution SPM/RPM	Insignificant	Operators are in closed cabins of Grader. Dust mask shall be provided
	Gaseous emission	Air pollution SO2/NOx/CO	Insignificant	Proper maintenance of Grader shall be done to keep emissions low.
	Noise generation	Noise pollution	Insignificant	Insignificant. No action needed. PPE shall be provided
Operation of Crusher				
Operation of Crusher	Generation of dust	Air Pollution,	Significant	Use of dust mask by crusher operator. Development of greenbelt. Sprinkling of water
	Generation of Noise	Noise Pollution	Significant	Use of ear muff near crusher Proper maintenance of crusher
DG Set				
DG Set	Flue gas emission, used oil generation	Air Pollution	Insignificant	The DG will be operated in case of power failure only. Green DG sets shall be installed

Activity	Environmental Aspects	Impact	Impact characteristics	
			Significance	Mitigative measures
	Generation of noise during DG Set operation	Noise Pollution	Significant	The DG Sets will have acoustic enclosure to minimize the noise.
Domestic Use				
Operation of domestic utilities	Washroom, toilets – Wastewater generation	Water Pollution	Significant	The sewage will be treated in septic tank.
Greenbelt Development				
Development and maintenance of Green Belt	Plantation of trees within premises. to cover 33% of the area	Reduction in Air Pollution and Noise Pollution	Insignificant	Positive Impact due to development of a proper green belt along the periphery of the premises. This will act as barrier for air emission and noise Mine area will be afforested after the end of mine life.
Socio-economic Development				
Employment Generation	Operation of mine	Socio-economic		Positive Impact due to direct employment of persons from the nearby area
				Substantial benefits in the form of contracts to local agencies for different services.
				Employment generation in transport sector for transportation of material.

1.4 ANALYSIS OF ALTERNATIVES

All the option for technology alternatives of the proposed project have been analysed. since it is a mineral specific project therefor analysis of alternative site is not applicable.

1.5 ENVIRONMENTAL MONITORING PROGRAM

In order to maintain the environmental quality within the stipulated standards, regular monitoring of various environmental components is necessary which will comply as per conditions. For this the lessee has taken the decision to formulate an Environment Policy of the mine and constitute an Environmental Management Cell and committed to operate the mine with the objectives mentioned in Environment Policy. EMP may also require measurement of ambient environmental quality in the vicinity of a site using ecological/biological, physical and chemical indicators. Monitoring may include socioeconomic interaction, through local liaison activities or even assessment of complaints. Regular Monitoring of all the environmental parameters *viz.*, air, water, noise, SE, EB and soil, as per the formulated program based on CPCB and MoEF&CC guidelines will be carried out every year. The location of the monitoring stations will be selected on the basis of prevailing micro meteorological conditions of the area like; wind direction and wind speed, relative humidity, temperature.

1.6 ADDITOINAL STUDIES

As per Ministry's OM dated 30.09.2020, the Ministry has decided to deliberate on the and commitments made by the project proponent to address the issues raised in the Public Hearing held on 06.03.2025. Total budget for implementation of the activities is Rs. 532.50 Lakhs.

1.7 PROJECT BENEFIT

Project will generate employment for about 126 persons directly. In addition, more than 100-150 people will be benefited indirectly. Management will engaged the Skilled, semi-skilled and unskilled workers from the nearby villages. The company management will contribute to the Educational Development, Infrastructure Development etc. for the welfare of the villagers. It has proposed to plant 8440 no. of trees till the plan period. The respective regulatory authority will strictly monitor the compliance of the mine lease in this regard. Other than this social development of the village will be considered as per social requirement of locality.

1.8 ENVIRONMENTAL MANAGEMENT PLAN

As per Above discussion there is no major impact on the environment due to mining except fugitive emission in the form of dust generated during mining and its allied activity. The adequate preventive measures will be adopted to contain the various pollutants within permissible limits. Plantation program will be carried out which will

be an effective pollution mitigate technique, and help avoid soil erosion during monsoon season. Employment opportunities will be provided to the locals. A budget of Rs. 220 Lakhs as a capital cost and Rs 60 lakhs per year for recurring cost for plan period has been kept for EMP.

1.9 CONCLUSION

The proposed project will have minimal impacts on surrounding environment due to manual mining operation as detailed in the report, however the impacts can be minimized by effective implementation of Environment Management Plan and continula monitoring of EMP to overcome any other remedial measures required as suggested in the EIA study. On the other hand, this project is likely to have several benefits like improvement in direct and indirect employment generation and economic growth of the area, by way of improved infrastructure facilities and better socio-economic conditions. Ultimately it gives financial and social benefits for the local people there by improving their standard of living.

PROCEEDINGS OF THE MEETING OF STATE LEVEL EXPERT APPRAISAL COMMITTEE, ODISHA HELD ON 22ND SEPTEMBER 2023

The SEAC met on 22nd September 2023 at 10:30 AM in the Conference Hall of Odisha State Pollution Control Board, Bhubaneswar under the Chairmanship of Sri Sashi Paul. The following members were present in the meeting.

1.	Sri Sashi Paul	-	Chairman (through VC)
2.	Dr. K. Murugesan	-	Member Secretary
3.	Dr. Rabi Narayan Patra	-	Member (through VC)
4.	Dr. Chittaranjan Panda	-	Member
5.	Prof. (Dr.) H.B. Sahu	-	Member (through VC)
6.	Prof. (Dr.) Abanti Sahoo	-	Member (through VC)
7.	Er. Fakir Mohan Panigrahi	-	Member (through VC)
8.	Prof. (Dr.) B.K. Satpathy	-	Member
9.	Er. Kumuda Ranjan Acharya	-	Member
10.	Shri Jayant Kumar Das	-	Member
11.	Dr. Ashok Kumar Sahu	-	Member
12.	Dr. K. C. S Panigrahi	-	Member (through VC)

Draft proceedings of the meeting was finalized by the members through e-mail and final proceedings of the meeting was confirmed by the members through e-mail. The agenda-wise proceedings and recommendations of the committee are detailed below.

ITEM NO. 01

PROPOSAL OF ENVIRONMENTAL CLEARANCE FOR M/S EVOS BUILDCON PVT. LTD. OF RESIDENTIAL PROJECT "EVOS AMANI" PLOT AREA17,342.50 SQUARE METER (4.285 ACRES), PROPOSED BUILT UP AREA – 92,774.928 SQM, DWELLING UNITS (414 NOS.), 4 BLOCKS/TOWERS AT CHANDAKA, TEHSIL - BHUBANESWAR, DISTRICT- KHURDA OF SRI KALINGA KESHARI RATH - EC

1. This proposal is for Environmental Clearance for M/s Evos Buildcon Pvt. Ltd. of Residential project "Evos Amani" Plot area17,342.50 Square Meter (4.285 Acre), Proposed Built up Area – 92,774.928 sqm, Dwelling Units (414 nos.), 4 blocks/Towers at Village - Chandaka, Tahasil-Bhubaneswar, District-Khurda of Sri Kalinga Keshari Rath.
2. **Category**: This project falls under Category "B", Project or Activity 8(a) Building and Construction projects as per EIA Notification dated 14th Sept, 2006 as its amendments.
3. **Location and connectivity:** The project site is located at Plot no. 2157, 2161/7460, 2161/7461, 2161/7462, 2161/7463, 2161/7464, 2161/7465, 2161/7466, 2161/7467, 2162, 2164, 2210, 2212, 2209/8684, 2209/4303 & 2209/4304, Khata No. 697, 603/5485, 603/5486, 603/5487.603/5488, 603/5489, 603/5490, 603/5491, 603/5492, 603/1253, 312, 603/825, 603/6905 & 603/564 in Village - Chandaka, Tahasil- Bhubaneswar in Khurda district, Odisha bounded by Latitude: 20°22'8.66"N and Longitude: 85°46'8.99"E. The project site is well connected by Chandaka

ITEM NO. 03

PROPOSAL FOR ENVIRONMENTAL CLEARANCE FOR M/S. KALINGA ALUMINA LIMITED OF BALLADA BAUXITE MINE FOR A PEAK RATED CAPACITY OF 4.0 MTPA OVER A MINING LEASE AREA OF 144.945 HA AT VILLAGE - BALLADA, TALUKA – NANDAPUR, DISTRICT-KORAPUT OF SRI KASSIREDDY ANIL KUMAR - TOR

2. The proposal was considered by the committee to determine the "Terms of Reference (ToR)" for undertaking detailed EIA study for the purpose of obtaining environmental clearance in accordance with the provisions of EIA Notification,2006 and amendment thereafter.
3. This proposal is for Terms of Reference for environmental clearance of M/s. Kalinga Alumina Limited of Ballada Bauxite Mine for a Peak Rated Capacity of 4.0 MTPA over a mining lease area of 144.945 ha at Village - Ballada, Taluka – Nandapur, District- Koraput of Sri Kassireddy Anil Kumar.
4. **Category:** The proposed project falls in schedule 1 (a) - Mining of Minerals, under Category "B", as per EIA notification – 2006 and amendment thereof issued by the Ministry of Environment, Forests and Climate Change, New Delhi.
5. The company was declared preferred bidder for this block on 17-02-2023.The letter of Intent has been issued vide letter no. SM-MC2-MC-0007-2023/2143/S&M Bhubaneswar dated 1st March 2023 by Steel and Mines Department, Government of Odisha.
6. The project involves open cast mining of Bauxite (ROM) with 4.0 MTPA capacity & setting up of 800 TPH Crusher/screening plant at pit head.
7. Mining Plan along with Progressive Mine Closure Plan has been approved by IBM vide letter No. MCDR-MiFL0BXT/5/2023-BBS-IBM_RO-BBS dated 8th August 2023.
8. Forest application has been submitted vide proposal no. FP/OR/MIN/QRY/442417/2023 dated 1st September 2023. Ballada Block is virgin bauxite block located in Nandapur Tehsil of Koraput district in Odisha, total mining lease area is 144.945 ha, located entirely within Nagasari reserve forest. The project contemplates to develop the mine and surrounding infrastructures for commercial production of bauxite of 4 MTPA peak rated capacity using opencast mining. In addition to ML area 12.267 ha area to be required for evacuation of minerals. Hence forest diversion application has been submitted for 157.212 ha.
9. **Location and connectivity:** Ballada Bauxite Block by opencast mining method with an annual Peak Rated Capacity of ~ 4.0 MTPA of Bauxite (ROM), located at village - Ballada, Tehsil – Nandapur, District – Koraput, Odisha. Ballada Bauxite Block covers an area of about 144.945 ha bounded by latitudes 18°26'05.61588" N / 18°27'13.34448" N and Longitudes 82°39'32.39136" / 82°40'25.36716" E. The lease area is covered under Survey of India toposheet no. E44K11 (65J/11). 144.945 Ha of Mine Lease area is Forest Land (Nagasari RF) under Koraput Forest Division. The mineral bearing plateau is situated about one kilometer west of Ballada village and about 8 km north of Padwa in Koraput district, Odisha. Jeypore, a major town in the Koraput district, is about 82 km NNW of the Ballada deposit and is approachable by major district road No.52. Koraput, the district headquarters is at 60 km north of the deposit and is connected by a metalled road via Similiguda on NH 26. Bheja, the nearest Railway Station is about 5 km due north-east. The nearest airport is at Visakhapatnam, about 140 km SE from the lease area. The

Nearest Water body is Jalaput reservoir located at a distance of 3 km South and SW. Nearest reserve forest is Nagasari RF i.e., entire mine lease area of 144.945 Ha. Nearest habitation is Ballada village, about 1 km in East.

10. **Method of Mining**: The deposit lies on surface, and it is proposed to be mined by mechanized opencast method of mining with excavator/ dumper combination. Deep hole drilling/Short hole drilling and blasting is proposed after taking prior permission from DGMS. Further, it is proposed to mine with Ripping-Dozing method and/or deployment of Surface Miner at a later date, based on feasibility.

Table: Proposed list of equipment

S No	Particulars	Make	Capacity	No. of equipment
i)	Diesel hydraulic shovel	Volvo EC480/Komatsu PC 450/TATA Hitachi ZX 670	3.1 cum	4
ii)	Dumper	Bharat Benz 3528	16 m^3	11
iii)	DTH drill	Epiroc-T40	Hole Dia -115 mm	3
iv)	Dozer	BEML D-155	324 p)	1

11. **Transport:** Mined bauxite (R.O.M) shall be transported to the crushing/screening plant through mine haul trucks. Evacuation of crushed bauxite is planned through a combination of road and rail route. There is an existing motorable approach road to the east of the mine which connects MDR-52 (Visakhapatnam-Jeypore Road). Bauxite shall be transported through 30 tonner dump trucks via the aforestated road to the nearest "Bheja Railway Station" from where it will be loaded on railway wagons using front end loaders and subsequently despatched to destination. Empty trucks shall return to mine for repeat loading. OB within the lease will be transported through rear-dump trucks to the dump area within the lease.

12. **Waste generation and management**: The waste generated in course of pre-mining development and subsequent mining operation will consist of topsoil and laterite with occasional occurrences of khondalite. During the first five years the rate of generation of waste is expected to be of the order of 0.073 Mm^3 or 0.15 MT of along with generation of 0.026 Mm^3 of Topsoil. Considering this, an average ore to waste ration of 1:0.018 is estimated. It is planned to stack topsoil and waste separately on ground during the initial 4 years of plan period. From 5th year onwards, waste material will be dumped systematically. Topsoil, stacked separately, would be spread over the reclaimed areas, to enable planting and growing of trees.The waste stacked on ground during the initial years of operation will be utilized to fill the worked-out areas at the end of the working life of the mine as well as during the interim period, as and when practicable. The generation of waste during the 5 year plan period will be very less and shall be dumped systematically. No backfilling is proposed during the initial 5 year period.

Table: **Proposed production plan during first five-year period**

Year	Top Soil Volume (m^3)	Over Burden/Waste Volume (m^3)	ROM Quantity (t)
Year 1	24072	0	1000120
Year 2	1710	24783	2024020

Year 3	0	44671	2001482
Year 4	0	3800	2002414
Year 5	0	0	4001868

13. **Water requirement and wastewater management**: The water requirement of the project during operation phase is 690 KLD. Water will be sourced from nearby Jalaput lake located at distance of 3 km. Wastewater generated from workshop will be treated using oil-water separator and treated water will be used in vehicle washing. Wastewater generated from mine office, rest shelters etc. will be disposed in soak pit via septic tank.

14. **Power requirement**: The estimated average power requirement is 1 MW, the peak requirement being 1.5 MW. Power shall be sourced from nearest substation located at a distance of 8 km at Padwa. Renewable energy source proposed to install is around 160 KW, which will be about 10 % contribution for the total power requirement.

15. **Greenbelt**: The greenbelt is proposed as per the following table.

Sr. No	Year	Area Proposed to be Covered (Ha)	Number of Plants Proposed	Expected Survival Rate (%)	Estimated Expenditure (INR)
1	Year 1	0.72	1440	75	2,01,600
2	Year 2	0.86	1720	75	2,40,800
3	Year 3	1.16	2320	75	3,24,800
4	Year 4	0.68	1360	75	1,90,400
5	Year 5	0.80	1600	75	2,24,000
Total		**4.22**	**8440**		**11,81,600**

16. **Manpower requirement**: Project will generate employment for about 126 persons directly, besides its potential to generate considerable indirect employment and livelihood opportunities.

17. **Project cost**: Total cost of the project is about Rs. 230 Crores which includes cost of Infrastructures, Land Acquisition and other development costs.

18. **Environment Consultant**: The Environment consultant **M/s Vardan Environet, Gurugram** along with the proponent made a presentation on the proposal before the Committee.

Considering the information / documents furnished by the proponent and presentation made by the consultant **M/s Vardan Environet, Gurugram**, the SEAC prescribed the following specific ToRs in addition to standard ToRs as per **Annexure – A** for conducting detailed EIA study.

i) The following information to be submitted.

   a) Compliance of mining plan, including waste and OB dump management, mine closure plan etc.

   b) Compliance to Common cause judgment

   c) Status of R&R

   d) Compliance of plantation

   e) Compliance of public hearing issues

f) Status of complaints/ court cases/legal action

g) Any other relevant environmental issue / parameter.

h) The following studies be undertaken by domain experts, viz:

- Blast vibration study
- Socio economic study of the neighbouring habitation
- Biodiversity study with audit mechanism.
- Slope stability study for both mines and OB /waste dumps.
- Surface runoff management along with rainwater harvesting and ground water recharge include the design of drainage structures.
- Traffic density study, both inside the mines and at haulage roads, intersecting points of haulage road with public road.
- Hydrology study: The study findings and the mitigation measures thereof to be submitted.
- Process scheme details of the crusher / screening plant such as dry / wet crushing etc. If dry crushing, then management plan for dust control. If wet crushing, then plan for treating used water and its recycle etc.

ii) Cost of the CER calculated shall be utilized for the concerns of the people in terms of health, education, and infrastructure and environment protection. Project Proponent also shall include the budget for the betterment of schools nearby and to facilitate the online education system by providing Wi-Fi connectivity and desktops/tablets.

iii) The project proponent should provide in the EIA Report details of all the statutory clearances, permissions, no objection certificates, consents etc. required for this project under various Acts, Rules and regulations and their status or estimated timeline after grant of EC.

iv) The project proponent should submit the revenue plan for mining lease, revenue plan should be imposed on the satellite imaginary clearly demarcate the Govt. land, private land, agricultural land etc.

v) The project proponent should submit the real-time aerial footage & video of the mining lease area and of the transportation route. The project proponent should submit the detailed plan in tabular format (year-wise for life of mine) for afforestation and green belt development in and around the mining lease. The project proponent should submit the number of saplings to be planted, area to be covered under afforestation & green belt, location of plantation, target for survival rate and budget earmarked for the afforestation & green belt development. In addition to this the project proponent should show on a surface plan (5-year interval for life of mine) of suitable scale the area to be covered under afforestation & green belt clearly mentioning the latitude and longitude of the area to be covered during each 5 years. The capital and recurring expenditure to be incurred needs to be submitted. Presently in India there are many agencies which are developing forest in short interval of time. Thus, for the plantation activities details of the experts/agencies to be engaged needs to be provided with budgetary provisions.

vi) The project proponent should submit the quantity of surface or ground water to be used for this

project. The complete water balance cycle needs to be submitted. In addition to this PP should submit a detailed plan for rain water harvesting measures to be taken. PP should submit the year wise target for reduction in consumption of the ground/surface water by developing alternative source of water through rain water harvesting measures. The capital and recurring expenditure to be incurred needs to be submitted.

vii) The project proponent should clearly bring out the details of the manpower to be engaged for this project with their roles /responsibilities/designations. In addition to this the project proponent should mention the number and designation of person to be engaged for implementation of environmental management plan (EMP). The capital and recurring expenditure to be incurred needs to be submitted.

viii) The project proponent should submit the year-wise, activity wise and time bound budget earmarked for EMP, occupational health surveillance & Corporate Environmental Responsibility. The capital and recurring expenditure to be incurred needs to be submitted.

ix) The project proponent should submit the measures/technology to be adopted for prevention of illegal mining and pilferage of mineral. The project proponent should submit the detailed mineralogical and chemical composition of the mineral and percentage of free silica from a NABL/MoEF&CC accredited laboratory.

x) The project proponent should clearly show the transport route of the mineral and protection and mitigative measure to be adopted while transportation of the mineral. The impact from the center line of the road on either side should be clearly brought out supported with the line source modelling and isopleth. Further, frequency of testing of Poly Achromatic Hydrocarbon needs to be submitted along with budget. Based on the above study the compensation to be paid in the event of damage to the crop and land on the either side of the road needs to be mentioned. The project proponent should provide the source of equations used and complete calculations for computing the emission rate from the various sources.

xi) The project proponent should clearly bring out that what is the specific diesel consumption and steps to be taken for reduction of the same. Year-wise target for reduction in the specific diesel consumption needs to be submitted.

xii) The project proponent should bring out the awareness campaign to be carried out on various environmental issues, practical training facility to be provided to the environmental engineer/diploma holders, mining engineer/diploma holders, geologists, and other trades related to mining operations. Target for the same needs to be submitted.

xiii) The budget to be earmarked for the various activities shall be decided after perusal of the Standard EC conditions. After perusal of Standard EC conditions if agreed the project proponent should also submit an undertaking by the way of affidavit for Compliance of Standard EC conditions already prescribed by the Ministry vide O.M. No and Specific condition if prescribed by the SEAC/SEIAA, Odisha.

xiv) The project proponent should ensure that only NABET accredited consultant shall be engaged for the preparation of EIA/EMP Reports. The project proponent shall ensure that accreditation of consultant shall be valid during the collection of baseline date, preparation of EIA/EMP report and during the appraisal process. The project proponent and consultant should submit an undertaking the information and data provided in the EIA Report and submitted to the SEIAA,

Odisha are factually correct and the project proponent and consultant are fully accountable for the same.

xv) The project proponent should submit the photograph of monitoring stations & sampling locations. The photograph should bear the date, time, latitude & longitude of the monitoring station/sampling location. In addition to this the project proponent should submit the original test reports and certificates of the labs which will analyze the samples.

xvi) "Zero discharge" management & "Zero Dust Re-suppression" management with SOP be submitted.

xvii) Internal roads, drain management with network of the drain, retaining walls and settling tanks with ETPs be submitted.

xviii) Details of air quality monitoring stations of the area and additional stations at entry and exit of mines and haulage roads, habitation to be considered.

xix) Construction and perennial maintenance of haulage road with details of plantation and the species thereof to be submitted.

xx) Parking plaza layout with maximum no. of vehicles and types of vehicles that can be parked with basic amenities and facilities.

xxi) Forest Clearance details with copy of all Forest Clearance.

xxii) Status of complaints/ court cases/legal action regarding to lease along with a detailed write up indicating case no., purpose of the case etc.

xxiii) Copy of lease document.

xxiv) Details of waste management i.e. composition and nature of waste generated, tabulated form showing year wise waste generation, usage and storage.

xxv) Project Proponent shall consider developing a good nursery in nearby village for production of saplings of 4-6 feet height for planting in safety zone, sides of external haulage roads and distribution among villagers for planting in their private land/ community land. The nursery may be developed by company on their own or in collaboration with forest department. A detailed proposal to this effect shall be submitted. The proponent shall ensure to use organic fertilizer in the nursery.

xxvi) Comprehensive water management, water balance with water harvesting and its reuse both monsoon and non-monsoon period.

xxvii) STP plan with design with location in the layout map for domestic waste water treatment.

xxviii) Provision of solar power (percentage wise) with detail plan.

xxix) To submit the network with dimension of concrete cement roads inside the mining lease area and haulage road.

xxx) To submit parking plaza at entry and exit of the mines with basic amenities.

xxxi) Plan and SoP to be submitted for water sprinkling inside the mines and outside in haulage road including regular vacuum cleaning and Zero Dust Resuspension system to completely mitigate and arrest fugitive dust emission.

xxxii) Total water management including domestic use w.r.t sourcing from borewell, rain water harvesting and recycling of waste water from ETP/STP, both for monsoon and non-monsoon be submitted.

xxxiii) Measures to be taken for arresting and mitigation of occupational health hazard including identification of the same, both for employees and nearby/surrounding habitation.

xxxiv) Year wise waste/OB management with reference to generation and utilization in consideration with dynamic movement of inventory indicating dump area and dimension of storage be submitted.

xxxv) Find out the possibility of other alternatives for approach road so that felling of 1000 trees proposed can be avoided.

xxxvi) Submit Wildlife Conservation plan duly certified from the concerned DFO.

xxxvii) Submit copy of application of forest diversion proposal and current status of it.

xxxviii) Explore possibility for construction of reservoir or adopt appropriate rainwater harvesting methods for collection of rain water and its usage.

xxxix) Submit Mine closure Plan with supporting documentation.

xl) Submit Standard Operating Procedure for magazine management.

xli) This Bauxite mines is meant for captive use. The proponent has not yet established any refinery in the state. They have to give details of use of Bauxite in absence of refinery and also an undertaking that Bauxite Ore cannot export outside the state.

xlii) Possibility of restoration/ creation of the pond present within lease area so that villagers can use it in future after mining lease period expires.

ITEM NO. 04

PROPOSAL OF ENVIRONMENTAL CLEARANCE FOR KHARIDA SAND BED MINING PROJECT ON JUNCTION OF RUSHIKULYA & GHORAHARA RIVER OVER AN AREA 5.261 HA AT KHATA NO-554, PLOT NO-4553/1 & 4532/1, VILLAGE- KHARIDA, TEHSIL HINJILICUT, DISTRICT-GANJAM OF SHRI KIRAN KUMAR PANDA - EC

1. This proposal is for Environmental Clearance for Kharida Sand Bed Mining Project on junction of Rushikulya & Ghorahara River over an area 5.261 ha at Khata No-554, Plot No-4553/1 & 4532/1, Village- Kharida, Tehsil Hinjilicut, District- Ganjam of Shri Kiran Kumar Panda.
2. **Category**: As per EIA Notification,2006 and its subsequent amendments, the proposed project falls under Category B in Schedule in item 1(a)- Mining of Minerals.
3. The Mining Lease has been granted vide letter no 1587 dated 02.03.2021. The Successful Bidder is Sri. Kiran Kumar Panda. S/O Late Gopinath Panda, Khalasi Sahi, Po: Berhampur, PS: Berhampur Sadar, Dist:Ganjam, State:Odisha.
4. The Mining Plan of Kharida Sand Bed Mining Project has been approved by Deputy Director of Geology, O/o The Joint Director of Geology, South Zone, Berhampur, Odisha vide letter no 1274 dated 06.10.2020.

ANNEXURE – A

TERMS OF REFERENCE (ToR) FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT STUDY AND INFORMATION TO BE INCLUDED IN EIA/EMP REPORT FOR M/S. KALINGA ALUMINA LIMITED OF BALLADA BAUXITE MINE FOR A PEAK RATED CAPACITY OF 4.0 MTPA OVER A MINING LEASE AREA OF 144.945 HA AT VILLAGE - BALLADA, TALUKA – NANDAPUR, DISTRICT- KORAPUT OF SRI KASSIREDDY ANIL KUMAR – TOR.

A. STANDARD TOR FOR MINING PROJECT

1. 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..
2. 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.
3. 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.
4. A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.
5. 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.
6. All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/toposheet, topographic sheet, 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).
7. 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.
8. 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.
9. 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

Asst. Environmental Scientist

Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the proposed safeguard measures in each case should also be provided.

10. 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.

11. 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 operational phases and submitted. Impact, if any, of change of land use should be given.

12. 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.

13. 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.

14. 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.

15. 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.

16. The vegetation in the RF / PF areas in the study area, with necessary details, should be given.

17. 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.

18. 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 Wildlife and copy furnished.

19. 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 along with 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

Asst. Environmental Scientist

project cost.

20. 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 SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered.

21. 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 failing under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).

22. 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 (ease 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.

23. 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 PM_{10}, particularly for free silica, should be given.

24. 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 wind roses showing pre-dominant wind direction may also be indicated on the map.

25. 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.

26. Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.

27. 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,

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28. 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.

29. 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 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.

30. Details of any stream, seasonal or otherwise, passing through the tease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be.

31. 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.

32. 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.

33. 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.

34. Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.

35. 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.

36. 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.

37. 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.

38. 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

Asst. Environmental Scientist

dimensions may be given with time frames for implementation.

39. 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.

40. 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.

41. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.

42. The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.

43. A Disaster management Plan shall be prepared and included in the EIA/EMP Report.

44. 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.

45. The activities and budget earmarked for Corporate Environmental Responsibility (CER) shall be as per MoEF&CC, Govt. of India O.M No 22-65/2017-IA. II (M) dated 01.05.2018 and the action plan on the activities proposed under CER shall be submitted at the time of appraisal of the project included in the EIA/EMP Report.

46. The Action Plan on the compliance of the recommendations of the CAG as per MoEF&CC, Govt. of India Circular No. J-11013/71/2016-IA.I (M), dated 25,10.2017 needs to be submitted at the time of appraisal of the project and included in the EIA/EMP Report.

47. Compliance of the MoEF&CC, Govt. of India Office Memorandum No. F: 3-50/2017-IA.III (Pt.), dated 30.05.2018 on the judgement 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 needs to be submitted and included in the EIA/EMP Report.

B. 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.

Asst. Environmental Scientist

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.

C. The prescribed TOR would be valid for a period of four years for submission of the EIA/EMP report.

Asst. Environmental Scientist

Minutes of 141st Meeting of SEIAA, Odisha Held on 01.11.2023 & 02.11.2023

AGENDA NO.141.01	
Proposal No.	SIA/OR/MIN/439954/2023
Date of application	01.09.2023
File no.	439954/109-MINB1/09-2023
Project Type	Proposal for ToR
Category	B1
Project/Activity including Schedule No.	1(a) Mining of minerals
Name of the Project	Proposal for ToR of M/s. Kalinga Alumina Limited for Ballada Bauxite Mine for a Peak Rated Capacity of 4.0 Mtpa over a Mining lease area of 144.945 Ha at Village -Ballada, Taluka–Nandapur, District- Koraput of Sri Kassireddy Anil Kumar
Name of the company/Organization	Sri Kassireddy Anil Kumar (Associate Vice President) Kalinga Alumina Limited
Location of Project	Village-Ballada, Taluka-Nandapur, District-Koraput
ToR Date	N/A
Name of the Consultant	M/s Vardan Environet, Gurugram

1. **Proposal in brief:** The highlights of the proposal as ascertained from the application and as revealed from proceedings/discussion held during the meeting of SEAC/SEIAA, are given as under.

i) The proposal was considered by the committee to determine the "Terms of Reference (ToR)" for undertaking detailed EIA study for the purpose of obtaining environmental clearance in accordance with the provisions of EIA Notification,2006 and amendment thereafter.

ii) This proposal is for Terms of Reference for environmental clearance of M/s. Kalinga Alumina Limited of Ballada Bauxite Mine for a Peak Rated Capacity of 4.0 MTPA over a mining lease area of 144.945 ha at Village - Ballada, Taluka – Nandapur, District- Koraput of Sri Kassireddy Anil Kumar.

iii) **Category:** The proposed project falls in schedule 1 (a) - Mining of Minerals, under Category "B", as per EIA notification – 2006 and amendment thereof issued by the Ministry of Environment, Forests and Climate Change, New Delhi.

iv) The company was declared preferred bidder for this block on 17-02-2023.The letter of Intent has been issued vide letter no. SM-MC2-MC-0007-2023/2143/S&M Bhubaneswar dated 1st March 2023 by Steel and Mines Department, Government of Odisha.

v) The project involves open cast mining of Bauxite (ROM) with 4.0 MTPA capacity & setting up of 800 TPH Crusher/screening plant at pit head.

vi) Mining Plan along with Progressive Mine Closure Plan has been approved by IBM vide letter No. MCDR-MiFL0BXT/5/2023-BBS-IBM_RO-BBS dated 8th August 2023.

vii) Forest application has been submitted vide proposal no. FP/OR/MIN/QRY/442417/2023 dated 1st September 2023. Ballada Block is virgin bauxite block located in Nandapur Tehsil of Koraput district in Odisha, total mining lease area is 144.945 ha, located entirely within Nagasari reserve forest. The project contemplates to develop the mine and surrounding infrastructures for commercial production of bauxite of 4 MTPA peak rated capacity using opencast mining. In addition to ML area 12.267 ha area to be required for evacuation of minerals. Hence forest diversion application has been submitted for 157.212 ha.

viii) **Location and connectivity**: Ballada Bauxite Block by opencast mining method with an annual Peak Rated Capacity of ~ 4.0 MTPA of Bauxite (ROM), located at village - Ballada, Tehsil – Nandapur, District – Koraput, Odisha. Ballada Bauxite Block covers an area of about 144.945 ha bounded by latitudes 18°26'05.61588" N to 18°27'13.34448" N and Longitudes 82°39'32.39136" to 82°40'25.36716" E. The lease area is covered under Survey of India toposheet no. E44K11 (65J/11). 144.945 Ha of Mine Lease area is Forest Land (Nagasari RF) under Koraput Forest Division. The mineral bearing plateau is situated about one kilometer west of Ballada village and about 8 km north of Padwa in Koraput district, Odisha. Jeypore, a major town in the Koraput district, is about 82 km NNW of the Ballada deposit and is approachable by major district road No.52. Koraput, the district headquarters is at 60 km north of the deposit and is connected by a metalled road via Similiguda on NH 26. Bheja, the nearest Railway Station is about 5 km due north-east. The nearest airport is at Visakhapatnam, about 140 km SE from the lease area. The Nearest Water body is Jalaput reservoir located at a distance of 3 km South and SW. Nearest reserve forest is Nagasari RF i.e., entire mine lease area of 144.945 Ha. Nearest habitation is Ballada village, about 1 km in East.

ix) **Method of Mining**: The deposit lies on surface, and it is proposed to be mined by mechanized opencast method of mining with excavator/ dumper combination. Deep hole drilling/Short hole drilling and blasting is proposed after taking prior permission from DGMS. Further, it is proposed to mine with Ripping-Dozing method and/or deployment of Surface Miner at a later date, based on feasibility.

Table: Proposed list of equipment

S No	Particulars	Make	Capacity	No. of equipment
i)	Diesel hydraulic shovel	Volvo EC480/Komatsu PC 450/TATA Hitachi ZX 670	3.1 cum	4
ii)	Dumper	Bharat Benz 3528	16 m^3	11
iii)	DTH drill	Epiroc-T40	Hole Dia -115 mm	3
iv)	Dozer	BEML D-155	324p)	1

x) **Transport:** Mined bauxite (R.O.M) shall be transported to the crushing/screening plant through mine haul trucks. Evacuation of crushed bauxite is planned through a combination of road and rail route. There is an existing motorable approach road to the east of the mine which connects MDR-52 (Visakhapatnam-Jeypore Road). Bauxite shall be transported through 30 tonner dump trucks via the aforestated road to the nearest "Bheja Railway Station" from where it will be loaded on railway wagons using front end loaders and subsequently despatched to destination. Empty trucks shall return to mine for repeat loading. OB within the lease will be transported through rear-dump trucks to the dump area within the lease.

xi) **Waste generation and management**: The waste generated in course of pre-mining development and subsequent mining operation will consist of topsoil and laterite with occasional occurrences of **khondalite**. During the first five years the rate of generation of waste is expected to be of the order of 0.073 Mm^3 or 0.15 MT of along with generation of 0.026 Mm^3 of Topsoil. Considering this, an average ore to waste ration of 1:0.018 is estimated. It is planned to stack topsoil and waste separately on ground during the initial 4 years of plan period. From 5th year onwards, waste material will be dumped systematically. Topsoil, stacked separately, would be spread over the reclaimed areas, to enable planting and growing of trees. The waste stacked on ground during the initial years of operation will be utilized to fill the worked-out areas at the end of the working life of the mine as well as

during the interim period, as and when practicable. The generation of waste during the 5 year plan period will be very less and shall be dumped systematically. No backfilling is proposed during the initial 5 year period.

Table: **Proposed production plan during first five-year period**

Year	Top Soil Volume (m^3)	Over Burden/Waste Volume (m^3)	ROM Quantity (t)
Year 1	24072	0	1000120
Year 2	1710	24783	2024020
Year 3	0	44671	2001482
Year 4	0	3800	2002414
Year 5	0	0	4001868

xii) **Water requirement and wastewater management**: The water requirement of the project during operation phase is 690 KLD. Water will be sourced from nearby Jalaput lake located at distance of 3 km. Wastewater generated from workshop will be treated using oil-water separator and treated water will be used in vehicle washing. Wastewater generated from mine office, rest shelters etc. will be disposed in soak pit via septic tank.

xiii) **Power requirement**: The estimated average power requirement is 1 MW, the peak requirement being 1.5 MW. Power shall be sourced from nearest substation located at a distance of 8 km at Padwa. Renewable energy source proposed to install is around 160 KW, which will be about 10 % contribution for the total power requirement.

xiv) **Greenbelt**: The greenbelt is proposed as per the following table.

Sr. No	Year	Area Proposed to be Covered (Ha)	Number of Plants Proposed	Expected Survival Rate (%)	Estimated Expenditure (INR)
1	Year 1	0.72	1440	75	2,01,600
2	Year 2	0.86	1720	75	2,40,800
3	Year 3	1.16	2320	75	3,24,800
4	Year 4	0.68	1360	75	1,90,400
5	Year 5	0.80	1600	75	2,24,000
Total		**4.22**	**8440**		**11,81,600**

xv) **Manpower requirement**: Project will generate employment for about 126 persons directly, besides its potential to generate considerable indirect employment and livelihood opportunities.

xvi) **Project cost**: Total cost of the project is about Rs. 230 Crores which includes cost of Infrastructures, Land Acquisition and other development costs.

xvii) **Environment Consultant**: The Environment consultant M/s Vardan Environet, Gurugram along with the proponent made a presentation on the proposal before the Committee.

2. **Whether SEAC recommended the proposal** – The proposal was placed in SEAC meeting held on 22.09.2023 and after detailed discussion, the SEAC recommended the proposal for issues of both standard and below mentioned specific ToR.

i) The following information to be submitted.
   a) Compliance of mining plan, including waste and OB dump management, mine closure plan etc.
   b) Compliance to Common cause judgment
   c) Status of R&R
   d) Compliance of plantation

e) Compliance of public hearing issues
f) Status of complaints/ court cases/legal action
g) Any other relevant environmental issue / parameter.
h) The following studies be undertaken by domain experts, viz:
   - Blast vibration study
   - Socio economic study of the neighbouring habitation
   - Biodiversity study with audit mechanism.
   - Slope stability study for both mines and OB /waste dumps.
   - Surface runoff management along with rainwater harvesting and ground water recharge include the design of drainage structures.
   - Traffic density study, both inside the mines and at haulage roads, intersecting points of haulage road with public road.
   - Hydrology study: The study findings and the mitigation measures thereof to be submitted.
   - Process scheme details of the crusher / screening plant such as dry / wet crushing etc. If dry crushing, then management plan for dust control. If wet crushing, then plan for treating used water and its recycle etc.

ii) Cost of the CER calculated shall be utilized for the concerns of the people in terms of health, education, and infrastructure and environment protection. Project Proponent also shall include the budget for the betterment of schools nearby and to facilitate the online education system by providing Wi-Fi connectivity and desktops/tablets.

iii) The project proponent should provide in the EIA Report details of all the statutory clearances, permissions, no objection certificates, consents etc. required for this project under various Acts, Rules and regulations and their status or estimated timeline after grant of EC.

iv) The project proponent should submit the revenue plan for mining lease, revenue plan should be imposed on the satellite imaginary clearly demarcate the Govt. land, private land, agricultural land etc.

v) The project proponent should submit the real-time aerial footage & video of the mining lease area and of the transportation route. The project proponent should submit the detailed plan in tabular format (year-wise for life of mine) for afforestation and green belt development in and around the mining lease. The project proponent should submit the number of saplings to be planted, area to be covered under afforestation & green belt, location of plantation, target for survival rate and budget earmarked for the afforestation & green belt development. In addition to this the project proponent should show on a surface plan (5-year interval for life of mine) of suitable scale the area to be covered under afforestation & green belt clearly mentioning the latitude and longitude of the area to be covered during each 5 years. The capital and recurring expenditure to be incurred needs to be submitted. Presently in India there are many agencies which are developing forest in short interval of time. Thus, for the plantation activities details of the experts/agencies to be engaged needs to be provided with budgetary provisions.

vi) The project proponent should submit the quantity of surface or ground water to be used for this project. The complete water balance cycle needs to be submitted. In addition to this PP should submit a detailed plan for rain water harvesting measures to be taken. PP should submit the year wise target for reduction in consumption of the ground/surface water by developing alternative source of water through rain water harvesting measures. The capital and recurring expenditure to be incurred needs to be submitted.

vii) The project proponent should clearly bring out the details of the manpower to be engaged for this project with their roles /responsibilities/designations. In addition to this the project proponent should mention the number and designation of person to be engaged for implementation of environmental management plan (EMP). The capital and recurring expenditure to be incurred needs to be submitted.

viii) The project proponent should submit the year-wise, activity wise and time bound budget

earmarked for EMP, occupational health surveillance & Corporate Environmental Responsibility. The capital and recurring expenditure to be incurred needs to be submitted.

ix) The project proponent should submit the measures/technology to be adopted for prevention of illegal mining and pilferage of mineral. The project proponent should submit the detailed mineralogical and chemical composition of the mineral and percentage of free silica from a NABL/MoEF&CC accredited laboratory.

x) The project proponent should clearly show the transport route of the mineral and protection and mitigative measure to be adopted while transportation of the mineral. The impact from the center line of the road on either side should be clearly brought out supported with the line source modelling and isopleth. Further, frequency of testing of Poly Achromatic Hydrocarbon needs to be submitted along with budget. Based on the above study the compensation to be paid in the event of damage to the crop and land on the either side of the road needs to be mentioned. The project proponent should provide the source of equations used and complete calculations for computing the emission rate from the various sources.

xi) The project proponent should clearly bring out that what is the specific diesel consumption and steps to be taken for reduction of the same. Year-wise target for reduction in the specific diesel consumption needs to be submitted.

xii) The project proponent should bring out the awareness campaign to be carried out on various environmental issues, practical training facility to be provided to the environmental engineer/diploma holders, mining engineer/diploma holders, geologists, and other trades related to mining operations. Target for the same needs to be submitted.

xiii) The budget to be earmarked for the various activities shall be decided after perusal of the Standard EC conditions. After perusal of Standard EC conditions if agreed the project proponent should also submit an undertaking by the way of affidavit for Compliance of Standard EC conditions already prescribed by the Ministry vide O.M. No and Specific condition if prescribed by the SEAC/SEIAA, Odisha.

xiv) The project proponent should ensure that only NABET accredited consultant shall be engaged for the preparation of EIA/EMP Reports. The project proponent shall ensure that accreditation of consultant shall be valid during the collection of baseline date, preparation of EIA/EMP report and during the appraisal process. The project proponent and consultant should submit an undertaking the information and data provided in the EIA Report and submitted to the SEIAA, Odisha are factually correct and the project proponent and consultant are fully accountable for the same.

xv) The project proponent should submit the photograph of monitoring stations & sampling locations. The photograph should bear the date, time, latitude & longitude of the monitoring station/sampling location. In addition to this the project proponent should submit the original test reports and certificates of the labs which will analyze the samples.

xvi) "Zero discharge" management & "Zero Dust Re-suppression" management with SOP be submitted.

xvii) Internal roads, drain management with network of the drain, retaining walls and settling tanks with ETPs be submitted.

xviii) Details of air quality monitoring stations of the area and additional stations at entry and exit of mines and haulage roads, habitation to be considered.

xix) Construction and perennial maintenance of haulage road with details of plantation and the species thereof to be submitted.

xx) Parking plaza layout with maximum no. of vehicles and types of vehicles that can be parked with basic amenities and facilities.

xxi) Forest Clearance details with copy of all Forest Clearance.

xxii) Status of complaints/ court cases/legal action regarding to lease along with a detailed write up indicating case no., purpose of the case etc.

xxiii) Copy of lease document.

xxiv) Details of waste management i.e. composition and nature of waste generated, tabulated form showing year wise waste generation, usage and storage.

xxv) Project Proponent shall consider developing a good nursery in nearby village for production of saplings of 4-6 feet height for planting in safety zone, sides of external haulage roads and distribution among villagers for planting in their private land/ community land. The nursery may be developed by company on their own or in collaboration with forest department. A detailed proposal to this effect shall be submitted. The proponent shall ensure to use organic fertilizer in the nursery.

xxvi) Comprehensive water management, water balance with water harvesting and its reuse both monsoon and non-monsoon period.

xxvii) STP plan with design with location in the layout map for domestic waste water treatment.

xxviii) Provision of solar power (percentage wise) with detail plan.

xxix) To submit the network with dimension of concrete cement roads inside the mining lease area and haulage road.

xxx) To submit parking plaza at entry and exit of the mines with basic amenities.

xxxi) Plan and SoP to be submitted for water sprinkling inside the mines and outside in haulage road including regular vacuum cleaning and Zero Dust Resuspension system to completely mitigate and arrest fugitive dust emission.

xxxii) Total water management including domestic use w.r.t sourcing from borewell, rain water harvesting and recycling of waste water from ETP/STP, both for monsoon and non-monsoon be submitted.

xxxiii) Measures to be taken for arresting and mitigation of occupational health hazard including identification of the same, both for employees and nearby/surrounding habitation.

xxxiv) Year wise waste/OB management with reference to generation and utilization in consideration with dynamic movement of inventory indicating dump area and dimension of storage be submitted.

xxxv) Find out the possibility of other alternatives for approach road so that felling of 1000 trees proposed can be avoided.

xxxvi) Submit Wildlife Conservation plan duly certified from the concerned DFO.

xxxvii) Submit copy of application of forest diversion proposal and current status of it.

xxxviii) Explore possibility for construction of reservoir or adopt appropriate rainwater harvesting methods for collection of rain water and its usage.

xxxix) Submit Mine closure Plan with supporting documentation.

xl) Submit Standard Operating Procedure for magazine management.

xli) This Bauxite mines is meant for captive use. The proponent has not yet established any refinery in the state. They have to give details of use of Bauxite in absence of refinery and also an undertaking that Bauxite Ore cannot export outside the state.

xlii) Possibility of restoration/ creation of the pond present within lease area so that villagers can use it in future after mining lease period expires.

Decision of Authority: Approved

After detailed deliberation, the Authority decided to issue ToR with standard conditions of MoEF & CC & along with SEAC recommended specific condition for EIA studies with Public Hearing for this project.

APPROVED BY

Member Secretary, SEIAA | **Member, SEIAA** | **Chairman, SEIAA**

03.11.2023

AGENDA NO.141.10	
Proposal No.	SIA/OR/MIN/303070/2023
Date of application	09.08.2023
File no.	SIA/OR/MIN/257245/2022
Project Type	Proposal for Amendment of EC based replenishment study report of sand
Category	B2
Project/Activity including Schedule No.	1(a) Mining of minerals
Name of the Project	Proposal for Amendment of EC of Digambarpur River Sand Quarry over an area of 12.00 acres or 4.856 hectares in village Digambarpur under Danagadi Tahasil in Jajapur District Odisha
Name of the company/Organization	Sri Gyanaranjan Mohapatra
Location of Project	village Digambarpur under Danagadi Tahasil in Jajapur District Odisha
ToR Date	N/A
Name of the Consultant	N/A

1. **Proposal in brief:**

(i) The highlights of the proposal as ascertained from the application and as revealed from proceedings/discussion held during the meeting of SEAC/SEIAA, are given as under.

(ii) This is a proposal for amendment of EC of Digambarpur River Sand Quarry over an area of 12.00 acres or 4.856 hectares in village Digambarpur under Danagadi Tahasil in Jajapur District Odisha.

(iii) The project proponent has obtained EC from SEIAA, Odisha vide EC letter no. 2887/SEIAA dated 28.09.2021 for Digambarpur River Sand Quarry over an area of 12.00 acres or 4.856 hectares in village Digambarpur under Danagadi Tahasil in Jajapur District Odisha.

(iv) During EC application the PP has submitted required documents along with mining plan where it is mentioned that mineable reserve of the proposed sand was 50038 cum with depth of sand deposition was 1.5 meter and proposed for annual extraction-50000 cum.

(v) The SEIAA also granted EC for 1st year production **7000 cum** with depth of mining 0.75 meter.

(vi) There is an EC conditions point no. 9.1 to 9.2 in page no. 03 that "Pending carrying out of the study & submission of the report, this clearance is being granted in an adhoc manner and is liable to be revoked after one year i.e. after 15th may 2022 if satisfactory replenishment study report is not submitted."

(vii) The PP has submitted EC compliance report and mentioned that **5571 cum** sand already extracted from the source for 1st year (06.04.2022 to 30.12.2022).

(viii) Now, the PP has submitted amendment of EC application and submitted replenishment study report by My World Consultancy Services Pvt. Ltd. with mentioned that Pre-monsoon RL is 17.838 m and Post-monsoon RL is 18.280 m an quantity of sand replenished is 6870 cum and proposed quantity for next year is 6870 cum.

(ix) Any deficiencies/omission have been noticed in the above documents-Nil

2. **Whether SEAC recommended the proposal** – The proposal was placed in SEAC meeting held on 7th, 8th & 11th Sept, 2023 and after detailed discussion, the SEAC observations the following-

(ii) At sl no 1.3 of report there is mention of Jajpur Tahasildar which needs clarification as the mine is in the jurisdiction of Danagadi Tahasil.

सत्यमेव जयते

Government of India
Ministry of Environment, Forest and Climate Change
(Issued by the State Level Expert Appraisal Committee(SEAC), ODISHA)
***

Minutes of Agenda for 73rd Meeting of State Expert Appraisal Committee, Odisha scheduled to be held on 30/05/2025 at 10:30 AM by both physical and Virtual mode (VC) through Video Conferencing in Google Meet - CAT B1 - NEW PROPOSALS
State Level Expert Appraisal Committee meeting held from 30/05/2025 to 30/05/2025

Date: 11/06/2025

MoM ID: EC/MOM/SEAC/595608/5/2025

Agenda ID: EC/AGENDA/SEAC/595608/5/2025

Meeting Venue: SEAC meeting scheduled to be held by both physical and Virtual mode (VC) through Video Conferencing in Google Meet in the Conference Hall of State Pollution Control Board, A/118, Paribesh Bhawan, Unit-8, Bhubaneswar

Meeting Mode: Hybrid

Date & Time:

30/05/2025	10:30 AM	03:00 PM

1. Opening remarks

N/A

2. Confirmation of the minutes of previous meeting

N/A

3. Details of proposals considered by the committee

Day 1 -30/05/2025

3.1. Agenda Item No 1:

3.1.1. Details of the proposal

Environment Clearance for Kedesala North East Iron Ore Block for production of 1.21 Million TPA ROM Iron Ore (Total Excavation of 1991120 TPA: ROM Iron ore 1210000 TPA + OB/Waste 781120 TPA) over an area of 1 00.439 Ha. in respect of located in village Jaldihi & Kensara in Sundargarh district of Odisha. by **RUNGTA MIN ES LTD** located at **SUNDARGARH,ODISHA**			
Proposal For		Fresh EC	
Proposal No	**File No**	**Submission Date**	**Activity**

xi) PP to submit details analysis of OB/Waste with regard to presence of any critical minerals.

xii) Generation of dust (blue dust), its Fe content and use.

3.1.5. Recommendation of SEAC

Deferred for ADS

3.2. Agenda Item No 2:

3.2.1. Details of the proposal

Ballada Bauxite Mining Project by **KALINGA ALUMINA LIMITED** located at **KORAPUT,ODISHA**			
Proposal For		Fresh EC	
Proposal No	**File No**	**Submission Date**	**Activity (Schedule Item)**
SIA/OR/MIN/536061/2025	536061/34-MINB1/05-2025	13/05/2025	Mining of minerals (1(a))

3.2.2. Project Salient Features

1. This proposal is for obtaining Environmental Clearance of M/s Kalinga Alumina Limited for Ballada Bauxite Mine for Mining of 4.0 MTPA Bauxite (ROM), being the Peak Rated Capacity, 1,46,508 tonnes of Overburden/waste and 51,564 tonnes (25,782 m3) of top soil over a period of 5 years and setting up of Crushing/ Screening facilities of 800 TPH capacity within the lease area spanning over an area of 144.945 ha located at Village– Ballada, Taluka-Nandapur, District – Koraput of Sri Kassireddy Anil Kumar.
2. **Category:** This is a Category – B project which falls under schedule 1(a): Mining of Minerals as per the EIA Notification 2006 and amendments thereafter.
3. **Project details:** The present proposal is a greenfield project for mining of major mineral (Bauxite) with peak production capacity of 4.0 MTPA in Mine Lease area of 144.945 Ha. ToR has been granted vide File No. SIA/OR/MIN/439954/2023 on 06.11.2023 by SEIAA, Odisha and Public Hearing held on 06.03.2025. Subsequently, the application has now been submitted for grant of Environmental Clearance (EC).
4. **List of statutory clearances:**

Sl. No.	**Clearance**	**Date**
1.	The letter of Intent for Mining lease of bauxite block has been issued vide letter no. SM-MC2-MC-0007-2023/2143/S&M Bhubaneswar	01.03.2023
2.	Mining plan along with Progressive Mine Closure Plan has been approved by IBM vide Letter No. MCDR-MiFL0BXT/5/2023-BBS-IBM_RO_BBS	08.08.2023

3.	The Site-Specific Wildlife Conservation plan received approval from P CCF (WL) & CWLW, Odisha. An amount of Rs 457.546 lakhs has bee n allocated towards conservation of wildlife in the study area.	04.06.2024
4.	Permission for use of surface water from Jalaput Reservoir obtained fr om the Department of Water Resources, Govt. of Odisha vide letter no. 30630/WR	08.11.2024
5.	Forest Clearance Stage-I "In-principal" approval has been granted by M oEF & CC (Forest Conservation Division).	23.12.2024

5. **Forest Application details**: Forest application has been submitted vide proposal no. FP/OR/MIN/QRY/456733/2023; dated 30.12.2023. Ballada Block is a virgin bauxite block located in Nandapur Tehsil of Koraput district in Odisha, total mining lease area is 144.945 ha, located entirely within Nagasari reserve forest. The project contemplates to develop the mine and surrounding infrastructures for commercial production of bauxite of 4 MTPA peak rated capacity using opencast mining. In addition to ML area 12.267 ha area to be required for evacuation of minerals. Hence forest diversion application has been submitted for 157.212 ha. Forest Clearance Stage-I "In-principal" approval has been granted by MoEF&CC (Forest Conservation Division) dated 23.12.2024.
6. **ToR details**: Terms of Reference (TOR) was granted by SEIAA, Odisha vide letter dtd. 06.11.2023.
7. **Public hearing details**: The Public Hearing for the proposed bauxite mine was held at Mouza- Bheja, Khata No. 27, Plot No. 225, under Nandapur Tehsil of Koraput District, Odisha, dated: 06.03.2025, Time: 11:00 AM. Issues raised during public hearing are resettlement and rehabilitation plan, Education Renovation of Primary school/Higher Secondary School, Free education in schools, Healthcare facilities like provision of Ambulance, Distribution of free medicine, conducting health Camps, Construction of road, Water coolers and purifier, for Drinking water, maintenance of village roads, rainwater harvesting at Community Area, Provision of Plantation and Streetlights in Community Area, Provision of Water Cooler for Potable Drinking water, skill development and employment, about the Ballada Cave, that might be destroyed due to mining activity, agriculture of villages will be affected, The Forest Right Act is to be adopted for diversion of forest and R&R plan, Applicability & Implementation of the PESA Act, Stream Water Affect, measures to control air pollution, overburden protection and subsequent plantation, cutting down trees, increase of DMF fund for development.
8. **Location and connectivity:** Ballada Bauxite Block is located at Village - Ballada, Tehsil – Nandapur, District – Koraput, Odisha. Block covers an area of about 144.945 ha. bounded by latitudes 18°26'05.61588" N / 18°27'13.34448" N and Longitudes 82°39'32.39136" / 82°40'25.36716" E. The lease area is covered under Survey of India toposheet no. E44K11 (65J/11). 144.945 Ha. of Mine Lease area is Forest Land (Nagasari RF) under Koraput Forest Division. The mineral bearing plateau is situated about one kilometer west of Ballada village and about 8 km north of Padwa in Koraput district, Odisha. Jeypore, a major town in the Koraput district, is about 82 km NNW of the Ballada deposit and is approachable by major district road No.52. Koraput, the district headquarters is 60 km north of the deposit and is connected by a metalled road via Similiguda on NH 26. Bheja, the nearest Railway Station is about 5 km due north-east. The nearest airport is at Visakhapatnam, about 140 km SE from the lease area. The Nearest Water body is Jalaput reservoir located at a distance of 3 km south. Nearest reserve forest is Nagasari RF i.e., entire mine lease area of 144.945 Ha. Nearest habitation is Ballada village, about 1 km in East. The Nearest Wild life Sanctuary is "Karlapat Wildlife Sanctuary" at a distance of 139.8 km in NNE direction. The Nearest Water body is Jalaput reservoir located at a distance of 3 km South.

9. **Product details**:

Units	Products and by Products	Existing	Additional	After Expansion
Million Tonnes Per Annum (MTPA)	**Product:** Bauxite	0.00	4.00	Not Applicable

10. **Equipment details**:

SNo	Particulars	Make	Capacity	No. of equipment
1	Diesel hydraulic shovel	Volvo EC480/Komatsu PC 450/TATA Hitachi ZX 670	3.1 cum	4
2	Dumper	Bharat Benz 3528	16 m^3	11
3	DTH drill	Epiroc-T40	Hole Dia - 115 mm	3

4	Dozer	BEML D-155	324 (hp)	1

11. **Mining method and production**: The deposit lies on surface, and it is proposed to be mined by mechanized opencast method of mining with excavator/ dumper combination. Deep hole drilling/Short hole drilling and blasting is proposed after taking prior permission from DGMS. Further, it is proposed to mine with Ripping-Dozing method and/or deployment of Surface Miner at a later date, based on feasibility. Mineable reserve is 19.96 Mt.

Year	Top Soil (m3)	Over Burden/ Waste (m3)	Over Burden/ Waste Quantity (t)	ROM Volume (m3)	ROM Quantity (t)	Recovery	Mineral Reject (t)	Production Main (t)	Production Associated (t)	OB to Ore Ratio (m3/ton)
Year 1	24072	0	0	500060	1000120		-	1000120	0	0.0
Year 2	1710	24783	49566	1012010	2024020		-	2024020	0	0.012
Year 3	0	44671	89342	1000741	2001482		-	2001482	0	0.022
Year 4	0	3800	7600	1001207	2002414	100%	-	2002414	0	0.002
Year 5	0	0	0	2000934	4001868		-	4001868	0	0.0
Total	**25782**	**73254**	**146508**	**5514952**	**11029904**			**11029904**		**0.0067**

12. **Transportation details**: Mined bauxite (R.O.M) shall be transported to the crushing/screening plant through mine haul trucks. Evacuation of crushed bauxite is planned through a combination of conveyor and rail route. The crushed bauxite will be transported by a closed conveyor system to the nearest “Bheja Railway Siding” from where it will be loaded on railway wagons using front end loaders and subsequently dispatched to destination. OB within the lease will be transported through rear-dump trucks to the dump area within the lease.

13. **Ground water depth**: Pre-monsoon depth to water level ranges between 2.25 mbgl to 7.22 mbgl and post-monsoonal water level ranges from 1.22 mbgl to 6.21 mbgl, in the study area.

14. **Details of Drilling & Blasting:** The primary activity in mining operation, i.e. fragmentation/ loosening of in-situ rock mass, is conventionally carried out by drilling and blasting. The slurry/emulsion explosives will be used. The top of the blast holes will be subjected to stemming with drill cuttings to prevent generation of

fly rocks. A minimum of one-third of the hole depth will be subjected to stemming. To minimize the vibration due to blasting NONEL with cord relay will be used and whenever blasting is to be done near any village or permanent structure muffle blasting will be done. The peak rated production capacity of mine will be 4 Mt per annum (2 Mm3 per annum).

15. **Soil dump details**: The waste generated in course of pre-mining development and subsequent mining operation will consist of topsoil and laterite with occasional occurrences of khondalite. During the first five years the rate of generation of waste is expected to be of the order of 0.073 Mm3 or 0.15 MT of along with generation of 0.026 Mm3 of Topsoil. Considering this, an average ore to waste ration of 1:0.018 is estimated. It is planned to stack topsoil and waste separately on ground during the initial 4 years of plan period. From 5th year onwards, waste material will be dumped systematically. Topsoil, stacked separately, would be spread over the reclaimed areas, to enable planting and growing of trees. The waste stacked on ground during the initial years of operation will be utilized to fill the worked-out areas at the end of the working life of the mine as well as during the interim period, as and when practicable. The generation of waste during the 5 year plan period will be very less and shall be dumped systematically. No backfilling is proposed during the initial 5 year period.

16. **Crusher and screen details**: For 4 million tons per annum peak rated capacity the crushing/ Screening plant requirement would be 800 TPH. It is proposed to install crushing and screening plants in phases 400 TPH (1 no.) for 2 MTPA RoM production and 400 TPH (2 nos.) for 4 MTPA production. The crushing plant and conveyor systems have been designed for 305 days operation per year with 3 shifts operation per day. The size of the product to be obtained after crushing in the plant will be minus 150 mm (d85).

Type of Crusher	**Capacity, TPH**	**Feed Size, mm**	**Product size, mm**
Crushing & Screening Plant	800	600-800	Minus 150

17. **Land use details**:

Sl. No.	**Head**	**At Present (Ha.)**	**At the end of SOM period (Ha.)**	**At the end of conceptual period (Ha.)**

a)	Area under Mining	0.00	42.78	81.82	
b)	Top soil stacking	0.00	0.28		-
c)	Overburden/ Waste Dumping	0.00	1.94	1.95	
d)	Mineral Storage	0.00	1.93		-
e)	Infrastructu	0.00	0.18		-

	re (Workshop, Administrative Building etc.)				
f)	Roads	0.00	0.38		-
g)	Mineral Separation Plant	0.00	0.13		-
h)	Others	0.00	3.92		-
i)	Undisturbed	0.00	-	61.18	

	Total	**0.00**	**51.54**	**144.945**

18. Details of waste generated:

Year	Top Soil Volume (m^3)	Overburden/ Waste Volume (m^3)
Year 1	24072	0
Year 2	1710	24783
Year 3	0	44671
Year 4	0	3800
Year 5	0	0

19. Mitigation of waste produced: It is planned to stack topsoil and waste separately on ground during the initial 4 years of plan period. From 5th year onwards, waste material will be dumped systematically. Topsoil, stacked separately, would be spread over the reclaimed areas, to enable planting and growing of trees. The waste stacked on ground during the initial years of operation will be utilized to fill the worked-out areas at the end of the working life of the mine as well as during the interim period, as and when practicable. The generation of waste during the 5 year plan period will be very less and shall be dumped systematically. No backfilling is proposed during the initial 5 year period.

20. **Baseline study details**: Baseline Study has been conducted during March 2023 to May 2023.

Parameters	Baseline status
Ambient Air Quality	PM10 – 50.4 – 76.9 (µg/m^3) PM 2.5 – 28.7 – 50.9 (µg/m^3) NOX – 16.1– 34.8 (µg/m^3) SO2 – 9.4 – 21.8 (µg/m^3) CO – 0.5 – 1.0 (mg/m3)
Noise Level	Noise Level during Day Time -- 41.59 – 52.2 Leq.(dB)A Noise Level during Night Time -- 34.2 – 43.38 Leq.(dB)A
Water Quality	**Ground Water :** All the Parameters like TDS (320.0– 380.0mg/L). pH (7.5

	5 – 8.24), Total Hardness (142.20- 300.42 mg/L) etc. are found within the p ermissible limits.
	Surface Water : All the Parameters like TDS (236.0- 400.0 mg/L). pH (7.5 1 - 7.72), Total Hardness (70.0- 81.0 mg/L) etc. are found within the permis sible limits.
Soil Quality	pH – 7.58 – 7.82 Organic Matter – 0.31 – 0.69 (%) Water Holding Capacity – 32.21 – 37.64 (%)
Socio Economic S tudy	The proposed project will provide positive impact to the nearby area. The pr oject will provide direct and indirect employment to nearby villagers. Projec t will generate employment for about 126 persons.
Ecology and Biodi versity	There is no wildlife sanctuary/biosphere reserve/national parks present withi n 10 Km radius of the study area. A Site-specific Wildlife Conservation Pla n has been prepared and is approved by PCCF (WL) & CWLW for conserva tion of schedule-I species of the study area.

21. **Water requirement and wastewater management**: Water requirement during construction phase (domestic and construction activity) is estimated as average 15 KLD with a peak consumption of 30 KLD.The water requirement of the project during operation phase is 690 KLD. Water will be sourced from nearby Jalaput lake located at distance of 3 km. Permission has been obtained from the Department of Water Resources, Govt. of Odisha vide letter no. 30630/WR. dated 08.11.2024 Wastewater generated from workshop will be treated using oil-water separator and treated water will be used in vehicle washing. Waste water generated from mine office, rest shelters etc. will be disposed in soak pit via septic tank.

S. No.	Consuming Area	Water requirement, (KLD)
1.	Haul road dust suppression including maintenance of topsoil	600
2.	Washing and cleaning of earthmoving equipment	45
3.	Drinking system	10
4.	Afforestation	15
5.	Miscellaneous	20
	Total	**690**

22. **Power Requirement and solar power details:** The estimated average power requirement is 1 MW, the peak requirement being 1.5 MW. Power shall be sourced from nearest substation located at a distance of 8 km at Padwa. Renewable energy source proposed to install is around 160 KW, which will be about 10 % contribution for the total power requirement.

23. **Rainwater Harvesting Details:** As per the CGWA Manual for Recharge (GEC Norms-2015), the recharge structures like Check Dam/ Percolation Pond will contribute 20% of the stored volume in the monsoon and 20% in the non-monsoon to the recharge of groundwater system. The mine pits are considered as ponds (manmade structures). Hence, the above percentage is considered as ground water recharge from the mining pits. The estimated ground water recharge through mine pit will be 253341 m3/month.

24. Green belt Development: The details of proposed greenbelt are given below:

Sr. No	Year	Green Belt Location (s)	Area Proposed to be Covered (Ha)	Number of Plants Proposed	Expected Survival Rate (%)	Estimated Expenditure (INR)
1	Year 1	Statutory Barrier, Dump & haul roads	0.72	1440	75	2,01,600
2	Year 2	Statutory Barrier, Dump & haul roads	0.86	1720	75	2,40,800
3	Year 3	Statutory Barrier, Dump & haul roads	1.16	2320	75	3,24,800
4	Year 4	Statutory Barrier, Dump & haul roads	0.68	1360	75	1,90,400
5	Year 5	Statutory Barrier, Dump & haul roads	0.80	1600	75	2,24,000
Total			4.22	8440		11,81,600

25. **Total employment**: Project will generate employment for about 126 persons directly, besides its potential to generate considerable indirect employment and livelihood opportunities.

26. **Project Cost:** Estimated cost of the project is Rs. 23000 Lakhs, EMP cost includes Capital Cost of Rs. 220 Lakhs and Recurring Cost of Rs. 60 Lakhs/year; CSR cost is Rs. 532.5 Lakhs.

Sl. No.	Environmental Protection Measures	Capital Cost	Recurring Cost
		(Rs. In lakhs)	(Rs. In lakhs/year)
1	Air Pollution Control Measures	100.00	25.00
2	Water Pollution Control Measures	25.00	5.00

3	Noise Pollution Control Measures	15.00	1.00
4	Greenbelt Development	20.00	5.00
5	Rainwater Harvesting	10.00	2.00
6	Health & Safety measures	20.00	2.00
7	Environment Monitoring	30.00	20.00
Total		**220.00**	**60.00**

27. **Environment Consultant**: The Environment consultant **M/s Vardan Environet LLP, Gurugram** along with the proponent made a presentation on the proposal before the Committee.

3.2.3. Deliberations by the committee in previous meetings

N/A

3.2.4. Deliberations by the SEAC in current meetings

Considering the information furnished and the presentation made by the consultant,
M/s Vardan Environet LLP, Gurugram along with the project proponent, the SEAC decided to take the decision on the proposal after receipt of the following from the proponent:

a) Status of stage-I Forest Clearance and copy of stage-I Clearance, if obtained.

b) Copy of Letter of Intent in name of Kalinga Alumina.

c) Explore the possibility of implementing the sprinkling system all along the conveyor line.

d) Provision for continuous water sprinkling facility to be adopted all along the road during transportation of minerals.

e) Note on Management of reactive silica.

f) Parking Plaza details.

g) Details on the exploration of minerals with respect to critical minerals.

During public hearing, local people made complaint about protection of cave, which is a place of worship in that locality and same is falling within the lease area. A detailed proposal for protection of the cave area used for worship by the local people including earmarking a no mining / safety zone in a layout to be submitted.

3.2.5. Recommendation of SEAC

Deferred for ADS

3.3. Agenda Item No 3:

ii) Detailed layout of the road connectivity connecting to the other mine showing the status of forest diversion. Revised KML showing it.

iii) Calculation of Fe grade in Overburden ROM and backfilling calculation.

iv) Master layout plan showing overburden dump area, product storage area, parking area, transportation route for trucks entry and exit.

v) Details regarding water withdrawal from seasonal nalla, water storage in lease area and NOC/permission copy for abstraction of water from seasonal nalla..

vi) Compliance report of SOTM and NEERI conditions.

vii) Details of railway siding and overburden.

viii) PP shall explore the alarm system possibility for detecting the choking of nozzle system.

ix) Traffic study report vetted by institute of repute.

x) Air pollution control measures during crushing and screening.

xi) PP to submit details analysis of OB/Waste with regard to presence of any critical minerals.

xii) Generation of dust (blue dust), its Fe content and use.

ITEM NO. 02

PROPOSAL OF ENVIRONMENTAL CLEARANCE OF M/S KALINGA ALUMINA LIMITED FOR BALLADA BAUXITE MINE FOR MINING OF 4.0 MTPA BAUXITE (ROM), BEING THE PEAK RATED CAPACITY, 1,46,508 TONNES OF OVERBURDEN/WASTE AND 51,564 TONNES (25,782 M3) OF TOP SOIL OVER A PERIOD OF 5 YEARS AND SETTING UP OF CRUSHING/ SCREENING FACILITIES OF 800 TPH CAPACITY WITHIN THE LEASE AREA SPANNING OVER AN AREA OF 144.945 HA LOCATED AT VILLAGE– BALLADA, TALUKA-NANDAPUR, DISTRICT – KORAPUT OF SRI KASSIREDDY ANIL KUMAR - EC

1. This proposal is for obtaining Environmental Clearance of M/s Kalinga Alumina Limited for Ballada Bauxite Mine for Mining of 4.0 MTPA Bauxite (ROM), being the Peak Rated Capacity, 1,46,508 tonnes of Overburden/waste and 51,564 tonnes (25,782 m3) of top soil over a period of 5 years and setting up of Crushing/ Screening facilities of 800 TPH capacity within the lease area spanning over an area of 144.945 ha located at Village– Ballada, Taluka-Nandapur, District – Koraput of Sri Kassireddy Anil Kumar.
2. **Category:** This is a Category – B project which falls under schedule 1(a): Mining of Minerals as per the EIA Notification 2006 and amendments thereafter.
3. **Project details:** The present proposal is a greenfield project for mining of major mineral (Bauxite) with peak production capacity of 4.0 MTPA in Mine Lease area of 144.945 Ha. ToR has been granted vide File No. SIA/OR/MIN/439954/2023 on 06.11.2023 by SEIAA, Odisha and Public Hearing held on 06.03.2025. Subsequently, the application has now been submitted for grant of Environmental Clearance (EC).
4. **List of statutory clearances:**

Sl. No.	Clearance	Date

1.	The letter of Intent for Mining lease of bauxite block has been issued vide letter no. SM-MC2-MC-0007-2023/2143/S&M Bhubaneswar	01.03.2023
2.	Mining plan along with Progressive Mine Closure Plan has been approved by IBM vide Letter No. MCDR-MiFL0BXT/5/2023-BBS-IBM_RO_BBS	08.08.2023
3.	The Site-Specific Wildlife Conservation plan received approval from PCCF (WL) & CWLW, Odisha. An amount of Rs 457.546 lakhs has been allocated towards conservation of wildlife in the study area.	04.06.2024
4.	Permission for use of surface water from Jalaput Reservoir obtained from the Department of Water Resources, Govt. of Odisha vide letter no. 30630/WR	08.11.2024
5.	Forest Clearance Stage-I "In-principal" approval has been granted by MoEF & CC (Forest Conservation Division).	23.12.2024

5. **Forest Application details**: Forest application has been submitted vide proposal no. FP/OR/MIN/QRY/456733/2023; dated 30.12.2023. Ballada Block is a virgin bauxite block located in Nandapur Tehsil of Koraput district in Odisha, total mining lease area is 144.945 ha, located entirely within Nagasari reserve forest. The project contemplates to develop the mine and surrounding infrastructures for commercial production of bauxite of 4 MTPA peak rated capacity using opencast mining. In addition to ML area 12.267 ha area to be required for evacuation of minerals. Hence forest diversion application has been submitted for 157.212 ha. Forest Clearance Stage-I "In-principal" approval has been granted by MoEF&CC (Forest Conservation Division) dated 23.12.2024.
6. **ToR details**: Terms of Reference (TOR) was granted by SEIAA, Odisha vide letter dtd. 06.11.2023.
7. **Public hearing details**: The Public Hearing for the proposed bauxite mine was held at Mouza- Bheja, Khata No. 27, Plot No. 225, under Nandapur Tehsil of Koraput District, Odisha, dated: 06.03.2025, Time: 11:00 AM. Issues raised during public hearing are resettlement and rehabilitation plan, Education Renovation of Primary school/Higher Secondary School, Free education in schools, Healthcare facilities like provision of Ambulance, Distribution of free medicine, conducting health Camps, Construction of road, Water coolers and purifier, for Drinking water, maintenance of village roads, rainwater harvesting at Community Area, Provision of Plantation and Streetlights in Community Area, Provision of Water Cooler for Potable Drinking water, skill development and employment, about the Ballada Cave, that might be destroyed due to mining activity, agriculture of villages will be affected, The Forest Right Act is to be adopted for diversion of forest and R&R plan, Applicability & Implementation of the PESA Act, Stream Water Affect, measures to control air pollution, overburden protection and subsequent plantation, cutting down trees, increase of DMF fund for development.
8. **Location and connectivity:** Ballada Bauxite Block is located at Village - Ballada, Tehsil – Nandapur, District – Koraput, Odisha. Block covers an area of about 144.945 ha. bounded by latitudes 18°26'05.61588" N / 18°27'13.34448" N and Longitudes 82°39'32.39136" / 82°40'25.36716" E. The lease area is covered under Survey of India toposheet no. E44K11 (65J/11). 144.945 Ha. of Mine Lease area is Forest Land (Nagasari RF) under Koraput Forest Division. The mineral bearing plateau is situated about one kilometer west of Ballada village and

about 8 km north of Padwa in Koraput district, Odisha. Jeypore, a major town in the Koraput district, is about 82 km NNW of the Ballada deposit and is approachable by major district road No.52. Koraput, the district headquarters is 60 km north of the deposit and is connected by a metalled road via Similiguda on NH 26. Bheja, the nearest Railway Station is about 5 km due north-east. The nearest airport is at Visakhapatnam, about 140 km SE from the lease area. The Nearest Water body is Jalaput reservoir located at a distance of 3 km south. Nearest reserve forest is Nagasari RF i.e., entire mine lease area of 144.945 Ha. Nearest habitation is Ballada village, about 1 km in East. The Nearest Wild life Sanctuary is "Karlapat Wildlife Sanctuary" at a distance of 139.8 km in NNE direction. The Nearest Water body is Jalaput reservoir located at a distance of 3 km South.

9. **Product details**:

Units	Products and by Products	Existing	Additional	After Expansion
Million Tonnes Per Annum (MTPA)	**Product:** Bauxite	0.00	4.00	Not Applicable

10. **Equipment details**:

S No	Particulars	Make	Capacity	No. of equipment
1	Diesel hydraulic shovel	Volvo EC480/Komatsu PC 450/TATA Hitachi ZX 670	3.1 cum	4
2	Dumper	Bharat Benz 3528	16 m^3	11
3	DTH drill	Epiroc-T40	Hole Dia -115 mm	3
4	Dozer	BEML D-155	324 (hp)	1

11. **Mining method and production**: The deposit lies on surface, and it is proposed to be mined by mechanized opencast method of mining with excavator/ dumper combination. Deep hole drilling/Short hole drilling and blasting is proposed after taking prior permission from DGMS. Further, it is proposed to mine with Ripping-Dozing method and/or deployment of Surface Miner at a later date, based on feasibility. Mineable reserve is 19.96 Mt.

Year	Top Soil (m3)	Over Burden / Waste (m3)	Over Burden / Waste Quantity (t)	ROM Volume (m3)	ROM Quantity (t)	Recovery	Mineral Reject (t)	Production Main (t)	Production Associated (t)	OB to Ore Ratio (m3/ton)
Year 1	24072	0	0	500060	1000120	100%	-	1000120	0	0.0
Year 2	1710	24783	49566	1012010	2024020		-	2024020	0	0.012
Year 3	0	44671	89342	1000741	2001482		-	2001482	0	0.022
Year 4	0	3800	7600	1001207	2002414		-	2002414	0	0.002
Year 5	0	0	0	2000934	4001868		-	4001868	0	0.0
Total	**25782**	**73254**	**146508**	**5514952**	**11029904**			**11029904**		**0.0067**

12. **Transportation details**: Mined bauxite (R.O.M) shall be transported to the crushing/screening plant through mine haul trucks. Evacuation of crushed bauxite is planned through a combination

of conveyor and rail route. The crushed bauxite will be transported by a closed conveyor system to the nearest “Bheja Railway Siding” from where it will be loaded on railway wagons using front end loaders and subsequently dispatched to destination. OB within the lease will be transported through rear-dump trucks to the dump area within the lease.

13. **Ground water depth**: Pre-monsoon depth to water level ranges between 2.25 mbgl to 7.22 mbgl and post-monsoonal water level ranges from 1.22 mbgl to 6.21 mbgl, in the study area.

14. **Details of Drilling & Blasting:** The primary activity in mining operation, i.e. fragmentation/ loosening of in-situ rock mass, is conventionally carried out by drilling and blasting. The slurry/emulsion explosives will be used. The top of the blast holes will be subjected to stemming with drill cuttings to prevent generation of fly rocks. A minimum of one-third of the hole depth will be subjected to stemming. To minimize the vibration due to blasting NONEL with cord relay will be used and whenever blasting is to be done near any village or permanent structure muffle blasting will be done. The peak rated production capacity of mine will be 4 Mt per annum (2 Mm3 per annum).

15. **Soil dump details**: The waste generated in course of pre-mining development and subsequent mining operation will consist of topsoil and laterite with occasional occurrences of khondalite. During the first five years the rate of generation of waste is expected to be of the order of 0.073 Mm3 or 0.15 MT of along with generation of 0.026 Mm3 of Topsoil. Considering this, an average ore to waste ration of 1:0.018 is estimated. It is planned to stack topsoil and waste separately on ground during the initial 4 years of plan period. From 5th year onwards, waste material will be dumped systematically. Topsoil, stacked separately, would be spread over the reclaimed areas, to enable planting and growing of trees. The waste stacked on ground during the initial years of operation will be utilized to fill the worked-out areas at the end of the working life of the mine as well as during the interim period, as and when practicable. The generation of waste during the 5 year plan period will be very less and shall be dumped systematically. No backfilling is proposed during the initial 5 year period.

16. **Crusher and screen details**: For 4 million tons per annum peak rated capacity the crushing/ Screening plant requirement would be 800 TPH. It is proposed to install crushing and screening plants in phases 400 TPH (1 no.) for 2 MTPA RoM production and 400 TPH (2 nos.) for 4 MTPA production. The crushing plant and conveyor systems have been designed for 305 days operation per year with 3 shifts operation per day. The size of the product to be obtained after crushing in the plant will be minus 150 mm (d85).

Type of Crusher	**Capacity, TPH**	**Feed Size, mm**	**Product size, mm**
Crushing & Screening Plant	800	600-800	Minus 150

17. **Land use details**:

	Head	**At Present (Ha.)**	**At the end of SOM period (Ha.)**	**At the end of conceptual period (Ha.)**
a)	Area under Mining	0.00	42.78	81.82
b)	Topsoil stacking	0.00	0.28	-

c)	Overburden/Waste Dumping	0.00	1.94	1.95
d)	Mineral Storage	0.00	1.93	-
e)	Infrastructure (Workshop, Administrative Building etc.)	0.00	0.18	-
f)	Roads	0.00	0.38	-
g)	Mineral Separation Plant	0.00	0.13	-
h)	Others	0.00	3.92	-
i)	Undisturbed	0.00	-	61.18
	Total	**0.00**	**51.54**	**144.945**

18. Details of waste generated:

Year	Top Soil Volume (m^3)	Overburden/ Waste Volume (m^3)
Year 1	24072	0
Year 2	1710	24783
Year 3	0	44671
Year 4	0	3800
Year 5	0	0

19. **Mitigation of waste produced:** It is planned to stack topsoil and waste separately on ground during the initial 4 years of plan period. From 5th year onwards, waste material will be dumped systematically. Topsoil, stacked separately, would be spread over the reclaimed areas, to enable planting and growing of trees. The waste stacked on ground during the initial years of operation will be utilized to fill the worked-out areas at the end of the working life of the mine as well as during the interim period, as and when practicable. The generation of waste during the 5 year plan period will be very less and shall be dumped systematically. No backfilling is proposed during the initial 5 year period.

20. **Baseline study details**: Baseline Study has been conducted during March 2023 to May 2023.

Parameters	Baseline status
Ambient Air Quality	PM10 – 50.4 – 76.9 (µg/m^3) PM 2.5 – 28.7 – 50.9 (µg/m^3) NOX – 16.1– 34.8 (µg/m^3) SO2 – 9.4 – 21.8 (µg/m^3) CO – 0.5 – 1.0 (mg/m3)
Noise Level	Noise Level during Day Time -- 41.59 – 52.2 Leq.(dB)A Noise Level during Night Time -- 34.2 – 43.38 Leq.(dB)A
Water Quality	**Ground Water :** All the Parameters like TDS (320.0– 380.0mg/L). pH (7.55 – 8.24), Total Hardness (142.20- 300.42 mg/L) etc. are found within the permissible limits.
	Surface Water : All the Parameters like TDS (236.0- 400.0 mg/L). pH (7.51 - 7.72), Total Hardness (70.0- 81.0 mg/L) etc. are found within the permissible limits.
Soil Quality	pH – 7.58 – 7.82 Organic Matter – 0.31 – 0.69 (%) Water Holding Capacity – 32.21 – 37.64 (%)

Socio Economic Study	The proposed project will provide positive impact to the nearby area. The project will provide direct and indirect employment to nearby villagers. Project will generate employment for about 126 persons.
Ecology and Biodiversity	There is no wildlife sanctuary/biosphere reserve/national parks present within 10 Km radius of the study area. A Site-specific Wildlife Conservation Plan has been prepared and is approved by PCCF (WL) & CWLW for conservation of schedule-I species of the study area.

21. **Water requirement and wastewater management**: Water requirement during construction phase (domestic and construction activity) is estimated as average 15 KLD with a peak consumption of 30 KLD.The water requirement of the project during operation phase is 690 KLD. Water will be sourced from nearby Jalaput lake located at distance of 3 km. Permission has been obtained from the Department of Water Resources, Govt. of Odisha vide letter no. 30630/WR. dated 08.11.2024 Wastewater generated from workshop will be treated using oil-water separator and treated water will be used in vehicle washing. Waste water generated from mine office, rest shelters etc. will be disposed in soak pit via septic tank.

S. No.	Consuming Area	Water requirement, (KLD)
1.	Haul road dust suppression including maintenance of topsoil	600
2.	Washing and cleaning of earthmoving equipment	45
3.	Drinking system	10
4.	Afforestation	15
5.	Miscellaneous	20
	Total	**690**

22. **Power Requirement and solar power details:** The estimated average power requirement is 1 MW, the peak requirement being 1.5 MW. Power shall be sourced from nearest substation located at a distance of 8 km at Padwa. Renewable energy source proposed to install is around 160 KW, which will be about 10 % contribution for the total power requirement.

23. **Rainwater Harvesting Details:** As per the CGWA Manual for Recharge (GEC Norms-2015), the recharge structures like Check Dam/ Percolation Pond will contribute 20% of the stored volume in the monsoon and 20% in the non-monsoon to the recharge of groundwater system. The mine pits are considered as ponds (manmade structures). Hence, the above percentage is considered as ground water recharge from the mining pits. The estimated ground water recharge through mine pit will be 253341 m3/month.

24. Green belt Development: The details of proposed greenbelt are given below:

Sr. No	Year	Green Belt Location (s)	Area Proposed to be Covered (Ha)	Number of Plants Proposed	Expected Survival Rate (%)	Estimated Expenditure (INR)
1	Year 1	Statutory Barrier, Dump & haul roads	0.72	1440	75	2,01,600
2	Year 2	Statutory Barrier, Dump & haul roads	0.86	1720	75	2,40,800

3	**Year 3**	**Statutory Barrier, Dump & haul roads**	**1.16**	**2320**	**75**	**3,24,800**
4	**Year 4**	**Statutory Barrier, Dump & haul roads**	**0.68**	**1360**	**75**	**1,90,400**
5	**Year 5**	**Statutory Barrier, Dump & haul roads**	**0.80**	**1600**	**75**	**2,24,000**
Total			**4.22**	**8440**		**11,81,600**

25. **Total employment**: Project will generate employment for about 126 persons directly, besides its potential to generate considerable indirect employment and livelihood opportunities.

26. **Project Cost:** Estimated cost of the project is Rs. 23000 Lakhs, EMP cost includes Capital Cost of Rs. 220 Lakhs and Recurring Cost of Rs. 60 Lakhs/year; CSR cost is Rs. 532.5 Lakhs.

Sl. No.	Environmental Protection Measures	Capital Cost (Rs. In lakhs)	Recurring Cost (Rs. In lakhs/year)
1	Air Pollution Control Measures	100.00	25.00
2	Water Pollution Control Measures	25.00	5.00
3	Noise Pollution Control Measures	15.00	1.00
4	Greenbelt Development	20.00	5.00
5	Rainwater Harvesting	10.00	2.00
6	Health & Safety measures	20.00	2.00
7	Environment Monitoring	30.00	20.00
Total		**220.00**	**60.00**

27. Environment Consultant: The Environment consultant **M/s Vardan Environet LLP, Gurugram** along with the proponent made a presentation on the proposal before the Committee.

Considering the information furnished and the presentation made by the consultant, **M/s Vardan Environet LLP, Gurugram** along with the project proponent, the SEAC decided to take the decision on the proposal after receipt of the following from the proponent:

a) Status of stage-I Forest Clearance and copy of stage-I Clearance, if obtained.

b) Copy of Letter of Intent in name of Kalinga Alumina.

c) Explore the possibility of implementing the sprinkling system all along the conveyor line.

d) Provision for continuous water sprinkling facility to be adopted all along the road during transportation of minerals.

e) Note on Management of reactive silica.

f) Parking Plaza details.

g) Details on the exploration of minerals with respect to critical minerals.

h) During public hearing, local people made complaint about protection of cave, which is a place of worship in that locality and same is falling within the lease area. A detailed proposal for protection of the cave area used for worship by the local people including earmarking a no mining / safety zone in a layout to be submitted.

Pollution Control Board and the State Government.

8. 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).

9. 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.

10. The SEIAA, Odisha may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.

11. The SEIAA, Odisha reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner shall implement these conditions.

12. The Regional Office, MoEF&CC, Bhubaneswar 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.

13. The above conditions shall 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, Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and the Public Liability Insurance Act, 1991 along with their amendments and Rules and any other orders passed by the Hon'ble Supreme Court of India / High Courts and any other Court of Law relating to the subject matter.

14. 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.

Environmental Scientist, SEAC

सत्यमेव जयते

Government of India
Ministry of Environment, Forest and Climate Change
(Issued by the State Level Expert Appraisal Committee(SEAC), ODISHA)
***

Minutes of Add. Agenda for 82nd Meeting of State Expert Appraisal Committee, Odisha scheduled to be held on 17/07/2025 at 03:30 PM by Virtual mode (VC) through Video Conferencing in Google Meet - Category B1 (OLD) proposals State Level Expert Appraisal Committee meeting held from 23/07/2025 to 23/07/2025 **Date:** 05/08/2025

MoM ID: EC/MOM/SEAC/134715/7/2025

Agenda ID: EC/AGENDA/SEAC/134715/7/2025

Meeting Venue: N/A

Meeting Mode: Virtual

Date & Time:

23/07/2025	04:36 PM	05:36 PM

1. Opening remarks

N/A

2. Confirmation of the minutes of previous meeting

N/A

3. Details of proposals considered by the committee

Day 1 -23/07/2025

3.1. Agenda Item No 1:

3.1.1. Details of the proposal

Proposal for Extension of Validity of Environmental Clearance for proposed Integrated solid waste management project over an area of 33.62 acres located at Village - Mohuda, Tahasil - Kukudakhandi, District - Berhampur, Odisha of Berhampur Municipal Corporation. by **District Youth Services & Sports Hamirpur** located at **GANJAM,ODISHA**

Proposal For		Application for Validity Extension of EC- Form-6	
Proposal No	**File No**	**Submission Date**	**Activity (Schedule Item)**
SIA/OR/MIN/533617/2025	533617/09-MIN/04-2025	10/04/2025	Mining of minerals

information / documents from the proponent:

i) Earlier EC granted by SEIAA, Odisha has already expired. It was observed that Massive Construction already done at basement with about 80- 100 pillars. PP needs to submit the following parameters in a Tabular form for previous EC and proposed EC with present construction details.

FAR, Ground Coverage, No of Floors (tower wise for both hotel and commercial), Fire corridor width, Power load, Water load, treated water discharge- volume in monsoon.

ii) As it looks like a violation case the justification may be submitted by the PP that why it cannot be a violation case.

iii) Demarcation of boundary, road and letter from GA about side approach road (for hotel entry) need to be submitted within photos of demarcation.

iv) NOC from BMC for discharge of excess water.

v) DLC certificate from concerned DFO that the project land has no forest land.

3.7.5. Recommendation of SEAC

Deferred for ADS

3.8. Agenda Item No 8:

3.8.1. Details of the proposal

Ballada Bauxite Mining Project by **KALINGA ALUMINA LIMITED** located at **KORAPUT,ODISHA**			
Proposal For		Fresh EC	
Proposal No	**File No**	**Submission Date**	**Activity (Schedule Item)**
SIA/OR/MIN/536061/2025	536061/34-MINB1/05-2025	13/05/2025	Mining of minerals (1(a))

3.8.2. Project Salient Features

1. This proposal is for obtaining Environmental Clearance of M/s Kalinga Alumina Limited for Ballada Bauxite Mine for Mining of 4.0 MTPA Bauxite (ROM), being the Peak Rated Capacity, 1,46,508 tonnes of Overburden/waste and 51,564 tonnes (25,782 m3) of top soil over a period of 5 years and setting up of Crushing/ Screening facilities of 800 TPH capacity within the lease area spanning over an area of 144.945 ha located at Village– Ballada, Taluka-Nandapur, District – Koraput of Sri Kassireddy Anil Kumar.
2. **Category:** This is a Category – B project which falls under schedule 1(a): Mining of Minerals as per the EIA Notification 2006 and amendments thereafter.
3. **Project details:** The present proposal is a greenfield project for mining of major mineral (Bauxite) with peak production capacity of 4.0 MTPA in Mine Lease area of 144.945 Ha. ToR has been granted vide File No. SIA/OR/MIN/439954/2023 on 06.11.2023 by SEIAA, Odisha and Public Hearing held on 06.03.2025. Subsequently, the application has now been submitted for grant of Environmental Clearance (EC).

4. **List of statutory clearances:**

Sl. No.	Clearance	Date
i)	The letter of Intent for Mining lease of bauxite block has been issued v ide letter no. SM-MC2-MC-0007-2023/2143/S&M Bhubaneswar	01.03.2023
ii)	Mining plan along with Progressive Mine Closure Plan has been appro ved by IBM vide Letter No. MCDR-MiFL0BXT/5/2023-BBS-IBM_R O_BBS	08.08.2023
iii)	The Site-Specific Wildlife Conservation plan received approval from PCCF (WL) & CWLW, Odisha. An amount of Rs 457.546 lakhs has b een allocated towards conservation of wildlife in the study area.	04.06.2024
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8. **Location and connectivity:** Ballada Bauxite Block is located at Village - Ballada, Tehsil – Nandapur, District – Koraput, Odisha. Block covers an area of about 144.945 ha. bounded by latitudes 18°26'05.61588" N / 18°27'13.34448" N and Longitudes 82°39'32.39136" / 82°40'25.36716" E. The lease area is covered under Survey of India toposheet no. E44K11 (65J/11). 144.945 Ha. of Mine Lease area is Forest Land (Nagasari RF) under Koraput Forest Division. The mineral bearing plateau is situated about

one kilometer west of Ballada village and about 8 km north of Padwa in Koraput district, Odisha. Jeypore, a major town in the Koraput district, is about 82 km NNW of the Ballada deposit and is approachable by major district road No.52. Koraput, the district headquarters is 60 km north of the deposit and is connected by a metalled road via Similiguda on NH 26. Bheja, the nearest Railway Station is about 5 km due north-east. The nearest airport is at Visakhapatnam, about 140 km SE from the lease area. The Nearest Water body is Jalaput reservoir located at a distance of 3 km south. Nearest reserve forest is Nagasari RF i.e., entire mine lease area of 144.945 Ha. Nearest habitation is Ballada village, about 1 km in East. The Nearest Wild life Sanctuary is "Karlapat Wildlife Sanctuary" at a distance of 139.8 km in NNE direction. The Nearest Water body is Jalaput reservoir located at a distance of 3 km South.

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13. **Ground water depth**: Pre-monsoon depth to water level ranges between 2.25 mbgl to 7.22 mbgl and post-

monsoonal water level ranges from 1.22 mbgl to 6.21 mbgl, in the study area.

14. **Details of Drilling & Blasting:** The primary activity in mining operation, i.e. fragmentation/ loosening of in-situ rock mass, is conventionally carried out by drilling and blasting. The slurry/emulsion explosives will be used. The top of the blast holes will be subjected to stemming with drill cuttings to prevent generation of fly rocks. A minimum of one-third of the hole depth will be subjected to stemming. To minimize the vibration due to blasting NONEL with cord relay will be used and whenever blasting is to be done near any village or permanent structure muffle blasting will be done. The peak rated production capacity of mine will be 4 Mt per annum (2 Mm3 per annum).

15. **Soil dump details**: The waste generated in course of pre-mining development and subsequent mining operation will consist of topsoil and laterite with occasional occurrences of khondalite. During the first five years the rate of generation of waste is expected to be of the order of 0.073 Mm3 or 0.15 MT of along with generation of 0.026 Mm3 of Topsoil. Considering this, an average ore to waste ration of 1:0.018 is estimated. It is planned to stack topsoil and waste separately on ground during the initial 4 years of plan period. From 5th year onwards, waste material will be dumped systematically. Topsoil, stacked separately, would be spread over the reclaimed areas, to enable planting and growing of trees. The waste stacked on ground during the initial years of operation will be utilized to fill the worked-out areas at the end of the working life of the mine as well as during the interim period, as and when practicable. The generation of waste during the 5 year plan period will be very less and shall be dumped systematically. No backfilling is proposed during the initial 5 year period.

16. **Crusher and screen details**: For 4 million tons per annum peak rated capacity the crushing/ Screening plant requirement would be 800 TPH. It is proposed to install crushing and screening plants in phases 400 TPH (1 no.) for 2 MTPA RoM production and 400 TPH (2 nos.) for 4 MTPA production. The crushing plant and conveyor systems have been designed for 305 days operation per year with 3 shifts operation per day. The size of the product to be obtained after crushing in the plant will be minus 150 mm (d85).

Type of Crusher	**Capacity, TPH**	**Feed Size, mm**	**Product size, mm**
Crushing & Screening Plant	800	600-800	Minus 150

17. **Land use details**:

Sl. No.	**Head**	**At Present (H**	**At the end of**	**At the end of conceptual period (Ha.)**

		a.)	**SOM period (Ha.)**		
a)	Area under Mining	0.00	42.78	81.82	
b)	Topsoil stacking	0.00	0.28		-
c)	Overburden/ Waste Dumping	0.00	1.94	1.95	
d)	Miner	0.00	1.93		-

	al Storage				
e)	Infrastructure (Workshop, Administrative Building etc.)	0.00	0.18		-
f)	Roads	0.00	0.38		-
g)	Mineral Separation	0.00	0.13		-

	Plant				
h)	Others	0.00	3.92		-
i)	Undisturbed	0.00	-	61.18	
	Total	**0.00**	**51.54**	**144.945**	

18. **Details of waste generated:**

Year	**Top Soil Volume (m^3)**	**Overburden/ Waste Volume (m^3)**
Year 1	24072	0
Year 2	1710	24783
Year 3	0	44671
Year 4	0	3800
Year 5	0	0

19. **Mitigation of waste produced:** It is planned to stack topsoil and waste separately on ground during the initial 4 years of plan period. From 5th year onwards, waste material will be dumped systematically. Topsoil, stacked separately, would be spread over the reclaimed areas, to enable planting and growing of trees. The waste stacked on ground during the initial years of operation will be utilized to fill the worked-out areas at the end of the working life of the mine as well as during the interim period, as and

when practicable. The generation of waste during the 5 year plan period will be very less and shall be dumped systematically. No backfilling is proposed during the initial 5 year period.

20. **Baseline study details**: Baseline Study has been conducted during March 2023 to May 2023.

Parameters	Baseline status
Ambient Air Quality	PM_{10} – 50.4 – 76.9 (µg/m^3) $PM_{2.5}$ – 28.7 – 50.9 (µg/m^3) NO_X – 16.1– 34.8 (µg/m^3) SO_2 – 9.4 – 21.8 (µg/m^3) CO – 0.5 – 1.0 (mg/m3)
Noise Level	Noise Level during Day Time -- 41.59 – 52.2 Leq.(dB)A Noise Level during Night Time -- 34.2 – 43.38 Leq.(dB)A
Water Quality	**Ground Water :** All the Parameters like TDS (320.0– 380.0mg/L). pH (7.55 – 8.24), Total Hardness (142.20- 300.42 mg/L) etc. are fo und within the permissible limits.
	Surface Water : All the Parameters like TDS (236.0- 400.0 mg/L). pH (7.51 - 7.72), Total Hardness (70.0- 81.0 mg/L) etc. are found w ithin the permissible limits.
Soil Quality	pH – 7.58 – 7.82 Organic Matter – 0.31 – 0.69 (%) Water Holding Capacity – 32.21 – 37.64 (%)
Socio Economic S tudy	The proposed project will provide positive impact to the nearby are a. The project will provide direct and indirect employment to nearb y villagers. Project will generate employment for about 126 person s.
Ecology and Biodi versity	There is no wildlife sanctuary/biosphere reserve/national parks pres ent within 10 Km radius of the study area. A Site-specific Wildlife Conservation Plan has been prepared and is approved by PCCF (W L) & CWLW for conservation of schedule-I species of the study ar ea.

21. **Water requirement and wastewater management**: Water requirement during construction phase (domestic and construction activity) is estimated as average 15 KLD with a peak consumption of 30 KLD.The water requirement of the project during operation phase is 690 KLD. Water will be sourced from nearby Jalaput lake located at distance of 3 km. Permission has been obtained from the Department of Water Resources, Govt. of Odisha vide letter no. 30630/WR. dated 08.11.2024 Wastewater generated from workshop will be treated using oil-water separator and treated water will be used in vehicle washing. Waste water generated from mine office, rest shelters etc. will be disposed in soak pit via septic tank.

S. No.	Consuming Area	Water requiremen

		t, (KLD)
i)	Haul road dust suppression including maintenance of topsoil	600
ii)	Washing and cleaning of earthmoving equipment	45
iii)	Drinking system	10
iv)	Afforestation	15
v)	Miscellaneous	20
	Total	**690**

22. **Power Requirement and solar power details:** The estimated average power requirement is 1 MW, the peak requirement being 1.5 MW. Power shall be sourced from nearest substation located at a distance of 8 km at Padwa. Renewable energy source proposed to install is around 160 KW, which will be about 10 % contribution for the total power requirement.

23. **Rainwater Harvesting Details:** As per the CGWA Manual for Recharge (GEC Norms-2015), the recharge structures like Check Dam/ Percolation Pond will contribute 20% of the stored volume in the monsoon and 20% in the non-monsoon to the recharge of groundwater system. The mine pits are considered as ponds (manmade structures). Hence, the above percentage is considered as ground water recharge from the mining pits. The estimated ground water recharge through mine pit will be 253341 m3/month.

24. **Green belt Development:** The details of proposed greenbelt are given below:

Sr. No	**Year**	**Green Belt Location (s)**	**Area Proposed to be Covered (Ha)**	**Number of Plants Proposed**	**Expected Survival Rate (%)**	**Estimated Expenditure (INR)**
i)	**Year 1**	**Statutory Barrier, Dump & haul roads**	**0.72**	**1440**	**75**	**2,01,600**
ii)	**Year 2**	**Statutory Barrier, Dump & haul roads**	**0.86**	**1720**	**75**	**2,40,800**
iii)	**Year 3**	**Statutory Barrier, Dump & haul roads**	**1.16**	**2320**	**75**	**3,24,800**
iv)	**Year 4**	**Statutory Barrier, Dump & haul roads**	**0.68**	**1360**	**75**	**1,90,400**
v)	**Year 5**	**Statutory Barrie**	**0.80**	**1600**	**75**	**2,24,000**

		r, Dump & haul roads				
Total			**4.22**	**8440**		**11,81,600**

25. **Total employment**: Project will generate employment for about 126 persons directly, besides its potential to generate considerable indirect employment and livelihood opportunities.

26. **Project Cost:** Estimated cost of the project is Rs. 23000 Lakhs, EMP cost includes Capital Cost of Rs. 220 Lakhs and Recurring Cost of Rs. 60 Lakhs/year; CSR cost is Rs. 532.5 Lakhs.

Sl. No.	**Environmental Protection Measures**	**Capital Cost**	**Recurring Cost**
		(Rs. In lakhs)	(Rs. In lakhs/year)
i)	Air Pollution Control Measures	100.00	25.00
ii)	Water Pollution Control Measures	25.00	5.00
iii)	Noise Pollution Control Measures	15.00	1.00
iv)	Greenbelt Development	20.00	5.00
v)	Rainwater Harvesting	10.00	2.00
vi)	Health & Safety measures	20.00	2.00
vii)	Environment Monitoring	30.00	20.00
	Total	**220.00**	**60.00**

27. **Environment Consultant**: The Environment consultant **M/s Vardan Environet LLP, Gurugram** along with the proponent made a presentation on the proposal before the Committee on 30.05.2025. **T**he SEAC decided to take the decision on the proposal after receipt of certain information / documents from the proponent:

28. The SEAC in its meeting held on dated **30.05.2025** decided to take decision after receipt of the following information and documents from the proponent. The proponent has furnished the compliance and the SEAC verified the same as follows:

Sl. No.	**Information Sought by SEAC**	**Compliance furnished by the proponent**	**Views of SEAC**
i)	Status of stage-I Forest Clearance and copy of stage-I Cle	FC Stage-1 has been granted vide file no. FP/OR/MIN/QRY/456733/2023 on 23.12.2024. Copy of FC stage-1 approval is attached as **Annexure 1**.	Complied

	arance, if obtained.		
ii)	Copy of Letter of I ntent in name of Ka linga Alumina.	The Letter of Intent (LOI) has been issued in t he name of Mundra Alumina Ltd. vide letter n o.2143/SM-MC2-MC007-2023, S&M, Bhuba neswar on 01.03.2023 from the Steel & Mines Department, Govt. of Odisha. However, chan ge in name of entity from “Mundra Alumina Ltd.” to “Kalinga Alumina Ltd.)” has been ap proved by the Department of Steel & Mines, Govt. of Odisha vide letter no. 5995 SM-MC 2-MC-0012-2023/SM, Bhubaneswar on 09.0 6.2023. The Copy of Letter of Intent is attached as **An nexure 2**.	-----
iii)	Explore the possibil ity of implementing the sprinkling syste m all along the con veyor line.	Provision of sprinkling system for dust suppr ession will be provided at the loading end, di scharge end and at all the transfer points of th e long-distance conveyor.	Complied
iv)	Provision for contin uous water sprinkli ng facility to be ado pted all along the ro ad during transport ation of minerals.	Provision for continuous water sprinkling fac ility will be adopted all along the Haul Road during transportation of minerals. An adequate number of water sprinkler and f og cannon shall be installed at appropriate lo cations to prevent air pollution during interna l transportation of mineral from pit to crushe r.	
v)	Note on Manageme nt of reactive silica.	Reactive Silica refers to a mineralogical form of silica, primarily present as Kaolinite, with the chemical formula $Al_2O_3 \cdot 2SiO_2 \cdot 2H_2O$. It is termed "Reactive" due to its chemical re activity with caustic solutions used in the Ba yer Process, the standard method employed b y alumina refineries to extract alumina from bauxite. During the Bayer Process, Reactive Silica rea cts with the caustic soda and precipitates as a	Complied

		solid by-product known as Desilication Prod uct (DSP). This DSP becomes part of the red mud, a residue that requires careful managem ent by alumina refinery operators. As such, Reactive Silica does not pose any e nvironmental or processing concerns during t he mining and crushing stages. Further, its pr esence in bauxite does not impact on the oper ations of Kalinga Alumina Limited, whose re sponsibilities are limited to the extraction, cr ushing, and sale of bauxite ore to various alu mina refineries.	
vi)	Parking Plaza detail s.	Designated parking plot for HEMM will be i nside the mining lease area for Intra mine tra nsportation. Since Bauxite will be transporte d through the long-distance conveyor system, therefore, no transportation of bauxite by roa d is envisaged.	Complied
vii)	Details on the explo ration of minerals with respect to criti cal minerals.	As per the tender documents, exploratory dril ling was carried out during the year 1976-77 by Geological Survey of India. A total of 15 boreholes (BB-1 to BB-15) have been drilled with a total meterage of 291.65 meters. Based on the grades, Bauxite has been catego rized into 5 types such as Metallurgical grade bauxite, Low grade Bauxite, Beneficiable gra de Bauxite High Silica Bauxite and Alumino us Laterite and the resources have been estim ated accordingly. The geological setting of the area, being part of the Eastern Ghats hill ranges and predomi nantly composed of Khondalite and Charnoc kite group of rocks, significantly reduces the likelihood of encountering critical mineral de posits. As per the Geological Report, the absence of known mineralization zones or geochemical anomalies in the region further supports that t he possibility of occurrence of critical minera ls in this bauxite deposit is very remote.	-----

		Geological report is attached as **Annexure-3**.	
viii)	During public hearing, local people made complaint about protection of cave, which is a place of worship in that locality and same is falling within the lease area. A detailed proposal for protection of the cave area used for worship by the local people including earmarking a no mining / safety zone in a layout to be submitted.	Regarding the protection of the Cave, we have proposed no mining activity will be carried out within 100m distance from the Cave. Hence the cave shall remain undisturbed and on the contrary, the cave and its vicinity shall be developed and beautified so as to attract tourism. District administration is also intent for the Beautification of Cave. The layout plan mentioning Safety zone is attached as **Annexure 4**. The protection plan of Cave is attached as **Annexure 5**.	Complied

29. Following issues have been raised by the public during Public Hearing for Ballada Bauxite Mines for M/s Kalinga Alumina Limited, Koraput held on 06.03.2025 at 11.00 am at Mouza Bheja (Khata no. 27. Plot no. 225 area -2,48 ac, kissam-d-111) under Nandapur Tehsil, District – Koraput.

i) Resettlement and Rehabilitation (R&R) Plan/Compensation details for the Project Affected People (PAP) should be furnished.

ii) Education Renovation of Primary school/Higher Secondary School, Free education in schools.

iii) Healthcare facilities like provision of Ambulance, Distribution of free medicine and conducting health Camps

iv) Infrastructure Development; Construction of road, Water coolers and purifier, for Drinking water

v) Physical Work: Strengthening/maintenance of village roads, Rainwater Harvesting at Community Area, Provision of Plantation and Streetlights in Community Area, Provision.

vi) Water Cooler for Potable Drinking water

vii) Skill Development and Employment; Wick making, Stitching, Mushroom Production and Computer Training.

viii) Ballada Cave will be destroyed due to mining activity.

ix) Agriculture of villages will be affected.

x) The Forest Right Act is to be adopted for diversion of forest and R&R plan

xi) Applicability & Implementation of the Panchayats Extension to Scheduled Areas (PESA) Act, 1996

xii) Stream Water Affect

xiii) Measures need to be taken to prevent Air Pollution in this project.

xiv) Overburden protection & subsequent plantation

xv) Felling of trees

xvi) Increase of DMF fund for development

30. About **2420 Nos.** of written representations have been received by the Board in connection with the public hearing and most of them are related to the above issues along with issues related to destruction of Nageswari Hill, Destruction of natural habitats of 23 different types of Animals and Birds, Affect the crops and millets grown at the foothill of the Balda Hill, affect the 23 perennial streams and 15 ponds and lakes around the Balda Hills and destruction of medicinal trees etc.

31. **Further, a representation from Sri Rama Chandra Kadam, Hon'ble MLA, Pottangi has been submitted to Hon'ble Chief Minister, Odisha raising following issues**

    i) The villagers of Balda Gram Panchayat, along with five other panchayats and about 30 villages, are associated with the Nageswari Hills. The forests, jungles and springs of nature are the beliefs and emotions of their tribal people. This hill is associated with the memories of our ancestors and our livelihood.

    ii) On the other hand, the State Tourism Department has also arranged an eco-retreat very close to this hill to attract tourists, which is the oldest cave in this area, known as Nageswari Cave. If the hill is excavated by the Adani Company, the tourism of the State, the natural beauty of the Nageswari Cave and the hill will be completely affected.

    iii) All the perennial streams and springs in this area will be dried up.

    iv) The medicinal trees that were thousands of years ago will also disappear, which is an irreparable loss.

32. The Committee observed that most of the points raised by the public during public hearing as well as raised by Hon’ble MLA have been addressed by the proponent in the EIA report. The proponent has also submitted a detailed proposal for protection of the Nageswari Cave such as maintaining no mining zone from the cave, beautification of the cave area to attract tourists and other pollution control measures as per concerns of public.

3.8.3. Deliberations by the committee in previous meetings

Date of SEAC 1 :30/05/2025

Deliberations of SEAC 1 :

onsidering the information furnished and the presentation made by the consultant,
M/s Vardan Environet LLP, Gurugram along with the project proponent, the SEAC decided to take the decisi
n the proposal after receipt of the following from the proponent:

a) Status of stage-I Forest Clearance and copy of stage-I Clearance, if obtained.

b) Copy of Letter of Intent in name of Kalinga Alumina.

c) Explore the possibility of implementing the sprinkling system all along the conveyor line.

d) Provision for continuous water sprinkling facility to be adopted all along the road during transportation of minerals.

e) Note on Management of reactive silica.

f) Parking Plaza details.

g) Details on the exploration of minerals with respect to critical minerals.

During public hearing, local people made complaint about protection of cave, which is a place of worship in that locality and same is falling within the lease area. A detailed proposal for protection of the cave area used for worship by the local people including earmarking a no mining / safety zone in a layout to be submitted.

3.8.4. Deliberations by the SEAC in current meetings

Considering the information furnished and the presentation made by the consultant,
M/s Vardan Environet LLP, Gurugram along with the project proponent, the SEAC recommended for grant of Environmental Clearance to the project valid for 10 years with stipulated conditions as per **Annexure – E** in addition to the following specific conditions**.**

i) The proponent shall take all precautionary measures to protect Nageswari Hill / Cave as approved in mining plan and as proposed in EIA / EMP report.

ii) The issues raised during the public hearing shall be addressed by the proponent as proposed in EIA/EMP report.

iii) The proponent shall obtain permission from the Archaeological Department if applicable before going for mining activity and take all protective measures to protect the Nageswari Cave in consultation with Archaeological Department if required.

iv) The proponent shall use conveyor for mineral evacuation and submit a detailed proposal with timeline for construction of conveyor within a month of issue of EC. Till the establishment of conveyor, they can go for mineral evacuation by road.

v) As proposed by the project proponent, a feasibility study shall be carried out at the earliest from an institute of repute for the application of ripper-dozer and/or surface miner at Ballada Bauxite Mine.

3.8.5. Recommendation of SEAC

Recommended

3.8.6. Details of Environment Conditions

3.8.6.1. Specific

	Specific Condition
1.	i) The proponent shall take all precautionary measures to protect Nageswari Hill / Cave as approved in mining plan and as proposed in EIA / EMP report. ii) The issues raised during the public hearing shall be addressed by the proponent as proposed in EIA/EMP report. iii) The proponent shall obtain permission from the Archaeological Department if applicable before going for mining activity and take all protective measures to protect the Nageswari Cave in consultation with Archaeological Department if required. iv) The proponent shall use conveyor for mineral evacuation and submit a detailed proposal with timeline for construction of conveyor within a month of issue of EC. Till the establishment of conveyor, they can go for mineral evacuation by road. v) As proposed by the project proponent, a feasibility study shall be carried out at the earliest from an

	institute of repute for the application of ripper-dozer and/or surface miner at Ballada Bauxite Mine.

3.8.6.2. Standard

1(a)	**Mining of minerals**
null	
1.	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.	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.
Statutory compliance	
1.	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.	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.
3.	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.
4.	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.
5.	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."
6.	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.
7.	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.

Statutory compliance	
1.	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.	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).
3.	The project proponent shall obtain clearance from the National Board for Wildlife, if applicable.
4.	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.
5.	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.
6.	The project proponent shall obtain authorization under the Hazardous and other Waste Management Rules, 2016 as amended from time to time.
7.	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.
Air quality monitoring and preservation	
1.	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.
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.	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.
4.	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.

5.	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.
Air quality monitoring and preservation	
1.	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 SPCB along with six-monthly monitoring report.
2.	The project proponent use leak proof trucks/dumpers carrying ore and other raw materials and cover them with tarpaulin.
3.	Design the ventilation system for adequate air changes as per ACGIH document for all tunnels, motor houses, Oil Cellars.
Air quality monitoring and preservation	
1.	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.
2.	Wind shelter fence and chemical spraying shall be provided on the raw material stock piles.
Water quality monitoring and preservation	
1.	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.
2.	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.
3.	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.	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.
5.	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.
Water quality monitoring and preservation	
1.	The project proponent shall practice rainwater harvesting to maximum possible extent.
2.	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.
3.	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.	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.
5.	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.
6.	Adhere to Zero Liquid Discharge
7.	Sewage Treatment Plant shall be provided for treatment of domestic wastewater to meet the prescribed standards.
8.	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.
9.	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.
10.	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.
11.	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.
Noise monitoring and prevention	
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.
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.
Noise and vibration monitoring and prevention	
1.	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.
2.	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 floodlights/ masks away from the villagers and keeping the noise levels well within the prescribed limits for day /night hours.
Noise and vibration monitoring and prevention	
1.	The peak particle velocity at 500m distance or within the nearest habitation, whichever is closer shall be monitored periodically as per applicable DGMS guidelines.
Mining plan	
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.).
Energy Conservation measures	
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;
2.	Provide LED lights in their offices and residential areas.
Mining plan	
1.	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 the MoEFCC and its concerned Regional Office.
Waste management	
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)
2.	The waste oil, grease and other hazardous waste shall be disposed of as per the Hazardous & Other waste (Management & Transboundary Movement) Rules, 2016.
Land reclamation	
1.	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.
2.	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.
Land reclamation	
1.	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.
2.	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.
Green Belt and EMP	
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
Transportation	
1.	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.
Transportation	
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].
Green Belt and EMP	
1.	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.
Public hearing and Human health issues	
1.	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.

Public hearing and Human health issues	
1.	Emergency preparedness plan based on the Hazard identification and Risk Assessment (HIRA) and Disaster Management Plan shall be implemented.
2.	Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.
3.	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.
Green Belt	
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.
Corporate Environment Responsibility	
1.	Self-environmental audit shall be conducted annually. Every three years third party environmental audit shall be carried out.
Public hearing and human health issues	
1.	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.
Corporate Environment Responsibility	
1.	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.
2.	All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Mineral Beneficiation plants shall be implemented.
Corporate Environment Responsibility	
1.	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.
2.	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.
3.	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.
Miscellaneous	
1.	The project authorities must strictly adhere to the stipulations made by the State Pollution Control Board and the State Government.
2.	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.
3.	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.
4.	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.
5.	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.
6.	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.
7.	The Ministry or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.
Miscellaneous	
1.	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.
2.	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.
3.	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).
4.	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.
5.	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.
6.	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.
7.	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.
8.	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.
9.	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.
10.	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.
Miscellaneous	
1.	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.
2.	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.
3.	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.
4.	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.
5.	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.
Corporate Environment Responsibility (CER)	
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.

4. Any Other Item(s)

N/A

5. List of Attendees

Sr. N	Name	Designation	Email ID	Remark

a) It was observed that Massive Construction already done at basement with about 80- 100 pillars.

b) PP informed that this is based on previous EC but due to change in FAR, they have applied fresh EC.

c) PP needs to submit the following parameters in a Tabular form for previous EC and proposed EC: FAR, Ground Coverage, No of Floors (tower wise for both hotel and commercial), Fire corridor width, Power load, Water load, treated water discharge- volume in monsoon.

d) Demarcation of boundary, road and letter from GA about side approach road (for hotel entry) need to be submitted within photos of demarcation.

e) NOC from BMC for discharge of excess water.

f) As it looks like a violation case the justification may be submitted by the PP that why it cannot be a violation case.

After detailed discussion, the SEAC decided to take decision on the proposal after receipt of the following information / documents from the proponent:

i) Earlier EC granted by SEIAA, Odisha has already expired. It was observed that Massive Construction already done at basement with about 80- 100 pillars. PP needs to submit the following parameters in a Tabular form for previous EC and proposed EC with present construction details.

FAR, Ground Coverage, No of Floors (tower wise for both hotel and commercial), Fire corridor width, Power load, Water load, treated water discharge- volume in monsoon.

ii) As it looks like a violation case the justification may be submitted by the PP that why it cannot be a violation case.

iii) Demarcation of boundary, road and letter from GA about side approach road (for hotel entry) need to be submitted within photos of demarcation.

iv) NOC from BMC for discharge of excess water.

v) DLC certificate from concerned DFO that the project land has no forest land.

ITEM NO. 08

PROPOSAL OF ENVIRONMENTAL CLEARANCE OF M/S KALINGA ALUMINA LIMITED FOR BALLADA BAUXITE MINE FOR MINING OF 4.0 MTPA BAUXITE (ROM), BEING THE PEAK RATED CAPACITY, 1,46,508 TONNES OF OVERBURDEN/WASTE AND 51,564 TONNES (25,782 M3) OF TOP SOIL OVER A PERIOD OF 5 YEARS AND SETTING UP OF CRUSHING/ SCREENING FACILITIES OF 800 TPH CAPACITY WITHIN THE LEASE AREA SPANNING OVER AN AREA OF 144.945 HA LOCATED AT VILLAGE– BALLADA, TALUKA-NANDAPUR, DISTRICT – KORAPUT OF SRI KASSIREDDY ANIL KUMAR - EC

1. This proposal is for obtaining Environmental Clearance of M/s Kalinga Alumina Limited for Ballada Bauxite Mine for Mining of 4.0 MTPA Bauxite (ROM), being the Peak Rated Capacity, 1,46,508 tonnes of Overburden/waste and 51,564 tonnes (25,782 m3) of top soil over a period of 5 years and setting up of Crushing/ Screening facilities of 800 TPH capacity within the lease area spanning over an area of 144.945 ha located at Village– Ballada, Taluka-Nandapur, District – Koraput of Sri Kassireddy Anil Kumar.
2. **Category:** This is a Category – B project which falls under schedule 1(a): Mining of Minerals as per the EIA Notification 2006 and amendments thereafter.

3. **Project details:** The present proposal is a greenfield project for mining of major mineral (Bauxite) with peak production capacity of 4.0 MTPA in Mine Lease area of 144.945 Ha. ToR has been granted vide File No. SIA/OR/MIN/439954/2023 on 06.11.2023 by SEIAA, Odisha and Public Hearing held on 06.03.2025. Subsequently, the application has now been submitted for grant of Environmental Clearance (EC).
4. **List of statutory clearances:**

Sl. No.	Clearance	Date
i)	The letter of Intent for Mining lease of bauxite block has been issued vide letter no. SM-MC2-MC-0007-2023/2143/S&M Bhubaneswar	01.03.2023
ii)	Mining plan along with Progressive Mine Closure Plan has been approved by IBM vide Letter No. MCDR-MiFL0BXT/5/2023-BBS-IBM_RO_BBS	08.08.2023
iii)	The Site-Specific Wildlife Conservation plan received approval from PCCF (WL) & CWLW, Odisha. An amount of Rs 457.546 lakhs has been allocated towards conservation of wildlife in the study area.	04.06.2024
iv)	Permission for use of surface water from Jalaput Reservoir obtained from the Department of Water Resources, Govt. of Odisha vide letter no. 30630/WR	08.11.2024
v)	Forest Clearance Stage-I “In-principal” approval has been granted by MoEF & CC (Forest Conservation Division).	23.12.2024

5. **Forest Application details**: Forest application has been submitted vide proposal no. FP/OR/MIN/QRY/456733/2023; dated 30.12.2023. Ballada Block is a virgin bauxite block located in Nandapur Tehsil of Koraput district in Odisha, total mining lease area is 144.945 ha, located entirely within Nagasari reserve forest. The project contemplates to develop the mine and surrounding infrastructures for commercial production of bauxite of 4 MTPA peak rated capacity using opencast mining. In addition to ML area 12.267 ha area to be required for evacuation of minerals. Hence forest diversion application has been submitted for 157.212 ha. Forest Clearance Stage-I “In-principal” approval has been granted by MoEF&CC (Forest Conservation Division) dated 23.12.2024.
6. **ToR details**: Terms of Reference (TOR) was granted by SEIAA, Odisha vide letter dtd. 06.11.2023.
7. **Public hearing details**: The Public Hearing for the proposed bauxite mine was held at Mouza- Bheja, Khata No. 27, Plot No. 225, under Nandapur Tehsil of Koraput District, Odisha, dated: 06.03.2025, Time: 11:00 AM. Issues raised during public hearing are resettlement and rehabilitation plan, Education Renovation of Primary school/Higher Secondary School, Free education in schools, Healthcare facilities like provision of Ambulance, Distribution of free medicine, conducting health Camps, Construction of road, Water coolers and purifier, for Drinking water, maintenance of village roads, rainwater harvesting at Community Area, Provision of Plantation and Streetlights in Community Area, Provision of Water Cooler for Potable Drinking water, skill development and employment, about the Ballada Cave, that might be destroyed due to mining activity, agriculture of villages will be affected, The Forest Right Act is to be adopted for diversion of forest and R&R plan, Applicability & Implementation of the PESA Act, Stream Water Affect, measures to control air pollution, overburden protection and subsequent plantation, cutting down trees, increase of DMF fund for development.

8. **Location and connectivity:** Ballada Bauxite Block is located at Village - Ballada, Tehsil – Nandapur, District – Koraput, Odisha. Block covers an area of about 144.945 ha. bounded by latitudes 18°26'05.61588" N / 18°27'13.34448" N and Longitudes 82°39'32.39136" / 82°40'25.36716" E. The lease area is covered under Survey of India toposheet no. E44K11 (65J/11). 144.945 Ha. of Mine Lease area is Forest Land (Nagasari RF) under Koraput Forest Division. The mineral bearing plateau is situated about one kilometer west of Ballada village and about 8 km north of Padwa in Koraput district, Odisha. Jeypore, a major town in the Koraput district, is about 82 km NNW of the Ballada deposit and is approachable by major district road No.52. Koraput, the district headquarters is 60 km north of the deposit and is connected by a metalled road via Similiguda on NH 26. Bheja, the nearest Railway Station is about 5 km due north-east. The nearest airport is at Visakhapatnam, about 140 km SE from the lease area. The Nearest Water body is Jalaput reservoir located at a distance of 3 km south. Nearest reserve forest is Nagasari RF i.e., entire mine lease area of 144.945 Ha. Nearest habitation is Ballada village, about 1 km in East. The Nearest Wild life Sanctuary is "Karlapat Wildlife Sanctuary" at a distance of 139.8 km in NNE direction. The Nearest Water body is Jalaput reservoir located at a distance of 3 km South.

9. **Product details**:

Units	Products and by Products	Existing	Additional	After Expansion
Million Tonnes Per Annum (MTPA)	**Product:** Bauxite	0.00	4.00	Not Applicable

10. **Equipment details**:

S No	Particulars	Make	Capacity	No. of equipment
i)	Diesel hydraulic shovel	Volvo EC480/Komatsu PC 450/TATA Hitachi ZX 670	3.1 cum	4
ii)	Dumper	Bharat Benz 3528	16 m^3	11
iii)	DTH drill	Epiroc-T40	Hole Dia -115 mm	3
iv)	Dozer	BEML D-155	324 (hp)	1

11. **Mining method and production**: The deposit lies on surface, and it is proposed to be mined by mechanized opencast method of mining with excavator/ dumper combination. Deep hole drilling/Short hole drilling and blasting is proposed after taking prior permission from DGMS. Further, it is proposed to mine with Ripping-Dozing method and/or deployment of Surface Miner at a later date, based on feasibility. Mineable reserve is 19.96 Mt.

Year	Top Soil (m3)	Over Burden/ Waste (m3)	Over Burden/ Waste Quantity (t)	ROM Volume (m3)	ROM Quantity (t)	Recovery	Mineral Reject (t)	Production Main (t)	Production Associated (t)	OB to Ore Ratio (m^3/ton)
Year 1	24072	0	0	500060	1000120	100%	-	1000120	0	0.0
Year 2	1710	24783	49566	1012010	2024020		-	2024020	0	0.012
Year 3	0	44671	89342	1000741	2001482		-	2001482	0	0.022
Year 4	0	3800	7600	1001207	2002414		-	2002414	0	0.002

Year 5	0	0	0	2000934	4001868		-	4001868	0	0.0
Total	**25782**	**73254**	**146508**	**5514952**	**11029904**			**11029904**		**0.0067**

12. **Transportation details**: Mined bauxite (R.O.M) shall be transported to the crushing/screening plant through mine haul trucks. Evacuation of crushed bauxite is planned through a combination of conveyor and rail route. The crushed bauxite will be transported by a closed conveyor system to the nearest “Bheja Railway Siding” from where it will be loaded on railway wagons using front end loaders and subsequently dispatched to destination. OB within the lease will be transported through rear-dump trucks to the dump area within the lease.
13. **Ground water depth**: Pre-monsoon depth to water level ranges between 2.25 mbgl to 7.22 mbgl and post-monsoonal water level ranges from 1.22 mbgl to 6.21 mbgl, in the study area.
14. **Details of Drilling & Blasting:** The primary activity in mining operation, i.e. fragmentation/ loosening of in-situ rock mass, is conventionally carried out by drilling and blasting. The slurry/emulsion explosives will be used. The top of the blast holes will be subjected to stemming with drill cuttings to prevent generation of fly rocks. A minimum of one-third of the hole depth will be subjected to stemming. To minimize the vibration due to blasting NONEL with cord relay will be used and whenever blasting is to be done near any village or permanent structure muffle blasting will be done. The peak rated production capacity of mine will be 4 Mt per annum (2 Mm3 per annum).
15. **Soil dump details**: The waste generated in course of pre-mining development and subsequent mining operation will consist of topsoil and laterite with occasional occurrences of khondalite. During the first five years the rate of generation of waste is expected to be of the order of 0.073 Mm3 or 0.15 MT of along with generation of 0.026 Mm3 of Topsoil. Considering this, an average ore to waste ration of 1:0.018 is estimated. It is planned to stack topsoil and waste separately on ground during the initial 4 years of plan period. From 5th year onwards, waste material will be dumped systematically. Topsoil, stacked separately, would be spread over the reclaimed areas, to enable planting and growing of trees. The waste stacked on ground during the initial years of operation will be utilized to fill the worked-out areas at the end of the working life of the mine as well as during the interim period, as and when practicable. The generation of waste during the 5 year plan period will be very less and shall be dumped systematically. No backfilling is proposed during the initial 5 year period.
16. **Crusher and screen details**: For 4 million tons per annum peak rated capacity the crushing/ Screening plant requirement would be 800 TPH. It is proposed to install crushing and screening plants in phases 400 TPH (1 no.) for 2 MTPA RoM production and 400 TPH (2 nos.) for 4 MTPA production. The crushing plant and conveyor systems have been designed for 305 days operation per year with 3 shifts operation per day. The size of the product to be obtained after crushing in the plant will be minus 150 mm (d85).

Type of Crusher	**Capacity, TPH**	**Feed Size, mm**	**Product size, mm**
Crushing & Screening Plant	800	600-800	Minus 150

17. **Land use details**:

	Head	**At Present**	**At the end of SOM**	**At the end of conceptual**

		(Ha.)	period (Ha.)	period (Ha.)
a)	Area under Mining	0.00	42.78	81.82
b)	Topsoil stacking	0.00	0.28	-
c)	Overburden/Waste Dumping	0.00	1.94	1.95
d)	Mineral Storage	0.00	1.93	-
e)	Infrastructure (Workshop, Administrative Building etc.)	0.00	0.18	-
f)	Roads	0.00	0.38	-
g)	Mineral Separation Plant	0.00	0.13	-
h)	Others	0.00	3.92	-
i)	Undisturbed	0.00	-	61.18
	Total	**0.00**	**51.54**	**144.945**

18. **Details of waste generated:**

Year	Top Soil Volume (m^3)	Overburden/ Waste Volume (m^3)
Year 1	24072	0
Year 2	1710	24783
Year 3	0	44671
Year 4	0	3800
Year 5	0	0

19. **Mitigation of waste produced:** It is planned to stack topsoil and waste separately on ground during the initial 4 years of plan period. From 5th year onwards, waste material will be dumped systematically. Topsoil, stacked separately, would be spread over the reclaimed areas, to enable planting and growing of trees. The waste stacked on ground during the initial years of operation will be utilized to fill the worked-out areas at the end of the working life of the mine as well as during the interim period, as and when practicable. The generation of waste during the 5 year plan period will be very less and shall be dumped systematically. No backfilling is proposed during the initial 5 year period.

20. **Baseline study details**: Baseline Study has been conducted during March 2023 to May 2023.

Parameters	Baseline status
Ambient Air Quality	PM_{10} – 50.4 – 76.9 (µg/m^3) $PM_{2.5}$ – 28.7 – 50.9 (µg/m^3) NO_X – 16.1– 34.8 (µg/m^3) SO_2 – 9.4 – 21.8 (µg/m^3) CO – 0.5 – 1.0 (mg/m3)
Noise Level	Noise Level during Day Time -- 41.59 – 52.2 Leq.(dB)A Noise Level during Night Time -- 34.2 – 43.38 Leq.(dB)A

Water Quality	**Ground Water :** All the Parameters like TDS (320.0– 380.0mg/L). pH (7.55 – 8.24), Total Hardness (142.20- 300.42 mg/L) etc. are found within the permissible limits.
	Surface Water : All the Parameters like TDS (236.0- 400.0 mg/L). pH (7.51 - 7.72), Total Hardness (70.0- 81.0 mg/L) etc. are found within the permissible limits.
Soil Quality	pH – 7.58 – 7.82 Organic Matter – 0.31 – 0.69 (%) Water Holding Capacity – 32.21 – 37.64 (%)
Socio Economic Study	The proposed project will provide positive impact to the nearby area. The project will provide direct and indirect employment to nearby villagers. Project will generate employment for about 126 persons.
Ecology and Biodiversity	There is no wildlife sanctuary/biosphere reserve/national parks present within 10 Km radius of the study area. A Site-specific Wildlife Conservation Plan has been prepared and is approved by PCCF (WL) & CWLW for conservation of schedule-I species of the study area.

21. **Water requirement and wastewater management**: Water requirement during construction phase (domestic and construction activity) is estimated as average 15 KLD with a peak consumption of 30 KLD.The water requirement of the project during operation phase is 690 KLD. Water will be sourced from nearby Jalaput lake located at distance of 3 km. Permission has been obtained from the Department of Water Resources, Govt. of Odisha vide letter no. 30630/WR. dated 08.11.2024 Wastewater generated from workshop will be treated using oil-water separator and treated water will be used in vehicle washing. Waste water generated from mine office, rest shelters etc. will be disposed in soak pit via septic tank.

S. No.	Consuming Area	Water requirement, (KLD)
i)	Haul road dust suppression including maintenance of topsoil	600
ii)	Washing and cleaning of earthmoving equipment	45
iii)	Drinking system	10
iv)	Afforestation	15
v)	Miscellaneous	20
	Total	**690**

22. **Power Requirement and solar power details:** The estimated average power requirement is 1 MW, the peak requirement being 1.5 MW. Power shall be sourced from nearest substation located at a distance of 8 km at Padwa. Renewable energy source proposed to install is around 160 KW, which will be about 10 % contribution for the total power requirement.

23. **Rainwater Harvesting Details:** As per the CGWA Manual for Recharge (GEC Norms-2015), the recharge structures like Check Dam/ Percolation Pond will contribute 20% of the stored volume in the monsoon and 20% in the non-monsoon to the recharge of groundwater system. The mine pits are considered as ponds (manmade structures). Hence, the above percentage is considered as ground water recharge from the mining pits. The estimated ground water recharge through mine pit will be 253341 m3/month.

24. **Green belt Development:** The details of proposed greenbelt are given below:

Sr. No	Year	Green Belt Location (s)	Area Proposed to be Covered (Ha)	Number of Plants Proposed	Expected Survival Rate (%)	Estimated Expenditure (INR)
i)	**Year 1**	**Statutory Barrier, Dump & haul roads**	**0.72**	**1440**	**75**	**2,01,600**
ii)	**Year 2**	**Statutory Barrier, Dump & haul roads**	**0.86**	**1720**	**75**	**2,40,800**
iii)	**Year 3**	**Statutory Barrier, Dump & haul roads**	**1.16**	**2320**	**75**	**3,24,800**
iv)	**Year 4**	**Statutory Barrier, Dump & haul roads**	**0.68**	**1360**	**75**	**1,90,400**
	Year 5	**Statutory Barrier, Dump & haul roads**	**0.80**	**1600**	**75**	**2,24,000**
Total			**4.22**	**8440**		**11,81,600**

25. **Total employment**: Project will generate employment for about 126 persons directly, besides its potential to generate considerable indirect employment and livelihood opportunities.

26. **Project Cost:** Estimated cost of the project is Rs. 23000 Lakhs, EMP cost includes Capital Cost of Rs. 220 Lakhs and Recurring Cost of Rs. 60 Lakhs/year; CSR cost is Rs. 532.5 Lakhs.

Sl. No.	Environmental Protection Measures	Capital Cost (Rs. In lakhs)	Recurring Cost (Rs. In lakhs/year)
i)	Air Pollution Control Measures	100.00	25.00
ii)	Water Pollution Control Measures	25.00	5.00
iii)	Noise Pollution Control Measures	15.00	1.00
iv)	Greenbelt Development	20.00	5.00
v)	Rainwater Harvesting	10.00	2.00
vi)	Health & Safety measures	20.00	2.00
vii)	Environment Monitoring	30.00	20.00
	Total	**220.00**	**60.00**

27. **Environment Consultant**: The Environment consultant **M/s Vardan Environet LLP, Gurugram** along with the proponent made a presentation on the proposal before the Committee on 30.05.2025. **T**he SEAC decided to take the decision on the proposal after receipt of certain information / documents from the proponent:

28. The SEAC in its meeting held on dated **30.05.2025** decided to take decision after receipt of the following information and documents from the proponent. The proponent has furnished the compliance and the SEAC verified the same as follows:

Sl. No.	Information Sought by SEAC	Compliance furnished by the proponent	Views of SEAC
i)	Status of stage-I Forest Clearance and copy of stage-I Clearance, if obtained.	FC Stage-1 has been granted vide file no. FP/OR/MIN/QRY/456733/2023 on 23.12.2024. Copy of FC stage-1 approval is attached as **Annexure 1**.	Complied
ii)	Copy of Letter of Intent in name of	The Letter of Intent (LOI) has been issued in the name of Mundra Alumina Ltd. vide letter	-----

Sl. No.	Information Sought by SEAC	Compliance furnished by the proponent	Views of SEAC
	Kalinga Alumina.	no.2143/SM-MC2-MC007-2023, S&M, Bhubaneswar on 01.03.2023 from the Steel & Mines Department, Govt. of Odisha. However, change in name of entity from "Mundra Alumina Ltd." to "Kalinga Alumina Ltd.)" has been approved by the Department of Steel & Mines, Govt. of Odisha vide letter no. 5995 SM-MC2-MC-0012-2023/SM, Bhubaneswar on 09.06.2023. The Copy of Letter of Intent is attached as **Annexure 2**.	
iii)	Explore the possibility of implementing the sprinkling system all along the conveyor line.	Provision of sprinkling system for dust suppression will be provided at the loading end, discharge end and at all the transfer points of the long-distance conveyor.	Complied
iv)	Provision for continuous water sprinkling facility to be adopted all along the road during transportation of minerals.	Provision for continuous water sprinkling facility will be adopted all along the Haul Road during transportation of minerals. An adequate number of water sprinkler and fog cannon shall be installed at appropriate locations to prevent air pollution during internal transportation of mineral from pit to crusher.	
v)	Note on Management of reactive silica.	Reactive Silica refers to a mineralogical form of silica, primarily present as Kaolinite, with the chemical formula $Al_2O_3 \cdot 2SiO_2 \cdot 2H_2O$. It is termed "Reactive" due to its chemical reactivity with caustic solutions used in the Bayer Process, the standard method employed by alumina refineries to extract alumina from bauxite. During the Bayer Process, Reactive Silica reacts with the caustic soda and precipitates as a solid by-product known as Desilication Product (DSP). This DSP becomes part of the red mud, a residue that requires careful management by alumina refinery operators. As such, Reactive Silica does not pose any environmental or processing concerns during the mining and crushing stages. Further, its presence in bauxite does not impact on the operations of Kalinga Alumina Limited, whose responsibilities are limited to the extraction, crushing, and sale of bauxite ore to various alumina refineries.	Complied
vi)	Parking Plaza details.	Designated parking plot for HEMM will be inside the mining lease area for Intra mine transportation. Since Bauxite will be transported	Complied

Sl. No.	Information Sought by SEAC	Compliance furnished by the proponent	Views of SEAC
		through the long-distance conveyor system, therefore, no transportation of bauxite by road is envisaged.	
vii)	Details on the exploration of minerals with respect to critical minerals.	As per the tender documents, exploratory drilling was carried out during the year 1976-77 by Geological Survey of India. A total of 15 boreholes (BB-1 to BB-15) have been drilled with a total meterage of 291.65 meters. Based on the grades, Bauxite has been categorized into 5 types such as Metallurgical grade bauxite, Low grade Bauxite, Beneficiable grade Bauxite High Silica Bauxite and Aluminous Laterite and the resources have been estimated accordingly. The geological setting of the area, being part of the Eastern Ghats hill ranges and predominantly composed of Khondalite and Charnockite group of rocks, significantly reduces the likelihood of encountering critical mineral deposits. As per the Geological Report, the absence of known mineralization zones or geochemical anomalies in the region further supports that the possibility of occurrence of critical minerals in this bauxite deposit is very remote. Geological report is attached as **Annexure-3**.	-----
viii)	During public hearing, local people made complaint about protection of cave, which is a place of worship in that locality and same is falling within the lease area. A detailed proposal for protection of the cave area used for worship by the local people including earmarking a no mining / safety zone in a layout to be submitted.	Regarding the protection of the Cave, we have proposed no mining activity will be carried out within 100m distance from the Cave. Hence the cave shall remain undisturbed and on the contrary, the cave and its vicinity shall be developed and beautified so as to attract tourism. District administration is also intent for the Beautification of Cave. The layout plan mentioning Safety zone is attached as **Annexure 4**. The protection plan of Cave is attached as **Annexure 5**.	Complied

29. Following issues have been raised by the public during Public Hearing for Ballada Bauxite Mines for M/s Kalinga Alumina Limited, Koraput held on 06.03.2025 at 11.00 am at Mouza Bheja (Khata no. 27. Plot no. 225 area -2,48 ac, kissam-d-111) under Nandapur Tehsil, District – Koraput.

i) Resettlement and Rehabilitation (R&R) Plan/Compensation details for the Project Affected People (PAP) should be furnished.

ii) Education Renovation of Primary school/Higher Secondary School, Free education in schools.

iii) Healthcare facilities like provision of Ambulance, Distribution of free medicine and conducting health Camps

iv) Infrastructure Development; Construction of road, Water coolers and purifier, for Drinking water

v) Physical Work: Strengthening/maintenance of village roads, Rainwater Harvesting at Community Area, Provision of Plantation and Streetlights in Community Area, Provision.

vi) Water Cooler for Potable Drinking water

vii) Skill Development and Employment; Wick making, Stitching, Mushroom Production and Computer Training.

viii) Ballada Cave will be destroyed due to mining activity.

ix) Agriculture of villages will be affected.

x) The Forest Right Act is to be adopted for diversion of forest and R&R plan

xi) Applicability & Implementation of the Panchayats Extension to Scheduled Areas (PESA) Act, 1996

xii) Stream Water Affect

xiii) Measures need to be taken to prevent Air Pollution in this project.

xiv) Overburden protection & subsequent plantation

xv) Felling of trees

xvi) Increase of DMF fund for development

30. About **2420 Nos.** of written representations have been received by the Board in connection with the public hearing and most of them are related to the above issues along with issues related to destruction of Nageswari Hill, Destruction of natural habitats of 23 different types of Animals and Birds, Affect the crops and millets grown at the foothill of the Balda Hill, affect the 23 perennial streams and 15 ponds and lakes around the Balda Hills and destruction of medicinal trees etc.

31. **Further, a representation from Sri Rama Chandra Kadam, Hon'ble MLA, Pottangi has been submitted to Hon'ble Chief Minister, Odisha raising following issues**

i) The villagers of Balda Gram Panchayat, along with five other panchayats and about 30 villages, are associated with the Nageswari Hills. The forests, jungles and springs of nature are the beliefs and emotions of their tribal people. This hill is associated with the memories of our ancestors and our livelihood.

ii) On the other hand, the State Tourism Department has also arranged an eco-retreat very close to this hill to attract tourists, which is the oldest cave in this area, known as Nageswari Cave. If the hill is excavated by the Adani Company, the tourism of the State, the natural beauty of the Nageswari Cave and the hill will be completely affected.

iii) All the perennial streams and springs in this area will be dried up.

iv) The medicinal trees that were thousands of years ago will also disappear, which is an irreparable loss.

32. The Committee observed that most of the points raised by the public during public hearing as well as raised by Hon'ble MLA have been addressed by the proponent in the EIA report. The proponent has also submitted a detailed proposal for protection of the Nageswari Cave such as maintaining no mining zone from the cave, beautification of the cave area to attract tourists and other pollution control measures as per concerns of public.

Considering the information furnished and the presentation made by the consultant, **M/s Vardan Environet LLP, Gurugram** along with the project proponent, the SEAC recommended for grant of Environmental Clearance to the project valid for 10 years with stipulated conditions as per **Annexure – E** in addition to the following specific conditions**.**

i) The proponent shall take all precautionary measures to protect Nageswari Hill / Cave as approved in mining plan and as proposed in EIA / EMP report.

ii) The issues raised during the public hearing shall be addressed by the proponent as proposed in EIA/EMP report.

iii) The proponent shall obtain permission from the Archaeological Department if applicable before going for mining activity and take all protective measures to protect the Nageswari Cave in consultation with Archaeological Department if required.

iv) The proponent shall use conveyor for mineral evacuation and submit a detailed proposal with timeline for construction of conveyor within a month of issue of EC. Till the establishment of conveyor, they can go for mineral evacuation by road.

v) As proposed by the project proponent, a feasibility study shall be carried out at the earliest from an institute of repute for the application of ripper-dozer and/or surface miner at Ballada Bauxite Mine.

MEMBER SECRETARY, SEAC

ANNEXURE- E

CONDITIONS TO BE STIPULATED IN ENVIRONMENTAL CLEARANCE FOR FOR M/S KALINGA ALUMINA LIMITED FOR BALLADA BAUXITE MINE FOR MINING OF 4.0 MTPA BAUXITE (ROM), BEING THE PEAK RATED CAPACITY, 1,46,508 TONNES OF OVERBURDEN/WASTE AND 51,564 TONNES (25,782 M3) OF TOP SOIL OVER A PERIOD OF 5 YEARS AND SETTING UP OF CRUSHING/ SCREENING FACILITIES OF 800 TPH CAPACITY WITHIN THE LEASE AREA SPANNING OVER AN AREA OF 144.945 HA LOCATED AT VILLAGE– BALLADA, TALUKA-NANDAPUR, DISTRICT – KORAPUT OF SRI KASSIREDDY ANIL KUMAR – EC.

A. SPECIFIC CONDITIONS

1. The Project Proponent shall commence the mining operation only after obtaining Stage-II FC.
2. The Project Proponent shall conduct the ground vibration study through authorized agencies and the results shall be compared with limiting values prescribed by Directorate General of Mines Safety (DGMS). The implementation status of the same shall be submitted to the Ministry's Integrated Regional Office.
3. The Project Proponent shall monitor the ground induced blasting vibrations for every blast and the results are to be compared with the limiting values prescribed by Director General of Mine Safety (DGMS). PP shall ensure that the values of "peak particle velocity" and "Air Over Pressure" shall be maintained below the permissible values prescribed by the DGMS, from time to time. The data needs to be maintained and submitted along with the six monthly compliance report.
4. The Project Proponent shall strictly adhere to the action plan to monitor the movement of wildlife in the vicinity of the mine lease area.
5. 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.
6. The Project Proponent needs to submit the annual compliance of the effectiveness of the Wildlife Conservation Plan to the Chief Wildlife Warden.
7. The Project Proponent needs to take adequate measures for protection of seasonal nallahs in the vicinity of the mine lease area. The natural water bodies and or streams which are flowing in and around the mine lease area should not be disturbed.
8. Regular monitoring on surface water flow, turbidity & water quality shall be carried out and report shall be submitted quarterly to the Ministry's Integrated Regional Office / SEIAA, Odisha.
9. The Project Proponent should install the 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.
10. The Project Proponent shall 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, crusher and at other sensitive receptors and such collected data shall be submitted quarterly to the Ministry's Integrated Regional Office/ SEIAA, Odisha.

11. The Project Proponent shall explore the possibility of increasing the budget towards promotion of solar energy.
12. The Project Proponent needs to install the permanent water sprinklers along the haul road and the approach road. Further, 10 nos. of fog canon/mist sprayer of at least 40 m throw shall be installed at various locations in the mine area.
13. The air pollution control equipment's like bag filters, vacuum suction hoods, dry fogging system etc. shall be installed at Crushers, and other areas prone to air pollution. PP shall take necessary measures to avoid generation of fugitive dust emissions. The dense plantation shall be carried out in the vicinity of the crusher. The Stack emission monitoring of the Crusher/DG set shall be carried out at periodic intervals. Continuous noise monitoring meters shall be established inside and outside of the crusher.
14. The Project Proponent needs to complete the entire 7.5 m peripheral plantation and safety barrier plantation within three years from the start of mining operations. The Project Proponent should plant quality sapling of appropriate height of native and fruit bearing species. In case of tall transplants (seedlings) the seedlings should have proper trained root stock with root biomass commensurate with seedling height to ensure good growth after out planting. Plantation shall be undertaken in consultation with the State Forest Department. 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 Integrated Regional Office / SEIAA, Odisha.
15. The budget of Rs 5.32 Cr to address the concerns raised by the public in the public hearing to be completed within 3 years from the date of start of mining operations. 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.
16. The Project Proponent shall create awareness among the local people working within the project area as well as its surrounding area on the ban of Single Use Plastic (SUP) in order to ensure the compliance of Notification published by MoEF&CC on 12/08/2021. A report, along with photographs, on the measures taken shall also be included in the six monthly compliance report.
17. The Project Proponent should adopt the proper mitigation measures as proposed under EMP with budgetary provision of Rs 2.20 Cr. 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 Integrated Regional Office / SEIAA, Odisha.
18. 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.

19. 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 IRO, MoEF&CC / SEIAA, Odisha.
20. The Project Proponent shall explore the possibility of using atleast 20% of Electric vehicles/CNG/Solar instead of diesel operation within three years.
21. NoC from the Central Ground Water Authority (CGWA)/ Concerned Local authority, as the case may be, shall be obtained before drawing the ground water for the project activities, State Pollution Control Board / Pollution Control Committees shall not issue the Consent to Operate (CTO) under Air (Prevention and Control of Pollution) Act and Water (Prevention and Control of Pollution) Act till the project proponent shall obtain such permission.
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. The preference shall be given to the local people for the purpose of employment and PP shall strictly adhere to the skill development plan for the work force.
23. The Project Proponent should periodically monitor and maintain the health records of the mine workers digitally prior to mining operations, at the time of operation of mine and post mining operations. Regular surveillance on occupational health shall be carried out every year for mine workers. PP shall also organize medical camp for the benefit of the local people and also the monitor the health impacts due to mining activity.
24. 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 Integrated Regional Office.

B. STANDARD CONDITIONS

I. Statutory compliance

1) This Environmental Clearance (EC) is subject to orders/ judgment of Hon'ble Supreme Court of India, Hon'ble High Court, Hon'ble NGT and any other Court of Law, Common Cause Conditions as may be applicable.
2) 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.

3) 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.

4) The Project Proponent shall follow the mitigation measures provided in MoEF&CC'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".

5) 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.

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.

7) 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 MoEF&CC Regional Office / SEIAA, Odisha for compliance and record.

8) The Project Proponent shall inform the MoEF&CC / SEIAA, Odisha for any change in ownership of the mining lease. In case there is any change in ownership or mining lease is transferred. PR needs to apply for transfer of EC as per provisions of the para 11 of EIA Notification, 2006 as amended from time to time.

II. <u>Air quality monitoring and preservation</u>

9) 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 S02 etc. as per the methodology mentioned in NAAQS Notification No. B-29016/20/90/PCI/l, 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.

10) 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 MoEF&CC/ CPCB.

III. Water quality monitoring and preservation

11) 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 MoEF&CC 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.

12) 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, SEIAA, Odiaha, CGWA and State Groundwater Department / State Pollution Control Board.

13) 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-a-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 MoEF&CC. 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.

14) 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.

15) 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 MoEF&CC / SEIAA, Odisha annually.

16) 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.

17) 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, SEIAA, Odisha and State Pollution Control Board.

IV. Noise and vibration monitoring and prevention

18) The peak particle velocity at 500m distance or within the nearest habitation, whichever is closer shall be monitored periodically as per applicable DGMS guidelines.

19) 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 floodlights/ masks away from the villagers and keeping the noise levels well within the prescribed limits for day /night hours.

20) 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.

V. Mining plan

21) 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.).

22) 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-

a-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 the MoEF&CC and its concerned Regional Office / SEIAA, Odisha.

VI. Land reclamation

23) 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.

24) 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.

25) Catch drains, settling tanks and siltation ponds of appropriate size shall be constructed around the mine working, mineral yards and Top Soil/OBAA/aste 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.

26) 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.

VII. Transportation

27) 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].

28) 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,

VIII. Green Belt

29) The Project Proponent shall develop greenbelt in 7.5 m 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.

30) 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.

31) 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. I he 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.

IX. Public hearing and human health issues

32) 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, creche 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.

X. Corporate Environment Responsibility (CER)

33) 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-I A. 111 dated 30 September, 2020. The action plan shall be implemented within three years of commencement of the project.

XI. Miscellaneous

34) 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 / SEIAA, Odisha.

35) 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.

36) The Project Proponent shall submit six monthly compliance reports on the status of the implementation of the stipulated environmental safeguards to the MOEF&CC & its concerned Regional Office, SEIAA, Odisha, Central Pollution Control Board and State Pollution Control Board.

37) 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 / SEIAA, Odisha.

38) The concerned Regional Office of the MoEF&CC/ SEIAA, Odisha 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.

39) In pursuant to Ministry's O.M No 22-34/2018-I A. 111 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 regressing 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.

40) The SEIAA, Odisha or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.

41) 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

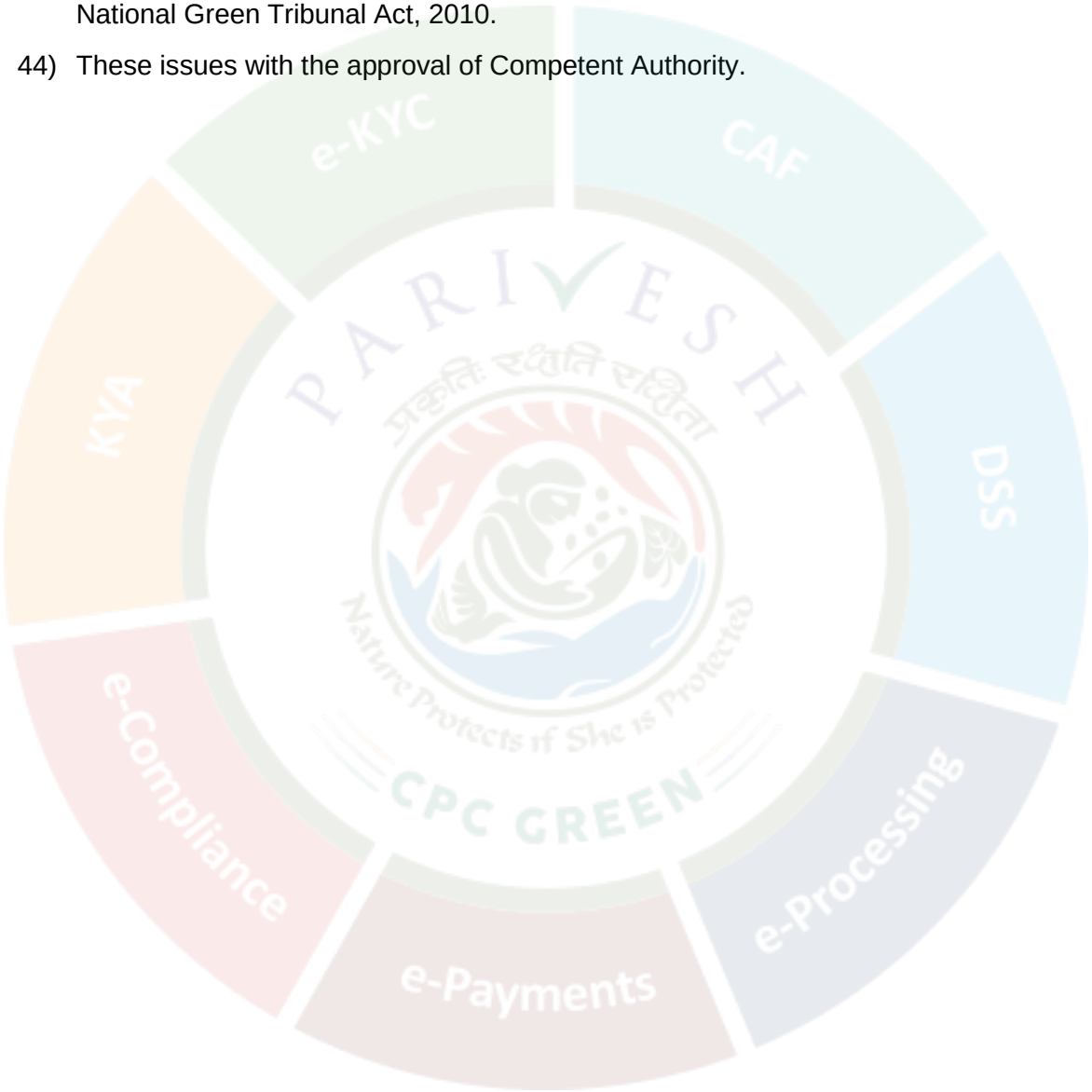
Environmental Scientist, SEAC

and attract action under the provisions of Environment (Protection) Act, 1986.

42) 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.

43) 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.

44) These issues with the approval of Competent Authority.



Environmental Scientist, SEAC

Annexure A9


GPS Map Camera
Koraput, Odisha, India
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Google


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BEFORE THE NATIONAL GREEN TRIBUNAL EASTERN ZONE AT KOLKATA

MEMORANDUM OF APPEAL

(Under Sections 16(h) read with 18(1) of the National Green Tribunal Act, 2010)

Appeal No. of 2025

Ajaya Muduli & Ors. …Appellants

-Vs-

State Level Environment Impact Assessment Authority, Odisha & Anr

…Respondents

INDEX

S. No	Date	Particulars	Page No.
VOLUME II			
15.	May 2025	Annexure A10- EIA report with annexures	267-748

//Certified to be True Copies of the respective originals//

Through
A.Yogeshwaran
Counsel for the Appellant
Ph : 9566254546 | Email : yogeshwaranadv@gmail.com

May, 2025

FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PLAN

Ballada Bauxite Mine for Peak Rated Capacity 4.0 MTPA Over a Mining Lease Area of 144.945 Ha

VILLAGE– BALLADA, TALUKA-NANDAPUR, DISTRICT – KORAPUT, STATE- ODISHA

STUDY PERIOD: MARCH 2023 TO MAY 2023
COLLECTED BY: VARDAN ENVIRO LAB
[The proposed project is listed under Schedule1 (a) Mining of Minerals under the Schedule of EIA Notification, 2006 and categorized as Category-B1]

PROJECT PROPONENT

M/s KALINGA ALUMINA LIMITED

ADANI CORPORATE HOUSE, SHANTIGRAM SG HIGHWAY, KHODIYAR, DIST. AHMEDABAD, STATE: GUJARAT

ENVIRONMENT CONSULTANT

VARDAN ENVIRONET LLP

(QCI/NABET ACCREDITATION NO. NABET/EIA/2326/RA 0284_Rev.01)

PLOT NO.: 82A, SECTOR-5, IMT MANESAR, GURUGRAM- 122052, HARYANA

E-mail: mining@vardan.co.in, Contact: +91 9953147268

Document No.: 2023_VM_0005_ Final EIA

1.1.1.1 REVIEW AND REVISION HISTORY

History of revisions of the present report:

Table I: History of the Revisions

S. No.	Rev.	Date	Modifications	Remarks
1.	Rev. 00 Final	03.05.2025	Final EIA /EMP Report	Report has been prepared by team Vardan and all comments of reviewers have been incorporated in the Final EIA/EMP Report.

Table II: Record of Review

Rev.	Date	Description	Review-1	Approval
Rev.00 Final	03.05.2025	Final EIA/EMP Report	Mr. Anshul Yadav	Mr. R.S. Yadav
-	-	The EIA/EMP report has been prepared by Mr. Anshul Yadav (EIA coordinator) and assisted by other team members.		

This Report has been prepared by **Vardan EnviroNet LLP** on behalf of and for the use of **M/s Kalinga Alumina Limited** with due consideration and skill as per our general terms and conditions of business and terms of agreement with **M/s Kalinga Alumina Limited.**



DISCLAIMER

Vardan EnviroNet LLP has taken all reasonable precautions in the preparation of this report as per its auditable quality plan. Vardan EnviroNet also believes that the facts presented in the report are accurate as on the date it was written. However, it is impossible to dismiss absolutely, the possibility of errors or omissions. Vardan EnviroNet LLP therefore specifically disclaims any liability resulting from the use or application of the information contained in this report. The information is not intended to serve as legal advice related to the individual situation.

NABET ANNEXURE – VII

Declaration by Experts contributing in report preparation of Mining of 4.0 MTPA Bauxite (ROM), being the Peak Rated Capacity, 1,46,508 tonnes of Overburden/waste and 51,564 tonnes (25,782 m^3) of top soil over a period of 5 years and setting up of Crushing/ Screening facilities of 800 TPH capacity within the lease area spanning over an area of 144.945 ha.

Declaration by Experts contributing:

I, hereby, certify that I was part of the EIA team in the following capacity that developed the above EIA.

EIA Co-ordinator:

Name : Mr. Anshul Yadav

Signature & Date : 

Period of involvement : **21.06.2023– Till date**

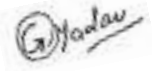
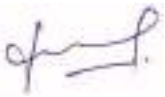
Contact information **:** Plot no.-82 A, Sector-5 IMT Manesar, Gurugram, Haryana

Contact no: +91- 9953147268

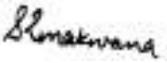
Email: mining@vardan.co.in

Functional Area Experts (FAEs):

S. No.	Functional Areas	Name of the Expert/s	Involvement	Signature & Date
1.	**AP**	FAE – Mr. Jayeshbhai Makwana	**1.** Measurement of meteorological data **2.** Selecting locations of sampling stations **3.** Monitoring/ supervision of field team for collection of ambient air quality data, collection, and preservation of the samples **4.** Identification of probable impacts of the different air emissions from the mines **5.** Identifying suitable Mitigation measures	

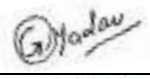
2.	**WP**	FAE - Mr. Gaurav Yadav	**1.** Designing sampling network for ground and surface water **2.** Supervision/monitoring of water samples including preservation of samples **3.** Preparation of water balance, suggesting water conservation measures, etc. **4.** Identification of effluent streams and suggesting treatment methods **5.** Identification of probable impacts of effluent/waste water discharges in to the receiving environment /water bodies.	
3.	**SHW**	FAE - Ms. Kavita Zog	**1.** Identification of hazardous waste, solid waste, and their disposal and mitigation measure.	
4.	**SE**	FAE - Mrs. Shilpa Mishra	**1.** Conducting baseline socio-economic surveys **2.** Extrapolation of census data to project an up-to-date status including selected ground validation of the same **3.** Conduct social needs assessment studies **4.** Evaluation of socio-economic status of both tribal and non-tribal areas	
5.	**EB**	FAE - Mr. Niteesh Kumar FAA – Mr. Adarsh Bhardwaj	**1.** Preparation of resource inventory (flora and fauna) of the project area and study area **2.** Conducting ecological/ wildlife surveys and preparation of status reports for rare, endangered and threatened species of animals and plants and also species protected under national laws **3.** Preparation of biodiversity study report and wild life conservation plan **4.** Preparation of eco system	 

			services report **5.** Suggesting mitigation measures such as green belt development	
6.	**HG**	FAE - Mr. Prashant Yadav	**1.** Review of surface hydrological studies conducted including nala diversion study report **2.** Designing of ground water table measurement and monitoring network, computation of ground water recharge, flow rate and direction. **3.** Plotting of ground water contours. **4.** Analysis and description of aquifer characteristics e.g. permeability, transmissivity, storage coefficient etc., estimation of groundwater potential and recharge phenomenon, determination of impact of withdrawal of groundwater. **5.** Preparation of ground water impact assessment, comprehensive hydrogeology report and groundwater modelling report	
7.	**GEO**	FAE - Mr. Prashant Yadav	**1.** Review of Geological Report conducted for mineral exploration **2.** Review of Mining Plan **3.** Review of Geology and Geo morphological analysis/ description. **4.** Review of Stratigraphy/Lithology. **5.** Vibration analysis in relation to mining operations. **6.** Review of geological maps. **7.** Review of Mining plan incorporating environmental aspects like top soil preservation, waste dump management, reclamation/rehabilitation	

			of mined out areas, run off management etc. **8.** Carrying out environmental impacts assessment and suggesting mitigation measures during mining and mine closure stage	
8.	**AQ**	FAE - Ms. Surbhi Rohan Makwana	**1.** Developing micro meteorological data for use in modeling **2.** Collecting and using secondary data on meteorology for modeling **3.** Application of models in prediction of dispersion of pollutants, plotting of isopleths of GLCs representing incremental pollution levels, worst case scenarios on suitable maps showing both, the sources of pollution as well as the environmentally sensitive receptors.	
9.	**NV**	FAE - Mr. KM Khare	**1.** Developing a monitoring network and supervision for collection of samples related to noise/ vibration levels using specific instruments, processing, and analysis of data **2.** Prediction of noise/ vibration isopleths using relevant models **3.** Probable impacts of noise and vibrations on the surrounding environment **4.** Suggesting control of noise emanating from mining operations, vehicles, machines, etc. **5.** Design and optimization of noise/vibration attenuation devices.	

10.	**LU**	FAE – Mr. Ankit Singh TM - Jai Prakash Sharma	**1.** Generation and analysis of data related to land use pattern **2.** Developing land use map of urban, semi-urban, rural, mixed areas, forest area, etc. using GIS **3.** GIS based land use analysis and development **4.** Integration of land use related data/ information for assessing environmental impacts	
11.	**RH**	FAE - Mr. Milind Joshi	**1.** Identification of hazardous prone areas **2.** Environment risk evaluation **3.** Preparation of on-site Emergency Preparedness Plan **4.** Preparation of off-site Disaster Management Plan	
12.	**SC**	FAE – Mr. Dushyant Parashar FAA – Mr. Adarsh Bhardwaj	**1.** Sampling, analysis and characterization of soil **2.** Assessment of fertility/ productivity of soil, nutrient availability **3.** Assessment of impact of gaseous, liquid and solid pollutants on soil **4.** Management of soil salinity **5.** Remediation of soil pollution/contaminated soils **6.** Controlling degradation of soil **7.** Suggesting Soil Conservation measures.	 

List of Team Members

Mr. Gaurav Yadav	
Mr. Adarsh Bhardwaj	
Mr. Manoj Kumar Saini	
Mr. Saurabh Vishwakarma	

Declaration by the Head of the accredited consultant organization/ authorized person.

I, R.S. Yadav, hereby, confirm that the above-mentioned case of Ballada Bauxite Mine is located at Village - Ballada, Taluka – Nandapur, District- Koraput, Odisha by **M/s Kalinga Alumina Limited.**

I, hereby, certify that I was a part of the EIA team in the following capacity that developed the above EIA.

I also confirm that I shall be fully accountable for any misleading information mentioned in this statement.

Name: **R.S.Yadav**



Signature

Designation: **Managing Partner**

Name of the EIA Consultant Organization: Vardan EnviroNet, QCI/NABET Accredited Environment Consultancy

NABET Certificate No. & Issue Date: NABET/EIA/2326/RA 0284_Rev.01 valid up to 04.05.2026.

Table of Contents

	Review	**i**
	NABET Annexure VII	**ii-vii**
	Table of Contents	**viii-xvii**
	ToR Compliance	**xviii-xlv**

1.	**INTRODUCTION**	**1-14**
1.1	Introduction	1
1.2	Purpose of the Report	2
1.3	Identification of Project & Project Proponent	2
1.3.1	The Project	2
1.3.2	The Project Proponent	3
1.4	Brief Description Nature, Size & Location of the Project	3
1.4.1	Location of the Project	3
1.4.2	Nature of the Project	6
1.4.3	Size of the Project	6
1.4.4	Importance of the Project to the Country & Region	8
1.5	Scope of the Study	8
1.5.1	Terms of Reference of EIA Study Prescribed by MoEF&CC	8
1.5.2	Baseline Data Generation, Field Studies	8
1.5.3	Secondary Information Collection	9
1.5.4	Report Coverage	9
1.6	Laws Applicable to This Project	10
2.	**PROJECT DESCRIPTION**	**15-43**
2.1	Type of Project	15
2.1.1	History of Mine lease	15
2.2	Need of the Project	15
2.3	Location of Project	16
2.4	Size/Magnitude of Operation	25
2.4.1	Proposed Operation	25
2.5	Status of Statutory Permissions	28
2.5.1	Letter of Intent	28
2.5.2	Mining Plan	28
2.5.3	Forest Issues	28
2.5.4	Wildlife Conservation Plan	28
2.5.5	Legal Issues	29
2.6	Implementation Schedule	29
2.7	Geology of Area	29
2.7.1	Physiography and Drainage	29
2.7.2	Regional Geology	29

2.7.3	Local Geology	30
2.8	Reserve Estimation and Life of Mine	30
2.8.1	Method of Estimation of Reserves	30
2.8.2	Mineral Resource Estimation for Conversion of Mineral Reserve	30
2.8.3	Threshold Value and Cutoff Parameters	31
2.8.4	Mineral Reserve	31
2.8.5	Life of Mine	32
2.9	Technology and Process Description	32
2.9.1	Mining Methodology	32
2.9.2	Proposed Production Plan	33
2.9.3	Mine Design Parameter	33
2.9.4	Drilling and Blasting	36
2.9.5	Crushing Unit	36
2.9.6	Extent of Mechanization	37
2.9.7	Waste Management	37
2.9.8	Top Soil Management	38
2.10	Use of Minerals	39
2.11	Resource Requirement	39
2.11.1	Power Requirement	39
2.11.2	Water Requirement	39
2.11.3	Manpower	40
2.11.4	Proposed Investment	40
2.11.5	Site Services	40
2.12	Transportation	40
2.13	Land Use	41
2.14	Assessment of New & Untested Technology	42
2.15	Description of Mitigation Measure	42
3	**DESCRIPTION OF ENVIRONMENT**	**44-151**
3.1	Study Area	44
3.2	Study Period	44
3.3	Components and Methodology	44
3.4	Establishment of Baseline for Valued Environmental Components	46
3.4.1	Micro-Meteorological Data	46
3.4.2	Air Environment	51
3.4.3	Noise Environment	62
3.4.4	Water Environment	66
3.4.5	Soil Environment	80
3.4.6	Traffic Study	86
3.4.7	Land Use and Environment	90
3.4.8	Land Use / Land Cover	91
3.4.9	Geomorphology and Soil Type	97

3.4.10	Hydrogeology	106
3.4.11	Ecology and Biodiversity	111
3.4.12	Socio-Economic Environment	126
4.	**ANTICIPATED ENVIRONMENTAL IMPACT & MITIGATION MEASURE**	**152-186**
4.1	Introduction	152
4.2	Identification & Characterization of Impacts	152
4.2.1	Impacts due to Project Location	153
4.2.2	Impacts due to Project Design	153
4.2.3	Impact during Construction	153
4.2.4	Impact during Operation Phase	153
4.3	Impact Matrix	154
4.4	Impacts during Operational Phase	165
4.4.1	Impact on Land Use	165
4.4.2	Slope Study of the Area	167
4.4.3	Impact on Air Quality	167
4.4.4	Meteorological Data	171
4.4.5	Results	171
4.5	Impacts of Water Pollution and Its Mitigation Measures	179
4.5.1	Impact of Mining on Water Usage	179
4.5.2	Impact of Mining on Surface Water	179
4.5.3	Impact of Mining on Ground Water	179
4.5.4	Impact due to Effluent Generation from the Mine	179
4.5.5	Rain Water Harvesting	180
4.6	Impacts of Noise/Vibrations and Mitigation Measures	180
4.7	Waste Management	180
4.8	Impacts on Ecology & Biodiversity and Its Mitigation Measures	181
4.9	Socio Economic Impact of the Project and Safety Measures	182
4.9.1	Positive Impacts	183
4.9.2	Mitigation Measures of Socio-economic Environment	183
4.10	Green Belt Development Plan	184
4.11	Mine Closure Plan	184
4.11.1	Post Mining Land Use	185
5.	**Analysis of Alternatives (Technology & Site)**	**187-189**
5.1.	Analysis of Alternative Site	187
5.2.	Environment Sensitivity of the Location	187
5.3.	Alternative for Technology	188
6.	**ENVIRONMENTAL MONITORING PROGRAM**	**190-199**
6.1	Introduction	190
6.2	Parameters to Be Monitored	190
6.2.1	Ambient Air Quality	190

6.2.2	Stack Monitoring	191
6.2.3	Fugitive Emissions Monitoring	191
6.2.4	Effluent Quality	191
6.2.5	Ground and Surface Water Quality	191
6.2.6	Noise Monitoring	192
6.2.7	Soil Characteristics	192
6.2.8	Inspection / Monitoring of quarry slope and dump slope failure	192
6.2.9	Study of Blasting effect	192
6.2.10	Plantation and green belt development	192
6.2.11	Occupational Health & Safety Monitoring	192
6.2.12	Training	193
6.2.13	Socio-Economic Development	193
6.2.14	Accidents and Diseases Monitoring	193
6.3	Budget Allocation for Monitoring	194
6.4	Environmental Management Cell	194
6.4.1	Monitoring & responsibility	195
6.4.2	Interaction with SPCB	195
6.4.3	Providing Training	195
6.5	Summary	199
7.	**ADDITIONAL STUDIES**	**200-267**
7.1	Preamble	200
7.2	Public Hearing	200
7.2.1	Public Hearing Notice	200
7.2.2	Photographs of Public Hearing	202
7.2.3	Action plan as per Public Demand	202
7.2.4	Budget/Scheme for the PH Commitments	241
7.3	Hazard Identification & Risk Assessment	248
7.3.1	Identification of Hazards	248
7.3.2	Risk Assessment	249
7.3.3	Mitigations Measures	255
7.3.4	Training and Human Resources Development	259
7.3.5	Medical Examination Schedule	260
7.4	Disaster Management Plan and Mitigation Measures	261
7.4.1	On-Site Emergency Plan	261
7.4.2	First Aid	262
7.4.3	Mock Drill	262
7.4.4	Training	262
7.5	Off-Site Emergency Planning	263
7.6	Biodiversity study with audit mechanism.	263
7.6.1	Biodiversity and Biodiversity Action Plan (BAP)	263
7.6.2	The CBD defines biodiversity as.	263

7.6.3	Impacts of Mining on Biodiversity.	264
7.6.4	Objective of the Audit.	265
7.6.5	Levels and types of Audit on biodiversity	265
7.6.6	Audit Criteria based on Compliance	265
7.6.7	Benefits of Conducting Biodiversity Audits in Mining Areas	266
8.	**PROJECT BENEFITS**	**268-271**
8.	Project Benefits	268
8.1	Introduction	268
8.2	Employment Potential	268
8.2.1	Direct Employment	268
8.2.2	Indirect Employment	268
8.3	Improvement in Infrastructure	268
8.4	Benefits to the State	269
8.5	Corporate Environment Responsibility	269
8.6	Improvements in the Social Infrastructure	269
8.7	Ecological Benefits	271
8.8	Other Tangible Benefits	271
9.	**ENVIRONMENTAL COST BENEFIT ANALYSIS**	**272**
10.	**ENVIRONMENT MANAGEMENT PLAN**	**273-281**
10.1	Introduction	273
10.2	Purpose of Environmental Management Plan	273
10.3	Environment Management Policy & Environment Committee	274
10.3.1	Interaction with SPCB	277
10.3.2	Training	277
10.4	Implementation of Environment Management Plan	281
10.4.1	Budgetary provisions for implementation of environment management plan	281
11.	**SUMMARY & CONCLUSION**	**282-293**
11.1	Introduction	282
11.2	Project Description	282
11.3	Description of the Environment	286
11.4	Anticipated Environmental Impacts and Mitigation Measures	287
11.5	Analysis of Alternatives	292
11.6	Environmental Monitoring Program	292
11.7	Additional Studies	292
11.8	Project Benefit	292
11.9	Environmental Management Plan	292
11.10	Conclusion	293

12.	**DISCLOSURE OF CONSULTANT**	**294-303**
12.1	Introduction	294
12.2	Services of Vardan Environet LLP	294
12.3	Recognitions	295
12.4	List of Software Models for Environmental Studies	295
12.5	Key Management Personnel of Vardan	296
12.6	Eminent Clientele of Vardan	296
12.7	Certifications of Vardan	297
12.8	Environmental Monitoring and Analysis Laboratory	298

LIST OF TABLES

Table 1.1: Environmental Setting of the Project 5
Table 1.2: Mineral Reserves 7
Table 1.3: Acts and Rules Applicable to the Project 11
Table 2.1: Latitude and Longitude of the project site (Boundary Co-ordinates) 16
Table 2.2: Salient Features of the Proposed Mine 25
Table 2.3: Mineral Reserve 31
Table 2.4: Proposed Production Details 33
Table 2.5: Mine Design Parameters 35
Table 2.6: Blasting Parameters 36
Table 2.7: Crushers Details 37
Table 2.8: Machineries Details 37
Table 2.9: Details of Waste Generation during Plan Period 38
Table 2.10: Top Soil Generation 38
Table 2.11: Water Requirement 39
Table 2.12: Existing Land use 41
Table 2.13: Land use after Plans period 41
Table 2.14: Land use at the end of life of mine 41
Table 2.15: Mitigation Measures for Pollution Control 42
Table 3.1: Environmental Components and Their Methodologies 45
Table 3.2: Climatological Data Station: IMD- Vishakhapatnam 47
Table 3.3: Summary of Wind Pattern–IMD Vishakhapatnam 48
Table 3.4: Summary of the Meteorological Data Monitored at Site (Primary Data) 49
Table 3.5: Ambient Air Quality Monitoring Stations (March to May 2023) 53
Table 3.6: National Ambient Air Quality Standards vide GSR 826 (E), Dt.16.11.09 55
Table 3.7: Techniques Adopted/Protocols for Ambient Air Quality Monitoring 55
Table 3.8: Baseline Result for the Air Monitoring Locations 57
Table 3.9: Noise Level Monitoring Locations Summer Season (March 2023 – May 2023) 63
Table 3.10: Noise Level Data (All Data is Expressed in dB(A) 64

Table 3.11: Noise Standards as per Noise Regulation (Pollution & Control) Rules, 2000 66
Table 3.12: Water Sampling Locations 68
Table 3.13: Ground Water Quality Data 71
Table 3.14: Surface Water Quality Data 75
Table 3.15: Soil Quality Monitoring Locations (March 2023 – May 2023) 81
Table 3.16: Soil Analysis Results 83
Table 3.17: Traffic Survey Highways in the Study Area 87
Table 3.18: Summarized Traffic Data 87
Table 3.19: LOS Standards 89
Table 3.20: Existing Traffic Scenario and LOS 89
Table 3.21: Proposed traffic Scenario and LOS 89
Table 3.22: Existing and Increase in PCU/day 90
Table 3.23: Land use of the study area 91
Table 3.24: Generalized Stratigraphic Succession 99
Table 3.25: Forest in the Study Area 113
Table 3.26: Floral Species recorded within core zone 114
Table 3.27: Faunal diversity from Study Area 120
Table 3.28: Avifauna diversity from Study Area 122
Table 3.29: Species of conservation significance present in the study area 124
Table 3.30: Fish fauna recorded in the study area 126
Table 3.31: Macrophytes recorded in the study area 126
Table 3.32: Summarized demographic structure of the study area 127
Table 3.33: Education facilities near project site 132
Table 3.34: Health Facilities in Koraput District 134
Table 3.35: List of Villages surveyed 138
Table 3.36: Key findings of Villages surveyed 139
Table 3.37: Demographic Structure of the Study Area 140
Table 3.38: Occupational Structure of the Study Area (Rural) 147
Table 4.1: Impact Identification Matrix 155
Table 4.2: Environmental Impacts during Construction Phase 156
Table 4.3: Environmental Impacts during Operation Phase 159
Table 4.4: Current Land Use Plan (Area in Ha) 164
Table 4.5: Land Use Plan (Area in Ha) after plan period 165
Table 4.6: Land Use Plan (Area in Ha) after Conceptual period 165
Table 4.7: Emission Factors for different mining activities 169
Table 4.8: Ground Level Concentration 171
Table 4.9: Details of Waste Generation 180
Table 4.10: Details of Dump 180
Table 4.11: Details of Stack 180
Table 4.12: Details of Green Belt Development 183
Table 4.13: Post Mining Land Use 184
Table 6.1: Fugitive Emissions Monitoring Location 191

Table 6.2: Cost of Environmental Monitoring Program 194
Table 6.3: Man power at EMC 194
Table 6.4: Responsibility Matrix for Implementation of EMC 197
Table 7.1: Action Plan as per Public Hearing 203
Table 7.2: Summarized Action Plan for Public Hearing (Written Submissions) 239
Table 7.3: Activity-wise Phasing of Public Hearing Commitments Scheme 241
Table 7. 4: Site Specific HIRA 251
Table 7. 5: Details of Firefighting Facilities 255
Table 7. 6: Personal Protective Equipment 256
Table 7 7: Mitigation Measures to prevent Occupational Hazard 258
Table 7 8: Medical Examination Schedule 260
Table 8.1: Proposed socio-economic development activities 269
Table 10.1: Man power at Environment Management Committee 276
Table 10.2: Training Schedule 278
Table 10.3 Reduction plan for Specific Diesel consumption 279
Table 10.3: Annual Budget for Environmental Management Plan for Operation 281
Table 11.1: Detail of the Project 283
Table 11.2: Baseline Environment Status 286
Table 11.3: Anticipated Environmental impacts and mitigation 287
Table 12.1: Key Management Personnel of Vardan 296

LIST OF FIGURES

Figure 1.1: Location of Project Site 4
Figure 2 1: Route Map 17
Figure 2 2: Project Site Photographs 18
Figure 2 3: Surface Plan 19
Figure 2 4: Geological Plan 20
Figure 2 5: Conceptual Plan 21
Figure 2 6: Topographical Map of Study Area 22
Figure 2 7: Coordinate Map 23
Figure 2 8: Google Earth Imagery of 10 KM Buffer Area of the Project Site 24
Figure 3 1: Secondary Data Wind Rose 50
Figure 3 2: Wind Rose Diagram of Study Period (Dec 2022 to Feb 2023) 51
Figure 3 3: Ambient Air Quality Monitoring Locations 54
Figure 3 4: Data for Particulate Pollutants (PM_{10} & $PM_{2.5}$) 60
Figure 3 5: Average Baseline data for SOx & NOx 60
Figure 3 6: Baseline data for CO 61
Figure 3 7: Noise Quality Monitoring Location Map 65
Figure 3 8: Equivalent Noise Levels at all Locations for Post Monsoon 66
Figure 3 9: Map showing Water Sampling Locations 70
Figure 3 10: Soil Quality Monitoring Locations Map 82

Figure 3 11: Transportation Map 88
Figure 3 12: Chart Representations for Total Vehicular Data 89
Figure 3 13: Satellite Imagery of 10 Km Study Area 93
Figure 3 14: LULC Map of 10 km Study Area 94
Figure 3 15: Elevation Map of 10 Km Study area 95
Figure 3 16: Contour Map of Study Area 96
Figure 3 17: Drainage Map of the study area 98
Figure 3 18: Geological Map of Study area 102
Figure 3 19: Lithological Map of Study area 103
Figure 3 20: Geomorphological Map of Study area 104
Figure 3 21: Earthquake Hazard map of Jharkhand 105
Figure 3 22: Flood Hazard Map of India 106
Figure 3 23: Hydrogeological Map of study Area 107
Figure 3 24: Groundwater Flow Direction 108
Figure 3 25: Pre-Monsoonal Ground Water Level 109
Figure 3 26: Post-Monsoonal Ground Water Table 110
Figure 3 27: Forest type map of Odisha 112
Figure 3 28: Male and Female Population in the Study Area 128
Figure 3 29: Sex Ration in the study area 129
Figure 3 30: Schedule Cast & Schedule Tribe Population in study area 129
Figure 3 31: Showing the Literacy Rate in the Study Area 130
Figure 3 32: Occupational Structure in the Study Area 131
Figure 4.1: Controlled Condition Isopleths for 24 Hr. Incremental Conc. (µg/m^3) for PM_{10} 172
Figure 4.2: Controlled Condition Isopleths for 24 Hr. Incremental Conc. (µg/m^3) for $PM_{2.5}$ 173
Figure 4.3: Controlled Condition Isopleths for 24 Hr. Incremental Conc. (µg/m^3) for NOx 174
Figure 4.4: Controlled Condition Isopleths for 24 Hr. Incremental Conc. (mg/m^3) for SO2 175
Figure 4.5: Controlled Condition Isopleths for 24 Hr. Incremental Conc. (mg/m^3) for CO 176
Figure 4.6: Post Mining Land Use Plan 185
Figure 10.1: Reporting Structure for Ensuring Various Environmental Compliances 275
Figure 10.2: Environment Policy 280

LIST OF ANNEXURES

Annexure I: Copy of Lease Grant Letter (LOI)
Annexure II: ToR letter
Annexure III: Copy of Approved Mining Plan with Approval Letter
Annexure IV: Hydrogeology Report
Annexure V: Hydrology Report
Annexure VI: Soil Moisture Conservation Report
Annexure VII: Approved Wildlife Conservation Report
Annexure VIII: Biodiversity study with Audit Mechanism Report
Annexure IX: Socio-economic survey Report

Annexure X: Cost Benefit Analysis
Annexure XI: Undertaking for Common Cause
Annexure XII: Undertaking for Blast Vibration Study
Annexure XIII: Undertaking for Slope stability study
Annexure XIV: Nursery Development Proposal
Annexure XV: Revenue Plan
Annexure XVI: Baseline Monitoring Photographs and Lab Reports
Annexure XVII: FC Stage-I Approval Letter
Annexure XVIII: Approved Application for Surface Water drawl from Jalaput
Annexure XIX: Public Hearing Proceedings
Annexure XX: Affidavit for compliance of standard EC conditions
Annexure XXI: Letter for NoC from DFO
Annexure XXII: FRA- Letter to Collector Koraput

COMPLIANCE TO TOR CONDITIONS

Point wise compliance of ToR issued by State Environment Impact Assessment Authority (SEIAA), Odisha vide File No. SIA/OR/MIN/439954/2023 dated 06.11.2023.

Specific Conditions:

Sr. No.	Points of TOR	Reply	Citation
1.	The following information to be submitted		
a)	Compliance of mining plan, including waste and OB dump management, mine closure plan etc.	Compliance of mining plan, including waste and OB dump management, mine closure plan etc. has been given in detail in Chapter-2 of the EIA/EMP Report.	Chapter-2
b)	Compliance to Common cause judgment	Compliance to Common cause judgment has been submitted in the form of an undertaking as an Annexure of the EIA report.	Annexure-XI
c)	Status of R&R	No R&R is involved in the present proposal as there is no habitation within the Block.	----
d)	Compliance of plantation	Compliance of plantation will be done in consultation with the local forest department once the mine commences operation. Details of Plantation and development of greenbelt is given in Chapter-4 of the EIA/EMP report.	Chapter-4
e)	Compliance of public hearing issues	Compliance of Public Hearing issues along with time-bound action plan with budgetary provisions is given in detail in Chapter-7 of the EIA/EMP Report.	Section 7.2 Chapter-7
f)	Status of complaints/ court cases/legal action	No complaints/ court cases/legal action is against the present proposal. If any in future, the status of the same will be submitted accordingly.	----
g)	Any other relevant environmental issue / parameter	No other environmental issue / parameters are involved in the project.	----
h)	The following studies be undertaken by domain experts, viz:		

	➢ Blast vibration study	Vibration studies will be carried out immediately upon commencement of mining operations to evaluate the zone of influence and impact of blasting along with its mitigation plan on the neighborhood. As such, within 500 meters of mining area there is no existence of human habitation. As proposed in the approved mining plan, controlled blasting shall be carried out with minimal impact in the neighborhood. However, as stated herein, suitable scientific studies shall be carried out as per industry norms and practices and the results of the same shall be submitted to MoEF, IBM and other relevant Statutory Authorities. Undertaking for the same has been attached as Annexure of the EIA report.	Annexure-XII
	➢ Socio economic study of the neighboring habitation	Socio economic study has been given in detail in Chapter-3 of the EIA/EMP report. A SES study has been conducted; report of the same is furnished as annexure-IX of the EIA/EMP report.	Section 3.4.12 Chapter-3 Annexure-IX
	➢ Biodiversity study with audit mechanism.	Biodiversity study with audit mechanism is furnished as annexure of the EIA/EMP Report.	Annexure - VIII
	➢ Slope stability study for both mines and OB/waste dumps.	Slope stability studies for mines as well as for OB/ Waste dumps shall be carried out upon commencement of mining operations. It may be noted that the required geotechnical data and related geological information can be gathered only after commencement of mining operations and subsequent progress of mining to a certain extent so as to carry out such studies. The physical parameters of the OB dumps like height, width and angle of slope will be governed as per the approved Mining Plan as per the guidelines/circulars issued by D.G.M.S with respect to safety in mining operations shall be strictly	Annexure - XIII

		adhered to maintain the stability of topsoil/waste dumps. The Project Proponent submits that after commencement of mining operation, Slope Stability Study for both mines and OB/Waste dumps will be carried out by deploying domain experts and study report will be submitted to MoEF, IBM and other relevant Statutory Authorities. Undertaking for the same has been attached as Annexure of the EIA report.	
	➢ Surface runoff management along with rainwater harvesting and ground water recharge include the design of drainage structures.	Hydrogeology and Hydrology reports have been furnished as annexure of the EIA/EMP report.	Annexure – IV and Annexure - V
	➢ Traffic density study, both inside the mines and at haulage roads, intersecting points of haulage road with public road.	Traffic Study has already been conducted in the public road. As it is a greenfield project, traffic density study is not applicable inside the mine area.	Section-3.4.6 Chapter-3
	➢ Hydrology study: The study findings and the mitigation measures thereof to be submitted.	Hydrology report has been furnished as an annexure of the EIA/EMP report.	Annexure - V
	➢ Process scheme details of the crusher/screening plant such as dry/wet crushing etc. If dry crushing, then management plan for dust control. If wet crushing, then plan for treating used water and its recycle etc.	Process scheme details of the crusher/ screening plant along with management plan for dust control is given in detail in Chapter-2 and Chapter-4 respectively of the EIA/EMP report.	Section-2.9.5 Chapter-2 Section-4.4.5.2.3 Chapter-4
2.	Cost of the CER calculated shall be utilized for the concerns of the people in terms of health, education, and infrastructure and environment protection. Project Proponent also shall include the budget for the betterment of schools nearby and to facilitate the online education system by providing Wi-Fi connectivity and desktops/tablets.	The CER/public hearing implementation of activities budget will be utilized only for the concerns of the people in terms of health, education, and infrastructure and environment protection. There will be provision and budget for the betterment of schools nearby and to facilitate the online education system by providing Wi-Fi connectivity and desktops/tablets etc. A detail Action plan with budget will be prepared and incorporated in Chapter-7 of the EIA/EMP	Section 7.2 Chapter-7

		report.	
3.	The project proponent should provide in the EIA Report details of all the statutory clearances, permissions, no objection certificates, consents etc. required for this project under various Acts, Rules and regulations and their status or estimated timeline after grant of EC.	The EIA/EMP report is prepared including the details of all the statutory clearances, permissions, no objection certificates, consents etc. required for this project under various Acts, Rules and regulations and their status or estimated timeline.	---
4.	The project proponent should submit the revenue plan for mining lease, revenue plan should be imposed on the satellite imaginary clearly demarcate the Govt. land, private land, agricultural land etc.	Entire Mine Lease area is Forest Land (Nagasari RF) falls under Koraput Forest Division. Revenue Plan for Mining Lease has been furnished as Annexure-XV of the EIA/EMP report.	Annexure-XV
5.	The project proponent should submit the real-time aerial footage & video of the mining lease area and of the transportation route. The project proponent should submit the detailed plan in tabular format (year-wise for life of mine) for afforestation and green belt development in and around the mining lease. The project proponent should submit the number of saplings to be planted, area to be covered under afforestation & greenbelt, location of plantation, target for survival rate and budget earmarked for the afforestation & green belt development. In addition to this the project proponent should show on a surface plan (5-year interval for life of mine) of suitable scale the area to be covered under afforestation & green belt clearly mentioning the latitude and longitude of the area to be covered during each 5 years. The capital and recurring expenditure to be incurred needs to be submitted. Presently in India there are many agencies which are developing forest in short interval of time. Thus, for the plantation activities details of the experts/agencies to be engaged needs to be provided with budgetary provisions.	Real-time aerial footage & video of the mining lease area and of the transportation route will be prepared and submitted at the time of appraisal by SEAC. The detailed afforestation and green belt development plan in tabular format has been given in Chapter-4 of the EIA/EMP report. Surface Plan and Conceptual Plan of suitable scale showing the area to be covered under afforestation & green belt along with other surface features have been incorporated in Chapter-2 of the EIA/EMP report. Total project cost, EMP cost with capital and recurring expenditure has been given in Chapter-2 of the EIA/EMP report. Details of the experts/agencies to be engaged for development of green belt and afforestation will be provided with budgetary provisions.	Section-4.10 Chapter-4 Fig. No. 2-3 to 2-5 Chapter-2

6.	The project proponent should submit the quantity of surface or ground water to be used for this project. The complete water balance cycle needs to be submitted. In addition to this PP should submit a detailed plan for rain water harvesting measures to be taken. PP should submit the year wise target for reduction in consumption of the ground/surface water by developing alternative source of water through rain water harvesting measures. The capital and recurring expenditure to be incurred needs to be submitted.	The complete water balance cycle with quantity of water, its source and utilization has been given in Chapter-2 of the EIA/EIA Report. The year wise target for reduction in consumption of the ground/surface water by developing alternative source of water through rain water harvesting measures along with capital and recurring expenditure will be included. Rainwater harvesting potential, design with detailed plan is also included in Chapter-4 of the EIA/EMP report.	Section-2.11.2 Chapter-2 Section-4.5.5 Chapter-4
7.	The project proponent should clearly bring out the details of the manpower to be engaged for this project with their roles /responsibilities/designations. In addition to this the project proponent should mention the number and designation of person to be engaged for implementation of environmental management plan (EMP). The capital and recurring	The details of manpower for this project with their roles/responsibilities/designations etc. have been detailed out in the EIA/EMP report. The manpower engaged with the EMP and members of the Environment Cell along with Capital and recurring Cost has been included in Chapter-10 of the EIA/EMP Report.	Section-2.11.3 Chapter-2 Table-8.1 Chapter-10
8.	The project proponent should submit the year-wise, activity wise and time bound budget earmarked for EMP, occupational health surveillance & Corporate Environmental Responsibility. The capital and recurring expenditure to be incurred needs to be submitted.	The year-wise, activity wise and time bound budget earmarked for EMP is Rs. 220 Lakhs capital cost and Rs. 60 Lakhs/year recurring, for health and safety Rs. 20 Lakhs has been earmarked as capital cost and Rs. 2 Lakhs/year recurring & The CER/public hearing implementation of activities budget of Rs. 532.5 Lakhs will be utilized only for the concerns of the people in terms of health, education, and infrastructure and environment protection. There will be provision and budget for the betterment of schools nearby and to facilitate the online education system by providing Wi-Fi connectivity and desktops/tablets etc. A detail of different budgetary provisions is given in	Table 7.3 Chapter-7 Table 10.3 Chapter-10

		Chapter-7 and Chapter-10 of the EIA/EMP report.	
9.	The project proponent should submit the measures/technology to be adopted for prevention of illegal mining and pilferage of mineral. The project proponent should submit the detailed mineralogical and chemical composition of the mineral and percentage of free silica from a NABL/MoEF&CC accredited laboratory.	To prevent illegal mining and pilferage, technology can be leveraged for surveillance, tracking, and data analysis. Key technologies include GIS and satellite imagery for monitoring land changes, RFID for tracking vehicles and materials, GPRS for real-time vehicle location, and CCTV for security. Additionally, blockchain technology can enhance traceability and transparency in the mineral supply chain. Detailed mineralogical and chemical composition of the mineral and percentage of free silica is given in Chapter-3 and as Annexure-XVI of the EIA/EMP report.	Chapter-3 Annexure-XVI
10.	The project proponent should clearly show the transport route of the mineral and protection and mitigative measure to be adopted while transportation of the mineral. The impact from the center line of the road on either side should be clearly brought out supported with the line source modelling and isopleth. Further, frequency of testing of Poly Achromatic Hydrocarbon needs to be submitted along with budget. Based on the above study the compensation to be paid in the event of damage to the crop and land on the either side of the road needs to be mentioned. The project proponent should provide the source of equations used and complete calculations for computing the emission rate from the various sources	The emission rate from the various sources including transportation along with equations and calculations, modeling and isopleths, have been given in detail in Chapter-4 of the EIA/EMP Report.	Section-4.3 Chapter-4
11.	The project proponent should clearly bring out that what is the specific diesel consumption and steps to be taken for reduction of the same. Year-wise target for reduction in the specific diesel consumption needs to be submitted.	The specific diesel consumption and year-wise target for reduction in the specific diesel consumption has been given in Chapter-10 of the EIA/EMP Report.	Section 10.3.3 Chapter-10
12.	The project proponent should bring out the	Adequate training/refresher training will be	Section-7.3.4

	awareness campaign to be carried out on various environmental issues, practical training facility to be provided to the environmental engineer/ diploma holders, mining engineer/diploma holders, geologists, and other trades related to mining operations. Target for the same needs to be submitted.	provided to the supervisors, workers keeping in view provisions of Mines Vocational Training Rules, 1966; Mine Rules, 1955, Mines Rescue Rules, 1985. Personnel who have to operate and maintain Trucks etc. are to be trained under the guidance of the manufacturers and as per provisions of DGMS Circulars. Special courses for employees will be arranged for afforestation, re-vegetation, reclamation, health hazards (identification), malaria eradication, and HIV prevention etc. in the training center of the company.	Chapter-7
13.	The budget to be earmarked for the various activities shall be decided after perusal of the Standard EC conditions. After perusal of Standard EC conditions if agreed the project proponent should also submit an undertaking by the way of affidavit for Compliance of Standard EC conditions already prescribed by the Ministry vide O.M. No and Specific condition if prescribed by the SEAC/SEIAA, Odisha.	Noted. The budget earmarked for the various activities will be decided after perusal of the Standard EC conditions. An affidavit for Compliance of Standard EC conditions prescribed by the Ministry vide O.M. and Specific condition prescribed by the SEAC/SEIAA, Odisha is attached as Annexure-XX of the EIA/EMP Report.	Annexure-XX
14.	The project proponent should ensure that only NABET accredited consultant shall be engaged for the preparation of EIA/EMP Reports. The project proponent shall ensure that accreditation of consultant shall be valid during the collection of baseline date, preparation of EIA/EMP report and during the appraisal process. The project proponent and consultant should submit an undertaking the information and data provided in the EIA Report and submitted to the SEIAA, Odisha are factually correct	Noted. A QCI-NABET Accredited consultant "Vardan EnviroNet" has been appointed for preparation of EIA/EMP report. Accreditation No. NABET/EIA/2326/RA0284_Rev.01 valid till 04.05.2026.	Chapter-12

	and the project proponent and consultant are fully accountable for the same.		
15.	The project proponent should submit the photograph of monitoring stations & sampling locations. The photograph should bear the date, time, latitude & longitude of the monitoring station/sampling location. In addition to this the project proponent should submit the original test reports and certificates of the labs which will analyze the samples.	The photographs with date, time, latitude & longitude of the monitoring station/sampling location and the original test reports are attached Annexure-XVI of the EIA/EMP report and certificates of the labs, NABL, NABET accreditation certificates etc. is given in Chapter-12 of the EIA/EMP Report.	Annexure-XVI Chapter-12
16.	"Zero discharge" management & "Zero Dust Re-suppression" management with SOP be submitted.	PP has committed for "Zero liquid discharge" management & "Zero Dust Re-suppression" management SOP will be formulated during the operational phase of mining.	---
17.	Internal roads, drain management with network of the drain, retaining walls and settling tanks with ETPs be submitted.	Details of the Internal Roads, drain management system, settling ponds etc. has been given in details in Chapter-4 of the EIA/EMP report.	Section-4.5 Chapter-4
18.	Details of air quality monitoring stations of the area and additional stations at entry and exit of mines and haulage roads, habitation to be considered.	Additional air quality monitoring stations at entry and exit of mines and haulage roads, habitation will be considered after commencement of mining operation.	---
19.	Construction and perennial maintenance of haulage road with details of plantation and the species thereof to be submitted.	Details of green belt development in different locations of the mine area including haul road plantation etc. has been given in detail in Chapter-4 of the EIA/EMP report.	Section-4.10 Chapter-4
20.	Parking plaza layout with maximum no. of vehicles and types of vehicles that can be parked with basic amenities and facilities.	Limited no. of HEMM will be used and for other vehicles the basic amenities with parking, facilities etc. has been shown on surface plan given in the EIA/EMP report.	Fig. No. 2-3 Chapter-2
21.	Forest Clearance details with copy of all Forest Clearance.	Forest Clearance application has been submitted vide application number FP/OR/MIN/QRY/442417/2023; dated 01.09.2023. Forest Clearance Stage-I “In-principal” approval has	Section-2.5.3 Chapter-2 Annexure-XVII

		been granted by MoEF&CC (Forest Conservation Division) dated 23.12.2024. The copy of the approval is attached as annexure-XVII of the EIA/EMP report.	
22.	Status of complaints/ court cases/legal action regarding to lease along with a detailed write up indicating case no., purpose of the case etc.	The present proposal is a greenfield project. No complaints/court cases/legal action regarding to lease is pending against the project.	Section-2.5.4 Chapter-2
23.	Copy of lease document.	Lease documents (LoI of Govt. of Odisha No. SM-MC2-MC-0007-2023 dt. 01.03.2023), granting mining lease for 50 years, has been furnished as annexure of the EIA/EMP report.	Annexure-I
24.	Details of waste management i.e. composition and nature of waste generated, tabulated form showing year wise waste generation, usage and storage.	Details of waste management, in tabular form have been given in Chapter-2 of the EIA/EMP report.	Section-2.9.7 Chapter-2
25.	Project Proponent shall consider developing a good nursery in nearby village for production of saplings of 4-6 feet height for planting in safety zone, sides of external haulage roads and distribution among villagers for planting in their private land/ community land. The nursery may be developed by company on their own or in collaboration with forest department. A detailed proposal to this effect shall be submitted. The proponent shall ensure to use organic fertilizer in the nursery.	A good nursery will be developed near the Ballada Village, in consultation with the forest department, to grow the native species of plants. The nursery will be developed with the help of organic fertilizer only. A detailed proposal to this effect has been furnished as an annexure of the EIA/EMP report.	Annexure-XIV
26.	Comprehensive water management, water balance with water harvesting and its reuse both monsoon and non-monsoon period.	Comprehensive water management plan with water balance etc. have been given in Chapter-2 and Chapter-4 of the EIA/EMP Report.	Section-2.11.2 Chapter-2
27.	STP plan with design with location in the layout map for domestic waste water treatment.	There is no effluent generation from the mine, the only waste water generation would be from domestic purpose which will be discharge in septic tank/soak pit system.	Section-4.5.4 Chapter-4

28.	Provision of solar power (percentage wise) with detail plan.	Source of renewable energy (solar power) have been considered in the present proposal. The details have been included in Chapter-2 of the EIA/EMP report.	Section-2.11.1 Chapter-2
29.	To submit the network with dimension of concrete cement roads inside the mining lease area and haulage road.	The network with dimension of concrete cement roads inside the mining lease area and haulage road etc. are given in detail and shown in surface and conceptual plans in Chapter-2 of the EIA/EMP report.	Chapter-2
30.	To submit parking plaza at entry and exit of the mines with basic amenities.	Parking plaza at entry and exit of the mines with basic amenities have been shown in the surface plan and given in EIA/EMP report.	Fig.2-3 Chapter-2
31.	Plan and SoP to be submitted for water sprinkling inside the mines and outside in haulage road including regular vacuum cleaning and Zero Dust Re-suspension system to completely mitigate and arrest fugitive dust emission.	Plan and SoP for dust suppression and to arrest fugitive dust emission inside the mine and outside have been given in detail in Chapter-4 and Chapter-10 of the EIA/EMP report.	Section-4.4.5.2 Chapter-4
32.	Total water management including domestic use w.r.t sourcing from borewell, rain water harvesting and recycling of waste water from ETP/STP, both for monsoon and non-monsoon be submitted.	Total water management with source and utilization, waste water generation & management, rainwater harvesting etc. has been covered in different chapters of EIA/EMP report	Chapter-2 Chapter-4
33.	Measures to be taken for arresting and mitigation of occupational health hazard including identification of the same, both for employees and nearby/surrounding habitation.	Measures to be taken for arresting and mitigation of occupational health hazard including identification of the same, both for employees and nearby area have been included in Chapter-4 and Chapter-7 of the EIA/EMP report.	Section-4.4.5.2 Chapter-4 Section-7.3.3.3 Chapter-7
34.	Year wise waste/OB management with reference to generation and utilization in consideration with dynamic movement of inventory indicating dump area and dimension of storage be submitted.	Year wise waste/OB management with generation and utilization, storage, dump design etc. have been given in detail in Chapter-2 of the EIA/EMP report.	Section-2.9.7 Chapter-2
35.	Find out the possibility of other alternatives for approach road so that felling of 1000 trees proposed	The Block is hill top, entirely forest land, with limited approach route. The mineral will be transported by conveyors to the nearest railway	---

	can be avoided.	siding, thereby reducing tree felling and 1000 trees will not be cut for approach road.	
36.	Submit Wildlife Conservation plan duly certified from the concerned DFO.	The Site-Specific Wildlife Conservation plan duly approved by the PCCF (WL) & CWLW, Odisha on 04.06.2024, has been furnished as annexure-VII of EIA/EMP report.	Annexure-VII
37.	Submit copy of application of forest diversion proposal and current status of it.	Forest Clearance application has been submitted vide application number FP/OR/MIN/QRY/442417/2023; dated 01.09.2023. Forest Clearance Stage-I "In-principal" approval has been granted by MoEF&CC (Forest Conservation Division) dated 23.12.2024. The copy of the approval is attached as annexure-XVII of the EIA/EMP report.	Section-2.5.3 Chapter-2 Annexure-XVII
38.	Explore possibility for construction of reservoir or adopt appropriate rainwater harvesting methods for collection of rain water and its usage.	A Rainwater harvesting structure understood to have been dug by Forest Dept. already present in the lease area, which will not be disturbed in the initial 5 years of mining operation. Post mine closure a water body of 1.08 Ha is envisaged to be left for water conservation and ground water recharge for the area.	Section-4.11 Chapter-4
39.	Submit Mine closure Plan with supporting documentation.	Copy of Approved Mine Plan with Progressive Mine Closure Plan have been furnished as an annexure of the EIA/EMP report.	Annexure- IV
40.	Submit Standard Operating Procedure for magazine management.	A detailed SoP for Magazine Management will be prepared during the operational phase of mine, as per Indian Explosives Act 1884 and as per DGMS guidelines.	---
41.	This Bauxite mines is meant for captive use. The proponent has not yet established any refinery in the state. They have to give details of use of Bauxite in absence of refinery and also an undertaking that Bauxite Ore cannot export outside the state.	The referred bauxite block has been allocated to the project proponent through a transparent auction process as per relevant provisions of MMDR Act and Mineral Auction Rules, as amended from time to time. These legislations, Rules and Guidelines are	---

		framed by the central government and auction for the referred mineral block was carried out by the state government as a Commercial block, and not as a Captive one. Furthermore, as per extant mining laws, there is no restriction in commercial sale of any ore in any particular geography. In view of the above, the project proponent has envisaged to sell the bauxite to existing alumina refineries in India who are struggling for raw materials. In fact, supplies from the Ballada mines shall improve raw material security for these refineries and at the same time will save precious foreign exchange for the country.	
42.	Possibility of restoration/ creation of the pond present within lease area so that villagers can use it in future after mining lease period expires.	A Rainwater harvesting structure understood to have been dug by Forest Dept. already present in the lease area, which will not be disturbed in the initial 5 years of mining operation. Post mine closure a water body of 1.08 Ha is envisaged to be left for water conservation and ground water recharge for the area.	Section-4.11 Chapter-4

Standard ToR Conditions:

Sr. No.	Points of TOR	Reply	Citation
1.	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.	Noted. All the statutory requirements and 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 will be ensured before start of mining operation.	-
2.	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.	Not Applicable as the present proposal is a greenfield project.	-
3.	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.	Not Applicable as the present proposal is a greenfield project.	-

4.	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.	Lease documents (LoI of Govt. of Odisha No. SM-MC2-MC-0007-2023 dt. 01.03.2023), granting Mining Lease for 50 years, will be furnished as annexure of the EIA/EMP report.	Annexure-I
5.	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.	Noted	-
6.	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery /toposheet, topographic sheet, 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).	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery /toposheet, topographic sheet, geomorphology and geology of the area and clearly showing the land use and other ecological features of the study area (Core and Buffer Zone) have been given as Fig. 3-14, in Chapter-3 of the EIA/EMP report.	Fig. 3-14, Chapter-3
7.	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.	The Survey of India Toposheet map 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 have been given as Fig. 3-18 to 3-20 in Chapter-3 of the EIA/EMP report.	Fig. 3-18 to 3-20 Chapter-3
8.	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	Mine Lease for 144.945 Ha has been granted by Govt. of Odisha vide letter no. SM-MC2-MC-0007-2023 dt. 01.03.2023, for 50 years. The entire block area is forest land, diversion of forest land will be carried out and application for the same has	Chapter-2

	the concerned authority.	been submitted to the forest department vide Proposal No. FP/OR/MIN/QRY/442417/2023; dated 01.09.2023.	
9.	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 proposed safeguard measures in each case should also be provided.	The Company has a well laid down Environment Policy duly approved by its Board of Directors. The Environment Policy with description of the prescribed operating process, hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions and the system of reporting of non-compliances/violations of environmental norms to the Board of Directors of the Company and/or shareholders have been given under Chapter-10 of the EIA/EMP report.	Chapter-10
10.	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.	10 km zone around the mine lease from lease periphery have been considered as study for environmental features, data collection etc. and the data contained in the EIA such as waste generation etc. have been given for the life of the mine.	-
11.	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, water bodies, human settlements and	Section 3.4.7 Chapter-3

	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.	other ecological features have been given under section 3.4.7 of Chapter-3. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and impact of change of land use have been given under Sections 4.4 of Chapter-4	Section-4.4 Chapter-4
12.	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.	No OB dump or any facility is proposed outside the Mine Lease area, all mining related activities will be confined within the lease area only.	-
13.	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.	Entire Mine Lease area i.e 144.945 Ha is forest land (Nagasari RF) falls under Koraput Division. The Diversion of the forest is required for mining activities and the Forest Clearance application has been submitted vide application number FP/OR/MIN/QRY/442417/2023; dated 01.09.2023. Forest Clearance Stage-I "In-principal" approval has been granted by MoEF&CC (Forest Conservation Division) dated 23.12.2024. The copy of the approval is attached as annexure-XVII of the EIA/EMP report.	Section- 2.5.3 Chapter-2
14.	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	Entire Mine Lease area i.e 144.945 Ha is forest land (Nagasari RF) falls under Koraput Division. The Diversion of the forest is required for mining activities and the Forest Clearance application has been submitted vide application number	Chapter-9

	also be furnished.	FP/OR/MIN/QRY/442417/2023; dated 01.09.2023. Forest Clearance Stage-I "In-principal" approval has been granted by MoEF&CC (Forest Conservation Division) dated 23.12.2024. The copy of the approval is attached as annexure-XVII of the EIA/EMP report. Cost-Benefit Analysis for Ballada Bauxite Block has been given in detail in Chapter-9 of the EIA/EMP report.	
15.	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.	No habitations are present in the Mine Lease Area. Application for Gram Sabha submitted to Collector & District Magistrate, Koraput for Settle the forest right of the local people under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 is initiated. Copy of application is attached as Annexure-XXII of the EIA/EMP report.	Annexure-XXII
16.	The vegetation in the RF/PF areas in the study area, with necessary details, should be given.	The details of the Flora of the RF/PF areas in the study area have been given in Chapter-3 of the EIA/EMP report.	Section – 3.4.11 Chapter-3
17.	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.	The study to ascertain the impact of the Mining Project on wildlife of the study area and Impact of the project on the wildlife in the surrounding and any other protected area is being carried out and the report for Wildlife conservation has been prepared and approved by the PCCF (WL) & CWLW, Odisha on 04.06.2024. The approved report is furnished as Annexure-XVII of EIA/EMP report.	Annexure-VII
18.	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/Elephant Reserves/(existing as well as	There are no National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/Elephant Reserves/ (existing or proposed), within 10 km of the	Section-4.8 Chapter-4

	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.	mine lease area. The Site-Specific Wildlife Conservation plan duly approved by the PCCF (WL) & CWLW, Odisha on 04.06.2024, has been furnished as annexure-VII of EIA/EMP report. An application in this regard has been submitted to DFO Koraput. Copy of the application is attached as Annexure-XXI of the EIA/EMP Report.	Annexure-XXI
19.	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 along with 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.	A detailed biological study of the study area core zone and buffer zone (10 km radius of the periphery of the mine lease) within 10 km of mining lease area is being carried out. There are 38 number of Schedule-I faunal species have been identified in the study area. Details of the species present in the Study Area are given in the Chapter-3 of the report. However, the Mine is dedicated and committed to conserve the species. The Conservation plan for protection of flora and fauna in Core and Buffer Zone of the Mine has been approved by the PCCF (WL) & CWLW, Odisha on 04.06.2024. The same will be implemented in the area on the funding from the Mine for the conservation of the flora and fauna, present in the Study Area.	Section-4.8 Chapter-4
20.	Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions	No designated ‘Critically Polluted’ area is in the proximity of the mine lease and no industries or mines lie in the study area.	-

	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.	'Aravali Range' is Not Applicable.	
21.	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 failing under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).	Not Applicable	-
22.	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 (ease area will be shifted or not. The issues relating to	Entire Mine Lease area is Forest Land (Nagasari RF) of Koraput Forest Division. The project does not envisage any leasing or acquisition of private land. Hence, R&R is not applicable for the present proposal.	Section-4.9.1.1 Chapter-4

	shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.		
23.	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.	Primary baseline data has been collected during March 2023 to May 2023 and described in Chapter 3. Primary data of Air, Noise, Water and Soil is attached as Annexures-XVI of EIA/EMP report. Site specific meteorology data has also been collected during March 2023 to May 2023 and the summary is incorporated in Chapter 3 of EIA/EMP report.	Chapter-3 Annexure-XVI
24.	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	Air quality modelling has been carried out for prediction of impact of the project on the air quality of the area. The AERMOD model (9.5.0 Version) has been setup and run for study period (3 months) to find out the cumulative maximum ground level concentration from the different activities in the mining areas.	Section-4.4.3 Chapter-4

	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 wind roses showing pre-dominant wind direction may also be indicated on the map.		
25.	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.	Total water requirement is 690 KLD in which the Dust Suppression: 600 KLD, Washing and cleaning: 45 KLD Drinking: 10 KLD Afforestation: 15 KLD Miscellaneous: 20 KLD **Source:** Jalaput Reservoir located at distance of 3 km	Section-2.11.2 Chapter-2
26.	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.	Water requirement for the mine will be met from surface water sourced from Jalaput reservoir for which permission has been obtained from the Department of Water Resources, Govt. of Odisha vide letter no. 30630/WR. dated 08.11.2024. Copy of the permission letter is attached as Annexure-XVIII. No ground water withdrawal is envisaged.	Section-2.11.2 Chapter-2 Annexure-XVIII
27.	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.	Impacts of mining on water regime and water conservation measures proposed to be adopted in the Project along with details of rainwater harvesting proposed in the Project, has been given under section 4.5 in Chapter-4 of the EIA/EMP report.	Section-4.5 Chapter-4
28.	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required,	Impact of the Project on the water quality, both surface and groundwater, have been assessed and necessary safeguard measures are mentioned in Chapter-4 of the	Section-4.5 Chapter-4

	should be provided.	EIA/EMP report.	
29.	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 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.	The mining activity proposed to be carried out during plan period will not interfere anywhere with the ground water table. A detailed Hydro-Geological Study has been conducted, report of the same is furnished as annexure of the EIA report. The Hydrogeological report inter-alia includes details of the aquifers present and impact of mining activities on these aquifers, if any.	Section-4.5 Chapter-4 Annexure-IV
30.	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.	The area has no perennial nalla or stream; hence there will not be any impact of mining on surface water regime. Hence, there is no possibility of any siltation in natural streams and reduction of vertical percolation. It is therefore apparent that there is hardly any impact of mining on the surface water regime. The rain water flow towards catchment area is not flowing through the lease area as garland drains will be made around the lease area. Hence, solid wash off will not occur.	Section-4.5 Chapter-4
31.	Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and BGL. A schematic diagram may also	Site elevation map is being given as Fig. 3-15 in Chapter-3 and Geomorphology of the study area explaining the elevation of the site and the surrounding have been given	Fig. 3-15 Chapter-3

<table>
<tr><td></td><td>be provided for the same.</td><td>under Section-3.4.9 in Chapter-3.</td><td></td></tr>
<tr><td>32.</td><td>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.</td><td>A Time bound Progressive Greenbelt Development Plan is given in a tabular form as follows:
<table>
<tr><th>Sr. No</th><th>Year</th><th>Green Belt Location (s)</th><th>Area Proposed to be Covered (Ha)</th><th>Number of Plants Proposed</th></tr>
<tr><td>1</td><td>Year 1</td><td>Statutory Barrier, Dump & haul roads</td><td>0.72</td><td>1440</td></tr>
<tr><td>2</td><td>Year 2</td><td>Statutory Barrier, Dump & haul roads</td><td>0.86</td><td>1720</td></tr>
<tr><td>3</td><td>Year 3</td><td>Statutory Barrier, Dump & haul roads</td><td>1.16</td><td>2320</td></tr>
<tr><td>4</td><td>Year 4</td><td>Statutory Barrier, Dump & haul roads</td><td>0.68</td><td>1360</td></tr>
<tr><td>5</td><td>Year 5</td><td>Statutory Barrier, Dump & haul roads</td><td>0.80</td><td>1600</td></tr>
</table>
Native plants and other local species will be planted. A suitable combination of trees that can grow fast and also have good leaf cover shall be adopted to develop the greenbelt.
Plantation will be done in consultation with the forest department.</td><td>Section-4.10
Chapter-4</td></tr>
<tr><td>33.</td><td>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</td><td>Traffic analysis is a study carried out to predict the magnitude and impact that the proposed project may have on the existing transportation network and also to evaluate whether the existing transportation facility is appropriate or needs an improvement for the proposed developmental project.
Traffic study was performed to assess impact of the project on local transport infrastructure, by</td><td>Section-3.4.6
Chapter-3</td></tr>
</table>

	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.	understanding the existing carrying capacity of the road in the vicinity of site, present traffic and additional traffic due to the proposed project and compared with the carrying capacity of the road, as recommended by Indian Road Congress (IRC). Traffic analysis is given in section 3.4.6 of Chapter-3 of EIA/EMP report.	
34.	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.	Requisite infrastructure will be developed for mining operation & allied activities such as Rest shelters, blasting shelters, First-aid room, drinking water supply, power supply, Site-offices, Stores & workshop, and toilets etc. within the mining lease as per requirement.	Section-2.11.5 Chapter-2
35.	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	The mine closure plan is one of the most important requirements in the environmental management of mining projects. The closure operation is a continuous series of activities right from the commencement to decommissioning of the project and post closure. Details of the post mining land use reclamation plan etc. have been given in Chapter-4 of the EIA/EMP report.	Section-4.11 Chapter-4
36.	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.	Open cast method involves dust generation by excavation, drilling, blasting, loading and transportation of mineral. At site, dust is main pollutant which affects the health of workers whereas environmental and climatic conditions also generate the health problems. Details of the occupational health impacts and mitigation measures have been discussed in Chapter-7 of the EIA/EMP report.	Section-7.3.3.3 Chapter-7
37.	Public health implications of the Project and	Public health implications of the Project and related	Section-4.9

	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.	activities for the population in the impact zone have been systematically evaluated and the remedial measures proposed are given in detail under the head "Socio-Economic Impact of the project and safety measures" in Chapter-4.	Chapter-4
38.	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.	Employment scenario of the study area is largely dependent on the agriculture. Estimated manpower requirement shall be 126. Both skilled & un-skilled workers will be employed by the company. Local people will be given the opportunity in employment as per their qualification and expertise. Priority will be given to scheduled tribe families including women. This will enhance the present socio economic status of the local people. Other Infrastructure facilities, Health & education facilities etc. proposed by the Project Proponent will be implemented within the given timeframe and specified budget for the purpose.	Section-8.2 & 8.3 Chapter-8
39.	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.	Detailed environmental management plan (EMP) to mitigate the environmental impacts including the impacts of change of land use, occupational health impacts and other impacts specific to the proposed Project are given in detail in Chapter-10 of the EIA/EMP report.	Chapter-10
40.	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	Noted. Public Hearing points raised and commitment of the Project Proponent on the same along with time bound	Section 7.2 Chapter-7

	provided and also incorporated in the final EIA/EMP Report of the Project.	Action Plan with budgetary provisions to implement the same is given under section 7.2 of Chapter-7 of the EIA/EMP Report.	
41.	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	No litigation pending against the project. This is a greenfield project.	Section-2.5.4 Chapter-2
42.	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	Total cost of the Project is Rs. 23000 Lakhs. Cost of implementation of EMP: Capital Cost – Rs. 220 Lakhs Recurring Cost – Rs. 60 Lakhs/year	Section-2.4 Chapter-2
43.	A Disaster management Plan shall be prepared and included in the EIA/EMP Report.	A detail Disaster Management Plan has been prepared and given in Chapter-7 of the EIA/EMP report.	Section-7.4 Chapter-7
44.	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 indicating the environmental, social, economic, employment potential, etc. have been given in detail in Chapter-8	Chapter-8
45.	The activities and budget earmarked for Corporate Environmental Responsibility (CER) shall be as per MoEF&CC, Govt. of India 0.M No 22-65/2017-IA. II (M) dated 01.05.2018 and the action plan on the activities proposed under CER shall be submitted at the time of appraisal of the project included in the EIA/EMP Report.	The activities and budget earmarked for Corporate Environmental Responsibility (CER)/public hearing implementation action plan have been prepared as per MoEF&CC, Govt. of India 0.M No 22-65/2017-IA. II (M) dated 01.05.2018 and the action plan on the activities proposed under CER/public hearing issues with budget of Rs. 532.50 Lakhs is given in Chapter-7 of the EIA/EMP report.	Section 7.2 Chapter-7
46.	The Action Plan on the compliance of the recommendations of the CAG as per MoEF&CC, Govt. of India Circular No. J-11013/71/2016-IA.I (M), dated 25.10.2017 needs to be submitted at	The EIA/EMP report has been prepared in compliance of the recommendations of the CAG as per MoEF&CC, Govt. of India Circular No. J-11013/71/2016-IA.I (M), dated 25.10.2017.	-----

	the time of appraisal of the project and included in the EIA/EMP Report.		
47.	Compliance of the MoEF&CC, Govt. of India Office Memorandum No. F: 3- 50/2017-IA.III (Pt.), dated 30.05.2018 on the 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 needs to be submitted and included in the EIA/EMP Report.	An undertaking for compliance of the MoEF&CC, Govt. of India Office Memorandum No. F: 3- 50/2017-IA.III (Pt.), dated 30.05.2018 on the 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, is attached as Annexure-XI of the EIA/EMP Report.	Annexure-XI
B.	**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.	All documents are properly referenced with index and continuous page numbering.	EIA/EMP report.
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.	The period and source of data has been mentioned, especially below the tables in all chapters.	All the tables in different Chapters of the EIA/EMP report.
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.	Copy of the analysis/testing reports of water, air, soil, noise etc. have been enclosed with the EIA/EMP report as annexures.	Annexures
d)	Where the documents provided are in a language other than English, an English translation should be provided.	Noted. An English translation has been provided.	Executive Summary
e)	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	Noted. The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry will be filled and submitted.	-
f)	While preparing the EIA report, the instructions for the	Noted.	-

	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.	Noted and Agreed.	-
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.	Not 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.	(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, has been included in the EIA/EMP report.	Fig. No. 2-3 to 2-5 Chapter-2
C.	The prescribed TOR would be valid for a period of four years for submission of the EIA/EMP report.	Noted	-

1. INTRODUCTION

1.1 INTRODUCTION

M/s Kalinga Alumina Limited (formerly known as M/s Mundra Aluminum Limited), a wholly owned subsidiary of Adani Enterprises Limited, has a vision of setting up an integrated greenfield alumina refinery of 4.0 MTPA capacity and also to develop bauxite mines in the vicinity for captive / commercial use. Recently Kalinga Alumina Limited has secured two bauxite blocks in Odisha, viz. Ballada in Koraput district and Kutrumali in Kalahandi/Rayagada district through an auction process.

Adani Group is currently embarking on a strategic growth plan to diversify into mines and metals space. Strong parentage in power, infrastructure, logistics, mining, and global presence puts it in a pre-eminent position to make it a globally competitive player in this field.

Adani Group is a global multinational and a front runner with its strong ESG principles. It has vast experience in mining operations of various major minerals such as Coal, Iron Ore, limestone, beach sand, among others and therefore, is in a pre-eminent position to conduct scientific and environment friendly mining

The Government of Odisha, issued letter of intent vide letter SM-MC2-MC-0007-2023/2143/S&M Bhubaneswar dated 1st March 2023 for grant of mining lease for Ballada bauxite block in Village - Ballada, Taluka – Nandapur, District- Koraput, Odisha for an area of 144.945 ha to **M/s Mundra Aluminum Limited** (now **M/s Kalinga Alumina Limited)** for period of 50 years. The Copy of letter is attached as **Annexure – I.**

The proposed project entails mining of Bauxite by opencast mining method with an annual Peak Rated Capacity of ~ 4.0 MTPA of Bauxite (ROM). The project also involves generation of 1,46,508 tonnes of Overburden/waste and 51,564 tonnes (25,782 m3) of top soil during initial 5 years of operations. Besides, it is envisaged to have crushing/Screening facilities within the lease area with a capacity of 800 TPH at rated production level over an area of 144.945 Ha located at Village - Ballada, Taluka – Nandapur, District- Koraput, Odisha between latitudes 18°26'05.61588" N to 18°27'13.34448" N and Longitude 82°39'32.39136" to 82°40'25.36716" E. & is covered under the Survey of India toposheet no. No. E44K11 (65J/11). The proposed project falls in schedule 1 (a) (i) Mining of Minerals of Category 'B1'.

1.2 PURPOSE OF THE REPORT

The proposed project is listed under activities 1(a) (i) under the Schedule of EIA Notification, 2006 and categorized as Category-B. As per the notification, the project necessitates prior environmental clearance. Hence, the company has followed due course of procedure for obtaining Environmental Clearance. As a part of the procedure, application to SEIAA has been submitted for obtaining Terms of reference (ToR) for carrying out EIA/EMP study under the EIA notification 2006. SEIAA issued Terms of reference vide File No. SIA/OR/MIN/439954/2023 dated 06.11.2023. ***(Attached as Annexure-II)***.

M/s Kalinga Alumina Limited (formerly known as M/s Mundra Aluminum Limited) has engaged M/s Vardan Environet LLP, Gurgaon to undertake the EIA study of the proposed project.

The EIA/EMP Report has been prepared as per the Terms of References (ToR) after collection of baseline data (March to May, 2023). The objective of the EIA study report is to take stock of the prevailing quality of the environment, assess the impacts of proposed project on environment and to plan appropriate environment management plan to minimize the adverse impacts. The following major objectives have been kept in view:

- Assessment of the existing status of environment;
- Assessment of the impacts due to proposed project;
- Planning pollution control and suggested mitigation measures;
- Action plan for implementation of suggested measures;
- Monitoring programme to assess efficacy of the environmental control measures;
- Assessment of financial considerations for suggested environmental control plans;
- Clearances from statutory authorities;

1.3 IDENTIFICATION OF PROJECT & PROJECT PROPONENT

1.3.1 The Project

The proposed project entails mining of Bauxite by opencast mining method with an annual Peak Rated Capacity of ~ 4.0 MTPA of Bauxite (ROM). The project also involves generation of 146508 tonnes of Overburden/waste and 51564 tonnes (25782 m^3) of top soil during initial 5 years of operations. Besides, it is envisaged to have crushing/Screening facilities within the lease area with a capacity of 800 TPH at rated production level over an area of 144.945 Ha located at Village - Ballada, Taluka – Nandapur, District- Koraput, Odisha.

1.3.2 The Project Proponent

Project Proponent

Contact details of the Project Proponent are given below:

Name	:	Mr. K Anil Kumar
Designation	:	Vice President - Aluminum, M/s Kalinga Alumina Limited (formerly known as M/s Mundra Aluminum Limited)
Mailing Address	:	Adani Corporate House, Shantigram SG Highway, Khodiyar, Ahmedabad – 382421
E-mail	:	k.anilkumar@adani.com
Telephone	:	+91 7752021010

1.4 BRIEF DESCRIPTION NATURE, SIZE & LOCATION OF THE PROJECT

The proposed project entails mining of Bauxite by opencast mining method with an annual Peak Rated Capacity of ~ 4.0 MTPA of Bauxite (ROM). The project also involves generation of 146508 tonnes of Overburden/waste and 51564 tonnes (25782 m^3) of top soil during initial 5 years of operations. Besides, it is envisaged to have crushing/Screening facilities within the lease area with a capacity of 800 TPH at rated production level over an area of 144.945 ha, of M/s Kalinga Alumina Limited (formerly known as M/s Mundra Aluminum Limited) at Village - Ballada, Taluka – Nandapur, District- Koraput, Odisha.

1.4.1 Location of the Project

The Project is located at Village - Ballada, Taluka – Nandapur, District- Koraput, Odisha between latitudes 18°26'05.61588" N to 18°27'13.34448" N and Longitude 82°39'32.39136" to 82°40'25.36716" E. & is covered under the Survey of India toposheet no. No. E44K11 (65J/11).

The site is situated about one to two kilometers west of Ballada and about 8 km north of Padua in Koraput district, Odisha. Jeypore, a major town in the Koraput district, is about 82 km north-north-west of the Ballada deposit and is approachable by major district road No.52. Koraput, the district headquarters is at 60 km north of the deposit and is connected by a metalled road via Similiguda on NH 26. Bheja, the nearest Railway Station is about 5.0 km due north-east. The nearest airport is at Visakhapatnam (140 km) from the lease.



Mine	Ballada Bauxite Block
Village	Ballada
Tehsil	Nandapur
District	Koraput
State	Odisha
Nearest Habitation	Ballada – 1.5 km in East
Nearest Rail head	Bheja at 5.0 km
Nearest Airport	Visakhapatnam at 140 km from Block

Figure 1.1: Location of Project Site

Table 1.1: Environmental Setting of the Project

S. No.	Particulars	Details
1.	Project	Mining of 4.0 MTPA Bauxite (ROM), being the Peak Rated Capacity, 1,46,508 tonnes of Overburden/waste and 51,564 tonnes (25,782 m^3) of top soil over a period of 5 years and setting up of Crushing/ Screening facilities of 800 TPH capacity within the lease area spanning over an area of 144.945 ha
2.	Mining lease area	144.945 ha
3.	Villages	Ballada
4.	Tehsil, District and State	Tehsil-Nandapur, District – Koraput, State- Odisha
5.	Type of Land	Forest land
6.	Elevation	1037.57 to 1266.89 to m from MSL
7.	Nearest highway	State Highway – 2km
8.	Nearest railway station	Bheja at 5.0 km.
9.	Nearest airport	Visakhapatnam at 140 km from Block
10.	Nearest Town/City	Koraput, the district headquarters is at 60 km north.
11.	Nearest water bodies	Jolaput Reservoir-3 Km
12.	Reserve / Protected Forest	Nagasari RF – 0.0 Km – Within Site Luluburu RF – 2.25 km – SE Bhimodoli RF – 5.00 km – E Padua RF – 6.5 km – SSE Rantha RF – 7.9 km – SSE Polput RF – 6.0 km – SW Jabagarh RF – 8.6 km – West Palam RF – 8.8 km – West Balel – 8.65 km – NW Thuba RF – 5.0 km – North Kasandi RF – 6.3 km – NE Kalladi RF – 9.5 km – East
13.	Other historical and archaeological places	None within 10 km radius
14.	Ecology sensitive/ Protected areas as per	There is no Wildlife Sanctuary, Biosphere Reserves, Tiger Reserves, Wildlife Corridors, etc. within 10 km radius.

S. No.	Particulars	Details
	Wild Life Protection Act 1972 (National Park/ Wild life Sanctuary/ Bio-sphere reserves)	
15.	Defense installations	None within 10 km
16.	Industries	None within 10 km
17.	Critically polluted area	None
18.	Transmission line	None
19.	Seismic zone	Zone-II as per IS-1893 (Part-1)-2002

Source: Mining Plan

1.4.2 Nature of the Project

The proposed project is listed under activity 1(a) Mining of Minerals under the Schedule of EIA Notification, 2006 as amended till date and categorized as Category-B.

1.4.3 Size of the Project

Total block area of the project is 144.945 Ha. The reserves as on 25.07.2023 have been estimated as follows:

Table 1.2: Mineral Reserves

Classification	Code	Quantity (Mt)			Grade	
		Forest	Non-Forest	Total	Forest	Non-Forest
A. Mineral Reserve						
1. Proved Mineral Reserve (A)	111					
2. Probable Mineral Reserve (A)	121					
3. Probable Mineral Reserve (A)	122	199,63,397.22		199,63,397.22	Al_2O_3: 42.18, SiO_2:2.96	
B. Remaining Resources						
1. Feasibility Mineral Resource (B)	211					
2. Prefeasibility Mineral Resource (B)	221					
3. Prefeasibility Mineral Resource (B)	222	21,68,107.64		21,68,107.64	Al_2O_3: 41.89 SiO_2:2.91	
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)		**22131504.86**		**221,31,504.86**		

Source: Mining Plan

1.4.4 Importance of the Project to the Country & Region

Bauxite is basically an aluminous rock containing hydrated aluminum oxide as the main constituent and iron oxide, silica and titania in varying proportions. Hydrated aluminum oxides present in the bauxite ore occur in form of three minerals, viz, Gibbsite, Boehmite & Diaspore. Bauxite is an essential ore of aluminum which is one of the most important nonferrous metals used in the modern industry. It is also an essential ore for refractory and chemical industries. The country has abundant resources of bauxite which can meet both domestic and export demands.

The production of mineral and its subsequent use in the Alumina Refinery will benefit the state by way of royalty and taxes and will also bring in large employment opportunities to the local population thereby usher in socio-economic benefit to the backward region.

1.5 SCOPE OF THE STUDY

The Environmental Impact Assessment (EIA) study is aimed to identify and analyze the aspects that affect the environment within the Mining Block (Core -Zone) and 10 km radius around the block (Buffer-Zone). The project scope includes detailed characterization of various environmental components like air, noise, water, land and socio-economic within the study area.

The objectives set for carrying out this EIA study based on the requirements that fulfill the EIA Notification 2006 and their subsequent amendments.

With a view to assess the environmental impacts arising due to the proposed Project, **M/s Kalinga Alumina Limited** has entrusted the work to NABET accredited EIA consultant Vardan Environet LLP, Gurgaon to prepare EIA report, in order to obtain the Environment clearance.

1.5.1 Terms of Reference of EIA Study Prescribed by SEIAA

Online application for grant of ToR was submitted by **M/s Kalinga Alumina Limited** on 01.09.2023 under schedule 1 (a) of EIA Notification to SEIAA., Odisha.

Terms of reference (ToR) for carrying out EIA/EMP study has been granted by SEIAA vide File No. SIA/OR/MIN/439954/2023 dated 06.11.2023.

1.5.2 Baseline Data Generation, Field Studies

The EIA/EMP report has been prepared on the basis of one full season baseline environmental data monitored during March 2023 to May 2023, by M/s. Vardan Envirolab, NABL Accredited Lab, in accordance with the EIA Notification, 2006 issued by the Ministry of Environment Forests and Climate Change, Govt. of India and CPCB, New Delhi.

The monitored baseline data includes micro meteorological parameters, ambient air quality, noise levels, surface water, and ground water quality and soil characteristics. Site survey has been conducted for studying the flora and fauna, socio-economic conditions including public consultation, land use, hydrology and hydrogeology, ecology, traffic density etc. Secondary information has been collected from several agencies and departments, both under State and Central Government.

The collected data have been analyzed in detail for identifying, predicting and evaluating the environmental impacts of the proposed project. Potential impacts on environment have been assessed and suitable environmental management plan has been formulated. **M/s Kalinga Alumina Limited** has engaged Vardan EnviroNet LLP, as consultant for formulation of EIA / EMP study report for the mine.

1.5.3 Secondary Information Collection

Secondary baseline information on water resources, geology, hydrology and hydrogeology, demography was collected from the following sources:

- India Meteorological Department (IMD) (1981-2010)
- Geological Survey of India (GSI)
- Office of the Forest Range Officer, Koraput Range, Koraput
- Census of India (Demographic data), Koraput
- CGWB, Ministry of Water Resources, Govt. of India.
- National Bureau of Soil Survey & Land use Planning.

1.5.4 Report Coverage

This EIA Report is prepared in accordance with the EIA Notification, 2006 as amended till date and has been divided into twelve chapters (in addition to the Executive Summary). The report contains information on the existing environment and evaluates the predicted environmental and socio-economic impacts of the proposed activities of the mine. A detailed coverage of background environmental quality, pollution sources, anticipated environmental impacts (including socio-economic impacts) and mitigation measures, environmental monitoring programme, additional studies, project benefits, environmental monitoring plan and all related aspects have been covered in this report as briefed hereunder:

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 and Site)

Chapter 6 – Environmental Monitoring Program

Chapter 7 – Additional Studies

Chapter 8 – Project Benefits

Chapter 9 – Environmental Cost Benefit Analysis

Chapter 10 – Environmental Management Plan

Chapter 11 – Summary

Chapter 12 – Disclosure of Consultant

1.6 LAWS APPLICABLE TO THIS PROJECT

The Acts and Rules applicable to this project along with roles and responsibilities of the project proponent is given in the **Table 1.3** below

Table 1.3: Acts and Rules Applicable to the Project

Legal Channel	Responsible Ministries/Bodies	Objective of Legislation	Roles & Responsibilities
The Water (Prevention & Control of Pollution) Acts 1974/ Rules 1975	CPCB, SPCB	The prevention and control of water pollution and also maintaining or restoring the wholesomeness of water	o Not to discharge any effluent, not confirming to standards, prescribed by SPCB into any stream, well, sewers or land. o Not to discharge air pollutant(s) in excess of standards, prescribed by the State PCB. o Obtain 'Consent to Establish' prior to establish any process, operation or treatment system. o Obtain 'Consent to Operate' prior to operation of system which is likely to discharge effluent. o Apply for renewal of the 'Consent to Operate' before the expiry. o Comply with conditions as prescribed under consents.
The Air (Prevention & Control of Pollution) Acts 1981/ Rules 1982	CPCB, SPCB	The prevention, control and abatement of air pollution	
The Environment (Protection) Acts 1986/ Rules 1986 The Environmental Impact Assessment (EIA) Notification, 2006	MoEF&CC, CPCB, SPCB	Protection and Improvement of the Environment	o Prevent discharge or emission of environment pollutants in excess of the prescribed standards. o Submit 'Environmental Statement' every year. o Obtain prior "Environmental Clearance' from MoEF&CC in case of new project or for Modernization / Expansion.
Hazardous and Other Wastes (Management	MoEF&CC, CPCB, SPCB	Management & Handling of hazardous wastes in line	o It is the responsibility of the occupier to identify the hazardous wastes in their units and ensure proper

and Trans boundary Movement) Rules, 2016		with the Basel convention	handling and disposal o PP to take all steps to contain contamination, prevent accident and limit consequences on human being and environment o Obtain authorization from SPCB and comply with the conditions. o Maintain records of Hazardous Waste generated in Form-3 and submit yearly return for generation, treatment, recycling, disposal etc., to SPCB in Form-4 o Used Oil to be send / sold to the registered recycler, re-processor, registered authorized facility o Shall be transported in accordance with the rule. o Site storage is allowed for 90 days only
The Solid Waste Management Rules, 2016	CPCB, SPCB	To manage/ utilize the generated solid waste without damaging the environment and surroundings	o Segregate waste in to three streams, Wet (Biodegradable), Dry (Plastic, Paper, metal, wood, etc.) and domestic hazardous wastes (diapers, napkins, empty containers of cleaning agents, mosquito repellents, etc.) and handover segregated wastes to authorized rag-pickers or waste collectors or local bodies.
Noise Pollution (Regulation and Control) Rules, 2000 and its amendments	CPCB, SPCB, MoEF&CC	To maintain the noise levels with respect to the place/equipment/ industry	o Noise Quality Monitoring & submission of reports on weekly/monthly basis. o Providing Ear plugs and Muffs to the workers working in noise prone areas. o Dampening the source noise level or making the noise characteristics less annoying by providing

			suitable enclosures and barriers.
The Central Motor Vehicle Rules, 1989	Ministry of Shipping, Road Transport and Highways	To consolidate and amend the law relating to motor vehicles including to regulate the transportation of dangerous goods with a view to prevent loss of life or damage to the environment	o Ensure compliance to safety provisions in the transport vehicle carrying dangerous and hazardous substances inside works o Display of emergency information panels at front, back and both side of vehicle o Every transporter to ensure safe transportation of dangerous/ hazardous goods. o Earthing chain for grounding, any prevalent static charge. o All motor vehicle entering the works shall have properly maintained brakes, lights, signal system for brakes, blinkers and registration number displayed, and valid Pollution under Control Certificate.
Mines & Minerals Development & Regulation (Amendment) Act 1957 & MMDR (Amendment) Act 2015	DMG/IBM	Regulation of mines and the development of minerals	o Development Restoration and Rehabilitation fund will be spent as per Mines & Minerals Development & Regulation Act 2015
Mines Act 1952	Mineral Resource Department	Guidelines for mining of Minor Mineral in the lease area	o Mineral will be extracted as per the approved mining plan.

Mineral Concession Rules, 1960 & Mineral Concession Rules, 2016.	IBM	Guidelines for mining of minerals in the lease area	o Mineral will be extract as per the approved mining plan.
Wildlife protection Act 1972 & Wildlife Protection (Amendment) Act, 2022	Forest Department, PCCF	Protection of plants and animal species	o Wildlife conservation plan has been approved to protect the Schedule species in the study area.

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2. PROJECT DESCRIPTION

The proposed project entails mining of Bauxite by opencast mining method with an annual Peak Rated Capacity of ~ 4.0 MTPA of Bauxite (ROM). The project also involves generation of 1,46,508 tonnes of Overburden/waste and 51,564 tonnes (25,782 m^3) of top soil during initial 5 years of operations. Besides, it is envisaged to have crushing/Screening facilities within the lease area with a capacity of 800 TPH at rated production level over an area of 144.945 Ha located at Village - Ballada, Taluka – Nandapur, District- Koraput, Odisha.

This chapter deals with the lease details, geology of the mining lease area, evaluation of the deposit, estimation of reserves, method of mining, mining machineries, year wise RoM extraction details, details on infrastructure, various sources of pollution and the measures to control.

2.1 TYPE OF PROJECT

The proposed project falls under Category 'B' Mining of Minerals of the list of project or activities requiring prior Environmental Clearance from SEIAA as per notification dated 14th September 2006 and subsequent amendment in connection with Environment (Protection) Rules 1986.

Terms of reference (ToR) for carrying out EIA/EMP study has been granted by SEIAA, Odisha vide letter File No. SIA/OR/MIN/439954/2023 dated 06.11.2023.

2.1.1 History of Mine lease

This is new mining block. No mining carried out in the past. The entire block area is part of reserve forest.

2.2 NEED OF THE PROJECT

Bauxite is basically an aluminous rock containing hydrated aluminum oxide as the main constituent and iron oxide, silica and titania in varying proportions. Hydrated aluminum oxides present in the bauxite ore occur in form of three minerals, viz, Gibbsite, Boehmite & Diaspore. Bauxite is an essential ore of aluminum which is one of the most important nonferrous metals used in the modern industry. It is also an essential ore for refractory and chemical industries. The country has abundant resources of bauxite which can meet both domestic and export demands.

The production of mineral and its subsequent use in the Alumina Refinery will benefit the state by way of royalty and taxes and will also bring in large employment opportunities to the local population thereby usher in socio-economic benefit to the backward region.

2.3 LOCATION OF PROJECT (MAPS SHOWING GENERAL LOCATION, SPECIFIC LOCATIONS, PROJECT BOUNDARY AND PROJECT SITE LAYOUT)

The Project is located at Village - Ballada, Taluka – Nandapur, District- Koraput, Odisha between latitudes 18°26'05.61588" N to 18°27'13.34448" N and Longitude 82°39'32.39136" to 82°40'25.36716" E. & is covered under the Survey of India toposheet no. No. E44K11 (65J/11).

The DGPS coordinates of the ML area are given in **Table 2.1.**

The site is situated about one to two kilometers west of Ballada and about 8 km north of Padwa in Koraput district, Odisha. Jeypore, a major town in the Koraput district, is about 82 km north-north-west of the Ballada deposit and is approachable by major district road No.52. Koraput, the district headquarters is at 60 km north of the deposit and is connected by a metalled road via Similiguda on NH 26. Bheja, the nearest Railway Station is about 5.0 km due north-east. The nearest airport is at Visakhapatnam (140 km) from the lease.

The Route Map, Site Photographs, Surface Plan, Geological Plan, Conceptual Plan are shown in **Figure 2.1, Figure 2.2**, **Figure 2.3, Figure 2.4, Figure 2.5** respectively**.** Topographic Map and Coordinate map and Google map are shown in **Figure 2.6, Figure 2.7 & Figure 2.8** respectively.

Table 2.1: Latitude and Longitude of the project site (Boundary Co-ordinates)

POINT	Latitude, N	Longitude, E
1	18°26'16.23156"	82°40'00.46092"
2	18°26'18.91140"	82°40'00.67800"
3	18°26'23.21664"	82°39'58.77720"
4	18°26'36.61440"	82°40'05.93040"
5	18°26'48.06600"	82°40'15.01104"
6	18°27'09.92016"	82°40'25.36716"
7	18°27'13.34448"	82°40'21.25920"
8	18°27'03.40524"	82°40'01.11144"
9	18°26'45.46356"	82°39'46.92528"
10	18°26'37.11876"	82°39'33.80148"
11	18°26'25.86912"	82°39'33.42420"
12	18°26'12.46524"	82°39'32.39136"
13	18°26'07.02348"	82°39'36.53856"
14	18°26'05.61588"	82°39'50.41692"

Source: Mining Plan

Human Settlement near site

The nearest human settlement is Ballada at 1.5 km in East from the site.

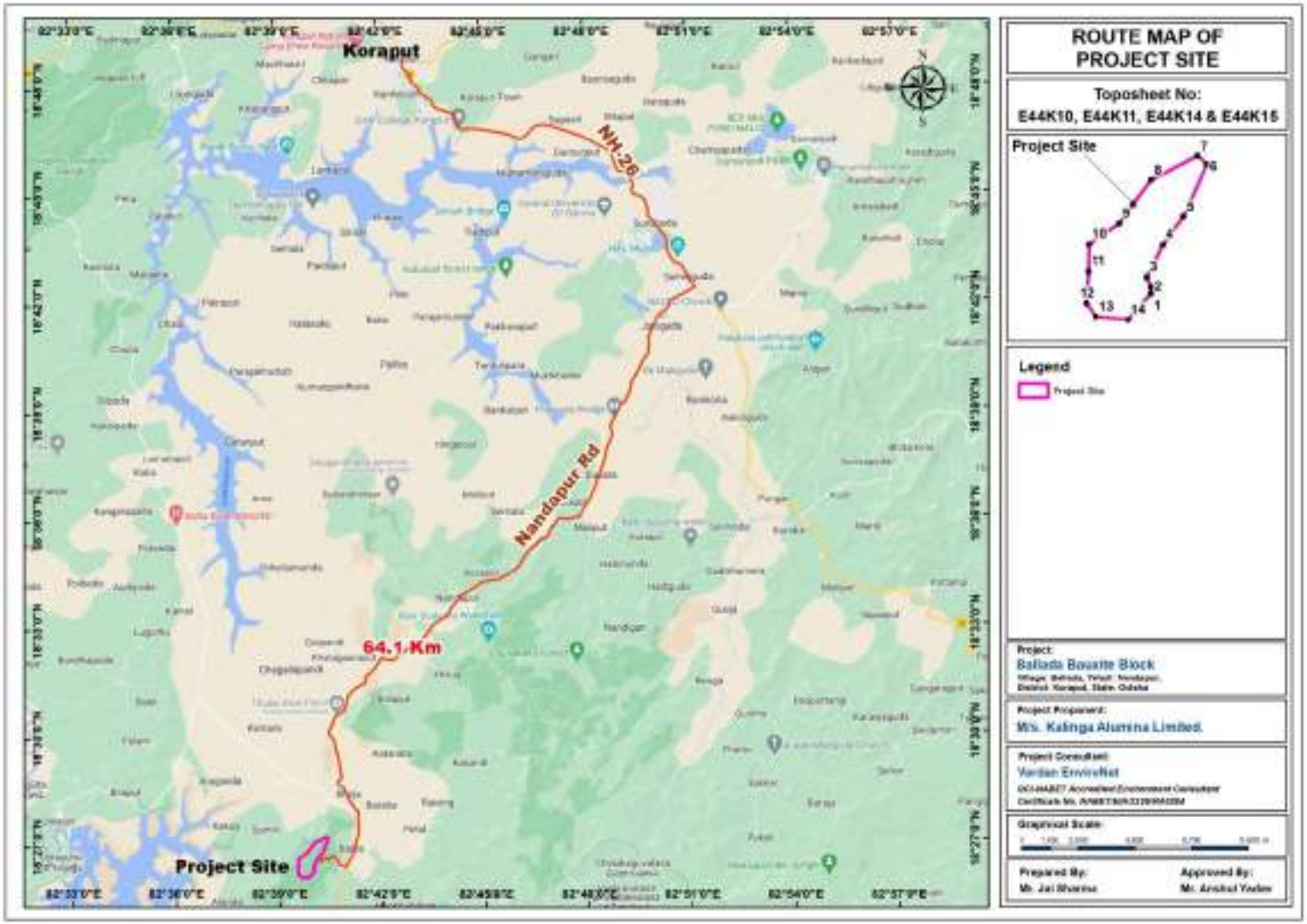


Figure 2-1: Route Map

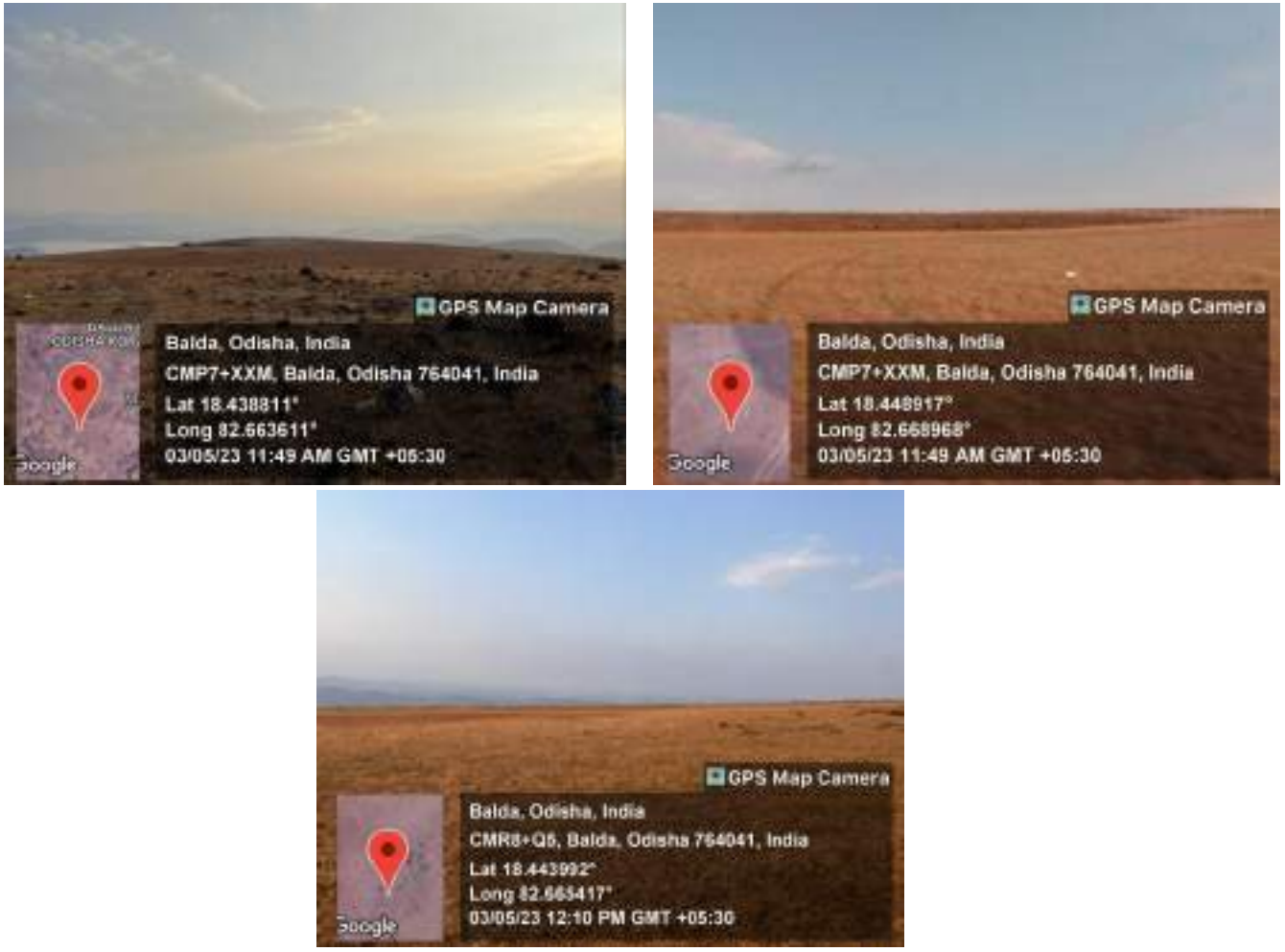


Figure 2-2: Project Site Photographs

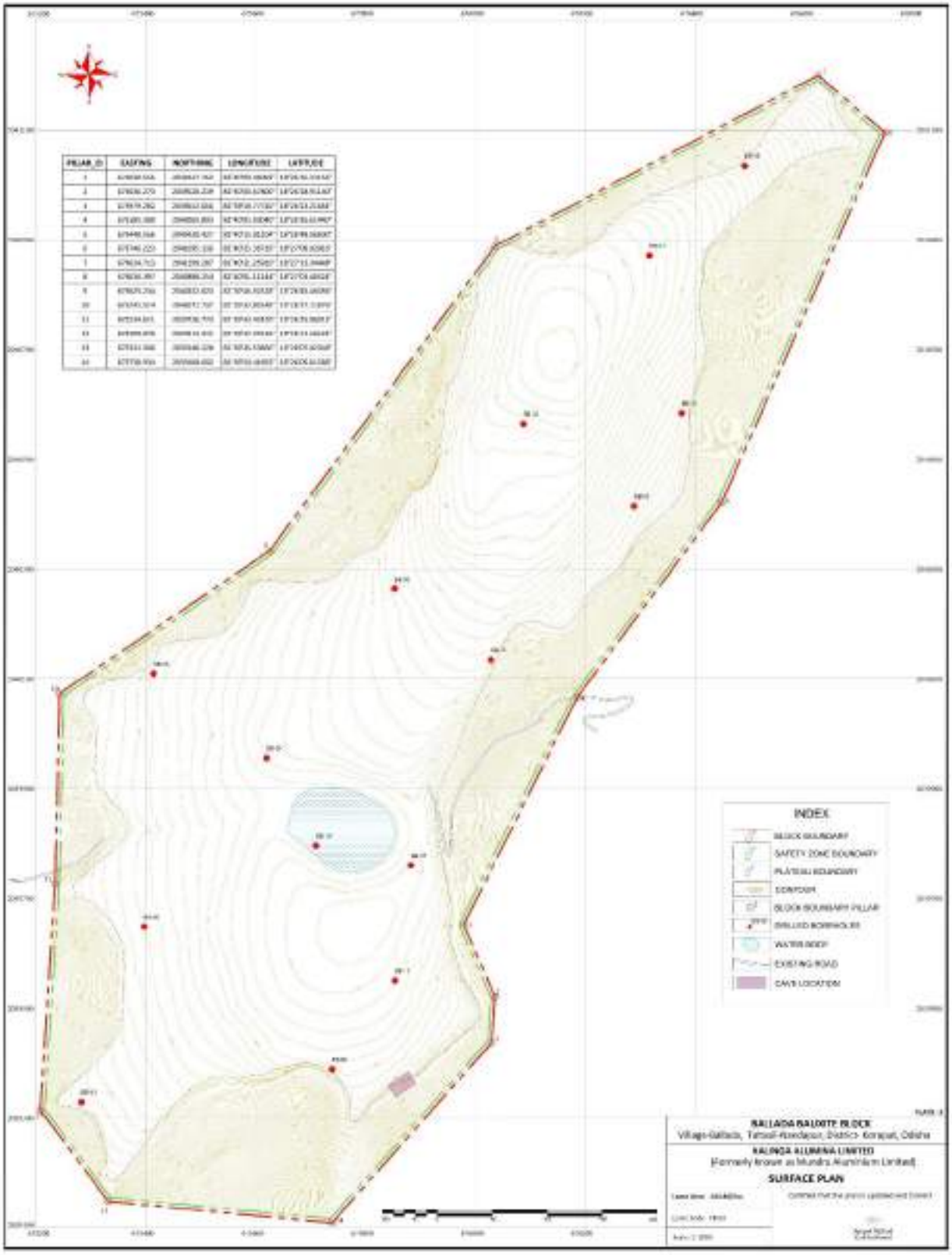


Figure 2-3: Surface Plan

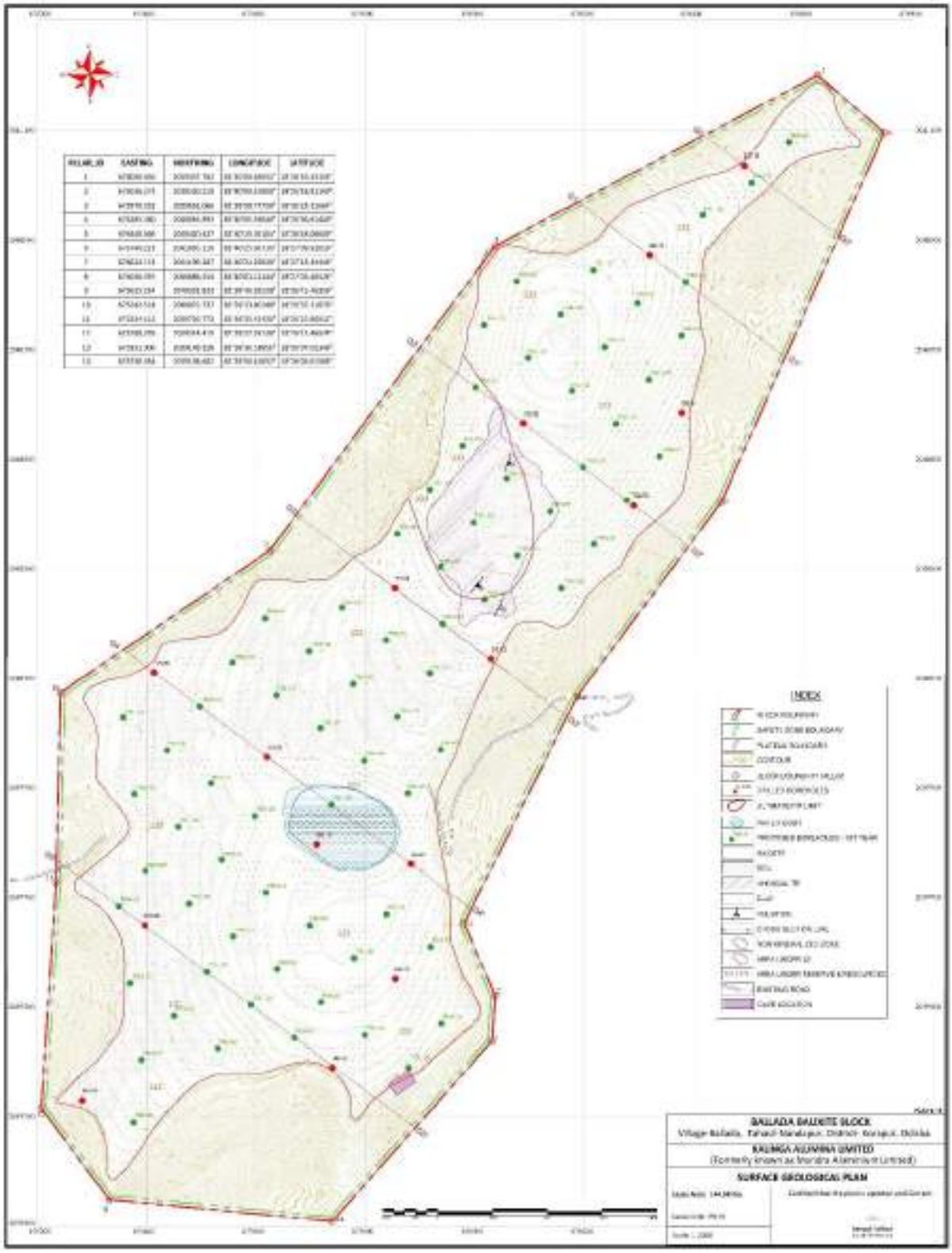


Figure 2-4: Geological Plan

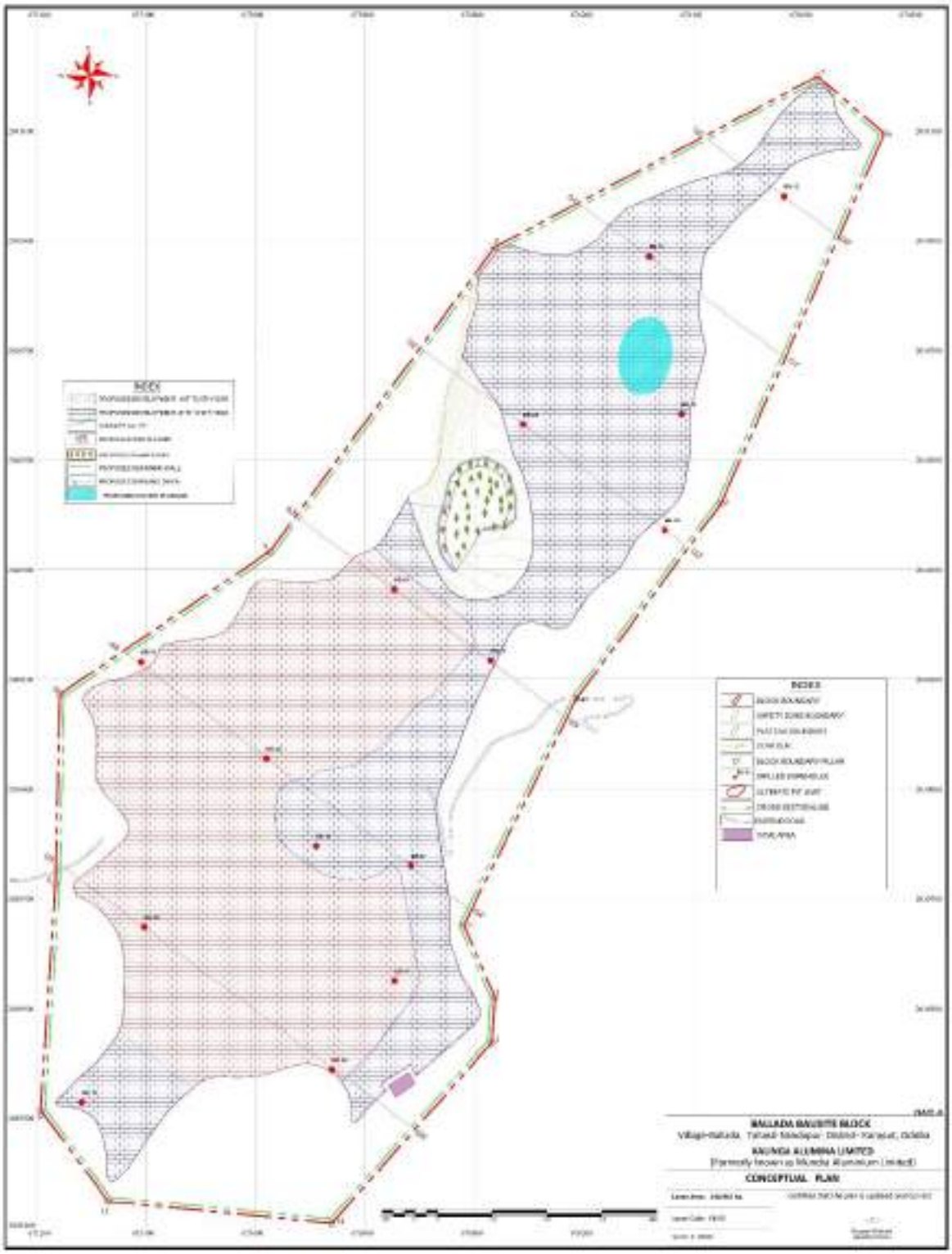


Figure 2-5: Conceptual Plan

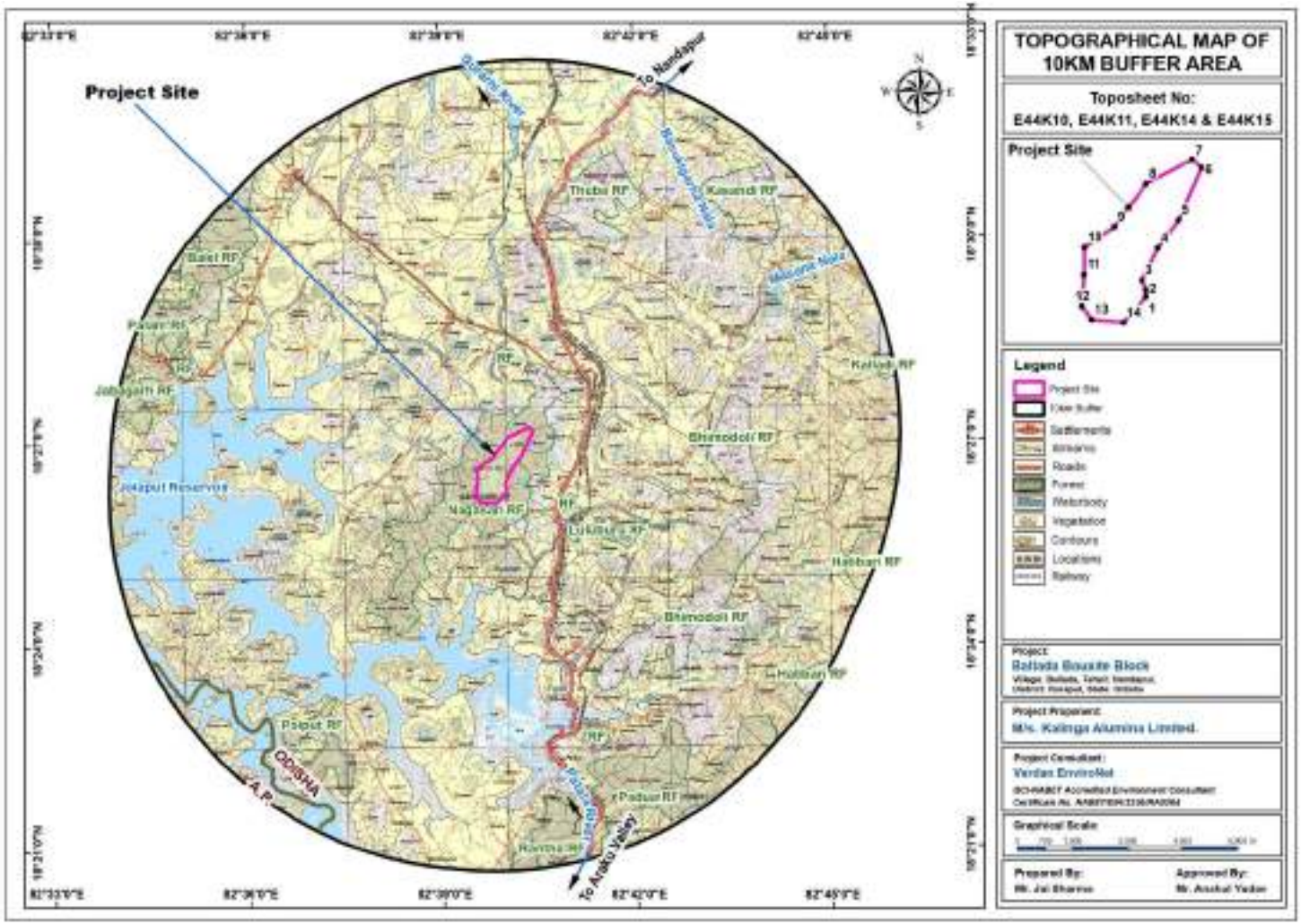


Figure 2-6: Topographical Map of Study Area

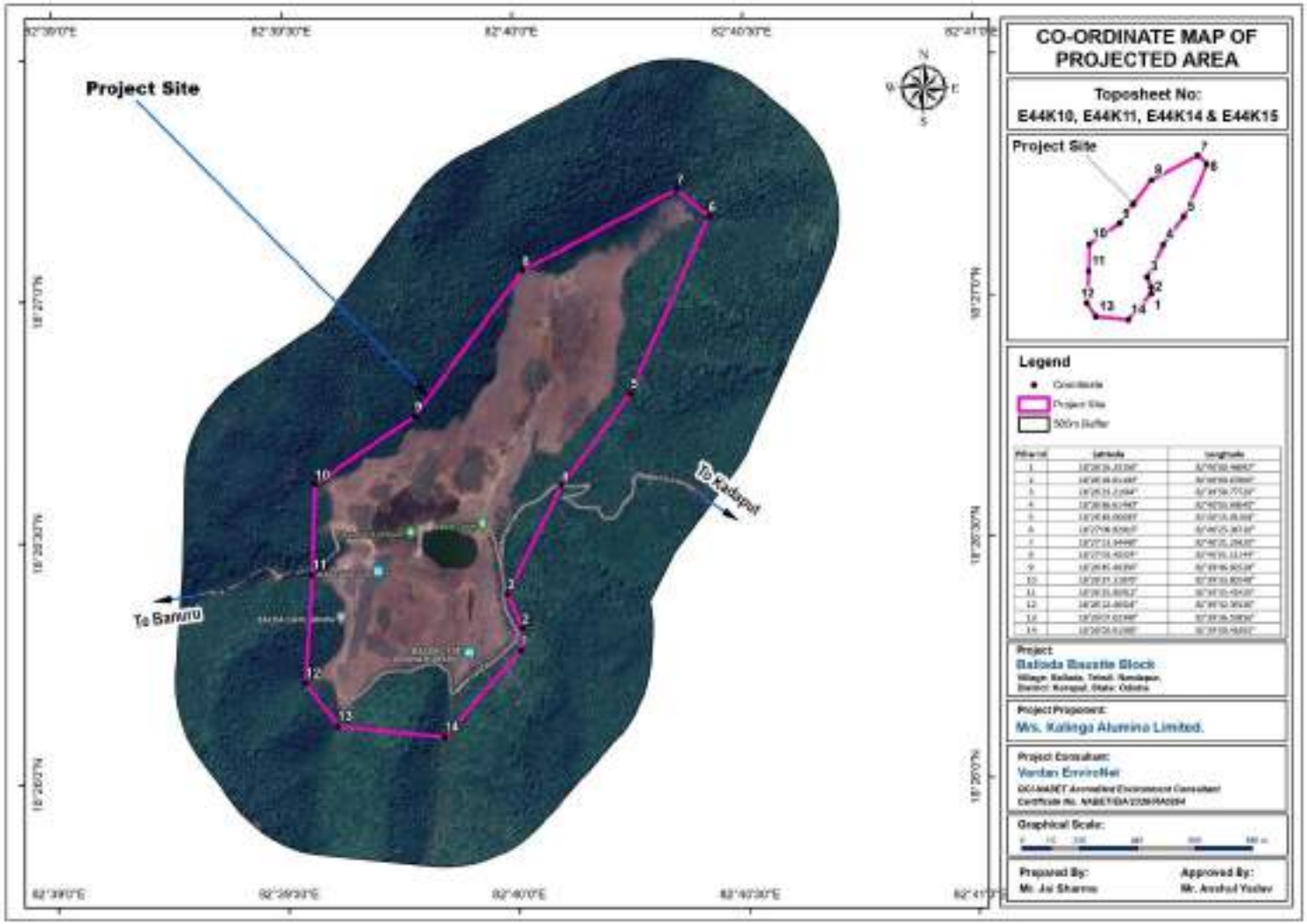


Figure 2-7: Coordinate Map

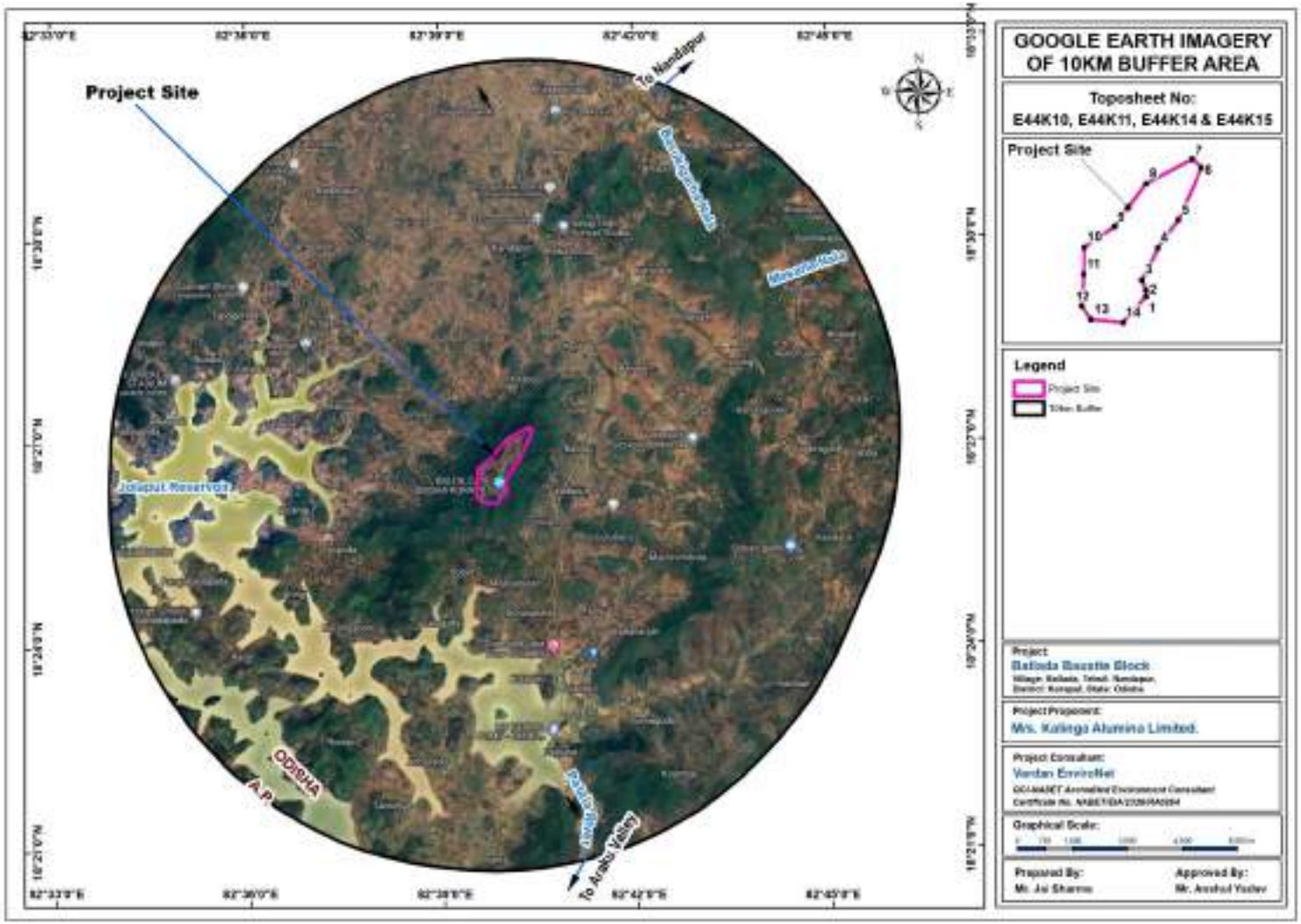


Figure 2-8: Google Earth Imagery of 10 KM Buffer Area of the Project Site

2.4 SIZE/MAGNITUDE OF OPERATION

2.4.1 Proposed Operation

The salient features of the proposed project are as given in **Table 2.2:**

Table 2.2: Salient Features of the Proposed Mine

<table>
<tr><th>S. No.</th><th>Description</th><th>Particulars</th></tr>
<tr><td>1.</td><td>Name of the Project</td><td>Mining of 4.0 MTPA Bauxite (ROM), being the Peak Rated Capacity, 146508 tonnes (73,254 m³) of overburden/waste and 51564 tonnes (25782 m³) of top soil over a period of 5 years and setting up of Crushing/ Screening facilities of 800 TPH capacity within the lease area spanning over an area of 144.945 ha</td></tr>
<tr><td>2.</td><td>Production for Plan period</td><td>
<table>
<tr><th>Year</th><th>Soil in m³</th><th>O.B. in m³</th><th>OB in Tonnes</th><th>Total Bauxite in Tonnes</th><th>OB to Ore Ratio</th></tr>
<tr><td>Y1</td><td>24072</td><td>0</td><td>0</td><td>1000120</td><td>0</td></tr>
<tr><td>Y2</td><td>1,710</td><td>24,783</td><td>49,566</td><td>2024020</td><td>0.012</td></tr>
<tr><td>Y3</td><td>0</td><td>44,671</td><td>89,342</td><td>2001482</td><td>0.022</td></tr>
<tr><td>Y4</td><td>0</td><td>3,800</td><td>7,600</td><td>2002414</td><td>0.02</td></tr>
<tr><td>Y5</td><td>0</td><td>0</td><td>0</td><td>4001868</td><td>0</td></tr>
<tr><td>Total</td><td>25,782</td><td>73,254</td><td>146508</td><td>11029904</td><td></td></tr>
</table>
</td></tr>
<tr><td>3.</td><td>Mining lease area</td><td>144.945 Ha</td></tr>
<tr><td>4.</td><td>Land use Area</td><td>Forest Land</td></tr>
<tr><td>5.</td><td>New / Expansion</td><td>New</td></tr>
<tr><td>6.</td><td>Category as per EIA Notification</td><td>“B”</td></tr>
<tr><td>7.</td><td>Lease Validity</td><td>28.02.2073</td></tr>
<tr><td>8.</td><td>Proposed Capacity</td><td>4.0 MTPA Bauxite (ROM)</td></tr>
<tr><td>9.</td><td>Life of mine</td><td>9 years</td></tr>
<tr><td>10.</td><td>Type of the Project</td><td>Opencast Mechanized Mining with drilling and blasting</td></tr>
<tr><td>11.</td><td>Probable Mineral Reserve</td><td>19.96 Mt</td></tr>
<tr><td>12.</td><td>Prefeasibility Mineral</td><td>2.17 Mt</td></tr>
</table>

S. No.	Description	Particulars
	Resource	
13.	**Total Mineable Resource**	22.13 Mt
14.	**Waste to Ore ratio over initial 5 years of operation (t/t)**	0.018:1
15.	**Bench heigh and bench width in OB & Mineral**	6.0 m x 10 m
16.	**Slope of Bench in OB and Mineral**	70 degrees
17.	**Overall pit slope**	30 degrees
18.	**Area under mining (Plan Period)**	42.78 Ha.
19.	**Max Depth of working**	30 m
20.	**OB To be Generated**	0.073 Mm^3 (During 5-year Plan period)
21.	**Top Soil to be generated**	0.026 Mm^3 (During 5-year Plan period)
22.	**Waste generation and disposal**	The waste generated in course of pre-mining development and subsequent mining operations will consist of topsoil and laterite with occasional occurrences of khondalite. During the first five years, the rate of generation of waste is expected to be of the order of 0.073 Mm^3 or 0.15 MT along with generation of top soil of 0.026 Mm^3 The average waste to ore ratio during the first 5 years of operations is estimated to be about 0.018:1. The waste materials will be dumped systematically, as per prudent industry practice. The waste stacked on ground during the initial years of operation will be utilized to partially fill the worked-out areas from time to time as per provisions of the approved mining plan
23.	**Top soil Management**	During initial five-years, top soil generation would be of the order of 0.026 Mm^3. Topsoil, stacked separately, would be spread over the reclaimed areas, to enable planting and growing of trees
24.	**Crushing**	The crushing plant and conveyor systems have been designed for 305 days operation per year with 3

S. No.	Description	Particulars
		shifts operation per day. The size of the product to be obtained after crushing in the plant will be minus 150 mm (d85). For 4 million tons per annum peak rated capacity, the crushing/ Screening plant requirement would be 800 TPH. It is proposed to install crushing and screening plants in phases, 400 TPH (1 no.) for 2 MTPA RoM production and 400 TPH (2 nos.) for 4 MTPA production. One RoM ore stockpile of about 50,000 tonnes capacity will be maintained near the crusher plant
25.	**Transportation**	The crushed bauxite from Ballada mine will be transported by closed conveyor system to Bheja railway siding, located at a distance of about 3 KM from the lease boundary. Intra-mine movement of ore and OB shall be carried out using dumpers of appropriate capacity as per provisions of the approved mine plan.
26.	**Infrastructure**	Requisite infrastructure will be developed for mining operation & allied activities such as Rest shelters, Fast-aid center, drinking water supply, Site-offices, and toilets within the mining lease as per requirement.
27.	**Working Regime**	305 days/ year, 3 shifts/day, 8 hours/shift
28.	**Man power**	126 persons
29.	**Power requirement**	The estimated average power requirement is 1 MW, the peak requirement being 1.5 MW. The power shall be sourced from nearest substation located at a distance of 8 km
30.	**Fuel requirement**	HSD: 1487 KL/Annum at peak rated capacity
31.	**Explosive Consumption**	1,13,400 kg per month (ROM Zone Blasting)
32.	**Water requirement**	Total water requirement is 690 KLD in which the Dust Suppression: 600 KLD, Washing and cleaning: 45 KLD Drinking: 10 KLD Afforestation: 15 KLD Miscellaneous: 20 KLD

S. No.	Description	Particulars
		Source: Jalaput lake located at distance of 3 km
33.	**No of tress to be planted and area of greenbelt**	8,440 during plan period, Greenbelt: 4.23 ha
34.	**Total cost of the project**	Rs 230 /- Crore
35.	**Fund Provision for EMP**	Capital- Rs 220.00 Lakhs (for first 5 years) Recurring- Rs 60.00 Lakhs/year
36.	**Name of the EIA Consultant Organization**	M/s Vardan EnviroNet LLP
37.	**QCI / NABET Accreditation**	Certificate No. QCI/NABET/EIA/ 2326/RA 0284_Rev.01, Valid up to 04.05.2026

Source: Mining Plan, PFR

2.5 STATUS OF STATUTORY PERMISSIONS

2.5.1 Letter of Intent

LOI (Letter of Intent): SM-MC2-MC-0007-2023/2143/S&M Bhubaneswar dated 1st March 2023 has been awarded to M/s Mundra Aluminum Limited (now M/s Kalinga Alumina Limited) by Steel and Mines Department, Government of Odisha. **(Attached as Annexure-I)**.

2.5.2 Mining Plan

Mining plan has been Approval by IBM vide letter MCDR-MiFL0BXT/5/2023-BBS-IBM_RO_BBS dated 08/08/2023. The copy of approved Mining Plan with approval letter is attached as **Annexure-III.**

2.5.3 Forest Clearance

Forest Clearance application has been submitted vide application number FP/OR/MIN/QRY/442417/2023 dated 01-09-2023. Forest Clearance Stage-I "In-principal" approval has been granted by MoEF&CC (Forest Conservation Division) dated 23.12.2024. The copy of the approval is attached as **Annexure-XVII**.

2.5.4 Wildlife Conservation Plan

A Site Specific Wild Life Conservation Plan is prepared and it is approved by the PCCF (WL) & CWLW, Odisha on 04.06.2024. Copy of the approved SSWLCP is attached as **Annexure-VII**.

2.5.5 Legal Issues

There is no litigation, directions or any order passed by any Court of Law or pending against the project.

2.6 IMPLEMENTATION SCHEDULE

It has been envisaged to execute the entire project including required approvals in 12 months' time from the "Start of the project. Duration of construction phase is approx. 180 days and expected to span from March-2024 to Sept-2024. The open cast mine will be developed to its 100 % capacity within five years in different stages. However, the implementation schedule is subject to receipt of all statutory clearances required for the proposed project.

2.7 GEOLOGY OF AREA

2.7.1 Physiography and Drainage

The area forms a part of Eastern Ghat hill ranges which have a NE-SW Trend. The block area comprises of a flat toped plateau which is moderately flat in the southern part and has gentle slope towards east. The elevation within the block varies from 1037.57m (minimum) to 1266.89m. (maximum). The natural drainage comprises of rills and gullies of first order. Dendritic drainage pattern is observed in this area.

2.7.2 Regional Geology

The Ballada hill range is located on the west of Pottangi plateau, Mali parbat and famous Panchpatmali plateau and forms a part of the Eastern Ghat Mobile Belt of Archean age represented by Khondalite suite of rocks, pyroxene granulite, Charnockite suite of rocks, variants of granite gneisses infused with pegmatoids and vein quartz of Archean age formed under granulite facies of metamorphism. The ortho and para metamorphites have undergone significant weathering and alteration at higher altitudes forming laterites of Tertiary age. The above litho units form more or less banded assemblage in NNE-SSW trend in conformity to the general trend of the Eastern Ghats. The rocks exposed in the area belong to the Eastern Ghat Super Group of rocks represented by quartzite, migmatised khondalite, pyroxene granulite, charnockites, leptynites and porphyroblastic granite gneisses together with high level laterite/bauxite. The most common rock in this group is quartz-garnet-feldspar sillimanite gneisses i.e. khondalites with or without graphite and/or manganese which has been migmatised to variable extent. The Khondalite suites form high and linear hills with sharp crests, while the Charnockites occupy the low-lying plains as well as dome shaped hill rocks.

Structurally the area is fairly complex. The bedding plane (S0) is never observed. The most pronounced planner structure is foliation plane (S1) of Khondalite. The trend of foliation swings from NNW - NNE to NE -SW with rather steep dip ranging from 60˚ to 80˚ due SE or SW. In the Niyam Dongar hill, where a broad upright asymmetric syncline is observed, the trend of foliation varies from NNW to NNE in the southern limb and swings to NE-SW in the northern limb.

2.7.3 LOCAL GEOLOGY

The area forms a segment of the east-central part of the Eastern Ghat hill ranges. Rocks belonging to the Khondalite and Charnockite groups are developed in the area. In general, Khondalites form high hills and peaks whereas the Charnockitic rocks are invariably confined to the valleys and slopes of high hills. Both the groups of rocks occur as concordant bands. It is a common feature to observe islands of Khondalites within the Charnockitic rocks. Bauxite of Ballada capping occurs as mantle over khondalite as proved by drilling. The gibbsite crystals occur as shining aggregates in a ferruginous groundmass. The relict foliation is observed in some of the bauxite outcrops. The bauxite invariably has a brick red colour. It is sporaceous towards the top where the voids are filled with kaolinite / limonite. At depth, it has spongy texture with ferruginous zones. The laterite is more ferruginous and siliceous at the top where it is hard and has craggy, cavernous look but is relatively soft and aluminous in the lower parts and grades into bauxite. The soil though present in very less quantity is mostly lateritic.

2.8 RESERVE ESTAMATION AND LIFE OF MINE

2.8.1 Reserve or Resource Estimation Method

As described in mining plan, cross sectional area on each section has been measured with the help of AutoCAD and recorded. Half-way influence between two section lines has been taken. Each of these areas has been multiplied by strike influence of the section line to arrive at volume. To get tonnage (gross resources), volume has been multiplied with Bulk Density.

2.8.2 Mineral Resource Estimation for Conversion of Mineral Reserve

In Mining plan, resources have been estimated based on level of exploration. All the exploratory holes drilled have been considered for computation. Based on the above data, the existing geological plan and sections are prepared. Bulk density of 2.0 tonnes/m^3 for all grades of Bauxite has been considered.

Section-wise Bauxite resources have been estimated for the entire lease based on the exploration undertaken and the configuration of the mineral body is more or less well established. The ultimate pit depth is upto 1166 mRL based on the disposition of the Bauxite. The Bauxite resources / reserves are considered based on +30% Al2O3 and -7% SiO2 as per threshold value specified given in Notification No. C-284/3/CMG/2017. By adopting the above enumerated criteria, section-wise mineral resource has been estimated at 22.13 Mt. Following losses are considered for estimation of mineable reserves from geological resources: a. Resources blocked under various mining constraints such as in the 7.50 m statutory barrier, bench slopes etc; these resources have been categorized under pre-feasibility resource (222). b. Mining loss at 5.0% due to operation

2.8.3 Threshold Value and Cutoff Parameters

The word "bauxite" used in this report connotes material with +30% Al2O3 and - 7% SiO2 as per the IBM's end use specification and threshold limits prescribed vide Circular No. C-284/3/CMG/2017 unless otherwise specified. These parameters constitute the chemical or specified threshold limits at which the ore characteristics have been assessed. The weighted average total silica within all types of bauxite (MGB, LGB, BGB, HSB) is 2.06, and Al_2O_3 is 42.09, which are well above the prescribed threshold value of Bauxite.

2.8.4 Mineral Reserve

Geological & Mineable reserve as estimated in the approved mining plan with grade has been given below.

Table 2.3: Mineral Reserve

Classification	Code	Quantity in tonnes			Grade	
		Forest	Non-Forest	Total	Forest	Non-Forest
A. Mineral Reserve						
1. Proved Mineral Reserve (A)	111					
2. Probable Mineral Reserve (A)	121					
3. Probable Mineral Reserve (A)	122	19963397.22		19963397.22	Al2O3: 42.18, SiO2:2.96	
B. Remaining Resources						
1. Feasibility Mineral Resource (B)	211					
2. Prefeasibility Mineral Resource (B)	221					
3. Prefeasibility Mineral Resource (B)	222	2168107.64		2168107.64	Al2O3: 41.89, SiO2: 2.91	
4. Measured Mineral Resource	331					

Classification	Code	Quantity in tonnes			Grade	
		Forest	Non-Forest	Total	Forest	Non-Forest
(B)						
5. Indicated Mineral Resource (B)	332					
6. Inferred Mineral Resource (B)	333					
7. Reconnaissance Mineral Resource (B)	334					
Total Mineral Resources (A+B)		22131504.86		22131504.86		

2.8.5 Life of Mine

Based on the Resources estimated (i.e. 22.13 million tons) as per the Geological Report provided along with auction documents the life of the mine with year wise proposed production is about 9 years. However, after execution of mining lease further detailed exploration will be carried out. There is a possibility that after detailed exploration there will be upside in reserves quantity. Thus, with augmentation of additional reserves the life of mine may increase further.

2.9 TECHNOLOGY AND PROCESS DESCRIPTION

2.9.1 Mining Methodology

Mining operations are proposed to be carried out by fully mechanized opencast mining method. The bench height and width in Bauxite is proposed to be 6m & 10m respectively. The maximum proposed production of Bauxite is 4 million tonnes per annum. The thickness of overburden which is usually soil in Ballada plateau is 0.2m to 1m. The Ore to waste ratio was computed to be 1: 0.018.

The primary activity in mining operation, i.e., fragmentation/ loosening of in-situ rock mass, is conventionally carried out by drilling and blasting. Blasting shall be done for fragmentation of both bauxite. Drilling and blasting would be required for about 70-80% of RoM.

2.9.2 Proposed Production Plan

The production target for the next five years, along with the target for removal of OB and soil is given below.

Table 2.4: Proposed Production Details

Year	Top Soil in m^3	O.B. in m^3	OB in Tonnes	Total RoM in Tonnes	OB to ore ration
1	24,072	0	0	10,00,120	0
2	1,710	24,783	49,566	20,24,020	0.012
3	0	44,671	89,342	20,01,482	0.022
4	0	3800	7600	2002,414	0.002
5	0	0	0	4001,868	0
Total	**25782**	**73254**	**146508**	**110,29,904**	**-**

2.9.3 Mine Design Parameter

Year wise bench development for plan period is given below.

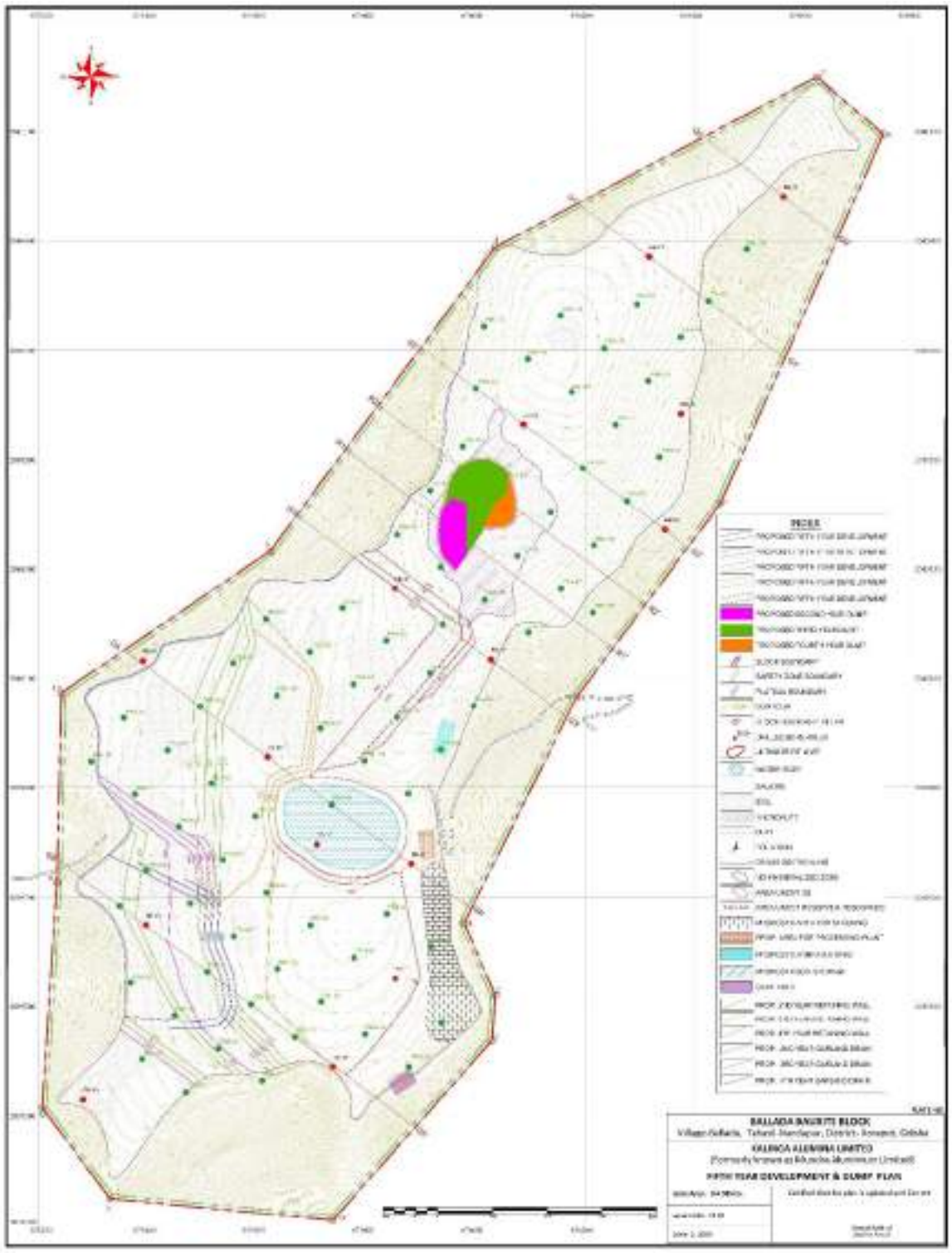


Fig 2-9 Five Year Development Plan

Table 2.5: Mine Design -Parameters

Pit Id	Year	Max Height of the Benches in Over Burden/Waste (m)	Min Width of the Benches in Over Burden/Waste (m)	Slope of the Bench in Over Burden/Waste (degree)	Max Height of the Benches in Mineral (m)	Minimum Width of the Benches in Mineral (m)	Slope of the Bench in Mineral (degree)	Overall Slope of Pit (degree)	Number of Benches in Mineral	Max Depth of Workings (m)	Depth of Water Table (m)	Max Slope Angle of Haul Roads (1 in)
Pit-1	Year 1	0	0	0	6	10	70	30	3	15	-	16
Pit-1	Year 2	6	10	70	6	10	70	30	5	21	-	16
Pit-1	Year 3	6	10	70	6	10	70	30	6	21.50	-	16
Pit-1	Year 4	6	10	70	6	10	70	30	4	16	-	16
Pit-1	Year 5	0	0	70	6	10	70	30	5	25	-	16

Source: Mining Plan

2.9.4 Drilling and Blasting

The primary activity in mining operation, i.e. fragmentation/ loosening of in-situ rock mass, is conventionally carried out by drilling and blasting. The slurry/emulsion explosives will be used. The top of the blast holes will be subjected to stemming with drill cuttings to prevent generation of fly rocks. A minimum of one-third of the hole depth will be subjected to stemming. To minimize the vibration due to blasting nonel with cord relay will be used and whenever blasting is to be done near any village or permanent structure muffle blasting will be done. The peak rated production capacity of the mine will be 4 Mt per annum (2 Mm^3 per annum). The details of drilling and blasting parameters are given as below.

Table 2.6: Blasting Parameters

Sr. No.	Particulars	Details
1.	Total ROM proposed to be handled in CUM/annum	2002434
2.	Total ROM proposed to be handled in CUM/ day	6565.35
3.	Spacing of Holes (m)	3.25
4.	Burden of Holes (m)	2.5
5.	Number of Rows	3
6.	Yield per Holes in ROM Zone (m^3)	48.75
7.	Frequency of Blasting in a Week	6
8.	Maximum Number of Holes Blasted in a Round	135
9.	No of Holes Required to be Blasted per Round	135
10.	Charge per Hole (kg)	35
11.	Charge per Round (kg)	4725
12.	Explosive Requirement Per Month for ROM Zone Blasting (kg)	113400
13.	Powder Factor in Ore (kg/t)	2.78
14.	Depth Of Hole, m	6.0

Source: Mining Plan

2.9.5 Crushing Unit

The bauxite excavated from Ballada mine will be crushed to (-) 150 mm size and transported by series of closed conveyors to the nearest railway station at Bheja for onward transportation to alumina plants. The ore being of high grade, no preliminary treatment/beneficiation is envisaged at the mine head.

The size of the product to be obtained after crushing in the plant will be minus 150 mm (d85).

The ore transported from the mine may be dumped directly into the crusher or to the stockpile depending upon evacuation readiness.

The crushing plant and conveyor systems have been designed for 305 days operation per year with 3 shifts operation per day. The effective working hours per shift during dry and monsoon season has been considered at 7 hours and 5 hours respectively. Crushing plant and conveyor system to operate 12 months in a year considering 8 dry months and 4 monsoon months.

For 4 million tons per annum peak rated capacity the crushing/ Screening plant requirement would be 800 TPH. It is proposed to install crushing and screening plants in phases 400 TPH (1 no.) for 2 MTPA RoM production and 400 TPH (2 nos.) for 4 MTPA production.

One RoM. ore stockpile of around 50,000 tonnes capacity will be maintained near the crusher plant. This stockpile would not only enable in absorbing the imbalance in mine raisings during dry season and monsoon but would also serve as a buffer between the mine and the crushing plant in the event of stoppage of either of these.

Table 2.7: Crusher Details

Type of Crusher	Capacity, TPH	Feed Size, mm	Product size, mm
Crushing & Screening Plant	800	600-800	Minus 150

2.9.6 Extent of Mechanization

The deposit lies on surface, and it is proposed to be mined by mechanized opencast method of mining with excavator / dumper combination, Deep hole drilling/Short hole drilling and blasting. Further, it is proposed to mine with the Ripping and Dozing method and deployment of Surface Miner at a later date if feasible.

The expected list of production and auxiliary equipment is given below.

Table 2.8: Machineries Details

S No	Particulars	Make	Capacity	No of equipment
1	Diesel hydraulic shovel	Volvo EC480/Komatsu PC 450/TATA Hitachi ZX 670	3.1 cum	4
2	Dumper	Bharat Benz 3528	16 m3	11
3	DTH drill	Epiroc-T40	Hole Dia -115 mm	2
4	Dozer	BEML D-155	324 (hp)	1

2.9.7 Waste Management

The waste generated in course of pre-mining development and subsequent mining operation will consist of topsoil and laterite with occasional occurrences of khondalite.

During the first five years the rate of generation of waste is expected to be of the order of 0.073 Mm^3 or 0.15 MT of along with generation of 0.026 Mm^3 of Topsoil. Considering this, an average ore to waste ration of 1:0.018 is estimated.

It is planned to stack topsoil and waste separately on ground during the initial 4 years of plan period. From 5th year onwards, waste material will be dumped systematically. Topsoil, stacked separately, would be spread over the reclaimed areas, to enable planting and growing of trees. The waste stacked on ground during the initial years of operation will be utilized to fill the worked-out areas at the end of the working life of the mine as well as during the interim period, as and when practicable. The generation of waste during the 5-year plan period will be very less and shall be dumped systematically. No backfilling is proposed during the initial 5-year period.

Table 2.9: Details of Waste Generation During Plan Period

Year	Top Soil in m^3	O.B. in m^3	OB in Tonnes
1	24072	0	0
2	1710	24783	49566
3	0	44671	89342
4	0	3800	7600
5	0	0	0
Total	**25782**	**73254**	**146508**

2.9.8 Top Soil Management

The plateau exposes lateritic bauxite of different grades on the surface with a thin veneer of soil at places. This place is overlain by a thin rim 0.2m to 1.00 m of soil. So, the Overburden is almost negligible. However, from the cross sections the volume of soil has been calculated to be 25782 cum or 0.026 Mm^3.

The topsoil removed ahead of bauxite mining will be stored in the earmarked areas during the initial years of operation. However, some of the removed topsoil will be utilized for plantation on the safety barrier, dump and haul roads as well as around the periphery of the site service facility area during the first five years:

Table 2.10: Top Soil Generation

Year	Soil in m^3	Estimated Expense
Year 1	24072	4814400
Year 2	1710	342400
Year 3	0	0
Year 4	0	0
Year 5	0	0

2.10 USE OF MINERALS

Bauxite produced from this mine is best suited for captive consumption in our proposed Refinery project. In-case of a potential time-lag between the commencement of Mining operations vis-à-vis the Refinery commissioning, the Bauxite shall be sold to Domestic Alumina Refineries.

2.11 RESOURCE REQUIREMENT

2.11.1 Power Requirement

The estimated average power requirement is 1 MW, the peak requirement being 1.5 MW. The power shall be sourced from nearest substation at Padwa, located at a distance of 8 km.

2.11.2 Water Requirement

Water requirement during construction phase (domestic and construction activity) is estimated as average 15 KLD with a peak consumption of 30 KLD.

The water requirement during mine operation is 690 KLD. The details are given below.

Table 2.11: Water Requirement

S. No.	Consuming Area	Water requirement, (KLD)
1.	Haul road dust suppression including maintenance of topsoil	600
2.	Washing and cleaning of earthmoving equipment	45
3.	Drinking system	10
4.	Afforestation	15
5.	Miscellaneous	20
	Total	**690**

Source of water

Water requirement will be met through the surface water supply through pipeline from Jalaput water bodies located at 3 km away from mine. Permission has been obtained from the Department of Water Resources, Govt. of Odisha vide letter no. 30630/WR. dated 08.11.2024. No ground water withdrawal is envisaged.

Wastewater generation

The wastewater from domestic use will be disposed through septic tank and soak pit system. There is no industrial wastewater generation from mine, Wastewater generated

from workshop will be treated using oil-water separator and treated water will be reused in vehicle washing.

2.11.3 Manpower

The proposed mining project will generate employment for about 126 persons. In addition, more people will be benefited indirectly.

2.11.4 Proposed Investment

Total cost of the proposed mining project is estimated as **Rs. 230 Cr.**

2.11.5 Site Services

Requisite infrastructure will be developed for mining operation & allied activities such as Rest shelters, blasting shelters, First-aid room, drinking water supply, power supply, Site-offices, Stores & workshop, and toilets etc. within the mining lease as per requirement.

2.12 TRANSPORTATION

The crushed bauxite from Ballada mine will be transported by closed conveyor system to Bheja railway siding, located at a distance of about 3 KM from the lease boundary.

Intra-mine movement of ore and OB shall be carried out using dumpers of appropriate capacity as per provisions of the approved mine plan.

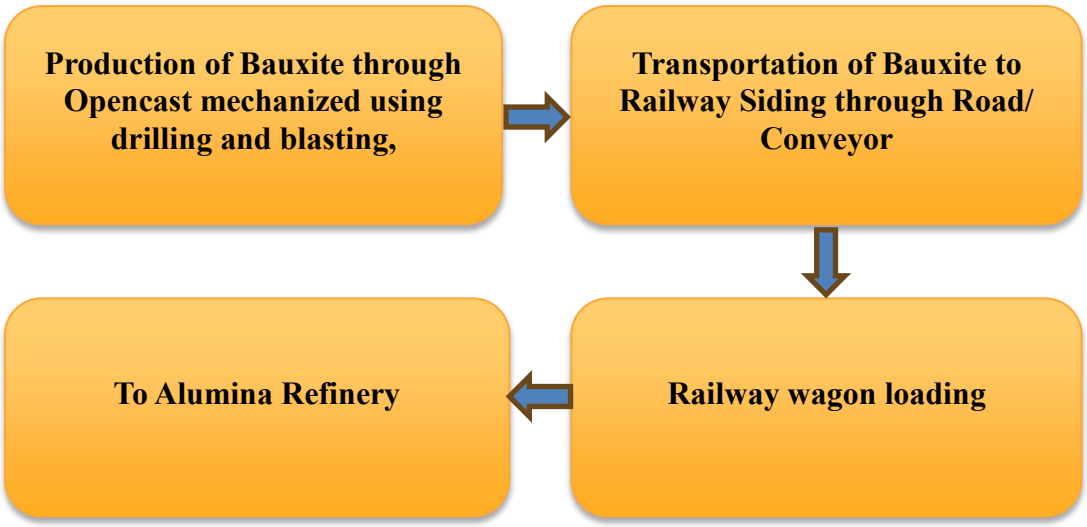


Fig. 2-10 Mineral Evacuation Plan

2.13 LAND USE

The total area of 144.945 Ha. is Forest land. The break-up of the present land use is as given below.

Table 2.12: Existing Land-use

Pre-Mining Use	AREA (Ha)
Barren / Waste land with small bushes & shrubs	91.100
Land under Agriculture / Crops	0.00
Land covered with Plants	53.845
Land under Grass Cover	0.00
Land under Public Infrastructure / Utilities (water bodies, roads, railways, electric lines, telephone lines etc.)	0
Land under Habitation	0.00
Land under Monuments & places of Historical Importance	0.00
Degraded by Pits & Excavation	0.00
Degraded by Dumps & Material Staking	0.00
Covered under Mine Infrastructure (plants, shades, buildings etc.)	0.00
Land under Forest	144.945

The land use plan after plan period is given below.

Table 2.13: Land-use after Plans period

S. No.	Particular	Total (Ha)
1	Area under Mining	42.78
2	Topsoil stacking	0.28
3	Overburden/Waste Dumping	1.94
4	Mineral Storage	1.93
5	Infrastructure (Workshop, Administrative Building etc.)	0.18
6	Roads	0.38
7	Railways	0
8	Tailing Pond	0
9	Effluent Treatment Plant	0
10	Mineral Separation Plant	0.13
11	Township Area	0
12	Others to Specify	3.92
Total		**51.54**

The land use plan after life of mine is given below.

Table 2.14: Landuse at the end of life of mine

S. No.	Post Mining Use	AREA (Ha)
1.	Degradation by Excavation	81.82
2.	Degradation by Dumps & Material Staking	1.95
3.	Covered under Plants, Shades & Buildings	0
4.	Covered by Roads & Approaches	0
5.	Any Other, please specify below	0
6.	Undisturbed	61.18
	Total	**144.95**

2.14 ASSESSMENT OF NEW & UNTESTED TECHNOLOGY FOR THE RISK OF TECHNOLOGICAL FAILURE

Process of production of mineral though open cast mechanized mining method and operation of such mine through this method is well proven.

2.15 DESCRIPTION OF MITIGATION MEASURE INCORPORATED IN TO THE PROJECT TO MEET ENVIRONMENTAL STANDARD, ENVIRONMENTAL OPERATING CONDITIONS OR OTHER EIA REQUIREMENTS

The equipment / facilities proposed below, are prescribed to meet the environmental standards and in most of the cases to keep below the prescribed standards. The environmental aspect, impact and proposed mitigation measures are given below in **Table 2.15.**

Table 2.15: Mitigation Measures for Pollution Control

Location	Pollution control facility
AIR POLLUTION	
Drilling	Sharp drill bits will be used for drilling and regrinding of these is to be done periodically to reduce generation of dust. Drilling machines will be equipped with wet drilling and dust collector systems to prevent dust to get air borne.
Blasting	Sufficient stemming column will be maintained to prevent air blast. Controlled blasting with proper blast design and charging.
Loading Operation	Water sprinkling through water tanker fitted with rain guns will be done on working faces to reduce generation of dust.
Transportation of Mineral	Air pollution control measures like development of greenbelt and avenue plantation, water sprinkling along

Location	Pollution control facility
	haul roads, will be deployed to minimize the impact on surroundings.
WATER POLLUTION	
Treatment of Domestic Effluent	Through septic tank and soak pit system
Wastewater from Washing	Wastewater generated from workshop will be treated using oil-water separator and treated water will be reused in vehicle washing
To arrest the sediments and prevent silting of the water courses by the run-off during rain from OB Dumps	In order to avoid soil erosion carryover of the material with rainwater retaining wall garland drain is proposed along the waste dump and topsoil stack yard to arrest the wash off Moreover peripheral drains all around the dumps shall be made to trap rainwater washings out of the dumps which in turn will reduce the load of suspended solids in the discharged water Sump pits will be provided along the length of the drains for effective trapping of rainwater washings Garland drains around the dumps will trap the fine particles from the dumps washed away by rain The drains will be 1m wide at the top and 1m deep and shall be provided with sump pits at suitable interval along its lengths Further a greenbelt is proposed to be provided around the dumps
NOISE POLLUTION	
Control of Noise at the boundary of Mine	Plantation along the boundary, Maintenance of vehicle and machineries
Blasting	Controlled blasting with proper blast design and charging
WASTE MANAGEMENT	
Waste dump management	• Garland drain along with Sump pit will be provided
	• Retaining Wall at the Toe of the Waste Dump
	• Proper Terracing of dump, slope stability
Management of Top Soil	• Separate stacking of top soil in earmarked places. • Use of top soil for plantation, green belt development and reclamation

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3. DESCRIPTION OF ENVIRONMENT

This chapter illustrates the description of the existing environmental status of the study area with reference to the major environmental attributes. The existing environmental setting is considered to establish the baseline conditions which are described with respect to physical environment, air environment, water environment, noise environment, vibration, traffic pattern and density, land environment, biological environment and socio-economic environment.

The monitoring of environmental parameters has been conducted within the core zone and buffer zone (10 km radial distance) from project site at Village - Ballada, Taluka – Nandapur, District- Koraput, Odisha, in accordance with the guidelines issued by the Ministry of Environment, Forests and Climate Change, CPCB, and SPCB, during the study period (March 2023 to May 2023) for EIA.

The impact identification always commences with the collection of baseline data such as Ambient Air Quality, Micro-Meteorological conditions, Ground and Surface Water Quality, Noise levels, Soil Quality, Land use pattern, Biological Environment, Socio-economic status, Demographic profile, Traffic density, Geology and Hydrology etc. within the study area of 10 km. radius.

Based on the baseline data, environmental impact assessment is carried out, mitigation measures proposed and Environmental Management Plan are prepared.

3.1 STUDY AREA

Studies of various environmental parameters have been done within 10 km radius area (Buffer zone) of the Mining lease area (Core Zone).

3.2 STUDY PERIOD

The baseline environmental study has been carried out during summer season, March 2023 to May 2023 by Vardan EnviroLab, NABL Accredited Lab, in accordance with the guidelines of EIA issued by the Ministry of Environment Forests and Climate Change, Govt. of India and CPCB, New Delhi. Secondary data was collected from different Government sources. The scope of the study has been done as per approved ToR.

State Environment Impact Assessment Authority issued Terms of References (ToR) for conducting EIA Study vide File No. SIA/OR/MIN/439954/2023 dated 06.11.2023. (Copy enclosed as **Annexure-II**).

3.3 COMPONENTS AND METHODOLOGY

The data was collected from both primary and secondary sources. The baseline information on micro-meteorology, ambient air quality, water quality, noise levels, soil

quality are largely drawn from the data collected by Vardan Envirolab. Micro-meteorological data was recorded by establishing an automatic weather Monitoring station at site. Ecology and Social economic survey have been carried out by the expert of M/s Vardan EnviroNet. Apart from these, secondary data have been collected from nearest IMD Station at Vishakhapatnam, Census Handbook, Revenue Records, Statistical Department, Soil Survey and Land use Planning Organization, Forest Department, Central Ground Water Authority, etc.

The studies involved conducting field survey and analyzing various parameters that might be affected due to the project. For reconnaissance survey the sampling locations were identified based on:

- Existing topography and meteorological conditions
- Location of human habitation and other sensitive areas present in the vicinity of the proposed project site.
- Representative areas for baseline conditions.
- Accessibility for sampling

The scoping and extent of data collection were formulated based on interdisciplinary team discussions, and professional judgment keeping in view of Standard ToR requirement. The baseline studies started with reconnaissance survey and site visits in the study area and the meteorological condition of the area for fixing the monitoring locations for collection of the primary data. Various parameters surveyed and studied for the baseline study are tabulated below in **Table 3.1**:

Table 3.1: Environmental Components and Their Methodologies

S. No.	Environmental components	Parameters	Methodology
1	Air	Meteorology (Temp., RH, WS, WD, RF)	USEPA (Meteorological Monitoring guidance for regulatory modeling applications)
		Ambient Air Quality (PM10, PM2.5, SO2, NOx, CO)	IS-5182, CPCB (guidelines for measurement of Ambient Air Pollutants).
2	Water	Water Quality (Surface & Ground)	Standard limits: Surface-IS:2296 Ground-IS 10500 Sampling Methodology-IS: 3025
3	Noise	Ambient Noise Quality (Lmax, Lmin, Leq)	IS:9989(Assessment of noise with respect to community response)
4	Soil	Soil Quality (pH, EC, BD, Infiltration, Texture, SAR,	Sampling Methodology and Analysis- IS: 2720

S. No.	Environmental components	Parameters	Methodology
		Key nutrients, OM, OC, Fe, Zn and Cu)	
5	Land Use	Land use types, Land schedules, Satellite imagery	Bhuvan, NRSA
6	Ecology	Ecology studies (Floristic diversity, Terrestrial ecosystem sustainability, Green belt development, sinking capacity of pollutants)	Field Study / Secondary Data
7	Socio Economic	Demography and Occupational details, agricultural situation etc.	Census, District report Public Consultation by Questionnaire/survey
8	Hydrology & Geology	Geological, hydrological, geomorphologic studies	Geological Survey of India
9	Traffic Study	PCU/hr., LOS	IRC 64:1990

3.4 ESTABLISHMENT OF BASELINE FOR VALUED ENVIRONMENTAL COMPONENTS AS IDENTIFIED IN THE SCOPE

The scope of the study is as per ToR letter issued by SIEAA vide File No. SIA/OR/MIN/439954/2023 dated 06.11.2023.

3.4.1 Micro-Meteorological Data

Micro-meteorological data of the project site during the air quality survey period is an indispensable part of air pollution study. To understand, the micro-meteorology data has been collected from both secondary and primary sources:

3.4.1.1 Secondary Data

Historical data on meteorological parameters also plays an important role in identifying the general meteorological status of the region. The data collection in the field is compared with the historical data in order to identify changes, which may have taken place during the course of time.

The latest secondary data for 30 years (1981-2010) is procured from the nearest IMD station, Vishakhapatnam for observing parameters like Temperature, Relative Humidity, Rainfall, Wind Speed and Wind direction. The IMD data for Vishakhapatnam is given in the **Table 3.2**.

3.4.1.1.1 Temperature

The pre-monsoon season starts from March and continues till the end of May. Both the night and day temperatures increase rapidly during the onset of the pre-monsoon season. During pre-monsoon season, the mean maximum temperature was observed to be 32.9 °C (May) with the mean minimum temperature at 24.6°C (March). The mean maximum temperature in the monsoon season was observed to be 32.7 °C in the month of June whereas the mean minimum temperature was observed to be 26°C in the month of September. By the end of September with the onset of post-monsoon, day temperature decreases slightly with height. Maximum temperature 31°C was observed in October and the lowest minimum temperature was observed 21.1°C during December. In winter season (December to February), the mean daily maximum temperature at 29.2 °C in February and the mean daily minimum temperature at 20.7 °C in January. The monthly variations of temperature are presented in **Table 3.2.**

3.4.1.1.2 Relative Humidity

The air is generally humid in this region during the entire year when the relative humidity at 08:30 hr was observed between 66 to 79%, while at 17:30 hr relative humidity was 65 to 80%. Relative humidity is presented in **Table 3.2.**

Table 3.2: Climatological Data Station: IMD- Vishakhapatnam

Month	Atmospheric Pressure (mb)		Temperature (^{0}C)		Relative Humidity (%)		Rainfall (mm)
			Mean Max	Mean Min			
January	1008.9	1005.7	27.7	20.7	72	70	11.1
February	1007.2	1003.9	29.2	22.3	73	72	10.5
March	1005.1	1001.5	30.8	24.6	72	75	13
April	1002.5	998.9	31.7	26.4	72	77	26.2
May	998.6	995.2	32.9	27.6	73	77	70.5
June	995.1	992.4	32.7	27.5	75	76	117
July	995.5	992.9	31.2	26.3	79	78	133.3
August	996.2	993.5	31.3	26.1	79	79	163.6
September	999.4	996.4	31.3	26.0	79	80	191.1
October	1003.5	1000.6	31.0	25.0	75	74	258.1
November	1006.7	1003.8	29.7	23.2	67	68	115.5
December	1009.2	1006.1	28.2	21.1	66	65	8.8

Month	Atmospheric Pressure (mb)	Temperature (^{0}C)		Relative Humidity (%)	Rainfall (mm)
		Mean Max	Mean Min		
				Total	**1118.8**

Source: IMD Climatological Normal 1981-2010

3.4.1.1.3 Atmospheric Pressure

The maximum pressure observed were 1009.2 mb at 08:30 hr. in the months of December. The minimum pressure observed were 992.4 mb at 17:30 hr during the month of July in monsoon season. The pressure levels are found to be fairly consistent over the region. The monthly variations in the pressure levels are presented in **Table 3.2.**

3.4.1.1.4 Rainfall

The average annual rainfall based on the 30 years of IMD data, was observed to be 1118.8 mm. The monsoon sets in the month of June and continues till October. The maximum amount of rainfall (258.1 mm) occurring in the month of October. Monthly variations in the rainfall for past 30 years are given in **Table 3.2.**

3.4.1.1.5 Wind Speed/Direction

Generally, light to moderate winds prevail throughout the year. The seasonal wind roses are presented in **Figure 3.1**. The summary of wind pattern at IMD, Vishakhapatnam is given in **Table 3.3**.

Table 3.3: Summary of Wind Pattern–IMD Vishakhapatnam

Season	Wind Direction	Avg. Wind Speed (Km/hr)	Calm Condition (%)
March	SW (49.5%)	11.4	16.5
April	SW (67.0%)	14.5	6.5
May	SW (60.0%)	13.7	10.5

Source: IMD Climatological Normal 1981-2010

3.4.1.2 Primary Data (March 2023 to May 2023)

3.4.1.2.1 Temperature

Maximum temperature 36.9^{0}C and minimum temperature of 13.0^{0}C was recorded during the study period. Maximum temperature was observed in May month and the minimum temperature was observed during March in the study period.

3.4.1.2.2 Relative Humidity

During the period of observation, the relative Humidity recorded ranged from 90% to 9%. Maximum humidity was observed during the month of March.

Table 3.4: Summary of the Meteorological Data Monitored at Site (Primary Data)

Month	Temperature (^{0}C)		Relative Humidity (%)		Rainfall (mm)		Atmospheric Pressure (mb)	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
March	31.2	13.0	90	11	15.28	0	916	905
April	35.7	18.3	85	17	13.21	0	913	903
May	36.9	17.7	89	9	15.39	0	911	901

Source: Primary On-site Data Collected by Vardan Envirolab

3.4.1.2.3 Pressure

The maximum pressure observed were 916mb in the months of March and the minimum pressure were observed 901mb in the month of May. The pressure levels are found to be fairly consistent over the region.

3.4.1.2.4 Rainfall

During the period of observation, Maximum rainfall was observed during the month of baseline month was 15.39 mm.

3.4.1.2.5 Wind Speed/Direction

The wind roses for the study period representing winter season are shown in **Figure-3.2**. A review of the wind rose diagram shows that predominant winds direction from W-E.

3.4.1.3 Interpretation

The India Meteorological Department (IMD) records the data at two times a day viz. 08:30 hr and 17:30 hr while the site-specific data has been recorded at an hourly interval. On comparison of site-specific data generated for study period vis-à-vis the IMD data, slight variations were found. The following observations are brought out:

The temperature recorded on site when compared vis-à-vis the IMD data, slight variations was found. The maximum and minimum temperatures recorded at site during study period were 36.9 ^{0}C and 13.0^{0}C, whereas the maximum and minimum temperature recorded at IMD, Vishakahapatanam for the same season is 32.9 ^{0}C and 24.6 ^{0}C respectively;

The relative humidity was observed to range from 90% to 9% during the study period whereas according to IMD, Vishakahapatanam data the relative humidity in the same season was observed to range from 77% to 72 %. The variation could be because of the

fact that the RH values considered for the site are actual values while the range of IMD, Vishakahapatanam data represents the average values for 30 year period.

During the study period was observed that the predominant direction in E-W followed. The variation could be because of the fact that the values considered for the site are actual values while the range of IMD, Vishakahapatanam data represents the average values for 30 year period.

The data obtained when compared with IMD data are found to be fairly consistent the data generated at continuous monitoring station at mine site when compared with the data recorded at IMD, it can be observed that the data generated at the site is broadly compatible with regional meteorology, except minor variations as described above.

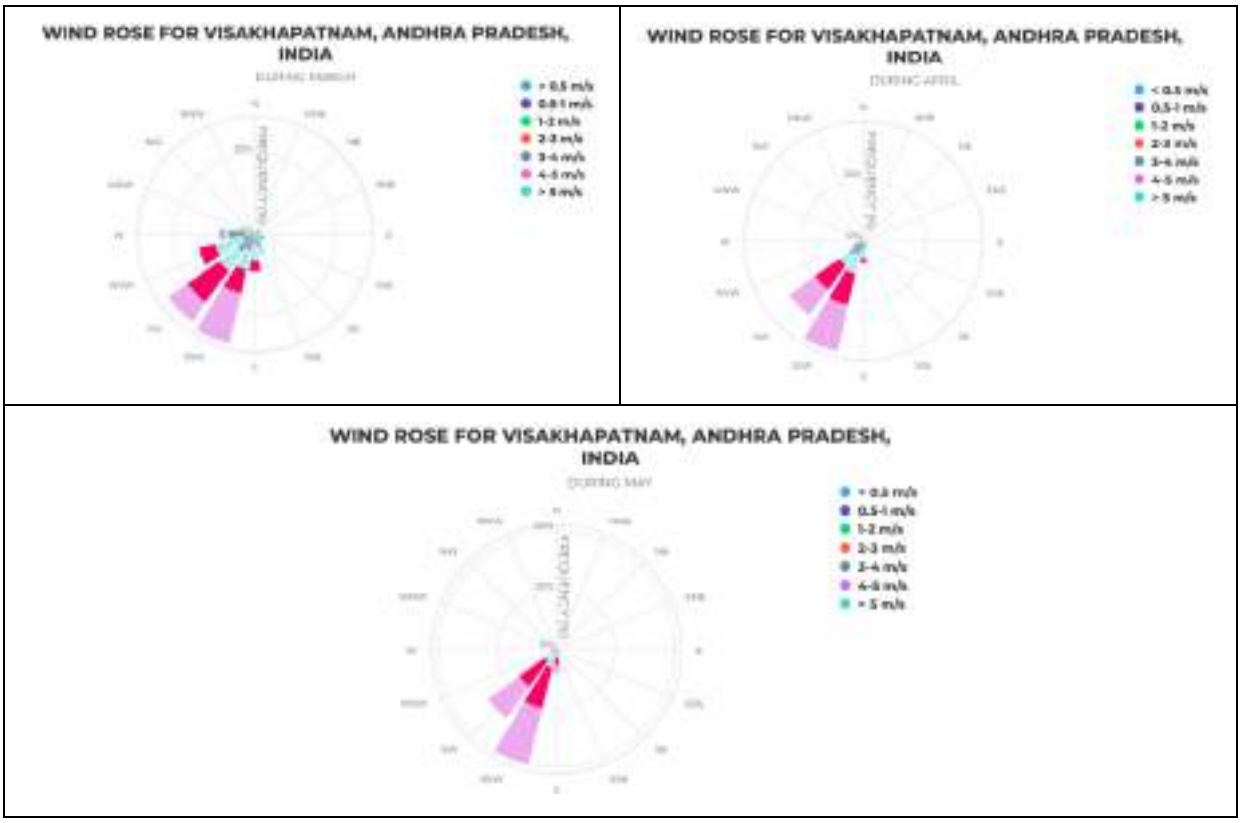


Figure 3-1: Secondary Data Wind Rose

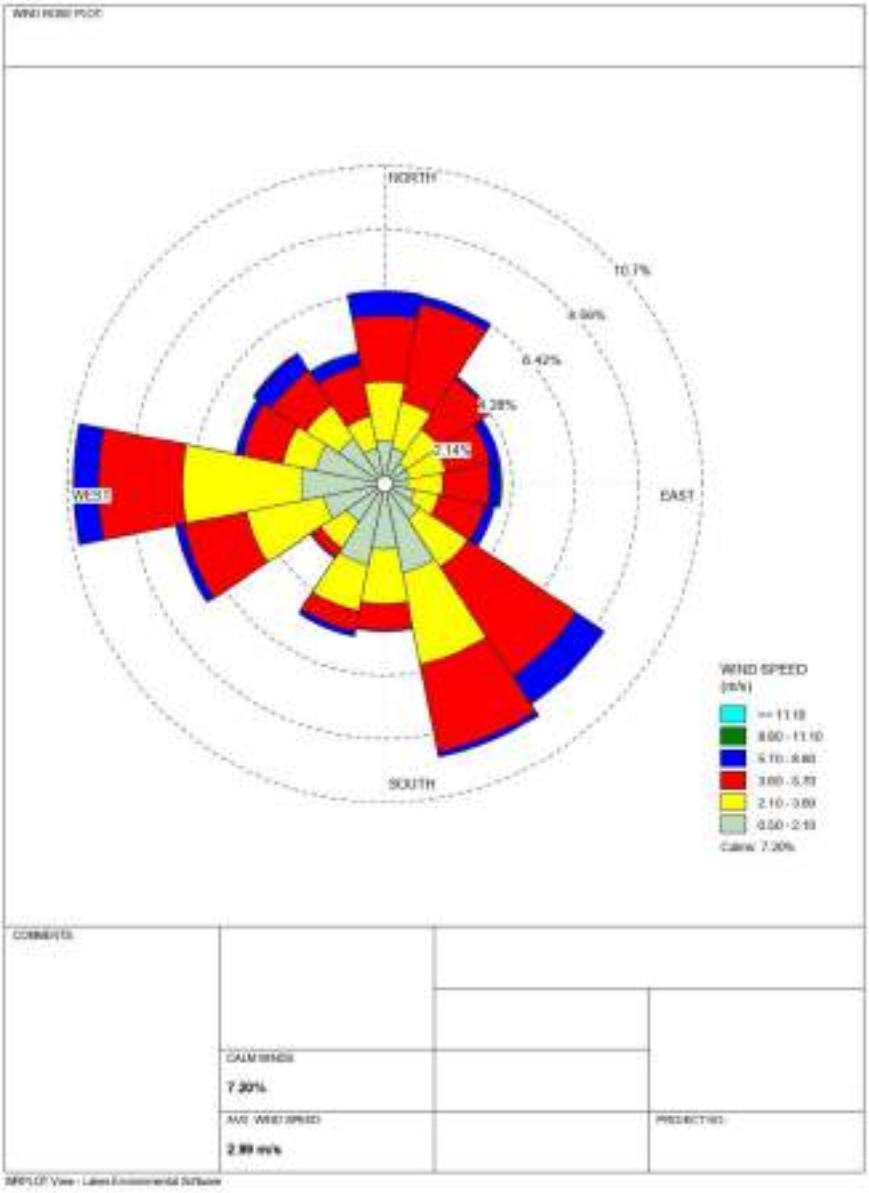


Figure 3-2: Wind Rose Diagram of Study Period (March to May2023)

3.4.2 AIR ENVIRONMENT

The baseline air quality was established by monitoring major air pollutants like suspended particulate matter, Sulphur dioxide, oxides of nitrogen, carbon monoxide at various locations near the project site. The prime objective of the ambient air quality study is to assess the existing air quality of the study area and to establish the existing ambient air quality within the study area and its conformity with NAAQS.

3.4.2.1 Selection of Sampling Locations

The sources of air pollution in the study area are; mining activities (excavation, loading, transportation of excavated materials) and haul road dust emission. The design of

monitoring network in the air quality surveillance program was based on the following considerations.

- Meteorological conditions on synoptic scale
- Topography of the study area
- Representation of project site
- Representation of cross-sectional distribution in the downward direction
- Influence of the existing sources if any, are to be kept at minimum

Eight (8) numbers of monitoring stations were set up to assess the existing air quality of the study area during the study period of March to May 2023. One station was located within the project site (core zone) and the seven stations were outside (buffer zone) the proposed project site.

The locations of the monitoring stations are also based on the meteorological conditions of the study area like pollution dispersion in areas located towards predominant wind directions, sensitive receptors in the study area like densely populated areas, forest area, river bodies, etc. Logistic considerations as ready accessibility, security, availability of reliable power supply, etc. were also examined while finalizing the monitoring locations. The Ambient Air Quality Monitoring locations have been presented in **Table 3.5 & Figure 3.3.**

Table 3.5: Ambient Air Quality Monitoring Stations (March to May 2023)

Stations	Name	Latitude	Longitude	Distance (km)	Direction	Selection Criteria
A1	Site	18°26'35.18"N	82°39'53.00"E	ML Area		Proposed Mine Site
A2	Near Forest Range of Ballada	18°26'28.06"N	82°40'45.78"E	1.2	E	E (Upwind)
A3	Near Primary School Mulda	18°26'54.75"N	82°42'55.56"E	5.0	E	E (Upwind)
A4	Bheja Village	18°28'43.22"N	82°40'56.82"E	3.0	NNE	NNE (Upwind)
A5	Kakua Village	18°27'27.56"N	82°37'24.42"E	4.1	W	W (Down Wind)
A6	Alanda Village	18°25'17.29"N	82°37'22.23"E	4.2	SW	SW (Down Wind)
A7	Soput Village	18°25'6.76"N	82°39'19.31"E	2.0	S	S (Cross Wind)
A8	Badahanjar Village	18°24'16.83"N	82°41'53.01"E	4.9	SE	SE (Cross Wind)
A9	Badel Village	18°28'41.51"N	82°39'5.96"E	3.4	NW	NW (Cross Wind)
A10	Sagur Village	18°30'50.39"N	82°36'44.40"E	9.0	NW	NW (Cross Wind)

Source: Baseline Monitoring Report, Vardan Envirolab

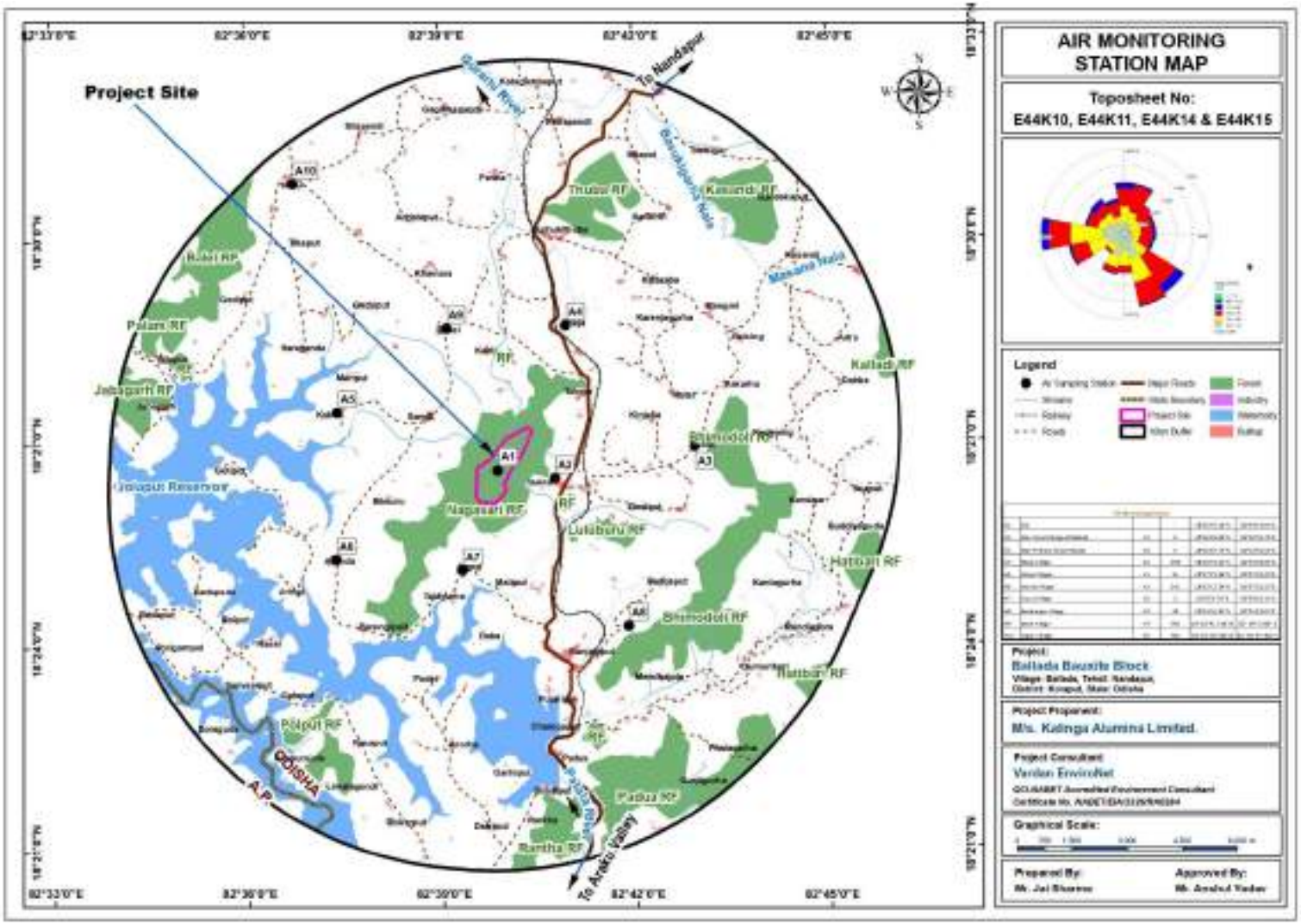


Figure 3-3: Ambient Air Quality Monitoring Locations

3.4.2.2 Analytical Techniques for Air Quality Monitoring

The sampling and analysis of the required parameters were carried out as per IS: 5182 methodology entitled "Methods of Measurement of Air Pollution" and AWMA entitled "Methods of Air Sampling and Analysis." Summary of the analytical techniques and their references are as given in **Table-3.7**.

The National Ambient Air Quality Standards, EPA Notification: GSR 176 (E), April 02, 1996 is made applicable. Thus, the prevailing National Ambient Air Quality Standards vide G.S.R. 826 (E) dated 16th Nov. 2009 are applicable for stations monitored in the buffer zone (refer **Table 3.6**).

Table 3.6: National Ambient Air Quality Standards vide GSR 826 (E), Dt.16.11.09

Sr. No.	Parameter	Time Weighted Average	Concentration in Ambient Air	
			Industrial Area, Residential, Rural & Other Areas	Ecologically Sensitive Area (Notified by Central Government)
1	SO_2 (µg/m^3)	Annual*	50	20
		24 Hours**	80	80
2	NOx (µg/m^3)	Annual*	40	30
		24 Hours**	80	80
3	PM_{10} (µg/m^3)	Annual*	60	60
		24 Hours**	100	100
4	$PM_{2.5}$ (µg/m^3)	Annual*	40	40
		24 Hours**	60	60
5	CO (mg/m^3)	8 hours**	2.0	2.0
		1 hour**	4.0	4.0

Table 3.7: Techniques Adopted/Protocols for Ambient Air Quality Monitoring

S. No	Parameters	Techniques	Technical Protocol
1	Sulphur Dioxide (SO_2)	West & Gaeke	IS:5182 (P2)
2	Nitrogen Dioxide (NO_2)	Jacob & Hochheiser	IS:5182 (P6)
3	Particulate Matter PM_{10}	Gravimetric	IS:5182 (P23)
4	Particulate Matter $PM_{2.5}$	Gravimetric	IS:5182 (P24)
5	Carbon-monoxide as CO	NDIR	IS: 5182 (P-10)

Source: Baseline Monitoring Report, Vardan enviro Lab

3.4.2.3 Air Quality Monitoring

Ambient air quality analysis reports are appended below in the **Table 3.8** and attached as **Annexure XVI**. The graphical representations of the results are depicted in **Figure 3.4, 3.5, 3.6 & 3.7.**

3.4.2.4 Data Analysis

The Ambient Air Quality survey has been carried out within 10 km radius of mine site. Eight (8) locations were set up summer monitoring for a period of March to May 2023. Measurement of Particulate matter (PM_{10} & $PM_{2.5}$), SO_2, NOX, CO, levels helps to understand the existing environmental scenario. The results of PM_{10}, $PM_{2.5}$, SO2, NOX, are expressed in µg/m^3 whereas the results of CO are expressed in mg/m^3. The results of all the locations were further computed for statistical parameters like 98 Percentile and Arithmetic mean (AM). The results are shown in **Table 3.8**. The graphical representations of the results are depicted in **Figure 3.4, 3.5, & 3.6**. Lab Reports are enclosed as **Annexure-XVI.**

Table 3.8: Baseline Result for the Air Monitoring Locations

Pollutant	Location Codes	Max.	Min.	Avg.	98 Percentile	NAAQS
PM10 (µg/m3)	A-1	57.5	50.5	53.84	57.35	100
	A-2	76.9	67.4	71.3	76.8	
	A-3	64.9	52.4	60.55	64.85	
	A-4	70.4	50.4	60.47	67.85	
	A-5	60.8	50.5	58.56	60.65	
	A-6	60	50.5	58.42	60	
	A-7	64.8	52.4	60.3	64.8	
	A-8	68.5	54.3	58.3	68.35	
	A-9	68.2	54.1	57.80	64.75	
	A-10	62.5	51	57.80	62.35	
PM2.5 (µg/m3)	A-1	40.9	30.2	35.2	40.45	60
	A-2	50.9	37.2	47.67	50.85	
	A-3	44.4	35.9	40.75	44.3	
	A-4	44.8	36.2	40.88	44.8	
	A-5	41.6	34.2	39.38	41.4	
	A-6	41.2	34.2	39.35	41.2	
	A-7	44.2	35.9	40.6	44.2	
	A-8	37	28.7	32.2	36.85	
	A-9	36.7	28.7	31.91	36.70	
	A-10	43.8	35.9	31.91	43.15	
NOX (µg/m3)	A-1	27	19.8	23.88	26.85	80
	A-2	34.8	26.2	30.83	34.7	
	A-3	28.2	20	24.38	28.15	

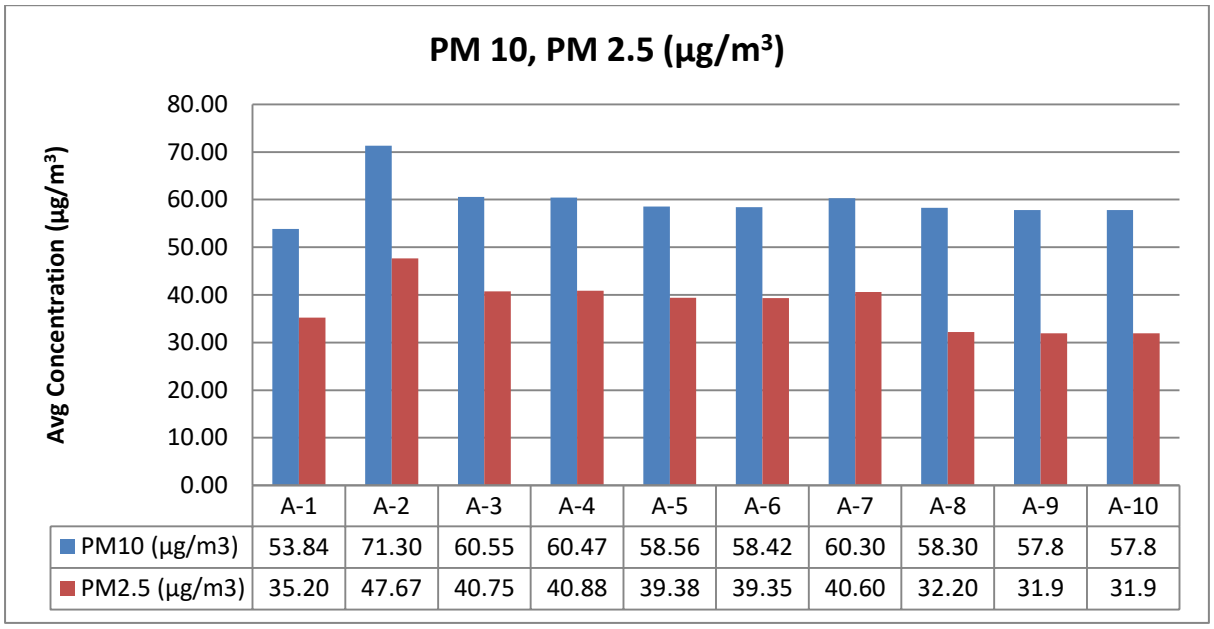
Pollutant	Location Codes	Max.	Min.	Avg.	98 Percentile	NAAQS
	A-4	28.8	20.2	24.64	28.7	
	A-5	27	19.8	23.8	26.85	
	A-6	27	19.8	23.8	26.85	
	A-7	28.1	20	24.44	28.05	
	A-8	21.6	16.2	19.16	21.55	
	A-9	21.6	16.1	18.92	21.55	
	A-10	27.5	20	18.92	27.45	
SO2 (µg/m3)	A-1	13.9	10.8	13.13	13.9	80
	A-2	21.8	16.8	19.47	21.7	
	A-3	15.4	11.1	13.45	15.2	
	A-4	16.1	11.6	13.73	16	
	A-5	14.1	10.8	13.29	14.1	
	A-6	14	10.8	13.25	14	
	A-7	15	11.1	13.47	15	
	A-8	14.4	9.6	12.31	14.3	
	A-9	14.4	9.4	12.12	14.30	
	A-10	14.6	10.8	12.12	14.60	
CO (mg/m3)	A-1	0.79	0.5	0.73	0.79	2
	A-2	1	0.8	0.93	1.03	
	A-3	0.9	0.7	0.76	0.86	
	A-4	0.91	0.66	0.77	0.9	
	A-5	0.8	0.5	0.74	0.8	
	A-6	0.8	0.5	0.74	0.8	
	A-7	0.9	0.7	0.76	0.85	

Pollutant	Location Codes	Max.	Min.	Avg.	98 Percentile	NAAQS
	A-8	0.8	0.5	0.7	0.83	
	A-9	0.83	0.53	0.70	0.83	
	A-10	0.82	0.62	0.70	0.81	

Source: Baseline Monitoring Report, Vardan Envirolab

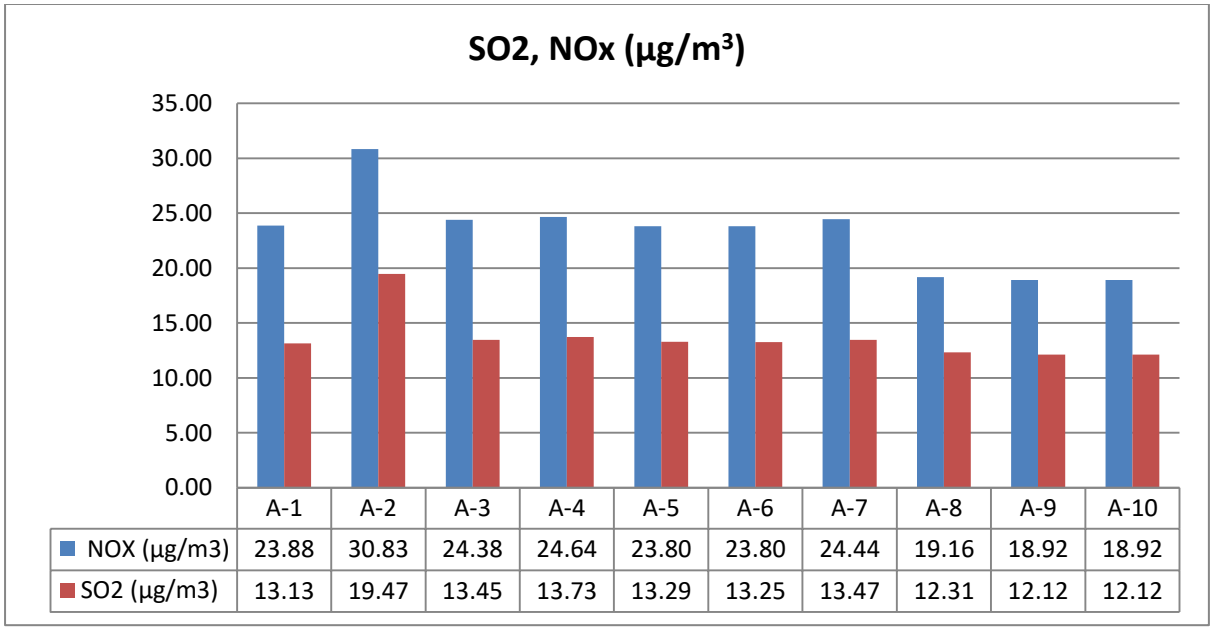
Free Silica Percentage in PM10:

Stations	Name	PM10 (µg/m³)	Free Silica (%)
A1	Site	57.5	1.31
A2	Near Forest Range of Ballada	76.9	1.79
A3	Near Primary School Mulda	64.9	1.52
A4	Bheja Village	70.4	1.60
A5	Kakua Village	60.8	1.42
A6	Alanda Village	60.0	1.36
A7	Soput Village	64.8	1.51
A8	Badahanjar Village	68.5	1.58
A9	Badel Village	68.2	1.55
A10	Sagur Village	62.5	1.42



	A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9	A-10
PM10 (µg/m3)	53.84	71.30	60.55	60.47	58.56	58.42	60.30	58.30	57.8	57.8
PM2.5 (µg/m3)	35.20	47.67	40.75	40.88	39.38	39.35	40.60	32.20	31.9	31.9

Figure 3-4: Data for Particulate Pollutants (PM_{10} & PM2.5)



	A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9	A-10
NOX (µg/m3)	23.88	30.83	24.38	24.64	23.80	23.80	24.44	19.16	18.92	18.92
SO2 (µg/m3)	13.13	19.47	13.45	13.73	13.29	13.25	13.47	12.31	12.12	12.12

Figure 3-5: Average Baseline data for SO_2 & NOx

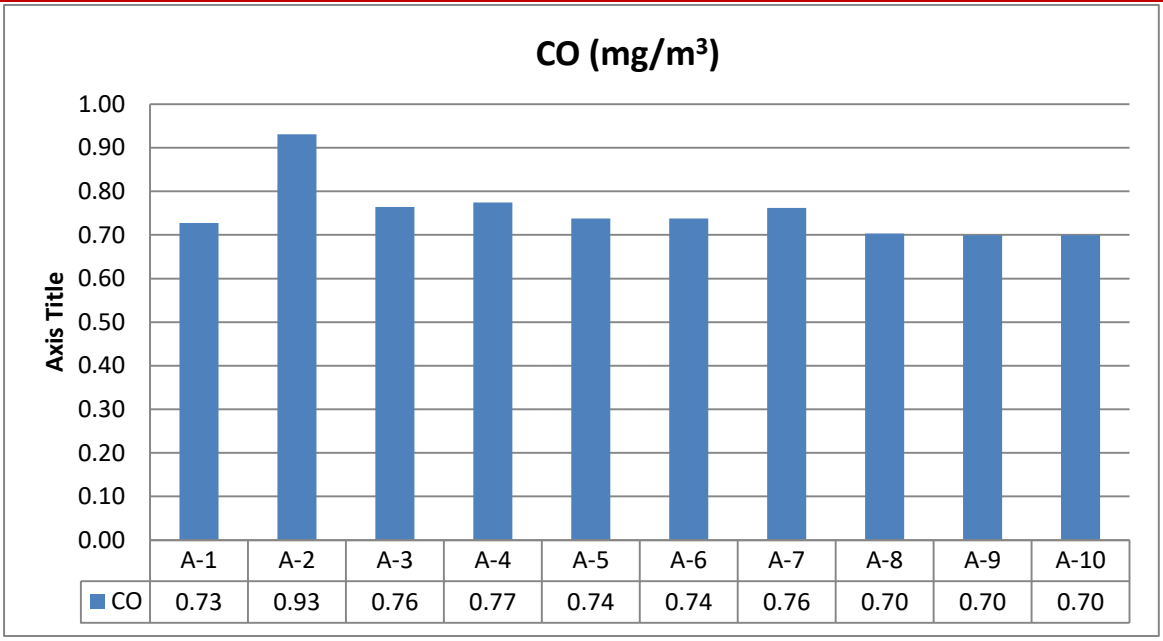


Figure 3-6: Baseline data for CO

3.4.2.5 Interpretation of Data Obtained

The results of the monitored data indicate that the ambient air quality of the region in general is in conformity with the National Ambient Air Quality Standards with present level of activities. Ambient Air Quality Monitoring reveals that;

March to May 2023
The maximum value for PM_{10} is observed at (A2) station, as 76.9 µg/m³ the reason of maximum result on this location due to urban area, However the minimum value observed at (A4) station as 50.4 µg/m³ during the study period as the monitoring location near to Bheja village.
The maximum value for $PM_{2.5}$ was also observed at A2 station as 50.9 µg/m3, this is also due to the near to the urban area however the minimum value observed at A8 station as 28.7 µg/m3 during the study period as the monitoring location away from urban.
The maximum value SOx was observed to be 21.8 µg/m³ at (A2) as the monitoring location, however minimum value observed at (A9) station as 9.4 µg/m³ during the study period.
The maximum value NOx is observed at A2 station, as 34.8 µg/m3 with the minimum value observed at (A9) station as 16.1 µg/m3 during the study period.
The maximum value CO is observed at (A2), as 1.0 mg/m³ with the minimum value observed at (A1, A5 & A6) station as 0.5 mg/m³ during the study period. The higher value of CO may be due to use of unconventional source of fuel like wood for household activities.

To maintain the ambient air quality of the area within the NAAQS, the latest/ modern air pollution control facilities along with suitable EMP will be adopted, which is elaborated in detailed in **Chapter 4** of the report.

3.4.3 NOISE ENVIRONMENT

Noise levels were measured at ten (10) locations within the study area which are given in **Table 3.9** and shown on map at **Figure 3.7.** Noise monitoring has been carried during day and night time and Leq values have then been computed hourly. Day time & Night time monitoring was conducted from 6 a.m. to 10 p.m. and from 10 p.m. to 6 a.m., respectively. Ambient noise levels were measured using integrated sound level meter (SLM) Lutron (SL-4001).

SLM was mounted on a tripod as per the standard methodology for noise measurements. Special care was taken for not making noise during the measurement and ensuring the least amount of reflective from our body to the meter. Noise levels were recorded at 8 locations by Sound Level Meter. Noise levels were recorded as per IS: 9989 entitled "Assessment of noise with respect to community response" methodology. Noise levels were recorded at approximately 1.5 meter above the ground level and about 3 m away from walls, buildings or other sound reflecting sources. Ambient Noise Monitoring Locations and analysis reports are appended below in the **Table 3.10** and attached as **Annexure XVI.**

Table 3.9: Noise Level Monitoring Locations Summer Season (March 2023 – May 2023)

Stations	Name	Latitude	Longitude	Dist (km)	Direction	Criteria
N1	Site	18°26'35.18"N	82°39'53.00"E	--	--	Mine site
N2	Near Forest Range of Ballada	18°26'28.06"N	82°40'45.78"E	1.2	E	E (Upwind)
N3	Near Primary School Mulda	18°26'54.75"N	82°42'55.56"E	5.0	E	E (Upwind)
N4	Bheja Village	18°28'43.22"N	82°40'56.82"E	3.0	NNE	NNE (Upwind)
N5	Kakua Village	18°27'27.56"N	82°37'24.42"E	4.1	W	W (Down Wind)
N6	Alanda Village	18°25'17.29"N	82°37'22.23"E	4.2	SW	SW (Down Wind)
N7	Soput Village	18°25'6.76"N	82°39'19.31"E	2.0	S	S (Cross Wind)
N8	Badahanjar Village	18°24'16.83"N	82°41'53.01"E	4.9	SE	SE (Cross Wind)
N9	Badel Village	18°28'41.51"N	82°39'5.96"E	3.4	NW	NW (Cross Wind)
N10	Sagur Village	18°30'50.39"N	82°36'44.40"E	9	NW	NW (Cross Wind)

Table 3.10: Noise Level Data (All Data is Expressed in dB(A)

S.No.	Locations	Average Noise Levels in dB(A)					
		Lmax		Lmin		Leq	
		Day	Night	Day	Night	Day	Night
1	Site	64.2	58.4	41.7	35	49.8	38.4
2	Near Forest Range of Ballada	62.4	56.9	43.5	37.2	51.64	43.38
3	Near Primary School Mulda	58.6	46.6	40.9	31.4	47.28	37.85
4	Bheja Village	61.6	48	38.9	35.2	45.26	38.91
5	Kakua Village	53.4	49.3	32	28.1	41.59	34.2
6	Alanda Village	51.5	44.5	40.3	30.2	46.43	38.65
7	Soput Village	52.5	47.9	38.5	32.1	45.7	39.6
8	Badahanjar Village	50.7	44.9	38.4	31.6	43.5	37.6
9	Badel Village	58.7	47.9	46.5	35.4	52.2	41.5
10	Sagur Village	59.2	48.7	39.1	32.6	50.6	39.2

Source: Baseline Monitoring Report, Vardan Enviro Lab

The environment setting of each noise monitoring location is shown in **Figure 3.7** below:

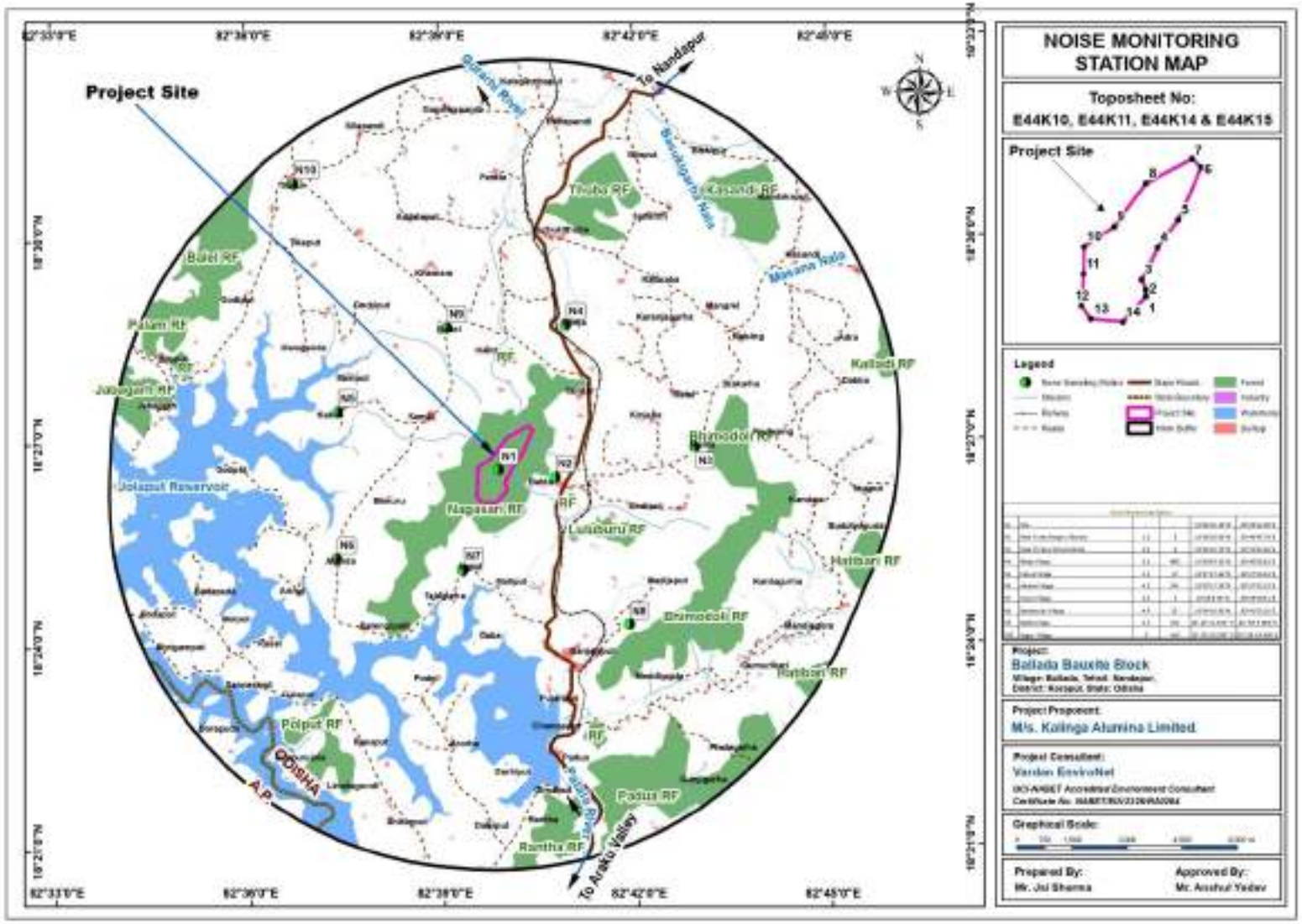


Figure 3-7: Noise Quality Monitoring Location Map

Noise Standards as per Noise Regulation (Pollution & Control) Rules, 2000 is as follows as **Table 3.11**:

Table 3.11: Noise Standards as per Noise Regulation (Pollution & Control) Rules, 2000

Category of Zones	Categorization of locations	Leq in dB(A)	
		Day	Night
Industrial	-	75	70
Commercial	-	65	55
Residential	N2, N3, N4, N5, N6, N7, N8, N9, N10	55	45
Silence Zone	N1	50	40

Source: Baseline Monitoring Report, Vardan Enviro Lab

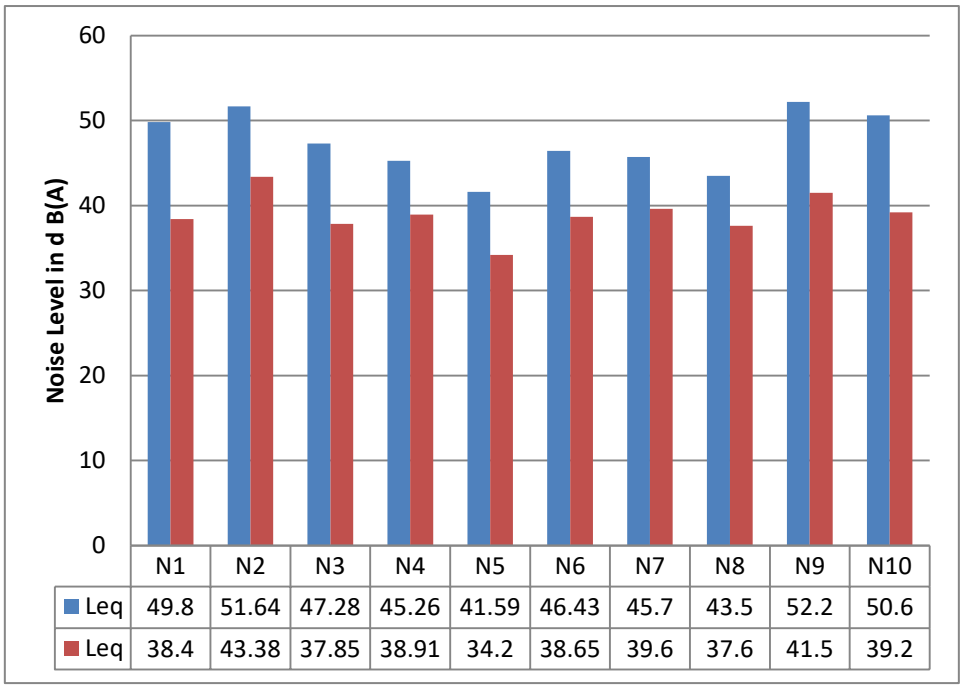


Figure 3-8: Equivalent Noise Levels at all Locations for Post Monsoon

3.4.3.1 Interpretation of Data

The noise levels recorded at all locations were within the limits of ambient noise as per Noise Regulation (Pollution & Control) Rules, 2000.

- The noise levels recorded at all locations were within the NANQS limits.

3.4.4 WATER ENVIRONMENT

The impact has been assessed on randomly selected surface and groundwater sources falling within the study area. In order to assess the existing water quality, the

Groundwater samples were collected from eight (08) different locations and Surface Water quality from eight (08) locations within the study area and analyzed as per the procedure specified in standard methods for examination of water and wastewater published by American Public Health Association and Bureau of Indian Standards (APHA/BIS). The groundwater samples were drawn from the hand pumps and dug wells being used by the villagers for their domestic needs. Surface water sampling were collected from ponds and stream present within 10 km of the project site. The details of the locations are given in **Table 3.12.**

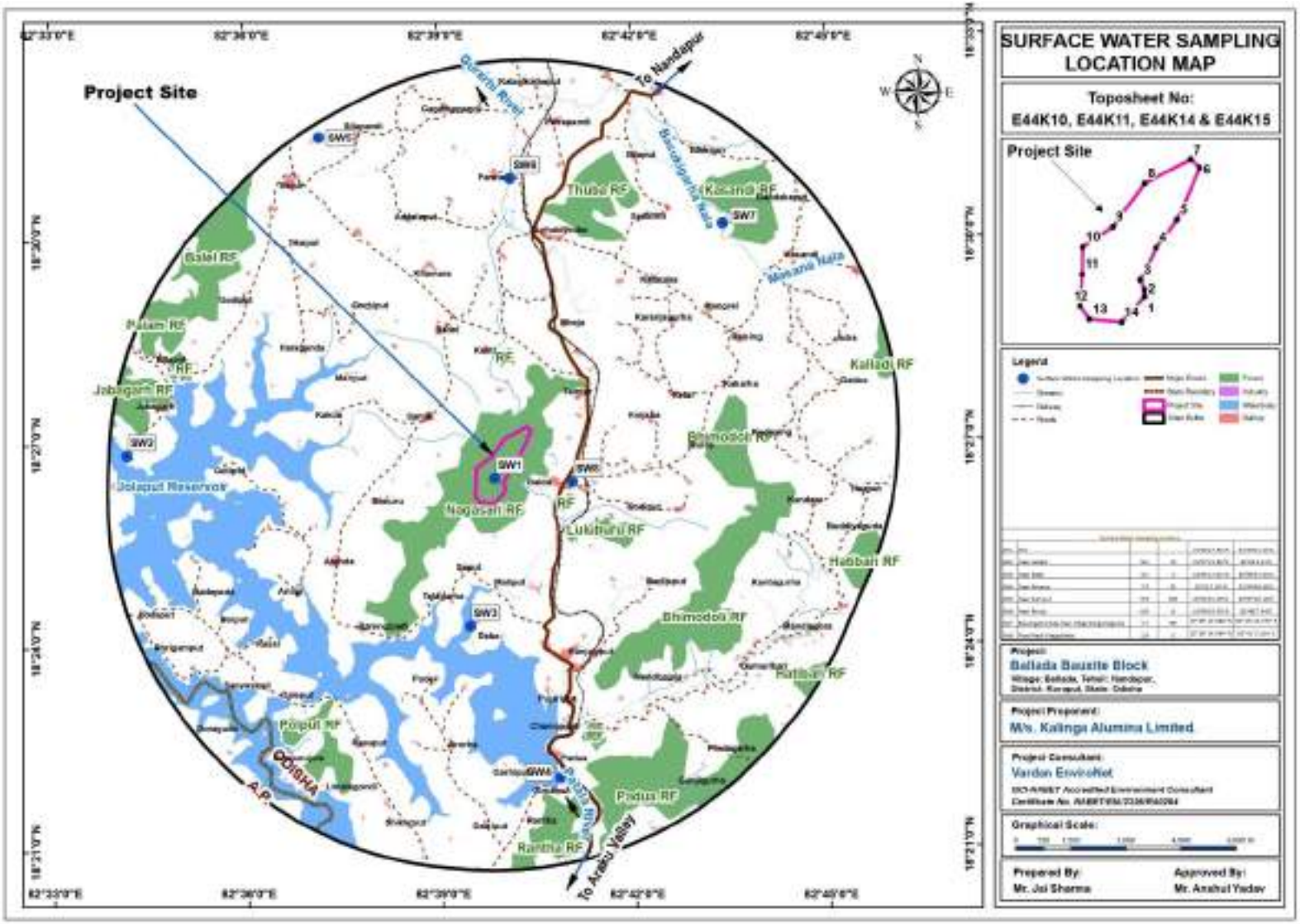
3.4.4.1 Methodology

Water Samples were collected from 16 locations out of which 08 for surface and 08 for ground water (**Figure 3.9**). Samples were collected as per IS: 3025 (Part-1) methodology. Necessary precautions were taken while collecting, preserving and transporting. All the parameters were analyzed as per "Methods of Sampling and Test (Physical and Chemical) for water and waste water" IS: 3025 and "Standard Methods for the Examination of Water and Wastewater" APHA. The results are then compared with the standards (IS: 10500 & IS: 2296) as per the quality of water. The ground water samples were drawn from the hand pumps and open wells being used by the villagers for their domestic needs. Surface water sampling was carried out from ponds present within 10 km of the project site. Water quality analysis reports are appended below in the **Table 3.13 & 3.14** and attached as **Annexure XVI.**

Table 3.12: Water Sampling Locations

Location	Name	Latitude	Longitude	Distance (km)	Direction	Selection Criteria
SW1	Site	18°26'27.90"N	82°39'51.03"E			Water body
SW2	Near Jalaput	18°27'21.86"N	82°33'5.31"E	9.5	W	Jolaput Reservoir
SW3	Near Daba	18°24'17.01"N	82°39'27.03"E	3.5	S	Reservoir
SW4	Near Paduwa	18°22'2.50"N	82°40'49.68"E	7.9	SE	River
SW5	Near Kumiput	18°31'31.30"N	82°37'10.14"E	9.9	NW	Water body
SW6	Near Parata	18°30'53.50"N	82°40'7.34"E	6.8	N	River
SW7	Basukigarha Nala Near Sangamagurha vill.	18°30'12.686"N	82°43'24.374"E	7.7	NE	Stream
SW8	Pond Near Balda Village	18°26'24.394" N	82°41'3.216"E	1.8	E	Pond
GW1	Ballada	18°26'25.97"N	82°40'47.35"E	1.4	E	Dug well
GW2	Atanda	18°25'15.12"N	82°37'21.50"E	4.2	SW	Dug well
GW3	Jabagada	18°27'32.62"N	82°34'39.61"E	8.8	W	Dug well
GW4	Banjalaput	18°23'40.37"N	82°41'0.08"E	4.9	SE	Dug well
GW5	Somli	18°27'20.64"N	82°38'47.93"E	1.9	W	Dug well
GW6	Kandaput	18°29'44.17"N	82°40'0.73"E	4.7	N	Dug well
GW7	Near Raising	18°28'29.65"N	82°43'39.23"E	6.2	NE	Dug well
GW8	Kandara	18°26'4.46"N	82°44'47.75"E	8.4	E	Dug well

Source: Baseline Monitoring Report, Vardan Enviro Lab


Project Site
To Nandapur
To Arabu Valley
Thuba RF
Kusumi RF
Balel RF
Kalliaguda RF
Jabaguda RF
Jolapput Reservoir
Nagasali RF
Lulumuru RF
Bhimodoli RF
Habbali RF
Pottili RF
Poput RF
Padua RF
Ranthe RF
ODISHA
A.P
SW1
SW2
SW3
SW4
SW5
SW6
SW7
SURFACE WATER SAMPLING LOCATION MAP
Toposheet No:
E44K10, E44K11, E44K14 & E44K15
Project Site
Legend
Project:
Ballada Bauxite Block
Project Proponent:
M/s. Kalinga Alumina Limited
Project Consultant:
Vardan EnviroNet
Graphical Scale:
Prepared By:
Mr. Jai Sharma
Approved By:
Mr. Anshul Yadav

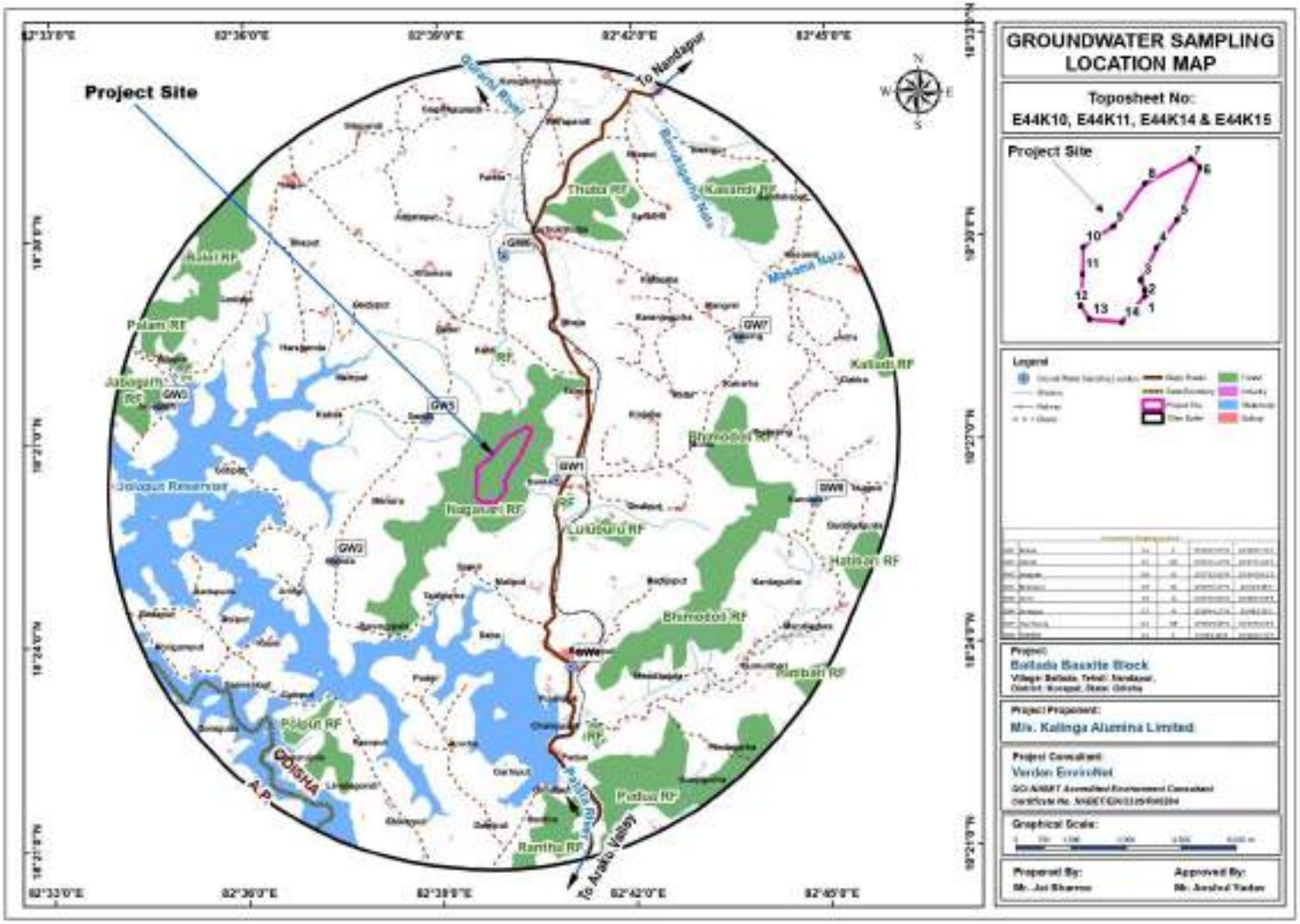


Figure 3-9: Map showing Water Sampling Locations

Table 3.13: Ground Water Quality Data

S. No.	Parameter	Test-Method	Unit	Limits of IS:10500 - 2012		GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8
				Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source								
1	pH (at 25 0C)	APHA ,4500-H+ B Electrometric Method	--	6.5 to 8.5	No Relaxation	8.15	8.24	7.83	7.86	7.74	7.65	7.65	7.55
2	Colour	APHA ,2120 B, Visual Comparison Method	Hazen	5	15	*BLQ (**LOQ 1.0 Hazen)	*BLQ (**LOQ 1.0 Hazen)	*BLQ (**LOQ 1.0 Hazen)	*BLQ (**LOQ 1.0 Hazen)	*BLQ (**LOQ 1.0 Hazen)	*BLQ (**LOQ 1.0 Hazen)	*BLQ (**LOQ 1.0 Hazen)	*BLQ (**LOQ 1.0 Hazen)
3	Turbidity	APHA, 2130 B, Nephlelometric Method	NTU	1	5	*BLQ (**LOQ 1.0 NTU)	*BLQ (**LOQ 1.0 NTU)	*BLQ (**LOQ 1.0 NTU)	*BLQ (**LOQ 1.0 NTU)	*BLQ (**LOQ 1.0 NTU)	*BLQ (**LOQ 1.0 NTU)	*BLQ (**LOQ 1.0 NTU)	*BLQ (**LOQ 1.0 NTU)
4	Odour	APHA, 2150 B , Threshold Odour Method	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5	Taste	APHA , 2160 B, Threshold Test Method	--	Agreeable	Agreeable	Disagreeable	DisAgreeable	DisAgreeable	DisAgreeable	Agreeable	Agreeable	DisAgreeable	DisAgreeable
6	Total Hardness as CaCO3	APHA , 2340 C, EDTA Titrimetric Method	mg/l	200	600	153.21	265.19	142.20	151.36	300.44	175.45	181.50	176.28

S. No.	Parameter	Test-Method	Unit	Limits of IS:10500 - 2012		GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8
				Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source								
7	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	mg/l	75	200	45.10	51.0	46.85	37.57	68.30	51.44	41.20	53.25
8	Alkalinity as CaCO3	APHA , 2320 B, Titrimetric Method	mg/l	200	600	126.00	132.00	113.24	130.01	282.18	154.50	145.33	159.28
9	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	mg/l	250	1000	86.21	81.89	85.21	95.20	86.10	74.00	101.36	78.23
10	Cyanide as CN	APHA , 4500 CN- D	mg/l	0.05	No Relaxation	*BLQ(**LOQ 0.02 mg/l)	*BLQ(**LOQ 0.02 mg/l)	*BLQ(**LOQ 0.02 mg/l)	*BLQ(LOQ 0.02 mg/l)	*BLQ(**LOQ 0.02 mg/l)	*BLQ(**LOQ 0.02 mg/l)	*BLQ(**LOQ 0.02 mg/l)	*BLQ(**LOQ 0.02 mg/l)
11	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	mg/l	30	100	8.12	7.89	3.63	10.26	12.00	10.000	17.00	12.00
12	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	mg/l	500	2000	346.0	356.00	330.0	360.0	375.0	340.0	380.00	320.00
13	Sulphate as SO4	APHA , 4500 E, Turbidimetric Method	mg/l	200	400	104.00	110.00	97.38	130.00	120.60	140.81	121.88	122.73

S. No.	Parameter	Test-Method	Unit	Limits of IS:10500 - 2012		GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8
				Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source								
14	Fluoride as F	APHA , 4500-F-D, SPADNS Method	mg/l	1	1.5	0.50	0.68	0.54	1.04	1.06	1.20	0.40	0.75
15	Nitrate as NO3	IS 3025 (P-34) ,Chromotropic Method	mg/l	45	No Relaxation	22.00	26.24	25.30	25.60	26.20	34.23	30.60	26.98
16	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	mg/l	1	No relaxation	0.24	0.22	0.40	0.30	0.19	0.30	0.27	0.11
17	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	mg/l	0.03	0.2	*BLQ(**LOQ 0.005 mg/l)	*BLQ(**LOQ 0.005 mg/l)	*BLQ(**LOQ 0.005 mg/l)	*BLQ(**LOQ 0.005 mg/l)	*BLQ(**LOQ 0.005 mg/l)	*BLQ(**LOQ 0.005 mg/l)	*BLQ(**LOQ 0.005 mg/l)	*BLQ(**LOQ 0.005 mg/l)
18	Boron	IS 3025 (P-65):2014(RA:2019)	mg/l	0.5	2.4	*BLQ(**LOQ 0.01 mg/l)	*BLQ(**LOQ 0.01 mg/l)	*BLQ(**LOQ 0.01 mg/l)	*BLQ(**LOQ 0.01 mg/l)	*BLQ(**LOQ 0.01 mg/l)	*BLQ(**LOQ 0.01 mg/l)	*BLQ(**LOQ 0.01 mg/l)	*BLQ(**LOQ 0.01 mg/l)
19	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	mg/l	0.05	No Relaxation	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)
20	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	mg/l	0.001	0.002	*BLQ(**LOQ 0.0005 mg/l)	*BLQ(**LOQ 0.0005 mg/l)	*BLQ(**LOQ 0.0005 mg/l)	*BLQ(**LOQ 0.0005 mg/l)	*BLQ(**LOQ 0.0005 mg/l)	*BLQ(**LOQ 0.0005 mg/l)	*BLQ(**LOQ 0.0005 mg/l)	*BLQ(**LOQ 0.0005 mg/l)
21	Mineral Oil	Clause 6 of IS:3025(Part 39)	mg/l	1	No Relaxation	*BLQ(**LOQ 0.1 mg/l)	*BLQ(**LOQ 0.1 mg/l)	*BLQ(**LOQ 0.1 mg/l)	*BLQ(**LOQ 0.1 mg/l)	*BLQ(**LOQ 0.1 mg/l)	*BLQ(**LOQ 0.1 mg/l)	*BLQ(**LOQ 0.1 mg/l)	*BLQ(**LOQ 0.1 mg/l)

S. No.	Parameter	Test-Method	Unit	Limits of IS:10500 - 2012		GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8
				Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source								
22	Anionic Detergents as MBAS	Annex K of IS 13428, IS 3025 (P-68)	mg/l	0.2	1	*BLQ(**LOQ 0.05 mg/l)	*BLQ(**LOQ 0.05 mg/l)	*BLQ(**LOQ 0.05 mg/l)	*BLQ(**LOQ 0.05 mg/l)	*BLQ(**LOQ 0.05 mg/l)	*BLQ(**LOQ 0.05 mg/l)	*BLQ(**LOQ 0.05 mg/l)	*BLQ(**LOQ 0.05 mg/l)
23	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	mg/l	5	15	0.41	1.13	0.76	1.19	1.16	1.14	1.31	1.34
24	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	mg/l	0.05	1.5	0.02	0.04	0.05	0.07	0.04	0.05	0.05	0.04
25	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	mg/l	0.1	0.3	*BLQ(**LOQ 0.01 mg/l)	*BLQ(**LOQ 0.01 mg/l)	*BLQ(**LOQ 0.01 mg/l)	*BLQ(**LOQ 0.01 mg/l)	*BLQ(**LOQ 0.01 mg/l)	*BLQ(**LOQ 0.01 mg/l)	*BLQ(**LOQ 0.01 mg/l)	*BLQ(**LOQ 0.01 mg/l)
26	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	mg/l	0.003	No Relaxation	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)
27	Lead as Pb	IS 3025 (P-65):2014(RA:2019)	mg/l	0.01	No Relaxation	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)
28	Selenium as Se	IS 3025 (P-65):2014(RA:2019)	mg/l	0.01	No Relaxation	*BLQ(**LOQ 0.001 mg/l)	*BLQ(**LOQ 0.001 mg/l)	*BLQ(**LOQ 0.001 mg/l)	*BLQ(**LOQ 0.001 mg/l)	*BLQ(**LOQ 0.001 mg/l)	*BLQ(**LOQ 0.001 mg/l)	*BLQ(**LOQ 0.001 mg/l)	*BLQ(**LOQ 0.001 mg/l)
29	Arsenic as As	IS 3025 (P-65):2014(RA:2019)	mg/l	0.01	No Relaxation	*BLQ(**LOQ 0.005 mg/l)	*BLQ(**LOQ 0.005 mg/l)	*BLQ(**LOQ 0.005 mg/l)	*BLQ(**LOQ 0.005 mg/l)	*BLQ(**LOQ 0.005 mg/l)	*BLQ(**LOQ 0.005 mg/l)	*BLQ(**LOQ 0.005 mg/l)	*BLQ(**LOQ 0.005 mg/l)

S. No.	Parameter	Test-Method	Unit	Limits of IS:10500 - 2012		GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8
				Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source								
30	Mercury as Hg	IS 3025 (P-65):2014(RA:2019)	mg/l	0.001	No Relaxation	*BLQ (**LOQ 0.0005 mg/l)	*BLQ (**LOQ 0.0005 mg/l)	*BLQ (**LOQ 0.0005 mg/l)	*BLQ (**LOQ 0.0005 mg/l)	*BLQ (**LOQ 0.0005 mg/l)	*BLQ (**LOQ 0.0005 mg/l)	*BLQ (**LOQ 0.0005 mg/l)	*BLQ (**LOQ 0.0005 mg/l)
31	Total Coliform	IS 1622,1981, RA-2019	MPN/100 ml	Shall not be detectable in any 100 ml sample		<2	<2	<2	<2	<2	<2	<2	<2
32	E. Coli	IS 1622,1981, RA-2019	MPN/100 ml	Shall not be detectable in any 100 ml sample		Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent

Source: Baseline Monitoring Report, Vardan Enviro Lab

Table 3.14: Surface Water Quality Data

S. No.	Parameter	Test-Method	Unit	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
1	pH (at 25 0C)	APHA ,4500-H+ B Electrometric Method	--	7.72	7.68	7.68	7.67	7.51	7.56	7.62	7.67
2	Colour	APHA ,2120 B, Visual Comparison Method	Hazen	10.0	20.2	8.0	18.0	20.0	14.0	16.0	60.0

S. No.	Parameter	Test-Method	Unit	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
3	Turbidity	APHA, 2130 B, Nephlelometric Method	NTU	41.00	12.0	16.0	34.00	24.00	46.00	48.00	57.0
4	Odour	APHA, 2150 B , Threshold Test Method	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5	Total Hardness as CaCO3	APHA , 2340 C, EDTA Titrimetric Method	mg/l	81.00	76.0	70.0	78.0	80.0	74.0	76.0	74.0
6	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	mg/l	30.00	24.6	22.1	28.1	26.0	24.0	24.8	25.4
7	Alkalinity as CaCO3	APHA , 2320 B, Titrimetric Method	mg/l	69.2	66.4	62.0	66.0	68.0	64.0	64.4	65.2
8	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	mg/l	39.4	34.6	32.0	36.0	32.0	34.0	34.6	34.6
9	Residual free Chlorine	APHA, 4500 Cl-B Iodometric Method	mg/l	*BLQ(**LOQ 0.15 mg/l)	*BLQ(**LOQ 0.15 mg/l)	*BLQ(**LOQ 1.0mg/l)	*BLQ(**LOQ 0.15mg/l)	*BLQ(**LOQ 0.15mg/l)	*BLQ(**LOQ 0.15mg/l)	*BLQ(**LOQ 0.15 mg/l)	*BLQ(**LOQ 0.15 mg/l)
10	Cyanide as CN	APHA , 4500 CN- D	mg/l	*BLQ(**LOQ 0.02 mg/l)	*BLQ(**LOQ 0.02 mg/l)	*BLQ(**LOQ 0.02 mg/l)	*BLQ(**LOQ 0.02 mg/l)	*BLQ(**LOQ 0.02 mg/l)	*BLQ(**LOQ 0.02 mg/l)	*BLQ(**LOQ 0.02 mg/l)	*BLQ(**LOQ 0.02 mg/l)
11	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	mg/l	12.00	10.0	11.20	12.80	12.4	10.02	16.45	12.2
12	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	mg/l	260.0	236.0	246.0	325.0	400.0	244.0	260.0	285.0
13	Total Suspended solids	APHA,2540 D Gravimetric Method	mg/l	47.34	41.21	34.14	37.61	24.00	12.0	12.0	14.2
14	Dissolved Oxygen	APHA,4500 O B Iodometric Method	mg/l	5.4	5.9	6.3	5.7	6.0	7.2	5.9	5.2

S. No.	Parameter	Test-Method	Unit	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
15	Sulphate as SO4	APHA , 4500 E, Turbidimetric Method	mg/l	146.41	34.0	20.6	180.00	26.0	20.2	162.00	18.2
16	Fluoride as F	APHA , 4500-F- D, SPADNS Method	mg/l	0.18	0.21	*BLQ(**LOQ 0.2 mg/l)	*BLQ(**LOQ 0.2 mg/l)	0.20	*BLQ(**LOQ 0.2 mg/l)	*BLQ(**LOQ 0.2 mg/l)	0.32
17	BOD (3 Days at 270C)	APHA, 5210 C / IS 3025,P-44	mg/l	6.00	4.00	4.00	6.00	10.00	6.00	8.00	14.00
18	COD	APHA, 5220 B, Open Reflux Method	mg/l	40.00	16.00	20.00	20.00	60.00	24.00	30.00	57.00
19	Conductivity (at 25 0C)	APHA, 2510 B, Conductivity Meter Method	mS/cm	0.382	0.308	0.340	0.385	0.359	0.398	0.390	0.462
20	Nitrate as NO3	IS 3025 (P-34) ,Chromotropic Method	mg/l	4.6	4.2	4.2	21.5	16.2	4.6	5.2	32.25
21	Sodium as Na	APHA,3500 Na B, Flame Photometric Method	mg/l	21.4	21.0	20.6	25.0	22.6	20.2	22.2	108.00
22	Potassium as K	APHA 3500 K B, Flame Photometric Method	mg/l	4.7	5.2	4.6	5.0	4.9	4.8	4.2	38.67
23	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	mg/l	0.30	0.02	0.27	0.30	0.30	0.30	0.32	1.72
24	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	mg/l	*BLQ(**LOQ 0.005 mg/l)	*BLQ(**LOQ 0.005 mg/l)	*BLQ(**LOQ 0.005 mg/l)	*BLQ(**LOQ 0.005 mg/l)	*BLQ(**LOQ 0.005 mg/l)	*BLQ(**LOQ 0.005 mg/l)	*BLQ(**LOQ 0.005 mg/l)	*BLQ(**LOQ 0.005 mg/l)
25	Boron	IS 3025 (P-65):2014(RA:2019)	mg/l	0.62	0.70	0.44	0.37	0.56	0.64	0.66	0.32
26	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	mg/l	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)

S. No.	Parameter	Test-Method	Unit	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
27	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	mg/l	*BLQ(**LOQ 0.0005mg/l)	*BLQ(**LOQ 0.0005mg/l)	*BLQ(**LOQ 0.0005mg/l)	*BLQ(**LOQ 0.0005 mg/l)	*BLQ(**LOQ 0.0005mg/l)	*BLQ(**LOQ 0.0005mg/l)	*BLQ(**LOQ 0.0005mg/l)	*BLQ(**LOQ 0.0005mg/l)
28	#Mineral Oil	Clause 6 of IS:3025(Part 39)	mg/l	*BLQ(**LOQ 0.01 mg/l)	*BLQ(**LOQ 0.1 mg/l)	*BLQ(**LOQ 0.1 mg/l)	*BLQ(**LOQ 0.1 mg/l)	*BLQ(**LOQ 0.1 mg/l)	*BLQ(**LOQ 0.1 mg/l)	*BLQ(**LOQ 0.1 mg/l)	*BLQ(**LOQ 0.1 mg/l)
29	#Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	mg/l	*BLQ(**LOQ 0.05 mg/l)	*BLQ(**LOQ 0.05 mg/l)	*BLQ(**LOQ 0.05 mg/l)	*BLQ(**LOQ 0.05 mg/l)	*BLQ(**LOQ 0.05 mg/l)	*BLQ(**LOQ 0.05 mg/l)	*BLQ(**LOQ 0.05 mg/l)	*BLQ(**LOQ 0.05 mg/l)
30	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	mg/l	2.24	2.39	2.04	2.18	2.06	1.20	1.24	1.44
31	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	mg/l	0.30	0.22	0.10	0.12	0.25	0.22	0.24	0.22
32	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	mg/l	*BLQ(**LOQ 0.01 mg/l)	*BLQ(**LOQ 0.01 mg/l)	*BLQ(**LOQ 0.01 mg/l)	*BLQ(**LOQ 0.01 mg/l)	*BLQ(**LOQ 0.01 mg/l)	*BLQ(**LOQ 0.01 mg/l)	*BLQ(**LOQ 0.01 mg/l)	*BLQ(**LOQ 0.01 mg/l)
33	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	mg/l	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)	*BLQ(**LOQ 0.002 mg/l)
34	Total Coliform	IS 1622,1981, RA-2019	MPN/100ml	1200	1100	1200	1500	1000	900	940	1200
35	Fecal Coliform	IS 1622,1981, RA-2019	MPN/100ml	800	800	900	1100	800	500	490	900

Source: Baseline Monitoring Report, Vardan Enviro Lab

3.4.4.2 Interpretation of data

The analysis of the 8 nos. of Ground Water and 8 nos. of Surface Water samples are presented below and are compared with the standards for drinking water as per IS: 10500-2012 "Specifications for Drinking Water" and IS:2296 respectively.

3.4.4.2.1 Interpretation of Ground Water Quality

The analysis results indicate that the pH ranges in between 7.55 to 8.24. The maximum pH of 8.24 was observed at (GW2) and the minimum pH of 7.55 was observed at (GW8).
Total Dissolved Solids (TDS) concentrations were found to be ranging in between 320 to 380 mg/l, the maximum concentration 380 mg/l of was observed at GW7. The minimum concentration 320 mg/l of was observed at (GW8).
Total Hardness was observed to be ranging from 142.20 to 300.44 mg/l. The maximum hardness is 300.44 mg/l was recorded at (GW5) and the minimum is 142.20 mg/l was recorded at (GW3) respectively.
Alkalinity of the samples lies between 113.24 mg/l to 282.18 mg/l. The maximum value 282.18 mg/l was at (GW5) and the minimum value 113.24 mg/l was found at (GW3).
Chlorides were found to be in the range of 74.00 mg/L to 101.36 mg/L. The maximum concentration is 101.36 mg/l was observed at (GW7), and where as the minimum concentration is 74.00 mg/l was observed at (GW6).
Sulphates were found to be in the range of 97.38 mg/l to 140.81 mg/l. The maximum value is 140.81 mg/l observed at (GW6), whereas the minimum value is 97.38 mg/l was observed at (GW3).
Bacteriological studies revealed the absence of Total coliform.

In study area, water quality has been observed to vary considerably. However, most of the parameters of GW quality are falling within the drinking water standards.

The detailed water quality reports are given in **Annexure XVI.**

3.4.4.2.2 Interpretation of Surface Water Quality

The analysis results indicate that the pH ranges in between 7.51 to 7.72 which are well within the specified standard of 6.5 to 8.5. The maximum pH of 7.72 was observed at (SW1) and the minimum pH of 7.51 was observed at (SW5).
Conductivity of the samples lies between 0.308 µS/cm to 0.462 µS/cm. The maximum value 0.462 µS/cm was observed at (SW8) and the minimum value 0.308 µS/cm was found in (SW2).
The Total Dissolved Solids (TDS) concentrations were found to be ranging in between 236.0 to 400.0 mg/l, the maximum concentration 400 mg/l was observed (SW5) and

minimum concentration 236.0 mg/l of was observed at (SW2).
Total Hardness was observed to be ranging from 70.0 to 81.0 mg/l, the maximum concentration 81.0 mg/l was observed at (SW1) and minimum concentration 70 mg/l of was observed at (SW3).
Chlorides were found to be in the range of 32.0 mg/l to 39.4 mg/l, the maximum concentration 39.4 mg/l was observed at (SW1) and minimum concentration 32.0 mg/l of was observed at (SW3).
Sulphates were found to be in the range of 18.2 mg/l to 180 mg/l, the maximum concentration 180 mg/l was observed at (SW4), and where as the minimum concentration 18.2 mg/l was observed at (SW8).
Dissolved Oxygen were found to be in the range of 5.2 mg/l to 7.2 mg/l, the maximum concentration 7.2 mg/l was observed at (SW6), and where as the minimum concentration 5.2 mg/l was observed at (SW8).
Total Coliform count is measured 900 to 1500 MPN/100ml

In accordance with CPCB water quality criteria, parameters studied were pH, DO, BOD and total coliforms. It may be observed that all the surface water samples have DO values ranging from 5.2 mg/l to 6.3 mg/L, indicating category B of CPCB water quality criteria.

3.4.5 SOIL ENVIRONMENT

In order to establish the baseline status of soil characteristic, soil sampling is conducted in the study area based on the land classification.

3.4.5.1 Methodology

Soil sampling was carried out at 8 sites to understand the soil quality. Meticulous attention was paid to collect adequate amount of composite soil samples for analysis. After removing the surface vegetation cover, visible roots, plant litter, gravel, plastic materials and other foreign materials. Samples were collected by Agar at a depth of 50, 150 and 300 cm and mixed thoroughly and analyzed as a single unit sample. The samples were packed in dependable, waterproof zip lock pouch bag and was marked specifically, accurately and brought to the laboratory for testing. This will establish the baseline characteristics and facilitate to identify if any.

3.4.5.2 Data Analysis

The samples were analyzed and the results were obtained. The detailed soil quality reports are given in **Annexure XVI**. The samples were collected Post monsoon season from the selected locations **(Figure 3.10)**. The monitoring locations and results of all the specified parameters at each location are given in **Table 3.15 and 3.16**.

Table 3.15: Soil Quality Monitoring Locations (March 2023 – May 2023)

Location	Name	Latitude	Longitude	Distance (km)	Direction	Criteria
S1	Project Site	18°26'34.87"N	82°39'58.50"E			Forest
S2	Sindhiput	18°25'50.14"N	82°40'25.22"E	1.0	SE	Agriculture
S3	Atanda	18°25'5.22"N	82°37'17.54"E	4.5	SW	Agriculture
S4	Near Somli	18°27'50.77"N	82°38'29.37"E	2.9	NW	Agriculture
S5	Nuaput	18°28'8.41"N	82°35'27.51"E	7.8	NNW	Near River Area
S6	Near Katarba	18°29'35.48"N	82°41'50.82"E	5.2	NNE	Agriculture
S7	Near Parajabhimdol	18°26'8.14"N	82°42'57.24"E	5.2	E	Agriculture
S8	Near Hatibari	18°23'21.06"N	82°43'43.16"E	8.6	SE	Agriculture

Source: Baseline Monitoring Report, Vardan Enviro Lab

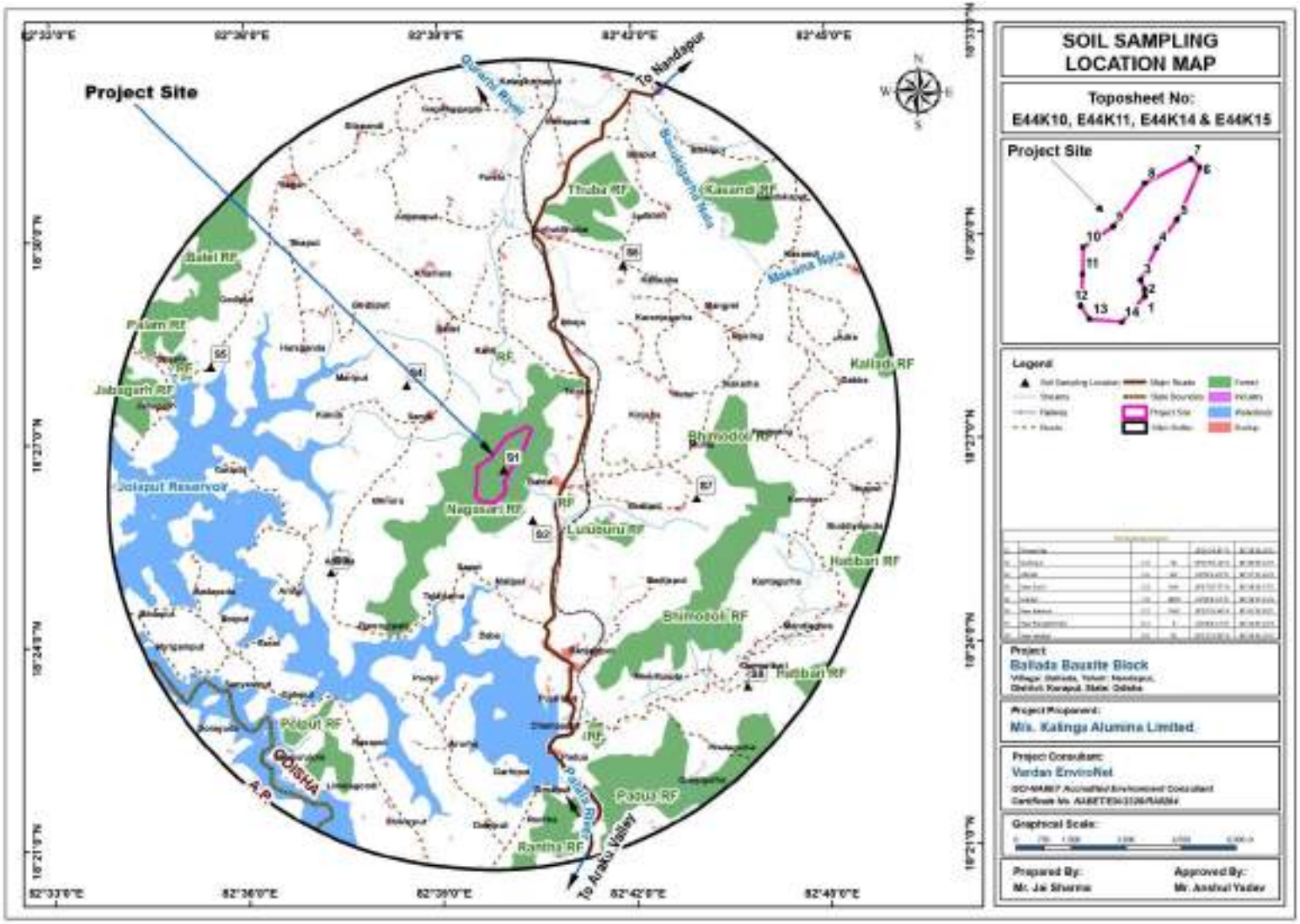


Figure 3-10: Soil Quality Monitoring Locations Map

Table 3.16: Soil Analysis Results

S. No.	Parameter	Test-Method	Unit	S1	S2	S3	S4	S5	S6	S7	S8
1.	**pH (at 25 ^{0}C)**	IS : 2720 (P-26)	--	7.58	7.6	7.68	7.78	7.82	7.64	7.64	7.69
2.	**Conductivity**	IS:14767	mS/cm	0.338	0.315	0.327	0.39	0.324	0.287	0.269	0.225
3.	**Soil Texture**	VEL/STP/EN/64, Issue No.-01, 01/11/2021		**Sand –53**	**Sand – 50**	**Sand – 49**	**Sand – 50**	**Sand –42**	**Sand – 45**	**Sand – 55**	**Sand – 50**
			%	**Silt - 35**	**Silt - 34**	**Silt - 33**	**Silt - 31**	**Silt -38**	**Silt - 35**	**Silt - 30**	**Silt - 35**
				Clay – 12	**Clay – 16**	**Clay – 18**	**Clay – 19**	**Clay–20**	**Clay – 20**	**Clay – 15**	**Clay – 15**
4.	**Color**	VEL/STP/EN/67, Issue No.-01, 01/11/2021	--	Yellowish Brown	Yellowish Brown	Yellowish Brown	Yellowish Brown	Yellowish Brown	Yellowish Brown	Yellowish Brown	Yellowish Brown
5.	**Water holding capacity**	VEL/STP/EN/86, Issue No.-01, 01/11/2021	%	32.21	35.23	34.78	33.25	37.64	34.26	34.2	36.28
6.	**Bulk density**	VEL/STP/EN/59, Issue No.-01, 01/11/2021	gm/cc	1.46	1.7	1.46	1.51	1.42	1.45	1.56	1.49
7.	**Chloride as Cl**	VEL/STP/EN/69, Issue No.-01, 01/11/2021	mg/100g	28.65	37.26	40.25	36.25	49.26	33.96	32.46	42.86
8.	**Calcium as Ca**	VEL/STP/EN/72, Issue No.-01, 01/11/2021	mg/100g	15.41	22.14	21.45	18.54	24.26	20.25	16.82	22.81

S. No.	Parameter	Test-Method	Unit	S1	S2	S3	S4	S5	S6	S7	S8
9.	**Sodium as Na**	VEL/STP/EN/62, Issue No.-01, 01/11/2021	mg/kg	38.62	42.15	45.14	43.69	52.15	41.25	38.96	41.65
10.	**Potassium as K**	VEL/STP/EN/61, Issue No.-01, 01/11/2021	kg/hec.	127.62	148.25	127.25	156.82	129.25	103.12	132.42	198.26
11.	**Organic Matter**	IS : 2720 (P-22), Titrimetric Method	%	0.31	0.4	0.5	0.42	0.69	0.62	0.38	0.52
12.	**Magnesium as Mg**	VEL/STP/EN/72, Issue No.-01, 01/11/2021	mg/100g	3.12	9.18	11.21	9.01	11.89	7.75	5.96	9.99
13.	**Available Nitrogen as N**	IS:14684 Distillation Method	kg./hec.	150.21	161.23	149.12	187.22	149.24	116.25	154.56	212.41
14.	**Available Phosphorus**	VEL/STP/EN/73, Issue No.-01, 01/11/2021	kg./hec.	28.23	36.52	28.25	37.36	29.22	22.26	33.18	42.72
15.	**Zinc (as Zn)**	VEL/STP/EN/165, Issue No.-01, 20/06/2022	mg/kg	2.07	1.74	2.67	0.93	2.19	3	0.89	2.4

S. No.	Parameter	Test-Method	Unit	S1	S2	S3	S4	S5	S6	S7	S8
16.	**Manganese (as Mn)**	VEL/STP/EN/165, Issue No.-01, 20/06/2022	mg/kg	4.51	7	9.39	4.88	8.39	5.89	1.98	9.89
17.	**Lead (as Pb)**	VEL/STP/EN/165, Issue No.-01, 20/06/2022	mg/kg	0.45	0.37	0.46	0.65	0.56	0.43	0.66	0.53
18.	**Cadmium (as Cd)**	VEL/STP/EN/165, Issue No.-01, 20/06/2022	mg/kg	0.38	0.42	0.38	0.49	0.35	0.32	0.42	0.34
19.	**Chromium (as Cr)**	VEL/STP/EN/165, Issue No.-01, 20/06/2022	mg/kg	0.27	0.29	0.3	0.34	0.29	0.23	0.38	0.26
20.	**Copper (as Cu)**	VEL/STP/EN/165, Issue No.-01, 20/06/2022	mg/kg	1.64	1.47	1.71	0.9	1.19	1.63	0.77	1.02

Source: Baseline Monitoring Report, Vardan Enviro Lab

3.4.5.3 Interpretation

Based on the results obtained, it is evident that the soil samples are predominantly Silty clay type.

The pH of the soil samples ranged from 7.58 to 7.82 indicating the neutral in nature.
The electrical conductance of the soil samples varied from 0.225 µS/cm to 0.39 µS/cm based on the Conductivity results it can be concluded that the ionic content of the soil samples is within the limits that does not harm the crops. Bulk densities of the soil samples varied from 1.42 to 1.7 gm/cc.
Available nitrogen in the soil samples varied from 116.25 Kg/ha to 212.41 Kg/ha which is indicating in good quantities in the soil samples. Available phosphorus in the region varied from 22.26 kg/ha to 42.72 kg/ha revealing the distribution from medium to average sufficient quantities
Available potassium levels in the samples ranged from 103.12 Kg/ha to 198.26 Kg/ha, which is indicating average quantities in the soil samples.
Soluble chlorides in the region varied from 28.65 mg/100g to 49.26 mg/100g. Organic matter concentrations ranged from 0.31% to 0.69 % on an average sufficient content is noticed in the soil samples
Based on particle sizes of the samples collected from the site, they are mostly falling in Silty loam category. Sand percent was varying from 42 to 55 %, Silt percent was in the range of 30 to 38 % and Clay was varying in range of 12 to 20%.
The water holding capacity of soil collected from all the specific locations vary in the range from 32.21 to 37.64 %. The analysis of present data shows that the considerable water holding capacity in all the sampling locations, leads to favourable circumstance for plantation and green belt development with small amount of addition of organic matter in soil.

3.4.6 Traffic Study

Traffic analysis is a study carried out to predict the magnitude and impact that the proposed project may have on the existing transportation network. Traffic analysis can also be used to evaluate whether the existing transportation facility is appropriate or needs an improvement for the proposed developmental project. During the operational phase, major additional traffic will be due to transportation of materials. Traffic study was performed to assess impact of the project on local transport infrastructure, by understanding the existing carrying capacity of the road in the vicinity of site, present traffic and additional traffic due to the proposed project. This will be compared with the carrying capacity of the road, as recommended by Indian Road Congress (IRC).

3.4.6.1 Traffic Survey

The traffic survey was conducted as per IRC: 64-1990. The sites for traffic survey monitoring were fixed away from the villages and the roads were divided into sections. The traffic density was monitored at the up and down sides of the locations namely:

Road: MDR-52 (Nandapur to Aaraku valley)

The monitoring was done for a period of 24 hours continuously. The observed traffic density has been processed for an interval of 1 hour. The total no. of vehicles was calculated on hourly basis as well as for 24 hours. The monitoring plan included the following vehicles namely Car, Buses, trucks, Tractors, Two wheelers, Three wheelers. Total numbers of vehicles per hour were determined.

3.4.6.2 Data Analysis

Table 3.17: Traffic Survey road in the Study Area

Name of Road	Direction		Dispatched Ratio in Percentage
	Up	Down	
MDR-52	Nandapur	Araku Valley	100

Source: Traffic Survey

3.4.6.3 Existing traffic scenario

The Level of Service (LOS) and the capacity of the Roadway segments computed is based on the Indian Roads Congress (IRC) standards sourced from Guidelines for Capacity of Rural Roads in Plain Areas IRC 64-1990. Following table provides the LOS standards adopted based on the volume to capacity (V/C) ratios at the intersections and its performance.

Table 3.18: Summarized Traffic Data

Type of Vehicles	No. of Vehicles	Equivalent PCU	No. of Vehicles in PCU/day
Trucks	166	3	498
Agriculture tractors/LCV	120	1.5	180
Bus	89	3	267
Cars	237	1	237
3-Wheeler	210	1	210
2-Wheeler	362	0.5	181
Total PCU/day			**1573**

Source: Traffic Survey

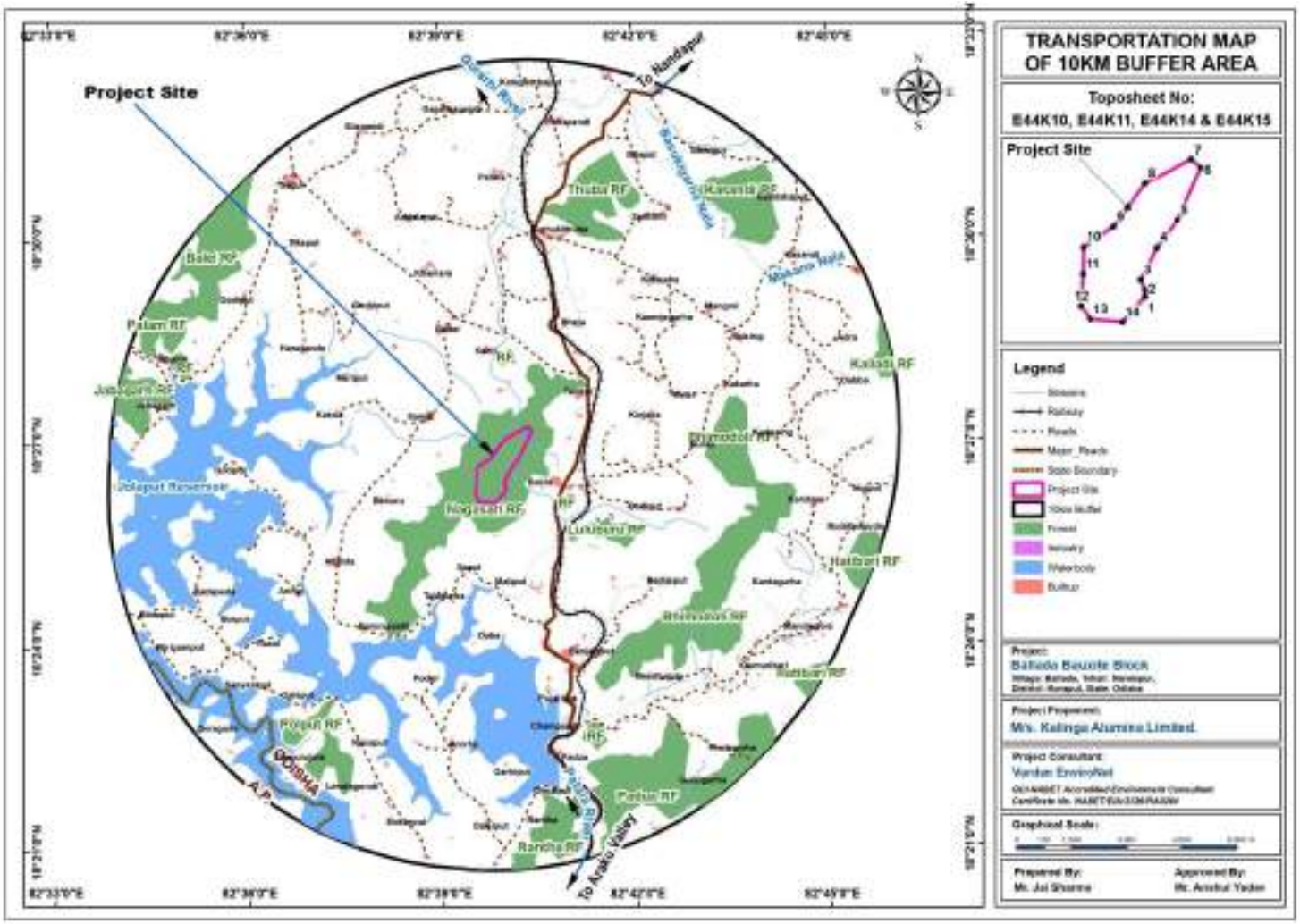


Figure 3-11: Transportation Map

Table 3.19: LOS Standards

V/C	LOS	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

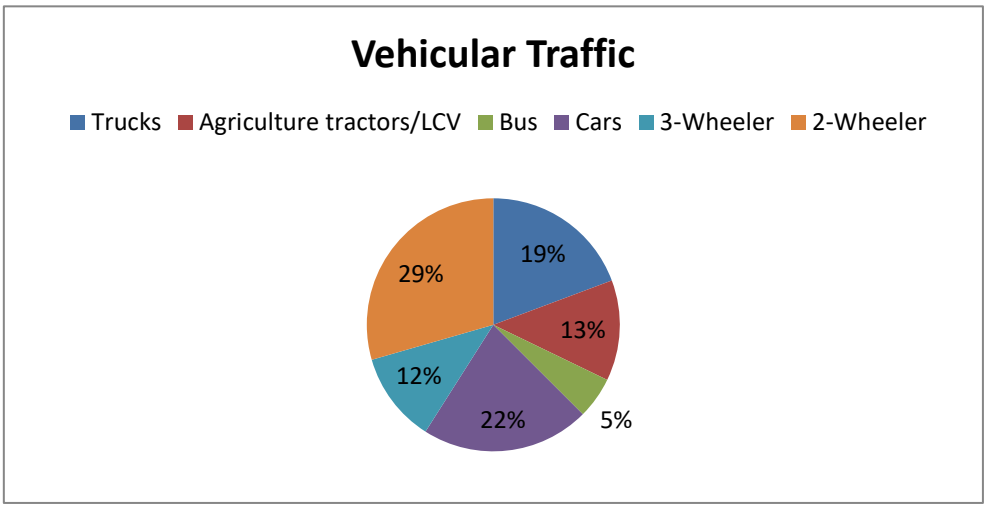


Figure 3-12: Chart Representations for Total Vehicular Data

Table 3.20: Existing Traffic Scenario and LOS

Type of Road	Existing Volume (PCU/day)	Capacity in (PCU/day)	V/C Ratio	LOS
MDR-52	1573	15000	0.10	A

Source: Traffic Survey

Table 3.21: Proposed traffic Scenario and LOS

During Mine Operation		
1	Total Production Capacity of mine (tons / year)	40,00,000
2	No. of working days	305
3	Production per day	13114.75 T/day
4	Dumper Capacity	24 Tones
5	Number of trucks trips/day (12 truck x 46 trips/day x 2) up/down)	1104
6	Total PCU/day	3312

Source: Traffic Survey

The LOS study shows that the existing traffic scenario is "Excellent" and the free flow of vehicles is observed during the study period. Due to the mine project the traffic density will increase as the entire mineral will be transported through the Metalled Road and the value of LOS would change from Excellent to V. good. Increase in PCU/day due to proposed project is given below in **Table 3.22**.

Table 3.22: Existing and Increase in PCU/day

Road	Existing	Proposed Volume (V)	Capacity (C)	Modified V/C Ratio	LOS
MDR-52	1573	1573+3312=4885	15000	0.32	B

Source: Traffic Survey

3.4.6.4 Interpretation

The density of heavy vehicles was comparatively low. The LOS study shows that the existing traffic scenario is "Excellent" and the free flow of vehicles is observed during the study period.

Due to the mine project the traffic density will increase as the entire mineral will be transported through the MDR road the value of LOS will change slightly to "Very good".

However, it is proposed to transport the mineral (Bauxite) through closed conveyor system upto the railway siding and thereby with rail, therefore as such there will not be any significant impact on the traffic density on the MDR due to mining operation.

3.4.7 Land Use and Environment

Land use/cover change is very essential for better understanding of landscape dynamic during a known period of time having sustainable management. Land use and land cover change has been recognized as an important driver of environmental change on all spatial and temporal scales. Land use/ Land cover changes also involve the modification, either direct or indirect, of natural habitats and their impact on the ecology of the area. Land use mapping has always been a time consuming and expensive process. Space technology in recent years has emerged as a powerful tool for land use /land cover studies, particularly change detection. Contrary to the traditional methods of field survey in which it took several years for the preparation and initial mapping of land use/ land cover of an area, remote sensing technology is a viable source of gathering quality land cover information at local, regional and global scales. As an information system, GIS provides for the organization, storage, analysis, modeling, mapping, and display of physical and biological data, as well as the distribution of cultural or socio-economic data. The Land use Land cover study has been carried out using Digital Image Processing and Digital Image Interpretation techniques. The Image Processing and Geographical Information Systems software have been used for the Spatial Analysis.

3.4.7.1.1 Land use / Land cover Classification

Digital image processing was carried out to delineate various land use / land cover categories in the lease area viz. built-up area, crop area, forests, scrub land, and water bodies etc. by assigning necessary training sets, which were identified based on tone, texture, size, shape pattern and location information. Necessary care was taken to identify proper land use class, where there is conflict between the signatures of various classes. The interpreted map was verified on ground at limited points and final land use / land cover map was prepared.

3.4.8 Land Use / Land Cover

The land use/land cover pattern of the area have been framed from the Satellite Imagery and Topo-sheet and authenticated by field visit. The land use/land cover pattern has been divided into 12 classes as follows: (i) Agriculture Land (ii) Barren land, (iii) Builtup (iv) Forest (v) Industry (vi) Open Scrub, (vii) Waterbody. The given categories of land use and land cover pattern covers an area of about 33745 Ha. Various classes and their respective areas with percentage of coverage are given in **Figure 3.13** & **Table 3.23**.

Table 3.23: Land use of the study area

S. no	Landuse Classification	Area in Hectare	Area in %
I	Agriculture Land	16549	44.6
ii	Barren Land	450	1.2
iii	Builtup	404	1.1
iv	Forest	4929	13.3
V	Industry	1	0.0
vi	Open Scrub	10703	28.8
vii	Waterbody	4103	11.0
	Total	**37139**	**100**

Source: IRS P-6 Satellite Imagery, Google Imagery and On-site Data Collected

3.4.8.1 Agriculture Land

The Agricultural land is major portion and covers about 16549 Ha, 44.6 % of the total land area. Major part of the agriculture land is double cropped agriculture land.

3.4.8.2 Scrub Land

Land area with the scrubs covers 10703 Ha of land area which is about 28.8% of total land area.

3.4.8.3 Forest Area

The forest land consists mostly of Protected Forest or Reserved Forest. The total forest

area cover is about 4929 Ha which is 13.3 % of the total study area.

3.4.8.4 Waterbody

Water bodies refer to the small collection of water in any natural or manmade storage like ponds, lakes, tanks, reservoirs etc. In the study area these water bodies are present covering 4103 Ha of land area which is 11 % of total study area.

3.4.8.5 Built-up area

Built-up in the study area refers to the village settlements with all infrastructural facilities like school, market, play ground and various other facilities. In the study area the settlements are mostly rural settlements scattered all over in patches. Total area comes under built-up is 404 Ha, which is 1.1% of the total.

3.4.8.6 Industry

The total industry area comes around 1 Ha only of the total study area.

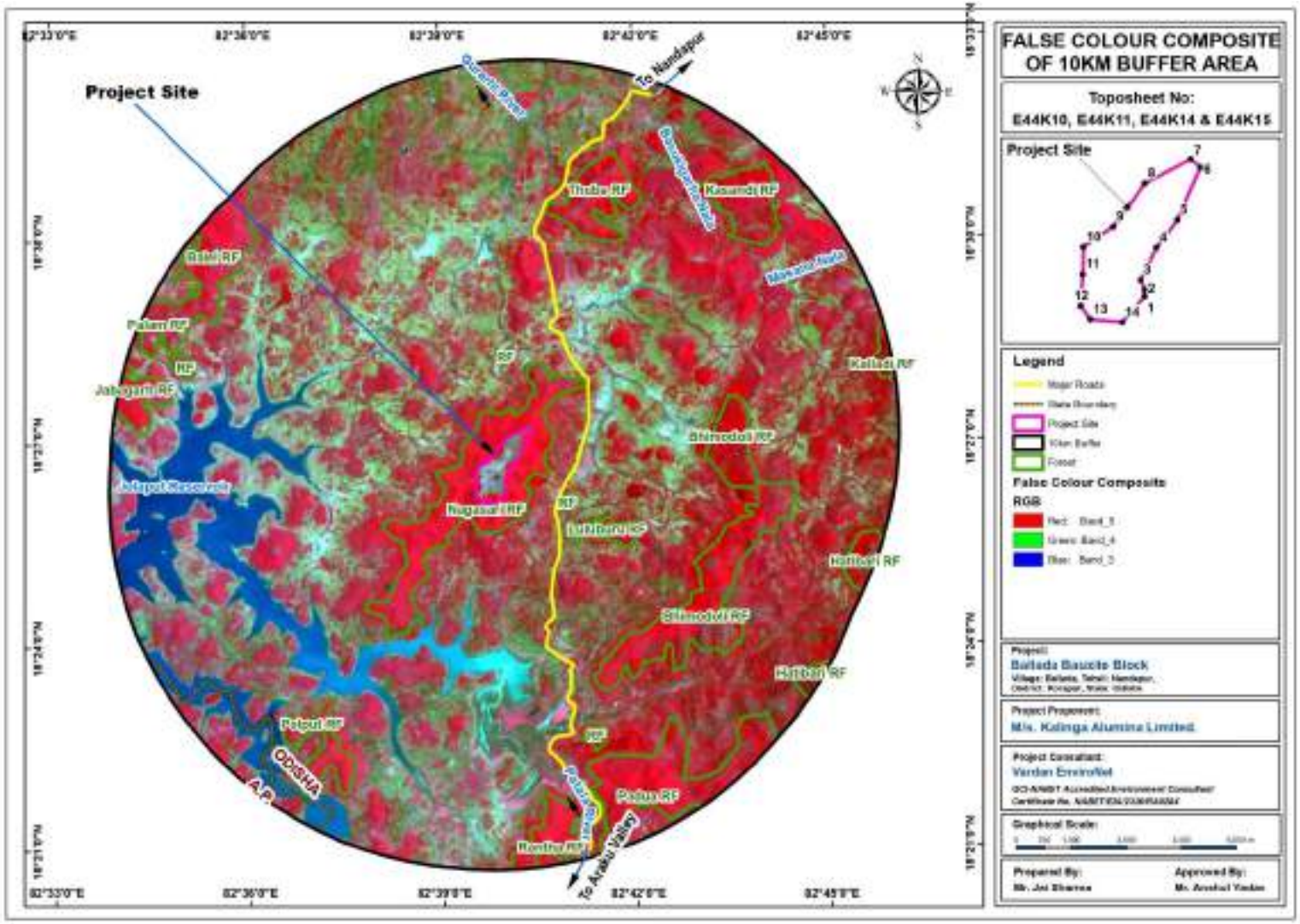


Figure 3-13: Satellite Imagery of 10 Km Study Area

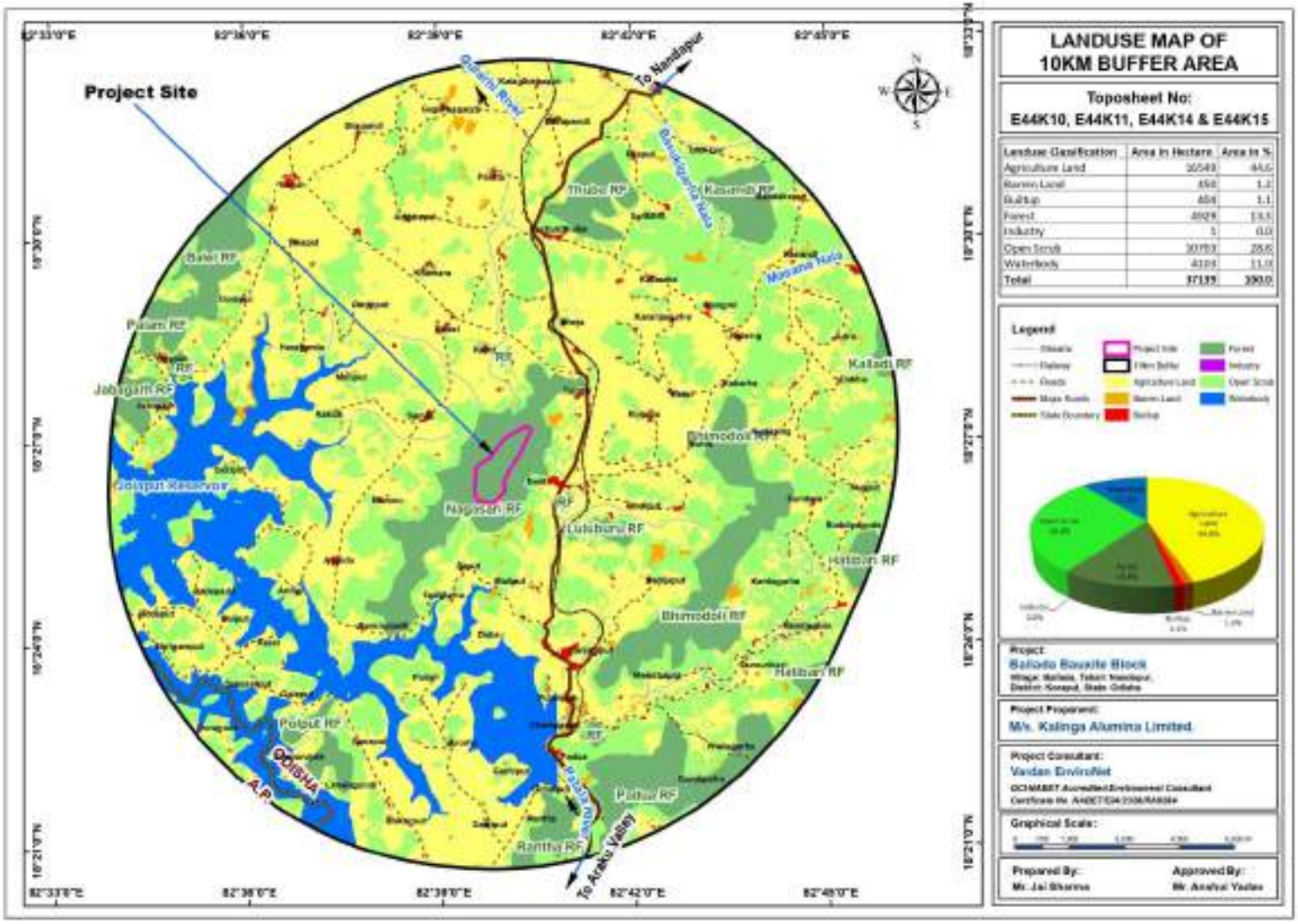


Figure 3-14: LULC Map of 10 km Study Area

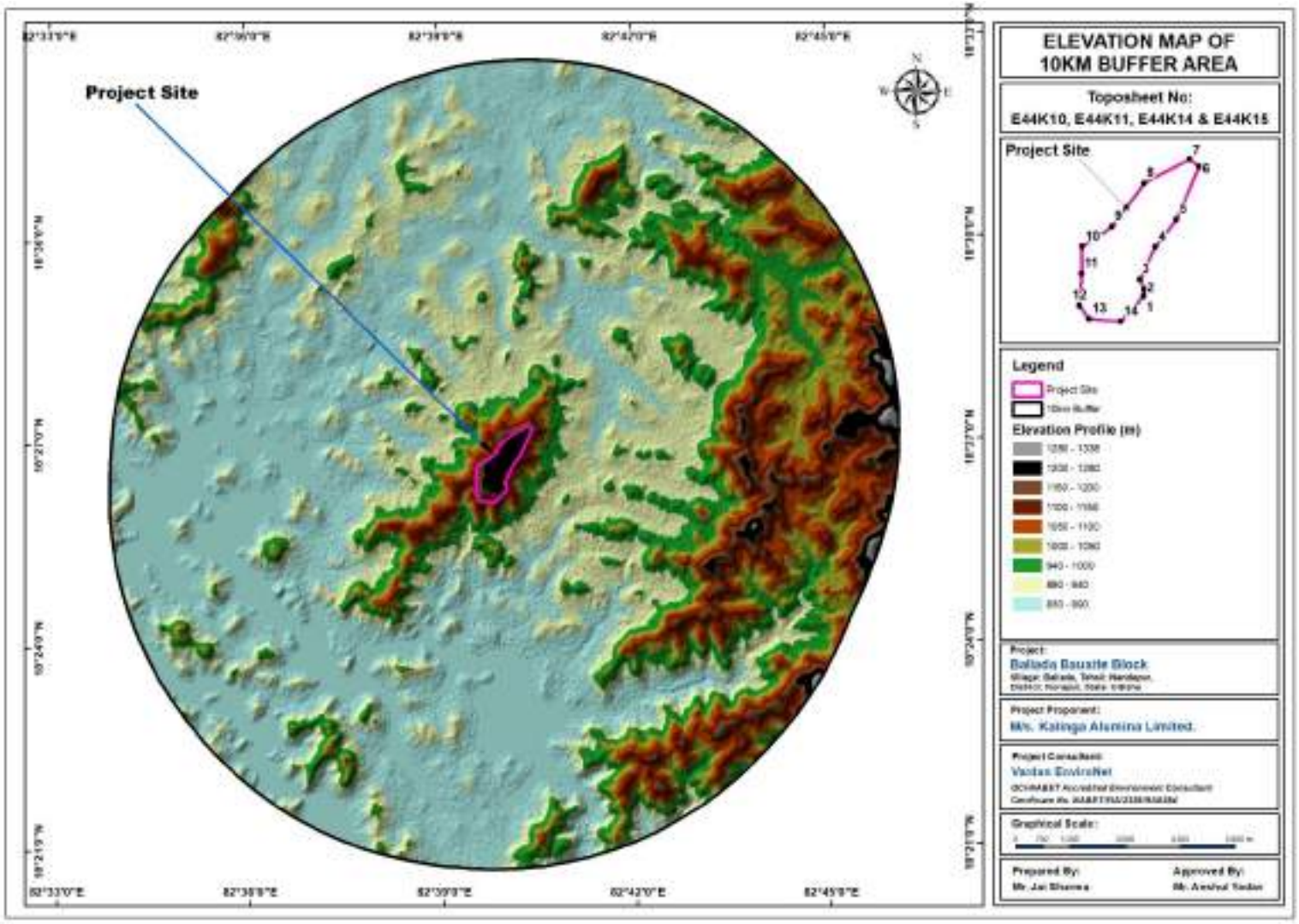


Figure 3-15: Elevation Map of 10 Km Study area

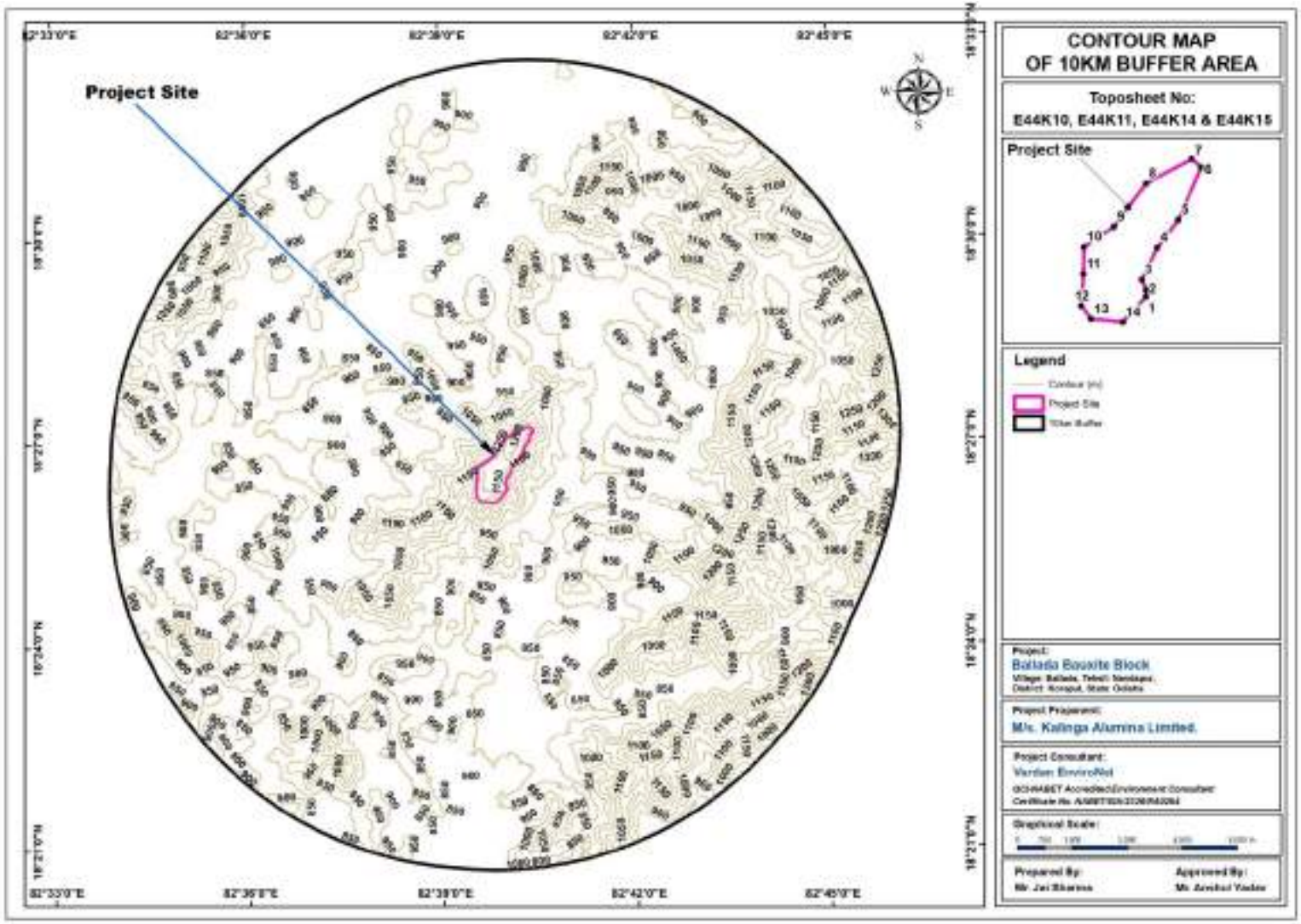


Figure 3-16: Contour Map of Study Area

3.4.9 Geomorphology

Broadly, the entire district is divided into Dissected plateau (hills & valleys), Undissected plateau (Plain), Pediplain and Ridges & Valleys.

The study area (10 km radius from the mine site boundary – buffer zone) elevation ranges from 717 m to 1274 m AMSL. The maximum elevation is observed in the mine lease area and eastern part of the study area.

Core Zone: The elevation of the core zone of a 2 km radius, ranges between 803 m AMSL to and 1274 m AMSL. The maximum elevation is noticed in the central part of the lease area. The mine site is located in an elevated area.

Geomorphologically the study area is characterized with Dissected Denudation hills & Valleys, Dissected Structural hills, and valleys, Pediment Pediplain Complex, Dam & Reservoir, River, and Waterbodies.

The core zone including the lease area composed with Dissected denudation hills & valleys and Dissected Structural hills & valleys.

3.4.9.1 Drainage

The Jolaput Reservoir is the nearest waterbody which is situated at 3 Km away from the project site. The drainage pattern of this area is dendritic in nature.

However, number of small to medium water bodies are noticed in the study area.

The study area is irrigated by bore well / dug well. The return flow from the irrigation land maintains the ground water level at moderately deeper depth in the bore well.

The drainage pattern is given in **Figure 3.17**.

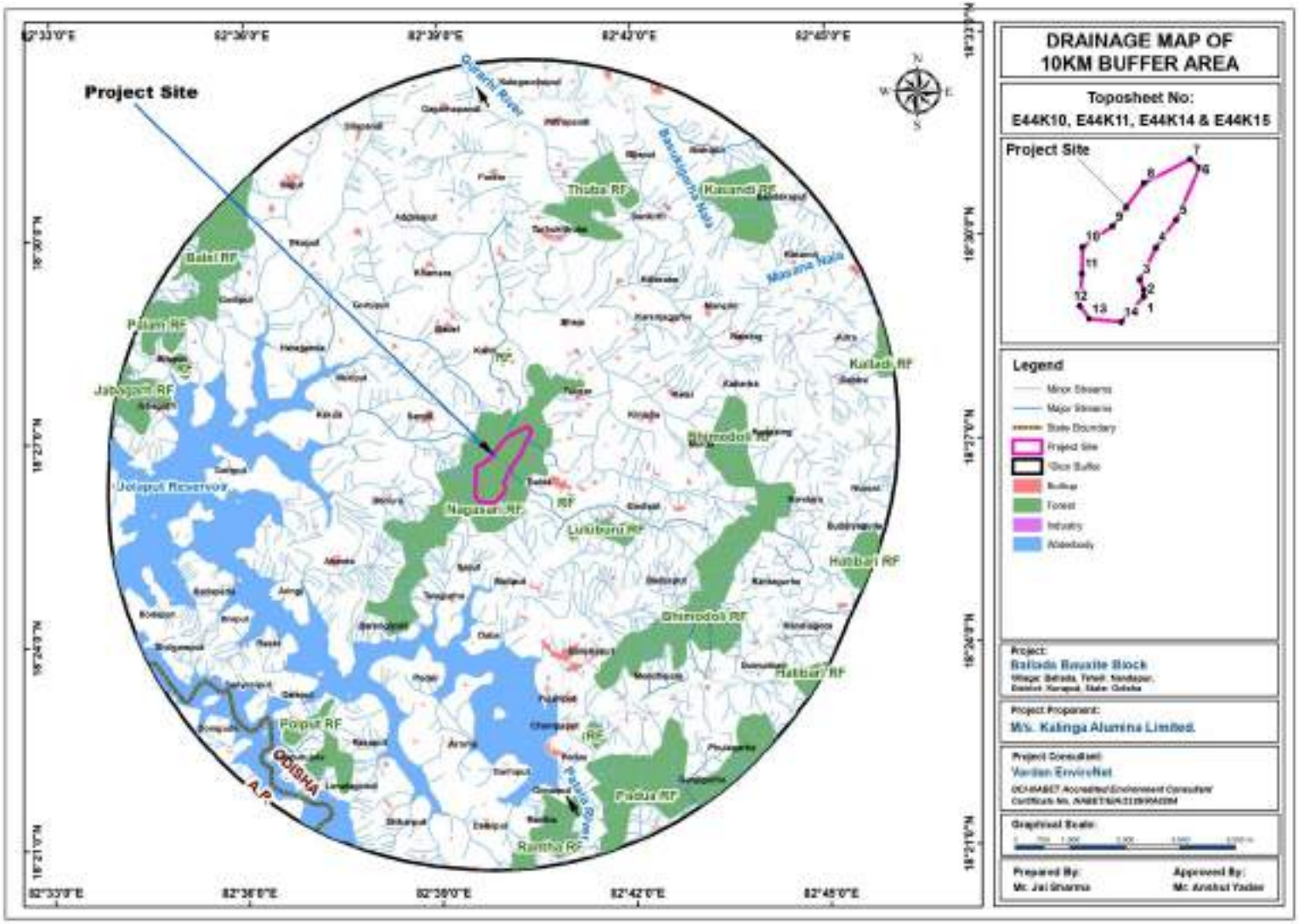


Figure 3-17: Drainage Map of the study area

3.4.9.2 Geology

Regional Geology

The Eastern Ghat Mobile Belt constituting a major part of the district, comprises Khondalite and Charnockite Group of rocks and Granite Gneiss of Archaean age. The western and southeastern part are dotted with small outlier of Bengpal Group of rocks, also of Archaean age in the backdrop of Granite Gneiss, Chattisgarh Group of sedimentary rocks of Proterozoic age occurs in the western part.

The general geological succession of the area is given in table below.

Table 3.24: Generalized Stratigraphic Succession

AGE		GEOLOGICAL UNIT	LITHOLOGY
Pleistocene to recent		Quaternary	Soil and alluvium
Cainozoic(undifferentiated)			Laterite (locally bauxite)
Middle to Upper Proterozoic		Chattisgarh Group	Shaly Limestone
			Shale
			Conglomerate, Sandstone, quartzite
Proterozoic(undifferentiated)		Igneous Intrusives	Pegmatite/Quartz vein
			Dolerite
			Nepheline Syenite
			Diorite and gabbro
Archaean		Bengpal Group	Meta-dolerite and gabbro
			Metabasics-ultrabasic rock
			Andalusite-mica schist
			Banded ferruginous quartzites (BMQ/BHQ)
			Quartzite
			Porphyroblastic granite gneiss, migmatites, leptynite
	Eastern Ghat	Charnockite Group	Acid and intermediate Charnockite

AGE		GEOLOGICAL UNIT	LITHOLOGY
	Supergroup		Basic Charnockite and pyroxene granulite
		Khondalite Group	Khondalite schist/gneiss
			Quartzite (Ferruginous/magnetitic)
			Calc-silicate rock/crystalline limestone

The Ballada hill range is located on the west of Pottangi plateau, Mali parbat and famous Panchpatmali plateau and forms a part of the Eastern Ghat Mobile Belt of Archean age represented by Khondalite suite of rocks, pyroxene granulite, Charnockite suite of rocks, variants of granite gneisses infused with pegmatoids and vein quartz of Archean age formed under granulite facies of metamorphism. The ortho and para metamorphites have undergone significant weathering and alteration at higher altitudes forming laterites of Tertiary age. The above lithounits form more or less banded assemblage in NNE-SSW trend in conformity to the general trend of the Eastern Ghats.

The rocks exposed in the area belong to the Eastern Ghat Super Group of rocks represented by quartzite, migmatised khondalite, pyroxene granulite, charnockites, leptynites and porphyroblastic granite gneisses together with high level laterite/bauxite. The most common rock in this group is quartz-garnet-feldspar sillimanite gneisses i.e. khondalites with or without graphite and/or manganese which has been migmatised to variable extent. The Khondalite suites form high and linear hills with sharp crests, while the Charnockites occupy the low-lying plains as well as dome shaped hill rocks.

Structurally the area is fairly complex. The bedding plane (S0) is never observed. The most pronounced planner structure is foliation plane (S1) of Khondalite. The trend of foliation swings from NNW - NNE to NE -SW with rather steep dip ranging from 60˚ to 80˚ due SE or SW. In the Niyam Dongar hill, where a broad upright asymmetric syncline is observed, the trend of foliation varies from NNW to NNE in the southern limb and swings to NE-SW in the northern limb.

Local Geology

The area forms a segment of the east-central part of the Eastern Ghat hill ranges. Rocks belonging to the Khondalite and Charnockite groups are developed in the area. In general, Khondalites form high hills and peaks whereas the Charnockitic rocks are invariably confined to the valleys and slopes of high hills. Both the groups of rocks occur as concordant bands. It is a common feature to observe islands of Khondalites within the Charnockitic rocks. Bauxite of Ballada capping occurs as mantle over khondalite as proved by drilling. The gibbsite crystals occur as shining aggregates in a ferruginous groundmass. The relict foliation is observed in some of the bauxite outcrops. The

bauxite invariably has a brick red colour. It is sporaceous towards the top where the voids are filled with kaolinite / limonite. At depth, it has spongy texture with ferruginous zones. The laterite is more ferruginous and siliceous at the top where it is hard and has craggy, cavernous look but is relatively soft and aluminous in the lower parts and grades into bauxite. The soil though present in very less quantity is mostly lateritic.

Structure

The trend of regional foliation is NE-SW with the dips varying from 300 to 800 towards southeast. The swinging of local foliation towards ENE-WSW and NNE-SSW is very common. The axes of mesoscopic folds plunge towards south-east at low angle (150 to 200). Mineral and groove lineations plunge towards east, south and south-east. Extensive slickensides are noticed at many places which result local displacements. These slickensides were probably generated due to a major fault system. Several synformal structures may be resulted due to the convergence of dips evident by the presence of synformal hills; the intervening low-lying areas mark the antiformal valleys.

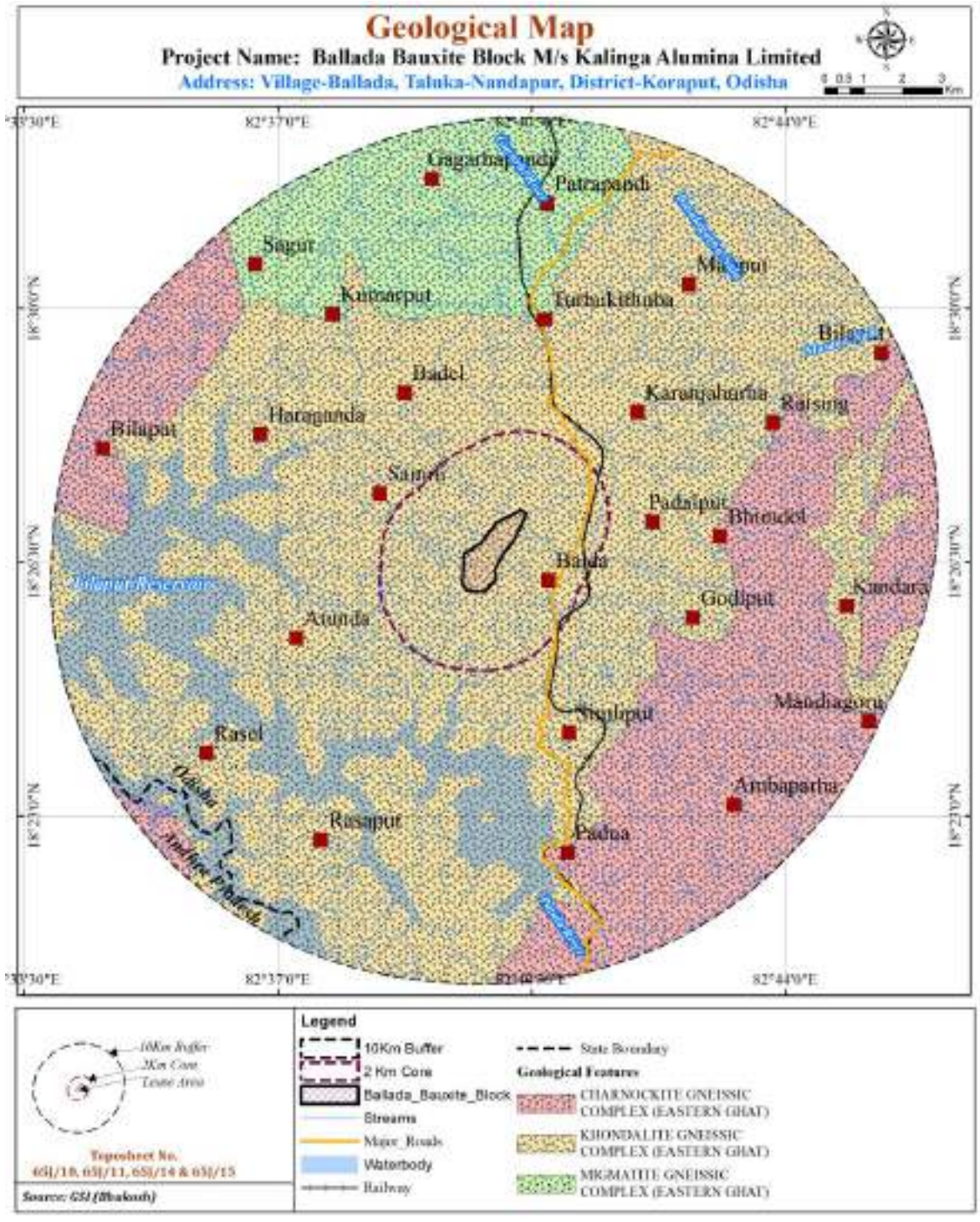


Figure 3-18: Geological Map of Study area

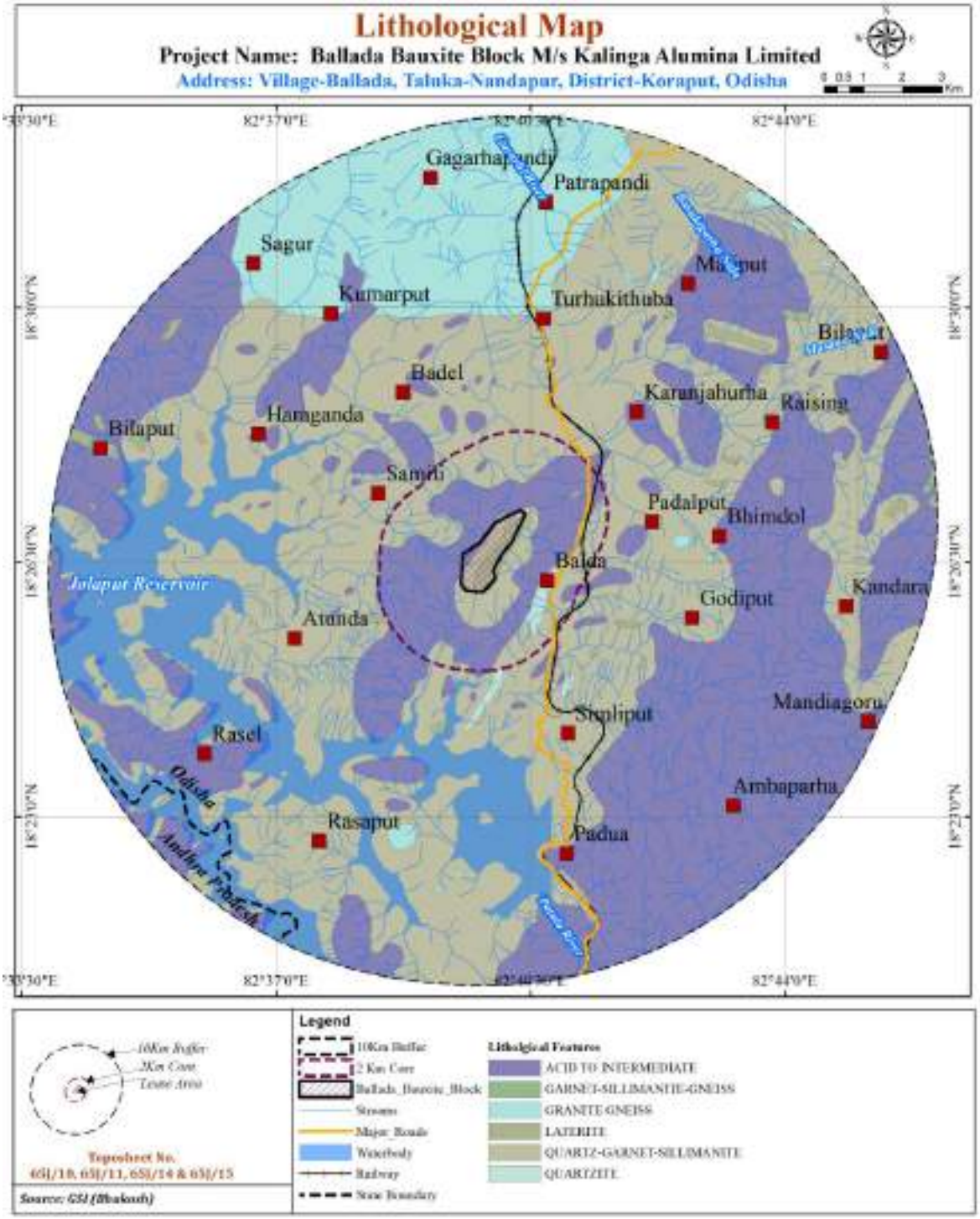


Figure 3-19: Lithological Map of Study area

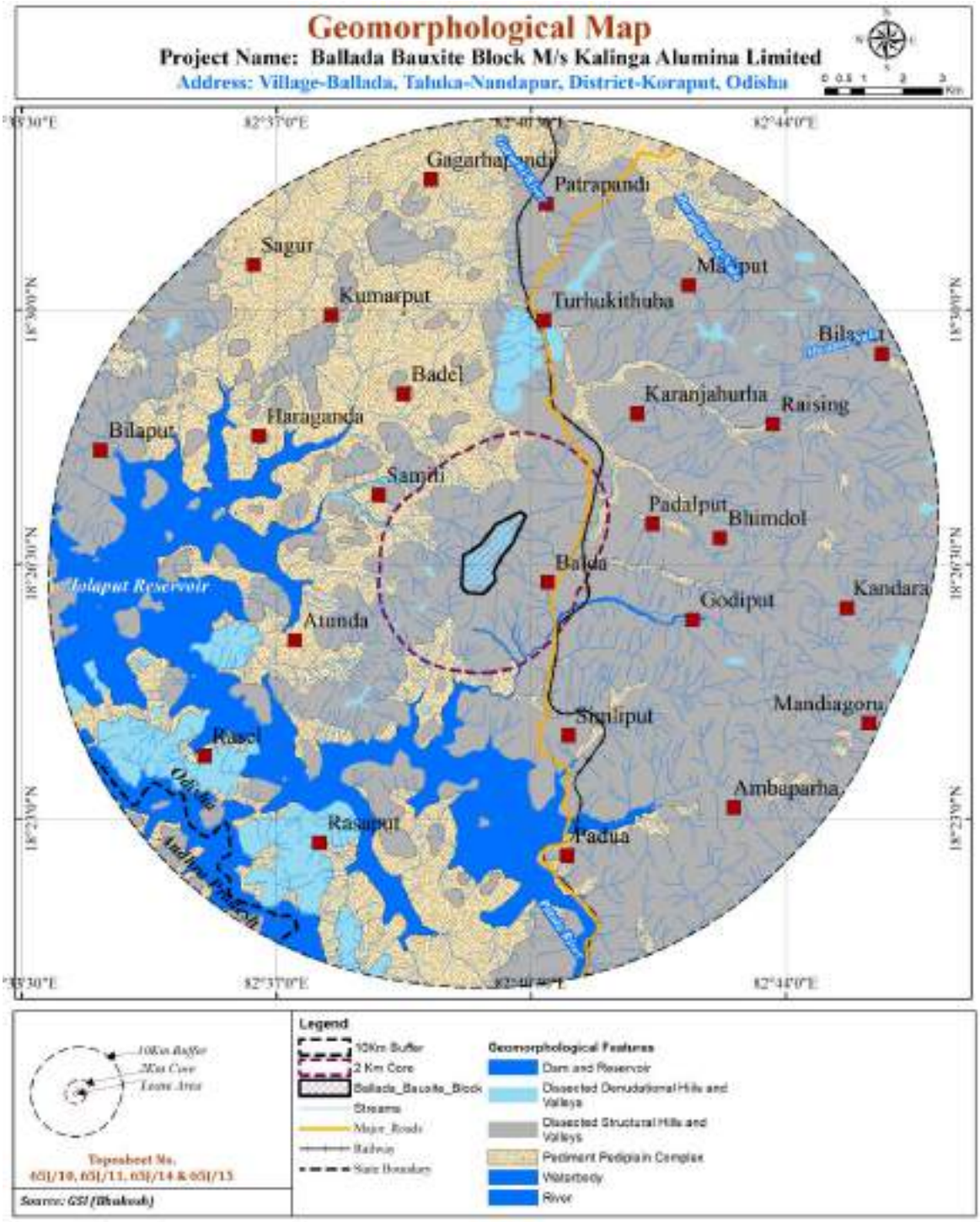


Figure 3-20: Geomorphological Map of Study area

3.4.9.3 Seismic Study

As per Earthquake hazard map (seismic map) of Odisha, the study area falls under the low damage risk zone-II.

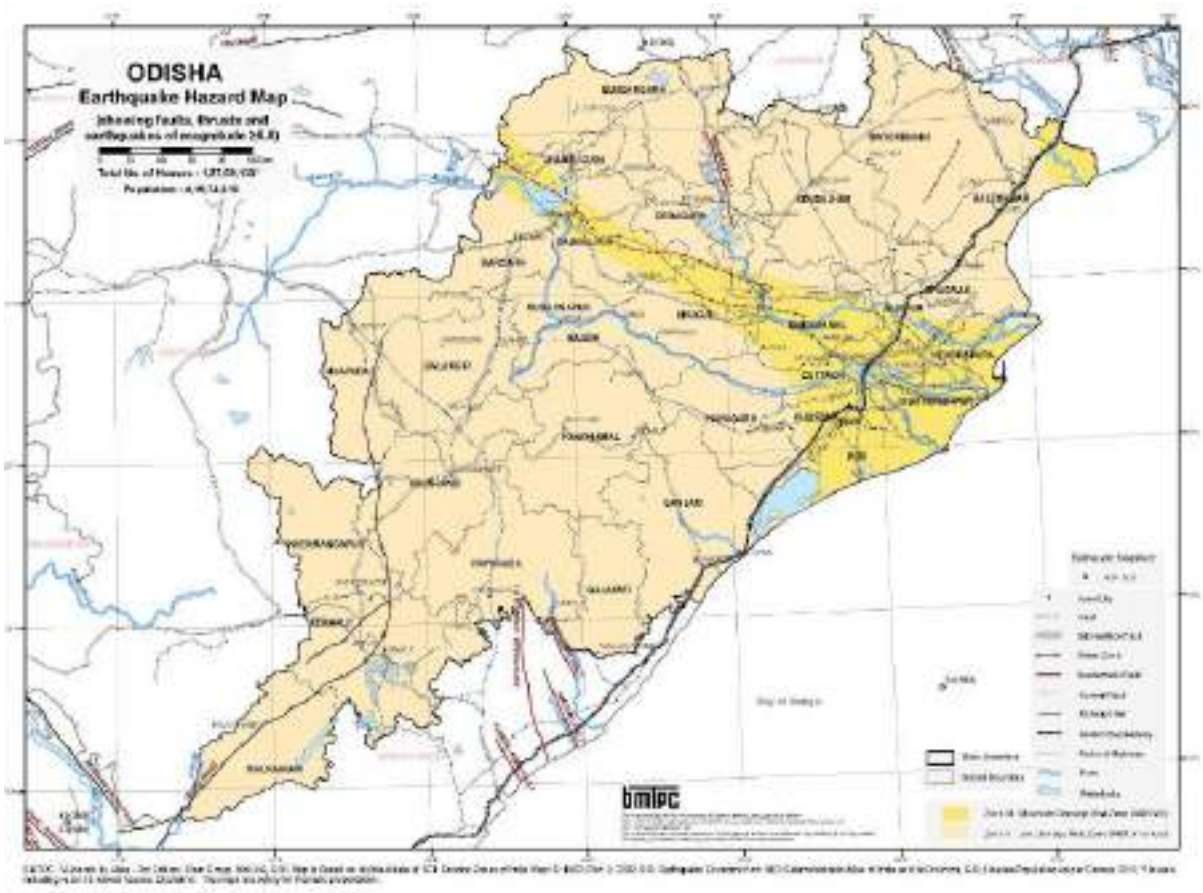


Figure 3-21: Earthquake Hazard map of Odisha

(Source: BMTPC: Vulnerability Atlas)

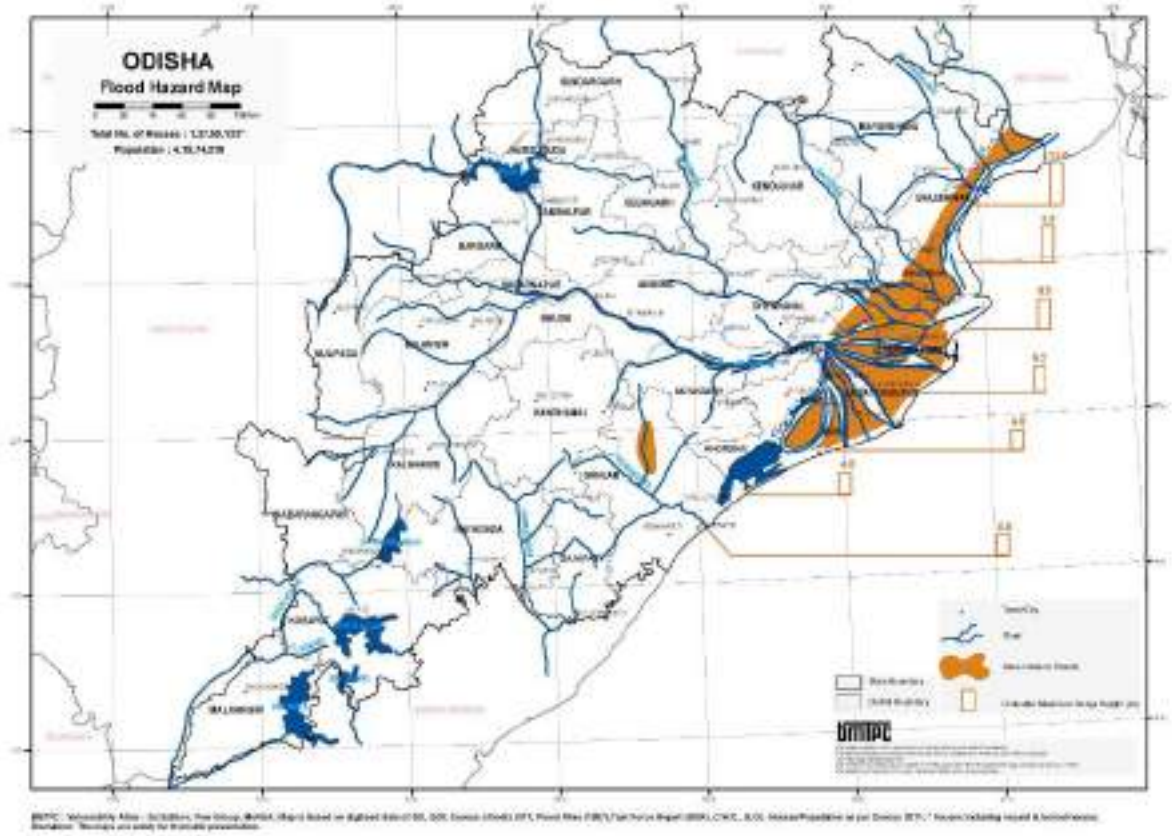
3.4.9.4 Study of landslide

Geologically the landslide is the movement of mass of rock, soil debris under the direct influence of gravity or landslides are a type of "mass wasting "when a section of soil or rock suddenly gives way and moves down. They can happen suddenly or more slowly over long periods of time.

The chances of landslides at or near project site are not there.

3.4.9.5 Flood Study

Considering the geographical location, the study area does not come under any flood prone zone. The flood map of Odisha is given below.



(Source: BMTPC)

Figure 3-22: Flood Hazard Map of India

3.4.10 Hydrogeology

Consolidated formation

These include all the hard rocks of Eastern Ghat Group, such as granite gneiss, khondalite, charnokite and quartzite, gneiss, limestone, and shale of Chhatisgarh Group. These rocks are devoid of primary porosity. The secondary porosity in these rocks developed as a result of weathering and fracturing due to major & minor tonic movements along with climatological actions. The secondary porosity forms the conditions for the movement of ground water and acts as a reservoir of ground water. Groundwater occurs under water table conditions in weathered residuum while it occurs under semi-confined to confined conditions in the fractured & jointed rocks.

Un-Consolidated formation

Alluvium of Recent to Sub-Recent age constitutes the unconsolidated formation comprising of gravel, sand, and clay. The alluvial deposits of recent origin occur as their discontinuous patches along the prominent drainage channels and 'particularly in the flood plains of Indravati and Kolab river. Due to the high degree of porosity and permeability, the alluvial strips constitute the moderately potential aquifers. Ground

water occurs under semi-confined to confined conditions. The potential aquifers present in this zone can be tapped through filter point shallow tubewells and dugwells. The maximum thickness of the alluvium is in the order of 20-23 m. The Depth to water level varies from 1.3 to 7.64 mbgl during pre-monsoon period and from 0.40 to 5.89 mbgl during post monsoon period. Yield of a dug well varies from 8-15 Ips.

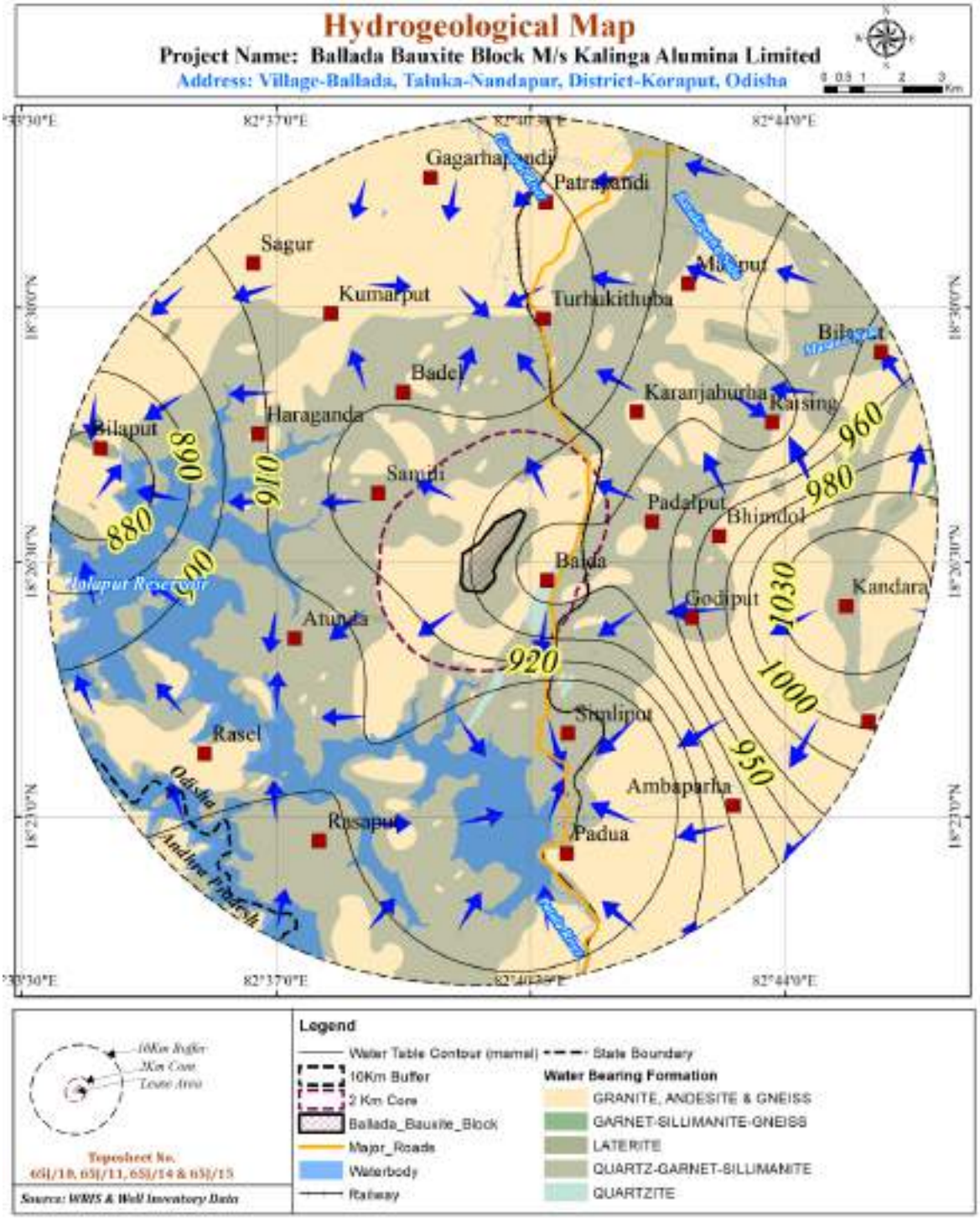


Figure 3-23: Hydrogeological Map of the Study Area

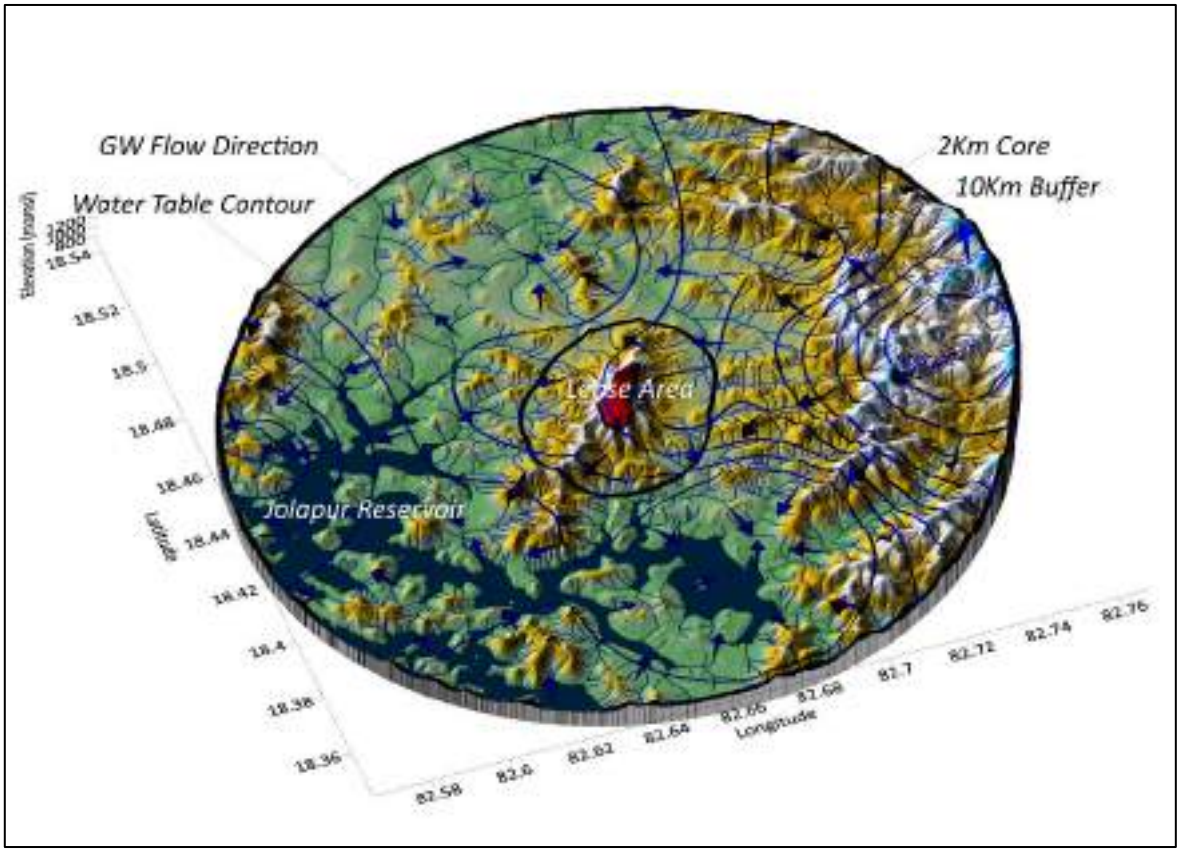


Figure 3-24: Groundwater Flow Direction

3.4.10.1 Ground Water Level

The ground water levels observed over a period provides valuable information on the behavior of the ground water regime, which is constantly subjected to changes due to recharge and discharge phenomenon. Based on data of observation wells a water level map for the Pre-monsoon and post-monsoon and ground water flow direction map has been prepared.

Study Area

Pre-monsoon

On the basis of depth of wate level of the study area, the premonsoonal depth to water level varies from about 2.5 to 6.1 mbgl in study area.

Post -monsoon

On the basis of depth of wate level of the study area, the post monsoonal depth to water level varies from 1.9 to 4.8 mbgl.

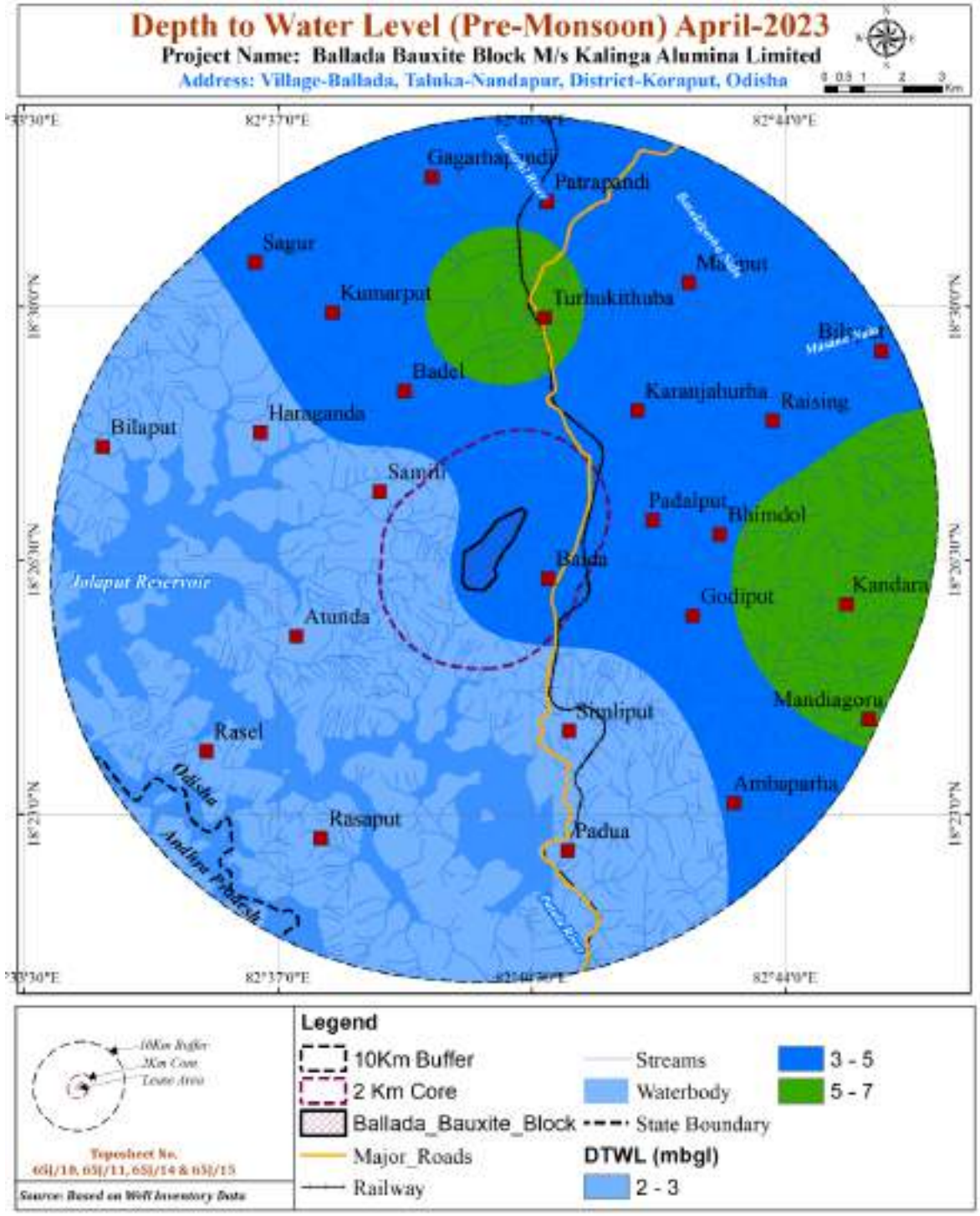


Figure 3-25: Pre-Monsoonal Ground Water Level Map

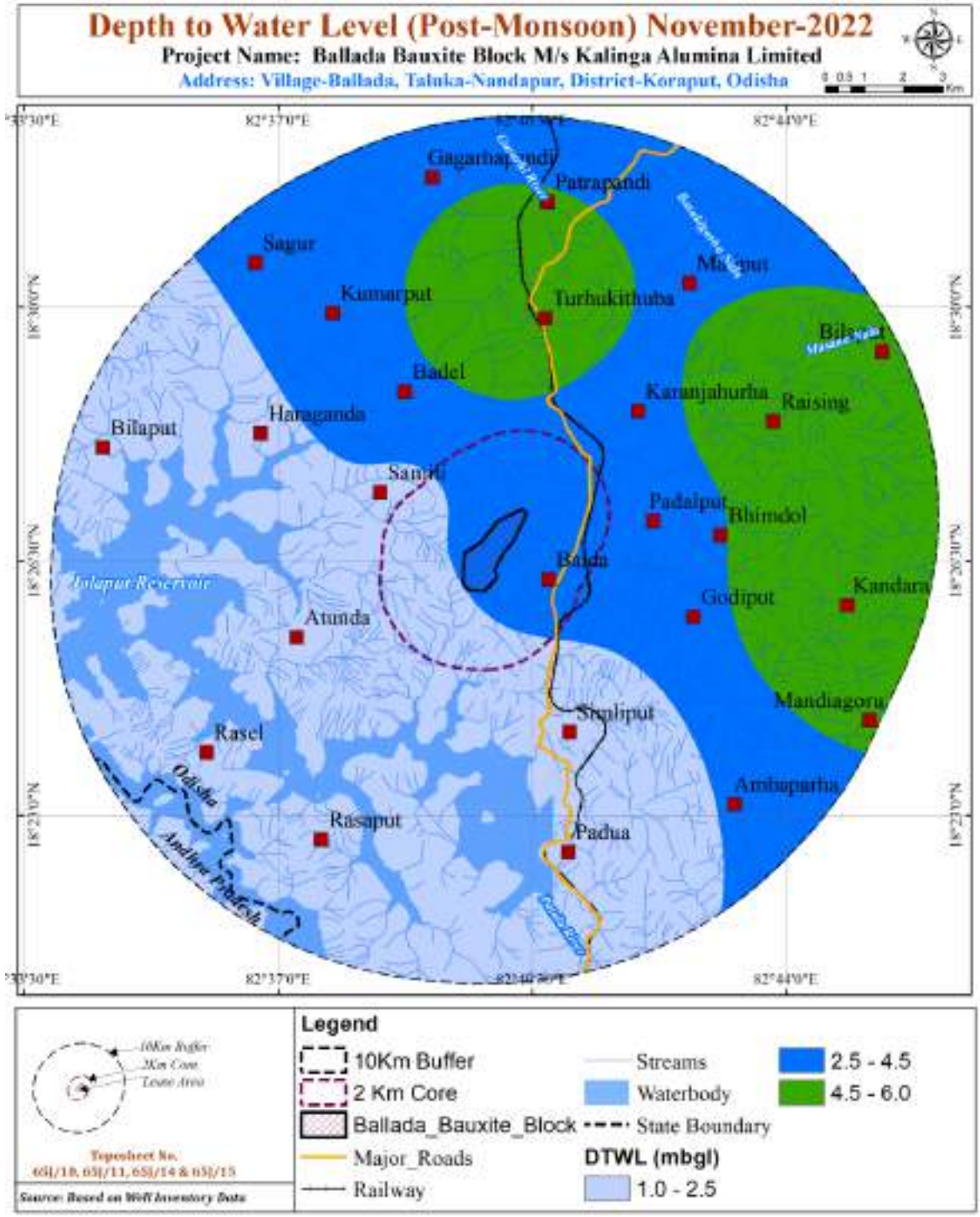


Figure 3-26: Post-Monsoonal Ground Water Level Map

3.4.10.2 Ground Water Resources & Development

According to the block wise Ground Water Resources assessment 2022. All the blocks including Nandapur falls under the Safe Categories.

As per the Dynamic ground water resources of India (2022), the Total Annual Ground Water Recharge of Koraput district is 58255.25 (ham) while total annual extraction ground water resource from Irrigation, Industrial and Domestic is 11663.27 (ham) and stage of ground water extraction is 21.81%.

3.4.10.3 Water Conservation and Artificial Recharge

Construction of water conservation structures will help to arrest run off, recharge the aquifer and retain the soil moisture.

3.4.11 Ecology and Biodiversity

Biological diversity discusses the existence of a variety of living species including algae to monocots of the plant kingdom and protozoans to mammals of the animal kingdom and nature supports these living beings under a structural and functional unit called an ecosystem. Biodiversity satisfies human needs in different ways either directly or indirectly. The direct way is increasing agricultural productivity which supports the existence of life on the earth. Indirect way includes nutrient trapping, maintaining water cycles, production and protection of soil, absorption and breakdown of pollutants, provide recreational, aesthetic, scientific and spiritual values that help to continue life on the earth.

Physiographically, Odisha can be divided into four regions, viz, Northern Plateau, Eastern Ghats, Central Tableland, and Coastal Plains. The annual rainfall ranges between 1,200 mm to 1,600 mm and the annual temperature varies from 12°C to 42°C. The State is drained by many important rivers, which include Subarnarekha, Brahmani, Baitarni, Mahanadi, Devi, and Rushikulya. The State has 30 districts, among which 12 are tribal districts. Being situated in the Eastern part of India covering three biogeographic provinces, the state of Odisha is bestowed with various natural ecosystems like agrarian, forests, wetlands, and grasslands.

The state is an abode for over 5174 species of plants and fungi including 2800 species of higher plants together with 300 species of grasses, 153 species of orchids, 178 species of pteridophytes, 22 species of gymnosperms, 63 species of mangroves and their associates, 24 species of seaweeds, 7 species of seagrasses, 17 species of carnivorous plants. About 300 species of bryophytes, 275 species of lichens, and above 1000 species of fresh, marine, and brackish water algae contributes to cryptogam diversity. Thirty species of wild edible mushrooms and above 450 species of macro-fungi, 300 species of

wild relatives of crop plants, and 500 species of medicinal plants also occur in Odisha. Around 117 plant species including 41 medicinal plant species of the state are considered as threatened and 24 species are endemic to Odisha, out of it 7 species each are orchids and grasses.

The faunal resources comprise 114 species of Mammals (103 wild and 11 domestic), 537 species of Birds, 131 species of Reptiles, 29 species of Amphibians, about 800 species of Pisces, 584 species of Crustaceans, 366 species of Molluscs, 259 species of Coleoptera, 98 species of Diptera, 265 species of Hymenoptera, 112 species of Spider, about 300 species of Lepidoptera, 102 species of Odonata and 31 species of Isopteran. A total of 65 globally threatened faunal species are reported to occur in the state which includes 26 species of birds, 20 species of mammals, 18 species of reptiles, and one species of fish.

3.4.11.1.1 Forest Types of Study area:

Atlas Forest Types of India-2021 and Classification of Champion and Seth (1968) classified Odisha's forests into 19 forest types dominated by Moist Peninsular low-level Sal Forest (21.27 %) and Northern Dry Mix Deciduous Forest (20.24 %). The major forest-forming species reported from the Odisha State are *Shorea robusta*, *Terminalia tomentosa*, *Madhuca latifolia*, *Anogeissus latifolia* and *Schleichera trijuga*. Sal itself is the major NTFP from the state followed by Mahua and Karanj.

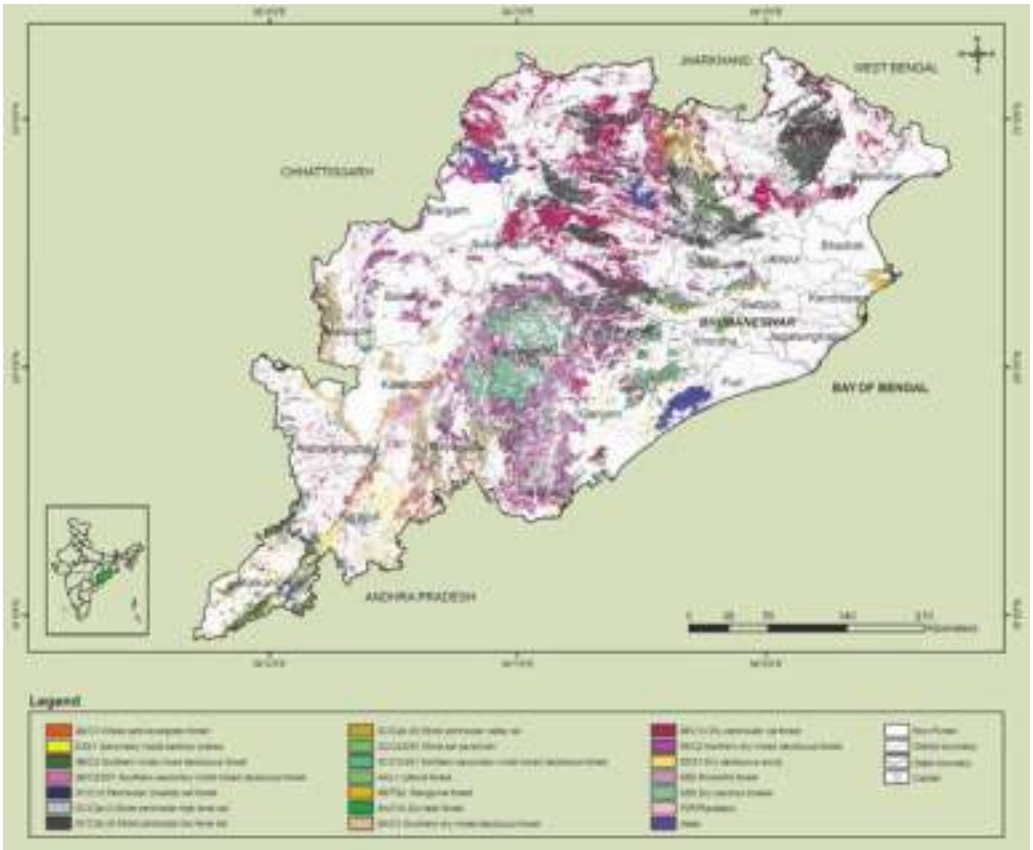


Figure 3-27: Forest Type Map of Odisha

As per ISFR 2023, a total of 1270.07 Km2 forest cover is recorded in the district which is about 24.44% of its total geographical area. Most of the forest present in the district is designated as open forest (944.37 Km2) followed by moderately dense forest (295.96 Km2) and very dense forest (29.74 Km2).

Various Forests has been recorded in the study area are listed below.

Table 3.25:Forest in the Study area

Forests	Direction
Nagasari RF	All directions (around the mining lease area)
Lulubura RF	South-East
Bhilmodi RF	South-East/ East
Hatbari RF	South-East/ East
Padua RF	South
Rantha RF	South
Polput RF	South
Jabagarh RF	West
Palam RF	West
Balel RF	West
Thuba RF	North
Kasundi RF	North
Kallad RF	East

3.4.11.1.2 Flora

The flora of the core and buffer zone of the project has been surveyed in order to generate baseline information and to identify the key plant biodiversity areas and key plant species using a reconnaissance survey followed by vegetation sampling. The study areas comprised of mining areas, and areas within the 10 km radius of mining zones as per the TOR. In addition, an inventory of various floristic elements was also prepared by walking different transects around these sampling sites. In order to understand the composition of the vegetation, most of the plant species were identified in the field itself whereas the species that could not be identified a herbarium specimen was collected along with their photographs for identification later with the help of available published literature and floras of the region. Data obtained from various secondary sources, govt. Departments data and published literature were also included in this study.

The floristic study reported a total of 256 species were reported out of which 120 are tree species, 43 shrubs, 19 climbers, 20 grasses, 5 bamboo and 49 orchids species. The list of floral species is presented in **Table-3.26**

Table 3.26: Floral Diversity within study area

S.No	LOCAL NAME	BOTANICAL NAME	FAMILY
		TREES	
1.	Achu	*Morinda tinctoria*	Rubiaceae
2.	Agasti	*Sesbania grandiflora*	Fabaceae
3.	Amata	*Bauhinia racemosa*	Caesalpinlaceae
4.	Amba	*Mangifera indica*	Anacardiaceae
5.	Ambada	*Spondiu smangifera*	Anacardiaceae
6.	Ambalata	*Bauhinia racemosa*	Caesalpiniaceae
7.	Amrud(Pijuli)	*Psidium guajava*	Myrtaceae
8.	Andini (Rajmai)	*Bursera serrata*	Burseraceae
9.	Ankula	*Alangium lamarckii*	Alangiaceae
10.	Aonla	*Emblica officinalis*	Euphorbiaceae
11.	Ashoka	*Saraca asoca*	Caesalpinlaceae
12.	Babul	*Acacia nilotica*	Mimosaceae
13.	Badopatri	*Callicarpa arborea*	Verbenaceae
14.	Bahada	*Terminalia bellirica*	Combretaceae
15.	Balthia(paldhua)	*Erythrina suberosa*	Fabaceae
16.	Bandhan	*Desmodium oojeinensis*	Fabaceae
17.	Bankapasia	*Kydia calycina*	Malvaceae
18.	Barbakulia	*Dalborgia paniculata*	Fabaceae
19.	Baro	*Ficus benghalensis*	Moraceae
20.	Barun	*Crateva religiosa/ C.nurvala*	Capparaceae
21.	Belo	*Aegle marmelos*	Rutaceae
22.	Bhalia	*Semecarpus anacardium*	Anacardiaceae
23.	Bhenta	*Limoniaacidissima*	Rutaceae
24.	Bheru	*Chloroxylon swietenia*	Rutaceae
25.	Bija	*Pterocarpus marsupium*	Fabaceae
26.	Bishnuchuda	*Jacaranda mimosifolia*	Bignoniaceae
27.	Blue gum (Nilagiri)	*Eucalyptus globulus*	Myrtaceae
28.	Bod-kurhein	*Wrightia tomentosa*	Apocynaceae
29.	Chadaigudi	*Vitex peduncularis*	Verbenaceae
30.	Chakunda(Bada)/R	*Samanea saman*	Mimosaceae
31.	Chakundi	*Cassia siamea*	Caesalpinlaceae
32.	Champa	*Michelia champaca*	Magnoliaceae
33.	Chandan	*Santalum album*	Santalaceae
34.	Char	*Buchanania lanzan*	Anacardiaceae
35.	Chhatin	*Alstonia scholaris*	Apocynaceae
36.	Dam kuruda	*Gardenia latifolia*	Rubiaceae
37.	Dauranja	*Holoptella integrifolia*	Ulmaceae
38.	Debadaru (Ashoka)	*Polyalthia longifolia*	Annonaceae
39.	Dhaman	*Grewia tiliifolia*	Tiliaceae
40.	Dhaura	*Anogeissus latifolia*	Combretaceae
41.	Dimiri	*Ficus glomerata*	Moraceae
42.	Gadapanasa	*Litsea macrophylla*	Lauraceae

S.No	LOCAL NAME	BOTANICAL NAME	FAMILY
43.	Gambhari	*Gmelina arborea*	Verbenaceae
44.	Gandhapalasa	*Miliusa velutina*	Annonaceae
45.	Genduli	*Sterculia urens*	Sterculiaceae
46.	Ghanto	*Zizyphus mauritiana*	Rhamnaceae
47.	Giringa	*Pterospermum heyneamum*	Sterculiaceae
48.	Gohira	*Acacia leucophloea*	Mimosaceae
49.	Gondaguria	*Macaranga peltata*	Euphorbiaceae
50.	Goniari	*Cochlospermum gossipium*	Cochlospermaceae
51.	Haldi	*Diospyros montana*	Ebenaceae
52.	Haldu(Halamda)	*Haldina cordifolia (Adina cor*	Rubiaceae
53.	Harida	*Terminalia chebula*	Combretaceae
54.	Hinjal	*Barringtonia acutangula*	Barringtoniaceae
55.	Jamun	*Sysygium cumini*	Myrtaceae
56.	Japhra	*Bixa orellana*	Bixaceae
57.	Jeoktba	*Artocarpus lakoocha*	Moraceae
58.	Kadamba	*Anthocephalus cadamba*	Rubiaceae
59.	Kaitho	*Feronia elephantum*	Rutaceae
60.	Kaju(Lanka Badam)	*Anacardium occidentale*	Anacardiaceae
61.	Kalasiris	*Albizia lebbeck*	Mimosaceae
62.	Kamalagundi	*Mallotus phillippensis*	Euphorbiaceae
63.	Kanchan	*Bauhinia variegata*	Caesalpiniaceae
64.	Kansa	*Hymenodictyon excellsum*	Rubiaceae
65.	Karanja	*Pongamia pinnata*	Fabaceae
66.	Karda	*Cleistanthuscollinus*	Euphorbiaceae
67.	Kasi	*Bridellia retusa*	Euphorbiaceae
68.	Kendu	*Diospyros melanoxylon*	Ebenaceae
69.	Kenkat	*Garuga pinnata*	Burseraceae
70.	Khaira	*Acacia catechu*	Mimosaceae
71.	Khajuri	*Phoenix sylvestris*	Arecaceae
72.	Kochila	*Strychnosnux-vomica*	Strychnaceae
73.	Koniyari	*Cascabela thevetia*	Apocynaceae
74.	Krushna	*Delonix regia*	Caesalpinlaceae
75.	Kuilari	*Bauhinia purpurea*	Caesalpinlaceae
76.	Kusum	*Schleichera oleosa*	Sapindaceae
77.	Machhkund/Giringa	*Pterospermum heyneanum*	Sterculiaceae
78.	Mahagni	*Swietenia mahagoni*	Meliaceae
79.	Mahul	*Madhuca indica*	Sapotaceae
80.	Mankadakendu	*Diospyros malabarica*	Ebenaceae
81.	Moi	*Lannea coromandelica*	Anacardiaceae
82.	Mokha/Mukha	*Schrebera swietenioides*	Oleaceae
83.	Munagha(Sajana)	*Moringa oleifera*	Moringaceae
84.	Mundi	*Mitragyna parvifolia*	Rubiaceae
85.	Neem/Limba	*Azadiracta indica*	Meliaceae
86.	Nilagiri	*Eucalyptus species*	Myrtaceae

S.No	LOCAL NAME	BOTANICAL NAME	FAMILY
87.	Padhel	*Pterospermum suaveolens*	Sterculiaceae
88.	Pahadisisoo	*Dalbergia latifolia*	Fabaceae
89.	Palasa	*Butea monosperma*	Fabaceae
90.	Panas	*Artocarpus heterophyllus*	Moraceae
91.	Panigambhari	*Trewia nudiflora*	Euphorbiaceae
92.	Phasi	*Anogeissus accuminata*	Combretaceae
93.	Phemphana	*Oroxylum indicum*	Bignoniaceae
94.	Pine(Khasi) Pipal	*Pinus insularis/P.khasia*	Pinaceae
95.	Pipal	*Ficus religiosa*	Moraceae
96.	Pitajamu (poi-gam)	*Syzygium operculate*	Myrtaceae
97.	Radhachuda	*Peltophorum ferrugineum*	Caesalpiniaceae
98.	Rai	*Dellenia pentagyna*	Dilleniaceae
99.	Ram phala	*Annona reticulata*	Annonaceae
100.	Rithaphala	*Sapindus mucorosis*	Sapindaceae
101.	Rohini	*Soymida febrifuga*	Meliaceae
102.	Safed siris	*Albizzia procera*	Mimosaceae
103.	Saguan (Teak)	*Tectona grandia*	Verbenaceae
104.	Sahada	*Strebulus aspera*	Moraceae
105.	Sahaja (Asan)	*Terminalia tomentosa*	Combretaceae
106.	Sal	*Shorea robusta*	Dipterocarpaceae
107.	Salai	*Boswellia serrata*	Burseraceae
108.	Salap (Toddypalm)	*Caryota urens*	Arecaceae
109.	Semili	*Bombax ceiba*	Bombacaceae
110.	Sennha (Sidha)	*Lagerstroemia parviflora*	Lythraceae
111.	Silver oak	*Grevellia robusta*	Proteaceae
112.	Sisoo	*Dalbergia sissoo*	Fabaceae
113.	Sunajhari	*Acacia auriculiformia*	Mimosaceae
114.	Sunari	*Cassia fistula*	Caesalpiniaceae
115.	Tala	*Borassus flabellifer*	Arecaceae
116.	Tangini	*Xyliaxylo carpa*	Mimosaceae
117.	Tentuli	*Tamarindus indica*	Caesalpiniaceae
118.	Thelka	*Tamilnadia uliginosa*	Rubiaceae
119.	Toon	*Toona ciliata*	Meliaceae
120.	Tulip tree (African)	*Spathodea campanulata*	Bignoniaceae
HERBS AND SHRUBS			
1.	Amada/Ama-haldi	*Curcuma amada*	Zingiberaceae
2.	Anata-mula	*Hemidesmus indicus*	Asclepiadaceae
3.	Antia (Murmuria)	*Helicteres isora*	Sterculiaceae
4.	Apamaranga	*Achyranthes aspera*	Amaranthaceae
5.	Arakha (arka)	*Calotropis procera*	Asclepiadaceae
6.	Ashwagandha	*Withania somnifera*	Solanaceae
7.	Ata/Seetaphal	*Annona squamosa*	Annonaceae
8.	Baigaba	*Jatropha carcus*	Euphorbiaceae
9.	Bana-tulasi	*Ocimum gratissimum*	Lamiaceae

S.No	LOCAL NAME	BOTANICAL NAME	FAMILY
10.	Ban-Khajuri	*Phoenix acaulis*	Arecaceae
11.	Barkoli	*Ziziphus mauritiana*	Rhamnaceae
12.	Basanga	*Justicia adhatoda*	Acanthaceae
13.	Besharam/Omori	*Ipomea carnea*	Convolvulaceae
14.	Bhant	*Clerodendron infortunatum*	Verbenaceae
15.	BhejiBaigana	*Solanum xanthocarpum*	Solanaceae
16.	Bhuin-Nim	*Andrographis paniculata*	Acanthaceae
17.	Bhursunga	*Murraya koenigii*	Rutaceae
18.	Bisalya-	*Tridax procumbens*	Asteraceae
19.	Bisiripi/Bajramuli	*Sida cordifolia*	Malvaceae
20.	Brahmi/Thalkuni	*Hydrocotyle asiatica*	Apiaceae
21.	Datura (Duddura)	*Datura stramonium*	Solanaceae
22.	Dhatiki	*Woodfordia fructicosa*	Lythraceae
23.	Dholachakunda	*Cassia tora*	Caesalpiniaceae
24.	Gangasiuli	*Nyctanthes arbortriatis*	Oleaceae
25.	Girli	*Indigofera pulchela*	Fabaceae
26.	Gokhara	*Tribulus terrestris*	Averrhoaceae
27.	Gudamari	*Premna herbacea*	Verbenaceae
28.	Hansalata	*Aristolochia bracteata*	Aristolochiaceae
29.	Hariharika	*Euphorbia hirta*	Euphorbiaceae
30.	Jada	*Ricinus communis*	Euphorbiaceae
31.	Kaminic	*Murrya exotica*	Rutaceae
32.	Kanteikoli	*Zizyphus oenoplea*	Rhamnaceae
33.	Karibira	*Nerium indicum*	Apocynaceae
34.	Khadisiju	*Euphorbia tirucalli*	Euphorbiaceae
35.	Khakada (Kakali)	*Casearia tomentosa*	Flacourtiaceae
36.	Khuradu	*Gardenia gummifera*	Rubiaceae
37.	Kila keruan	*Ixora parviflora*	Rubiaceae
38.	Kundaphula	*Jasminum pubescens*	Oleaceae
39.	Kundo-phul	*Jasminum humile*	Oleaceae
40.	Kurei/Kurmi	*Holarrhena antidysenterica*	Apocynaceae
41.	Mehandi (Manjuati)	*Lawsonia inermis*	Lythraceae
42.	Mohana (Pottua)	*Randia dumetorum*	Rubiaceae
43.	Murga	*Agave americana*	Agavaceae
CLIMBERS			
1.	Arkawla	*Millettia auriculata*	Fabaceae
2.	Atundi	*Combretum decandrum*	Combretaceae
3.	Dantari (Nali-	*Acacia sinuata*	Mimosaceae
4.	Desi Alu	*Dioscorea deltoidea*	Dioscoreaceae
5.	Dudhi-mal	*Cryptolepis buchananii*	Periplocaceae
6.	Gilo	*Entada acandens/E.pursaitha*	Mimosaceae
7.	Gunja (Kaincha)	*Abrusprecatorius*	Fabaceae
8.	Kalmi sag	*Ipomea reptans*	Convolvulaceae
9.	KaruKando/Kulihak	*Dioscorea hispida*	Dioscoreaceae

S.No	LOCAL NAME	BOTANICAL NAME	FAMILY
10.	Lata palasa	*Butea superba*	Fabaceae
11.	Madang	*Loranthus scurrula*	Loranthaceae
12.	Madhumalati	*Hiptage madablota*	Malpighiaceae
13.	Meheriaphulo	*Gloriosa superba*	Liliaceae
14.	Muturi	*Smilax macrophylla*	Smilaceae
15.	Nirmuli	*Cassytha filiformis*	Cassytha
16.	Petchurimal(Torida	*Ventilago madraspatana*	Rhamnaceae
17.	Pitchuli/Kantamali	*Ventilago denticulata*	Rhamnaceae
18.	Satawari	*Asperagus racemosus*	Liliaceae
19.	Siali	*Bauhinia vahlii*	Caesalpiniaceae
BAMBOO			
1.	BadiaBauns	*Bambusa nutans*	Poaceae
2.	Bauns(Salia	*Dendricalamus strictus*	Poaceae
3.	DabaBauns (Kanta	*Bambusa arundinacea*	Poaceae
4.	Sundarkani	*Bambussa vulgaris*	Poaceae
5.	TaledaBauns	*Bambusa tulda*	Poaceae
GRASSES			
1.	Balunga	*Oryza rufipogon*	Poaceae
2.	Basana	*Bethriochoapertma*	Poaceae
3.	Chhana	*Imperata arundinaceae*	Poaceae
4.	Dhanwaritari	*Cymbopogon flexuosus*	Poaceae
5.	Duba (Dhubo)	*Cynodon dactylon*	Poaceae
6.	Ghodalanji	*Aristida setacea*	Poaceae
7.	Gondabena	*Bothriochloa bladhii*	Poaceae
8.	Guguchia	*Chrysopogon gryllus*	Poaceae
9.	Jharu	*Arundinella setosa*	Poaceae
10.	Kasatandi (Chadeia)	*Saccharum spontaneum*	Poaceae
11.	Khus-Khus (Bena)	*Vetiveria zizaniodes*	Poaceae
12.	Koji jhipa (Kuti)	*Eragrostis coaretata*	Poaceae
13.	Noto	*Phragmites karka*	Poaceae
14.	Phulbadhun	*Thysanolaena maxima*	Poaceae
15.	PhuriPhuri	*Eragrostis unioloides*	Poaceae
16.	Rosa grass	*Cymbopogon matinii*	Poaceae
17.	Sabai (Panasi)	*Eulaliopsis binata*	Poaceae
18.	Sinkulia	*Heteropogon contortus*	Poaceae
19.	Tandi (kasatandi)	*Saccharum spontaneum*	Poaceae
20.	Tuli	*Ichaemum rugosum*	Poaceae

List of Orchids Species present in the study area

S.No	BOTANICAL NAME	STATUS	FAMILY
1.	*Acampe ochracea*	Occasional	Orchidaceae
2.	*Acampe praemorsa*	Freequent	Orchidaceae

S.No	BOTANICAL NAME	STATUS	FAMILY
3.	*Aerides odorata*	Occassional	Orchidaceae
4.	*Aerides ringens*	Occassional	Orchidaceae
5.	*Bulbophyllum carniflorum*	Occassional	Orchidaceae
6.	*Bulbophyllum guttulatum*	Rare	Orchidaceae
7.	*Bulbophyllum polyrhizum*	Occassional	Orchidaceae
8.	*Crepidium mackinnonii*	Scarce	Orchidaceae
9.	*Demdrobum aphyllum*	Occassional	Orchidaceae
10.	*Demdrobumbic ameratum*	Occassional	Orchidaceae
11.	*Demdrobum regium*	Scarce	Orchidaceae
12.	*Dendrobium herbaceum*	Occassional	Orchidaceae
13.	*Dendrobium crepidatum*	Scarce	Orchidaceae
14.	*Dendrobium crepidatum*	Scarce	Orchidaceae
15.	*Dendrobium herbaceum*	Occassional	Orchidaceae
16.	*Dendrobium macrostachyum*	Freequent	Orchidaceae
17.	*Dendrobium macrostachyum*	Freequent	Orchidaceae
18.	*Dendrobium transparens*	Occassional	Orchidaceae
19.	*Dendrobium transparens*	Occassional	Orchidaceae
20.	*Gastrochileus inconspicuum*	Freequent	Orchidaceae
21.	*Geodorum recurvum*	Freequent	Orchidaceae
22.	*Habenaria commelinifolia*	Freequent	Orchidaceae
23.	*Habenaria furcifera*	Occassional	Orchidaceae
24.	*Habenaria grandifloriformis*	Scarce	Orchidaceae
25.	*Habenaria longicorniculata*	Scarce	Orchidaceae
26.	*Habenaria marginata*	Scarce	Orchidaceae
27.	*Habenaria panigrahiana*	Occassional	Orchidaceae
28.	*Habenaria plantaginea*	Occassional	Orchidaceae
29.	*Habenaria roxburgmii*	Freequent	Orchidaceae
30.	*Kingidium deliciosum*	Occassional	Orchidaceae
31.	*Liparis viridiflora*	Scarce	Orchidaceae
32.	*Luisa trichorhiza*	Freequent	Orchidaceae
33.	*Luisia zeylanica*	Occassional	Orchidaceae
34.	*Nervilia aragoana*	Occassional	Orchidaceae
35.	*Nervilia crociformis*	Scarce	Orchidaceae
36.	*Nervilia plicata*	Abundant	Orchidaceae
37.	*Oberonia ensiformis*	Occassional	Orchidaceae
38.	*Oberonia falconeri*	Occassional	Orchidaceae
39.	*Pecteilis henryi*	Rare	Orchidaceae
40.	*Pelatanthera insectifera*	Occassional	Orchidaceae
41.	*Peristylus constrictus*	Occassional	Orchidaceae
42.	*Peristylus plantagineus*	Scarce	Orchidaceae
43.	*Pholidota imbricata*	Freequent	Orchidaceae
44.	*Polystachya concreta*	Rare	Orchidaceae
45.	*Rhynchostylis retusa*	Freequent	Orchidaceae
46.	*Seidenfia rheedii*	Occassional	Orchidaceae

S.No	BOTANICAL NAME	STATUS	FAMILY
47.	*Thunia bracteata*	Occassional	Orchidaceae
48.	*Vanda tessellata*	Freequent	Orchidaceae
49.	*Vanda testacea*	Freequent	Orchidaceae

**Source: Primary Survey Data; Forest working Plan of Koraput forest Division 2006-07 to 2015-16*

3.4.11.1.3 Faunal Diversity

A negligible abundance of fauna has been noticed during the primary study of this project. Maximum faunal species enumerated in this study were captured from the secondary information. In order to study the wild mammals, avifauna, herpetofauna and insects of the project area 1-2 km line transect trails were carried out in the different locations. The study area was divided into different strata based on vegetation and topography. Sampling for habitat and animals was done in different strata. As the normal systematic transects for mammals and birds were not possible in this study area due to difficult terrain, therefore mostly trails were used for faunal sampling. In addition to the field sampling secondary data and information were also collected as follows: a) Direct sighting and indirect evidence such as calls, signs and trophies of mammals were recorded along the survey routes taking aid from Prater (1980), b) Interviews of local villagers for the presence and relative abundance of various animal species within each locality c) The Forest Working Plan of the Forest Division falling in the project area was referred to for secondary information on the wildlife of the area.

A total of 35 mammals, 23 Reptiles and 51 Avifaunal species were recorded/ reported from the study area. Among these faunal species, a total 38 species come in the Schedule-I category of IWPA 1972 (ammended 2022). List of faunal species is presented in (**Table-3.27**).

Table 3.27: Faunal Diversity from Study Area

S.No	Local Name	English Name	*Scientific Name*	IUCN	IWPAA Schedule
MAMMALS					
1.	Badudi	Short nosed fruitbat	*Cynopterus sphinx*	LC	-
2.	Bagha	Tiger	*Panthera tigris*	EN	I
3.	Bagrakapta	Pangolin	*Manis crassicaudata*	EN	I
4.	BaliaKukur	Wild dog or Dholes	*Cuon alpinus*	EN	I
5.	Banbiradi	Jungle cat	*Felis chaus*	LC	I
6.	Barha	Wild boar	*Sus scrofa cristamus*	LC	II
7.	Bhalu	Sloth bear	*Melursus ursinus*	VU	I
8.	Bilua	Jackal	*Canis aureus*	LC	I
9.	Chausingha	The Four horned antelope	*Tetracerus quadricornis*	VU	I
10.	Cheetah Biradi	Leopard cat	*Felis bengalensis*	LC	I
11.	Chhuchhundra	Grey musk shrew	*Suncus murinus*	LC	-
12.	Gada Bhalu	Ratel	*Mellivora capensis*	LC	I

S.No	Local Name	English Name	*Scientific Name*	IUCN	IWPAA Schedule
13.	Gunduchimusa	3 stripped palm squirrel	*Funambulus palmarum*	LC	-
14.	Gunduchimusa	5 stripped palm squirrel	*Funambulus pennanti*	LC	-
15.	Gurandi	Mouse deer	*Tragulus meminna*	LC	I
16.	Harina	Spotted deer	*Axis axis*	LC	II
17.	HetaBagha	Hyaena	*Hyaena hyaena*	NT	I
18.	Jhinka	porcupine	*Hystrix indica*	LC	I
19.	KalarapatriaBagha	Leopard (Panther)	*Panthera pardus*	VU	I
20.	Kokisiali	Fox	*Vulpes bengalensis*	LC	I
21.	Kutura	Barking deer	*Muntiacus muntijack*		
22.	Mankada (Hanu)	Monkey	*Semnopithecus entellus*	LC	II
23.	Mankada (Pati)	Rhesus monkey	*Macaca mulatta*	LC	II
24.	Musa	Rat	*Rattus rattus*	LC	-
25.	Musa	White tailed wood rat	*Rattus blanfordi*	LC	-
26.	Musa	Long tailed tree mouse	*Vandeleuria oleracea*	LC	-
27.	Musa (Nepali)	Gaintindian squirrel	*Ratufa indica*	LC	-
28.	Neula (Hatia)	Common mongoose	*Urva edwardsii*	LC	I
29.	Neula (Kuji)	Small indian mongoose	*Urva auropunctata*	LC	I
30.	Odha	Smooth Indian otter	*Lutra perspicillata*	VU	I
31.	Ramsiali	Wolf	*Canis lupus*	VU	I
32.	Saliapatani	Small Indian civet	*Viverricula indica*	LC	I
33.	Saliapatani	Toddy cat	*Paradoxurus hermaphroditus*	LC	I
34.	Sambar	Sambar	*Cervus unicolor*	VU	I
35.	Thekua	Hare	*Lepus nigricollis*	LC	II
REPTILES					
1.	Ahiraja	King cobra	*Ophiphagus hannah*	VU	I
2.	Ajagarh	Indian python	*Python molurus*	NT	I
3.	Boda	Common boa	*Boa constricta*	LC	II
4.	Chiti	Common Indian krait	*Bungarus caeruleus*	LC	II
5.	Dhamana	Rat snake	*Ptyas mucosa*	LC	I
6.	Dhandaboda	Russels viper	*Daboia russelii*	LC	I
7.	Dhulinag	Saw scale viper	*Echis carinatus*	LC	II
8.	Kandanali	Tree snake	*Ahetulla spp*	-	-
9.	Laudankia	Common green	*Dryophisna sutrus*	-	-

S.No	Local Name	English Name	*Scientific Name*	IUCN	IWPAA Schedule
		whipsnake			
10.	Naga (Gokhar)	Indian cobra	*Naja species*	LC	I
11.	Panidhanda	Checkered keel back	*Natrix piscator*	LC	I
12.	Rana	Krait	*Bungarus candidus*	LC	
13.	Telisapa	Common blind snake	*Typhlops brahminus*	LC	II
14.	Bahurupi	Indian chameleon	*Chameleon zeylanicus*	LC	I
15.	BahurupiKuasa p	Garden geeko	*Calotes versicolor*	LC	-
16.	Champainoil	Skink	*Mabuya bibro*	-	II
17.	Endua	Rock geeko	*Hemidactylus maculatus*	LC	-
18.	Godhi	Land monitor	*Varanus bengalensis*	NT	I
19.	Jhitipiti	House lizard	*Hemidactylus flaviviridis*	LC	-
20.	PaniGodhi	Water monitor	*Varnus salvador*	LC	I
TORTOISE					
21.	Chebedakaincha	Land tortoise	*Trionyx gangeticus*	EN	I
22.	Kurma	Indian tent turtle	*Pangshura tentoria*	LC	I
23.	Panikaincha	Terrapin	*Lissemys punctata*	VU	I

Abbreviations:
IUCN: International Union for Conservation of Nature
IUCN Red List of Threatened Species: Categories (CR: Critically Endangered; EN: Endangered; VU: Vulnerable; NT: Near Threatened; LC: Least Concem; DD: Data Deficient; NA: Not Accessed).
IWPAA: Indian Wild Life (Protection) Amendment Act, 2022, an act further to amend the Wild Life (Protection) Act, 1972 (Schedule I and II).
Source: Approved WLCP for Ballada bauxite Block

Under the current investigation, a total of 51 avifauna species were reported/ recorded. Jungle fowl grey, Hornbill malabar pied, Peafowl common, Vulture white backed or Bengal Myna was the species that comes under the Schedule-I category of IWPAA among enumerated avifaunal species. List of avifauna species presented in **Table 3.28**.

Table 3.28: Avifaunal Diversity from Study Area

S.No	Local Name	English Name	Scientific Name	IUCN	IWPAA Schedule
1.	Baga	Egret cattle	*Bubulcus ibis*	LC	II
2.	Banakukuda	Jungle fowl grey	*Gallus sonneratii*	LC	I
3.	Banakukuda	Jungle fowl red	*Gallus gallus*	LC	II
4.	Bani	Mynaindian	*Acridotheres tristis*	LC	II
5.	Batak	Teal common	*Anas crecca (Linnaeus)*	LC	II
6.	Baya	Baya weaver bird	*Ploceus philippinus*	LC	II

S.No	Local Name	English Name	Scientific Name	IUCN	IWPAA Schedule
7.	Bhadbhadalia	Roller or blue jay	*Coracias benghalensis*	LC	II
8.	Bhaliakhai	Hornbill Common grey	*Ocyceros birostris*	LC	II
9.	Bhrungaraja	Drongo rocket tailed	*Dicrurus paradiseus*	LC	II
10.	Bulbul or Gobrachadhei	Bulbul (red vented)	*Pycnonotus cafer*	LC	II
11.	Chakua-chakoi	Duck Ruddy sheldrake	*Tadorna ferruginea*	LC	II
12.	Chatak	Cuckoo pied crested	*Clamator jacobinus*	LC	II
13.	Chataka	Swift House	*Apus affinis*	LC	II
14.	Chilla	Kite common pariak	*Milvus migrans*	LC	II
15.	Damara kau	Crow jungle	*Corvus macrorhynchos*	LC	II
16.	Deuliapara	Pigeon Bluerock	*Columba livia*	LC	NL
17.	Gandalia	Stork openbilled	*Anastomus oscitans*	LC	II
18.	Gharchatia	Soarriw House	*Passer domesticus*	LC	II
19.	Ghukalika	Myna pied	*Gracupica contra*	LC	II
20.	Gunduri	Quail blue legged	*Turnix suscitator*	LC	II
21.	Haladibasanta	Oriole black headed	*Oriolus xanthornus*	LC	II
22.	Hansa	Duck Grey or spotbill	*Anas poecilorhyncha*	LC	II
23.	Hansarali	Grebe little or Debachick	*Tachybaptus ruficollis*	LC	II
24.	Kajalpati	Drongo black or King crow	*Dicrurus macrocercus*	LC	II
25.	Kantiabaga	Heron pond or paddy bird	*Ardeola grayii*	LC	II
26.	Kapota	Dove king	*Streptopelia decaocto*	LC	II
27.	Kapota	Dove spotted	*Spilopelia chinensis*	LC	II
28.	Kathkhumpa	Woodpecker	*Yungipicus nanus*	LC	II
29.	Kathkhumpa	Woodpecker golden backed	*Dinopium benghalense*	LC	II
30.	Kau	House Crow	*Corvus splendens*	LC	NL
31.	Koili	Cuckoo common Hawk	*Hierococcyx varius*	LC	II
32.	Koili	Cuckoo indian	*Cuculus micropterus*	LC	II
33.	Kuchilakhai	Hornbill malabar pied	*Anthracoceros coronatus*	NT	I
34.	Kumbhatua	Crowpheasant	*Centopus sinensis*	LC	II
35.	Kunda	Babbler common	*Argya caudata*	LC	II
36.	Machharanka	King fisher pied	*Ceryle rudis*	LC	II
37.	Mayur	Peafowl common	*Pavo cristatus*	LC	I

S.No	Local Name	English Name	Scientific Name	IUCN	IWPAA Schedule
			(Linnaeus)		
38.	Nilkantha	Robin magpie	*Copsychus saularis*	LC	II
39.	Pahadi bulbul	Bulbul (red whiskered)	*Pycnonotus jocosus*	LC	II
40.	Panikua	Cormorant little	*Microcarbo niger*	LC	II
41.	Para	Pigeon imperial green	*Ducula aenea*	NT	II
42.	Pecha	Owl indian greathorned	*Bubo bubo*	LC	II
43.	Pecha	Owlet spotted	*Athene brama*	LC	II
44.	Phutki	Tailor bird	*Orthotomus sutorius*	LC	II
45.	Saguna	Vulture white backed or bengal	*Gyps bengalensis*	CE	I
46.	Sankhachilla	Kite Brahminy	*Haliastur indus*	LC	II
47.	Sari	Myna hill	*Gracula religiosa*	LC	I
48.	Sua	Parakeet large indian	*Psittacula eupatria*	NT	II
49.	Teetiri	Patridge grey	*Ortygornis pondicerianus*	LC	II
50.	Teetri	Quail Bush jungle	*Perdicula asiatica*	LC	II
51.	Teetri	Quail Bushpainted	*Perdicula erythrorhyncha*	LC	II

Abbreviations:
IUCN: International Union for Conservation of Nature
IUCN Red List of Threatened Species: Categories (CR: Critically Endangered; EN: Endangered; VU: Vulnerable; NT: Near Threatened; LC: Least Concem; DD: Data Deficient; NA: Not Accessed).
IWPAA: Indian Wild Life (Protection) Amendment Act, 2022, an act further to amend the Wild Life (Protection) Act, 1972 (Schedule I and II).
Source: Approved WLCP for Ballada bauxite Block

3.4.11.2 Species of Conservation Significance

The Wildlife Protection (Amendment) Act 2022, identifies a total of 38 species listed under Schedule-I within the study area, which consists of 21 mammals, 05 birds, and 12 reptile species.

Table 3.29: Species of Conservation Significance from Study Area

SL. No.	English Name	Scientific Name
Mammals		
1.	Tiger	*Panthera tigris*
2.	Pangolin	*Manis crassicaudata*
3.	Wild dog or Dholes	*Cuon alpinus*
4.	Jungle cat	*Felis chaus*
5.	Sloth bear	*Melursus ursinus*

SL. No.	English Name	Scientific Name
6.	Jackal	*Canis aureus*
7.	The Four horned antelope	*Tetracerus quadricornis*
8.	Leopard cat	*Felis bengalensis*
9.	Ratel	*Mellivora capensis*
10.	Mouse deer	*Tragulus meminna*
11.	Hyaena	*Hyaena hyaena*
12.	porcupine	*Hystrix indica*
13.	Leopard (Panther)	*Panthera pardus*
14.	Fox	*Vulpes bengalensis*
15.	Common mongoose	*Urva edwardsii*
16.	Small indian mongoose	*Urva auropunctata*
17.	Smooth Indian otter	*Lutra perspicillata*
18.	Wolf	*Canis lupus*
19.	Small Indian civet	*Viverricula indica*
20.	Toddy cat	*Paradoxurus hermaphroditus*
21.	Sambar	*Cervus unicolor*
Reptiles		
1.	King cobra	*Ophiphagus hannah*
2.	Indian python	*Python molurus*
3.	Rat snake	*Ptyas mucosa*
4.	Russels viper	*Daboia russelii*
5.	Indian cobra	*Naja species*
6.	Checkeered keelback	*Natrix piscator*
7.	Indian chameleon	*Chameleon zeylanicus*
8.	Land monitor	*Varanus bengalensis*
9.	Water monitor	*Varnus salvador*
10.	Land tortoise	*Trionyx gangeticus*
11.	Indian tent turtle	*Pangshura tentoria*
12.	Terrapin	*Lissemys punctata*
Aves		
1.	Grey Jungle fowl	*Gallus sonneratii*
2.	Malabar pied hornbill	*Anthracoceros coronatus*
3.	Peafowl common	*Pavo cristatus*
4.	Vulture white backed	*Gyps bengalensis*
5.	Myna hill	*Gracula religiosa*

3.4.11.3 Aquatic Ecology

There are various water bodies present in the study area include Patala River, Gurahi River, Jalaput Reservoir, Basukingrha Nala and Masana Nala along with some village ponds. The fish communities within these water bodies were estimated with the help of

experimental fishing in the project area. Total of 17 freshwater fish species were collected during experimental fishing. Fish species recorded during the primary survey are listed in Table below.

Table 3.30: Fish Fauna recorded in Study Area

	FISHES (FRESH WATER)			
S.No	**Local Name**	**English Name**	**Latin Name**	**Schedule**
1.	Balia	Freshwater Shark	*Wallagoniaattu*	*Not included*
2.	Bansapati		*Alliacoha*	
3.	Bhakur	Buffalo fish (catle)	*Catlacatla*	
4.	Chenga	Schneider	*Ophiocaphalusgachua*	
5.	Dandkiri	Dandkiri	*Esomusdandrica*	
6.	Gadisa	Gadisa	*Ophiocaphalus punctatus*	
7.	Jallah	Jallah	*Chela argentea*	
8.	Kantia	Kantia	*Myotuscavasius*	
9.	Kerandi	Kerandi	*Barbusambassis*	
10.	Kou	Kou	*Anabas tistudineus*	
11.	Magura	Magura	*Clariasbatrachus*	
12.	Mahurali	Mahurali	*Amblypharyngodon mola*	
13.	Mirakali	Mirkali	*Cirrhinamrigala*	
14.	Pohale (chuna)	Pohale	*Cirrbinareba*	
15.	Pohale (Denga)	Pohale	*Labeobata*	
16.	Rohi	Rohu	*Labeorohita*	
17.	Singi	Bloch	*Heterophneustesfossilis*	

04 Macrophytes were also recorded during the primary survey carried out under this project.

Table 3.31: Macrophytes recorded in Study Area

Sl. No.	Scientific Name	Family
1	*Fimbristylis dichotoma*	Cyperaceae
2	*Hydrilla verticillata*	Hydrocharitaceae
3	*Ammannia baccifera*	Lythraceae
4	*Cyperus difformis*	Cyperaceae

3.4.12 Socio-Economic Environment

Any developmental activity exerts a direct impact on the socio-economic environment of the region. Usually, the beneficial impacts such as better job opportunities, improved education, communication, energy, housing, health, transportation facilities etc. outweighs the adverse impacts, if any.

The study of socio-economic component of environment is incorporating various facets, viz. demographic structure, availability of basic amenities such as housing, education, health and medical services, occupation, water supply, sanitation, communication and power supply, prevailing diseases in the region as well as features such as places of tourist attraction and monuments of archaeological importance. The study of these parameters in identifying predicting and evaluating the likely impacts due to project activity in the surrounding region due to operation of the proposed project.

Baseline data such as demographic pattern, occupational status, educational, health and other amenities as existing in the study area have been studied.

3.4.12.1 Baseline Status

The latest Socio-Economic Status of the study area has been reviewed to generate the existing socio-economic scenario. Information on socio-economic profile was collected from the Primary Census Abstract CD 2011 including the population details of the region.

3.4.12.1.1 Demographic Structure

Study Area

The study area was defined as an area within 10 km radius around the mining project site. The details of the parameters of demographic structure of the study area within 10 km are shown in **Table -3.32.**

Table 3.32: Summarized demographic stucture of the study area

Sl. No.	Parameter	Study Area (Rural)
1.	Total no. of Villages	102
2.	Household	11113
3.	Household Ratio	3.8
4.	Total Population	42384
5.	Male Population %	20531(48.44%)
6.	Female Population %	21853(51.56%)
7.	Population (0-6 Years) %	7536(17.78%)
10.	Sex Ratio	1064
11.	Child Sex Ratio	970
12.	Scheduled Caste %	5542(13.07%)
13.	Scheduled Tribes %	23877(56.33%)
14.	Literates %	13820(32.61%)
15.	Male Literates%	8936(64.66%)

Sl. No.	Parameter	Study Area (Rural)
16.	Female Literates%	4884(35.34%)
17.	Main Workers %	15164(35.78%)
i.	Cultivators	11676(76.98%)
ii.	Agriculture Labourers	1577(10.40%)
iii	Household Workers	84(0.55%)
iv	Other Workers	1827(12.04%)
18.	Marginal Workers %	10531(24.85%)
19.	Non-Workers %	16689(39.37%)

Source: PCA Census 2011

3.4.12.1.2 Demographic Profile of the Study Area (10 Km radius)

Household and Population

Total number of households in the study area is about 11113 with total population in study area is about 42384 with male population is 20531(48.44%) and female population is 21853(51.56%)

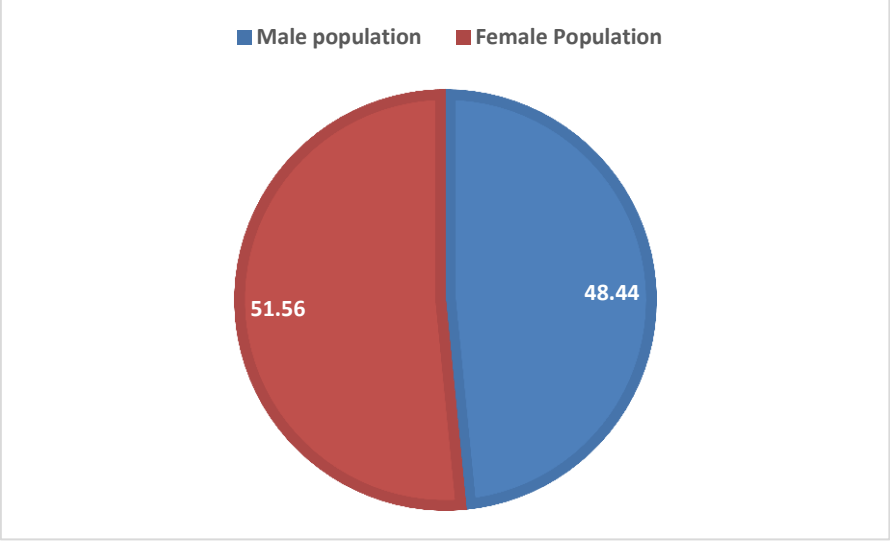


Figure 3-28: Male and Female Population in the Study Area

Household Ratio and Population Density

The average family size i.e person per family is about 3.8. It can be concluded from the data obtained that the study area is average populated.

Population 0-6 Age-Group

Out of the total population, the population of children within the age of 0-6 age-group in rural area is 7536(17.78%).

Sex Ratio & Child Sex Ratio

Sex ratio (No. of females per 1000 males) is 1064 in study area which indicates that females are less in number than their male counterpart in study area and also the Child Sex ratio is 970 in study area i.e no.of female child per 1000 male child. It can be concluded from the data that female child is lower than the adult female population. The graphical presentation of the distribution of population is given in fig below.

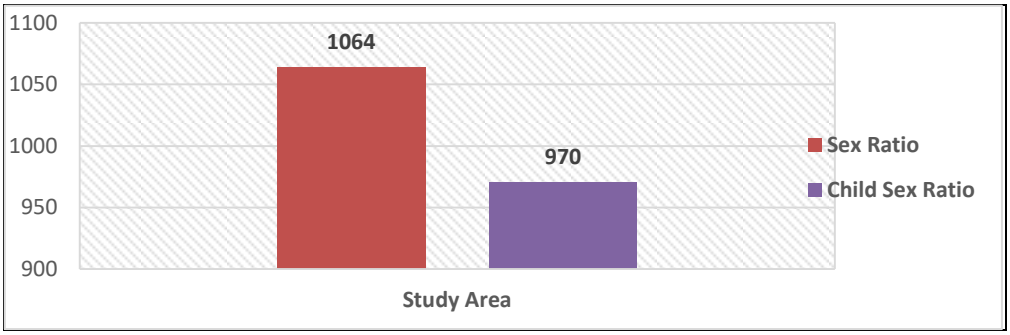


Figure 3-29: Sex Ration in the study area

3.4.12.1.3 Scheduled Caste and Scheduled Tribes Population in the Study Area

Scheduled caste population in study area is about 5542 (13.07%) while scheduled tribe population are higher of about 23877(56.33%) in the study area.

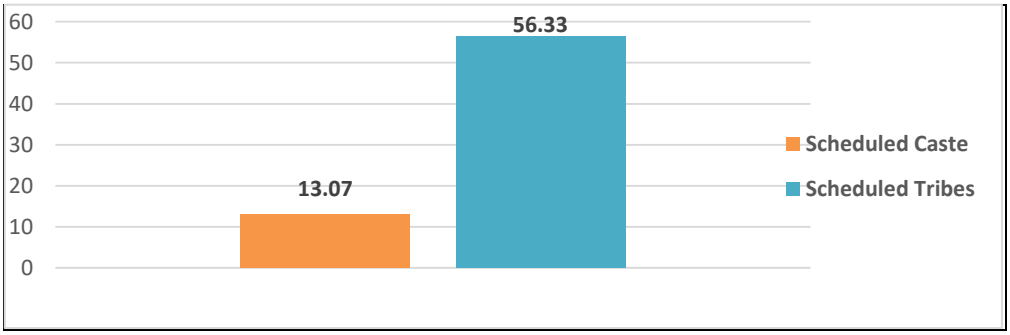


Figure 3-30: Schedule Cast & Schedule Tribe Population in study area

3.4.12.1.4 Literacy Rate in the Study Area

Out of the total population 13820 i.e 32.61% literates are in the study area with male literates 8936(64.66%) and female literates 4884(35.34%) in the study area. The literacy level of the region is poor of which the male populations are more literates as compared to the female population.

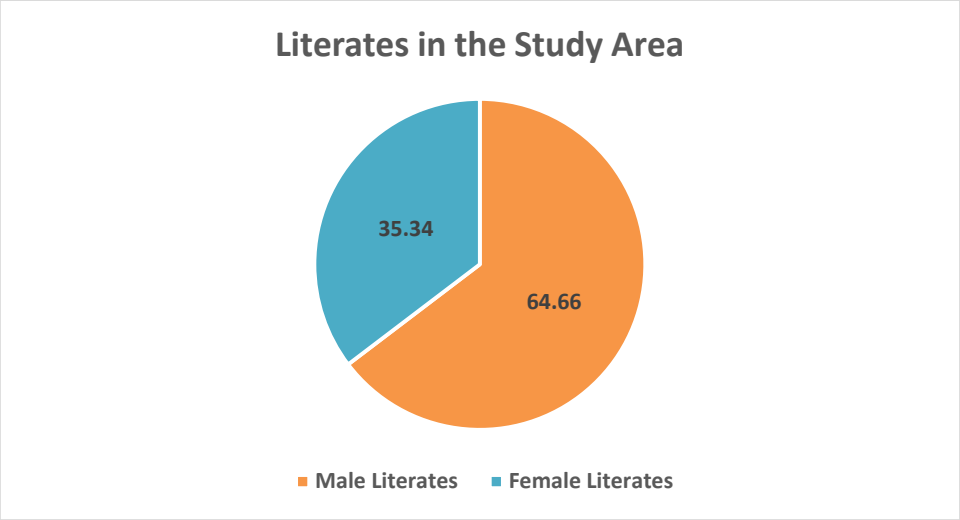


Figure 3-31: Showing the Literacy Rate in the Study Area

3.4.12.2 Occupational Pattern/ Economic Resource Base

Total Workers

Occupational pattern of the villages in the study area within 10 km is abstracted from Census of India 2011 of Odisha State. Occupational pattern of any region mainly depends upon its economically active group i.e. the working populations involved in different economically productive activities. The total workers further categorized as main worker, marginal and the non-working population.

A. Main Workers

Main workers are those who have worked for a major part of the year (i.e. at least six months or 183 days). Main activity of a person who was engaged in more than one activity was reckoned in terMiddle school of time disposition. 15164 (35.78%) in the study area from the total population comes under the main workers category from the villages coming in the project site. Main workers are further classified into 4 categories viz., cultivators, agricultural laborers and household workers and other main workers.

Cultivators

Maximum population in the study area is engaged as Cultivators'i.e depended on agriculture. The cultivator population within the area is 11676(76.98%). It can be concluded from the data the populations in the villages are mainly engaged in agriculture activity.

Agricultural Laborers

Persons working on land owned by others for wages or share in the yield have been treated as agricultural laborers. Out of the total main worker category in the study area, agricultural laborers population in study area is about 1577(10.40%).

Laborers in Household Industry

The laborers engaged in household activity are quite low in all the study area. Among the total main worker very few populations are engaged in household activity are only 84(0.55%) people in the study area.

Other Workers

All main workers i.e. those who have been engaged in some economic activity during the last one year and who are neither cultivators nor agricultural laborers or household industry workers are classified as other main workers. The type of workers that come under this category includes factory workers, plantation workers, those in trade, commerce, business, transport, construction, political or social works, all government servants, municipal employees, teachers, priests, entertainers, artists etc. Among the total population of the study area 1827(12.04%) are engaged in other activity.

It can be concluded that maximum population from the villages are engaged in agriculture and its allied activities. Different types of workers in total worker population may be classified and described below while presented in **Figure 3.27**.

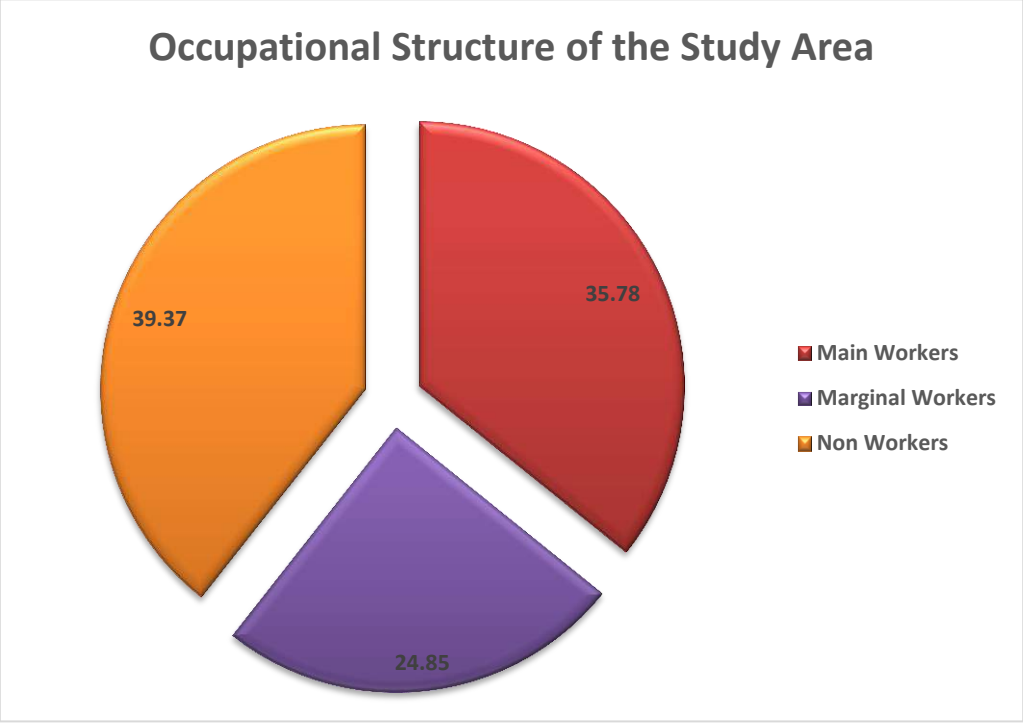


Figure 3-32: Occupational Structure in the Study Area

B. Marginal Workers

Marginal workers are those who have worked any time in the year for less than six months or 183 days but have not worked for a major part of the year. The population of marginal workers within the study area comprises of about 10531(24.85%) of the total population.

C. Non-Workers

Non-Workers are those who have not worked any time at all in the year. Non-workers constitute householders, students, dependents, retired persons etc. Workers are engaged in private jobs in industrial area in the study area, which is mostly temporary and on contractual basis so it is being observed that the 16689(39.37%) population are among the non-woker population in the study area.

It can be inferred from the data collected that the percentage of population engaged as marginal workers can be higher as most of the population are engaged as laboures working in the Mines in the study area and the nature of the job is mostly temporary in nature.

3.4.12.3 Infrastructure Resource Base in the Study Area

The details of infrastructure resources base of the study area with reference to education, drinking water, medical facility, sanitation and drainage, transportation, communication facility, power supply, etc. are presented below.

3.4.12.3.1 Education Faclities

There are 56 private primary schools, 14 private middle schools, 5 private High School, 2 Senior Secondary schools in the study area. Nearest Senior secondary school is in Lamtaput, Thuba, Jalaput and Paikthuba in the study area. While nearest arts and Commerce college is in Jeypore, Nanadapur, Medical College is in Simliguda, Polytechnic college is in Jeypore town.

Education facilities near project site is giveb below.

Table 3.33: Education Facilities near Project Site

NAME OF THE EDUCATIONAL FACILITY
Balda SSD High School
WGS SchooL, Balda
Upper primary school, Taintar
Luluburu New Primary School
Project Primary School, Arlabput
Ekalavya Model Residential School
Primary School, Mulda
Government Primary School, Rasaput



School in Ballada Village

3.4.12.3.2 Drinking Water Faclities

The numbers of major sources of drinking water in the study area is through Tube wells in 62 villages Hand Pump facility in 11 villages, Uncovered Wells in only 2 villages, covered well in 8 villages and tank water in 18 villages through spring in 12 villages and by River in 21 villages of the study area. Most of the villages do not have treated tap water facility and the quality of water is very poor in the study area.

Jal Jeevan Mission - Har Ghar Jal (Koraput District)

The Jal Jeevan Mission in Koraput district was launched on 15 Aug 2019. The total number of households to be identified in the district was 3,24,151 of which tap water connection was given to only 7,471(2.30%) while at present 1,75,152 households i.e 54.03% have been benefitted under Har Ghar Jal Mission.

3.4.12.3.3 Medical Faclities

Medical facility is available in the form of medical colleges, Community health centres, Primary health Centres, mobile health centres and Dispensaries in the state.

The medical facilities are provided by different agencies like Maternal and Child Welfare centre in 5 villages, Primary Health Sub- Centre is in 0-5 kms. Mobile Health Clinics is in 3 villages (Tudukuthuba, Padua, Kasandi) Govt., Private individuals and voluntary organizations in the district. There were 2 no. DHH, 16 nos. CHC, 51 nos. PHC of the Allopathic medical institutions including 307 nos. of Sub Centre in the district during the year 2019-20. There were 18 nos. of Homoeopathic dispensaries and 18 nos. of Ayurvedic dispensaries in the district during the year 2019-20.

Table 3.34: Health Facilities in Koraput District

Malaria (2020)			Leprosy 2019-20		Tuberculosis		Blindness (2019-20)	
Pv	**Pf**	**Deaths**	**Cases Found**	**Cases Treated**	**Cases Found**	**Cases Treated**	**Cataract target**	**Achievement**
96	3450	0	350	302	2492	2492	9245	1540
HIV	AIDS							
Cases Found	Cases Treated							
142	42							

Source: Directorate of Health, Koraput District, Odisha

It is observed from the data obtained under the health programmes conducted by the health department in Koraput district that there has been no death due to malaria in the region while almost all the patients have been treated of tuberculosisin the district in the year 2020.

3.4.12.3.4 Sanitation and Drainage

It is observed that there is open pucca drainage system is available in 60 villages and 11 villages have open uncovered drainage system in 11 villages in the study area. 30-35% households in the study area have Toilet facility. The sanitation and drainage facility are very poor in the village and villagers are not aware health and hygiene.

3.4.12.4 Economic Resource Base in the Study Area

The district economy mainly depends on agriculture and which mainly depends on rainfall. The rainfall depends on South-West monsoon. Out of total cropping area of 296000 ha in Koraput, irrigation potential in Kharif is 30.71% and in Rabi is 21.51%. Generally, crops grown during Rabi like Paddy, Wheat, Maize, Ragi, Mung, Biri, Groundnut, Mustard, Field Pea, Sunflower etc. needs assured irrigation.

The Economy of Koraput District is primarily based upon forestry and agriculture (including shifting cultivation), the bulk of commodities used domestically for everyday use are agricultural and forest products. The district with semi evergreen to deciduous vegetation endowed with various wild plants as a natural resource. The perennial streams and rivulets, the availability of huge under-utilized ground water, the potentials to promote eco-tourism, the women self-help groups who have taken responsibilities of implementing mid-day meal, Public Distribution System and other economic activities and the village and cottage industries in different parts of the district are the strengths of the District's Economy.

Agriculture is the mainstay of the Economy of the Koraput District because around 83 percent depends on it. The soil and climate in the district are favourable for taking up of agro horticultural activities. The suitability of soil and climatic condition for production

of coffee, cashew, cotton, tobacco, vegetable and fruits and the production of these crops strengthen the economy of the Koraput District

Although there has been no sustained prospecting, it is well known that the district is rich in mineral deposits of which the important ones are given below.

1. Clay

2. Limestone

3. Manganese

4. Mica

5. Ochre

6. Bauxite

7. Dimension stone

8. Mica

9. Quartzite

10. Graphite

11. Nepheline Syenite

12. Soap Stone

13. Gold and Semi-Precious Stone

14. Semi-precious Stones

Major industries

There are only five Large Scale industries located in the district manufacturing & Processing Alumina, Paper, Cement, Aeronautical Engine & hydro electricity. The general pattern of non-agricultural employment, however, leans heavily towards small-scale and household industries.

- Hindustan Aeronautics Limited (HAL) - Sunabeda
- NALCO-Damanjodi
- BILT PAPERMILL-Jeypore
- Kolab Hydroelectric Power Station
- Macha kunda Hydroelectric power station Under Lamptaput Block
- Kodingamali bauxite mines

Minerals

The principal economic mineral deposits of Koraput district are Limestone & Bauxite, besides this, occurrence of China clay, Nepheline Synite, Gold, Black & Multi colored rocks named as Decorative Stone are also found in this district.

The principal mines in the district are

- Panchpatmali Bauxite Mines of M/s. National Aluminum & Co. Ltd.
- Maliparbat Bauxite Mines of M/s. Hindalco Industries Ltd.,
- Ampavally Limestone Mines of M/s. Odisha Mining Corporation Ltd. and M/s. Industrial Development Corporation of Odisha Ltd.

3.4.12.5 Culture and Aesthetic Attribute

Balda cave situated 66 kms away from koraput. Surrounding with natural beauty. The top of the mountain plateau is flat one. In the summit of this mountain, you will find a flat structure, extremely huge. Moreover, this is the best spot for trekkers and adventure tourists waiting to dive deep into the flora at koraput. The jalaput reservoir from this plateau is enchanting one. Donger dei is the main deity of the cave worship by the local people during chaitra festival. It is best place for trekking and place for nature lover. It is one of the tourist place in the area and people from nearby villages come to visit the place.





Ballada Cave

3.4.12.6 Socio-economic Survey

In order to access and evaluate likely impacts arising out of any development projects on socio economic environment, it is necessary to gauge the apprehensions of the people in the study areas.

3.4.12.6.1 Sampling Method

A judgmental and purposive sampling method was used for choosing respondents of various sections of the society Judgmental and purposive sampling method includes the right cases from the total population to fulfill the purpose of study.

3.4.12.6.2 Methodology for Data Collection

For the study, both qualitative and quantitative methods were adopted.

Data regarding the field area were collected both from primary as well as secondary sources.

- Primary sources include data collected through direct field sampling, observations based on schedules, questionnaires etc.
- Secondary source includes Census 2011 records, District Statistical Handbook literatures, documents from district etc.
- Data regarding mining, revenue generated by mining practices etc was collected from the District Mineral Funds, Koraput district.

3.4.12.6.3 Primary Data Collection

- The Socio-economic survey was carried out in the nearby human inhabitations (villages) of mining sites in order to study the existing resources of the area, land use, social structure of the community, employment patterns, income generation activities, dependency on forests and species preferred by the local people along with information on other related environmental and socioeconomic aspects.
- Detailed information on demography, labor allocation and employment, dependence on forest products, health and perceptions of change in the local environment was elicited through the interviews.
- The study was performed in mining areas by using Questionnaire based pre-structured Feedback Surveys and Interviews.

3.4.12.6.4 Data Collection Techniques Used for Primary Data Survey

- The sample frame of this study consists of villages within the 10 km of mining site.
- Quantitative and qualitative data collection techniques namely Participatory Rural Appraisal (PRA) tools, direct observations through questionnaire-based survey through villagers' meetings were employed.

Participatory Rural Appraisal

Face-to-face interview conducted with the villagers to obtain information regarding household heads, live stocks, income, dependency on forest, impacts of mining, choice of species for reclamation from nearby communities in the study area.

Direct Observation

Direct observation was used throughout the pre-structured questionnaire-based survey.

3.4.12.6.5 Secondary Data Collection

Preparation of Work Plan including information collected from secondary sources, profile of the study site, criteria for assessment etc.

Secondary data obtained from the sources was verified during the primary survey carried out in the study area.

Sample Size

The sample size of roughly 10 percent villages were selected which included 60-70% villages from Core Zone Area (within 5 Kms from the project site) and 10-20% villages were from the Buffer Zone area (5-10 kms from the project site) on a random basis that involves statistically valid representative sample of all strata of the affected population. Socio-economic survey was conducted in the villages within the study areas located in all directions with reference to the study area. 10 villages were surveyed from study area.

The respondents were asked for their awareness / opinion about the impacts of the project which are an important aspect of socio-economic environment, viz. job opportunities, education, health care, housing, transportation facility and economic status.

The villages surveyed are enlisted in **Table-3.35.**

Table 3.35: List of Villages surveyed

S. No	Village	Justification
1	Balda	• Villages are within the core zone i.e within 5 kms of the study area and are adjacent to the project Site • Primary Health Centre is in Atanda village • Luluburu village is having Government primary school.
2	Kasaput	
3	Chilam	
4	Gayalpur	
5	Taintar	
6	Luluburu	
7	Somli	
8	Atanda	
9	Rasaput	• Village is located closer to project site
10	Paduwa	
11	Mulda	
12	Paikathoba	• Villages are in the buffer zone of

S. No	Village	Justification
		the study area and were selected randomly by using the Judgmental and purposive sampling method considering their population size. • Rural Health Care centre and Government Hospital is available in Santribida and Kosala villages.

Key Finding of Socio-Economic Survey

Key findings of the socio-economic survey in various villages are listed in Table below.

Table 3.36: Key findings of Villages surveyed

Village	Expectation from Project Authority
• The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders. • The Main issue of villagers during public consultation was discussed. • Perceptions of the villagers were discussed • Expectations of the respondent from the project proponent were discussed to know their priority needs and requirements	• Most of the respondents of Balda village are aware about the project but they are not aware when the project will commission. • Respondents from Balda and Chilam and Kadaput village expect that Employment opportunities must be provided to the villagers in the mining activity. • Villagers opined that the project proponent should work for improving the sanitaion facility in the village and also develop the water facility. • The hand pumps in the village are not working properly so project authority must assist for its maintenance • Villagers are expecting that project authority should improve Health facility by organizing health camps and distribution of medicines and health care measures.

Table 3.37: Demographic Structure of the Study Area

Sr.No.	Villages	Households	Total Population	Male Population	Female Population	Population (0-6 Years)	Scheduled Caste	Scheduled Tribes	Literates	Male Literates	Female Literates
Koraput District											
Padua Tehsil											
1.	Lenjiput	4	12	7	5	1	0	3	3	1	2
2.	Pangiput	33	119	65	54	22	0	34	19	16	3
3.	P.Khilaput	30	92	47	45	13	0	0	27	21	6
4.	Taraliput	31	103	51	52	13	0	0	35	28	7
5.	Tudukuthuba	204	702	348	354	106	90	58	380	229	151
6.	Kandaput	0	0	0	0	0	0	0	0	0	0
7.	Hanjarpentha	95	376	201	175	54	3	275	163	119	44
8.	Panasaput	0	0	0	0	0	0	0	0	0	0
9.	Chiliput	62	208	109	99	43	33	119	54	47	7
10.	Handiput	0	0	0	0	0	0	0	0	0	0
11.	H. Khilaput	45	141	76	65	27	132	6	41	33	8
12.	Bheja	103	401	203	198	55	128	120	186	127	59

Sr.No.	Villages	Households	Total Population	Male Population	Female Population	Population (0-6 Years)	Scheduled Caste	Scheduled Tribes	Literates	Male Literates	Female Literates
13.	Kitaba	57	223	109	114	34	3	15	39	27	12
14.	Kanti	175	575	280	295	88	38	285	176	141	35
15.	Badel	318	1108	588	520	219	180	252	310	240	70
16.	Sukuriput	30	135	64	71	22	0	5	56	41	15
17.	Kamara	380	1377	668	709	278	263	516	384	249	135
18.	Masuri	58	183	78	105	32	6	154	62	40	22
19.	Antabiri	45	151	68	83	23	57	81	41	28	13
20.	Tapogonda	71	268	146	122	64	0	81	70	54	16
21.	Nuaput	16	64	35	29	16	0	49	17	15	2
22.	Bilaput	37	145	69	76	13	26	23	59	32	27
23.	Jabagada	114	464	258	206	99	149	42	198	142	56
24.	Uparharaganda	7	25	14	11	6	0	25	5	5	0
25.	Sabun	34	104	53	51	17	0	101	23	20	3
26.	Redingi	78	266	131	135	44	85	132	61	49	12
27.	Kakua	125	428	209	219	104	105	255	59	45	14
28.	Somili	269	954	456	498	206	121	504	108	80	28

Sr.No.	Villages	Households	Total Population	Male Population	Female Population	Population (0-6 Years)	Scheduled Caste	Scheduled Tribes	Literates	Male Literates	Female Literates
29.	Taintar	161	715	297	418	152	76	619	355	172	183
30.	Gayalput	22	70	35	35	16	0	70	24	17	7
31.	Baraba	142	500	245	255	89	88	321	168	110	58
32.	Petal	113	377	186	191	67	26	338	86	68	18
33.	Kakada	34	146	75	71	28	0	23	33	24	9
34.	Raising	114	481	246	235	89	72	305	181	110	71
35.	Danduguda	39	161	75	86	40	0	159	6	5	1
36.	Jhankarguda	8	29	18	11	9	0	29	1	1	0
37.	Kudasing	64	214	100	114	32	0	212	7	6	1
38.	Parajabhimdol	68	218	97	121	23	0	146	111	67	44
39.	Mulda	99	385	201	184	57	0	385	138	96	42
40.	Maliput	44	151	70	81	11	5	9	46	30	16
41.	Ambel	48	180	73	107	41	26	154	40	23	17
42.	Kinjaraba	136	513	249	264	112	97	383	136	107	29
43.	Katiaput	33	132	67	65	22	130	0	46	36	10
44.	Padalput	37	155	66	89	28	4	60	73	44	29

Sr.No.	Villages	Households	Total Population	Male Population	Female Population	Population (0-6 Years)	Scheduled Caste	Scheduled Tribes	Literates	Male Literates	Female Literates
45.	kadaput	50	189	94	95	34	18	77	80	58	22
46.	Balda	264	1385	445	940	192	370	799	863	290	573
47.	Chilam	22	75	32	43	16	11	64	29	19	10
48.	Banuru	144	558	279	279	130	5	108	204	142	62
49.	Atanda	181	669	320	349	137	17	510	164	130	34
50.	Aringi	39	147	69	78	28	16	126	29	26	3
51.	Rasel	100	315	152	163	65	7	303	25	16	9
52.	Parajabadapada	174	716	322	394	143	49	526	226	136	90
53.	Matamput	0	0	0	0	0	0	0	0	0	0
54.	Dangabiri(Danbiri)	97	386	200	186	66	6	380	52	34	18
55.	Jalaputjalabhandar	0	0	0	0	0	0	0	0	0	0
56.	Barangapali	74	282	155	127	53	4	261	75	56	19
57.	Talaguda	73	249	133	116	44	0	243	59	38	21
58.	Soput	93	315	148	167	43	0	222	71	59	12
59.	Daba	52	216	102	114	45	0	112	77	42	35
60.	Malisubular	88	337	168	169	60	0	311	85	60	25

Sr.No.	Villages	Households	Total Population	Male Population	Female Population	Population (0-6 Years)	Scheduled Caste	Scheduled Tribes	Literates	Male Literates	Female Literates
61.	Dorasubalar	242	967	395	572	160	136	633	447	222	225
62.	Kulabiri	339	1435	773	662	217	403	466	852	525	327
63.	Pujariput	216	800	395	405	110	154	243	402	239	163
64.	Atubu	74	267	124	143	48	31	92	99	69	30
65.	Luluburu	142	493	246	247	80	4	279	219	151	68
66.	Badahanjar	169	698	277	421	101	32	596	247	101	146
67.	Malibhimdola	116	448	230	218	68	43	119	210	156	54
68.	Kandara	317	1370	683	687	284	11	922	295	218	77
69.	Hatibari	570	2303	1099	1204	438	51	1855	570	374	196
70.	Kiramba	211	796	396	400	142	0	780	238	184	54
71.	Gumaguda	193	679	346	333	140	81	587	173	131	42
72.	Padua	394	1487	700	787	249	181	393	632	377	255
73.	Abharada	371	1471	701	770	245	295	814	482	338	144
74.	Rasaput	65	273	153	120	46	173	99	64	50	14
75.	Lugum	91	377	195	182	80	0	377	35	25	10
76.	Madiput	25	92	49	43	18	0	92	8	7	1

Sr.No.	Villages	Households	Total Population	Male Population	Female Population	Population (0-6 Years)	Scheduled Caste	Scheduled Tribes	Literates	Male Literates	Female Literates
77.	Tansing	283	1285	630	655	296	618	411	368	238	130
Total		**8852**	**34131**	**16444**	**17687**	**6193**	**4659**	**19148**	**11407**	**7256**	**4151**
Machh kund											
78.	Badasagar	263	935	433	502	155	201	620	319	207	112
79.	Sanasagar	164	618	309	309	112	36	397	99	79	20
80.	Jadiaput	37	141	64	77	24	25	116	18	13	5
Total		**464**	**1694**	**806**	**888**	**291**	**262**	**1133**	**436**	**299**	**137**
Nandapur Tehsil											
81.	Ghagadapandi	135	413	215	198	58	100	288	165	131	34
82.	Parata	144	531	270	261	66	74	24	187	128	59
83.	Kukudaput	57	201	109	92	36	0	5	58	49	9
84.	Bijagura	11	58	30	28	20	0	0	8	4	4
85.	Billaput	110	359	173	186	56	10	326	72	50	22
86.	Satasemili	120	446	223	223	78	32	69	167	114	53
87.	Patrapandi	234	809	398	411	122	81	168	282	175	107
88.	Paikathoba	49	339	186	153	26	26	79	272	161	111

Sr.No.	Villages	Households	Total Population	Male Population	Female Population	Population (0-6 Years)	Scheduled Caste	Scheduled Tribes	Literates	Male Literates	Female Literates
89.	Sankiri	42	151	72	79	27	0	109	46	35	11
90.	Kataraba	62	223	110	113	49	0	199	71	53	18
91.	Bodaligura	49	152	67	85	27	71	66	56	38	18
92.	Karanjagura	55	210	103	107	40	30	177	19	14	5
93.	Mangrel	111	363	189	174	71	15	217	119	95	24
94.	Solapguda	0	0	0	0	0	0	0	0	0	0
95.	Kasandi	133	545	298	247	109	182	179	175	147	28
96.	Rurichuan	83	298	148	150	49	0	298	56	32	24
97.	Similiput	33	121	55	66	21	0	121	13	11	2
98.	Bilaput	59	218	106	112	39	0	218	29	17	12
99.	Adra	69	242	122	120	36	0	241	48	39	9
100.	Baghragura	22	66	36	30	10	0	0	6	4	2
101.	Dabba	99	348	167	181	62	0	347	68	47	21
102.	Khinibar	120	466	204	262	50	0	465	60	37	23
Total		**1797**	**6559**	**3281**	**3278**	**1052**	**621**	**3596**	**1977**	**1381**	**596**
Grand Total		**11113**	**42384**	**20531**	**21853**	**7536**	**5542**	**23877**	**13820**	**8936**	**4884**

Source: PCA Census 2011

Table 3.38: Occupational Structure of the Study Area (Rural)

Sr.No.	Villages	Total Main Workers	Main Workers				Marginal Workers	Non-Workers
			Cultivators	Agricultural Laborers	Household Laborers	Other Workers		
Odisha State								
Koraput District								
Padua Tehsil								
1.	Lenjiput	4	4	0	0	0	4	4
2.	Pangiput	31	31	0	0	0	51	37
3.	P.Khilaput	61	61	0	0	0	9	22
4.	Taraliput	61	61	0	0	0	16	26
5.	Tudukuthuba	168	45	3	6	114	108	426
6.	Kandaput	0	0	0	0	0	0	0
7.	Hanjarpentha	134	97	25	0	12	81	161
8.	Panasaput	0	0	0	0	0	0	0
9.	Chiliput	59	57	1	0	1	90	59
10.	Handiput	0	0	0	0	0	0	0
11.	H. Khilaput	55	44	9	0	2	29	57
12.	Bheja	217	190	2	1	24	57	127
13.	Kitaba	48	46	1	0	1	93	82
14.	Kanti	166	149	11	0	6	207	202
15.	Badel	642	579	18	0	45	32	434
16.	Sukuriput	64	60	3	0	1	14	57
17.	Kamara	304	278	3	3	20	684	389

Sr.No.	Villages	Total Main Workers	Main Workers				Marginal Workers	Non-Workers
			Cultivators	Agricultural Laborers	Household Laborers	Other Workers		
18.	Masuri	52	51	0	0	1	72	59
19.	Antabiri	57	45	4	3	5	75	19
20.	Tapogonda	136	130	0	0	6	82	50
21.	Nuaput	27	26	0	0	1	21	16
22.	Bilaput	60	58	0	0	2	72	13
23.	Jabagada	83	30	6	0	47	152	229
24.	Uparharaganda	8	4	2	0	2	7	10
25.	Sabun	38	22	16	0	0	30	36
26.	Redingi	21	16	2	0	3	137	108
27.	Kakua	219	217	1	0	1	80	129
28.	Somili	259	256	1	0	2	403	292
29.	Taintar	278	212	22	2	42	45	392
30.	Gayalput	44	37	7	0	0	3	23
31.	Baraba	91	79	0	0	12	326	83
32.	Petal	103	101	1	0	1	172	102
33.	Kakada	36	24	11	0	1	52	58
34.	Raising	106	64	14	0	28	141	234
35.	Danduguda	40	39	0	0	1	73	48
36.	Jhankarguda	19	17	1	1	0	0	10
37.	Kudasing	159	132	26	1	0	8	47
38.	Parajabhimdol	153	86	67	0	0	24	41
39.	Mulda	228	154	69	0	5	5	152
40.	Maliput	45	36	7	0	2	54	52

Sr.No.	Villages	Total Main Workers	Main Workers				Marginal Workers	Non-Workers
			Cultivators	Agricultural Laborers	Household Laborers	Other Workers		
41.	Ambel	41	38	0	0	3	56	83
42.	Kinjaraba	230	70	140	3	17	134	149
43.	Katiaput	28	26	0	0	2	38	66
44.	Padalput	39	31	0	0	8	39	77
45.	kadaput	49	41	0	0	8	44	96
46.	Balda	291	118	20	1	152	301	793
47.	Chilam	49	44	5	0	0	6	20
48.	Banuru	243	227	11	2	3	75	240
49.	Atanda	215	169	19	3	24	205	249
50.	Aringi	4	4	0	0	0	83	60
51.	Rasel	146	145	0	0	1	41	128
52.	Parajabadapada	217	207	2	1	7	152	347
53.	Matamput	0	0	0	0	0	0	0
54.	Dangabiri(Danbiri)	101	96	4	0	1	142	143
55.	Jalaputjalabhandar	0	0	0	0	0	0	0
56.	Barangapali	10	7	0	0	3	138	134
57.	Talaguda	3	0	1	0	2	163	83
58.	Soput	80	65	1	5	9	167	68
59.	Daba	3	0	0	0	3	135	78
60.	Malisubular	1	0	0	0	1	189	147
61.	Dorasubalar	125	41	66	0	18	311	531
62.	Kulabiri	506	122	28	7	349	269	660
63.	Pujariput	291	92	62	2	135	221	288

Sr.No.	Villages	Total Main Workers	Main Workers				Marginal Workers	Non-Workers
			Cultivators	Agricultural Laborers	Household Laborers	Other Workers		
64.	Atubu	49	27	14	5	3	125	93
65.	Luluburu	141	117	13	1	10	153	199
66.	Badahanjar	250	111	132	0	7	83	365
67.	Malibhimdola	293	216	75	0	2	32	123
68.	Kandara	559	550	8	1	0	259	552
69.	Hatibari	1115	1095	1	0	19	375	813
70.	Kiramba	427	308	89	1	29	70	299
71.	Gumaguda	407	337	51	0	19	3	269
72.	Padua	518	141	62	17	298	248	721
73.	Abharada	474	432	17	1	24	427	570
74.	Rasaput	63	57	1	0	5	102	108
75.	Lugum	99	99	0	0	0	124	154
76.	Madiput	27	27	0	0	0	32	33
77.	Tansing	678	656	17	0	5	6	601
Total		**12048**	**9254**	**1172**	**67**	**1555**	**8457**	**13626**
Machh kund Tehsil								
78.	Badasagar	530	302	62	4	162	89	316
79.	Sanasagar	260	157	101	2	0	143	215
80.	Jadiaput	0	0	0	0	0	83	58
Total		**790**	**459**	**163**	**6**	**162**	**315**	**589**
Nandapur Tehsil								
81.	Ghagadapandi	78	71	0	0	7	209	126
82.	Parata	23	15	1	1	6	233	275

Sr.No.	Villages	Total Main Workers	Main Workers				Marginal Workers	Non-Workers
			Cultivators	Agricultural Laborers	Household Laborers	Other Workers		
83.	Kukudaput	45	45	0	0	0	112	44
84.	Bijagura	12	12	0	0	0	23	23
85.	Billaput	108	85	18	0	5	160	91
86.	Satasemili	200	180	14	2	4	94	152
87.	Patrapandi	175	130	12	5	28	241	393
88.	Paikathoba	70	5	41	0	24	9	260
89.	Sankiri	42	37	5	0	0	57	52
90.	Kataraba	67	38	29	0	0	79	77
91.	Bodaligura	75	35	32	0	8	12	65
92.	Karanjagura	56	56	0	0	0	104	50
93.	Mangrel	100	100	0	0	0	155	108
94.	Solapguda	0	0	0	0	0	0	0
95.	Kasandi	206	112	68	2	24	113	226
96.	Rurichuan	168	161	7	0	0	36	94
97.	Similiput	36	28	8	0	0	48	37
98.	Bilaput	122	119	1	0	2	15	81
99.	Adra	165	165	0	0	0	1	76
100.	Baghragura	42	39	3	0	0	4	20
101.	Dabba	238	236	0	0	2	0	110
102.	Khinibar	298	294	3	1	0	54	114
Total		**2326**	**1963**	**242**	**11**	**110**	**1759**	**2474**
Grand Total		**15164**	**11676**	**1577**	**84**	**1827**	**10531**	**16689**

Source: PCA Census 2011

4 ANTICIPATED ENVIRONMENTAL IMPACT AND MITIGATION MEASURES

4.1 INTRODUCTION

Environmental impact in the study area is any alteration of environmental conditions or creation of new set of environmental conditions, adverse or beneficial, caused or induced by the impact of project. Prediction involving identification and assessment of potential impacts of the project on surrounding environment is a significant component of EIA studies. The proposed project entails mining of Bauxite by opencast mining method with an annual Peak Rated Capacity of ~ 4.0 MTPA of Bauxite (ROM). The project also involves generation of 146508 tonnes of Overburden/waste and 51564 tonnes (25782 m^3) of top soil during initial 5 years of operations. Besides, it is envisaged to have crushing/Screening facilities within the lease area with a capacity of 800 TPH at rated production level over an area of 144.945 Ha located at Village - Ballada, Taluka – Nandapur, District- Koraput, Odisha.

All components of the environment are considered and wherever possible impacts are evaluated in quantitative/qualitative terms. Several scientific methods are available to qualify and predict the impact of project on environmental attributes such as water, air, noise, land ecological socio-economic etc. Such predictions are superimposed over baseline environmental status to derive post project scenario of the environmental conditions.

The resultant (post-project) quality of environmental parameters is predicted and reviewed with respect to the prevailing standards/Norms. Based on the impacts thus predicted, preventive and mitigation measures are formulated and incorporated in the environmental management plan to minimize adverse impacts on environmental quality during and after the project execution.

Construction and operation phase of the project comprises of various activities, each of which will have an impact on some or other environmental parameters. Activities during construction and operational phase have been studied to estimate the impacts on environment. The impacts have been predicted for the proposed project assuming that the pollution due to the existing activities has already been covered under baseline environmental data.

4.2 IDENTIFICATION & CHARACTERIZATION OF IMPACTS

The wastes and pollutants generated due to various activities of the project may cause direct & indirect impacts on different environmental attributes. The major project activities and the anticipated environmental impacts due to the proposed project are discussed below, under the following categories:

- Impacts due to project location
- Impacts due to project design
- Impacts during construction
- Impacts during operation.

4.2.1 Impacts due to Project Location

Mining is the site-specific project. The proposed project shall be carried out within the mining lease area of 144.945 Hectares. 12.267 ha additional land shall be required for the project for approach road.

4.2.2 Impacts due to Project Design

The proposed project will be carried out by mechanized open cast mining method and as per approved mining plan.

4.2.3 Impact during Construction

Construction activity includes foundation works, fabrication and erection of various facilities required for the proposed project.

4.2.3.1 Project Activities

The Project activities during construction phase are.

1. Earth Work
2. Civil works
3. Fabrication
4. Vehicular movement
5. Loading and unloading of construction items and plant machineries
6. Storage of construction items & plant machineries
7. Erection & Installation of structures and machineries
8. Maintenance of construction machinery
9. Power supply
10. Utilisation / Disposal of removed earth / Construction waste

4.2.4 Impact during Operation Phase

The major activities at mine in the operational phase involve drilling, blasting, excavation, waste disposal, transportation etc. These activities may affect the environment in varying degrees through natural resources depletion viz. water consumption, release of pollutants (particulates and gaseous emissions), run-off from waste dump areas etc. The quality of Air, water and noise may be affected due to these activities. Associated activities, e.g. transportation of materials, operations of HEMM etc., may also affect air, water and noise environment. Greenbelt development will have

a positive impact not only on flora and fauna but also on the air quality, noise and soil. Positive impacts on socio-economic environment are expected due to employment, infrastructure development and also due to developmental activities will be taken up by the project management. The major project activities and the affected environmental parameters are given below:

4.2.4.1 Project Activities

1. Excavation, drilling and blasting
2. Removal of Top Soil & Disposal of Over burden
3. Transportation of materials and personnel.
4. Water Usage
5. Waste dump management.
6. Maintenance of Machineries
7. Waste water management
8. Generation of Hazardous Waste & its Management

4.2.4.2 Pollution Sources

1. Air pollution due to excavation, drilling, blasting, loading, unloading and transportation of Bauxite and OB.
2. Noise and vibration during drilling, blasting.
3. Noise during transportation of ore and OB and use of machineries
4. Water pollution from Waste dump, vehicle washing from workshop area.
5. Waste water and solid waste generation from domestic activities

4.2.4.3 Affected Environmental Parameters

1. Air quality
2. Water quality and resource
3. Noise quality
4. Soil quality
5. Land use/Land cover
6. Biological environment
7. Socio-economic conditions

4.3 IMPACT MATRIX

Environmental impacts could be positive or negative, direct or indirect, local or regional and also reversible or irreversible. The primary function of an environment impact assessment study is to predict and quantify the magnitude of these impacts, evaluate and assess the importance of the identified changes, present information and monitor actual changes. The activities of the proposed project are studied. The impacts of various activities of the proposed project are identified and presented as matrix in **Table 4.1.** Further the characteristics of these impacts during the different stages of project are presented in **Table- 4.2**.

Table 4.1: Impact Identification Matrix

Aspects Impacted Attributes	Construction phase				Mining, Storage and handling and allied activity (Operation phase)							Post Operation		
	Storage of Raw materials	Ready-mix concrete preparation	Transportation of raw materials	Construction activities	Site Clearance	Operation Open Cast mine	Storage/stacking Mining Mineral and waste	Transportation Mineral	Mobile Crusher	Generation of waste water	Development Greenbelt	Development of Green belt	(Buffer) Urbanization	Industrialization
Ambient Air	•	•	•	•	•	•	*	•	•	-	*	*	*	*
Water Resource	•	•	-	•	-	•	-	-	-	•	-	*	-	-
Water Quality	•	•	-	•	-	•	*	-	-	-	-	-	-	-
Ambient Noise	-	•	•	•	-	•	-	•	•	-	-	*	-	-
Flora and Fauna	-	-	•	•	•	•	-	-	-	-	*	*	-	-
Soil and Land-use	•	•	•	•	•	•	*	-	*	-	*	*	-	-
Infrastructure	-	-	-	-	•	•	-	-	-	-	-	-	-	-
Traffic	-	-	•	-	-	-	-	*	-	-	-	-	-	•
Health & Safety	•	•	•	•	-	•	*	-	-	-	*	*	-	*
Socio-economic	-	-	-	*	*	*	-	-	-	-	*	*	*	*

• *Adverse Impact * Beneficial Impacts.*

Table 4.2: Environmental Impacts during Construction Phase

Activity	Environmental attributes	Cause	Impact characteristics			
			Nature	Duration	Reversibility	Significance, Mitigative measures
Construction of infrastructure	Air Pollution (Dust)	Excavation of the area, cutting, etc.	Direct Negative	Short Term	Reversible	Significant Water sprinkling at specific locations and Personnel Protective Equipment (PPE) shall be used. Greenbelt will be developed for mitigating the air pollution.
	Noise Pollution	Movement of HEMM	Direct Negative	Short Term	Reversible	Significant Acoustic enclosures will be provided in all HEMM and proper maintenance of machineries.
	Land use	Change in land use due to excavation.	Direct Negative	Long Term	Reversible	Significant Reclamation of the area will be done by plantation on the land at the end of mine.
	Water Pollution	Potential for seepage from the waste storage area.	Direct Negative	Short Term	Reversible	Significant Proper care of the storage area shall be taken.
Site clearing	Air Pollution (Dust)	Conversion of private land to mining area	Direct Negative	Long Term	Reversible	Significant- There will be afforestation in safety zone, greenbelt along infrastructure.
	Noise Pollution	Noise generation from earth moving equipment	Direct Negative	Short Term	Reversible	Insignificant. Acoustic enclosures will be provided in all HEMM and proper maintenance of machineries. Personnel Protective Equipment (PPE) shall be used.

Activity	Environmental attributes	Cause	Impact characteristics			
			Nature	Duration	Reversibility	Significance, Mitigative measures
	Land use	Change of Land use	Direct Negative	Long Term	Irreversible	Significant After mining the excavated area will be reclaimed and afforested.
	Ecology	Removal of vegetation and loss of flora & fauna	Direct Negative	Long Term	Reversible	Significant After mining the excavated area will be reclaimed and afforested and conservation of flora and fauna will be a part of Biodiversity management plan.
Transportation of scrap/spares/ waste material/ construction material	Air Pollution (Dust & Gases)	Transportation of scrap / waste material by trucks	Direct Negative	Short Term	Reversible	Insignificant Regular emission checks shall be performed. Raw materials will be transported, covered with tarpaulin.
	Noise Pollution	Noise generated from loading / unloading and movement of vehicles	Direct Negative	Short Term	Reversible	Insignificant, Regular vehicle maintenance shall be done. PPE shall be provided.
Construction activities	Air Pollution (Dust & Gases)	Operation of construction machinery, welding & others	Direct Negative	Short Term	Reversible	Significant. Water sprinkling will be done to suppress the air pollutants PPE shall be provided to workers.
	Noise Pollution	Generation from construction activities	Direct Negative	Short Term	Reversible	Significant. Regular maintenance will be carried out for the machineries used PPE shall be provided to workers
	Land use	Storage of spares/ materials	Direct Negative	Short Term	Reversible	Significant. Storage of materials is temporary and during construction period only

Activity	Environmental attributes	Cause	Impact characteristics			
			Nature	Duration	Reversibility	Significance, Mitigative measures
	Ecology	Loss of vegetation	Direct Negative	Short Term	Reversible	Insignificant, No cutting of trees. Green belt development is envisaged.
Disposal of scrap / waste material	Air Pollution (Dust & Gases)	Due to movement of Vehicles and loading / unloading of material	Direct Negative	Short Term	Reversible	Significant. PUC certified vehicles will be utilized and material will be covered by Tarpaulin sheets.
	Noise Pollution	Due to movement of Vehicles and loading / unloading of material	Direct Negative	Short Term	Reversible	Insignificant. Regular vehicle maintenance and pollution check shall be done.
Development of Road	Air Pollution (Dust & Gases)	Due to development of road Cutting of trees/shrubs to construct the widening of road	Direct Negative	Short Term	Reversible	Significant- Trees will be planted along the road and water sprinkling will be done during construction phase.
	Noise Pollution	Due to movement of HEMM	Direct Negative	Short Term	Reversible	Insignificant. Regular vehicle maintenance and pollution check shall be done.
	Solid waste	Due to widening road	Direct Negative	Short Term	Reversible	Significant- The solid waste generated from widening of road will be handled as per the waste management rule
	Ecology	Tree cutting and loss of flora fauna	Direct Negative	Long Term	Reversible	Significant Plantation will be done along both sides of road.

Activity	Environmental attributes	Cause	Impact characteristics			
			Nature	Duration	Reversibility	Significance, Mitigative measures
	Land Use	Due to widening of road	Direct Negative	Long Term	Irreversible	Significant- construction of road would be designed to minimize the cutting and filling of earth. Land clearing at sit will be kept to the absolute minimum practicable. Construction debris will be managed properly.

Table 4.3: Environmental Impacts During Operation Phase

Activity	Environmental Aspects	Impact	Impact characteristics	
			Significance	Mitigative measures
Mining				
Excavation	Excavation of area by Drilling, blasting and excavator and dumper combination	Air Pollution,	Significant	Dust curtains will be installed on drill rigs. Water injector will be used on drill rigs to minimize dust emission. Blast will only be conducted when meteorological conditions are favourable. Thick greenbelt will be developed.

Activity	Environmental Aspects	Impact	Impact characteristics	
			Significance	Mitigative measures
	Mine runoff	Water Pollution	Significant	All the fines will be arrested in a very systematic established framework of protective measures like Garland drain, Gabion wall, retaining wall, check dam, settling tank, ETP and STP.
	Due to Drilling, blasting and excavator and dumper	Noise Pollution	Significant	Provision and maintenance of thick tree belts Proper maintenance of noise generating machinery including the transport vehicles. Provision of protective devices like ear muffs/ear plugs to workers. Confining the noise by isolating the source of noise
	Excavation of Bauxite	Land use	Significant	Land will be covered with plantation after backfilling and stabilisation after due technical and biological reclamation.
Drilling	Generation of dust	Air pollution	Significant	Wet drilling method Introduction of dust suppression system Installation of permanent pipe water sprinkler along mine haul road and Development of green belt
	Generation of Gaseous emissions	Air pollution (SO2/NOx/CO)	Insignificant	Regular maintenance of Drilling M/c to reduce gaseous emissions.

Activity	Environmental Aspects	Impact	Impact characteristics	
			Significance	Mitigative measures
	Generation of Noise	Noise Pollution	Insignificant	Operator Cabin is enclosed. Ear muff shall be also be provided to the operator. Confining the noise by isolating the source of noise. Reducing the exposure time of workers to the higher noise levels.
Blasting	Dust generation	Air pollution	Significant	Controlled blasting with proper burden, spacing, safe charge and adequate stemming shall be done. Non electric (NONEL) initiation system shall be used.
	Gaseous emission	Air pollution NOx / CO	Insignificant	Emulsion/slurry explosive/ ammonium nitrate fuel oil mixture (ammonium nitrate: fuel oil = 94:6 by weight) will be used.
	Vibration & Air blast	Damage to nearby structures & buildings	Significant	Safe explosive charge will be decided based on Vibration study
	Fly rock generation	Potential for accidents (damage to equipment etc.)	Significant	Blasting Shelters will be provided Warning Signal will be placed Danger Zone shall be marked with Red Flag

Activity	Environmental Aspects	Impact	Impact characteristics	
			Significance	Mitigative measures
Transportation of mineral	Dust generation	Air pollution	Significant	Water sprinkling will be done on haul road and use of closed conveyor system for mineral transport. Transportation of mineral (Bauxite) within mining lease area will be done by series of conveyors & upto the railway siding by closed conveyor system, which will significantly reduce dust generation.
	Gaseous emission	Air pollution SO2/NOx/CO/HC	Insignificant	Regular maintenance of Dumper / Tippers to keep emissions under control
Transportation of waste to Waste Dump	Dust generation	Air pollution	Significant	Water sprinkling will be done on haul road, greenbelt development within lease area. The small quantity of excavated waste would be transported to dump through dumpers, with water sprinkling arrangements and plantation, dust generation would be reduced significantly.
	Gaseous emission	Air pollution SO_2/NOx/HC	Insignificant	Regular maintenance of Dumper / Tippers to keep emissions under control.
Grading of Haul Road	Dust generation	Air pollution SPM/RPM	Insignificant	Operators are in closed cabins of Grader. Dust mask shall be provided
	Gaseous emission	Air pollution SO2/NOx/CO	Insignificant	Proper maintenance of Grader shall be done to keep emissions low.

Activity	Environmental Aspects	Impact	Impact characteristics	
			Significance	Mitigative measures
	Noise generation	Noise pollution	Insignificant	Insignificant. No action needed. PPE shall be provided
Operation of Crusher				
Operation of Crusher	Generation of dust	Air Pollution,	Significant	Use of dust mask by crusher operator. Development of greenbelt. Sprinkling of water
	Generation of Noise	Noise Pollution	Significant	Use of ear muff near crusher Proper maintenance of crusher
DG Set				
DG Set	Flue gas emission, used oil generation	Air Pollution	Insignificant	The DG will be operated in case of power failure only. Green DG sets shall be installed
	Generation of noise during DG Set operation	Noise Pollution	Significant	The DG Sets will have acoustic enclosure to minimize the noise.
Domestic Use				

Activity	Environmental Aspects	Impact	Impact characteristics	
			Significance	Mitigative measures
Operation of domestic utilities	Washroom, toilets – Wastewater generation	Water Pollution	Significant	The sewage will be treated in septic tank.
Greenbelt Development				
Development and maintenance of Green Belt	Plantation of trees within premises. to cover 33% of the area	Reduction in Air Pollution and Noise Pollution	Insignificant	Positive Impact due to development of a proper green belt along the periphery of the premises. This will act as barrier for air emission and noise Mine area will be afforested after the end of mine life.
Socio-economic Development				
Employment Generation	Operation of mine	Socio-economic		Positive Impact due to direct employment of persons from the nearby area
				Substantial benefits in the form of contracts to local agencies for different services.
				Employment generation in transport sector for transportation of material.

4.4 IMPACTS DURING OPERATIONAL PHASE

The proposed mine is opencast, which will involve drilling, blasting, excavation of mineral and waste, operation of crusher and transportation within mine lease and transportation of mineral outside the lease, the activities related to the operational phase will have varying impacts on the environment and are considered for impact assessment.

4.4.1 Impact on Land Use

The proposed opencast mine will result in change of the land use pattern of the ML area. The land degradation is expected during mining activities like excavation of mineral overburden dumps, etc.

4.4.1.1 Land-use Alteration

As indicated earlier in Chapter 2, the mine lease area is 144.945 ha, 12.267 ha additional land will be acquired for mining or any other project related activity hence no Rehabilitation and Resettlement is involved under the present proposal. The entire block area is forest land, diversion of forest land will be carried out and application for the same has been submitted to the forest land. Activity wise land utilization under various land categories is given in below. Various land categories are given in below **Table 4.4**:

Table 4.4: Current Land Use Plan (Area in Ha)

Pre-Mining Use	AREA (Ha)
Barren / Waste land with small bushes & shrubs	91.100
Land under Agriculture / Crops	0.00
Land covered with Plants	53.845
Land under Grass Cover	0.00
Land under Public Infrastructure / Utilities (water bodies, roads, railways, electric lines, telephone lines etc.)	0
Land under Habitation	0.00
Land under Monuments & places of Historical Importance	0.00
Degraded by Pits & Excavation	0.00
Degraded by Dumps & Material Staking	0.00
Covered under Mine Infrastructure (plants, shades, buildings etc.)	0.00
Land under Forest	144.945

Table 4.5: Land Use Plan (Area in Ha) after plan period

S. No.	Particular	Total (Ha)
1	Area under Mining	42.78
2	Topsoil stacking	0.28
3	Overburden/Waste Dumping	1.94
4	Mineral Storage	1.93
5	Infrastructure (Workshop, Administrative Building etc.)	0.18
6	Roads	0.38
7	Railways	0
8	Tailing Pond	0
9	Effluent Treatment Plant	0
10	Mineral Separation Plant	0.13
11	Township Area	0
12	Others to Specify	3.92
Total		**51.54**

Table 4.6: Land Use Plan (Area in Ha) after Conceptual period

S.No.	Post Mining Use	AREA (Ha)
1.	Degradation by Excavation	81.82
2.	Degradation by Dumps & Material Staking	1.95
3.	Covered under Plants, Shades & Buildings	0
4.	Covered by Roads & Approaches	0
5.	Any Other, please specify below	
6.	Undisturbed	61.18
	Total	**144.95**

Source: Mining Plan

At the end of the present planned period, area under mining will be about 42.78 ha. At the end of mining activity area under mining will be 81.82 ha, the land use of the area will be changed. The quarry area will be fenced to prevent any inadvertent movement of persons into the area. Part of the area covered under waste dumps will be afforested by plantation. Plantation will be carried out 7.5 m statutory barrier.

4.4.2 Slope Study

A slope study will be carried out after commencement of the operation through a reputed Institute and report will be submitted to MOEF&CC after getting the EC and other permission from regulatory authority.

4.4.3 Impact on Air Quality

The opencast mechanized mining operation will generate low levels of Particulate Matter (PM). Impacts on air quality due to the project depend on the quantum of mineral extraction, and transportation. The Increase in excavation from the mine may further increase the work-zone dust levels, in absence of any dust control measures.

4.4.3.1 Emission from Area Sources (Fugitive Emissions)

Fugitive emissions are expected from following sources:

- Fugitive emissions are expected from excavation, drilling, blasting, crushing loading & unloading operations
- Haul road emission during transportation

4.4.3.2 Air Pollution Impact Prediction through Dispersion Modelling

The emissions will be mainly Particulate Matter (PM), NOX and CO.

Details of Mathematical Modelling

The Gaussian Dispersion Modelling (GDM) is used for prediction of dispersion of air emission and the computation of Ground Level Concentration (GLC) up to a specified distance from source. The fundamental model is given below:

$$c(x,y,z) = \frac{Q}{2\pi\sigma_y\sigma_z u}\exp\left(\frac{-y^2}{2\sigma_y^2}\right)\left(\exp\left(\frac{-(z-h)^2}{2\sigma_z^2}\right)+\exp\left(\frac{-(z+h)^2}{2\sigma_z^2}\right)\right)$$

Where c is a concentration at a given position, Q is the source term, x is the downwind, y is the crosswind and z is the vertical direction and u is the wind speed at the h height of the release. The σy, σz deviations describe the crosswind and vertical mixing of the pollutant. The above equation describes a mixing process that results in a Gaussian concentration distribution both in crosswind and in vertical direction, centered at the line downwind from the source. Gravitational settling and chemical or radioactive decays are neglected.

The model computes the pollutant concentration dispersed in microgram per cubic meter for any point source with the location coordinated x, y and z.

Approach & Methodology

The "Gaussian Dispersion Model" version formed the basic frame work of the computer model used for the computations of concentration of pollutants at ground level.

The model assumptions

- Steady State Condition - Ideal gas, continuous uniform emission rate, homogenous horizontal wind field, representative wind velocity, no directional wind shear in the vertical, infinite plume, no plume history and normal distribution of eddy turbulences.
- Pollutants Characteristics - The pollutant emitted are stable gases or aerosol which remains suspended in the air and particulates in the turbulent movement of the atmosphere and none of the material is removed as the plume advances and diffuses down wind and there is complete reflection at the ground.
- Gaussian distribution - The pollutant material within the plume takes on a Gaussian distribution in both the horizontal cross wind and vertical directions described by empirical dispersion parameters σy, and σz.
- It has been assumed that the pollutant does not undergo any physicochemical transformations.
- Gravitational settling of pollutants has not been considered.
- Reflection factor from any surface has not been considered.
- Control measures applied during calculation are described in Table.
- $PM_{2.5}$ has been assumed 60% of PM_{10}.

4.4.3.2.1 Emission Estimate from Mining area

The emission rates for the different sources in the mining area were calculated primarily based on emission factor equation given in latest USEPA's AP-42 guidelines. Further the emission estimation equations given in "TSP Emission Factors for different mining activities for Air Quality Impact Prediction as collated from different Sources" by S P Banerjee (CMRI) were also considered since these are based on the study conducted in India for the estimation of emission rate of respirable suspended particulate matter from various open cast mining activities. In addition, as the proposed mine development will be undertaken in environmentally friendly manner as per the stipulated guidelines, activity specific control factors are considered in calculation the emission rates.

Drilling

Emissions from drilling are a relatively minor component of the overall emission from an open-cast mine. The USEPA default uncontrolled emission factor of 0.31 kg/hole is

used for PM10 emission estimation. Drilling will be carried out using 115 mm dia. Drill with burden 2.0 & 3.0 m spacing.

Blasting

The emission rate has been calculated based on the equation given below:

$$E = 0.00022 \text{ X } A^{1.5}$$ ---- AP42 (Oct 1998)

Where,

E = Blasting Emission Factor, kg/blast

A= Area blasted in m^2

Loading of Material

The blasted mineral will be loaded on dumpers using excavators, The PM10 emission rate due to loading activity is calculated using below equation.

E=k X 0.0016 X ((U/2.2)^1.3/(M/2)^1.4) --- AP42 (Nov 2006)

Where,

E = Emission Factor, kg/ton

k = Particle size multiplier, 0.35 for PM10

M = Moisture Content, %

u = Mean wind speed, m/s

Emission of PM10 due to Transportation

The hauling of mineral from the mining pit via haul road (unpaved road) will cause emission of particulate matters. This emission will be limited to the extent of haul road in the mining area. The particulate matters generated due to transportation on haul road get settled in proximity of the haul road only. As per the mining plan one working shift of 8 hours per day will be used for transportation. The following empirical expressions is used to estimate the quantity in pounds (lb) of size-specific particulate emissions from an unpaved road in industrial sites, per vehicle mile travelled (VMT)

E=k (s/12)^a (W/3)^b+ C --- AP42 (Nov 2006)

Where,

k, a, b are empirical constants i.e. different for different particle size.

E = size-specific emission factor (lb/VMT)

s = surface material silt content (%)

W = mean vehicle weight (tons)

C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear, 0.0047 lb/VMT for PM10.

The source characteristics are referred to as correction parameters for adjusting the emission estimates to local conditions. The effective emission factor after considering reduction in emission potential of haul roads due to water sprinkling was calculated for use in AERMOD model.

Table 4.7: Emission Factors for different mining activities

Activities	Unit	PM_{10}	$PM_{2.5}$
Drilling	g/s	0.000730805	0.000292
Blasting	g/s	0.0380825	0.0057668
Loading/Unloading	g/s	0.0437158	0.0174863
Transportation	$g/s/m^2$	0.0005910	0.0000771
Crushing	$g/s/m^2$	0.082829482	0.033132

4.4.4 Meteorological Data

The meteorology of the project area plays very important role in dispersion of pollutants and build-up of pollution within the atmosphere. In the present study, one season (March – May 2023) meteorological data has been taken to find the dispersion of pollutant concentration. The mixing height for study period, which is an important parameter to express the dispersive potential of atmosphere, has been taken from the atlas of hourly mixing height and assimilative capacity of atmosphere in India (S.D. Attri et al., 2008). Windrose diagram of season meteorological data used for modelling is shown in Chapter -3

4.4.5 Results

4.4.5.1 AERMOD Results

The quarry area has been taken as an open pit source for all the dust emitting sources from different mining activities and the road leading to dump yard from the quarry has been selected as poly area source for plying of dumpers / trucks and unloading of OB material. Appropriate emission factors, programme control parameters such as land use, UTM zone, Albedo, Bowen Ratio, Surface roughness, surrounding surface features, etc. and micrometeorological data was taken. The emission reduction by implementation of proposed control measures was also considered. The ground level concentrations are computed for HIGH 1ST HIGH 24-HR CONCENTRATION VALUES for all the baseline air quality monitoring stations by selecting them as discrete Cartesian receptors in the modelling area so that 10 receptors points taken for computation 24 - HR. AVERAGE CONCENTRATIONS of pollutants and the predicted increment of Pollutant concentration at receptors for peak production capacities of the project are furnished in the **Table No. 4.8** and depicted in the Figure No. 4.1 to 4.4.

Table 4.8: – Ground Level Concentration

Location Code	AAQM Location Name	Max Baseline Conc.PM10 (µg/m3)	Max Baseline Conc.PM2.5 (µg/m3)	Max Baseline Conc.SO2 (µg/m3)	Max Baseline Conc.NO2 (µg/m3)	Max Baseline Conc.CO (mg/m3)	Predicted GLC (µg/m3) – PM10	Predicted GLC (µg/m3) – PM2.5	Predicted GLC (µg/m3) – SO2	Predicted GLC (µg/m3) – NO2	Predicted GLC (mg/m3) – CO	Cumulative GLC PM10 (µg/m3)	Cumulative GLC PM2.5 (µg/m3)	Cumulative GLC SO2 (µg/m3)	Cumulative GLC NO2 (µg/m3)	Cumulative GLC CO (mg/m3)
A1	Project Site	57.5	40.9	13.9	27	0.79	14.3456	8.6079	0.77471	1.0004	0.000286	71.8456	49.5079	14.67471	28.0004	0.790286
A2	Near Project range of Ballada	76.9	50.9	21.8	34.8	1.03	1.26841	0.76105	0.06849	0.08879	0.000025	78.16841	51.66105	21.86849	34.88879	1.030025
A3	Near Primary school Mulda	64.9	44.4	15.4	28.2	0.86	1.03607	0.62164	0.05595	0.07253	0.00002	65.93607	45.02164	15.45595	28.27253	0.86002
A4	Bheja Village	70.4	44.8	16.1	28.8	0.91	0.20955	0.12573	0.01132	0.01467	0.000004	70.60955	44.92573	16.11132	28.81467	0.91000
A5	Kakua Village	60.8	41.6	14.1	27	0.8	0.33154	0.19893	0.0179	0.02321	0.000006	61.13154	41.79893	14.1179	27.02321	0.80001
A6	Alanda Village	60	41.2	14	27	0.8	0.43769	0.26262	0.02364	0.03064	0.000008	60.43769	41.46262	14.02364	27.03064	0.80001
A7	Soput Village	64.8	44.2	15	28.1	0.85	0.51748	0.31049	0.02794	0.03622	0.0000103	65.31748	44.51049	15.02794	28.13622	0.85001
A8	Badahanjar Village	68.5	37	14.4	21.6	0.83	0.5483	0.32898	0.02961	0.03838	0.0000109	69.0483	37.32898	14.42961	21.63838	0.83001
A9	Badel Village	68.2	36.7	14.4	21.6	0.83	0.11316	0.06789	0.00611	0.00792	0.0000022	68.31316	36.76789	14.40611	21.60792	0.83000
A10	Sagur Village	62.5	43.8	14.6	27.5	0.82	0.20253	0.12152	0.0194	0.01418	0.000004	62.70253	43.92152	14.6194	27.51418	0.82000

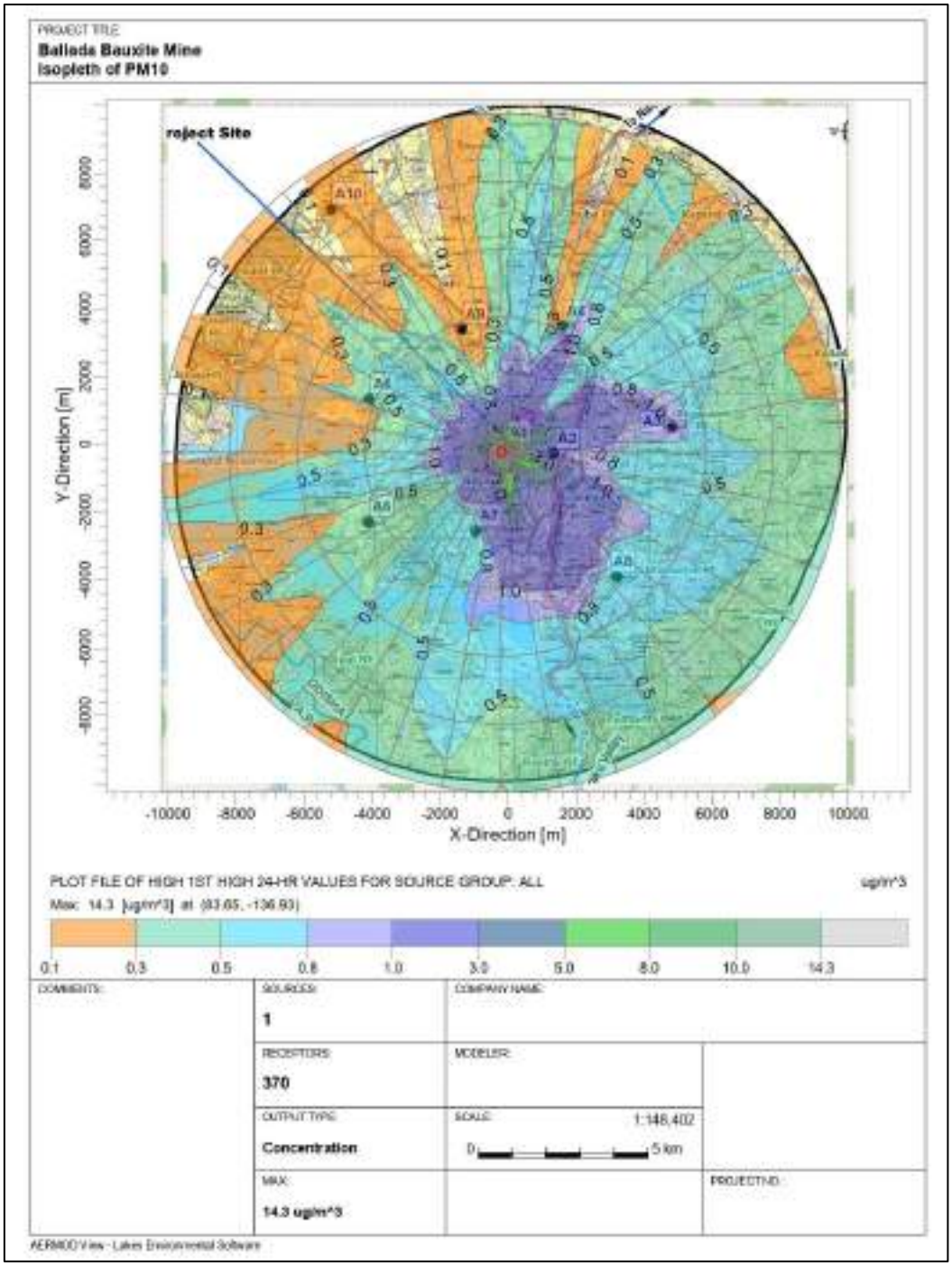


Figure 4.1: Controlled Condition Isopleths for 24 Hr. Incremental Conc. (µg/m³) for PM_{10}

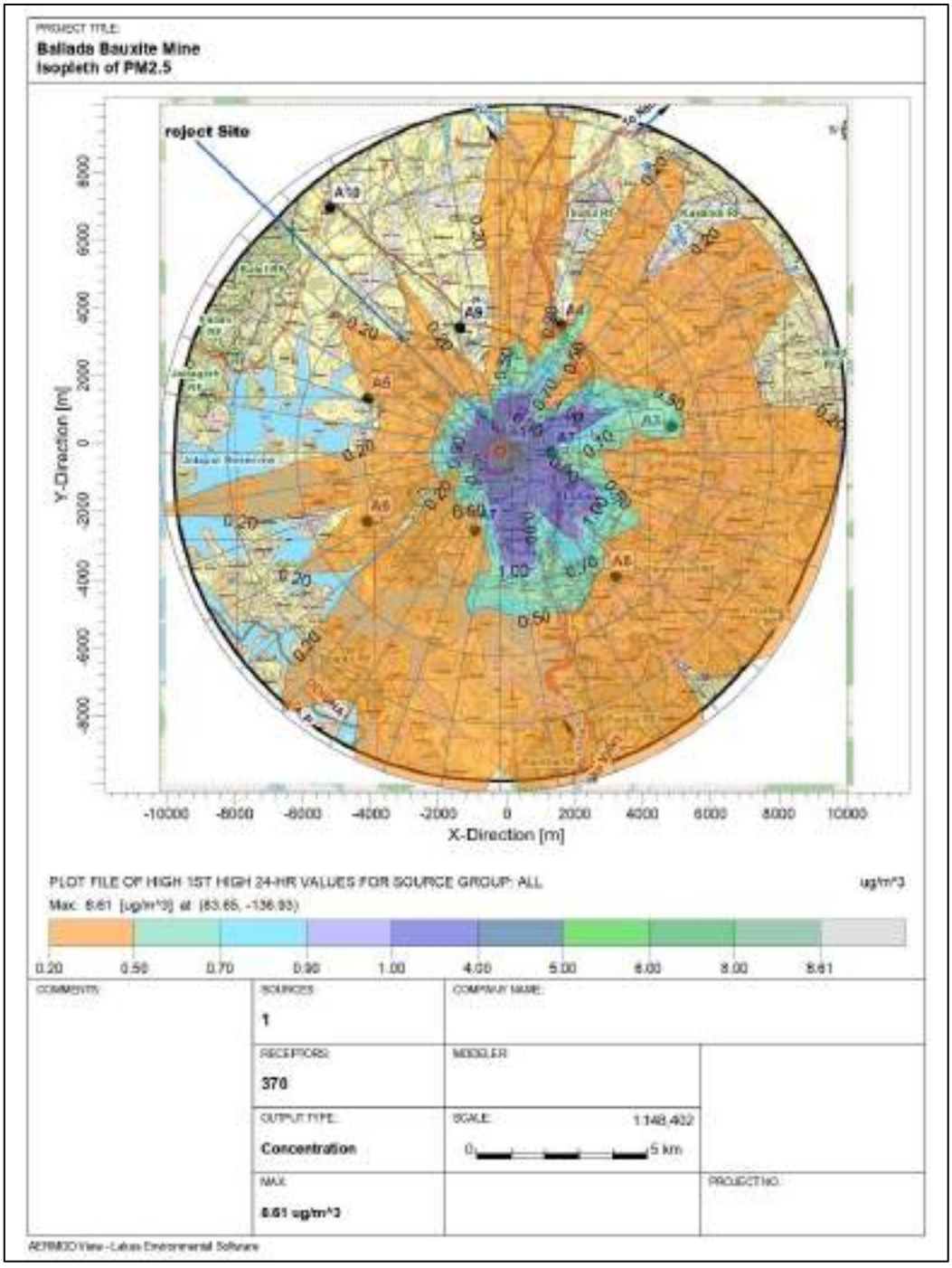


Figure 4.2: Controlled Condition Isopleths for 24 Hr. Incremental Conc. (µg/m³) for $PM_{2.5}$

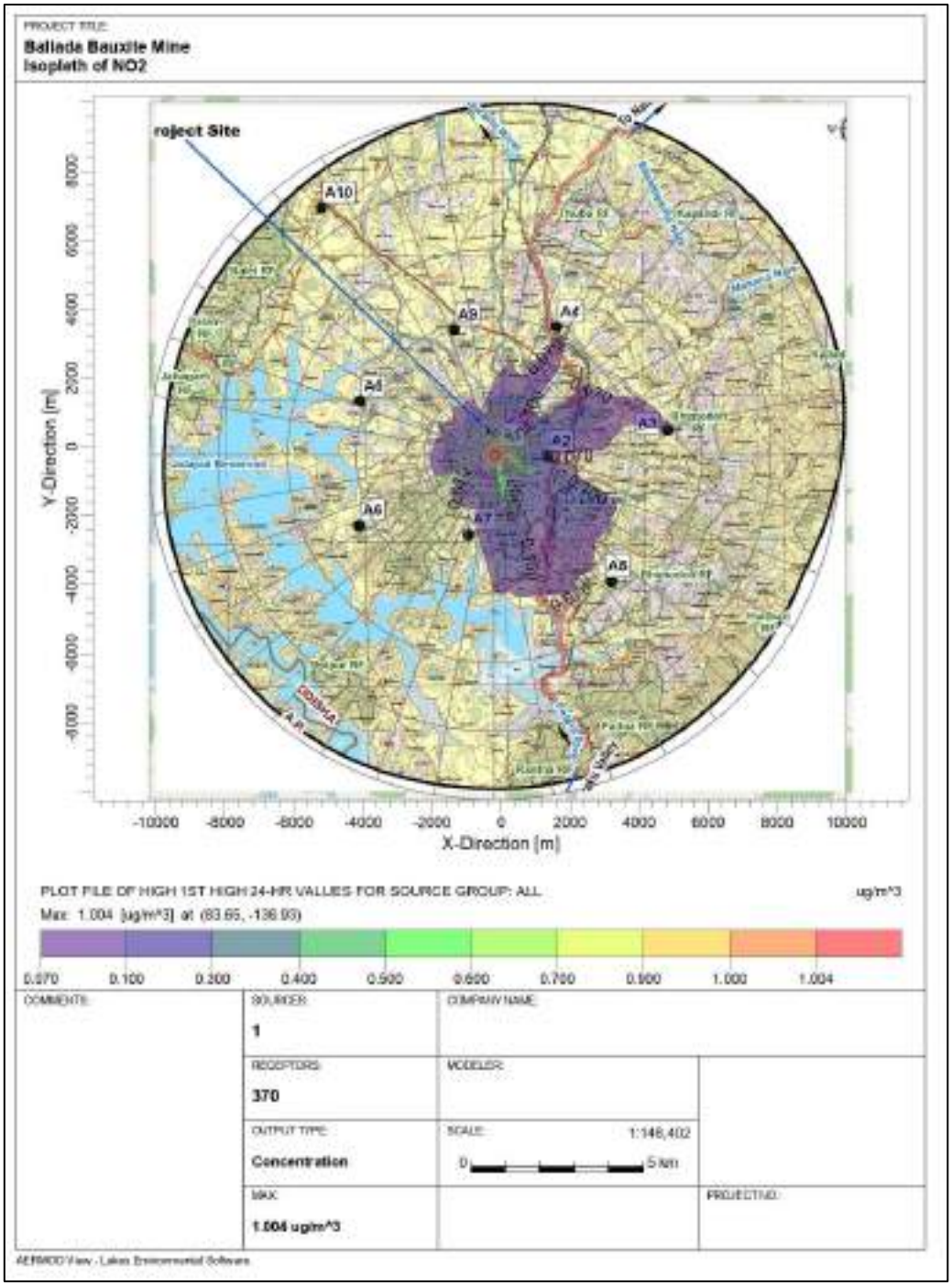


Figure 4.3: Controlled Condition Isopleths for 24 Hr. Incremental Conc. (µg/m³) for NOx

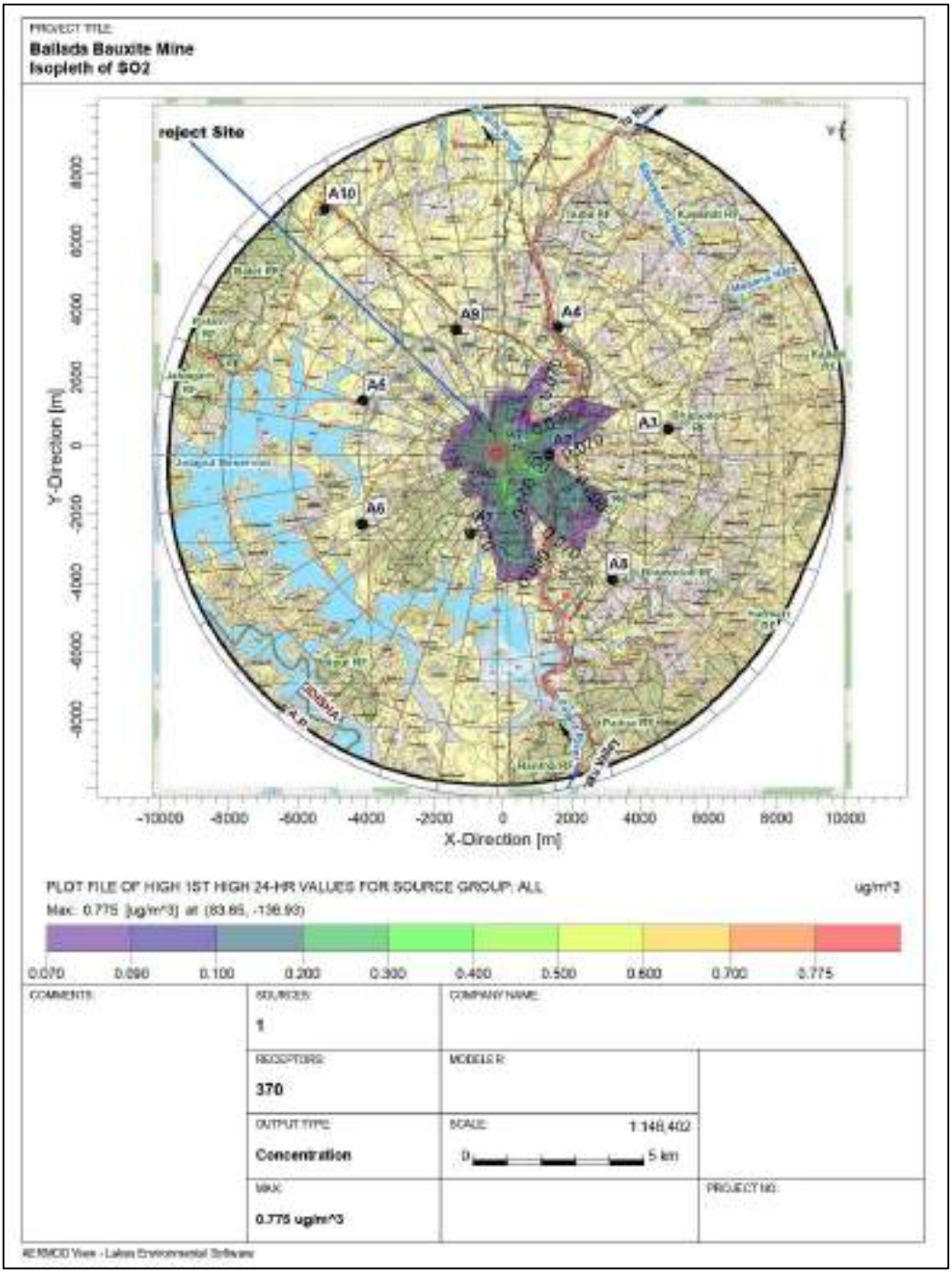


Figure 4.4: Controlled Condition Isopleths for 24 Hr. Incremental Conc. (µg/m³) for SO2

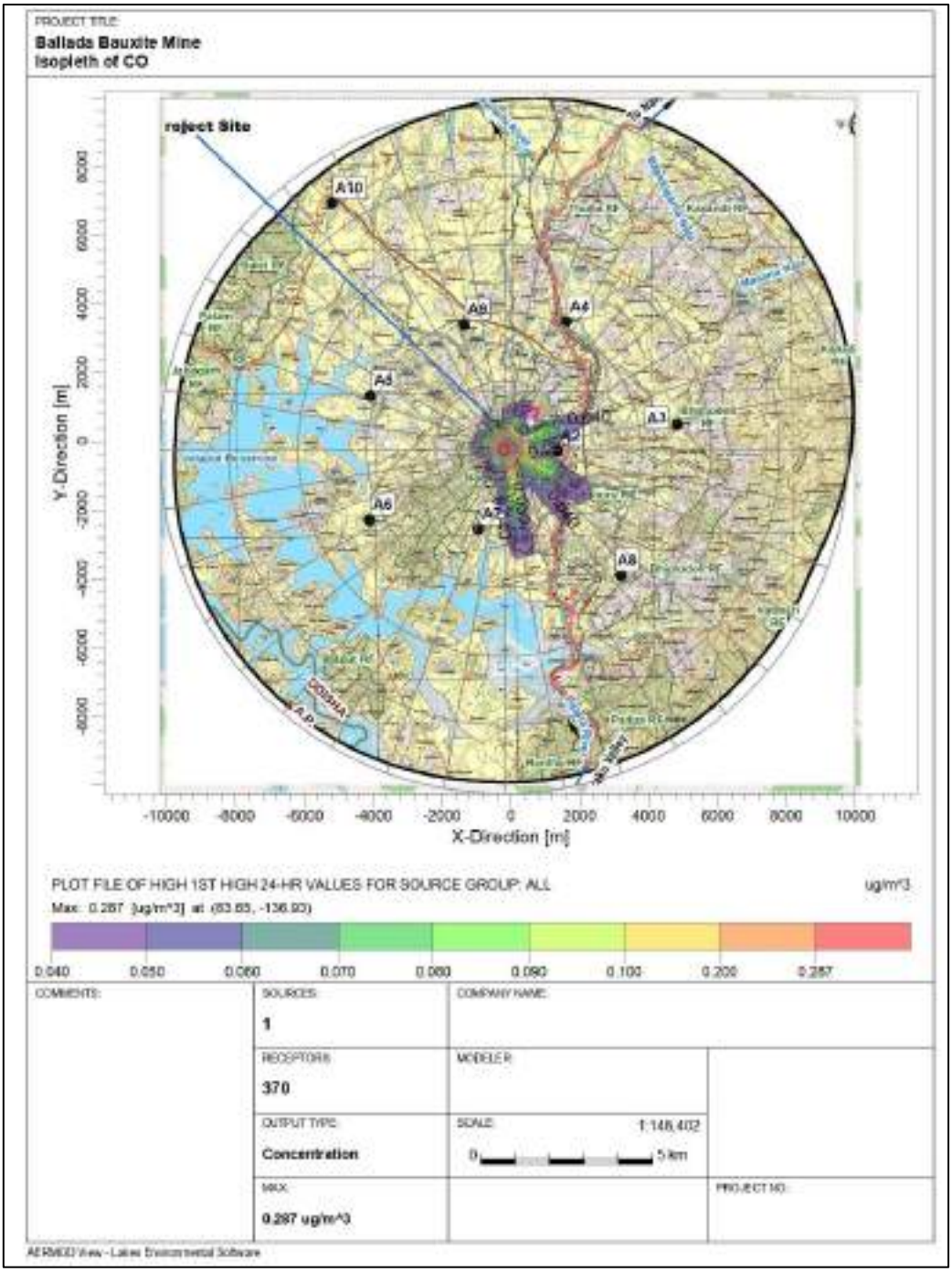


Figure 4.5: Controlled Condition Isopleths for 24 Hr. Incremental Conc. (mg/m³) for CO

4.4.5.1.1 Conclusions

As per the analytical reports of the project site and the surrounding areas, after the addition of cumulative GLC due to the proposed project and existing mining activity the ambient air quality will not exceed the NAAQS limits.

4.4.5.2 Air Pollution Mitigation Measures

Dust is the main air pollutant generated from the mining. The nature of mining operations is such that complete elimination of dust from mining process would not be possible. However, some preventive measures i.e. control at source like sprinkling of water, development of green belt, shall be carried out to minimize fugitive dust emission.

4.4.5.2.1.1 Drilling

Blast hole drilling generate considerable amount of dust in the open cast mining. All drill machines being engaged in the mine are equipped with Wet drilling facility to minimize the dust generation. Sharp drill bits are being used / will be used. All new drilling machines shall be provided with dust extractors.

The operating crew of the drills are also provided with dust masks to prevent their exposure to dust. Moreover, dust hoods will also be provided at the collar of the hole.

4.4.5.2.1.2 Blasting

Blasting is relatively minor contributor to total dust emissions. However, blasting dust in the form of concentrated cloud, that is highly visible and may have potential impact on neighbours at downwind of the blast. The blasting of near-surface weathered materials that contain a high proportion of fines, creates high dust emissions.

Blasting under unfavourable wind and atmospheric conditions i.e. during foggy weather or during nights and when low visible clouds, will be avoided to protect areas adjacent to the mine.

4.4.5.2.2 Haul Roads/Transportation of Minerals

Fugitive dust emissions are caused by the contact of the tyres with the unsealed road surface that affect the total distance travelled.

Vehicular emissions are being controlled through regular and proper preventive maintenance schedules. Emissions tests are also being done with diesel smoke meter to ensure emission values.

Haul road water sprinkling will be done continuously in production shift to ensure effective suppression of dust on haul roads.

4.4.5.2.3 Crusher

Water sprinkling arrangements will be provided all around the crusher so as to suppress dust generation

4.4.5.2.4 Measures to mitigate CO levels

As per the baseline study of the CO concentration in the ambient air, it has been found to be negligible and is far below the prescribed limit of CPCB moreover it is not anticipated to exceed in future. All heavy and light vehicles shall be tested for pollutants concentration in their exhausts regularly and well maintained. Strict lookout will be carried out in and around the operational area for any fire which shall be immediately controlled.

4.5 IMPACTS OF WATER POLLUTION AND ITS MITIGATION MEASURES

4.5.1 Impact of Mining on Water Usage

Total Water requirement for project is estimated to be 690 KLD during operation phase. Water requirement will be met through the surface water supply through pipeline. Necessary permission will be obtained from water resource department for using the Surface water.

4.5.2 Impact of Mining on Surface Water

The area has no perennial nalla, hence there will not be any impact of mining on surface water regime. Hence, there is no possibility of any siltation in natural streams and reduction of vertical percolation. It is therefore apparent that there is hardly any impact of mining on the surface water regime.

The rain water flow towards catchment area is not flowing through the lease area as garland drains will be made around the lease area. Hence, solid wash off will not occur.

4.5.3 Impact of Mining on Ground Water

The mining activity proposed to be carried out during plan period will not interfere anywhere with the ground water table.

4.5.4 Impact due to Effluent Generation from the Mine

There is no effluent generation from the mine, the only waste water generation would be from domestic purpose which will be discharge in septic tank/soak pit system. Wastewater generated from workshop will be treated using oil-water separator and treated water will be used in vehicle washing.

4.5.5 Rain Water Harvesting

As part of the rain water harvesting a shallow depression is understood to have been dug under CAMPA scheme in the year 2020-21 by the forest department. The dimension of the same is 76m x 54m x 1m. The current mine plan proposal does not envisage mining of the aforecited area during the first 5 years of mining. Water storage of 1.08 ha area has been proposed during the conceptual period of mining.

Following rain water harvesting measures will be adopted:

- By making garland drains all the collated rain water will be directed to mine pit or other recharge structure.
- Settling tanks will be provided in the lease area.
- Mine pit also acts as natural recharge for the collected rain water.

4.6 IMPACTS OF NOISE/VIBRATIONS AND MITIGATION MEASURES

Ambient noise levels measured in and around the Mine during the study period indicated that the noise levels at all the locations were within the permissible limits at most of the times. Adequate PPE will be provided to workers working in lease area to protect them against localized noise.

4.7 WASTE MANAGEMENT

The waste generated in course of pre-mining development and subsequent mining operation will consist of topsoil and laterite with occasional occurrences of khondalite.

During the first five years the rate of generation of waste is expected to be of the order of 0.073 Mm^3 or 0.15 MT of along with generation of 0.026 Mm^3 of Topsoil. Considering this, an average ore to waste ration of 1:0.018 is estimated.

It is planned to stack topsoil and waste separately on ground during the initial 4 years of plan period. From 5th year onwards, waste material will be dumped systematically. Topsoil, stacked separately, would be spread over the reclaimed areas, to enable planting and growing of trees. The waste stacked on ground during the initial years of operation will be utilized to fill the worked-out areas at the end of the working life of the mine as well as during the interim period, as and when practicable. The generation of waste during the 5-year plan period will be very less and shall be dumped systematically. No backfilling is proposed during the initial 5-year period.

Table 4.9: – Details of Waste Generation

Year	Top Soil Volume (m^3)	Over Burden/Waste Volume (m^3)
Year 1	24072	0
Year 2	1710	24783
Year 3	0	44671
Year 4	0	3800
Year 5	0	0

Source: Mining Plan

Table 4.10: – Details of Dump

Year	Dump ID	Type of Dump	Area in ha	Height, m
Year 1	Nil	-	-	-
Year 2	Dump-I	Waste	0.53	5
Year 3	Dump-I	Waste	0.75	7
Year 4	Dump-I	Waste	0.53	2
Year 5	Dump-I	Waste	0.26	2

Source: Mining Plan

Table 4.11: Details of Stack

Year	Stack ID	Type of Stack	Area in ha	Height, m
Year 1	Satck I	Mineral	1.93	3
Year 2	Satck I	Mineral	1.93	3
Year 3	Satck I	Mineral	1.93	3
Year 4	Satck I	Mineral	1.93	3
Year 5	Satck I	Mineral	1.93	3

Source: Mining Plan

4.8 IMPACTS ON ECOLOGY & BIODIVERSITY AND ITS MITIGATION MEASURES

No National Park, Wild Life Sanctuary, Bio-sphere Reserve, Elephant Reserve, Tiger Reserve or Elephant Corridor etc. is present within 10 km of mining lease area. There is one Schedule-I faunal species have been reported during the site visit. Details of the species present in the Study Area are given in the Chapter-3 of the report. However, the Mine is dedicated and committed to conserve the species. The Conservation plan for protection of flora and fauna in Core and Buffer Zone of the Mine is under process with the consultation of Local Forest and Wildlife Department. The same will be implemented in the area on the funding from the Mine for the conservation of the flora and fauna, present in the Study Area.

Green belt / cover, is an important sink for air pollutants, it also absorbs noise. Enhancing green cover not only mitigates pollutants but also improves the ecological conditions / aesthetics and reduces the adversities of extreme weather conditions. Trees also have major long-term impacts on soil quality and the ground water table. By using suitable plant species, green belts can be developed in strategic zones to provide protection from emitted pollutants and noise.

The green belt / cover will serve the following purposes:

- Compensate the damage to vegetation due to setting up and operation of the mine.
- Prevent the spread of fugitive dust generated due to mining and allied activities
- Attenuate noise generated by the mine.
- Reduce soil erosion.
- Help stabilize the slope of external over-burden dumps.
- Increases green cover and improve aesthetics.
- Attract animals to re-colonise the area when the mine is abandoned.

The species for plantation have been selected on the basis of soil quality, place of plantation, chances of survival, commercial value (timber value, ornamental value, etc.), etc. It is to be noted that only indigenous species will be planted. The species for green belt /vegetation cover development will be selected in consultation with State Forest Department and State Soil Conservation Department. Mixed plantations will be done keeping optimum spacing between the saplings. However, the species suitable for planting in the area as recommended by Central Pollution Control Board in their publication "Guidelines for Developing Greenbelts" (PROBES/75/1999-2000).

The project area will be reclaimed. Total 8440 trees over five years will be planted inside the mining lease area.

There may be some impact on the biological environment due to the air pollution during transportation of mineral from the mine to the end users. The dust deposition on the plants along the approach road may reduce the photosynthesis. This will be taken care by transportation of minerals, covered truck with tarpaulin and regular water sprinkling on the approach road. Avenue plantation along the approach road will further reduce the impact.

4.9 SOCIO ECONOMIC IMPACT OF THE PROJECT AND SAFETY MEASURES

Critically analyzing the existing environmental status of the socio-economic profile and visualizing the scenario with the project, the impacts of the project would be varied and may generate both positive and negative impacts of the proposed project in the region that are stated below:

4.9.1 Positive Impacts

4.9.1.1 Rehabilitation and Resettlement

The project does not envisage any leasing or acquisition of private land. Hence R&R plan is not applicable under the present proposal.

4.9.1.2 Increase in Job Opportunities

As per the survey it has been observed that the non-worker population is about 39.37 % in the area so the project in general will help to provide direct and indirect job opportunities for auxiliary and ancillary works etc.

4.9.1.3 Minimal burden in the existing Infrastructure Facilities

Local work force will be given first preference in the activity due to which influx of the outsiders is not envisaged or it will be very minimal. Thus, there will not be the necessity of provision of housing facility for the local workers and not stressing on the existing civic amenities of the area. If sufficient number of local workers will not be available, then workers from outside will be engaged.

4.9.1.4 Improvement in Infrastructure

The activity will benefit the local people due to provision of more infrastructural facilities such as developments of approach routes within the village area, street light, health facilities etc.

4.9.2 Mitigation Measures of Socio-economic Environment

- Adequate measures have been envisaged in the project design to control dust. Proposed adequate & effective control measures will be provided which include dust suppression
- Well maintained tarpaulin covered trucks etc shall be used. Therefore, the likely adverse impacts on people, health, social and economic factors will be minimized
- Female population in the study area must be given education about the awareness of sex education and health education and safety through awareness camps in collaboration with the local NGOs
- Periodic health check-up camps shall be organized by project authority for villagers near the project villages
- Apart from the normal health check-up, emphasis shall also be given to prevent specific diseases originating due to emission of different pollutants such as respiratory ailments, skin problems, water borne diseases, hearing abilities etc.
- Job oriented training courses must be organized through industrial / technical training institutions for educated youth like electrical, tailoring, plumbing, type

writing, shorthand and machine repairing, welding fabrication, and other skill developing trades

- Whenever necessary, collaboration between project authority and local bodies will be done on regular basis with an objective to build and maintain a good relationship which is necessary for smooth functioning of the project as well as progress and welfare of the people in the study area
- Awareness programs will be taken to make people aware about the environmental protection, need of water conservation etc.

4.10 GREEN BELT DEVELOPMENT PLAN

In order to minimize the environmental impacts arising due to the proposed project, especially from air pollution, soil erosion etc., the Greenbelt development around the project sites can provides the mitigation option. The green canopy not only absorbs some of these pollutants but also improves the aesthetic environment. Therefore, a "Green Belt Development Plan" has been proposed.

The area is mostly rocky with very poor density of vegetation. Plantation will be carried out around the mine, to arrest the dust at source.

Native plants and other local species will be planted. A suitable combination of trees that can grow fast and also have good leaf cover shall be adopted to develop the greenbelt.

Table 4.12: – Details of Green Belt Development

Sr. No	Year	Green Belt Location (s)	Area Proposed to be Covered (Ha)	Number of Plants Proposed	Expected Survival Rate (%)	Estimated Expenditure (INR)
1	Year 1	Statutory Barrier, Dump & haul roads	0.72	1440	75	2,01,600
2	Year 2	Statutory Barrier, Dump & haul roads	0.86	1720	75	2,40,800
3	Year 3	Statutory Barrier, Dump & haul roads	1.16	2320	75	3,24,800
4	Year 4	Statutory Barrier, Dump & haul roads	0.68	1360	75	1,90,400
5	Year 5	Statutory Barrier, Dump & haul roads	0.80	1600	75	2,24,000

Source: Mining Plan

4.11 MINE CLOSURE PLAN

The mine closure plan is one of the most important requirements in the environmental management of mining projects. The closure operation is a continuous series of activities right from the commencement to decommissioning of the project. Therefore, the progressive mine closure plan is specifically included in the mining plan. The primary aim is to ensure that the following broad objectives along with the abandonment of the mine can be successfully achieved:

- Creation of a productive and sustainable after-use for the site, acceptable to mine owners, regulatory agencies, and most importantly to the community.
- Protection of public health and safety of the surrounding habitation.
- Minimization of environmental damage.
- Conservation of valuable attributes and aesthetics.
- Counter balancing the adverse socioeconomic impacts.

4.11.1 Post Mining Land Use

During post mining stage, the excavated mining area will be partly backfilled from the waste dumps prevailing over the lease at the time to restore the natural profile. The back fill will be properly graded & traced and will be biologically reclaimed. The post mining land use, thereafter is given below:

Table 4.13: Post Mining Land Use

S. No.	Post Mining Use	AREA (Ha)
1.	Degradation by Excavation	81.82
2.	Degradation by Dumps & Material Staking	1.95
3.	Covered under Plants, Shades & Buildings	0
4.	Covered by Roads & Approaches	0
5.	Any Other, please specify below	0
6.	Undisturbed	61.18
	Total	**144.95**

Source: Mining Plan

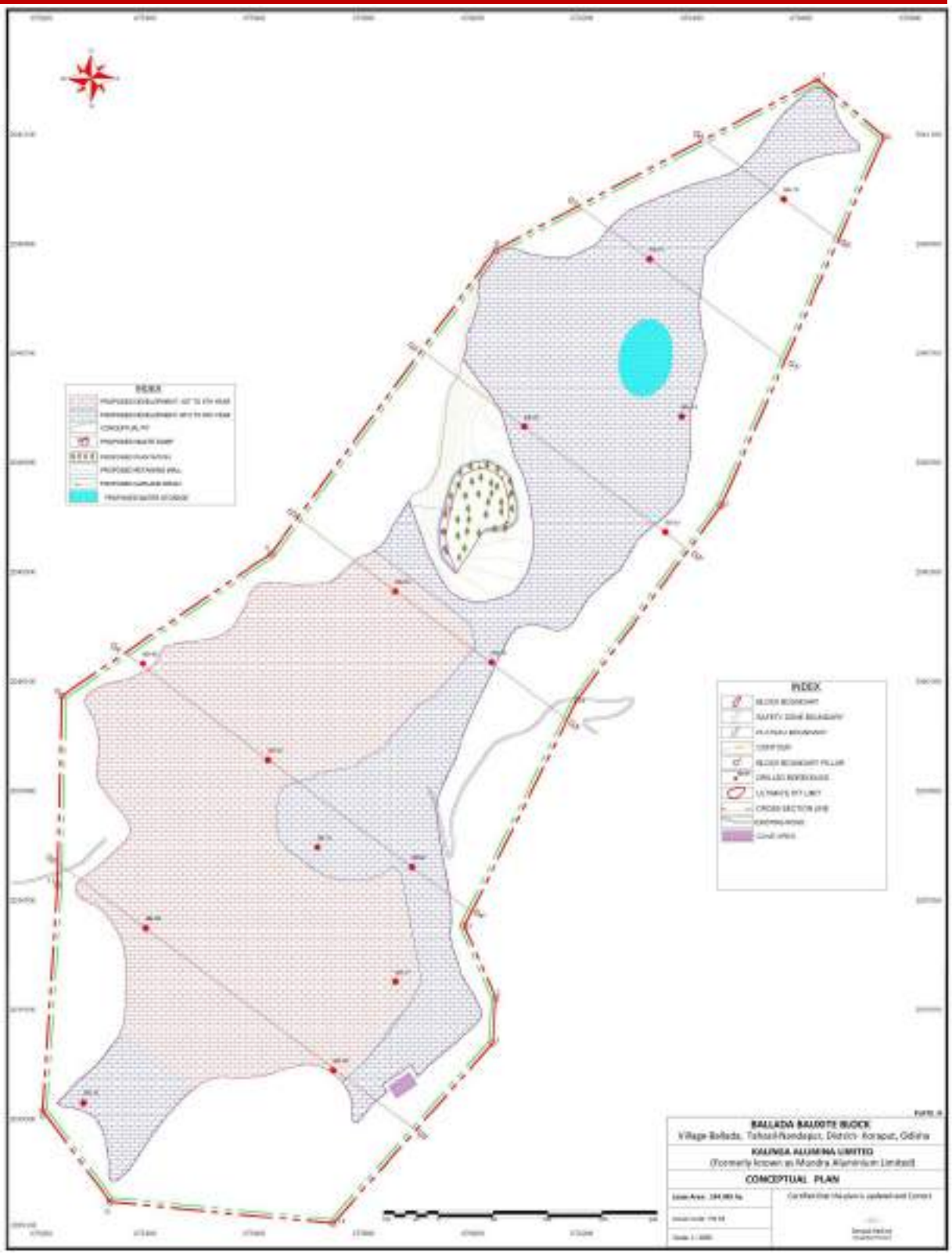


Figure 4.5: Post Mining Conceptual Plan

5. ANALYSIS OF ALTERNATIVES (TECHNOLOGY & SITE)

The proposed project entails mining of Bauxite by opencast mining method with an annual Peak Rated Capacity of ~ 4.0 MTPA of Bauxite (ROM). The project also involves generation of 1,46,508 tonnes of Overburden/waste and 51,564 tonnes (25,782 m^3) of top soil during initial 5 years of operations. Besides, it is envisaged to have crushing/Screening facilities within the lease area with a capacity of 800 TPH at rated production level over an area of 144.945 Ha located at Village - Ballada, Taluka – Nandapur, District- Koraput, Odisha between latitudes 18°26'05.61588" N to 18°27'13.34448" N and Longitude 82°39'32.39136" to 82°40'25.36716" E. & is covered under the Survey of India toposheet no. No. E44K11 (65J/11).

5.1 ANALYSIS OF ALTERNATIVE SITE

Since the mining activity is site specific and it depends on occurrence of mineral, as, therefore, alternate sites are not examined with respect to this project. The site has following benefits:

➢ **Site Connectivity**

- The site is situated about one to two kilometres west of Ballada and about 8 km north of Padwa in Koraput district, Odisha. Jeypore, a major town in the Koraput district, is about 82 km north-north-west of the Ballada deposit and is approachable by major district road No.52. Koraput, the district headquarters is at 60 km north of the deposit and is connected by a metalled road via Similiguda on NH 26. Bheja, the nearest Railway Station is about 5.0 km due north-east. The nearest airport is at Visakhapatnam (140 km) from the lease.

➢ **Manpower**

- Both skilled and unskilled workers are available near site.

5.2 ENVIRONMENT SENSITIVITY OF THE LOCATION

1. There is no Wildlife Sanctuary / National Park / Bio-sphere Reserve / Habitat of Migratory birds within 10 km radius from the project site.
2. There is no Tiger Reserve / Elephant Reserve / Turtle Nesting Ground within 10 km radius from the project site.
3. There is no Archaeological Monument / Defence installation within 10 km radius from the project site.

5.3 ALTERNATIVE FOR TECHNOLOGY

Mining will be carried out as open cast mechanized method of mining using drilling and blasting, hence analysis pertaining to technological alternatives has not been carried out.

- All statutory requirements, guidelines, and recommendations of SPCB/CPCB/MoEF & CC shall be complied.
- No any industrial wastewater generation.
- Solid waste and hazardous waste to be generated shall be disposed-off in environment friendly manner.
- Air emission shall be controlled by providing adequate pollution control equipment.
- Continuous efforts shall be made for improvement of the socio-economic status of the surrounding area.

The factors considered the choice of the mining method for a given deposit are deposit characteristics, percentage recovery, requirement of health and safety and environmental concerns, production, scheduling, scope of mechanization and automation, workforce requirements, wage rates, land reclamation, operating and capital cost estimates. The selection of the mining method (development and extraction) is a key decision to be made in the opening up of a mine. Surface or open pit mining is used for large, near-surface mineral deposits. Mineral is excavated, loaded into trucks. Mining must be planned so that the combine of mining processing and reclaiming the land is taken up concurrently.

- The opencast mining method will be adopted for the proposed mines because of the following reasons:

  - The opencast mining operations ensure higher mineral conservation.
  - The method used for mining is efficient for bauxite, so no alternative mining method is proposed. The main considerations in designing the quarry layout have been:
    - To design an economical production of required quality of minerals for the life of mine;
    - To minimize transportation distance for minerals and waste;
    - To minimize re-handling of overburden;
    - To minimize adverse effects on environment;

- Technologies and operations selected will maximize the opportunities for recycling and re-use of water;
- Dust control is important at most mines, and involves both equipment design and operational procedures;
- Solid waste disposal activities have been appropriately located as well as conservatively designed. Attention has given to long-term stability of disposal. Drainage and leach ate from disposal sites will be minimized by appropriate location, design and ongoing maintenance.

6. ENVIRONMENTAL MONITORING PROGRAM

6.1 INTRODUCTION

Environmental Monitoring is an essential tool for sustainable development and ensuring effective implementation of Environmental Management Plan and mitigation measures. The monitoring and evaluation of the management measures envisaged are critical in implementation of the Project. Monitoring involves periodic checking to ascertain whether activities are going according to the plans. The purpose of the environmental monitoring plan is to ensure that the envisaged purpose of the project is achieved and results in desired benefits.

To ensure the effective implementation of the proposed mitigation measures, the broad objectives of monitoring plan are:

- To implement the mitigative measures defined in EMP.
- To evaluate the performance of mitigation measures proposed in the EMP.
- To evaluate the adequacy of Environmental Management Plan.
- To suggest improvements in management plan, if required
- To improve environmental quality.

A detailed monitoring of emissions from different sources for different environmental parameters will be carried out as per the permitted norms and any further notification / direction from State Pollution Control Board, Odisha, Central Pollution Control Board (CPCB) and MoEF&CC. Monitoring methodologies will follow standard methods prescribed by Central Pollution Control Board (CPCB), USEPA, etc.

6.2 PARAMETERS TO BE MONITORED

- Ambient Air Quality,
- Work zone Air quality,
- Water Quality and Ground Water Level
- Noise Level
- Vibration study
- Performance of pollution control equipment

6.2.1 Ambient Air Quality

Ambient air quality monitoring in core zone and buffer one will be done as per direction by SPCB. The selected parameters shall be monitored as per National Ambient air quality Standard, 2009.

The location of the AAQMS will be decided as per the meteorological condition, wind pattern, site condition and further in consultation with the SPCB. The selected parameters shall be monitored as per National Ambient air quality Standard, 2009.

6.2.2 Stack Monitoring

DG set Stack analysis will be carried out as per CTO of State Pollution Control Board.

6.2.3 Fugitive Emissions Monitoring

Fugitive emissions shall be monitored as per GSR-742 (E), dated 25.09.2000 in predominant down wind direction for **Particulate Matters** at a distance of 25 ± 2 meters from the source of pollution, at following locations:

Table 6.1: Fugitive Emissions Monitoring Location

Area	Monitoring Location
Mine Face	Drilling, excavation and loading
Haul Road / Service Road	Haul road to OB dumps, & mine exit
Crusher	Near Crusher house
OB Dumps	Active OB Dumps

6.2.4 Effluent Quality

No effluent generation from proposed project, Domestic wastewater is being treated in Septic tank, Wastewater generated from washing will be treated using oil water separator and treated water will be reused.

6.2.5 Ground and Surface Water Quality

Ground water quality & level shall be monitored in and around the mine lease area. The existing dug well/borewell located in and around the mine lease area shall be covered along with the piezometers to be constructed for the mine. The exact location of the sampling points with sampling frequency will be decided in consultation with SPCB as well as the guidelines of CGWA/CGWB/CPCB.

Monitoring of surface water quality shall be carried out in the nearby surface water bodies in upstream/downstream direction. The results will be compared with IS: 2296 surface water standard.

6.2.6 Noise Monitoring

Work zone Noise

Noise monitoring shall be carried out at near to the high noise generating areas like Drilling, Blasting, DG Set, Compressor, crusher area etc., once in a month.

Ambient Noise

Ambient noise levels will be monitored once in every quarter during daytime (6 AM to 10 PM) and night time (10 PM to 6 AM) as per The Noise Pollution (Regulation and Control) Rules, 2000, Schedule III at Industrial, Commercial, Residential and Silence Zone.

6.2.7 Soil Characteristics

Soil quality shall be monitored once in a year, as per the prevailing practice, to check the impact of mining on soil.

6.2.8 Inspection / Monitoring of quarry slope and dump slope failure

Regular examination will be carried out to look after the slope failure on mine faces and overburden benches etc. Slope Stability is a critical safety and production issue for open-cut mines around the world to understand the probability of mine wall failures. Dump slope failure occurs mainly due to accumulation of water in dumping areas, formation of gullies in the dump slopes, improper terracing/dumping etc. with precision level instruments on regular interval.

6.2.9 Study of Blasting effect

Main reason of fly rock due to blasting is Improper blast design i.e., less stemming, inadequate burden & spacing, high charge concentration, improper delay, presence of geological discontinuities such as joints, faults, muds etc. Regular study shall be conducted for proper designing of blast (i.e., charge weight per blast, number of holes, spacing, stemming etc.). Ground vibration and sound overpressure will be compiled.

6.2.10 Plantation and green belt development

Plant growth, its maintenance and survival rate will be monitored.

6.2.11 Occupational Health & Safety Monitoring

Surveillance of workers health: A systematic program for medical check-up at regular intervals will be followed at the Mine for all workers (including contractor workers) to ascertain any changes in the health condition of workers due to the working conditions. Employee's health is being checked at the time of joining and at regular interval, thereafter.

Inspection and Testing of Safety Appliances: All safety appliances shall be regularly inspected and tested as hazard control measures for mine operation. The inspection shall verify that issued personal protective equipment (PPE) continues to provide adequate protection and is being worn as required.

6.2.12 Training

Training activities for employees and visitors shall be adequately monitored and documented (curriculum, duration, and participants). Emergency exercises shall be documented adequately.

6.2.13 Periodic Inspection of Effectiveness of Pollution Control Equipment

A detailed inspection schedule shall be drawn for checking the effectiveness all pollution control systems. The maintenance shall be done strictly as per schedule and guidelines furnished by equipment manufacturer

6.2.14 Socio-Economic Development – Monitoring of the commitments made to address the concern of stakeholders

The mining activities will improve the socio-economic conditions in the surrounding area. The communities, benefited by the mine, are the key stakeholders of the mining. Project Proponent (PP) will have structured interactions with the community to disseminate the measures taken by the mine and to elicit suggestions for overall improvement for the development of the surrounding area.

6.2.15 Accidents and Diseases Monitoring

PP shall establish procedures and systems for reporting and recording of Occupational accidents and diseases and dangerous occurrences and incidents.

These systems shall enable workers to report immediately to their immediate supervisor any situation they believe presents a danger to life or health. The systems and the employer shall further enable and encourage workers to report to management all:

- Occupational injuries and near misses.
- Suspected cases of occupational disease; and
- Dangerous occurrences and incidents.

All reported occupational accidents, occupational diseases, dangerous occurrences, and incidents together with near misses shall be investigated with the assistance of a person knowledgeable/competent in occupational safety. The investigation shall:

- Establish what happened.
- Determine the cause of what happened; and
- Identify measures necessary to prevent a recurrence

6.3 BUDGET ALLOCATION FOR MONITORING

To maintain the environmental quality within the stipulated standards, regular monitoring of various environmental components is necessary.

Table 6.2: Cost of Environmental Monitoring Program

S. No.	Item	Cost in Rs. Per year
1.	Cost of monitoring of environmental parameters for Air, Water, Noise and Soil	10,00,000
2.	Slope Stability	1,00,000
3.	Occupational Health & Safety	7,50,000
4.	Plantation & Socio-economic development	1,50,000
Total		**20,00,000**

6.4 ENVIRONMENTAL MANAGEMENT CELL

A "Environmental Management Cell" (EMC) will be established to look after all environmental related matters of the mine. The EMC will supervise the reported activity from time to time for smooth implementation of Environmental Monitoring Program and Mitigation and Management measures and will take necessary actions if required. The cell will act to ensure the suitability, adequacy, and effectiveness of the Environment Management Program. It will also ensure to meet all the Statutory Requirements.

Table 6.3: Man power at EMC

Description	Manpower
Head of Mines	1
Mines Manager	1
Environment Engineer	1
Supervisor	1
Total	**4**

EMC will serve the following purpose:

- Identification of any environmental problem, which may occur in the mine or surrounding area.
- Initiating or providing solutions to those problems through designated channels and verification of the implementation status.

- Control of activities inside the mine, until the environmental problem has been corrected.
- Suitably respond to emergency situations. Provide details of the emergency and the actions taken to the top management.
- Suitably make modifications or alterations in the mine to meet regulatory standards as amended from time to time.

6.4.1 Monitoring & responsibility

The cell will be responsible for monitoring of the mine environment related requirements which include**:**

6.4.2 Interaction with SPCB

EMC shall be in regular touch with SPCB and shall send them reports regularly in the prescribed format, as per the prevailing practice. Any new regulations considered by State/Central Pollution Control Board for the mine shall be taken care of by EMC

6.4.3 Providing Training

EMC would be responsible for the implementation of the EMP, needs to be trained on the effective implementation of the environmental issues. To ensure the success of the implementation set up proposed, there is a high requirement of training and skill up-gradation. For the proposed project, additional training facilities will be developed for environmental control. For proper implementation of the EMP, the officials responsible for EMP implementation will be trained accordingly.

To achieve the overall objective of pollution control it is essential not only to provide latest pollution control and monitoring systems but also to provide trained man power resources to operate and maintain the same. So far, the practice with many mines is to utilize the mine operations and maintenance crew for operation of systems. This has shown adverse results due to lack of specialized knowledge in addition to priority selection. Therefore, apart from the EMC, specific training will be provided to personnel handling the operation and maintenance of different pollution control equipment.

In-mine training facilities will be developed for environmental control. Specialized courses at various Research / Educational institutes will be organized. The training will be given to employees to cover the following fields:

- Awareness of pollution control and environmental protection to all.
- Occupational health/safety.
- Disaster management.
- Environmental management.
- Afforestation / plantation and post care of mine.
- Knowledge of norms, regulations and procedures.
- Risk assessment and Disaster Management.

The cell will also be responsible for monitoring of the mine safety and safety related systems which include

- Checking of safety related operating conditions.
- Visual inspection of safety equipment.
- Preparation of a maintenance plan and documentation of maintenance work specifying different maintenance intervals and the type of work to be performed.

Other responsibilities of the cell will include

- A CPCB/SPCB registered agency will be retained to generate the environment quality data in respect of air, water, noise, soil and meteorology and prepare the Environmental report.
- Submitting environmental monitoring report to SPCB. The cell will also take mitigative or corrective measures as required or suggested by the Board.
- Timely renewal of Consents & Authorization will be taken care of.
- Conduct and submit annual Environmental Statement to the State Pollution Control Board in Form-V under Rule 14 of the Environment (Protection) Second Amendment Rules 1992 of the Environment (Protection) Act, 1986.
- Prepare and submit six monthly reports on the compliance with the conditions of the environmental clearance and submit to the Regional Office of MoEF&CC.
- Comply with the conditions prescribed under the Consents and Authorization.
- File timely return under Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016, E-Waste (Management) Rules, 2016 and Batteries (Management and Handling) Rules, 2001 and as per their subsequent amendments.
- Keeping the management updated on regular basis about the findings / results of monitoring activities and proposes measures to improve environmental performance.
- Conducting regular safety drills and training programs to educate employees on safety practices. A qualified and experienced safety officer will be responsible for the identification of the hazardous conditions and unsafe acts of workers and advise on corrective actions, organize training programs and provide professional expert advice on various issues related to occupational safety and health.
- Conducting safety and health audits to ensure that recommended safety and health measures are followed.

Table 6.4: Responsibility Matrix for Implementation of EMC

Attributes	Environmental Management					Reporting and Receiving Feedback from Statutory Authority	
	Primary Responsibility and Report Generation	Short Term and Time Series Analysis and Generation of Status Report	Approval of Status Report and Decision on Actions	Implementation of Follow up Action	Verification of Follow up Action and Reporting Back to Approval Authority	Who will do?	Whom to report?
Environment Monitoring (Air, Water & Noise)	EMC [Environment Engineer]	Mines Manager	Head of Mines	EMC [Environment Engineer]	Head of Mines	EMC	Regional MoEF&CC/ SPCB
Plantation & Greenbelt development	EMC [Environment Engineer]			EMC [Environment Engineer]			
Reclamation progress [Biological reclamation]	EMC [Environment Engineer]			EMC [Environment Engineer]			
Social Welfare	CSR cell			CSR cell		CSR cell	Regional MoEF&CC/ SPCB
Reclamation progress [Technical reclamation]	Mining & Excavation			Mining & Excavation		Mining & Excavation	DGMS

Attributes	Environmental Management					Reporting and Receiving Feedback from Statutory Authority	
	Primary Responsibility and Report Generation	Short Term and Time Series Analysis and Generation of Status Report	Approval of Status Report and Decision on Actions	Implementation of Follow up Action	Verification of Follow up Action and Reporting Back to Approval Authority	Who will do?	Whom to report?
Drainage cleaning	Civil			Civil		NA	
Water and Energy Utilization	Mechanical, Electrical and Civil Maintenance			Mechanical, Electrical and Civil Maintenance			
Occupational Health Monitoring	Health unit			Mining & Excavation		Mine safety	DGMS
Dump slope, Quarry slope inspection	Mine Safety	Mine Safety		Mining & Excavation			
Blast Monitoring	Mine Safety			Mining & Excavation			
Environmental and safety related training	Vocational training centre	Vocational training centre		Vocational training centre			

6.5 SUMMARY

The environment monitoring plan enables environmental management system with early sign of need for additional action and modification of ongoing actions for environment management, improvement, and conservation. The environmental monitoring points will be decided considering the environmental impacts likely to occur due to the operation of proposed project as the main scope of monitoring program. Monitoring of environmental samples will be done as per the guidelines provided by MoEF&CC/CPCB/SPCB.

7 ADDITIONAL STUDIES

7.1 PREAMBLE

In this chapter followings have been discussed:

- Public Consultation / Public Hearing
- Hazard Identification and Risk Management
- Biodiversity study with audit mechanism.

7.2 PUBLIC HEARING

7.2.1 Public Hearing Notice:

The Public Hearing for the proposed bauxite mine was held under Chairmanship of Mrs. Alomani Sethy, OAS (SAG), Additional District Magistrate (General), Koraput, in the presence of Er. Deepesh Kumar Biswal, Regional Officer, State Pollution Control Board, Koraput at Mouza- Bheja, Khata No. 27, Plot No. 225, under Nandapur Tehsil of Koraput District, Odisha, dated: 06.03.2025, Time: 11:00 AM as per the EIA Notification dated 14th September 2006, as amended on date by the Ministry of Environment Forest and Climate Change, New Delhi.

The details of the public hearing including place of Public Hearing and time was published in the daily newspapers: Sambada (Odia edition) and The New Indian Express (English edition) on 04th February 2025 by the State Pollution Control Board, Odisha with project details, inviting objection, suggestions, views from the public regarding the proposed project. The copies of the notification published for public hearing are given in **Figure 7.1**.

The proceedings of the Public Hearing have been attached as **Annexure-IX**.



ରାଜ୍ୟ ପ୍ରଦୂଷଣ ନିୟନ୍ତ୍ରଣ ବୋର୍ଡ, ଓଡ଼ିଶା

(ବଣ, ପରିବେଶ ଓ ଜଳବାୟୁ ପରିବର୍ତ୍ତନ ବିଭାଗ, ଓଡ଼ିଶା ସରକାର)

ପରିବେଶ ଭବନ, ଏ/୧୫୮, ଚନ୍ଦ୍ରଶେଖର ନଗର, ଭୁବନେଶ୍ୱର-୭୫୧୦୨୨

ବିଜ୍ଞାପନ

CAD-2465: ଏତଦ୍ଦ୍ୱାରା ସାଧାରଣ ଅବଗତି ନିମନ୍ତେ ଏହା ଜଣାଯାଉଛି ଯେ ମାଇର୍ସ ଭଦିକ ଆଲୁମିନା ଲିମିଟେଡ, ଗତ୍ରାପୁର ଜିଲ୍ଲା, ନନ୍ଦପୁର ତହସିଲ ଅନ୍ତର୍ଗତ ବଲ୍ଲାଡା ଗ୍ରାମରେ ପ୍ରସ୍ତାବିତ ୪.୦ MTPA ଉତ୍ପାଦନ କ୍ଷମତା ପାଇଁ ୧୪୪.୯୪୫ ହେକ୍ଟର ଜମି ଉପରେ ଏକ ବକ୍ସାଇଟ ଖଣି ପ୍ରକଳ୍ପ ପାଇଁ ପରିବେଶ ଅନୁମତି ନିମନ୍ତେ ରାଜ୍ୟ ପରିବେଶ ପ୍ରଭାବ ମୂଲ୍ୟାୟନ କର୍ତ୍ତୃପକ୍ଷ (SEIAA) ଙ୍କ ନିକଟରେ ଆବେଦନ କରିଛନ୍ତି। ଏହି ପ୍ରସ୍ତାବ ସମ୍ପର୍କରେ ଜନସାଧାରଣଙ୍କ ମତାମତ ଗ୍ରହଣ ପାଇଁ ଏକ ଜନଶୁଣାଣି ଆୟୋଜନ କରାଯିବ।

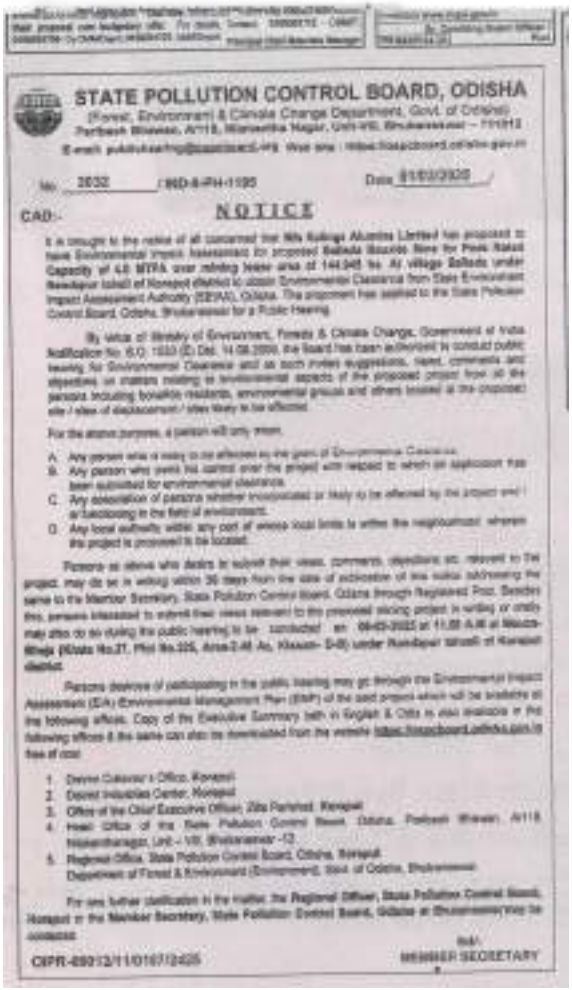
ଏହି ପ୍ରସ୍ତାବ ସମ୍ପର୍କରେ ଯେକୌଣସି ବ୍ୟକ୍ତି ତାଙ୍କ ମତାମତ, ଆପତ୍ତି ଇତ୍ୟାଦି ଲିଖିତ ଭାବରେ ଏହି ବିଜ୍ଞାପନ ପ୍ରକାଶିତ ହେବାର ୩୦ ଦିନ ମଧ୍ୟରେ ସଦସ୍ୟ ସଚିବ, ଓଡ଼ିଶା ପ୍ରଦୂଷଣ ନିୟନ୍ତ୍ରଣ ବୋର୍ଡ, ପରିବେଶ ଭବନ, ଏ/୧୫୮, ଚନ୍ଦ୍ରଶେଖର ନଗର, ଭୁବନେଶ୍ୱର-୭୫୧୦୨୨ ଠିକଣାରେ ପଠାଇ ପାରିବେ। ଏହା ବ୍ୟତୀତ ଉକ୍ତ ପ୍ରସ୍ତାବିତ ପ୍ରକଳ୍ପ ସମ୍ପର୍କରେ ଯେକୌଣସି ବ୍ୟକ୍ତି ଉକ୍ତ ଜନଶୁଣାଣି ସମୟରେ ଉପସ୍ଥିତ ରହି ମତାମତ ଦେଇପାରିବେ। ଏହି ପ୍ରସ୍ତାବିତ ପ୍ରକଳ୍ପ ସମ୍ପର୍କରେ ଜନସାଧାରଣଙ୍କ ମତାମତ ଗ୍ରହଣ ପାଇଁ ପରିବେଶ ପ୍ରଭାବ ମୂଲ୍ୟାୟନ (Environmental Impact Assessment) ଏବଂ ପରିବେଶ ପରିଚାଳନା (Executive Summary) ଓଡ଼ିଆ ଏବଂ ଇଂରାଜୀ ଭାଷାରେ ନିମ୍ନଲିଖିତ ସ୍ଥାନରେ ମିଳିପାରିବ।

୧) ଜିଲ୍ଲାପାଳଙ୍କ କାର୍ଯ୍ୟାଳୟ, କୋରାପୁଟ। ୨) ଜିଲ୍ଲା ଶିଳ୍ପକେନ୍ଦ୍ର, କୋରାପୁଟ। ୩) ଜିଲ୍ଲା ପରିଷଦ ମୁଖ୍ୟ ଦେୟାଧିକାରୀଙ୍କ କାର୍ଯ୍ୟାଳୟ, କୋରାପୁଟ। ୪) ମୁଖ୍ୟ କାର୍ଯ୍ୟାଳୟ, ଓଡ଼ିଶା ପ୍ରଦୂଷଣ ନିୟନ୍ତ୍ରଣ ବୋର୍ଡ, ପରିବେଶ ଭବନ, ଏ/୧୫୮, ଚନ୍ଦ୍ରଶେଖର ନଗର, ଭୁବନେଶ୍ୱର-୭୫୧୦୨୨(୧) ଆଞ୍ଚଳିକ କାର୍ଯ୍ୟାଳୟ, ଓଡ଼ିଶା ପ୍ରଦୂଷଣ ନିୟନ୍ତ୍ରଣ ବୋର୍ଡ, ପରିବେଶ ଭବନ, ଏ/୧୫୮, ଚନ୍ଦ୍ରଶେଖର ନଗର, ଭୁବନେଶ୍ୱର-୭୫୧୦୨୨(୨) ଜଳ, ପରିବେଶ ଏବଂ ଜଙ୍ଗଲ ବିଭାଗର ଦ୍ୱିତୀୟ ମହଲା, ଜିଲ୍ଲା ସଚିବାଳୟ, କୋରାପୁଟ। ୫) ଜିଲ୍ଲା ପରିଷଦ ମୁଖ୍ୟ ଦେୟାଧିକାରୀଙ୍କ କାର୍ଯ୍ୟାଳୟ, ଜଳ ପ୍ରଦୂଷଣ ନିୟନ୍ତ୍ରଣ ବୋର୍ଡ, ପରିବେଶ ଭବନ, ଏ/୧୫୮, ଚନ୍ଦ୍ରଶେଖର ନଗର, ଭୁବନେଶ୍ୱର-୭୫୧୦୨୨ (Executive Summary) ଓଡ଼ିଆ ଏବଂ ଇଂରାଜୀ ଭାଷାରେ ଉକ୍ତ ପ୍ରସ୍ତାବିତ ନିମନ୍ତେ ଦେୟାଧିକାରୀଙ୍କ ଓଡ଼ିଶା ପ୍ରଦୂଷଣ ନିୟନ୍ତ୍ରଣ ବୋର୍ଡ, ପରିବେଶ ଭବନରେ https://ospcboard.odisha.gov.in ରୁ ମଧ୍ୟ ମିଳିପାରିବ।

ଏ ବିଷୟରେ ଅଧିକ ବିବରଣୀ ପାଇଁ ଉକ୍ତ ପ୍ରସ୍ତାବିତ ନିମନ୍ତେ ଦେୟାଧିକାରୀଙ୍କ କାର୍ଯ୍ୟାଳୟ, ଜିଲ୍ଲାପାଳଙ୍କ କାର୍ଯ୍ୟାଳୟ, କୋରାପୁଟ ସ୍ଥିତ ଆଞ୍ଚଳିକ କାର୍ଯ୍ୟାଳୟ, ଓଡ଼ିଶା ପ୍ରଦୂଷଣ ନିୟନ୍ତ୍ରଣ ବୋର୍ଡ, ପରିବେଶ ଭବନ ରେ ଯୋଗାଯୋଗ କରାଯାଇପାରେ।

CIPR-08013/11/0186/2425 ସ୍ୱା/- ସଦସ୍ୟ ସଚିବ

Sambada (Odia)



STATE POLLUTION CONTROL BOARD, ODISHA

(Forest, Environment & Climate Change Department, Govt. of Odisha)

Paribesh Bhawan, A/158, Nilakantha Nagar, Unit-VIII, Bhubaneswar – 751012

E-mail: publicheari[illegible]@gmail.com Web site : https://ospcboard.odisha.gov.in

No. 2632 /SEIAA-HH-1195 Date 31/01/2025

CAD:- NOTICE

It is brought to the notice of all concerned that M/s Kalinga Alumina Limited has proposed to have Environmental Impact Assessment for proposed Ballada Bauxite Mine for Peak Rated Capacity of 4.0 MTPA over mining lease area of 144.945 ha. At village Ballada under Nandapur tahsil of Koraput district to obtain Environmental Clearance from State Environment Impact Assessment Authority (SEIAA), Odisha. The proponent has applied to the State Pollution Control Board, Odisha, Bhubaneswar for a Public Hearing.

By virtue of Ministry of Environment, Forests & Climate Change, Government of India Notification No. S.O. 1533 (E) Dtd. 14.09.2006, the Board has been authorized to conduct public hearing for Environmental Clearance and as such invites suggestions, views, comments and objections on matters relating to environmental aspects of the proposed project from all the persons including bonafide residents, environmental groups and others located at the proposed site / sites of displacement / sites likely to be affected.

For the above purpose, a person will only mean

A. Any person who is likely to be affected by the grant of Environmental Clearance.

B. Any person who owns his control over the project with respect to which an application has been submitted for environmental clearance.

C. Any association of persons whether incorporated or likely to be affected by the project and / or functioning in the field of environment.

D. Any local authority within any part of whose local limits is within the neighbourhood wherein the project is proposed to be located.

Persons as above who desire to submit their views, comments, objections etc. relevant to the project, may do so in writing within 30 days from the date of publication of this notice addressing the same to the Member Secretary, State Pollution Control Board, Odisha through Registered Post. Besides this, persons interested to submit their views relevant to the proposed mining project in writing or orally may also do so during the public hearing to be conducted on 08-03-2025 at 11.00 A.M. at Mauza-Bheja (Khata No.27, Plot No.325, Area-2.46 Ac, Khasra- 0-8) under Nandapur tahsil of Koraput district.

Persons desirous of participating in the public hearing may get through the Environment Impact Assessment (EIA) Environmental Management Plan (EMP) of the said project which will be available on the following offices. Copy of the Executive Summary both in English & Odia is also available in the following offices & the same can also be downloaded from the website https://ospcboard.odisha.gov.in free of cost

1. Deputy Collector's Office, Koraput
2. District Industries Center, Koraput
3. Office of the Chief Executive Officer, Zilla Parishad, Koraput
4. Head Office of the State Pollution Control Board, Odisha, Paribesh Bhawan, A/158, Nilakantha Nagar, Unit – VIII, Bhubaneswar -12
5. Regional Office, State Pollution Control Board, Odisha, Koraput
Department of Forest & Environment (Environment), Govt. of Odisha, Bhubaneswar

For any further clarification in the matter, the Regional Officer, State Pollution Control Board, Koraput or the Member Secretary, State Pollution Control Board, Odisha at Bhubaneswar may be contacted.

Sd/-

CIPR-08013/11/0187/2425 MEMBER SECRETARY

The New Indian Express (English)

Figure 7.1: Notice for Public Hearing published on 04.02.2025 in Sambada & The New Indian Express

7.2.2 Photographs Public Hearing:



The Chairperson



Project Proponent



Public Consultation



Public Gathering

Figure 7.2: Photographs of Public Hearing

7.2.3 Action Plan as per Public Hearing Demand:

The minutes of the meeting of the proceedings of the Public Hearing has been issued by the Regional Officer, State Pollution Control Board, Odisha vide Letter No. 7101/IND-II-PH-1195, dated 04.04.2025. Inline, the action plan has been prepared and given below:

Table 7-1: Action Plan as per Public Hearing

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
1.	**Sri. Chaitanya Hantal, Nandapur**	Sri Hantal emphasized that industrialization is essential for the development of the area, state, and country. He highlighted that industrial growth would lead to the generation of employment opportunities. Furthermore, he stated that the company should operate in a manner that does not harm the environment or forests in the area. He also stressed that; the company should focus on various developmental activities, particularly in the areas of education and healthcare for the local population. Sri Hantal specifically pointed out that Ballada cave located in the Nageswari Hill	• Proper arrangement for education & health facility will be made by the company under Corporate Social Responsibility (CSR) for the benefits of the local people. • The Project Proponent has agreed to adopt various environmental protection measures in proposed mining project for control of road dust, air pollution, water pollution and noise pollution. In addition, the company is planning to install close conveyer system for evacuation of mineral from mines to siding area. This system will significantly reduce the air pollution and Plantation Barriers will be followed.	• Educational facilities like Benches, Boards, Books, Stationary & construction of toilets etc., in the nearby schools. Health Centre shall be set up in consultation with concerned people. Location of the same shall be decided as per the requirement of villagers. • Water sprinkling in the mining area, loading unloading points and roads. Massive plantation other that Compensatory Afforestation, in and around the mining area. Social Afforestation. • Barrier around the cave area and landscaping & beautification of the area. • Preference in employment will be given to nearby villagers as per their qualifications.	FY 2026-2029	• Rs. 175 Lakhs for Health and Education Facility • Rs. 100 Lakhs towards Greenbelt development, Plantation and social afforestation in the nearby areas. • 220 Lakhs as capital cost for EMP and Rs. 60 Lakhs recurring cost/year for environmental protection measures.

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
		should not be affected by the project. Additionally, he urged that educated students from the local area should be given priority in employment opportunities in the mine.	• The Approved Mining Plan stipulates that mining activity shall not be carried out in a distance of 100 meters from the Cave. Hence the cave shall remain undisturbed and its vicinity shall be developed and beautified so as to attract tourism. • Preference will be given to the nearby villagers for employment at the mine as per their qualification and experience.			
2.	**Sri. Madan Hadaputia, Balda GP**	Sri Hadaputia expressed concerns regarding the potential adverse effects of the project on the surrounding environment. He said that the villagers in the locality worship the goddess of Ballada cave and also mentioned that the area is a popular tourist destination, thus requiring	• The Project Proponent has agreed to adopt an environmental protection measure in proposed mining project for control of road dust, air pollution, water pollution and noise pollution. In addition, the company is planning to install close conveyer system for	• Water sprinkling in the mining area, loading unloading points and roads. Massive plantation other that Compensatory Afforestation in and around the mining area. Social Afforestation. • Barrier around the cave area and landscaping & beautification of the area. • Preference in employment will be given to nearby villagers as per their qualifications.	FY 2026-2029	• 220 Lakhs as capital cost for EMP and Rs. 60 Lakhs recurring cost/year for environmental protection measures. • The mine has ear marked Rs. 20 Lakhs for beautification of the cave which would be regularly maintained under

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
		protection. He requested the company to ensure the preservation of the cave and also provide a high-quality road leading to the cave for better accessibility. Furthermore, he urged the company to offer health, education, and road infrastructure facilities in the nearby affected villages. Sri Hadaputia also emphasized that priority should be given to employing local educated individuals in the mine. Lastly, he requested the government to be prepared for any potential calamities that may arise as a result of the mining activities.	evacuation of mineral from mines to siding area. This system will significantly reduce the air pollution and Plantation Barriers will be followed. • The Approved Mining Plan stipulates that mining activity shall not be carried out in a distance of 100 meters from the Cave. Hence the cave shall remain undisturbed, the cave and its vicinity shall be developed and beautified so as to attract tourism. • Preference will be given to the nearby villagers for employment at the mine site as per their qualification and experience. • Proper arrangement for Health & Education will be made by the company under Corporate Social Responsibility (CSR) for which	• Educational facilities like Benches, Boards, Books, Stationary & construction of toilets etc., in the nearby schools. Health Centre shall be set up in consultation with concerned people. Location of the same shall be decided as per the requirement of villagers.		the CSR initiative of the Project. • Rs. 100 Lakhs towards Greenbelt development, Plantation and social afforestation in the nearby areas. • Rs. 175 Lakhs for Health and Education Facilities.

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
			appropriate funds shall be maintained which will be used for the benefits of the local people.			
3.	**Sri. Ramachandra Khara, Hikimput GP**	Sri Khara emphasized the importance of developing the affected villages. He stressed that the project should not cause harm to the forest and mountains in the area. He highlighted the cave as a tourist destination and urged the project proponent to take steps for its development. Sri Khara also addressed the company to provide essential facilities, including schools, hospitals, and roads for better connectivity for the affected Panchayats. Additionally, he requested that educated students from the affected villages should be given priority for employment	• The Project Proponent has agreed to adopt an environmental protection measure in proposed mining project for control of road dust, air pollution, water pollution and noise pollution. In addition, the company is planning to install close conveyer system for evacuation of mineral from mines to siding area. This system will significantly reduce the air pollution and Plantation Barriers will be followed. • The Approved Mining Plan stipulates that mining activity shall not be carried out in a distance of 100 meters from the Cave. Hence the cave shall remain	• Water sprinkling in the mining area, loading unloading points and roads. Massive plantation other that Compensatory Afforestation in and around the mining area. Social Afforestation. • Barrier around the cave area and landscaping & beautification of the area. • Preference in employment will be given to nearby villagers as per their qualifications. • Educational facilities like Benches, Boards, Books, Stationary & construction of toilets etc., in the nearby schools. Health Centre shall be set up in consultation with concerned people. Location of the same shall be decided as per the requirement of villagers.	FY 2026-2029	• 220 Lakhs as capital cost for EMP and Rs. 60 Lakhs recurring cost/year for environmental protection measures. • The mine has ear marked Rs. 20 Lakhs for beautification of the cave which would be regularly maintained under the CSR initiative of the Project. • Rs. 100 Lakhs towards Greenbelt development, Plantation and social afforestation in the nearby areas. • Rs. 175 Lakhs for Health and Education Facilities.

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
		opportunities in the company.	undisturbed and on the contrary, the cave and its vicinity shall be developed and beautified so as to attract tourism. • Preference will be given to the nearby villagers for employment at the mine site as per their qualification and experience. • Proper arrangement for Health & Education will increased by the company under Corporate Social Responsibility for the benefits of the local people.			
4.	**Sri. Bhagaban Petia, Hikimput GP**	Sri Petia reiterated the promises made by the company such as the company would protect and develop the cave to attract more tourists, the company would undertake plantation activities after mining activities are completed and that the company would	• The Approved Mining Plan stipulates that mining activity shall not be carried out in a distance of 100 meters from the Cave. Hence the cave shall remain undisturbed and on the contrary, the cave and its vicinity shall be developed and beautified so as to	• The Balda Cave shall be protected and a barrier will be left around the site and landscaping & beautification of the area will be carried out. • Plantation of 8,440 trees on 4.22 Ha area as green belt within the mine lease are in 5 years with 90% survival rate. Other than plantation with the mine area, social afforestation with fruit	FY 2026-2029	• Rs. 20 Lakhs towards beautification of the Balda Caves. • Rs. 100 Lakhs towards Greenbelt development, Plantation and social afforestation in the nearby areas. • Rs. 175 Lakhs for

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
		provide educational, healthcare, and road connectivity facilities. Sri Petia stated that if the company fulfils these promises, it would lead to development in the surrounding areas. He requested that the company shall provide employment opportunities to the affected villagers at the Alumina Refinery plant to be located in Rayagada, as the mining operations are expected to generate limited local employment. Additionally, he expressed concern about the inadequate funds allocated by the company for developmental activities and urged that a minimum of 10% of the royalty paid to the government should he allocated for developmental activities. Lastly, he	attract tourism. • Proponent has proposed to plant 8,440 trees on 4.22 Ha area as green belt within the mine lease are in 5 years with 90% survival rate. Native species has been proposed to be planted in the Mine lease / mined out area in phased manner. Regular guidance from forest department will be taken before plantation. • Proper arrangement for education will be made by the company and in sector of health facility will be increased under Corporate Social Responsibility (CSR) funds for the benefits of the local people. • Preference will be given to the nearby villagers for employment at the mine site as per their	bearing and medicinal plants will be carried out in the nearby villages, for which land will be identified in consultation with village panchayats. Native species of plants will be planted in consultation with local forest department. • Educational facilities like Benches, Boards, Books, Stationary & construction of toilets etc., in the nearby schools. Health Centre shall be set up in consultation with concerned people. Location of the same shall be decided as per the requirement of villagers.		Health and Educational Facilities.

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
		emphasized that, as the area contains mostly tribal population, the company should prioritize the overall development of the affected villagers.	qualification and experience.			
5.	**Sri. Lakshmidhar Badam, Attanda GP**	Sri Badam was apprehensive about the project and shared an anecdote expressing that, in the past, locals were being displaced due to the construction of a dam and other project in the locality and the affected individuals were deprived of getting essential benefits. He also urged the company to ensure the provision of water to the agricultural lands in the area to support farming activities. Furthermore, he requested the company to establish a high school in the locality, along with hostel facilities to accommodate	• No R&R is involved in the present proposal as there is no habitation within the Block. • Proper arrangement for Health & Education facility will increase under Corporate Social Responsibility (CSR) funds for the benefits of the local people. • Preference will be given to the nearby villagers for employment at the mine site as per their qualification and experience.	• Educational facilities like Benches, Boards, Books, Stationary & construction of toilets etc., in the nearby schools. Health Centre shall be set up in consultation with concerned people. Location of the same shall be decided as per the requirement of villagers. • Preference in employment will be given to nearby villagers as per their qualifications.	FY 2026 - 2029	• Rs. 175 Lakhs for Health and Educational Facilities.

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
		students. He also requested the company to provide employment opportunities to the affected villagers and concluded by saying that if the aforementioned demands are met, he will support the project.				
6.	**Smt. Lakshmi Sisa, Bheja GP**	Smt. Lakshmi Sisa expressed strong opposition to the project, stating that the villagers do not wish to surrender their land and forest to the company. She specifically raised concerns about the deforestation and potential displacement of their Goddess of Nageswari Hill due to the mining activities. She questioned where the villagers would live if their lands were taken and who would protect their forest rights. She emphasized that the	• No R&R is involved in the present proposal as there is no habitation within the Block. • Compensatory Afforestation will be carried out as per the Forest Conservation act 1980. The plantation will be done within the state. • The Approved Mining Plan stipulates that mining activity shall not be carried out in a distance of 100 meters from the Cave. Hence the cave shall remain undisturbed, the cave and its vicinity shall be developed and	• Compensatory Afforestation will be carried out as per the Forest Conservation act 1980. Other than compensatory afforestation, social afforestation scheme will be taken up for plantation of fruit bearing and medicinal plants in nearby areas, in consultation with local panchayats and forest department. • The Balda Cave shall be protected and a barrier will be left around the site and landscaping & beautification of the area will be carried out.	FY 2026 - 2029	• Rs. 100 Lakhs towards Greenbelt development, Plantation and social afforestation in the nearby areas. • Rs. 20 Lakhs towards beautification of the Balda Caves.

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
		community is entirely dependent on the forest for food and other necessities. Additionally, she pointed out that they had not been properly informed about the public hearing and that the Gram Sabha had not been conducted in relation to the project. She questioned about the facilities that the government has provided to safeguard the interests of the tribal communities. She said that the villagers have their forest rights and concluded by expressing her opposition to the project.	beautified so as to attract tourism. • General information with respect to Public Hearing was published in newspapers Sambada (Odia edition) and The New Indian Express (English edition) on 04th February 2025. Additionally, the notice regarding the Public Hearing was displayed on the Notice Board of the Balda, Kulabir & Atanda Panchayat Office and copy of EIA/EMP/Executive Summary report of the proposed mine was provided in the concerned local Village Panchayat.			
7.	**Sri. Jana Sisa, Balda GP**	Sri Sisa stated that the project will impact the people of five Gram Panchayats. He further highlighted that the soil quality, water, and air in the area will be adversely affected due to Deforestation	• The Project Proponent has agreed to adopt various environmental protection measures in proposed mining project for control of road dust, air	• Water sprinkling in the mining area, loading unloading points and roads. Massive plantation other that Compensatory Afforestation in and around the mining area. Plantation of 8,440 trees on 4.22 Ha area as green belt	FY 2026-2031	• Rs. 220 Lakhs as capital cost for EMP and Rs. 60 Lakhs recurring cost/year for environmental protection measures. Including Rs. 20

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
		caused by mining activities. He emphasized that the villagers are currently living in harmony with the environment. In conclusion, he opposed the project, saying that the land belongs to the people and they have rights over their land.	pollution, water pollution and noise pollution. In addition, the company is planning to install close conveyer system for evacuation of mineral from mines to siding area. This system will significantly reduce the air pollution and Plantation Barriers will be followed. • EMP measures for Air Pollution, Water Pollution & Noise Pollution Control Measures will be adopted for which the following cost is proposed Rs. 100 Lakhs, Rs. 25 Lakh & Rs. 15 Lakh as capital cost. • It is proposed to spend approximately Rs. 220 Lakh and Rs. 60 Lakh as Recurring Cost on Environment Management.	within the mine lease area with 90% survival rate. Other than plantation within the mine area, social afforestation with fruit bearing and medicinal plants will be carried out in the nearby villages, for which land will be identified in consultation with village panchayats. Native species of plants will be planted in consultation with local forest department. • EMP measures for Air Pollution, Water Pollution & Noise Pollution Control Measures will be adopted for which the following cost is proposed Rs. 100 Lakhs, Rs. 25 Lakh & Rs. 15 Lakh as capital cost.		Lakhs as capital cost for Plantation and Rs. 5 Lakhs/year as recurring cost for maintenance of greenbelt.
8.	**Sri. Mana Khara, Balda GP**	Sri Khara expressed concerns about the existing challenges faced by the villagers,	• The following arrangement for the existing challenges faced by the villagers	• Providing nearby villages rechargeable lamps, solar, and other alike equipment to tackle the issue of power cut.	FY 2026-2031	• Rs 40 Lakhs for providing Solar Street and other equipment to

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
		including frequent power cuts, electricity failure and water shortages. He highlighted that the community depends on farming for their livelihood and questioned how they would survive if the forest will be cleared. He concluded by stating his opposition to the project.	will be mitigated by providing rechargeable lamps, solar, and other alike equipment to tackle the issue of power cut. • Villages facing water shortage will be provided with facility of through sufficient borewell installation. • Compensatory Afforestation will be carried out as per the Forest Conservation act 1980. The Compensatory Afforestation will be carried out within the state. • Alternate livelihood opportunities will be created and provided. • Skill Development Training shall be carried for the youth in the study area, and preference in employment will be given to them.	• Villages facing water shortage will be provided with facility of through sufficient borewell installation. Plantation of 8,440 trees on 4.22 Ha area as green belt within the mine lease area with 90% survival rate. Other than plantation within the mine area, social afforestation with fruit bearing and medicinal plants will be carried out in the nearby villages, for which land will be identified in consultation with village panchayats. Native species of plants will be planted in consultation with local forest department. • Skill Development Training shall be carried for the youth in the study area.		tackle the issue of power cut. • Rs. 20 Lakhs towards Greenbelt development in mine lease area • Rs 25 Lakhs for Skill Development Training
9.	**Smt. Bobita Muduli, Bheja GP**	Smt. Muduli stated that they have been living in the area for	• The Approved Mining Plan stipulates that mining activity shall	• The Balda Cave shall be protected and a barrier will be left around the site and	•	• Rs. 20 Lakhs for beautification of Balda caves.

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
		generations & they are worshipping. Goddess present in the Nageswari hill. She emphasized that the villagers benefit from the forest, as it provides essential resources such as vegetables, wood & water. Smt. Muduli further mentioned that the forest is worshiped by the community as their mother. She expressed concern that the public hearing was being conducted without a prior Gram Sabha in their village violating PESA act and 5th schedule of the Indian constitution and expressed that they had not been informed about the hearing. She highlighted that the people of the five surrounding panchayats are entirely dependent on the forest for their livelihood. Smt.	not be carried out in a distance of 100 meters from the Cave. Hence the cave shall remain undisturbed and on the contrary, the cave and its vicinity shall be developed and beautified so as to attract tourism. • Compensatory Afforestation will be carried out as per the Forest Conservation act 1980. The Compensatory Afforestation will be done within the state. • Alternate livelihood opportunities will be created and provided. • General information with respect to Public Hearing was published in newspapers Sambada (Odia edition) and The New Indian Express (English edition) on 04th February 2025. Additionally, the notice regarding the	landscaping & beautification of the area will be carried out. • Plantation of 8,440 trees on 4.22 Ha area as green belt within the mine lease area with 90% survival rate. Other than plantation within the mine area, social afforestation with fruit bearing and medicinal plants will be carried out in the nearby villages, for which land will be identified in consultation with village panchayats. Native species of plants will be planted in consultation with local forest department. • Skill Development Training shall be carried for the youth in the study area.		• Rs. 220 Lakhs as capital cost for EMP and Rs. 60 Lakhs recurring cost/year for environmental protection measures. Including Rs. 20 Lakhs towards Greenbelt development in mine lease area • Rs 25 Lakhs for Skill Development Training

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
		Muduli also made it clear that they do not seek any compensation or benefits from the company in exchange for their forest land. She concluded by expressing her opposition to the project.	Public Hearing was displayed on the Notice Board of the Balda, Kulabir, Bheja, Badel & Atanda Panchayat Office copies of EIA/EMP & Executive Summary report of the proposed mine was provided in the concerned local Village Panchayat.			
10	**Sri. Reli Sisa, Balda GP**	Sri Sisa stated that the villagers had not yet received any benefits from the various mining and industrial establishments that are operating in the vicinity of their villages. He raised concerns about the lack of proper healthcare access, stating that it takes up to 30 minutes for villagers to transport a patient using their own means. He also addressed several other issues, highlighting that the other villagers at various places have	• Proper arrangement for the healthcare & Education facility will be provided under Corporate Social Responsibility for the benefits of the local people. • Compensatory Afforestation will be carried out as per the Forest Conservation act 1980. The Compensatory Afforestation will be done within the state.	Renovation/Repairing of the following schools will be carried out: • Ambel Primary school • Balda Upper primary school • Dabasput Primary school • Godiput B Primary school • Katiaput Proj Primary school • Kinjaraba Primary school In addition to the above physical activities the following activities are also proposed to be carried out by the Project Proponent to uplift the social status of the study area: • Coaching support for higher class students. • Specialized coaching for	• FY 2026- 2029	• Rs. 92.5 Lakhs towards Education facilities in the nearby villages.

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
		not received the promised benefits from other companies. Sri Sisa emphasized that the community is entirely dependent on the forest for essential resources such as food, vegetables, and fruits. He concluded by expressing his opposition to the project.		youths for competitive examinations. Library will be constructed/expanded at following High School- • Malisublar Proj Primary school • Mulda Primary school • Parajabhimdol Proj Primary school • Soput Primary school • Talaguda Proj Primary school		
11	**Sri. Madhusudhan Dadia, Balda GP**	Sri Dadia stated that conducting the Gram Sabha without the implementation of forest rights is a violation. He further emphasized that the local communities have rights over the water, forests, and land in the area. He expressed that the villagers live in harmony with the birds, animals, natural resources, forest, and the environment. He also noted that the mining activities would lead to an	• Entire Mine Lease Area is forest land and mining activity will commence only after the grant of Statutory Clearance from concerned authority. • The study to ascertain the impact of the Project on wildlife of the study area and Impact of the project on the wildlife in the surrounding and any other protected area is carried out and the report for Wildlife conservation	• FC Stage-I has been already granted by MoEF&CC (Forest Conservation Division) vide letter no. FP/OR/MIN/QRY/456733/2023 dated 23.12.2024. Mining activity in the area will commence only after grant of FC Stage-II and other statutory clearances. • A site specific wildlife conservation plan has been prepared and approved by PCCF (WL) & CWLW, Odisha on 04.06.2024 for conservation of schedule-I species of the study area. • Plantation of 8,440 trees on 4.22 Ha area as green belt within the mine lease area	FY 2026-2029	• WLCP has been approved by PCCF (WL) & CWLW, Odisha on 04.06.2024 with budgetary provision of 457.546 Lakhs for conservation of schedule-I species • Rs 25 Lakhs for Skill Development Training

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
		increase in the temperature of the region, which could negatively impact the crops. He expressed concern about their livelihood if mining activities will take place. He mentioned that during the COVID pandemic, the villagers were able to survive as they were living in a healthy environment. Sri Dadia requested the government to protect their forest rights. He concluded by stating his opposition to the project.	submitted to the concerned Authority. • As the most of the mining area is plateau and there is no vegetation exist. There is no tree cutting involved during mining activity. Tree plantation will be done during mining activity also, however in addition for sustainable mining, use of solar power, EVs/hybrid vehicles, rainwater harvesting method etc. will be explored. • Compensatory Afforestation will be carried out as per the Forest Conservation act 1980. The plantation will be done within the state.	with 90% survival rate. Other than plantation within the mine area, social afforestation with fruit bearing and medicinal plants will be carried out in the nearby villages, for which land will be identified in consultation with village panchayats. Native species of plants will be planted in consultation with local forest department.		
12	**Sri. Raghunath Khara, Balda GP**	Sri Khara stated that the villagers have not yet received their rights under the Forest Rights Act, despite applying for them since 2015. He	• Entire Mine Lease Area is forest land and mining activity will commence only after the grant of Statutory Clearance from concerned	• FC Stage-I has been already granted by MoEF&CC (Forest Conservation Division) vide letter no. FP/OR/MIN/QRY/456733/2023 dated 23.12.2024. Mining activity in the area	FY 2026-2029	• WLCP has been approved by PCCF (WL) & CWLW, Odisha on 04.06.2024 with budgetary provision of

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
		Emphasized that only after getting their rights, a decision can be made regarding granting the company permission to establish operations on their land and forest by the village committee. He concluded by expressing his opposition to the project.	authority. • Compensatory Afforestation will be carried out as per the Forest Conservation act 1980. The Compensatory Afforestation will be done within the state.	will commence only after grant of FC Stage-II and other statutory clearances. • A site specific wildlife conservation plan has been prepared and approved by PCCF (WL) & CWLW, Odisha on 04.06.2024 for conservation of schedule-I species of the study area. • Plantation of 8,440 trees on 4.22 Ha area as green belt within the mine lease area with 90% survival rate. Other than plantation within the mine area, social afforestation with fruit bearing and medicinal plants will be carried out in the nearby villages, for which land will be identified in consultation with village panchayats. Native species of plants will be planted in consultation with local forest department.		457.546 Lakhs for conservation of schedule-I species • Rs 25 Lakhs for Skill Development Training
13	**Smt. Bimla Pujari, Bheja GP**	Smt. Pujari stated that the villagers benefits from the forest in various ways. She mentioned that, since childhood, they have been sustaining themselves by collecting vegetables,	• As per Forest Conservation act 1980, Compensatory Afforestation will be done on equivalent area proposed within the state. • Alternate livelihood opportunities will be	• As per Forest Conservation act 1980, Compensatory Afforestation will be done on equivalent area proposed within the state. FC Stage-I has been already granted by MoEF&CC (Forest Conservation Division) vide letter no.	FY 2026-2029	• WLCP has been approved by PCCF (WL) & CWLW, Odisha on 04.06.2024 with budgetary provision of 457.546 Lakhs for conservation of

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
		harvesting crops, and engaging in fishing activities in the area. She said that they are surviving by eating whatever the forests offer to them. She emphasized that the villagers sustain themselves only through farming. She concluded by expressing her opposition to the project.	created and provided. • Skill Development Training shall be carried for the youth in the study area, and preference in employment will be given to them.	FP/OR/MIN/QRY/456733/2023 dated 23.12.2024. Mining activity in the area will commence only after grant of FC Stage-II and other statutory clearances. • Skill Development Training for operators, fitters, electricians for the Unemployed youth in the study area • Opening new Training centers for Ladies (stitching, Embroidery, workshops etc.)		schedule-I species. • Rs 25 Lakhs for Skill Development Training.
14	**Smt. Tula Sisa, Bheja GP**	Smt. Sisa shared that she is a widow with two children. She stated that she does not receive any government assistance and is completely dependent on forest products, which she collects and sells to sustain her family. Smt. Sisa emphasized that the forest is of vital importance to the tribal community, providing essential resources in many ways. She concluded by stating that their	• Compensatory Afforestation will be carried out as per the Forest Conservation act 1980. The Compensatory Afforestation will be done within the state. • Alternate livelihood opportunities will be created and provided. • Skill Development Training shall be carried for the youth in the study area, and preference in employment will be given to them.	• As per Forest Conservation act 1980, Compensatory Afforestation will be done on equivalent area proposed within the state. FC Stage-I has been already granted by MoEF&CC (Forest Conservation Division) vide letter no. FP/OR/MIN/QRY/456733/2023 dated 23.12.2024. Mining activity in the area will commence only after grant of FC Stage-II and other statutory clearances. • Skill Development Training for operators, fitters, electricians for the Unemployed youth in the study area	FY 2026-2029	• Rs 25 Lakhs for Skill Development Training

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
		survival is dependent on the existence of the forest. She concluded by expressing her opposition to the project.		• Opening new Training centers for Ladies (stitching, Embroidery, workshops etc.)		
15.	**Smt. Gouri Sisa, .Bheja GP**	Smt. Sisa said that the villagers have rights to their forest, mountain and the worship of Goddess Nageswari. She emphasized that the traditional Ayurvedic medicines collected from the hill are essential for their survived. She stated that they are reliant on these forest resources for their livelihood. She concluded by expressing her opposition to the company and the project.	• Compensatory Afforestation will be carried out as per the Forest Conservation act 1980. The plantation will be done within the state. • Alternate livelihood opportunities will be created and provided. • Skill Development Training shall be carried for the youth in the study area, and preference in employment will be given to them.	• As per Forest Conservation act 1980, Compensatory Afforestation will be done on equivalent area proposed within the state. FC Stage-I has been already granted by MoEF&CC (Forest Conservation Division) vide letter no. FP/OR/MIN/QRY/456733/2023 dated 23.12.2024. Mining activity in the area will commence only after grant of FC Stage-II and other statutory clearances. • Skill Development Training for operators, fitters, electricians for the Unemployed youth in the study area • Opening new Training centers for Ladies (stitching, Embroidery, workshops etc.)	FY 2026-2029	• Rs 25 Lakhs for Skill Development Training
16.	**Smt. Gangu Khara, Attanda GP**	Smt. Khara expressed her opposition to the company and the project. She stated that she would not	• The Approved Mining Plan stipulates that mining activity shall not be carried out in	• The Balda Cave shall be protected and a barrier will be left around the site and landscaping & beautification of the area will be carried	FY 2026-2029	• Rs. 20 Lakhs for beautification of Balda Caves. • 220 Lakhs as capital cost for

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
		support the destruction of the cave where the Goddess is worshipped. Smt. Khara raised concerns about the survival of future generations if mining activities will take place. She also highlighted the on-going water shortage in their village. She stated that if the mountain is mined, they will be deprived of access to medicines, food, essential leaves, and other resources, which are necessary for their survival. Additionally, she mentioned that the villagers have been fighting for their rights through rallies and other efforts to reach out to the government, but have not been successful. She concluded by strongly opposing the project.	a distance of 100 meters from the Cave. Hence the cave shall remain undisturbed and on the contrary, the cave and its vicinity shall be developed and beautified so as to attract tourism. • No water will be drawn from the ground as the water requirement will be fulfilled from the Surface reservoir. The mining activity proposed to be carried out during plan period will not interfere anywhere with the ground water table. • As per Forest Conservation act 1980, Compensatory Afforestation will be done on equivalent area proposed within the state. • Alternate livelihood opportunities will be created and provided.	out. • Water requirement for the mine will be met from surface water sourced from Jalaput reservoir for which permission has been obtained from the Department of Water Resources, Govt. of Odisha vide letter no. 30630/WR. Dated 08.11.2024. No ground water withdrawal is envisaged. • As per Forest Conservation act 1980, Compensatory Afforestation will be done on equivalent area proposed within the state. FC Stage-I has been already granted by MoEF&CC (Forest Conservation Division) vide letter no. FP/OR/MIN/QRY/456733/2023 dated 23.12.2024. Mining activity in the area will commence only after grant of FC Stage-II and other statutory clearances. • Skill Development Training for operators, fitters, electricians for the		EMP and Rs. 60 Lakhs recurring cost/year for environmental protection measures. • Rs. 20 Lakhs as capital caost for greenbelt development within mine and Rs. 5 Lakhs/yaer for maintenance of plantation. • Rs 25 Lakhs for Skill Development Training

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
			• Skill Development Training shall be carried for the youth in the study area, and preference in employment will be given to them.	Unemployed youth in the study area • Opening new Training centers for Ladies (stitching, Embroidery, workshops etc.)		
17.	**Smt. Kamala Sisa, Balda GP**	Smt. Sisa expressed that they do not wish to receive any benefits from the company. She said that the villagers are sceptical about the project and are having sleepless nights thinking that where will they go, what they will eat and where will they conduct their traditional cultural activities. She further stated that they are willing to engage in labour work, fishing, and other similar activities to sustain themselves but are not willing to give up their land for mining operations.	• Proper arrangement for education & health facility will be made by the company under Corporate Social Responsibility (CSR) funds for the benefits of the local people. • Preference in employment will be given to nearby villagers as per their qualifications. • Alternate livelihood opportunities will be created and provided. • Skill Development Training shall be carried for the youth in the study area, and preference in employment will be	• Educational facilities like Benches, Boards, Books, Stationary & construction of toilets etc., in the nearby schools. Health Centre shall be set up in consultation with concerned people. Location of the same shall be decided as per the requirement of villagers. • Preference in employment will be given to nearby villagers as per their qualifications. • Skill Development Training for operators, fitters, electricians for the Unemployed youth in the study area • Opening new Training centers for Ladies (stitching, Embroidery, workshops etc.)	FY 2026-2029	• Rs 175 Lakhs provided for Health and Educational Facilities. • Rs 25 Lakhs for Skill Development Training

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
			given to them.			
18.	**Smt. Dalima Khara, Somali, Attanda GP**	Smt. Khara highlighted that their forest land provides a variety of crops, vegetables, medicines and millets, along with many essential resources for daily life. She raised concerns about the impact of mining on the mountain and forest, questioning how they would survive and what they would eat if the mining activities were to take place. Additionally, she mentioned that they worship Goddess Nageswari on the mountain and are leading a prosperous life under her blessings. In conclusion she expressed her opposition to the proposed project.	• As per Forest Conservation act 1980, Compensatory Afforestation will be done on equivalent area proposed within the state. • Alternate livelihood opportunities will be created and provided skill developments. • The Project Proponent has agreed to adopt various environmental protection measures in proposed mining project for control of road dust, air pollution, water pollution and noise pollution. In addition, the company is planning to install close conveyer system for evacuation of mineral from mines to siding area. This system will significantly reduce the air pollution and Plantation Barriers will be followed.	• As per Forest Conservation act 1980, Compensatory Afforestation will be done on equivalent area proposed within the state. FC Stage-I has been already granted by MoEF&CC (Forest Conservation Division) vide letter no. FP/OR/MIN/QRY/456733/2023 dated 23.12.2024. Mining activity in the area will commence only after grant of FC Stage-II and other statutory clearances. • Skill Development Training for operators, fitters, electricians for the Unemployed youth in the study area • Opening new Training centers for Ladies (stitching, Embroidery, workshops etc.) • Various environmental protection measures in proposed mining project for control of road dust, air pollution, water pollution and noise pollution. In addition, the company is planning to install close	FY 2026-2029	• WLCP has been approved by PCCF (WL) & CWLW, Odisha on 04.06.2024 with budget of 4.57 Crores. • Rs 25 Lakhs for Skill Development Training • 220 Lakhs as capital cost for EMP and Rs. 60 Lakhs recurring cost/year for environmental protection measures. • Rs. 20 Lakhs for beautification of Balda caves for tourist attraction.

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
			• The Approved Mining Plan stipulates that mining activity shall not be carried out in a distance of 100 meters from the Cave. Hence the cave shall remain undisturbed and its vicinity shall be developed and beautified so as to attract tourism.	conveyer system for evacuation of mineral from mines to siding area. This system will significantly reduce the air pollution and Plantation Barriers will be followed. • The Balda Cave shall be protected and a barrier will be left around the site and landscaping & beautification of the area will be carried out.		
19.	**Sri. Narayan Khillo, Balda GP**	Sri. Khillo stated that they sustain their livelihood through hard work and self-effort. He expressed concern that the government has not yet fulfilled the basic necessities in their villages. He also mentioned that they celebrate the festival of Goddess Nageswari on the mountain and was skeptical where they will worship if the mountain is mined out. He opposed the commencement of mining activities in that area. In	• As per the requirement received from local villagers necessary benefits will be provided under Corporate Social Responsibility (CSR) funds for the benefits of the local people. • The Approved Mining Plan stipulates that mining activity shall not be carried out in a distance of 100 meters from the Cave. Hence the cave shall remain undisturbed and its vicinity shall be developed and beautified so as to	• Educational facilities like Benches, Boards, Books, Stationary & construction of toilets etc., in the nearby schools. Health Centre shall be set up in consultation with concerned people. Location of the same shall be decided as per the requirement of villagers. • The Balda Cave shall be protected and a barrier will be left around the site and landscaping & beautification of the area will be carried out.	FY 2026-2029	• Rs 175 Lakhs for Health & Educational facilities. • Rs. 20 Lakhs for beautification of Balda caves for tourist attraction.

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
		conclusion, he expressed his opposition to the proposed project.	attract tourism.			
20.	**Smt. Golapi Khara, Balda GP**	Smt. Khara stated that they worship Goddess on the mountain and consider the forest as their mother. She emphasized that the forest, mountain, water, and other natural resource belong to them, and they have rights over these resources. She further expressed that they do not require assistance from either the government or the company. She highlighted that they are used to living in coordination with the forest and depend on it for their survival. In conclusion, she expressed her opposition to the proposed project.	• The Approved Mining Plan stipulates that mining activity shall not be carried out in a distance of 100 meters from the Cave. Hence the cave shall remain undisturbed and on the contrary, the cave and its vicinity shall be developed and beautified so as to attract tourism. • As per Forest Conservation act 1980, Compensatory Afforestation will be done on equivalent area proposed within the state. • Alternate livelihood opportunities will be created and provided. • Skill Development Training shall be carried for the youth in the study area, and preference in employment will be given to them.	• The Balda Cave shall be protected and a barrier will be left around the site and landscaping & beautification of the area will be carried out. • As per Forest Conservation act 1980, Compensatory Afforestation will be done on equivalent area proposed within the state. FC Stage-I has been already granted by MoEF&CC (Forest Conservation Division) vide letter no. FP/OR/MIN/QRY/456733/2023 dated 23.12.2024. Mining activity in the area will commence only after grant of FC Stage-II and other statutory clearances. • Skill Development Training for operators, fitters, electricians for the Unemployed youth in the study area • Opening new Training centers for Ladies (stitching, Embroidery, workshops etc.)	FY 2026-2029	• Rs. 20 Lakhs for beautification of Balda caves for tourist attraction. • Rs. 220 Lakhs as capital cost for EMP and Rs. 60 Lakhs recurring cost/year for environmental protection measures. • WLCP has been approved by PCCF (WL) & CWLW, Odisha on 04.06.2024 with budget of Rs. 4.57 Crores for conservation of schedule-I species. • Rs 25 Lakhs for Skill Development Training.

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
21.	**Sri. Sanyas Khillo, Bheja GP**	Sri. Khillo raised concerns about the potential adverse impacts on air and water quality resulting from the deforestation. He stated that over 10,000 people across five panchayats rely entirely on the forest for their livelihood. He also expressed dissatisfaction that the company had not consulted the affected villagers nor explained the potential challenges they would face due to the proposed mining activities. Sri. Khillo referred to the on-going issue at Niyamgiri Hills of Lanjigarh, Kalahandi. He highlighted that various types of crops are cultivated around the forest. He questioned where the people would go who depend on agriculture for their sustenance, if mining will take place.	• The Project Proponent has agreed to adopt various environmental protection measures in proposed mining project for control of road dust, air pollution, water pollution and noise pollution. • As per Forest Conservation act 1980, Compensatory Afforestation will be done on equivalent area within the state. • Alternate livelihood opportunities will be created and provided. • Skill Development Training shall be carried for the youth in the study area, and preference in employment will be given to them. • The Project Proponent has committed to take up plantation drives and surrounding areas for better local environment.	• Various environmental protection measures in proposed mining project for control of road dust, air pollution, water pollution and noise pollution. In addition, the company is planning to install close conveyer system for evacuation of mineral from mines to siding area. This system will significantly reduce the air pollution and Plantation Barriers will be followed. • Skill Development Training for operators, fitters, electricians for the Unemployed youth in the study area. • Opening new Training centers for Ladies (stitching, Embroidery, workshops etc.) • Plantation of 8,440 trees on 4.22 Ha area as green belt within the mine lease area with 90% survival rate. Other than plantation within the mine area, social afforestation with fruit bearing and medicinal plants will be carried out in the	FY 2026-2029	• Rs. 220 Lakhs as capital cost for EMP and Rs. 60 Lakhs recurring cost/year for environmental protection measures. • Rs 25 Lakhs for Skill Development Training • Rs. 20 Lakhs towards Greenbelt development in mine lease area and Rs. 5 Lakhs/year as recurring cost.

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
			• No R&R is involved in the present proposal as there is no habitation within the Block.	nearby villages, for which land will be identified in consultation with village panchayats. Native species of plants will be planted in consultation with local forest department.		
22.	**Sri. Rabindra Pangi, Balda GP**	Sri. Pangi stated that five villages are entirely dependent on Nageswari Hills for their sustenance. He further mentioned that the proposed mountain is a popular tourist destination, even attracting visitors from the neighbouring states of Andhra Pradesh and Chhattisgarh. He emphasized that the forest is worshipped by the villagers, as it provides essential resources such as wood, leaves, water, etc. He expressed concern that the forest is now on the verge of Destruction. He stated that, they are unable to bear the medical expenses in case of	• The Approved Mining Plan stipulates that mining activity shall not be carried out in a distance of 100 meters from the Cave. Hence the cave shall remain undisturbed and on the contrary, the cave and its vicinity shall be developed and beautified so as to attract tourism. • As per Forest Conservation act 1980, Compensatory Afforestation will be done on equivalent area proposed within the state. • Alternate livelihood opportunities will be created and provided. • Skill Development Training shall be carried for the youth in the study area, and	• The Balda Cave shall be protected and a barrier will be left around the site and landscaping & beautification of the area will be carried out. • As per Forest Conservation act 1980, Compensatory Afforestation will be done on equivalent area proposed within the state. FC Stage-I has been already granted by MoEF&CC (Forest Conservation Division) vide letter no. FP/OR/MIN/QRY/456733/2023 dated 23.12.2024. Mining activity in the area will commence only after grant of FC Stage-II and other statutory clearances. • Skill Development Training for operators, fitters, electricians for the Unemployed youth in the study area.	FY 2026-2029	• Rs. 20 Lakhs for beautification of Balda caves. • Rs 25 Lakhs for Skill Development Training

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
		illness and are reliant on the medicinal herbs from the forest for their healthcare needs. Sri. Pangi urged all present to carefully consider how the local communities would survive if mining activities will take place.	preference in employment will be given to them. • The Project Proponent has committed to take up plantation drives and surrounding areas for better local environment.	• Opening new Training centers for Ladies (stitching, Embroidery, workshops etc.) • Plantation of 8,440 trees on 4.22 Ha area as green belt within the mine lease area with 90% survival rate. Other than plantation within the mine area, social afforestation with fruit bearing and medicinal plants will be carried out in the nearby villages, for which land will be identified in consultation with village panchayats. Native species of plants will be planted in consultation with local forest department.		
23.	**Sri. Jayaram Galori, Mali Sublar, Kulabir GP**	He said that they have rights over the forest and would not permit the company to carry out mining activities in the area. He further emphasized their tribal rights in relation to the forest. In conclusion, he expressed his opposition to the proposed project.	• Compensatory Afforestation will be carried out as per the Forest Conservation act 1980. The plantation will be done within the state.	• As per Forest Conservation act 1980, Compensatory Afforestation will be done on equivalent area proposed within the state. FC Stage-I has been already granted by MoEF&CC (Forest Conservation Division) vide letter no. FP/OR/MIN/QRY/456733/2023 dated 23.12.2024. Mining activity in the area will commence only after	FY 2026-2029	• WLCP has been approved by PCCF (WL) & CWLW, Odisha on 04.06.2024with budget of 4.57 Crore.

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
				grant of FC Stage-II and other statutory clearances.		
24.	**Sri. Nath Guru, Kitaba, Badel GP**	Sri Nathguru stated that the mining activity will lead to food and water scarcity for the villagers and will have an adverse impact on agriculture. He stated that they would not permit the company to carry out mining activities that would put their forest & mountain at risk. He further emphasized that the people would strongly resist any mining activities, as they are determined to protect their livelihoods and the forest. In conclusion, He expressed his opposition to the proposed project.	• The mining activity in the region will have a positive impact on the social, economic condition of the area by way of providing employment to the local inhabitants; wages paid to them will increase the per capita income, housing, education, medical and transportation facilities, economic status, health and agriculture. • Alternate livelihood opportunities will be created and provided. • Skill Development Training shall be carried for the youth in the study area, and preference in employment will be given to them.	• The company will provide direct employment opportunity for the local people based on their skill and educational qualifications, which will help to uplift the social standard of the area and economic development. • Skill Development Training for operators, fitters, electricians for the Unemployed youth in the study area. • Opening new Training centers for Ladies (stitching, Embroidery, workshops etc.)	FY 2026-2029	• Rs 25 Lakhs for Skill Development Training
25.	**Sri Sunadar Muduli, Attanda GP**	Sri. Muduli urged the villagers to consider the long-term benefits of preserving the forest and emphasized the importance of	• No R&R is involved in the present proposal as there is no habitation within the Block.	• No R&R is involved in the present proposal as there is no habitation within the Block.	-	-

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
		protecting it. He stated that during the construction of the Jalaput Dam, many villagers were displaced from their land. He also mentioned that, for his sustenance, he is engaged in agricultural activities on the mountain.				
26.	**Sri. Budura Khillo, Attanda GP**	He said that he is completely dependent on the mountain as various crops are grown over there. He questioned how the community would survive if the Nageswari Hill will be mined.	• There is no agricultural land involved, however some mitigations measures like water sprinkling for dust suppression, transportation of mineral with closed Conveyors and Plantation Barriers will be followed. • The Approved Mining Plan stipulates that mining activity shall not be carried out in a distance of 100 meters from the Cave. Hence the cave shall remain undisturbed and on the contrary, the cave and its vicinity shall be developed and	• No agricultural land involved in the mine lease area and entire lease area s forest land. However, mitigations measures like water sprinkling for dust suppression, transportation of mineral with closed Conveyors and Plantation Barriers will be followed, to protect the adverse impacts on the nearby crops. • The Balda Cave shall be protected and a barrier will be left around the site and landscaping & beautification of the area will be carried out.	• Life of mine	-

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
			beautified so as to attract tourism.			
27.	**Sri. Suba Sisa, Badel GP**	He stated that the villagers were not properly informed about the Public Hearing and he said that villagers got to know about the hearing on very short notice. He said that people in his village are worried and disturbed hearing about this mining project. He expressed his Opposition to the proposed project.	• General information with respect to public hearing was published in newspapers Sambada (Odia edition) and The New Indian Express (English edition) on 04th February 2025. Additionally, the notice regarding the Public Hearing was displayed on the Notice Board of the Balda, Kulabir, Bheja, Badel & Atanda Panchayat Office. EIA/EMP/ Executive Summary report of the proposed mine was provided in the concerned local Village Panchayat.	• General information with respect to public hearing was published in newspapers Sambada (Odia edition) and The New Indian Express (English edition) on 04th February 2025. Additionally, the notice regarding the Public Hearing was displayed on the Notice Board of the Balda, Kulabir, Bheja, Badel & Atanda Panchayat Office.	-	-
28.	**Sri. Kamesh Kamodi, Nandapur**	He expressed concern that, if the project is approved. it may lead to displacement of people, similar to what has occurred in other areas with similar projects. He requested the project proponent	• No R&R is involved in the present proposal as there is no habitation within the Block. • The mining activity in the region will have a positive impact on the social, economic	• The company will provide direct employment opportunity for the local people based on their skill and educational qualifications, which will help to uplift the social standard of the area and economic development.	FY 2026-2029	• Rs 25 Lakhs for Skill Development Training • Rs. 220 Lakhs as capital cost for EMP and Rs. 60 Lakhs recurring cost/year for environmental protection

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
		to explain the benefits that the community would gain from the project and to address the potential pollution that may result from mining activities. He also urged the company to consult with the local people, discuss the proposed developmental activities and provide information on the employment opportunities that the project will generate. Additionally, He highlighted that the community currently benefits from good quality air and water due to the presence of the green forest.	condition of the area by way of providing employment to the local inhabitants; wages paid to them will increase the per capita income, housing, education, medical and transportation facilities, economic status, health and agriculture. • The Project Proponent has agreed to adopt various environmental protection measures in proposed mining project for control of road dust, air pollution, water pollution and noise pollution. In addition, the company is planning to install close conveyer system for evacuation of mineral from mines to siding area. This system will significantly reduce the air pollution and Plantation Barriers will be followed. • Proper arrangement	• Skill Development Training for operators, fitters, electricians for the Unemployed youth in the study area. • Opening new Training centers for Ladies (stitching, Embroidery, workshops etc.) • Various environmental protection measures in proposed mining project for control of road dust, air pollution, water pollution and noise pollution. In addition, the company is planning to install close conveyer system for evacuation of mineral from mines to siding area. This system will significantly reduce the air pollution and Plantation Barriers will be followed. • Educational facilities like Benches, Boards, Books, Stationary & construction of toilets etc., in the nearby schools. Health Centre shall be set up in consultation with concerned people. Location of the same shall be decided as per the requirement of villagers.		measures. • Rs 175 Lakh for Health and Education Facilities.

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
			for education & health facility will be made by the company under Corporate Social Responsibility (CSR) funds for the benefits of the local people. • Preference will be given to the surrounding villagers for employment at the mine site as per their qualification and experience. • Alternate livelihood opportunities will be created and provided. • Skill Development Training shall be carried for the youth in the study area, and preference in employment will be given to them. • The Project Proponent has committed to take up plantation drives in the project and surrounding areas for better environment.			
29.	**Sri. Gopal Mattam, Nandapur**	He stated that the company should have sought the opinions of	• As per Forest Conservation act 1980, compensatory	• As per Forest Conservation act 1980, Compensatory Afforestation will be done	FY 2026-2029	• WLCP has been approved by PCCF (WL) & CWLW,

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
		the local people regarding the project before conducting the Public Hearing. He also mentioned that the community offers prayers to the goddess using resources from the surrounding forest. He highlighted the suffering of the people due to the construction of dams in the past. He expressed concerns that mining activities would lead to pollution. In conclusion, he opposed the proposed project.	Afforestation will be done on equivalent area within the state. • The Project Proponent has agreed to adopt various environmental protection measures in proposed mining project for control of road dust, air pollution, water pollution and noise pollution. In addition, the company is planning to install close conveyer system for evacuation of mineral from mines to siding area. This system will significantly reduce the air pollution and Plantation Barriers will be followed. • The Project Proponent has committed to take up plantation drive in the project and surrounding areas for better local environment.	on equivalent area proposed within the state. FC Stage-I has been already granted by MoEF&CC (Forest Conservation Division) vide letter no. FP/OR/MIN/QRY/456733/ 2023 dated 23.12.2024. Mining activity in the area will commence only after grant of FC Stage-II and other statutory clearances. • Various environmental protection measures in proposed mining project for control of road dust, air pollution, water pollution and noise pollution. In addition, the company is planning to install close conveyer system for evacuation of mineral from mines to siding area. This system will significantly reduce the air pollution and Plantation Barriers will be followed. • Plantation of 8,440 trees on 4.22 Ha area as green belt within the mine lease area with 90% survival rate. Other than plantation within the mine area, social afforestation with fruit bearing and medicinal		Odisha on 04.06.2024 with budget of 4.57 Crores for conservation of schedule-I species. • Rs. 220 Lakhs as capital cost for EMP and Rs. 60 Lakhs recurring cost/year for environmental protection measures. • Rs. 20 Lakhs towards Greenbelt development in mine lease area and Rs. 5 lakhs/year as recurring cost for plantation.

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
				plants will be carried out in the nearby villages, for which land will be identified in consultation with village panchayats. Native species of plants will be planted in consultation with local forest department.		
30.	**Sri. Narsun Kamudi, Koraput**	He suggested that the Public Hearing should be re-conducted and said that the company should seek the opinions of the villagers. He further stated that the government should consider the preservation of the local forests.	• General information with respect to Public Hearing was published in newspapers Sambada (Odia edition) and The New Indian Express (English edition) on 04th February 2025. Additionally, the notice regarding the Public Hearing was displayed on the Notice Board of the Balda, Kulabir, Bheja, Badel & Atanda Panchayat Office and copies of EIA/EMP & Executive Summary. • The present Public Hearing has been conducted as per the provisions laid down	• General information with respect to Public Hearing was published in newspapers Sambada (Odia edition) and The New Indian Express (English edition) on 04th February 2025. Additionally, the notice regarding the Public Hearing was displayed on the Notice Board of the Balda, Kulabir, Bheja, Badel & Atanda Panchayat Office. • As per Forest Conservation act 1980, Compensatory Afforestation will be done on equivalent area proposed within the state. FC Stage-I has been already granted by MoEF&CC (Forest Conservation Division) vide letter no. FP/OR/MIN/QRY/456733/ 2023 dated 23.12.2024. Mining activity in the area will commence only after grant of FC Stage-II and	-	-

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
			in the EIA Notification 2006 subsequent amendments till date. • As per Forest Conservation act 1980, Compensatory Afforestation will be done on equivalent area proposed within the state.	other statutory clearances.		
31.	**Sri. Bikram Sisa, Balda GP**	Sri. Sisa raised questions regarding the potential benefits and negative impacts of the project and requested a detailed explanation.	• The mining activity in the region will have a positive impact on the social, economic condition of the area by way of providing employment to the local inhabitants; wages paid to them will increase the per capita income, housing, education, medical and transportation facilities, economic status, health and agriculture. • Preference will be given to the surrounding villagers for employment at the mine site as per their qualification and experience.	• The company will provide direct employment opportunity for the local people based on their skill and educational qualifications, which will help to uplift the social standard of the area and economic development. • Skill Development Training for operators, fitters, electricians for the Unemployed youth in the study area. • Opening new Training centers for Ladies (stitching, Embroidery, workshops etc.) • Various environmental protection measures in proposed mining project for control of road dust, air pollution, water pollution and noise pollution. In addition, the company is	FY 2026-2029	• Rs 25 Lakhs for Skill Development Training. • Rs. 220 Lakhs as capital cost for EMP and Rs. 60 Lakhs recurring cost/year for environmental protection measures. • Rs 175 Lakhs for Health and Education Facilities.

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
			• The Project Proponent has agreed to adopt various environmental protection measures in proposed mining project for control of road dust, air pollution, water pollution and noise pollution. In addition, the company is planning to install close conveyer system for evacuation of mineral from mines to siding area. This system will significantly reduce the air pollution and Plantation Barriers will be followed. • The Project Proponent is committed to undertaking plantation drives in the project and surrounding areas to improve the local environment.	planning to install close conveyer system for evacuation of mineral from mines to siding area. This system will significantly reduce the air pollution and Plantation Barriers will be followed. • Educational facilities like Benches, Boards, Books, Stationary & construction of toilets etc., in the nearby schools. Health Centre shall be set up in consultation with concerned people. Location of the same shall be decided as per the requirement of villagers.		
32.	**Sri Ajay Muduli, Bheja GP**	Sri. Muduli stated that the public hearing is being conducted in	• General information with respect to Public Hearing was	• General information with respect to Public Hearing was published in	-	-

Sr. No.	Name of the Villager's	Comments	Reply	Action Plan	Time Frame	Budgetary Provision
		violation of the PESA Act, the Forest Rights Act, the Fifth Schedule of the Indian Constitution and the Scheduled Castes and Scheduled Tribes (Prevention of Atrocities) Act. In conclusion, he expressed his opposition to the proposed project.	published in newspapers Sambada (Odia edition) and The New Indian Express (English edition) on 04th February 2025. Additionally, the notice regarding the public hearing was displayed on the Notice Board of the Balda, Kulabir, Bheja, Badel & Atanda Panchayat Office in EIA/EMP & Executive Sumary. • The present Public Hearing has been conducted as per the provisions laid down in the EIA Notification 2006 subsequent amendments till date.	newspapers Sambada (Odia edition) and The New Indian Express (English edition) on 04th February 2025. Additionally, the notice regarding the public hearing was displayed on the Notice Board of the Balda, Kulabir, Bheja, Badel & Atanda Panchayat Office.		

Table 7-2: Summarized Action Plan for Public Hearing (Written Submissions)

Sr. No.	Issues Raised	Reply/ Action Plan
1.	Impact of mining not provided in the EIA report	Environmental impacts due to the proposed project have been discussed in Chapter-4 in the EIA Report and also discussed below in the following manner: • The mining activity in the region will have a positive impact on the social, economic condition of the area by way of providing employment to the local inhabitants; wages paid to them will increase the per capita income, housing, education, medical and transportation facilities, economic status, health and agriculture. • **Air pollution:** Emissions from vehicles, factories, and power plants (e.g., CO_2, NOx, PM2.5). • **Water pollution:** Dumping waste and agricultural runoff contaminating water bodies. • **Soil pollution:** Heavy metals, and industrial waste degrading soil quality. • **Noise and light pollution:** Affecting wildlife behavior and human health.
	Incomplete EIA report submitted for PH	• EIA Report has been prepared as Appendix-III as per EIA Notification 2006 and the draft EIA is submitted to OPCB for Public Hearing. • Final EIA incorporating in public hearing comments and applying in action plan. • Information with respect to public hearing was published in local newspaper before one month. • General information with respect to Public Hearing was published in newspapers Sambada (Odia edition) and The New Indian Express (English edition) on 04th February 2025. Additionally, the notice regarding the Public Hearing was displayed on the Notice Board of the Balda, Kulabir, Bheja, Badel & Atanda Panchayat Office and copies of EIA/EMP & Executive Summary.
	Violation of FRA Act	None
	Violation of PESA Act	There is no violation of PESA Act. The PESA Act has been instrumental in strengthening local governance and enabling the participation of tribal communities in decision-making processes within Koraput, particularly through the Gram Sabhas (Panchayat Assemblies) and Palli Sabhas (Village Assemblies), as reported by the National Institute of Rural Development and Panchayati RaJ.
	Natural Resources Destruction	Entire Mine Lease area i.e 144.945 ha is Forest Land (Nagasari RF), Cost Benefit Analysis for the same is furnished as **Annexure-X.**
	Flora & Fauna list is allegedly incomplete	The list of Flora and fauna has been incorporated in line with approved site-specific wildlife conservation plan duly approved by PCCF (WL) & CWLW, Odisha on 04.06.2024.
	Destruction of Agricultural Land	Agriculture land shall not be disturbed by the mining activity however training related to modern agricultural techniques shall be provided to help villagers to earn their livelihood. Agricultural Facilities such as donation of seeds, saplings, providing fertilizers, manure to needy farmers, financial assistance shall be provided for Irrigation facilities, Construction of farm ponds for needy farmers and for meeting the needs of physical demands of the farmers a fund of Rs. 70 Lakh is allocated for the CSR Budget.

Sr. No.	Issues Raised	Reply/ Action Plan
	Hydrological disturbance due to mining	A detailed assessment of the proposed lease area confirms that there is no intersection with the groundwater table, as the depth of mining operations will remain well above the recorded pre- and post-monsoon groundwater levels. Since the excavation will not reach the water table, there will be no requirement for dewatering, and thus no impact on the aquifer system or natural groundwater flow. As a result, the mining activity will not disturb the hydrogeological regime.
	Religious issues such as presence of Burial grounds, abode of Deities sacred Balda cave and Nageshwari Cave	The approved mining plan stipulates that mining activity shall not be carried out in a distance of 100 meters from the Cave. Hence the cave shall remain undisturbed and on the contrary, the cave and its vicinity shall be developed and beautified so as to attract tourism. The mine has ear marked Rs. 20 Lakhs for beautification of the cave which would be regularly maintained under the CSR initiative of the Project.
2.	Violation of FRA	None
	No consent from Gram Sabha	Under progress
	Violation of SC ST Act 1989	None
3.	Fifth schedule of Indian constitution	None
4.	155 no's of individual rights (Form-A) and 08 no's of community rights (Form- B & C) Claim – Panchayat Samiti	Under progress
5.	Environmental Pollution	• **Air pollution:** Emissions from vehicles, factories, and power plants (e.g., CO_2, NOx, PM2.5). • **Water pollution:** Dumping waste and agricultural runoff contaminating water bodies. • **Soil pollution:** Heavy metals, and industrial waste degrading soil quality. • **Noise and light pollution:** Affecting wildlife behavior and human health. • Based on base line study adequate mitigation measures have been proposed in the EIA EMP report which will be implemented and monitored on regular basis to keep the environmental parameters within permissible limits during mining operations. • The PP has agreed to adopt an environmental protection measure in proposed mining project for control of road dust, air pollution, water pollution and noise pollution. In addition, the company is planning to install close conveyer system for evacuation of mineral from mines to siding area. This system will significantly reduce the air pollution and Plantation Barriers will be followed. • EMP cost, a few measures like Air Pollution, Water Pollution & Noise Pollution Control Measures is 25 Lakhs, 5 Lakh & 1 Lakh/year.
6.	Damage due to Blasting	The major activities at mine in the operational phase involve drilling, blasting, excavation etc. These activities may affect the environment in varying degrees through natural resources depletion viz. water consumption, release of pollutants (particulates and gaseous emissions), run-off from waste dump areas

Sr. No.	Issues Raised	Reply/ Action Plan
		etc. • Air pollution due to excavation, drilling, blasting, loading, unloading and transportation of Bauxite and OB. • Noise and vibration during drilling, blasting.

7.2.4 Budget/ Scheme for the Public Hearing Commitments

As per Ministry's OM dated 30.09.2020, the Ministry has decided to deliberate on the and commitments made by the project proponent to address the issues raised in the Public Hearing held on 06.03.2025. Hence, the activities proposed by M/s Kalinga Alumina Limited to address the issues raised in the Public Hearing vis-à-vis budget for the same is given below. Total budget for implementation of the activities is **Rs. 532.50 Lakhs.**

Table 7-3: Activity-wise Phasing of Public Hearing Commitments Scheme

S. No.	Proposed Activities under public hearing commitment scheme		Phasing of Allocated proposed PH commitment Budget, Rs. Lakh			
			1st Year	2nd Year	3rd Year	Total
1	**Providing Health Facility**	Providing medical instruments PHC/CHC in the study area. Few key medical instruments are as follows: BP Apparatus (18) Glucometer (15) ENT Tool Kit (5) Thermal Scanner (10) Pulse Oximeter (6) Bio Medical Waste Bins (30)	12	8	--	**20**

S. No.	Proposed Activities under public hearing commitment scheme		Phasing of Allocated proposed PH commitment Budget, Rs. Lakh			
			1st Year	2nd Year	3rd Year	Total
		Examine Light (5) Hub Cutter of 1.4 Ltr. (4) Anti-Shock Garment (3) Standing BP Apparatus (5) Medical Dressing Trolley (5) Foldable Cot (10) Back Rest (10) The following PHC will be covered through the above funds: • PHC Kasandi • PHC Padua • PHC Hatibari • PHC Kulabir • PHC Bilaput				
		Providing 01 Ambulance to the Local Primary Health Sub Centre of following villages- • PHC Bheja; PHC Badel; & PHC Raising	60	60	60	**180**
2	**Providing Educational**	Renovation/Repairing of the following schools will be carried out:	20	10	10	**40**

S. No.	Proposed Activities under public hearing commitment scheme		Phasing of Allocated proposed PH commitment Budget, Rs. Lakh			
			1st Year	2nd Year	3rd Year	Total
	Facilities	• Ambel Primary school • Balda Upper primary school • Dabasput Primary school • Godiput B Primary school • Katiaput Proj Primary school • Kinjaraba Primary school In addition to the above physical activities the following activities are also proposed to be carried out by the Project Proponent to uplift the social status of the study area: • Coaching support for higher class students. • Specialized coaching for youths for competitive examinations. **Library will be constructed/expanded at following High School-** • Malisublar Proj Primary school • Mulda Primary school • Parajabhimdol Proj Primary school				

S. No.	Proposed Activities under public hearing commitment scheme		Phasing of Allocated proposed PH commitment Budget, Rs. Lakh			
			1st Year	2nd Year	3rd Year	Total
		• Soput Primary school • Talaguda Proj Primary school				
		Providing 50 Desktop Computer (@45,000 INR/Unit) with necessary accessories to existing Labs in the ITI at nearby areas: • Nandapur (17 km)- 10 Computers • Semiliguda (34 km)- 10 Computers • Pottangi (36 km)- 10 Computers • Koraput (37 km)- 10 Computers • Ambaguda (57 km)- 10 Computers	10	4.5	8	**22.5**
		Construction/ Augmentation (of existing) Science Laboratory in schools for Higher Studies • Taintar Secondary school • Dorasubalar Secondary school • Balda Girls High school	10	10	10	**30**
3	**Infrastructure development**	Construction of Overhead tanks, piping, Culverts and Related Infrastructure in the following villages- • Bheja • Badel • Raising • Attanda	10	10	20	**40**

S. No.	Proposed Activities under public hearing commitment scheme		Phasing of Allocated proposed PH commitment Budget, Rs. Lakh			
			1st Year	2nd Year	3rd Year	Total
		• Bilaput • Kulabir • Hatibari • Padua • Kasandi				
		Providing Solar Street Lighting (including panels, inverters, wiring, structure, connectors, junction boxes, etc.) in nearby villages in consultation with local gram panchayat offices @ Rs.50,000 per unit (Total 800 unit)	10	10	20	**40**
		Installation of 50 roof top rain water harvesting system in Village Panchayat Building/ Public Use Buildings in nearby 12 Villages (One unit @ ₹2,00,000, including maintenance for one year).	10	5	10	**25**
		Carrying Out Plantation Programmes in vicinity of Public Buildings such as GP Office, Banks, Community Centres and other govt. offices	5	5	5	**15**
4	**Employment Generation**	Skill Development Training for operators, fitters, electricians for the Unemployed youth in the study area	10	5	10	**25**

S. No.	Proposed Activities under public hearing commitment scheme		Phasing of Allocated proposed PH commitment Budget, Rs. Lakh			
			1st Year	2nd Year	3rd Year	Total
		Opening new Training centers for Ladies (stitching, Embroidery, workshops etc.)	5	7	8	**20**
6	**Agricultural Activities/ Training**	Providing Farming Equipment to the farmers for yield improvement in following villages in consultation with gram panchayat. • Bheja • Badel • Raising • Attanda • Bilaput List of proposed farming equipment: • Rotary Tiller (1.5 Lakh) *30 • Seed Drills (45 Thousand)*35 • Agricultural Sprayers (4500) *50 • Iron Greavity Conveyor Bhusa Machine (75000)* 10 • Yam Moulding Maker (1,65,000)*2 • Iron Agriculture Bund Maker (10,000)*10 • Mild Steel Farm Cultivator Leveling Blade	30	20	25	**75**

S. No.	Proposed Activities under public hearing commitment scheme		Phasing of Allocated proposed PH commitment Budget, Rs. Lakh			
			1st Year	2nd Year	3rd Year	Total
		(10,000)*2				
Total			**192**	**154.5**	**186.0**	**532.50**

7.3 HAZARD IDENTIFACTION & RISK ASSESSMENT

Risk assessment is the systematic study of uncertainties and risks encountered in various areas during any operation. It is a process to identify potential hazards, evaluate impacts and suggest mitigations. As part of managing the health and safety of business, one must control the risks in workplace. To do this one need to think about what might cause harm to people and decide whether reasonable steps can be taken to prevent them. The following section describes various risks and hazards which can happen during open cast mining of bauxite and a disaster management plan with an aim of taking precautionary steps to avert disasters and also take such action after disaster which limits the damage to minimum. The various safeguards to be taken to ensure the safety of the mine and that of employees as per regulations like Mines Act, 1952, CMR 2017 etc. Moreover DGMS, rules to be strictly followed for mining operations.

7.3.1 IDENTIFICATION OF HAZARDS

There are various factors, which can cause risk to working population in the mine are as follow:

- Hazard due to drilling and blasting
- Fire/explosion due to explosive transport
- Accidents due to movement of trucks and dumpers;
- Physical hazard due to conveyor system and material handling
- Collapse of Structures/Fall of Material, stacking failure
- Loading/ Unloading failures
- Electrocution/ Electrical Hazards
- Fire hazards/Slippage hazard due to waste oil generated in mining area
- Mechanical Hazards
- Natural Disaster
- Occupational Health hazard

7.3.1.1 Common Causes of Hazard

Based on the analysis of past accident information, common causes of accidents are identified as:

- Poor housekeeping;
- Improper use of tools, equipment, facilities;
- Unsafe or defective equipment facilities;
- Lack of proper procedures;
- Failure to follow prescribed procedures;
- Jobs not understood;
- Lack of awareness of involved hazards;
- Lack of guides and safety devices;
- Lack of protective equipment and clothing.

7.3.1.2 Failure of Human System

Major causes of human failures reported are due to:

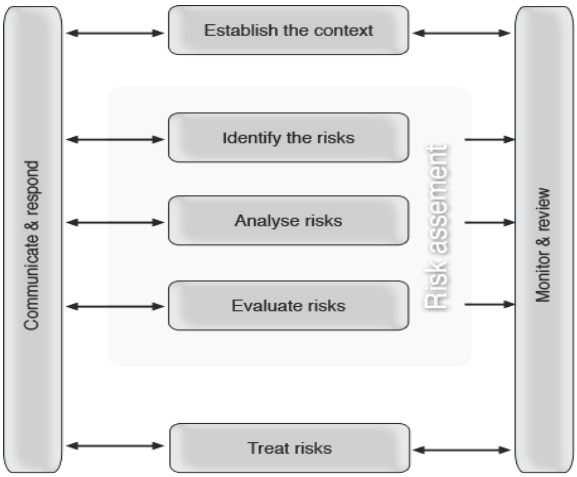
- Stress induced by poor equipment design,
- Unfavorable environmental conditions, fatigue, etc.;
- Lack of training in safety and loss prevention;
- Indecision in critical situations;
- Inexperienced staff being employed in hazardous situations.
- Often, human errors are not analyzed while accident reporting and accident reports only provide information about equipment and/or component failures. Hence, a great deal of uncertainty surrounds analysis of failure of human systems and consequent damages.

7.3.1.3 Physical Hazard Onsite

- Accident due to Conveyor feeding system/Machines
- Slip/Trip/ Fall due to improper stacking of material/unclean platforms
- Slip/Trip/ Fall due to slippery area formed by water showers for dust suppression
- Contact with explosive chemicals
- Approach of heavy good vehicles for loading and unloading material
- Excessive Dust during Loading/unloading operation
- Cleaning of overflows
- Unauthorized passages, travelling over transportation system
- Motor overloading

7.3.2 RISK ASSESSMENT

Risk assessment is the determination of quantitative and qualitative value of risk related to a concrete situation and a recognized threat. Activities requiring assessment of risk due to occurrence of most probable instances of hazard and accident are both onsite and off-site



The risk management measures for the proposed project activities will be adopted as required for best safety practice within the works boundary.

7.3.2.1 Matrix of Risk Assessment

The 5 X 5 matrix of risk assessment is given below.

Likelihood

- 5. Almost Certain
- 4. Probable
- 3. Possible
- 2. Possible (under unfortunate circumstances)
- 1. Rare

Severity

- 5. Fatality
- 4. Major Injury, resulting in disability
- 3. Injury Requires, Doctor's or Hospital attendance
- 2. Minor Injury, 1st Aid required
- 1. Minor Injury, 1st Aid not required

Risk Rating is calculated by multiplying the likelihood against the consequences, e.g. taking a likelihood of 4, which is classified as Probable, and multiplying this against a consequence of 2, which is classified as a Minor Injury aid required, would give you and overall risk rating of 8, which would be risk rated as a low risk.

High Risk (16 – 25)	High Risks activities should cease immediately until further control measures to mitigate the risk are introduced
Medium Risk (9 – 15)	Medium Risks should only be tolerated for the short-term and then only whilst further control measures to mitigate the risk are being planned and introduced, within a defined time period. Note: Medium risks can be an organizations greatest risk, can be considered as Achilles heel, this due to the fact that they can be tolerated in the short-term.
Low Risk (1 – 8)	Low Risks are largely acceptable, subject to reviews periodically, or after significant change etc.

Table 7-4: Site Specific HIRA

S. No.	Activity	Hazard	Risk	Risk Level	Proposed Safety system
1.1	Explosive Handling and Transportation	Fire and explosion	Injury/Fatality	Medium	• Handling and Transportation through authorized person • Handling and transportation in approved vehicle • Proper SOP to follow for handling and transportation
1.2	Drilling	Dust, noise, mechanical hazard	Respiratory problems and injury to personnel	Medium	• Proper SOP to follow • Ensure use of PPE
1.3	Blasting	Flying off sharp stones	Burn injury and personal injury	Medium	• Blasting by approved blaster • Ensure use of PPE • Controlled Blasting
1.4	Excavation	Dust and noise, benches and loose strata	Respiratory problems and injury to personnel	Medium	• Water sprinkling • Development of Greenbelt • Use of PPE • Work as per Approved mining plan
1.5	Loading and unloading of material from trucks/dumpers	Dust, collision of trucks	Respiratory problems and injury to personnel	Medium	• Provide adequate training to operators • Ensure use of PPE

S. No.	Activity	Hazard	Risk	Risk Level	Proposed Safety system
1.6	Crushing	Dust, noise, Crusher Mechanical system	Respiratory problem and injury to personnel	Medium	• Proper SOP and Training manuals • Provide adequate training to operators • Conduct regular safety audits and rectify safety issue and monitor safety compliance reports. • Ensure use of PPE
1.7	Over burden dump handling	Dust, noise, dump slope failure	Respiratory problem and injury to personnel	Medium	• Work as per approved mining plan • Slope stabilization
1.8	Dumper Movement	Improper handling leads to accident	Personnel injury	Medium	• Regular Maintenance of EOT cranes in respect of wire ropes, brakes, lifting hook, rails/wheels, electrical system/motors etc. • Provision of proper limit switches Emergency main switch of cranes to be provided near platform or at an easily accessible place. • Bell/Siren is to be provided in the cabin for crane operator ϖ Annual inspection of Cranes/Lifting tackles by competent person every year as

S. No.	Activity	Hazard	Risk	Risk Level	Proposed Safety system
					per factory act • Display of safe working load on each crane • Proper Guarding of all stairs and crane's CT Trolley
1.9	Diesel Generator	Mechanical hazards and fire hazards in Lube oil system Cable galleries Short circuits	Fire/electrical accident	Medium	• Inspection and Maintenance • Fire protection/suppression system. • Provision in electrical system described above
1.10	Waste Oil/ lubricants Generated in Excavators, compressors	Fire hazard/Slippage hazard	Fire hazard, may impact wellbeing of person due to slippage	Low	• Proper house keeping • No smoking/any other ignition source while handling waste oil • SOPs
1.11	Electrical System	Exposure to Electrical Shocks, Scope of Fire Due to Electrical Short Circuits, Exposure to Burns Due to Electrical Systems	Burns due to electrical accidents, Shocks due to electrical accidents, Damages to skin due to electrical fire accidents, Neurological problems due to electrical shocks	Medium	• Adequately rated and quick response circuit breakers, aided by reliable and selective digital or microprocessor based electromagnetic protective relays would be incorporated in the electrical system design for the proposed activities. • Proper firefighting scheme for electrical failures eliminate these

S. No.	Activity	Hazard	Risk	Risk Level	Proposed Safety system
					Hazards • Proper design of electrical equipment as per standards/HAC and proper isolation to eliminate these, Hazards. • All motors should be flame proof in case of usage near Hydrocarbon handling area. • The metering and instruments would be of proper accuracy class and scale dimensions.
1.12	Workers movement in mining area, workshop, vehicle and instrument maintenance, during mechanical repair work in workshops, during excavation work, road accidents due to vehicular movement, etc	Unsafe Practices/Design	Injury. Can be fatal	Medium	• The mining machinery comprises of standard engineering designs meeting all quality specifications. Since most accidents occur due to human error and improper work practice, safety awareness workshop for the working personnel is organized on regular basis. Workers are encouraged to wear and use appropriate safety devices like boots, gloves, helmets, aprons, goggles and safety belts etc.

7.3.2.2 Measures to Prevent Accidents due to Trucks and Dumpers

- All transportation within the main working area will be carried out under the direct supervision and control of the management;
- The vehicles must be maintained in good repairs and checked thoroughly at least once a week by a competent person authorized for this purpose by the management;
- Broad signs should be provided at each and every turning point specially for the guidance of the drivers at night;
- To avoid dangers while reversing the trackless vehicles, especially at the embankment and tripping points, all areas for reversing of lorries should, as far as possible, be made man free, and there should be a light and sound device to indicate reversing of trucks; and
- A statutory provision of the fence, constant education, training etc. will go a long way in reducing the incidence of such accidents.

7.3.3 MITIGATION MEASURES

Risk Mitigation measures for the new mining activities require adoption of best safety practice at the respective construction zones as well as operational phase within the works boundary along with proper designing of the facility. In addition, the design and engineering of the proposed facilities will take into consideration of the proposed protection measures for air and water environmental as outlined in earlier Chapter.

7.3.3.1 Firefighting inside the Block

All the fire extinguisher system will be controlled by the Security Department. Safety department will consist of qualified safety manager, safety officer and supporting staff. Following are firefighting facilities required in the plant:

- Portable fire extinguishers
- Fire Water Hydrant system
- Sprinkler system employed near fire prone areas
- Fire Buckets
- Foam type fire extinguishers near lubrication, hydraulic and fuel oil installation.

Details of firefighting facilities to be installed at site is given below.

Table 7-5: Details of Firefighting Facilities

S. No.	Name of site	Type of Extinguisher
1	High voltage panel	CO_2 & Foam type, Dry chemical powder
2	Control rooms	CO_2 & Foam type, Dry chemical powder
3	MCC rooms	CO_2 & Foam type, Dry chemical powder

S. No.	Name of site	Type of Extinguisher
4	Pump Houses	CO_2 & Foam type, Dry chemical powder
5	Guest houses and offices	Dry chemical powder, foam type
6	Godown	Foam type
7	Bunkers, Silo, enclosed dust collector	CO_2 type, N_2 type, automatic sprinkler, fixed spray nozzle (unless water reactive)

7.3.3.2 Personal Protective Equipment

Following Table shows the lists of recommended Personal Protective Equipment (PPE) to be kept onsite.

Table 7-6: Personal Protective Equipment

Targeted Organ	Workplace Hazards	Suggested PPE
Eye and face protection	Flying particles, gases or vapors, light radiation	• Safety glasses with side-shields, protective shades, etc.
Head protection	Falling objects, inadequate height clearance, and overhead power cords	• Plastic helmets for top and side impact protection
Hearing protection	Noisy Areas	• Hearing protectors (ear plugs or ear muffs)
Foot protection	Failing or rolling objects, points objects. Corrosive or hot liquids	• Safety shoes and boots for protection against moving and failing objects, liquids and chemicals
Hand protection	Hazardous materials, cuts or lacerations, vibrations, extreme temperatures	• Gloves made of rubber or synthetic material (Neoprene), leather, steel, insulation materials, etc.
Respiratory protection	Dust, fogs, fumes, mists, gases, smokes, vapors	• Facemasks with appropriate filters for dust removal and air purification (chemical, mists, vapors and gases).
	Oxygen deficiency	• Portable or supplied air (fixed lines). • Onsite rescue equipment

Targeted Organ	Workplace Hazards	Suggested PPE
Body / leg protection	Extreme temperatures, hazardous materials, biological agents, cutting and laceration	• Insulating clothing, body suits, aprons etc. of appropriate materials
Dust	Dust handling and storage	• For handling, dust-proof goggles and rubber or PVC gloves. • For large quantities or where heavy contamination is likely, wear: coveralls. • For high dust levels, wear: a Full-face Class P3 (Particulate) or an Air-line respirator. • For inhalation risk exists, wear: a Class P1 (Particulate) respirator.

7.3.3.3 Occupational Health Hazard

Open cast method involves dust generation by excavation, drilling, blasting, loading and transportation of mineral. At site, dust is main pollutant which affects the health of workers whereas environmental and climatic conditions also generate the health problems. Addressing the occupational health hazard means gaining an understanding of the source (its location and magnitude or concentration), identifying an exposure pathway (e.g. a means to get it in contact with someone), and determination of likely a receptor (someone receiving the stuff that is migrating).

Occupational hazard due to open cast mining mainly comes under the physical hazards. Possible physical hazards are as mentioned below

Physical Hazards due to Mining Operations

Following health related hazards were identified in open cast mining operations to the workers

1. Light: - The workers may be exposed to the risk of poor illumination or excessive brightness. The effects are eye strain, headache, eye pain and lachrymation, congestion around the cornea and eye fatigue. In present case, the mining activity is done during day time only.

2. Heat and Humidity: - The most common physical hazard is heat. The direct effects of heat exposure are burns, heat exhaustion, heat stroke and heat cramps; the indirect effects are decreased efficiency, increased fatigue and enhanced accident rates. Heat and humidity are encountered in hot and humid condition when temperatures and air temperatures increase in summer time up to 48^0C or above in the river bed mining area.

3. Eye Irritation: - During the high windy days in summer the dust could be the problems for eyes like itching and watering of eyes.

4. Respiratory Problems: - Large amounts of dust in air can be a health hazard, exacerbating respiratory disorders such as asthma and irritating the lungs and bronchial passages.

5. Noise Induced Hearing Loss: - Machinery is the main source of noise pollution at the mine site.

Table 7-7: Mitigation Measures to prevent Occupational Hazard

Particulars	Control Measures
Heat & Light	➢ The mine site will have adequate drinking water supply so that workers do not get dehydration. ➢ Lightweight and loose fitting clothes having light colors will be preferred to wear. ➢ Rigorous exercise and more physical activities will be avoided in hot weather.
Noise	➢ Noise exposure measurements will be taken to determine the need for noise control strategies. ➢ The personal protective equipment will be provided for each mine workers. ➢ Supervisor will be instructed for reporting any problems with hearing protectors or noise control equipment. ➢ At noisy working activity, exposure time will be minimized. ➢ Machineries will be labeled with noise levels.
Respiratory	➢ PPE's like face mask etc. will be provided during mining activity. ➢ Periodic medical examinations will be provided for all workers. ➢ Awareness program will be organized for workers.
Drilling and blasting	➢ Driller shall be equipped with a closed cabin to reduce exposure to noise and dust. In addition, the operators and other workers should be provided with masks, helmets, gloves and earplugs.
Workers health surveillance	➢ Health survey programs for workers and local community. Regular training and awareness of employees to be conducted to meet health and safety objectives

7.3.3.4 Natural Disaster

Risk assessment with respect to high accidents like subsidence, seismic activities, tailing dam failure, flood, etc. are as follows:

Subsidence

The mining will be done by opencast mechanized method and no underground working exists in the area. Chances of subsidence will be insignificant.

Seismic Activities

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. By contrast, peninsular India is relatively less seismic, having suffered only infrequent earthquakes of moderate strength. The main seismogenic belts are associated with the collision plate boundary between the Indian and Eurasian plates.

The project site as well as study area lies in Zone II of seismic Zoning map, and thus can be said to be located in an area of moderate intensity zone by national standards.

Tailing dam failure

The bauxite does not require any beneficiation at site. Thus, no tailing will be generated and no tailing dam is requiring to be maintained.

Flood

With the previous year's meteorological data, no flood situation was observed in the area.

7.3.4 Training and Human Resources Development

i. Adequate training/refresher training will be provided to the supervisors, workers keeping in view provisions of Mines Vocational Training Rules, 1966; Mine Rules, 1955, Mines Rescue Rules, 1985.
ii. Personnel who have to operate and maintain Trucks etc. are to be trained under the guidance of the manufacturers and as per provisions of DGMS Circular Technical 1/1989 regarding accidents in opencast mines. Recommendation of Seventh Conference on Safety in Mines on “Safety in Open Cast Mining”, “Traffic Rules and Procedures”, “Mobile equipment’s and Highway Delivery Vehicles”, “Operations and Operator Training” and other related circulars.
iii. The training of mine personnel shall be provided regularly with respect to environmental protection.
iv. Special courses for employees will be arranged for afforestation, re-vegetation,

reclamation, health hazards (identification), malaria eradication, HIV prevention etc. in the training center of the company.

7.3.5 Medical Examination Schedule

To minimize the health impacts PPE's like dust masks, ear plugs/ muffs and other equipment's will be provided for use by the work personnel. All workers will be subjected to Initial Medical Examination as per Mines Rule 1955 at the time of appointment. Periodical Medical Examination will be conducted at least once in five years. Medical camps will be organized. The detail of health checkup and periodical medical examination schedule is given below in **Table 7-8**.

Table 7-8: Medical Examination Schedule

S. No	Activities	1st Year	2nd Year	3rd Year	4th Year	5th Year
1.	Initial Medical Examination (Mine Workers)					
A	Physical Check -up		-	-	-	-
B	Psychological Test		-	-	-	-
C	Audiometric Test		-	-	-	-
D	Respiratory Test					
2.	Periodical Medical Examination (Mine Workers)					
A	Physical Check -up	-				
B	Audiometric Test	-				
C	Eye Check -up	-				
D	Respiratory Test	-				
3.	Medical Camp	-				
	(Mine Workers & Nearby Villagers					
4.	Training (Mine Workers)					

Medical Follow Up: Work force will be divided into three targeted group age wise as follows:

Age Group	PME as per Mine Rule 1955	Special Examination
Less than 25 years	Once in Three Years	In case of emergencies
Between 25 to 40 Years	Once in Three Years	In case of emergencies
Above 40 years	Once in Three Years	In case of emergencies

Medical help on top priority immediately after diagnosis/ accident is the essence of preventive aspects.

7.4 Disaster Management Plan (DMP)

The objectives of DMP are to describe the company's emergency preparedness, organization, the resource availability and response actions applicable to deal with various types of situations that can occur at mines in shortest possible time.
Thus, the overall objectives of the emergency plan are summarized as:-

- Rapid control and containment of Hazardous situation.
- Minimizing the risk and impact of event/ accident.
- Effective prevention of damage to property.

In order to achieve effectively the objectives of emergency planning, the critical elements that form the backbone of Disaster Management Plan (DMP) are

- Reliable and early detection of an emergency and immediate careful planning.
- The command, co-ordination and response organization structure along with availability of efficient trained personnel.
- The availability of resources for handling emergencies.
- Appropriate emergency response action.
- Effective notification and communication facilities.
- Regular review and updating DMP.
- Training of the concerned personnel.

Steps taken for minimizing the effects may include rescue operations, first aid, evacuation, rehabilitation and communicating promptly to people living nearby.

7.4.1 On-Site Emergency Plan

Disaster management plan are prepared with an aim of taking precautionary step to control the hazard propagation, avert disaster, take action after the disaster which limits the damage to the minimum and follow the on-site emergency planning.

The onsite emergency is an unpleasant situation that causes extensive damage to site structure, personnel and surrounding area and its environment due to in operation, maintenance, design and human error. Onsite plan will be applied in case of proposed project.

Following point are taken into consideration:

- To identify, assess, foresee and work out various kinds of possible hazards, their places, potential and damaging capacity and area in case of above happenings.
- Review, revise, redesign, replace or reconstruct the process and control measures if so assessed.

- Measures to protect persons and property in case of all kinds of accidents, emergencies and disasters
- To inform people and surroundings about emergency if it is likely to adversely affect them.

Following will be kept handy at site

- Hotline connection to district collector, police control room, fire brigade, Hospital etc.
- Public address system (PAS)
- List of dispensaries and registered medical practitioners around site
- Area map of surrounding villages
- Note pads and ball pens to record message received and instructions
- Updated copies of the On-site Disaster Management Plan
- Emergency telephone numbers
- The names, phone number, and address of external agencies, response organizations and neighboring facilities
- Personal protective equipment (PPE)
- Safety helmets
- Clock
- Several maps of the facility including drainage system for surrounding area

7.4.2 First Aid

- Ambulance facility shall be made available. The Ambulance shall be periodically checked through preventive maintenance programme.
- The injured shall be shifted to nearby hospital.
- A list of First Aid boxes shall be arranged at site.
- The names & contact numbers of trained First Aiders will be provided and the same will be displayed at all the site office.

7.4.3 Mock Drill

For reviewing and assessing the level of preparedness, Mine In-charge shall conduct Mock trials twice in a year (one in each half) simulating the covered emergencies and will maintain records of the trials. Corrective and Preventive measures, if suggested/directed, will be initiated and relevant records of the same are maintained. The findings of the mock drills shall be used for improvements in preparedness and response.

7.4.4 Training

On yearly basis class room training for safety and mitigating measures to be adopted to reduce environmental impact & OHS risks, will be imparted covering at least 20% employee. The records of the same shall be maintained.

7.5 Off-Site Emergency Planning

The off-site emergency plan is an integral part of any hazard control system. It is based on those accidents identified by the works management, which could affect people and the environment outside the works. The responsibility for the off-site plan will be with the local authority.

These emergencies will be dealt with as per guidelines of district administration.

7.6 Biodiversity study with audit mechanism.

7.6.1 Biodiversity and Biodiversity Action Plan (BAP)

India has a long history of conservation and sustainable use of natural resources. Perhaps India is the first developing country in the world to enact a formal forest conservation act at a national level. Over the years, India has developed a stable organizational structure and a strong legal and policy framework for protection of environment in the country. India is also a Party to the Convention on Biological Diversity (CBD), which requires all Parties to prepare national biodiversity strategy and action plans for conservation and sustainable use of biological diversity. The objectives of the convention is to Conserve biodiversity, sustainably use the various components of biodiversity; and Share the benefits arising from the commercial and other uses of biodiversity in a fair and equitable manner.

7.6.2 The CBD defines biodiversity as:

The variability among living organisms from all sources including inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

Simply put, biodiversity encompasses the variety and variability of life on Earth. It refers to the differences within and between all living organisms at their different levels of biological organization – genes, individuals, species and ecosystems. Biodiversity embraces all living organisms and their genetic diversity, a vast and complex array of ecosystems and habitats, as well as the processes that underpin and result from this diversity, such as photosynthesis, nutrient cycling or pollination. Different species – plant, animal, fungal and microbial – interact with each other in a variety of ecological processes to form ecosystems. These processes are in turn the result of the interactions between species and with their physical and chemical environments.

The intent of a BAP is to create a framework for the optimal management of biodiversity to ensure that systems which are in a good functional state remain this way while

systems which have become degraded and non-functional, for whatever reasons, are returned to a better functional state.

7.6.3 Impacts of Mining on Biodiversity

Mining has the potential to affect biodiversity throughout the life cycle of a project, both directly and indirectly. Direct or primary impacts from mining can result from any activity that involves land clearance (such as access road construction, exploration drilling, and overburden stripping or tailings impoundment construction) or direct discharges to water bodies (riverine tailings disposal or tailings impoundment releases) or the air (such as dusts or smelter emissions). Direct impacts are usually readily identifiable. Indirect or secondary impacts can result from social or environmental changes induced by mining operations and are often harder to identify.

Due to the continuing demand for minerals, the depletion of resources in readily accessible areas, changing technologies and economics, mining is increasingly being proposed in remote and biodiversity-rich areas that were previously unexplored and undeveloped for minerals.

Despite the significant potential for negative impacts on biodiversity from mining operations, there is a great deal that companies can do to minimize or prevent such impacts in areas identified as being appropriate for mining. There are also many opportunities for companies to enhance biodiversity conservation within their areas of operations. Being proactive in the assessment, management and monitoring of biodiversity is important for mines in biodiversity rich areas. With this objective BAP of Ballada Bauxite Mine will be developed.

Audit with respect to Biodiversity & its management plan mentioned in the study is basically assessment of implementation of proposed management plan in terms of physical provisions mandated in the plan along with financial provisions made therein. Additionally, audit shall also be undertaken to review the compliance status with respect to prevailing provisions of Wildlife and Biodiversity through third party agency.

For present project, financial provisions have been made in Project Specific Wildlife Conservation Plan which will be spent by concerned Forest & Wildlife Officials wherein financial audits are directly undertaken by concerned Departments in view of the same, financial audit shall be out of the purview of this report. Audit mechanism for this report shall be limited to physical progress of biodiversity action plan, biodiversity management plan as well as implementation of provisions of mining plan. A compliance status of mining activities vis-à-vis wildlife & biodiversity related regulations shall also be undertaken.

7.6.4 Objective of the Audit:

The core objective of the audit is effective implementation of Biodiversity Management Plan, Biodiversity Action Plan as well as ensuring compliance to Wildlife & Biodiversity related regulations during operation of the project. Audit will also find out the gaps in implementation and compliance if any. It shall recommend suitable additional measures to fulfill the gaps if any.

7.6.5 Levels and types of Audit on biodiversity:

Audit on biodiversity may occur at any of the following levels:

Ecosystem level: An ecosystem or habitat can be affected if a potential project or activity changes the size, diversity or spatial variation of the ecosystem. In addition, an impact to an ecosystem can occur if its ability to provide long-term function or services is changed.

Species level: In predicting biodiversity impacts, it is also important to assess the impacts at the species level. Potential impacts to species can be assessed according to population numbers and the internal, national or local significance that a species may have to stakeholders.

Genetic level: Diversity within an ecosystem is also associated with genetic diversity of populations. Genetic diversity is extremely difficult to measure. For this reason biodiversity assessment is usually carried out at the ecosystem or species level.

7.6.6 Audit Criteria based on Compliance:

Annual audit through third party shall be undertaken to ensure compliance of following regulations but not limited to the same-

- ✓ Wildlife Protection Act (WPA), 1972 (as amended) and Rules thereunder,
- ✓ The Biological Diversity Act, 2002 and rules 2004,
- ✓ Forest Conservation Act 1980 and compliance of project specific Forest Clearance granted by MoEF&CC for the diversion of forest land in the mining lease.
- ✓ Any Orders of the Hon‟ble Supreme Court of India, guidelines/ orders issued by the GoI/ GoWB/ Wildlife Institute of India (WII), etc. for the project area or with reference to National regulations.

Third party agency shall be free to develop suitable monitoring/reporting formats for the compliance audit of the project.

Audit Criteria based on Physical Progress of BMP & BAP and provisions related to biodiversity in mining Plan:

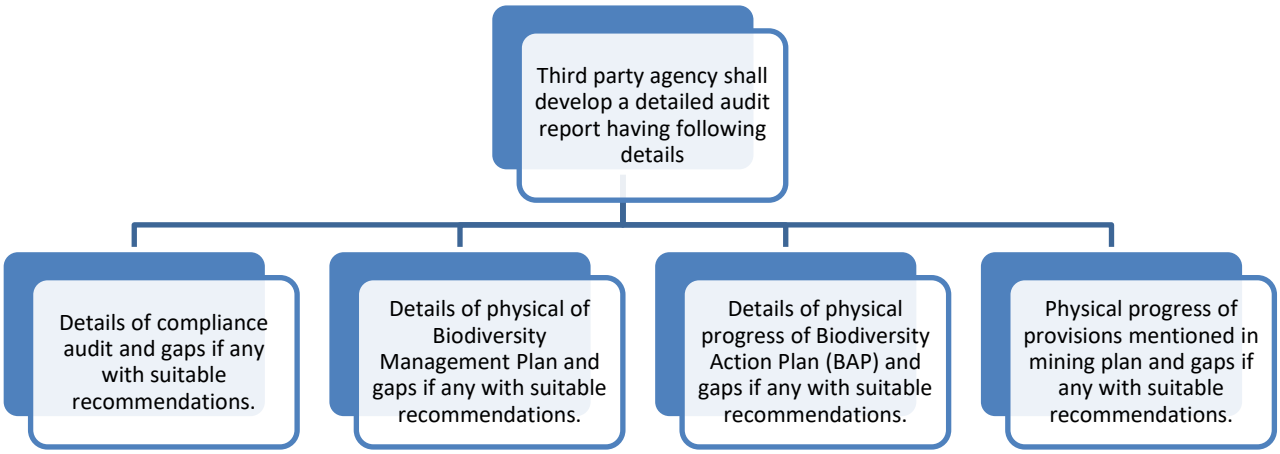
Annual audit through third party shall be undertaken to ensure compliance of following project specific plans-

(i) **Physical Progress of Biodiversity Management Plan** including Fire protection measures, greenbelt development, roadside avenue plantation, protection of mine pit to avoid animal falls, water & soil management plans, Air pollution management plans, mining practices including controlled blasting etc. mentioned in chapter-6 of this report.

(ii) **Physical progress of Biodiversity Action Plan (BAP)** including Soil conservation measures, afforestation plan, Installation of nest boxes for birds, drainage pattern development etc. mentioned in chapter-8 of this report.

(iii) **Physical progress of provisions mentioned in mining plan** including restoration of excavated area as well as overburden dumps planned vs actual.

Third party agency shall be free to develop suitable monitoring/reporting formats for the physical progress audit of the project.



7.6.7 Benefits of Conducting Biodiversity Audits in Mining Areas:

Ecosystem Preservation

Audit mechanisms help protect vulnerable habitats, endangered species, and maintain biodiversity hotspots, ensuring long-term ecological resilience.

Renewable Resource Management

By assessing ecosystem services, audits enable sustainable extraction and minimize the depletion of renewable resources, fostering responsible mining practices.

Community Engagement

Biodiversity audits facilitate meaningful engagement with local communities, promoting social license to operate, and supporting shared decision-making processes.

Corporate Reputation

Companies with robust biodiversity audit mechanisms enhance their reputation, attract responsible investors, and contribute to broader sustainability goals.

The detail Biodiversity study with audit mechanism report is given as **Annexure-VIII**.

8. PROJECT BENEFITS

8.1 INTRODUCTION

Bauxite is basically an aluminous rock containing hydrated aluminum oxide as the main constituent and iron oxide, silica and titania in varying proportions. Hydrated aluminum oxides present in the bauxite ore occur in form of three minerals, viz, Gibbsite, Boehmite & Diaspore. Bauxite is an essential ore of aluminum which is one of the most important nonferrous metals used in the modern industry. It is also an essential ore for refractory and chemical industries. The country has abundant resources of bauxite which can meet both domestic and export demands.

8.2 EMPLOYMENT POTENTIAL

Proposed mine shall provide an opportunity of direct employment to 126 persons and total indirect employment of approx. 100-150 persons.

8.2.1 Direct Employment

Employment scenario of the study area is largely dependent on the agriculture. The present project has employment generation potential by way of recruiting local people directly for different activities of the mining. The proposed project will improve the rural employment.

Estimated manpower requirement shall be 126. Both skilled & un-skilled workers will be employed by the company.

Local people will be given the opportunity in employment as per their qualification and expertise. Priority will be given to scheduled tribe families including women. This will enhance the present socio economic status of the local people.

8.2.2 Indirect Employment

Indirect employment and income effects of any mining activity usually remain widespread across a long region. Over the years the mine has caused generation of income and employment opportunities in the vicinity of the mine, specifically, transport and commercial establishments.

8.3 IMPROVEMENT IN INFRASTRUCTURE

The proposed proposal will enhance the following physical infrastructure facilities in the adjoining areas:

a. Road Transport: The existing road will be maintain regularly for better communication.

b. Market: Generating useful economic resource for construction. Excavated mineral will provide a good market opportunity.

c. Infrastructure: Maintenance of community assets (infrastructure) like village roads/ linked roads, dispensary and health center, market place etc., as a part of corporate environment responsibility.

d. Greenbelt Development: Project Proponent has proposed to plant 8,440 no. of saplings till conceptual stage of mine.

e. Increasing other business opportunities for local people: There will be scope of hiring vehicle during operation phase.

8.4 BENEFITS TO THE STATE

The proposed project shall contribute towards developmental needs of the State. The project would support Government's endeavour in bringing up the assigned area in terms of growth indices such as power generation and employment generation. Also, the revenue generated from Mining may get reinvested by the State Govt. in further developmental works of the State. Moreover, the proposed project will also boost the economic development of a predominantly backward region of the state.

8.5 CORPORATE ENVIRONMENT RESPONSIBILITY (CER)

CER has been worked out based on the issues raised during the Public Hearing and social need assessment. The detailed of the public hearing issues and a time-bound acton plan for implementation of activities proposed along with Budget of Rs. 532.5 Lakhs is given in Chapter-7.

8.6 IMPROVEMENTS IN THE SOCIAL INFRASTRUCTURE

The mining activity in the region will have a positive impact on the social, economic condition of the area by way of providing employment to the local inhabitants; wages paid to them will increase the per capita income, housing, education, medical and transportation facilities, economic status, health and agriculture.

A detailed program for socio economic development of the area has been framed. The salient features of the program are as follows.

Table 8.1: Proposed socio economic developmet activities

S. No.	Proposed Planned Activities under CSR	
1.	**Health Facility**	• Providing infrastructure facilities such as beds, medical instruments in Community health centre at Jeypore centres and Sub Centre in Atanda village • Ambulance 24x7 to be made available in Balda and Chilam villages for emergency cases

S. No.	Proposed Planned Activities under CSR	
		• Health checkup programs and provision of medicines shall be made available to the villagers of Balda, Kadaput, Taintar and Gayalput villages
2.	**Educational Development**	• Installation of water coolers in Government schools in Balda village • Construction of Toilets in the schools in Lulluburu Priamry school village • Distribution of Classroom Desks in Govt. Schools in the core area • Lab Equipments in Government High school at Rasaput village • Distribution of Sports Kits to the school students for promoting sports in villages • Scholarship to Students for promoting education • Construction of Playground in government schools
3.	**Infrastructure Development**	• Construction of Pucca roads, Bridges, Waiting Shed, Community Hall, Cultural Centre etc in villages • Construction of CC drainages & internal roads • Provision of Solar Street Light • Beautification and construction of village • Construction of Girls Toilet Block.
4.	**Employment Development**	• Skill Development training for providing Industrial trades- Electrician, Welder, Filtter, Computer Skills • Skill Training Plumbing, Masonary, Welding • Training centres for Ladies (stitching, Embroidery, tailoring etc.)
5.	**Sanitation and Hygiene**	• Construction of Nallas for proper drainage system in core area villages • Community Garbage Disposal system • Providing sanitation infrastructure and other facilities under Swachh Bharat Abhiyan
6.	**Community Development**	• Supply of Drinking water by installation of Hand Pump, Tap water system in villages with the issues of quality of water • Providing sanitation facilities at Common area near

S. No.	Proposed Planned Activities under CSR	
		• Panchayat Bhavan
7.	**Afforestation Programs**	• Plantation of trees at road side of project site in Ballada & nearby villages.

8.7 ECOLOGICAL BENEFITS

The proposed project will improve the ecology by planting the trees of native species. The backfills will be properly graded & terraced and will be biologically reclaimed by plantation. Plantation will be carried out on 7.5 m ML boundary. Thus, at the post mining stage the area will have partly backfilled mined out voids surrounded from all the sides by plantation and dense avenue plantation.

8.8 OTHER TANGIBLE BENEFITS

The proposed project by nature serves as the nuclei for development of small-scale industries in the areas around them. These small-scale units usually have input-output linkages with the other industries.

9. ENVIRONMENTAL COST BENEFIT ANALYSIS

As per EIA Notification dated 14th September, 2006 as amended from time to time; the chapter on "Environmental Cost Benefit Analysis" is applicable only, if the same is recommended at the Scoping Stage.

Entire Mine Lease area i.e 144.945 ha is Forest Land (Nagasari RF), Cost Benefit Analysis for the same is furnished as **Annexure-X**.

10. ENVIRONMENT MANAGEMENT PLAN

10.1 INTRODUCTION

Any development project is associated with certain positive impacts as well as some negative impacts on the environment. However, the negative or adverse impacts cannot possibly rule out scientific development. At the same time adverse impacts cannot be neglected. The Environmental Management Plan describes the administrative aspects of ensuring that mitigation measures are implemented, and their effectiveness monitored. EMP ensures that set of mitigation measures taken to eliminate the adverse environmental impacts or reduce them to acceptable levels. During the implementation and operation, projects have been effectively implemented. The plan helps in formulation, implementation, and monitoring of the environmental parameters during and after commissioning of the project. The Environmental Management Plan describes in brief, the management plan for proper and adequate implementation of treatment and control system for air, water and noise pollution and for maintaining the environment. It also includes the development of green belts in and around the mine, proper safety of the workers, noise control, fire protection systems and measures.

10.2 PURPOSE OF ENVIRONMENTAL MANAGEMENT PLAN

The environment management plan is prepared with a view to facilitate effective environment management of the project, in general and implementation of the mitigation measures. The EMP provides a delivery mechanism to address potential adverse impacts and to introduce standards of good practice to be adopted for all project works. For each stage of the program, the EMP lists all the requirements to ensure effective mitigation of every potential biophysical and socio-economic impact identified in the EIA. For each operation, which could otherwise give rise to impact, the following information is presented:

1. To treat and dispose-off all the pollutants viz. liquid, gaseous, and solid waste to meet statutory requirements (Relevant Pollution Control Acts) with appropriate technology
2. To support and implement work to achieve environmental standards and to improve the methods of environmental management.
3. To promote green-belt development.
4. To encourage good working conditions for employees.
5. To reduce fire and accident hazards.
6. Budgeting and allocation of funds for environment management system.
7. To adopt cleaner production technology and waste minimization program.

10.3 ENVIRONMENT MANAGEMENT POLICY & ENVIRONMENT COMMITTEE

The Company is very much obvious of its responsibility in protecting the Environment. Thus, various mitigation measures as given in the report shall be taken-up and effort will be made to reduce the impact of the Project on the Environment. Any action or effort remains incomplete, if it is not monitored properly at regular intervals and corrective measures taken, wherever necessary. Regular monitoring has thus, been provided.

The Company has well defined policy. The system of reporting of Non-conformances / violation of any Environmental Law/Policy will be as per the SOP defined under the Integrated Management System. As per the SOP, any non-conformances/violation of Environmental Law/Policy, either identified during Internal Audits or reported by any authority or received through any source, will be discussed during Management Review Meetings with Board of Directors/Partners. Under the system designated persons at all hierarchy level have been identified for ensuring adherence to the policy and compliance with the environmental laws and regulations. Also, system has been developed to take adequate measures.

SOP in case of any Violation is observed:

1. The cases of violations/non-compliances of Environment or Forest Laws, if any, shall be reported to the Board of Directors through EHS Manager and shall identify designate responsible person for ensuring compliance with the Environmental Laws and Regulations.
2. Comply with all relevant environmental laws and regulations to minimize risks to health, safety and the environment.

Work with local government, regulatory authorities and communities

An Environment Management Committee (EMC) shall be constituted consisting of following members to monitor the implementation of EMP and other environmental protection measures.

i. Head of Mines
ii. Mines Manager
iii. Environment Engineer

Hierarchical system of the company to deal with environmental issues and for ensuring compliance with EC conditions

Mine manager is responsible for implementation of the approved EMP and various conditions of EC, FC and CFO. Environment engineer will assist the Mine manager in ensuring the compliance of conditions. Head of mines will be reviewing the environmental issues for ensuring compliance of norms/conditions.

System Of Reporting Non-Compliances/Violations of Environmental Norms

Mines manager will monitor the implementation of environmental norms/conditions and shall report any deviations to the head of mines. The head of mines will take suitable corrective measures with the help of Mine Manager.

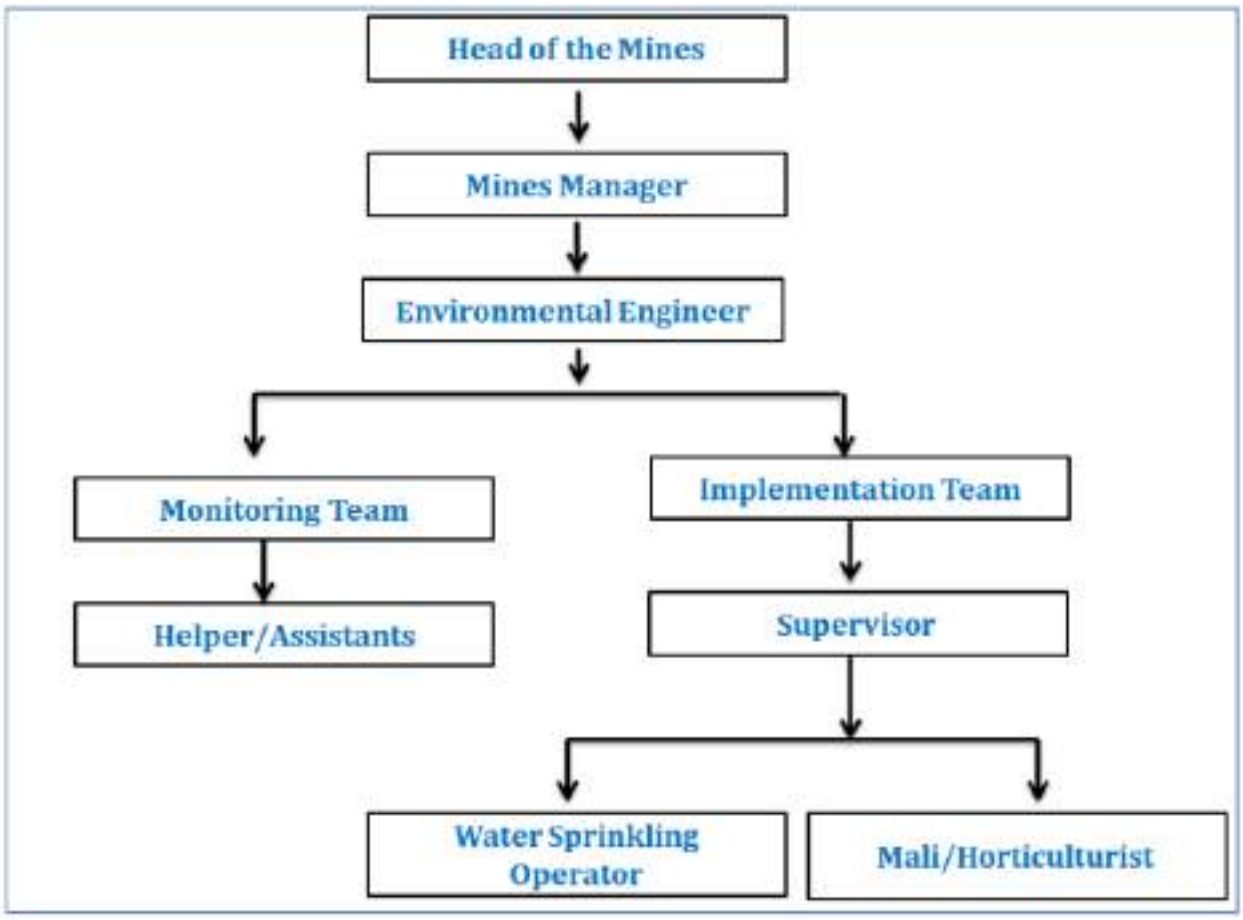


Figure 10.1: Reporting Structure for Ensuring Various Environmental Compliances

The main aims of the said Policy are to:

1. Effectively manage, monitor, improve and communicate the environmental performance.
2. Take all reasonable steps to prevent pollution.
3. Set realistic and measurable objectives and targets for continual improvement of the environmental performance.
4. Ensure that all employees and contractors are trained to understand their environmental responsibilities and create an environment that adheres to the Company's Policies, procedures, and applicable regulations.
5. Hold leadership accountable for good environment performance of our operations and projects. Inherent in that accountability will be the commitment of management to provide resources and successfully create an appropriate environment.
6. Comply fully with all relevant legal requirements, codes of practice and regulations.
7. Reduce, recycle, and reuse natural resources.

8. Minimize waste generation and increase reuse within the framework of waste management procedures.
9. Identify and manage environmental risks and hazards.
10. The project proponent shall regularly review this policy and ensure the effectiveness of the same.
11. That corrective and preventative action is taken to ensure continual improvement.
12. To treat all the pollutants viz. air, gaseous and noise, which contribute to the degradation of the environment, with appropriate technologies.
13. To comply with all regulations stipulated by the Central / State Pollution Control Boards related to air emissions and liquid effluent discharge as per air and water pollution control laws.
14. To handle hazardous wastes as per the Hazardous Waste Hazardous & Other Wastes Rules, 2016 of the Environment (Protection) Act, 1986
15. To encourage support and conduct developmental work for the purpose of achieving environmental standards and to improve the methods of environmental management.
16. To make continuous efforts to improve environment.
17. The system of reporting of Non-conformances/ violation of any Environmental Law/Policy will be as per the management system.

For successful implementation of the environmental management plan other agencies of the State will also be involved by project proponent, if required (for regulatory requirement or technical support). The coordinating agencies, which may be involved for specific environmental, and project related activities, are as follows.

Table 10.1: Man power at Environment Management Committee

Description	Manpower
Head of Mines	1
Mines Manager	1
Environment Engineer	1
Supervisor	1
Total	**4**

For successful implementation of the environmental management plan other agencies of the State will also be involved by Project Proponent, if required (for regulatory requirement or technical support).

10.3.1 Interaction with SPCB

EMC always remains in regular touch with SPCB/Regional Office, SEIAA/MoEF&CC and sends them periodic compliance report on EMP compliance in the prescribed format. Any new regulations/ guidelines considered by SPCB / CPCB shall be taken care of by EMC.

10.3.2 Training

Requisite training facilities will be provided. For proper implementation of the EMP.

The training will be given to employees covering the following areas:

1. Awareness of pollution control and environmental protection (for all employees)
2. Operation and maintenance of specialized pollution control equipment to the concerned employees
3. Field monitoring, maintenance, and calibration of pollution monitoring instruments
4. Repair of pollution monitoring instruments.
5. Awareness Training on Environment Management System.
6. Afforestation / plantation and post care of plants.
7. Knowledge of norms, regulations, and procedures.
8. Risk assessment and Disaster Management.
9. ISO 9001:2015/ EMS 15001: 2015/ OSHAS 45001:2018

Table 10.2: Training Schedule of Mining Engineers, Environmentalists, Diploma Engineers, Geologists, Supervisors etc.

			Duration in month											
Area of Training	**Persons to be covered Under Training**	**Duration, Month**	**1st**	**2nd**	**3nd**	**4th**	**5th**	**6th**	**7th**	**8th**	**9th**	**10th**	**11th**	**12th**
Awareness Campaign of pollution control and environmental protection	Management& Non Management Employees (Upto Supervisors)	12												
Operation and maintenance of specia lized Pollution control equipment.	Management & Non Management Employees (Upto Supervisors Level)	3												
Field monitoring, maintenance and calibration of pollution monitoring instruments	Environmental officers,Chemists	4												
Laboratory testing of pollutants.	Environmental Officers,Chemists	3												
Repair of pollution monitoring instruments.	Mechanical & Electrical Supervisors (Diploma Holders)	2												
Risk assessment and Disaster Management.	Mining Engineers, Environmental Officers,Mechanical Engineers, Electric£1 Engineers,sts etc	6												
Environmental management.	Mines Manager, Mining Engineers, Environmental Officers,Geologists	3												
Afforestation / plantation and post care of plants.	Horticulturists,Environment Officers	2												
Knowledge of norms, regulations and procedures.	Management & Non Management Employees (Upto Chemist Level)	3												
ISO 9001:2015	Management & Non Management Employees (Upto Supervisors)	4												
OSHAS 45001, 2018	Management & Non Management Employees (Upto Supervisors)	4												
EMS 14001:2015	Management & Non Management Employees (Upto Supervisors)	4												

10.3.3 Plan for reduction of Specific Diesel Consumption

Specific Diesel Consumption of M/s Kalinga Alumina Limited Mines is projected below. Following major site specific measures will be taken in a phased manner to reduce the specific diesel consumption in Ballada Bauxite mine.

1. Regular monitoring of equipment-wise diesel consumption, running hours of equipment and their hourly production to check any abnormal change in the diesel consumption pattern.
2. Reduction of idling of the dumpers at face, Dumpers shall be in OFF position during idling except for the 1st dumper near excavator for loading.
3. Reducing the unnecessary movement of dumpers during shift change time.
4. Prevention of diesel leakage.
5. Regular check-up of tyre pressure to maintain it as per manufacturer's recommendations.
6. Implementation of maintenance schedule and fixation of equipment–wise norms for diesel consumption based on periodic review of collected data.
7. Maintaining proper haul road width & gradient, removing potholes in the road.
8. Reducing the lead distance by proper haul road planning.
9. As effectiveness of implementation measures depend mostly upon the attitude of operators, awareness programmes will be conducted for conservation of fuels.

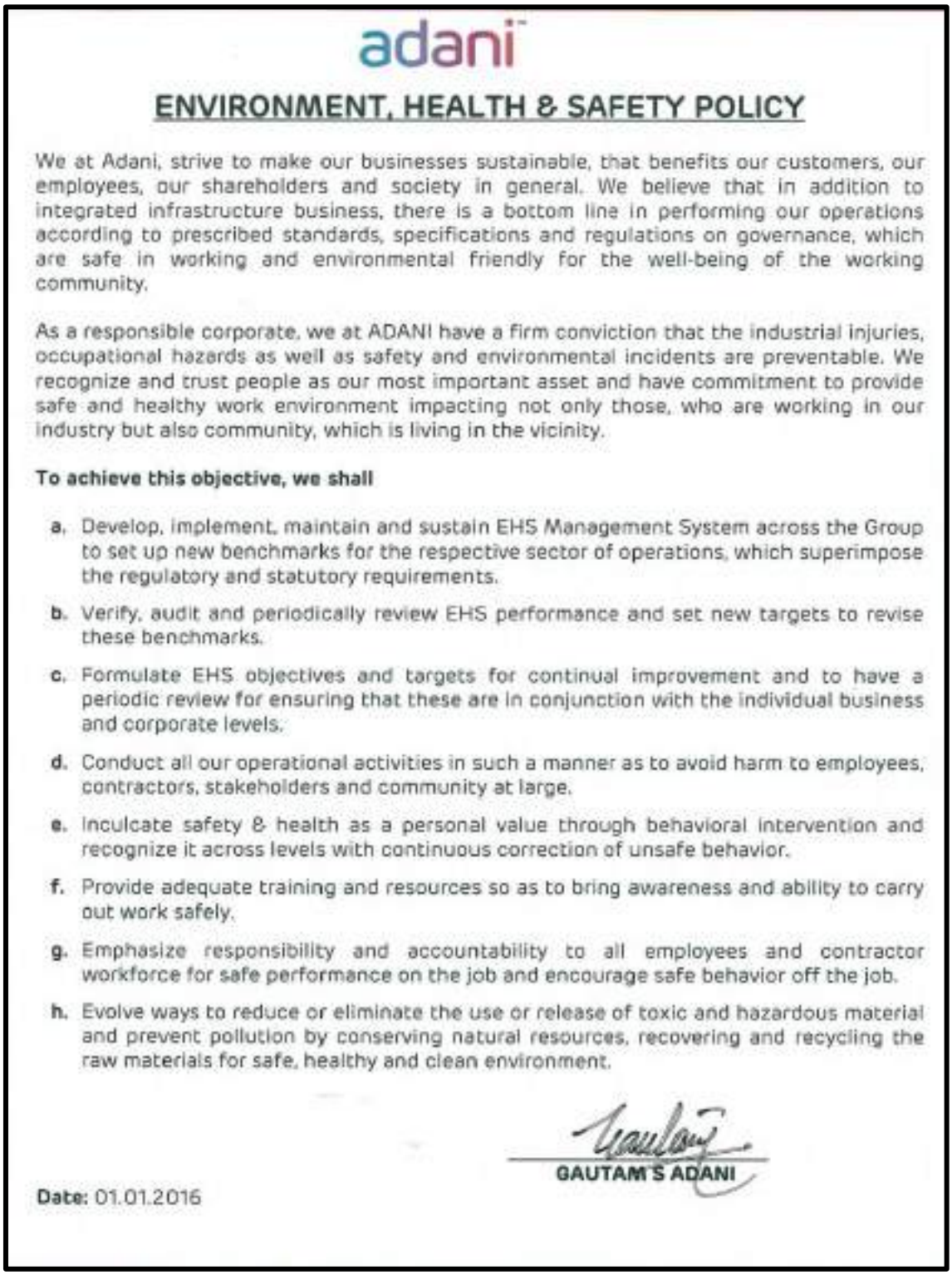
Year-wise proposed rate of Specific Diesel Consumption for the proposed excavation plan for the 1st five years of plan period is given below.

Table 10.3: Year-Wise reduction plan for Specific Diesel Consumption for Next Five Years

Year	Total Excavation, t	Diesel Consumption, l	Specific Diesel Consumption, Litre/t
1	1048264	524132	0.50
2	2077006	1038503	0.50
3	2090824	836329	0.40
4	2010014	783905	0.39
5	4001868	1487000	0.37

10.3.4 Water Reduction Plan

No water will be drawn from the ground water as the water requirement will be fulfilled from the Surface reservoir & water from mine sump (after treatment).



adani

ENVIRONMENT, HEALTH & SAFETY POLICY

We at Adani, strive to make our businesses sustainable, that benefits our customers, our employees, our shareholders and society in general. We believe that in addition to integrated infrastructure business, there is a bottom line in performing our operations according to prescribed standards, specifications and regulations on governance, which are safe in working and environmental friendly for the well-being of the working community.

As a responsible corporate, we at ADANI have a firm conviction that the industrial injuries, occupational hazards as well as safety and environmental incidents are preventable. We recognize and trust people as our most important asset and have commitment to provide safe and healthy work environment impacting not only those, who are working in our industry but also community, which is living in the vicinity.

To achieve this objective, we shall

a. Develop, implement, maintain and sustain EHS Management System across the Group to set up new benchmarks for the respective sector of operations, which superimpose the regulatory and statutory requirements.

b. Verify, audit and periodically review EHS performance and set new targets to revise these benchmarks.

c. Formulate EHS objectives and targets for continual improvement and to have a periodic review for ensuring that these are in conjunction with the individual business and corporate levels.

d. Conduct all our operational activities in such a manner as to avoid harm to employees, contractors, stakeholders and community at large.

e. Inculcate safety & health as a personal value through behavioral intervention and recognize it across levels with continuous correction of unsafe behavior.

f. Provide adequate training and resources so as to bring awareness and ability to carry out work safely.

g. Emphasize responsibility and accountability to all employees and contractor workforce for safe performance on the job and encourage safe behavior off the job.

h. Evolve ways to reduce or eliminate the use or release of toxic and hazardous material and prevent pollution by conserving natural resources, recovering and recycling the raw materials for safe, healthy and clean environment.

GAUTAM S ADANI

Date: 01.01.2016

Figure 10.2: Environment Policy

10.4 IMPLEMENTATION OF ENVIRONMENT MANAGEMENT PLAN

A separate department "Environmental Management Cell" (EMC) will be formed to look after all environmental related matters of the plant. The EMC will supervise the reported activity from time to time for smooth implementation of Environmental Mitigation and Management measures and will take necessary actions if required. The cell will act to ensure the suitability, adequacy and effectiveness of the Environment Management Program. It will also ensure to meet all the Statutory Requirements. Roles & responsibilities of Environment Monitoring Cell (EMC) have been discussed in details in Chapter-6.

10.4.1 Budgetary provisions for implementation of environment management plan

Following provisions are proposed to be taken for improving, control and monitoring of environment protection measures.

Table 10.4: Budget for Environmental Management Plan

Sl. No.	Environmental Protection Measures	Capital Cost (Rs. In lakhs)	Recurring Cost (Rs. In lakhs/year)
1	Air Pollution Control Measures	100.00	25.00
2	Water Pollution Control Measures	25.00	5.00
3	Noise Pollution Control Measures	15.00	1.00
4	Greenbelt Development	20.00	5.00
5	Rainwater Harvesting	10.00	2.00
6	Health & Safety measures	20.00	2.00
7	Environment Monitoring	30.00	20.00
Total		**220.00**	**60.00**

11. SUMMARY & CONCLUSION

11.1 INTRODUCTION

M/s Kalinga Alumina Limited (formerly known as M/s Mundra Aluminum Limited), a wholly owned subsidiary of Adani Enterprises Limited, has a vision of setting up an integrated greenfield alumina refinery of 4.0 MTPA capacity and also to develop bauxite mines in the vicinity for captive / commercial use. Recently M/s Kalinga Alumina Limited has secured two bauxite blocks in Odisha, viz. Ballada in Koraput district and Kutrumali in Kalahandi/Rayagada district through an auction process.

Adani Group is currently embarking on a strategic growth plan to diversify into mines and metals space. Strong parentage in power, infrastructure, logistics, mining and global presence puts it in a pre-eminent position to make it a globally competitive player in this field.

Adani Group is a global multinational and a front runner with its strong ESG principles. It has vast experience in mining operations of various major minerals such as Coal, Iron Ore, limestone, beach sand, among others and therefore, is in a pre-eminent position to conduct scientific and environment friendly mining

The Government of Odisha, issued letter of intent vide letter SM-MC2-MC-0007-2023/2143/S&M Bhubaneswar dated 1st March 2023 for grant of mining lease for Ballada bauxite block in Village - Ballada, Taluka – Nandapur, District- Koraput, Odisha for an area of 144.945 ha to M/s Mundra Aluminum Limited (now M/s Kalinga Alumina Limited) for period of 50 years.

11.2 PROJECT DESCRIPTION

The proposed project entails mining of Bauxite by opencast mining method with an annual Peak Rated Capacity of ~ 4.0 MTPA of Bauxite (ROM). The project also involves generation of 146508 tonnes (73254 m^3) of Overburden/waste and 51564 tonnes (25782 m^3) of top soil during initial 5 years of operations. Besides, it is envisaged to have crushing/Screening facilities within the lease area with a capacity of 800 TPH at rated production level over an area of 144.945 Ha located at Village - Ballada, Taluka – Nandapur, District- Koraput, Odisha between latitudes 18°26'05.61588" N to 18°27'13.34448" N and Longitude 82°39'32.39136" to 82°40'25.36716" E. & is covered under the Survey of India toposheet no. No. E44K11 (65J/11). The proposed project falls in schedule 1 (a) (i) Mining of Minerals of Category 'B1'.

The mining operation will be carried out as per the approved Mining Plan. Detail of the project is summarized in below attached table:

Table 11.1: Detail of the Project

<table>
<tr><th>S. No.</th><th>Description</th><th>Particulars</th></tr>
<tr><td>1.</td><td>Name of the Project</td><td>Mining of 4.0 MTPA Bauxite (ROM), being the Peak Rated Capacity, 146508 tonnes (73254 m³) of overburden/waste and 51564 tonnes (25782 m³) of top soil over a period of 5 years and setting up of Crushing/ Screening facilities of 800 TPH capacity within the lease area spanning over an area of 144.945 ha</td></tr>
<tr><td>2.</td><td>Production for Plan period</td><td>
<table>
<tr><th>Year</th><th>Top Soil in m³</th><th>O.B. in m³</th><th>OB in Tonnes</th><th>Total Bauxite in Tonnes</th><th>OB to Ore Ratio</th></tr>
<tr><td>Y1</td><td>24072</td><td>0</td><td>0</td><td>1000120</td><td>0</td></tr>
<tr><td>Y2</td><td>1,710</td><td>24,783</td><td>49566</td><td>2024020</td><td>0.012</td></tr>
<tr><td>Y3</td><td>0</td><td>44,671</td><td>89342</td><td>2001482</td><td>0.022</td></tr>
<tr><td>Y4</td><td>0</td><td>3,800</td><td>7600</td><td>2002414</td><td>0.02</td></tr>
<tr><td>Y5</td><td>0</td><td>0</td><td>0</td><td>4001868</td><td>0</td></tr>
<tr><td>Total</td><td>25,782</td><td>73,254</td><td>146508</td><td>11029904</td><td></td></tr>
</table>
</td></tr>
<tr><td>3.</td><td>Mining lease area</td><td>144.945 Ha</td></tr>
<tr><td>4.</td><td>Land use Area</td><td>Forest Land</td></tr>
<tr><td>5.</td><td>New / Expansion</td><td>New</td></tr>
<tr><td>6.</td><td>Category as per EIA Notification</td><td>“B”</td></tr>
<tr><td>7.</td><td>Lease Validity</td><td>28.02.2073</td></tr>
<tr><td>8.</td><td>Proposed Capacity</td><td>4.0 MTPA Bauxite (ROM)</td></tr>
<tr><td>9.</td><td>Life of mine</td><td>9 years</td></tr>
<tr><td>10.</td><td>Type of the Project</td><td>Opencast Mechanized Mining with drilling and blasting</td></tr>
<tr><td>11.</td><td>Probable Mineral Reserve</td><td>19.96 Mt</td></tr>
<tr><td>12.</td><td>Prefeasibility Mineral Resource</td><td>2.17 Mt</td></tr>
<tr><td>13.</td><td>Total Mineable Resource</td><td>22.13 Mt</td></tr>
<tr><td>14.</td><td>Waste to ratio over initial 5 years of</td><td>0.018:1</td></tr>
</table>

S. No.	Description	Particulars
	operation (m^3/t)	
15.	**Bench height and bench width in OB & Mineral**	6.0 m x 10 m
16.	**Slope of Bench in OB and Mineral**	70 degrees
17.	**Overall pit slope**	30 degrees
18.	**Area under mining (Plan Period)**	42.78 Ha.
19.	**Max Depth of working**	30 m
20.	**OB to be Generated**	0.073 Mm^3 (During 5-year Plan period)
21.	**Top Soil to be generated**	0.026 Mm^3 (During 5-year Plan period)
22.	**Waste generation and disposal**	The waste generated in course of pre-mining development and subsequent mining operations will consist of topsoil and laterite with occasional occurrences of khondalite. During the first five years, the rate of generation of waste is expected to be of the order of 0.073 Mm3 or 0.15 MT along with generation of top soil of 0.026 Mm3 The average waste to ore ratio during the first 5 years of operations is estimated to be about 0.018:1. The waste materials will be dumped systematically, as per prudent industry practice. The waste stacked on ground during the initial years of operation will be utilized to partially fill the worked-out areas from time to time as per provisions of the approved mining plan
23.	**Top soil Management**	During initial five-years, top soil generation would be of the order of 0.026 Mm3. Topsoil, stacked separately, would be spread over the reclaimed areas, to enable planting and growing of trees
24.	**Crushing**	The crushing plant and conveyor systems have been designed for 305 days operation per year with 3 shifts operation per day. The size of the product to be obtained after crushing in the plant will be minus 150 mm (d85). For 4 million tons per annum peak rated capacity, the crushing/ Screening plant requirement would be 800 TPH. It is proposed to

S. No.	Description	Particulars
		install crushing and screening plants in phases, 400 TPH (1 no.) for 2 MTPA RoM production and 400 TPH (2 nos.) for 4 MTPA production. One RoM ore stockpile of about 50,000 tonnes capacity will be maintained near the crusher plant
25.	**Transportation**	The crushed bauxite from Ballada mine will be transported by closed conveyor system to Bheja railway station, located at a distance of about 3 KM from the lease boundary. Intra-mine movement of ore and OB shall be carried out using dumpers of appropriate capacity as per provisions of the approved mine plan.
26.	**Infrastructure**	Requisite infrastructure will be developed for mining operation & allied activities such as Rest shelters, Fast-aid center, drinking water supply, Site-offices, and toilets within the mining lease as per requirement.
27.	**Working Regime**	305 days/ year, 3 shifts/day, 8 hours/shift
28.	**Man power**	126 nos
29.	**Power requirement**	The estimated average power requirement is 1 MW, the peak requirement being 1.5 MW. The power shall be sourced from nearest substation located at a distance of 8 km
30.	**Fuel requirement**	HSD: 1487 KL/Annum at peak rated capacity
31.	**Explosive Consumption**	113400 kg per month (ROM Zone Blasting)
32.	**Water requirement**	Total water requirement is 690 KLD in which the Dust Suppression: 600 KLD, Washing and cleaning: 45 KLD Drinking: 10 KLD Afforestation: 15 KLD Miscellaneous: 20 KLD Source: Jalaput Reservoir located at distance of 3 km
33.	**No of tress to be planted and area of greenbelt**	8,440 nos. during plan period, Greenbelt: 4.23 ha
34.	**Total cost of the project**	Rs 230 /- Crore
35.	**Fund Provision for EMP**	Capital - 220.00 Lakhs

S. No.	Description	Particulars
		Recurring - 60.00 Lakhs/year
36.	**Name of the EIA Consultant Organization**	M/s Vardan EnviroNet LLP
37.	**QCI / NABET Accreditation**	Certificate No. QCI/NABET/EIA/2326/RA 0284_Rev.01, Valid up to 04.05.2026

11.3 DESCRIPTION OF THE ENVIRONMENT

Environmental data have been collected in relation to proposed mining for Air, Noise, Water, Soil, Ecology and Biodiversity. The generation of primary data, as well as collection of secondary data and information from the site and surroundings was carried out during summer season, i.e. March 2023 to May 2023 by Vardan EnviroLab, NABL Accredited Lab, in accordance with the guidelines of EIA issued by the Ministry of Environment Forests and Climate Change, Govt. of India and CPCB, New Delhi. Secondary data was collected from different Government sources. The scope of the study has been done as per ToR letter. The EIA study is being done for the Mine Lease (core zone) and area within 10 Km distance from the mine lease boundary (buffer zone), both of which together comprise the study area.

Table 11.2: Baseline Environment Status

Parameters	Baseline Status
Ambient Air Quality	PM10 – 50.4 – 76.9 (µg/m3) PM 2.5 – 28.7 – 50.9 (µg/m3) NOX – 16.1– 34.8 (µg/m3) SO2 – 9.4 – 21.8 (µg/m3) CO – 0.5 – 1.0 (mg/m3)
Noise Level	Noise Level during Day Time - 41.59 – 52.2 Leq.(dB)A Noise Level during Night Time - 34.2 – 43.38 Leq.(dB)A
Water Quality	**Ground Water :** All the Parameters like TDS (320.0– 380.0mg/L). pH (7.55 – 8.24), Total Hardness (142.20- 300.42 mg/L) etc. are found within the permissible limits.
	Surface Water : All the Parameters like TDS (236.0- 400.0 mg/L). pH (7.51 - 7.72), Total Hardness (70.0- 81.0 mg/L) etc. are found within the permissible limits.
Soil Quality	pH – 7.58 – 7.82 Organic Matter – 0.31 – 0.69 (%) Water Holding Capacity – 32.21 – 37.64 (%)

Parameters	Baseline Status
Socio Economic	The proposed project will provide positive impact to the nearby area. The project will provide direct and indirect employment to nearby villagers. Project will generate employment for about 126 persons.
Ecologu and Biodiversity	There is no wildlife sanctuary/biosphere reserve/national parks present within 10 Km radius of the study area. A Site-specific Wildlife Conservation Plan has been prepared and is approved by PCCF (WL) & CWLW for conservation of schedule-I species of the study area.

11.4 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The proposed mining operations are not anticipated to raise the concentration of the pollutants beyond prescribed limits. However, the measures are suggested to mitigate any harmful impacts of pollutants, like the plantation of trees along haul roads, to help reduce the impact of dust on the nearby villages; planning, transportation of mineral by series of conveyors and closed conveyor system, to significantly reduce the dust generation due to transportation; regular water sprinkling on approach roads to avoid dust generation etc. The mining activities is likely to increase the per capita income of local people by which the socioeconomic status of the people will be improved. The local people will be provided with either direct employments or indirect employment such as transport & other business, contract works and development work like roads, etc. and other welfare amenities such as medical facilities, conveyance, free education, drinking water supply etc. Except dust generation, there is no source which can show a probability for health related diseases. Regular water sprinkling will be done with water sprinklers and dust masks will be provided to the workers. All workers will be subjected to a medical examination as per Mines Rule 1955 both at the time of appointment and at least once in a year. Medical camps will be organized for this activity. Insurance for all employees as per the rules will also be carried out.

Table 11.3: Anticipated Environmental impacts and mitigation

Activity	Environmental Aspects	Impact	Impact characteristics	
			Significance	Mitigative measures
Mining				
Excavation	Excavation of area by Drilling, blasting and excavator and dumper combination	Air Pollution,	Significant	Dust curtains will be installed on drill rigs. Water injector will be used on drill rigs to minimize dust emission. Blast will only be conducted when meteorological conditions are favorable. Thick greenbelt will be developed.
	Mine runoff	Water Pollution	Significant	All the fines will be arrested in a very systematic established framework of protective measures like Garland drain, Gabion wall, retaining wall, check dam, settling tank, ETP and STP.
	Due to Drilling, blasting and excavator and dumper	Noise Pollution	Significant	Provision and maintenance of thick tree belts Proper maintenance of noise generating machinery including the transport vehicles. Provision of protective devices like ear muffs/ear plugs to workers. Confining the noise by isolating the source of noise
	Excavation of Bauxite	Land use	Significant	Land will be covered with plantation after backfilling and stabilisation after due technical and biological reclamation.
Drilling	Generation of dust	Air pollution	Significant	Wet drilling method Introduction of dust suppression system Installation of permanent pipe water sprinkler along mine haul road and Development of green belt

Activity	Environmental Aspects	Impact	Impact characteristics	
			Significance	Mitigative measures
	Generation of Gaseous emissions	Air pollution (SO2/NOx/CO)	Insignificant	Regular maintenance of Drilling M/c to reduce gaseous emissions.
	Generation of Noise	Noise Pollution	Insignificant	Operator Cabin is enclosed. Ear muff shall be also be provided to the operator. Confining the noise by isolating the source of noise. Reducing the exposure time of workers to the higher noise levels.
Blasting	Dust generation	Air pollution	Significant	Controlled blasting with proper burden, spacing, safe charge and adequate stemming shall be done. Non electric (NONEL) initiation system shall be used.
	Gaseous emission	Air pollution NOx / CO	Insignificant	Emulsion/slurry explosive/ ammonium nitrate fuel oil mixture (ammonium nitrate: fuel oil = 94:6 by weight) will be used.
	Vibration & Air blast	Damage to nearby structures & buildings	Significant	Safe explosive charge will be decided based on Vibration study
	Fly rock generation	Potential for accidents (damage to equipment etc.)	Significant	Blasting Shelters will be provided Warning Signal will be placed Danger Zone shall be marked with Red Flag
Transportation of mineral	Dust generation	Air pollution	Significant	Water sprinkling will be done on haul road and use of closed conveyor system for mineral transport. Transportation of mineral (Bauxite) within mining lease area will be done by series of conveyors & upto the railway siding by closed conveyor system, which will significantly reduce dust generation.
	Gaseous emission	Air pollution SO2/NOx/CO/HC	Insignificant	Regular maintenance of Dumper / Tippers to keep emissions under control

Activity	Environmental Aspects	Impact	Impact characteristics	
			Significance	Mitigative measures
Transportation of waste to Waste Dump	Dust generation	Air pollution	Significant	Water sprinkling will be done on haul road, greenbelt development within lease area. The small quantity of excavated waste would be transported to dump through dumpers, with water sprinkling arrangements and plantation, dust generation would be reduced significantly.
	Gaseous emission	Air pollution SO_2/NOx/HC	Insignificant	Regular maintenance of Dumper / Tippers to keep emissions under control.
Grading of Haul Road	Dust generation	Air pollution SPM/RPM	Insignificant	Operators are in closed cabins of Grader. Dust mask shall be provided
	Gaseous emission	Air pollution SO2/NOx/CO	Insignificant	Proper maintenance of Grader shall be done to keep emissions low.
	Noise generation	Noise pollution	Insignificant	Insignificant. No action needed. PPE shall be provided
Operation of Crusher				
Operation of Crusher	Generation of dust	Air Pollution,	Significant	Use of dust mask by crusher operator. Development of greenbelt. Sprinkling of water
	Generation of Noise	Noise Pollution	Significant	Use of ear muff near crusher Proper maintenance of crusher
DG Set				
DG Set	Flue gas emission, used oil generation	Air Pollution	Insignificant	The DG will be operated in case of power failure only. Green DG sets shall be installed

Activity	Environmental Aspects	Impact	Impact characteristics	
			Significance	Mitigative measures
	Generation of noise during DG Set operation	Noise Pollution	Significant	The DG Sets will have acoustic enclosure to minimize the noise.
Domestic Use				
Operation of domestic utilities	Washroom, toilets – Wastewater generation	Water Pollution	Significant	The sewage will be treated in septic tank.
Greenbelt Development				
Development and maintenance of Green Belt	Plantation of trees within premises. to cover 33% of the area	Reduction in Air Pollution and Noise Pollution	Insignificant	Positive Impact due to development of a proper green belt along the periphery of the premises. This will act as barrier for air emission and noise Mine area will be afforested after the end of mine life.
Socio-economic Development				
Employment Generation	Operation of mine	Socio-economic		Positive Impact due to direct employment of persons from the nearby area
				Substantial benefits in the form of contracts to local agencies for different services.
				Employment generation in transport sector for transportation of material.

11.5 ANALYSIS OF ALTERNATIVES

All the option for technology alternatives of the proposed project have been analysed. since it is a mineral specific project therefor analysis of alternative site is not applicable.

11.6 ENVIRONMENTAL MONITORING PROGRAM

In order to maintain the environmental quality within the stipulated standards, regular monitoring of various environmental components is necessary which will comply as per conditions. For this the lessee has taken the decision to formulate an Environment Policy of the mine and constitute an Environmental Management Cell and committed to operate the mine with the objectives mentioned in Environment Policy. EMP may also require measurement of ambient environmental quality in the vicinity of a site using ecological/biological, physical and chemical indicators. Monitoring may include socioeconomic interaction, through local liaison activities or even assessment of complaints. Regular Monitoring of all the environmental parameters *viz.*, air, water, noise, SE, EB and soil, as per the formulated program based on CPCB and MoEF&CC guidelines will be carried out every year. The location of the monitoring stations will be selected on the basis of prevailing micro meteorological conditions of the area like; wind direction and wind speed, relative humidity, temperature.

11.7 ADDITOINAL STUDIES

As per Ministry's OM dated 30.09.2020, the Ministry has decided to deliberate on the and commitments made by the project proponent to address the issues raised in the Public Hearing held on 06.03.2025. Total budget for implementation of the activities is Rs. 532.50 Lakhs.

11.8 PROJECT BENEFIT

Project will generate employment for about 126 persons directly. In addition, more than 100-150 people will be benefited indirectly. Management will engaged the Skilled, semi-skilled and unskilled workers from the nearby villages. The company management will contribute to the Educational Development, Infrastructure Development etc. for the welfare of the villagers. It has proposed to plant 8440 no. of trees till the plan period. The respective regulatory authority will strictly monitor the compliance of the mine lease in this regard. Other than this social development of the village will be considered as per social requirement of locality.

11.9 ENVIRONMENTAL MANAGEMENT PLAN

As per Above discussion there is no major impact on the environment due to mining except fugitive emission in the form of dust generated during mining and its allied activity. The adequate preventive measures will be adopted to contain the various pollutants within permissible limits. Plantation program will be carried out which will

be an effective pollution mitigate technique, and help avoid soil erosion during monsoon season. Employment opportunities will be provided to the locals. A budget of Rs. 220 Lakhs as a capital cost and Rs 60 lakhs per year for recurring cost for plan period has been kept for EMP.

11.10 CONCLUSION

The proposed project will have minimal impacts on surrounding environment due to manual mining operation as detailed in the report, however the impacts can be minimized by effective implementation of Environment Management Plan and continula monitoring of EMP to overcome any other remedial measures required as suggested in the EIA study. On the other hand, this project is likely to have several benefits like improvement in direct and indirect employment generation and economic growth of the area, by way of improved infrastructure facilities and better socio-economic conditions. Ultimately it gives financial and social benefits for the local people there by improving their standard of living.

12. DISCLOSURE OF CONSULTANT

12.1 INTRODUCTION

Vardan EnviroNet LLP (formally known as Vardan EnviroNet) is a pioneer consulting organisation of India specializing in Environmental Protection, Industrial Pollution Control, Environmental & Mechanical testing and engineering field. Vardan assists clients in comprehensive environmental and engineering services ranging from conceptual planning and preliminary investigation to detailed engineering designs. Local knowledge coupled with national and international experience of proven technical know-how and a strong commitment from our team of experts enables Vardan to assist in solving the clients environmental and engineering problems successfully with competence by first analysing then visualizing and finally utilizing technically strong and dedicated skill.

Vardan has successfully completed a wide range of multi-disciplinary assignments/reports. The company's project formulation requires preliminary and detailed project investigation. The objective of the investigation is to assess the technical viability and cost effectiveness of the proposals vis-à-vis the objective and benefit. Vardan was founded in 2012 and brought together a number of consultancy services with a track record of performance in the environmental Science and Engineering field.

Headquartered in Gurugram, Vardan has prominent presence in Delhi-NCR, Rajasthan, Maharashtra, Madhya Pradesh, West Bengal and Jharkhand. With a man-power of over more than 200 professionals, the organization comprises of senior retired government officers from various departments like Pollution Control Board, Mines & Geology, Civil Services, SAIL, GAIL, NEERI who have decades of experience in the field of environmental management. The team also Comprises of young, dynamic and progress driven Environment, Civil, Mechanical & Chemical engineers, Geologists, GIS experts, Ecologists and Auditors.

Vardan EnviroLab LLP (formally known as Vardan Envirolab), a sister concern provides reliable and precise testing services for a wide range of Environmental, Chemical, Food testing, Microbiology and Building Materials with in-house Equipment/Instruments of advance technology along with experienced technical staff.

12.2 SERVICES OF VARDAN ENVIRONET LLP

- Environmental Impact Assessment (EIA), Environmental Management Plan (EMP), Environmental Compliance, Mining Plan, Social Impact Assessment,

- Testing of water, Waste water, Ambient & work zone air, stack emissions, noise, soil, limestone, dolomite, iron ore, coal, cement, bricks, concrete, blocks, steel bars & wires, Indoor Air Quality monitoring, Sludge.
- Hydrological surveys for ground water clearance.
- Approvals/NOC/Clearances from various Government Authorities.
- Detailed Project report/Feasibility report/Plans/Designs.
- Environmental Quality Monitoring and analysis.
- Geotechnical investigations, Topographical Survey, Planning and Designs.
- EHS, Energy and water Audit, risk/hazard studies and disaster management plan (both onsite and off-site)
- Exploration of Minerals and Preparations of Geological Reports.

12.3 RECOGNITIONS

- Vardan EnviroNet LLP (formally known as Vardan Environet), is approved by NABET in 21 sectors for preparation of EIA/EMP reports.
- Vardan EnviroNet LLP (formally known as Vardan Environet), is Accredited by QCI-NABET for Exploration Agency in Mineral Sector.
- Vardan EnviroNet LLP (formally known as Vardan Environet), is Notified Private Exploration Agency (NPEA) by the Ministry of Mines, Govt. of India.
- Vardan EnviroLab LLP is recognized by Ministry of Environment, Forest & Climate Change, Govt. of India under Environmental Protection Act 1986.
- Vardan EnviroLab LLP (formally known as Vardan Envirolab) is accredited by NABL in the field of Testing.
- Vardan EnviroLab LLP (formally known as Vardan Envirolab) is certified by OHSAS 18001:2007.
- Vardan EnviroLab LLP (formally known as Vardan Envirolab) is certified by ISO 14001:2015.
- Vardan EnviroLab LLP (formally known as Vardan Envirolab) is certified by ISO 9001:2015.
- Vardan EnviroLab LLP (formally known as Vardan Envirolab) is approved by HSPCB & RSPCB.

12.4 LIST OF SOFTWARE MODELS FOR ENVIRONMENTAL STUDIES

- Multisource Dispersion Model based on Gaussian Model (ISCST3, AERMOD)
- Noise Propagation Model (Dhawani Pro)
- Risk and Hazard studies through Aloha model
- GIS mapping through Arc GIS, watershed & area drainage mapping, cadastral mapping, DGPS survey, 3D modelling, Urban/Rural area planning & management and Digital Elevation Model.
- Transect and line intercepts for Ecology and Biodiversity studies

- Extrapolative method & Intuitive technique (Delphi technique) in socio-economic assessment.

12.5 KEY MANAGEMENT PERSONNEL OF VARDAN

Table 12.1: Key Management Personnel of Vardan

S. No.	Name	Designation	Experience (Years)
1.	R.S. Yadav	Managing Director	35
2.	Roopika Sharma	CEO	14
3.	Aman Sharma	President	16
4.	Anshul Yadav	General Manager	12
5.	K.M. Khare	EIA Coordinator	40

12.6 EMINENT CLIENTELE OF VARDAN

Vardan has executed around 1500 projects across all over India in a short span of time covering both public and private sectors. Following are some of our reputed clients.

Indian Oil, HPCL, NTPC, NHPC, BPCL, Delhi Metro, GAIL, GPIL, SAIL, NHAI, APCPL, RITES, MPPGCL, Indian Railways, JK Lakshmi Cement Ltd., L&T, Tata, Adani, Hero, Honda, HCL, Panasonic, Jaypee group, DLF, Godrej, Haldiram's, Unitech, JBM, Trident hotels, Lanco, Aditya Birla, Mangalam cement, JW Marriot, Eros group and many others.

12.7 CERTIFICATIONS OF VARDAN

QUALITY COUNCIL OF INDIA

National Accreditation Board for Education and Training

Certificate of Accreditation

Vardan Environet LLP (*formerly Vardan Environet*), Gurugram

Plot No. 82-A, Sector 5, IMT Manesar, Gurugram, Haryana-122051

*The organization is accredited as **Category-A** under the QCI-NABET Scheme for Accreditation of EIA Consultant Organization, Version 3: for preparing EIA-EMP reports in the following Sectors –*

S. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1	Mining of minerals including opencast/ underground mining	1	1 (a) (i)	A
2	Offshore & Onshore Oil and gas exploration, development & production	2	1 (b)	B
3	River Valley projects	3	1 (c)	A
4	Thermal power plants	4	1 (d)	B
5	Coal washeries	6	2 (a)	A
6	Mineral beneficiation	7	2 (b)	A
7	Metallurgical industries (ferrous & non-ferrous)	8	3 (a)	A
8	Cement Plants	9	3 (b)	A
9	Coke oven plants	11	4 (b)	A
10	Chemical fertilizers	15	5 (a)	A
11	Petro-chemical complexes	18	5 (c)	A
12	Synthetic organic chemicals industry	21	5 (f)	A
13	Distilleries	22	5 (g)	A
14	Sugar Industry	25	5 (j)	B
15	Oil & gas transportation pipeline, passing through national parks/ sanctuaries/coral reefs /ecologically sensitive Areas including LNG terminal	27	6 (a)	A
16	Isolated storage & handling of hazardous chemicals	28	-	B
17	Airports	29	7 (a)	A
18	Industrial estates/ parks/ complexes/ Areas, export processing zones (EPZs), Special economic zones (SEZs), Biotech parks, Leather complexes	31	7 (c)	A
19	Highways	34	7 (f)	A
20	Building and construction projects	38	8 (a)	B
21	Townships and Area development projects	39	8 (b)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated April 21, 2023 and Supplementary Assessment minutes dated November 17, 2023 posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no. QCI/NABET/ENV/ACO/23/2752 dated May 01, 2023. The accreditation needs to be renewed before the expiry date by Vardan Environet LLP (formerly Vardan Environet), Gurugram following due process of assessment.

Sr. Director, NABET
Dated: July 05, 2024

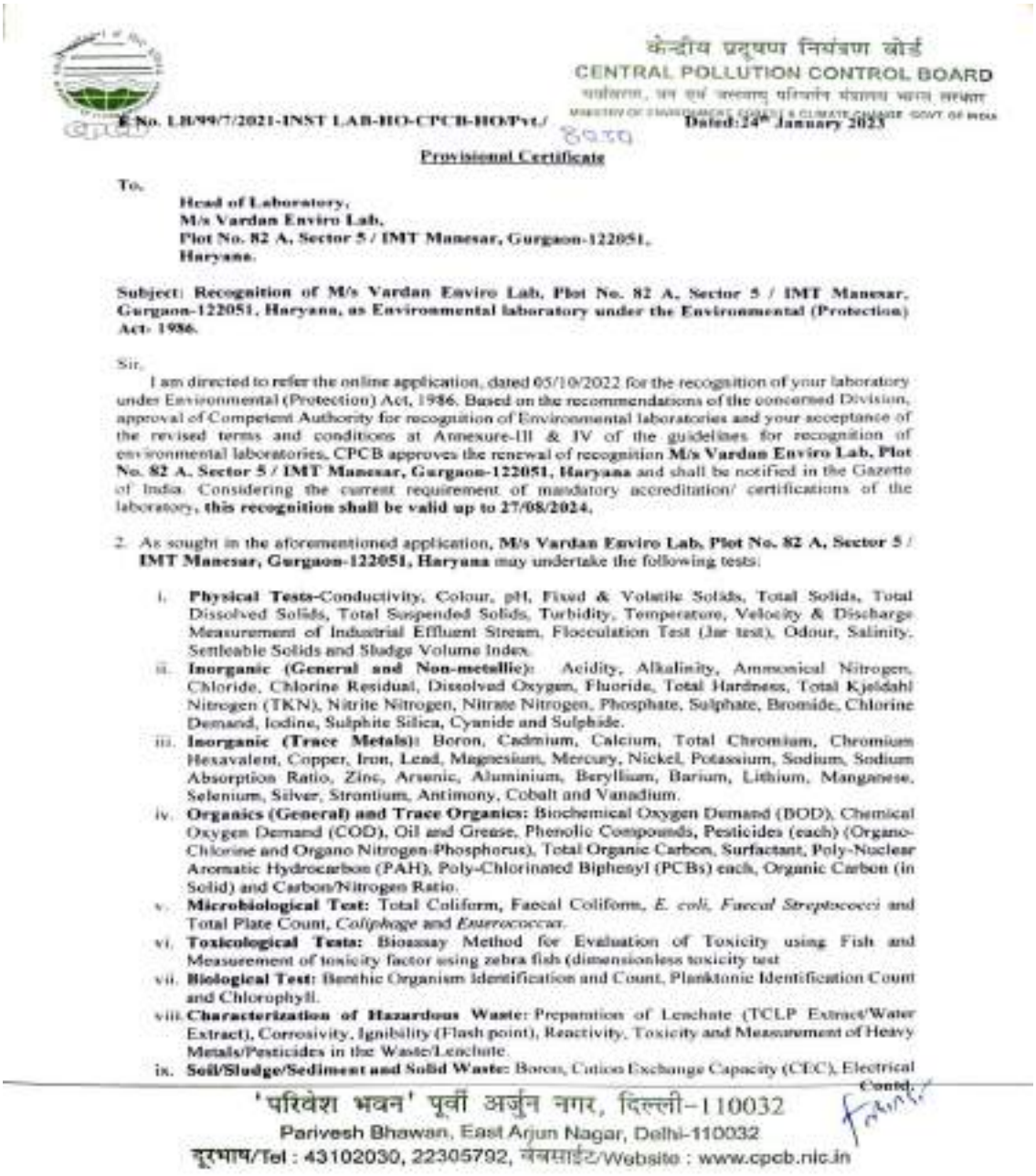
Certificate No.
NABET/EIA/2326/RA 0284_Rev.01

Valid up to
May 04, 2026

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.

12.8 ENVIRONMENTAL MONITORING AND ANALYSIS LABORATORY

Environmental Baseline data generation has been carried out by NABL Accredited laboratory Vardan Envirolab LLP, Sector-5, IMT Manesar, Gurgoan, Haryana. The laboratory has also been accorded recognition as Environment Laboratory by CPCB (MoEF&CC). NABL Accreditation Certificate of Vardan Envirolab is given below.



केन्द्रीय प्रदूषण नियंत्रण बोर्ड
CENTRAL POLLUTION CONTROL BOARD

E.No. LB/99/7/2021-INST LAB-HO-CPCB-HOPvt./ Dated:24th January 2023

Provisional Certificate

To,

Head of Laboratory,
M/s Vardan Enviro Lab,
Plot No. 82 A, Sector 5 / IMT Manesar, Gurgaon-122051,
Haryana.

Subject: Recognition of M/s Vardan Enviro Lab, Plot No. 82 A, Sector 5 / IMT Manesar, Gurgaon-122051, Haryana, as Environmental laboratory under the Environmental (Protection) Act- 1986.

Sir,

I am directed to refer the online application, dated 05/10/2022 for the recognition of your laboratory under Environmental (Protection) Act, 1986. Based on the recommendations of the concerned Division, approval of Competent Authority for recognition of Environmental laboratories and your acceptance of the revised terms and conditions at Annexure-III & IV of the guidelines for recognition of environmental laboratories, CPCB approves the renewal of recognition **M/s Vardan Enviro Lab, Plot No. 82 A, Sector 5 / IMT Manesar, Gurgaon-122051, Haryana** and shall be notified in the Gazette of India. Considering the current requirement of mandatory accreditation/ certifications of the laboratory, **this recognition shall be valid up to 27/08/2024.**

2. As sought in the aforementioned application, **M/s Vardan Enviro Lab, Plot No. 82 A, Sector 5 / IMT Manesar, Gurgaon-122051, Haryana** may undertake the following tests:

i. **Physical Tests-**Conductivity, Colour, pH, Fixed & Volatile Solids, Total Solids, Total Dissolved Solids, Total Suspended Solids, Turbidity, Temperature, Velocity & Discharge Measurement of Industrial Effluent Stream, Flocculation Test (Jar test), Odour, Salinity, Settleable Solids and Sludge Volume Index.
ii. **Inorganic (General and Non-metallic):** Acidity, Alkalinity, Ammonical Nitrogen, Chloride, Chlorine Residual, Dissolved Oxygen, Fluoride, Total Hardness, Total Kjeldahl Nitrogen (TKN), Nitrite Nitrogen, Nitrate Nitrogen, Phosphate, Sulphate, Bromide, Chlorine Demand, Iodine, Sulphite Silica, Cyanide and Sulphide.
iii. **Inorganic (Trace Metals):** Boron, Cadmium, Calcium, Total Chromium, Chromium Hexavalent, Copper, Iron, Lead, Magnesium, Mercury, Nickel, Potassium, Sodium, Sodium Absorption Ratio, Zinc, Arsenic, Aluminium, Beryllium, Barium, Lithium, Manganese, Selenium, Silver, Strontium, Antimony, Cobalt and Vanadium.
iv. **Organics (General) and Trace Organics:** Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Oil and Grease, Phenolic Compounds, Pesticides (each) (Organo-Chlorine and Organo Nitrogen-Phosphorus), Total Organic Carbon, Surfactant, Poly-Nuclear Aromatic Hydrocarbon (PAH), Poly-Chlorinated Biphenyl (PCBs) each, Organic Carbon (in Solid) and Carbon/Nitrogen Ratio.
v. **Microbiological Test:** Total Coliform, Faecal Coliform, *E. coli, Faecal Streptococci* and Total Plate Count, *Coliphage* and *Enterococcus*.
vi. **Toxicological Tests:** Bioassay Method for Evaluation of Toxicity using Fish and Measurement of toxicity factor using zebra fish (dimensionless toxicity test
vii. **Biological Test:** Benthic Organism Identification and Count, Planktonic Identification Count and Chlorophyll.
viii. **Characterization of Hazardous Waste:** Preparation of Leachate (TCLP Extract/Water Extract), Corrosivity, Ignibility (Flash point), Reactivity, Toxicity and Measurement of Heavy Metals/Pesticides in the Waste/Leachate.
ix. **Soil/Sludge/Sediment and Solid Waste:** Boron, Cation Exchange Capacity (CEC), Electrical

Contd.

'परिवेश भवन' पूर्वी अर्जुन नगर, दिल्ली-110032
Parivesh Bhawan, East Arjun Nagar, Delhi-110032
दूरभाष/Tel : 43102030, 22305792, वेबसाईट/Website : www.cpcb.nic.in

g) **Biological Test:** Benthic Organism Identification and Count, Planktonic Identification Count and Chlorophyll.

h) **Characterization of Hazardous Waste:** Preparation of Leachate (TCLP Extract/Water Extract), Corrosivity, Ignibility (Flash Point), Toxicity and Measurement of Heavy Metals/Pesticides in the Waste/Leachate.

i) **Soil/Sludge/Sediment and Solid Waste:** Boron, Cation Exchange Capacity (CEC), Electrical Conductivity, Nitrogen (Available), Organic Carbon/Matter (Chemical Method), pH, Phosphorous (Available), Phosphate (Ortho), Phosphate (Total), Potassium, SAR in Soil Extract, Sodium, Soil Moisture, TKN, Calorific Value, Ammonia, Calcium, Calcium Carbonate, Chloride, Colour, Exchangeable Sodium Percentage(ESP), Heavy Metal, Magnesium, Nitrate, Nitrite, Sulphate and Water Holding Capacity.

j) **Ambient Air/ Fugitive Emissions:** Nitrogen Dioxide (NO_2), Sulphur Dioxide (SO_2), Total Suspended Particulate Matter, Respirable Suspended Particulate Matter (PM_{10}), Ammonia, Carbon monoxide, Chlorine, Fluoride, Lead, Ozone, Benzene Toluene Xylene (BTX), Polycyclic Aromatic Hydrocarbon (PAH) Benzo-α-Pyrine & others and $PM_{2.5}$.

k) **Stack Gases/ Source Emission:** Particulate Matter, Sulphur Dioxide, Velocity & Flow, Carbon Dioxide, Carbon Monoxide, Temperature, Oxygen, Oxides of Nitrogen, Acid Mist, Ammonia, Chlorine, Fluoride(Gaseous), Total Hydrocarbon and Hydrogen Sulphide.

l) **Noise Level:** Noise level measurement (20 to 140 dba) and Ambient Noise & Source Specific Noise.

m) **Meteorological:** Ambient Temperature, Wind Direction, Wind Speed, Relative Humidity, Solar Radiation and Rain Fall.

4. The laboratory shall compulsorily participate in the Analytical Quality Control (AQC) Exercise conducted by the CPCB to ascertain the capability of the laboratory and analysts. The lab shall submit quarterly progress report on the sample analysis carried out to CPCB.

5. The surprise inspection / periodic surveillance of the recognized environment laboratory will be undertaken to assess its proper functioning systematic operation and reliability of data generated at the laboratory by a Joint Team as per the Notification.

6. The laboratory should have the mandatory requisite accreditation and certificate of the ISO: 17025 and ISO:45001 as per rules. This recognition is subject to such accreditations and renewals as applicable and in case of serious non-compliance of any of the terms and conditions, the laboratory may be black listed for a minimum period of two years and civil/criminal proceedings, as applicable, may be initiated for performing functions on behalf of the Government in an unauthorized manner.

7. **M/s Vardan Enviro Lab LLP, Gurgaon, Haryana** is required to apply for further renewal of recognition through online using CPCB web portal (https://cpcbepalab.in/epalab) before expiry of recognition with mandatory accreditation / certification concerned.

Yours faithfully,

30/9/24

(Dr. K. Ranganathan)
Scientist-E & Divisional Head
Instrumentation laboratory

डॉ. के. रंगनाथन / Dr. K. RanganaDan
वैज्ञानिक 'ई' / Scientist 'E'
प्रभारी प्रभाग एवं प्रयोगशाला प्रशिक्षण
Dy. Head-Water & Instrumentation Laboratory
केन्द्रीय प्रदूषण नियंत्रण बोर्ड
Central Pollution Control Board
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार
MoEF&CC, Govt. of India
पर्यावरण भवन, पूर्वी अर्जुन नगर, दिल्ली-110032
Paryavaran Bhawan, East Arjun Nagar, Delhi-110032

National Accreditation Board for Testing and Calibration Laboratories

NABL

CERTIFICATE OF ACCREDITATION

VARDAN ENVIROLAB LLP

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2017

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

Plot No. 82A, Sector 5, IMT Manesar, Gurgaon, Haryana

in the field of

TESTING

Certificate Number	TC-6299		
Issue Date	28/08/2024	Valid Until	27/08/2026

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.
(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)

Name of Legal Entity : Vardan Envirolab LLP

Signed for and on behalf of NABL

N. Venkateswaran
Chief Executive Officer

Certificate of Registration

UK GLOBAL

This is to certify that the
Quality Management System of

VARDAN ENVIROLAB LLP

PLOT NO 82A, SECTOR-5, IMT MANESAR, GURUGRAM-122051, HARYANA, INDIA

has been independently assessed and is
compliant with the requirements of :

ISO 9001:2015

For the following scope of activities:

PROVIDING OF TESTING FOR ENVIRONMENTAL PARAMETERS, FOOD & AGRICULTURAL PRODUCTS, DRUGS & PHARMACEUTICALS, AYUSH PRODUCTS, ANIMAL AND FEED, NUTRACEUTICAL AND FUNCTIONAL FOOD, COSMETICS, MEDICAL DEVICES, MICROBIOLOGICAL & LEATHER FOOTWEAR PRODUCTS

This certificate is issued under the following conditions:
1. Fulfilled are requirement as per implemented of suggested standards
2. The certificate remains valid until the manufacturing / supplying conditions are changed.
3. The certificate validity is conditioned by positive results or surveillance audits.
4. After fulfilling the relevant Standard testing performance,

the supplier service shall affix to each device, of the referenced models.

The compliance as shown above can be used, under the responsibility of the manufacturer / supplier, after completion of a Declaration of conformity and compliance with all relevant Standard requirements. The statement is based on a single evaluation of one sample of above-mentioned product service. It does not imply an assessment of the whole production service.

Certificate Number: **UQ-3295**

Validity of this certificate can be verified at www.ukglobal.uk

Initial registration date : 22/02/2024 Issue date : 22/02/2024

1st surveillance on or before : 21/02/2025

2nd surveillance on or before : 21/02/2026 Valid until : 21/02/2027

Authorised Signatory
(UKGlobal Certification & Inspection Limited)

This certificate is the property of UKGlobal Certification & Inspection Limited and shall be returned immediately on request.
71-75 Shelton Street Covent Garden London United Kingdom WC2H9JQ
Website : www.ukglobal.uk, enquiries@ukglobal.uk
Company No.118478

Uk Global Certification & Inspection Limited

Certificate of Compliance

UK GLOBAL

This is to certify that the
Environmental Management System of

VARDAN ENVIROLAB LLP

PLOT NO 82A, SECTOR-5, IMT MANESAR, GURUGRAM-122051, HARYANA, INDIA

has been independently assessed and is
compliant with the requirements of :

ISO 14001:2015

For the following scope of activities:

PROVIDING OF TESTING FOR ENVIRONMENTAL PARAMETERS, FOOD & AGRICULTURAL PRODUCTS, DRUGS & PHARMACEUTICALS, AYUSH PRODUCTS, ANIMAL AND FEED, NUTRACEUTICAL AND FUNCTIONAL FOOD, COSMETICS, MEDICAL DEVICES, MICROBIOLOGICAL & LEATHER FOOTWEAR PRODUCTS

This certificate is issued under the following conditions:

1. Fulfilled are requirement as per implemented of suggested standards
2. The certificate remains valid until the manufacturing conditions are changed.
3. The certificate validity is conditioned by positive results or surveillance audits.
4. After fulfilling the relevant Standard testing performance,
the manufacturer shall affix to each device, of the referenced models.

The compliance as shown above can be used, under the responsibility of the manufacturer, after completion of a Declaration of conformity and compliance with all relevant Standard requirements. The statement is based on a single evaluation of one sample of above-mentioned product. It does not imply an assessment of the whole production.

Certificate Number: **UQ-3294**

Validity of this certificate can be verified at www.ukglobal.uk

Initial registration date : 22/02/2024 Issue date : 22/02/2024

1st surveillance on or before : 21/02/2025

2nd surveillance on or before : 21/02/2026 Valid until : 21/02/2027

Authorised Signatory
(UKGlobal Certification & Inspection Limited)

This certificate is the property of UKGlobal Certification & Inspection Limited and shall be returned immediately on request.
71-75 Shelton Street Covent Garden London United Kingdom WC2H9JQ
Website : www. ukglobal.uk, enquiries@ukglobal.uk
Company No.118478

Uk Global Certification & Inspection Limited

Certificate of Registration

UK GLOBAL

This is to certify that the
Occupational Health and Safety Management System of

VARDAN ENVIROLAB LLP

PLOT NO 82A, SECTOR-5, IMT MANESAR, GURUGRAM-122051, HARYANA, INDIA

has been independently assessed and is
compliant with the requirements of :

ISO 45001:2018

For the following scope of activities:

PROVIDING OF TESTING FOR ENVIRONMENTAL PARAMETERS, FOOD & AGRICULTURAL PRODUCTS, DRUGS & PHARMACEUTICALS, AYUSH PRODUCTS, ANIMAL AND FEED, NUTRACEUTICAL AND FUNCTIONAL FOOD, COSMETICS, MEDICAL DEVICES, MICROBIOLOGICAL & LEATHER FOOTWEAR PRODUCTS

This certificate is issued under the following conditions:
1. Fulfilled are requirement as per implemented of suggested standards
2. The certificate remains valid until the manufacturing conditions are changed.
3. The certificate validity is conditioned by positive results or surveillance audits.
4. After fulfilling the relevant Standard testing performance,
the manufacturer shall affix to each device, of the referenced models.

The compliance as shown above can be used, under the responsibility of the manufacturer, after completion of a Declaration of conformity and compliance with all relevant Standard requirements. The statement is based on a single evaluation of one sample of above-mentioned product. It does not imply an assessment of the whole production.

Certificate Number: **UQ-3298**

Validity of this certificate can be verified at www.ukglobal.uk

Initial registration date : 22/02/2024 Issue date : 22/02/2024

1st surveillance on or before : 21/02/2025

2nd surveillance on or before : 21/02/2026 Valid until : 21/02/2027

Authorised Signatory
(UKGlobal Certification & Inspection Limited)

This certificate is the property of UKGlobal Certification & Inspection Limited and shall be returned immediately on request.
71-75 Shelton Street Covent Garden London United Kingdom WC2H9JQ
Website : www. ukglobal.uk, enquiries@ukglobal.uk
Company No.118478

Uk Global Certification & Inspection Limited

ANNEXURES

Annexure – I

Regd. Post with A/D

GOVERNMENT OF ODISHA
STEEL & MINES DEPARTMENT
****

No. 2143 /S&M, Bhubaneswar, dated the 01.03.2023
SM-MC2-MC-0007-2023

From
Sri S.K Swain,
Special Secretary to Government.

To
Mundra Aluminium Limited,
10th Floor (East Wing), Adani Corporate House,
Shantigram Near Vaishno Devi Circle,
S. G. Highway, Khodiyar,
Ahmedabad-382421
Email – k.anilkumar@adani.com

Sub: Letter of intent with reference to e-auction dated 15.02.2023 for grant of mining lease for Ballada Bauxite Block for Bauxite in Ballada village of Nandapur Tahasil of Koraput District over 144.945 Hectare Area.

1. Background:

1.1 Government of Odisha, pursuant to the Mines and Minerals (Development and Regulation) Act, 1957 (the "**Act**") and the Mineral (Auction) Rules, 2015 as amended from time to time (the "**Auction Rules**"), issued the Notice Inviting Tender (NIT) dated 23.11.2022 to commence the auction process for grant of mining lease for Ballada Bauxite Block located in Koraput District of Odisha. The e-auction process was conducted in accordance with the tender document for the said mineral block and Mundra Aluminium Limited was declared as the 'Preferred Bidder' under Rule 9(9)(ii) or Rule 10 (1A) of Auction Rules, having quoted a Final Price Offer of 72.25 %.

1.2 As required under Rule 10(1) or Rule 10 (1A) of the Auction Rules and the tender document for the said mineral block, Mundra Aluminium Limited has made payment of the first instalment of Rs.6,68,41,122/-(Rupees Six Crore Sixty Eight Lakh Forty One Thousand One Hundred Twenty Two) being 20% (twenty percent) of the upfront payment through e-challan Reference Id-359A9C0976 dtd.27.02.2023 at Koraput, Odisha.

2. Grant of Letter of Intent

Accordingly, pursuant to Rule 10(2) of the Auction Rules and the terms of the Tender Document, the Government of Odisha is pleased to issue this letter of intent for grant of Mining Lease for Ballada Bauxite Block for Bauxite in Ballada village of Nandapur Tahasil of Koraput District over 144.945 Hectare Area to Mundra Aluminium Limited for a period of 50 (fifty) years.

3. Conditions

3.1 This letter of intent and the subsequent grant of aforementioned mining lease shall be subject to the provisions of the Act and the Rules made thereunder, as amended from time to time, and Mundra Aluminium Limited shall be designated as the 'successful bidder' and subsequently granted the mining lease only upon satisfactory completion of all the requirements under the Acts and Rules made thereunder.

The State Government may impose such other conditions in the Mine Development and Production Agreement (MDPA) and/or Mining Lease as may be considered by the State Government to be in the interest of mineral development and in public interest.

Mundra Aluminium Limited shall be bound by (i) the enactment, bringing into effect, adoption, promulgation, amendment, modification or repeal of any Applicable Laws (including the Act and Rules) occurring at any time, including prior to or after the Bid Due Date; (ii) any amendments made by the State Government to this effect in the Tender Document, the letter of intent, the MDPA and/or the mining lease deed at any time, including prior to or after the Bid Due Date.

Mundra Aluminium Limited shall ensure that the Bid Security is valid until the Performance Security is furnished to the Government of Odisha.

3.2 For reference, the requirements under the Auction Rules for designation of Mundra Aluminium Limited as the "successful bidder" and subsequent grant of the mining lease are reiterated below. It is clarified that the requirements mentioned below are only for reference and in the event of any change in the Act or the Rules made thereunder, the requirements under the modified Act or the Rules made thereunder, as the case may be, shall be applicable.

a. Designation as the "Successful Bidder":

Mundra Aluminium Limited shall be considered to be the 'successful bidder" upon:

i. continuing to be in compliance with all the terms and conditions of eligibility;

ii. payment of the second instalment being 20% (twenty per cent.) of the upfront payment.

iii. furnishing an irrevocable and unconditional performance security to the State Government from an Acceptable Bank and payable at Bhubaneswar Odisha, pursuant to the Auction Rules; and

v. satisfying the conditions specified in clause (b) of sub-section (2) of Section 5 of the Act with respect to a mining plan.

b. Signing of the Mine Development and Production Agreement

Mundra Aluminium Limited shall sign the Mine Development and Production Agreement with the Government of Odisha upon obtaining all consents, approvals, permits, no-objections and the like as may be required under applicable laws for commencement of mining operations.

c. Grant of mining lease

Subsequent to signing of the Mine Development and Production Agreement, Mundra Aluminium Limited shall make payment of the third instalment being 60% (sixty per cent) of the upfront payment and thereafter the Government of Odisha shall grant the aforementioned mining lease.

4. Validity

4.1 This letter of intent is valid for a period of 3 (Three) years from the date of its issuance, within which time all the above conditions must be fulfilled and the Mining Lease deed must be executed between the Mundra Aluminium Limited and the Government of Odisha. In case there is a delay in execution of Mining Lease Deed due to reasons beyond the control of the Preferred Bidder, then it may submit an application to Government of Odisha, requesting for further extension.

4.2 If the Government of Odisha is satisfied that there is a delay in execution of Mining Lease Deed due to reasons beyond the control of the Preferred Bidder and a longer period is required to enable the Preferred Bidder to satisfy all or any of the above conditions, it may extend the validity of this letter of intent for such period or periods as the Government of Odisha may specify. Provided that, (a) this letter of intent shall be extended for a maximum period of 2 (two) years; and (b) the total period for which this letter of intent would remain valid must not exceed 5 (five) years from the date of issuance.

4.3 The holder of the Letter of Intent shall comply with the terms and conditions of this Letter of Intent, including executing the Mining Lease within the period referred to in Sub-rule 6 of Rule 10 of the Auction Rules, failing which:

(a) this Letter of Intent shall be revoked, and
(b) the Bid Security or the Performance Security, as the case may be, and

any Instalment of Upfront Payment paid, shall be forfeited and appropriated in full by the State Government.

Mundra Aluminium Limited shall furnish acceptance of the terms and conditions of Letter of Intent within 15 (Fifteen) days from the date of issue of this letter.

Yours faithfully,

01.03.2023

Special Secretary to Government

Memo No. 2144 /SM, Bhubaneswar dated the 01.03.2023

Copy forwarded to the Director of Mines & Geology, Odisha, Bhubaneswar/ the Deputy Director of Mines, Koraput for information and necessary action.

01.03.2023

Special Secretary to Government

Memo No. 2145 /SM, Bhubaneswar dated the 01.03.2023

Copy forwarded to the Collector, Koraput for information and necessary action.

01.03.2023

Special Secretary to Government

Annexure – II

STATE ENVIRONMENT IMPACT ASSESSMENT AUTHORITY, ODISHA
5RF-2/1, Unit-IX, Bhubaneswar-751022, Tel: 0674-3510075, Email: seiaaodisha@gmail.com
(A statutory body constituted by Ministry of Environment, Forest & Climate Change under Environment (Protection) Act, 1986)

File No. SIA/OR/MIN/439954/2023

Dated 06th November, 2022
Bhubaneswar

To

Sri Kassireddy Anil Kumar,
Associate Vice-President of
M/s. Kalinga Alumina Limited
(Formerly known as Kalinga Alumina Ltd.)
Address-Shantigram, Ahmedabad
Guhurat-382421

Subject: Proposal of M/s. Kalinga Alumina Limited for grant of Term of Reference (ToR) for mining of Ballada Bauxite Mine for a Peak Rated Capacity of 4.0 MTPA over a Mining lease area of 144.945 Ha at Village -Ballada, Taluka–Nandapur, District-Koraput and applicant is Sri Kassireddy Anil Kumar, Associate Vice-President of M/s. Kalinga Alumina Ltd.- Reg.

The Project Proponent Sri Kassireddy Anil Kumar on behalf of M/s. Kalinga Alumina Limited has submitted an application for ToR to SEIAA, Odisha through the Parivesh portal of MoEF&CC, GOI vide online application no. SIA/OR/MIN/439954/2023 dated 01.09.2023 for grant of Term of Reference (ToR) for mining of Ballada Bauxite Mine for a Peak Rated Capacity of 4.0 MTPA over a Mining lease area of 144.945 Ha at Village -Ballada, Taluka–Nandapur, District- Koraput.

2. Proposal in brief:

Proposal No.	SIA/OR/MIN/439954/2023
Date of Application	01.09.2023
File No.	439954/109-MINB1/09-2023
Project Type	Proposal for ToR
Category	B1
Project/Activity including Schedule No.	1(a) Mining of minerals
Name of the Project	Proposal for ToR of M/s. Kalinga Alumina Limited for Ballada Bauxite Mine for a Peak Rated Capacity of 4.0 Mtpa over a Mining lease area of 144.945 Ha at Village -Ballada, Taluka–Nandapur, District- Koraput of Sri Kassireddy Anil Kumar

STATE ENVIRONMENT IMPACT ASSESSMENT AUTHORITY, ODISHA
SRF-2/1, Unit-IX, Bhubaneswar-751022, Tel: 0674-3510075, Email: seiaaodisha@gmail.com
(A statutory body constituted by Ministry of Environment, Forest & Climate Change under Environment (Protection) Act, 1986)

Name of the company/Organization	Sri Kassireddy Anil Kumar (Associate Vice President) Kalinga Alumina Limited
Location of Project	Village-Ballada, Taluka-Nandapur, District-Koraput
ToR Date	N/A
Name of Consultant	M/s Vardan Environet, Gurugram

3. Project details: The highlights of the project, as ascertained from the application and as revealed from the proceedings/ discussions held during the meetings of SEAC/SEIAA, are given as under:

(i) This is a proposal submitted for grant of Term of Reference (ToR) for mining of Ballada Bauxite Mine for a Peak Rated Capacity of 4.0 MTPA over a Mining lease area of 144.945 Ha at Village -Ballada, Taluka–Nandapur, District- Koraput of Sri Kassireddy Anil Kumar, the applicant.

(ii) The company was declared preferred bidder for this block on 17-02-2023.The letter of Intent has been issued vide letter no. SM-MC2-MC-0007-2023/2143/S&M Bhubaneswar dated 1st March 2023 by Steel and Mines Department, Government of Odisha.

(iii) The project involves open cast mining of Bauxite (ROM) with 4.0 MTPA capacity & setting up of 800 TPH Crusher/screening plant at pit head.

(iv) Mining Plan along with Progressive Mine Closure Plan has been approved by IBM vide letter No. MCDR-MiFL0BXT/5/2023-BBS-IBM_RO-BBS dated 8th August 2023.

(v) Forest application has been submitted vide proposal no. FP/OR/MIN/QRY/442417/2023 dated 1st September 2023. Ballada Block is virgin bauxite block located in Nandapur Tehsil of Koraput district in Odisha, total mining lease area is 144.945 ha, located entirely within Nagasari reserve forest. The project contemplates to develop the mine and surrounding infrastructures for commercial production of bauxite of 4 MTPA peak rated capacity using opencast mining. In addition to ML area 12.267 ha area to be required for evacuation of minerals. Hence forest diversion application has been submitted for 157.212 ha.

(vi) Location and connectivity: Ballada Bauxite Block by opencast mining method with an annual Peak Rated Capacity of ~ 4.0 MTPA of Bauxite (ROM), located at village - Ballada, Tehsil – Nandapur, District – Koraput, Odisha. Ballada Bauxite Block covers an area of about 144.945 ha bounded by latitudes 18°26'05.61588" N to 18°27'13.34448" N and Longitudes 82°39'32.39136" to 82°40'25.36716" E. The lease area is covered under Survey of India toposheet no. E44K11 (65J/11). 144.945 Ha of Mine Lease area is Forest Land (Nagasari RF) under Koraput Forest Division. The mineral bearing plateau is situated about one kilometer west of Ballada village and about 8 km north of Padwa in Koraput district, Odisha. Jeypore, a major town in the

STATE ENVIRONMENT IMPACT ASSESSMENT AUTHORITY, ODISHA
5RF-2/1, Unit-IX, Bhubaneswar-751022, Tel: 0674-3510075, Email: seiaaodisha@gmail.com
(A statutory body constituted by Ministry of Environment, Forest & Climate Change under Environment (Protection) Act, 1986)

Koraput district, is about 82 km NNW of the Ballada deposit and is approachable by major district road No.52. Koraput, the district headquarters is at 60 km north of the deposit and is connected by a metalled road via Similiguda on NH 26. Bheja, the nearest Railway Station is about 5 km due north-east. The nearest airport is at Visakhapatnam, about 140 km SE from the lease area. The Nearest Water body is Jalaput reservoir located at a distance of 3 km South and SW. Nearest reserve forest is Nagasari RF i.e., entire mine lease area of 144.945 Ha. Nearest habitation is Ballada village, about 1 km in East.

(vii) Method of Mining: The deposit lies on surface, and it is proposed to be mined by mechanized opencast method of mining with excavator/ dumper combination. Deep hole drilling/Short hole drilling and blasting is proposed after taking prior permission from DGMS. Further, it is proposed to mine with Ripping-Dozing method and/or deployment of Surface Miner at a later date, based on feasibility.

Table: Proposed list of equipment

S No	Particulars	Make	Capacity	No. of equipment
i)	Diesel hydraulic shovel	Volvo EC480/Komatsu PC 450/TATA Hitachi ZX 670	3.1 cum	4
ii)	Dumper	Bharat Benz 3528	16 m^3	11
iii)	DTH drill	Epiroc-T40	Hole Dia -115 mm	3
iv)	Dozer	BEML D-155	324 p)	1

(viii) Transport: Mined bauxite (R.O.M) shall be transported to the crushing/screening plant through mine haul trucks. Evacuation of crushed bauxite is planned through a combination of road and rail route. There is an existing motorable approach road to the east of the mine which connects MDR-52 (Visakhapatnam-Jeypore Road). Bauxite shall be transported through 30 tonner dump trucks via the aforestated road to the nearest "Bheja Railway Station" from where it will be loaded on railway wagons using front end loaders and subsequently despatched to destination. Empty trucks shall return to mine for repeat loading. OB within the lease will be transported through rear-dump trucks to the dump area within the lease.

(ix) Waste generation and management: The waste generated in course of pre-mining development and subsequent mining operation will consist of topsoil and laterite with occasional occurrences of khondalite. During the first five years the rate of generation of waste is expected to be of the order of 0.073 Mm^3 or 0.15 MT of along with generation of 0.026 Mm^3 of Topsoil. Considering this, an average ore to waste ration of 1:0.018 is estimated. It is planned to stack topsoil and waste separately on ground during the initial 4 years of plan period. From 5th year

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onwards, waste material will be dumped systematically. Topsoil, stacked separately, would be spread over the reclaimed areas, to enable planting and growing of trees. The waste stacked on ground during the initial years of operation will be utilized to fill the worked-out areas at the end of the working life of the mine as well as during the interim period, as and when practicable. The generation of waste during the 5 year plan period will be very less and shall be dumped systematically. No backfilling is proposed during the initial 5 year period.

Table: Proposed production plan during first five-year period

Year	Top Soil Volume (m^3)	Over Burden/Waste Volume (m^3)	ROM Quantity (t)
Year 1	24072	0	1000120
Year 2	1710	24783	2024020
Year 3	0	44671	2001482
Year 4	0	3800	2002414
Year 5	0	0	4001868

(x) Water requirement and wastewater management: The water requirement of the project during operation phase is 690 KLD. Water will be sourced from nearby Jalaput lake located at distance of 3 km. Wastewater generated from workshop will be treated using oil-water separator and treated water will be used in vehicle washing. Wastewater generated from mine office, rest shelters etc. will be disposed in soak pit via septic tank.

(xi) Power requirement: The estimated average power requirement is 1 MW, the peak requirement being 1.5 MW. Power shall be sourced from nearest substation located at a distance of 8 km at Padwa. Renewable energy source proposed to install is around 160 KW, which will be about 10 % contribution for the total power requirement.

(xii) Greenbelt: The greenbelt is proposed as per the following table.

Sr. No	Year	Area Proposed to be Covered (Ha)	Number of Plants Proposed	Expected Survival Rate (%)	Estimated Expenditure (INR)
1	Year 1	0.72	1440	75	2,01,600
2	Year 2	0.86	1720	75	2,40,800
3	Year 3	1.16	2320	75	3,24,800
4	Year 4	0.68	1360	75	1,90,400
5	Year 5	0.80	1600	75	2,24,000
Total		4.22	8440		11,81,600

(xiii) Manpower requirement: Project will generate employment for about 126 persons directly, besides its potential to generate considerable indirect employment and livelihood opportunities.

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(xiv) Project cost: Total cost of the project is about Rs. 230 Crores which includes cost of Infrastructures, Land Acquisition and other development costs.

(xv) Environment Consultant: The Environment consultant M/s Vardan Environet, Gurugram along with the proponent made a presentation on the proposal before the Committee.

4. This proposal conforms to the item no. 1(a) in the schedule of EIA Notification, 2006 as amended time to time, and the proposed project falls under category "B1" of Item of Schedule to the EIA Notification, 2006 or activity 1 (a): Mining of Mineral.

5. Whether SEAC recommended the proposal – Yes, the proposal was placed in SEAC meeting held on 22.09.2023 and after detailed discussion, the SEAC recommended the proposal for issues of both standard and below mentioned specific ToR.

6. The matter was examined in the State Environment Impact Assessment Authority (SEIAA), Odisha in its 141st meeting held on 01.11.2023 & 02.11.2023 in in accordance with the EIA Notification, 2006 and further amendments thereto.

7. **The Terms of Reference (ToR) is granted under the provisions of EIA Notification No. S.O. 1533 (E) dated the 14th September, 2006 of the Government of India in the erstwhile Ministry of Environment and Forests, as amended from time to time for mining of Ballada Bauxite Mine for a Peak Rated Capacity of 4.0 MTPA over a Mining lease area of 144.945 Ha at Village -Ballada, Taluka–Nandapur, District- Koraput and applicant is Sri Kassireddy Anil Kumar, Associate Vice-President of M/s. Kalinga Alumina Ltd. for EIA studies with the specific conditions mentioned below along with Public Hearing and standard conditions (attached in annexure-I).**

Specific Conditions

i) The following information to be submitted.
   a) Compliance of mining plan, including waste and OB dump management, mine closure plan etc.
   b) Compliance to Common cause judgment
   c) Status of R&R
   d) Compliance of plantation
   e) Compliance of public hearing issues
   f) Status of complaints/ court cases/legal action
   g) Any other relevant environmental issue / parameter.
   h) The following studies be undertaken by domain experts, viz:
      - Blast vibration study
      - Socio economic study of the neighbouring habitation
      - Biodiversity study with audit mechanism.
      - Slope stability study for both mines and OB /waste dumps.

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- Surface runoff management along with rainwater harvesting and ground water recharge include the design of drainage structures.
- Traffic density study, both inside the mines and at haulage roads, intersecting points of haulage road with public road.
- Hydrology study: The study findings and the mitigation measures thereof to be submitted.
- Process scheme details of the crusher / screening plant such as dry / wet crushing etc. If dry crushing, then management plan for dust control. If wet crushing, then plan for treating used water and its recycle etc.

ii) Cost of the CER calculated shall be utilized for the concerns of the people in terms of health, education, and infrastructure and environment protection. Project Proponent also shall include the budget for the betterment of schools nearby and to facilitate the online education system by providing Wi-Fi connectivity and desktops/tablets.

iii) The project proponent should provide in the EIA Report details of all the statutory clearances, permissions, no objection certificates, consents etc. required for this project under various Acts, Rules and regulations and their status or estimated timeline after grant of EC.

iv) The project proponent should submit the revenue plan for mining lease, revenue plan should be imposed on the satellite imaginary clearly demarcate the Govt. land, private land, agricultural land etc.

v) The project proponent should submit the real-time photographs during EIA data collection, aerial footage & video of the mining lease area and of the transportation route. The project proponent should submit the detailed plan in tabular format (year-wise for life of mine) for afforestation and green belt development in and around the mining lease. The project proponent should submit the number of saplings to be planted, area to be covered under afforestation & green belt, location of plantation, target for survival rate and budget earmarked for the afforestation & green belt development. In addition to this the project proponent should show on a surface plan (5-year interval for life of mine) of suitable scale the area to be covered under afforestation & green belt clearly mentioning the latitude and longitude of the area to be covered during each 5 years. The capital and recurring expenditure to be incurred needs to be submitted. Presently in India there are many agencies which are developing forest in short interval of time. Thus, for the plantation activities details of the experts/agencies to be engaged needs to be provided with budgetary provisions.

vi) The project proponent should submit the quantity of surface or ground water to be used for this project. The complete water balance cycle needs to be submitted. In addition to this PP should submit a detailed plan for rain water harvesting measures to be taken. PP should submit the year wise target for reduction in consumption of the, ground/surface water by developing alternative source of water through rain

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water harvesting measures. The capital and recurring expenditure to be incurred needs to be submitted.

vii) The project proponent should clearly bring out the details of the manpower to be engaged for this project with their roles /responsibilities/designations. In addition to this the project proponent should mention the number and designation of person to be engaged for implementation of environmental management plan (EMP). The capital and recurring expenditure to be incurred needs to be submitted.

viii) The project proponent should submit the year-wise, activity wise and time bound budget earmarked for EMP, occupational health surveillance & Corporate Environmental Responsibility. The capital and recurring expenditure to be incurred needs to be submitted.

ix) The project proponent should submit the measures/technology to be adopted for prevention of illegal mining and pilferage of mineral. The project proponent should submit the detailed mineralogical and chemical composition of the mineral and percentage of free silica from a NABL/MoEF&CC accredited laboratory.

x) The project proponent should clearly show the transport route of the mineral and protection and mitigative measure to be adopted while transportation of the mineral: The impact from the center line of the road on either side should be clearly brought out supported with the line source modelling and isopleth. Further, frequency of testing of Poly Achromatic Hydrocarbon needs to be submitted along with budget. Based on the above study the compensation to be paid in the event of damage to the crop and land on the either side of the road needs to be mentioned. The project proponent should provide the source of equations used and complete calculations for computing the emission rate from the various sources.

xi) The project proponent should clearly bring out that what is the specific diesel consumption and steps to be taken for reduction of the same. Year-wise target for reduction in the specific diesel consumption needs to be submitted.

xii) The project proponent should bring out the awareness campaign to be carried out on various environmental issues, practical training facility to be provided to the environmental engineer/diploma holders, mining engineer/diploma holders, geologists, and other trades related to mining operations. Target for the same needs to be submitted.

xiii) The budget to be earmarked for the various activities shall be decided after perusal of the Standard EC conditions. After perusal of Standard EC conditions if agreed the project proponent should also submit an undertaking by the way of affidavit for Compliance of Standard EC conditions already prescribed by the Ministry vide O.M. No and Specific condition if prescribed by the SEAC/SEIAA, Odisha.

xiv) The project proponent should ensure that only NABET accredited consultant shall be engaged for the preparation of EIA/EMP Reports. The project proponent shall ensure that accreditation of consultant shall be valid during the collection of baseline date, preparation of EIA/EMP report and during the appraisal process. The project

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proponent and consultant should submit an undertaking the information and data provided in the EIA Report and submitted to the SEIAA, Odisha are factually correct and the project proponent and consultant are fully accountable for the same.

xv) The project proponent should submit the photograph of monitoring stations & sampling locations. The photograph should bear the date, time, latitude & longitude of the monitoring station/sampling location. In addition to this the project proponent should submit the original test reports and certificates of the labs which will analyze the samples.

xvi) "Zero discharge" management & "Zero Dust Re-suppression" management with SOP be submitted.

xvii) Internal roads, drain management with network of the drain, retaining walls and settling tanks with ETPs be submitted.

xviii) Details of air quality monitoring stations of the area and additional stations at entry and exit of mines and haulage roads, habitation to be considered.

xix) Construction and perennial maintenance of haulage road with details of plantation and the species thereof to be submitted.

xx) Parking plaza layout with maximum no. of vehicles and types of vehicles that can be parked with basic amenities and facilities.

xxi) Forest Clearance details with copy of all Forest Clearance.

xxii) Status of complaints/ court cases/legal action regarding to lease along with a detailed write up indicating case no., purpose of the case etc.

xxiii) Copy of lease document.

xxiv) Details of waste management i.e. composition and nature of waste generated, tabulated form showing year wise waste generation, usage and storage.

xxv) Project Proponent shall consider developing a good nursery in nearby village for production of saplings of 4-6 feet height for planting in safety zone, sides of external haulage roads and distribution among villagers for planting in their private land/ community land. The nursery may be developed by company on their own or in collaboration with forest department. A detailed proposal to this effect shall be submitted. The proponent shall ensure to use organic fertilizer in the nursery.

xxvi) Comprehensive water management, water balance with water harvesting and its reuse both monsoon and non-monsoon period.

xxvii) STP plan with design with location in the layout map for domestic waste water treatment.

xxviii) Provision of solar power (percentage wise) with detail plan.

xxix) To submit the network with dimension of concrete cement roads inside the mining lease area and haulage road.

xxx) To submit parking plaza at entry and exit of the mines with basic amenities.

xxxi) Plan and SoP to be submitted for water sprinkling inside the mines and outside in haulage road including regular vacuum cleaning and Zero Dust Resuspension system to completely mitigate and arrest fugitive dust emission.

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xxxii) Total water management including domestic use w.r.t sourcing from borewell, rain water harvesting and recycling of waste water from ETP/STP, both for monsoon and non-monsoon be submitted.

xxxiii) Measures to be taken for arresting and mitigation of occupational health hazard including identification of the same, both for employees and nearby/surrounding habitation.

xxxiv) Year wise waste/OB management with reference to generation and utilization in consideration with dynamic movement of inventory indicating dump area and dimension of storage be submitted.

xxxv) Find out the possibility of other alternatives for approach road so that felling of 1000 trees proposed can be avoided.

xxxvi) Submit Wildlife Conservation plan duly certified from the concerned DFO.

xxxvii) Submit copy of application of forest diversion proposal and current status of it.

xxxviii) Explore possibility for construction of reservoir or adopt appropriate rainwater harvesting methods for collection of rain water and its usage.

xxxix) Submit Mine closure Plan with supporting documentation.

xl) Submit Standard Operating Procedure for magazine management.

xli) This Bauxite mines is meant for captive use. The proponent has not yet established any refinery in the state. They have to give details of use of Bauxite in absence of refinery and also an undertaking that Bauxite Ore cannot export outside the state.

xlii) Possibility of restoration/ creation of the pond present within lease area so that villagers can use it in future after mining lease period expires.

Yours Faithfully,

Member Secretary

Copy to

1. Additional Chief Secretary, Forest, Environment & Climate Change Dept., Government of Odisha for information.
2. Member Secretary, State Pollution Control Board, Odisha, Paribesh Bhawan, A/118, Nilakantha Nagar, Unit-8, Bhubaneswar for information.
3. Member Secretary, SEAC, Paribesh Bhawan, A/118, Nilakantha Nagar, Unit-VIII, Bhubaneswar for information.
4. Deputy D.G.Forest., Integrated Regional Office (IRO), Ministry of Environment & Forests, A-31, Chandrasekharpur, Bhubaneswar for information.
5. Collector & DM, Koraput /Sub Collector, Koraput, Tahasildar, Nandapur for Information and necessary action.
6. Ditector Steel & Mines Dept., Govt. of Odisha
7. Guard file for record/Website/Parivesh Portal.

Member Secretary

ANNEXURE – I

TERMS OF REFERENCE (ToR) FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT STUDY AND INFORMATION TO BE INCLUDED IN EIA/EMP REPORT FOR M/S. KALINGA ALUMINA LIMITED OF BALLADA BAUXITE MINE FOR A PEAK RATED CAPACITY OF 4.0 MTPA OVER A MINING LEASE AREA OF 144.945 HA AT VILLAGE - BALLADA, TALUKA – NANDAPUR, DISTRICT-KORAPUT OF SRI KASSIREDDY ANIL KUMAR – TOR.

A. STANDARD TOR FOR MINING PROJECT

1. 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.
2. 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.
3. 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.
4. A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.
5. 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.
6. All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/toposheet, topographic sheet, 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).
7. 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.
8. 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.

9. 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 proposed safeguard measures in each case should also be provided.

10. 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.

11. 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 operational phases and submitted. Impact, if any, of change of land use should be given.

12. 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.

13. 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.

14. 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.

15. 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.

16. The vegetation in the RF / PF areas in the study area, with necessary details, should be given.

17. 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.

18. 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 Wildlife and copy furnished.

19. 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 along with 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.

20. 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 SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered.

21. 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 failing under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).

22. 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 (ease 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.

23. 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 PM_{10}, particularly for free silica, should be given.

24. 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 wind roses showing pre-dominant wind direction may also be indicated on the map.

25. 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.

26. Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.

27. 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,

28. 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.

29. 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 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.

30. Details of any stream, seasonal or otherwise, passing through the tease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be.

31. 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.

32. 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.

33. 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.

34. Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.

35. 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.

36. 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.

37. 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.

38. 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.

39. 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.

40. 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.

41. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.

42. The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.

43. A Disaster management Plan shall be prepared and included in the EIA/EMP Report.

44. 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.

45. The activities and budget earmarked for Corporate Environmental Responsibility (CER) shall be as per MoEF&CC, Govt. of India O.M No 22-65/2017-IA. II (M) dated 01.05.2018 and the action plan on the activities proposed under CER shall be submitted at the time of appraisal of the project included in the EIA/EMP Report.

46. The Action Plan on the compliance of the recommendations of the CAG as per MoEF&CC, Govt. of India Circular No. J-11013/71/2016-IA.I (M), dated 25.10.2017 needs to be submitted at the time of appraisal of the project and included in the EIA/EMP Report.

47. Compliance of the MoEF&CC, Govt. of India Office Memorandum No. F: 3-50/2017-IA.III (Pt.), dated 30.05.2018 on the judgement 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 needs to be submitted and included in the EIA/EMP Report.

B. 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.

C. The prescribed TOR would be valid for a period of four years for submission of the EIA/EMP report.

Annexure – III

MINING PLAN ALONG WITH PROGRESSIVE MINE CLOSURE PLAN

(Submitted for Approval Under Rule 16 of MCR, 2016)

For

"BALLADA BAUXITE BLOCK"

(BLOCK AREA -144.945 ha.)

Village- Ballada, Tehsil- Nandapur,

District- Koraput, State- Odisha

(Open Cast- category A- Fully Mechanized Mine)

Type of Land- Nagasari Reserve Forest, 144.945 Ha.

Of

M/s KALINGA ALUMINA LIMITED

(Formerly known as Mundra Aluminium Limited).

Prepared by

Deepak Rathod

M. Tech (Mineral Exploration)
M. Sc. (Applied Geology)
Qualified Person

MINING TECH CONSULTANCY SERVICES PVT LTD

Adani Corporate House, Shantigram, SG Highway
Ahmedabad-382421, Gujarat, India
info@mtcspl.com | www.mtcspl.com

By e-mail

GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES
OFFICE OF THE REGIONAL CONTROLLER OF MINES, BHUBANESHWAR

Approved

No. MCDR-MiFL0BXT/5/2023-BBS-IBM_RO_BBS Dt : 08/08/2023

Shri/M/s. KALINGA ALUMINA LIMITED ,
Adani Corporate House, Shantigram Near Vaishnodevi Circle, SG Highway, Khodiyar Khodiyar Ballada Bauxite Block (PB93)

Sub : Approval of the Mining Plan along with Progressive Mine Closure Plan (PMCP) in respect of BALLADA BLOCK Mining Lease for Bauxite Ore over an area of 144.945 ha of M/s Kalinga Alumina Ltd, situated in Ballada Village, Padua Taluka, Koraput District of Odisha State

Sir,

In exercise of the powers conferred by clause (b) of sub-section (2) of section 5 of the Mines & Minerals (Development & Regulation) Act, 1957 and clause (3) of Rule 16 of the Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 read with Government of India Order No. S.O. 1857(E) dated 18th May, 2016; I hereby **Approve** the Mining Plan along with Progressive Mine Closure Plan (PMCP) in respect of BALLADA BLOCK Mining Lease Area for Bauxite Ore over an area of 144.945 ha of M/s.Kalinga Alumina Ltd, situated in Ballada Village, Padua Taluka, KoraputDistrict of Odisha State. This approval is subject to the following conditions:-

A--General Conditions:

(1). The 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.

(2). That this approval of aforesaid 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 and other relevant statutes, order and guidelines as may be applicable to the lease area from time to time

(3). The provisions of the Mines Act, 1952 and Rules and Regulations made thereunder including submission of notices of opening, appointment of manager and other statutory officials as required by the Mines Act, 1952 shall be complied with.

(4).The execution of Mining Plan shall be subjected to vacations of prohibitory orders / notices, if any.

(5). If anything is found to be concealed as required by the Mines Act in the contents of the mining plan and the proposal for rectification has not been made, the approval shall be deemed to have been withdrawn with immediate effect.

(6). This approval for proposed mining operations and associated activities is restricted to the mining lease area only from this date. The mining lease area is as shown on the statutory plans by the Lessee/QP/Applicant and Indian Bureau of Mines has not undertaken any survey verification of mining lease boundary on the ground.

(7). Your attention is invited to the Supreme Court interim order in W.P. (C) No. 202 dated 12.12.1996 for compliance. The approval of above said Mining Plan is therefore, issued without prejudice to and is subject to the said directions of the Supreme Court as applicable.

(8).This department does not undertake any responsibility regarding correctness of the boundaries of the lease area shown on the ground.

(9). At any stage, if it is observed that the information furnished in the document are incorrect or misrepresent facts, the approval of the document shall be revoked with immediate effect.

(10). If this approval conflicts with any other law or court order/ Direction under any statute, it shall be revoked immediately.

(11). It shall be mandatory for the project proponent, abstracting ground water, to obtain “No Objection Certificate” from Central Ground Water Authority or, the concerned State/Union Territory Ground Water Authority, as the case may be.

(12). Lessee shall ensure grassing/re-grassing of worked out mining lease area in accordance with Hon'ble Supreme Court Order dated 8/1/2020.

(13). Validity of excavation proposal of this document shall expire within 5 (five) financial year from execution of the mining lease.

(14).The next Review of Mining Plan for the subsequent period of five years shall become due 180 days before expiry of this document proposal period.

(15) Copy of the Lease deed, MDPA signed and performance security deposited to the State Government to be submitted before commencement of mining operation.

(16) The feasibility report considered for reserve/resource estimation as per UNFC is submitted by the preferred bidder / lessee which is prepared based on the current data as reported and it may not establishes the future economic viability of mining project, which may be affected by the market dynamics and other related factors.

(17) Disposal of OB/Waste as minor mineral shall be carried out only after obtaining permission under Rule 12(1)(k) of Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016.

Yours Faithfully

Ballada Bauxite Block (PB93)

Approved

(B.L.GURJAR)

Regional Controller of Mines,

Indian Bureau of Mines, Bhubaneswar

Copy for information to:-

(1).The Controller of Mines (EZ), Indian Bureau of Mines, CP-13, Sector V, Salt Lake City, Kolkata- 700 091 by mail. zo.kol@ibm.gov.in

(2). The Director of Mines, Directorate of Mines, Government of Odisha, Heads of the Department Building, Bhubaneswar– 751001, Email-directorateofmines@orissaminerals.gov.in.

(3). The Director of Mines Safety, Bhubaneswar, Email-dgmsbbsr@gmail.com

(4).Qualified Person by mail- deepak.rathod@mtcspl.com

(5). Concerned MCDR file.

Chapter 1 : General Information

1.1 : Lease Details

IBM Registration Number :	IBM/45445/2023
Lease Code :	PB93
Mine Code :	Nil
Name of Lessee :	KALINGA ALUMINA LIMITED
Address of Lessee :	Adani Corporate House, Shantigram Near Vaishnodevi Circle, SG Highway, Khodiyar Khodiyar
Type of Lessee :	Private
Name of Mining Lease :	Ballada Bauxite Block
State :	ODISHA
District :	KORAPUT
Tehsil/ Taluk/ Mandal :	Padua
Village :	Balda
Lease Area (Ha) :	144.945
Forest Area (Ha) :	144.9450
Name of Minerals :	BAUXITE

Approved

Name of associated minerals :	
Type :	Fresh Grant
Period of the proposal (FY) from :	Nil
Period of the proposal (FY) to :	Nil
Type of working :	Opencast
Nature of Use :	Non Captive
Category of Mine :	Category A

1.1.1 : Initial/subsequent Lease grant details

Grant	From	To	Lease deed execution date	Lease registration date
Nil	Nil	Nil	Nil	Nil

1.1.2 : Mining Plan Submission Criteria Details

Type of Document :	Mining Plan Under Rule 16(1) Of MCR 2016
LOI Number :	SM-MC2-MC-0007-2023/2143/S&M Bhubaneswar
Date :	01/03/2023

1.2 : Land Ownership Details

View Land Ownership Details Excel	Land_Ownership_Details.xlsx

1.3 : Existing Lease

Date of Execution :	Nil

Approved

1.3.1 : Approval of earlier Mining Plan & Its Subsequent Review in Chronological Order

S.N.	Letter Number	Date	Period		Type Of Approved Document	Remark
			From	To		
1	NA	Nil	Nil	Nil	Nil	Fresh Grant

1.3.2 : Partial Surrenderd Area During Stages of Operations in Chronological Order

Not Applicable

1.3.3 : Transfer of Lease Area Subsequent to Grant

Not Applicable

1.3.4 : Statutory Compliances

1.3.4.1 : Environment Clearance

Applicable :	No
Letter No :	Nil
Date :	Nil
Validity :	Nil

Approved

ROM Mineral :	Nil

1.3.4.2 : SPCB Approvals

Letter No :	Nil
Approval of :	Nil
Date :	Nil
Validity :	Nil
ROM Mineral :	Nil

1.3.4.3 : Forest Clearance

Applicable :	No
Letter No :	Nil
Date :	Nil
Validity :	Nil
Area (Ha) :	Nil

Approved

1.3.4.4 : Land Acquisition Details

Total Area Acquired in hectare:	0.0000
Total Amount Paid (INR) :	0.0000

1.3.5 : Mine Location Details

Toposheet Number :	E44K11 (65 J/11)

1.3.5.1 : Location of Boundary Pillars

View Location of Boundary Pillars Excel	location_boundary_pillar.xlsx

1.3.6 : Owner/Nominated Owner Details

Name	PAN of owner / Nominated Owner	Address of owner/ Nominated Owner	Mobile Number	Email	Please attach Minutes of Board Resolution in case of Nominated Owner
Ajit Kumar Samal	AGXPS6861N	902 Glen Dale Hiranadani Garden Powai Maharashtra	9820316442	ajit.samal@adani.com	A5_CTC_Onwner_of_Mine.pdf

Approved

1.3.7 : Qualified Person Details as per M(OAHCEM)CR, 2016

S.N.	Prefix	Name	PAN of QP	Address	Mobile no.	Qualification	Exp in years as prescribed under the rule	Email
1	Mr	Deepak Rathod	ACXPR5593G	Mining Tech Consultancy Services Private Limited, Adani Corporate House, Shantigram, Near Vaishno Devi Circle, SG Highway Khodiyar Ahmedabad -382421 Gujarat	6358935667	MSc Applied Geology MTech Mineral Exploration	28	deepak.rathod@mtcspl.com

Chapter 2A : Geology & Exploration

2A.1 : Geology

2A.1.1 : Topography

Terrain :	Plateaux
Highest Level (m) from MSL :	1266.8900
Lowest Level (m) from MSL :	1037.5700
Average Level (m) from MSL :	1152.2300
Drainage Pattern :	Dendritic
Order of Stream :	Order 1
Min Dist of Stream from Lease Area(m) :	24.0000

Approved

2A.1.2 : Details of Physiographic features and Infrastructures avaiable in and around the lease/ block area

Description	Location if existing Within the lease/block area	Distance from boundary periphery in kms, if existing outside the lease/block area. (within 5.00Kms)	Remark if any
River/Nallah/Reservoir	Man Made pond	Jolaput Reservoir-3 Km	As part of rain water harvesting, a shallow depression is understood to have been dug under CAMPA Scheme in the year 2020-21 by the Forest Department. The dimension of the same is 76m x 54m x 1m.
Public roads (Tar road, cart road)	Tar Road	Balda SH-1.5 Km	Nil
Railway track	NIL	Bheja-5 Km	Nil
Human settlements	NIL	Balda, Lulluburu, Godiput, Maliput, Katiput,	Nil

		Mulda, Kakada, Petal, Baraba, Karanjagura, Bodaligura, Chiliput, Handiput, H.Khilaput, Bheja, Hanjrapentha, Sukriput, Badel, Kakua, Somali, Kitaba, Banuru, Atanda, Patal, Padwa, Arlabput, Dorasabalpur, Malisubu	
Archaeological monuments/ places of worships/public utilities etc	NIL	NIL	Nil
Wild life sanctuaries/ national parks	NIL	NIL	Nil
Coastal Regulation Zone (CRZ)	NIL	NIL	Nil
Powertransmision lines/telephone lines	NIL	Present within 5 Km	Nil
Firing range	NIL	Padwa-5 Km	Nil
Ordinance factory	NIL	NIL	Nil
grazing land/ burial ground or cremation ground	NIL	Grazing Land present within 5 km.	Nil
Any other specify	Balda Cave	NIL	A small cave exists on the escarpment at the southern periphery of the block. The cave is likely to have been formed by weathering of rock which is a common geological phenomenon, particularly observed in Bauxite deposits.

Approved

Particulars	Distance from lease boundary in kms
Near by village	Balda-1.5 Km
Nearest Railway station	Bheja-5 Km
Nearest Port	Visakhapatnam-140 Km
Distance of SH/NH from lease area	SH-2 km, NH-(Proposed)-50Km (Raipur to Visakhapatnam)

2A.1.3 : Regional Geology

Regional Geology

The Ballada hill range is located on the west of Pottangi plateau, Mali parbat and famous Panchpatmali plateau and forms a part of the Eastern Ghat Mobile Belt of Archean age represented by Khondalite suite of rocks, pyroxene granulite, Charnockite suite of rocks, variants of granite gneisses infused with pegmatoids and vein quartz of Archean age formed under granulite facies of metamorphism. The ortho and para metamorphites have undergone significant weathering and alteration at higher altitudes forming laterites of Tertiary age. The above lithounits form more or less banded assemblage in NNE-SSW trend in conformity to the general trend of the Eastern Ghats. The rocks exposed in the area belong to the Eastern Ghat Super Group of rocks represented by quartzite, migmatised khondalite, pyroxene granulite, charnockites, leptynites and porphyroblastic granite gneisses together with high level laterite/bauxite. The most common rock in this group is quartz-garnet-feldspar sillimanite gneisses i.e. khondalites with or without graphite and/or manganese which has been migmatised to variable extent. The Khondalite suites form high and linear hills with sharp crests, while the Charnockites occupy the low-lying plains as well as dome shaped hill rocks. Structurally the area is fairly complex. The bedding plane (S0) is never observed. The most pronounced planner structure is foliation plane (S1) of Khondalite. The trend of foliation swings from NNW - NNE to NE -SW with rather steep dip ranging from 60° to 80° due SE or SW. In the Niyam Dongar hill, where a broad upright asymmetric syncline is observed, the trend of foliation varies from NNW to NNE in the southern limb and swings to NE-SW in the northern limb.

2A.1.4 : Local Geology & Structure

2A.1.4.1 : Local Geological Set-up

The area forms a segment of the east-central part of the Eastern Ghat hill ranges. Rocks belonging to the Khondalite and Charnockite groups are developed in the area. In general, Khondalites form high hills and peaks whereas the Charnockitic rocks are invariably confined to the valleys and slopes of high hills. Both the groups of rocks occur as concordant bands. It is a common feature to observe islands of Khondalites within the Charnockitic rocks. Bauxite of Ballada capping occurs as mantle over khondalite as proved by drilling. The gibbsite crystals occur as shining aggregates in a ferruginous groundmass. The relict foliation is observed in some of the bauxite outcrops. The bauxite invariably has a brick red colour. It is sporaceous towards the top where the voids are filled with kaolinite / limonite. At depth, it has spongy texture with ferruginous zones. The laterite is more ferruginous and siliceous at the top where it is hard and has craggy, cavernous look but is relatively soft and aluminous in the lower parts and grades into bauxite. The soil though present in very less quantity is mostly lateritic.

Approved

2A.1.4.2 : Structure

The trend of regional foliation is NE-SW with the dips varying from 30 to 80 degree towards southeast. The swinging of local foliation towards ENE-WSW and NNE-SSW is very common. The axes of mesoscopic folds plunge towards south-east at low angle (15 to 20 degree). Mineral and groove lineations plunge towards east, south and south-east. Extensive slickensides are noticed at many places which result local displacements. These slickensides were probably generated due to a major fault system. Several synformal structures may be resulted due to the convergence of dips evident by the presence of synformal hills; the intervening low-lying areas mark the antiformal valleys.

2A.1.4.3 : Lithology, Petrographic & Mineralogical Description for Major, Associated & Indicator Minerals

Petrography: The bauxites are massive & moderately hard. The common types include reddish brown, pink, cream and yellowish brown-coloured bauxites with crystalline, cryptocrystalline and dense gibbsite occurring in varying proportions. Gibbsite occurs as fine dissemination, coarse saccharoidal grains, elongated and tabular crystals. Bauxites derived from the khondalite show relict foliations of crystalline and cryptocrystalline sillimanite within gibbsite. Minerography: Thin section studies revealed that gibbsite is the predominant aluminous mineral. This is confirmed by X-ray studies. Bohemite is present only in traces. Other minerals include Haematite & goethite as ferruginous minerals; Kaolinite as clay mineral and anatase as titanium mineral. At places fine disseminations of

gibbsite occur as lining of the micro and mega cavities. Otherwise, gibbsite is coarse grained saccharoidal and/or tabular displaying twinning effect. Gibbsitisation along cleavages in the sillimanite is best seen in some of the thin sections. The word bauxite used in this report defines the material with +30% Al_2O_3 and -7% SiO_2 as per the IBMs end use specification and threshold limits prescribed, unless otherwise specified (Annexure-10). The ore zone have been defined by this threshold limit as given below: a. Metallurgical bauxite (MGB) - Ore containing +40% Al_2O_3 and -4% total SiO_2 b. Low grade bauxite (LGB) - Ore containing +35% Al_2O_3 and <7 % total SiO_2 c. Beneficiable grade bauxite (BGB) - Ore containing +30% to <35% Al_2O_3 and 7 % total SiO_2 has been considered in this category. Although, the threshold limit by IBM prescribes this as -5% reactive silica for this category, -7% total silica has been considered as reactive silica has not been determined. d. High Silica bauxite (HSB) Although IBM has not defined any such categorisation, some bauxite samples exhibit ore containing +30% Al_2O_3 and +7 % total SiO_2 & can be utilised as ore suitably by blending with high grade ores.

2A.1.4.4 : Mode of Occurance & Controls of Mineralization

The bauxite occurs as a blanket or capping over the partially lateritised khondalite or weathered khondalite. The full profile can be observed in some of the scarp faces. The contact between laterite and bauxite at top is generally gradational whereas at bottom the contact between bauxite and khondalite is sharp. Laterite/bauxite occurs within khondalite exposure on surface. The extensive exposure of bauxite/laterite in the capping indicates its physical continuity on the surface. The long axis is aligned in NE-SW direction for an axial length of 2200 m. The plateau has an average width of about 390m.

2A.1.4.5 : Extent of Weathering/ Alteration

Bauxite is derived by the in-situ chemical weathering of the underlying khondalites (garnet-sillimanite-quartz-feldspar gneisses). There is convincing field evidence corroborated by equally striking mineralogical and chemical data which clearly indicate the in-situ origin of the East coast bauxite deposits.

2A.1.4.6 : Nature/Form of Mineral	Lump
Specify If any other	The host rock ferruginous kaolinised sillimanite gneiss has probably led to the formation of bauxite in the area. The kaolinite in these rocks might have developed after feldspar alteration. Gibbsite is the main bauxite mineral which has developed mo

2A.1.4.7 : Extent of Mineralization

The Ballada bauxite block comprising over an area of 144.945 Ha, constitutes the plateau area of 91.67 Ha with a mineralised zone of 83.778 Ha and non-mineralised zone of 61.167 Ha including the central khondalite and southern clay pocket. The deposit spreads all over the plateau area and is irregular in shape. The non-mineralised zone within the plateau area is 7.892 Ha and outside the plateau is 53.275 Ha. Considering the threshold limit of bauxite and aluminous laterite, the plateau exposes bauxites of different categories with a thin layer of soil having 0.2 to 1m thickness.

Approved

2A.1.4.8 : Deposit Type (as per MEMC Rule)
I. Stratiform, Strata-bound and Tabular Deposits of Regular Habit: Principal kinds of minerals - thick bauxite cappings

Strike / Trend of the Ore Body						
NE	Nil	NE	to	SW	Nil	SW

Amount of Dip of the Ore Body (degree)	Amount of Dip of the Ore Body (degree)
30	80
(from)	(to)

Dip Direction of the Ore Body			Plunge of Mineral Body (degree) (if any)	Direction of Plunge		
SE	Nil	SE	15	SE	Nil	SE

Approved

2A.2: Exploration

2A.2.1: Summary of The Previous Exploration (for fresh grant) / During Last Plan Period (for existing leases)

Name of The Agency
Geological Survey of India (GSI)

2A.2.1.1: Geological Mapping

SI.No.	Year		Scale	Area Covered (Ha)
	From	To		
1	01/04/1975	31/03/1977	1:1000	91.7600

2A.2.1.2: Airborne Geophysical Survey

SI.No.	Type of Survey	Spacing (m)	Total line (km)	Area Covered (Ha)	Latitude (dd:mm:ss.ss)	Longitude (dd:mm:ss.ss)

					Form	To	Form	To
1	NIL	0	0.00	0.0000	Nil	Nil	Nil	Nil

2A.2.1.3: Ground Geophysical Survey

SI.No.	Type of Survey	Spacing (m)	Total line (km)	Area Covered (Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
					Form	To	Form	To
1	Nil	0	0	0.0000	Nil	Nil	Nil	Nil

2A.2.1.4: Geochemical Survey

SI.No.	Type of Sample	No of Samples	Aanlysis report	Area Covered (Ha)
1	Nil	0	Nil	Nil

2A.2.1.5: Pitting

Number of Pits
0

SI.No.	Year		Pit ID	Length of Pit (m)	Width of Pit (m)	Depth of Pit (m)	Depth (from)	Depth(to)	Running mtr	Litho units exposed	Name of the radical	Av Grade(in %)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
	From	To											From	To	From	To
1	Nil	Nil	NIL	0.00	0.00	0.00	0.00	0.00	0.00	NIL	NIL	0.00	Nil	Nil	Nil	Nil

2A.2.1.6: Trenching

Number of Trenches
0

Approved

2A.2.1.6.1: Spacing

Min (m)	Max (m)	Avg (m)
0.00	0.00	0.00

SI.No.	Year		Trench ID	Length of Trench (m)	Width of Trench (m)	Depth of Trench(m)	Depth (from)	Depth(to)	Running mtr	Litho units exposed	Name of the radical	Av. Grade	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
	From	To											From	To	From	To
1	Nil	Nil	NIL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	NIL	NIL	0.0000	Nil	Nil	Nil	Nil

2A.2.1.7 Exploratory Drilling(Core/non Core)

SI.No.	Year		Exploration agency	Core holes		Non-core (RC/DTH)		Grand total		Attach log sheet of each borehole in csv/excel format
	From	To		Number of boreholes drilled	Total mtrs	Number of boreholes drilled	Total mtrs	Number of boreholes drilled	Total mtrs	
1	01/04/1975	31/03/1977	Geological Survey of India (GSI)	15	291.65	0	0.00	15	291.65	A12_BH_Litho log.xlsx

Approved

2A.2.1.8: Exploratory Mining

SI.No.	Pit/Adit ID	Length in Mtr	Width in Mtr	Depth in mtrs	Volume (m^3)
1	NIL	0.00	0.00	0.00	0.00

2A.2.1.9: Sampling

SI.No.	Type of sample	No of samples collected	Number of samples analyzed	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Remark if any
				From	To	From	To	
1	Drill Core	12	12	18:27:02.76	18:27:02.76	82:40:10.70	82:40:10.70	BB-01
2	Drill Core	4	4	18:26:52.87	18:26:52.87	82:40:02.77	82:40:02.77	BB-02

3	Drill Core	18	18	18:26:47.93	18:26:47.93	82:40:09.57	82:40:09.57	BB-03
4	Drill Core	21	21	18:26:43.15	18:26:43.15	82:39:54.66	82:39:54.66	BB-04
5	Drill Core	15	15	18:26:33.20	18:26:33.20	82:39:46.62	82:39:46.62	BB-05
6	Drill Core	11	11	18:26:38.27	18:26:38.27	82:39:39.65	82:39:39.65	BB-06
7	Drill Core	12	12	18:26:26.76	18:26:26.76	82:39:55.52	82:39:55.52	BB-07
8	Drill Core	15	15	18:26:23.27	18:26:23.27	82:39:38.92	82:39:38.92	BB-08
9	Drill Core	6	6	18:26:14.72	18:26:14.72	82:39:50.50	82:39:50.50	BB-09
10	Drill Core	0	0	18:26:27.98	18:26:27.98	82:39:49.65	82:39:49.65	BB-10
11	Drill Core	13	13	18:26:19.95	18:26:19.95	82:39:54.45	82:39:54.45	BB-11
12	Drill Core	9	9	18:26:38.89	18:26:38.89	82:40:00.61	82:40:00.61	BB-12
13	Drill Core	20	20	18:26:12.92	18:26:12.92	82:39:34.94	82:39:34.94	BB-13
14	Drill Core	18	18	18:26:53.40	18:26:53.40	82:40:12.61	82:40:12.61	BB-14
15	Drill Core	9	9	18:27:08.02	18:27:08.02	82:40:16.65	82:40:16.65	BB-15

Approved

2A.2.1.10: Chemical Analysis

SI.No.	Sample ID	Minerals	Radical with garde in %	Name of Agency	Type of agency	Attachment
1	Borehole BB-1 to BB-15 (183 no. of samples)	Bauxite	Al2O3, SiO2, Fe2O3, TiO2 and LOI	GSI	Govt. Lab	Collar_Survey_Litho_Assay.xls

* Chemical analysis of core /non vore samples may be uploaded in CSV file which shall normally include Five files namely collar file, survey file and Geology log file, Assay file & RQD File.

2A.2.1.11: Petrology & Mineralogical Studies

SI.No.	Type of Sample	Number of Sample Drawn	Number of Sample Analyzed	Petrographic Study Report
1	None	0	0	Nil

2A.2.1.12: Beneficiation Studies

SI.No.	Type of Beneficiation	Number of Samples	Attach
1	Nil	0	Nil

2A.2.1.13: Bulk Density Study as per M(EMC) Rules, 2015 and SOP of CGPB

Method adopted for calculating bulk density of ore and waste
Method adopted for calculating bulk density of ore and waste. About 20 to 40 specimens were collected from each block representing the various lithological types. Their specific gravities were determined with the help of a Walker's steel yard. The average specific gravity was calculated for each block. It ranges between 2.1 and 2.3. An effective specific gravity of 2 was considered for resource calculations.

SI.No.	Nature of Ore/OB	Mineral	Number of samples	Bulk Density Established (t/m^3)
1	Bauxite	Bauxite	20 to 40	2.00

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2A.2.1.14: Area Covered under Exploration

Level of exploration	Area in Ha.		Total Area in Ha.
	Forest	Non Forest	
G-1	0.000000	0.000000	0.000000
G-2	83.778000	0.000000	83.778000
G-3	0.000000	0.000000	0.000000
G-4	0.000000	0.000000	0.000000
Area proved as Non-mineralized	61.167000	0.000000	61.167000
Area to be explored	0.000000	0.000000	0.000000
Total	144.945000	0.000000	144.945000

2A.2.2: Summary of The Previous Exploration (Before Last Plan Period)

Name of The Agency
Not Applicable

2A.2.2.1: Geological Mapping

SI.No.	Year		Scale	Area Covered (Ha)
	From	To		
1	Nil	Nil	Nil	Nil

2A.2.2.2: Airborne Geophysical Survey

SI.No.	Type of Survey	Spacing (m)	Total line (km)	Area Covered (Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
					From	To	From	To
1	NIL	0.00	0.000000	0.00	Nil	Nil	Nil	Nil

2A.2.2.3: Ground Geophysical Survey

SI.No.	Type of Survey	Spacing (m)	Total line (km)	Area Covered (Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
					From	To	From	To
1	NIL	0	0	0.0000	Nil	Nil	Nil	Nil

2A.2.2.4: Geochemical Survey

SI.No.	Type of Sample	No of Samples
1	Nil	0

2A.2.2.5: Pitting

SI.No.	Pit ID	Length of Pit (m)	Width of Pit (m)	Depth of Pit (m)	Litho units exposed	Litho Unit From (m)	Litho Unit To (m)	Average Grade(%)	Running Metres (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
										Form	To	Form	To
1	NIL	0.00	0.00	0.00	NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

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2A.2.2.6: Trenching

Number of Trenches
0

Spacing

Min (m)	Max (m)	Avg (m)
0.00	0.00	0.00

Area Covered Under Trenching

Co-ordinates

Latitude

North	Nil
North	Nil
North	Nil
North	Nil

Longitude

East	Nil
East	Nil
East	Nil
East	Nil

SI.No.	Trench ID	Length of Trench (m)	Width of Trench (m)	Depth of Trench (m)	Litho Units Exposed	Average Grade	Running mtr	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
								From	To	From	To

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1	NIL	0.0000	0.0000	0.0000	NIL	Nil	Nil	Nil	Nil	Nil	Nil

2A.2.2.7: Exploratory Drilling

2A.2.2.7.1:Core/Non-core Drilling

SI.No.	Year		Exploration agency	Core holes		Non-core (RC/DTH)		Grand total		Attach log sheet of each borehole in csv/excel format
	From	To		Number of boreholes drilled	Total mtrs	Number of boreholes drilled	Total mtrs	Total boreholes	Total mtrs	
1	Nil	Nil	NA	0	0.00	0	0.00	0	0.00	Nil

2A.2.2.8: Exploratory Mining

SI.No.	Pit / Adit ID	Volume (m^3)
1	NIL	0.00

2A.2.2.9: Sampling

SI.No.	Type of sample	Number of Samples	Area Covered (Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
				From	To	From	To
1	Nil	0	0.00	Nil	Nil	Nil	Nil

2A.2.2.10: Chemical Analysis

SI.No.	Sample ID	Minerals	Radical Analysis	Attachment
1	NIL	NIL	NIL	Nil

2A.2.2.11:Petrology & Mineralogical Studies

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SI.No.	Type of Sample	Number of Sample Drawn	Number of Sample Analyzed	Petrographic Study Report
1	None	0	0	Nil

2A.2.2.12: Beneficiation Test

SI.No.	Type of Beneficiation	Number of Samples	Attachment
1	Nil	0	Nil

2A.2.2.13: Bulk Density

SI.No.	Rock Type	Number of Samples	Minerals	Bulk Density Established (t/m^3)
1	NIL	0	NIL	0.00

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2A.2.2.14: Area Covered under Exploration

Level of exploration	Area in Ha.		Total Area in Ha.
	Forest	Non Forest	
G-1	Nil	Nil	Nil
G-2	Nil	Nil	Nil
G-3	Nil	Nil	Nil
G-4	Nil	Nil	Nil
Area proved as Non-mineralized	Nil	Nil	Nil
Area to be explored	Nil	Nil	Nil
Total	0.0000	0.0000	0.0000

SI.No.	Year		Area converted to G1 from G2, G3 & G4	% increase in G-1 Area	Remaining Area % in G2	Remaining Area % in G3	Remaining Area % in G4	Remaining Area in G2	Remaining Area in G3	Remaining Area in G4
	From	To								
1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

Potentially Mineralised area (Ha)	Nil

2A.2.3 Ore Body Geometry & Grade

SI.No.	Name of the ore band	General Strike / Trend	Dip Of Mineral Body	Average Strike Length (m)	Average Width (m)	Chemical parameters				
						Average Depth (m)	Name of the radical	Min Grade (%)	Max Grade (%)	Avg Grade (%)
1	Bauxite	NE-SW	SW	2200.00	390.00	19.44	Al2O3	33.01	46.28	43.65
2	Bauxite	NE-SW	SW	2200.00	390.00	19.44	SiO2	1.93	7.29	3.90

2A.2.4: Reserve / Resource Estimation Method

2A.2.4.1: Methodology

Resource / Reserve Estimation Method
Sectional Area Method
Methodology
Six parallel cross section lines at about 200m-400m strike interval have been drawn in NW-SE direction. These lines are numbered NE to SW as G1 to G5 & G0 generated based on borehole data of BH No. BB-15. Geological cross sections are generated from borehole logs. Cross sectional area on each section has been measured with the help of AutoCAD and recorded. Half-way influence between two section lines has been taken. Each of these areas has been multiplied by strike influence of the section line to arrive at volume. To get tonnage (gross resources), volume has been multiplied with Bulk Density. The resources were calculated by following given formula: R = Sv * T * BD where R = Resources/ Tonnage, Sv = Sectional area of Bauxite, T = Halfway influence (200m) between successive section lines, BD = Bulk Density. The parameters of estimation of resource quantity are based on the Geological Report prepared by GSI provided along with Tender Document (Annexure-15).

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2A.2.4.2: Resource Calculation

SI.No.	Cross Section/Block	Section Area/ Block Area(sq mt)	Influence(m)	Depth in mtr	Volume (m^3)	Bulk Density (t/m^3)	Resource Quantity (t)	Level of Exploration	Type of Land	Name of the radical	Grade (%)	Method used for resource estimation
1	G0	1598.47	240.00	11.00	383632.80	2.00	767265.60000	332	Forest	Al2O3 & SiO2	Al2O3: 39.16 SiO2: 4.36	CS Method, HSB-(17469 3.6 t, Al2O3-

												37.91 and SiO2- 7.75) , MGB-(285352.8t, Al2O3-41.35 and SiO2-2.70), LGB-(307219.2t, Al2O3-37.85 and SiO2-3.97)
2	G1	3515.37	383.00	16.00	1346386.71	2.00	2692773.42000	332	Forest	Al2O3 & SiO2	Al2O3:40.77 SiO2: 3.423.33	CS Method, HSB-(341938.57t, Al2O3-39.54 and SiO2-7.10), (MGB-1225446.8t, Al2O3-43.79 and SiO2-1.89, LGB-1125388.05t, Al2O3-37.85 and SiO2-3.97)
3	G2	5259.595	382.00	20.00	2009165.29	2.00	4018330.58000	332	Forest	Al2O3 & SiO2	Al2O3: 43.49 SiO2: 2.84	CS Method, HSB-(357498.527t, Al2O3-44.62 and SiO2-7.44), (MGB-2097756.82t, Al2O3-46.84 and SiO2-1.849, LGB-1563075.24t,

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												Al2O3- 38.74 and SiO2-1.70)
4	G3	5852.255	386.00	16.00	2468861.79	2.00	4937723.58000	332	Forest	Al2O3 & SiO2	Al2O3: 42.13 SiO2: 2.90	CS Method, HSB-(542314.56t, Al2O3- 45.86 and SiO2- 7.72), (MGB- 2210 7158.56t, Al2O3- 46.53 and SiO2-1.94), LGB-(1868467.74t, Al2O3- 38.23 and SiO2-2.50), BGB-(419782.72t,Al2O3- 32.63 and SiO2-3.18)
5	G4	6499.175	380.00	15.00	2895924.90	2.00	5791849.80000	332	Forest	Al2O3 & SiO2	Al2O3: 41.74 SiO2: 2.90	CS Method, HSB-(561438.6t, Al2O3- 47.26 and SiO2- 7.92), (MGB- 2324201.6t, Al2O3- 47.34 and SiO2-1.69), LGB-(2053732.8t, Al2O3- 37.46 and SiO2-2.89), BGB-(852476.8t,Al2O3-

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												33.11 and SiO2-2.96)
6	G5	5384.94	329.00	16.00	1961780.94	2.00	3923561.88000	332	Forest	Al2O3 & SiO2	Al2O3: 42.93 SiO2: 3.18	CS Method, HSB-(861341.74t, Al2O3-44.13 and SiO2-7.18), (MGB-1529928.96t, Al2O3-48.69 and SiO2-1.56), LGB-(1152019.82t, Al2O3-37.43 and SiO2- 2.51), BGB-(380271.36t,Al2O3-33.67 and SiO2-2.70)
Total					11065752.43		22131504.86000					

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2A.2.4.3: Mineral Resource Estimate for Conversion to Mineral Reserve

Resources have been estimated based on level of exploration. All the exploratory holes drilled have been considered for computation. Based on the above data, the existing geological plan and sections are prepared. Bulk density of 2.0 tonnes/m3 for all grades of Bauxite has been considered (as per Geological Report Annexure-15). Section-wise Bauxite resources have been estimated for the entire lease based on the exploration undertaken and the configuration of the mineral body is more or less well established. The ultimate pit depth is upto 1166 mRL based on the disposition of the Bauxite. The Bauxite resources / reserves are considered based on +30% Al2O3 and -7% SiO2 as per threshold value specified given in Notification No. C-284/3/CMG/2017. By adopting the above enumerated criteria, section-wise mineral resource has been estimated at 22.13 Mt. Following losses are considered for estimation of mineable reserves from geological resources: a. Resources blocked under various mining constraints such as in the 7.50 m statutory barrier, bench slopes etc; these resources have been categorized under pre-feasibility resource (222). b. Mining loss at 5.0% due to operation.

2A.2.4.4: Threshold value & Cut off Parameters

The word “bauxite” used in this report connotes material with +30% Al_2O_3 and - 7% SiO_2 as per the IBM’s end use specification and threshold limits prescribed vide Circular No. C-284/3/CMG/2017 , unless otherwise specified. These parameters constitute the chemical or specified threshold limits at which the ore characteristics have been assessed. The weighted average total silica within all types of bauxite (MGB, LGB, BGB, HSB) is 2.06, and Al_2O_3 is 42.09, which are well above the prescribed threshold value of Bauxite.

2A.2.4.5: Mining Factors or Assumptions

The deposit lies on surface, and it is proposed to be mined by mechanized opencast method of mining with excavator / dumper combination. Deep hole drilling/Short hole drilling and blasting is proposed after taking the prior permission from DGMS. Further, it is proposed to mine with the Ripping and Dozing method and deployment of Surface Miner at a later date.

2A.2.4.6: Metallurgical Factors or Assumptions

The bauxite deposit of Ballada will be used for commercial sale to alumina refineries and/or captive purpose for production of alumina hydrate and/or alumina. As per the process requirement, the bauxite feed to the alumina plant should preferably contain ≥ 40% Al_2O_3 and ≤ 4% SiO_2. The bauxite of Ballada is of high grade, averaging approximately 42.09% Al_2O_3 and 2.96% SiO_2, and meets the specifications of refinery feed requirement, up-gradation of bauxite is not required before it is being sold or used for captive purpose. However, size reduction of the mined bauxite is mandatory to make the material transportable. Hence, required equipment and systems are envisaged.

2A.2.4.7: Cost & Revenue Factors

The capital cost of the project is Rs 230 Crores The operating cost of bauxite/tonne is estimated to about Rs. 3185 / t ex-mines. Bauxite produced from the mine shall be sold to alumina refineries and/or used for captive purpose in proposed alumina refinery project.

2A.2.4.8: Market Assessment

Bauxite produced from the mine will be consumed as raw material in the proposed captive alumina refinery plant. Alumina is produced by Bayer process by refining bauxite ore. The refined Alumina (Aluminium Oxide) is used further as feed material in a smelter to produce Aluminium metal. As per CRU analysis of July 2015, global alumina capacity which is presently at about 138 MTPY is forecasted to grow consistently over the next ten years, reaching to about 180 MT by 2024. The demand & supply status changes according to market requirements.

2A.2.4.9: Other Modifying Factors

LOI has been granted, this is fresh block, Environment and Forest clearance will be obtained after approval of Mining Plan. NOC’s from pollution department (CTE & CTO) will also be obtained after obtaining the EC. The topography of the area is such, that, no disaster like land slide, flood or inundation or fire are anticipated. The height and width of benches will be 6m & 10m respectively and the pit slope at 70 degree in Bauxite. The hanging wall & footwall of the mineralized zone are hard & competent to stand safely for long time. There will be no risk of fire as no wood will be

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used in the mine. Fuel oil and lubricants will be stored only in the tanks of machinery and filled there in by Diesel pumps. The mining project is economical and viable.

2A.2.4.10: Classification

Economic Axis The deposit is of metallurgical grade having reserves of about 20.48 million tonnes which will sustain for a period of 9 years considering the peak mine capacity of 4.0 MTPA. Further, the area is devoid of any private lands and no acquisition of land is involved for smooth mining operations. The reserves have been placed under Probable (122) category while some reserves fall under Prefeasibility Resource (222) category as per UNFC code while entire area is covered under General Exploration (G-2 level) as per prevailing MEMC Rules. Feasibility Axis The equipment will be selected to match the proposed mode of operation of conventional mining by drilling and blasting with shovel-dumper combination or Ripper Dozer and Surface miner options. Environmental studies will be undertaken. Monitoring of various environmental parameters shall be regularly carried out. The pre-feasibility study report is given as Annexure-14. Geological Axis The mining lease area covering 144.945 ha was explored by DMG. About 291.65m of exploratory drilling was carried out in 15 bore holes at 400x400m interval to establish Probable Reserve (122). As detailed exploration is proposed in the period of Mining plan and R & R of area may be increase which will be assess after detailed exploration. Bauxite reserves have been classified as per UNFC norms: based on drilling grid (400m x 400m) and exploration depth. The mineral reserves of Ballada Block have been categorized as Probable Reserve (122) as per UNFC code.

2A.2.4.11: Calculation of blocked resources

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SI.No.	Reserves blocked due to	Cross section/Block	Sectional area/ block area (in Sq mtr)	Influence (m)	Depth (m)	Volume (m^3)	Bulk Density (t/m^3)	Resource Quantity (t)	UNFC code	Type of Land	Name of the radical	Grade (%)	Method used for resource estimation
1	Ultimate Pit Limit	G0	40.48	240.00	11.00	9715.20	2.00	19428.48000	222	Forest	Al2O3 SiO2	Al2O3: 39.47 SiO2: 3.69	CS Method, HSB-(744t, Al2O3- 37.92 and SiO2-7.76), MGB-(4114.68t, Al2O3- 41.35 and SiO2-2.70), LGB-(2533.8t, Al2O3- 37.85 and SiO2- 3.97)
2	Ultimate Pit Limit	G1	437.85	383.00	16.00	167696.55	2.00	335390.23000	222	Forest	Al2O3 SiO2	Al2O3: 36.35 SiO2: 3.50	CS Method, HSB-(4345.14t, Al2O3-

													39.54 and SiO2-7.10), MGB-(43467.05t, Al2O3-43.79 and SiO2-1.89), LGB-(25246t, Al2O3-37.85 and SiO2- 3.97)
3	Ultimate Pit Limit	G2	589.09	382.00	20.00	225032.38	2.00	450061.90000	222	Forest	Al2O3 SiO2	Al2O3: 41.54 SiO2: 1.97	CS Method, HSB-(17874.9t, Al2O3-44.63 and SiO2-7.45), MGB-(102902.4t, Al2O3-46.84 and SiO2-1.84), LGB-(67026.29t, Al2O3-38.74 and SiO2- 1.70)
4	Ultimate Pit Limit	G3	678.37	386.00	16.00	261850.82	2.00	523704.34000	222	Forest	Al2O3 SiO2	Al2O3: 41.98 SiO2: 3.16	CS Method, HSB-(24475.49t, Al2O3-44.86 and SiO2-7.72), MGB-(100279.91t, Al2O3-46.53 and SiO2-1.94), LGB-(88318.15t,

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													Al2O3- 38.23 and SiO2- 2.50), BGB- (19243.26t, Al2O3- 32.63 and SiO2- 3.18)
5	Ultimate Pit Limit	G4	829.48	380.00	15.00	315202.40	2.00	630408.98000	222	Forest	Al2O3 SiO2	Al2O3: 42.70 SiO2: 3.15	CS Method, HSB-(24490.43t, Al2O3- 47.26 and SiO2-7.93), MGB-(107999.99t, Al2O3- 47.34 and SiO2-1.69), LGB-(98259.26t, Al2O3- 37.46 and SiO2- 2.89), BGB- (40905.10t, Al2O3- 33.11 and SiO2- 2.96)
6	Ultimate Pit Limit	G5	317.80	329.00	16.00	104556.47	2.00	209113.72000	222	Forest	Al2O3 SiO2	Al2O3: 44.23 SiO2: 2.65	CS Method, HSB-(12004.72t, Al2O3- 44.14 and SiO2-7.19), MGB(- 59320.35.6t , Al2O3- 48.69 and SiO2-1.56),

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													LGB-(45835.79t, Al2O3-37.43 and SiO2-2.51), BGB-(19013.57t, Al2O3-33.67 and SiO2- 2.70)
Total						1084053.82		2168107.65					

2A.2.4.12: Calulation of Reserves - I

SI.No.	Cross section/Block	Sectional area/ block area (in Sq mtr)	Influence (m)	Depth (m)	Volume (m^3)	Bulk Density (t/m^3)	Resource Quantity (t)	UNFC code	Type of Land	Name of the radical	Grade (%)	Method used for resource estimation
1	G0	1557.99	240.00	11.00	373918.56	2.00	747837.12	122	Forest	Al2O3 SiO2	Al2O3: 39.16 SiO2: 4.38	CS Method, HSB-(173121.6t, Al2O3-37.92 and SiO2-7.76), MGB-(276378.12t, Al2O3-41.35 and SiO2-2.70), LGB-(298337.4t, Al2O3-37.85 and SiO2- 3.97)
2	G1	3077.52	383.00	16.00	1178691.60	2.00	2357383.19	122	Forest	Al2O3 SiO2	Al2O3: 40.97 SiO2: 3.41	CS Method, HSB-(336272.085t, Al2O3-39.54 and SiO2-7.10),

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												MGB- (1142 166.897t, Al2O3- 43.79 and SiO2-1.89), LGB-(87894 4.2105t, Al2O3- 37.85 and SiO2- 3.97)
3	G2	4670.51	382.00	20.00	1784134.34	2.00	3568268.69	122	Forest	Al2O3 SiO2	Al2O3: 43.74 SiO2: 2.32	CS Method, HSB-(33962 3.594t, Al2O3- 44.63 and SiO2-7.45), MGB- (1955 145.524t, Al2O3- 46.84 and SiO2-1.84), LGB-(12734 99.567t, Al2O3- 38.74 and SiO2- 1.70)
4	G3	5717.64	386.00	16.00	2207009.62	2.00	4414019.24	122	Forest	Al2O3 SiO2	Al2O3: 42.15 SiO2: 2.87	CS Method, HSB-(46503 4.272t, Al2O3- 44.86 and SiO2-7.72), MGB-(1905 318.195t, Al2O3- 46.53 and SiO2-1.94), LGB-(16780 44.869t, Al2O3-

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												38.23 and SiO2- 2.50), BGB-(365621.902t, Al2O3- 32.63 and SiO2- 3.18)
5	G4	6791.37	380.00	15.00	2580720.41	2.00	5161440.82	122	Forest	Al2O3 SiO2	Al2O3: 41.62 SiO2: 2.88	CS Method, HSB-(465318.17t, Al2O3- 47.26 and SiO2-7.93), MGB-(2051999.81t, Al2O3- 47.34 and SiO2-1.69), LGB-(1866925.94t, Al2O3- 37.46 and SiO2- 2.89), BGB-(777196.9t, Al2O3- 33.11 and SiO2- 2.96)
6	G5	5645.06	329.00	16.00	1857224.08	2.00	3714448.16	122	Forest	Al2O3 SiO2	Al2O3: 42.86 SiO2: 3.22	CS Method, HSB-(832327.7t, Al2O3- 44.14 and SiO2-7.19), MGB(-1414678.6t, Al2O3- 48.69 and SiO2-1.56), LGB-(1106184.0t, Al2O3-

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												37.43 and SiO2- 2.51), BGB-(361257.8t, Al2O3- 33.67 and SiO2- 2.70)
Total					9981698.61		19963397.22					

2A.2.4.13: Calculation of Reserves -II

Mineral	BAUXITE
Reserves/ Resources estimated as on	25/07/2023
UNIT of estimation	tonnes

A. Mineral Reserve

Classification	Code	Quantity			Grade		Remark
		Forest	Non Forest	Total	Forest	Non Forest	
1. Proved Mineral Reserve (A)	111	0.00	0.00	0.00	0	0	Nil
2. Probable Mineral Reserve (A)	121	0.00	0.00	0.00	0	0	Nil
3. Probable Mineral Reserve (A)	122	19963397.22	0.00	19963397.22	Al2O3: 42.18, SiO2: 2.96	0	HSB-2611697.4 T, MGB- 8745687.16T LGB-7101936.02T, BGB-1504076.59T

B. Remaining Resources

Classification	Code	Quantity			Grade		Remark
		Forest	Non Forest	Total	Forest	Non Forest	
1. Feasibility Mineral Resource (B)	211	0.00	0.00	0.00	0	0	Nil

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2. Prefeasibility Mineral Resource (B)	221	0.00	0.00	0.00	0	0	Nil
3. Prefeasibility Mineral Resource (B)	222	2168107.64	0.00	2168107.64	Al2O3: 41.89, SiO2: 2.91	0	HSB-227528.14T, MGB-824158.38T LGB-967966.83T, BGB-148454.29T
4. Measured Mineral Resource (B)	331	0.00	0.00	0.00	0	0	Nil
5. Indicated Mineral Resource (B)	332	0.00	0.00	0.00	0	0	Nil
6. Inferred Mineral Resource (B)	333	0.00	0.00	0.00	0	0	Nil
7. Reconnaissance Mineral Resource (B)	334	0.00	0.00	0.00	0	0	Nil

Total Mineral Resources (A+B) :	22131504.86

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2A.2.4.13: Calculation of Reserves -III

No associate minerals are available!

2A.2.5: Future Exploration Proposal

2A.2.5.1: Geological Mapping

SI.N.	Year	Scale	Area Covered (Ha)
1	Year1	1:1000	144.95

2A.2.5.2: Ground Geophysical Survey

SI.No.	Year	Type of Survey	Spacing (m)	Total line (km)	Area Covered (Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
						From	To	From	To

1	Nil	NIL	0	0	0.0000	Nil	Nil	Nil	Nil

2A.2.5.3: Pitting

Number of Pits
Nil

SI.No.	Year	Land Type	Pit ID	Length of Pit (m)	Width of Pit (m)	Depth of Pit (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
							From	To	From	To
1	Nil	Nil	NIL	0.00	0.00	0.00	Nil	Nil	Nil	Nil

2A.2.5.4: Trenching

Number of Trenches
0

2A.2.5.4.1: SPACING

Min (m)	Max (m)	Avg (m)
0.00	0.00	0.00

2A.2.5.4.2: Area Covered Under Trenching

Co-ordinates

SI.No.	Year	Land Type	Trench ID	Length of Trench (m)	Width of Trench (m)	Depth of Trench(m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
							From	To	From	To
1	Nil	Nil	NIL	0.0000	0.0000	0.0000	Nil	Nil	Nil	Nil

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2A.2.5.5: Exploratory Drilling

2A.2.5.5.1: Core Drilling & Non-Core Drilling

SI.No.	Year	In Forest Area				In Non Forest Area				Total Borehole	Total Meter
		No. of Borehole	Total Mtr	Type Borehole	Grid Interval	No. of Borehole	Total Mtr	Type Borehole	Grid Interval		
1	Year1	75	2625.00	Core	100.00	0	0.00	Nil	0.00	75	2625.00

2A.2.5.6: Exploratory Mining

SI.No.	Year	Pit ID	Length in meter	Width in meter	Depth in meter	Volume (m^3)
1	Nil	NIL	0.00	0.00	0.00	0.00

2A.2.5.7: Sampling

SI.No.	Year	Type of Sample	Number of Samples Proposed	Area Covered(Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
					From	To	From	To
1	Year1	Drill Core	2625	91.67	Nil	Nil	Nil	Nil

2A.2.5.8 Petrographic & Mineralgraphic Studies

SI.No.	Year	Type of Sample	Number of Samples Proposed
1	Year1	Mineral	15
2	Year1	Waste	5

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Chapter 2B : Geology & Exploration UG : NA

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Chapter 3: Mineral Beneficiation / Processing

Name of The Ore/Mineral	Bauxite

3.1: Mineralogy of the ROM ore/ Mineral

SI.No	Valuable Mineral Name	Approx. Mineral %	Gangue Mineral/s name	Approx. Mineral Gangue %
1	NIL	0.0000	NIL	0.0000

3.2: Complete Chemical Analysis of the ROM Ore/Mineral

SI.No	Radical	Wt%
1	Al2O3	42.0900
2	SiO2	2.9600
3	Fe2O3	28.9700
4	TiO2	2.1900
5	LOI	23.6300

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3.3: Crushing Section

3.3.1: Primary Crushing

SI.No	Type of Crusher	Make	Capacity of Crusher(tph)	Feed Size(mm)	Product Size(mm)
1	Jaw Crusher	Bedeschi	800	600.0000	-150.0000

3.3.2: Secondary Crushing

Not Applicable

3.3.3: Tertiary Crushing

Not Applicable

3.4: Grinding Section

3.4.1: Dry Grinding

Not Applicable

3.4.2: Wet Grinding

Not Applicable

3.5: Dry Processing

3.5.1: Screening and Classification

Not Applicable

3.5.2: Other Operations

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Not Applicable

3.5.3: Product Quality

Not Applicable

3.6: Wet Processing

3.6.1: Scrubbing / Washing

SI.No	Type of Scrubbers / washers	Stages, if applicable	Make	Capacity(tph)	Feed Size(mm)	Product Size (mm)	Product Quality, if available	Water Requirement(l/h)	Fresh Water Requirement (l/h)	Recirculated Water (l/h)
1	Nil	Not applicable	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

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3.6.2: Screening and Classification

SI.No	Type of screen / classifiers	Stages, if applicable	Make	Capacity(tph)	Aperture Size of Screen/Classifier (mm), if applicable	Feed Size(mm)	Product Size (mm)	Product Quality, if available	Water Requirement(l/h)	Fresh Water Requirement (l/h)	Recirculated Water (l/h)
1	Nil	Not applicable	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

3.6.3: Gravity Separation

SI.No	Type of separators (jig, table,	Stages, if applicable	Make	Capacity(tph)	Feed Size(mm)	Product (Conc) (tph)	Product-Mid (tph), if available	Product-Tail (tph)	Water Requirement(l/h)	Fresh Water Requirement (l/h)	Recirculated Water (l/h)

	spiral, etc.)										
1	NA	NA	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

3.6.4: Magnetic Separation

SI.No	Type of magnetic separators (magnetic intensity)	Stages, if applicable	Make	Capacity(tph)	Feed Size(mm)	Product-Mag (tph)	Product-Mid (tph), if available	Product non-Mag (tph)	Water Requirement(l/h)	Fresh Water Requirement (l/h)	Recirculated Water (l/h)
1	NA	NA	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

3.6.5: Flotation

SI.No	Type of flotation equipment (froth/ column)	Stages (rougher/ cleaner, etc), if applicable	Make	Capacity(tph)	Feed Size(mm)	Product-Float (tph)	Product non-Float (tph)	Water Requirement(l/h)	Fresh Water Requirement (l/h)	Recirculated Water (l/h)
1	NA	NA	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

3.6.6: Other Operations

SI.No	Type of equipment / operation	Stages, if applicable	Make	Capacity(tph)	Feed Size(mm)	Product-Conc (tph)	Product-Mid (tph), if available	Product-Tail (tph)	Water Requirement(l/h)	Fresh Water Requirement (l/h)	Recirculated Water (l/h)
1	NA	Not applicable	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

3.6.7: Product Quality (wet processing)

Products	Wt%	In Tonnes	Size (Range) mm	Complete chemical analysis

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Concentrate	0.0000	0.0000	0	0
Sub-grade	0.0000	0.0000	0	0
Rejects	0.0000	0.0000	0	0

3.7: Overall Product Quality (Dry cum Wet Processing)

Products	Wt%	In Tonnes	Size (Range) mm	Complete chemical analysis
Concentrate	0.0000	0.0000	0	0
Sub-grade	0.0000	0.0000	0	0
Rejects	0.0000	0.0000	0	0

3.8: Disposal Method for tailing/ rejects

a) Explain the disposal method for tailing or reject from processing plant with detail chemical / mineral analysis of tailing	Nil
b) Size and capacity of tailing pond, toxic effect of such tailings, process adopted to neutralise its effect (if any)	Nil
c) Any other data (if available)	Nil

3.9: Overall water requirement of mining and mineral processing

Indicate quantity, source of supply, disposal of water and extent of recycling and chemical analysis of water	Water_Requirement_and_Source.pdf

3.10: Flow sheets and charts

Material balance chart of mineral processing plant(s) (each stage of process)	Mineral_Processing_Plant.pdf
Attach flow sheet of beneficiation of plant(s)	Nil

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Any other data (if applicable)	Nil

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Chapter 4A: Mining Operations

4A.1.1: Existing Method of Mining	Nil

4A.1.2: Proposed Method of Mining	Mechanized

Choose one or more	HEMM with deephole drilling	None	None	None

Reasons for Proposed Changes	The maximum proposed production of Bauxite is 4 million tonnes per annum The thickness of overburden which is usually soil in Ballada plateau is 20 cm to 1m The Ore to waste ratio was computed during the initial 5 year period as 1 to zero point 018 T to T Mining operations are proposed to be carried out by fully mechanized opencast mining method It is proposed to mine with excavator dumper combination Deep hole drillingShort hole drilling and blasting is proposed after taking the prior permiss

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4A.2: Operational Parameters

4A.2.1: Inventory of Existing Pits & Dumps

4A.2.1.1: Pits

SI.No.	Pit ID	Pit Status	Area Covered by Pit(Ha)	Pit Dimensions(L*W*D)
1	NIL	Nil	0.00	NIL

4A.2.1.2: Dumps and Stacks

4A.2.1.2.1: Dump Details

SI.No.	Dump ID	Dump Status	Type of Dump	Total of Dump Quantity(t)	Area Covered by Dump(Ha)	Height(m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
							From	To	From	To
1	NIL	Nil	Nil	0.00	0.00	0.00	Nil	Nil	Nil	Nil

4A.2.1.2.2: Stack Details

SI.No.	Stack ID	Type of Stack	Total Stack of Quantity(t)	Area Covered by Stack(Ha)	Height(m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
						From	To	From	To
1	NIL	Nil	0	0	0	Nil	Nil	Nil	Nil

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4A.2.1.3: Details of stabilised dumps

SI.No.	Dump ID	Number of Terraces	Average Height of Terraces(m)	Lenght of Toe Wall(m)	Lenght of Garland Drain(m)	Area Stablized(Ha)	Method of Stablization
1	NIL	Nil	0.00	0.00	0.00	0.00	0

4A.2.2: Opencast Mining

4A.2.2.1: Bench Parameters

Pit ID	Year	Max Height of the Benches in Over Burden (m)	Min Width of the Benches in Over Burden (m)	Slope of the Bench in Over Burden (degree)	Max Height of the Benches in Mineral (m)	Minimum Width of the Benches in Mineral (m)	Slope of the Bench in Mineral (degree)	Overall Slope of Pit (degree)	Number of Benches in Top Soil	Number of Benches in Over Burden	Number of Benches in Mineral	Max Depth of Workings (m)	Depth of Water Table (mRL)	Max Slope Angle of Haul Roads (1xx in)
PIT-1	Year1	0.00	0.00	0.00	6.00	10.00	70.00	30.00	0	0	3	15.00	Nil	16
PIT-1	Year2	6.00	10.00	70.00	6.00	10.00	70.00	30.00	0	0	5	21.00	Nil	16

PIT-1	Year3	6.00	10.00	70.00	6.00	10.00	70.00	30.00	0	0	6	21.50	Nil	16
PIT-1	Year4	6.00	10.00	70.00	6.00	10.00	70.00	30.00	0	0	4	16.00	Nil	16
PIT-1	Year5	0.00	0.00	70.00	6.00	10.00	70.00	30.00	0	0	5	25.00	Nil	16

4A.2.2.2: Yearwise Opencast Development - I Continue

SI.No.	Year	Pit ID	Bench	Direction	Bulk Density of Overburden (BD1) (ton/m^3)	Bulk Density of Mineral (BD2) (tonn/m^3)	Top Soil Volume (Length x Width x Height) (m^3)	Over Burden Volume (Length x Width x Height) (m^3)	Over Burden Quantity (t)	ROM Volume (Length x Width x Height) (m^3)	ROM Quantity (t)	Recovery	Mineral Reject (t)	Production Main (t)	Production Associated (t)	OB Ratio to Ore (m^3/ton)
1	Year1	Pit-1	RL-1206, 1200,1194	NW-SE to N-S to NE-SW	2.00	2.00	24072.00	0.00	0.00	500060.00	1000120.00	1.00	0.00	1000120.00	0.00	Nil
2	Year2	Pit-1	RL-1206, 1200,1194, 1188	NW-SE to N-S to NE-SW	2.00	2.00	1710.00	24783.00	49566.00	1012010.00	2024020.00	1.00	0.00	2024020.00	0.00	0.0122
3	Year3	Pit-1	RL-1206, 1200,1194, 1188,1182,1176	N-S and NW-SE	2.00	2.00	0.00	44671.00	89342.00	1000741.00	2001482.00	1.00	0.00	2001482.00	0.00	0.0223
4	Year4	Pit-1	RL-1212, 1206,1200	NNW-SSE	2.00	2.00	0.00	3800.00	7600.00	1001207.00	2002414.00	1.00	0.00	2002414.00	0.00	0.0019
5	Year5	Pit-1	RL-1224, 1218,1212,1206,1200	NNW-SSE	2.00	2.00	0.00	0.00	0.00	2000934.00	4001868.00	1.00	0.00	4001868.00	0.00	0.0000
Total									146508.00		1102990 4.00		0.00	1102990 4.00	0.00	

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4A.2.2.2 Yearwise Opencast Development - I End

SI.No.	Year	Pit ID	Total Topsoil Volume (m^3)	Total Over Burden Volume (m^3)	Total Over Burden Quantity (t)	Total ROM Volume (m^3)	Total ROM Quantity (t)
1	Year1	Pit-1	24072.00	0.00	0.00	500060.00	1000120.00
2	Year2	Pit-1	1710.00	24783.00	49566.00	1012010.00	2024020.00
3	Year3	Pit-1	0.00	44671.00	89342.00	1000741.00	2001482.00
4	Year4	Pit-1	0.00	3800.00	7600.00	1001207.00	2002414.00
5	Year5	Pit-1	0.00	0.00	0.00	2000934.00	4001868.00
		Total	25782.00	73254.00	146508.00	5514952.00	11029904.00

4A.2.2.3: Transportation & Hauling Equipment

SI.No.	Type	Make	Capacity (m^3)	No. of Equipments
1	Dumper	Bharat Benz 3528/Ashok Leyland 3532/TATA LX 3130	16.00	11

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4A.3: Material Handling Summary

4A.3.1: Studies Undertaken

Title	Study Undertaken	Attachment (only pdf allowed)
Blast Vibration Study Report	No	Nil
Slope Stability Study Report	No	Nil
Recovery Study Report	No	Nil
Hydrological Study Report	No	Nil
Mineral Beneficiation Study Report	No	Nil
Subsidence Study Report	No	Nil
Geotechical Study Report	No	Nil

Any Other Study Report	No	Nil
Bulk Density Study Report	Yes	Bulk_Density_GR_Extracted.pdf

4A.3.2: Insitu Mining

SI.No.	Year	Waste Quantity(t)	ROM Quantity(t)	Total Handling (t)	ROM Quantity Saleable Mineral (t)	ROM Quantity Mineral Reject (t)	OB Ratio to Ore (Waste Quantity / ROM Quantity)	Grade Range (%)
1	Year1	0.00	1000120.00	1000120.00	1000120.00	0.00	0.00	Al2O3- 38.70% SiO2- 2.37%
2	Year2	49566.00	2024020.00	2073586.00	2024020.00	0.00	0.02	Al2O3- 41.96% SiO2- 2.10%
3	Year3	89342.00	2001482.00	2090824.00	2001482.00	0.00	0.04	Al2O3- 41.60% SiO2- 2.28%
4	Year4	7600.00	2002414.00	2010014.00	2002414.00	0.00	0.00	Al2O3- 43.52% SiO2- 2.76%
5	Year5	0.00	4001868.00	4001868.00	4001868.00	0.00	0.00	Al2O3- 43.18% SiO2- 2.61%
	Total	146508.00	11029904.00	11176412.00	11029904.00	0.00		

4A.3.3: Dump workings

SI.No.	Year	Dump ID	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Area (m2)	Avg Height of Dump (m)	Volume (m^3)	Total Dump Quantity (t)	Proposed Dump Handling Quantity (t) (A)	Proposed Recovery of Saleable Mineral (t)(B)	Proposed Waste Quantity (t) (A-B)	Grade Range (%)	Justification
			From	To	From	To									
1	Year1	NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
2	Year2	NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
3	Year3	NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
4	Year4	NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

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5	Year5	NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

4A.3.4: Calculation Summary

Year	Year1	Year2	Year3	Year4	Year5	Total
(A) Total ROM quantity (t)	1000120.00	2024020.00	2001482.00	2002414.00	4001868.00	11029904.00
(B) Saleable ore from ROM (t)	1000120.00	2024020.00	2001482.00	2002414.00	4001868.00	11029904.00
(C) Proposed Dump Handling Quantity (t)	0.00	0.00	0.00	0.00	0.00	0.00
(D) Saleable Ore recovered from dump workings (t)	0.00	0.00	0.00	0.00	0.00	0.00
(E) Total Saleable Ore (t)(=B+D)	1000120.00	2024020.00	2001482.00	2002414.00	4001868.00	11029904.00
(F) Total Quantity Handled (t)(=A+C)	1000120.00	2024020.00	2001482.00	2002414.00	4001868.00	11029904.00

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4A.4: Machine Calculation

4A.4.1: Machine Requirement Summary

Number of Average Working Days in One Year (A)	305
Number of Shifts per Day (B)	3
Material Handling Required per Day (t) ((D)=Largest of (Q1,Q5)/(A))	13121
Material to be Handled per Shift (t) ((E)=(D)/(B))	4373.67
Handling Required per Hour (t) ((F)=(E)/8 hours)	728.83

Effective Shift Time	6 hrs 00 mins

4A.4.2: Shovel / Excavator Requirement

Effective Shift Time	6 hrs	00 mins

SI.No.	Type	Bucket Capacity (m^3)(A)	Bucket Fill Factor (B)	Swell Factor (C)	Tonnage Factor (t/m^3) (D)	Machine Utilization Factor (%) (U)	Efficiency (%) (E)	Cycle time (sec) (F)	(G) TPH =TPH (G) =((3600 x A x B x C x D x E x U) / F)	Total Hours (H) =Number of working days x Number of shifts/day x Effective shift hours	Yearly handling by one Excavator (t) (I)=(G x H)	Maximum handling of the material by this machine during the block period (t) (J)	Number of excavator machines required (K) = (J / I)	Standby excavator (L)
1	Diesel Hydraulic Shovel	3.10	0.90	0.8	2.00	0.65	0.70	30	243.73	5490	1338077.70	4001868.00	2.99	1

4A.4.3: Dumper Requirement

Effective Shift Time	6 hrs	00 mins

SI.No.	Total Hours=Number of working days (W)x Number of shifts/day x Effective shift hours (Machine Requirement	Capacity of Dumpers (t) (B)	Speed of the dumper (KMPH) (i)	Lead Distance (KM) (ii)	Time taken to cover distance in minutes(iii) =(ii/i) x 60	Queuing, Loading Time at Shovel (min) (iv)	Queuing, Unloading Time during unloading (min) (v)	Total Time to complete one trip(vi) = (iii + iv + v)	No. of Trips / hr = (60 / vi)	Total transportation per hour =(B X vii)	Yearly handling by one dumper (ix) = A x TPH	Maximum handling of the material by this machine during the block period (t) (x)	Number of dumpers will be (xi) =(x / ix)	Plus Standby dumper (xii)

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	Summary) (A)													
1	5490	24.00	17.00	4.50	15.88	4.25	2.50	22.63	2	63	345870.00	4001868.00	12	2

4A.4.4: Drill Machine Requirement

Effective Shift Time	6 hrs	00 mins

SI.No.	Type of Drill	Depth of Hole(including Sub-grade Drilling (m)	Spacing (m)	Burden (m)	Bulk Density of Waste (t/m^3)	Bulk Density of Mineral (t/m^3)	Yield per Hole (t)	Yield per Meter (t/m) = Yield per Hole (t)/Depth of Hole(including Sub-grade Drilling (m))	Annual Target Known (t)	Drilling Requirement per Day (m) = (Annual Target Known (t) / Yield per Meter (t/m))/Number of Average Working Days in One Year (A)	Drilling Requirement per Shift(m)	Rate of Drilling per Hours (m/hr) = Drilling Requirement per Shift(m)/Effective Shift Time	Required No. of drills (m/c) = Required rate of drilling in meters per hr./ Actual rate of drilling in meters per hr of the machine deployed	Stand by Drill
1	In-the-hole longhole drill rigs	6.50	3.25	2.50	2.00	2.00	97.50	15.00	4001868.00	874.72	291.57	48.59	2.00	1

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4A.4.5: Machine Deployment Details

4A.4.5.1: Excavator & Loading Equipment

SI.No.	Type	Make	Capacity (m^3)	No. of Equipments

1	Diesel Hydraulic Excavator	Volvo EC480/Komatsu PC 450/TATA Hitachi ZX 670	3.10	4

4A.4.5.2: Dozers Details

SI.No.	Type	Make	Capacity (hp)	No. of Equipments
1	Crawler Dozer	BEML D155	324.00	1

4A.4.5.3: Drilling Details

SI.No.	Type	Make	Capacity (t)	Diameter of Hole(mm)
1	DTH Drill	Epiroc-T40	16.30	115.00

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4A.5 Blasting Requirement

4A.5.1: Blasting & Explosive Requirement in Waste/Development

SI.No.	Drill Pattern / Spacing of Holes (m)	Burden of Holes (m)	Number of Rows / Rings	Yield per Holes in Waste (m^3)	Frequency of Blasting in a Week	Maximum Number of Holes Blasted in a Round	Charge per Hole (kg)	Charge per Round (kg)	Explosive Requirement Per Month in Development (kg)	Powder Factor in Development / Waste (t/kg)	Depth Of Hole
1	0	0	0	0	0	0	0	0	0	0	0

4A.5.2: Blasting & Explosive Requirement in Mineral / Ore

Type of Explosive	Type of Explosives used / to be Used
Non Permitted Explosives	Non Permitted Slurry Explosives (Large Diameter)

SI.No.	Total ROM proposed	Total ROM proposed	Spacing of Holes	Burden of Holes	Number of Rows	Yield per Holes	Frequency of Blasting	Maximum Numbe	No of Holes Required	Charge per Hole	Charge per Round	Explosive Requireme	Powder Factor in Ore	Pop Shooting (no of	Plaster Shooting (no of	Use of Rockbreaker	Capacity	Secondary Blasting	Depth Of Hole

	to be handled in CUM/annum	to be handled in CUM/day	(m)	(m)		in ROM Zone (m^3)	in a Week	r of Holes Blasted in a Round	to be Blasted per Round	(kg)	(kg)	nt Per Month for ROM Zone Blasting (kg)	(t/kg)	Boulders)	Boulders)			Requirements	
1	2002434	6565.35	3.25	2.5	3	48.75	6	135	135	35	4725	113400	2.78	1	1	2	0	Yes	6.0

4A.6: Man Power Deployment

4A.6.1: Managerial

SI.No.	Particular	Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day
1	1st Class	0	0	0	2	2
2	2nd Class Manager	1	1	1	2	5
3	Geologist	0	0	0	1	1
4	Mechanical Engineer	0	0	0	2	2
5	Electrical Engineer	0	0	0	2	2
6	other	0	0	0	3	3

4A.6.2: Supervisory

SI.No.	Particular	Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day
1	Foreman	1	1	1	0	3
2	Mine-mate	1	1	1	0	3
3	Blaster	2	0	0	0	2
4	other	2	0	0	2	4

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4A.6.3: Skilled Workers / Operators

SI.No.	Particular	Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day
1	Drill Operator	2	2	2	0	6
2	Dumper Operator	9	9	9	0	27
3	Dozer/Grader Operator	1	1	1	0	3
4	Pump Operator	0	0	0	1	1
5	Technician	1	1	1	3	6
6	Operator	3	3	3	0	9

4A.6.4: Semi-skilled Workers

SI.No.	Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day
1	3	3	2	5	13

4A.6.5: Unskilled Workers

SI.No.	Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day
1	6	4	4	8	22

4A.6.6: Others Specify

SI.No.	Particular	Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day
1	other	4	2	2	4	12

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4A.6.7: No of Persons Engaged Per Day

SI.No.	Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day
1	36	28	27	35	126

No of Shifts per Day ((A) = Machine Requirement Summary (B))	3
Average Daily Employment per Shift ((B) = (Total Number of Person per Day) / (A))	42
Material to be Handled per Shift ((C) = Machine Requirement Summary (E))	4373

4A.6.8: Supervision

SI.No.	Particular	Qualification	Requirement / Proposed	In Position / Existing Strength	(Requirement / Proposed) - (In Position / Existing Strength) = (-) Shortage / (+) Excess	Remarks
1	General Manager	B.Tech (Mining)	1	0	1	Mine Operation Yet To Start
2	Mines Manager	B.Tech (Mining)	1	0	1	Mine Operation Yet To Start
3	Deputy General Manager	B.Tech (Mining)	1	0	1	Mine Operation Yet To Start
4	Assistant Manager	B.Tech (Mining)	1	0	1	Mine Operation Yet To Start
5	Mining Engineer	B.Tech (Mining)	3	0	3	Mine Operation Yet To Start
6	Geologist	M.Tech/M.Sc Geology	2	0	2	Mine Operation Yet To Start
7	Mine Foreman	Diploma (Mining)	4	0	4	Mine Operation Yet To Start
8	Mining Mate	Diploma/12th/10th	8	0	8	Mine Operation Yet To Start

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9	Blaster	12th/10th	2	0	2	Mine Operation Yet To Start
10	Others Specify	B.tech (Mech)	2	0	2	Mine Operation Yet To Start
11	Others Specify	B.tech (Elec)	2	0	2	Mine Operation Yet To Start
12	Others Specify	Diploma (Mine Survey)	2	0	2	Mine Operation Yet To Start
13	Others Specify	Graduate	3	0	3	Mine Operation Yet To Start

4A.7: Waste Management

4A.7.1: Existing Dump

SI.No.	Year	Dump Id	Type of Dump	Proposed Area (ha)	Height (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Total Dump Quantity (m^3)	Existing Dump Location
						From	To	From	To		
1	Nil	NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

4A.7.2: New Dump

SI.No.	Year	Dump Id	Type of Dump	Proposed Area (ha)	Height (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Total Dump Quantity (m^3)	New Dump Location
						From	To	From	To		
1	Year1	NIL	Waste	0.00	0.00	Nil	Nil	Nil	Nil	0.00	NIL
2	Year2	Dump-1	Waste	0.53	5.00	18:26:44.29	18:26:48.26	82:39:58.20	82:39:58.24	24783.00	E: 675984.2504 - 675933.6977 N: 2040297.2354 - 2040429.558
3	Year3	Dump-1	Waste	0.75	7.00	18:26:48.41	18:26:49.67	82:39:57.79	18:26:49.67	36023.00	E:

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											675942.3968 - 676060.1538 N: 2040413.287 - 2040500.7938
4	Year3	Dump-1	Waste	0.53	2.00	18:26:48.41	18:26:49.67	82:39:57.79	18:26:49.67	8648.00	E: 675984.2504 - 675933.6977 N: 2040297.2354 - 2040429.558
5	Year4	Dump-1	Waste	0.26	2.00	18:26:46.69	18:26:49.67	82:40:00.27	82:40:01.90	3800.00	E: 676014.9741 - 676072.9116 N: 2040375.6681 - 2040473.3461
6	Year5	NIL	Waste	0.00	0.00	Nil	Nil	Nil	Nil	0.00	NIL

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4A.7.3: Existing Stack

SI.No.	Year	Stack ID	Type of Stack	Proposed Area (ha)	Height (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Total Stack Quantity (m^3)	Existing Stack Location
						From	To	From	To		
1	Nil	NIL	Nil	0.00	0.00	Nil	Nil	Nil	Nil	0.00	NIL

4A.7.4: New Stack

SI.No.	Year	Stack ID	Type of Stack	Proposed Area (ha)	Height (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Total Stack Quantity (m^3)	New Stack Location
						From	To	From	To		
1	Year1	Stack-1	Stack for mineral	1.93	3.00	18:26:16.58	18:26:26.98	82:39:56.43	82:39:57.56	30126.00	E: 675899.6446 - 676009.8346 N:

											2039433.586 - 2039767.987
2	Year2	Stack-1	Stack for mineral	1.93	3.00	18:26:16.58	18:26:26.98	82:39:56.43	82:39:57.56	30126.00	E: 675899.6446 - 676009.8346 N: 2039433.586 - 2039767.987
3	Year3	Stack-1	Stack for mineral	1.93	3.00	18:26:16.58	18:26:26.98	82:39:56.43	82:39:57.56	30126.00	E: 675899.6446 - 676009.8346 N: 2039433.586 - 2039767.987
4	Year4	Stack-1	Stack for mineral	1.93	3.00	18:26:16.58	18:26:26.98	82:39:56.43	82:39:57.56	30126.00	E: 675899.6446 - 676009.8346 N: 2039433.586 - 2039767.987
5	Year5	Stack-1	Stack for mineral	1.93	3.00	18:26:16.58	18:26:26.98	82:39:56.43	82:39:57.56	30126.00	E: 675899.6446 - 676009.8346 N: 2039433.586 - 2039767.987

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4A.8: Mineral Waste Handling To Utilize As Minor Mineral

SI.No.	Year	Dump ID	Type of Dump	Proposed Area (ha)	Quantity Handled (t)	Quantity Recovered (t)	Name Of Minor Mineral	Alternative Waste Utilization (m^3)
1	Year1	NIL	Nil	0.00	0.00	0.00	NIL	0.00
2	Year2	NIL	Nil	0.00	0.00	0.00	NIL	0.00
3	Year3	NIL	Nil	0.00	0.00	0.00	NIL	0.00
4	Year4	NIL	Nil	0.00	0.00	0.00	NIL	0.00

5	Year5	NIL	Nil	0.00	0.00	0.00	NIL	0.00

4A.9: Use of Minerals

SI.No.	Proposed Use Of Mineral	Name Of Mineral	Relevant Use Of Mineral	Physical Specifications	Chemical Specifications
1	Captive use in Own Industry	BAUXITE	Proposed alumina refinery project	Lumps (-150mm)	Al2O3 42.09%, SiO2 2.96%, Fe2O3 28.97%, TiO2 2.19%, LOI 23.63%
2	Direct Selling	BAUXITE	As per buyers requirement	Lumps (-150mm)	Al2O3 42.09%, SiO2 2.96%, Fe2O3 28.97%, TiO2 2.19%, LOI 23.63%

* Choose among these:

1. Captive use in own industry

2. Direct Selling

3. Selling Post-Beneficiation /Up-gradation

*Select more than one, if applicable

Approved

Chapter 4 B : Mining Operations UG : NA

Approved

Chapter 5: Sustainable Mining

5.1: Sustainable Mining and SDF Implementations in Compliance of Rule 35 of MCDR'2017

This is a fresh grant of auction block, Sustainable Mining and SDF Implementations in Compliance of Rule 35 of MCDR'2017 will be complied after execution of lease area. A Sustainable development framework committee shall be established with various representatives for stakeholder engagement.The Committee shall be responsible for assessing impacts and their mitigation measures for sustainable development of mining operation starting from exploration to production and subsequent implementation of Progressive mine closure plan. Details documents shall be submitted to IBM after the formulation of SDF Committee.

(Total 200 characters)

Compliance of Vishakha Committee Guidelines for prevention of women harassment at workplace	Not Applicable

Approved

5.2: CSR INITIATIVES

5.2.1: Year1

Details of Work Proposed during the Year / Measures Planned for the Affected Segment	Cumulative Work done / Measures Taken
5.2.1.1: Area to be Developed for Recreation	
Area (Ha)	Area (Ha)
0.00	0.00

5.2.1.2: Area for Water Storage & Recharge Facility	
Area (Ha)	Area (Ha)
0.00	0.00

5.2.1.3: Efforts Made towards Housing for Local Communities	
Number of Houses	Number of Houses

0	0

5.2.1.4: Efforts Made towards Providing Transport to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
0	0

5.2.1.5: Efforts Made towards Providing Healthcare to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
500	500

5.2.1.6: Efforts Made towards Providing Hygiene & Sanitation to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
1000	1000

5.2.1.7: Efforts Made towards Skill Development Programs to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
50	50

5.2.1.8: Efforts Made to Promote Education & Knowledge Based Initiatives	
Number of Beneficiaries	Number of Beneficiaries
500	500

5.2.1.9: Communication Facilities Provided to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
0	0

5.2.1.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities	
Number of Beneficiaries	Number of Beneficiaries
50	50

5.2.1.11: Adoption of ODF

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Number of Toilets Built inside the Lease Area	Number of Toilets Built outside the Lease Area:	Number of Beneficiaries
0	10	200

5.2.1.12: Awareness Program among Mine Workers for Swatchata	
Number of Swatchata Programmes Proposed	Number of Swatchata Programmes Held
2	0

5.2.1.13: Efforts for green energy	
Total energy consumption (KWh)	Green energy consumption (% of total)
3000000.00	10.00

5.2.1.14: Water & recycled use	
Total water consumption (KLD)	Water recycled (% of total)
690.00	5.00

5.2.2: Year2

Details of Work Proposed during the Year / Measures Planned for the Affected Segment	Cumulative Work done / Measures Taken
5.2.2.1: Area to be Developed for Recreation	
Area (Ha)	Area (Ha)
0.00	0.00

5.2.2.2: Area for Water Storage & Recharge Facility	
Area (Ha)	Area (Ha)
0.00	0.00

5.2.2.3: Efforts Made towards Housing for Local Communities	
Number of Houses	Number of Houses
0	0

5.2.2.4: Efforts Made towards Providing Transport to Local Communities

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Number of Beneficiaries	Number of Beneficiaries
0	0

5.2.2.5: Efforts Made towards Providing Healthcare to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
1000	1500

5.2.2.6: Efforts Made towards Providing Hygiene & Sanitation to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
2000	3000

5.2.2.7: Efforts Made towards Skill Development Programs to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
100	150

5.2.2.8: Efforts Made to Promote Education & Knowledge Based Initiatives	
Number of Beneficiaries	Number of Beneficiaries
1000	1500

5.2.2.9: Communication Facilities Provided to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
0	0

5.2.2.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities	
Number of Beneficiaries	Number of Beneficiaries
100	150

5.2.2.11: Adoption of ODF		
Number of Toilets Built inside the Lease Area	Number of Toilets Built outside the Lease Area:	Number of Beneficiaries
0	10	200

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5.2.2.12: Awareness Program among Mine Workers for Swatchata	
Number of Swatchata Programmes Proposed	Number of Swatchata Programmes Held
2	0

5.2.2.13: Efforts for green energy	
Total energy consumption (KWh)	Green energy consumption (% of total)
3000000.00	10.00

5.2.2.14: Water & recycled use	
Total water consumption (KLD)	Water recycled (% of total)
690.00	5.00

5.2.3: Year3

Details of Work Proposed during the Year / Measures Planned for the Affected Segment	Cumulative Work done / Measures Taken
5.2.3.1: Area to be Developed for Recreation	
Area (Ha)	Area (Ha)
0.00	0.00

5.2.3.2: Area for Water Storage & Recharge Facility	
Area (Ha)	Area (Ha)
0.00	0.00

5.2.3.3: Efforts Made towards Housing for Local Communities	
Number of Houses	Number of Houses
0	0

5.2.3.4: Efforts Made towards Providing Transport to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
0	0

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5.2.3.5: Efforts Made towards Providing Healthcare to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
1000	2500

5.2.3.6: Efforts Made towards Providing Hygiene & Sanitation to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
2000	5000

5.2.3.7: Efforts Made towards Skill Development Programs to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
100	250

5.2.3.8: Efforts Made to Promote Education & Knowledge Based Initiatives	
Number of Beneficiaries	Number of Beneficiaries
1000	2500

5.2.3.9: Communication Facilities Provided to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
0	0

5.2.3.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities	
Number of Beneficiaries	Number of Beneficiaries
100	250

5.2.3.11: Adoption of ODF		
Number of Toilets Built inside the Lease Area	Number of Toilets Built outside the Lease Area:	Number of Beneficiaries
0	5	100

5.2.3.12: Awareness Program among Mine Workers for Swatchata	
Number of Swatchata Programmes Proposed	Number of Swatchata Programmes Held
2	0

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5.2.3.13: Efforts for green energy	
Total energy consumption (KWh)	Green energy consumption (% of total)
3000000.00	10.00

5.2.3.14: Water & recycled use	
Total water consumption (KLD)	Water recycled (% of total)
690.00	5.00

5.2.4: Year4

Details of Work Proposed during the Year / Measures Planned for the Affected Segment	Cumulative Work done / Measures Taken
5.2.4.1: Area to be Developed for Recreation	
Area (Ha)	Area (Ha)
0.00	0.00

5.2.4.2: Area for Water Storage & Recharge Facility	
Area (Ha)	Area (Ha)
0.00	0.00

5.2.4.3: Efforts Made towards Housing for Local Communities	
Number of Houses	Number of Houses
0	0

5.2.4.4: Efforts Made towards Providing Transport to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
0	0

5.2.4.5: Efforts Made towards Providing Healthcare to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
1000	3500

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5.2.4.6: Efforts Made towards Providing Hygiene & Sanitation to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
2000	7000

5.2.4.7: Efforts Made towards Skill Development Programs to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
100	350

5.2.4.8: Efforts Made to Promote Education & Knowledge Based Initiatives	
Number of Beneficiaries	Number of Beneficiaries
1000	3500

5.2.4.9: Communication Facilities Provided to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
0	0

5.2.4.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities	
Number of Beneficiaries	Number of Beneficiaries
100	350

5.2.4.11: Adoption of ODF		
Number of Toilets Built inside the Lease Area	Number of Toilets Built outside the Lease Area:	Number of Beneficiaries
5	30	100

5.2.4.12: Awareness Program among Mine Workers for Swatchata	
Number of Swatchata Programmes Proposed	Number of Swatchata Programmes Held
2	0

5.2.4.13: Efforts for green energy	
Total energy consumption (KWh)	Green energy consumption (% of total)
3000000.00	10.00

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5.2.4.14: Water & recycled use	
Total water consumption (KLD)	Water recycled (% of total)
690.00	5.00

5.2.5: Year5

Details of Work Proposed during the Year / Measures Planned for the Affected Segment	Cumulative Work done / Measures Taken
5.2.5.1: Area to be Developed for Recreation	
Area (Ha)	Area (Ha)
0.00	0.00

5.2.5.2: Area for Water Storage & Recharge Facility	
Area (Ha)	Area (Ha)
0.00	0.00

5.2.5.3: Efforts Made towards Housing for Local Communities	
Number of Houses	Number of Houses
0	0

5.2.5.4: Efforts Made towards Providing Transport to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
0	0

5.2.5.5: Efforts Made towards Providing Healthcare to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
1000	4500

5.2.5.6: Efforts Made towards Providing Hygiene & Sanitation to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
2000	9000

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5.2.5.7: Efforts Made towards Skill Development Programs to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
100	450

5.2.5.8: Efforts Made to Promote Education & Knowledge Based Initiatives	
Number of Beneficiaries	Number of Beneficiaries
1000	4500

5.2.5.9: Communication Facilities Provided to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
0	0

5.2.5.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities	
Number of Beneficiaries	Number of Beneficiaries
100	450

5.2.5.11: Adoption of ODF		
Number of Toilets Built inside the Lease Area	Number of Toilets Built outside the Lease Area:	Number of Beneficiaries
0	5	100

5.2.5.12: Awareness Program among Mine Workers for Swatchata	
Number of Swatchata Programmes Proposed	Number of Swatchata Programmes Held
2	0

5.2.5.13: Efforts for green energy	
Total energy consumption (KWh)	Green energy consumption (% of total)
3000000.00	10.00

5.2.5.14: Water & recycled use	
Total water consumption (KLD)	Water recycled (% of total)
690.00	5.00

Approved

5.3: Rehabilitation & Resettlement of Affected Persons

Particular	Year1	Year2	Year3	Year4	Year5
Proposed Number of Project Affected Persons(PAP)	0	0	0	0	0
Proposed Number of Person for Alternate Arrangement for Sustainable Livelihood	0	0	0	0	0
Proposed Number of Person for Skill Training	0	0	0	0	0
Proposed Number of Person Likely to get Direct Employment	0	0	0	0	0
Proposed Number of Person Likely to get Indirect Employment	0	0	0	0	0
Proposed Project Affected Families Skilled and Absorbed	0	0	0	0	0
Proposed Number of Project Affected Families	0	0	0	0	0

Approved

Chapter 6: Progressive Mine Closure Plan

6.1: Status of Land

Total Area Degraded					Total mined out area Reclaimed and Rehabilitated			Other Areas Reclaimed and Rehabilitated	
Total area under excavation in the lease		Area under Dumps(in hect)	Area under utility services(in hect)	Area under Stack yards(in hect)	Mined out Area Reclaimed but not rehabilitated(in hect)	Mined outArea fully Rehabilitated from Reclaimed area(in hect)	Area under Water Reservoir considered Rehabilitated (in hect)	Stabililized Waste dump Rehabilitated (in hect)	Virgin area under Green Belt (in hect)
Area under mining operation	Mined Out area in the lease								
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

6.2: Progressive Reclamation and Rehabilitation Plan

6.2.1: Backfilling

Quantity of Waste / Fill Material Available at Site (m^3)	0.00
Availability of Top Soil for Spreading (m^3)	0.00
Proposed Spread Area (m^2)	0.00

6.2.1.1: Year Wise Proposal

SI.No	Year	Pit ID	Area (m^2)	Top RL	Bottom RL	Estimated Expenditure (₹ INR)
1	Year1	NIL	0.00	0	0	0.00
2	Year2	NIL	0.00	0	0	0.00
3	Year3	NIL	0.00	0	0	0.00

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4	Year4	NIL	0.00	0	0	0.00
5	Year5	NIL	0.00	0	0	0.00

6.2.2: Water Reservoir

Average Rainfall of The Area (mm)	1200.00
Proposed Area under Water Storage	NIL

6.2.2.1: Preparations For Ground Water Recharging

6.2.2.1.1: Drilling Holes	
Year	Proposed no of Holes to be Drilled
Year1	0.00
Year2	0.00
Year3	0.00
Year4	0.00
Year5	0.00

6.2.2.1.2:Preparation of Course Gravel Bed	
Year	Proposed Area of Bed (LxW)
Year1	0
Year2	0
Year3	0
Year4	0
Year5	0

Please specify, if others
This is fresh grant of area under auction.

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6.2.2.2: Protective measures (Please specify running meter)

6.2.2.2.1: Fencing					
Year	Proposed Fencing Length (m)	Latitude(dd:mm:ss.ss)		Longitude(dd:mm:ss.ss)	
		From	To	From	To
Year1	0	Nil	Nil	Nil	Nil
Year2	0	Nil	Nil	Nil	Nil
Year3	0	Nil	Nil	Nil	Nil
Year4	0	Nil	Nil	Nil	Nil
Year5	0	Nil	Nil	Nil	Nil

6.2.2.2.2: Retaining Wall					
Year	Proposed Wall Length (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
		From	To	From	To
Year1	0	Nil	Nil	Nil	Nil
Year2	128	Nil	Nil	Nil	Nil
Year3	192	Nil	Nil	Nil	Nil
Year4	152	Nil	Nil	Nil	Nil
Year5	0	Nil	Nil	Nil	Nil

6.2.2.2.3: Garland Drains					
Year	Proposed Bund Length (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
		From	To	From	To
Year1	0	Nil	Nil	Nil	Nil
Year2	195	Nil	Nil	Nil	Nil
Year3	192	Nil	Nil	Nil	Nil
Year4	152	Nil	Nil	Nil	Nil

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Year5	0	Nil	Nil	Nil	Nil

6.2.3: Green Belt Development

6.2.3.1: Cumulative work done (upto end of previous block of five years)

SI.No	Total Expenditure Incurred up to Last Year (INR)	Area Covered (Ha)	Number of Plants	Survival Rate (%)
1	0.00	0.00	Nil	0.00

6.2.3.2: Year Wise Proposal

SI.No	Year	Green Belt Location (s)	Area Proposed to be Covered (Ha)	Number of Plants Proposed	Expected Survival Rate (%)	Estimated Expenditure (₹ INR)
1	Year1	Statutory Barrier Dump haul roads	0.72	1440	75	201600
2	Year2	Statutory Barrier Dump haul roads	0.86	1720	75	240800
3	Year3	Statutory Barrier Dump haul roads	1.16	2320	75	324800
4	Year4	Statutory Barrier Dump haul roads	0.68	1360	75	190400
5	Year5	Statutory Barrier Dump haul roads	0.80	1600	75	224000

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6.2.4: Use of Shallow Pits

6.2.4.1: Cumulative Work Done (upto end of previous block of five years)

SI.No	Pit ID	Work Done	Area covered (m^2)	Total Expenditure Incurred (up to last five year block) (₹ INR)
1	NIL	0	0.00	0.00

6.2.4.2: Year Wise Proposal

SI.No	Year	Pit ID	Total Area(Ha)	Area Proposed for Crops (Ha)	Suitable Crops	Area Proposed for Grass (Ha)	Total Proposed Expenditure (₹ INR)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Remarks
								From	To	From	To	
1	Year1	NIL	0.00	0.00	0	0.00	0.00	Nil	Nil	Nil	Nil	NIL
2	Year2	NIL	0.00	0.00	0	0.00	0.00	Nil	Nil	Nil	Nil	NIL
3	Year3	NIL	0.00	0.00	0	0.00	0.00	Nil	Nil	Nil	Nil	NIL
4	Year4	NIL	0.00	0.00	0	0.00	0.00	Nil	Nil	Nil	Nil	NIL
5	Year5	NIL	0.00	0.00	0	0.00	0.00	Nil	Nil	Nil	Nil	NIL

6.2.5: Pisciculture

6.2.5.1: Total Expenditure incurred as on Date (INR)	0

6.2.5.2: Cumulative work done as on Date

SI.No	Pit ID	Area (m^2)	Expenditure (₹ INR)
1	NIL	0.00	0.00

6.2.5.3: Year Wise Proposal

SI.No	Year	Pit ID	Area (m^2)	Estimated Expenditure (₹ INR)
1	Year1	NIL	0.00	0.00
2	Year2	NIL	0.00	0.00

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3	Year3	NIL	0.00	0.00
4	Year4	NIL	0.00	0.00
5	Year5	NIL	0.00	0.00

6.2.5.4: Source of Water for Pisciculture	Not applicable

6.2.5.5: Whether the quality of water has been assessed & found to be suitable for Pisciculture	Yes

6.2.6: Recreational Facility

6.2.6.1: Total Expenditure Incurred (up to last five year block) (INR)	0.00

6.2.6.2: Cumulative work done as on Date

SI.No	Pit ID	Area (m^2)	Expenditure (₹ INR)
1	NIL	0.00	0.00

6.2.6.3: Year Wise Proposal

SI.No	Year	Type of Recreational Facility	Area Covered (Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Estimated Expenditure (INR)
				From	To	From	To	
1	Year1	NIL	0.00	Nil	Nil	Nil	Nil	0.00
2	Year2	NIL	0.00	Nil	Nil	Nil	Nil	0.00
3	Year3	NIL	0.00	Nil	Nil	Nil	Nil	0.00
4	Year4	NIL	0.00	Nil	Nil	Nil	Nil	0.00
5	Year5	NIL	0.00	Nil	Nil	Nil	Nil	0.00

6.2.7: Dump Area Stabilization & Development

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SI.No	Year	Dump ID	No of Terraces	Average Height of Terraces (m)	Length of Toe Wall (m)	Length of Garland Drain (m)	Area Stabilized (Ha)	Method of Stabilization	Estimated Expenditure (₹ INR)	No of Check Dams
1	Year1	NIL	0	0.00	0.00	0.00	0.00	NIL	0.00	Nil
2	Year2	Dump-1	1	5.00	128.00	195.00	0.00	NIL	692650.00	Nil
3	Year3	Dump-1	1	7.00	192.00	192.00	0.00	NIL	1011840.00	Nil
4	Year3	Dump-1	1	2.00	0.00	0.00	0.00	NIL	0.00	Nil
5	Year4	Dump-1	1	2.00	152.00	152.00	0.00	NIL	801040.00	Nil
6	Year5	NIL	0	0.00	0.00	0.00	0.00	NIL	0.00	Nil

6.2.8: Other Form of Reclaiming the Area

6.2.8.1: Cumulative work done as on Date

SI.No	Total Expenditure incurred as on Date (INR)	Work Done
1	0.00	0

6.2.8.2: Year Wise Proposal

SI.No	Year	Work Proposals	Estimated Expenditure (INR)
1	Year1	No Proposal	0.00
2	Year2	No Proposal	0.00
3	Year3	No Proposal	0.00
4	Year4	No Proposal	0.00
5	Year5	No Proposal	0.00

6.2.9: TopSoil Management

Approved

6.2.9.1: Cummulative Work Done as on Date

SI.No	Top Soil Generated (m^3)	Top Soil Utilized (m^3)	Topsoil Stored (m^3)	Total expenditure incurred as on date (₹)
1	0.00	0.00	0.00	0.00

6.2.9.2: Year Wise Proposal

SI.No	Year	Topsoil Generated (m^3) (A)	Topsoil Utilized (m^3) (B)	Topsoil Stored (m^3) (A-B)	Estimated Expenditure (INR)
1	Year1	15660.00	4700.00	Nil	3132000.00
2	Year2	1680.00	5400.00	Nil	336000.00
3	Year3	7375.00	7375.00	Nil	1475000.00
4	Year4	3960.00	4000.00	Nil	792000.00
5	Year5	0.00	7200.00	Nil	0.00

Approved

6.2.10: Tailings Dam Management

SI.No	Year	Yearly generation of Tailing (m^3) (A)	Total capacity of Tailing Pond (m^3)	Measures Proposed for Periodic Desilting	Yearly Utilization of Tailing (m^3) (B)	Disposal of Tailing to Tailing Pond (m^3) (A-B)	Tailing Dam Design	Structural Stability Studies
1	Year1	0.00	0.00	0	0.00	0.00	Nil	Nil
2	Year2	0.00	0.00	0	0.00	0.00	Nil	Nil
3	Year3	0.00	0.00	0	0.00	0.00	Nil	Nil
4	Year4	0.00	0.00	0	0.00	0.00	Nil	Nil
5	Year5	0.00	0.00	0	0.00	0.00	Nil	Nil

6.2.11: Land Use of Lease Area at the Expiry of Lease Period

Total Area Degraded	Non Degraded	Total mined out area Reclaimed and	Other Areas Reclaimed and Rehabilitated

				area	Rehabilitated						
Mined Out area in the lease	Area under Dumps(in hect)	Area under the Tailing Dam	Area under utility services(in hect)	Area undistur bed/virgin	Mined out Area Reclaimed but not rehabilitated(i n hect)	Mined outArea fully Rehabilitated from Reclaimed area(in hect)	Area under Water Reservoir considered Rehabilitated (in hect)	Stabililized Waste dump Rehabilitated (in hect)	Virgin area under Green Belt (in hect)	Rehabilitated Area under utility services(in hect)	Rehabilitated Area under Tailing dam (in hect)
81.82	1.95	0.00	0.00	61.18	80.74	0.00	1.08	1.95	4.23	0.00	0.00

Approved

Chapter 7: Financial Assurance/ Performance Surety (AREA PUT TO USE)

Year1

Consolidated View of Financial Assurance

SI.No	Particular	Area put to use at Start of Year (ha) (A)	Additional Requirement (ha) (B)	Total (ha) (C = A + B)
1	Area under Mining	0.00	5.89	5.89
2	Topsoil stacking	0.00	0.28	0.28
3	Overburden/Waste Dumping	0.00	0.00	0.00
4	Mineral Storage	0.00	1.93	1.93
5	Infrastructure (Workshop, Administrative Building etc.)	0.00	0.18	0.18
6	Roads	0.00	0.38	0.38
7	Railway	0.00	0.00	0.00
8	Tailing Pond	0.00	0.00	0.00
9	Effluent Treatment Plant	0.00	0.00	0.00
10	Mineral Separation Plant	0.00	0.13	0.13
11	Township Area	0.00	0.00	0.00
12	Others to specify	0.00	0.72	0.72
	Total	0.00	9.51	9.51

Approved

Year2

Consolidated View of Financial Assurance

SI.No	Particular	Area put to use at Start of Year (ha) (A)	Additional Requirement (ha) (B)	Total (ha) (C = A + B)
1	Area under Mining	5.89	4.40	10.29
2	Topsoil stacking	0.28	0.00	0.28
3	Overburden/Waste Dumping	0.00	0.53	0.53
4	Mineral Storage	1.93	0.00	1.93
5	Infrastructure (Workshop, Administrative Building etc.)	0.18	0.00	0.18
6	Roads	0.38	0.00	0.38
7	Railway	0.00	0.00	0.00
8	Tailing Pond	0.00	0.00	0.00
9	Effluent Treatment Plant	0.00	0.00	0.00
10	Mineral Separation Plant	0.13	0.00	0.13
11	Township Area	0.00	0.00	0.00
12	Others to specify	0.72	0.86	1.58
	Total	9.51	5.79	15.30

Approved

Year3

Consolidated View of Financial Assurance

SI.No	Particular	Area put to use at Start of Year (ha) (A)	Additional Requirement (ha) (B)	Total (ha) (C = A + B)
1	Area under Mining	10.29	7.10	17.39
2	Topsoil stacking	0.28	0.00	0.28
3	Overburden/Waste Dumping	0.53	1.15	1.68
4	Mineral Storage	1.93	0.00	1.93
5	Infrastructure (Workshop, Administrative Building etc.)	0.18	0.00	0.18

6	Roads	0.38	0.00	0.38
7	Railway	0.00	0.00	0.00
8	Tailing Pond	0.00	0.00	0.00
9	Effluent Treatment Plant	0.00	0.00	0.00
10	Mineral Separation Plant	0.13	0.00	0.13
11	Township Area	0.00	0.00	0.00
12	Others to specify	1.58	1.16	2.74
	Total	15.30	9.41	24.71

Year4

Consolidated View of Financial Assurance

SI.No	Particular	Area put to use at Start of Year (ha) (A)	Additional Requirement (ha) (B)	Total (ha) (C = A + B)
1	Area under Mining	17.39	8.36	25.75
2	Topsoil stacking	0.28	0.00	0.28
3	Overburden/Waste Dumping	1.68	0.26	1.94
4	Mineral Storage	1.93	0.00	1.93
5	Infrastructure (Workshop, Administrative Building etc.)	0.18	0.00	0.18
6	Roads	0.38	0.00	0.38
7	Railway	0.00	0.00	0.00
8	Tailing Pond	0.00	0.00	0.00
9	Effluent Treatment Plant	0.00	0.00	0.00
10	Mineral Separation Plant	0.13	0.00	0.13
11	Township Area	0.00	0.00	0.00
12	Others to specify	2.74	0.38	3.12
	Total	24.71	9.00	33.71

Approved

Year5

Consolidated View of Financial Assurance

SI.No	Particular	Area put to use at Start of Year (ha) (A)	Additional Requirement (ha) (B)	Total (ha) (C = A + B)
1	Area under Mining	25.75	17.03	42.78
2	Topsoil stacking	0.28	0.00	0.28
3	Overburden/Waste Dumping	1.94	0.00	1.94
4	Mineral Storage	1.93	0.00	1.93
5	Infrastructure (Workshop, Administrative Building etc.)	0.18	0.00	0.18
6	Roads	0.38	0.00	0.38
7	Railway	0.00	0.00	0.00
8	Tailing Pond	0.00	0.00	0.00
9	Effluent Treatment Plant	0.00	0.00	0.00
10	Mineral Separation Plant	0.13	0.00	0.13
11	Township Area	0.00	0.00	0.00
12	Others to specify	3.12	0.80	3.92
	Total	33.71	17.83	51.54
	Grand Total			Nil

Performance Surety

(b) Performance Surety

Lease Category (A/B)	Total Resources in Tonnes For Calculations of Performnce Surety	Existing Performnce Surety in Rs	Valid Till (dd/mm/yyyy)	Upload Copy Of Existing Performance Surety as Attachment
A	22132136	334205610.00	Nil	Nil

Approved

724

Ballada Bauxite Block (PB93)

Approved

Chapter 8 : Review of previous proposals during the last plan period (NA)

Approved

Chapter 9: Impact Assessment(for fresh grant)

9.1 : Baseline Information

Whether Area falls under Forest	Yes
Whether Area falls under Wildlife Sanctuary	No
Whether Area falls under Coastal Regulation Zone (CRZ)	No
Whether Area falls under Defence Land	No
Any Other Clearance (specify)	No

Any Significant Objections from any Agency Involved in Stakeholder's Consultation.

It is a fresh grant we will be obtaining Environmental and Forest clearance from MoEF CC During the preparation of EIA EMP various studies will be conducted A copy of the approved EIA EMP report shall be submitted to IBM

(Total 500 characters)

Approved

9.2: Environment Parameters

9.2.1: Environment Monitoring

Monitoring Activity

9.2.1.1: Ambient Air Quality

Core Zone (Quarterly Monitoring Planned)	Yes

Buffer Zone (Quarterly Monitoring Planned)	Yes

9.2.1.2: Water Quality

Core Zone (Quarterly Monitoring Planned)	Yes
Buffer Zone (Quarterly Monitoring Planned)	Yes

9.2.1.3: Noise Level

Core Zone (Quarterly Monitoring Planned)	Yes
Buffer Zone (Quarterly Monitoring Planned)	Yes

Approved

9.3: Impact Assessment

9.3.2: Land Environment

9.3.2.1: BASE / PRESENT STATUS

Pre Mining Use	AREA (Ha)
Barren / Waste land with small bushes & shrubs	91.1000
Land under Agriculture / Crops	0.0000
Land covered with Plants	53.7500
Land under Grass Cover	0.0000
Land under Public Infrastructure / Utilities (water bodies, roads, railways, electric lines, telephone lines etc.)	0.0000

Land under Habitation	0.0000
Land under Monuments & places of Historical Importance	0.0000
Degraded by Pits & Excavation	0.0000
Degraded by Dumps & Material Staking	0.0000
Covered under Mine Infrastructure (plants, shades, buildings etc.)	0.0000
Land under Forest	144.9450
Historically, Culturally & Ecologically Important Places	0.1000
Any Other, please specify below	0.0000
Date of Observation	25/04/2023

Approved

9.3.2.2: ANTICIPATED IMPACT

Post Mining Use	AREA (Ha)
Degradation by Excavation	81.8200
Degradation by Dumps & Material Staking	1.9500
Covered under Plants, Shades & Buildings	0.0000
Covered by Roads & Approaches	0.0000
Any Other, please specify below	61.1800

9.3.2.3: MITIGATION MEASURES

9.3.2.3.1: Backfilling

The Ore to OB ratio during the first five years is 1:0.018. The OB thus generated is very less in quantity and shall be dumped separately. The dump area is being progressively stabilized. No backfilling during the plan period is proposed. As it is a fresh grant, we will be obtaining Environmental and Forest clearance from MoEF & CC. During the preparation of EIA/ EMP, various studies will be conducted. A copy of the approved EIA/EMP report shall be submitted to IBM.

(Total 1000 characters)

9.3.2.3.2: Area proposed to be covered by Plantation in Backfilled Area

No backfilling during the plan period is proposed. Hence, no area is proposed to be covered by Plantation in Backfilled Area during the period of Mining Plan.

(Total 1000 characters)

9.3.2.3.3: Proposed Area under Agriculture

No area is proposed for agriculture during the period of the Mining Plan.

(Total 1000 characters)

9.3.2.3.4: Proposed Area to be converted to Grazing Land

No Grazing land exists in the block area since it is hilly terrain. Therefore no proposals of converting Grazing Land is given However, the same shall be reviewed during the conceptual period of mining. As it is a fresh grant, we will be obtaining Environmental and Forest clearance from MoEF & CC. During the preparation of EIA/ EMP, various studies will be conducted. A copy of the approved EIA/EMP report shall be submitted to IBM.

(Total 1000 characters)

9.3.2.3.5: Ground Water Recharging

A water storage ha been proposed during the conceptual period. The total area of the proposed water storage shall be 1.08 ha. As it is a fresh grant, we will be obtaining Environmental and Forest clearance from MoEF & CC. During the preparation of EIA/ EMP, various studies will be conducted. A copy of the approved EIA/EMP report shall be submitted to IBM.

(Total 1000 characters)

9.3.2.3.6: Green Belt Development

Area under greenbelt has proposed covering statutory boundary, haul road and around the dumps During the Plan period, 3.2 ha. area has been considered for greenbelt development. Year Wise Proposal for plantation is mentioned under Para 6.2.3.2: Major steps for post plantation care are given below: Mulching to minimize transpiration losses and to ensure good establishment. Regular dose of compost manure/ fertilizers as per the schedules. Spraying of organic insecticides and fungicides whenever required. Hoeing, weeding, and watering at regular intervals. Guarding of saplings by fencing wherever needed. Monitoring of the growth of plantation by the independent and self-sustained horticulture department.

(Total 1000 characters)

9.3.2.3.7: Agriculture

No proposals of agriculture are given in this Mining plan period. As it is a fresh grant, we will be obtaining Environmental and Forest clearance from MoEF & CC. During the preparation of EIA/

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EMP, various studies will be conducted. A copy of the approved EIA/EMP report shall be submitted to IBM.

(Total 1000 characters)

9.3.3: Air Environment

9.3.3.1: Climate & Meteorology (Please provide average of 10 years)

Temperature (°C)	
Maximum	36.00
Minimum	10.00

Relative Humidity (%)
60.00

Average Rainfall (mm)
99.99

Approved

9.3.3.2: Air Quality Details for Base line Information / Present Status

S.N.	Station Name	Season	PM10 (µg/m3)	PM10 Excess (µg/m3)2	PM2.5 (µg/m3)	PM2.5 Excess (µg/m3)2	SO2 Value (µg/m3)	SO2 Excess (µg/m3)	NOX Value (µg/m3)	NOX Excess (µg/m3)	Date of Observation	Action
1	NIL	Nil	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	Nil	NA

9.3.3.3: Impact Assessment & Mitigation Measures

9.3.3.3.1: Anticipated Impact

Give details on Prediction of fugitive dust emissions due to mining activities, crushing & cleaning plants, loading & unloading, transportation by rail, road or conveyor

The mining activity does have impacts on air quality. The major contribution to the air pollution by open cast mining is the rise in Suspended Particulate Matter (SPM) due to generation of dust by drilling, blasting, handling of waste/mineral, movement of fleet of dumpers, trucks, jeep etc. Apart from these, the fumes emitted by mining machinery also pollute the atmosphere. The proposed mining activities include various mining operations involving development of benches, approach roads, haul roads, excavation and transportation of Bauxite and waste materials, operation of crushing unit for sizing of Bauxite. These operations generally result in generation of dust. Dust is a particulate contaminant suspended in the atmosphere. The upper size limit of dust particles is governed by gravitational effects. While the distinction between the respirable and irrespirable dust is scientifically valid, it is clear that both sizes can impair lung functions when inhaled over a long period of time. Deployment of diesel-powered equipment for mining may produce emissions that are known to be hazardous.

(Total 1000 characters)

9.3.3.3.2: Mitigation Measure

Give details on measures to reduce the emissions of pollutants during mining, loading, unloading, transportation, drilling, blasting, crushing etc. to maintain the air quality

Regular ambient air quality monitoring will be carried out at different locations in core/buffer zone and nearby villages of the lease area to assess the existing air quality and also to assess the conformity to standards of ambient air quality during mining operations. Measure taken to control dust pollution: During drilling operations: - Sharp drill bits will be used for drilling and regrinding of these is to be done periodically to reduce generation of dust. Drilling machines will be equipped with wet drilling and dust collector systems to prevent dust to get air borne. The drill machines will be kept leakage free. The drill operator and helper will be provided with personal protective equipment. During blasting operation: - Sufficient stemming column will be maintained to prevent air blast. Controlled blasting with proper blast design and charging. Controlled blasting also provides a number of hazard mitigation measures including the: By applying appropriate quality control and understanding of the implications of proper blast design, blasting operations can not only improve the safety on the mine, but will most likely improve productivity and the long-term sustainability of the mine as well. During loading operation: - Water sprinkling through water tanker fitted with rain guns will be done on working faces to reduce generation of dust. The operators will be provided with closed cabins and dust mask. During Transport operation: - Haul roads will be properly maintained with use of compactor and motor grader and watered regularly to prevent generation of dust. Water spraying arrangements will be made at all material transfer points to suppress dust. Prevention of spillage of material during transportation. Ambient air quality monitoring Ambient air monitoring will be carried out regularly in core and buffer zones to know the quality of air

(Total 1000 characters)

Approved

9.3.4: Water Environment

9.3.4.1: RAIN WATER

9.3.4.1.1: Base / Present Status

(Details of Rivers, Springs, Lakes, Reservoirs & Drains up to First Order in Study Area)

First order dendritic drainage patter is observed adjacent to the block area As part of rain water harvesting a shallow depression is understood to have been dug under CAMPA Scheme in the year 202021 by the Forest Department The dimension of the same is 76m x 54m x 1m The current mine plan proposal does not envisage mining of the aforecited area during the first 5 years of mining A water storage has been proposed during the conceptual period of mining

(Total 1000 characters)

9.3.4.1.2: Anticipated Impact

(Impact on Surface Water Bodies / Groundwater Table Regime / Streams / Lake / Springs due to Mining, to be Assessed from Hydro-geological StudyGive details about impact on vegetation)

Mining operation will not generate toxic effluent from solid waste Therefore impacts of mining activities on soil and water environment in and around the mining area will be negligible The chances of the water quality getting affected due to mining activity are very remote as no chemical having toxic element shall be used in carrying out mining activity Mining will be carried out above the water table during the Plan period and shall not intersect the ground water table during the plan and conceptual period The Machhkund is the major source for water and the deposit is a plateau with forest covered area Hence mining activity will not affect agriculture or vegetation As it is a fresh grant we will be obtaining Environmental and Forest clearance from MoEF CC During the preparation of EIA EMP various studies will be conducted A copy of the approved EIAEMP report shall be submitted to IBM

(Total 1000 characters)

9.3.4.1.3: Mitigation Measure

(Possibilities of Rain Water Harvesting & Artificial Recharge with in the Mining Lease)

The water levels in the area exist far below the proposed working depth and the ultimate working depth at the end of life of mine The mining operations will not interfere with natural drainage patterns In order to avoid soil erosion carryover of the material with rainwater retaining wall garland drain is proposed along the waste dump and topsoil stack yard to arrest the wash off Moreover peripheral drains all around the dumps shall be made to trap rainwater washings out of the dumps which in turn will reduce the load of suspended solids in the discharged water Sump pits will be provided along the length of the drains for effective trapping of rainwater washings Garland drains around the dumps will trap the fine particles from the dumps washed away by rain The drains will be 1m wide at the top and 1m deep and shall be provided with sump pits at suitable interval along its lengths Further a green belt is proposed to be provided around the dumps As it is a fresh grant we will be obtaining Environmental and Forest clearance from MoEF CC During the preparation of EIA EMP various studies will be conducted A copy of the approved EIAEMP report shall be submitted to IBM

(Total 1000 characters)

Approved

9.3.4.2: WATER BODY

9.3.4.2.1: Base / Present Status

(Water Bodies Existing & Water Bodies likely to be created due to Mining Activities & their Water Holding Capacity)

As part of rain water harvesting a shallow depression is understood to have been dug under CAMPA Scheme in the year 202021 by the Forest Department The dimension of the same is 76m x 54m x 1m . The current mine plan proposal does not envisage mining of the aforesaid area during the first 5 years of mining.

(Total 1000 characters)

9.3.4.2.2: Anticipated Impact

(Ingress of Sea Water, Particularly for Mining Projects in Coastal Areas)

Mining operation will not generate toxic effluent from solid waste. Therefore, impacts of mining activities on soil and water environment in and around the mining area will be negligible. The chances of the water quality getting affected due to mining activity are very remote, as no chemical having toxic element shall be used in carrying out mining activity. Mining will be carried out above the water table during the Plan period and shall not intersect the ground water table during the plan and conceptual period.

(Total 1000 characters)

9.3.4.2.3: Mitigation Measure

(Steps to Minimize Impact on Water Table if Mining Intercepts Groundwater Regime)

The water levels in the area exist far below the proposed working depth and the ultimate working depth and at the end of life of mine. The mining operations will not interfere with natural drainage patterns. Safe distance will be left from canal, Nallah & River on either side if any. The water will pass only in the rainy season through broken land, waste dumps, and its quality is likely to deteriorate, as in absence of toxic minerals, the quality of water will not have any adverse impact. In order to avoid soil erosion & carry-over of the material with rainwater, retaining wall & garland drain are proposed. Various steps, statutory and otherwise, are being taken to protect surface water.

(Total 1000 characters)

Approved

9.3.4.3: Water Balance

9.3.4.3.1: Base / Present Status

(Water Balance (Withdrawal of Surface Water & Release of Mine Drainage Water) Water Requirement & Waste Water Generation from various Activities of Mine, Including Beneficiation)

Water requirement during construction phase domestic and construction activity is estimated as average 15 KLD with a peak consumption of 30 KLD The water requirement of the project during operation phase is 690 KLD Source of water supply Water will be sourced from nearby Jalaput lake located at distance of 3 km Adequate control measures shall be adopted to check the wash off The measures proposed to be adopted are Garland drains are proposed at the toe of the dumps to channelize the runoff water from dumps No waste water shall be generated from the mining activities Septic tanks and soak pit shall be provided for the disposal of effluent generated from mine office The breakup of water requirement is given below Haul road dust suppression including maintenance of topsoil 600 KLD Washing and cleaning of earthmoving equipment service water system 45 KLD Drinking system 10KLD Afforestation 15 KLD Miscellaneous 20 KLD TOTAL 690 KLD

(Total 1000 characters)

9.3.4.3.2: Anticipated Impact

(Impact of Water Drawl on Surface & Groundwater Resources Impact on Surface & Groundwater Quality due to Discharges from Mining, Tailings Pond, Workshop, Township, & Leach ate from Solid Waste Dumps etc)

The mining activity will not entail any significant adverse environmental impact on the surface water and ground water resources and their quality in the core zones of mining lease area Further no tailing dam exists in the lease area There are no welldefined aquifers within the area Thus due to mining ground water resources of the area will not be affected adversely However the baseline data collection will be carried out during the EIAEMP report preparation and shall be furnished to IBM As it is a fresh grant we will be obtaining Environmental and Forest clearance from MoEF CC During the preparation of EIA EMP various studies will be conducted A copy of the approved EIAEMP report shall be submitted to IBM

(Total 1000 characters)

9.3.4.3.3: Mitigation Measure

(Construction of Check Dams, Sedimentation Ponds, Settling Tanks, Retaining Walls etc. with Design & Site Features for Control of run-off Mine Water Treatment for Meeting the Prescribed Standard Waste Water Treatment for Township Sewage, Workshop(s), Tailing Pond Overflow etc)

Adequate control measures shall be adopted to check the wash off The measures proposed to be adopted are Garland drains are proposed at the toe of the dumps to channelize the runoff water from dumps No wastewater shall be generated from the mining activities Septic tanks and soak pit shall be provided for the disposal of effluent generated from mine office Water monitoring stations are marked on Environment Key Plan

(Total 1000 characters)

Approved

9.3.5: Noise

9.3.5.1: Critical Locations Identified within Lease Area

Noise is created during drilling, blasting and by movement of dumpers, truck, loading of muck by shovels etc. and movement of HEMM. Noise levels will be measured within core zone and buffer zone of area. The sample locations are marked on the environment plan. The noise level is under permissible level. The noise level will be recorded quarterly, and the monitoring reports will be submitted to MOEF and CPCB.

(Total 1000 characters)

9.3.5.2: Give Detail About Prediction of Noise Level by using Mathematical Modeling at Different Locations Identified

Generally high noise levels will be confined to work zone areas only and the noise levels gets diffused rapidly with distance, In summary, it can be stated that the impact on the present noise levels due to mining operations will be restricted to the work zone areas only. The summary of the permissible exposures in cases of continuous noise as per above rules is give below:- Noise at lower levels (sound pressure) is quite acceptable and does not have any bad effect on human being but when it is abnormally high, it incurs some maleficent effects on human beings. Sufficiently loud noise may cause the following adverse effects:- (i) Damage hearing and health (ii) Interfere with work task (iii) Interfere with speech communication (iv) Cause irritation (v) Affect inter-room privacy (vi) Interfere with sleep (vii) Cause annoyance. The impact on the ambient noise levels will not be felt at the settlement areas due to masking effect with the existing noise levels. Hence, the noise levels impact due to the proposed mining operations on community is insignificant.

(Total 1000 characters)

9.3.5.3: Measures to Minimize the Impact on Receiving Environment

Noise level will be managed by: 1. Maintenance of machinery and running the same at optimum level. 2. Trained operators will be employed for the operation of machinery. 3. Plantation of trees around haul roads. 4. Drilling should be done by use of sharp bits. 5. Controlled blasting with adequate burden, spacing delay blasting and adequate charge and stemming, secondary blasting shall be avoided. 6. Blasting will be carried out in day times only. 7. The operator's cabin shall be guarded with proper enclosures to reduce the noise level. 8. Provisions of Earmuffs/Plugs for operator. 9. Quarterly monitoring of Sound Level will be done, and reports will be sent to MOEF and RSPCB

(Total 1000 characters)

9.3.5.4: Noise Details for Base / Present Status

Noise Standards			
Area Code	Category of Area	Limits in dB(A)Leq	
		Day Time	Night Time
A	Industrial Area	75	70
B	Commerical Area	65	55
C	Residential Area	55	45
D	Silence Area	40	50

Note :

1. Day time reckoned in between 6.00 am to 9.00p.m

2. Night time reckoned in between 9.00p.m.to 6:00am

3. Silence zone is defined as areas up to 100 meter around such premises as Hospitals, Educational institutes and Courts. The Silence zones are to be declared by the competent Authority

4. Mixed categories of areas should be declared as "one of the four above mentioned categories" by the Competent Authority and the corresponding standards shall be applied.

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S.N.	Station Name	Season	Type of Area	Noise At Day Time	Excess Noise At Day	Noise At Night Time	Excess Noise at Night	Date of Observation
1	NIL	Nil	Nil	0	0	0	0	Nil

9.3.5.5: Impact Assessment & Mitigation Measures

9.3.5.5.1: Anticipated Impact

Give details on impact on ambient noise level due to rock excavation, transportation, processing equipment's & ancillaries

Noise at lower levels sound pressure is quite acceptable and does not have any bad effect on human beings but when it is abnormally high it incurs some maleficent effects on human beings Sufficiently loud noise may cause the following adverse effects Damage hearing and health Interfere with work task Interfere with speech communication Cause irritation Interfere with sleep Cause annoyance

(Total 1000 characters)

9.3.5.5.2: Mitigation Measure

Give details on measures for noise abatement including point source & line source

Due to the mining activities the noise sources shall not generate sound levels above 75 dBA and 70 dBA during day and night respectively as per CPCB Norms for Industrial area The following control measures shall be adopted to keep the ambient noise levels well below the limits Drilling shall be carried out with the help of sharp drill bits which will help in reducing noise Controlled blasting shall be done with proper spacing burden stemming and optimum charge delay Secondary blasting shall not be carried out and Hydraulic rock breaker shall be used for breaking boulders The blasting shall be carried out during favorable atmospheric conditions and less human activity timings Proper maintenance of oiling and greasing of mining machinery at regular intervals shall be done to reduce generation of noise Adequate silencers shall be provided in all diesel engines Acoustic cabin in HEMM protects the operator from high noise level Green Belt Plantation shall be developed around the mining activity area along haul roads temporary dumps and other open areas The plantation minimizes propagation of noise Personal Protective Equipment like dust mask ear plugs etc shall be provided to all employees Periodical monitoring of noise shall be done

(Total 1000 characters)

Approved

9.3.6: VIBRATION

9.3.6.1: Vibration Details for Base / Present Status

S.N.	Station Name	Season	Distance from the Blasting Site (m)	Peak Particle Velocity (mm/s)	Air Over Pressure (DB)	Frequency (Hz)	Date of Observation
1	NIL	Nil	0.00	0.00	0.00	0.00	Nil

9.3.6.2: Impact Assessment & Mitigation Measures

9.3.6.2.1: Anticipated Impact

(Give details on impact of vibrations including damage to materials/structures due to blasting)

The ground vibrations are generated due to mechanization blasting Since there are no habitats are nearby the mining zone it will not have any impact on the buildings and structures etc Blasting also generates air over pressure which may cause damage to window pans Main key factors affecting the ground vibrations are geology and rock type burden maximum charge weight delay initiation pattern and distance and conditions of structure Besides structural damage another factor of concern is human response towards vibration Controlled Blasting under the supervision of a Mining Engineer Mines Manager is proposed so the effect of vibration will not be there also the effect of vibration will be reduced by using sequential blasting with delay detonators and Shock tubes Also the guidelines of DGMS and other competent agencies are being strictly followed apart from the provisions of safety precautions as laid down in the Metalliferous Mines Regulation 1961

(Total 1000 characters)

9.3.6.2.2: Mitigation Measure

Give details on measures for noise abatement including point source & line source

The blasting operations in the mine shall be carried out by using delay detonators which reduces the ground vibrations Further the ground vibrations shall also be controlled by using modern shock tubes with delay nonelectric detonators The measures that are generally followed and currently proposed for abatement of ground vibration air blast and fly rocks are detailed below Blasting shall be carried out strictly as per the guidelines specified under MMR1961 Proper design of blast with correct spacing burden optimum charge delay Supervision of drilling and blasting operations to ensure blast design geometry Subdrilling shall be kept just adequate to tear off the bench bottom Blasting operations shall be carried out only during daytime as per DGMS guidelines Proper warning signals shall be given Drilling parameters like depth diameter and spacing shall be properly designed to give an optimum blast Effective stemming of the explosives shall be done in the drill holes NonElectric detonators NONEL shall also be used to control ground vibrations Blast vibration study shall be conducted regularly

(Total 1000 characters)

Approved

9.3.7: Socio-Economic Environment

9.3.7.1: Demographic Profile

S.N.	Type of Area	Name of Village	Total Population	Male to Female Ratio	Literacy Rate (%)	Employment Rate (%)
1	Residential	Atanda Banuru	360.00	1.00	37.00	41.70
2	Residential	Badel	1108.00	0.88	20.80	57.90
3	Residential	Balda LulluburuSoput	1385.00	2.11	62.30	21.00
4	Residential	Bheja BarabaBodaliguraHKhilaputHanjrapenthaSukriput	401.00	0.97	46.40	54.10
5	Residential	Chiliput	208.00	0.82	26.00	28.40
6	Residential	Kulabiri Dorasabalpur	1435.00	0.85	59.40	35.30

7	Residential	Handiput	Nil	Nil	Nil	Nil
8	Residential	Kakada	146.00	0.94	22.60	24.70
9	Residential	Kakua	428.00	1.04	13.80	51.20
10	Residential	Karanjagura Khurji	210.00	1.03	9.10	26.70
11	Residential	Katiput	132.00	0.97	34.90	21.20
12	Residential	Kitaba	223.00	1.04	17.50	21.50
13	Residential	Maliput Hikimput	151.00	1.15	30.50	29.80
14	Residential	Malisubular	337.00	1.00	25.20	0.30
15	Residential	Mulda	385.00	0.91	35.90	59.20
16	Residential	Padwa	1487.00	1.12	42.50	34.80
17	Residential	Petal	377.00	1.02	22.80	27.30
18	Residential	Somali	954.00	1.09	11.30	27.10

9.3.7.1.1: Anticipated Impact

(Give details about impact on the cropping pattern & crop productivity in the core zone)

The above demography table has been sourced from Census data from internet.The major source of employment in the buffer zone is agriculture which depends upon the rain. There will be no impact on cropping due to mining activities. The Machhkund is the major source for water and the deposit is a plateau with forest covered area. Hence mining will not affect agriculture. Corporate development invariably contributes towards acceleration of the process of socio-economic upliftment of the rural society. CSR activities in the area are proposed.

(Total 1000 characters)

Approved

9.3.7.1.2: Mitigation Measure

(Give details about compensation for loss of land & crops)

Entire Ballada Bauxite block comprises of forest land and no private land is involved. The land within the block area will be degraded during the course of mine operation. However, various mitigation measures have been proposed to control and minimize the impact. Retaining walls / Toe walls and garland drains have been proposed in the periphery of the dump and pit area to control and prevent the flow of discharge water from the mining area. It is proposed to develop greenbelt plantation within the 7.5m safety zone and stabilizing dead dumps by carrying out plantation on it. During the plan period, the worked out area will be reclaimed by suitable plantation.

(Total 1000 characters)

9.3.7.2: Traditional Skills & Source of Livelihood

9.3.7.2.1: Base / Present Status

(Give details about present status on traditional skills & source of livelihood)

The major source of employment in buffer zone is agriculture.

(Total 1000 characters)

9.3.7.2.2: Anticipated Impact

(Give details about positive & negative impacts on present status of livelihood in the area)

The major source of employment in buffer zone is agriculture. Due to mining activities no evacuation of human settlement is involved. The mining operations will not cause any adverse impact on socio economic environment of the area. The Social & Demographic Profile of the area improves by having economic activity near the villages by direct and in direct jobs.

(Total 1000 characters)

9.3.7.2.3: Mitigation Measure

(Give details about training to locals for employment in the project training for making them self-employable or elsewhere)

The mining activities in the area will help in the improvement of the socio-economic status of the people around the mine area by generating direct or indirect employment opportunities. The project also attracts ancillary and related small-scale industries in the adjoining areas. Continued mining activities will benefit the local people due to provision of more infrastructural facilities provided by local industry as mining industry boost up the local market. The Bauxite mined from this mine will be used for Alumina manufacturing, which is an essential commodity for infrastructure development, thus this help in improving economic standard of the country. Further, the company will contribute towards taxes, DMF etc, which will indirectly benefit the local community. Hence, The Social & Demographic Profile of the area will definitely improve by having an economic activity near the villages by direct and in direct jobs.

(Total 1000 characters)

Approved

9.3.7.3: Economic Profile of the Population in Core & Buffer Zone

9.3.7.3.1: Base / Present Status

(Give details about economic profile of the population in core & buffer zone)

The major source of employment in buffer zone is agriculture The economic Profile of the populations in core and buffer zone is satisfactory The socioeconomic conditions of the surrounding villages near the mine site will be improved as the mine will provide both direct and indirect employment to the people However various studies will be conducted during the preparation of EIA EMP report inline with the guidelines of MoEF and CC A copy of the approved EIA EMP report shall be submitted to IBM

(Total 1000 characters)

9.3.7.3.2: Anticipated Impact

(Give details about impact on community resources such as grazing land)

No adverse impact is envisaged due to mining activities on community resources such as grazing land However various studies will be conducted during the preparation of EIA EMP report inline with the guidelines of MoEF and CC A copy of the approved EIA EMP report shall be submitted to IBM

(Total 1000 characters)

9.3.7.3.3: Mitigation Measure

(Give details about employment opportunities & access to other amenities such as education, health care facilities to be extended to locals, addressing local unemployment, tourism or recreation opportunities, efforts for sustainable development of the local community)

The company will assist in improvement of livelihood to promote productive employment and microenterprise short term intensive courses in various trades may commence that aim to achieve sustainable livelihood by strengthening youths technical and functional skills However various studies will be conducted during the preparation of EIA EMP report inline with the guidelines of MoEF and CC A copy of the approved EIA EMP report shall be submitted to IBM

(Total 1000 characters)

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9.3.7.4: Human Settlement in Core & Buffer Zone

9.3.7.4.1: Base / Present Status

(Give details about human settlement in core & buffer zone)

Within the mining lease area no human settlements However there are 18 villages within the buffer zone The details are provided in Demographic Profile chapter Various studies will be conducted during the preparation of EIA EMP report inline with the guidelines of MoEF and CC A copy of the approved EIA EMP report shall be submitted to IBM

(Total 1000 characters)

9.3.7.4.2: Anticipated Impact

(Give details about any displacement of human settlements during the life of the mine)

No displacement of human settlements is proposed during the life of the mine The mining activities will be undertaken after obtaining forest clearance No private land acquisition is involved However various studies will be conducted during the preparation of EIA EMP report inline with the guidelines of MoEF and CC A copy of the approved EIA EMP report shall be submitted to

IBM

(Total 1000 characters)

9.3.7.4.3: Mitigation Measure

(Give details about rehabilitation & resettlement of land ousters & displaced people)

As no displacement of human settlements is proposed during the life of the mine so this para is not applicable However various studies will be conducted during the preparation of EIA EMP report inline with the guidelines of MoEF and CC A copy of the approved EIA EMP report shall be submitted to IBM

(Total 1000 characters)

9.3.7.5: Health Profile of Population in Core & Buffer Zone

9.3.7.5.1: Base / Present Status

(Give details about health profile of population in core & buffer zone)

The health profile of the populations in the buffer zone are satisfactory Some health and safety hazards are anticipated to affect the persons to be employed in the project The workers will be exposed to the dust particles and excavation if adequate measures have not been taken it may cause occupational health hazard However various studies will be conducted during the preparation of EIA EMP report inline with the guidelines of MoEF and CC A copy of the approved EIA EMP report shall be submitted to IBM

(Total 1000 characters)

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9.3.7.5.2: Anticipated Impact

(Give details about any adverse impact on the general health condition of the population in core & buffer zone)

No adverse impact on the general health condition of the population in buffer zone is envisaged due to mining operations Plantation is proposed in the area The applicant will strictly implement all the prescribed safety measures although the magnitude of mining is very less High safety is ensured in the working conditions of the miners Protective equipment will be provided to the employees such as safety shoes helmets and dust masks By using these PPEs the chances of occupational health diseases will be minimized The health of the workers will be regularly monitored and suitable medical facilitates shall be created by the applicant By periodical medical checkup treatment and job rotation of employees the impact would be minimized Pre placement medical checkup shall be done and regular health check up in 6 monthly intervals is planned for all the mine workers Following measures will be implemented Dust Extraction System Regular Water Sprinkling for dust suppressions Initial medical examination of workers is proposed Rest shelter and toilets facilities will be provided All the safety equipment such as helmets shoes goggles dust mask and ear plugs will be provided Medical facilities will be provided to the workers A well equipped first aid facility will be maintained at the area However various studies will be conducted during the preparation of EIA EMP report inline with the guidelines of MoEF and CC A copy of the approved EIA EMP report shall be submitted to IBM

(Total 1000 characters)

9.3.7.5.3: Mitigation Measure

(Give details about avenues like dispensaries, hospitals, maternity homes if any to be created)

Public health Centre PHCS are there in all the villages in buffer zone but for other major facilities are available Villagers have to go to more than 10 km from their place to avail medical facility However various studies will be conducted during the preparation of EIA EMP report inline with the guidelines of MoEF and CC A copy of the approved EIA EMP report shall be submitted to IBM

(Total 1000 characters)

9.3.7.6: Historically, Culturally & Ecologically Important Places in Core & Buffer Zone

9.3.7.6.1: Base / Present Status

(Give details about historically, culturally & ecologically important places in core & buffer zone)

The core and buffer zone are free from historically culturally and ecologically important places up to 10km radius

(Total 1000 characters)

Approved

9.3.7.6.2: Anticipated Impact

(Give details about risk profiling)

As there is no historical monument place of worship within 10 km of the mining lease area hence no anticipations are envisaged

(Total 1000 characters)

9.3.7.6.3: Mitigation Measure

(Give details about public health benefits (e.g. clean water to an aboriginal community), measure for safeguard against damage etc.)

The project is a fresh grant of area under auction All the clearances will be taken before execution of are The mining plan approval environmental clearance process is also being run Owing to that a detailed EIAEMP report shall be prepared incorporating all the issues related to the environment concerning both core and buffer zones After that preparation the detailing as required can be done As far as the matter related to public health is a concern and the company is very keen in the particular matter shall do accordingly as the regulations

(Total 1000 characters)

Chapter 10: Annexures

1. Upload Document

1.1 Upload Document

SI.No.	Title	Is Upload	Document (only pdf allowed)
1	Letter of Intent /Letter of lease grant	Nil	A1_Letter_of_Intent_Name_Change.pdf
2	Copy of lease deed executed	Nil	Nil
3	Copy of Declaration of Owner/Nominated Owner in case of Company/partnership firm	Nil	A5_CTC_Onwner_of_Mine.pdf
4	ID & Address Proof of Owner/ Nominated Owner	Nil	A6_KYC_-_Ajit_Kumar_Samal.pdf
5	Copy of Environment and Forest Clearence, Consent to Establish, Consent to Operate	Nil	Nil
6	Copy of Registration of Company (RoC)/Partnership firm (Registration) & Deed	Nil	A3_Registration_of_Company_MAL_KAL.pdf
7	Consent letter for Qualified Person	Nil	A7_Mine_Owners_Authorization___22May2023.pdf
8	Experience & Qualification Details of Qualified Person	Nil	A8_QP_Certificates.pdf
9	Certificate from QP	Nil	A9_Certificate_from_Qualified_Person-f.pdf
10	Copy of Bank Guarantee	Nil	Bid_Security_BG_Ballada.pdf
11	Copy of Performance Surety	Nil	Upfront_payment.pdf
12	Copy of MDPA (as applicable)	Nil	Nil
13	Exploration details	Nil	Proposed_BH_Details.pdf
14	Copy of feasibility Report	Nil	Prefeasibility_Report.pdf

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15	Copy of Study reports conducted as per Para 4.3.1	Nil	Ballada_combined_GR.pdf
16	Chemical and Mineralogical analysis report	Nil	A14_Chemical_Analysis_Report.pdf
17	Any other Report or Certification as required in the submitted Document.	Nil	Nil
18	Copy of Scale relaxation approval granted(if applicable)	No	Nil
19	Mineral processing flowsheet with stage wise recovery	Nil	Mineral_Processing_Plant.pdf
20	Any Other	Yes	Combined_Annexures_Uploaded.pdf

Approved

Chapter 11: Plates (OC)

1. Upload Document

1.1 Upload Document

S.N.	Title	Is Upload	Document
1	Lease sketch plan;	Nil	Plate_1_Ballada_Key_Plan_Toposheet.pdf
2	Surface Plan (.KMZ format)(Georeferenced); A statutory plan as per MCDR, 2017. The Plan should be submitted showing different color codes for:(1) Active Pits & Excavation area(2) Excavated area reclaimed & rehabilitated (3)Active dumps (4) Stabilized & rehabilitated dump area , (5) Green belt (6) Mineral Stacks (7) Utilities such as plant, buildings etc (8) Lease boundary along with other details.)	Nil	SURFACE_PLAN.kmz
3	Surface Geological Plan of the lease (.KMZ format)(Georeferenced); The Plan should be submitted showing different color codes for : (1) Lithological/Geological Occurance (2) Area under G1,G2,G3 & G4 (3) Active pits & Excavation area (4) Dump Area (5) Mineral Stacks (6) Lease boundary along with other details.)	Nil	GEOLOGICAL_PLAN.kmz
4	Surface Geological sections (in Pdf format); Geological sections with different color coding depicting all the features shown in Surface Geological Plan.)	Nil	Geological_Cross_Section.pdf
5	Five year Production and Development plan (.KMZ format)(Georeferenced); The Plan should be submitted showing different color coding for: (1) Active Pit and Excavation area ,	Nil	5_YEARS_P&D.kmz

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	(2) Year wise excavation proposal for year I to V ((3) Active dump and yearwise dump proposal for year I to V (4) Year wise Dump working proposal for year I to V (6) Lease boundary (with reference to chapter 4) along with other details.)		
6	Five year Production and Development sections (in pdf fromat); Year wise excavation and dumping proposals with different color coding depicting all the features as shown in the Five year Production and development plan.)	Nil	P&D_Sections.pdf
7	Progressive Mine Closure Plan (.KMZ format)(Georeferenced); The Plan should be submitted showing different color coding for : (1) Yearwise excavated area Reclaimed & rehabilitated for year I to V (2) Year wise dump area to be stabilized and dump area to be rehabilitatd for year I to V (3) Year wise Green area proposed from year I to V.(4) Any other reclamation and rehabilitation measures proposed.(5) Lease boundary (with reference to chapter 6) along with other details.)	Nil	PMCP_1.kmz
8	Progressive mine Closure sections (in pdf format); Year wise Progressive mine clouser sections showing all the yearwise reclamation, rehabilitaion proposals as depicted in the Progessive mine clouser plan.)	Nil	Progressive_Mine_Closure_Section.pdf
9	Conceptual Plan (.KMZ format)(Georeferenced); The Plan should depict the staus of lease area as envisaged at the end of life of Mine showing all the details. Status of land use shall be depicted by different color coding.)	Nil	CONCEPTUAL_PLAN.kmz
10	Conceptual Sections (pdf) format;	Nil	Conceptual_Section.pdf
11	Geo referenced Cadastral Plan; Duly certified by the State Government)	Nil	Georeferenced_Cadastral_Plan.pdf
12	Financial Assurance Plan (KMZ);	Nil	FINANCIAL_ASSURANCE_PLAN.kmz

Approved

13	Environmental Plan (.KMZ format)(Georeferenced); As per MCDR, 2017 indicating all the details.)	Nil	Plate_11_Enviornment_Plan.kmz
14	Any other plan/section as deemed necessary by approving authority;	Yes	Ballada_Plan__Combined.pdf
15	Five Year Production and Development sections (in pdf format);	No	Nil
16	LEVEL WISE SLICE PLAN; LEVEL WISE SLICE PLAN (PDF FORMAT IN VISIBLE SCALE))	No	Nil

Approved

Chapter 11 : Plates(UG) : NA

Approved

Esigned by: RD
Date: 08/08/2023 04:59:57 PM

BEFORE THE NATIONAL GREEN TRIBUNAL EASTERN ZONE AT KOLKATA

MEMORANDUM OF APPEAL

(Under Sections 16(h) read with 18(1) of the National Green Tribunal Act, 2010)

Appeal No. of 2025

Ajaya Muduli & Ors. …Appellants

-Vs-

State Level Environment Impact Assessment Authority, Odisha & Anr

…Respondents

INDEX

S. No	Date	Particulars	Page No.
VOLUME III			
16.	May 2025	Annexure A10- EIA report with annexures	749-1358
17.	-	Annexure A11- Acknowledgement receipts of the FRA claims along with translation	1359-1376

//Certified to be True Copies of the respective originals//

Through
A.Yogeshwaran
Counsel for the Appellant
Ph : 9566254546 | Email : yogeshwaranadv@gmail.com

Annexure – IV

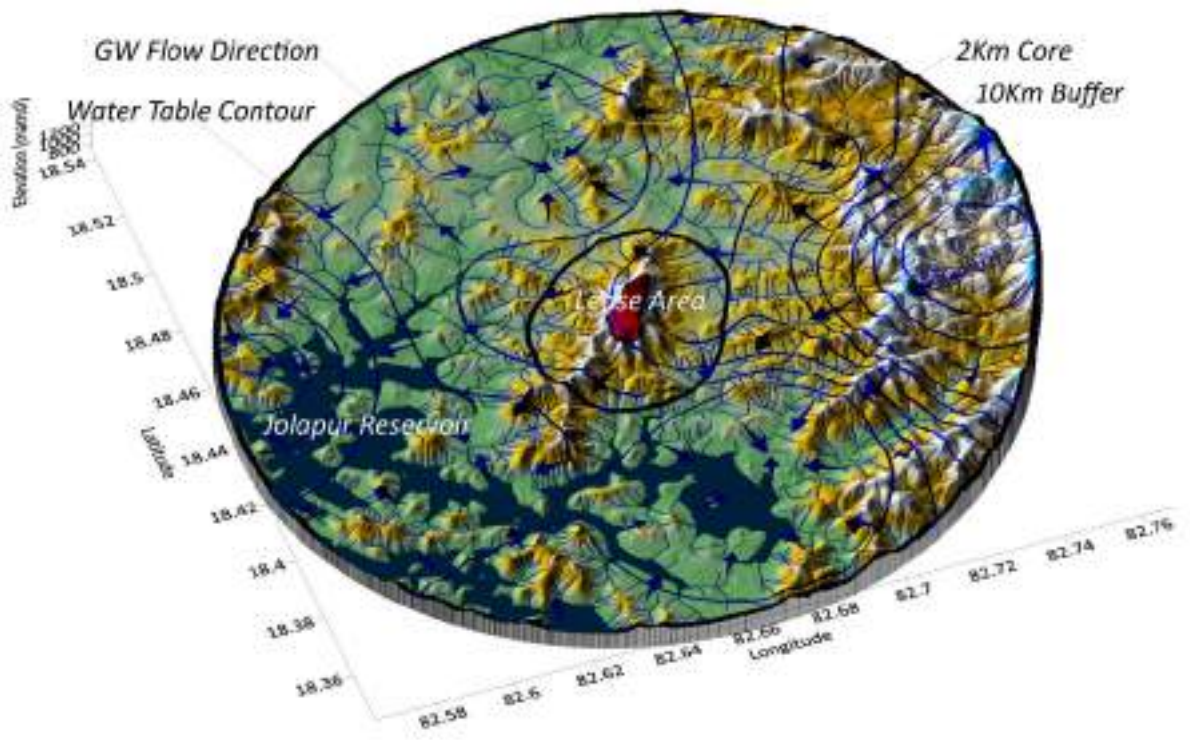
COMPREHENSIVE HYDROGEOLOGICAL REPORT

SUBITTED BY

Ballada Bauxite Block

M/s Kalinga Alumina Limited

(Located at Village Ballada, Taluka – Nandapur, Koraput district, Odisha.)



CGWA ACCREDITED INSTITUTION
VARDAN ENVIRONET
Plot 82-A, IMT Manesar, Sector-5, Gurugram (Haryana)
E-Mail: hydro@vardan.co.in
Contact: 0124-4343750, 09953147268

DOCUMENT NO. 2023_141_CHR

(December-2023)

TABLE OF CONTENTS

CHAPTER 1	**SAILENT FEATURE OF THE PROPOSAL**	**01**
CHAPTER 2	**ABOUT THE PROJECT**	**02-18**
2	BRIEF INTRODUCTION ABOUT THE PROJECT	2
2.1	LAND USE LAND COVER OF THE SURROUNDING AREA	7
2.2	DEM AND TOPOGRAPHY	10
2.3	GEOMORPHOLOGY AND DRAINAGE 5KM(RADIUS/SQUARE)	12
2.4	DETAILS OF WETLANDS/MAJOR WATER BODIES	17
CHAPTER 3	**HYDROGEOLOGY**	**19- 59**
3.1	GEOLOGICAL SETUP	19
3.2	HYDROGEOLOGICAL SETUP	23
3.2.1	AQUIFER CHARACTERISTICS	28
3.2.2	AQUIFER PARAMETERS	28
3.2.3	GROUND WATER FLOW AND AQUIFER INTERACTION WITH SURFACE WATER BODIES	36
3.2.4	DEPTH TO WATER LEVEL	38
3.2.5	HYDROGRAPH OF THE WATER LEVEL (10 YEARS)	43
3.2.6	GROUND WATER QUALITY	49
3.2.7	GROUND WATER QUALITY OF NEAR BY WATER BODIES	59
CAHPTER 4	**APPROVED MINE PLAN**	**61-68**
CAHPTER 5	**ESTIMATION OF MINE SEEPAGE AND ADVANCED DEWATERING PLAN**	**69**
CAHPTER 6	**MINE WATER MANAGEMENT**	**70**
CAHPTER 7	**IMPACT OF MINE DEWATERING/ABSTRACTING AND MITIGATION MEASURES**	**71-72**
CAHPTER 8	**ANY OTHER DETAILS PERTAINING TO THE PROJECT**	**73**
CHAPTER 9	**SUMMERY AND CONCLUSION**	**74-75**
CHAPTER 10	**ACCREDITATION CERTIFICATE**	**76**

LIST OF TABLES

TABLE NO.	TITLE	PAGE NO.
1.1	SALIENT FEATURES OF THE PROJECT	1
2.1	LULC CLASSIFICATION	7
2.2	RAINFALL STATISTICS OF DISTRICT OF 10 YEARS	16
3.1	STRATIGRAPHIC SUCCESSION	19
3.2	AQUIFER GROUPING IN KORAPUT DISTRICT, ODISHA	28
3.3	SUMMARY OF SDT DATA	29
3.4	SDT DATA SHEET – PUMPING WELL	29-31

3.5	RESULT OF PUMPING TEST	33
3.6	AQUIFER PERFORMANCE TEST DATA- TIME V/S DRAWDOWN EXPLORATORY WELL & OBSERVATION WELL	34
3.7	AQUIFER PERFORMANCE TEST – RESIDUAL DRAWDOWN V/S T/T' OF EXPLORATORY WELL & OBSERVATION WELL	35
3.8	DETAILS OF WELL INVENTORY AND GROUNDWATER LEVELS MONITORED IN AND AROUND PROJECT SITE	38
3.9	DETAILS OF THE CGWB MONITORING STATIONS.	45
3.10	PHYSICOCHEMICAL RESULTS OF THE GROUNDWATER.	48
3.11	GROUND WATER QUALITY OF CGWB STATION	54
3.12	SURFACE WATER QUALITY RESULT	59-60
4.1	YEAR WISE OPENCAST DEVELOPMENT	63
4.2	LAND ENVIRONMENT	65
6.1	WATER REQUIREMENT DETAIL	70
8.1	DYNAMIC GROUND WATER RESOURCE OF INDIA, 2022 (KORAPUT DISTRICT OF ODISHA)	73

LIST OF FIGURES

FIGURE NO.	TITLE	PAGE NO.
2.1	LOCATION MAP OF THE STUDY AREA	4
2.2	SATELLITE IMAGERY MAP OF THE STUDY AREA	5
2.3	TOPOGRAPHICAL MAP OF THE STUDY AREA.	6
2.4	PIE CHART OF LULC CATEGORIES	8
2.5	LAND USE/LAND COVER PATTERN OF BUFFER ZONE	9
2.6	DEM MAP	11
2.7	ELEVATION MAP OF THE STUDY AREA	13
2.8	GEOMORPHOLOGICAL MAP OF THE STUDY AREA	14
2.9	DRAINAGE MAP OF THE STUDY AREA	15
2.10	RAINFALL DATA OF THE DISTRICT (10 YEARS)	17
2.11	SHOWING THE WETLANDS OF INDIA	18
3.1	GEOLOGICAL MAP (10KM BUFFER)	21
3.2	LITHOLOGICAL MAP (10KM BUFFER)	22
3.3	HYDROGEOLOGICAL MAP (10 KM BUFFER)	26
3.4	3D WATER TABLE CONTOUR MAP	27
3.5	DEPTH TO WATER LEVEL OF CORE AND BUFFER ZONE IN PRE-MONSOON SEASON (MBGL)	40
3.6	DEPTH TO WATER LEVEL OF CORE AND BUFFER ZONE IN POST-MONSOON SEASON (MBGL)	41
3.7	GROUND WATER LEVEL FLUCTUATION MAP OF THE STUDY AREA	42
3.8	LOCATION OF CGWB OBSERVATION WELLS	44
3.9	HYDROGRAPH OF BHEJA CGWB MONITORING WELL.	46
3.10	HYDROGRAPH OF SATSIMILE CGWB MONITORING WELL.	47
3.11	HYDROGRAPH OF SOGURU CGWB MONITORING WELL.	48

FIGURE NO.	TITLE	PAGE NO.
3.12	ELECTRICAL CONDUCTIVITY GRAPH	52
3.13	FLUORIDE CONCENTRATION GRAPH	52
3.14	NITRATE CONCENTRATION GRAPH	53
3.15	CHLORIDE CONCENTRATION GRAPH	53
3.16	ELECTRICAL CONDUCTIVITY MAP OF CORE AND BUFFER ZONE	55
3.17	FLUORIDE MAP OF CORE AND BUFFER ZONE	56
3.18	NITRATE MAP OF CORE AND BUFFER ZONE	57
3.19	CHLORIDE MAP OF CORE AND BUFFER ZONE	58
4.1	MINE CONCEPTUAL PLAN	66
4.2	SURFACE PLAN MAP	67
4.3	GEOLOGICAL CROSS SECTION	68
6.1	WATER BALANCE CHART	70

S. N	TITLE	PAGE NO.
01.	BIBLIOGRAPHY	77

ANNEXURE

ANNEXURE NO	TITLE	PAGE NO.
I	GROUND WATER QUALITY TEST REPORT	78-93
II	SURFACE WATER QUALITY TEST REPORT	94-109
III	PHOTOGRAPHS OF SITE VISIT	110-111

CHAPTER -1

SAILENT FEATURE OF THE PROPOSAL

Table 1.1: Salient Feature of the Project

1.1	*Application No. (CGWA NOC No.)*	***Not Applicable***
1.2	*Accredited by*	***Rajiv Gandhi National Ground Water Training & Research Institute***
1.3	*Date of Accreditation*	***15.02.2021***
1.4	*Validity upto*	***14.02.2026***
1.5	*Work Order Date (Attach copy of work order with masking details of charging)*	***Not Applicable***
1.6	*Name of Project with Address*	***Ballada Bauxite Block M/s Kalinga Alumina Limited Address: Village Ballada, Taluka – Nandapur, Koraput district, Odisha***
1.7	*Existing/Proposed Project*	***Proposed Project***
1.8	*CTE issued date*	*-*
1.9	*Alluvium/Non-Alluvium*	***Non-Alluvium***
1.10	*Block Name & Category (GWRA,2020)*	***Nandapur (Safe)***
1.11	*Water requirement (m^3/day)*	***690 KLD Surface water from Jalaput Lake***
1.12	*Ground water Modeling Requirement (Yes/No)*	***Not Applicable***
1.13	*In case the report is prepared jointly by accredited institute and individual consultant, name/details of chapters prepared by the individual consultant*	***Report is prepared by Vardan Environet***
1.14	*Signature of the Consultants(s)*	

CHAPTER -2

ABOUT THE PROJECT

2. BRIEF INTRODUCTION ABOUT PROJECT

Kalinga Alumina Limited (formerly known as Mundra Aluminum Limited), a wholly owned subsidiary of Adani Enterprises Limited, has a vision of setting up an integrated greenfield alumina refinery of 4.0 MTPA capacity and also to develop bauxite mines in the vicinity for captive / commercial use. Recently Kalinga Alumina Limited has secured two bauxite mines in Odisha, viz. Ballada in Koraput district and Kutrumali in Kalahandi/Rayagada district through an auction process.

Adani Group is currently embarking on a strategic growth plan to diversify into mines and metals space. Strong parentage in power, infrastructure, logistics, mining, and global presence puts it in a pre-eminent position to make it a globally competitive player in this field.

Adani Group is a global multinational and a front runner with its strong ESG principles. It has vast experience in mining operations of various major minerals such as Coal, Iron Ore, limestone, beach sand, among others and therefore, is in a pre-eminent position to conduct scientific and environment friendly mining

The Government of Odisha, issued letter of intent vide letter SM-MC2-MC-0007-2023/2143/S&M Bhubaneswar dated 1st March 2023 for grant of mining lease for Ballada bauxite block in Village - Ballada, Taluka – Nandapur, District- Koraput, Odisha for an area of 144.945 ha to Mundra Aluminum Limited (now Kalinga Alumina Limited) for period of 50 years. The Copy of letter is attached as Annexure –I.

The proposed project entails mining of Bauxite by opencast mining method with an annual Peak Rated Capacity of ~ 4.0 MTPA of Bauxite (ROM). Besides, it is envisaged to have crushing/Screening facilities within the lease area with a capacity of 800 TPH at rated production level over an area of 144.945 Ha located at Village - Ballada, Taluka – Nandapur, District- Koraput, Odisha between latitudes 18°26'05.61588" N to 18°27'13.34448" N and

Longitude 82°39'32.39136" to 82°40'25.36716" E. & is covered under the Survey of India toposheet no. No. E44K11 (65J/11).

Sources of water shall be from Jolaput Lake located at distance of 5km, the total Surface water requirement during mine operation is estimated as 690 KLD.

SCOPE OF STUDY

The main objective of the present study is to prepare a Comprehensive Hydrogeological report in line with the CGWA guidelines and SOP Version 9.1 issued in May 2023. The study is broadly encompassing of the following aspects:

1. The sub-surface lithology, aquifer characteristics, ground water level, ground water quality, long term ground water level and quality changes, availability of ground water in and around the mine area [Core (2 km radius) and buffer zones (10 km radius) from the mine boundary].
2. Estimation of stage-wise and year-wise mine seepage as per CGWA Guidelines and SOP Version 9.1 issued in May 2023.
3. Estimation of the quantum of mine dewatering to be required during mine operations and appraisal of its impact on the local Hydro-geological regime and gainful reuse of water available through dewatering of mine.
4. To suggest rainwater harvesting measures in and around the mine lease area.

METHODOLOGY

To achieve the above scope the following methodology has been adopted

- Collection of satellite data, maps, and literature about the aquifer characteristics etc.,
- Generation of topography of the study area using Carto-DEM
- Collection for rainfall data.
- Collection of legacy pre and post monsoon ground water level data
- Collection of details such as rock type, lithology, type of aquifer shallow or deep aquifer, ground water withdrawal and aquifer parameters.

- Collection of well inventory data & measurement of well depth, water level, yield, and water quality.
- Preparation of ground water level zone map, water table contour (pre and post monsoon).

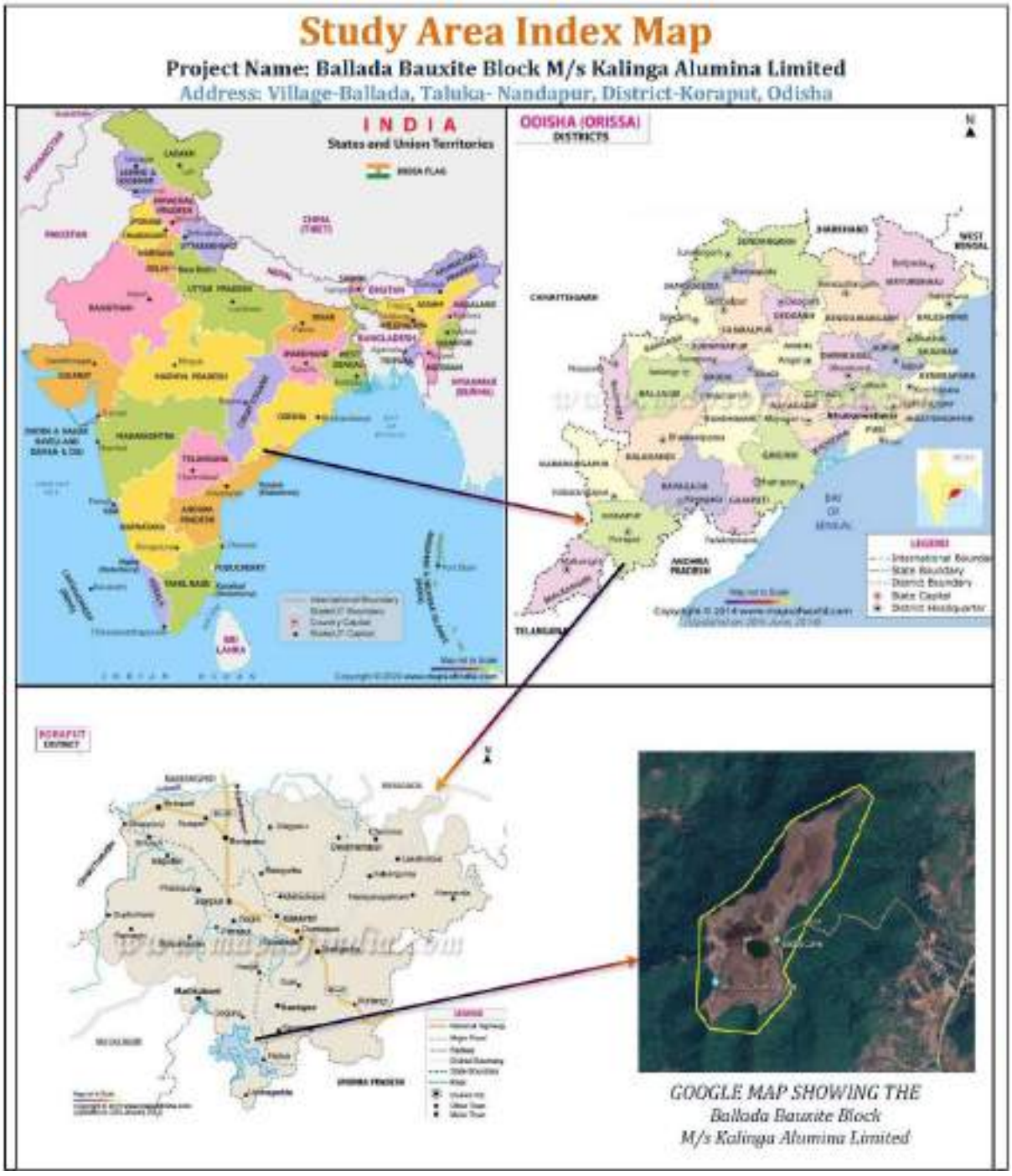


Figure 2.1: Location map of the study area

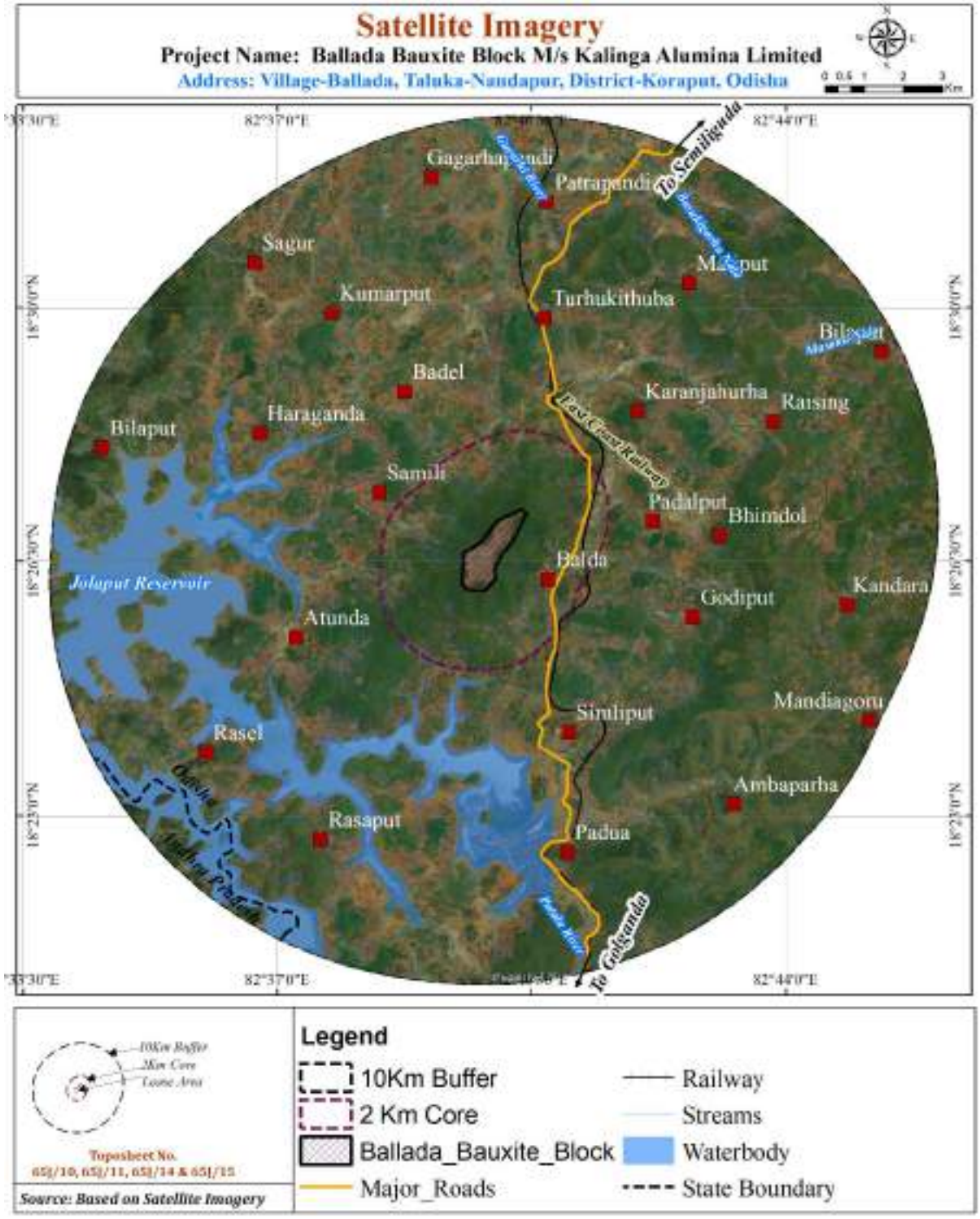


Figure 2.2: Satellite Imagery map of the study area

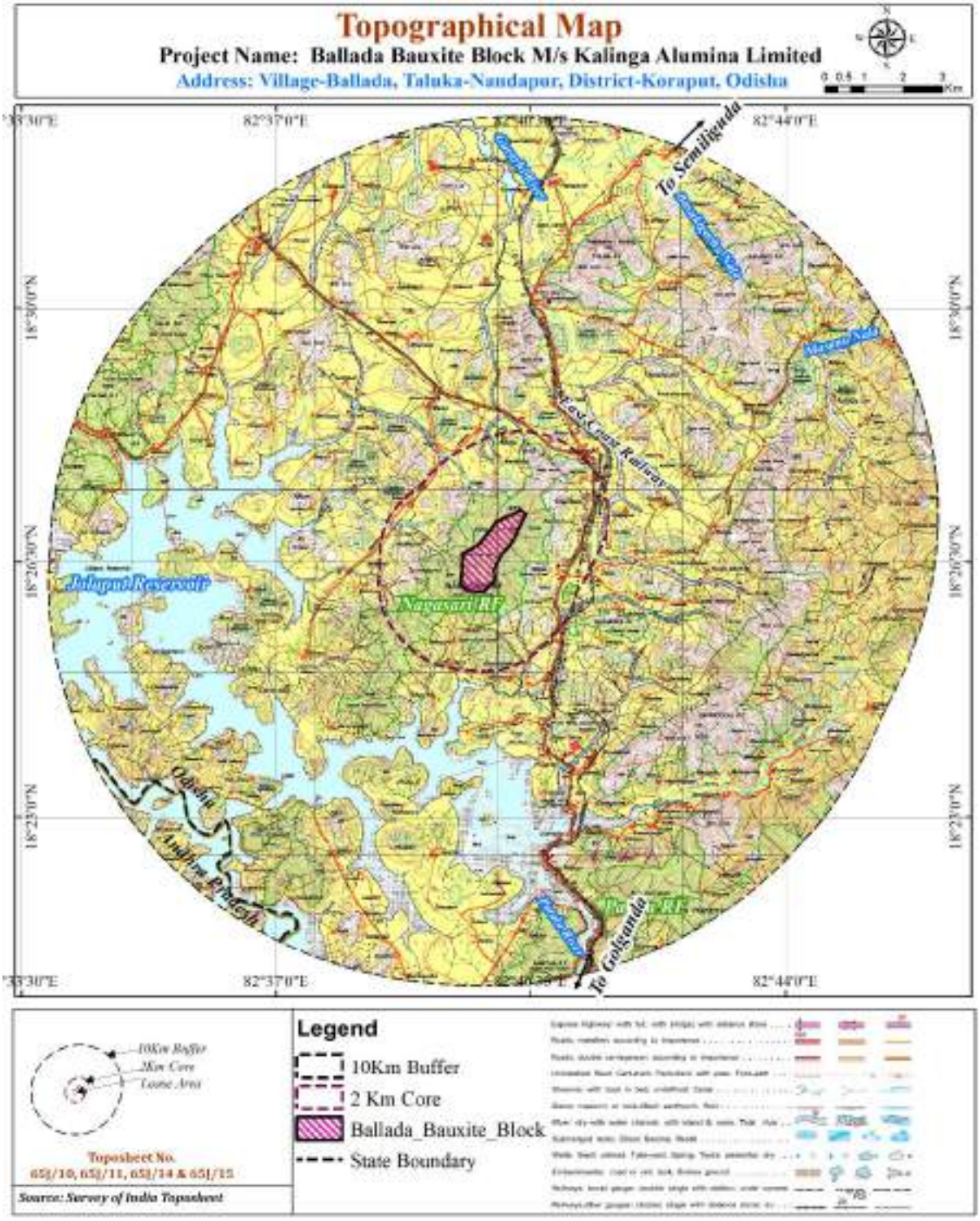


Figure 2.3: Topographical map of the study area

2.1. LAND USE LAND COVER OF THE SURROUNDING AREA

The land use of the study area is studied and analysed by using the latest available satellite imagery from National Remote Sensing Centre (NRSC), Hyderabad.

***Satellite data*: -** The Indian Remote Sensing satellite IRS-1C/1D/P6 LISS III was used for present analysis. One scene of IRS P6 LISS III covered the entire study area.

Topographical maps of the study area: - The Survey of India topographical map of 65J/10, 65J/11, 65J/14 & 65J15 covering the project site is used as reference map for geo referencing of the remote sensing data.

The land use in the village reflects the socio-economic conditions of the people in addition to the natural environmental factors. Land use is also one of the prime parameters to be considered for ground water estimation. Primarily, a 10 km radius from the mine site forms part of Forest. The second major land use is Crop Land. Most of the area is irrigated by open wells.

Core Zone - Crop Land and Forest.

Buffer Zone - The majority of the Buffer zone within a 10 km radius of the mine boundary occupies Crop land followed by Forest Area.

The study area theoretically covers an area of 36884 Ha, within the circle encompassed by 10 km radius around the Mine site. The land use is classified into 6 classes - viz. Agriculture Land, Built-up, Barren Land, Forest, Open Scrub & Water body.

The pie-chart of LULC category and Land use map is given in figure no 2.4 and 2.5 respectively.

Land use pattern in buffer zone (10 km Radius) –

Table 2.1: LULC Classification

Land-use Classification	Area (Ha)	Area (%)
Agriculture Land	16549	45
Built-up	150	1
Barren Land	450	1
Forest	4929	13
Open Scrub	10703	29
Waterbody	4103	11
Total	*36884*	*100*

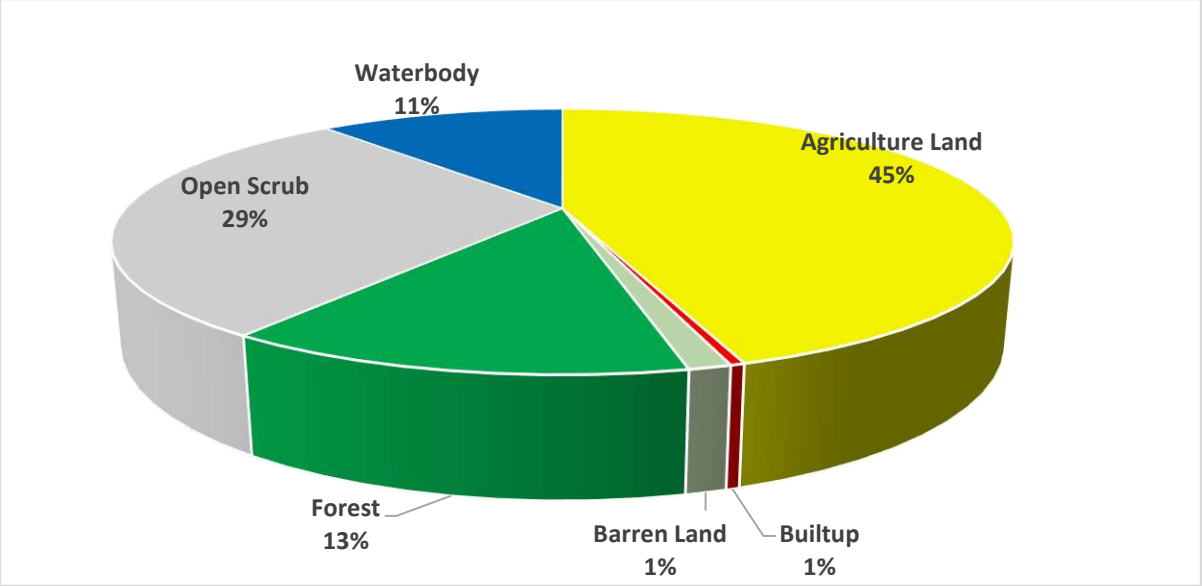


Figure. 2.4: Pie chart of LULC categories

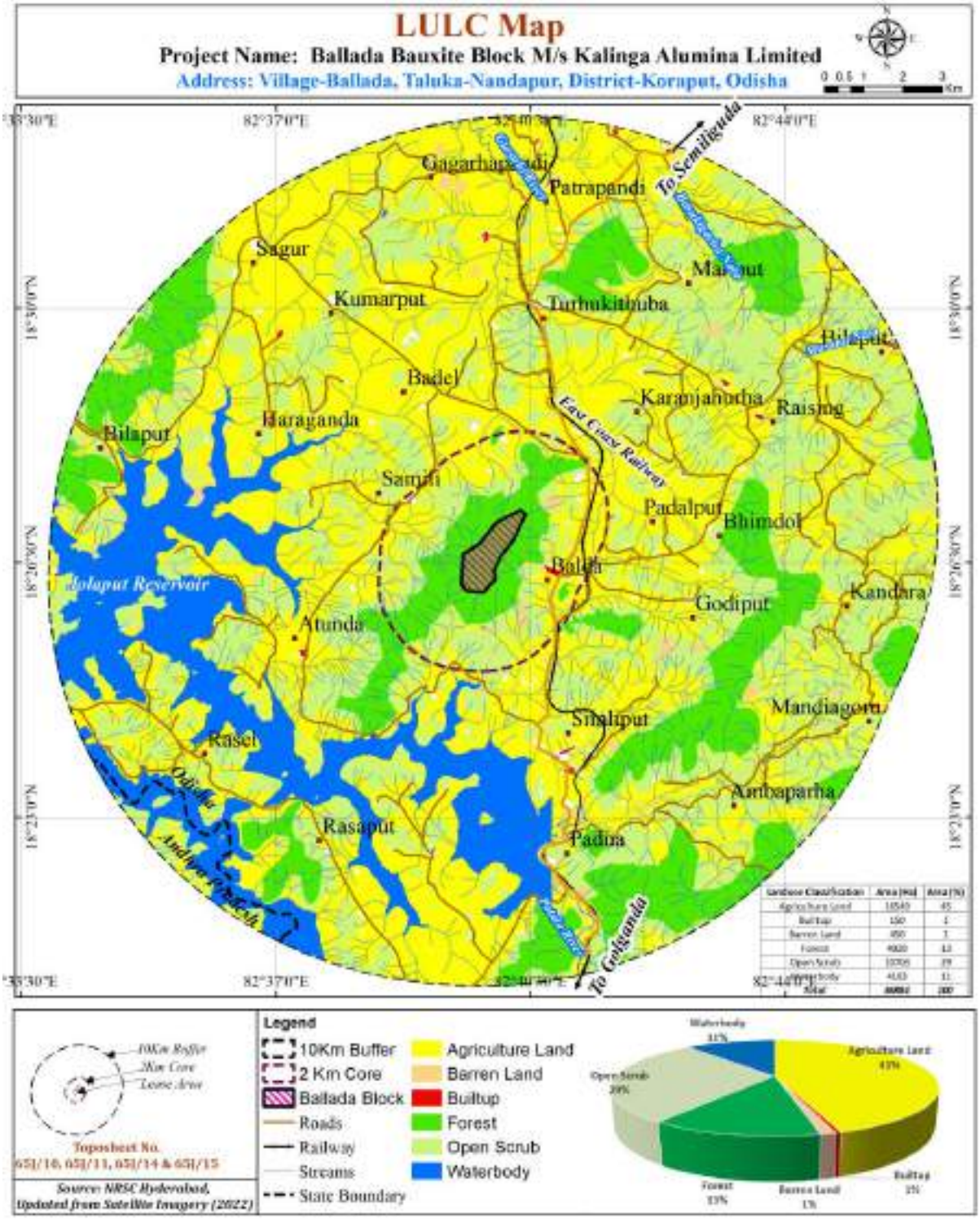


Figure 2.5: Land use/Land cover pattern of Buffer Zone

2.2. DEM AND TOPOGRAPHY

The Terrain elevation (Topography) is derived from the Carto-DEM data.

The study area (10 km radius from the mine site boundary – buffer zone) elevation ranges from 717 m to 1274 m AMSL. The maximum elevation is observed in the mine lease area and eastern part of the study area.

Core Zone: The elevation of the core zone of a 2 km radius, ranges between 803 m AMSL to and 1274 m AMSL. The maximum elevation is noticed in the central part of the lease area. The mine site is located in an elevated area.

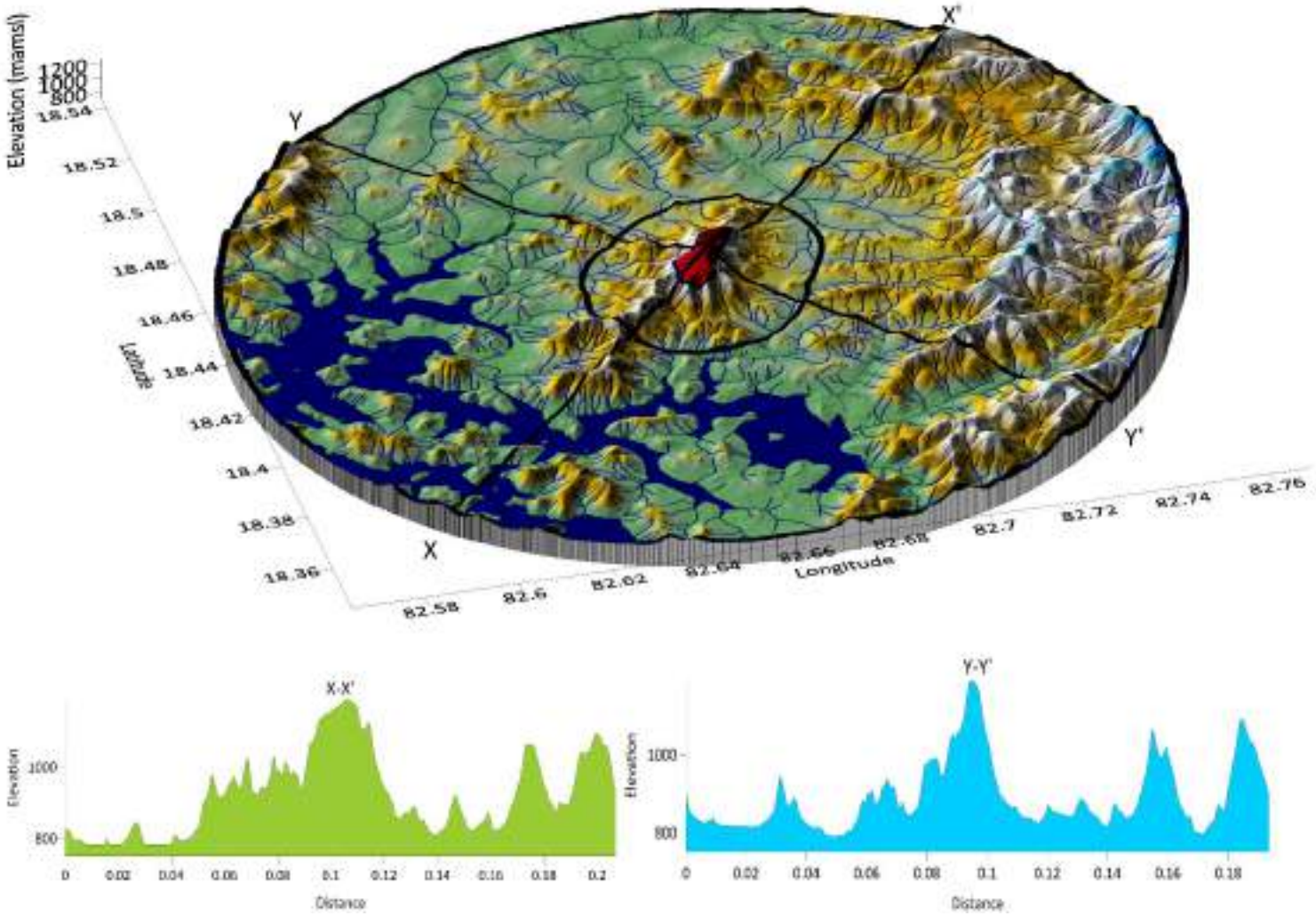


Figure 2.6: DEM Map

2.3. GEOMORPHOLOGY AND DRAINAGE 10 Km (Radius/Square)

Geomorphology:

Broadly, the entire district is divided into Dissected plateau (hills & valleys), Undissected plateau (Plain), Pediplain and Ridges & Valleys.

Geomorphologically the study area is characterized with Dissected Denudation hills & Valleys, Dissected Structural hills, and valleys, Pediment Pediplain Complex, Dam & Reservoir, River, and Waterbodies.

The core zone including the lease area composed with dissected denudation hills & valleys and dissected structural hills & valleys.

Drainage and Waterbodies

The Jolaput Reservoir is the nearest waterbody which is situated at 5 Km away from the project site. The drainage pattern of this area is dendritic in nature. However, number of small to medium water bodies are noticed in the study area. The study area is irrigated by bore well / dug well. The return flow from the irrigation land maintains the ground water level at moderately deeper depth in the bore well.

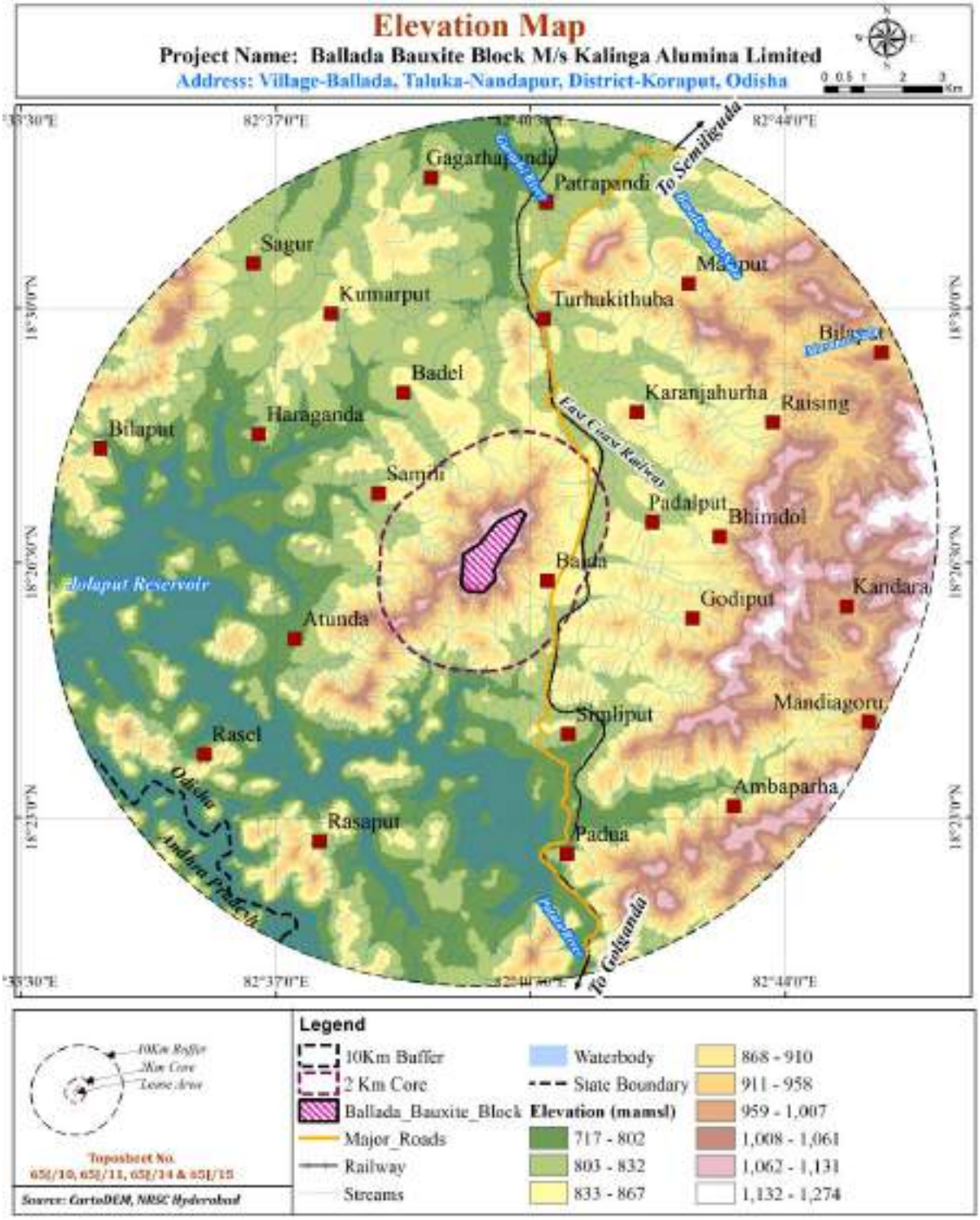


Figure 2.7: Elevation Map of the Study Area

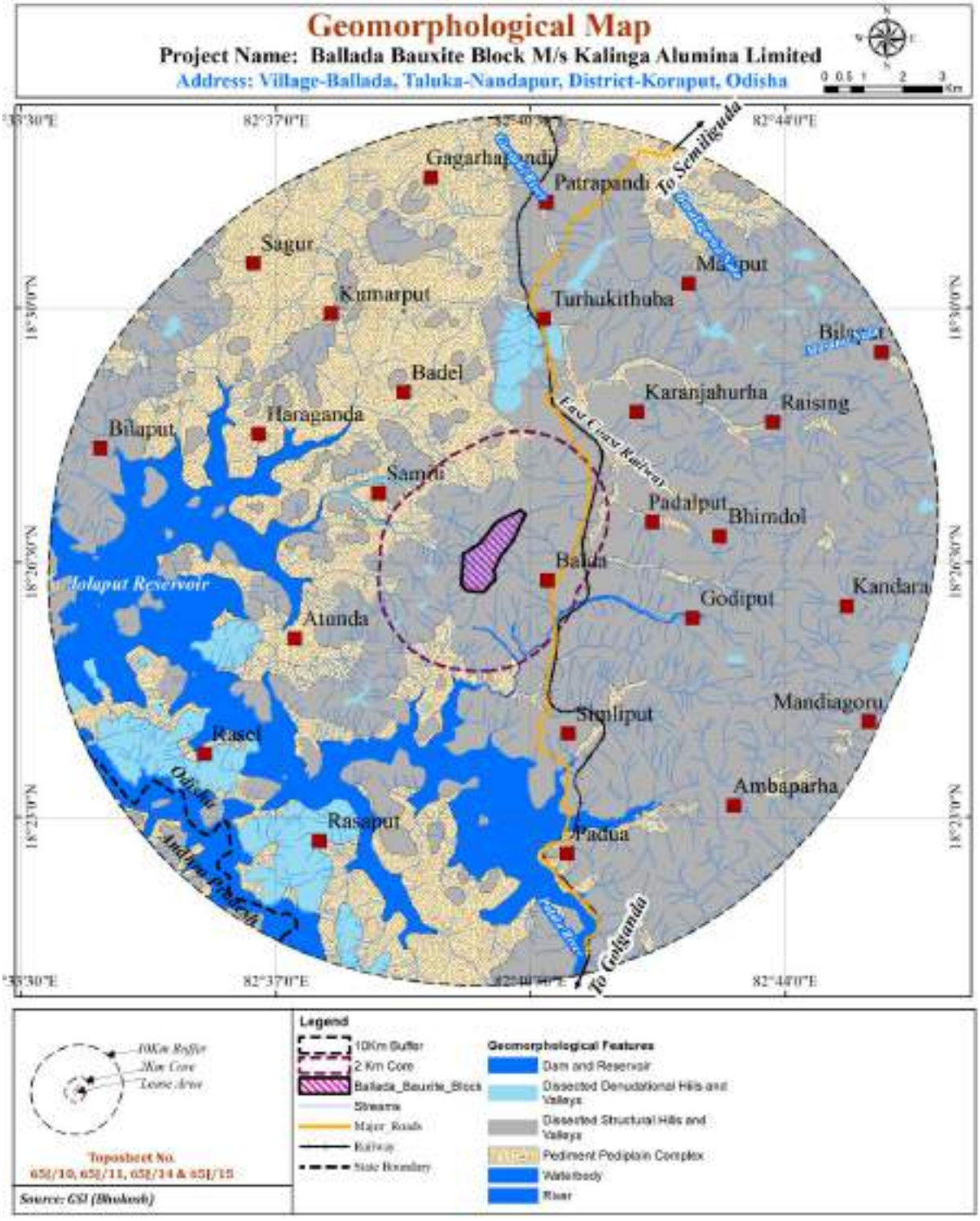


Figure 2.8: Geomorphological Map of the Study Area

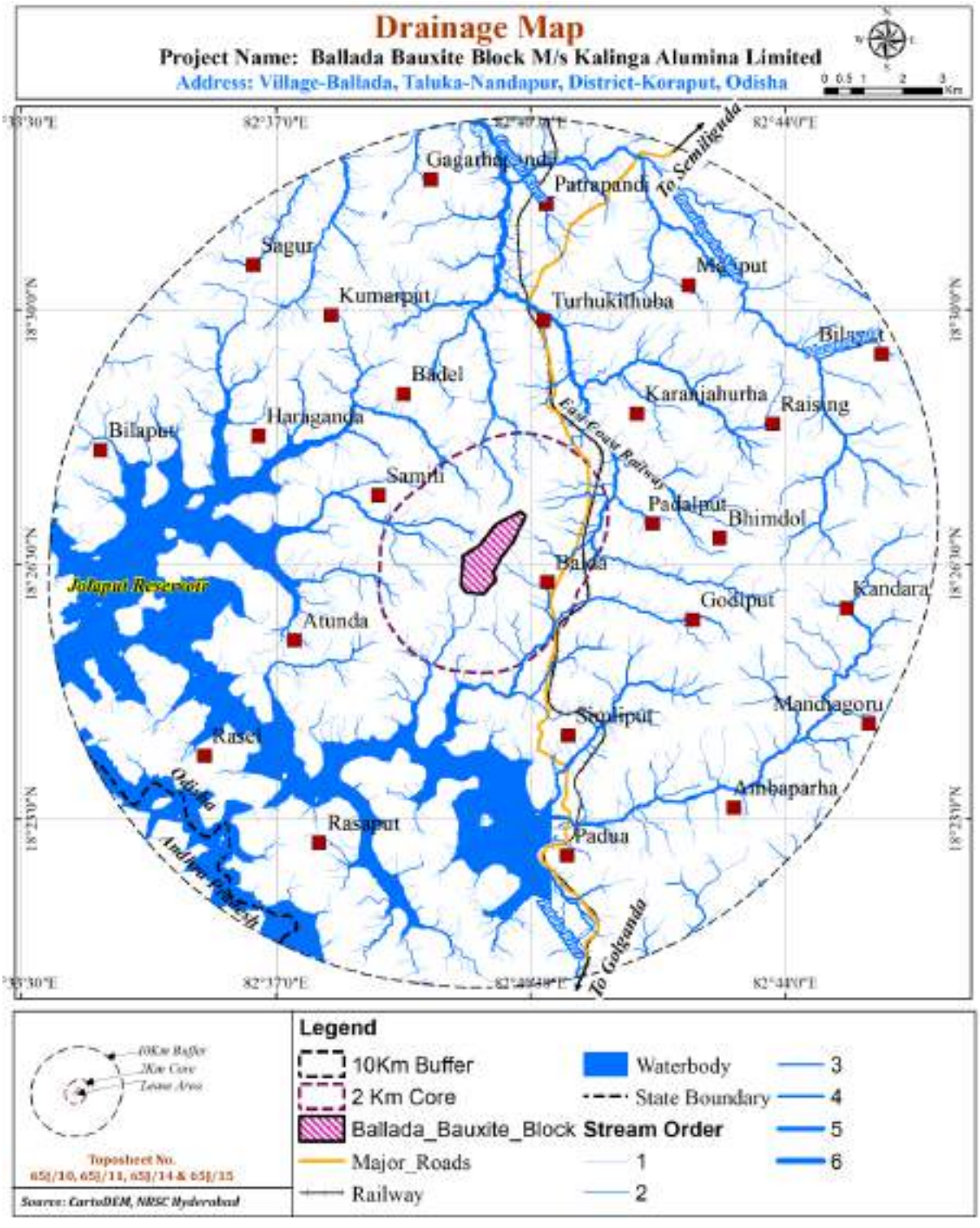


Figure 2.9: Drainage Map of the Study Area

Climate & Rainfall

The district enjoys tropical climate characterized by hot summer, cold winters and rainy seasons. The winter season generally commences from late November and continues up to the end of February. The temperature in winter drops below 1°C at places like Pottangi otherwise it is in the range of 10°C to 13.5°C in the valley plains. The summer season commences from March and continues till middle of June. The summer is quite pleasant here with the mean daily maximum temperature around 40°C while the mean daily minimum temperature is around 14°C. It is observed that about 80% of the total annual rainfall takes place due to south-west monsoon between the middle of June and mid-October. The north east monsoon gives erratic and insufficient rainfall. The average annual rainfall varies between 1320-1520mm. The district is drought prone because of the erratic and uneven pattern of rainfall. The average annual rainfall of Koraput district is 1454 mm.

Table 2.2: Rainfall Statistics of District of 10 Years

S. N	Year	Rainfall (mm)
1	2013	1417
2	2014	1582
3	2015	1349
4	2016	1400
5	2017	1354
6	2018	1532
7	2019	1600
8	2020	1349
9	2021	1361
10	2022	1598
	Average	***1454***

(Source: Indian Meteorological Department)

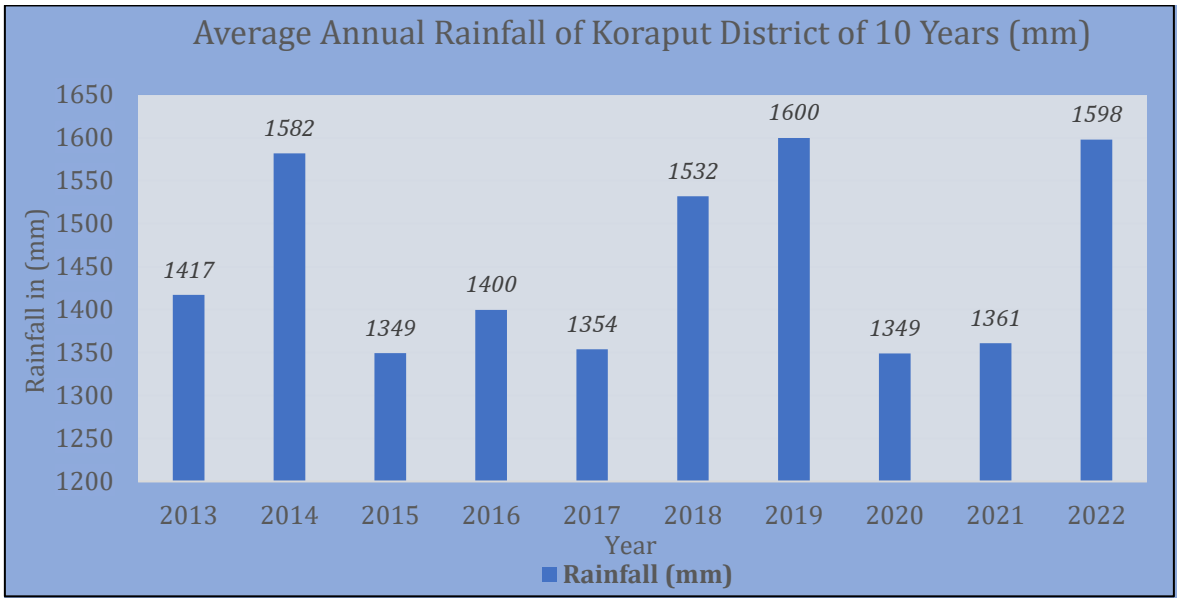


Figure 2.10: Rainfall data of the district (10 Years)

2.4. DETAILS OF WETLANDS/ MAJOR WATER BODIES

A wetland is a distinct ecosystem that is flooded by water, either permanently or seasonally, where oxygen-free processes prevail. Any wetland site which has been listed under the Ramsar Convention that aims to conserve it and promote sustainable use of its natural resources is called a Ramsar Site. The mine site is located 500 m away from notified Ramsar sites. As per latest Ramsar Map of India 2022-23, total 6 nos. of wetlands are present in Odisha state namely Ansupa Lake, Bhitarkanika Mangroves, Chilka Lake, Hirakud Reservoir, Satkosia Gorge & Tampara Lake. In which Satkosia Gorge (324 KM, NE from project site) & Tampara Lake (267 KM, NE from project site) are two nearby wetlands. The detail of Ramsar site of India is given in *figure no 2.11*

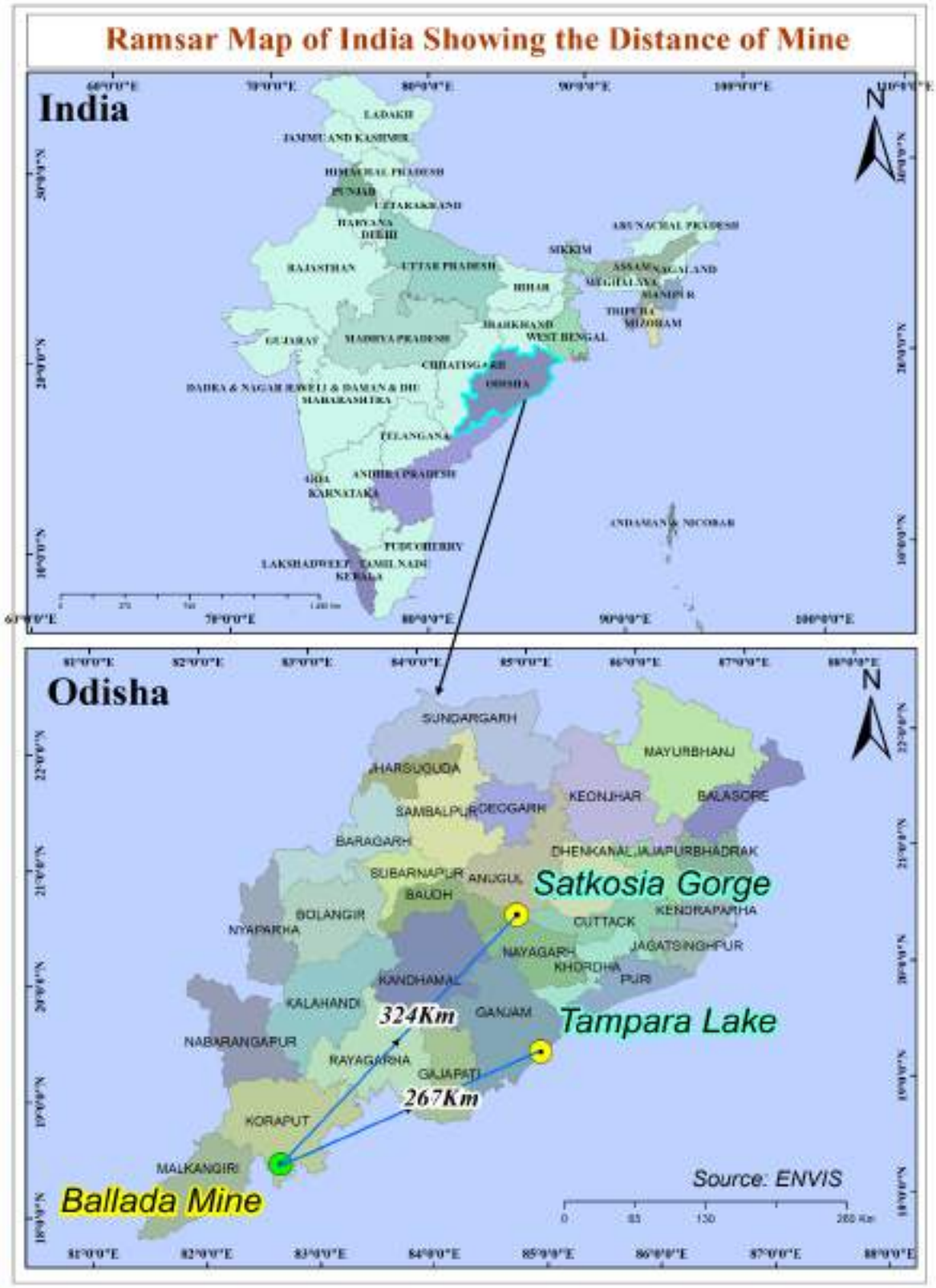


Figure 2.11: Showing the wetlands of India

CHAPTER-3

HYDROGEOLOGY

3.1. GEOLOGICAL SETUP

Regional Geology

The Eastern Ghat Mobile Belt constituting a major part of the district, comprises Khondalite and Charnockite Group of rocks and Granite Gneiss of Archaean age. The western and southeastern part are dotted with small outlier of Bengpal Group of rocks, also of Archaean age in the backdrop of Granite Gneiss, Chhattisgarh Group of sedimentary rocks of Proterozoic age occurs in the western part.

The general geological succession of the area is given in *Table 3.1*

Table 3.1: Stratigraphic sequence

AGE	GEOLOGICAL UNIT	LITHOLOGY
Pleistocene to recent	Quaternary	Soil and alluvium
Cainozoic(undifferentiated)		Laterite (locally bauxite)
Middle to Upper Proterozoic	Chattisgarh Group	Shaly Limestone
		Shale
		Conglomerate, Sandstone, quartzite
Proterozoic(undifferentiated)	Igneous Intrusives	Pegmatite/Quartz vein
		Dolerite
		Nepheline Syenite
		Diorite and gabbro
Archaean	Bengpal Group	Meta-dolerite and gabbro
		Metabasics-ultrabasic rock
		Andalusite-mica schist
		Banded ferruginous quartzites (BMQ/BHQ)
		Quartzite
		Porphyroblastic granite gneiss, migmatites,

			leptynite
	Eastern Ghat Supergroup	Charnockite Group	Acid and intermediate Charnockite
			Basic Charnockite and pyroxene granulite
		Khondalite Group	Khondalite schist/gneiss
			Quartzite (Ferruginous/magnetitic)
			Calc-silicate rock/crystalline limestone

Local Geology

The area forms a segment of the east-central part of the Eastern Ghat hill ranges. Rocks belonging to the Khondalite and Charnockite groups are developed in the area. In general, Khondalites form high hills and peaks whereas the Charnockitic rocks are invariably confined to the valleys and slopes of high hills. Both the groups of rocks occur as concordant bands. It is a common feature to observe islands of Khondalites within the Charnockitic rocks. Bauxite of Ballada capping occurs as mantle over khondalite as proved by drilling. The gibbsite crystals occur as shining aggregates in a ferruginous groundmass. The relict foliation is observed in some of the bauxite outcrops. The bauxite invariably has a brick red colour. It is sporaceous towards the top where the voids are filled with kaolinite / limonite. At depth, it has spongy texture with ferruginous zones. The laterite is more ferruginous and siliceous at the top where it is hard and has craggy, cavernous look but is relatively soft and aluminous in the lower parts and grades into bauxite. The soil though present in very less quantity is mostly lateritic.

Structure:

The trend of regional foliation is NE-SW with the dips varying from 300 to 800 towards southeast. The swinging of local foliation towards ENE-WSW and NNE-SSW is very common. The axes of mesoscopic folds plunge towards south-east at low angle (150 to 200). Mineral and groove lineations plunge towards east, south and south-east. Extensive slickensides are noticed at many places which result local displacements. These slickensides were probably

generated due to a major fault system. Several synformal structures may be resulted due to the convergence of dips evident by the presence of synformal hills; the intervening low-lying areas mark the antiformal valleys

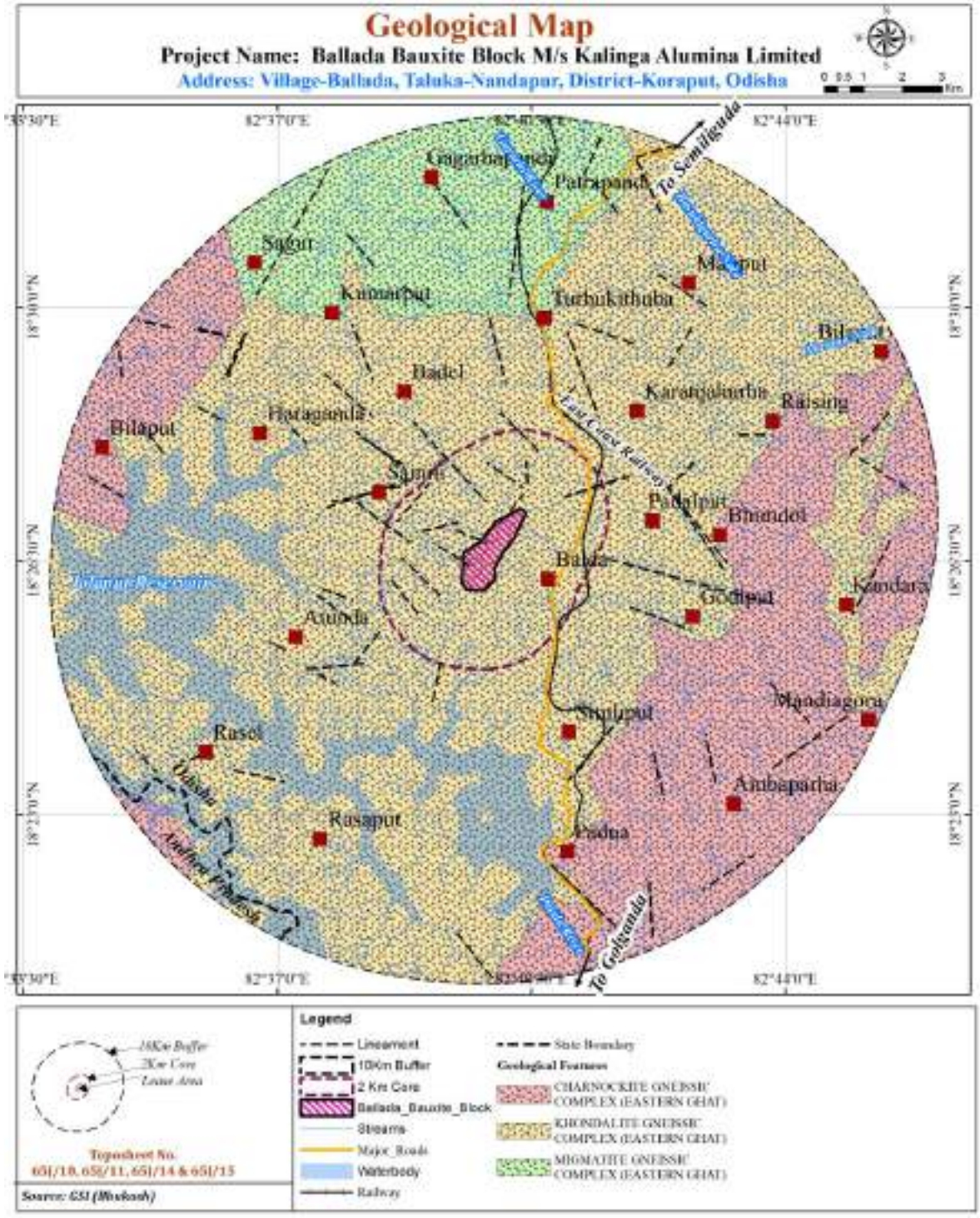


Figure 3.1: Geological Map of 10 Km Buffer

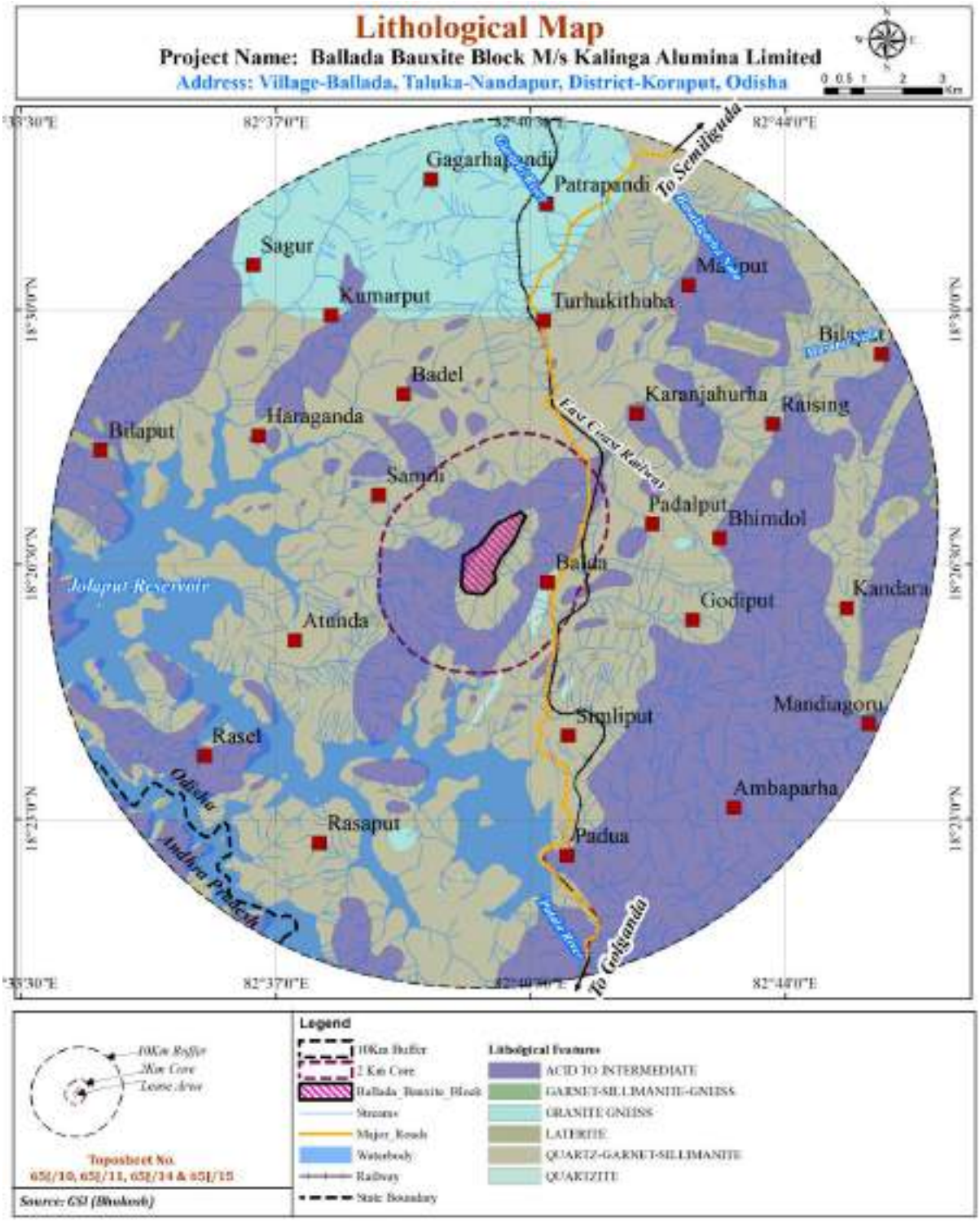


Figure 3.2: Lithological Map 10 Km Buffer

3.2. HYDROGEOLOGICAL SETUP

Consolidated formation

These include all the hard rocks of Eastern Ghat Group, such as granite gneiss, khondalite, charnokite and quartzite, gneiss, limestone, and shale of Chhattisgarh Group. These rocks are devoid of primary porosity. The secondary porosity in these rocks developed as a result of weathering and fracturing due to major & minor tonic movements along with climatological actions. The secondary porosity forms the conditions for the movement of ground water and acts as a reservoir of ground water. Groundwater occurs under water table conditions in weathered residuum while it occurs under semi-confined to confined conditions in the fractured & jointed rocks. The hydrogeological characteristics of different rocks formations falling under the consolidated unit are described below.

Granite Gneisses: These are the most prominent rock types among all other rocks falling under the consolidated unit. The thickness of the weathered residuum ranges from negligible to 34 m. The Depth at the openwells ranges from 2.25 to 12.45 m bgl. The Depth to the water level in the dug wells during the pre-monsoon period varies from 1.53 to 12.29 m bgl while during the post-monsoon period from 0.33 to 7.6 m bgl. The yield of the wells depends on the thickness of the water saturated, zone as also the number of intersecting fractures tapped. The average yield of existing dug wells is around 1 Ips, and the wells can be pumped for 3-4 hrs during post monsoon and 2-3 hrs during pre-monsoon in a day. Out of the total wells drilled, around 45% of the well has recorded yield 3 to 6.9 Ips, and only 20% wells yielded less than 1 Ips, and the rest of the 35% of the wells recorded yield between 1 to 3 Ips. The yield of the wells located in granitic terrain in Jeypore and Boriguma block is considerably more than those in khondalitic terrain. Maximum potential fractures in this formation occur in the depth range of 45-125 mbgl. The transmissivity value of the aquifer ranges from 0.5 to 10.68 m2/ day.

Khondalites: Khondalite suites of rocks are generally highly metamorphosed intensely folded with fractures that are 25-30 m deep. The joints extend beyond 65 m depth bgl. Groundwater occurs under unconfined to semi-confined conditions. The thickness of this

residuum ranges from 27 to 47 m bgl. The Depth to the water level in phreatic aquifer during pre and post monsoon periods varies from 0.65 to 15.35 mbgl and 0.42 to 13.75 mbgl respectively. The discharge of the bore well varies from 1 to 3 Ips. Maximum potential fractures in this formation occur in the depth range of 35-96 m bgl. Transmissivity value of the aquifer ranges from 0.5 to 2-3 m2/ day.

Charnokite -Due to the hard, compact, and massive nature of this formation, the thickness of weathered residuum is limited. The weathering is not very pronounced, being upto only 7-10 m in Depth. The spacing of the joints is wide apart. The Depth to the water level in phreatic aquifer is of limited areal extent during pre and post monsoon period varies from 2.05 to 14.9m bgl and from 2.31 to 11.30m bgl, respectively. Discharge of bore wells tapping fractured zone ranges from 1 to 5 Ips. Maximum potential fractures in this formation occur in the depth range of 30- 136 mbgl. The transmissivity value of the aquifer ranges from 1.8-3.0 m2/ day.

Quartzite/gneiss - The phreatic aquifer in this formation is of limited areal extent. The thickness of weathered residuum varies from 10 to 12 m bgl. The Depth to the water level in the phreatic aquifer during pre- and post-monsoon periods varies from 3.52 to 10.7 mbgl & from 1.24 to 7.08 mbgl, respectively. The yield of the dug well is less than 1 Ips.

Limestone -This formation is generally found in the western fringe of the district and is of limited areal extent. Groundwater occurs in weathered zone under unconfined to confined conditions. The Depth to the water level in phreatic aquifers ranges from 8.03 to 10.15 mbgl during the pre-monsoon period and from 5.59 to 7.66 mbgl during the post-monsoon period.

Laterite -These are highly porous and are formed as capping over the older formations. At quite a few places, hydrological testing has revealed that the lateritic aquifer has the potentiality of yielding groundwater from 1-12 Ips. The lateritic profile extends down to a depth of 10-20m. The Depth of dug well varies from 3.14 to 13.4 mbgl. The Depth to the water level in phreatic aquifer varies from 1.93 to 13.22 mbgl during the pre-monsoon period while the water level ranges from 1.9 to 11.44 mbgl during the post-monsoon period.

Un-Consolidated formation

Alluvium of Recent to Sub-Recent age constitutes the unconsolidated formation comprising of gravel, sand, and clay. The alluvial deposits of recent origin occur as their discontinuous patches along the prominent drainage channels and 'particularly in the flood plains of Indravati and Kolab river. Due to the high degree of porosity and permeability, the alluvial strips constitute the moderately potential aquifers. Ground water occurs under semi-confined to confined conditions. The potential aquifers present in this zone can be tapped through filter point shallow tubewells and dugwells. The maximum thickness of the alluvium is in the order of 20-23 m. The Depth to water level varies from 1.3 to 7.64 mbgl during pre-monsoon period and from 0.40 to 5.89 mbgl during post monsoon period. Yield of a dug well varies from 8-15 Ips.

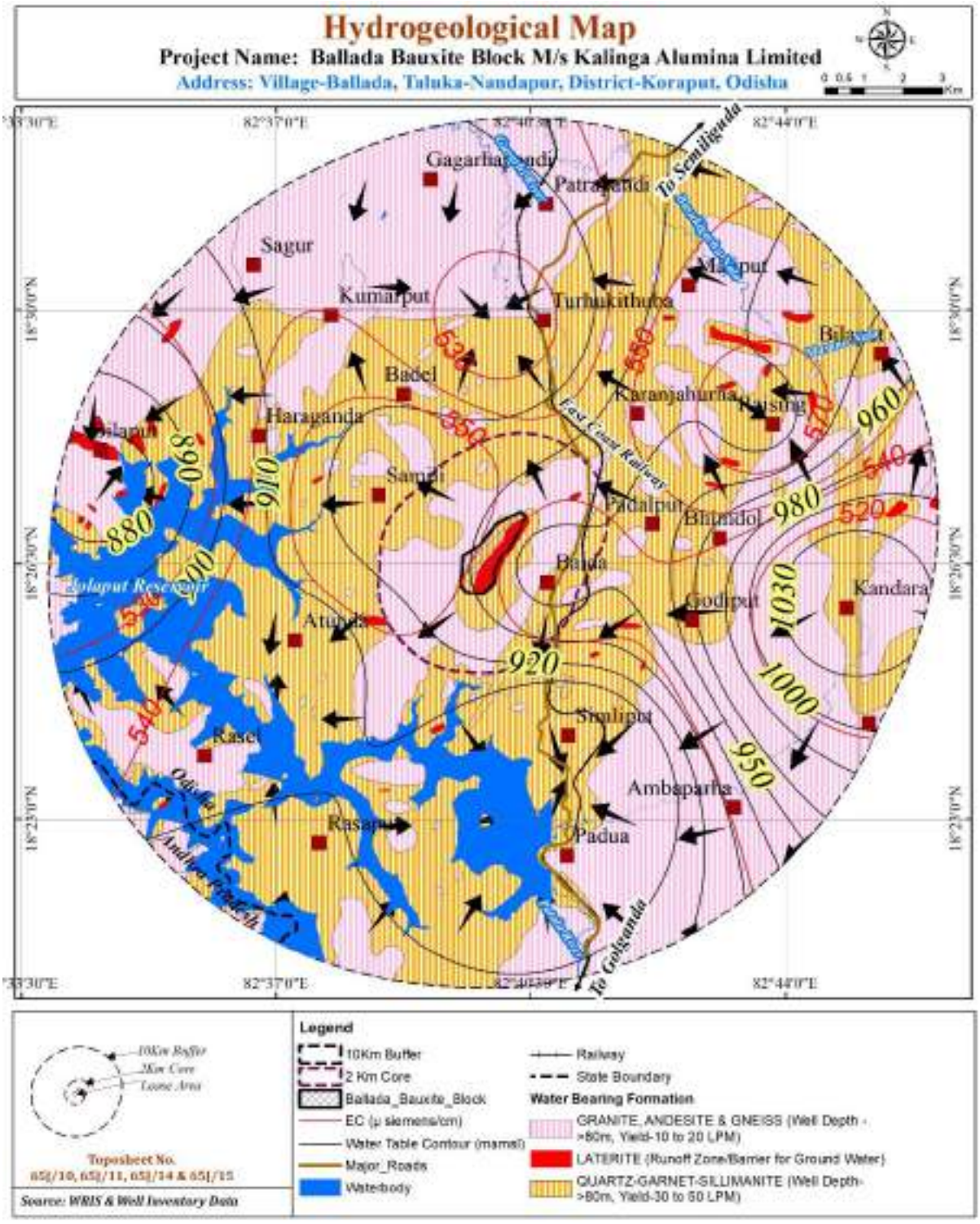


Figure 3.3: Hydrogeological Map 10 Km Buffer

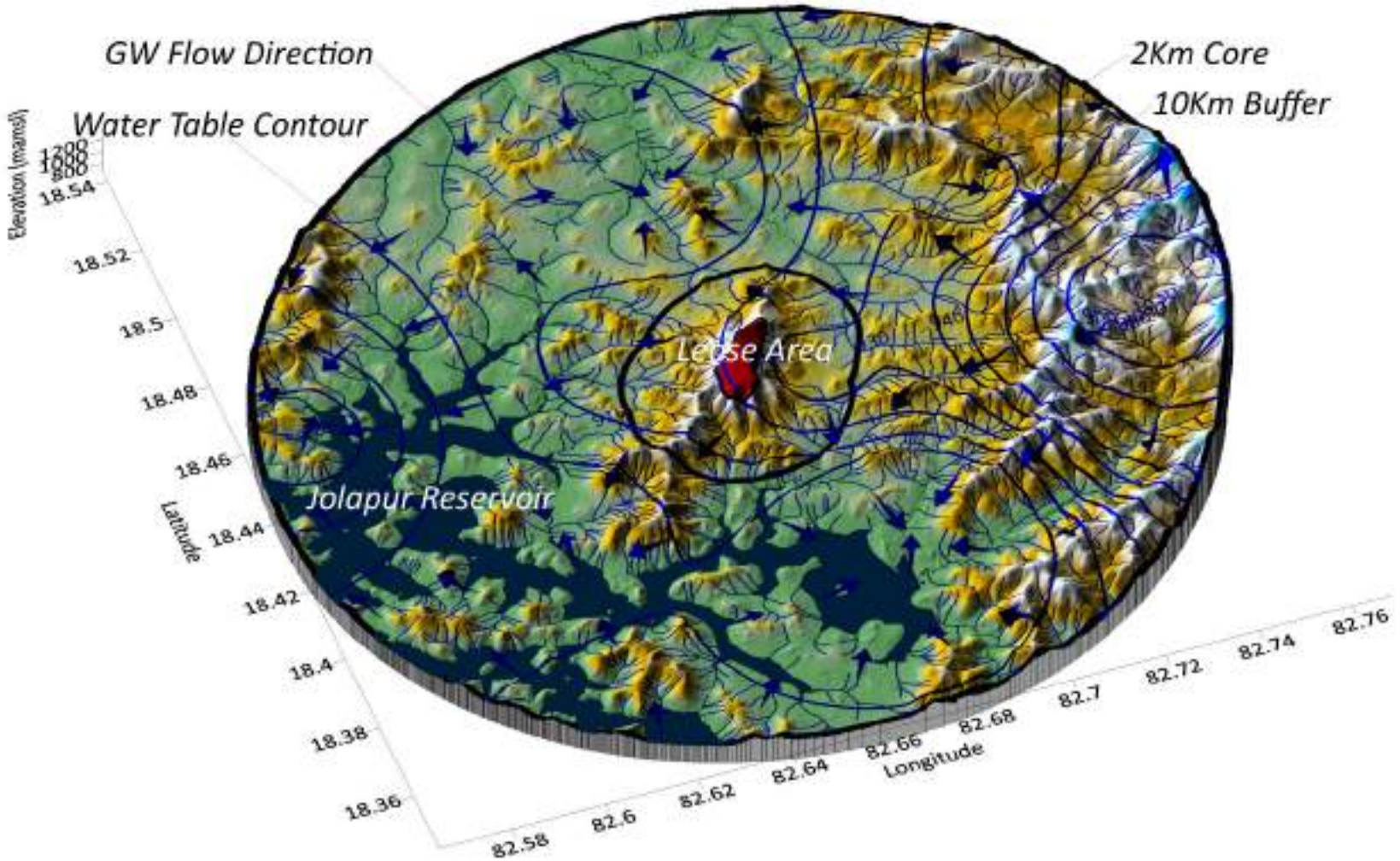


Figure 3.4: 3D Water Table Contour Map

3.2.1 Aquifer characteristics

On the basis of data collection of exploratory wells, it has observed that 7 bore well-constructed within 100 mbgl depth and 67 bore wells constructed between 100-200 mbgl depth. Discharge of the tube wells having fracture zones within 100-meter depth varies from 0.25-3.3 lps and discharge of the tube wells having fracture zones upto 200-meter depth varies from 0.40 – 12.19 lps. On the basis of weathered zone and fracture zone details, aquifer grouping is summarized in below table,

Table 3.2: Aquifer Grouping in Koraput District, Odisha

Aquifer Group		***Depth Range (mbgl)***		***Thickness (m)***	
		From	***To***	***Min***	***Max***
Aquifer I (Within 100 m)	*(Weathered Zone)*	*5.5*	*49.2*	*0.5*	*44.2*
	(Fracture Zone)	*18*	*98*	*0.5*	*1.5*
Aquifer II (100-200 m) (Fracture zone)		*103*	*187*	*0.5*	*1*

3.2.2 AQUIFER PARAMETERS

The exploratory tube well was subjected to under hydrological testing to determine its efficiency and aquifer characteristics. The hydrogeological tests are two types –

1.) Step Drawdown Test

During the test the exploratory well was pumped for fixed duration at different discharges in increasing order and corresponding drawdown recorded with time.

The step drawdown test comprising of three steps of 60-minute duration was conducted on 29.09.2023. The exploratory well was pumped at different discharges during each step in increasing order and resultant drawdown was recorded which is given in below table –

Table 3.3: Summary of SDT Data

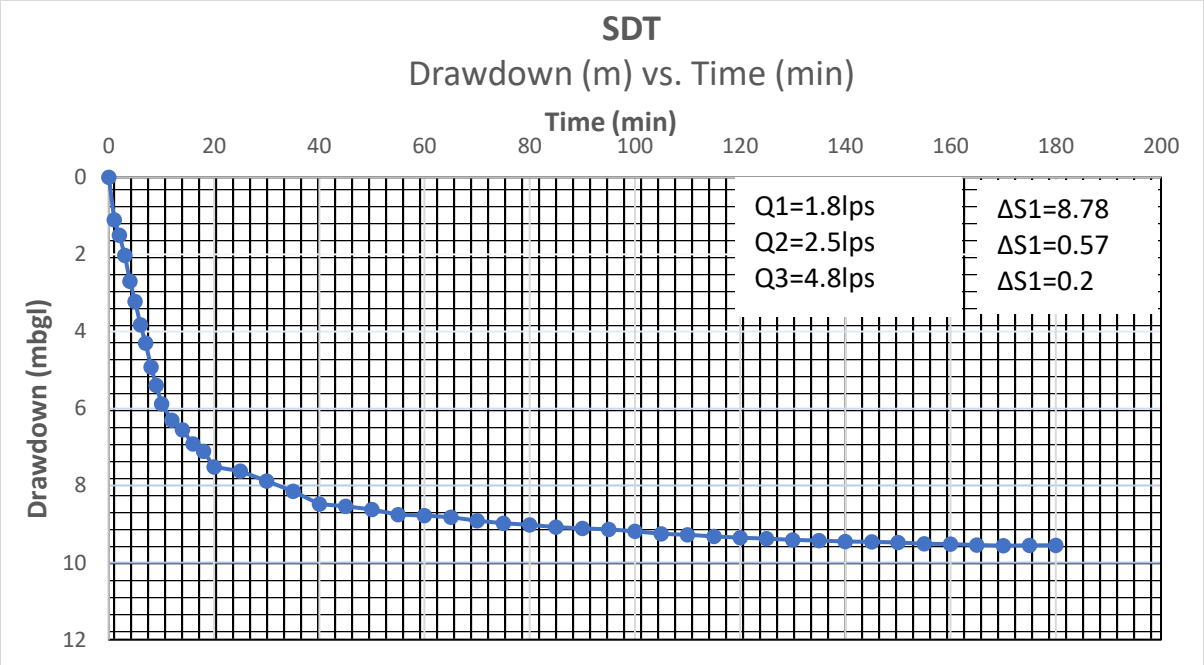
Step	Duration in min	Discharge (lpm)	Drawdown (m)	Specific capacity (lpm/m)
I	60	108.00	13.58	7.95
II	60	174.00	14.15	12.29
III	60	288.00	14.35	20.06

Table 3.4: SDT Data Sheet – Pumping Well

Site Name with coordinates			Bheja 18.478528 N & 82.681720 E	
District & State			Korapur, Orrisa	
Type of Well			EW	
Date of Test & Start time			29.09.2023 & 09:10 AM	
Diameter of well (mm)			150	
Distance from the observation well (m)			50	
Capacity of the pump (HP)			7	
Discharge (lps)			1.8 lps, 2.9 lps & 4.8 lps	
Measuring Point (m)			0.55	
SWL in m below measuring point			4.8	
Time since pump started (in min)	Pumping Water level (m bgl)	Static Water Level(mbgl)	Drawdown (m bgl)	Remarks
0	4.8	4.8	0	**1st Step**
1	5.9	4.8	1.1	Total Head = 21"
2	6.3	4.8	1.5	Head adjust = 7"
3	6.82	4.8	2.02	Orifice Plate = 3"
4	7.5	4.8	2.7	Delivery Pipe = 4"
5	8.02	4.8	3.22	Discharge = 220 litre/118 sec
6	8.63	4.8	3.83	1.8 lps
7	9.1	4.8	4.3	108 lpm
8	9.72	4.8	4.92	

9	10.2	4.8	5.4	
10	10.68	4.8	5.88	
12	11.1	4.8	6.3	
14	11.35	4.8	6.55	
16	11.72	4.8	6.92	
18	11.91	4.8	7.11	
20	12.32	4.8	7.52	
25	12.42	4.8	7.62	
30	12.68	4.8	7.88	
35	12.95	4.8	8.15	
40	13.28	4.8	8.48	
45	13.34	4.8	8.54	
50	13.42	4.8	8.62	
55	13.55	4.8	8.75	
60	13.58	4.8	8.78	
65	13.62	4.8	8.82	**2nd Step**
70	13.71	4.8	8.91	Head adjust = 14"
75	13.78	4.8	8.98	Discharge = 220 litre/75 sec
80	13.82	4.8	9.02	2.9 lps
85	13.88	4.8	9.08	174 lpm
90	13.91	4.8	9.11	
95	13.94	4.8	9.14	
100	13.99	4.8	9.19	
105	14.05	4.8	9.25	
110	14.08	4.8	9.28	
115	14.12	4.8	9.32	
120	14.15	4.8	9.35	
125	14.18	4.8	9.38	**3rd Step**
130	14.21	4.8	9.41	Head = 21"
135	14.23	4.8	9.43	Discharge = 220/45 sec, 4.8 lps
140	14.25	4.8	9.45	288 lpm
145	14.26	4.8	9.46	
150	14.28	4.8	9.48	
155	14.31	4.8	9.51	
160	14.32	4.8	9.52	
165	14.34	4.8	9.54	

170	14.36	4.8	9.56	
175	14.35	4.8	9.55	
180	14.35	4.8	9.55	



2.) Pumping Test

The pumping test is the most accurate, reliable, and commonly used method to evaluate the hydraulic parameters of an aquifer, efficiency of a well/bore well, safe operational rates of pumping and selection of suitable pump. The methods of a pumping test are highly varying in their application. The main objective of the pumping test is to determine the aquifer. parameters such as Transmissivity (T), Storage co-efficient (S) Hydraulic Conductivity (K), well performance and safe yield for the execution of water supply.

In order to evaluate the aquifer characteristics and safe yield to match the ground water requirement, a constant discharge test has been conducted in the Bore well.

Pumping Test Methodology

- The constant discharge test has been carried out with the help of the motors fitted in the Bore well and electronic water level indicator etc.,

- During the pumping test, discharge has been measured by volumetric methods and ground water level has been measured using electronic indicator.
- Drawdown and recovery have been measured from the pumping well.

In order to assess the aquifer parameter, the recovery data has been used. Both drawdown and recovery measurement have been taken in the wells. After stopping the pump recovery measurements were taken, the principle behind the estimation of Transmissivity of deeper aquifer of a Bore well is that the recovery of water level in a well after the pump is shut off can be simulated by continuing pumpage as before, and recharging by an imaginary recharge well at the same rate during the recovery period. Under such conditions the residual drawdown s', i.e., the difference between the drawdown component due to continued pumpage and the recovery component due to recharge is given by Theis (1935):

$$s = \frac{Q}{4\pi T}\left[\log_e\left(\frac{4Tt}{r_w^2 S}\right) - \log e\left(\frac{4Tt'}{r_w^2 S'}\right)\right]$$

Where Q = constant discharge, s' = residual drawdown

rw = effective radius of well in which the water level recovery is measured.

t = time since pumping started and t' = time since pumping stopped

If storage coefficient remains constant and equal (S during pumping = S' during recovery) and $u = r^2S/4Tt'$ is sufficiently small, the above equation is simplified to

$$s = \frac{2.303Q}{4\pi T}\log_{10}\frac{t}{t'}$$

The procedure for data analysis is to plot s^1against t/t' in semi- logarithmic paper, with s^1 on the arithmetic scale and t/t' on the log scale. After the value of t' becomes sufficiently

large, the observed data should fall on a straight line. The slope of this line gives the value of $\log_{10}$ t/t'. For convenience, the value of t/t' is chosen on log cycle apart, so that its logarithm becomes unity. The above equation is simplified to:

$$T = \frac{2.303Q}{4\pi\Delta s'}$$

Where Q = constant discharge, in cu.m/day and

Δs' = change in residual drawdown in meters per log cycle of t/t.'

Storage coefficient is calculated based on equation

$$S = \frac{2.25Tt^0}{r^2}$$

Where T = Transmissivity,

t^0 = intercept of the straight line at zero drawdown in days

r = radius of the well / distance from observation well in m

Pumping tests carried out in Bore well-constructed in the consolidated formation of Granite gneiss. The data and graphs pertaining to pumping tests are shown as below:

Table 3.5: Result of Pumping Test

Parameter	Exploratory Well	Observation Well	Transmissivity m^2/day (By Theiss method)	Storativity(S)
Date of test	30/09/2023	30/09/2023	80.2	4.90×10^{-4}
Duration of test in min	1000	1000		
Static Water level (m bgl)	4.85	4.88		
Drawn down	11.28	2.29		
Residual Drawdown	2.78	1.39		

Table 3.6: Aquifer Performance Test Data- Time V/s Drawdown Exploratory Well & Observation Well

APT (EW & OW)

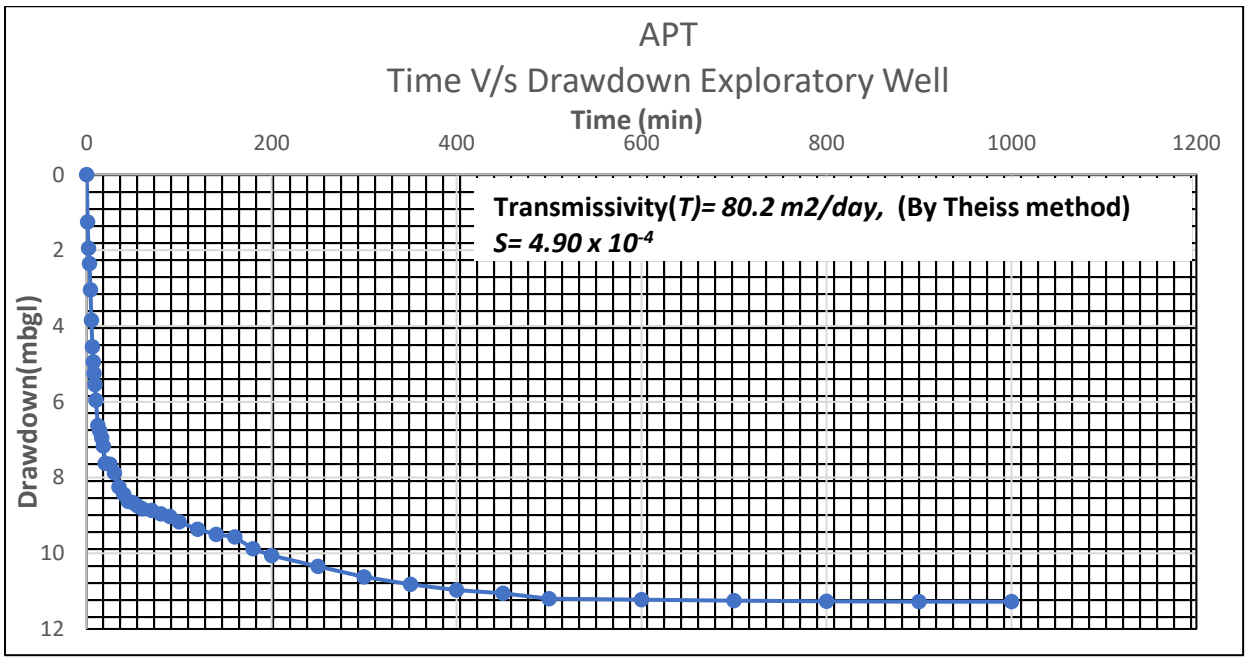
Date: 6.10 AM, 30.09.23	SWL (EW) mbgl	4.85	SWL (OW) mbgl	4.88	**Remark**
Time since	Exploratory Well		Observation Well		
Pumping has					
Started (Mins)	Depth to water level	Drawdown	Depth to water level	Drawdown	
0	0	0	4.88	0	
1	6.1	1.25	5.05	0.17	
2	6.8	1.95	5.12	0.24	
3	7.2	2.35	5.21	0.33	
4	7.9	3.05	5.32	0.44	
5	8.7	3.85	5.41	0.53	
6	9.4	4.55	5.52	0.64	
7	9.8	4.95	5.67	0.79	
8	10.1	5.25	5.78	0.9	
9	10.4	5.55	5.82	0.94	
10	10.81	5.96	5.91	1.03	
12	11.48	6.63	6.08	1.2	
14	11.62	6.77	6.15	1.27	
16	11.8	6.95	6.27	1.39	
18	12.02	7.17	6.35	1.47	
20	12.48	7.63	6.41	1.53	
25	12.5	7.65	6.52	1.64	
30	12.73	7.88	6.58	1.7	
35	13.1	8.25	6.62	1.74	
40	13.3	8.45	6.68	1.8	
45	13.48	8.63	6.71	1.83	
50	13.52	8.67	6.73	1.85	
55	13.6	8.75	6.78	1.9	
60	13.68	8.83	6.82	1.94	
70	13.72	8.87	6.85	1.97	
80	13.81	8.96	6.89	2.01	
90	13.88	9.03	6.92	2.04	
100	14.02	9.17	6.95	2.07	

120	14.22	9.37	6.97	2.09	
140	14.35	9.5	7.02	2.14	
160	14.42	9.57	7.03	2.15	
180	14.73	9.88	7.05	2.17	
200	14.91	10.06	7.08	2.2	
250	15.2	10.35	7.1	2.22	
300	15.48	10.63	7.13	2.25	
350	15.67	10.82	7.12	2.24	
400	15.82	10.97	7.13	2.25	
450	15.91	11.06	7.15	2.27	
500	16.05	11.2	7.14	2.26	
600	16.08	11.23	7.15	2.27	
700	16.1	11.25	7.155	2.275	
800	16.12	11.27	7.16	2.28	
900	16.13	11.28	7.17	2.29	
1000	16.13	11.28	7.17	2.29	

Table 3.7: Aquifer Performance Test – Residual Drawdown V/s t/t' of Exploratory Well & Observation Well

APT Recovery (EW & OW)						
Date: 10:10 PM: 30.09.2023	Time since pumping has been stopped (t')	t/t'	S.W.L (EW) = 4.85 mbgl		S.W.L (OW) = 4.88 mbgl	
Time since pumping has been started (mins) (t)			Exploratory Well		Observation Well	
			Depth to water level	Residual Drawdown	Depth to water level	Residual Drawdown
1000	0		16.13		7.17	
1001	1	1001.0	15.8	10.95	7.13	2.25
1002	2	501.0	14.92	10.07	7.1	2.22
1003	3	334.3	13.8	8.95	7.07	2.19
1004	4	251.0	12.7	7.85	7.01	2.13
1005	5	201.0	12.02	7.17	6.99	2.11
1006	6	167.7	11.88	7.03	6.95	2.07

1007	7	143.9	11.32	6.47	6.91	2.03
1008	8	126.0	10.88	6.03	6.89	2.01
1009	9	112.1	10.42	5.57	6.82	1.94
1010	10	101.0	10.15	5.3	6.77	1.89
1012	12	84.3	9.62	4.77	6.63	1.75
1014	14	72.4	9.05	4.2	6.52	1.64
1016	16	63.5	8.72	3.87	6.48	1.6
1018	18	56.6	8.62	3.77	6.43	1.55
1020	20	51.0	8.5	3.65	6.39	1.51
1025	25	41.0	8.35	3.5	6.37	1.49
1030	30	34.3	8.22	3.37	6.33	1.45
1035	35	29.6	8.1	3.25	6.31	1.43
1040	40	26.0	8.05	3.2	6.29	1.41
1045	45	23.2	7.95	3.1	6.28	1.4
1050	50	21.0	7.88	3.03	6.29	1.41
1060	60	17.7	7.72	2.87	6.28	1.4
1070	70	15.3	7.68	2.83	6.27	1.39
1080	80	13.5	7.62	2.77	6.275	1.395
1090	90	12.1	7.62	2.77	6.27	1.39
1100	100	11	7.63	2.78	6.27	1.39



3.2.3 Ground water flow and aquifer interaction with surface water bodies

The ground water table is generated from the ground water level data collected during the field visit.

From the mine site, the ground water flow is towards south and west and the hydraulic gradient is moderate which indicates the moderately gentle movement of ground water. Pre-monsoon ground water table map is presented in **figure 3.5.** The same flow pattern is observed during the post-monsoon period. However, there is a change in the hydraulic gradient. Post-monsoon ground water table map is presented in **figure 3.6.**

The ground water level fluctuation and the ground water table clearly indicate that there is a surface (rainfall) and ground water interaction. The main source of recharge in the study area is only from rainfall and partly from the river system.

3.2.4 Depth to water level

To understand the ground water situation of the study area covering a 10 km radius, ground water level monitoring was carried out in 08 bore wells / dug well. At the time of the field visit, the above 08 bore wells/open wells are noticed as non-pumping and all are located in different places of the core and buffer zones of the study area during the pre-monsoon season.

At the time of the well inventory public inquiry, the pre-monsoon ground water levels were recorded and the same is crosschecked with the nearest CGWB observation wells.

The field expert identifies the open well or bore well in the village and ground water monitoring has been undertaken. While monitoring the ground water level, the well inventory has also been taken up. 08 key wells are monitored in the core (2 km radius) and buffer zone (10 km radius) for monitoring purposes.

As per well inventory of study area it has been observed that the pre monsoon depth to water level ranges between ***2.25 mbgl to 7.22 mbgl*** and post-monsoonal water level ranges from ***1.22 mbgl to 6.21 mbgl***. Ground water level of pre and post monsoonal season have been shown by below mentioned graphs.

The Key well data in the study area are presented in bellowTable

Table 3.8: Details of well inventory and groundwater levels monitored in and around project site

STATION	Location	Lat_Deg	Long_Deg	Pre-Monsoonal GWL (mbgl)	Post-Monsoonal GWL (mbgl)
1	Ballada	18.440556	82.679818	4.35	3.1
2	Atanda	18.420875	82.622643	2.94	1.52
3	Jabagada	18.459049	82.57768	2.31	1.22
4	Banjalaput	18.394561	82.683377	2.25	1.3
5	Somli	18.455722	82.646655	3.68	2.78
6	Kandaput	18.495602	82.666869	6.21	5.6
7	Near Raising	18.474906	82.727554	5.38	4.85
8	Kandara	18.434575	82.746596	7.22	6.21

The pre-monsoon ground water level is considered for seepage calculation.

In order to seepage estimation ground water level for the pre- and post-monsoon periods, the open well ground water level was considered.

In order to study the spatial distribution of ground water levels for the pre- and post-monsoon periods, the monitored Bore wells ground water level is considered and accordingly, water level zone maps are prepared.

Pre-Monsoon

The pre-monsoon depth to ground water level depicts that the relatively deepest ground water level zone of 2-7 m. The shallowest ground water level zone occupies the northern part of the study area. Pre-monsoon ground water level zone map is presented in figure 3.5

Post-Monsoon

The post-monsoon depth to ground water level depicts that the relatively shallower to deepest ground water level zone of 1-6 m falls in the south western part of the study area.

During the post-monsoon period, there is a considerable rise in the ground water level. It is observed that there is an increase in ground water level throughout the study area where the ground water level is moderately deep during the pre-monsoon period.

It clearly indicates that rainfall recharge is taking place considerably. Post-monsoon ground water level zone map is presented figure 3.6

Ground water level Fluctuation

Based on the pre- and post-monsoon ground water level data of the study area, the ground water fluctuation is generated and presented figure 3.7

The ground water level fluctuation of the study area indicates that the ground water level fluctuation ranges from 0.50–1.40 m which indicates that the aquifer of the study area has moderate recharge potential.

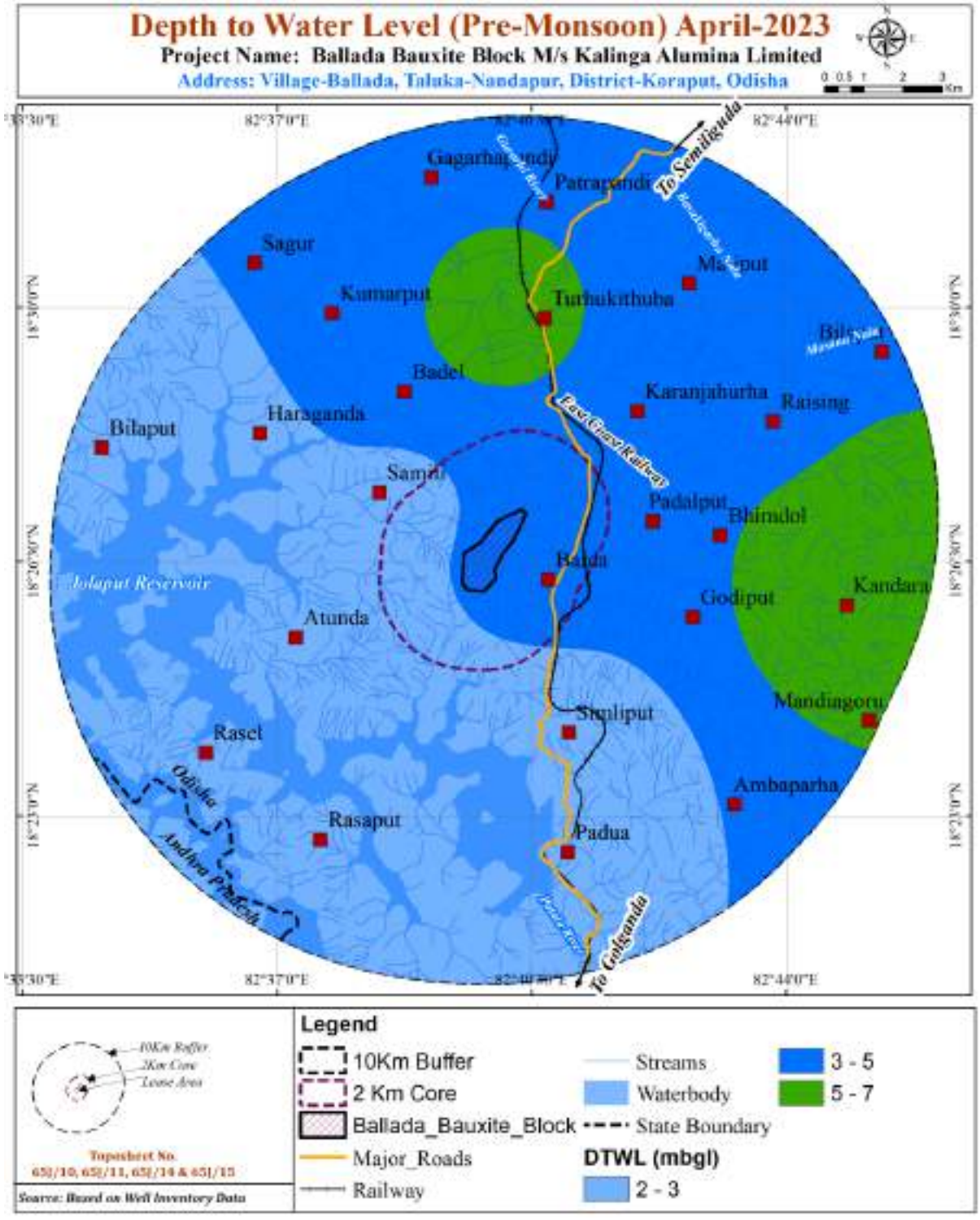


Figure 3.5: Depth to Water Level of Core and Buffer Zone in Pre-Monsoon season (mbgl)

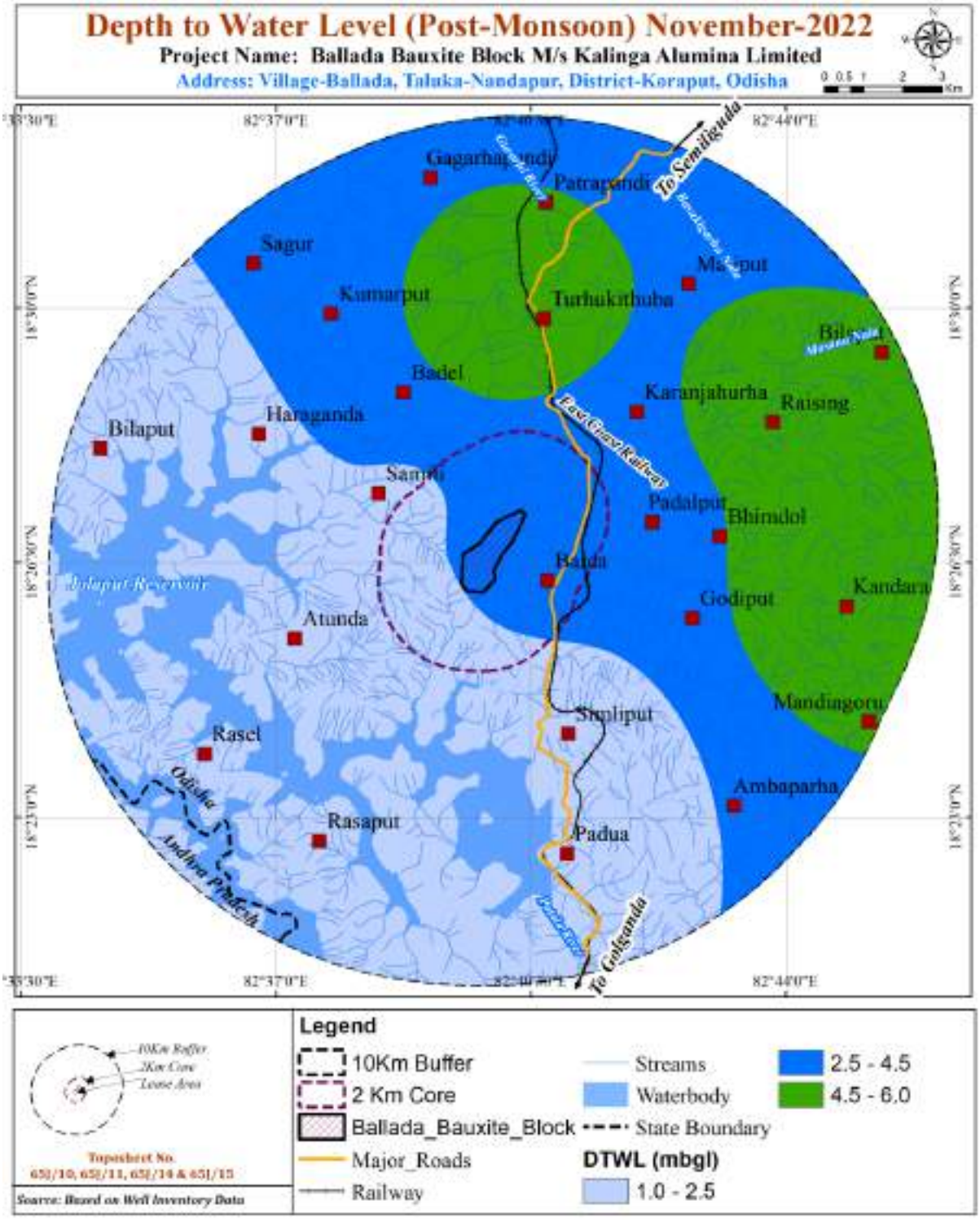


Figure 3.6: Depth to Water Level of Core and Buffer Zone in Post-Monsoon season (mbgl)

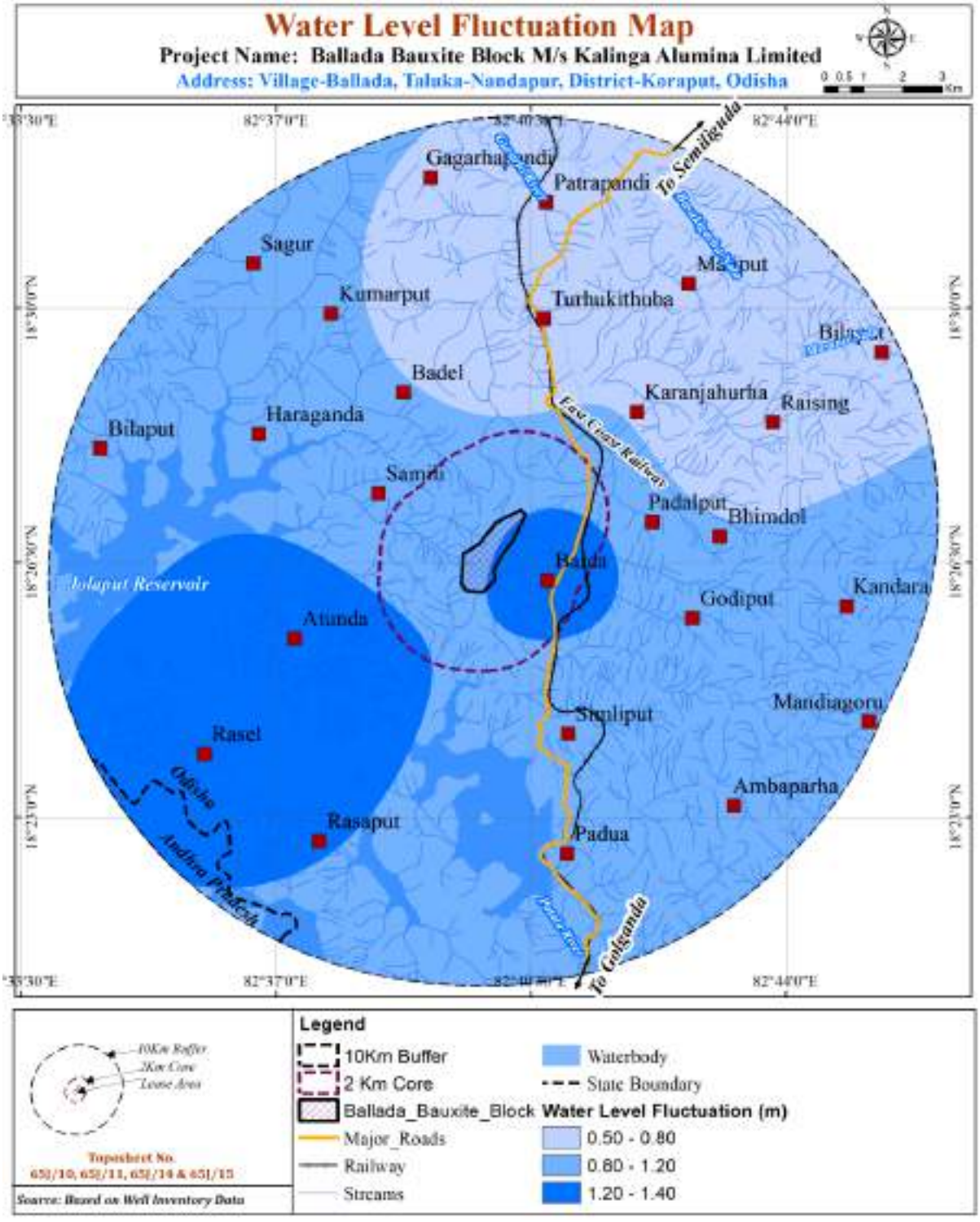


Figure 3.7: Ground water level fluctuation map of the study area

3.2.5 LONG TERM WATER LEVEL DATA ANALYSIS

In order to understand the long-term (10 years) ground water level changes, the CGWB observation wells located in and around the study area have been downloaded from the INDIAWRIS website and plotted on the SOI topo map. The nearest continuous monitoring well (with less data gap) has been chosen for the long-term trend analysis. The locations of the CGWB observation stations located in and around the study area are presented in Figure 3.8.



Figure 3.8: Location of CGWB Observation Wells

The continuous monitoring data is available for locations of Bheja-1, Satsimile & Soguru which are located within a 10 km radius in the Northeast & Northwest directions with the same Hydrogeological environs. The above observation wells have been considered for long-term analysis.

Ground water observation well data for a period of 10 years have been collected from CGWB for the locations. The geographic coordinate of the 03 monitoring well is given in Table 3.9

Table 3.9: Details of the CGWB monitoring stations.

Sl. No	Location	Monitoring Agency	Latitude	Longitude	Direction	Distance	Water Level (mbgl)
1	Bheja1	CGWB	18.477438	82.686255	North-East	3.00 Km	3.04
2	Satsimile	CGWB	18.527149	82.692647	North-East	8.40 Km	6.29
3	Soguru	CGWB	18.515760	82.612678	North-West	9.22 Km	5.6

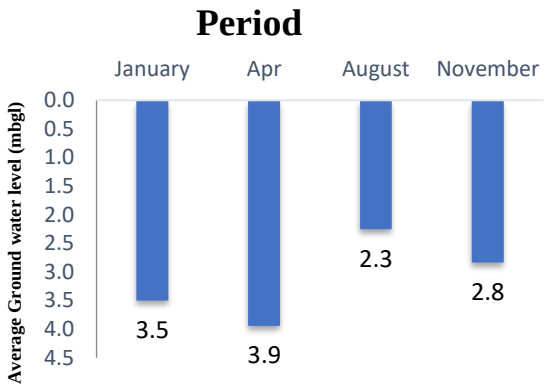
Ground water observation was done by CGWB to monitor the shallow ground water level in the study area. The ground water level data from 2013 to 2022 has been collected from INDIAWRIS Website.

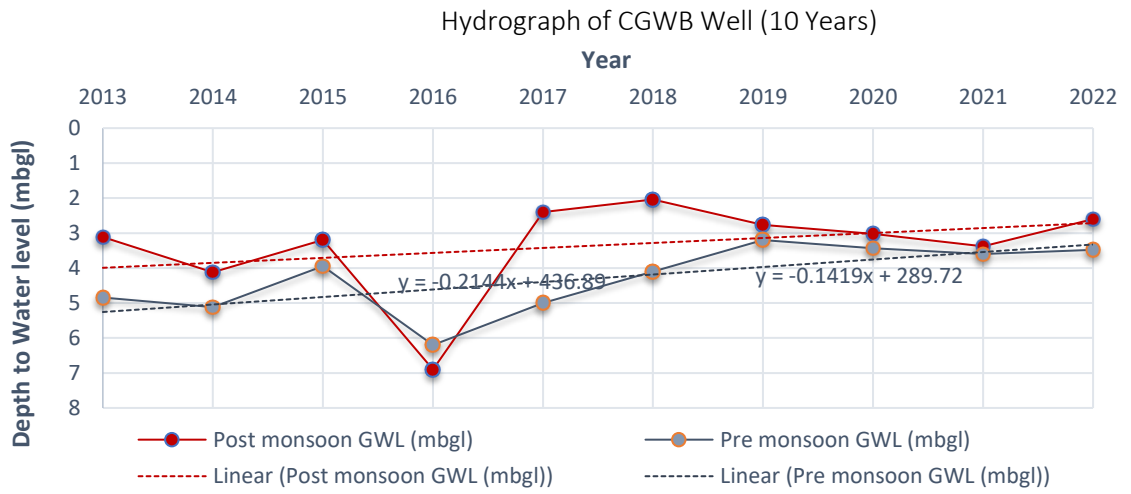
Hydrograph of water level for 10 Years

Decadal Trend of water levels for pre-monsoon and post-monsoon periods for the last ten years (2013-2022) have been computed for CGWB Ground Water Monitoring Wells. The season wise Hydrograph was constructed for the monitoring wells and is presented in below Figures

CGWB Hydrograph station Bheja 1 Crossing located at 3.00 Km from the project site (Lat= 18.477438 and Long = 82.686255)

Year	Jan	May	Aug	Nov
2013	3.4	4.84	3.12	3.11
2014	4.01	5.12	3.11	3.84
2015	3.6	3.95	2.95	3.2
2016	3.9	6.2	2.85	6.9
2017	4	5	3.2	2.4
2018	2.9	4.1	1.6	2.11
2019	3.6	3.2	1.6	2.77
2020	3.43	3.11	1.1	3.02
2021	3.6	3.24	2.32	3.38
2022	3.46	3.48	1.76	2.6
Average	***3.5***	***3.7***	***1.9***	***2.7***





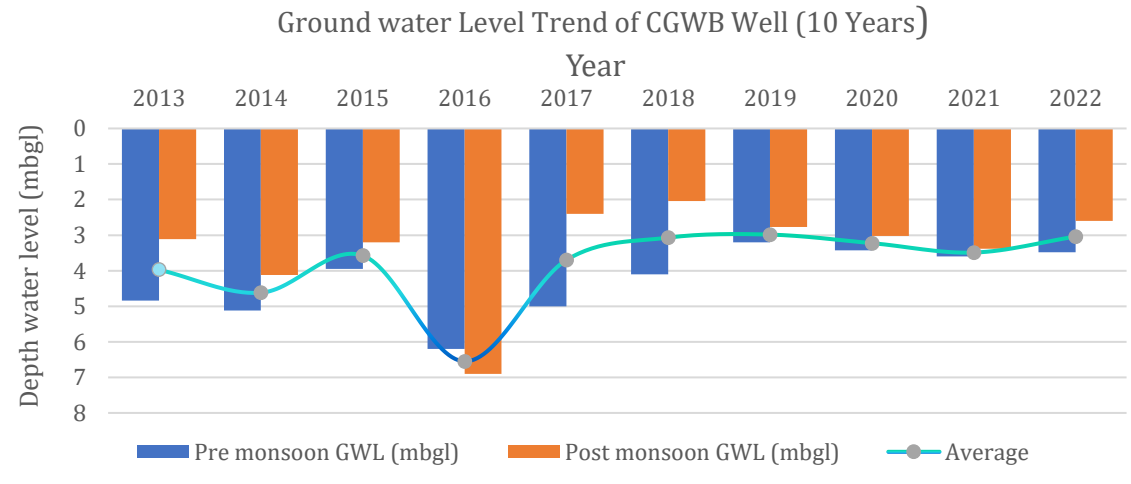
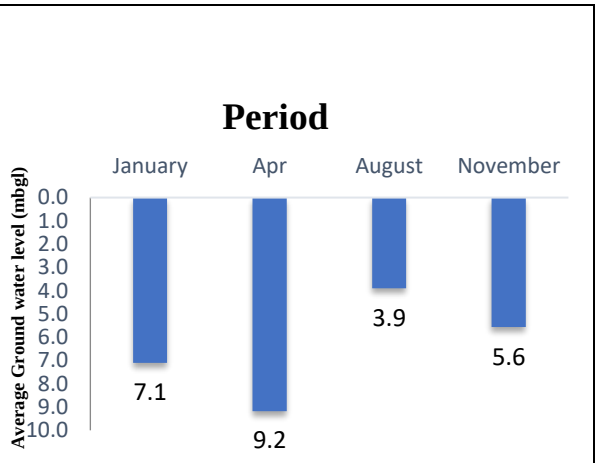
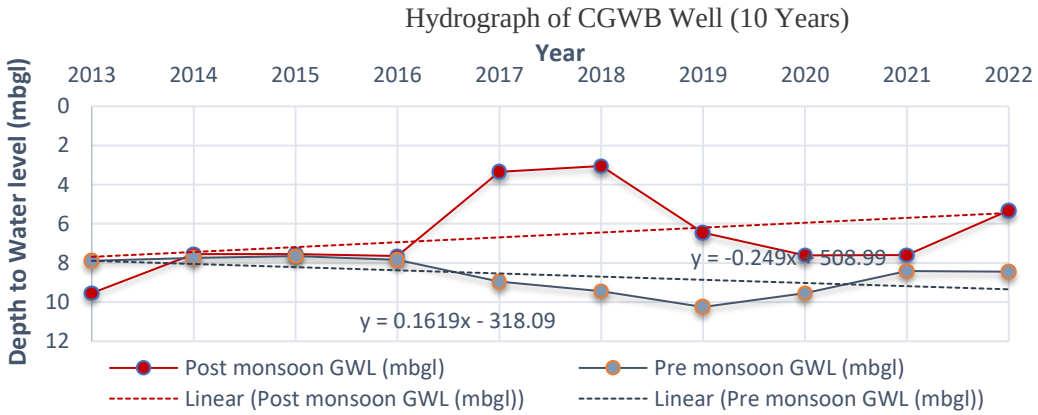


Figure 3.9: Hydrograph of Bheja CGWB monitoring well.

CGWB Hydrograph station Satsimile Crossing located at 8.40 Km from the project site (Lat= 18.527149 and Long = 82.692647)

Year	Jan	May	Aug	Nov
2013	7.25	7.89	5.25	9.54
2014	7.65	7.75	4.45	7.55
2015	7.7	7.65	6.85	7.55
2016	7.75	7.85	2.95	7.65
2017	7.85	8.95	2.5	3.35
2018	4.05	9.45	1.6	3.05
2019	7.45	10.25	2.95	6.45
2020	7.61	9.54	3.85	7.62
2021	7.85	8.41	7.59	7.6
2022	7.8	8.44	4.93	5.33
Average	***7.1***	***9.2***	***3.9***	***5.6***





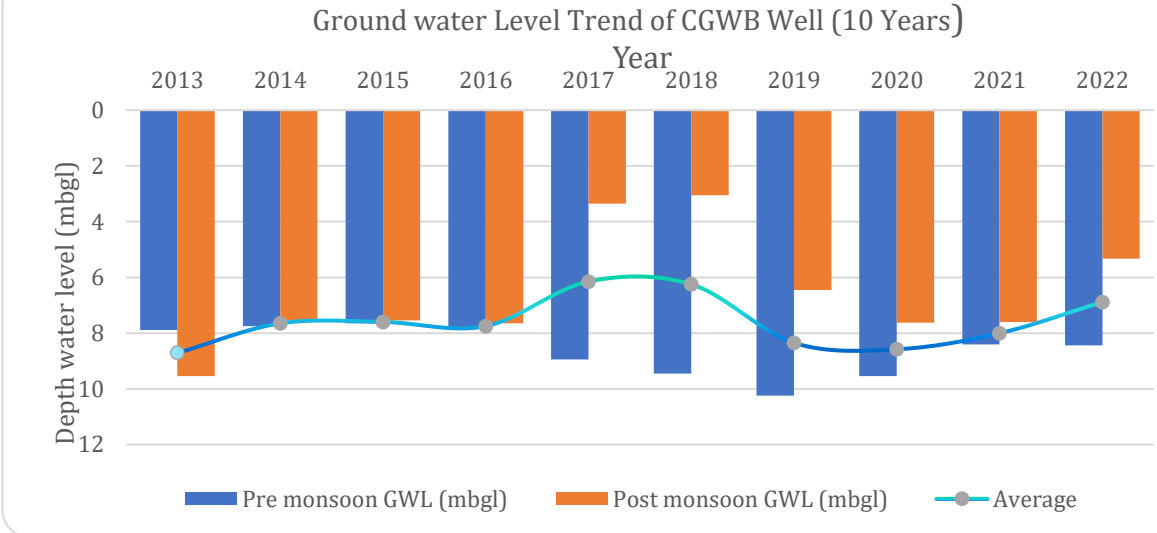
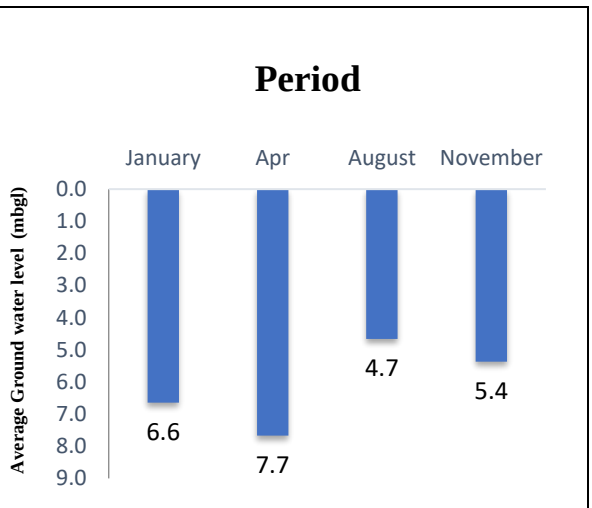
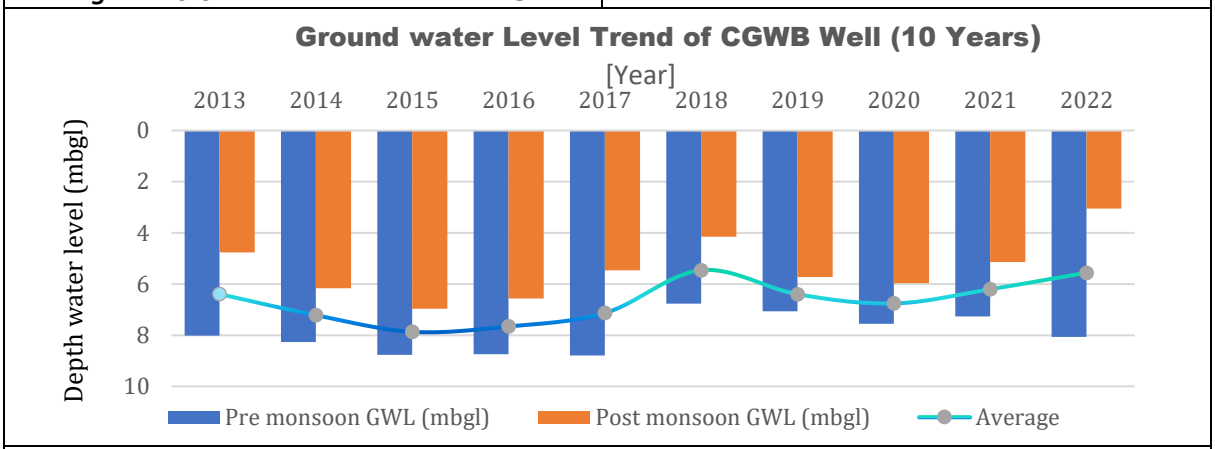


Figure 3.10: Hydrograph of Satsimile CGWB monitoring well.

CGWB Hydrograph station Soguru Crossing located at 5.6 Km from the project site (Lat=18.515760 & Long 82.612678)

Year	Jan	Apr	Aug	Nov
2013	7.17	8.24	0.72	4.77
2014	7.27	8.27	5.97	6.17
2015	7.47	8.77	6.37	6.97
2016	7.51	8.75	5.57	6.57
2017	7.57	8.8	2.4	5.47
2018	6.27	6.77	3.47	5.84
2019	3.57	7.07	4.77	5.73
2020	7.55	7.81	4.87	5.97
2021	7.27	7.5	5.01	6.14
2022	7.63	8.07	7.44	3.05
Average	***6.6***	***7.7***	***4.7***	***5.4***





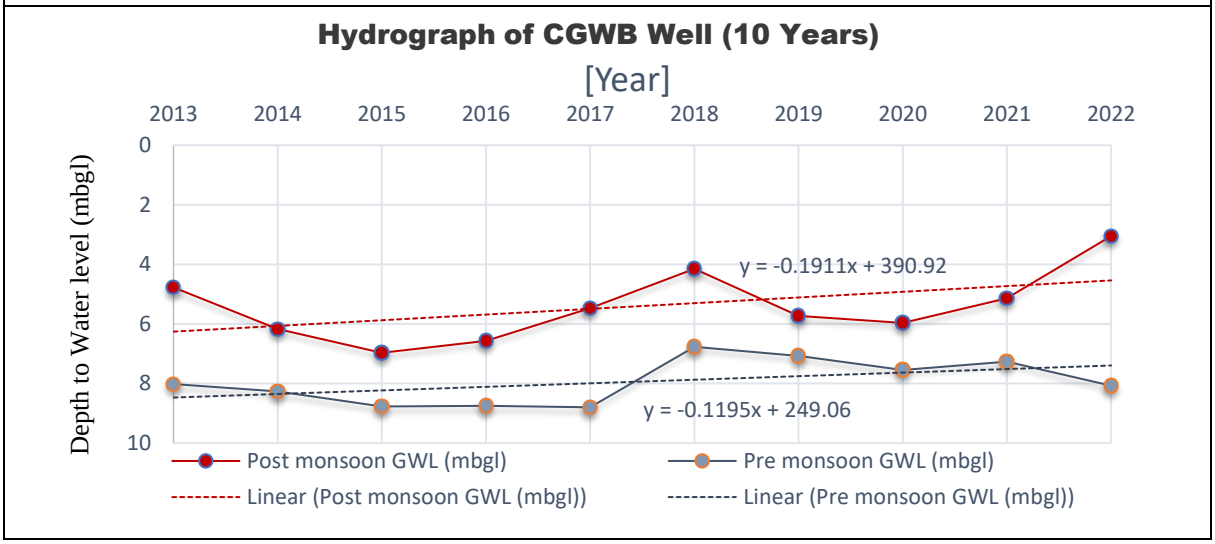


Figure 3.11: Hydrograph of Soguru CGWB monitoring well.

The long-term trend in and around the study area clearly indicates that there is no stress in the ground water.

3.2.6 Ground Water Quality

It is highly essential to assess the quality of ground water in the area and accordingly its suitability for various purposes viz. drinking, irrigation and industrial purposes etc. During the course of the project, water quality has been determined by testing the water samples at various locations inside and outside of the lease area of mine, covering a 10 km radius from the mine's boundary

Ground water samples were collected from 08 ground water source and analyzed in the NABL Accredited laboratory by adopting the standard method of the analytical process. Ground water quality reports are given in **Annexure I.**

The test result is presented in Table 3.10. The analysis reveals that quality of water is within the permissible limits of IS:10500 -2012.

Table 3.10: Physicochemical results of the groundwater.

S.N	Parameter	Units	Acceptable Limit	Permissible Limit	Ballada	Atanda	abagada	Banjalaput	Somli	Kandaput	Near Raising	Kandara
1	pH	--	6.5 to 8.5	No Relaxation	8.15	8.24	7.83	7.86	7.74	7.65	7.65	7.55
2	Colour	Hazen	5	15	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
3	Turbidity	NTU	1	5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
4	Odour	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5	Taste	--	Agreeable	Agreeable	Disagreeable	DisAgreeable	Agreeable	DisAgreeable	Agreeable	Agreeable	DisAgreeable	DisAgreeable
6	Total Hardness as $CaCO_3$	mg/l	200	600	153.21	265.19	142.20	151.36	300.44	175.45	181.50	176.28
7	Calcium as Ca	mg/l	75	200	45.10	51.0	46.85	37.57	68.30	51.44	41.20	53.25
8	Alkalinity as $CaCO_3$	mg/l	200	600	126.00	132.00	113.24	130.01	282.18	154.50	145.33	159.28
9	Chloride as Cl	mg/l	250	1000	86.21	81.89	85.21	95.20	86.10	74.11	101.36	78.23
10	Cyanide as CN	mg/l	0.05	No Relaxation	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
11	Magnesium as Mg	mg/l	30	100	8.12	7.89	3.63	10.26	12.00	10.000	17.00	12.00
12	Total Dissolved Solids	mg/l	500	2000	346.0	356.00	330.0	360.0	375.0	340.0	380.00	320.00
13	Sulphate as SO_4	mg/l	200	400	104.00	110.00	97.38	130.00	120.60	140.81	121.88	122.73
14	Fluoride as F	mg/l	1.0	1.5	0.50	0.68	0.54	1.04	1.06	1.20	0.40	0.75
15	Nitrate as NO_3	mg/l	45	No Relaxation	22.00	26.24	25.30	25.60	26.20	34.23	30.60	26.98
16	Iron as Fe	mg/l	1.0	No relaxation	0.24	0.22	0.40	0.30	0.19	0.30	0.27	0.11
17	Aluminium as Al	mg/l	0.03	0.2	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
18	Boron	mg/l	0.5	2.4	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
19	Chromium as Cr	mg/l	0.05	No Relaxation	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
20	Conductivity (at 25^0C)	µS/cm	--	--	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
21	#Phenolic Compounds	mg/l	0.001	0.002	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
22	Mineral Oil	mg/l	1.0	No Relaxation	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
23	Anionic Detergents as MBAS	mg/l	0.2	1.0	0.41	1.13	0.76	1.19	1.16	1.14	1.31	1.34
24	Zinc as Zn	mg/l	5	15	0.02	0.04	0.05	0.07	0.04	0.05	0.05	0.04
25	Copper as Cu	mg/l	0.05	1.5	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
26	Manganese as Mn	mg/l	0.1	0.3	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
27	Cadmium as Cd	mg/l	0.003	No Relaxation	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
28	Lead as Pb	mg/l	0.01	No Relaxation	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
29	Selenium as Se	mg/l	0.01	No Relaxation	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
30	Arsenic as As	mg/l	0.01	No Relaxation	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
31	Mercury as Hg	mg/l	0.001	No Relaxation	<2	<2	<2	<2	<2	<2	<2	<2
32	Total Coliform	MPN/100ml	-		Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
33	E. Coli	MPN/100ml	-									

Apart from the above on-site Electrical Conductivity was tested in the field during the well inventory water samples were collected and tested in the NABL Lab. The samples tested for the selected key wells during the field study revealed that the maximum and minimum EC concentration in ground water is 444 and 602 µs/cm which is potable as per the CPHEEO standards. Based on the above results of EC, the spatial distribution of EC concentration has been generated and presented in figure 3.16.

A higher concentration of EC is observed in the North-eastern part of the study area. The majority of the area falls under the 492-585 µs/cm EC zone. The spatial distribution of EC concentration reveals that the area does not fall under the ground water quality affected zone.

pH: pH value of ground water indicates that the water is in general a bit alkaline in nature. The range of pH is 7.55 to 8.24. The pH values of all analyzed samples remain within the standard norm.

Total Dissolved Solids: To ascertain the suitability of groundwater for any purpose, it is essential to classify the groundwater depending on its hydro-chemical properties and TDS values. TDS concentration varies from 320 to 380 mg/L. This suggests that the study area is characterized by fresh water, with TDS values less than 500 mg/L. Most of the groundwater samples are within the maximum permissible limit (2000 for drinking as per the CPHEEO standards and BIS, 2012.

Chloride: The range of Chloride is 78.23 to 101.36. The Chloride values of all analyzed samples remain within the standard norm. The spatial distribution of Chloride concentration is presented in figure 3.19.

Nitrate: The concentration of nitrogen in groundwater is derived from the biosphere. Nitrogen is originally fixed from the atmosphere and then by soil bacteria into ammonium. Under aerobic conditions, nitrogen is finally converted into nitrate by nitrifying bacteria.

The Nitrate concentration varies from 22-34.23 mg/L. All the samples show nitrate concentration within the permissible limit. As the nitrate is a point source pollutant and anthropogenic pollution, a Nitrate concentration map showing the point values has been generated and presented in figure 3.12.

Fluoride: Fluoride concentration in ground water is of geo-genic nature. Fluoride concentration varies from 0.4 – 1.2 mg/L. The fluoride concentration of the study area is within permissible limits of the drinking water standards (1.5mg/l). The fluoride concentration map as a point value is presented in figure 3.13

On perusal of the results of the chemical analysis of ground water samples collected and analyzed shows that ground water, in general, is potable and the majority of the constituents are within acceptable limits as prescribed by BIS, 2012. Hence, it is concluded that ground water is suitable for drinking, industrial and agricultural purposes and does not contain any toxic elements at the majority of locations.

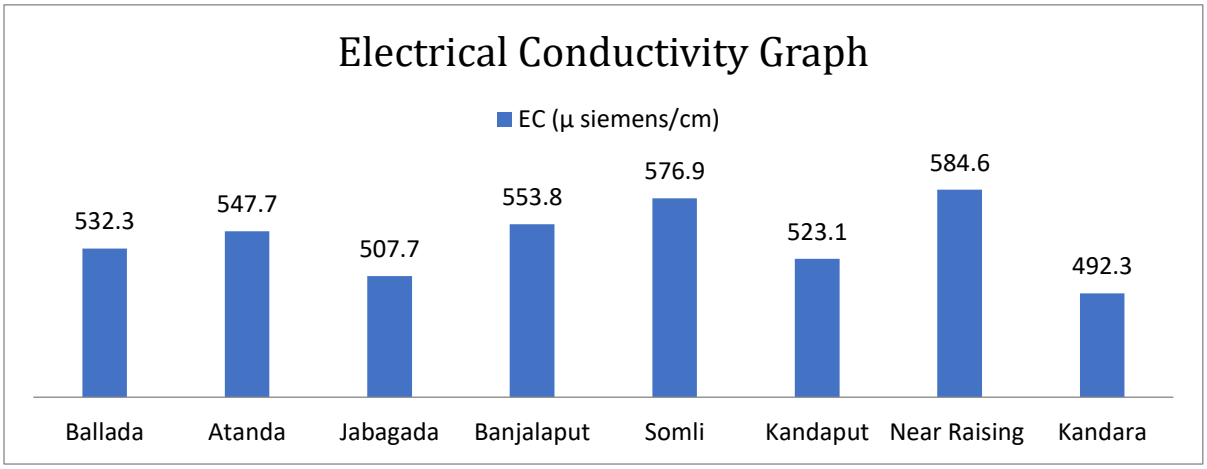


Figure 3.12: Electrical Conductivity Graph

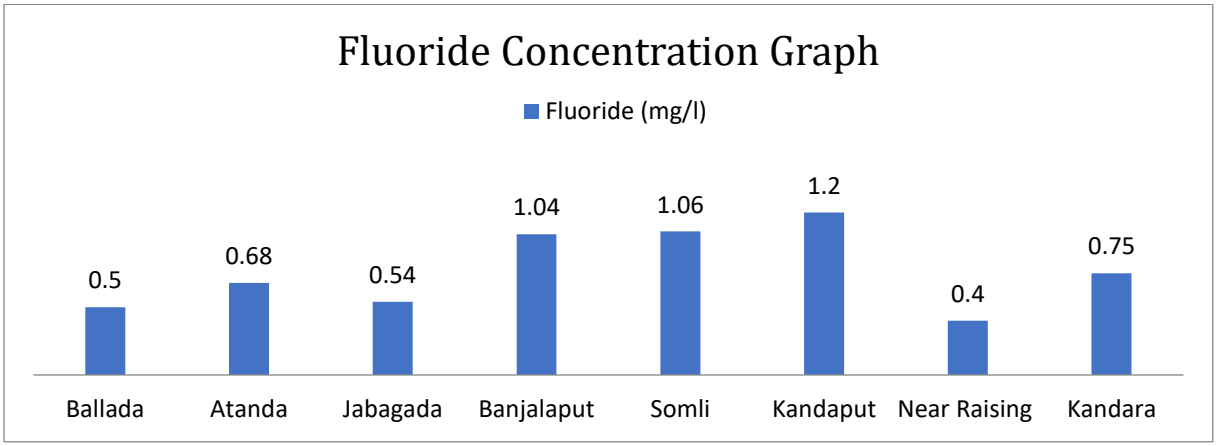


Figure 3.13: Fluoride Concentration Graph

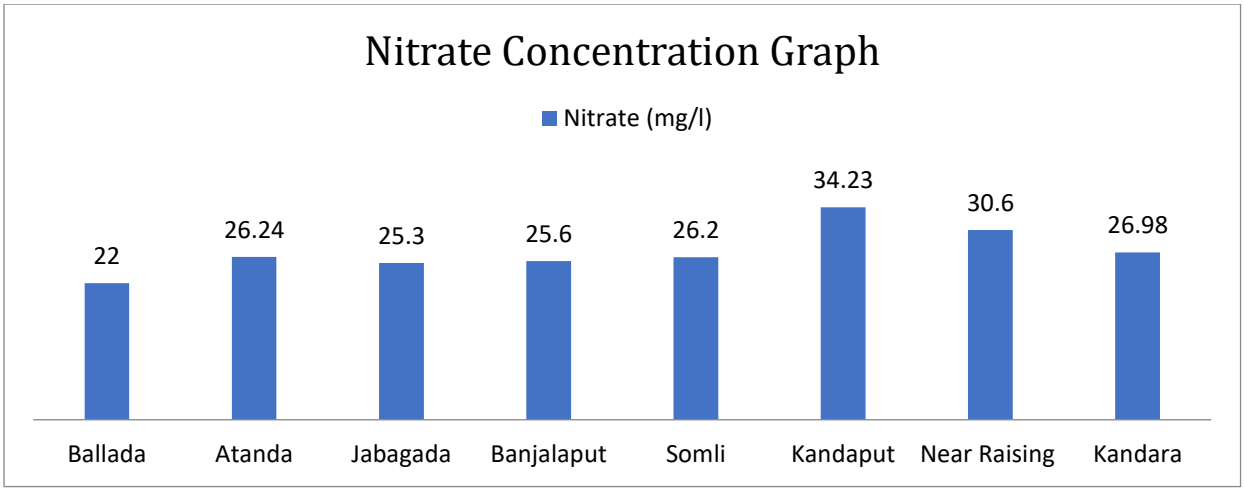


Figure 3.14: Nitrate Concentration Graph

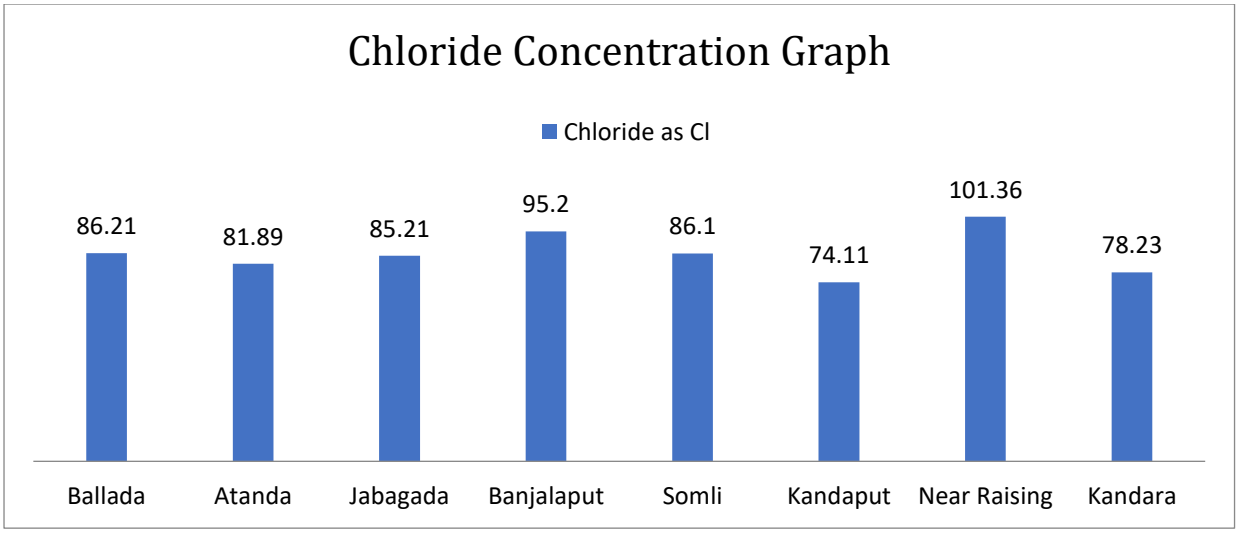
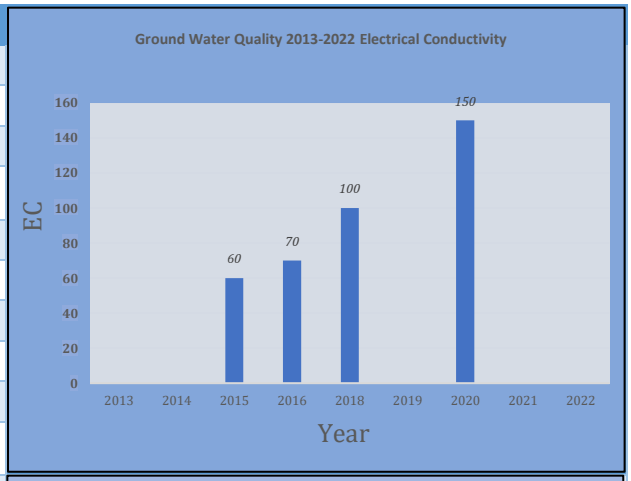


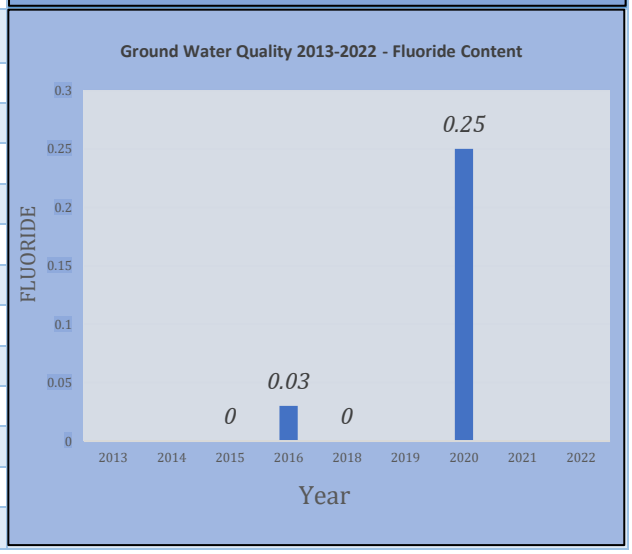
Figure 3.15: Chloride Concentration Graph

Furthermore, the ground water quality data for a period of 10 years for the Bheja 1 CGWB observation well has been collected and presented in Table 3.11. The quality of ground water is potable with respect to drinking water standards.

Table 3.11: Ground water quality of CGWB station

Parameter	2013	2014	2015	2016	2018	2019	2020	2021	2022
PH	-	-	7.34	7.14	7.44	-	7.9	-	-
EC	-	-	60	70	100	-	150	-	-
TH	-	-	25	-	46	75	-	-	-
TOT_ALKALINITY	-	-	14.75	-	44.26	-	-	-	-
CA	-	-	8	-	10	-	20	-	-
MG	-	-	1.23	-	5.12	-	6.1	-	-
NA	-	-	2	-	1	-	2	-	-
K	-	-	0.7	-	0.2	-	0.8	-	-
FE	-	-	ND	0	0.09	-	-	-	-
CARBONATE	-	-	0	-	0	-	-	-	-
BICARBONATE	-	-	18	-	54	-	67	-	-
CHLORIDE	-	-	11	17	3	-	17	-	-
SULPHATE	-	-	1	-	0	-	-	-	-
NITRATE	-	-	ND	-	0	-	-	-	-
FLUORIDE	-	-	BDL	0.03	0	-	0.25	-	-
SAR	-	-	0.17	-	0.06	-	-	-	-
RSC	-	-	-0.21	-	0	-	-	-	-
SiO2	-	-	-	-	0	-	-	-	-
PO4	-	-	-	-	0	-	-	-	-
TDS	-	-	-	-	46	90	-	-	-
Turbidity	-	-	-	-		-	-	-	-
%Na	-	-	-	-		-	-	-	-
Arsenic	-	-	-	-	0	-	-	-	-





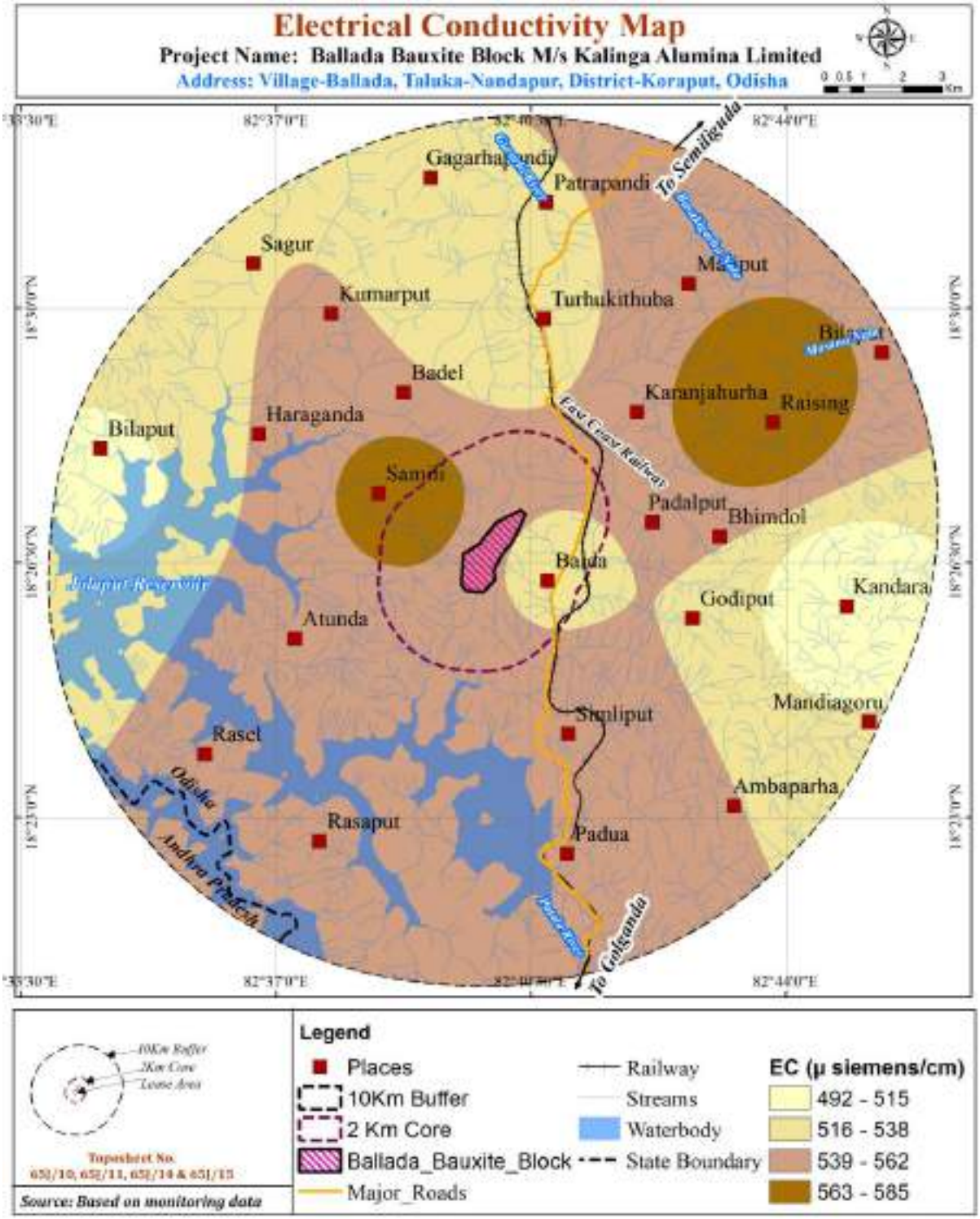


Figure 3.16: Electrical Conductivity Map of Core and Buffer Zone

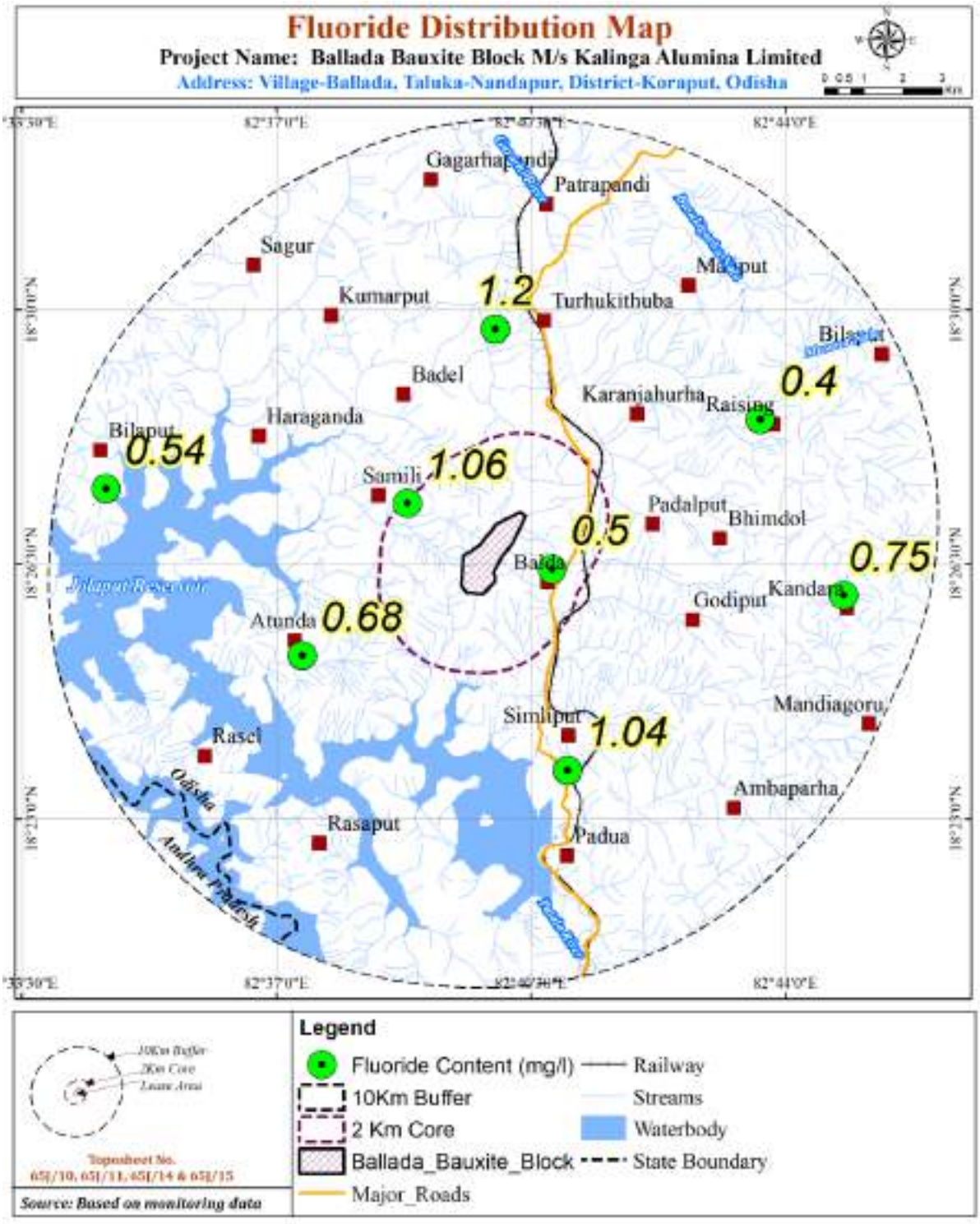


Figure 3.17: Fluoride Map of Core and Buffer Zone

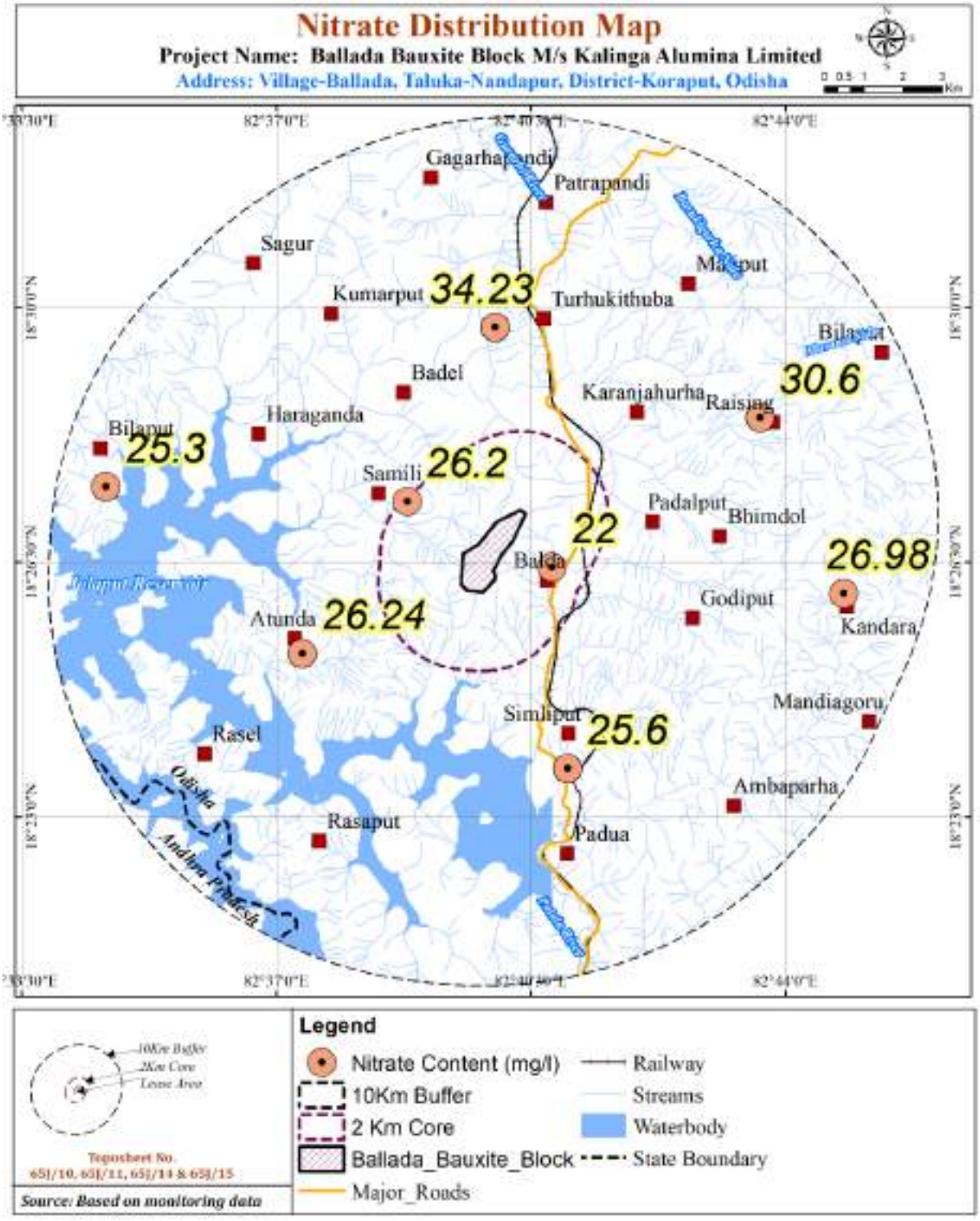


Figure 3.18: Nitrate Map of Core and Buffer Zone

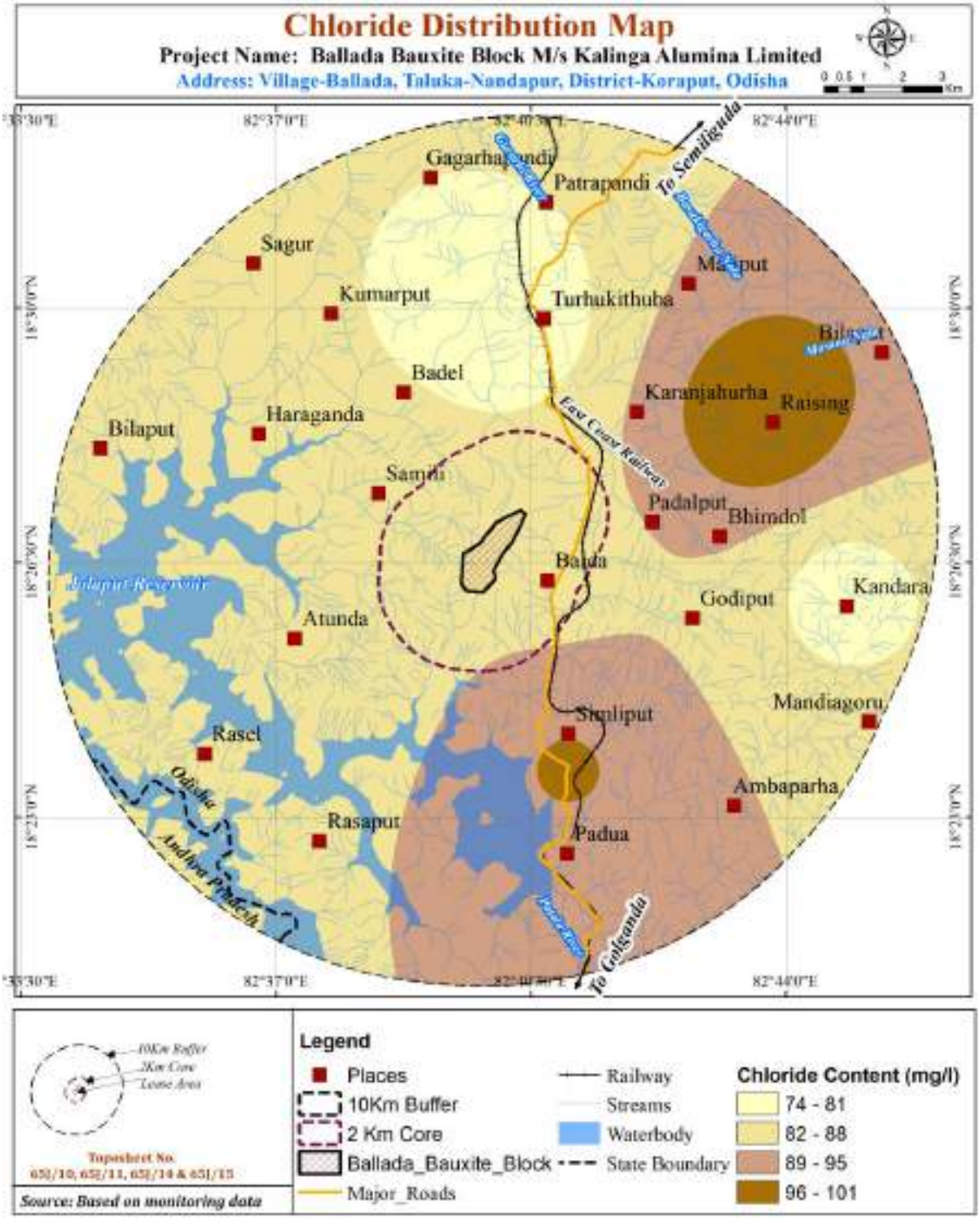


Figure 3.19: Chloride Map of Core and Buffer Zone

3.2.7 Water quality of nearby water bodies

As per groundwater quality test report, no anomalies have been recorded for the nearby water bodies.

Table No. 3.12: Surface Water Quality Result

Parameter	Unit	Water Body Site (SW1)	Near Jalaput Reservoir (SW2)	Near Daba Reservoir (SW3)	Near Paduwa River (SW4)	Pond Near village kumiput (SW5)	Near Parata River (SW6)	Basukigarha Nala (SW7)	Pond Near Balda village (SW8)
pH (at 25°C)	--	7.72	7.68	7.68	7.67	7.51	7.56	7.62	7.67
Colour	Hazen	10	20	8	18	20	14	16	60
Turbidity	NTU	41	12	16	34	24	46	48	57
Odour	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Total Hardness as CaCO3	mg/l	81	76	70	78	80	74	76	74
Calcium as Ca	mg/l	30	24.6	22.1	28.1	26	24	24.8	25.4
Alkalinity as CaCO3	mg/l	69.2	66.4	62	66	68	64	64.4	65.2
Chloride as Cl	mg/l	39.4	34.6	32	36	32	34	34.6	34.6
Residual free Chlorine	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cyanide as CN	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Magnesium as Mg	mg/l	1.46	3.52	3.58	1.88	12.4	10.02	16.45	12.2
Total Dissolved Solids	mg/l	260	236	246	325	400	244	260	285
Total Suspended solids	mg/l	47.34	41.21	34.14	37.61	24	12	12	14.2
Dissolved Oxygen	mg/l	6.8	6.9	6.8	6.8	6	7.2	5.9	5.2
Sulphate as SO4	mg/l	146.41	34	20.6	180	26	20.2	162	18.2
Fluoride as F	mg/l	0.18	0.21	BDL	BDL	0.2	BDL	BDL	0.32
BOD (3 Days at 27°C)	mg/l	6	4	4	6	10	6	8	14
COD	mg/l	40	16	20	20	60	24	30	57
Conductivity (at 25°C)	µS/cm	0.392	0.384	0.399	0.524	0.645	0.398	0.39	0.462
Nitrate as NO3	mg/l	4.6	4.2	4.2	21.5	16.2	4.6	5.2	32.25
Sodium as Na	mg/l	21.4	21	20.6	25	22.6	20.2	22.2	108
Potassium as K	mg/l	4.7	5.2	4.6	5	4.9	4.8	4.2	38.67
Iron as Fe	mg/l	0.04	0.02	0.02	0.3	0.3	0.3	0.32	1.72

Parameter	Unit	Water Body Site (SW1)	Near Jalaput Reservoir (SW2)	Near Daba Reservoir (SW3)	Near Paduwa River (SW4)	Pond Near village kumiput (SW5)	Near Parata River (SW6)	Basukigarha Nala (SW7)	Pond Near Balda village (SW8)
Aluminium as Al	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Boron	mg/l	0.62	0.7	0.21	0.37	0.56	0.64	0.66	0.32
Chromium as Cr	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Phenolic Compounds	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
#Mineral Oil	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
#Anionic Detergents as MBAS	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Zinc as Zn	mg/l	0.09	0.06	0.03	2.18	2.06	1.2	1.24	1.44
Copper as Cu	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Manganese as Mn	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cadmium as Cd	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Total Coliform	MPN/100ml	1200	1100	1200	1500	1000	900	940	1200
Fecal Coliform	MPN/100ml	800	800	900	1100	800	500	490	900

CHAPTER -4

APPROVED MINE PLAN

Extent of Mineralization

The Ballada bauxite block comprising over an area of 144.945 Ha, constitutes the plateau area of 91.67 Ha with a mineralised zone of 83.778 Ha and non-mineralised zone of 61.167 Ha including the central khondalite and southern clay pocket. The deposit spreads all over the plateau area and is irregular in shape. The non-mineralised zone within the plateau area is 7.892 Ha and outside the plateau is 53.275 Ha. Considering the threshold limit of bauxite and aluminous laterite, the plateau exposes bauxites of different categories with a thin layer of soil having 0.2 to 1m thickness.

Crushing Section

The bauxite excavated from Ballada mine will be crushed and transported by a dumper/truck to the alumina plant and used for production of metallurgical grade alumina and shall be transported to the customers by road. The ore being of high grade, any preliminary treatment/beneficiation is not envisaged at the mine head. However, to enable smooth and easy transportation, the minus 600-800 mm ROM bauxite will be required to be reduced to a suitable size. This necessitates installation of a crushing plant at the mine head.

The size of the product to be obtained after crushing in the plant will be minus 150 mm (d85).

The ore transported from the mine may be dumped directly into the mobile crusher or to the stockpile depending upon the grade of bauxite and the requirement of the crushing plant.

The crushing plant and conveyor systems have been designed for 330 days operation per year with 3 shifts operation per day. The effective working hours per shift during dry and

monsoon season has been considered at 7 hours and 5 hours respectively. Crushing plant and conveyor system to operate 12 months in a year considering 8 dry months and 4 monsoon months.

For 4 million tons per annum peak rated capacity the crushing/ Screening plant requirement would be 800 TPH. It is proposed to install mobile crushing and screening plants in phases 400 TPH (1 no.) for 2 MTPA RoM production and 400 TPH (2 nos.) for 4 MTPA production.

One RoM. ore stockpile of around 50,000 tonnes capacity will be maintained near the crusher plant. This stockpile would not only enable to absorb the imbalance in mine raisings during dry season and monsoon to some extent but would also serve as a buffer between the mine and the crushing plant in the event of stoppage of either of these.

Year wise Opencast Development

Table 4.1: Year wise Opencast Development

Sr. No	Year	Pit ID	Bench	Bulk Density of Overburden (Waste) (BD1) (ton/m3)	Bulk Density of Mineral (BD2) (tonn/m3)	Top Soil Volume (Length x Width x Height) (m3)	Over Burden/Waste Volume (Length x Width x Height) (m3)	Over Burden/Waste Quantity (t)	ROM Volume (Length x Width x Height) (m3)	ROM Quantity (t)	Recovery	Mineral Reject (t)	Production Main (t)	Production Associated (t)	Location of Advancement	OB to Ore Ratio (ton/m3)
1	Year 1	New Pit	1, 2, 3	2	2	15,660	0	0	501256	1002512		-	1002512	0	SW	0.02
2	Year 2	New Pit	1,2,3,4,5,6	2	2	1,680	17,400	34,800	999880	1999760		-	1999760	0	SW	0.01
3	Year 3	New Pit	1,2,3,4, 7,8	2	2	7,375	35,984	71,968	1000122	2000244	95%	-	2000244	0	Central	0.02
4	Year 4	New Pit	9, 10, 11, 12	2	2	3,960	1,4400	28,800	1000440	2000880		-	2000880	0	Central	0.01
5	Year 5	New Pit	1, 9, 13, 14, 15, 16,	2	2	0	50,8840	101,7680	2000030	4000060		-	4000060	0	Central	0.13

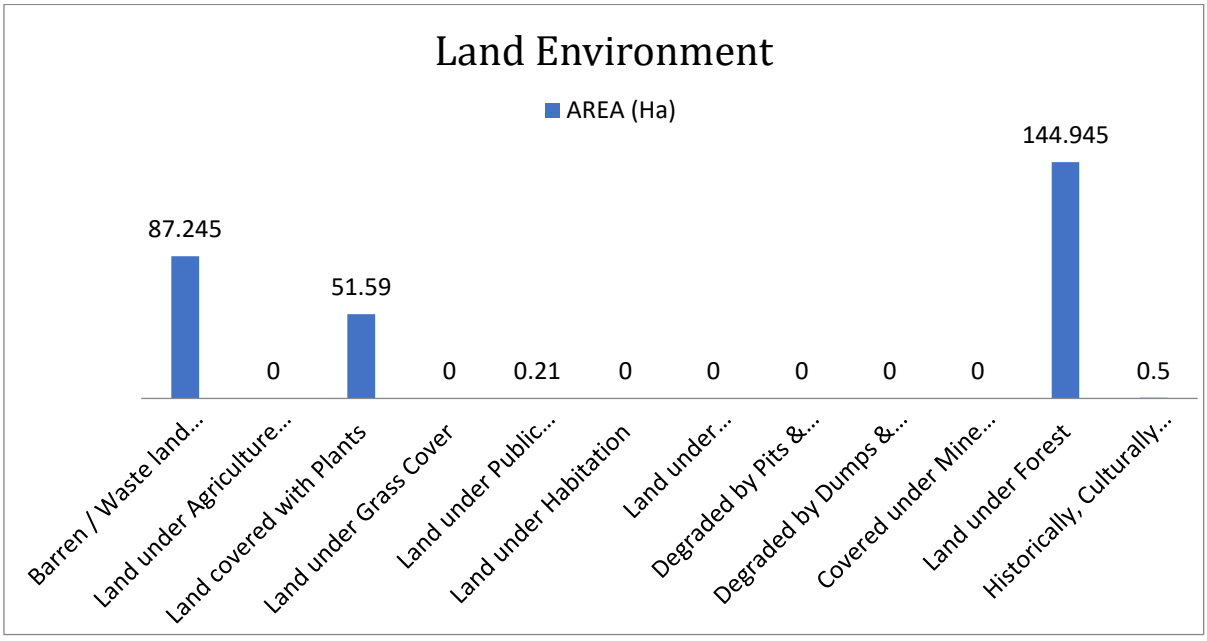
The development of bauxite mine at Ballada will be in phases and concomitant to installation of alumina plant. The alumina plant will be commissioned in phases. The initial phases of the alumina plant will be fed with bauxite sourced from Ballada & Kutrumali deposit. In Ballada, the initial one year will be utilised for the development and pre-mining activities and production of 1.0 MT. In the second year of mining operation at Ballada, the production of bauxite will be around 2.0 MT. Subsequently, production from Ballada will be gradually ramped up and will reach its peak production capacity of 4 MTPA in the fifth year of operation.

The waste generated in course of pre-mining development and subsequent mining operation will consist of topsoil and laterite with occasional occurrences of khondalite. The rate of generation of waste is expected to be of the order of 0.975 Mm3 considering an average waste to ore ratio of about 1: 0.095. However, during first five years of operation, including pre-mining development, the total generation of waste and topsoil has been estimated at about 1.0 Mm3 cu m, of which the topsoil is around 0.028 Mm3.

It is planned to stack topsoil and waste separately on ground during the initial 4 years of plan period. From 5th year onwards, waste material will be used for backfillings in the exhausted mine out pit and worked out benches. Topsoil, stacked separately, would be spread over the reclaimed areas, to enable planting and growing of trees. The waste stacked on ground during the initial years of operation will be utilised to fill the worked-out areas at the end of the working life of the mine as well as during the interim period, as and when practicable. The quantity of waste to be backfilled in the mined-out benches with topsoil spreading on it after 4th year of operation.

Table 4.1: Land Environment

BASE / PRESENT STATUS	
Pre-Mining Use	AREA (Ha)
Barren / Waste land with small bushes & shrubs	87.245
Land under Agriculture / Crops	0
Land covered with Plants	51.59
Land under Grass Cover	0
Land under Public Infrastructure / Utilities (water bodies, roads, railways, electric lines, telephone lines etc.)	0.21
Land under Habitation	0
Land under Monuments & places of Historical Importance	0
Degraded by Pits & Excavation	0
Degraded by Dumps & Material Staking	0
Covered under Mine Infrastructure (plants, shades, buildings etc.)	0
Land under Forest	144.945
Historically, Culturally & Ecologically Important Places	0.5



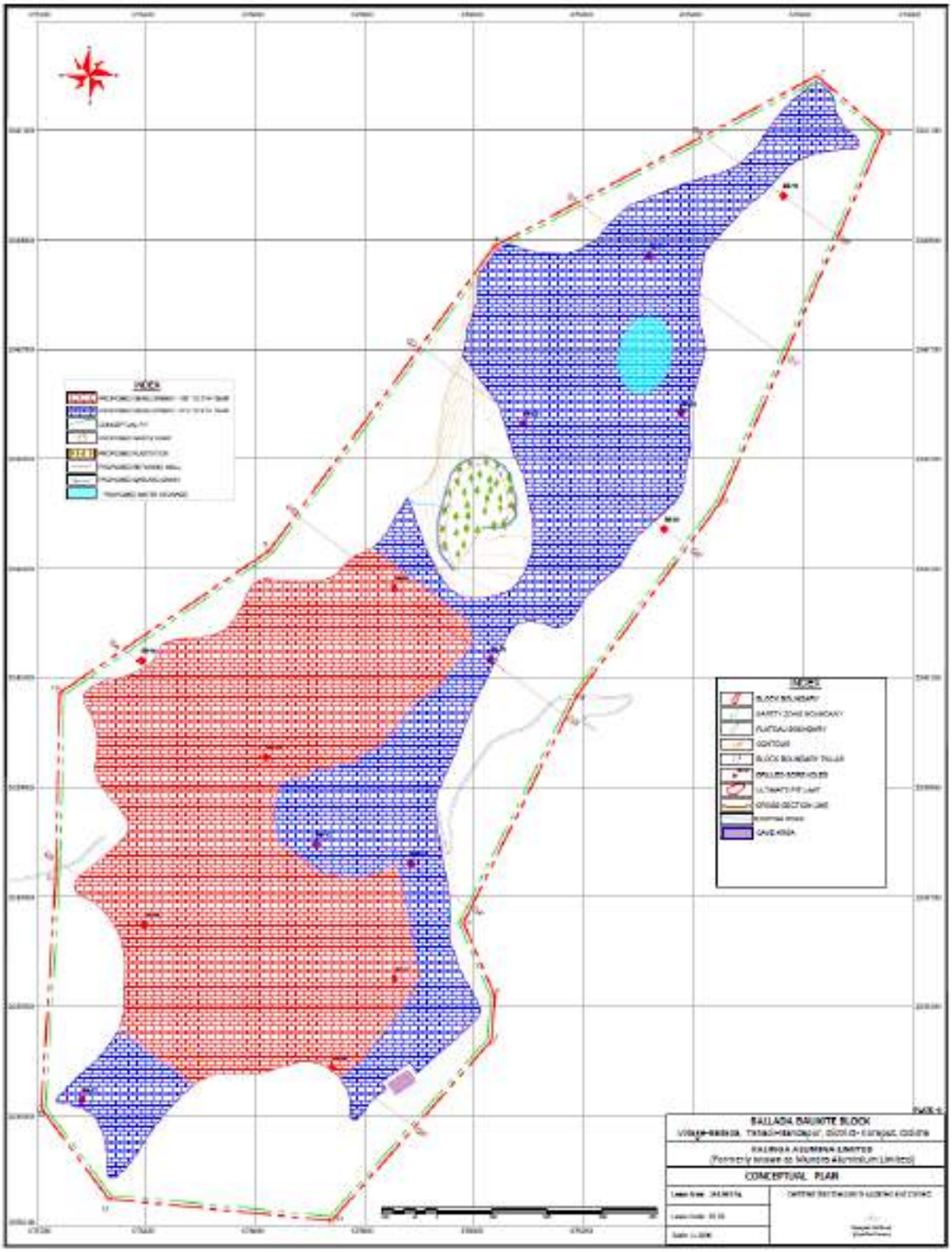


Figure 4.1: Mine Conceptual Plan

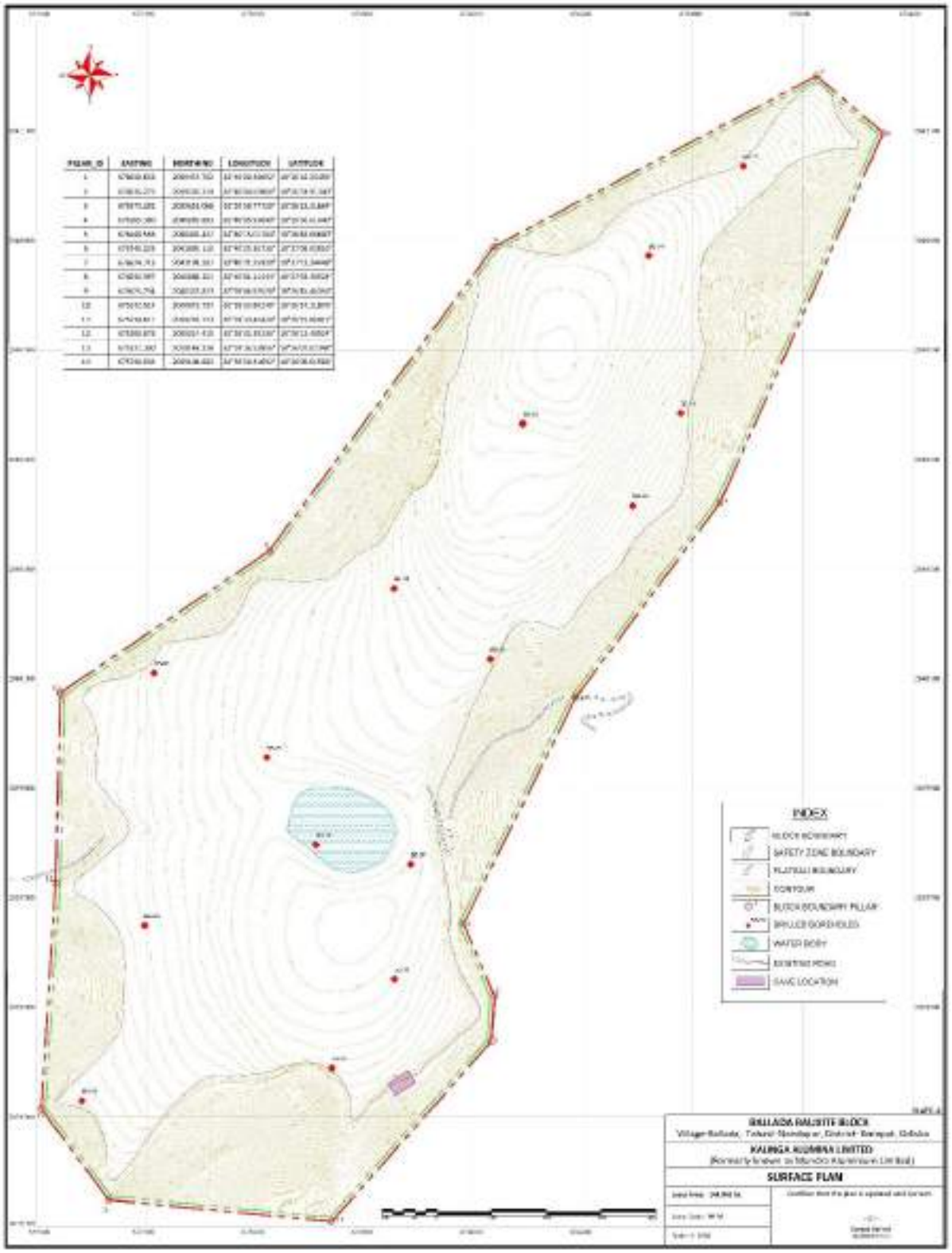


Figure 4.2: Surface Plan Map

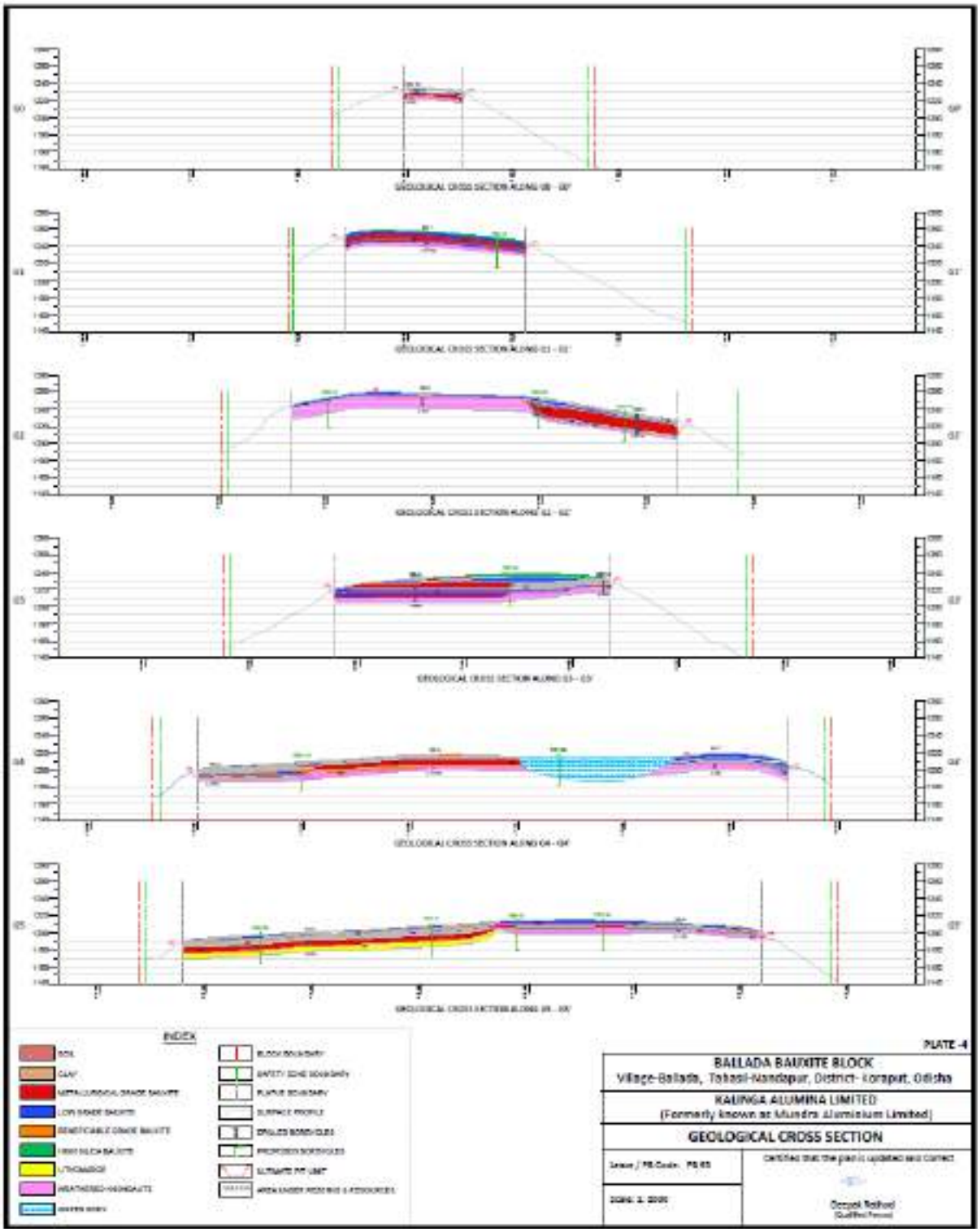


Figure 4.3: Geological Cross Section

CHAPTER -5

ESTIMATION OF MINE SEEPAGE AND ADVANCED DEWATERING PLAN

As per approved mining plan the maximum Woking depth is 1280 mRL and the ultimate pit depth is upto 1166 mRL. The Water table in and around the mine lease area is varies from 875 to 1073 mRL, ensuring there will be no groundwater seepage into the mine pit.

CHAPTER -6

MINE WATER MANAGEMENT

In the mining operation, the major requirement of water is for the suppression of dust, mostly generated a long-haul road, crushing plant and during excavation. Water shall also be required for plantation and cleaning and washing of mining machineries i.e., excavators, dumpers and drilling machines (mining involves drilling and blasting operations). Small quantity is required for drinking purpose.

The water requirement and their consumption are given in figure no 6.1.

Table 6.1: Water requirement detail

S.N.	Consuming Area	Water requirement,(KLD)
1.	Haul road dust suppression including maintenance of topsoil	600
2.	Washing and cleaning of earthmoving equipment (service water system)	45
3.	Drinking system	10
4.	Afforestation	15
5.	Miscellaneous	20
	Total	**690**



Figure 6.1 Water Balance Chart

CHAPTER -7

IMPACT OF MINE DEWATERING/ABSTRACTING AND MITIGATION MEASURES

7.1 Impact on the ground water regime

As per approved mining plan the maximum Woking depth is 1280 mRL and the ultimate pit depth is upto 1166 mRL. The Water table in and around the mine lease area is varies from 875 to 1073 mRL. So, there will not be any seepage of ground water.

Ground Water will not be utilized in mining process so there will not be any impact on ground water.

7.2 Impact on surface water sources

The mine is located on the hilly terrain and no any surface water source is passing through the mine lease area so there will not be any impact on surface water due to mining activity. Garland drain shall be constructed for mine pit and sump capacity should be designed keeping safety margin over and above 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.

Current and Potential Issues

No such potential threats are noticed except a few issues related to the drinking water. Therefore, the project proponent has made proper arrangements in this regard: i.e. in all the rehabilitation villages, suitable drinking water supply is provided by sinking hand pumps, dug wells and tube wells to certain extent, besides supplying drinking water through the mobile tankers in the affected villages and/ or on request of the local populace.

7.3 Impact on water quality

Regular monitoring is proposed to carried out in the study area to access the impact the mining on groundwater quality. The groundwater chemistry indicates that the groundwater in the area is potable and not containing any toxic elements. The **opencast mining activities** does not induce any unwanted chemicals or elements into the groundwater to affect the

water chemistry. With the movement heavy machinery in the project area the observed contamination may be Total Suspended Solids (TSS). With the provision of sufficient sump capacity, which acts as primary settling tank, the quality can be improved significantly. To reduce TSS further, the mine water would be discharged only after passing through the sedimentation tanks constructed on the surface.

7.4 Mitigation measures

Following mitigtaion measure will be proposed in the project premises

- Implementation of Rain Water Harvesting structures
- Construction of Graland drains for the collection of Rain Water
- Plantation in and around the project site

7.5 Saline water disposal strategies (In case of saline water abstraction)

The mine is not using saline water. Hence, the disposal of saline water does not arise.

CHAPTER -8

ANY OTHER DETAILS PERTAINING TO THE PROJECT

Table 8.1: DYNAMIC GROUND WATER RESOURCE OF INDIA, 2022 (Koraput District of Odisha)

Name of District	Ground Water Recharge							Annual Ground Water Extraction For							
	Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge (Ham)	Total Natural Discharge (Ham)	Annual Extractable Ground Water Resource (Ham)	Irrigation (Ham)	Industrial (Ham)	Domestic (Ham)	Total Extraction (Ham)	Annual Allocation for Domestic Use as on 2025 (Ham)	Net Ground Water Availability for future use (Ham)	Stag4e of Ground Water Extraction (%)	Categorization (Overexploited /Critical/ Semi critical/ Safe/Saline)
	Recharge from rainfall	Recharge from Other Sources	Recharge from rainfall	Recharge from Other Sources											
Koraput	*43067.79*	*4017.45*	*5196.41*	*5973.60*	*58255.25*	*4768.89*	*53486.36*	*6594.32*	*596.70*	*4472.26*	*11663.27*	*4827.20*	*41468.16*	*21.81*	*Safe*

As per Dynamic Ground Water Resource of India, 2022 All block of Koraput District of Odisha falls under the Safe category.

CHAPTER -9

SUMMARY AND CONCLUSION

- ✓ Kalinga Alumina Limited (formerly known as Mundra Aluminum Limited), a wholly owned subsidiary of Adani Enterprises Limited, has a vision of setting up an integrated greenfield alumina refinery of 4.0 MTPA capacity and also to develop bauxite mines in the vicinity for captive / commercial use.
- ✓ The Ballada bauxite block comprising over an area of 144.945 Ha, constitutes the plateau area of 91.67 Ha with a mineralised zone of 83.778 Ha and non-mineralised zone of 61.167 Ha including the central khondalite and southern clay pocket.
- ✓ Sources of water requirement of mine shall be from Jalaput Lake located at distance of 5km, the total water requirement during mine operation is estimated as 690 KLD, which will be fulfilled through surface water.
- ✓ The Survey of India topographical map of 65J/10, 65J/11, 65J/14 & 65J15 covering the project site is used as reference map for geo referencing of the remote sensing data.
- ✓ The study area theoretically covers an area of 36884 Ha, within the circle encompassed by 10 km radius around the Mine site. The land use is classified into 6 classes - viz. Agriculture Land, Built-up, Barren Land, Forest, Open Scrub & Water body.
- ✓ The study area (10 km radius from the mine site boundary – buffer zone) elevation ranges from 717 m to 1274 m AMSL. The maximum elevation is observed in the mine lease area and eastern part of the study area.
- ✓ The core zone including the lease area composed with Dissected denudation hills & valleys and Dissected Structural hills & valleys.
- ✓ The Jolaput Reservoir is the nearest waterbody which is situated at 5 Km away from the project site. The drainage pattern of this area is dendritic in nature.
- ✓ The average annual rainfall of Koraput district is 1454 mm.
- ✓ The mine site is located 500 m away from notified Ramsar sites.

- ✓ The study area forms a segment of the east-central part of the Eastern Ghat hill ranges. Rocks belonging to the Khondalite and Charnockite groups are developed in the area.
- ✓ Study area is basically forming the consolidated and unconsolidated hydrogeological formation.
- ✓ Basically 2 types of aquifers are present in the study area (Aquifer-I 100m depth and Aquifer-II 100-200m depth).
- ✓ As per well inventory of study area it has been observed that the pre monsoon depth to water level ranges between 2.25 mbgl to 7.22 mbgl and post-monsoonal water level ranges from 1.22 mbgl to 6.21 mbgl.
- ✓ The water quality analysis reveals that quality of water is within the permissible limits of IS:10500 -2012.
- ✓ As per approved mining plan the maximum Woking depth is 1280 mRL and the ultimate pit depth is upto 1166 mRL. The Water table in and around the mine lease area is varies from 875 to 1073 mRL, ensuring there will be no groundwater seepage into the mine pit.
- ✓ As per Dynamic Ground Water Resource of India, 2022 All block of Koraput District of Odisha falls under the Safe category.

CHAPTER -10

ACCREDITATION CERTIFICATE

Accreditation Board of CGWA

Certificate of Accreditation

M/s. Vardan Environet
Gurugaon, Haryana

Has been accredited as a Ground Water Professionals to prepare reports in the Functional Areas of

- *Impact Assessment of Existing / Proposed GW Extraction*
- *Hydrogeological conditions in mining projects.*

Valid from : 15.02.2021
Valid thru : 14.02.2026

Certificate No. : CGWA/RG1/003
Dated : 07.07.2021

क्षेत्रीय निदेशक
Regional Director
आरजीएनजीडब्ल्यूटीआरआई
RGNGWT&RI

सदस्य
Member
आरजीएनजीडब्ल्यूटीआरआई
RGNGWT&RI

List of Reference /Bibliography

- DEM and/ or topographic contour map of the area (The details of elevation of the surrounding area) https://earthexplorer.usgs.gov/
- Geomorphology map (including drainage and water bodies) https://bhukosh.gsi.gov.in/Bhukosh/MapViewer.aspx
- Map of Land use/ Land cover map of the surrounding area https://www.arcgis.com/home/item.html?id=d6642f8a4f6d4685a24ae2dc0c73d4ac
- Maps of both regional Geology and the local Geology of the surrounding area https://bhukosh.gsi.gov.in/Bhukosh/MapViewer.aspx
- Open street map (includes roads, places and railways) https://extract.bbbike.org/
- Rainfall data collected from https://indiawris.gov.in/wris/#/rainfall
- Toposheets collected from Survey of India https://onlinemaps.surveyofindia.gov.in/FreeMapSpecification.aspx
- Water level data collected from https://indiawris.gov.in/wris/#/groundWater

Annexure-I

Ground Water Quality Test Report

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/01	Report No.:	VEL/W/2304/10/001
Name & Address of the Project:	Ballada Bauxite Mine Village - Ballada, Tehsil - Nandapur, District - Koraput, Odisha – 764038	Format No.:	7.8.3-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Description:	Ground Water Sample	Period of Analysis:	10/04/2023-14/04/2023
Sample Location:	Village Ballada (GW1)	Receipt Date:	10/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	08/04/2023
Sampling and Analysis Protocol:	IS 3025 & APHA 23rd Edition 2017	Sampling Quantity:	5.0 Ltr + 250ml
Preservation:	Ice Box	Sampling Type:	Grab

S. No.	Parameter	Test Method	Result	Unit	Limits of IS:10500-2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	8.15	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BLQ (**LOQ 1.0 Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BLQ (**LOQ 1.0 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Disagreeable	--	Agreeable	Agreeable
6.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	274.0	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	58.32	mg/l	75	200
8.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	240.26	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	564.45	mg/l	250	1000
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(**LOQ 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	32.34	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	1540.00	mg/l	500	2000
13.	Sulphate as SO_4	APHA , 4500 E, Turbidimetric Method	104.00	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	0.50	mg/l	1.0	1.5
15.	Nitrate as NO_3	IS 3025 (P-34) ,Clinometropic Method	22.00	mg/l	45	No Relaxation
16.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.24	mg/l	1.0	No relaxation
17.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.03	0.2
18.	Boron	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.5	2.4
19.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.05	No Relaxation

(Checked By) 14/04/2023

(Approved By)

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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)

ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/KAL/W/01			Report No.: VEL/W/2304/10/001			
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005 mg/l)	mg/l	0.001	0.002
21.	Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1 mg/l)	mg/l	1.0	No Relaxation
22.	Anionic Detergents as MBAS	Annex K of IS 13428, IS 3025 (P-65)	*BLQ(**LOQ 0.05 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	IS 3025 (P-63):2014(RA:2019)	0.41	mg/l	5	15
24.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	0.02	mg/l	0.05	1.5
25.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.001 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.01	No Relaxation
30.	Mercury as Hg	IS 3025 (P-65):2014(RA:2019)	*BLQ (**LOQ 0.0005 mg/l)	mg/l	0.001	No Relaxation
31.	Total Coliform	IS 1622,1981, RA-2019	<2	MPN/100ml	Shall not be detectable in any 100 ml sample	
32.	E. Coli	IS 1622,1981, RA-2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

Note: - *BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

(Checked by) 14/04/2023

VARDAN ENVIROLAB GURGAON

Gurbir Prasad Singh

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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/02	Report No.:	VEL/W/2304/10/002
Name & Address of the Project:	Ballada Bauxite Mine Village – Ballade, Tehsil – Nandapur, District – Koraput, Odisha – 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Description:	Ground Water Sample	Period of Analysis:	10/04/2023-14/04/2023
Sample Location:	Village Atanda (GW2)	Receipt Date:	10/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	08/04/2023
Sampling and Analysis Protocol:	IS 3025 & APHA 23rd Edition 2017	Sampling Quantity:	5.0 Ltr + 250ml
Preservation:	Ice Box	Sampling Type:	Grab

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	8.24	–	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BLQ(**LOQ 1.0 Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BLQ (**LOQ 1.0 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Odour Method	Agreeable	–	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	DisAgreeable	–	Agreeable	Agreeable
6.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	265.19	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	51.0	mg/l	75	200
8.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	261.39	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl B, Argentometric Method	514.16	mg/l	250	1000
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(**LOQ 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	33.38	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	1230.00	mg/l	500	2000
13.	Sulphate as SO_4	APHA , 4500 E, Turbidimetric Method	110.00	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	0.68	mg/l	1.0	1.5
15.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	26.24	mg/l	45	No Relaxation
16.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.22	mg/l	1.0	No relaxation
17.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.03	0.2
18.	Boron	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.5	2.4
19.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.05	No Relaxation

(Checked By)

(Authorised By)

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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)

ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/KAL/W/02 — Report No.: VEL/W/2304/10/002

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005 mg/l)	mg/l	0.001	0.002
21.	Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1 mg/l)	mg/l	1.0	No Relaxation
22.	Anionic Detergents as MBAS	Annex K of IS 13428, IS 3025 (P-68)	*BLQ(**LOQ 0.05 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	1.13	mg/l	5	15
24.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	0.04	mg/l	0.05	1.5
25.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.001 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.01	No Relaxation
30.	Mercury as Hg	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.0005 mg/l)	mg/l	0.001	No Relaxation
31.	Total Coliform	IS 1622:1981, RA-2019	<2	MPN/100ml	Shall not be detectable in any 100 ml sample	
32.	E. Coli	IS 1622:1981, RA-2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

Note: - *BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

(Checked By) 14/04/2023

(Approved By) Gaurav Pratap Singh

VARDAN ENVIROLAB GURGAON

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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/83	Report No.:	VEL/W/2304/18/003
Name & Address of the Projec	Ballada Bauxite Mine Village – Ballada, Tehsil – Nandapur, District - Koraput, Odisha – 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited,		
Sample Description:	Ground Water Sample	Period of Analysis:	10/04/2023-14/04/2023
Sample Location:	Village Jabagada (GW3)	Receipt Date:	10/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	08/04/2023
Sampling and Analysis Protocol:	IS 3025 & APHA 23rd Edition 2017	Sampling Quantity:	5.0 Ltr + 250ml
Preservation:	Ice Box	Sampling Type:	Grab

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500-2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	7.80	–	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BLQ (**LOQ 1.0 Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BLQ (**LOQ 1.0 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Odour Method	Agreeable	–	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	DisAgreeable	–	Agreeable	Agreeable
6.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	293.00	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	57.20	mg/l	75	200
8.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	300.12	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	706.29	mg/l	250	1000
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(**LOQ 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	36.42	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	1400.00	mg/l	500	2000
13.	Sulphate as SO_4	APHA , 4500 E, Turbidimetric Method	97.58	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	0.54	mg/l	1.0	1.5
15.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	25.30	mg/l	45	No Relaxation
16.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.40	mg/l	1.0	No relaxation
17.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.03	0.2
18.	Boron	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.5	2.4
19.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.05	No Relaxation

(Checked by) 14/04/2023

(Approved By)

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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/KAL/W/03 — Report No: VEL/W/2304/10/003

S. No.	Parameter	Test Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005 mg/l)	mg/l	0.001	0.002
21.	Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1 mg/l)	mg/l	1.0	No Relaxation
22.	Anionic Detergents as MBAS	Annex K of IS 13428, IS 3025 (P-68)	*BLQ(**LOQ 0.05 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	1.26	mg/l	5	15
24.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	0.05	mg/l	0.05	1.5
25.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.001 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.01	No Relaxation
30.	Mercury as Hg	IS 3025 (P-65):2014(RA:2019)	*BLQ (**LOQ 0.0005 mg/l)	mg/l	0.001	No Relaxation
31.	Total Coliform	IS 1622:1981, RA-2019	<2	MPN/100ml	Shall not be detectable in any 100 ml sample	
32.	E. Coli	IS 1622:1981, RA-2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

Note: -*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

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VARDAN ENVIRONET PVT. LTD. GURGAON

Gaurav Pratap Singh

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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/04	Report No.:	VEL/W/2304/10/004
Name & Address of the Project:	Ballada Bauxite Mine Village - Ballada, Tehsil - Nandapur, District - Koraput, Odisha – 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Description:	Ground Water Sample	Period of Analysis:	10/04/2023-14/04/2023
Sample Location:	Village Banjalaput (GW4)	Receipt Date:	10/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	08/04/2023
Sampling and Analysis Protocol:	IS 3025 & APHA 23rd Edition 2017	Sampling Quantity:	5.0 Ltr + 250ml
Preservation:	Ice Box	Sampling Type:	Grab

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	7.86	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BLQ (**LOQ 1.0 Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BLQ (**LOQ 1.0 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Dis Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	320.73	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	65.40	mg/l	75	200
8.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	436.49	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	1038.22	mg/l	250	1000
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(LOQ 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	38.17	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	2000.0	mg/l	500	2000
13.	Sulphate as SO_4	APHA , 4500 E, Turbidimetric Method	110.00	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	1.04	mg/l	1.0	1.5
15.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	25.60	mg/l	45	No Relaxation
16.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.30	mg/l	1.0	No relaxation
17.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.03	0.2
18.	Boron	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.5	2.4
19.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.05	No Relaxation

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ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/KAL/W/04			Report No.: VEL/W/2304/18/004			
S. No.	Parameter	Test Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005 mg/l)	mg/l	0.001	0.002
21.	Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1 mg/l)	mg/l	1.0	No Relaxation
22.	Anionic Detergents as MBAS	Annex K of IS 13428, IS 3025 (P-65)	*BLQ(**LOQ 0.05 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	1.19	mg/l	5	15
24.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	0.07	mg/l	0.05	1.5
25.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.001 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.01	No Relaxation
30.	Mercury as Hg	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.0005 mg/l)	mg/l	0.001	No Relaxation
31.	Total Coliform	IS 1622,1981, RA:2019	<2	MPN/100ml	Shall not be detectable in any 100 ml sample	
32.	E. Coli	IS 1622,1981, RA:2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

Note: - *BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

Checked by 14/04/2023

VARDAN ENVIROLAB GURGAON

Authorised By: Pritam Singh

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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/05	**Report No.:**	VEL/W/2304/10/005
Name & Address of the Project:	Ballada Bauxite Mine Village - Ballada, Tehsil – Nandapur, District – Koraput, Odisha – 764020	**Format No.:**	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Description:	Ground Water Sample	**Period of Analysis:**	10/04/2023-14/04/2023
Sample Location:	Village Somli (GW5)	**Receipt Date:**	10/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	**Sampling Date:**	08/04/2023
Sampling and Analysis Protocol:	IS 3025 & APHA 23rd Edition 2017	**Sampling Quantity:**	5.0 Ltr + 250ml
Preservation:	Ice Box	**Sampling Type:**	Grab

S. No.	Parameter	Test Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	7.74	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BLQ (**LOQ 1.0 Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BLQ (**LOQ 1.0 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Disagreeable	--	Agreeable	Agreeable
6.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	300.64	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	68.30	mg/l	75	200
8.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	282.18	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	598.49	mg/l	250	1000
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(**LOQ 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	31.48	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	1751.00	mg/l	500	2000
13.	Sulphate as SO_4	APHA , 4500 E, Turbidimetric Method	120.60	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	1.06	mg/l	1.0	1.5
15.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	29.20	mg/l	45	No Relaxation
16.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.19	mg/l	1.0	No relaxation
17.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.03	0.2
18.	Boron	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.5	2.4
19.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.05	No Relaxation

(Checked By) 14/04/2023

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ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/KAL/W/05			Report No.: VEL/W/2304/10305			
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005 mg/l)	mg/l	0.001	0.002
21.	Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1 mg/l)	mg/l	1.0	No Relaxation
22.	Anionic Detergents as MBAS	Annex K of IS 13428, IS 3025 (P-68)	*BLQ(**LOQ 0.05 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	1.16	mg/l	5	15
24.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	0.04	mg/l	0.05	1.5
25.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.001 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.01	No Relaxation
30.	Mercury as Hg	IS 3025 (P-65):2014(RA:2019)	*BLQ (**LOQ 0.0005 mg/l)	mg/l	0.001	No Relaxation
31.	Total Coliform	IS 1622,1981, RA-2019	<2	MPN/100ml	Shall not be detectable in any 100 ml sample	
32.	E. Coli	IS 1622,1981, RA-2039	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

Note: - *BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)

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Test Report

Sample Number:	VEL/KAL/W/06	Report No.:	VEL/W/2304/10/006
Name & Address of the Project:	Ballada Bauxite Mine Village - Ballada, Tehsil – Nandapur, District - Koraput, Odisha – 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Description:	Ground Water Sample	Period of Analysis:	10/04/2023-14/04/2023
Sample Location:	Village Kandapat (GW6)	Receipt Date:	10/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	08/04/2023
Sampling and Analysis Protocol:	IS 3025 & APHA 23rd Edition 2017	Sampling Quantity:	5.0 Ltr + 250ml
Preservation:	Ice Box	Sampling Type:	Grab

S. No.	Parameter	Test Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	7.65	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BLQ (**LOQ 1.0 Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BLQ (**LOQ 1.0 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	DisAgreeable	--	Agreeable	Agreeable
6.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	327.81	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	53.29	mg/l	75	200
8.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	454.83	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	1080.43	mg/l	250	1000
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(**LOQ 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	47.20	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	1902.00	mg/l	500	2000
13.	Sulphate as SO_4	APHA , 4500 E, Turbidimetric Method	140.81	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	1.20	mg/l	1.0	1.5
15.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	34.23	mg/l	45	No Relaxation
16.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.30	mg/l	1.0	No relaxation
17.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.03	0.2
18.	Boron	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.5	2.4
19.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.05	No Relaxation

Checked by 14/04/2023

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Test Report

Sample No.: VEL/KAL/W/06					Report No.: VEL/W/2304/10/006	
					Limits of IS:10500 -2012	
S. No.	Parameter	Test-Method	Result	Unit	Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005 mg/l)	mg/l	0.001	0.002
21.	Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1 mg/l)	mg/l	1.0	No Relaxation
22.	Anionic Detergents as MBAS	Annex K of IS 13428, IS 3025 (P-68)	*BLQ(**LOQ 0.05 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	1.14	mg/l	5	15
24.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	0.05	mg/l	0.05	1.5
25.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.001 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.01	No Relaxation
30.	Mercury as Hg	IS 3025 (P-65):2014(RA:2019)	*BLQ (**LOQ 0.0005 mg/l)	mg/l	0.001	No Relaxation
31.	Total Coliform	IS 1622,1981, RA-2019	<2	MPN/100ml	Shall not be detectable in any 100 ml sample	
32.	E. Coli	IS 1622,1981, RA-2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

Note: – *BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

(Checked By) 14/04/2023

(Approved By) Gaurav Pratap Singh

VARDAN ENVIROLAB PVT. LTD. GURGAON

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/07	Report No.:	VEL/W/2304/10.007
Name & Address of the Project:	Ballada Bauxite Mine Village - Ballada, Tehsil - Nandapur, District - Koraput, Odisha – 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Description:	Ground Water Sample	Period of Analysis:	10/04/2023-14/04/2023
Sample Location:	Village Near Raising (GW7)	Receipt Date:	10/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	08/04/2023
Sampling and Analysis Protocol:	IS 3025 & APHA 23rd Edition 2017	Sampling Quantity:	5.0 Ltr + 250ml
Preservation:	Ice Box	Sampling Type:	Grab

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	7.65	–	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BLQ (**LOQ 1.0 Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephlelometric Method	*BLQ (**LOQ 1.0 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Odour Method	Agreeable	–	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	DisAgreeable	–	Agreeable	Agreeable
6.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	238.64	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	45.71	mg/l	75	200
8.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	370.19	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	750.63	mg/l	250	1000
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(**LOQ 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	30.39	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	1921.00	mg/l	500	2000
13.	Sulphate as SO_4	APHA , 4500 E, Turbidimetric Method	121.88	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	0.40	mg/l	1.0	1.5
15.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	30.60	mg/l	45	No Relaxation
16.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.27	mg/l	1.0	No relaxation
17.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.03	0.2
18.	Boron	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.5	2.4
19.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.05	No Relaxation

(Checked by) 14/04/2023

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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)

ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/KAL/W/07 — Report No.: VEL/W/2304/10/097

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005 mg/l)	mg/l	0.001	0.002
21.	Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1 mg/l)	mg/l	1.0	No Relaxation
22.	Anionic Detergents as MBAS	Annex K of IS 13428, IS 3025 (P-68)	*BLQ(**LOQ 0.05 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	1.31	mg/l	5	15
24.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	0.05	mg/l	0.05	1.5
25.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.001 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.01	No Relaxation
30.	Mercury as Hg	IS 3025 (P-65):2014(RA:2019)	*BLQ (**LOQ 0.0005 mg/l)	mg/l	0.001	No Relaxation
31.	Total Coliform	IS 1622,1981, RA-2019	<2	MPN/100ml	Shall not be detectable in any 100 ml sample	
32.	E. Coli	IS 1622,1981, RA-2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

Note: - *BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

(Checked by) — (Approved by) Gaurav Pratap Singh

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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/08	Report No.:	VEL/W/2304/10/008
Name & Address of the Project:	Ballada Bauxite Mine Village - Ballada, Tehsil - Nandapur, District - Koraput, Odisha – 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Description:	Ground Water Sample	Period of Analysis:	10/04/2023-14/04/2023
Sample Location:	Village Kandara (GW8)	Receipt Date:	10/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	08/04/2023
Sampling and Analysis Protocol:	IS 3025 & APHA 23rd Edition 2017	Sampling Quantity:	5.0 Ltr + 250ml
Preservation:	Ice Box	Sampling Type:	Grab

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	7.53	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BLQ (**LOQ 1.0 Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BLQ (**LOQ 1.0 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	DisAgreeable	--	Agreeable	Agreeable
6.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	297.81	mg/l	200	600
7.	Calcium as Ca	APHA, 3500-Ca B, EDTA Titrimetric Method	48.40	mg/l	75	200
8.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	460.30	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	913.67	mg/l	250	1000
10.	Cyanide as CN	APHA , 4500-CN- D	*BLQ(**LOQ 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	42.94	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	1987.00	mg/l	500	2000
13.	Sulphate as SO_4	APHA , 4500 E, Turbidimetric Method	122.73	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	0.75	mg/l	1.0	1.5
15.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	26.98	mg/l	45	No Relaxation
16.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.31	mg/l	1.0	No relaxation
17.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.03	0.2
18.	Boron	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.5	2.4
19.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.05	No Relaxation

(Checked by) 14/04/2023

(Authorized Signatory)

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Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
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Test Report

Sample No.: VEL/KAL/W/08			Report No.: VEL/W/2304/10/008			
S. No.	Parameter	Test Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005 mg/l)	mg/l	0.001	0.002
21.	Mineral Oil	Clause 6 of IS:3025 (Part 39)	*BLQ(**LOQ 0.1 mg/l)	mg/l	1.0	No Relaxation
22.	Anionic Detergents as MBAS	Annex K of IS: 13428, IS:3025 (P-68)	*BLQ(**LOQ 0.05 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	1.34	mg/l	5	15
24.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	0.04	mg/l	0.05	1.5
25.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.001 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.01	No Relaxation
30.	Mercury as Hg	IS 3025 (P-65):2014(RA:2019)	*BLQ (**LOQ 0.0005 mg/l)	mg/l	0.001	No Relaxation
31.	Total Coliform	IS 1622.1981, RA-2019	<2	MPN/100ml	Shall not be detectable in any 100 ml sample	
32.	E. Coli	IS 1622.1981, RA-2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

Note: - *BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

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Annexure-II

Surface Water Quality Test Report

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/89	Report No.:	VEL/W/2304/10/009
Name & Address of the Project:	Ballada Bauxite Mine Village - Ballada, Tehsil - Nandapur, District – Koraput, Odisha - 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
Name of company:	Kalinga Alumina Limited.	Reporting Date:	14/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	08/04/2023
Preservation:	Ice Box	Sampling Quantity:	5.0 Ltr + 250ml
Sample Location :	Water body site (SW1)		
Sampling and Analysis Protocol:	IS:3025 & APHA, 23rd Edition 2017	Sampling Type:	Grab

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	7.72	--
2.	Colour	APHA ,2120 B, Visual Comparison Method	10.0	Hazen
3.	Turbidity	APHA, 2130 B, Nephelometric Method	41.00	NTU
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--
5.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	142.00	mg/l
6.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	30.00	mg/l
7.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	272.00	mg/l
8.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	412.00	mg/l
9.	Residual free Chlorine	APHA, 4500 Cl B Iodometric Method	*BLQ(**LOQ 0.15 mg/l)	mg/l
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(**LOQ 0.02 mg/l)	mg/l
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	16.26	mg/l
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	1290.00	mg/l
13.	Total Suspended solids	APHA,2540 D Gravimetric Method	47.34	mg/l
14.	Dissolved Oxygen	APHA,4500 O B Iodometric Method	5.4	mg/l
15.	Sulphate as SO_4	APHA , 4500 E, Turbidimetric Method	146.43	mg/l
16.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	0.18	mg/l
17.	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025,P-44	6.00	mg/l
18.	COD	APHA, 5220 B, Open Reflux Method	40.00	mg/l

Checked By

14/04/2023

Approved By

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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)

ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/KAL/W/09			Report No.: VEL/W/2304/10.009	
S. No.	Parameter	Test-Method	Result	Unit
19.	Conductivity (at 25 °C)	APHA, 2510 B, Conductivity Meter Method	1950	µS/cm
20.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotogic Method	15.93	mg/l
21.	Sodium as Na	APHA 3500 Na B, Flame Photometric Method	310.39	mg/l
22.	Potassium as K	APHA 3500 K B, Flame Photometric Method	40.4	mg/l
23.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.30	mg/l
24.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l
25.	Boron	IS 3025 (P-65):2014(RA:2019)	0.62	mg/l
26.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l
27.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005mg/l)	mg/l
28.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.01 mg/l)	mg/l
29.	#Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BLQ(**LOQ 0.05 mg/l)	mg/l
30.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	2.24	mg/l
31.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	0.30	mg/l
32.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l
33.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l
34.	Total Coliform	IS 1622,1981, RA-2019	1200	MPN/100ml
35.	Fecal Coliform	IS 1622,1981, RA-2019	800	MPN/100ml

Note: -#These parameter are not covered in our NABL scope.
*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

(Checked By) 14/04/2023

(Approved By) Gaurav Pratap Singh

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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/10	Report No.:	VEL/W/2304/10/010
Name & Address of the Project:	Ballada Bauxite Mine Village - Ballada, Tehsil - Nandapur, District - Koraput, Odisha - 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
Name of company:	Kalinga Alumina Limited.	Reporting Date:	14/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	08/04/2023
Preservation:	Ice Box	Sampling Quantity:	5.0 Ltr + 250ml
Sample Location :	Near Jalapot Jalapot Reservoir (SW2)		
Sampling and Analysis Protocol:	IS & APHA, 23rd Edition 2017	Sampling Type:	Grab

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	7.68	–
2.	Colour	APHA ,2120 B, Visual Comparison Method	20.0	Hazen
3.	Turbidity	APHA, 2130 B, Nephelometric Method	57.00	NTU
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	–
5.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	210.7	mg/l
6.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	56.7	mg/l
7.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	297.15	mg/l
8.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	329.53	mg/l
9.	Residual free Chlorine	APHA, 4500 Cl B Iodometric Method	*BLQ(**LOQ 0.15 mg/l)	mg/l
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(**LOQ 0.02 mg/l)	mg/l
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	16.57	mg/l
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	1458.00	mg/l
13.	Total Suspended solids	APHA,2540 D Gravimetric Method	41.21	mg/l
14.	Dissolved Oxygen	APHA,4500 O B Iodometric Method	5.9	mg/l
15.	Sulphate as SO_4^{2-}	APHA , 4500 E, Turbidimetric Method	154.05	mg/l
16.	Fluoride as F	APHA , 4500-F D, SPADNS Method	0.21	mg/l
17.	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025 P-44	4.00	mg/l
18.	COD	APHA, 5220 B, Open Reflux Method	16.00	mg/l

(Checked by) 14/04/23

(Approved By)

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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)

ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/KAL/W/10			Report No.: VEL/W/2304/10010	
S. No.	Parameter	Test-Method	Result	Unit
19.	Conductivity (at 25 °C)	APHA, 2510 B, Conductivity Meter Method	2247	µS/cm
20.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	19.67	mg/l
21.	Sodium as Na	APHA 3500 Na B, Flame Photometric Method	285.38	mg/l
22.	Potassium as K	APHA 3500 K B, Flame Photometric Method	56.01	mg/l
23.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.39	mg/l
24.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l
25.	Boron	IS 3025 (P-65):2014(RA:2019)	0.70	mg/l
26.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l
27.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005mg/l)	mg/l
28.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1 mg/l)	mg/l
29.	#Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BLQ(**LOQ 0.05 mg/l)	mg/l
30.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	2.39	mg/l
31.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	0.22	mg/l
32.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l
33.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l
34.	Total Coliform	IS 1622,1981, RA:2019	1100	MPN/100ml
35.	Fecal Coliform	IS 1622,1981, RA:2019	800	MPN/100ml

Note: -#These parameter are not covered in our NABL scope.

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

(Checked by) 14/04/2023

(Authorised Sign)

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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/11	Report No.:	VEL/W/2304/10011
Name & Address of the Project:	Ballada Bauxite Mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
Name of company:	Kalinga Alumina Limited.	Reporting Date:	14/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	08/04/2023
Preservation:	Ice Box	Sampling Quantity:	5.0 Ltr + 250ml
Sample Location :	Near Dalta Reservoir (SW3)		
Sampling and Analysis Protocol:	IS 3025 & APHA, 23rd Edition 2017	Sampling Type:	Grab

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	7.68	--
2.	Colour	APHA ,2120 B, Visual Comparison Method	8.0	Hazen
3.	Turbidity	APHA, 2130 B, Nephelometric Method	22.00	NTU
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--
5.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	144.25	mg/l
6.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	36.13	mg/l
7.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	330.25	mg/l
8.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	398.14	mg/l
9.	Residual free Chlorine	APHA 4500 Cl B Iodometric Method	*BLQ(**LOQ 1.0mg/l)	mg/l
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(**LOQ 0.02 mg/l)	mg/l
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	13.46	mg/l
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	1265.00	mg/l
13.	Total Suspended solids	APHA,2540 D Gravimetric Method	34.14	mg/l
14.	Dissolved Oxygen	APHA,4500 O B Iodometric Method	6.3	mg/l
15.	Sulphate as SO_4^{2-}	APHA , 4500 E, Turbidimetric Method	172.32	mg/l
16.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	*BLQ(**LOQ 0.2 mg/l)	mg/l
17.	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025 P-44	4.00	mg/l
18.	COD	APHA, 5220 B, Open Reflux Method	20.00	mg/l

(Checked by)

(Approved By)

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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/KAL/W/11 — Report No.: VEL/W/2304/18011

S. No.	Parameter	Test-Method	Result	Unit
19.	Conductivity (at 25 °C)	APHA, 2510 B, Conductivity Meter Method	1910	µS/cm
20.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	15.7	mg/l
21.	Sodium as Na	APHA:3500 Na B, Flame Photometric Method	126.12	mg/l
22.	Potassium as K	APHA 3500 K B, Flame Photometric Method	42.51	mg/l
23.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.27	mg/l
24.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l
25.	Boron	IS 3025 (P-65):2014(RA:2019)	0.44	mg/l
26.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l
27.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.005mg/l)	mg/l
28.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1 mg/l)	mg/l
29.	#Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BLQ(**LOQ 0.05 mg/l)	mg/l
30.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	2.04	mg/l
31.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	0.10	mg/l
32.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l
33.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l
34.	Total Coliform	IS 1622,1981, RA-2019	1200	MPN/100ml
35.	Fecal Coliform	IS 1622,1981, RA-2019	900	MPN/100ml

Note: -#These parameter are not covered in our NABL scope.
*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

(Checked by) 14/04/2023

Approved By
Gaurav Pratap Singh

VARDAN ENVIRONET GURGAON

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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)

ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/12	Report No.:	VEL/W/2304/10/012
Name & Address of the Project:	Ballada Bauxite Mine Village - Ballady, Tehsil - Nandapur, District - Koraput, Odisha - 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
Name of company:	Kalinga Alumina Limited.	Reporting Date:	14/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	08/04/2023
Preservation:	Ice Box	Sampling Quantity:	5.0 Ltr + 250ml
Sample Location :	Near Paduwa River (SW4)		
Sampling and Analysis Protocol:	IS 3025 & APHA, 23rd Edition 2017	Sampling Type:	Grab

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	7.67	–
2.	Colour	APHA ,2120 B, Visual Comparison Method	15.0	Hazen
3.	Turbidity	APHA, 2130 B, Nephelometric Method	34.00	NTU
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	–
5.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	136.42	mg/l
6.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	30.16	mg/l
7.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	278.14	mg/l
8.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	390.00	mg/l
9.	Residual free Chlorine	APHA, 4500 Cl D Iodometric Method	*BLQ(**LOQ 0.15mg/l)	mg/l
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(**LOQ 0.02 mg/l)	mg/l
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	14.80	mg/l
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	1533.00	mg/l
13.	Total Suspended solids	APHA,2540 D Gravimetric Method	37.61	mg/l
14.	Dissolved Oxygen	APHA,4500 O B Iodometric Method	5.7	mg/l
15.	Sulphate as SO_4^{2-}	APHA , 4500 E, Turbidimetric Method	180.00	mg/l
16.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	*BLQ(**LOQ 0.2 mg/l)	mg/l
17.	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025,P-44	6.09	mg/l
18.	COD	APHA, 5220 B, Open Reflux Method	20.00	mg/l

(Checked By) 14/04/2023

(Observed By)

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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/KAL/W/12			Report No.: VEL/W/2304/10.912	
S. No.	Parameter	Test Method	Result	Unit
19.	Conductivity (at 25 °C)	APHA, 2510 B, Conductivity Meter Method	2010	µS/cm
20.	Nitrate as NO_3	IS 3025 (P-34) ,Chromatopic Method	21.5	mg/l
21.	Sodium as Na	APHA:3500 Na B, Flame Photometric Method	257.00	mg/l
22.	Potassium as K	APHA 3500 K B, Flame Photometric Method	52.25	mg/l
23.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.30	mg/l
24.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l
25.	Boron	IS 3025 (P-65):2014(RA:2019)	0.37	mg/l
26.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l
27.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005 mg/l)	mg/l
28.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1 mg/l)	mg/l
29.	#Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BLQ(**LOQ 0.05 mg/l)	mg/l
30.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	2.18	mg/l
31.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	0.12	mg/l
32.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l
33.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l
34.	Total Coliform	IS 1622,1981, RA-2019	1500	MPN/100ml
35.	Fecal Coliform	IS 1622,1981, RA-2019	1100	MPN/100ml

Note: -#These parameter are not covered in our NABL scope.
*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

Checked by

VARDAN ENVIRONET GURGAON

Authorized Signatory

Gaurav Pratap Singh

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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/13	Report No.:	VEL/W/2304/18/013
Name & Address of the Project:	Ballada Bauxite Mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
Name of company:	Kalinga Alumina Limited.		
Sampling Location:	Pond Near village kumiput (SW3)	Reporting Date:	14/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	Receipt Date:	10/04/2023
Preservation:	Ice Box	Sampling Date:	08/04/2023
Sampling and Analysis Protocol:	IS 3025 & APHA, 23rd Edition 2017	Sampling Quantity:	5.0 Ltr + 250ml
		Sampling Type:	Grab

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	7.51	--
2.	Colour	APHA ,2120 B, Visual Comparison Method	20.0	Hazen
3.	Turbidity	APHA, 2130 B, Nephelometric Method	24.80	NTU
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--
5.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	156.32	mg/l
6.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	25.015	mg/l
7.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	289.25	mg/l
8.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	372.00	mg/l
9.	Residual free Chlorine	APHA, 4500 Cl B Iodometric Method	*BLQ(**LOQ 0.15mg/l)	mg/l
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(**LOQ 0.02 mg/l)	mg/l
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	22.70	mg/l
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	1420.00	mg/l
13.	Total Suspended solids	APHA,2540 D Gravimetric Method	24.00	mg/l
14.	Dissolved Oxygen	APHA,4500 O B Iodometric Method	6.0	mg/l
15.	Sulphate as SO_4^{2-}	APHA , 4500 E, Turbidimetric Method	170.00	mg/l
16.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	0.20	mg/l
17.	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025,P-44	10.00	mg/l
18.	COD	APHA, 5220 B, Open Reflux Method	60.00	mg/l

(Checked By) 14/04/2023

(Approved By)

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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/KAL/W/E5 — Report No.: VEL/W/2304/E8/013

S. No.	Parameter	Test Method	Result	Unit
19.	Conductivity (at 25 °C)	APHA, 2510 B, Conductivity Meter Method	2128	µS/cm
20.	Nitrate as NO_3	IS 3025 (P-34) ;Chromotropic Method	17.7	mg/l
21.	Sodium as Na	APHA,3500 Na B, Flame Photometric Method	240.00	mg/l
22.	Potassium as K	APHA 3500 K B, Flame Photometric Method	4.0	mg/l
23.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.30	mg/l
24.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l
25.	Boron	IS 3025 (P-65):2014(RA:2019)	0.56	mg/l
26.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l
27.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005mg/l)	mg/l
28.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1 mg/l)	mg/l
29.	#Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BLQ(**LOQ 0.05 mg/l)	mg/l
30.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	2.06	mg/l
31.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	0.25	mg/l
32.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l
33.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l
34.	Total Coliform	IS 1622,1981, RA-2019	1080	MPN/100ml
35.	Fecal Coliform	IS 1622,1981, RA-2019	800	MPN/100ml

Note: -#Those parameter are not covered in our NABL scope.
*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/14	Report No.:	VEL/W/2304/10/014
Name & Address of the Project:	Ballada Bauxite Mine Village - Ballade, Tehsil – Nandapur, District - Koraput, Odisha - 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	08/04/2023
Preservation:	Ice Box	Sampling Quantity:	5.0 Ltr + 250ml .
Sample Location :	Near Parara River (SW6)		
Sampling and Analysis Protocol:	IS 3025 & APHA, 23rd Edition 2017	Sampling Type:	Grab

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	7.56	–
2.	Colour	APHA ,2120 B, Visual Comparison Method	14.0	Hazen
3.	Turbidity	APHA, 2130 B, Nephelometric Method	46.00	NTU
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	–
5.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	533.00	mg/l
6.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	58.00	mg/l
7.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	341.00	mg/l
8.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	227.00	mg/l
9.	Residual free Chlorine	APHA, 4500 Cl B Iodometric Method	*BLQ(**LOQ 0.15mg/l)	mg/l
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(**LOQ 0.02 mg/l)	mg/l
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	16.02	mg/l
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	1297.00	mg/l
13.	Total Suspended solids	APHA,2540 D Gravimetric Method	46.00	mg/l
14.	Dissolved Oxygen	APHA,4500 O B Iodometric Method	5.5	mg/l
15.	Sulphate as SO_4^{2-}	APHA , 4500 E, Turbidimetric Method	158.00	mg/l
16.	Fluoride as F	APHA , 4500-F D, SPADNS Method	*BLQ(**LOQ 0.2 mg/l)	mg/l
17.	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025,P-44	6.00	mg/l
18.	COD	APHA, 5220 B, Open Reflux Method	24.00	mg/l

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Test Report

Sample No.: VEL/KAL/W/14			Report No.: VEL/W/2304/18/014	
S. No.	Parameter	Test Method	Result	Unit
19.	Conductivity (at 25 °C)	APHA, 2510 B, Conductivity Meter Method	1865	µS/cm
20.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	14.0	mg/l
21.	Sodium as Na	APHA;3500 Na B, Flame Photometric Method	310.00	mg/l
22.	Potassium as K	APHA 3500 K B, Flame Photometric Method	7.8	mg/l
23.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.30	mg/l
24.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l
25.	Boron	IS 3025 (P-65):2014(RA:2019)	0.64	mg/l
26.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l
27.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.005mg/l)	mg/l
28.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1 mg/l)	mg/l
29.	#Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BLQ(**LOQ 0.05 mg/l)	mg/l
30.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	1.20	mg/l
31.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	0.22	mg/l
32.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l
33.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l
34.	Total Coliform	IS 1622,1981, RA-2019	900	MPN/100ml
35.	Fecal Coliform	IS 1622,1981, RA-2019	500	MPN/100ml

Note: -#These parameter are not covered in our NABL scope.
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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/15	Report No.:	VEL/W/2304/10/015
Name & Address of the Project:	Ballada Bauxite Mine Village - Ballada, Tehsil - Nandapur, District - Koraput, Odisha - 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
Name of company:	Kalinga Alumina Limited.	Reporting Date:	14/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	08/04/2023
Preservation:	Ice Box	Sampling Quantity:	5.0 Ltr + 250ml.
Sample Location :	Basukigarha Nala Near Sangamagurha vill (SW7)		
Sampling and Analysis Protocol:	IS 3025 & APHA, 23rd Edition 2017	Sampling Type:	Grab

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	7.62	--
2.	Colour	APHA ,2120 B, Visual Comparison Method	16.0	Hazen
3.	Turbidity	APHA, 2130 B, Nephelometric Method	48.00	NTU
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--
5.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	136.00	mg/l
6.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	39.00	mg/l
7.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	342.00	mg/l
8.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	338.00	mg/l
9.	Residual free Chlorine	APHA, 4500 Cl B Iodometric Method	*BLQ(**LOQ 0.15 mg/l)	mg/l
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(**LOQ 0.02 mg/l)	mg/l
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	16.45	mg/l
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	1180.00	mg/l
13.	Total Suspended solids	APHA,2540 D Gravimetric Method	45.00	mg/l
14.	Dissolved Oxygen	APHA,4500 O B Iodometric Method	5.9	mg/l
15.	Sulphate as SO_4^{2-}	APHA , 4500 E, Turbidimetric Method	162.00	mg/l
16.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	*BLQ(**LOQ 0.2 mg/l)	mg/l
17.	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025,P-44	8.00	mg/l
18.	COD	APHA, 5220 B, Open Reflux Method	30.00	mg/l

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Test Report

Sample No.: VEL/KAL/W15			Report No.: VEL/W/2304/10/015	
S. No.	Parameter	Test Method	Result	Unit
19.	Conductivity (at 25 °C)	APHA, 2510 B, Conductivity Meter Method	1070	µS/cm
20.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	15.0	mg/l
21.	Sodium as Na	APHA,3500 Na B, Flame Photometric Method	315.00	mg/l
22.	Potassium as K	APHA 3500 K B, Flame Photometric Method	7.9	mg/l
23.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.32	mg/l
24.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l
25.	Boron	IS 3025 (P-65):2014(RA:2019)	0.66	mg/l
26.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l
27.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005mg/l)	mg/l
28.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1 mg/l)	mg/l
29.	#Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BLQ(**LOQ 0.05 mg/l)	mg/l
30.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	1.24	mg/l
31.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	0.24	mg/l
32.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l
33.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l
34.	Total Coliform	IS 1622,1981, RA-2019	940	MPN/100ml
35.	Fecal Coliform	IS 1622,1981, RA-2019	490	MPN/100ml

Note: -#Those parameter are not covered in our NABL scope.
*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

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VARDAN ENVIRONET

Gaurav Pratap Singh

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ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/16	Report No.:	VEL/W/2304/10/016
Name & Address of the Project:	Ballada Bauxite Mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	Format No.:	7.8 F-81
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	08/04/2023
Preservation:	Ice Box	Sampling Quantity:	5.0 Ltr + 250ml .
Sample Location :	Pond Near Balda Village (SWB)		
Sampling and Analysis Protocol:	IS 3025 & APHA, 23rd Edition 2017	Sampling Type:	Grab

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	7.67	–
2.	Colour	APHA ,2120 B, Visual Comparison Method	60.0	Hazen
3.	Turbidity	APHA, 2130 B, Nephelometric Method	57.0	NTU
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	–
5.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	680.0	mg/l
6.	Calcium as Ca	APHA, 3500-Ca B, EDTA Titrimetric Method	168.3	mg/l
7.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	650.11	mg/l
8.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	341.72	mg/l
9.	Residual free Chlorine	APHA, 4500 Cl B Iodometric Method	*BLQ(**LOQ 0.15 mg/l)	mg/l
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(**LOQ 0.02 mg/l)	mg/l
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	104.2	mg/l
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	1327.00	mg/l
13.	Total Suspended solids	APHA,2540 D Gravimetric Method	92.00	mg/l
14.	Dissolved Oxygen	APHA,4500 O B Iodometric Method	5.2	mg/l
15.	Sulphate as SO_4^{2-}	APHA , 4500 E, Turbidimetric Method	81.62	mg/l
16.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	0.32	mg/l
17.	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025.P-44	14.00	mg/l
18.	COD	APHA, 5220 B, Open Reflux Method	57.00	mg/l

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ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/KAL/W/16				Report No.: VEL/W/2304/10016
S. No.	Parameter	Test Method	Result	Unit
19.	Conductivity (at 25 °C)	APHA, 2510 B, Conductivity Meter Method	1622	µS/cm
20.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	32.25	mg/l
21.	Sodium as Na	APHA,3500 Na B, Flame Photometric Method	108.00	mg/l
22.	Potassium as K	APHA 3500 K B, Flame Photometric Method	38.67	mg/l
23.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	1.72	mg/l
24.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l
25.	Boron	IS 3025 (P-65):2014(RA:2019)	0.32	mg/l
26.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l
27.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005mg/l)	mg/l
28.	#Mineral Oil	Clause 6 of IS:3025 (Part 39)	*BLQ(**LOQ 0.1 mg/l)	mg/l
29.	#Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BLQ(**LOQ 0.05 mg/l)	mg/l
30.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	1.44	mg/l
31.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	0.22	mg/l
32.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l
33.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l
34.	Total Coliform	IS 1622,1981, RA-2019	1200	MPN/100ml
35.	Fecal Coliform	IS 1622,1981, RA-2019	900	MPN/100ml

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Annexure-III

Photographs of Site Visit




Latitude: 18.516206
Longitude: 82.666284
Elevation: 877.64±41 m
Accuracy: 7.6 m
Time: 29-09-2023 10:43
Powered by NoteCam
Latitude: 18.51558
Longitude: 82.668312
Elevation: 1020.73±100 m
Accuracy: 12.4 m
Time: 29-09-2023 10:30

Annexure – V

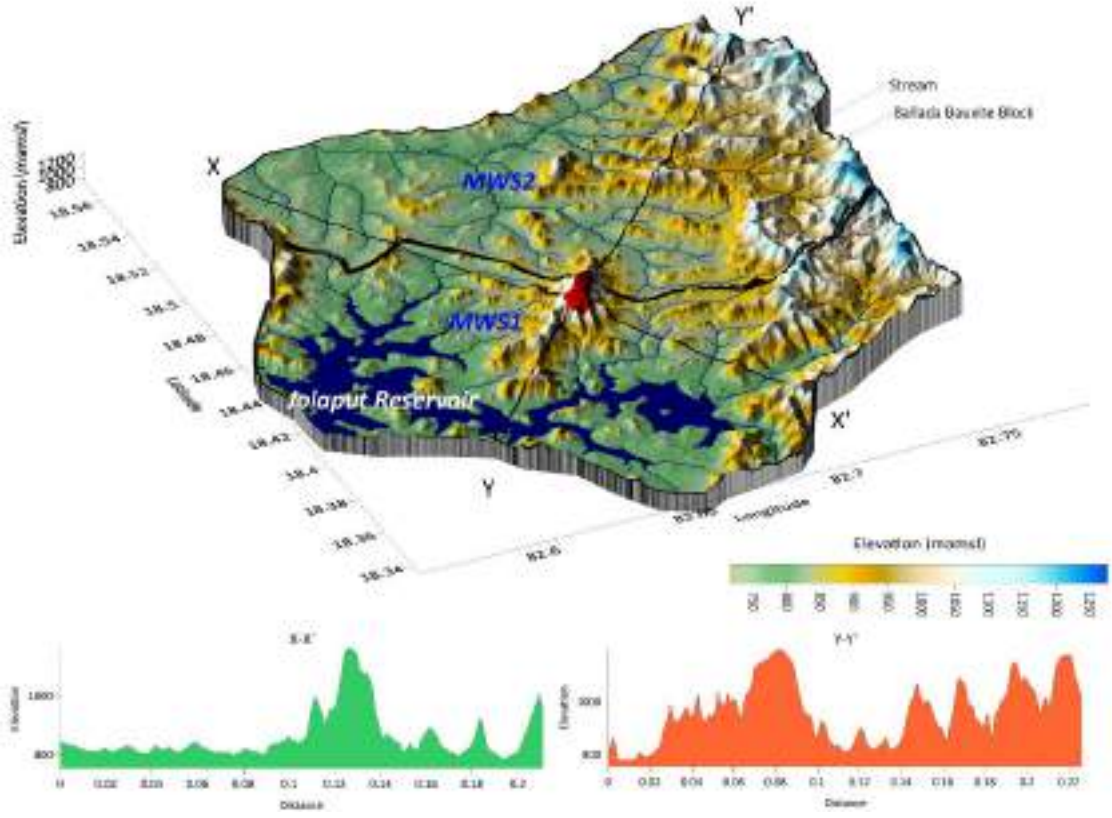
HYDROLOGICAL STUDY REPORT

BALLADA BAUXITE BLOCK

LOCATED AT VILLAGE – BALLADA, TALUKA – NANDAPUR, KORAPUR DISTRICT, ODISHA

PROJECT PROPONENT

M/S KALINGA ALUMINA LIMITED



PREPARED BY

Vardan Environet

Vardan Environet

Plot No. 82A, Sector-5, IMT Manesar

Gurugram, Haryana

October-2023

Contents

1.0. INTRODUCTION 3
1.1. Scope of Work 3
1.3. Location and Communication 4
1.4. Data Requirement 5
1.5. Study Area 6
1.6. Topography 6
2.0. HYDROMETERLOGICAL DATA 10
2.1. Rainfall 10
2.2. Potential Evapotranspiration (PE) 11
2.3. Climatic Water Balance 13
2.4. Water Balance Techniques 14
3.0. DRAINAGE ANALYSIS 15
3.1. Drainage 15
3.2. Morphometric Analysis 16
3.3. Micro Watershed of Hills Drainage External & Mine Drainage Internal 19
3.4. Slope of Micro Watershed: 22
4.0. GEO – TECHNICAL PARAMETERS 25
4.1. Geology 25
4.2. Mining 27
4.3. Infiltration 31
4.4. Hydrogeology 33
4.5. Mine Seepage 36
5.0. HYDROLOGY–WATER MANAGEMENT 37
5.1. Compound Runoff 37
5.2. Design of Bauxite Mine Drainage System for External Runoff 39
5.3. Intensity of Rainfall and Infiltration 40
5.4. Runoff Co-efficient and Hill Area 41
5.5. Peak Runoff by Rational Formula 41
5.5.1. Control of External Water 42
5.6. Direct Rain Water Accumulation in the mine 43
5.7. Sedimentation Pond 45
6.0. CONCLUSION 46

List of Table:

Table 1: Avg. Annual Rainfall of Koraput District....10
Table 2: Month wise Evapotranspiration....12
Table 3: Climatic Water Balance of 10 year for Koraput District....13
Table 4: Morphometric Analysis....18
Table 5: Geological Succession....25
Table 6: Calculation of Infiltration....32
Table 7: Aquifer Characteristics....36
Table 8: Annual Return Period and 1 Day Maximum Rainfall:....40
Table 9: Rainfall Ratio and Conversion Ratio....41
Table 10: Intensity of rainfall for 1 hr....41
Table 11: Variation of Pan Coefficient values with month....44
Table 12: Estimation of Rainwater Collected in Mine Pit....44

List of Figures:

Figure 1: Location Map....5
Figure 2: Topographical Map of Watershed....7
Figure 3: Elevation Map of Micro watershed....8
Figure 4: DEM Map of Micro watershed....9
Figure 5: Avg. Annual Rainfall Koraput District....11
Figure 6: Month Wise Evapo-transpiration (in mm)....13
Figure 7: Climatic Water Balance....14
Figure 8: Drainage Map of Micro watershed....16
Figure 9: Bifurcation Ration....18
Figure 10: Surface Water Flow Direction Map....19
Figure 11: Watershed Map....21
Figure 12: Micro Watershed Map....22
Figure 13: Slope Map of Micro watershed....24
Figure 14: Geological Map of Study Area....27
Figure 15: Conceptual Plan....29
Figure 16: Surface Plan....30
Figure 17: Geological Cross Section....31
Figure 18: Infiltration Test Location Map....32
Figure 19: Infiltration Test Graph at Ballada Village....33
Figure 20: Schematic Diagram of Component of Runoff....37
Figure 21: River, Stream and Waterbody of Microwatershed....38

1.0. INTRODUCTION

Kalinga Alumina Limited (formerly known as Mundra Aluminium Limited), a wholly owned subsidiary of Adani Enterprises Limited, has a vision of setting up an integrated greenfield alumina refinery of 4.0 MTPA capacity and also to develop bauxite mines in the vicinity for captive / commercial use. Recently Kalinga Alumina Limited has secured two bauxite mines in Odisha, viz. Ballada in Koraput district and Kutrumali in Kalahandi/Rayagada district through an auction process. Adani Group is currently embarking on a strategic growth plan to diversify into mines and metals space. Strong parentage in power, infrastructure, logistics, mining, and global presence puts it in a pre-eminent position to make it a globally competitive player in this field.

Adani Group is a global multinational and a front runner with its strong ESG principles. It has vast experience in mining operations of various major minerals such as Coal, Iron Ore, limestone, beach sand, among others and therefore, is in a preeminent position to conduct scientific and environment friendly mining

The Government of Odisha, issued letter of intent vide letter SM-MC2-MC-0007-2023/2143/S&M Bhubaneswar dated 1st March 2023 for grant of mining lease for Ballada bauxite block in Village - Ballada, Taluka – Nandapur, District- Koraput, Odisha for an area of 144.945 ha to Mundra Aluminium Limited (now Kalinga Alumina Limited) for period of 50 years.

The proposed project entails mining of Bauxite by opencast mining method with an annual Peak Rated Capacity of ~ 4.0 MTPA of Bauxite (ROM). The project also involves generation of 146508 tonnes of Overburden/waste and 51564 tonnes (25782 m3) of top soil during initial 5 years of operations. Besides, it is envisaged to have crushing/Screening facilities within the lease area with a capacity of 800 TPH at rated production level over an area of 144.945 Ha

1.1. Scope of Work

i. *Hydrometrology: Rainfall, Intensity of heaviest rainfall in 24 hrs. Potential evapotranspiration, Climatic water balance.*

ii. *Hillock Drainage: River/Nala morphology, Geomorphology of watershed, Morphometric analysis of watershed/Catchment Area, garland drainage study, control measure for prevention of mine inundation with reference to extreme rainfall in hillock watershed.*

iii. *Hydrology: Storm peak runoff, Intensity of peak runoff of different return period, Surface runoff Control of storm runoff, Annual runoff yield, Rainfall & runoff relationship.*

1.2. *Hydrogeology: Water table, flow of ground water, hydraulic gradient, Delineation of recharge and discharge area, Rainfall – runoff – recharge relationship.*

1.3. Location and Communication

The Ballada Bauxite Block M/s Kalinga Alumina Limited is located in Koraput district of the state of Odisha. Project site is laying between latitudes 18°26'05.61588" N to 18°27'13.34448" N and Longitude 82°39'32.39136" to 82°40'25.36716" E. & is covered under the Survey of India toposheet no. No. E44K11 (65J/11).

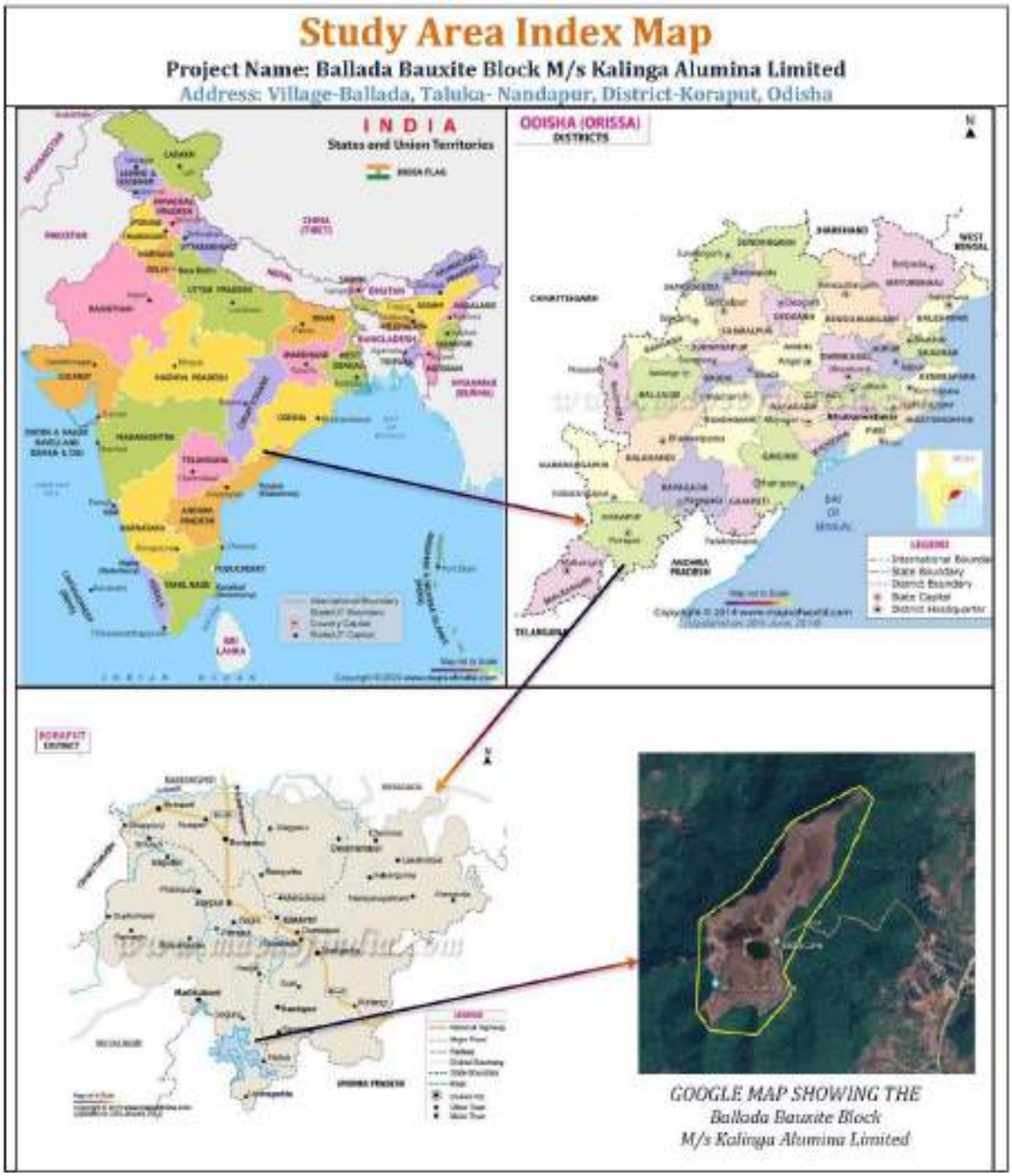


Figure 1: Location Map

1.4. Data Requirement

- Collection of daily rainfall data from the State/Central Government departments
- Geographic coordinates and geotagged photos need to be captured. The data collection should be carried out for the peak flow period (rainy season) and non-flow season (lean period).
- The flow measurements have to be undertaken in the upstream and downstream locations of the river/reservoir/stream.

- Water quality monitoring of surface water and ground water samples in and around the project site.
- Groundwater level monitoring in the watershed area (spatially covered all the areas of the watershed). Geographic coordinates and geotagged photos need to be captured.

Public inquiry needs to be undertaken and the details such as flow and not flow periods, flood events, area of inundation etc., have to be recorded.

1.5. Study Area

Project site is laying between latitudes 18°26'05.61588" N to 18°27'13.34448" N and Longitude 82°39'32.39136" N to 82°40'25.36716" E. & is covered under the Survey of India toposheet no. No. E44K11 (65J/11).

1.6. Topography

The Terrain elevation (Topography) is derived from the Carto-DEM data. The study area (10 km radius from the mine site boundary – buffer zone) elevation ranges from 717 m to 1274 m AMSL. The maximum elevation is observed in the mine lease area and eastern part of the study area.

Core Zone: The elevation of the core zone of a 2 km radius, ranges between 803 m AMSL to and 1274 m AMSL. The maximum elevation is noticed in the central part of the lease area. The mine site is located in an elevated area.



Figure 2: Topographical Map of Watershed

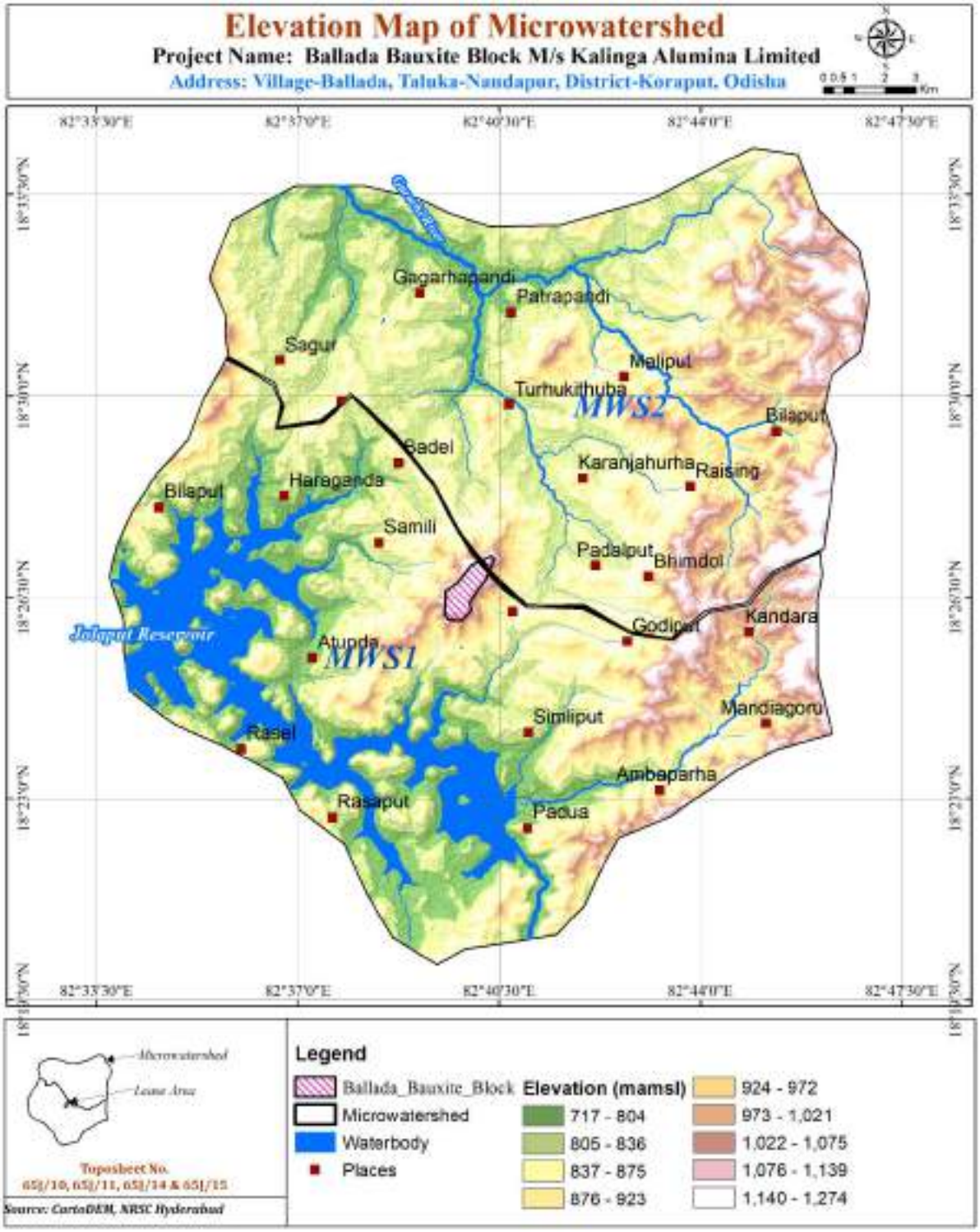


Figure 3: Elevation Map of Micro watershed

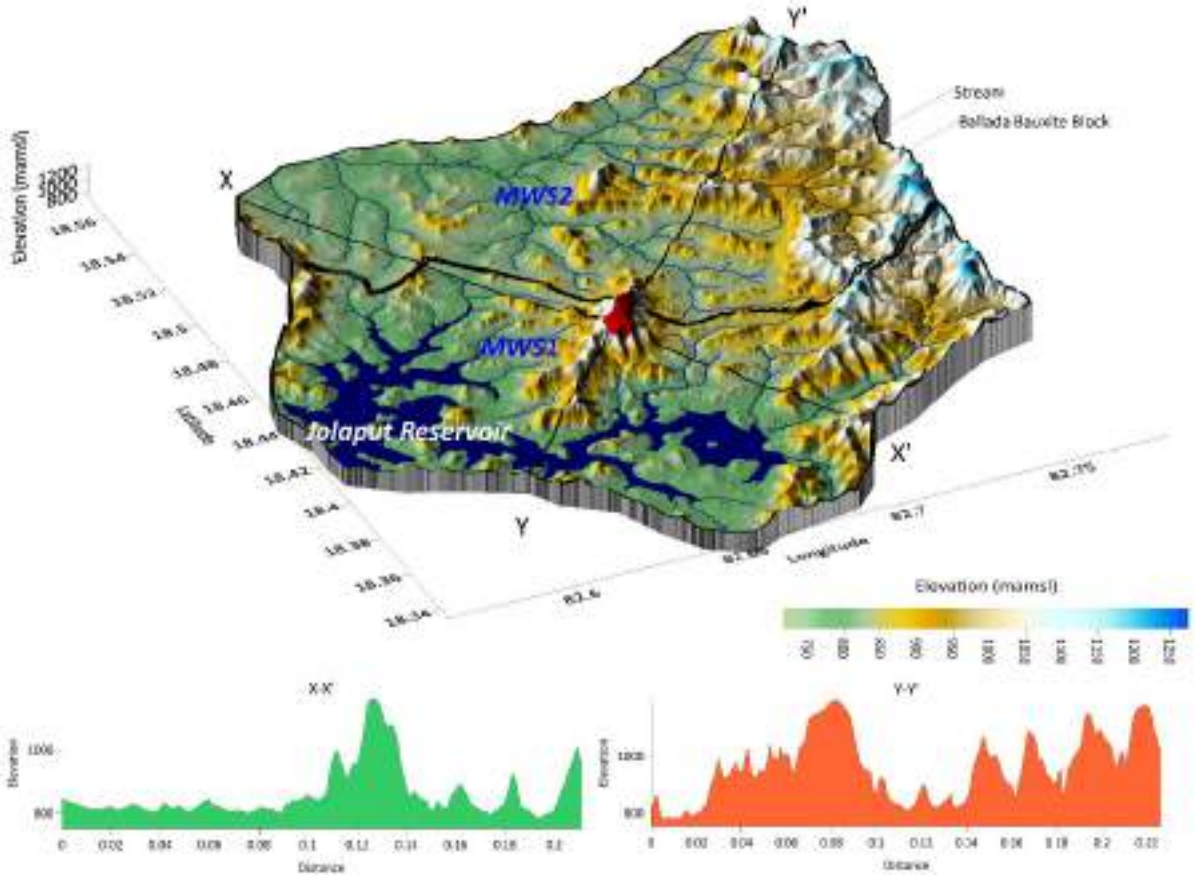


Figure 4: DEM Map of Micro watershed

2.0. HYDROMETERLOGICAL DATA

2.1. Rainfall

The district enjoys tropical climate characterized by hot summer, cold winters and rainy seasons. The winter season generally commences from late November and continues up to the end of February. The temperature in winter drops below 1°C at places like Pottangi otherwise it is in the range of 10°C to 13.5°C in the valley plains. The summer season commences from March and continues till middle of June. The summer is quite pleasant here with the mean daily maximum temperature around 40°C while the mean daily minimum temperature is around 14°C.It is observed that about 80% of the total annual rainfall takes place due to south-west monsoon between the middle of June and mid-October. The north east monsoon gives erratic and insufficient rainfall. The average annual rainfall varies between 1320-1520mm. The district is drought prone because of the erratic and uneven pattern of rainfall.

The average annual rainfall of Koraput district is 1471 mm.

Table 1: Avg. Annual Rainfall of Koraput District

Year/Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Rainfall (mm)
1997	14.09	13.43	44.55	66.17	50.47	134.70	267.58	262.60	286.59	43.99	44.82	44.02	1273
1998	1.56	18.76	76.83	45.94	46.60	197.41	351.15	228.25	181.46	132.21	154.48	0.00	1435
1999	0.00	0.34	0.10	8.22	96.69	205.58	141.82	297.65	188.70	74.38	31.94	0.00	1045
2000	0.00	33.38	0.32	28.75	75.40	244.07	267.66	332.34	143.52	26.83	4.07	8.47	1165
2001	0.03	0.00	10.77	55.61	116.90	249.45	435.85	345.03	162.46	75.61	37.23	0.01	1489
2002	27.76	0.00	0.58	42.89	33.26	175.68	182.83	281.67	122.95	106.05	0.10	0.00	974
2003	0.03	12.02	59.70	41.39	8.57	75.95	380.52	385.54	251.71	254.59	2.04	78.43	1550
2004	43.94	3.24	14.97	72.85	45.51	297.23	289.95	250.25	122.66	212.96	41.90	0.00	1395
2005	11.58	0.39	5.28	30.53	33.38	170.37	237.40	237.77	439.78	255.70	69.69	0.46	1492
2006	0.00	0.00	39.77	69.94	152.14	221.72	650.21	873.62	610.22	41.01	9.88	0.00	2669
2007	0.00	0.04	0.04	15.32	84.54	769.55	227.38	500.51	433.07	184.53	2.79	0.00	2218
2008	0.58	7.37	85.84	44.34	57.76	258.21	272.33	510.38	401.88	30.71	1.27	3.41	1674
2009	0.00	0.00	15.48	3.15	77.54	154.09	419.06	278.24	115.25	121.41	37.25	3.61	1225
2010	25.67	9.35	10.29	19.71	85.34	147.21	436.81	306.75	300.57	162.49	87.77	60.69	1653
2011	0.03	17.54	3.27	83.31	82.30	132.67	171.80	257.24	231.30	54.74	1.41	9.96	1046
2012	33.24	0.00	3.44	36.97	31.72	113.82	311.53	385.29	251.81	78.70	156.77	0.00	1403
2013	1.27	5.30	1.10	59.41	26.25	398.52	264.59	227.74	160.82	257.57	14.39	0.04	1417
2014	0.00	2.13	50.57	28.01	137.39	120.53	441.02	367.69	236.21	189.23	2.41	6.64	1582
2015	3.33	1.26	17.41	77.07	55.17	286.14	106.07	259.34	484.94	40.12	15.88	2.53	1349

Year/Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Rainfall (mm)
2016	0.48	10.62	22.21	33.57	120.44	251.53	302.51	259.54	274.47	116.52	5.53	2.33	1400
2017	0.00	0.00	22.81	19.53	63.47	164.84	305.16	368.23	159.64	200.68	49.48	0.01	1354
2018	0.00	0.00	2.99	105.72	78.39	119.17	376.55	449.37	247.28	76.98	3.28	71.93	1532
2019	1.38	0.28	8.54	39.04	70.40	149.28	327.99	393.55	335.85	256.61	15.57	1.28	1600
2020	13.70	23.77	53.18	108.94	62.03	205.79	145.01	315.86	207.98	191.93	20.71	0.00	1349
2021	4.09	3.12	2.42	53.09	99.19	132.67	206.88	307.01	356.54	108.32	72.78	14.63	1361
2022	53.02	4.69	1.58	22.19	111.33	112.06	346.51	425.67	317.83	190.44	9.15	3.26	1598
Avg. Annual Rainfall (mm)													***1471***

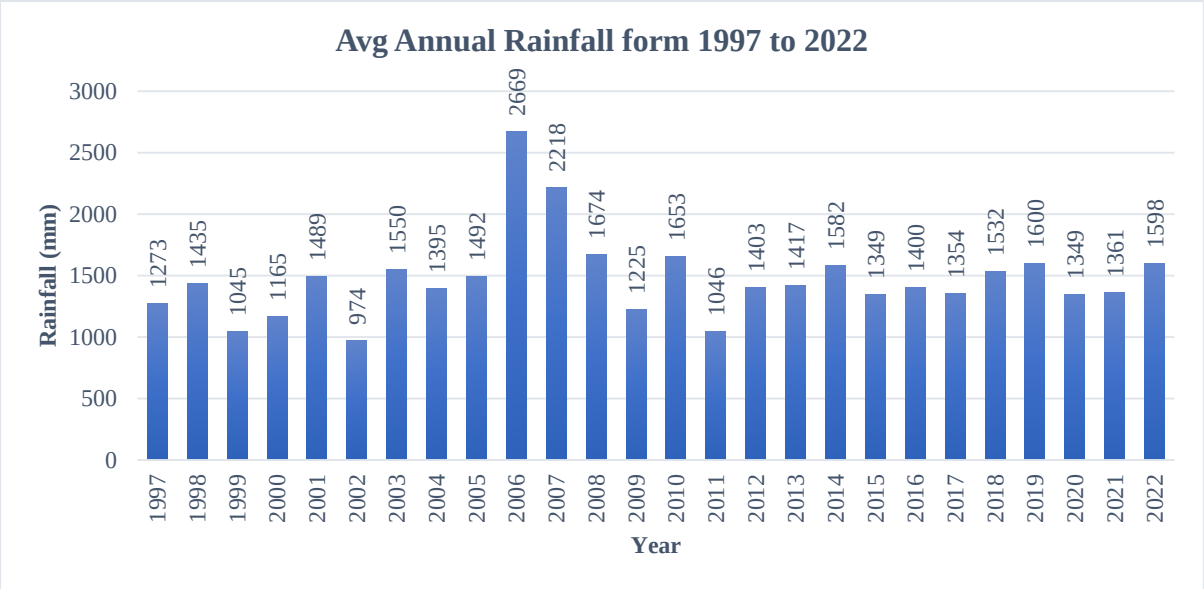


Figure 5: Avg. Annual Rainfall Koraput District

2.2. Potential Evapotranspiration (PE)

Potential Evapotranspiration (PE) is a concept used in hydrology, meteorology, and environmental science to represent the amount of water that could be evaporated and transpired from the Earth's surface under specific environmental conditions. It provides an estimate of the maximum water loss that can occur in an area, assuming there is an unlimited supply of water available.

Several methods and equations have been developed to calculate potential evapotranspiration, with the most widely known and used method being the Penman-Monteith equation. This equation takes into account various factors that influence evapotranspiration, including temperature, humidity, wind speed, and solar radiation. The Penman-Monteith equation is

often employed in agricultural and hydrological studies to estimate the water requirements of crops, irrigation needs, and other water resource management tasks.

The key factors that affect potential evapotranspiration include:

- Temperature: Higher temperatures generally lead to increased evaporation rates.
- Humidity: Lower humidity levels result in higher potential evapotranspiration.
- Wind speed: Greater wind speeds can enhance the evaporation process by carrying moisture away from the surface.
- Solar radiation: Intense sunlight increases the energy available for evaporation.
- Vegetation: The presence of plants can increase evapotranspiration due to the process of transpiration, where plants release water vapor through their leaves.
- Soil characteristics: The type of soil and its moisture-holding capacity can influence evapotranspiration rates.

Table 2: Month wise Evapotranspiration

Month	Evapo-transpiration (in mm)
Jan	20.26
Feb	15.74
Mar	14.8
Apr	42.8
May	64.94
Jun	84.64
Jul	105.63
Aug	120.96
Sep	117.02
Oct	100.33
Nov	45.75
Dec	19.89
Jan	13.28

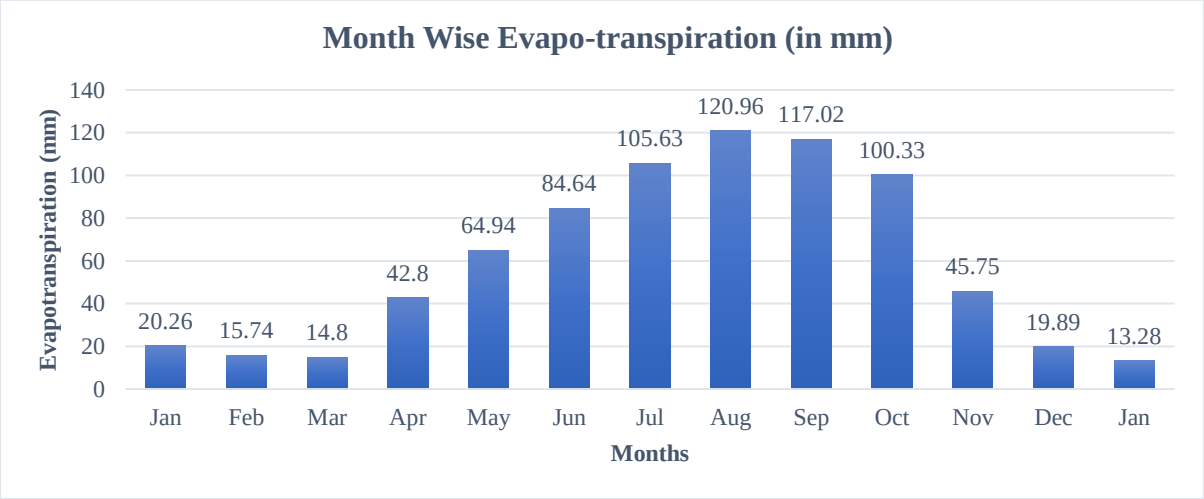


Figure 6: Month Wise Evapo-transpiration (in mm)

2.3. Climatic Water Balance

The Climatic Water Balance, also known as the Water Budget or the Water Balance Equation, is a hydrological concept used to evaluate and quantify the distribution of water in a specific region over a defined period, often on an annual or monthly basis. It helps in understanding the availability and movement of water within a particular area and is crucial for various applications, including water resource management, agriculture, and ecology.

The Climatic Water Balance (B) is calculated using only the two climatic components of the full water balance, namely Rainfall (R) and Evaporation (E).

The Climatic Water Balance is defined by: B = R – E

Where:

B is the Climatic Water Balance in mm of water

R is the rainfall in mm of water

E is the evaporation from a soil surface in mm of water.

Table 3: Climatic Water Balance of 10 year for Koraput District

S. N	Year	Rainfall(mm)	Evaporation (mm)	Climatic Water Balance (mm)
1	2013	1417	280	1137
2	2014	1582	310	1272
3	2015	1349	268	1081
4	2016	1400	254	1146
5	2017	1354	238	1116

S. N	Year	Rainfall(mm)	Evaporation (mm)	Climatic Water Balance (mm)
6	2018	1532	270	1262
7	2019	1600	290	1310
8	2020	1349	277	1072
9	2021	1361	318	1043
10	2022	1598	302	1296
Average		***1454***		

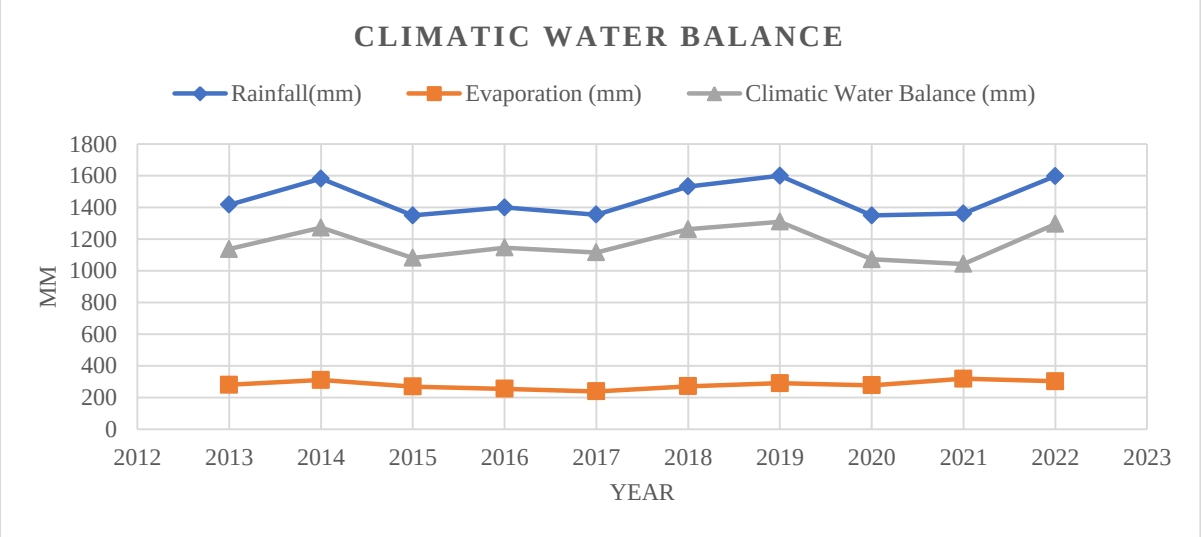


Figure 7: Climatic Water Balance

2.4. Water Balance Techniques

The term "Water Balance" refers to the balance between the incoming water from precipitation and the outgoing water by evapotranspiration resulting in change of soil moisture and runoff. It is a climatic balance obtained by comparing the match of precipitation with evapotranspiration, yielding a number of moisture parameters like water surplus, water deficiency, soil moisture changes and runoff. The basic relation governing the water balance concept is;

$P = E \pm \Delta S + R0$

Where,

P = is precipitation in mm

E = is evapotranspiration in nun

ΔS = is change of soil moisture in mm

Ro = is runoff in mm

An important feature of the water balance concept is the recognition of the part played by soil in the exchange of moisture between the earth's surface and the atmosphere. Soil-acts as a medium for storing water (up to a limit) in times of excessive rainfall and releasing the same (in a restricted manner) at other times for purposes of evaporation and transpiration.

3.0. DRAINAGE ANALYSIS

3.1. Drainage

The Jolaput Reservoir is the nearest waterbody which is situated at 3 Km away from the project site. The drainage pattern of this area is dendritic in nature. However, number of small to medium water bodies are noticed in the study area.

The study area is irrigated by bore well / dug well. The return flow from the irrigation land maintains the ground water level at moderately deeper depth in the bore well.

The Drainage map is presented below figure

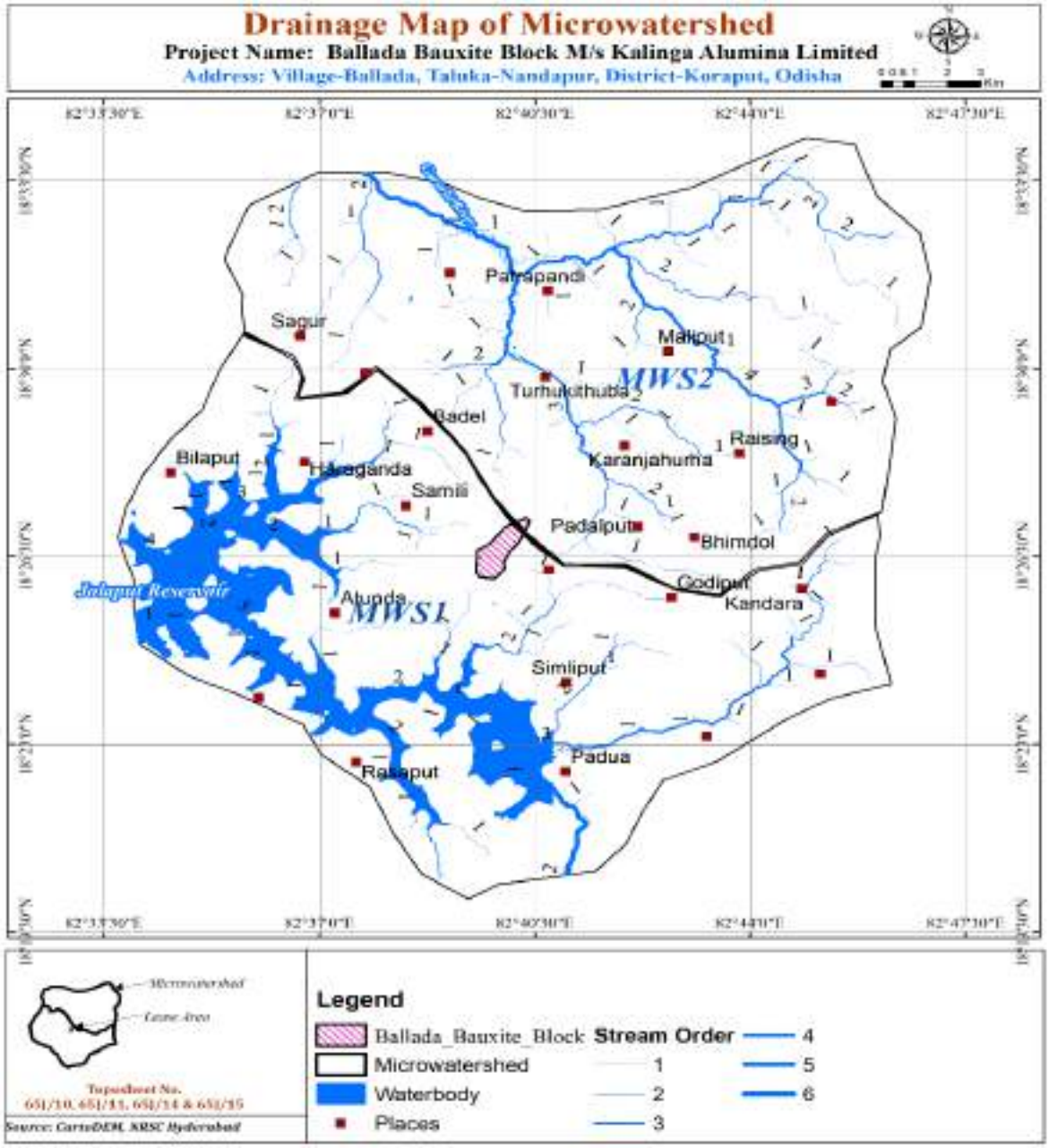


Figure 8: Drainage Map of Micro watershed

3.2. Morphometric Analysis

Morphometric analysis of a watershed involves the quantitative assessment of the physical characteristics and geometric properties of the land and drainage network within a specific watershed. This analysis is crucial for understanding the hydrological behaviour, erosion potential, and overall functioning of a watershed. Here are some of the key morphometric parameters and their significance in watershed analysis:

Linear Parameters:

Stream Length (L): The total length of all the stream segments within the watershed. It provides information about the drainage density.

Stream Order (Strahler Order): It classifies streams within the watershed into different orders, helping to understand the hierarchical nature of the drainage network.

Area Parameters:

Watershed Area (A): The total land area that contributes runoff to a particular outlet point. It influences the total volume of runoff and is essential for hydrological modelling.

Bifurcation Ratio (Rb): The ratio of the number of streams in each order to the number of streams in the next higher order. It indicates the branching pattern of the watershed.

Drainage Density (Dd): The total length of streams divided by the watershed area. It provides insights into the intensity of the drainage network.

Shape Parameters:

Circularity Ratio (Rc): The ratio of the watershed's area to the area of a circle with the same perimeter. It characterizes the shape of the watershed.

Compactness Coefficient (Kc): The ratio of the square of the perimeter to the watershed area. It assesses the compactness of the watershed.

Relief Parameters:

Relief (R): The difference in elevation between the highest and lowest points within the watershed. It indicates the topographic variation and slope within the watershed.

Slope (S): The average slope of the terrain within the watershed. It affects the speed of runoff and potential erosion.

Shape and Form Factor:

Form Factor (Rf): The ratio of watershed area to square root of its drainage basin perimeter. It describes the elongation of the watershed.

Elongation Ratio (Re): The ratio of the maximum and minimum distances from the outlet to the watershed boundary. It provides information about the watershed's elongation.

Texture Parameters:

Texture Ratio (T): The ratio of the area of the watershed to the area of a circle with the same perimeter. It characterizes the texture of the watershed.

Table 4: Morphometric Analysis

Order of Stream (U)	NU	Log NU
1	6267	3.80
2	3355	3.53
3	1529	3.18
4	924	2.97
5	538	2.73
6	524	2.72

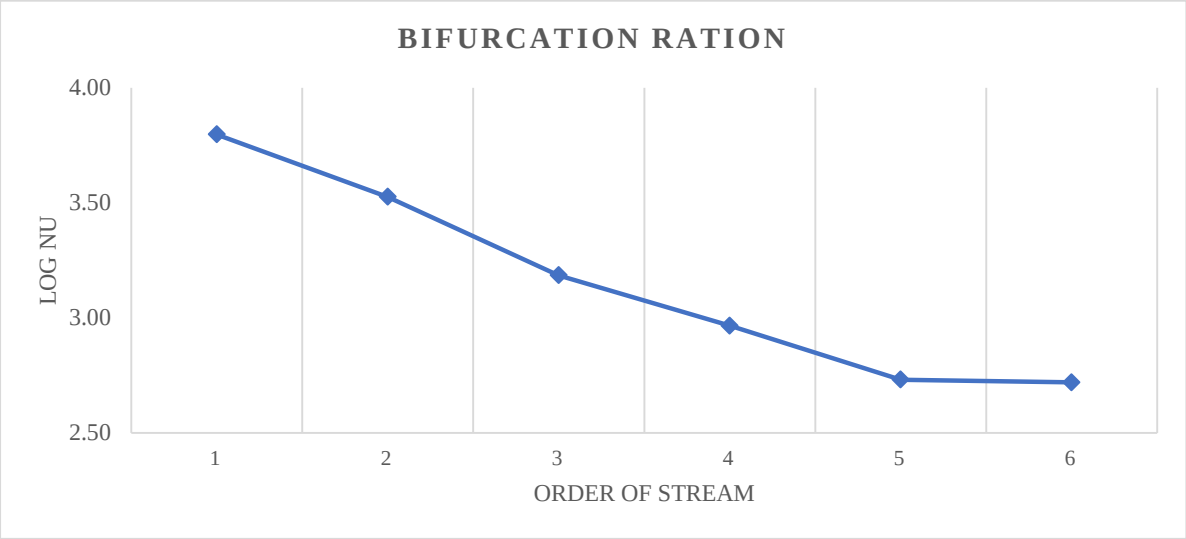


Figure 9: Bifurcation Ration

The bifurcation ratio of basin is 3.15. Horton observed, "Bifurcation ratio characteristically ranges from 3 to 5 for watershed in which geological structure does not distort the drainage pattern". From this it can be concluded that above value of bifurcation ratio indicate that geological structure has not affected the drainage pattern of the basin under consideration. The morphometric study concludes that drainage developed in and around mine is due to erosional activity.

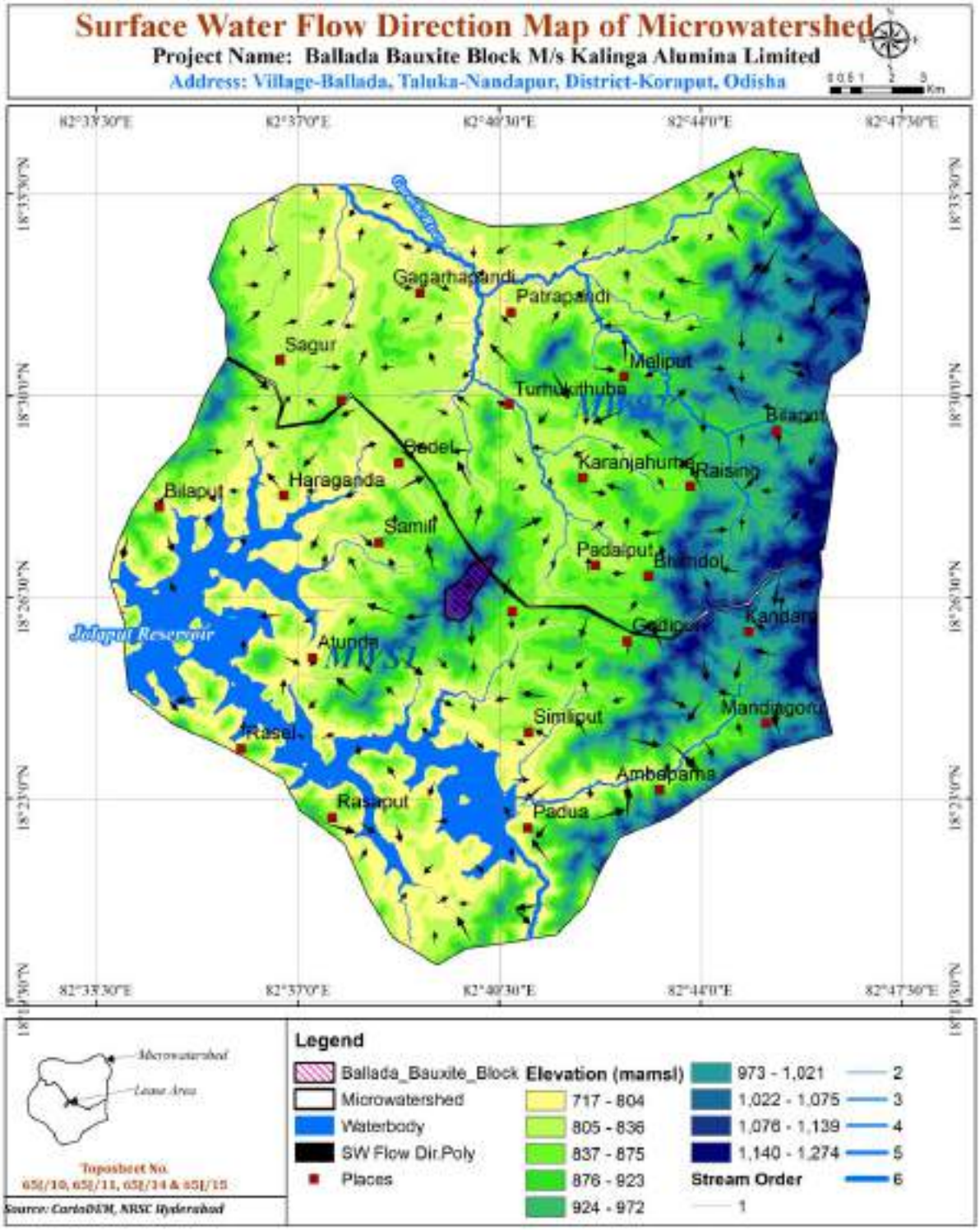


Figure 10: Surface Water Flow Direction Map

3.3. Micro Watershed of Hills Drainage External & Mine Drainage Internal

A micro watershed, also known as a sub-watershed or sub-basin, is a smaller unit within a larger watershed or river basin. Watersheds are geographic areas that drain into a common

point, such as a river, lake, or ocean. Micro watersheds are subdivisions of these larger watersheds and typically have their own distinct boundaries.

Micro watersheds are essential for managing and understanding the distribution and flow of water resources in a particular region. They are often used in hydrology, environmental management, and land-use planning. Analyzing micro watersheds allows for a more detailed examination of local hydrological processes, soil erosion, water quality, and the impact of land use on the environment.

Lease area falls in the watershed 4E1E5 & 4E1E6

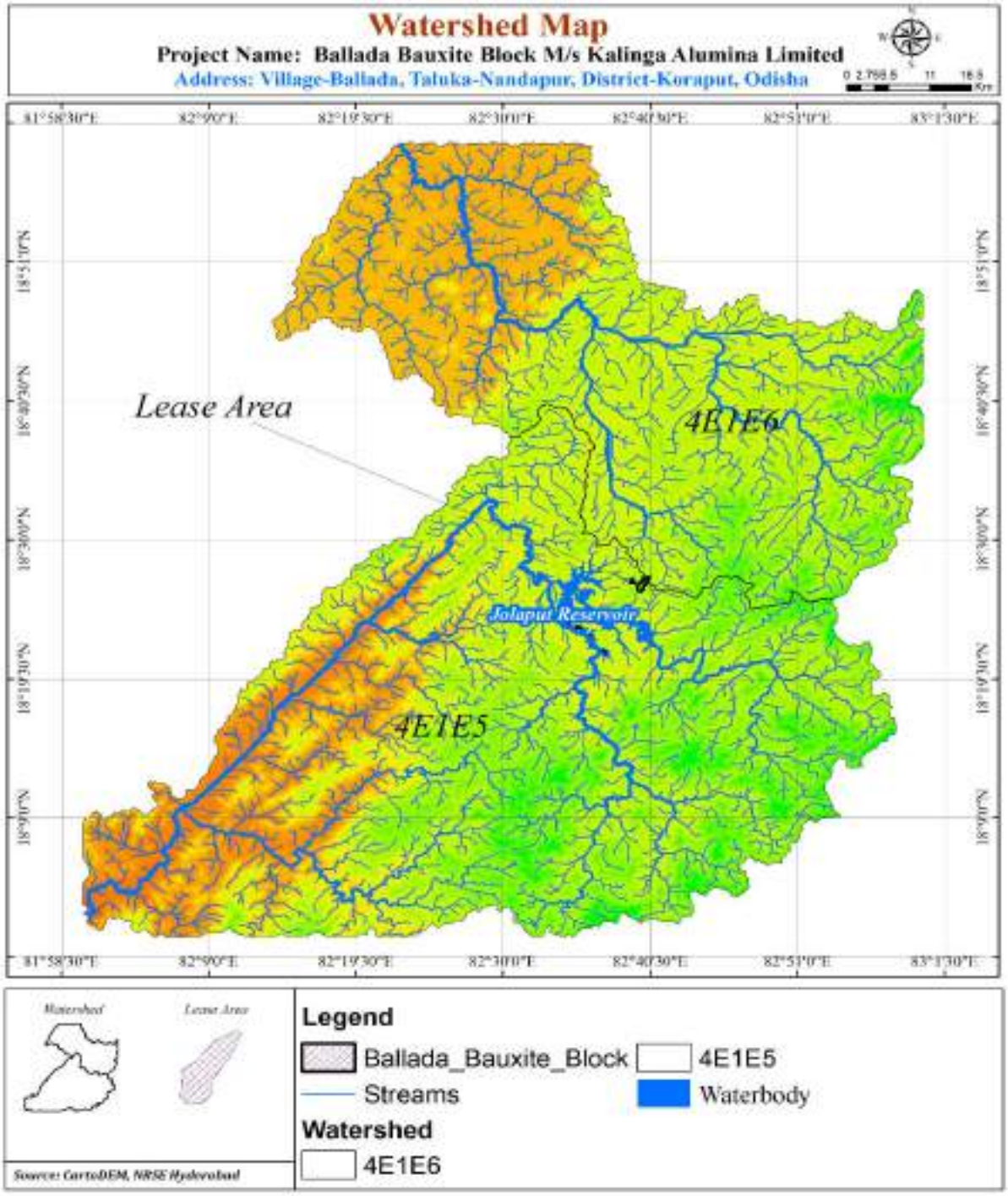


Figure 11: Watershed Map

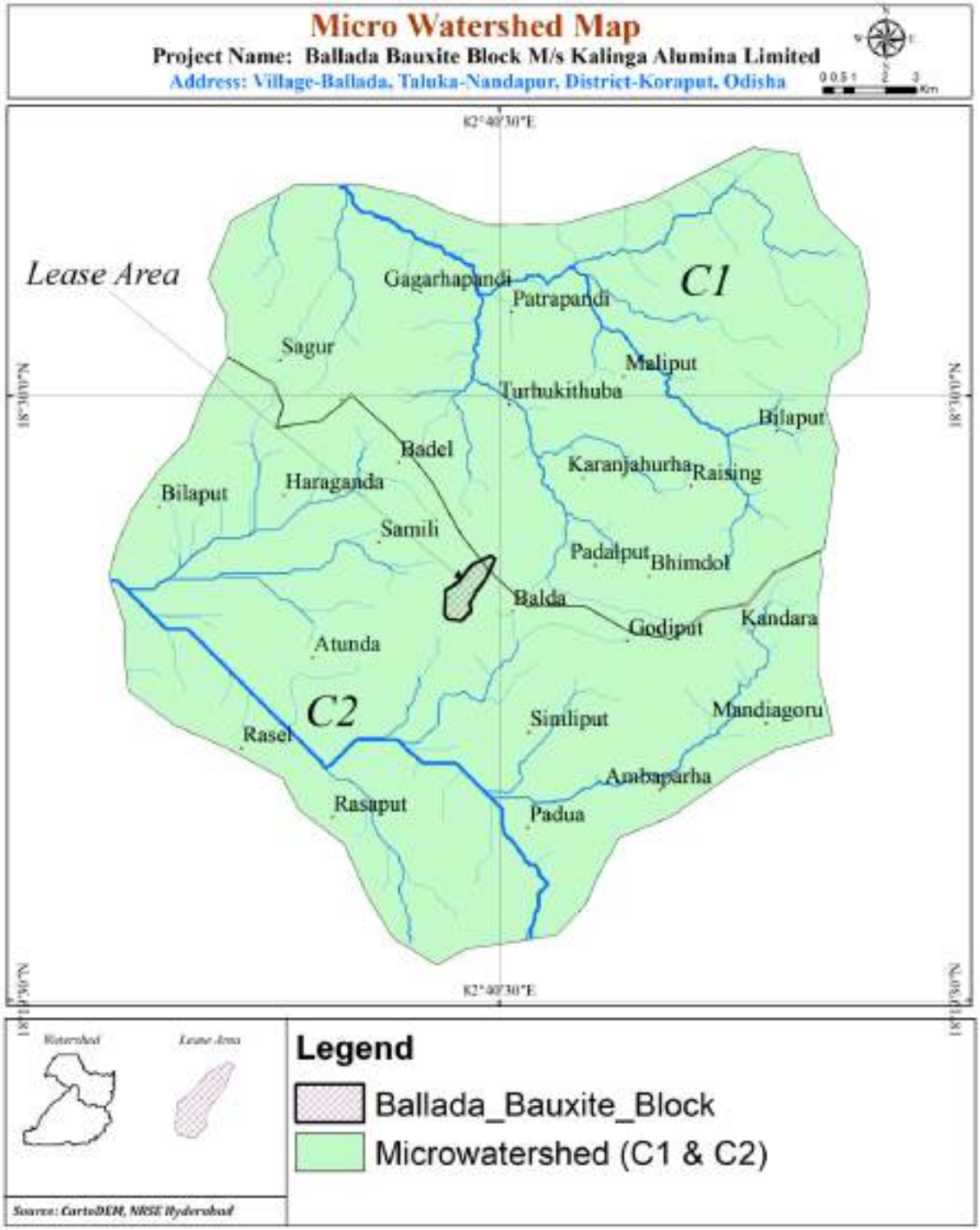


Figure 12: Micro Watershed Map

3.4. Slope of Micro Watershed:

The slope of a micro watershed refers to the incline or gradient of the land within that specific small-scale watershed or sub-basin. Understanding the slope of a micro watershed is

crucial for various purposes, including hydrological assessments, soil erosion control, and land-use planning. Here's why the slope is significant:

Hydrological Assessments: The slope of a micro watershed affects the flow of water within that area. Steeper slopes can result in faster runoff and potentially lead to more rapid and intense surface water flow during rainfall events. This information is essential for managing and mitigating flood risks, designing drainage systems, and ensuring a stable and sustainable supply of water resources.

Soil Erosion Control: Slope plays a vital role in soil erosion. In areas with steep slopes, soil erosion can be a more significant concern, as gravity can cause soil to move downhill more quickly. Managing erosion in these areas may require implementing appropriate conservation practices, such as terracing, contour farming, and afforestation.

Land-Use Planning: The slope of a micro watershed influences land-use decisions. Steeper slopes may not be suitable for agriculture or construction, while flatter areas might be more conducive to these activities. Understanding the slope helps in making informed decisions about land development, zoning regulations, and conservation efforts within the micro watershed.

The slope of drainage developed by hill area and mine area has been studied with the help of GIS tool and result is shown in below figure

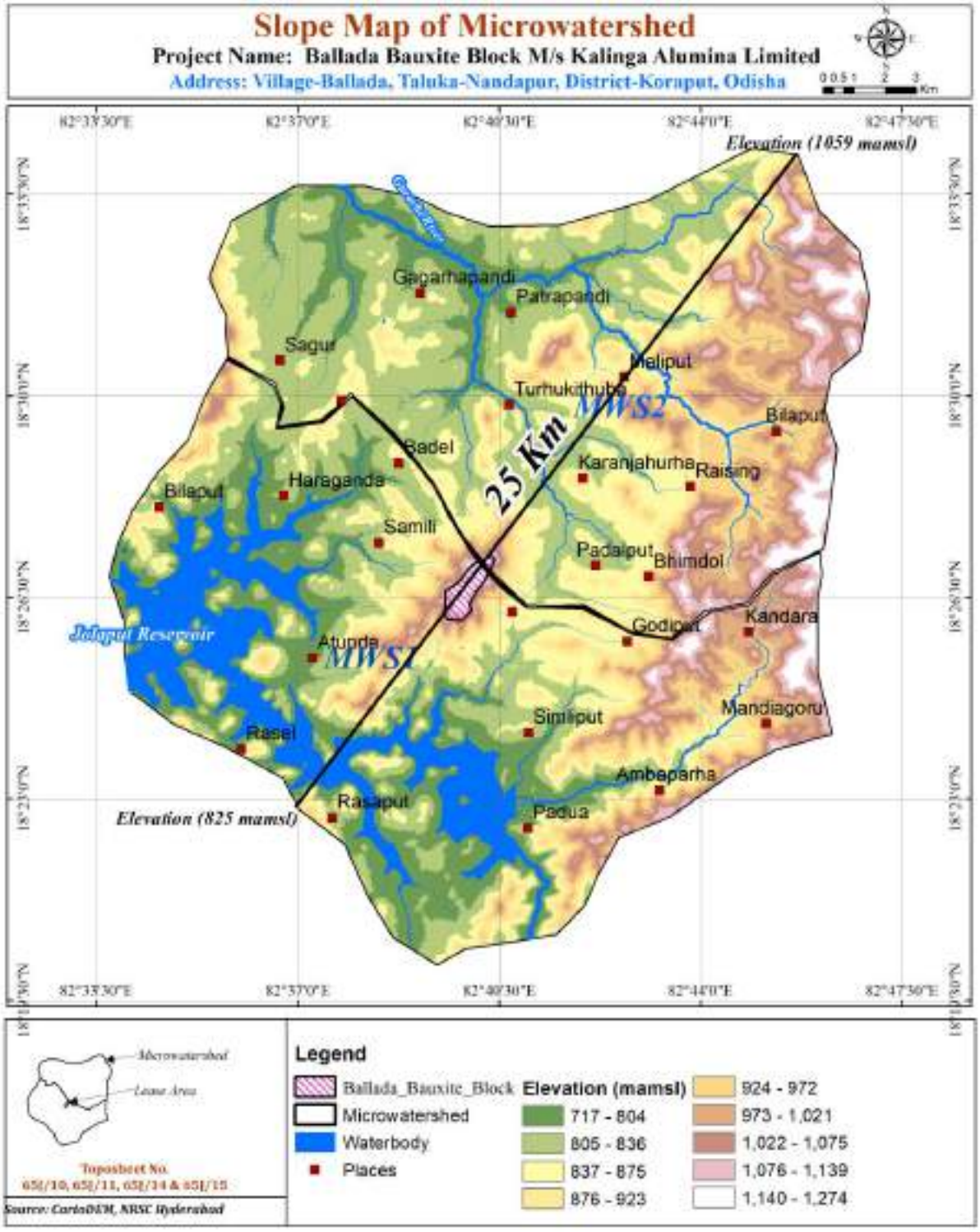


Figure 13: Slope Map of Micro watershed

4.0. GEO – TECHNICAL PARAMETERS

This will include Geology, Infiltration & Hydrogeology

4.1. Geology

Regional Geology

The Eastern Ghat Mobile Belt constituting a major part of the district, comprises Khondalite and Charnockite Group of rocks and Granite Gneiss of Archaean age. The western and southeastern part are dotted with small outlier of Bengpal Group of rocks, also of Archaean age in the backdrop of Granite Gneiss, Chhattisgarh Group of sedimentary rocks of Proterozoic age occurs in the western part.

Table 5: Geological Succession

AGE		GEOLOGICAL UNIT	LITHOLOGY
Pleistocene to recent		Quaternary	Soil and alluvium
Cainozoic(undifferentiated)			Laterite (locally bauxite)
Middle to Upper Proterozoic		Chattisgarh Group	Shaly Limestone
			Shale
			Conglomerate, Sandstone, quartzite
Proterozoic(undifferentiated)		Igneous Intrusives	Pegmatite/Quartz vein
			Dolerite
			Nepheline Syenite
			Diorite and gabbro
Archaean		Bengpal Group	Meta-dolerite and gabbro
			Metabasics-ultrabasic rock
			Andalusite-mica schist
			Banded ferruginous quartzites (BMQ/BHQ)
			Quartzite
			Porphyroblastic granite gneiss, migmatites, leptynite
	Eastern Ghat Supergroup	Charnockite Group	Acid and intermediate Charnockite
			Basic Charnockite and pyroxene granulite
		Khondalite Group	Khondalite schist/gneiss
			Quartzite (Ferruginous/magnetitic)
			Calc-silicate rock/crystalline limestone

Local Geology

The area forms a segment of the east-central part of the Eastern Ghat hill ranges. Rocks belonging to the Khondalite and Charnockite groups are developed in the area. In general, Khondalites form high hills and peaks whereas the Charnockitic rocks are invariably confined to the valleys and slopes of high hills. Both the groups of rocks occur as concordant bands. It is a common feature to observe islands of Khondalites within the Charnockitic rocks. Bauxite of Ballada capping occurs as mantle over khondalite as proved by drilling. The gibbsite crystals occur as shining aggregates in a ferruginous groundmass. The relict foliation is observed in some of the bauxite outcrops. The bauxite invariably has a brick red colour. It is sporaceous towards the top where the voids are filled with kaolinite / limonite. At depth, it has spongy texture with ferruginous zones. The laterite is more ferruginous and siliceous at the top where it is hard and has craggy, cavernous look but is relatively soft and aluminous in the lower parts and grades into bauxite. The soil though present in very less quantity is mostly lateritic.

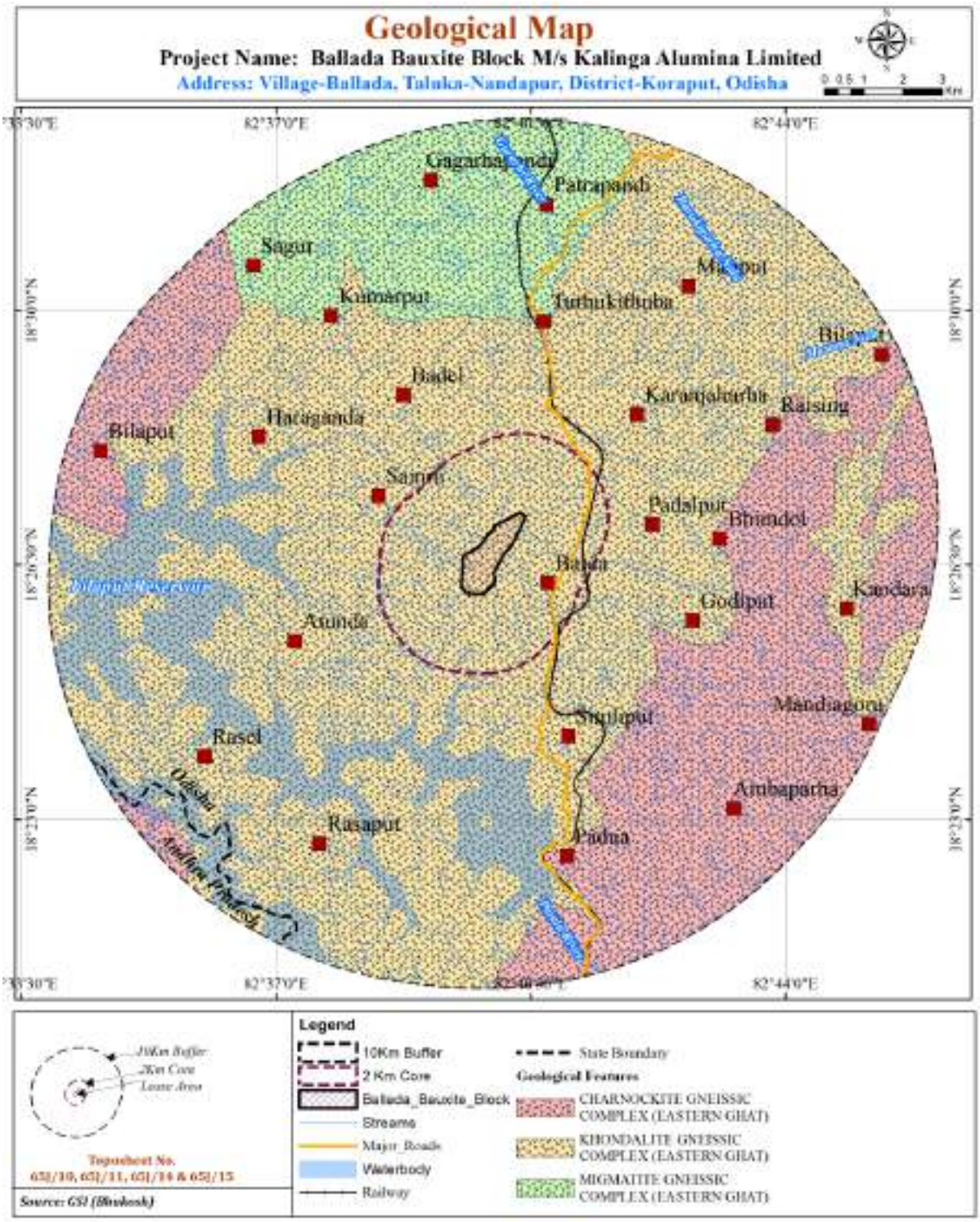


Figure 14: Geological Map of Study Area

4.2. Mining

Extent of Mineralization

The Ballada bauxite block comprising over an area of 144.945 Ha, constitutes the plateau area of 91.67 Ha with a mineralized zone of 83.778 Ha and non-mineralized zone of 61.167 Ha including the central khondalite and southern clay pocket. The deposit spreads all over the plateau area and is irregular in shape. The non-mineralized zone within the plateau area is 7.892 Ha and outside the plateau is 53.275 Ha. Considering the threshold limit of bauxite and aluminous laterite, the plateau exposes bauxites of different categories with a thin layer of soil having 0.2 to 1m thickness.

The development of bauxite mine at Ballada will be in phases and concomitant to installation of alumina plant. The alumina plant will be commissioned in phases. The initial phases of the alumina plant will be fed with bauxite sourced from Ballada & Kutrumali deposit. In Ballada, the initial one year will be utilized for the development and pre-mining activities and production of 1.0 MT. In the second year of mining operation at Ballada, the production of bauxite will be around 2.0 MT. Subsequently, production from Ballada will be gradually ramped up and will reach its peak production capacity of 4 MTPA in the fifth year of operation.

The waste generated in course of pre-mining development and subsequent mining operation will consist of topsoil and laterite with occasional occurrences of khondalite. The rate of generation of waste, during first five years of operation, is expected to be of the order of 0.073Mm3 or 0.15 MT considering an average waste to ore ratio of about 1: 0.018.

It is planned to stack topsoil and waste separately on ground during the initial5 years of plan period. Topsoil, stacked separately, would be spread over the reclaimed areas, to enable planting and growing of trees.

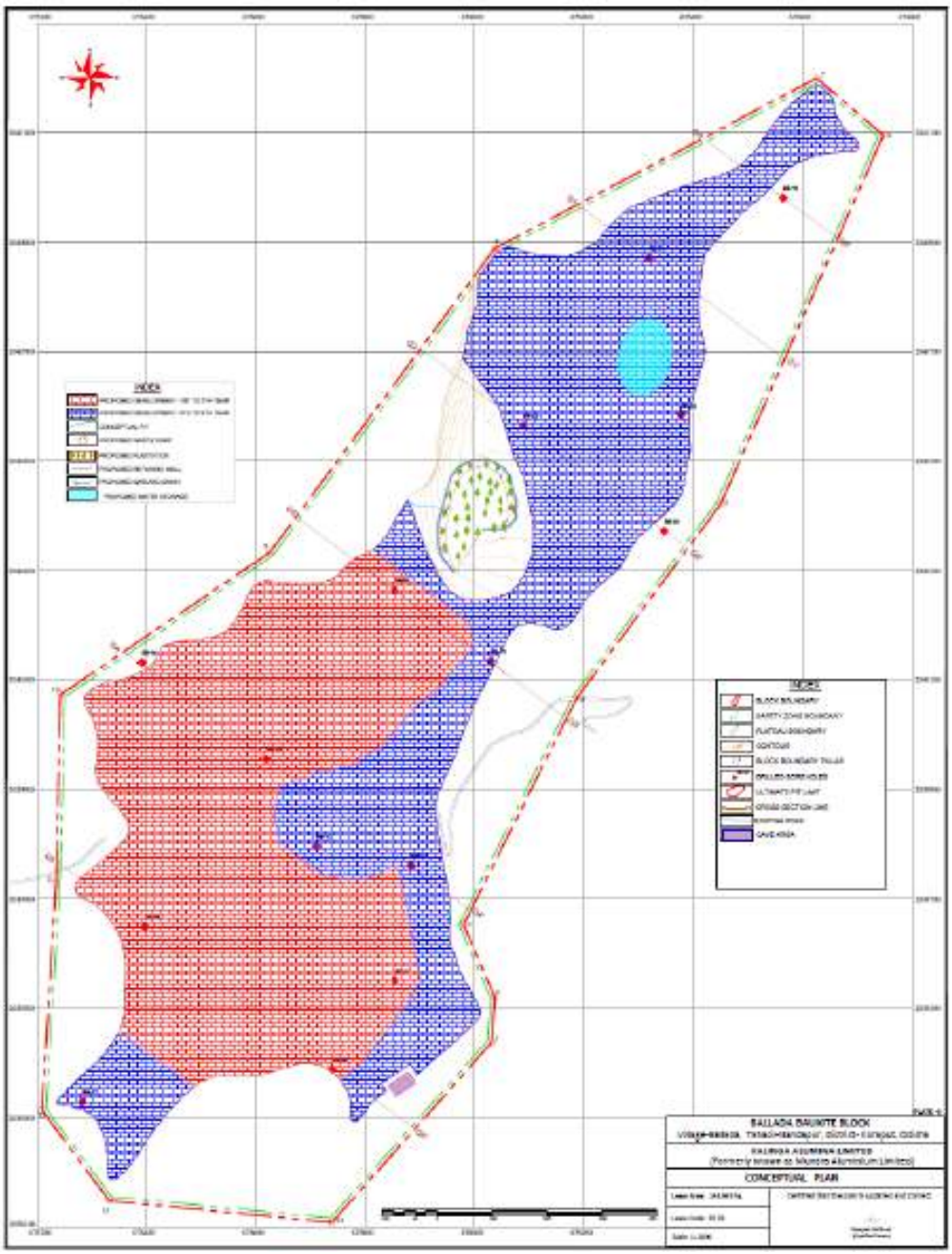


Figure 15: Conceptual Plan

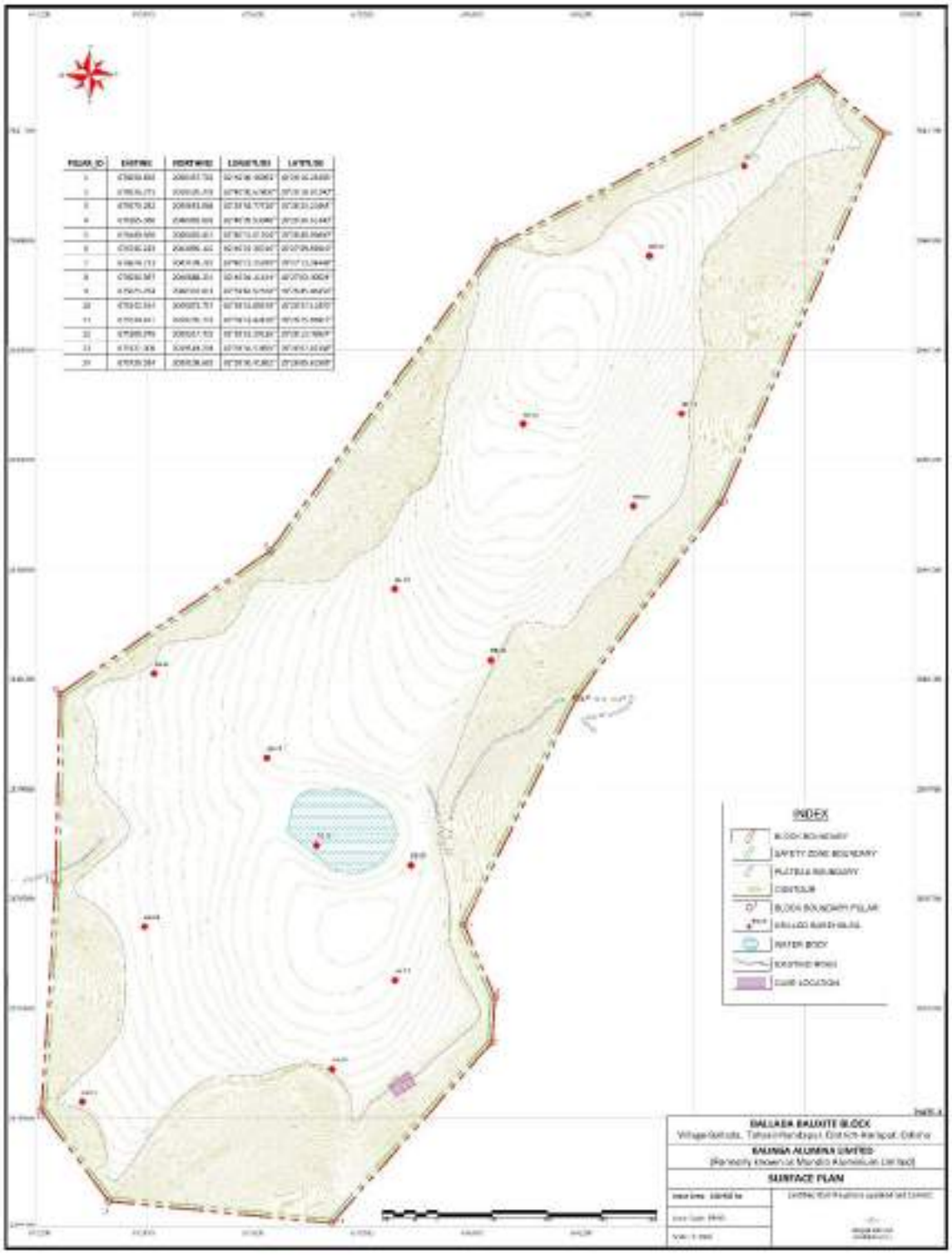


Figure 16: Surface Plan

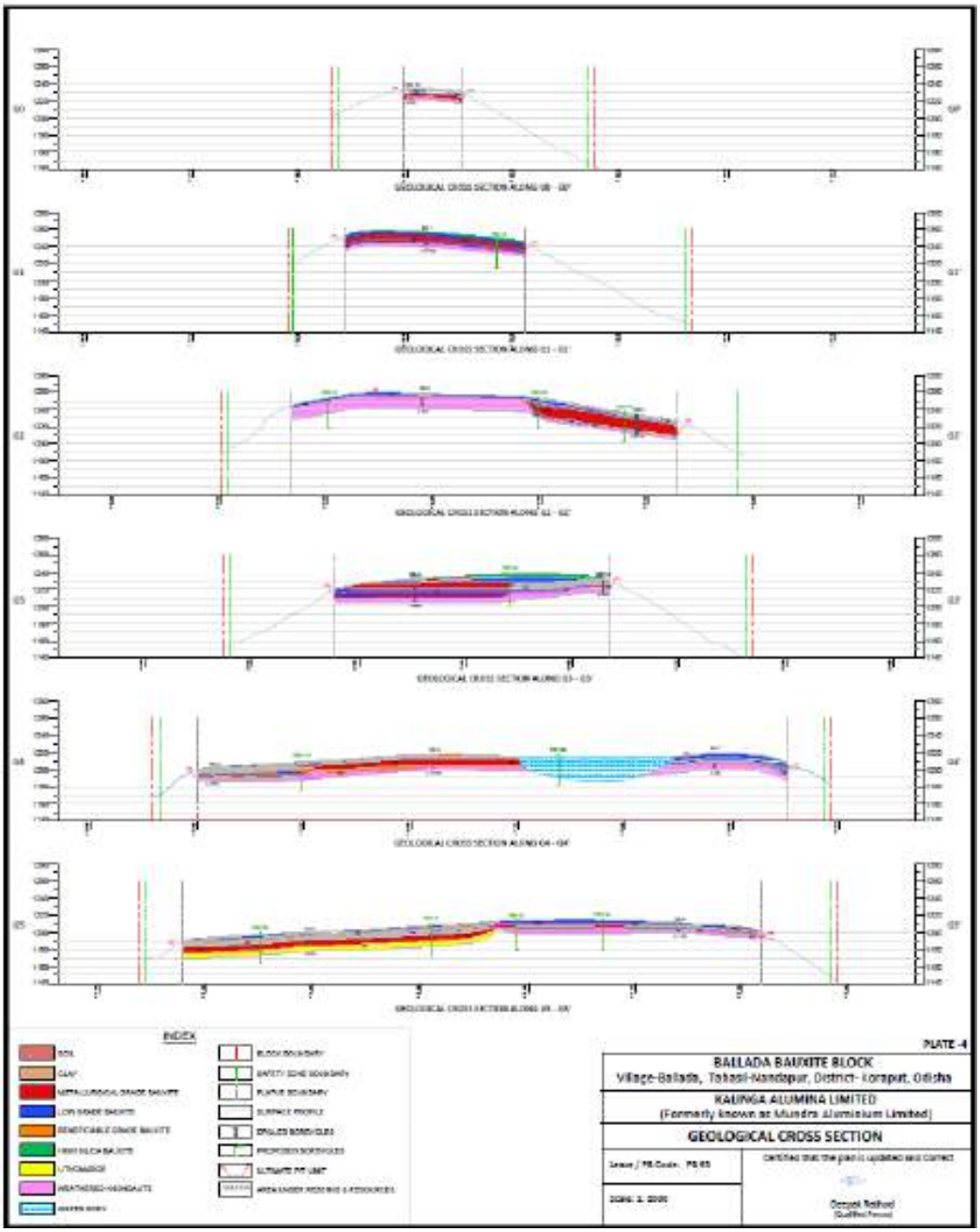


Figure 17: Geological Cross Section

4.3. Infiltration

Infiltration is the flow of water into the ground through the soil surface. Since infiltrated water may contribute to the ground water discharge in addition to soil moisture, the process can be schematically modeled. The infiltration characteristics of a soil at a given location has been estimated by using flooding infiltrometer,



Figure 18: Infiltration Test Location Map

Table 6: Calculation of Infiltration

Time since start	Infiltration rate (cm/hr)

Minutes	Hour	Test-I (Balda)	Test-II (Simliput)	Test-III (Atunda)	Test-VI (Samili)
10	0.16	20.90	16.20	12.70	10.30
20	0.33	18.20	14.00	8.40	9.20
30	0.50	16.50	10.40	7.30	7.54
45	0.75	12.30	9.50	5.21	5.21
60	1.00	9.80	6.25	3.20	3.50
90	1.50	5.60	5.21	2.50	2.00
120	2.00	2.70	4.55	1.90	1.78
150	2.50	1.80	3.00	1.50	1.30
180	3.00	1.20	1.70	0.75	0.70
210	3.50	0.75	0.60	0.40	0.25
Constant Infiltration rate cm/hr		***0.75***	***0.60***	***0.40***	***0.25***
Infiltration zone		High	High	Moderate	Low
Recharge/Discharge		Recharge	Recharge	Discharge	Discharge

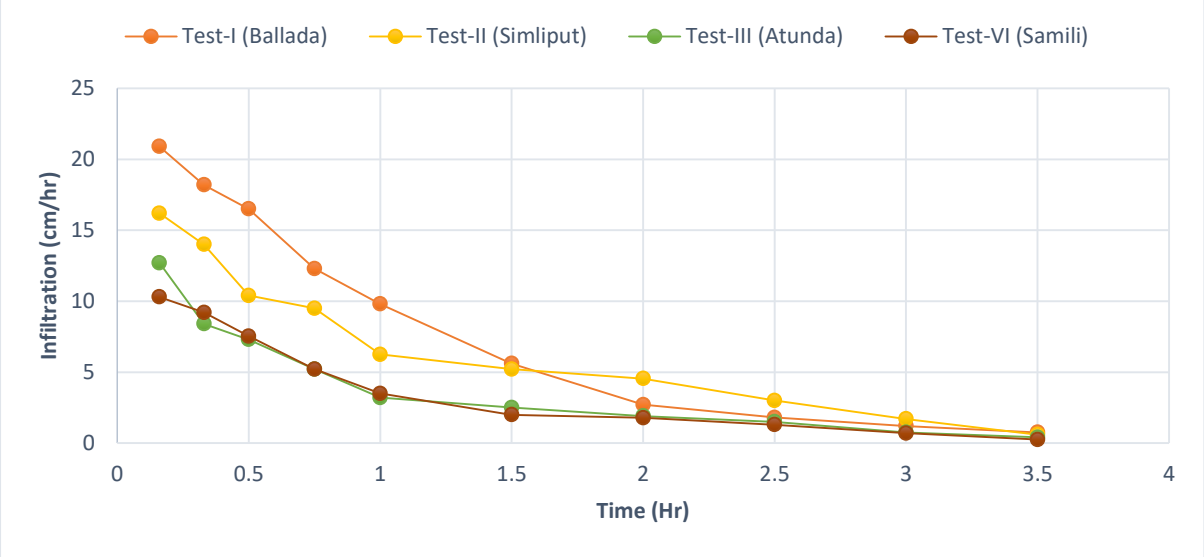


Figure 19: Infiltration Test Graph at Ballada Village

4.4. Hydrogeology

Consolidated formation

These include all the hard rocks of Eastern Ghat Group, such as granite gneiss, khondalite, charnokite and quartzite, gneiss, limestone, and shale of Chhattisgarh Group. These rocks are

devoid of primary porosity. The secondary porosity in these rocks developed as a result of weathering and fracturing due to major & minor tonic movements along with climatological actions. The secondary porosity forms the conditions for the movement of ground water and acts as a reservoir of ground water. Groundwater occurs under water table conditions in weathered residuum while it occurs under semi-confined to confined conditions in the fractured & jointed rocks. The hydrogeological characteristics of different rocks formations falling under the consolidated unit are described below.

Granite Gneisses: These are the most prominent rock types among all other rocks falling under the consolidated unit. The thickness of the weathered residuum ranges from negligible to 34 m. The Depth at the open wells ranges from 2.25 to 12.45 m bgl. The Depth to the water level in the dug wells during the pre-monsoon period varies from 1.53 to 12.29 m bgl while during the post-monsoon period from 0.33 to 7.6 m bgl. The yield of the wells depends on the thickness of the water saturated, zone as also the number of intersecting fractures tapped. The average yield of existing dug wells is around 1 Ips, and the wells can be pumped for 3-4 hrs during post monsoon and 2-3 hrs during pre-monsoon in a day. Out of the total wells drilled, around 45% of the well has recorded yield 3 to 6.9 Ips, and only 20% wells yielded less than 1 Ips, and the rest of the 35% of the wells recorded yield between 1 to 3 Ips. The yield of the wells located in granitic terrain in Jeypore and Boriguma block is considerably more than those in khondalitic terrain. Maximum potential fractures in this formation occur in the depth range of 45-125 mbgl. The transmissivity value of the aquifer ranges from 0.5 to 10.68 m2/ day.

Khondalites: Khondalite suites of rocks are generally highly metamorphosed intensely folded with fractures that are 25-30 m deep. The joints extend beyond 65 m depth bgl. Groundwater occurs under unconfined to semi-confined conditions. The thickness of this residuum ranges from 27 to 47 m bgl. The Depth to the water level in phreatic aquifer during pre and post monsoon periods varies from 0.65 to 15.35 mbgl and 0.42 to 13.75 mbgl respectively. The discharge of the bore well varies from 1 to 3 Ips. Maximum potential fractures in this formation occur in the depth range of 35-96 m bgl. Transmissivity value of the aquifer ranges from 0.5 to 2-3 m2/ day.

Charnokite -Due to the hard, compact, and massive nature of this formation, the thickness of weathered residuum is limited. The weathering is not very pronounced, being upto only 7-10 m in Depth. The spacing of the joints is wide apart. The Depth to the water level in phreatic

aquifer is of limited areal extent during pre and post monsoon period varies from 2.05 to 14.9m bgl and from 2.31 to 11.30m bgl, respectively. Discharge of bore wells tapping fractured zone ranges from 1 to 5 Ips. Maximum potential fractures in this formation occur in the depth range of 30- 136 mbgl. The transmissivity value of the aquifer ranges from 1.8-3.0 m2/ day.

Quartzite/gneiss - The phreatic aquifer in this formation is of limited areal extent. The thickness of weathered residuum varies from 10 to 12 m bgl. The Depth to the water level in the phreatic aquifer during pre- and post-monsoon periods varies from 3.52 to 10.7 mbgl & from 1.24 to 7.08 mbgl, respectively. The yield of the dug well is less than 1 Ips.

Limestone -This formation is generally found in the western fringe of the district and is of limited areal extent. Groundwater occurs in weathered zone under unconfined to confined conditions. The Depth to the water level in phreatic aquifers ranges from 8.03 to 10.15 mbgl during the pre-monsoon period and from 5.59 to 7.66 mbgl during the post-monsoon period.

Laterite -These are highly porous and are formed as capping over the older formations. At quite a few places, hydrological testing has revealed that the lateritic aquifer has the potentiality of yielding groundwater from 1-12 Ips. The lateritic profile extends down to a depth of 10-20m. The Depth of dug well varies from 3.14 to 13.4 mbgl. The Depth to the water level in phreatic aquifer varies from 1.93 to 13.22 mbgl during the pre-monsoon period while the water level ranges from 1.9 to 11.44 mbgl during the post-monsoon period.

Un-Consolidated formation

Alluvium of Recent to Sub-Recent age constitutes the unconsolidated formation comprising of gravel, sand, and clay. The alluvial deposits of recent origin occur as their discontinuous patches along the prominent drainage channels and 'particularly in the flood plains of Indravati and Kolab river. Due to the high degree of porosity and permeability, the alluvial strips constitute the moderately potential aquifers. Ground water occurs under semi-confined to confined conditions. The potential aquifers present in this zone can be tapped through filter point shallow tubewells and dugwells. The maximum thickness of the alluvium is in the order of 20-23 m. The Depth to water level varies from 1.3 to 7.64 mbgl during pre-monsoon period and from 0.40 to 5.89 mbgl during post monsoon period. Yield of a dug well varies from 8-15 Ips.

Aquifer characteristics

On the basis of data collection of exploratory wells, it has observed that 7 bore well-constructed within 100 mbgl depth and 67 bore wells constructed between 100-200 mbgl depth. Discharge of the tube wells having fracture zones within 100-meter depth varies from 0.25-3.3 lps and discharge of the tube wells having fracture zones upto 200-meter depth varies from 0.40 – 12.19 lps. On the basis of weathered zone and fracture zone details, aquifer grouping is summarized in below table,

Table 7: Aquifer Characteristics

Aquifer Group		Depth Range (mbgl)		Thickness (m)	
		From	To	Min	Max
Aquifer I (Within 100 m)	(Weathered Zone)	5.5	49.2	0.5	44.2
	(Fracture Zone)	18	98	0.5	1.5
Aquifer II (100-200 m) (Fracture zone)		103	187	0.5	1

4.5. Mine Seepage

As per approved mining plan the maximum Woking depth is 1280 mRL and the ultimate pit depth is upto 1166 mRL. The Water table in and around the mine lease area is varies from 875 to 1073 mRL, ensuring there will be no groundwater seepage into the mine pit.

5.0. HYDROLOGY–WATER MANAGEMENT

The hydrology of area is dealt as -

- Component of Runoff
- External water from hill management
- Internal water within mine water management

5.1. Compound Runoff

A surface water management plan for a mine is a specialized strategy designed to address the unique challenges and environmental considerations associated with mining operations. Mines can significantly impact surface water resources through activities such as excavation, tailings disposal, and runoff, and it is essential to manage these impacts effectively. Here's an outline of what such a plan might entail:

The water management of Bauxite mine is entirely based on mine plan and actual operation plan. There are two components of water viz surface water and ground water. Surface water is overland flow during monsoon and ground water in mine is as mine inflow (Mine Seepage). The Component of Hydrologic Cycle in the study area is depicted in below figure. The relevant component of hydrology of the area has been dealt with evaporation, infiltration and surface runoff.

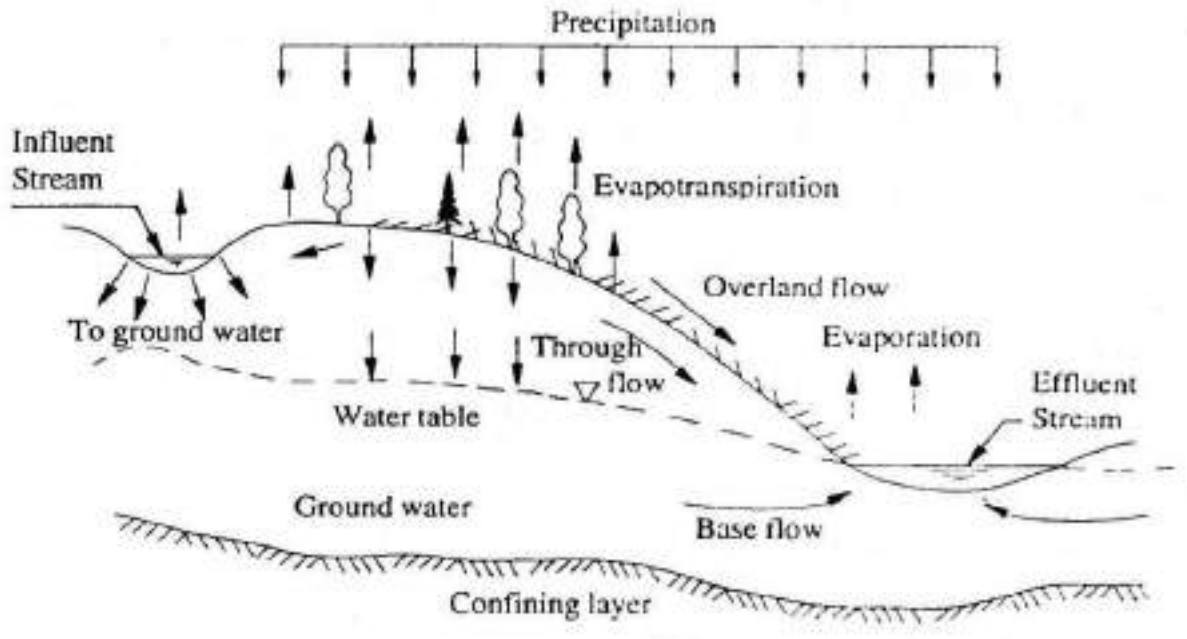


Figure 20: Schematic Diagram of Component of Runoff

The micro watershed area comprises of 426Km^2. The Map of Micro watershed showing the River, Stream and Waterbody is given below,

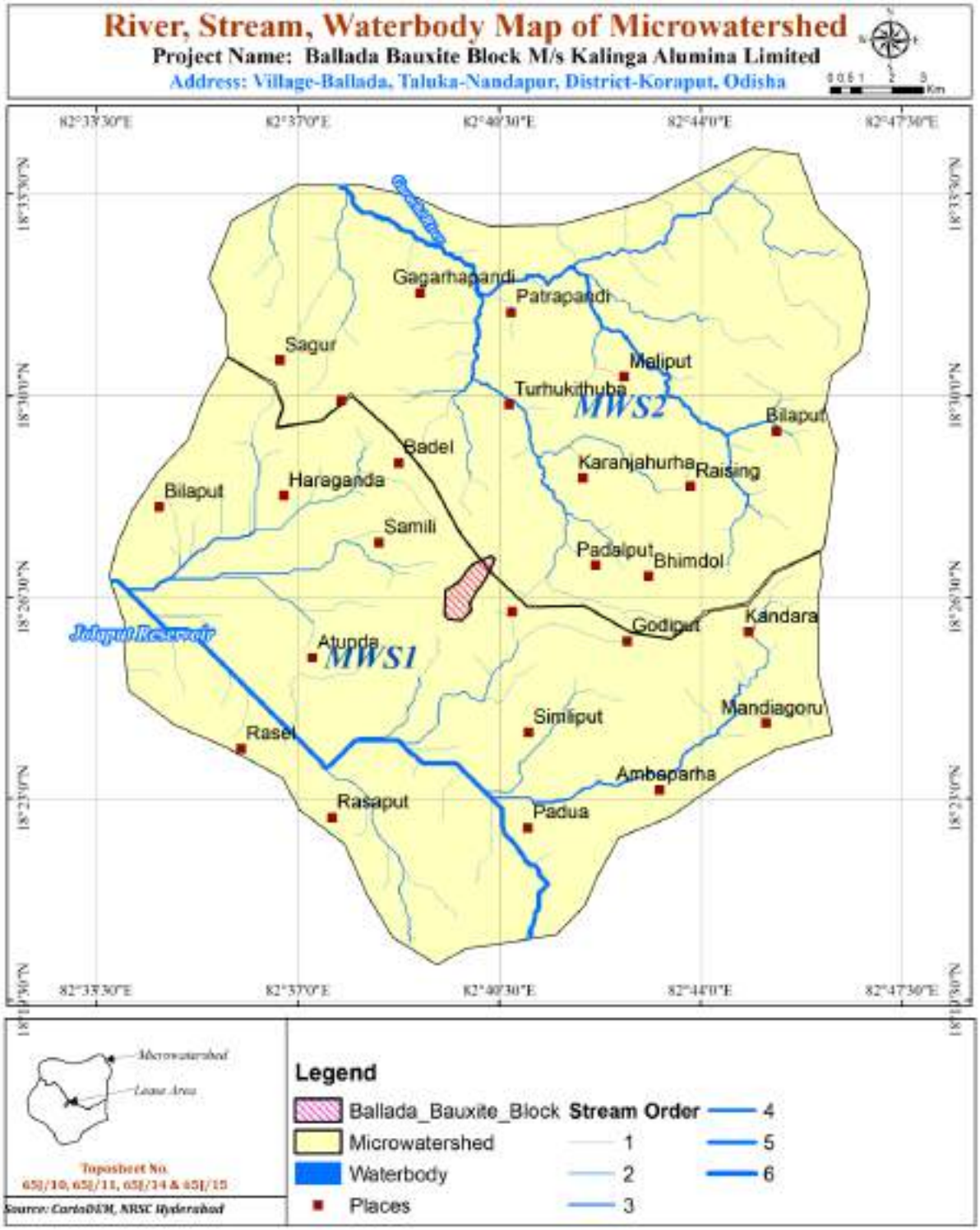


Figure 21: River, Stream and Waterbody of Microwatershed

5.2. Design of Bauxite Mine Drainage System for External Runoff

Impact:

The mine water, either surface runoff or mine seepages, problem is a major challenge in Bauxite mining particularly near a hilly area. The phenomenon of heavy rainfall cannot be prevented, which causes rainy water to enter into mine from external area and accumulate and inundate. The mine pit bottom resulting large capacity pumps to remove the water. The excess rain water into mine creates an accumulation of mud sediment and mud layer. These are the problems in operational activity in achieving production target in monsoon month. The aquifer also filled with infiltrated water and quickly discharged into mine pit as additional load to pumping.

Mitigation Measure:

Designing a drainage system for external runoff in a bauxite mine is a critical component of the overall surface water management plan for mining operations. The primary goal is to manage and control runoff from precipitation, which can carry sediments, contaminants, and potentially harmful materials associated with bauxite mining into nearby surface water bodies. Here are some key considerations for designing a bauxite mine drainage system:

- Site Assessment: Before designing the drainage system, conduct a thorough site assessment to understand the topography, hydrogeology, and the locations of potential sources of runoff.
- Erosion Control: Integrate erosion control measures into the drainage system design. These measures may include the use of sediment basins, silt fences, erosion control blankets, and vegetative cover to prevent soil erosion and sedimentation of nearby water bodies.
- Runoff Collection: Design a system for collecting runoff from various areas of the mine, including disturbed soil areas, stockpiles, and roads. Use swales, ditches, or other collection structures to capture and direct runoff.
- Sediment Ponds: Include sediment ponds in the design to allow sediment to settle out of the runoff water before discharge. Proper sizing and maintenance of sediment ponds are essential to their effectiveness.

- Water Quality Management: Implement measures to manage water quality. This may include settling basins, filtration systems, or chemical treatment to remove contaminants from the runoff.

Maintenance Plan: Develop a maintenance plan to ensure that the drainage system remains in good working order. Regular inspection, sediment removal, and repair of damaged components are essential for effective system function.

Emergency Response: Include provisions for responding to emergencies, such as extreme weather events or unexpected spills. Develop a plan for shutting down the drainage system and notifying appropriate authorities in case of an emergency.

Parameter for peak runoff estimation:

- Intensity of Rainfall (I) in m/hr
- Runoff coefficient (c) in percentage to rainfall
- Micro watershed area (A) in Km^2

5.3. Intensity of Rainfall and Infiltration

The rainfall intensity corresponding to a duration and desired probability of exceedance i.e., return period. This is rainfall-frequency duration relationship for the given catchment area. I.M.D. has prepared Isopluvial maps for the different return period for given catchment area. C.W.C. has also adopted the same for their publication of February 1997 in respect of flood estimation report.

The Isopluvial maps for 25-year return period, 50-year return period and 100-year return period are taken from CWC publication.

Table 8: Annual Return Period and 1 Day Maximum Rainfall:

SL. No.	Annual Return Period	24 Hrs Highest Rainfall (mm)
1	25	250
2	50	290
3	100	340

Source: WRIS

The conversion ratio for different duration of rainfall have been worked out by C.W.C. (1997) and given below,

Table 9: Rainfall Ratio and Conversion Ratio

SL. No.	Rainfall Duration (hr)	Conversion Ratio
1	1	0.390
2	3	0.610
3	6	0.760
4	9	0.820
5	12	0.860
6	15	0.880
7	18	0.920
8	24	1.000

Source: C.W.C

The rainfall intensity for different return period for one hour is estimated by multiplying conversion ratio with 24 hrs maximum rainfall of mine. The intensity of rainfall for 1 hour have been estimated and given in below table,

Table 10: Intensity of rainfall for 1 hr

SL. No.	Return Period (Year)	24 hr Maximum Rainfall (mm)	Conversion factor for 1 hr	Intensity of Rainfall in 1 hr (mm/hr)
1	25	250	0.390	97.5
2	50	290	0.390	113.1
3	100	340	0.390	132.6

The intensity of rainfall peak flood estimation for nala diversion has been taken for 100-year return period which is 133 mm/hr (0.125 m/hr).

Intensity of Rainfall - 0.133 m/hr

5.4. Runoff Co-efficient and Hill Area

The runoff coefficient is a dimensionless coefficient relating to amount to runoff to the amount of precipitation received. It depends on Geology, infiltration rate, slop of land and flow accumulations and evaporations. Based above study done in earlier chapters the runoff coefficient has been considered is 25% for unmined area of external sub basin.

Mine Runoff Coefficient – 25% of Rainfall

5.5. Peak Runoff by Rational Formula

Estimation of peak flood using Rational Formula for the external catchment area of mine comprising Micro watershed. The total area of catchment is 426 km^2 and time of concentration is 1 hr. The intensity of rainfall was estimated from daily rainfall data using

isopluvial maps using the C.W.C. guideline for this region for 100-year return period maximum value of 125 mm/hr. The runoff coefficient has been considered 25%. The estimated value of external sub watersheds is for the total area in order to keep 100% safely for mine operation. The computation of the peak runoff discharge for design of open channels using rational formula as under:

$$Q = \frac{(C \; x \; I \; x \; A)}{3600}$$

Where,

Q	=	Runoff discharge in m^3/sec
C	=	Runoff coefficient (0.25)
I	=	Intensity of rainfall in m/hr (0.133 m/hr)
A	=	Catchment area mine in m2 (1.45 x 10^6 m^2)

Estimation Runoff for Open Channels – 14 m^3/sec

Design runoff for open channels should be 20% more of estimated value which is to the tune of 16m^3/sec and velocity should be in the range of 3 to 4 m/sec.

Design Runoff for Garland Drain – 16 m3/sec

5.5.1. Control of External Water

Open Channel: The external water generated during monsoon will be control by constructing open channel along northern boundary concurrent mining operation of respective one year ahead. The RCC open channel will control the external water generated during monsoon.

Embankment: There will be hill cutting and filling to construct embankment. The embankment should be of maximum 2 m height and 2 m width.

Garland Drain:

- The water levels in the lease area exist far below the proposed working depth and the ultimate working depth at the end of life of mine The mining operations will not interfere with natural drainage patterns In order to avoid soil erosion carryover of the material with

rainwater retaining wall garland drain is proposed along the waste dump and topsoil stack yard to arrest the wash off Moreover peripheral drains all around the dumps shall be made to trap rainwater washings out of the dumps which in turn will reduce the load of suspended solids in the discharged water Sump pits will be provided along the length of the drains for effective trapping of rainwater washings Garland drains around the dumps will trap the fine particles from the dumps washed away by rain The drains will be 1m wide at the top and 1m deep and shall be provided with sump pits at suitable interval along its lengths Further a green belt is proposed to be provided around the dumps.

- The natural drainage originating from hills and passing through mine area should be cleaned and deepen for free flow during heaviest rainfall / cloud burst. Since, surface slope in mine area is gentle. In event of heavy surface flow, the area between local nala and garland drain may be flooded. The excess surface runoff may enter into mine by over flooding garland drain. In such situation there will be land slid of upper benches in to mine.

5.6. Direct Rain Water Accumulation in the mine

During the mining process, there will be two ways of water collection in the mine pit. 1) Ground water inflow in the mine when the mine intersects the ground water (which is not applicable for this project as it is located on hill top) 2) Rainfall storage in the mine pit.

In open cast mining, depression is created. Based on the normal monthly rainfall, the rainwater storage in the mine pit is estimated. The ground water seepage is expected below the ground water table. While mine pits are being excavated, protection arrangements/ Garland drains are made all along the periphery of the mine to channelize the rain water in the mines for easy operation of mines. Hence, no surface runoff into the mine pit is considered in the case of garland drains located outside of the mine pit area.

Normally, the dumps are used for the protection arrangement and green belt are developed to reduce the erosion and to avoid dust pollution. In the above situation, the rainfall occurs over the mine pits alone collected in the pits. Since there is no runoff from the mine pit, the co-efficient of 1.0 (100 % direct rainfall) is considered as rainwater collection.

Evaporation:

Evaporation records from pans are frequently used to estimate evaporation from lakes and reservoirs and ET from an area. Since information about monthly coefficients is not available for the study area. The evaporation losses are computed after referring to the open-source data of the Water Resources Systems Division, National Institute of Hydrology, India. Accordingly, the average coefficient value of 0.6 is considered for the enumeration of evaporation losses from the stored rainwater of mine pits.

Table 11: Variation of Pan Coefficient values with month

Location	Coefficient		
	0.6	0.7	0.8
North of 22° latitude	November-February	March-April and September-October	May-August
South of 22° latitude	December-January	February-April and September-November	May-August

Source: *Water Resources Systems Division, National Institute of Hydrology Jalvigyan Bhawan, Roorkee*

As per the CGWA Manual for Recharge (GEC Norms -2015), the recharge structures like Check Dam / Percolation Pond will contribute 20% of the stored volume in the monsoon and 20% in the non-monsoon to the recharge of groundwater system. The mine pits are considered as ponds (manmade structures). Hence, the above percentage is considered as ground water recharge from the mining pits. Accordingly, the ground water recharge quantity from the mine pit is estimated. The estimation of monthly rainwater collection is presented in below table,

Table 12: Estimation of Rainwater Collected in Mine Pit

Estimation of Rainwater collection in the Mine Pit								
Name of mine	**Mine Pit Area in sq m**	**Co-Efficient**	**Season**	**Estimation Storage in the mine pit in m3**	**Estimation Evaporation Loss in m3/month**	**Estimation Recharge in m3/month**	**Rainwater available in the mine pit**	**Rainwater collection m3/day**
Ballada Bauxite Deposit	856500	1	Monsoon	977628	586577	195526	195526	536
			Non-monsoon	289078	173447	57816	57816	158
			Total	1266706	760024	253341	253341	***694***
Month	**25 Years Normal Monthly rainfall (mm)**	**Estimated Storage in the mine Pit in m3**	**Estimated Evaporation Loss in m3/month**			**Estimated Recharge inm3/month**		**Total water available in the mine pit**
January	8.9	7595	4557			1519		1519
February	6.1	5262	3157			1052		1052
March	20.4	17455	10473			3491		3491
April	45.8	39244	23547			7849		7849
May	74.1	63440	38064			12688		12688
June	214.1	183412	110047			36682		36682
July	303.9	260328	156197			52066		52066
August	353.8	303014	181808			60603		60603
September	269.6	230875	138525			46175		46175

October	137.6	117865	70719	23573	23573
November	33.9	29045	17427	5809	5809
December	10.7	9171	5503	1834	1834
Total	***1478.93***	***1266706***	***760024***	***253341***	***253341***

5.7. Sedimentation Pond

A sedimentation pond, also known as a sedimentation basin or settling pond, is a type of water management structure designed to remove suspended solids from water. These ponds are commonly used in various industrial, agricultural, and environmental contexts, including wastewater treatment, mining, construction, and environmental restoration.

The primary purpose of a sedimentation pond is to allow solid particles, such as silt, sand, and other debris, to settle to the bottom of the pond, allowing cleaner water to flow out. Here's how they typically work:

Inflow: Water containing suspended solids enters the pond, typically from a stream, drainage, or industrial discharge.

Stagnation: The water is allowed to sit in the pond for a period of time, allowing gravity to take effect. During this time, larger and heavier particles settle to the bottom of the pond.

Outlet: Cleaner water is then drawn from the top of the pond, while the settled solids at the bottom are periodically removed and disposed of or managed according to local regulations.

6.0. CONCLUSION

- The Ballada Bauxite Block M/s Kalinga Alumina Limited is located in Koraput district of the state of Odisha. Project site is laying between latitudes 18°26'05.61588" N to 18°27'13.34448" N and Longitude 82°39'32.39136" to 82°40'25.36716" E.
- The Terrain elevation (Topography) is derived from the Carto-DEM data. The study area (10 km radius from the mine site boundary – buffer zone) elevation ranges from 717 m to 1274 m AMSL. The maximum elevation is observed in the mine lease area and eastern part of the study area.
- The average annual rainfall of Koraput district is 1471 mm.
- The Jolaput Reservoir is the nearest waterbody which is situated at 3 Km away from the project site. The drainage pattern of this area is dendritic in nature.
- Lease area falls in the watershed 4E1E5 & 4E1E6.
- As per approved mining plan the maximum Woking depth is 1280 mRL and the ultimate pit depth is upto 1166 mRL. The Water table in and around the mine lease area is varies from 875 to 1073 mRL, ensuring there will be no groundwater seepage into the mine pit.
- The micro watershed area comprises of 426Km2.
- The intensity of rainfall peak flood estimation for nala diversion has been taken for 100-year return period which is 133 mm/hr (0.125 m/hr).
- The lease area is present on Hilly terrain, so the rain water collected in and around the lease area will be redirect to nearby Jolaput Reservoir.
- No major river is passing through the lease area so there will not be any impact of mining activity on the surface water.
- Surface water management plan will be adopted in and around the lease area for maintaining the natural flow of drainage.

Bibliography:

- *AMSL* *Above Mean Sea level*
- *CGWA* *Central Ground Water Authority*
- *CWC* *Central Water Commission*
- *CGWB* *Central Ground Water Board*
- *DEM* *Digital Elevation Model*
- *ET* *Evapotranspiration*
- *GEC* *Ground Water Resource Estimation Committee*
- *GSI* *Geological Survey of India*
- *GWL* *Ground Water Level*
- *GWRE* *Ground Water Resource Estimation*
- *MAMSL* *Meter Above mean Sea Level*
- *MBGL* *Meter Below Ground Water Level*
- *MRL* *Meter Reference Level*
- *MTPA* *Million Tons per Year*
- *NRSC* *National Remote Sensing Centre*
- *PE* *Potential Evaporation*
- *ROM* *Run of Mine*
- *RWH* *Rain water harvesting*
- *TPH* *Tones Per Hour*
- *WRIS* *Water resource information system*

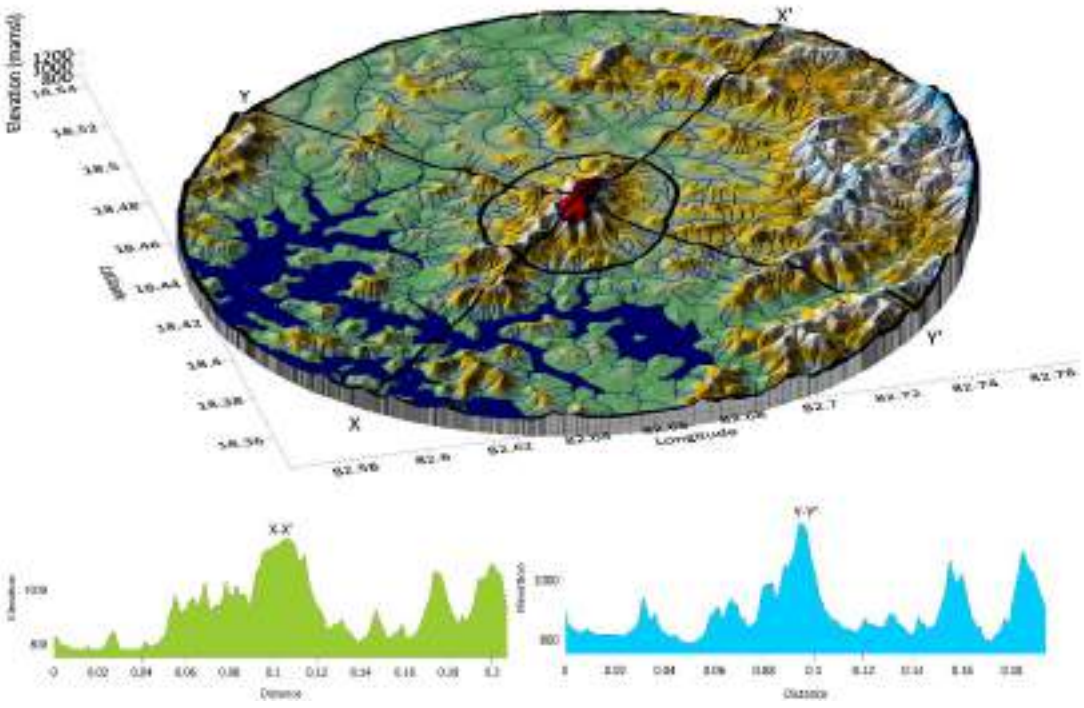
Annexure – VI

REPORT ON
SOIL MOISTURE CONSERVATION
Work Plan In 10 Km Radius
OF
Ballada Bauxite Block

(Located at Village Ballada, Taluka – Nandapur, Koraput district, Odisha)

PROJECT PROPONENT

M/s Kalinga Alumina Limited



CGWA ACCREDITED INSTITUTION
VARDAN ENVIRONET
Plot 82-A, IMT Manesar, Sector-5, Gurugram (Haryana)
E-Mail: hydro@vardan.co.in
Contact: 0124-4343750, 09899651342



Contents

EXECTIVE SUMMARY 1
Chapter-1 2
Introduction 2
1.1. ABOUT THE PROJECT 2
1.2. LOCATION OF THE PROJECT SITE 3
1.3. SCOPE OF WORK 5
1.4. RESERACRCH ON SOIL MOISTURE CONSERVATION WORK PLAN 5
1.4.1. Technique of soil moisture conservation work plan 5
1.4.2. Objective of soil moisture conservation plan 6
1.5. OPEN CAST BAUXITE MINING SOIL MOISTURE CONSERVATION PROBLEM 7
1.6. SOIL MOISTURE CONSERVATION CONTROL TECHNIQUES 8
Chapter–2 9
Land use planning 9
2.1. LAND USE PLAN 9
2.1.1. During Mining Land Use 9
Chapter–3 12
Geomorphology and Drainage 12
3.1. DIGITAL ELEVATION MODEL (DEM) 12
3.2. GEOMORPHOLOGY 15
3.3. DRAINAGE 15
3.4. CLIMATE AND RAINFALL 18
3.5. CLIMATIC WATER BALANCE 19
3.6. DETAILS OF WETLANDS/MAJOR WAER BODIES 20
Chapter–4 22
Hydrogeology 22
4.1. GEOLOGICAL SETUP 22
4.1.1. Local Geology 23
4.2. HYDROGEOLOGY 26
Chapter–5 30
Basic data generation 30
5.1. DETAILS OF WATERSHED OF THE STUDYA AREA 30
5.2. INTENSITY OF RAINFALL 32
5.3. RUNOFF CO-EFFICIENT 32
5.4. INFILTRATION TEST 32
5.5. WATER LEVEL 34
5.6. RAINFALL-RUNOFF-INFILTRATION RELATION 38
5.7. SOIL EROSION 38
5.8. GRAIN SIZE ANALYSIS 39

5.8.1. GRAIN SIZE ANALYSIS OF SOIL 39
5.8.2. SILT YIELD INDEX (SYI) 39
5.8.3. Slope of Tract 41
5.9. SOIL LOSS AND SEDIMENT YIELD 42
5.9.1. Equation for soil loss 43
5.10. DISCUSSION – DATABASE GENERATION 44
Chapter–6 45
Probable source of soil erosion 45
6.1. GENERAL 45
6.2. TOP SOIL MANAGEMENT 45
6.3. Year wise Opencast development 45
6.4. STABILIZATION OF OVER BURDEN DUMP 51
6.4.1. Steps to be taken to avoid Dumps Slides 51
6.4.2. Reclamation of overburden Dumps 51
Chapter–7 52
Soil moisture conservation work plan 52
7.1. Biological Conservation Plan 52
7.1.1 Approach Plan 52
7.1.2 Post Plantation Care 54
7.1.3 Fencing 54
7.1.4 Executing Agency 54
7.2. ENGINEERING CONSERVATION PLAN 54
7.2.1. Approach Plan 54
7.2.2. Construction of Retaining Walls/Toe Walls 56
7.2.3. Construction of Catch Pits 56
7.2.4. Inspection, Monitoring and Evaluation 56
7.2.5. Executive Agency 56
Chapter–8 58
Cost estimate of soil moisture conservation plan 58
8.1. COST FOR SOIL CONSERVATION 58
Chapter–9 60
Conclusion 60
Reference 61

List of Tables

Table 1: Land Use of Mine Lease Area (Ha) 9
Table 2: Post Mining Land Use 10
Table 3: Average Annual Rainfall of Koraput District of 10 Years 18

Table 4: Climatic Water Balance 19
Table 5: Geological Succession 22
Table 6: Infiltration Test Data 34
Table 7: Rainfall –Runoff – Infiltration Relation 38
Table 8: Grain Size Analysis in (%) 39
Table 9: Silt Yield Index (SYI) 40
Table 10: Slope of the Tract 41
Table 11: Top Soil Excavation 45
Table 12: Year wise Opencast development 46
Table 13: Cost Estimates for CAT Plan 58
Table 14: Total Cost of Mitigative Measures 58

List of Figures

Figure 1: Location map of the study area 4
Figure 2: Land use in mine lease area 10
Figure 3: Topographical map of the study area of 10 Km Buffer 11
Figure 4: Contour map of the study area of 10 Km Buffer 13
Figure 5: Elevation map of the study area of 10 Km Buffer 14
Figure 6: DEM map of the study area of 10 Km Buffer 15
Figure 7: Geomorphological map of the study area of 10 Km Buffer 16
Figure 8: Drainage map of the study area of 10 Km Buffer 17
Figure 9: Average Annual Rainfall Graph of 10 Years of Koraput District 19
Figure 10: Map Showing the Distance of Ramsar Site from Lease Area 21
Figure 11: Geological map of the study area of 10 Km Buffer 25
Figure 12: Lithological map of the study area of 10 Km Buffer 26
Figure 13: 3-D Water Table Contour map of the study area of 10 Km Buffer 28
Figure 14: Hydrogeological map of the study area of 10 Km Buffer 29
Figure 15: Watershed map of the study Area 30
Figure 16: Micro-Watershed Map 31
Figure 17: Infiltration Test Location Map 33
Figure 18: Pre-monsoon ground water level map 35
Figure 19: Post-monsoon ground water level map 36
Figure 20: Water Level Fluctuation Map 37
Figure 21: Ground water flow direction map (3D) 38
Figure 22: Slope Map of the study area 42
Figure 23: Theoretical Annual Loss and Water Runoff 44
Figure 24: Surface Geological Plan 47
Figure 25: Conceptual Plan 48
Figure 26: 1st year Development and production Plan 49
Figure 27: 5th year Development and production Plan 50

EXECTIVE SUMMARY

- The Ballada Bauxite Block allocated to Kalinga Alumina Limited (Formerly known as Mundra Aluminium Limited) comprising total lease area of 144.945 hectare has been allotted to Adani Enterprises, located at Village – Ballada, Taluka – Nandpur, District – Korapur, State – Odisha.
- The area is covered in the Survey of India Toposheet No. 65J/10, 65J/11, 65J/14 & 65J/15 (R.F.1:50,000)) and is bound by latitude of 18°26'05.61588" N to 18°27'13.34448" N & longitude of 82°39'32.39136" E to 82°40'25.36716" E.
- The letter of Intent for Mining lease of bauxite block has been issued vide letter no. SM-MC2-MC-0007-2023/2143/S&M Bhubaneswar dated 1st March 2023 by Steel and Mines Department, Government of Odisha.
- The study area (10 km radius from the mine site boundary – buffer zone) elevation ranges from 717 m to 1274 m AMSL. The maximum elevation is observed in the mine lease area and eastern part of the study area.
- Koraput district is divided into Dissected plateau (hills & valleys), Undissected plateau (Plain), Pediplain and Ridges & Valleys.
- In mitigative measures, biological conservation plan and Engineering conservation plan will be adopted.
- The Jolaput Reservoir is the nearest waterbody which is situated at 3 Km away from the project site. The drainage pattern of this area is dendritic in nature.
- The district enjoys tropical climate characterized by hot summer, cold winters and rainy seasons.
- Cost estimate for Biological Conservation Plan which include green belt and sowing of seeds will cost around Rs. 25,17,500.
- Cost estimate for Engineering Conservation Plan which include Catch pits and Check dams or toe walls will cost around Rs. 24,99,000.
- The Total Cost of Soil Conservation Plan is Rs. 76,07,940 lakhs

Chapter-1
Introduction

1.1. ABOUT THE PROJECT

Kalinga Alumina Limited (formerly known as Mundra Aluminum Limited), a wholly owned subsidiary of Adani Enterprises Limited, has a vision of setting up an integrated greenfield alumina refinery of 4.0 MTPA capacity and also to develop bauxite mines in the vicinity for captive / commercial use. Recently Kalinga Alumina Limited has secured two bauxite mines in Odisha, viz. Ballada in Koraput district and Kutrumali in Kalahandi/Rayagada district through an auction process.

Adani Group is currently embarking on a strategic growth plan to diversify into mines and metals space. Strong parentage in power, infrastructure, logistics, mining, and global presence puts it in a pre-eminent position to make it a globally competitive player in this field.

Adani Group is a global multinational and a front runner with its strong ESG principles. It has vast experience in mining operations of various major minerals such as Coal, Iron Ore, limestone, beach sand, among others and therefore, is in a pre-eminent position to conduct scientific and environment friendly mining

The Government of Odisha, issued letter of intent vide letter SM-MC2-MC-0007-2023/2143/S&M Bhubaneswar dated 1st March 2023 for grant of mining lease for Ballada bauxite block in Village - Ballada, Taluka – Nandapur, District- Koraput, Odisha for an area of 144.945 ha to Mundra Aluminum Limited (now Kalinga Alumina Limited) for period of 50 years.

The proposed project entails mining of Bauxite by opencast mining method with an annual Peak Rated Capacity of ~ 4.0 MTPA of Bauxite (ROM). The project also involves generation of 146508 tonnes of Overburden/waste and 51564 tonnes (25782 m3) of top soil during initial 5 years of operations. Besides, it is envisaged to have crushing/Screening facilities within the lease area with a capacity of 800 TPH at rated production level over an area of 144.945 Ha located at Village - Ballada, Taluka – Nandapur, District- Koraput, Odisha between latitudes 18°26'05.61588" N to 18°27'13.34448" N and Longitude 82°39'32.39136" to 82°40'25.36716" E. & is covered under the Survey of India toposheet no. No. E44K11 (65J/11).

1.2. LOCATION OF THE PROJECT SITE

The lease area covers land belonging to village – Ballada, Taluka – Nandpur, District – Koraput, Odisha. Jeypore, a major town in the Koraput district, is about 82 km north-north-west of the Ballada deposit and is approachable by major district road No. 52. Koraput, the district headquarters is at 60 km north of the deposit and is connected by a metalled road via Similiguda on NH 26. Bheja, the nearest Railway Station is about 5 km due north-east. The nearest airport is at Visakhapatnam (140 km) from the lease. The entire block area is reserve forest land.

The location map of the study area is given in *Figure no 1.1*

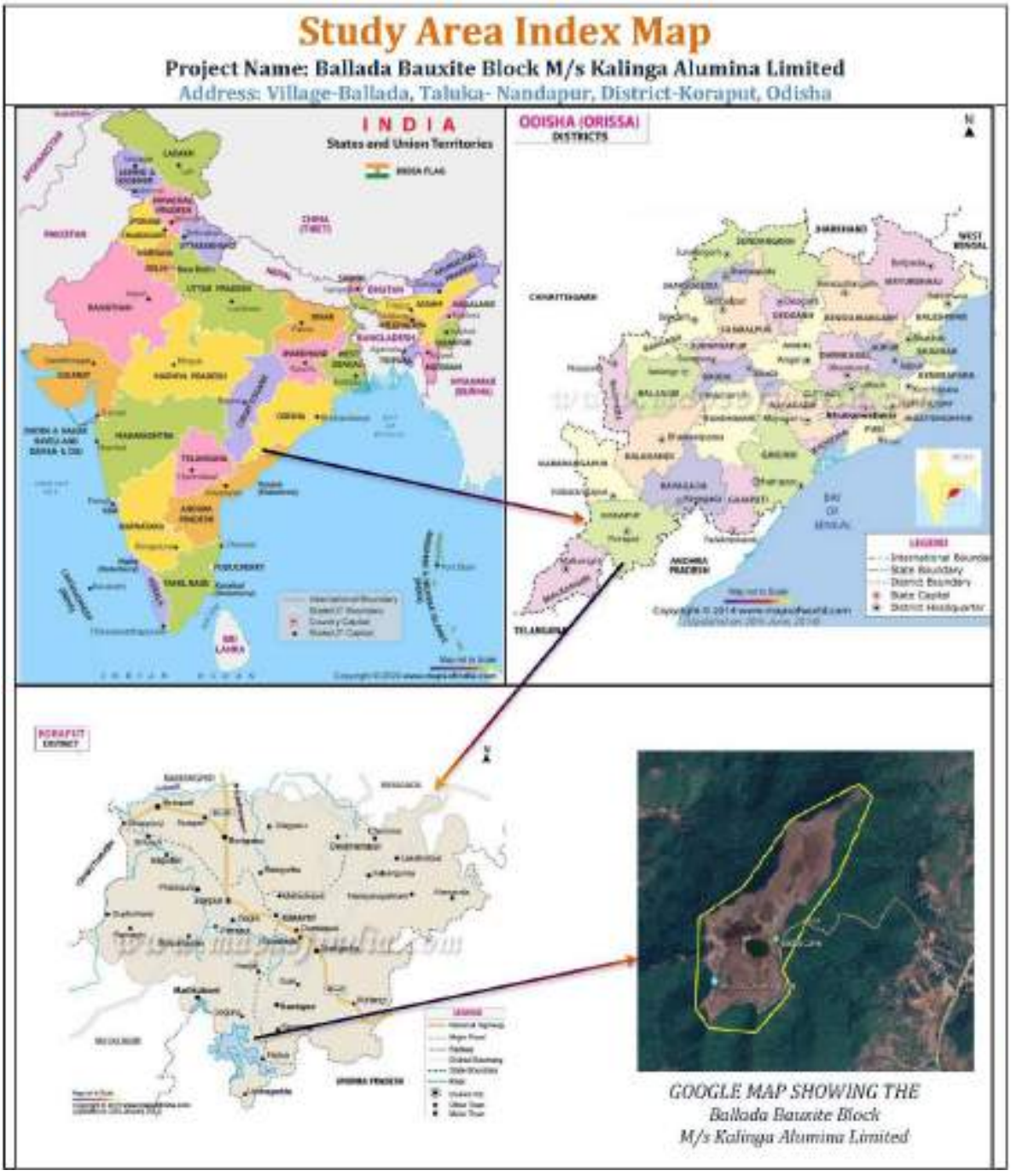


Figure 1: Location map of the study area

1.3. SCOPE OF WORK

The main objective of work for soil moisture conservation of Ballada Bauxite Block is as follows-

1) *Climatic Water Balance*
2) *Proposed open cast mining surface erosion problem*
3) *Sediment control technique*
4) *Soil chemistry of mine area*
5) *Land use*
6) *Pre mining*
7) *Forest land use*
8) *Land use of mining activities*
9) *Surface runoff characteristics of micro watershed of mine*
10) *Soil erosion: Soil loss & water runoff*
11) *Top soil management of mine and its stability*
12) *Soil moisture conservation plan*
13) *Cost estimate*

1.4. RESERACRCH ON SOIL MOISTURE CONSERVATION WORK PLAN

1.4.1. Technique of soil moisture conservation work plan

The main objective of soil moisture conservation is to minimize the amount of water lost from the soils through evaporation and transpiration or combined. Soil moisture is important means to maintain the necessary water for agricultural production, and also helps minimize irrigation needs of the crops. This is especially important in areas where rainwater and or groundwater resources for irrigation are decreasing due to climate change or other causes.

There are a variety of methods that can be used to conserve soil moisture. Most of these soil moisture conservation techniques are relatively low cost and complexity approaches, primarily relying on the presence of required materials and technical capacity locally. Many of the methods rely on providing some kind of cover for the soil to minimize evapotranspiration and direct soil exposure to heat and sun. Generally, most methods used for soil quality improvement and conservation, will also yield

benefits to soil moisture conservation. There are following methods for reducing excess soil moisture loss which as follows-

- ***Spreading manure*** **-** The spreading manure method minimize the evapotranspiration and also provides valuable nutrients to the soil through processes of decomposition.
- ***Mulching***- The mulch is a layer of organic or inorganic materials that is placed on the root zone of the plants. Examples of mulch materials include *straw, wood chips, peat.* Inorganic mulch in form of plastic sheeting is also used. Mulching is most suited for low to medium rainfall areas, and less suited for areas with very wet conditions.
- ***Contour ploughing*** - On ploughing the soil along the contour instead of up- and downward slopes, the velocity of runoff is reduced, creating even barriers, and more water is retained in the soils and distributed more equally across the cropland.
- ***Strip cropping-*** On growing erosion permitting crops and erosion resisting crops in alternate strips. Other soil moisture conservation techniques may include rainwater harvesting to minimize runoff and collect water for use on site.

The benefits of many soil conservation methods, depending on the material used, include better control of weeds, provision of additional nutrients to the soil, soil temperature control and protection of soil surface from the impacts of heavy rain and wind. Active reuse of waste organic materials also reduces waste management needs, returning the residue crops and plants to the soil through decomposition. Socioeconomic Benefits Potential to reduce water irrigation needs, increase crop productivity and improve soil quality by extension, reduced irrigation needs may also reduce the costs and energy requirements of water pumping for irrigation.

(Source: https://www.ctc n.org/sites/www.ctcn.org/files/resources/soil_moisture_conservation_techniques_0.pdf)

1.4.2. Objective of soil moisture conservation plan

The main objectives of soil moisture conservation plan are to mitigate the impact of the proposed mining activities on the local surface water structures to rejuvenate various potential and degraded ecosystems and topography in the Mine area. The opencast mining activities disturb large tracts of land.

The objective of this report is to present the outline of opencast Bauxite mining *surface erosion problem*, *method of modelling sediment yield*, measures to be taken for reducing or controlling sediment discharges.

The action plans have been prepared for this purpose with the following objectives.

I. *To facilitated the hydrological functioning of the mining area and augment the water quality.*
II. *Soil conservation through biological & engineering measures to reduce sediment load in river and tributaries, thus improving quality of water.*
III. *Increase vegetative cover and water retaining properties.*

1.5. OPEN CAST BAUXITE MINING SOIL MOISTURE CONSERVATION PROBLEM

The problem related to soil moisture during open cast bauxite mine may be due to following-

- Soil erosion and sediment transport depend on the following factors-
  - *Climatic conditions like rainfall, temperature etc*
  - *Soil and spoil erosivity*
  - *Overland slope and slope length*
  - *Ground cover*
  - *Topography*
  - *Soil conservation control practices*
  - *Catchment drainage characteristics*
- Open-cast mining activities tend to change radically several of these factors and severe sediment production could occur in the following locations-
  - *Topsoil stockpiles*
  - *Spoil piles*
  - *Waste dumps*
  - *Bare topsoil areas*
  - *Steep out slopes*
  - *Ramps*
  - *Haul roads*

Scalping, blasting, material handling, heavy vehicular travel over replaced spoils and top soiling activities generally produces compacted area of soil and spoil materials with a high colloidal content. Colloidal particles require a very long detention time in an impoundment before they will settle out of suspension and frequently deposition does not occur until the sediment laden flows discharge into dams.

1.6. SOIL MOISTURE CONSERVATION CONTROL TECHNIQUES

The major causes of erosion problems in surface mining operation are due to disturbed areas, which are integrated with the mining operations. By developing a sediment control plan the following basic approach has been adopted-

- Minimize the area which is disturbed at any one time
- Develop a drainage control, system for the mine lease area
- Integrate drainage, erosion, and sediment control, into each stage of the mining operation
- Minimize the amount of water lost from the soil through evaporation and transpiration
- Develop a mining and rehabilitation plan prior to initiating mining activities
- Limit the handling of spoil and topsoil materials
- Rehabilitate area as soon as possible
- Maintain drainage and erosion control measure

Chapter–2
Land use planning

2.1. LAND USE PLAN

The land use plan for pre-mining and post- mining including stages of mining is essential input for formation of Soil Conservation Plan. The data in respect of above has been adopted from approved Mine Plan.

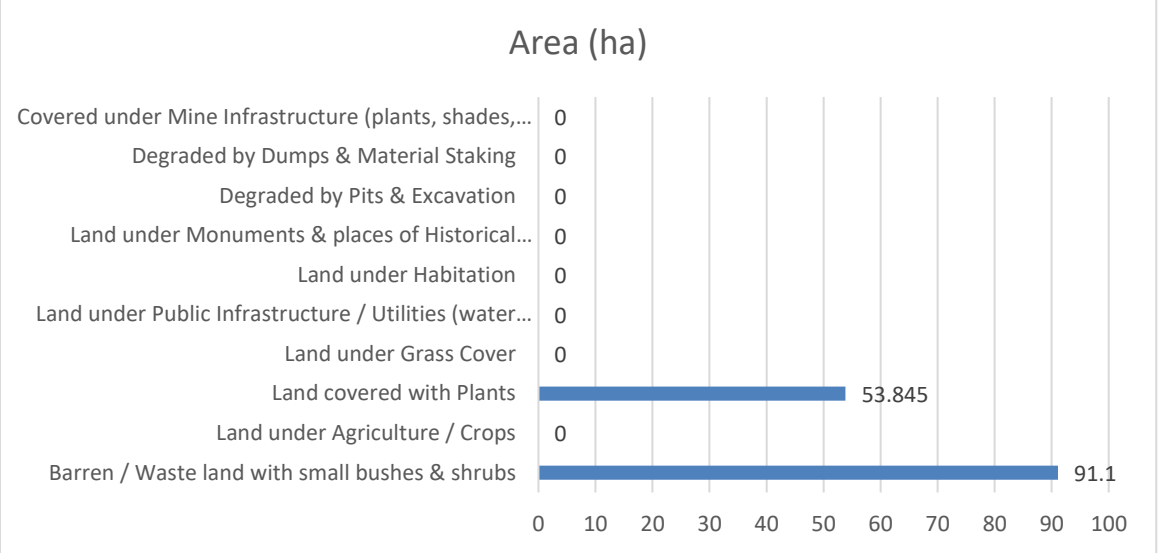
2.1.1. During Mining Land Use

Landuse of Mining Lease:

The breakup of the present land use is given in below table,

Table 1: Land Use of Mine Lease Area (Ha)

SL. No.	Pre-Mining Use	Area (Ha)
1	Barren / Waste land with small bushes & shrubs	91.100
2	Land under Agriculture / Crops	0.000
3	Land covered with Plants	53.845
4	Land under Grass Cover	0.000
5	Land under Public Infrastructure / Utilities (water bodies, roads, railways, electric lines, telephone lines etc.)	0.000
6	Land under Habitation	0.000
7	Land under Monuments & places of Historical Importance	0.000
8	Degraded by Pits & Excavation	0.000
9	Degraded by Dumps & Material Staking	0.000
10	Covered under Mine Infrastructure (plants, shades, buildings etc.)	0.000
	Land under Forest (Total)	**144.945**



During- mining Land Use Plan for Mine area is given below in *Table 2.1*

Table 2: Post Mining Land Use

SL. No.	Post Mining Use	Area (Ha)
1	Degradation by Excavation	81.82
2	Degradation by Dumps & Material Staking	1.95
3	Covered under Plants, Shades & Buildings	0.00
4	Covered by Roads & Approaches	0.00
5	Any Other	0.00
6	Undisturbed	61.18
	Total	**144.945**

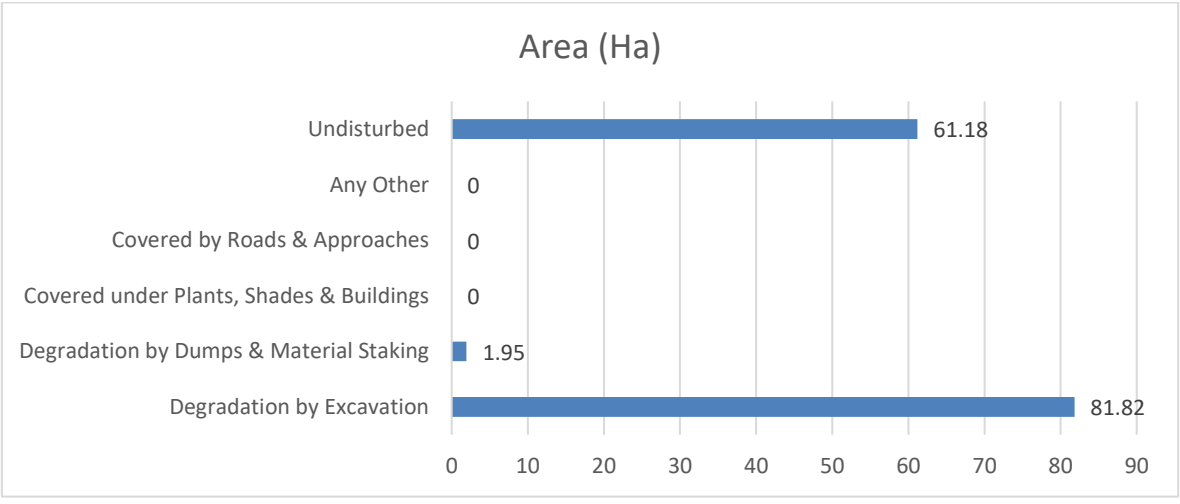


Figure 2: Land use in mine lease area

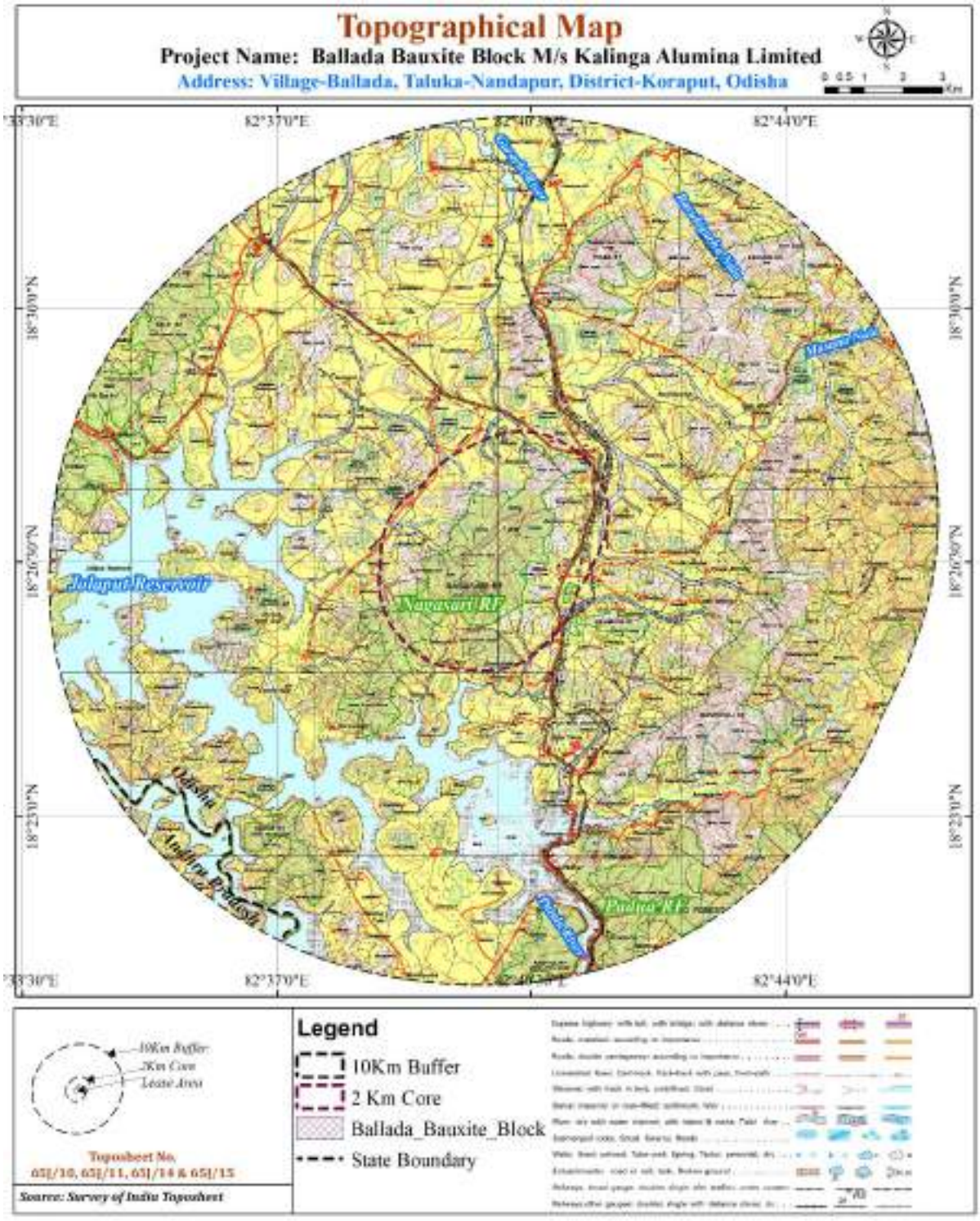


Figure 3: Topographical map of the study area of 10 Km Buffer

Chapter–3
Geomorphology and Drainage

3.1. DIGITAL ELEVATION MODEL (DEM)

The Terrain elevation (Topography) is derived from the Carto-DEM data.

The study area (10 km radius from the mine site boundary – buffer zone) elevation ranges from 717 m to 1274 m AMSL. The maximum elevation is observed in the mine lease area and eastern part of the study area.

Core Zone: The elevation of the core zone of a 2 km radius, ranges between 803 m AMSL to and 1274 m AMSL. The maximum elevation is noticed in the central part of the lease area. The mine site is located in an elevated area.

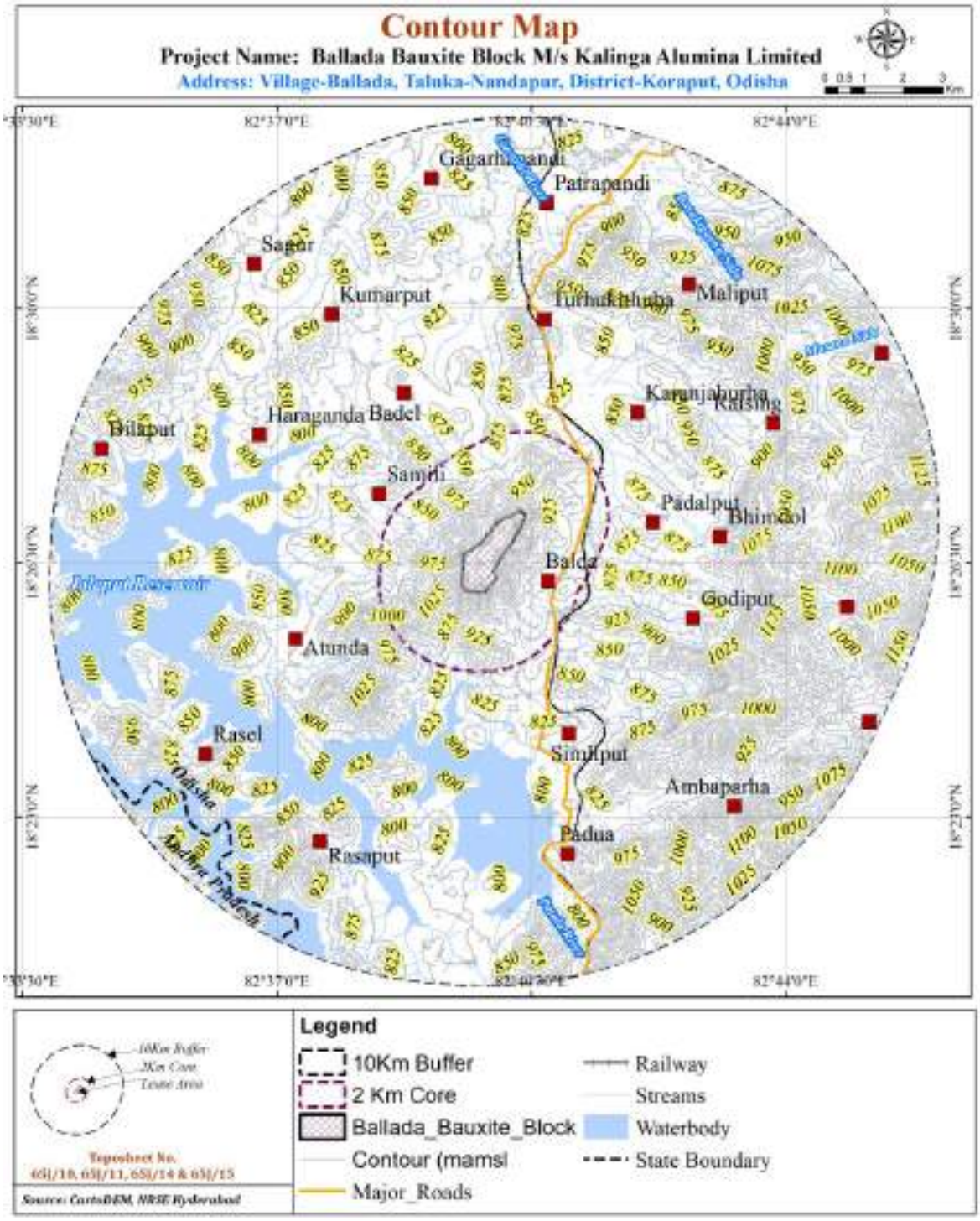


Figure 4: Contour map of the study area of 10 Km Buffer

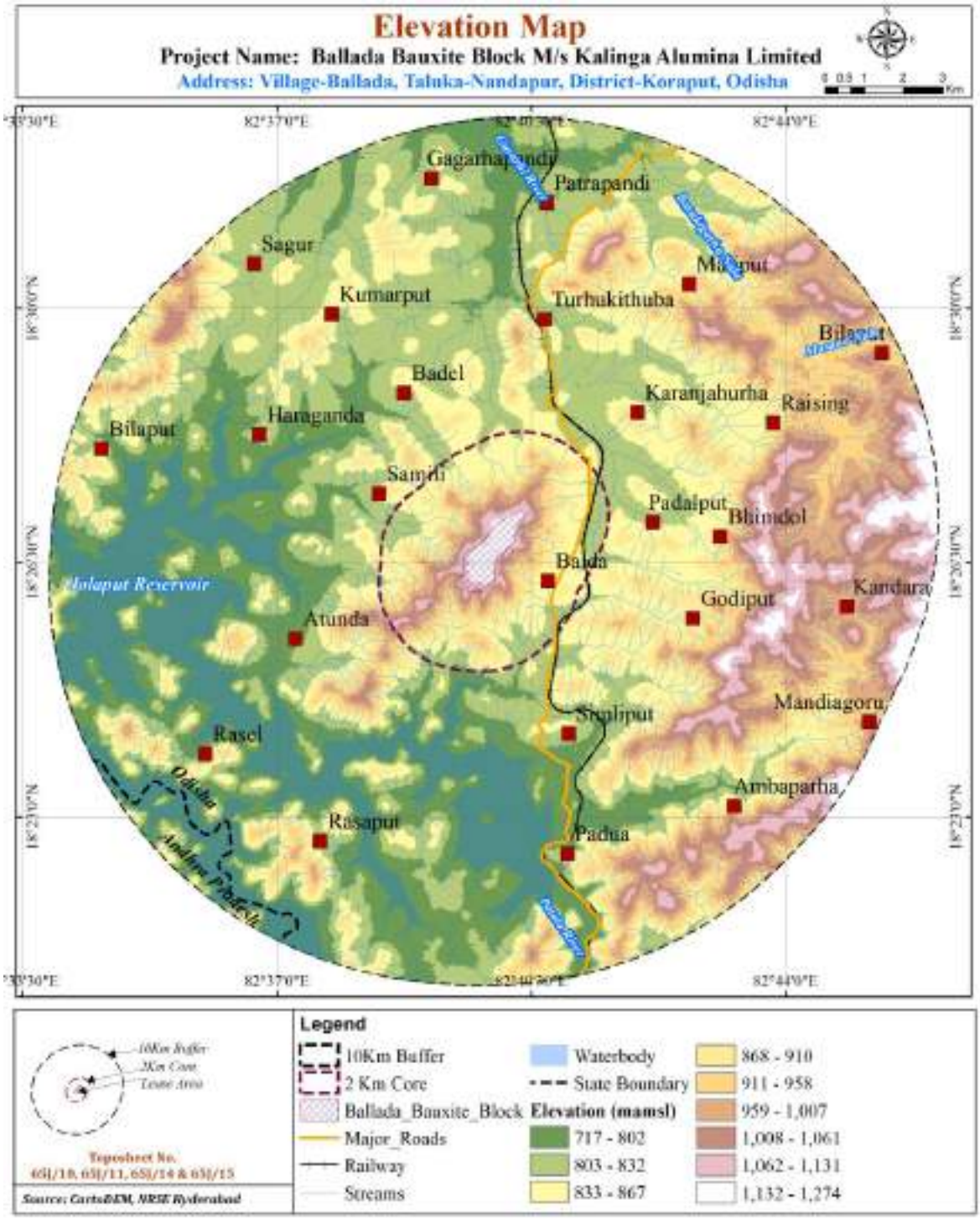


Figure 5: Elevation map of the study area of 10 Km Buffer

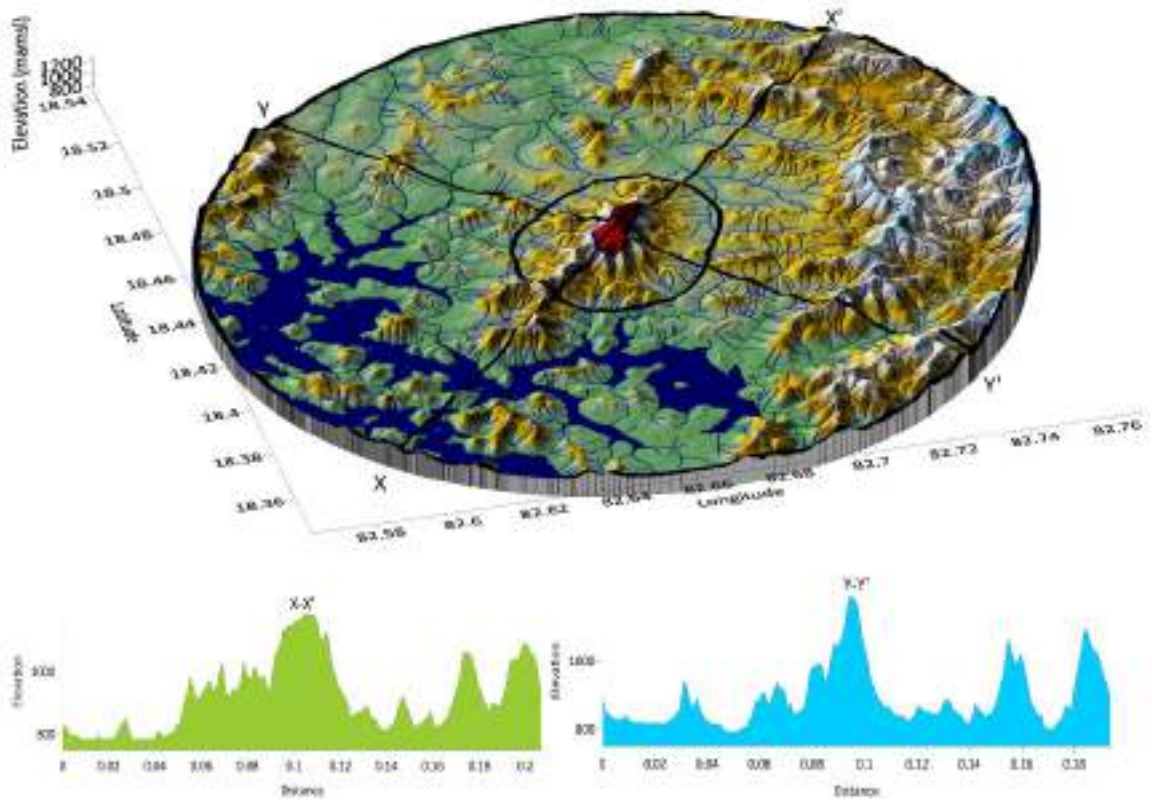


Figure 6: DEM map of the study area of 10 Km Buffer

3.2. GEOMORPHOLOGY

Broadly, the entire district is divided into Dissected plateau (hills & valleys), Undissected plateau (Plain), Pediplain and Ridges & Valleys.

Geomorphologically the study area is characterized with Dissected Denudation hills & Valleys, Dissected Structural hills, and valleys, Pediment Pediplain Complex, Dam & Reservoir, River, and Waterbodies.

The core zone including the lease area composed with Dissected denudation hills & valleys and Dissected Structural hills & valleys.

3.3. DRAINAGE

The Jolaput Reservoir is the nearest waterbody which is situated at 3 Km away from the project site. The drainage pattern of this area is dendritic in nature.

However, number of small to medium water bodies are noticed in the study area.

The study area is irrigated by bore well / dug well. The return flow from the irrigation land maintains the ground water level at moderately deeper depth in the bore well. The Drainage map is presented in Figure 6.

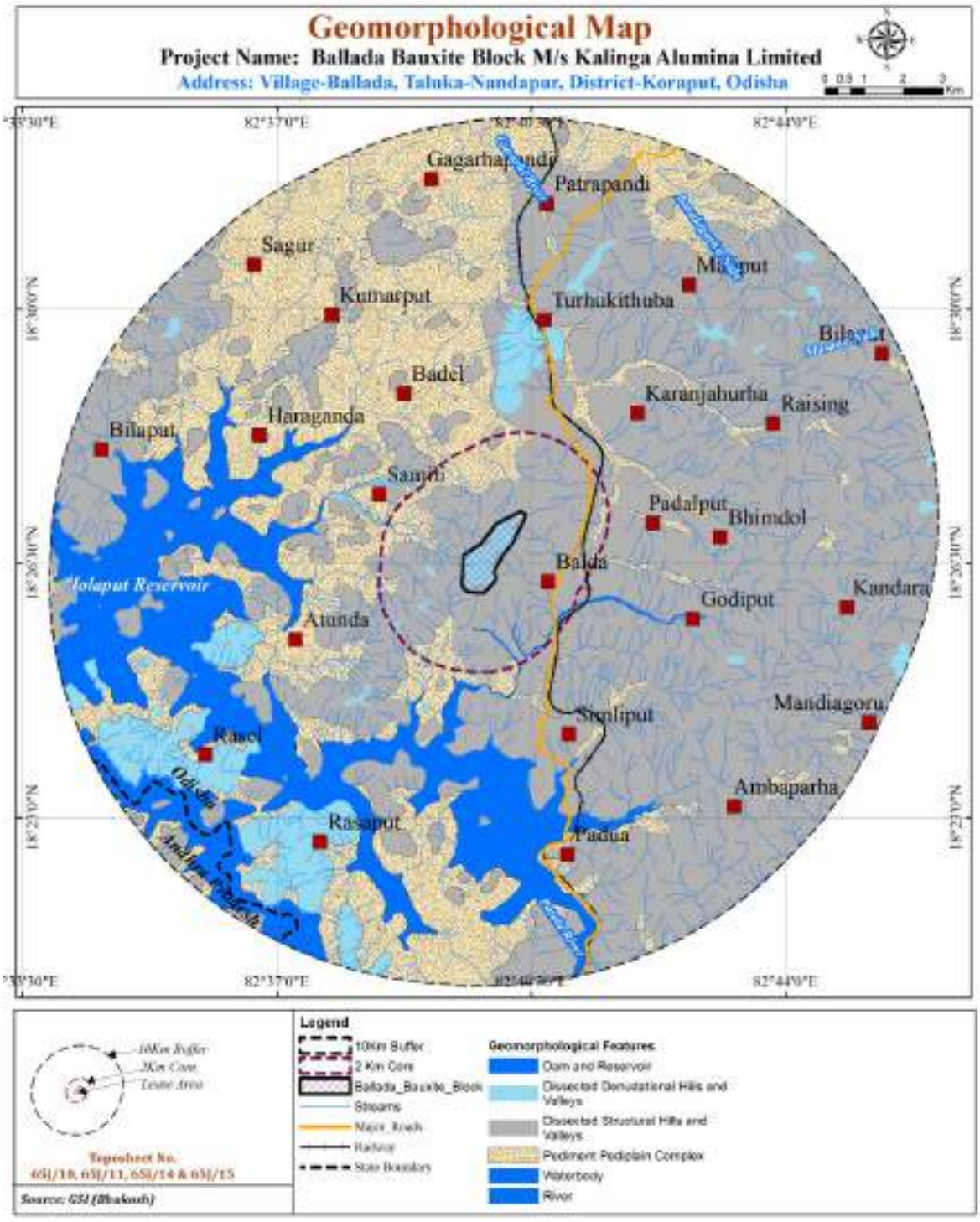


Figure 7: Geomorphological map of the study area of 10 Km Buffer

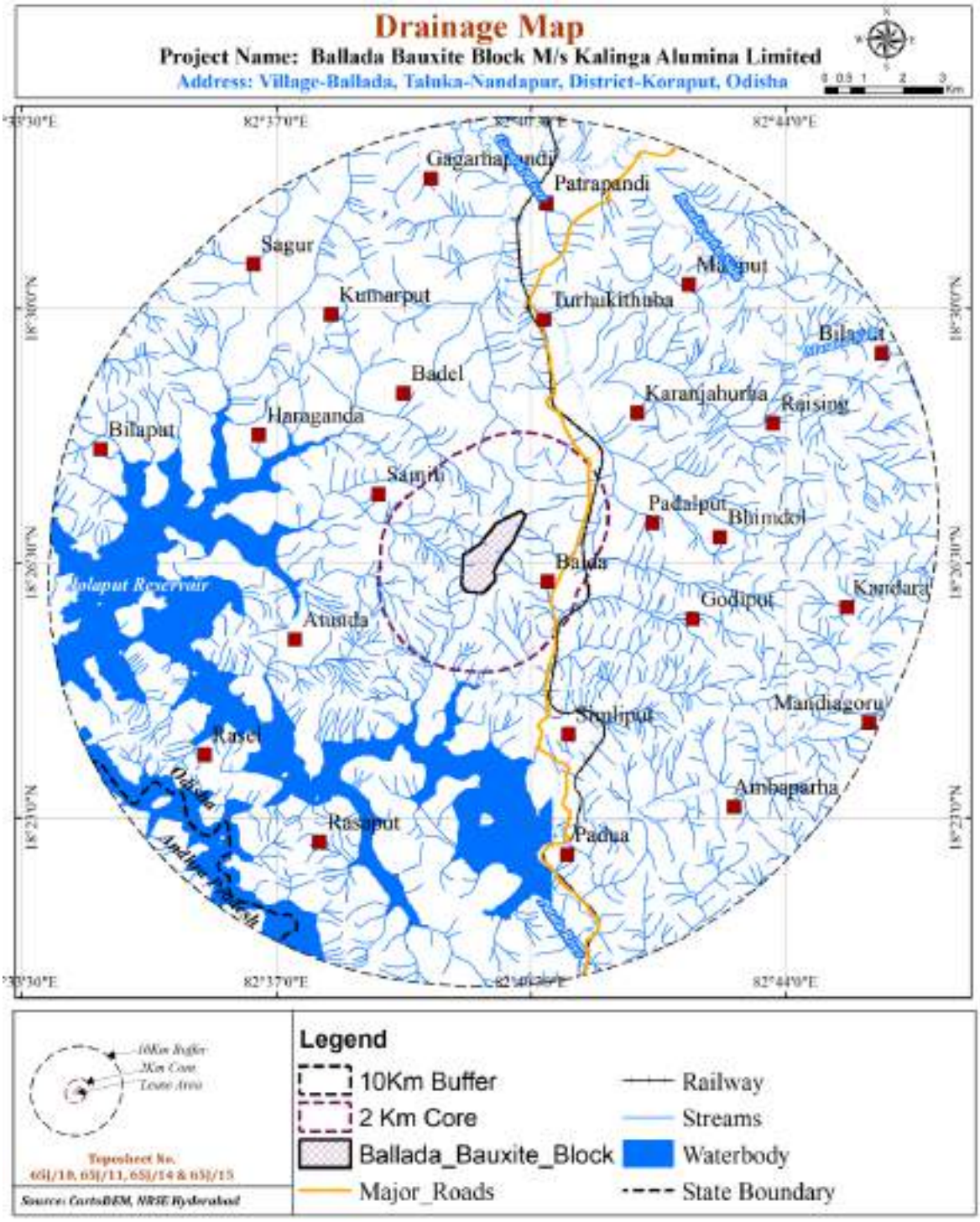


Figure 8: Drainage map of the study area of 10 Km Buffer

3.4. CLIMATE AND RAINFALL

The district enjoys tropical climate characterized by hot summer, cold winters and rainy seasons. The winter season generally commences from late November and continues up to the end of February. The temperature in winter drops below 1°C at places like Pottangi otherwise it is in the range of 10°C to 13.5°C in the valley plains. The summer season commences from March and continues till middle of June. The summer is quite pleasant here with the mean daily maximum temperature around 40°C while the mean daily minimum temperature is around 14°C.It is observed that about 80% of the total annual rainfall takes place due to south-west monsoon between the middle of June and mid-October. The north east monsoon gives erratic and insufficient rainfall. The average annual rainfall varies between 1320-1520mm. The district is drought prone because of the erratic and uneven pattern of rainfall.

The average annual rainfall of Korapur district is 1454 mm.

Table 3: Average Annual Rainfall of Koraput District of 10 Years

S. N	Year	Rainfall (mm)
1	2013	1417
2	2014	1582
3	2015	1349
4	2016	1400
5	2017	1354
6	2018	1532
7	2019	1600
8	2020	1349
9	2021	1361
10	2022	1598
Average		***1454***

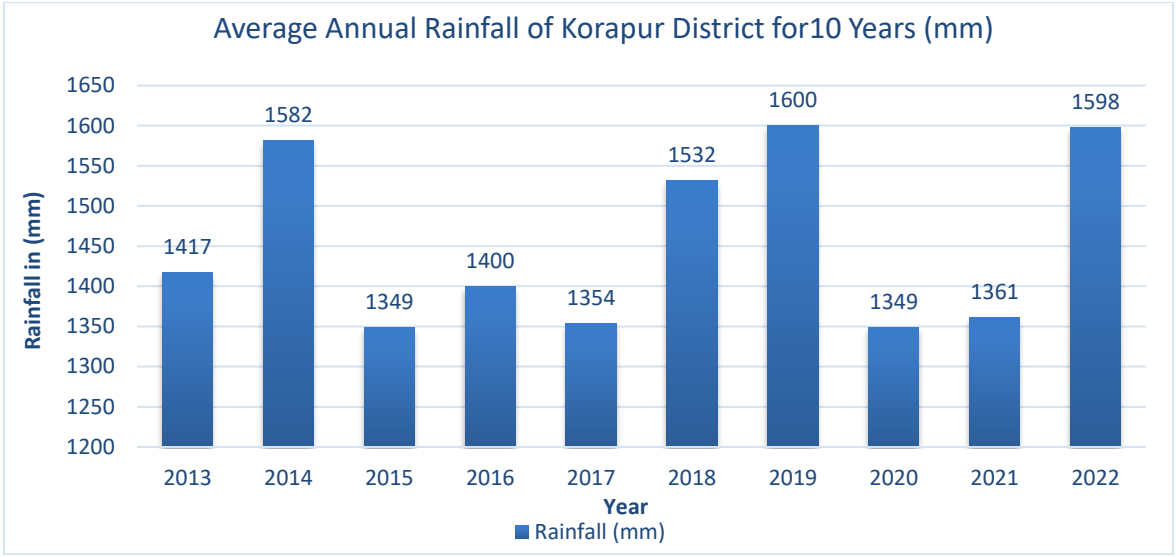


Figure 9: Average Annual Rainfall Graph of 10 Years of Koraput District

3.5. CLIMATIC WATER BALANCE

The Climatic Water Balance (B) is calculated using only the two climatic components of the full water balance, namely Rainfall (R) and Evaporation (E).

The Climatic Water Balance is defined by: B = R – E

Where:

B is the Climatic Water Balance in mm of water

R is the rainfall in mm of water

E is the evaporation from a soil surface in mm of water.

Table 4: Climatic Water Balance

S. N	Year	Rainfall(mm)	Evaporation	Climatic Water Balance
1	2013	1417	280	1137
2	2014	1582	310	1272
3	2015	1349	268	1081
4	2016	1400	254	1146
5	2017	1354	238	1116
6	2018	1532	270	1262
7	2019	1600	290	1310
8	2020	1349	277	1072
9	2021	1361	318	1043
10	2022	11598	302	1296
Average		***1454***		

3.6. DETAILS OF WETLANDS/MAJOR WAER BODIES

A wetland is a distinct ecosystem that is flooded by water, either permanently or seasonally, where oxygen-free processes prevail. Any wetland site which has been listed under the Ramsar Convention that aims to conserve it and promote sustainable use of its natural resources is called a Ramsar Site. The total number of Ramsar sites in India is 75.

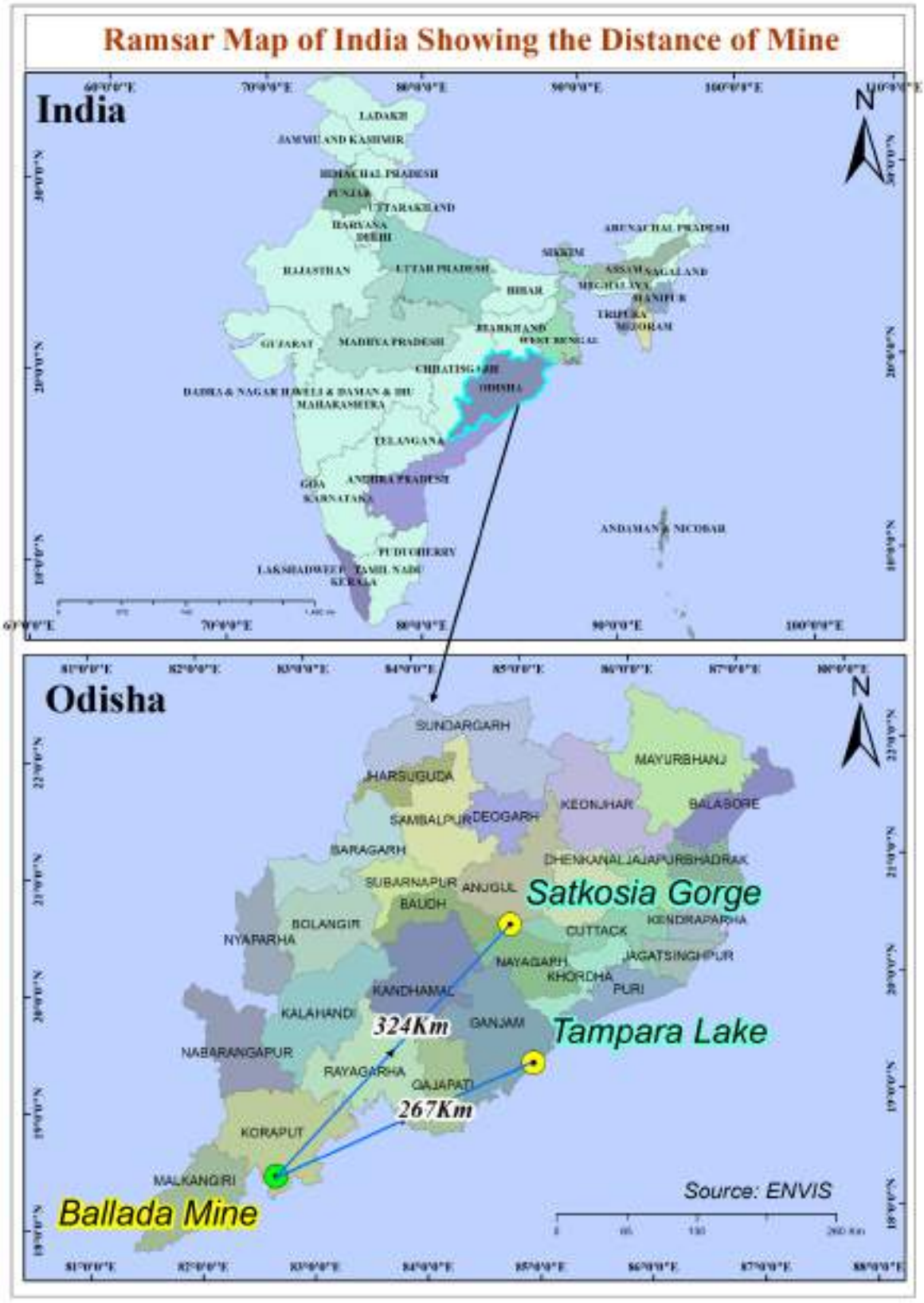


Figure 10: Map Showing the Distance of Ramsar Site from Lease Area

Chapter–4
Hydrogeology

4.1. GEOLOGICAL SETUP

Regional Geology

The Eastern Ghat Mobile Belt constituting a major part of the district, comprises Khondalite and Charnockite Group of rocks and Granite Gneiss of Archaean age. The western and southeastern part are dotted with small outlier of Bengpal Group of rocks, also of Archaean age in the backdrop of Granite Gneiss, Chattisgarh Group of sedimentary rocks of Proterozoic age occurs in the western part.

The general geological succession of the area is given in *Table 2*

Table 5: Geological Succession

AGE		GEOLOGICAL UNIT	LITHOLOGY
Pleistocene to recent		Quaternary	Soil and alluvium
Cainozoic(undifferentiated)			Laterite (locally bauxite)
Middle to Upper Proterozoic		Chattisgarh Group	Shaly Limestone
			Shale
			Conglomerate, Sandstone, quartzite
Proterozoic(undifferentiated)		Igneous Intrusives	Pegmatite/Quartz vein
			Dolerite
			Nepheline Syenite
			Diorite and gabbro
Archaean		Bengpal Group	Meta-dolerite and gabbro
			Metabasics-ultrabasic rock
			Andalusite-mica schist
			Banded ferruginous quartzites (BMQ/BHQ)
			Quartzite
			Porphyroblastic granite gneiss, migmatites, leptynite
	Eastern Ghat Supergroup	Charnockite Group	Acid and intermediate Charnockite
			Basic Charnockite and pyroxene granulite

		Khondalite Group	Khondalite schist/gneiss
			Quartzite (Ferruginous/magnetitic)
			Calc-silicate rock/crystalline limestone

Source: Geological Survey of India (GSI)

The Ballada hill range is located on the west of Pottangi plateau, Mali parbat and famous Panchpatmali plateau and forms a part of the Eastern Ghat Mobile Belt of Archean age represented by Khondalite suite of rocks, pyroxene granulite, Charnockite suite of rocks, variants of granite gneisses infused with pegmatoids and vein quartz of Archean age formed under granulite facies of metamorphism. The ortho and para metamorphites have undergone significant weathering and alteration at higher altitudes forming laterites of Tertiary age. The above lithounits form more or less banded assemblage in NNE-SSW trend in conformity to the general trend of the Eastern Ghats.

The rocks exposed in the area belong to the Eastern Ghat Super Group of rocks represented by quartzite, migmatised khondalite, pyroxene granulite, charnockites, leptynites and porphyroblastic granite gneisses together with high level laterite/bauxite. The most common rock in this group is quartz-garnet-feldspar sillimanite gneisses i.e., khondalites with or without graphite and/or manganese which has been migmatised to variable extent. The Khondalite suites form high and linear hills with sharp crests, while the Charnockites occupy the low-lying plains as well as dome shaped hill rocks.

Structurally the area is fairly complex. The bedding plane (S0) is never observed. The most pronounced planner structure is foliation plane (S1) of Khondalite. The trend of foliation swings from NNW - NNE to NE -SW with rather steep dip ranging from 60° to 80° due SE or SW. In the Niyam Dongar hill, where a broad upright asymmetric syncline is observed, the trend of foliation varies from NNW to NNE in the southern limb and swings to NE-SW in the northern limb.

4.1.1. Local Geology

The area forms a segment of the east-central part of the Eastern Ghat hill ranges. Rocks belonging to the Khondalite and Charnockite groups are developed in the area.

In general, Khondalites form high hills and peaks whereas the Charnockitic rocks are invariably confined to the valleys and slopes of high hills. Both the groups of rocks occur as concordant bands. It is a common feature to observe islands of Khondalites within the Charnockitic rocks. Bauxite of Ballada capping occurs as mantle over khondalite as proved by drilling. The gibbsite crystals occur as shining aggregates in a ferruginous groundmass. The relict foliation is observed in some of the bauxite outcrops. The bauxite invariably has a brick red colour. It is sporaceous towards the top where the voids are filled with kaolinite / limonite. At depth, it has spongy texture with ferruginous zones. The laterite is more ferruginous and siliceous at the top where it is hard and has craggy, cavernous look but is relatively soft and aluminous in the lower parts and grades into bauxite. The soil though present in very less quantity is mostly lateritic.

Structure:

The trend of regional foliation is NE-SW with the dips varying from 30^0 to 80^0 towards southeast. The swinging of local foliation towards ENE-WSW and NNE-SSW is very common. The axes of mesoscopic folds plunge towards south-east at low angle (15^0 to 20^0). Mineral and groove lineation's plunge towards east, south and south-east. Extensive slickensides are noticed at many places which result local displacements. These slickensides were probably generated due to a major fault system. Several synformal structures may be resulted due to the convergence of dips evident by the presence of synformal hills; the intervening low-lying areas mark the antiformal valleys.

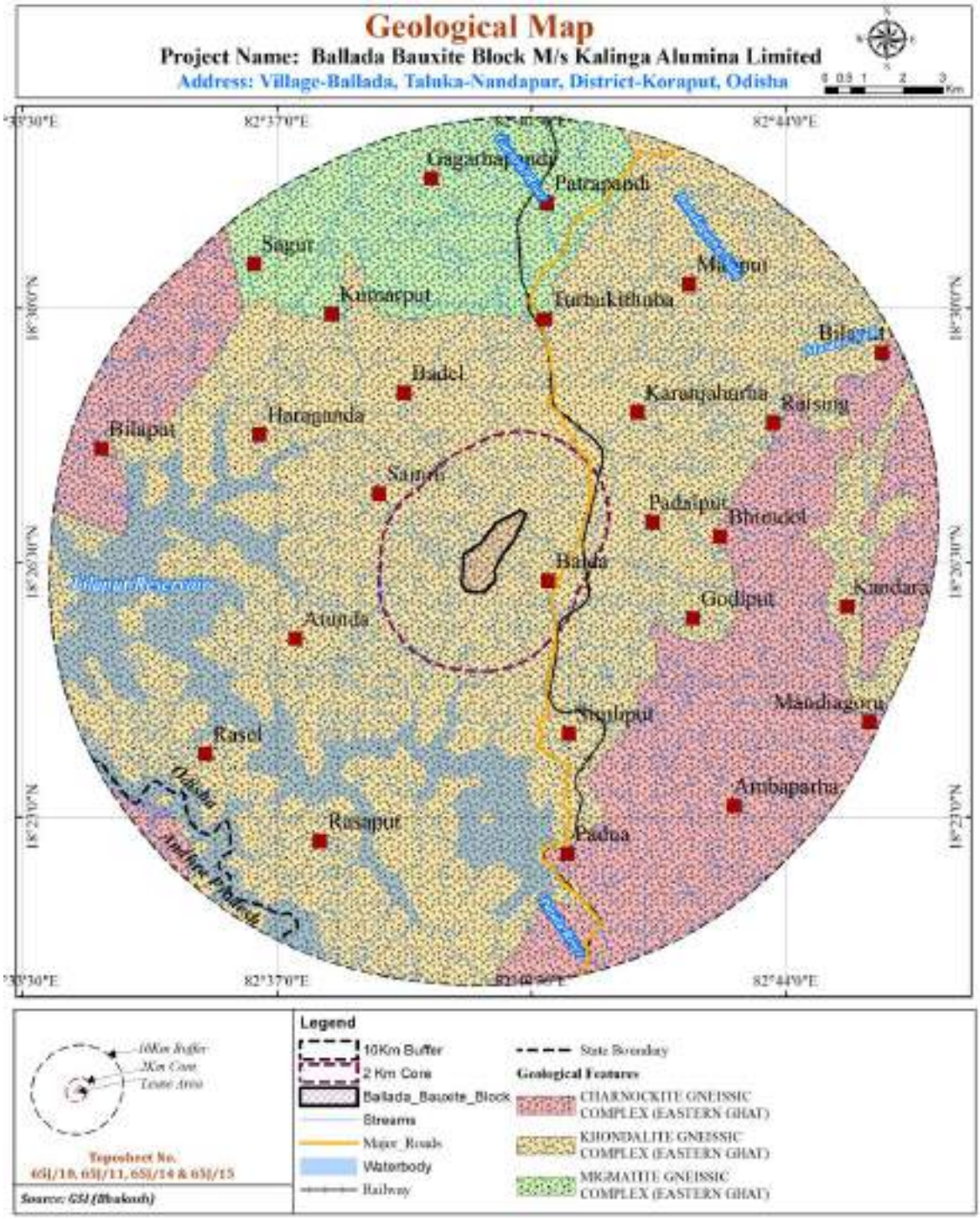


Figure 11: Geological map of the study area of 10 Km Buffer

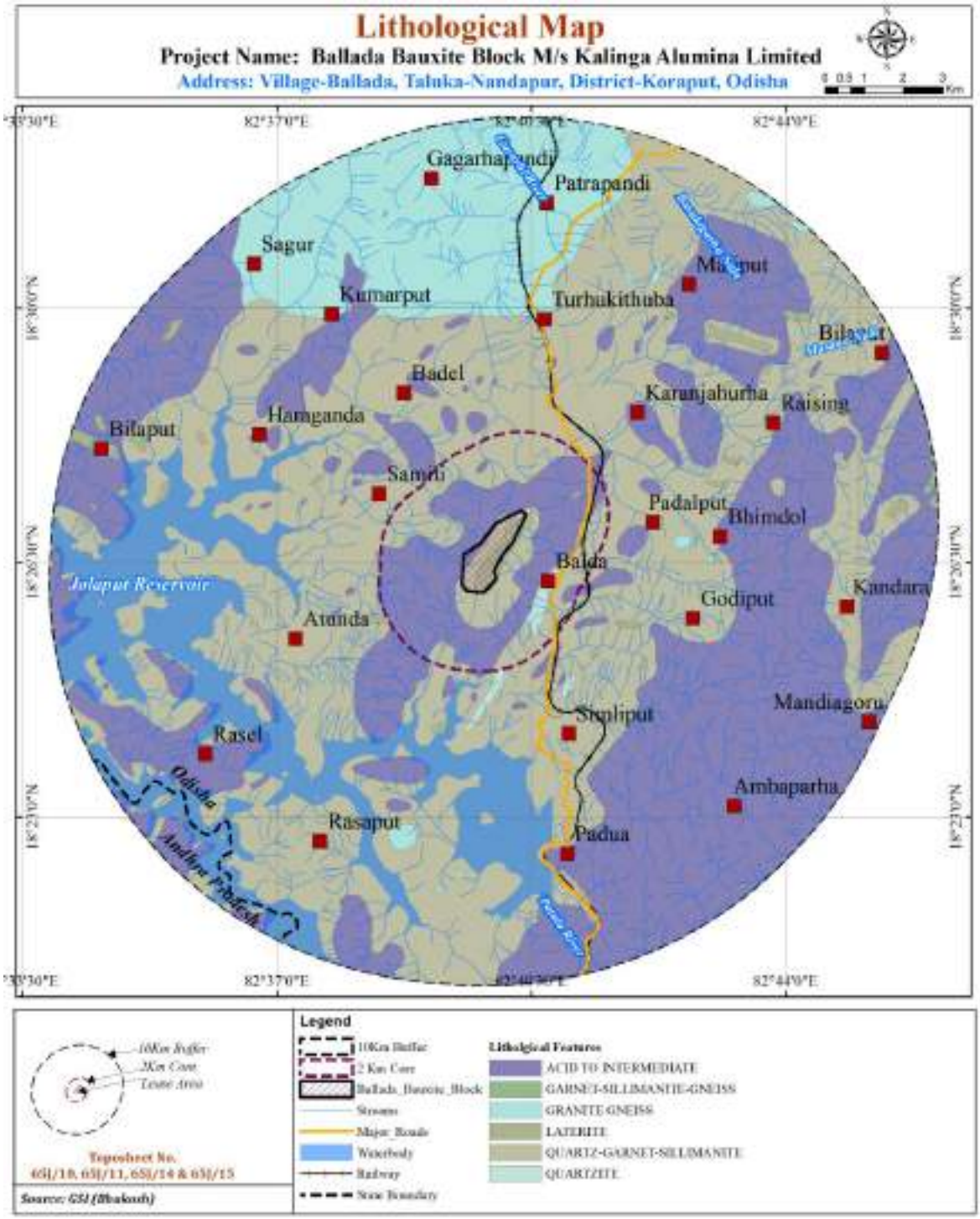


Figure 12: Lithological map of the study area of 10 Km Buffer

4.2. HYDROGEOLOGY

Consolidated formation:

These include all the hard rocks of Eastern Ghat Group, such as granite gneiss, khondalite, charnokite and quartzite, gneiss, limestone, and shale of Chhatisgarh

Group. These rocks are devoid of primary porosity. The secondary porosity in these rocks developed as a result of weathering and fracturing due to major & minor tonic movements along with climatological actions. The secondary porosity forms the conditions for the movement of ground water and acts as a reservoir of ground water. Groundwater occurs under water table conditions in weathered residuum while it occurs under semi-confined to confined conditions in the fractured & jointed rocks.

Un-Consolidated formation:

Alluvium of Recent to Sub-Recent age constitutes the unconsolidated formation comprising of gravel, sand, and clay. The alluvial deposits of recent origin occur as their discontinuous patches along the prominent drainage channels and 'particularly in the flood plains of Indravati and Kolab river. Due to the high degree of porosity and permeability, the alluvial strips constitute the moderately potential aquifers. Ground water occurs under semi-confined to confined conditions. The potential aquifers present in this zone can be tapped through filter point shallow tube-wells and dug-wells. The maximum thickness of the alluvium is in the order of 20-23 m. The Depth to water level varies from 1.3 to 7.64 mbgl during pre-monsoon period and from 0.40 to 5.89 mbgl during post monsoon period. Yield of a dug well varies from 8-15 Ips.

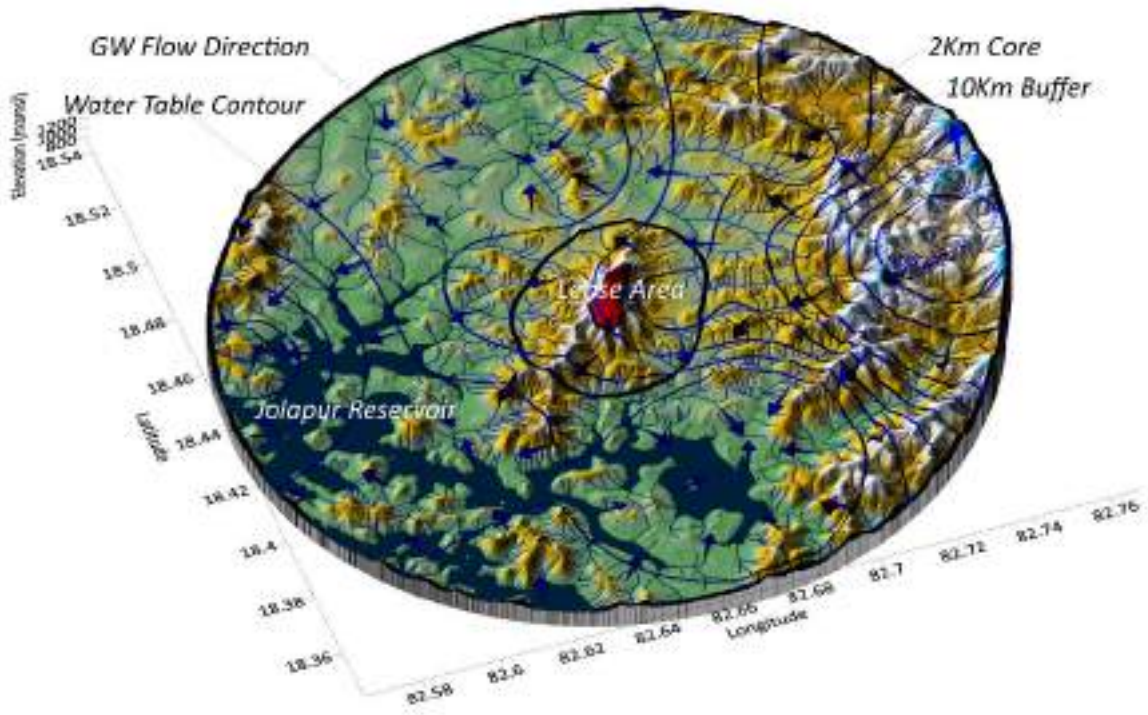


Figure 13: 3-D Water Table Contour map of the study area of 10 Km Buffer

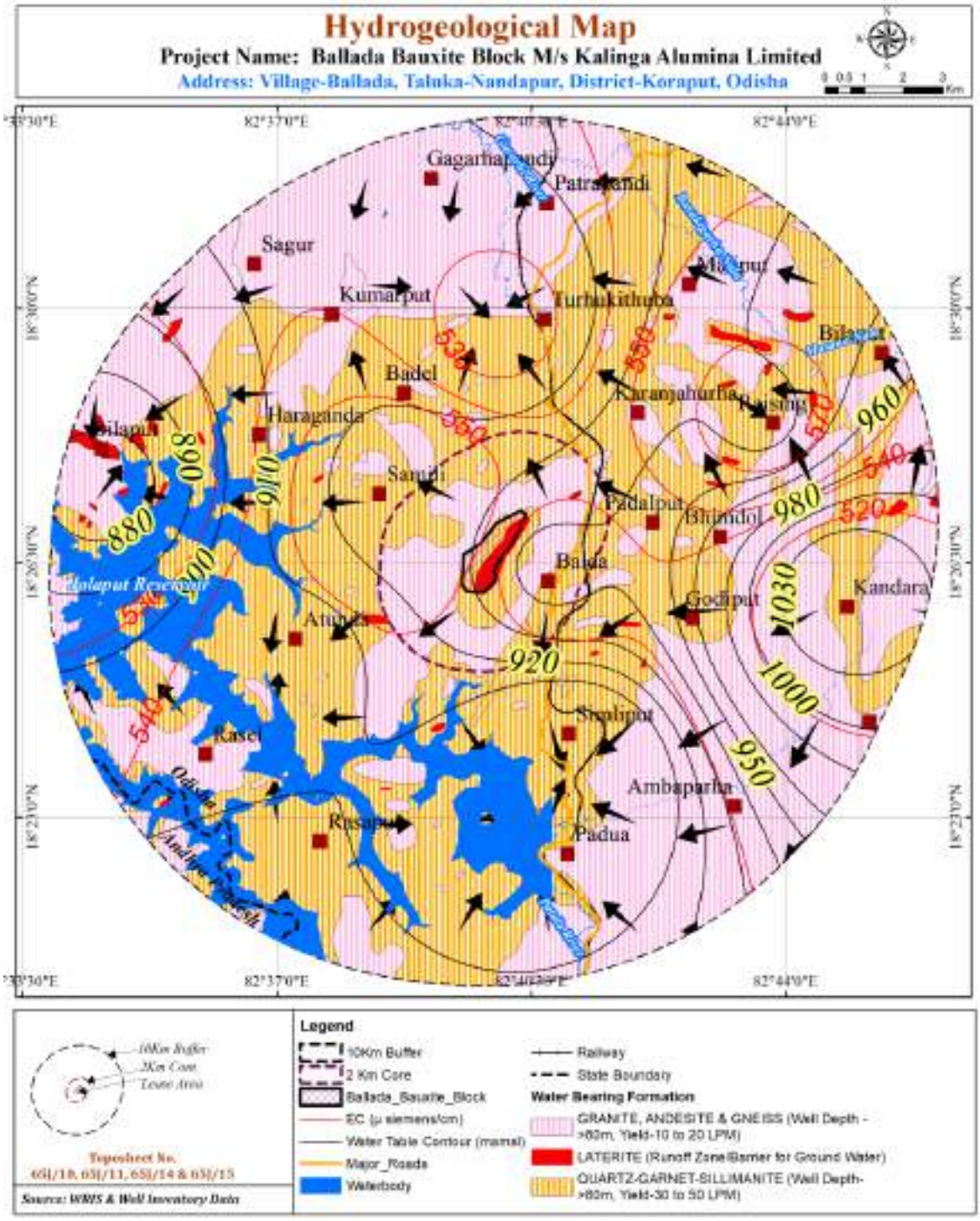


Figure 14: Hydrogeological map of the study area of 10 Km Buffer

Chapter–5
Basic data generation

5.1. DETAILS OF WATERSHED OF THE STUDYA AREA

Lease area falls in the watershed 4E1E5 & 4E1E6

The watersheds with location of Balada Bauxite Block are given in Figure 5.1.

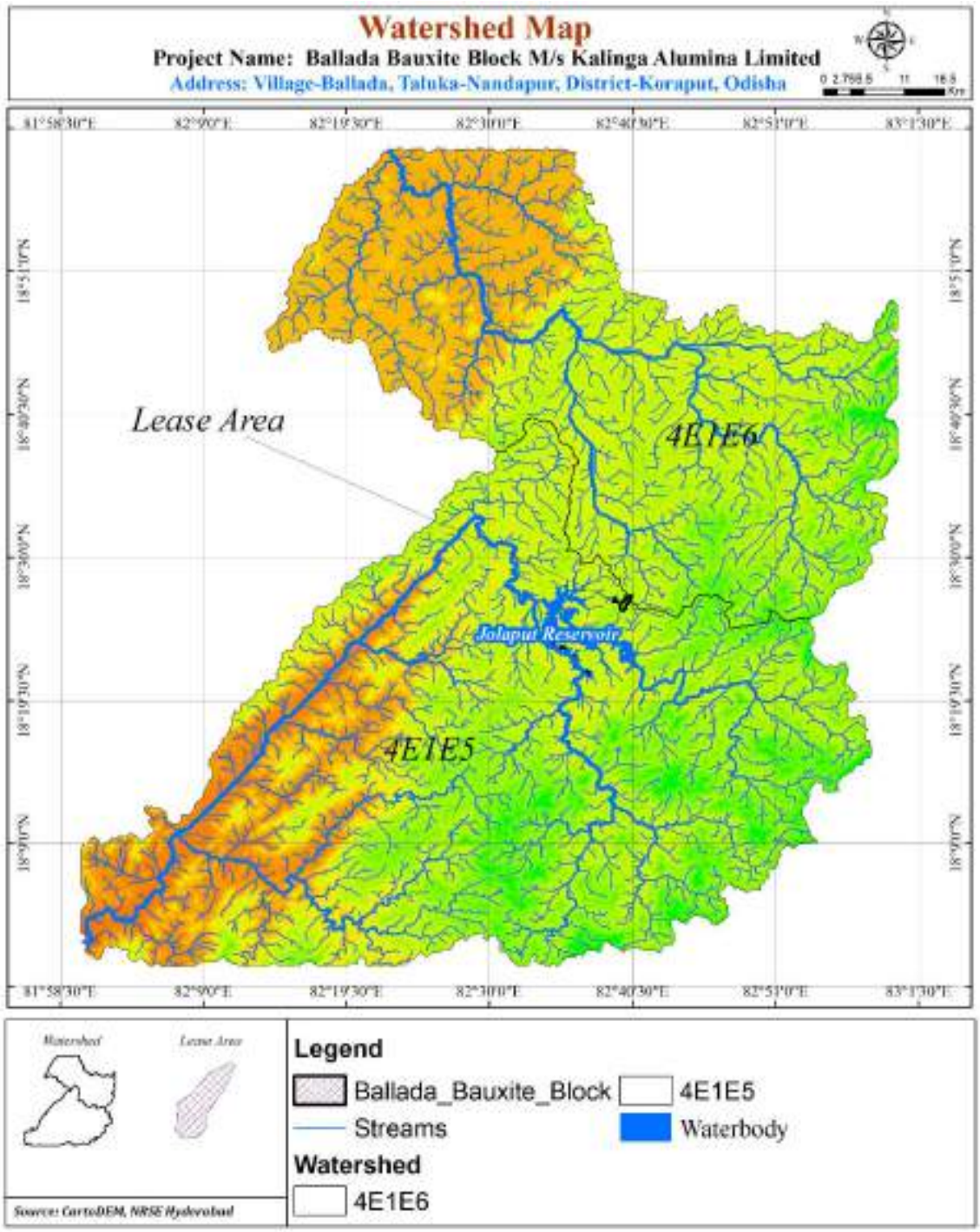


Figure 15: Watershed map of the study Area

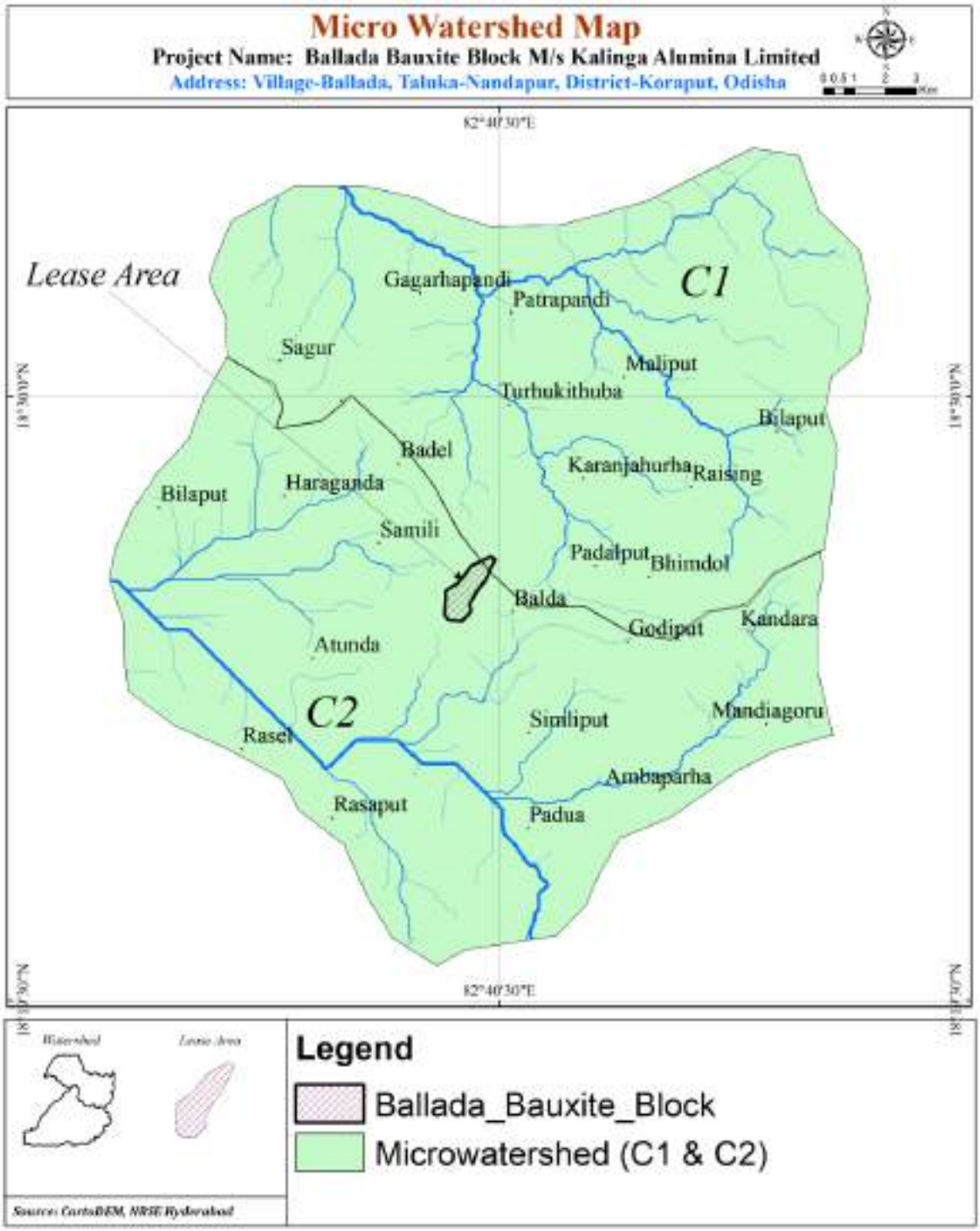


Figure 16: Micro-Watershed Map

In order to recapitulate the following basic information is reproduced for ready reference-

- *Watershed including mine lease area.*
- *Digital Elevation Model (DEM)*

- *Intensity of rainfall*
- *Runoff Coefficient*
- *Infiltration test*
- *Water table*
- *Rainfall –Runoff-Infiltration relation.*
- *Grain size & Silt Yield Index.*
- *Soil loss & Sediment Yield*

5.2. INTENSITY OF RAINFALL

The rainfall intensity corresponding to a duration and desired probability of exceedance i.e. return period. This is rainfall-frequency duration relationship for the given catchment area. I.M.D. has prepared Isopluvial maps for the different return period for given catchment area.

The maximum intensity of one hour rainfall is 30mm.

5.3. RUNOFF CO-EFFICIENT

The runoff coefficient is a dimensionless coefficient relating to amount of runoff to the amount of precipitation received. It is larger value for area with low infiltration and high runoff and lower for permeable well vegetated area (forest, flat land).

Runoff of Co-efficient = 20 %

5.4. INFILTRATION TEST

Infiltration is the flow of water into the ground through the soil surface. Since infiltrated water may contribute to the ground water discharge in addition to soil moisture, the process can be schematically modeled. The infiltration characteristics of a soil at a given location has been estimated by using flooding infiltrometer.



Figure 17: Infiltration Test Location Map

Table 6: Infiltration Test Data

Time since start		Infiltration rate (cm/hr)			
Minutes	**Hour**	**Test-I (Balda)**	**Test-II (Simliput)**	**Test-III (Atunda)**	**Test-VI (Samili)**
10	0.16	20.90	16.20	12.70	10.30
20	0.33	18.20	14.00	8.40	9.20
30	0.50	16.50	10.40	7.30	7.54
45	0.75	12.30	9.50	5.21	5.21
60	1.00	9.80	6.25	3.20	3.50
90	1.50	5.60	5.21	2.50	2.00
120	2.00	2.70	4.55	1.90	1.78
150	2.50	1.80	3.00	1.50	1.30
180	3.00	1.20	1.70	0.75	0.70
210	3.50	0.75	0.60	0.40	0.25
Constant Infiltration rate cm/hr		***0.75***	***0.60***	***0.40***	***0.25***
Infiltration zone		High	High	Moderate	Low
Recharge/Discharge		Recharge	Recharge	Discharge	Discharge

5.5. WATER LEVEL

The ground water levels observed over a period provides valuable information on the behavior of the ground water regime, which is constantly subjected to changes due to recharge and discharge phenomenon. Based on data of observation wells a water level map for the Pre-monsoon and post-monsoon and ground water flow direction map has been prepared. The Pre-monsoon, Post-monsoonal ground water level, water level fluctuation maps and ground water flow direction map are given in figure 5.4, 5.5, 5.6 and 5.7 respectively.

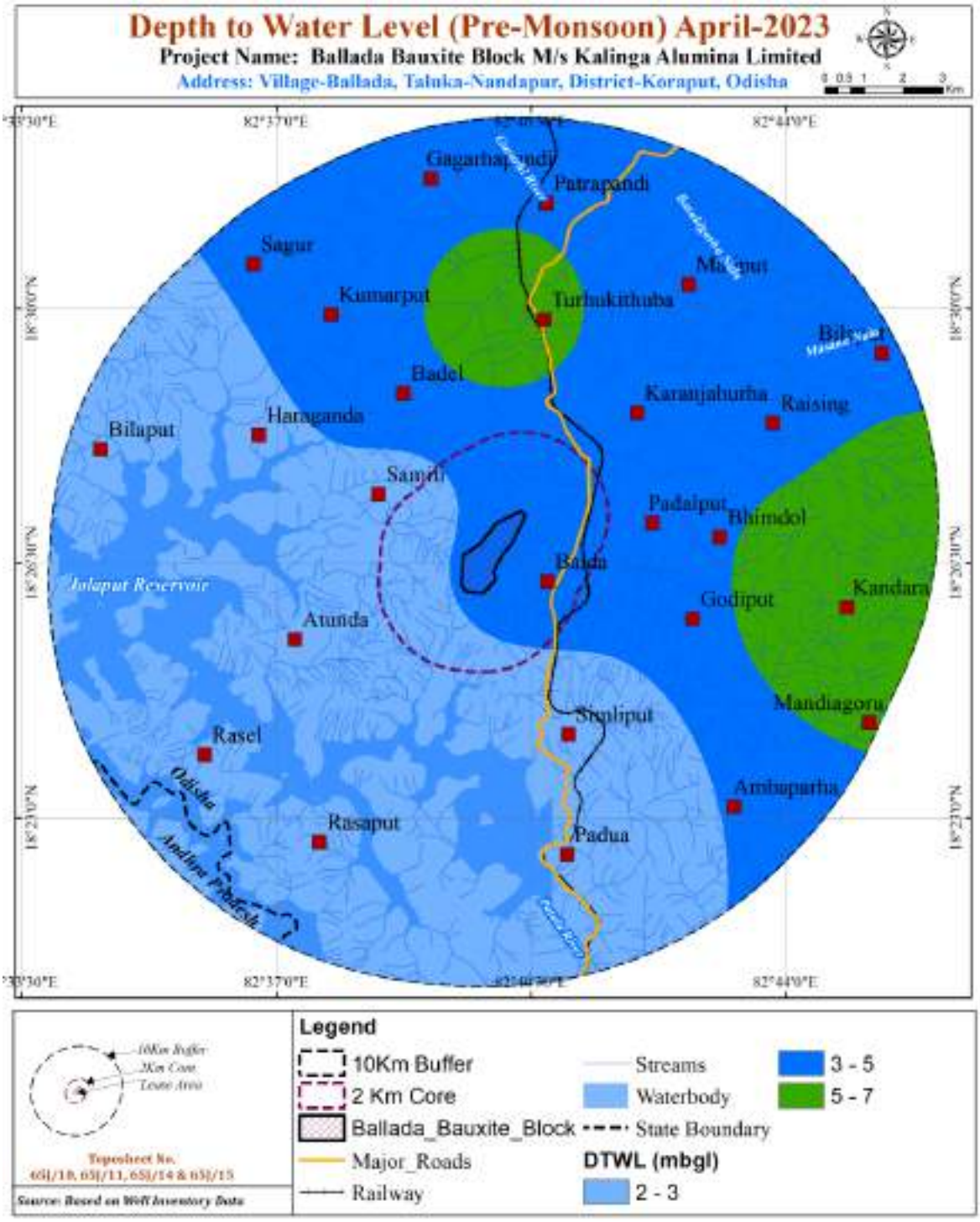


Figure 18: Pre-monsoon ground water level map

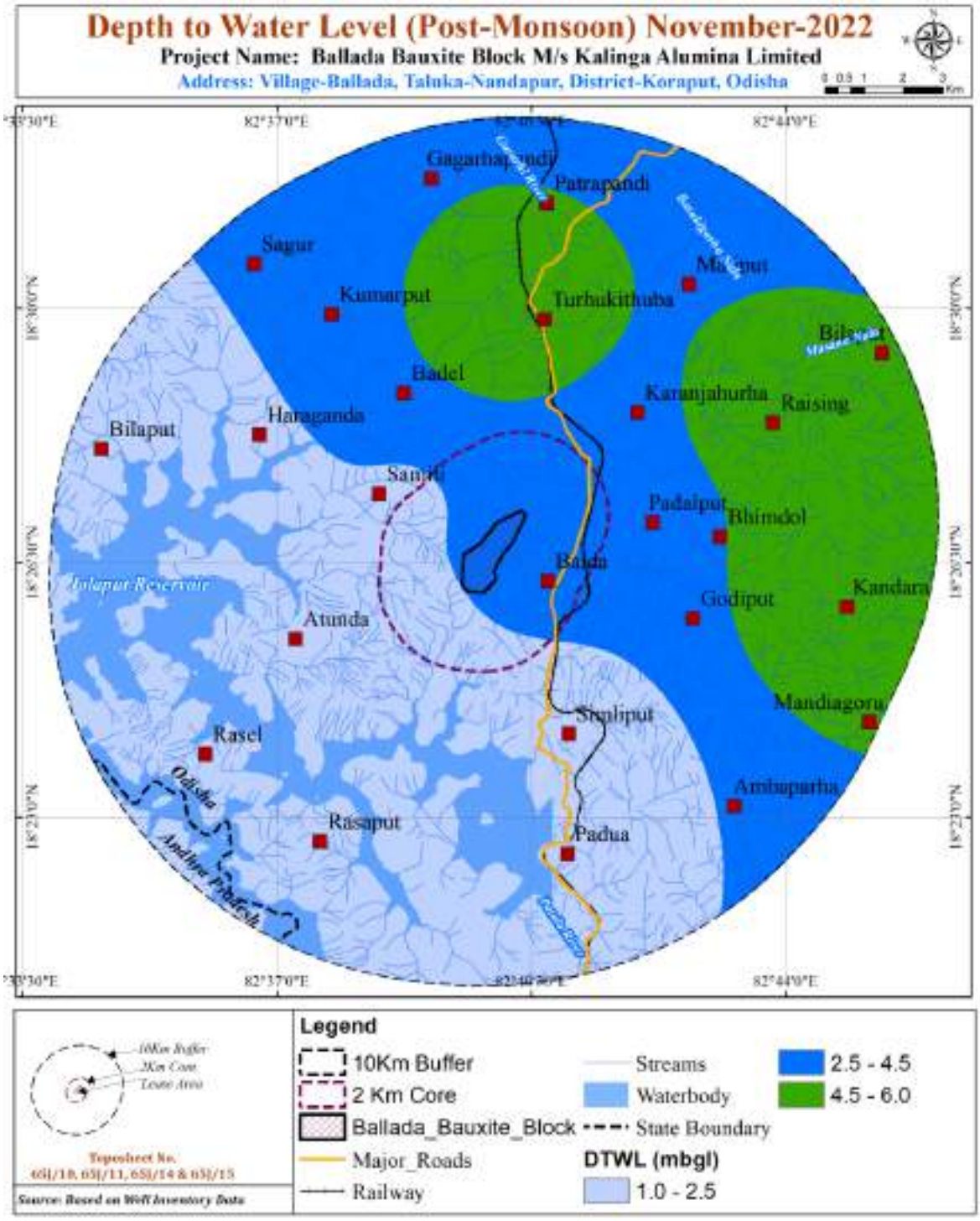


Figure 19: Post-monsoon ground water level map

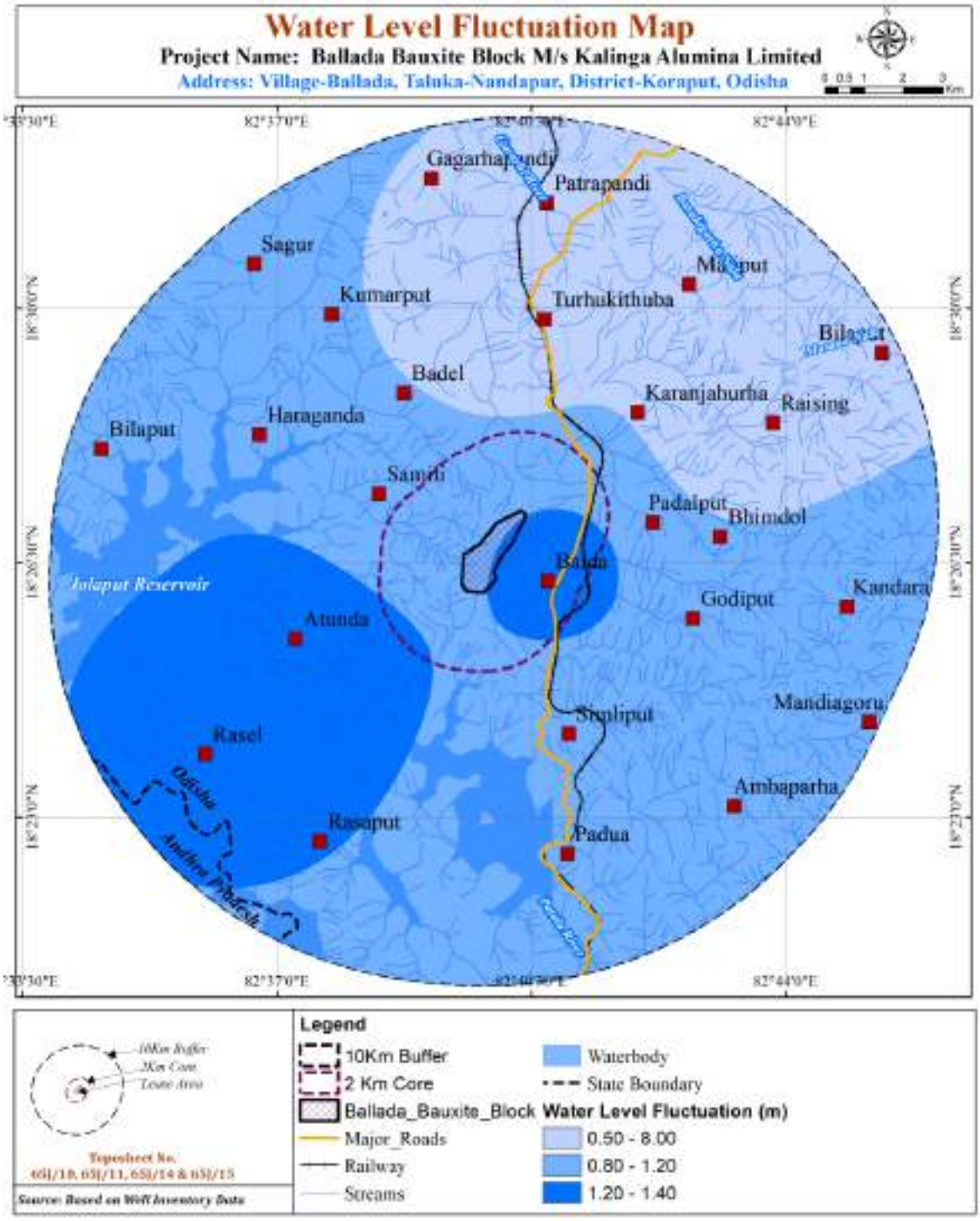


Figure 20: Water Level Fluctuation Map

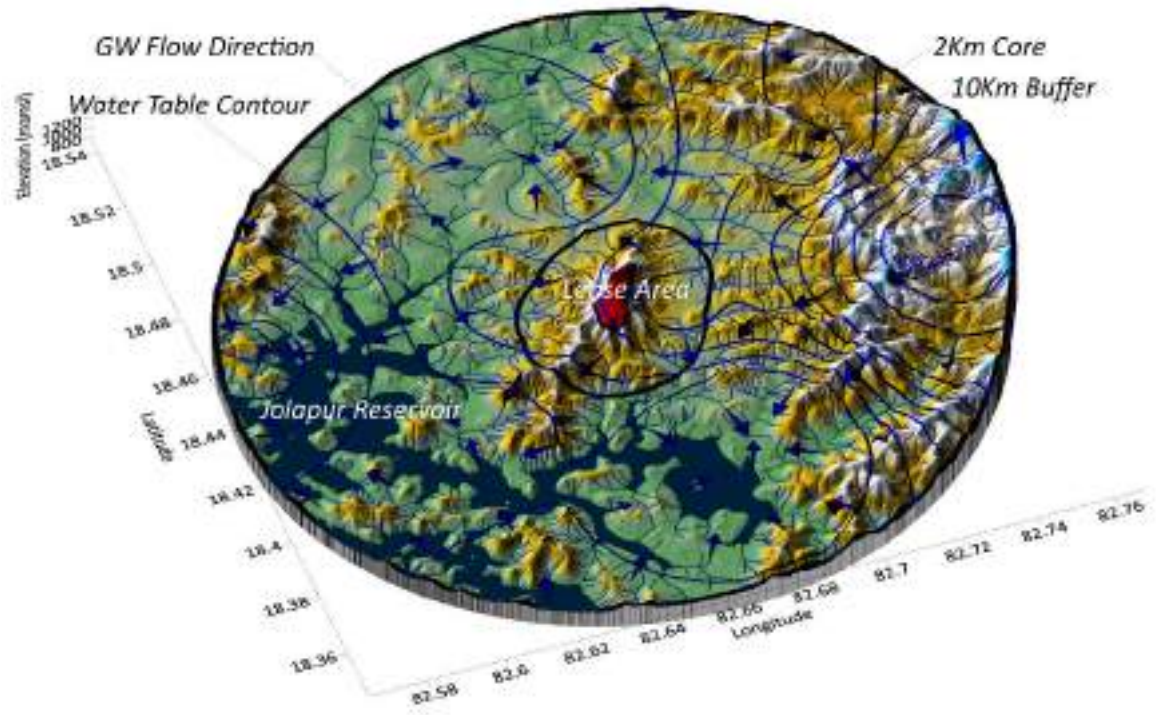


Figure 21: Ground water flow direction map (3D)

5.6. RAINFALL-RUNOFF-INFILTRATION RELATION

Based on UNDP study carried out for Hydrological consequences in respect of pre & post mining in study area, the relationship between Rainfall –Runoff – Infiltration has been studied and result given in Table 5.2

Table 7: Rainfall –Runoff – Infiltration Relation

Phase/Condition	Area of CAT	Normal rainfall in monsoon	Surface Water		Ground water	
			Runoff Coefficients	Runoff	Infiltration coefficient	Groundwater Recharge
	Ha	m	%	MCM	%	MCM
Pre mining	144.95	1.454	0.2	42.15	30	12.65
Post Opencast mining	144.95	1.454	0.2	42.15	20	8.43

5.7. SOIL EROSION

Soil erosion may be defined as the defacement and transportation of soil. Water is the major agent responsible for this erosion. The Soil Erosion highlights the management

technique to control erosion in the catchment area. The Soil Conservation Plan involves the following parameters.

- ✓ Understanding the erosion characteristics
- ✓ Suggesting remedial measures to reduce the erosion rate
- ✓ Detain the Silt (Charged particles) in the runoff in nala on the way and prevent or reduce
- ✓ The transportation of soil to streams or reservoirs.

5.8. GRAIN SIZE ANALYSIS

5.8.1. GRAIN SIZE ANALYSIS OF SOIL

The grain size analysis of the soil in respect of area in and around of study area is given in Table 5.3

Table 8: Grain Size Analysis in (%)

Type of Grain	Notation	Project Site	Sindhiput	Atanda	Near Somali	Average %
		S1	S2	S3	S4	
Sand	(SAN)	53	50	49	50	51
Silt	(SIL)	35	34	33	31	33
Clay	(CLN)	12	16	18	19	16
Organic	(C)	0.31	0.40	0.50	0.42	0.41
	%	100	100	100	100	100

(Source: Lab Test Report)

5.8.2. SILT YIELD INDEX (SYI)

Silt Yield Index method has been used for prioritization of sub-watersheds in the catchment for treatment. The Silt Yield Index is defined as the Yield per unit area. Silt Yield Index value for hydrologic unit is obtained by taking the weighted arithmetic mean over the entire area of the hydrologic unit by using suitable empirical equation.

Legend for Composite Erosion Intensity Unit (CEIU) & Weightages:

Erosion	Slope Intensity	Land-use/ Land-cover	Soil depth	Weightage/DR Unit
(a) Very Severe	Very steep >50%	Open forest, scrub forest	Shallow	20/0.95

(b) Severe	Steep to very steep 25-50%	Open forest, scrub, cultivation	Moderately shallow	18/0.90
(c) Moderate to Slight	Strongly sloping to moderately steep 10-25%	Dense forest, open forest, Cultivation	Moderately deep	13-15/0.90
(d) Slight to Negligible	Gently sloping to Moderately sloping 5-10%	Dense, forest, open forest	Deep	11/0.85

The area of each of the mapping units is computed and silt yield indices of individual sub-watersheds are calculated using the following equations:

Silt Yield Index
SYI = (Ai x Wi x Di) x 100/Aw; where I = 1 to n

Where
Ai = Area of ith (EIMU)
Wi = Weightage value of ith mapping unit
Di = Delivery ratio
n = No. of mapping units
Aw = Total area of sub-watershed

The SYI values for classification of various categories of erosion intensity rates were taken for the present study as follows:

Priority Category	SYI Values
1. Very High	>1300
2. High	1200-1299
3. Medium	1100-1199
4. Low	1000-1099
5. Very low	<1000

The Silt Yield Index (SYI) of watershed has been calculated and given in Table 5.4

Table 9: Silt Yield Index (SYI)

Micro Water Shed Name	Erosion Intensity	Area	Weightage	Area*Weightage	Delivery ratio	Gross silt yield	Sediment Yield Index (SYI)
C1	a	20575	16	329200	0.9	296280	1440
C2	a	20721	14	290094	0.8	232075.2	1120

5.8.3. Slope of Tract

The slop of the tract is given in Table 5.5 The slop map of the area has been demarcated in Figure 5.5

Table 10: Slope of the Tract

SL. No.	Slope class (Gradient in %)	Area in Ha	Percentage	Remark
1	0-1%	22338.6	60%	Low soil loss
2	1– 10%	9307.75	25%	Medium
3	>10 %	5584.65	15%	High
Total		***37231***	***100***	**-**

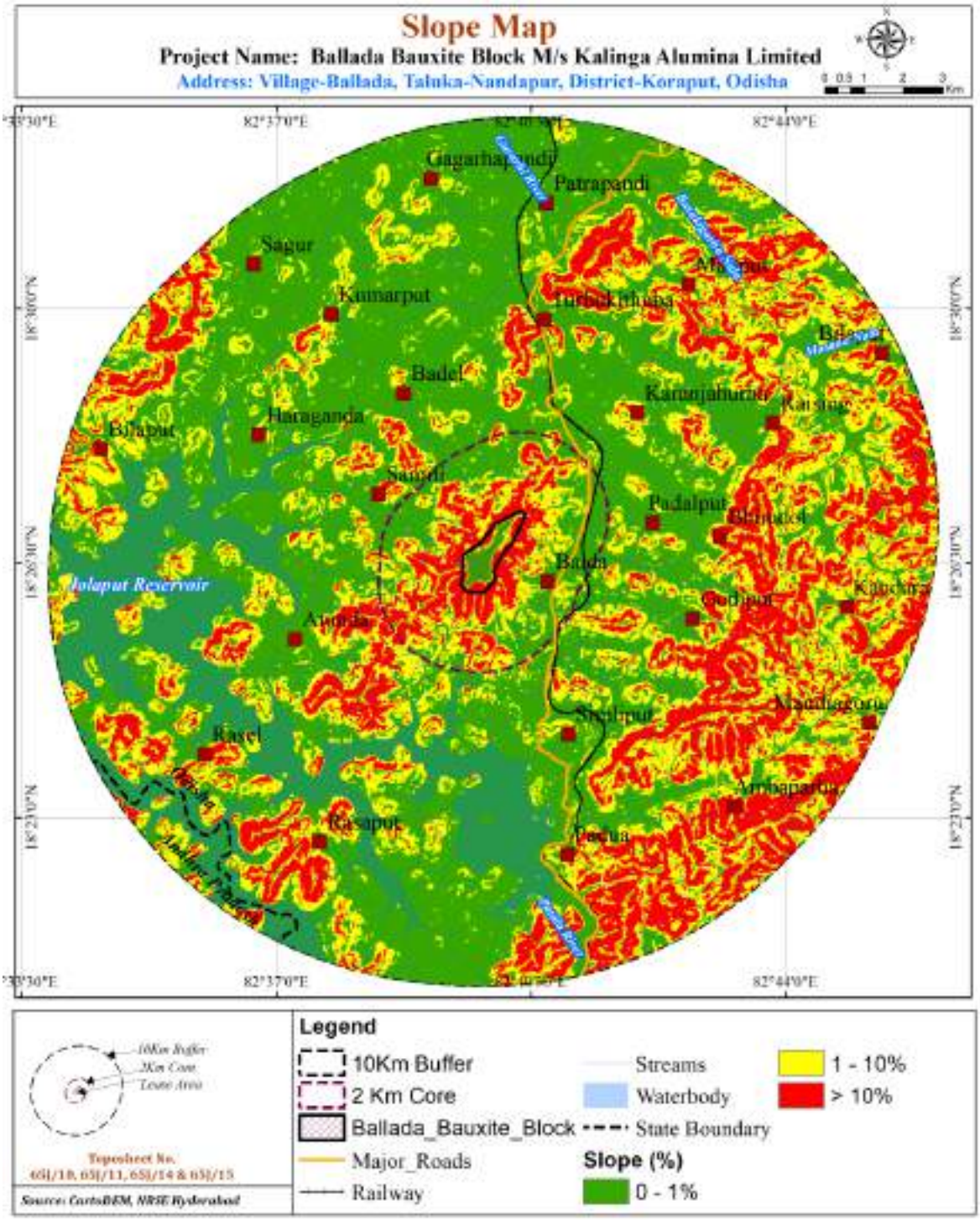


Figure 22: Slope Map of the study area

5.9. SOIL LOSS AND SEDIMENT YIELD

Annual soil loss and sediment yield due to water erosion has been evaluated for Soil Conservation Plan

5.9.1. Equation for soil loss

The Revised Universal Soil Equation (RUSLE) model is most commonly used method for calculating the soil loss.

The soil loss equation is as follows-

$$A = R \times K \times LS \times C \times P$$

Where,

A = Soil loss (tons/ha/year)

R = The he rainfall erosivity factor

K = The soil erodibility factor

L S = Topographic factors representing length and slope

C = The vegetation cover and management factor and

P = The support practices factor.

Despite the USLE's plot-scale spatial focus, the model has often been used to estimate soil erosion on much larger areas, such as watersheds or even whole continents. The relation between gradient (in %) to Soil loss per ha is represented below in Figure 5.11.

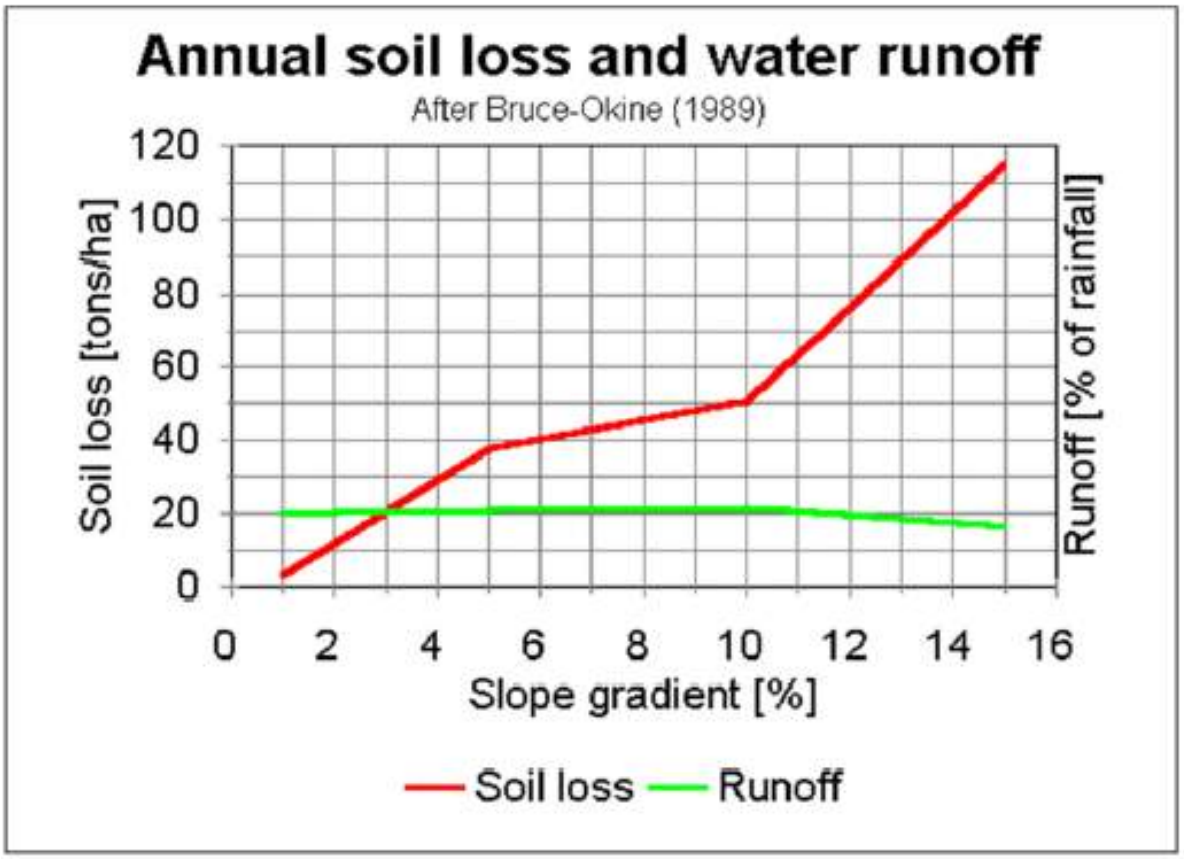


Figure 23: Theoretical Annual Loss and Water Runoff

5.10. DISCUSSION – DATABASE GENERATION

The arable land standard will be achieved by the areas with a slope of less than 5%. Less than 10% of the rehabilitated area will not meet the arable land standard.

Chapter–6
Probable source of soil erosion

6.1. GENERAL

In course of mining excavation activity will be taken up over an area of 144.945 ha during complete Mining Operation. The location of excavation, dump, backfilling and uncut area within Mine lease boundary for different stages of mining area Adequate management strategy has been prescribed in the mining plan to check soil, erosion from dumps.

6.2. TOP SOIL MANAGEMENT

The topsoil removed ahead of bauxite mining will be stored in the earmarked areas during the initial years of operation. However, some of the removed topsoil will be utilized for plantation on the safety barrier, dump and haul roads as well as around the periphery of the site service facility area during the first five years.

Topsoil details-

Table 11: Top Soil Excavation

Year	Topsoil Generated (m^3) (A)	Topsoil Utilized (m^3) (B)
Year 1	15,660	4,700
Year 2	1,680	5,400
Year 3	7,375	7,375
Year 4	3,960	4,000
Year 5	0	7,200

6.3. Year wise Opencast development

Mining operations are proposed to be carried out by fully mechanized opencast mining method. The bench height and width in Bauxite is proposed to be 6m & 10m respectively. The maximum proposed production of Bauxite is 4 million tons per annum. The thickness of overburden which is usually soil in Ballada plateau is 0.2m to 1m. The Ore to waste ratio was computed to be 1: 0.098.

The primary activity in mining operation, i.e., fragmentation/ loosening of in-situ rock mass, is conventionally carried out by drilling and blasting. Blasting shall be done for fragmentation of both bauxites. Drilling and blasting would be required for about 70-80% of RoM.

Year wise dump schedule of is given in Table no 6.2

Table 12: Year wise Opencast development

Year	Bench	Bulk Density of Overburden (Waste) (BD1) (ton/m^3)	Bulk Density of Mineral (BD2) (ton/m^3)	Top Soil Volume (Length x Width x Height) (m^3)	Over Burden/Waste Volume (Length x Width x Height) (m^3)	Over Burden/Waste Quantity (t)	ROM Volume (Length x Width x Height) (m^3)	ROM Quantity (t)	Production Main (t)	Production Associated (t)	Location of Advancement	OB to Ore Ratio (ton/m^3)
Year 1	1, 2, 3	2	2	15,660	0	0	501256	1002512	1002512	0	SW	0.02
Year 2	1, 2, 3, 4, 5, 6	2	2	1,680	17,400	34,800	999880	1999760	1999760	0	SW	0.01
Year 3	1, 2, 3, 4, 7, 8	2	2	7,375	35,984	71,968	1000122	2000244	2000244	0	Central	0.02
Year 4	9, 10, 11, 12	2	2	3,960	1,4400	28,800	1000440	2000880	2000880	0	Central	0.01
Year 5	1, 9, 13, 14, 15, 16	2	2	0	50,8840	101,7680	2000030	4000060	4000060	0	Central	0.13

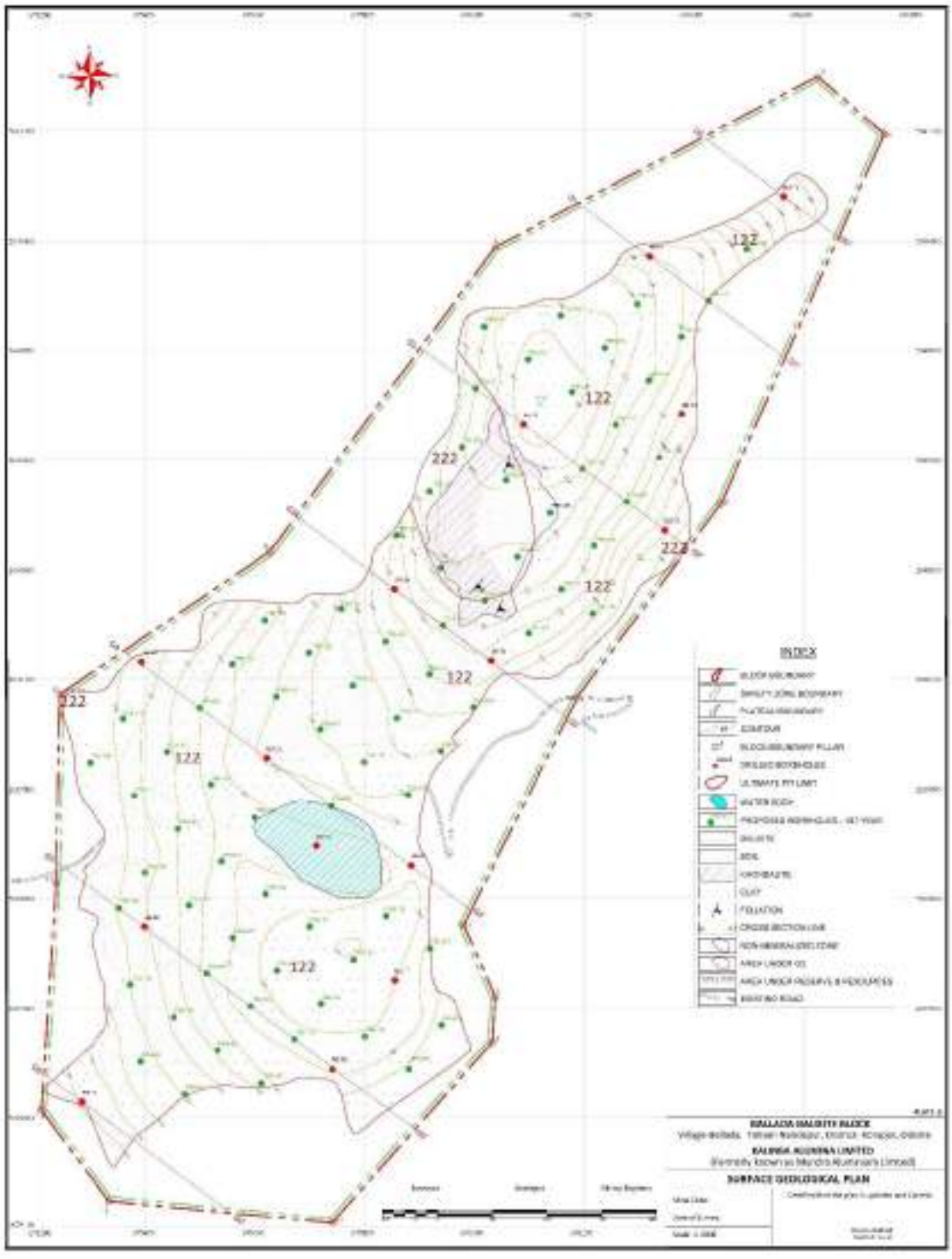


Figure 24: Surface Geological Plan

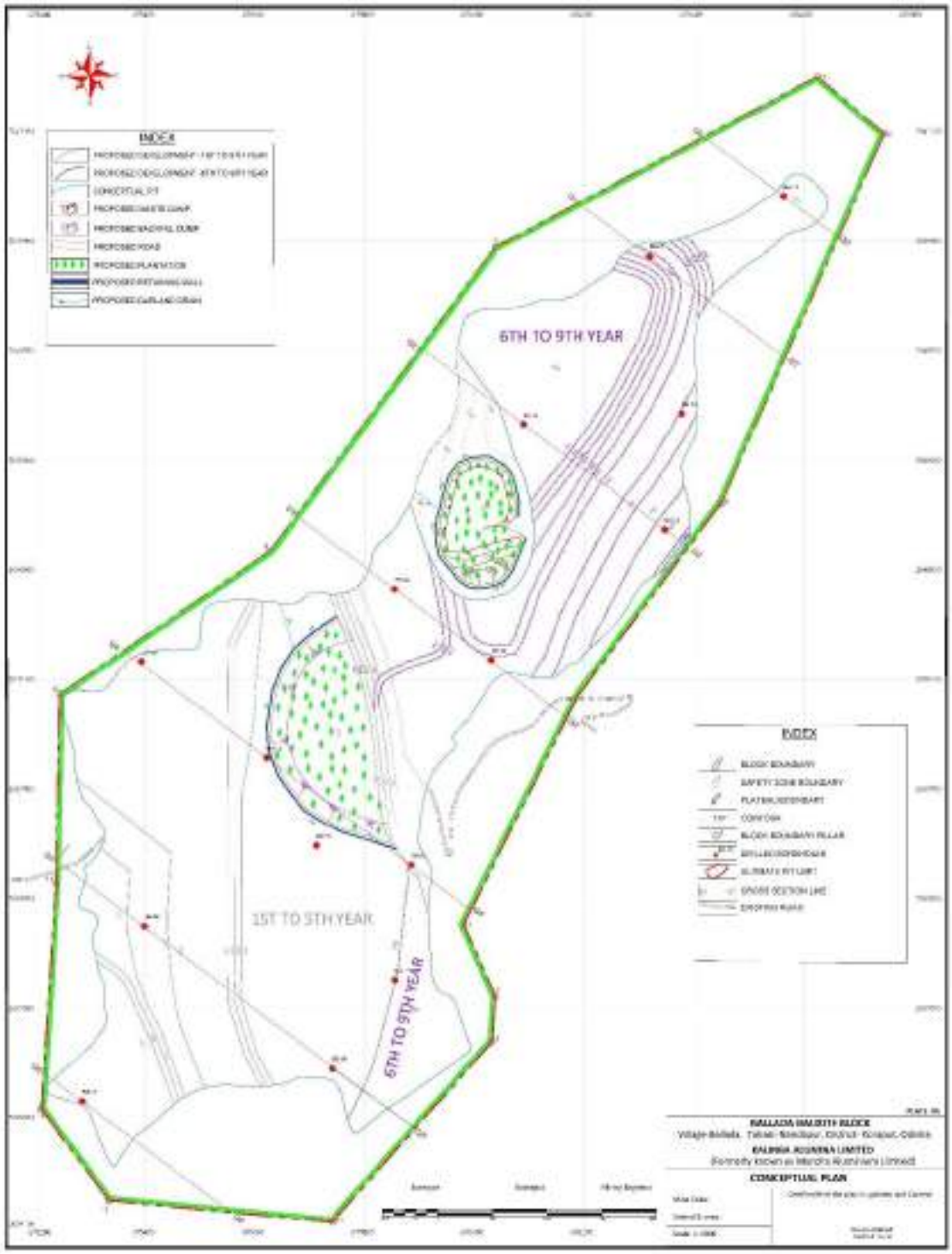


Figure 25: Conceptual Plan

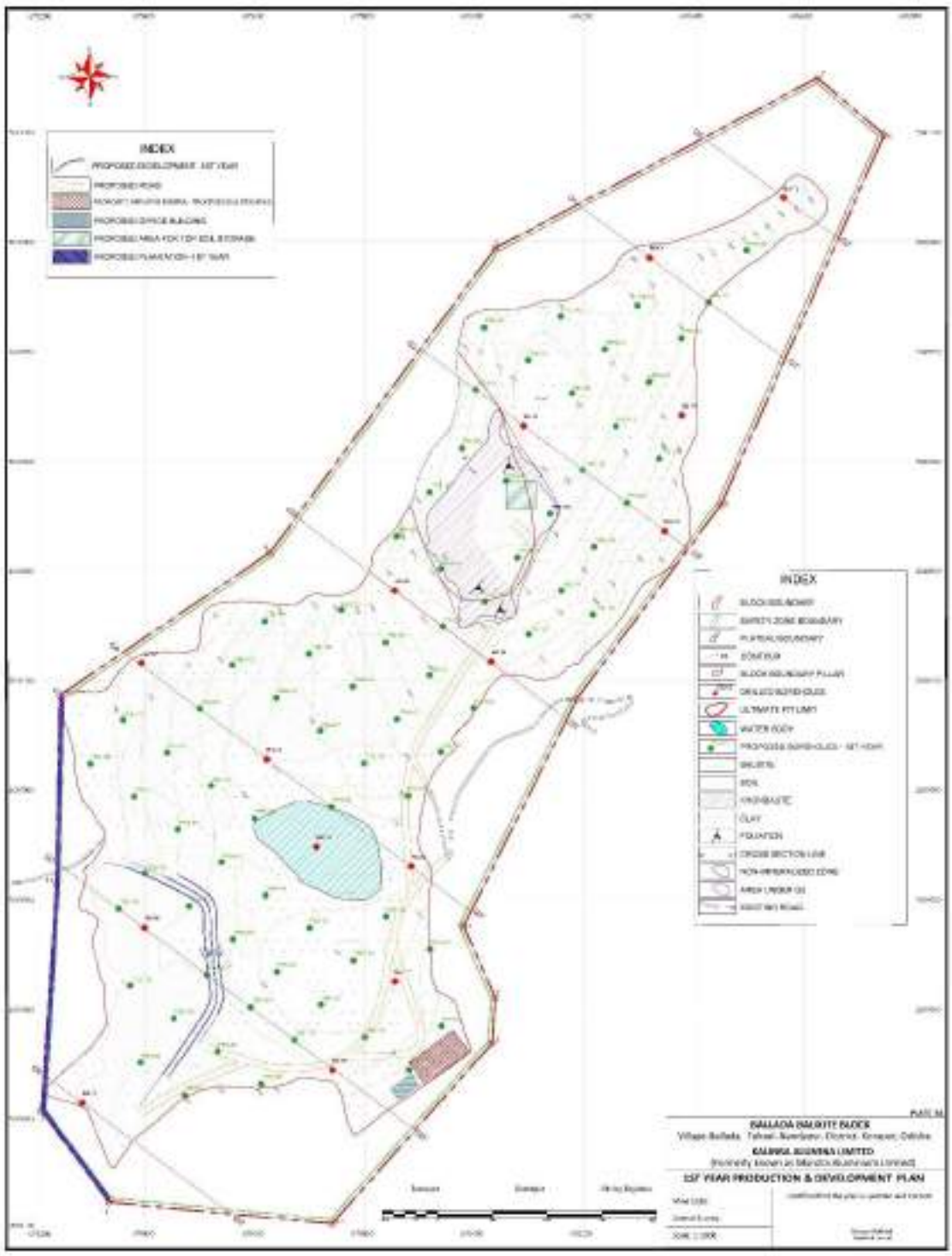


Figure 26: 1st year Development and production Plan

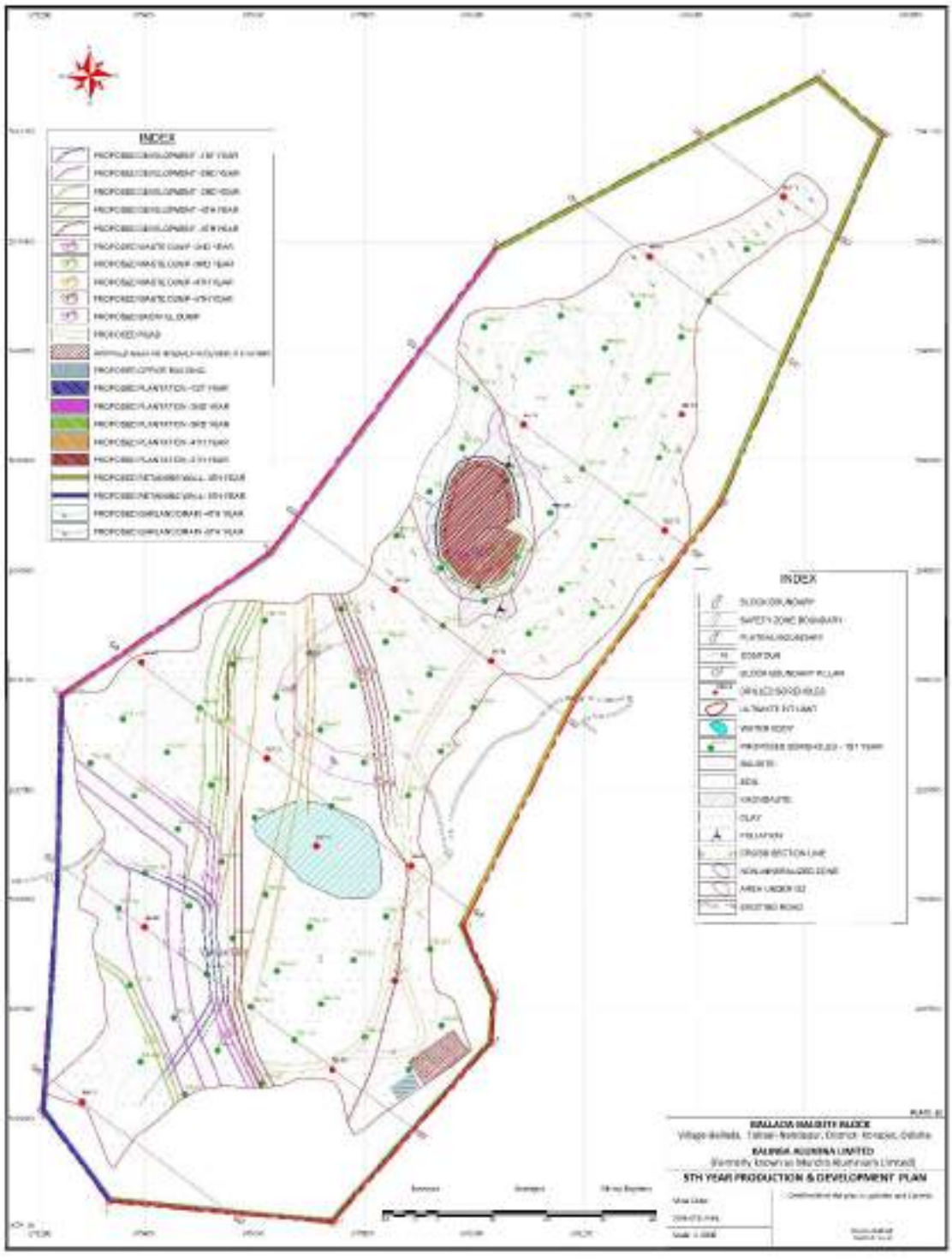


Figure 27: 5th year Development and production Plan

6.4. STABILIZATION OF OVER BURDEN DUMP

6.4.1. Steps to be taken to avoid Dumps Slides

- Dumping of top soil will be avoided at the bottom of the cut as it leads to in stability. Dumping of soil and clayey material will be done away from the working area, that is on farther end of the dump so that formation of weak planes is avoided.
- Afforestation by planting trees will help a lot in improving stability of dumps by preventing erosion.

6.4.2. Reclamation of overburden Dumps

Following activities shall be taken up for reclamation of Overburden dumps-

- Stabilization of overburden dumps
- Construction of retaining walls
- Construction of drain for drainage
- Provision of jute mesh for facilitating grass or vegetative growth on slopes
- Provision of good soil mixed with manure and subsequent irrigation for growth of grass for anchorage on slopes. Plantation mixed with indigenous and fast-growing plant species
- The degraded area will be reclaimed and rehabilitated with local species of plantation in a phased manner
- Plantation will be carried out on waste dumps
- The haulage roads will be flanked by trees on either side and
- A belt of trees with thick canopy will be created along the mine boundary to intercept dust, gaseous pollutants and noise.

During quarry operations, it is necessary to adopt suggested mining parameters for the stability of benches, high-walls and spoil dumps. It is also mandatory to examine systematically the fencing of mine working, landslides and cracks between benches. It is required to maintain well graded and wide roads on benches keeping the width of working areas sufficient for spreading of blasted rock and movement of the mining and transport equipment.

Chapter–7
Soil moisture conservation work plan

The mitigative measures to minimize soil erosion will be undertaken by two plan –

1) Biological Conservation Plan

2) Engineering Conservation Plan

The plateau exposes lateritic bauxite of different grades on the surface with a thin veneer of soil at places. This place is overlain by a thin rim 0.2m to 1.00 m of soil. So, the Overburden is almost negligible. However, from the cross sections the volume of soil has been calculated to be 28675 cum.

Soil Conservation Measure

- Garland drains will be provided around the mine whenever required to arrest any soil from the mine area being carried away by the rain water.
- The bench levels will be provided with water gradient against the general pit slope to decrease the speed of storm water and prevent its uncontrolled descent.
- Special local stone paved chutes and channels will be provided wherever required, to allow controlled descent of water, especially from external dumps.
- Gullies formed, if any, on side of the benches shall be provided with check dams of local stone or sand filled bags.
- The inactive dump slopes will be planned with bushes, grass, shrubs and trees to prevent soil erosion after applying top soil.
- Retaining walls (with gabion, concrete or local stone) will be provided, wherever required, to support the benches or any loose material and also to arrest sliding of loose debris.

7.1. Biological Conservation Plan

7.1.1 Approach Plan

The following biological conservation plan will be adopted to mitigate soil erosion.

- Dumping of top soil will be avoided at the bottom of the cut as it leads to in stability. Dumping of soil and clayey material will be done away from the working area that is on farther end of the dump so that formation of weak planes is avoided.

- Afforestation by planting trees will help a lot in improving stability of dumps by preventing erosion.
- Stabilization of overburden dumps
- Provision of jute mesh for facilitating grass or vegetative growth on slopes
- Provision of good soil mixed with manure and subsequent irrigation for growth of grass for anchorage on slopes. Plantation mixed with indigenous and fast-growing plant species
- The degraded area will be reclaimed and rehabilitated with local species of plantation in a phased manner
- Plantation will be carried out on waste dumps
- The haulage roads will be flanked by trees on either side and
- A belt of trees with thick canopy will be created along the mine boundary to intercept dust, gaseous pollutants and noise.

Planning for plantation is done keeping the following objectives in mine

- Compensate the damage to vegetation due to setting up and operation of the mine
- Prevent the spread of fugitive dust generated due to mining and allied activities
- Attenuate noise generated by the mine
- Reduce soil erosion
- Help stabilize the slope of external overburden dumps
- Increases green cover and improve aesthetics

Green belt development and afforestation will be carried inside the mining lease area to restore and increase the green cover of the region. Progressive Green Belt development and plantation in and around the mining area to control soil erosion. Progressive green belt development and plantation in the available areas will be carried out in a phase-wise manner till end of the mine life. Plantation will commence there from the initial years of excavation and plantation will be expanded in such areas in progressive stages.

7.1.2 Post Plantation Care

Prescribed post plantation care shall be adopted to ensure maximum survival of the plants. Funds for maintenance of the plants for the first five years after the plantation shall be kept. Immediately after planting the seedlings, watering will be done. Further watering will depend on the rainfall. In the dry seasons, watering will be regularly done especially during March to June. Watering in one year planted saplings will be more frequent (thrice a week). Manuring will be done using organic manure (animal dung,). Diseased and dead plants will be uprooted and destroyed and replaced by fresh saplings. Growth / health and survival rate of saplings will be regularly monitored and remedial actions will be undertaken as required.

7.1.3 Fencing

As some part of area is nearer to the habitation and lies adjacent to the agricultural land there is every chance of biotic interference to the plantation area. Therefore, it has been proposed to provide fencing towards habitation area.

7.1.4 Executing Agency

In all cases, the works shall be executed by the User Agency having specialized departments headed by qualified persons with outsourced man and machinery as and where required. To facilitate this, the User agency shall establish its own executing and supervision cells along with required infrastructural facilities. In order to maintain the quality of work, in house supervision through competent personnel shall be provided. The entire work shall be carried out through close coordination with the Forest Department.

7.2. ENGINEERING CONSERVATION PLAN

7.2.1. Approach Plan

In this Plan, considering the topography and contours of the lease area, emphasis has been given to arrest sliding down of excavated materials along the contour by constructing check dams and retention walls at specified locations in the mining lease. Locations are judiciously selected within the leasehold and plans are prepared. The salient features of the drainage management plan are as follows:

- Check dams across the drain will check water current and arrest solids. These need to be cleaned periodically.
- Stone pitching will be made at suitable places as per requirement to regulate water flow. Some of the drains which will serve for a long time shall be made pucca.
- The Ballada Bauxite Block allocated to Kalinga Alumina Limited (Formerly known as Mundra Aluminium Limited) comprising total lease area of 144.945 hectare has been allotted to Adani Enterprises, located at Village – Ballada, Taluka – Nandpur, District – Korapur, State – Odisha.
- The area is covered in the Survey of India Toposheet No. 65J/10, 65J/11, 65J/14 & 65J/15 (R.F.1:50,000)) and is bound by latitude of 18°26'05.61588" N to 18°27'13.34448" N & longitude of 82°39'32.39136" E to 82°40'25.36716" E.
- The letter of Intent for Mining lease of bauxite block has been issued vide letter no. SM-MC2-MC-0007-2023/2143/S&M Bhubaneswar dated 1st March 2023 by Steel and Mines Department, Government of Odisha.
- The study area (10 km radius from the mine site boundary – buffer zone) elevation ranges from 717 m to 1274 m AMSL. The maximum elevation is observed in the mine lease area and eastern part of the study area.
- Koraput district is divided into Dissected plateau (hills & valleys), Undissected plateau (Plain), Pediplain and Ridges & Valleys.
- In mitigative measures, biological conservation plan and Engineering conservation plan will be adopted.
- The Jolaput Reservoir is the nearest waterbody which is situated at 3 Km away from the project site. The drainage pattern of this area is dendritic in nature.
- The district enjoys tropical climate characterized by hot summer, cold winters and rainy seasons.
- Cost estimate for Biological Conservation Plan which include green belt and sowing of seeds will cost around Rs. 25,17,500.
- Cost estimate for Engineering Conservation Plan which include Catch pits and Check dams or toe walls will cost around Rs. 24,99,000.

The Total Cost of Soil Conservation Plan is Rs. 76.07 lakh Retaining walls/Toe walls and garland drains shall serve the purpose of protection against rolling boulders on the slopes and drainage respectively. The drains will be provided with settling pits at regular intervals as required. Outside of the garland drains on the drainage lines shall be reinforced with green cover. Check dams will be constructed at identified locations to prevent the rainwater run-offs from adjoining high-lying areas to enter the OB area. After physical reclamation, top soil shall be spread on the dumped material and water sprinkling on the soil will be carried out.

7.2.2. Construction of Retaining Walls/Toe Walls

Retaining walls is a structure which aims at resisting the lateral pressure of soil when there is a change in ground elevation that exceeds the angle of repose of soil. Such retaining walls will be constructed around the overburden (OB) dump to arrest sliding down of the excavated material.

7.2.3. Construction of Catch Pits

The run-off / storm water flowing through the network of garland drains around quarries and dumps will be led through siltation pits to settle out suspended solids. The clear water will be discharged to the nearby seasonal streams or nala. Coagulant, if necessary, will be added in the settling pits in monsoon season. Siltation settling pits will be constructed along the garland drains. It is expected that 4 numbers of settling tanks are required. The structure would be checked against overturning and sliding etc. Proper abutment at both sides should be made with earth filling so that excess run-offs would pass through only the catch pits or siltation pits without any breach elsewhere.

7.2.4. Inspection, Monitoring and Evaluation

For successful implementation of the above proposed program, intensive inspection and technical guidance from the concerned technical wing to be set up by the user agency is required. Infrastructure, conveyance and all other required facilities will be provided by the User agency for proper implementation of the program

7.2.5. Executive Agency

In all the cases, the works shall be executed by the agency having specialized departments headed by qualified persons with outsourced manpower and machinery as and where required. To facilitate this, the user agency shall establish its own

executing and supervision cells along with required infrastructural facilities. In order to maintain the quality of work, in house supervision through competent personnel shall be provided.

Chapter–8
Cost estimate of soil moisture conservation plan

8.1. COST FOR SOIL CONSERVATION

The total expenditure proposed for taking up the works connected to "Mitigative Measures for soil Erosion, choking of streams and following top soil Management Plan".

Table 13: Cost Estimates for CAT Plan

SL No.	Item	
		Financial (Rs)
I	Biological Measures	
1	Afforestation	
	i) Creation	6,00,000
	ii) Maintenance for 5 years	1,00,000
2	Assisted Natural Regeneration	
	i) Creation	17,50,000
	ii) Maintenance for 5 years	50,000
3	Wages for plantation watchman i.e., unskilled laborer round the year for 5 years	17,500
A	**Sub Total I (1+2+3)**	25,17,500
II	Engineering Measures	
4	Brushwood Check Dams	8,00,000
5	Dry Stone Masonry Check Dams (Nos)	7,25,000
6	Fencing	4,00,000
7	Contour Bunding	5,74,000
	Sub Total II (4+5+6+7)	2,499,000
	Total (*Sub Total I + II*)	***50,16,500***

The total cost of Mitigative measure is given in Table 8.1

Table 14: Total Cost of Mitigative Measures

SL. No.	Item	Amount (Rs.)
1	Biological Measure (Aim to check the soil erosion, prevent/check siltation of reservoir and to maintain its storage capacity)	2,517,500
2	Maintenance cost for 5 years including watch & ward @ Rs.1 lakh per year	500000

3	Nursery Development	80000
4	Sub-Total I (2 +3)	580,000
5	Engineering Measures like fencing etc.	2,499,000
6	Silt Observation Units	100000
7	Sub-total II (5+6)	2,599,000
8	Total (1+4+7)	5,696,500
9	Administrative Charges @5% of Total	284825
10	Microplanning @3% of Total	170895
11	Monitoring and evaluation @8% of Total	455720
12	Training and Extension program	400000
13	Forest Protection	300000
14	Capacity building	200000
15	Extra Additional Charges	100000
	Grand Total	***7607940***

<u>Note-</u> Cost of Conservation plan = 76,07,940/- Rs in four stages

Chapter–9
Conclusion

- The Ballada Bauxite Block allocated to Kalinga Alumina Limited (Formerly known as Mundra Aluminium Limited) comprising total lease area of 144.945 hectare has been allotted to Adani Enterprises, located at Village – Ballada, Taluka – Nandpur, District – Korapur, State – Odisha.
- The area is covered in the Survey of India Toposheet No. 65J/10, 65J/11, 65J/14 & 65J/15 (R.F.1:50,000)) and is bound by latitude of 18°26'05.61588" N to 18°27'13.34448" N & longitude of 82°39'32.39136" E to 82°40'25.36716" E.
- The letter of Intent for Mining lease of bauxite block has been issued vide letter no. SM-MC2-MC-0007-2023/2143/S&M Bhubaneswar dated 1st March 2023 by Steel and Mines Department, Government of Odisha.
- The study area (10 km radius from the mine site boundary – buffer zone) elevation ranges from 717 m to 1274 m AMSL. The maximum elevation is observed in the mine lease area and eastern part of the study area.
- Koraput district is divided into Dissected plateau (hills & valleys), Undissected plateau (Plain), Pediplain and Ridges & Valleys.
- In mitigative measures, biological conservation plan and Engineering conservation plan will be adopted.
- The Jolaput Reservoir is the nearest waterbody which is situated at 3 Km away from the project site. The drainage pattern of this area is dendritic in nature.
- The district enjoys tropical climate characterized by hot summer, cold winters and rainy seasons.
- Cost estimate for Biological Conservation Plan which include green belt and sowing of seeds will cost around Rs. 25,17,500.
- Cost estimate for Engineering Conservation Plan which include Catch pits and Check dams or toe walls will cost around Rs. 24,99,000.
- The Total Cost of Soil Conservation Plan is Rs. 76,07,940 lakhs

Reference

- Mine Plan
- Ven Te Chow, "Hand Book of Applied Hydrology", (1964).
- Santosh Kumar Garg, "Irrigation Engineering and Hydraulic Structures"
- Andy Ward, Adrian Smith & Jack Caldwelt, Surface Erosion and sediment control at Open Cast Mine in South Africa, (1984) IAHS publication no. 144.
- Source-UNEP-DHI Partnership- Soil moisture conservation techniques
- Soil and Land Use Survey of India *(https://slusi.dacnet.nic.in/)*
- For Soil Moisture Conservation Map
    - *I.* *https://bhukosh.gsi.gov.in/Bhukosh/Public*
    - *II.* *https://bhuvan.nrsc.gov.in/*
    - *III.* *https://onlinemaps.surveyofindia.gov.in/*
    - *IV.* *https://earthexplorer.usgs.gov/*

Wildlife Conservation Plan

for

Ballada Bauxite Block Mining Lease for production of of 4 MTPA Bauxite using conventional open cast mining method over 144.945 ha. in Nandapur Tehsil of Koraput District and Balda Range of Koraput Forest Division, Odisha.

Project Proponent:

M/S Kalinga Alumina Ltd.

(Formerly known as Mundra Aluminium Limited)

Adani Corporate House,

Near Vaishnodevi Circle,

S.G Highway, Khodiyar Ahmedabad 382421, Gujarat

In compliance to specific condition No. 7 XXXVI and Terms of Reference (TOR) for EIA study and information to be included in EIA/EMP report vide File.No. SIA/OR/MIN/439954/2023 dt. 06.11.2023 issued by State Environment Impact Assessment Authority (SEIAA) Odisha.

Prepared By :

DIVISIONAL FOREST OFFICER
KORAPUT FOREST DIVISION

CONTENTS

Sl. No.	Title	Page No.
1	**Executive Summary**	i-vii
2	**Chapter-I -Introduction –** Brief Description of the project, Location, Nature & extent land required and condition imposed in EC regarding WLCP.	1-7
3	**Chapter-II -** Description of project area & impact area, land use, flora & fauna other habitats, movement pattern of mega fauna, wildlife corridor & HWC details in the area etc.	8-41
4	**Chapter-III -** Probable impacts of the project on Flora & fauna etc.	42-48
5	**Chapter-IV** -Mitigation Measures Required to counter the adverse impact of the project along with financial implication.	49-72
6	**Chapter-IV (A) -** Animal passage plan.	73
7	**Chapter-V** :Financial implications and monitoring - Total financial implications of proposals given and year wise cash flow statement. Monitoring and evaluation & interim review provision.	74-76
8	**Chapter-VI**: Maps and annexures – **i)** Topo map/maps in 1:50000 scale showing project area, impact area with forest blocks, Roads, Railway line, Water bodies, Reservoir& movement of mega fauna. **ii)** Map showing location of nearby protected area, wildlife corridor etc. **iii)** Survey of India Topo sheets showing proposed interventions to be implemented by DFO Koraput within 10 KM radius impact area of the project.	77
9	**Annexure-I** :Copy of Letter of Intent (LoI) issued by Govt. of Odisha in Steel and Mines Deptt. for granting mining lease over 144.945 ha. vide no. 2143/S&M, Bhubaneswar, dt. 01.03.2023	78-83

10	**Annexure-II** :Copy of online Application in form A (Part-I) for diversion of 157.212 ha. of forest land vide project ID (Single Windows No) SW/139582/23	84-94
11	**Annexure-III** : Copy of TOR issued by SEIAA, Odisha vide file no. SIA/OR/MIN/439954/2023 dt. 06.11.2023	95-110
12	**Annexure-IV** : Copy of Letter No. MCDR-MiFLOBXT/5/2023-BBS-IBM_RO_BBS dt. 08.08.2023 of Indian Bureau of Mines, Bhubaneswar approving Mining Plan.	111-112
13	**Annexure-V** : Copy of Govt. Approved cost norm for Wildlife protection/Anti depredation squad on current wage rate.	113
14	**Annexure-VI** :Copy of Approved cost norm for ANR gap plantation @ 500 plants per ha. with 10-year maintenance, concerned matrix.	114-118
15	**Annexure-VII** : Copy of Approved cost norm for Fencing for Compensatory Plantation raised inside using Bamboo twig and Thorn fencing.	119-121
16	**Annexure-VIII** : Reddy Reckoner for FY-2023-24 approved vide-O.O no. 1109 dt. 08.11.2021 of PCCF Odisha.	122-123
17	**Annexure-IX** : Copy of Approved cost norm for Block plantation with 1600 plant per ha.	124-128

Executive Summary

1. Ballada Bauxite Block Mining Lease (ML) of M/s Kalinga Alumina Limited (Formerly known as Mundra Aluminium limited, Adani Corporate House, Shantigram, Ahmedabad-382421, Gujarat, India) proposes for production of Bauxite occurring in the lease area over 144.945 ha. in side Nagasari Reserve Forest of Koraput Forest Division near Balda village, Nandapur Tehsil of Koraput District.

2. Govt. of Odisha in Steel and Mines Deptt. issued Letter of Intent (LoI) with reference to e-auction dt. 15.02.2023 for grant of mining lease over 144.945 ha. area vide No. 2143 dt. 01.03.2023 in favour of Kalinga Alumina Limited/Mundra Aluminium Limited for a period of 50 years.Annexure-I,Page No. 78 to 83.

3. The LoI is subject to fulfilling the terms and conditions mentioned in that letter for obtaining statutory clearances like Forest Clearance under FC Act 1980, Environmental Clearance under Environment (Protection) Act 1986 and EIA Notification 2006, other consents, approvals and no objections as would be required under applicable laws for grant of lease and commencement of mining operations by M/s Kalinga Alumina Ltd. Page No. 78 to 83.

4. M/s Kalinga Alumina Ltd. has obtained **Mining plan** approved vide No. MCDR-MIFL0BXT/5/2023-BBS-IBM_RO_BBSR dt.08.08.2023 for production of 4 million tonnes of Bauxite per annum in the said Ballada Bauxite block. Annexure-IV, Page No.111 to 112.

5. It has also filed online application in form-A (Part-I) on MoEF & CC web-portal for diversion of 144.945 ha as per LoI of Govt. of Odisha in steel and mines department for mining bearing project ID-SW/139582/23 for Ballada Bauxite mining project. Annexure-II, Page No.84 to 94.

6. It has obtained standard TOR (Terms of Reference) for Ballada Bauxite Mine from State Environment Impact Assessment Authority, Odisha (SEIAA) vide no. SIA/OR/MIN/439954/2023 dt. 06.11.2023.Annexure-III, Page No.95 to 110.

7. The mining process shall be opencast mechanized method as per Mining plan and Pre-feasibility study report prepared by M/S Kalinga Alumina Ltd.

8. The Ore type of Bauxite in Ballada lease is + 40% Al_2O_3. As the Bauxite of the site is high-grade having average of 42.15% Al_2O_3no beneficiation is to be done. Annexure-IV, as per approved Mining planPage No.111 to 112 and Pre-feasibility study report.

9. Capital cost of the project is around Rs. 230.00 crores and operation cost around 3185.00 crores. The cost of production per ton is estimated to be Rs. 3,185/- (including mining cost, royalty, DMF, Auction & premium etc.)as per approved Mining plan and Pre-feasibility study report.

10. Net Revenue from Bauxite sale shall be around 684 crore and nos. of population to be benefited due to the project will be 2000 nos. as perapproved Mining plan and Pre-feasibility study report.

11. **Location** - Village Balda, R.I Circle Balda under NandapurTehsil of Koraput District.

Inside Nagasari RF of Forest Beat-Balda,Section - Balda, Forest Range - Balda Range, Division - Koraput Division.

12.

Location as per GPS Co-Ordinates on survey of India Topo sheet no. E44K11			
Sl.No	**Direction**	**Latitude**	**Longitude**
1	North Side	18°27'11.49"N	82°40'23.23"E
2	South Side	18°26'5.61"N	82°39'50.38"E
3	East Side	18°26'34.37"N	82°40'4.47"E
4	West Side	18°26'37.01"N	82°39'33.83"E

13. Nature & Extent of land required :

Total ML/Project area –144.945 ha. inside Nagasari RF of Koraput Division

This Wildlife Conservation Plan (WLCP) is prepared in pursuance to specific condition No. 7 XXXVI and Standard TOR (**Terms of Reference)** for conducting Environment Impact Assessment study and information to be included in EIA/EMP report vide TOR condition No. 17, 18& 19 of SEIAA letter no. cited above:

Specific condition No. 7 XXXVI- Submit Wildlife Conservation Plan duly certified from the concerned DFO.

TOR conditions in Para 17, 18 & 19 (Copy enclosed at Page No.95 to 110,As Annexure-III)

Para – 17 - 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.

Para – 18 - Location of National Park, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site, Tiger/Elephant Reserve/(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 area as mentioned above, should be obtained from the standing committee of National Board of Wildlife and copy furnished.(Location Map is enclosed Plate-II)

Para – 19 - 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 along with budgetary provision for their conservation should be prepared in consultation with State Forest and Wildlife Department and detailed furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.

14. **Fauna like** Bear, Barking deer, Hare, Wild boar, Jackal, Porcupine, Jungle cat, Jungle fowl, Peacock, Rhesus monkey, Monitor lizard, Mongoose, Snakes like Cobra, Boda, Dhaman, Common langur are noticed in the forest of Nagasari R.F bordering the lease area.

15. **Flora**: The mining lease area is centrally a plateau covering an area of 92 ha. devoid of any vegetationas per calculation done on GIS Domain. However, the periphery of the lease over about 52.945 ha. mainly hosts species like Jamun, Kusuma, Harida, Bahada, Anla, Amba, Panasa, Rai/Raudi, Shindur,Dimiri, Karanja, Kanchana, Bela, Siali, MankadaKendu, Arjuna, Asana, Semul, Piasala, Paldhua, Gambhar, Char, Bhalia and Sunari etc.

16. **The ML area and project impact area do not form part of any Wildlife Sanctuary/ National Park/Tiger Reserve/Elephant Reserved/Eco-Sensitive Zone or Elephant Corridors etc. (Existing or Proposed|**

17. The nearest wildlife sanctuaries i.e Lakhari valley, Kotagarh, Karlapat & Baisipalli are located at a distance of 221.642 KM, 206.841 KM, 144.038 KM & 204.16 KM from the project site respectively from the project site. Accordingly map enclosed as Plate No. II

    Similarly identified elephant corridors like Kotagarh-Chandrapur, Karlapat-Urladani and Buguda andCentral RF of Nayagarh Division are located at a distance of 195.911KM, 187.922KM and 306.614KM from the project site respectively.

    Fauna of Impact Area

18. Schedule-I fauna like Sloth Bear, Pangolin, Jungle Cat, Hyena, Porcupine, Jackel, Ratel, Fox, Indian Otter, Ahiraj, Indian Python, Indian Cobra, Magar Crocodile are found in the forest blocks and water body of the buffer zone.

    Schedule-II fauna like Wild boar, Common Mongoose, Giant Indian squirrel, 3 Striped palm squirrels etc. are also noticed.

19. No **Rare and Endemic** flora & fauna are found either in the ML or in impact area.

20. **Man-Animal conflict**- No man-animal conflict is reported in the project area. Man-Sloth bear conflict is reported in the project impact area of Semiliguda Range.

    There are reports of human injury and casualty in the project impact area due to sloth bear attack. Instances of crop damage by wild boar and monkeys are also reported. Wild boar and Barking deer poaching occur occasionally in the impact area.

21. **Interventions inside project area (To be adopted by project proponent).**

i) For prevention of Illicit felling, Poaching, Forest fire provision for Watch & Ward, Fire protection squad, Fireline clearance, Fire blower and Awareness campaign have been proposed.

ii) Provision for internal road side **avenue plantation** in single row on either side over a length of about 5 Km with species like Krushnachuda, Radhachuda, Neem, Karanja, Jack fruit, chhatian, Patuli, etc.

iii) **Block plantation** with 1000 plant per ha. in open spaces, stock yards crusher sites etc. as per availability of area using indigenous wide crown to arrest fugitive dust, minimize light illumination and sound.

iv) To implement **soil** and **moisture conservation measures** across 7 to 8 seasonal nalas, water channel originating from the lease by construction of loose boulder check dams, gully plugging, wire mesh check dam, contour bonds etc.as per site requirement in order to prevent soil erosion by surface runoff during rain, siltation in nearby nalas, water sources and to divert clean water into nearby nalas.

v) Solar Power fencing with underground cable around the mining pits have been proposed to prevent fall of wild animals in to mining pits. The fencing shall be removed after back filling of pit.

vi) Creation of awareness among the mine working force for protection of wild animals and their habitats in and around mining lease area have been proposed.

vii) Contribution of Rs. 2.5 crores for ex-situ conservation of Papadahandi Mini Zoo in Nabarangpur Division have been proposed.

viii) The project proponent shall strictly adhere to the specific TOR conditions laid down in the SEIAA File No. SIA/OR/MIN/439954/2023 dt. 06.11.2023 for protection of flora and fauna in the project area and impact area at the project cost.

22. **Interventions proposed in the project impact area.**

Habitat Improvement

i) Provision for water bodies to provide water to wild animal during summer month have been proposed.
ii) Provision for Earthen bund WHS with spillway across nala to provide water to wild animals inside wildlife habitat.
iii) Provision for site specific SMC works like Drainage line treatment, LBCD of different size, Cement masonary check dam, RCC check dam, Graded bund, Sub-surface dyke, Contour bund and Gully plugging inside Nagasari RF, Bhimodoli RF, Podua RF, Thuba RF & Kansandi PRFas per field requirement have been proposed.
iv) Provision for uprooting of invasive weeds inside Nagasari RF to invite natural regeneration and establishment of existing forest species have been proposed.
v) Provision for fire blower for firefighting and fire tracing have been proposed.
vi) Incentive to local SHG Group/VSS in firefighting and protection of wildlife habitat have been proposed.
vii) Awareness campaign have been proposed for wildlife protection, fire protection and habitat improvement have been proposed.

Antidepredation Measures for Man-Animal conflict

i) Provision for a Wildlife protection/Antidepredation squad with provision of hired vehicle to mitigate Human-Animal/Bear conflict have been proposed.
ii) Provision for a two-story Mobile Squad Barrack for housing the protection squad and staff during Man-Animal conflict have been proposed.

Mitigation for Human Bear Conflict

I. Procurement of tools, cages and equipments for mitigation of HBC (Human Bear Conflict) have been proposed.

Monitoring and evaluation

i) Provision towards cost of monitoring and GIS Analysis, Research and Analysis, documentation etc. have been proposed.

Total cost of financial forecast for different mitigative interventions in the impact area is proposed to be **Rs. 457.546 Lakhs (Rupees Four Crores Fifty Seven Lakhs Fifty Four Thousands Six Hundred)** only.

The project proponent M/s Kalinga Alumina Ltd. shall deposit said amount in Ad-hoc CAMPA fund in favour of DFO Koraput Division after approval of the plan.

The project proponent shall implement different interventions proposed in the project area at the project cost under the supervision of DFO, Koraput Division for protection of flora and fauna inside and outside the lease area.

The plan has been prepared for a period of five year. Interim revision may be done evaluating the result of the presumptuous. The project proponent undertakes to prepare subsequent plans in continuation to this plan one year before expiry of this plan.

KALINGA ALUMINA LIMITED

Divisional Forest Officer
Koraput Forest Division

CHAPTER – I

i) Brief Description of the Project:

Ballada Bauxite Block Mining Lease (ML) **a B1 category ML** of M/s Kalinga Alumina Limited (Formerly known as Mundra Aluminium limited, Adani Corporate House, Shantigram, Ahmedabad-382421, Gujarat, India) is for production of Bauxite occurring in the lease area over 144.945 ha. in side Nagasari Reserve Forest of Koraput Forest Division near Balda village, Nandapur Tehsil of Koraput District.

The project area as well as the project impact area at a radius of 10 KM from the ML boundary has been shown on survey of India Topo sheet and google map and is annexed as **plate-I.**

The Government of Odisha in Steel and Mines Depatment issued Letter of Intent (LOI) with reference to e-auction dt. 15.02.2023 for grant of mining lease over 144.945 ha. area vide No. 2143 dt. 01.03.2023 (Copy enclosed as **Annexure-I**) in favour of Kalinga Alumina Limited/Mundra Aluminium Limited for a period of 50 years subject to fulfilling the terms and conditions mentioned in that letter and obtaining statutory clearances like Forest Clearance under FC Act 1980, Environmental clearance under Environment (Protection) Act 1986 and EIA Notification 2006 and other consents, approvals and no objections as would be required under applicable laws for commencement of mining operations.

According to the mining plan approved vide No. MCDR-MiFL0BXT/5/2023-BBS-IBM_RO_BBSR dt.08.08.2023 there shall be production of Bauxite at the rate of 4 million tonnes per annum by opencast mechanized method. **Annexure-IV**

As envisaged in the project report the ore type of Bauxite is + 40% Al_2O_3. As the Bauxite of the site is high-grade having average of 42.15% Al_2O_3 no beneficiation is to be done.

ii) Cost of the Project:

Total capital cost of the project is around Rs. 230.00 crores and operation cost around 3185.00 crores. The cost of production per ton is estimated to be Rs. 3,185/ (including mining cost, royalty, DMF, Auction & premium etc.)

The derivation of, or assumption made, regarding project capital and operation cost by the company is furnished below.

Calculation of capital cost

Sl. No.	Item / Activity	Amount in Crore	Remarks
1	Land Acquisition, NPV & CA	50	Project CAPEX spent by the proponent
2	Lease Deed, Stamp-Duty & Registration	45	
3	Studies & Clearances,	25	
	Surveys & Statutory Fees		
	Wild Life Management		
	Additional Exploration & Testing		
	Lease Boundary pillaring, DGPS survey etc.		
4	HEMM & Mining Equipment including Crushers & Mining Infrastructures	80	
5	Building / Workshop	5	
6	HR, Admin, Preoperative and Associated Expenses	10	
7	CSR	5	
8	Contingency	10	
Total		**230**	
Outside Mining Lease Area			
Logistics Facilities (Road & Rail)		60	CAPEX to be spent by logistics contractor.
Grand Total		**290**	

Estimation of operating cost

Cost of production, INR/t	
Mining Cost	430
Auction Premium, Royalty, Taxes	2510
Spares & Consumables, HR & Admin	63
Interest Component	182
Ex-Mines	**3185**

Cost of production per ton of mineral is estimated to Rs. 3,185 (it included Mining cost, Royalty, DMF & NMET, Auction premium etc). The Bauxite excavated from the mine may be used in own Bauxite plant or sell to other prospective buyers.

iii) Details of employment likely to be generated

a. During construction phase: ·

➢ Permanent employment :	[A]		20 nos.
➢ Period of employment :	[B]		180 days.
➢ Number of man days :	[X] = [A] × [B]		3600 nos.
➢ Temporary/Contractual employment (no. of man days) :	[Y]		27,000
Total	**[X] + [Y] =**		**30,600**

b. During operational phase: -

➢ Permanent employment :	[A]		30 nos.
➢ Period of employment :	[B]		3650 days.
➢ Number of man days :	[X] = [A] × [B]		1,09,500 nos.
➢ Temporary/Contractual employment (no. of man days) :	[Y]		3,50,000
Total	**[X] + [Y] =**		**4,59,500**

iv) Statement on net revenue and benefits to different Govt. bodies

Sl. No.	Parameters	Parameters	Rate (Rs. /T)	Production, Mn T	Amount
1	Net Revenue from Bauxite sale	Gross Revenue	3,537.6	19.399	6,862.6
		Operating Cost	3,185.0	19.399	6,178.6
		Net Revenue	352.6		684.0
2	Benefits to Different Govt. Bodies	Auction Premium	2,193.9	19.399	4,255.9
		Royalty	281.9	19.399	546.8
		DMF @ 10% of Royalty	28.2	19.399	54.7
		NMET @ 2% of Royalty	5.6	19.399	10.9
		Total Benefit	**2,509.6**		**4,868.3**
3	No. of population Benefits due to the project				2000
4	Economic Benefits due to direct and indirect employment created due to project and operation (500 people×9 year×Avg.2,00,000/year).				90.0
5	Economic Benefit due to compensatory Afforestation benefits from Compensatory Afforestation (CA) accruing over next 50 years monetized and discounted to the present value has been included as benefits from CA.				708.0
	Total Benefits (1+2+4+5)				**6,350.3**

v) Location of the Project:

The location of the ML with reference to the State Forest Deptt.& Revenue Deptt.jurisdiction is as under:

Location of the ML area as per State Forest Department jurisdiction		
Forest Beat	:	Balda beat of Balda Range.
Forest Section	:	Balda section of Balda Range.
Forest Range	:	Balda Range
Forest Division	:	Koraput Forest Division

Location of the ML area as per State Civil Department Jurisdiction		
Village	:	Balda
RI circle	:	Balda
Tehsil	:	Nandapur
Grama Panchayat	:	Balda
CD Block	:	Nandapur
District	:	Koraput

The said ML finds place within Latitude and Longitude as detailed below on survey of India Topo sheet E44K11 **(Plate-I)**

Location as per GPS Co-Ordinates			
Sl. No	Direction	Latitude	Longitude
1	North Side	18°27'11.49"N	82°40'23.23"E
2	South Side	18°26'5.61"N	82°39'50.38"E
3	East Side	18°26'34.37"N	82°40'4.47"E
4	West Side	18°26'37.01"N	82°39'33.83"E

vi) Topography of ML:

The topography of the ML is a plateau with flat hill top with elevation about 1100 m – 1265 m above mean sea level (AMSL) with slope on all sides covered with dense mixed jungle. The centre of plateau is devoid of any forest growth over an area of about 92 ha. and the fringe areas hosts vegetation over an area of about 52.945 ha. Continuous to rest of forest of Nagasari R.F.

Photograph of project area (Ballada Bauxite ML) Hill Top :

vii) Nature & Extent of land required:



Total ML/project area -144.945 ha. The entire lease area is reserve forest land in Nagasari RF comprising of compartment No. 11/VII, 11/VIII, 11/IX & 11/X Balda Range under Koraput forest division. However, in order to have access to the ML the UA has to utilise another 12.267 ha. (5.603 ha. from west side and 6.664 ha from east side) of forest land inside RF. Therefore, total forest land required for mining and access road in 157.212 ha. for which the UA has filed online application for forest diversion.

viii) Conditions imposed in stage – I or EC regarding WLCP:

M/s Kalinga Alumina Ltd. is on the process of complying all the terms and conditions mentioned in the Govt. of Odisha letter dt. 01.03.2023 within the stipulated time period and going to sign the mine development and production agreement after obtaining all consents, approvals etc. as may be required under applicable laws.

M/S Kalinga Alumina Ltd. has filed online application in form-A (Part-I) on MoEF & CC web-portal for diversion of157.212 ha (144.945 ha for mining & allied activities and 12.267 ha for access road) bearing project ID-SW/139582/23 in above Ballada Bauxite mining project **(Annexure-II).**

It has obtained TOR (Term of Reference) from the State Environment Impact Assessment Authority, Odisha vide File No. SIA/OR/MIN/439954/2023 dt. 06.11.2023 for conducting EIA study and information to be included in EIA/EMP report. **(Annexure-III).**

Hence as per the stipulations made in point no. 7 XXXVI and TOR point no.-17, 18 & 19 of the above SEIAA letter **(Annexure-III)** this draft WLCP is being prepared. The said stipulations envisage the following studies for preparation of the plan.

Specific condition No. 7 XXXVI- Submit Wildlife conservation plan duly certified from the concerned DFO.

TOR Point No. – 17 - 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.

TOR Point No.– 18 - Location of National Park, Sanctuary, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/Elephant Reserve/ (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 area as mentioned above, should be obtained from the standing committee of National Board of Wildlife and copy furnished.

TOR Point No.– 19 - 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 along with budgetary provision for their conservation should be prepared in consultation with State Forest and Wildlife Department and detailed furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.

Basing on the **specific condition** and **Terms of Reference (TOR)** for EIA/EMP report for this project of that letter of SEIAA in Point No. 7 XXXVI and TOR Point No. 17, 18 & 19 this Wildlife Conservation Plan is prepared according to the guideline issued by PCCF (WL) & CWLW, Odisha vide memo No. 3332 dt. 16.04.2022 and Memo No. 13,323 dt. 14.12.2023 to address the impact of the project on the schedule-I fauna present both in project area/ impact area proposing required mitigative interventions by the Divisional Forest Officer, Koraput Forest Division. Copy enclosed as **Annexure- III at Page No. 95-110.**

KALINGA ALUMINA LIMITED

Asst. Conservator of Forests
Koraput Forest Division
KORAPUT

Divisional Forest Officer
Koraput Forest Division

CHAPTER-II

Description of project area & impact area.

A. PROJECT AREA.

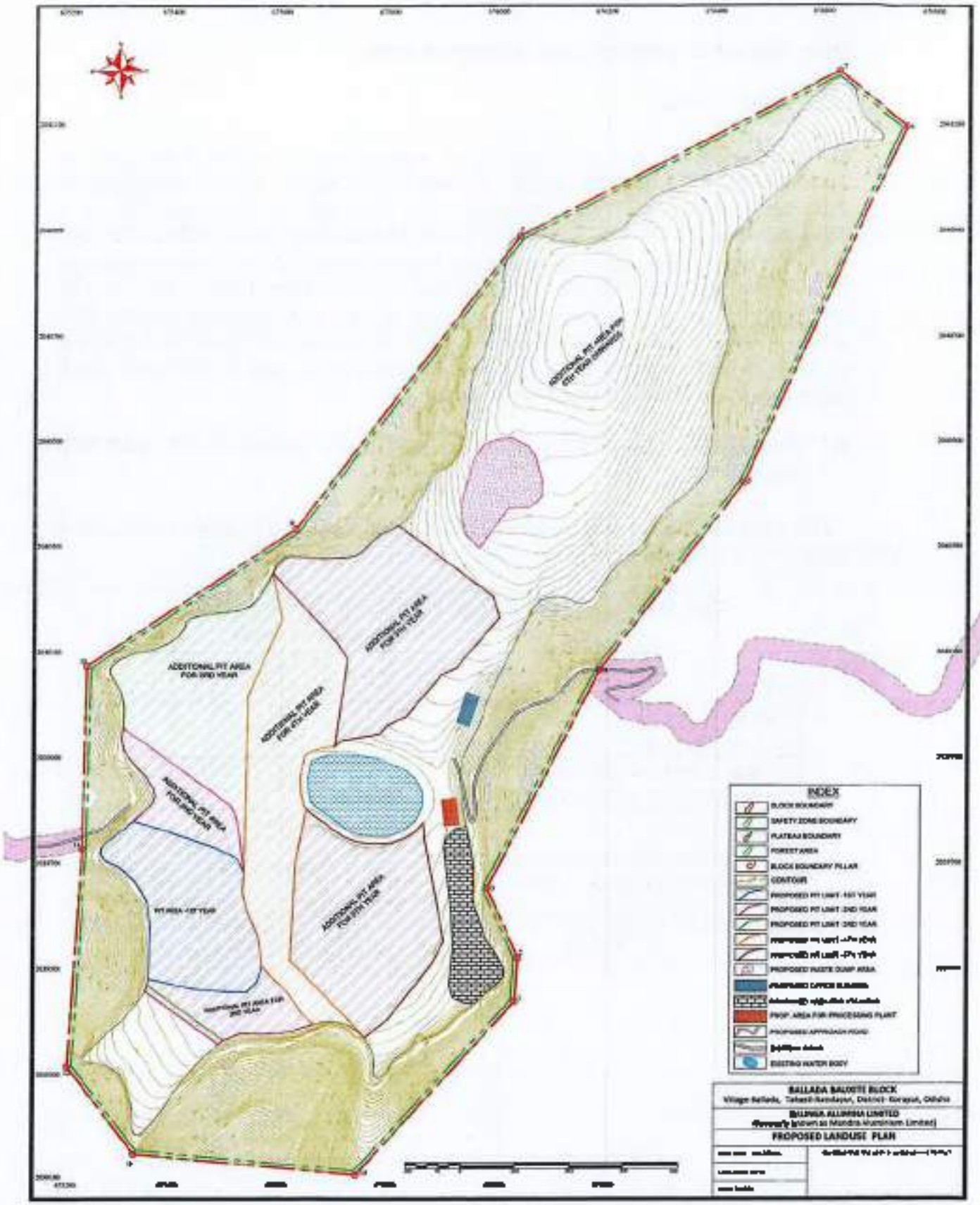
i) **Location :** It is a mining project comprising of mining lease area of 144.945 ha. located in Balda Range of Koraput Forest Division as narrated in the previous chapter. The hill top of Nagasari RF is a plateau devoid of any forest growth spreading over above 92 ha. However, the fringe area of the lease hosts degraded to dense vegetation over more than 52 ha. A hill cut road exists from Balda side to the lease. There are two caves at the edge of the hill towards South. The caves are very small and formed due to leaching/chemical weathering of rock, which is typical in bauxite formation. In one of the cave local deity is kept and worshiped by people.

ii) **Land use**: Total Mining lease area inside Nagasari RF-:**144.945 ha.**

The proposed land use plan of the project as per the approved mining plan area are furnished as under.

The Purpose/ Land use wise Area break-up			
Sl. No.	**Particulars**	**Forest area in ha.**	**Remarks**
1	Mining	73.895	
	Dumping of OB	3.15	
	Mineral Storage	1.93	
	Infrastructure work shop, Administrative building etc.	0.18	
	Road	0.38	
	Area earmarked for Safety zone 7.5 m Along ML Boundary Line	4.23	
2	Undisturbed/Virgin area	61.18	
	Total	**144.945 ha.**	

SKETCH MAP OF PROPOSE LAND USE PLAN OF MINING LEASE



iii) Human habitations: There is no human habitation inside the ML area and it does not require any displacement of human habitation.

As per the stipulation in para no. 19 of Terms of Reference it is stipulated that a detail biological study of the core zone as well as buffer zone (10 KM. Radius) of the periphery of the mining lease is to be carried out. Therefore, a details study of the core zone was carried out and the findings on the flora and fauna are furnished as under.

iv) **a. Flora**: The mining lease area is centrally a plateau covering an area of about 92 ha and devoid of any vegetation. However, the periphery of the lease contains forest growth at an average width of about 153 m which occurs in balance area of the RF. The forest growth on the periphery of lease occurs over about 52.945 ha. mainly towards western, eastern and southern side of the lease area at varying width from the central plateau.

This portion of project area inside Nagasari R.F mainly hosts species like Jamun, Kusuma, Harida, Bahada, Anla, Amba, Panasa, Rai/Raudi, Shindur, Dimiri, Karanja, Kanchana, Bela, Siali and MankadaKendu, Arjuna, Asana, Semul, piasala, Paldhua, Gambhar, Char, Batbhalia. Sunari etc.

b. Fauna: Fauna like Bear, Barking deer, Hare, Wild boar, Jackal, Porcupine, Jungle cat, Grey jungle fowl, Peacock, Rhesus monkey, Monitor lizard, Mongoose, Snakes like Cobra, Boda, Dhaman, Common langur are noticed in the forest of Nagasari R.F bordering the lease area.

Flora and fauna studied in the project area are furnished below.

Flora:-

LOCAL NAME	BOTANICAL NAME	FAMILY
Jamun	*Sysygiumcumini*	Myrtaceae
Kusum	*Schleicheraoleosa*	Sapindaceae
Harida	*Terminalia chebula*	Combretaceae
Bahada	*Terminalia bellirica*	Combretaceae
Aonla	*Emblica officinalis*	Euphorbiaceae
Amba	*Mangifera indica*	Anacardiaceae
Rai	*Delleniapentagyna*	Dilleniaceae
Dimiri	*Ficus glomerata*	Moraceae
Karanja	*Pongamia pinnata*	Fabaceae
Bela	*Bauhinia variegata*	Caesalpiniaceae
Kanchan	*Bauhinia variegata*	Caesalpiniaceae
Siali	*Bauhinia vahlii*	Caesalpiniaceae

Mankadakendu	*Diospyros malabarica*	Ebenaceae
Arjuna	Terminalia arjuna	Combretaceae
Asan	Terminalia tomentosa	Combretaceae
Semili	*Bombax ceiba*	Bombacaceae
Bija	*Pterocarpus marsupium*	Fabaceae
Gambhari	*Gmelina arborea*	Verbenaceae
Char	*Buchanania lanzun*	Anacardiaceae
Bhalia	*Semecarpus anacardium*	Anacardiaceae
Sunari	*Cassia fistula*	Caesalpiniaceae
Kasi	*Bridellia retusa*	Euphorbiaceae
Bandhan	*Desmodiumoojeinensis*	Fabaceae
Mundi	*Mitragynaparvifolia*	Rubiaceae
Moi	*Lanneacoromandelica*	Anacardiaceae
Sonnha (Sidha)	*Lagerstroemia parviflora*	Lythraceae
Mahul	*Madhuca indica*	Sapotaceae
Kamalagundi	*Mallotusphillippensis*	Euphorbiaceae
Kurei/Kurmi	*Holarrhenaantidysenterica*	Apocynaceae
Dhatiki	*Woodfordiafruticosa*	Lythraceae
Girli	*Indigofera pulchela*	Fabaceae
Ban-Khajuri	*Phoenix acaulis*	Arecaceae
Pokasunga	*Eupatorium odoratum*	Asteraceae
Bhanta	*Clerodendron infortunatum*	Verbenaceae

Fauna :-

Mammals, Birds, Reptiles			
Local Name	**English Name**	**Latin Name**	**Schedule**
Bhalu	Sloth bear	*Melursus ursinus*	*I*
Kutura	Barking deer	*Muntiacusmuntijack*	*II*
Thekua	Hare	*Lepus nigricollis*	*II*
Barha	Wild boar	*Sus scrofa cristamus*	*II*
Bilua	Jackal	*Canis aureus*	*I*
Jhinka	porcupine	*Hystrix indica*	*I*
Bambiradi	Jungle cat	*Felis chaus*	*I*
Banakukuda	Jungle fowl grey	*Gallus sonneratii*	*I*
Mayur	Peafowl common	*Pavocristatus (Linnaeus)*	*I*
Mankada (Pati)	Rhesus monkey	*Macaca mulatta*	*II*
PaniGodhi	Water monitor	*Varnussalvador*	*II*
Godhi	Land monitor	*Varnus bengalensis*	*II*
Neula (Hatia)	Common mangoose	*Herpestesedwardsi*	*II*
Naga (Gokhar)	Indian cobra	*Naja species*	*I*
Boda	Common boa	*Boa constricta*	*II*
Dhamana	Rat snake	*Ptyasmucosus*	*II*
Godhi	Land monitor	*Varnus bengalensis*	*II*

Mankada (Hanu)	Monkey	*Presbylis entellus*	II
Mankada (Pati)	Rhesus monkey	*Macaca mulatta*	II
Pecha	Owl Indian greathorned	*Bubo bubo*	II
Kau	Crow house	*Corvus splendens*	II
Kapota	Dove spotted	*Streptopelia chinensis*	II
Bari	Mynaindian	*Acridotherestristris*	II

v) Wildlife corridors and Human-Wild animal conflict:

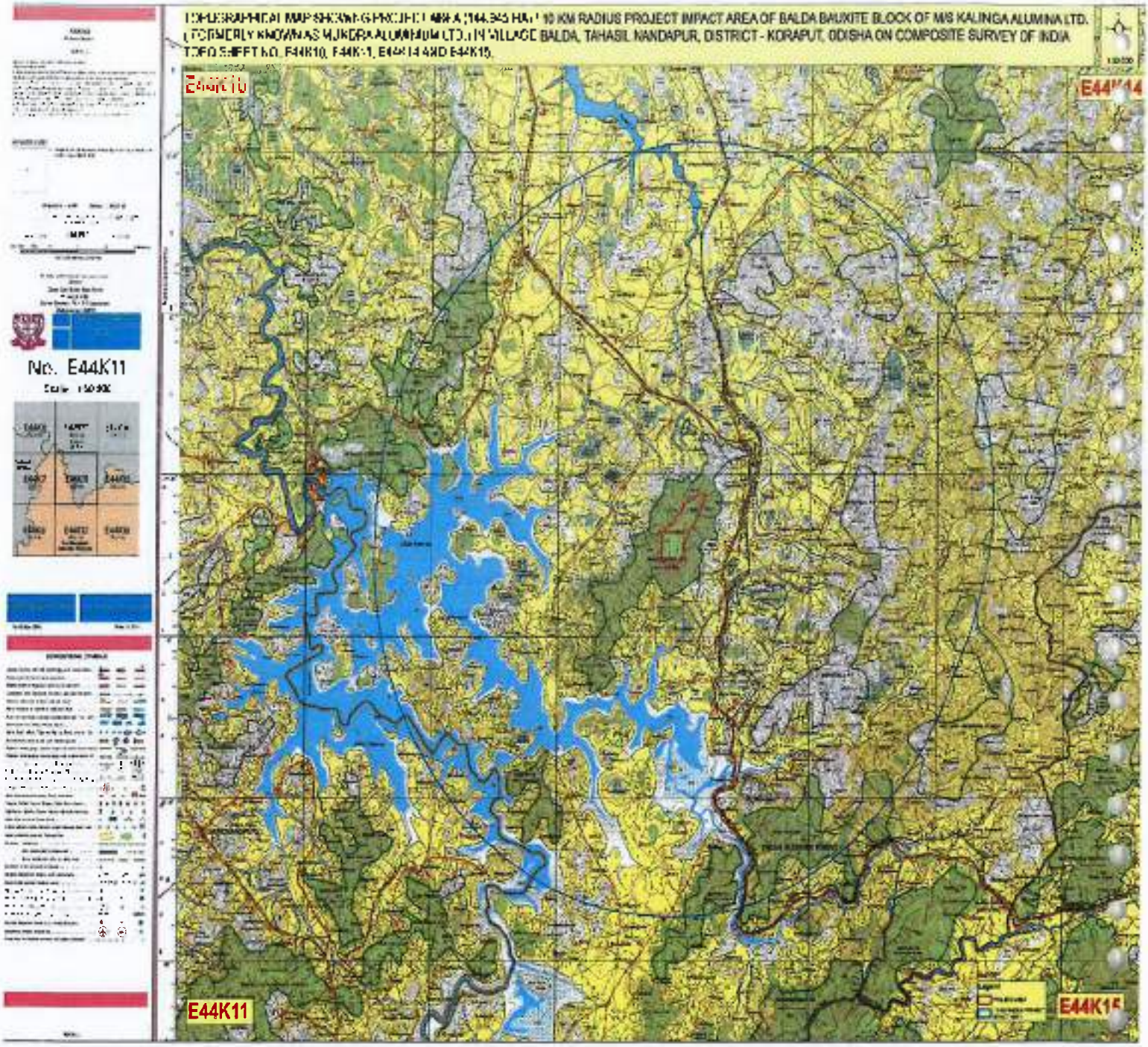
The ML area does not form part of any wildlife corridors and no such man-animal conflict has been reported. Besides it does not form part of any protected area or their eco-sensitive zone. No Wildlife Sanctuary, National Park, Tiger reserve and elephant corridor exists nearer to the project site.

The wildlife sanctuaries i.e. Lakhari valley, Kotagarh, Karlapat & Baisipalli are located at a distance of 221.642 KM, 206.841 KM, 144.038 KM & 204.16 KM respectively from the project site.

Similarly identified elephant corridors like Kotagarh-Chandrapur, Karlapat-Urladani and Buguda central RF of Nayagarh Division located at a distance of 195.911KM, 187.922KM and 306.614KM respectively from the project site.

B. PROJECT IMPACT AREA :

i) **Location** : 10 KM radius of project impact area finds place on Survey of India Topo sheet No E44K11, E44K10, E44K14&E44K15



The10 KM radius impact area of the ML occurs in three forest ranges namely **Balda Range, Semiliguda Range & Lamtaput Range of Koraput Forest Division**.

ii) Land use: Land use pattern (Approximate) of the10 KM radius total project impact is as under :

a) Reserve Forests, PFs & PRFs etc. totalling to 18 nos. : About 50 Sqkm.
b) Agricultural land, non-forest Govt. land : About 143.44 Sqkm.
c) Jolaput reservoir inside the impact area covers : About 41.50 Sqkm.
d) Rivers like Machhakunda, Gurahi and Patala flows inside the impact area.
e) Total nos. of villages/hamlets within 10 KM impact area of the mining lease: About 40 nos. where there are about 4182 house hold comprising of about 16,000 population. The most human settlements in villages like Balda, Lulluburu, Godiput, Maliput, Katiput, Mulda, kakada, petal, Baraba, Karanjaguru, Bodaliguru, Chiliput, Handiput, H.Khilaput, Bheja, Hanjrapentha, Sukriput, Badel, Kakua, Somali, Kitabu, Banuru, Atanda, Patal, Padwa, Arlabput, Dorasabalpur, Malisubular are noticed.

Roads, Railways, Rivers, Nalas: About 26 KM length of Kottabalasa – Kirundul branch of East coast railway line passes though the project impact area of the lease. The Rly. Track is about 5 KM away from the lease boundary. NH-516E from Aruk to Semiliguda over a length 25 KM and PWD road from Nandapur to Darliput and another from Sagur to Jolaput passes through the impact area. Besides many RD roads, Panchayat Roads and Village roads also passes through the impact area. Balda SH is about 1.5 Km away from the lease boundary.

There are some seasonal/perennial nalas flows down along the slope of Nagasari RF and ultimately drain the surface runoff to river Patal and Machhakunda river. Hence Nagasari RF can be treated Partly as the catchment area of those rivers.

iii) Forests, Flora, Fauna: The following forest blocks with respect to three Ranges of Koraput Forest Division fall partly or wholly in the project impact area.

Sl. No.	Name of the forest block	Name of the Range	Full/part	Area as per W.P/ (Approximate in ha.)	Total area already treated under various schemes from 2019-20 to 2023-24
1	Nagasari RF	Balda	Full	1181.1852	130.00
2	Powlput RF	Balda	Full	246.0130	40.00
3	Palma RF	Balda	Part	230.12	
4	Bhimodole RF	Balda	Full	618.7863	155.00
5	Bhimodole Ext.	Balde	Full	162.8108	0
6	Hatibari PRF	Balda	Part	151.00	205.00
7	Hatibari Ext. PRF	Balda	Full	74.0197	10.00
8	Padua RF	Balda	Part	720.648	215.00
9	Rantha DPF	Balda	Part	206.309	130.00
10	Lulubaru PRF	Balda	Full	76.4074	0
11	Champaput PRF	Balda	Full	32.5379	0
12	Jabagarh RF	Lomtaput	Part	152.68	100.00
13	Balel RF	Lomtaput	Part	319.271	0
14	Bilaput RF	Lomtaput	Full	32.7807	0
15	Thuba RF	Semiliguda	Full	343.9950	0
16	Kalladi PRF	Semiliguda	Part	52.791	30.00
17	Kansandi PRF	Semiliguda	Full	398.0225	30.00
18	Kituba RF	Semiliguda	Full	8.058	0
	Total			**5007.4355 ha.**	**1345**

FORESTS AND FOREST TYPES OF IMPACT ZONE :

Forest type is defined as a unit of vegetation which possesses similar characteristics of physiognomy, structure, function, floristic composition and phenology influenced by climate and topography (Champion & Seth (1968). The climatic and edaphic factors coupled with biotic disturbances in Koraput Division have given rise to a rich and varied flora. According to Champion & Seth, the forest types in the division are categorized as under.

Forests of Koraput Forest Division are mainly Tropical dry deciduous type and broadly classified in to two major groups such as Moist Tropical Forests, Dry Tropical Forests. According to Champion & Seths revised classification of forest types of India, these forests have been further classified in to different sub types depending upon physiognomy moisture conditions, flora composition and other variables. As per the above classification the forest of project area and impact area fall under the following category.

1. Northern dry mixed deciduous forests:

Group 5	:	Tropical dry deciduous forests.
Sub group 5B	:	Northern tropical dry deciduous forests.
Type $5B/C_2$	:	Northern dry mixed deciduous forests.

Nagasari RF which is a dense mixed Forest and partly degraded fall under the above type.

The top canopy of this type of forests includes species like Shore Robusta (Sal), Pterocarpus marsupium (Piasal), Terminalia tomantosa (Asan), Bombax ceiba (Simul), Mitragyna parviflora (Mitkania), Anogeissus latifolia (Dhoura) and Gmelina arborea (Gambhar) etc.

The middle storey consists of Bridelia retusa (Kasi), Dalbergia sissoo (sisoo), Ougeinia oojeinensis (Bandhan), Lannea coromandelica (Mai), Lagerstroemia parviflora (siddha), Buchanania lanzan (Chara), Aegle marmelos (Bela), Terminalia belerica (Bahada), Terminalia chebula (Harida), Semicarpus anacardium (Bhalia), Syzygium cumini (Jamun), Diospyros melanoxylon (Kendu), Schleichera oleosa (Kusum), Madhuca indica (Mahul), Cleistanthus collinus (Karda), Morinda tinctoria(Achu), Sterculia urens (Genduli), Dellenia pentagyna (Rai), Emblica officinalis (Anla), Tamarindus indica (Tentuli), Anogeissus ecuminata (Phasi), Mangifera indica (Amba), Bauhinia variegate (Kanchan), Mallotus phillippensis (Kamala Gundi) and Pongamia pinata (Karanja) etc.

Undergrowth like Woodfordia fructiosa (Dhatiki), Holarrhena antidysenterica (Kurei), Indigofera pulchela (Girli), Andrographis paniculate (Bhuinim), Phoenix acaulis (Bana Khajuri), Tridax procumbens (Bishalya Karani), Eupatorium odoratum (Pokosunga) and Clerodendron infortunatum (Bhant) etc. are also noticed in this forest type.

2. Dry deciduous scrub forests:

Group 5	:	Tropical dry deciduous forests.
Type $5/DS_1$	:	Dry deciduous scrub forests (Biotic climax type).

Powlput RF, Bhimodole RF and adjoining RFs having scrub forests more or less comes under the above type. Such forests are result of continued biotic interferences and known as biotic climax type. The vegetation of this types of forests are Adina cardifolia (Kuruma), Anogeissus latifolia (Dhaura), Bombax ceiba (Simili), Boswellia serrata (Salai), Bridelia retusa (Kashi), Dalbergia latifolia (Pahadi sissoo), Diospyros melanoxylon (Kendu), Burscra serrata (Rajamai), Lagerstroemia parviflora (Sidha), Linnea coromondelica (Mai), Madhuca indica (Mahula), Mitragyna parviflora (Mundi), Peteocarpus marsupium (Piasal), Shore arobusta (Sal), Syzigium cumini (Jamun), Terminalia belerica (Bahada), Terminalia tomentosa (Asan) & Miscellaneous species. Species composition relating to middle storey and

under growth are similar to Northern dry mixed deciduous forests. The regeneration status is very poor in this type of forests.

3. Southern dry mixed deciduous forests:

Group 5	:	Tropical dry deciduous forests.
Sub group 5A	:	Southern tropical dry deciduous forests
Type $5A/C_2$	:	Southern dry mixed deciduous forests.

Hatibari PRF having open mixed jungle and in partly degraded condition. Lulubaru PRF& Padua RF having open forests in highly degraded condition and adjoining forest blocks in impact zone have been grouped in this category. The floristic composition is like Terminalia tomentosa (Asan), Anogeissus latifolia (Dhaura), Boswellia serrata (Salai), Ougeniaoojeneensis (Tinsa), Sterculia urens(Genduli), Shorearobusta(Sal), Pterocarpus masupium(Piasal), Bridellia retusa(Kasi) and Diospyros melanoxylon(Kendu) etc.

The middle storey consists of Chloroxylon swietenia (Bheru), Emblica officinalis (Anla), Morinda tinctoria (Achu), Cassia fistula (Sunari), Bauhinia racemose (Ameta), Dalbergia latifolia (Pahedisisoo), Buchananialanzan(Char) and Careya arborea(Kumbhi) etc.

Under storey consists of Woodfordia fructicisa (Dhatiki), Holarrhena antidysenterica (Kurei), Lantana camara (Nagauiri), Zizyphus oenoplea (Kanteikoli) etc. with main climbers being Bauhinia vahlii (Siali), Butea superb (Lata Palasa), Smilax macrophylla (Muturi) and Combretum, deandrum (Atundi). These forests are subject to heavy grazing, burnt annually and regeneration is very poor.

List of flora of Koraput Division with reference to working plan prepared for the project 2006-07 to 2015-16.

COMMON TREES		
LOCAL NAME	**BOTANICAL NAME**	**FAMILY**
Achu	*Morinda tinctoria*	Rubiaceae
Agasti	*Sesbania grandiflora*	Fabaceae
Amara	*Bauhinia racemosa*	Caesalpiniaceae
Amba	*Mangifera indica*	Anacardiaceae
Ambada	*Spondiasmangifera*	Anacardiaceae
Ambalata	*Bauhinia racemosa*	Caesalpiniaceae
Amrud(Pijuli)	*Psidium guajava*	Myrtaceae
Andini (Rajmai)	*Bursera serrata*	Burseraceae
Ankula	*Alangiumlamarckii*	Alangiaceae
Aonla	*Emblica officinalis*	Euphorbiaceae
Ashoka	*Saracaasoca*	Caesalpiniaceae
Babul	*Acacia nilotica*	Mimosaceae
Badopatri	*Callicarpa arborea*	Verbenaceae

LOCAL NAME	BOTANICAL NAME	FAMILY
Bahada	*Terminalia bellirica*	Combretaceae
Balthia(paldhua)	*Erythrina suberosa*	Fabaceae
Bandhan	*Desmodiumoojeinensis*	Fabaceae
Bankapasia	*Kydiacalycina*	Malvaceae
Barbakulia	*Dalborgiapaniculata*	Fabaceae
Baro	*Ficus benghalensis*	Moraceae
Barun	*Crateva religiosa/ C.nurvala*	Capparaceae
Belo	*Aegle marmelos*	Rutaceae
Bhalia	*Semecarpus anacardium*	Anacardiaceae
Bhenta	*Limoniaacidissima*	Rutaceae
Bheru	*Chloroxylon swietenia*	Rutaceae
Bija	*Pterocarpus marsupium*	Fabaceae
Bishnuchuda	*Jacaranda mimosifolia*	Bignoniaceae
Blue gum (Nilagiri)	*Eucalyptus globulus*	Myrtaceae
Bod-kurhein	*Wrightia tomentosa*	Apocynaceae
Chadaigudi	*Vitex peduncularis*	Verbenaceae
Chakunda(Bada) / Rain tree	*Samanea saman*	Mimosaceae
Chakundi	*Cassia siamea*	Caesalpiniaceae
Champa	*Michetiachampaca*	Magnoliaceae
Chandan	*Santalum album*	Santalaceae
Char	*Buchananialanzan*	Anacardiaceae
Chhatin	*Alstoniascholaris*	Apocynaceae
Dam kuruda	*Gardenia latifolia*	Rubiaceae
Dauranja	*Holoptelia integrifolia*	Ulmaceae
Debadaru (Ashoka)	*Polyalthia longifolia*	Annonaceae
Dhaman	*Grewia tiliifolia*	Tiliaceae
Dhaura	*Anogeissus latifolia*	Combretaceae
Dimiri	*Ficus glomerata*	Moraceae
Gadapanasa (Baghoari)	*Litsea macrophylla*	Lauraceae
Gambhari	*Gmelina arborea*	Verbenaceae
Gandhapalasa	*Miliusavelutina*	Annonaceae
Genduli	*Sterculia urens*	Sterculiaceae
Ghanto	*Zizyphusmauritiana*	Rhamnaceae
Giringa	*Pterospermumheyneanum*	Sterculiaceae
Gohira	*Acacia leucophloea*	Mimosaceae
Gondaguria	*Macaranga peltata*	Euphorbiaceae
Guniari (Kantapalas)	*Cochlospermumgossipium*	Cochlospermaceae
Haldi	*Diospyros montana*	Ebenaceae
Haldu(Halamda)	*Haldina cordifolia (Adina cor*	Rubiaceae
Harida	*Terminalia chebula*	Combretaceae
Hinjal	*Barringtonia acutangula*	Barringtoniaceae

1008

LOCAL NAME	BOTANICAL NAME	FAMILY
Jamun	*Sysygiumcumini*	Myrtaccae
Japhra	*Bixa orellana*	Bixaccae
Jeoktha (Makeyjack)	*Artocarpus lakoocha*	Moraceae
Kadamba	*Anthocephaluscadamba*	Rubiaceae
Kaitho	*Feronia elephantum*	Rutaceae
Kaju(Lanka Badam)	*Anacardium occidentale*	Anacardiaceae
Kalasiris	*Albizia lebbeck*	Mimosaceae
Kamalagundi	*Mallotusphillippensis*	Euphorbiaceae
Kanchan	*Bauhinia variegata*	Caesalpiniaceae
Kansa	*Hymenodictyonexcellsum*	Rubiaceae
Karanja	*Pongamia pinnata*	Fabaceae
Karda	*Cleistanthuscollinus*	Euphorbiaceae
Kasi	*Bridellia retusa*	Euphorbiaccae
Kendu	*Diospyros melanoxylon*	Ebenaceae
Kenkat	*Garuga pinnata*	Burseraccae
Khaira	*Acacia catechu*	Mimosaceae
Khajuri	*Phoenix sylvestris*	Areaceae
Kochila	*Strychnosnux-vomica*	Strychnaceae
Koniyari	*Cascabelathevetia*	Apocynaceae
Krushna Chuda/Gulmohar	*Delonix regia*	Caesalpiniaceae
Kuilari (Debakanchan)	*Bauhinia purpurea*	Caesalpiniaceae
Kusum	*Schleicheraoleosa*	Sapindaceae
Machhkund/Giringa	*Pterospermumheyneanum*	Sterculiaceae
Mahagni	*Swietenia mahagoni*	Meliaceae
Mahul	*Madhuca indica*	Sapotaceae
Mankadakendu	*Diospyros malabarica*	Ebenaceae
Moi	*Lanneacoromandelica*	Anacardiaceae
Mokha/Mukha	*Schreberaswietenioides*	Oleaceae
Munagha(Sajana)	*Moringa oleifera*	Moringaceae
Mundi	*Mitragynaparvifolia*	Rubiaceae
Neem/Limba	*Azadiracta indica*	Meliaceae
Nilagiri	*Eucalyptus species*	Myrtaceae
Padhel (Chuinpatoli)	*Pterospermumsuaveolens*	Sterculiaceae
Pahadisisoo	*Dalbergia latifolia*	Fabaceae
Palasa	*Butea monosperma*	Fabaceae
Panas	*Artocarpus heterophyllus*	Moraceae
Panigambhari	*Trewianudiflora*	Euphorbiaceae
Phasi	*Anogeissusaccuminata*	Combretaceae
Phemphana	*Oroxylum indicum*	Bignoniaceae
Pine(Khasi) Pipal	*Pinus insularis/P.khasia*	Pinaceae
Pipal	*Ficus religiosa*	Moraceae
Pitajamu (poi-gam)	*Syzygium operculate*	Myrtaceae
Radhachuda	*Peltophorumferrugineum*	Caesalpiniaceae
Rai	*Delleniapentagyna*	Dilleniaceae
Ram phala	*Annona reticulata*	Annonaceae

LOCAL NAME	BOTANICAL NAME	FAMILY
Rithaphala (Muktamanja)	*Sapindusmucorosis*	Sapindaceae
Rohini	*Soymidafebrifuga*	Meliaceae
Safed siris	*Albizzia procera*	Mimosaceae
Saguan (Teak)	*Tectona grandia*	Verbenaceae
Sahada	*Strebulus aspera*	Moraceae
Sahaja (Asan)	*Terminalia tomentosa*	Combretaccae
Sal	*Shorearobusta*	Dipterocarpacea e
Salai	*Bosuellia serrata*	Burseraceae
Salap (Toddypalm)	*Caryotaurens*	Areaceae
Semili	*Bombax ceiba*	Bombacaceae
Sennha (Sidha)	*Lagerstroemia parviflora*	Lythraccae
Silver oak	*Grevelliarobusta*	Proteaceae
Sisoo	*Dalbergia sissoo*	Fabeceae
Sunajheri	*Acacia auriculiformia*	Mimosaceae
Sunari	*Cassia fistula*	Caesalpiniaccae
Tala	*Borassus flabellifer*	Arecaceae
Tangini	*Xyliaxylocarpa*	Mimosaccae
Tentuli	*Tamarindus indica*	Caesalpiniaccae
Thelka	*Tamilnadianuliginosa*	Rubiaceae
Toon	*Toona ciliata*	Meliaceae
Tulip tree (African)	*Spathodeacampanulata*	Bignoniaceae

HERBS AND SHRUBS		
LOCAL NAME	BOTANICAL NAME	FAMILY
Amada/Ama-haldi	*Curcuma amada*	Zingiberaceae
Anata-mula	*Hemidesmus indicus*	Asclepiadaceae
Antia (Murmuria)	*Helicteresisora*	Sterculiaceae
Apamaranga	*Achyranthes aspera*	Amaranthaccae
Arakha (arka)	*Calotropis procera*	Asclepiadaceae
Ashwagandha	*Withaniasomnifera*	Solanaceae
Ata/Seetaphal	*Annona squamosa*	Annonaceae
Baigaba	*Jatropha carcus*	Euphorbiaceae
Bana-tulasi	*Ocimumgratissimum*	Lamiaceae
Ban-Khajuri	*Phoenix acaulis*	Arecaceae
Barkoli	*Ziziphus mauritiana*	Rhamnaceae
Basanga	*Justicia adhatoda*	Acanthaceae
Besharam/Omori	*Ipomea carnea*	Convolvulaceae
Bhant	*Clerodendroninfortunatum*	Verbenaceae
BhejiBaigene (Ankaranti)	*Solanum xanthocarpum*	Solanaceae
Bhuin-Nim (Chirecta) (Kala-megh)	*Andrographis paniculata*	Acanthaceae
Bhursunga (Mirsingapattra)	*Murrayakoenigii*	Rutaceae

LOCAL NAME	BOTANICAL NAME	FAMILY
Bisalya-karani/Bhumi poksungo	*Tridax procumbens*	Asteraceae
Bisiripi/Bajramuli	*Sida cordifolia*	Malvaccae
Brahmi/Thalkuni	*Hydrocotyle asiatica*	Apiaceae
Datura (Duddura)	*Datura stramonium*	Solanaccae
Dhatiki	*Woodfordiafructicosa*	Lythraccae
Dholachakunda	*Cassia tora*	Cacsalpiniaccae
Gangasiuli (gotikhadika)	*Nyctanthesarbortriatis*	Oleaceae
Girli	*Indigofera pulchela*	Fabaccae
Gokhara	*Tribulus terrestris*	Averrhoaccae
Gudamari	*Premnaherbacea*	Verbenaceae
Hansalata	*Aristolochiabracteata*	Aristolochiaceae
Hariharika	*Euphorbia hirta*	Euphorbiaceae
Jada	*Ricinus communis*	Euphorbiaceae
Kaminic	*Murrya exotica*	Rutaceae
Kanteikoli	*Zizyphusoenoplea*	Rhamnaceae
Karibira	*Nerium indicum*	Apocynaceae
Khadisiju	*Euphorbia tirucalli*	Euphorbiaceae
Khakada (Kakali)	*Casearia tomentosa*	Flacourtiaceae
Khuradu	*Gardenia gummifera*	Rubiaceae
Kila keruan	*Ixora parviflora*	Rubiaceae
Kundaphula	*Jasminum pubescens*	Oleaceae
Kundo-phul	*Jasminum humile*	Oleaceae
Kurei/Kurmi	*Holarrhenaantidysenterica*	Apocynaceae
Mchandi (Manjuati)	*Lawsoniainermis*	Lythraceae
Mohana (Pottua)	*Randiadumetorum*	Rubiaccae
Murga	*Agave americana*	Agavaceae
Mur-muria	*Helicteresisora*	Sterculiaceae
Nagauiri(Nagaboiri)	*Lantana camara*	Verbenaceae
Nilabaigaba	*Jatropha gossypifolia*	Euphorbiaceae
Nirgundi (Begunia)	*Vitex negundo*	Verbenaceae
Palma/Palagunda	*Curiuma angustifolia*	Zingiberaceae
Palua/Bana-haldi	*Curcuma aromatica*	Zingiberaceae
Patalgaruda	*Rauvolfia serpentina*	Apocynaceae
Pokasunga	*Eupatorium odoratum*	Asteraceae
Punarnava/Pugincannava	*Boerhaviadiffusa*	Nyctaginaceae
Raktachitaparu(Lal-chita)	*Plumbago rosea/P.indica*	Plumbaginaceae
Ranikathi	*Flemingiachappar*	Fabaccae
Saru	*Colocasia esculenta*	Araceae
Simakoina	*Pithecellobium dulce*	Mimosaceae
Sisal	*Agava sisalana*	Agavaceae
Sitaparu/Dhola-chitaparu	*Plumbago zeylanica*	Plumbaginaceae

LOCAL NAME	BOTANICAL NAME	FAMILY
Sunaragoda	*Grewia hirsuta*	Tiliaceae
Tilai	*Wendlandia tinctoria*	Rubiaceae
Tulasi (Kala)	*Ocimumzanctum*	Lamiaceae
Tulasi(Dhala)	*Ocimumbasilicum*	Lamiaceae

CLIMBERS		
LOCAL NAME	**BOTANICAL NAME**	**FAMILY**
Arkawla	*Millettia auriculata*	Febaceae
Atundi	*Combretum decandrum*	Combretaceae
Dantari (Nali-Kantia)	*Acacia sinuata*	Mimosaceae
Desi Alu	*Dioscoreadeltoidea*	Dioscoreaceae
Dudhi-mal	*Cryptolepisbuchananii*	Periplocaceae
Gilo	*Entada acandens/E.pursaitha*	Mimosaceae
Gunja (Kaincha)	*Abrusprecatorius*	Fabaceae
Kalmi sag	*Ipomea reptans*	Convolvulaceae
KaruKando/Kulihakanda	*Dioscoreahispida*	Dioscoreaceae
Lata palasa	*Butea superba*	Fabaceae
Madang	*Loranthus scurrula*	Loranthaceae
Madhumalati	*Hiptagemadablota*	Malpighiaceae
Mehcriaphulo	*Gloriosa superba*	Liliaceae
Muturi	*Smilax macrophylla*	Smilaceae
Nirmuli	*Cassytha filiformis*	Cassytha
Petchurimal(Torida)	*Ventilagomadraspatana*	Rhamnaceae
Pitchuli/Kantamali	*Ventilagodenticulata*	Rhamnaceae
Satawari	*Asperagusracemosus*	Liliaceae
Siali	*Bauhinia vahlii*	Caesalpiniaceae

BAMBOO		
LOCAL NAME	**BOTANICAL NAME**	**FAMILY**
BadieBauns	*Bambusa nutans*	Poaceae
Bauns (Salia bamboo)	*Dendricalamusstrictus*	Poaceae
Daba Bauns (Kanta bamboo)	*Bambusaarundinacea*	Poaceae
Sundarkani	*Bambusa vulgaris*	Poaceae
TaledaBauns	*Bambusatulda*	Poaceae

GRASSES		
LOCAL NAME	**BOTANICAL NAME**	**FAMILY**
Balunga	*Oryza rufipogon*	Poaceae
Basana	*Bethriochoapertma*	Poaceae
Chhana	*Imperataarundinaceae*	Poaceae
Dhanwaritari	*Cymbopogon flexuosus*	Poaceae
Duba (Dhubo)	*Cynodondactylon*	Poaceae

LOCAL NAME	BOTANICAL NAME	FAMILY
Ghodalanji	*Aristida setacea*	Poaceae
Gondabena	*Bothriochloabladhii*	Poaceae
Guguchia	*Chrysopogongryllus*	Poaceae
Jharu	*Arundinellasetosa*	Poaceae
Kasatandi (Chadeia)	*Saccharum spontaneum*	Poaceae
Khus Khus (Bena)	*Vetiveriazizaniodes*	Poaceae
Koji jhipa (Kuti)	*Eragrostiscouretata*	Poaceae
Noto	*Phragmites karka*	Poaceae
Phulbadhun (PhulJhadu)	*Thysanolaena maxima*	Poaceae
PhuriPhuri	*Eragrostisunioloides*	Poaceae
Rosa grass	*Cymbopogon maunii*	Poaceae
Sabai (Panasi)	*Eulaliopsisbinata*	Poaceae
Sinkulia	*Heteropogoncontortus*	Poaceae
Tandi (kasatandi)	*Saccharum spontaneum*	Poaceae
Tuli	*Ichaemumrugosum*	Poaceae

ORCHIDS		
BOTANICAL NAME	STATUS	FAMILY
Acampeochracea	*Occasional*	Orchidaceae
Acampepraemorsa	*Freequent*	Orchidaceae
Aerides odorata	*Occassional*	Orchidaceae
Aeridesringens	*Occassional*	Orchidaceae
Bulbophyllumcarniflorum	*Occassional*	Orchidaceae
BulbophyllumGuttulatum	*Rare*	Orchidaceae
Bulbophyllumpolyrhizum	*Occassional*	Orchidaceae
Crepidiummackinnonii	*Scarce*	Orchidaceae
Demdrobumaphyllum	*Occassional*	Orchidaceae
Demdrobumbicameratum	*Occassional*	Orchidaceae
Demdrobumbicameratum	*Occassional*	Orchidaceae
Demdrobum regium	*Scarce*	Orchidaceae
Dendrobium herbaceum	*Occassional*	Orchidaceae
Dendrobium crepidatum	*Scarce*	Orchidaceae
Dendrobium crepidatum	*Scarce*	Orchidaceae
Dendrobium Herbaceum	*Occassional*	Orchidaceae
Dendrobium macrostachyum	*Freequent*	Orchidaceae
Dendrobium macrostachyum	*Freequent*	Orchidaceae
Dendrobium transparens	*Occassional*	Orchidaceae
Dendrobium transparens	*Occassional*	Orchidaceae
Gastrochileusinconspicuum	*Freequent*	Orchidaceae
Geodorumrecurvum	*Freequent*	Orchidaceae
Habenariacommelinifolia	*Freequent*	Orchidaceae
Habenariafurcifera	*Occassional*	Orchidaceae

BOTANICAL NAME	STATUS	FAMILY
Habenariagrandifloriformis	*Scarce*	Orchidaceae
Habenarialongicorniculata	*Scarce*	Orchidaceae
Habenariamarginata	*Scarce*	Orchidaceae
Habenariapanigrahiana	*Occassional*	Orchidaceae
Habenariaplantaginea	*Occassional*	Orchidaceae
Habenariaroxburgmii	*Freequent*	Orchidaceae
Kingidiumdeliciosum	*Occassional*	Orchidaceae
Liparis viridiflora	*Scarce*	Orchidaceae
Luisa trichorhiza	*Freequent*	Orchidaceae
Luisiazeylenica	*Occassional*	Orchidaceae
Nerviliaaragoana	*Occassional*	Orchidaceae
Nerviliacrociformis	*Scarce*	Orchidaceae
Nervilliaplicata	*Abundant*	Orchidaceae
Oberoniaensiformis	*Occassional*	Orchidaceae
Oberoniafalconeri	*Occassional*	Orchidaceae
Pecteilishenryi	*Rare*	Orchidaceae
Pelatantherainsectifera	*Occassional*	Orchidaceae
Peristylusconstrictus	*Occassional*	Orchidaceae
Peristylusplantagineus	*Scarce*	Orchidaceae
Pholidota imbricata	*Freequent*	Orchidaceae
Polystachyaconcreta	*Rare*	Orchidaceae
Rhynchostylis retusa	*Freequent*	Orchidaceae
Seidenfiarheedii	*Occassional*	Orchidaceae
Thuniabracteata	*Occassional*	Orchidaceae
Vanda tessellata	*Freequent*	Orchidaceae
Vanda testacea	*Freequent*	Orchidaceae

Fauna/Wildlife

Koraput Division is a part of Eastern plateau Biotic Province under the Decan peninsula Bio geographic Zone. The Division was once rich in variety of wildlife. The varied terrain and dense, compact, contiguous forest of different types significantly contributed to the richness of wildlife which still continues to be so in spite of severe pressure on their habitat. However, with the passage of time, denudation of forests and depletion of wildlife have been faster in Koraput Division.

The project impact area of the lease spreading over three Ranges cited above comprises 18 forest blocks having approximate area about 50 Sqkm excluding the existing Revenue Forests. Some of the forest blocks are also dense, medium dense, scrub forest and highly degraded in condition. Still, it houses the available wildlife population since long in depleted condition also. The fauna of the impact area are as under.

Among the species of **Canide** Hyaena (Schedule-I), Indian Fox (Schedule-I), Jackel (Schedule-I), Sloth Bear (Schedule-I), Common mongoose, Large squirrel. Three stripped squirrel, Indian porcupine (Schedule-I), Indian Pangolin (Schedule-I), Otters (Schedule-I) and Hares are common in the forest blocks, may be in small or large number.

Among the **harvibours** Barking deer, Chital, Sambar (Schedule-I), Wild boar, Common langur and common patimankada are available in the forest block.

Avifauna like Peafowl (Schedule-I), Red jungle fowl, Common quail, green pigeon, Imperial pigeon, Doves, Drongoes, Blue rock pigeon, Racket tailed drongoe or Bhringaraj, Hill Mynas, Grey headed Mynas, Bays, Red vented bulbuls, Golden black and Pied wood peckers, Koels, Crow phcasants, Large Indian parakeets, Common king fisher, Common horn bills, Common Indian night jar, Screech owl, Great horned owl, White backed vulture, Swifts, Pariah kite, Eagle, Bush quail (Perdicula asiatica), Grey patridge, Cattle egret, Stocks, Pond herons, Jungle crow, Pipits and Waglails are common in the area.

Migratory birds like spot bill and open billed stork visit Jolaput reservoir in Lamtaput and Balda Range. Snipes, Teals and Water hen are also seen in Jolaput reservoir. The details study of migratory birds visits Jolaput reservoir spreading over 41.5 sqkm is furnished below along with Mid-winter waterfowl census report – 2023 in three Ranges.

Snakes like Dhamana, India Cobra, (Schedule-I) Viper, Krait and Python (Schedule-I) are found in the project impact area. Fresh water Magar crocodile (Schedule-I), Common tortoise variety of fishes and crabs are also found in the reservoir.

List of fauna with Local name, English name and Scientific name with schedule found in Koraput Division are furnished below (Source Working Plan of Koraput Division).

The schedule to which the wildlife belongs has been categorised according to the latest. The Wildlife (Protection) Amendment Act, 2022 dt. 19.12.2022 published in The Gazette of India (20.12.2022).

MAMMLES			
Local Name	**English Name**	**Latin Name**	**Schedule**
Badudi	Shortnosedfruitbat	*Cynopterus sphinx*	
Bagha	Tiger	*Panthera tigris*	I
Bagrakapta	Pangolin	*Manis crassicaudata*	I
BaliaKukur	Wild dog or Dholes	*Cuonalpinus*	I
Banbiradi	Jungle cat	*Felis chaus*	*I*
Barha	Wild boar	*Sus scrofa cristamus*	*II*
Bhalu	Sloth bear	*Melursus ursinus*	*I*
Bilua	Jackal	*Canis aureus*	*I*
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*	
Gunduchimusa	5 stripped palm squirrel	*Funambulus pennanti*	
Gurandi	Mouse deer	*Tragulusmeminna*	*I*
Harina	Spotted deer	*Axis axis*	*II*
HetaBagha	Hyaena	*Hyaena hyaena*	*I*
Jhinka	porcupine	*Hystrix indica*	*I*
KalarapatriaBagha	Leopard (Panther)	*Panthera pardus*	*I*
Kokisiali	Fox	*Vupes bengalensis*	*I*
Kutura	Barking deer	*Muntiacusmuntijack*	
Mankada (Hanu)	Monkey	*Presbylis entellus*	*II*
Mankada (Pati)	Rhesus monkey	*Macaca mulatta*	*II*
Musa	Rat	*Rattus rattus*	
Musa	White tailed wood rat	*Rattus blanfordi*	
Musa	Long tailed tree mouse	*Vandeleuriaoleracea*	
Musa (Nepali)	Gaintindian squirrel	*Rutufa indica*	
Neula (Hatia)	Common mangoose	*Herpestesedwardsi*	
Neula (Kuji)	Small indianmangoose	*Herpestesauropunctatus*	
Odha	Smooth Indian otter	*Lutraperspicillata*	*I*
Ramsiali	Wolf	*Canis lupus*	*I*
Saliapatani	Small Indian civet	*Viverricula indica*	
Saliapatani	Toddycat	*Paradoxurus hermaphroditus*	
Sambar	Sambar	*Cervus unicolor*	*I*
Thekua	Hare	*Lepus nigricollis*	*II*

SNAKES			
Local Name	**English Name**	**Latin Name**	**Schedule**
Ahiraja	King cobra	*Ophiphagushannah*	*I*
Ajagarh	Indian python	*Python molurus*	*I*
Boda	Common boa	*Boa constricta*	*II*
Chiti	Common Indian krait	*Bungarus caeruleus*	*II*
Dhamana	Rat snake	*Ptyasmucosus*	*II*
Dhandaboda	Russels viper	*Viper russelli*	*II*
Dhulinag	Saw scale viper	*Echiscarinatus*	
Kandanali	Tree snake	*Ahetullaspp*	
Laudankia	Common green whipsnake	*Dryophisnasutus*	
Naga (Gokhar)	Indian cobra	*Naja species*	*I*
Panidhanda	Checkeered keel back	*Natrix piscator*	
Rana	Krait	*Bunganuscandidus*	
Telisapa	Common blind snake	*Typhlopsbrahminus*	

LIZARDS			
Local Name	**English Name**	**Latin Name**	**Schedule**
Bahurupi	Indian chameleon	*Chameleon zeylanicus*	*I*
BahurupiKuas ap	Garden geeko	*Calotes versicolor*	
Champainoil	Skink	*Mabuyabibro*	*II*
Endua	Rock geeko	*Hemidactylus maculatus*	
Godhi	Land monitor	*Varnus bengalensis*	*II*
Jhitipiti	House lizard	*Hemidactylus flaviviridis*	
PaniGodhi	Water monitor	*Varnussalvador*	*II*

TORTOISE			
Local Name	**English Name**	**Latin Name**	**Schedule**
Chebedakainc ha	Land tortoise	*Trionyx gangeticus*	
Kurma	Indian tent turtle	*Kachugatectatecta*	
Panikaincha	Terrapin	*Lissemys punctata*	

FISHES (FRESH WATER)			
Local Name	**English Name**	**Latin Name**	**Schedule**
Balia	Freshwater Shark	*Wallagoniaattu*	*Not included*
Bansapati		*Alliacoha*	
Bhakur	Buffalo fish (catle)	*Catlacatla*	
Chenga	Schneider	*Ophiocaphalusgachua*	
Dandkiri	Dandkiri	*Esomusdandrica*	
Gadisa	Gadisa	*Ophiocaphalus punctatus*	
Jallah	Jallah	*Chela argentea*	
Kantia	Kantia	*Myotuscavasius*	
Kerandi	Kerandi	*Barbusambassis*	
Kou	Kou	*Anabas tistudineus*	
Magura	Magura	*Clariasbatrachus*	
Mahurali	Mahurali	*Amblypharyngodon mola*	
Mirakali	Mirkali	*Cirrhinamrigala*	
Pohale (chuna)	Pohale	*Cirrbinareba*	
Pohale (Denga)	Pohale	*Labeobata*	
Rohi	Rohu	*Labeorohita*	
Singi	Bloch	*Heterophneustesfossil is*	

BIRDS			
Local Name	**English Name**	**Latin Name**	**Schedule**
Baga	Egret cattle	*Babulcus ibis*	*II*
Banakukuda	Jungle fowl grey	*Gallus sonneratii*	*I*
Banakukuda	Jungle fowl red	*Gallus gallus*	*II*
Bani	Mynaindian	*Acridotherestristris*	*II*
Batak	Teal common	*Anas crecca (Linnaeus)*	*II*
Baya	Baya weaver bird	*Ploceusphillipinus*	*II*
Bhadbhadalia	Roller or blue jay	*Coracias benghalenisis*	*II*
Bhaliakhai	Hornbill Common grey	*Tockusbirostris*	*II*
Bhrungaraja	Drongo rocket tailed	*Dicrurusparadisens*	*II*
Bulbul or Gobrachadhei	Bulbul (red vented)	*Pyononotuscafer*	*II*
Chakua-chakoi	Duck Ruddy sheldrake	*Casarcaferrigines*	*II*
Chatak	Cuckoo pied crested	*Clamatorjacobinus*	*II*
Chataka	Swift House	*Apus affinis*	*II*
Chilla	Kite common pariak	*Milvus migrans*	*II*
Damara kau	Crow jungle	*Corvus macrorhynchos*	*II*

Local Name	English Name	Latin Name	Schedule
Deuliapara	Pigeon Bluerock	*Columba livia (Gmelin)*	II
Gandalia	Stork openbilled	*Anostomusoscitans*	II
Gharchatia	Soarriw House	*Passer domesticus*	II
Ghukalika	Myna pied	*Sturnus contra*	II
Gunduri	Quail blue legged	*Turnixsuscitator*	II
Haladibasanta	Oriole black headed	*Oriolusxanthornus*	II
Hansa	Duck Grey or spotbill	*Anas poecilorhyncha*	II
Hansarali	Grebe little or Debachick	*Podiceps ruficollis*	II
Kajalpati	Drongo black or King crow	*Dicrurusmacrocerus*	II
Kantiabaga	Heron pond or paddy bird	*Ardeolagrayili*	II
Kapota	Dove king	*Streptopeliadecaocto*	II
Kapota	Dove spotted	*Streptopelia chinensis*	II
Kathkhumpa	Woodpecker	*Picoides nanus*	II
Kathkhumpa	Woodpecker golden backed	*Dinopiumbenghalense*	II
Kau	Crow house	*Corvus splendens*	II
Koili	Cuckoo common Hawk	*Cuculusvarius*	II
Koili	Cuckoo indian	*Cuculusmicropterus*	II
Kuchilakhai	Hornbill malabar pied	*Anthracoceroscoronatus*	I
Kumbhatua	Crowpheasant	*Centopus sinensis*	II
Kunda	Babbler common	*Turdoidescaudatus*	II
Machharanka	King fisher pied	*Cerylerudis*	II
Mayur	Peafowl common	*Pavocristatus (Linnaeus)*	I
Nilkantha	Robin magpie	*Copsychussaularis*	II
Pahadi bulbul	Bulbul (red whiskered)	*Pyononotusjocosus*	II
Panikua	Cormorant little	*Phalacrocoraxniger*	II
Para	Pigeon imperial green	*Ducula aenea*	II
Pecha	Owl Indian greathorned	*Bubo bubo*	II
Pecha	Owlet spotted	*Athene brama*	II
Phutki	Tailor bird	*Orthotonus sutorius*	II
Saguna	Vulture white backedorbengal	*Gyps bengalensis*	I
Sankhachilla	Kite Brahminy	*Haliasturindus*	II
Sari	Myna hill	*Gracula religiosa*	I
Sua	Parakeet large indian	*Psittaculaeupatria*	II
Teetiri	Patridge grey	*Francolinuspondiceria nus*	II
Teetri	Quail Bush jungle	*Perdiculaasiatica*	II
Teetri	Quail Bushpainted	*Perdiculaerythrorhyncha*	II

Mid-Winter Waterfowl Census-2023 Report.					
Sl. No.	Name of the water fowl	Name of the Range			
		Lamtaput	Balda	Semiliguda	Total No.
1	Little corinorant	44	449	415	908
2	Brahminy Shelduck	-	-	-	0
3	Indian Pond Heron	21	87	46	154
4	Indian Shag	7	-	9	16
5	Common King Fisher	3	16	40	59
6	Little Egret	7	330	114	451
7	Great Egret	41	-	53	94
8	Red Wattle Lapwing	2	21	56	79
9	Cattle Egret	21	-	-	21
10	Intermediate Egret	-	-	-	0
11	Great Cormorant	164	-	3	167
12	Common Coot	-	-	-	0
13	Common Shelduck	9	-	264	273
14	Grey Heron	2	-	32	34
15	Lapwing	3	212	27	242
16	Common Crane	60	-	-	60
17	White Breasted Water hen	-	20	1	21
18	Raddhi Shelduck	-	-	69	69
19	Barn Swallow	-	-	120	120
20	White Threated Kingfisher	-	-	3	3
21	Lesser Whistling Shelduck	-	-	40	40
G.Total		384	1135	1292	2811

Additional Species					
Sl. No.	Name of the Species	Name of the Range			
		Lamtaput	Balda	Semiliguda	Total No.
1	King Fisher	-	-	2	2
2	Spotted Dove	3	64	-	67
3	Rock Pigeon	31	14	-	45
4	Unidentified Species	-	-	-	0
5	Common Myna	79	100	27	206
6	Openbill Stroke	-	59	-	59
7	Common Sand Piper	-	31	-	31
8	Greeb Sand Pipper	-	25	4	29
9	Asian Openbill	-	56	-	56
10	Little Grab	-	6	-	6
11	Black Drongo	7	13	-	20

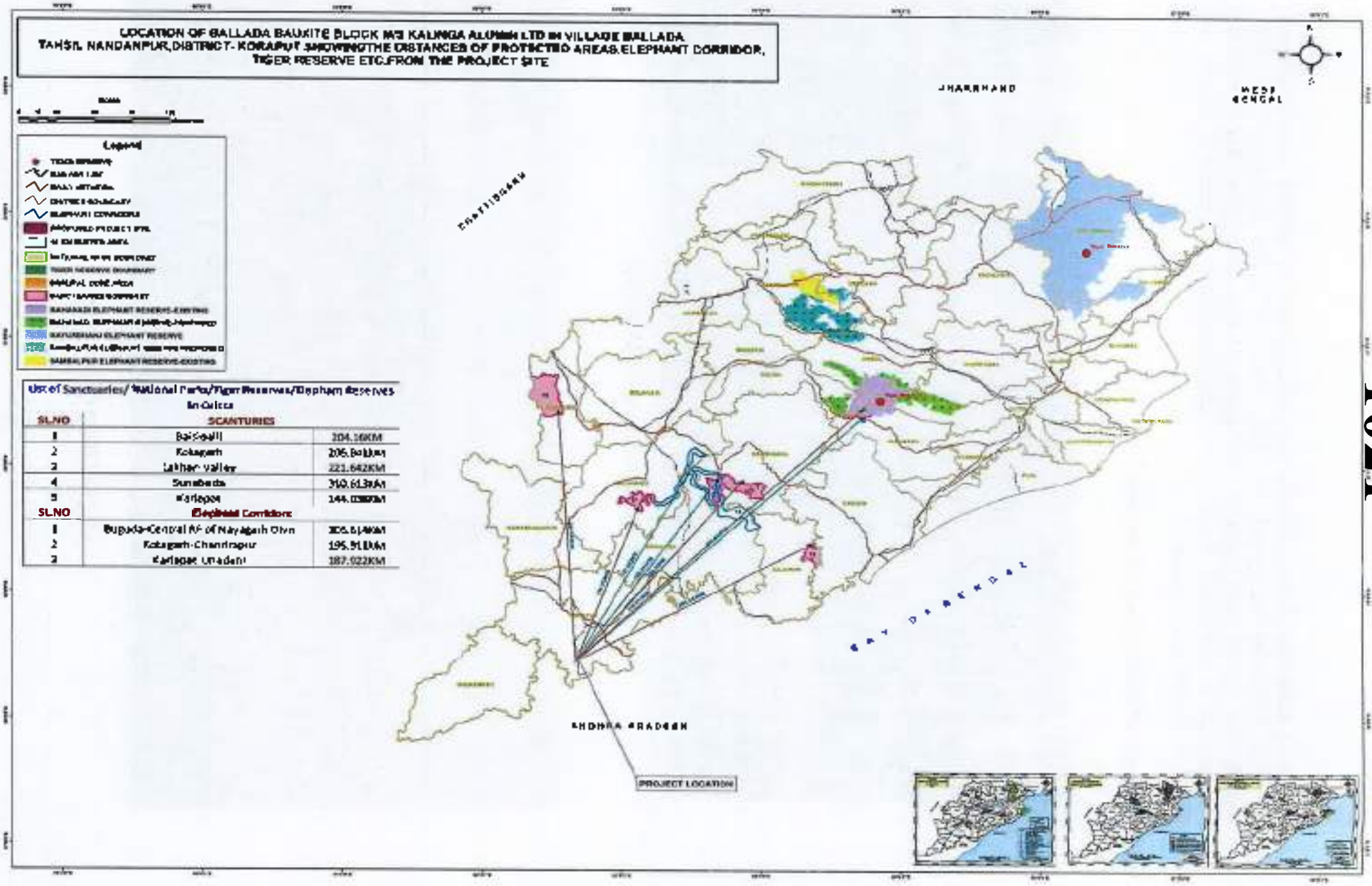
Sl. No.	Name of the Species	Name of the Range			
		Lamtaput	Balda	Semiliguda	Total No.
12	Rufous Tree Pie	-	2	-	2
13	Oriental Darter	-	-	10	10
14	Oriental Tartle Dove	-	-	2	2
15	Asian Pied Straling	-	-	15	15
16	White Browd Wegtil	-	-	2	2
17	Swap Bird	-	-	15	15
18	Great White Pelican	-	-	-	0
19	Little Ringer Plover	-	-	4	4
20	Jungle Owlet	2	-	-	2
21	Green Bee Eater	10	-	-	10
22	Eurosin Hoopee	2	-	-	2
23	Black Rumped Flemback	4	-	-	4
24	Indian Koel	4	-	-	4
25	Black Necked Gribs	-	-	-	0
G.Total		142	370	81	593

The project area and project impact area do not form part of any National Park, wildlife sanctuary, Elephant Corridor, Tiger reserve and Eco-sensitive zone. The nearest wildlife sanctuary i.e Karlapat wildlife sanctuary and its eco-sensitive zone is about 144.038 KM and 134.038 KM respectively from the boundary of the project/ML (Plate-II).

However, other sanctuaries and elephant corridors of the state occurring around the project site at far off places as furnished below.

SL. NO	SANCTURIES	
1	Baisipalli	204.16 KM
2	Kotagarh	206.841 KM
3	Lakhari Valley	221.642 KM
4	Sunabeda	310.613 KM
5	Karlapat	144.038 KM
SL. NO	**ELEPHANT CORRIDOR**	
1	Karlapat-Urladani	187.922 KM
2	Kotagarh-Chandrapur	195.911 KM
3	Bugudi-Central RF of Nayagarh Division	306.614 KM

Location Map in compliance to point no. 18 of Standard TOR for mining project is enclosed as plate-II


LOCATION OF BALLADA BAUXITE BLOCK M/S KALINGA ALUMINA LTD IN VILLAGE BALLADA
TAHSIL NANDANPUR, DISTRICT- KORAPUT SHOWING THE DISTANCES OF PROTECTED AREAS, ELEPHANT CORRIDOR,
TIGER RESERVE ETC. FROM THE PROJECT SITE
Legend
JHARKHAND
WEST BENGAL
CHATTISGARH
ANDHRA PRADESH
BAY OF BENGAL
PROJECT LOCATION
List of Sanctuaries/ National Parks/Tiger Reserves/Elephant Reserves in Odisha
SL.NO
SANCTUARIES
1 Baisipalli 204.16KM
2 Kotagarh 205.84KM
3 Lakhari valley 221.642KM
4 Sunabeda 310.613KM
5 Karlapat 144.038KM
SL.NO
Elephant Corridors
1 Buguda-Central Pt of Nayagarh Divn 305.61KM
2 Kotagarh-Chandrapur 195.91KM
3 Karlapat-Umerkote 187.022KM

1021

No **Rare** and **Endemic** flora or fauna are found either in the ML area or project impact area. **Endangered** species of fauna grouped under schedule-I category like Jungle cat, Sloth bear, Jackle, Porcupine, Hyena, Pangolin, Ratel, Python, King Cobra are found there. Some of the photographs of Schedule-I Fauna are furnished in the foregoing pages.

Photograph of Scheduled – I Fauna



Sloth Bear (Melurpus Ursinus)



Jackel (Canis aureus)



Fox (Vulpes bengalensis)



Smoth Indian Otter (Lutra Perspicillata)



Ahiraj (Ophiphagus Hanra)



Python (Python molurus)



Mayur (Pavo cristatus)



Hill Myna (Gracular Religiosa)



Ratel (Mellivora Capensis)



Jungle Cat (Felis Chaus)



Bajrakapta (Mants crassicaudata)

V) No such mega fauna like elephants are there either in the project area or project impact area because the identified elephant habitats and the corridors are far away from the project site. However, the small herbivores and carnivores reside the above forest blocks usually move from one forest area to others in search of food without causing road obstruction and man-animal during movement.

The existing flora in part of core area 10 KM radius and impact area was studied and the species composition were recorded as per field observation by laying out **sample plots** at random in the forest blocks as narrated above and compiling the same as per the working plan having glossary of flora of Koraput Division and data from the local forest staff. The species as narrated in the forest types above are found in the study area.

Presence of fauna like avians, simians, rodents, reptiles and mammals etc were recorded through actual sighting and observing signs like droppings, nests, pugmarks etc., **in transect lines method** laid down in the above forest block besides collection of data from local people and forests staff.

Other forested areas in the impact zone were inspected to assess the habitat condition, study of flora and fauna. The areas which have comparatively dense vegetation at places with forage materials have richness of varieties of fauna were also ascertained.

Information about the presence of large animals, their movement paths, damage to crop and property, man-animal conflict, dependence of local people on forests to meet their basic needs and also to improve their economic status by sale of NTFP etc were assessed.

The aquatic fauna inside the river systems and Jolaput reservoir were studied and recorded. The status of the habitat in general was studied. It was observed that the forests are reasonably dense over the inaccessible area and the vegetative cover for fauna is adequate. Good quantity of food and water is available for sustenance of different types of fauna. In some parts shifting cultivation and forest fire are found to be the threats for sustenance of the habita.

VI) Human-wildlife Conflict:

As per report on man wild animal conflict in Koraput Division the situation is not so alarming. Moreover, there is no Man-Elephant conflict as seen in nearby Division like Rayagada, Kalahandi south division, as the identified elephant corridors are around 100 km away from the district boundary.

There are sloth bear attacks which are only reported in the division. There is not only human injury by sloth bear but also there are human kill, crop damage by wild boar are noticed at some places but the extent is not significant. A detail of man-animals conflict inside Koraput division and the three Ranges of project impact area are furnished below occurred during last three financial years.

Loss of human life and property due to wild animal depredation in Koraput Division.

Sl No.	Year	Human kill	Human injury	Crop damage	Cattle kill
1	2020-21	-	3 (bear)	-	-
2	2021-22	1 (bear)	8 (bear)	-	-
3	2022-23	1 (bear)	9 (bear)	0.17 (Boar)	1 (RBT) 3 (Heyna)
	Total	**2**	**20**	**0.17**	**4**

Death of wild animals in Koraput Division

Sl No.	Year	Name of species	Poaching	Disease	Total
1	2020-21	Bear	-	1	1
		Boar	1	-	1
2	2021-22	Pangolin	-	1	1
		Barking deer	-	1	1
3	2022-23		-	-	0
		Total	**1**	**3**	**4**

Wild Life Offence cases booked in Koraput Division

Sl No.	Year	Name of offence cases booked	No. of person arrested
1	2020-21	1	1
2	2021-22	1	2
3	2022-23	0	0
	Total	**2**	**3**

Information on Human Injury and compensation paid in Balda, Semiliguda and Lamtaput Range.

Sl. No	Name of the Range	Year	Name of the wild animal involved	Type and No. of Injury cases		Amount paid in Rs.
				Permanent	Temporary	
1	Balda	2020-21	-	0	0	0
	Semiliguda		Wild Bear	0	1	5000
	Lamtaput		-	0	0	0
2	Balda	2021-22	-	0	0	0
	Semiliguda		-	0	0	0
	Lamtaput		-	0	0	0
3	Balda	2022-23	-	0	0	0
	Semiliguda		Wild Bear	0	3	15,000
	Lamtaput		-	0	0	0

Information on crop damage in Balda, Semiliguda and Lamtaput range

Sl. No	Name of the Range	Year	Name of the wild animal involved	Type of crop	No. of cases	Extent of damage in Ac.	Amount paid
1	0	2020-21	0		0	0	0
2	0	2021-22	0		0	0	0
3	Balda	2022-23	Wild Boar	Paddy	2	0.17	1700/-

There are no crop damages reported from the period 2020-21 to 2022-23 in Semiliguda and Lamtaput Ranges. Also, there is no evidence of house damage and cattle kill during the last three year in the above three Ranges. However, there is report of two such cases on cattle and goat kill during the year 2022-23 in adjoining Narayanapatna Range of Koraput division.

Information on death of wild animals

Sl. No	Name of the Range	Year	Name of wild animal death	No.
1	Balda	2020-21	Wild Pig	3
2	Semiliguda	2021-22	Barking Deer	1
3	Semiliguda	2022-23	Barking Deer	1

From the above data furnished above on man-animal conflict in project impact area of three Ranges it is observed that there is occasional wild bear attack to human lives for which required mitigative measures need to be taken.

It is also reported that in Balda Range at times wild boars damage the corn fields during harvesting seasons by uprooting paddy columns for which compensation has been paid to the tenants. Besides it is also reported by R.O Balda that both the types of monkeys like Common langur and Pati Mankada uproot the ground nut seedlings during harvesting seasons for their food. Wild animal poaching cases are very casual. At times rare wild boar poaching occurs.

VII) Other project or their impact vis a vis impact area of bauxite block of Kalinga Alumina ltd. There are no such heavy Industrial project and mining are there inside the project impact area of this project. However, Damanjodi plant and Punchpatmali Bauxite mine area of NALCO are located outside the impact area of this project.

KALINGA ALUMINA LIMITED

Asst. Conservator of Forest
Koraput Forest Division
KORAPUT

Divisional Forest Officer
Koraput Forest Division

CHAPTER – III

Impact of the project on flora and Wildlife in the surrounding

The main pollutants of an open cast mine are fugitive dust, noise and vibration, silt with gaseous exhaust fumes, light, waste lubricant, grease etc. as narrated below. Shall have adverse impact on wild fauna and flora exist in the project/impact area.

A. PROJECT AREA

i. Dust: -

Fugitive dust will be generated due to drilling, cutting, handling of over burden and operative Dumpers and Trucks on haul roads. It will also be generated at the loading and unloading points.

There shall be Accumulation of dust on foliage's of the different floral composition which are food for wild herbivores. Dust emission may cause respiratory problems in wild fauna residing in the vicinity, who will migrate to other places. In course of migration, they may be victim to poachers.

ii. Noise and vibrations: -

Excavation, loading, unloading, haulage of Bauxite and movement of people will create noise and vibrations. It will affect the tranquillity of the area, Will affect the health and reproduction process of wild animals. Many of them may desert the area out of fear and anxieties and get killed or run over by vehicles outside their habitat.

iii. Bauxite fines:

The Bauxite silt and fines generated in the process of mining may pollute the soil and water. Water running off the OB dumps, Bauxite stacks, roads and unused land surface may carry Bauxite fines which shall contaminate the streams down below, affecting use of stream water by aquatic and terrestrial animals.

iv. Light:

Light from High Masts, Roads, moving vehicles will affect wildlife which love the tranquillity in dark night. Artificial light disturbs their diurnal/nocturnal cycle of activity. Such disturbances affect physiology, metabolism and sets stress leading to disorientation and natural behaviour. Prolonged stress may terminate in death.

v. Waste lubricant and grease:

With improper maintenance of vehicle/machineries spillage of such material will pollute the soil and water of nearby wildlife habitats. There shall be generation of CO, CO_2 and some extent of NO and SO_2, hence fugitive may be generated along the road and wildlife habitats. Fugitive dust may cause road accident of wild animals while crossing the road in search of food and water.

vi. Solid waste

The principal solid waste produced in an open cast mine is overburden. The waste generation in Ballada Bauxite quarries can be classified into two types i.e. waste from the bauxite band (intercalated waste) and the overburden. The intercalated waste may be about 10% of the total excavation. The solid wastes may be drained in to natural streams during heavy rains causing the water sources polluted.

Degradation anticipated on account project implementation.

i. Soil Erosion:

Soil erosion will denude the forest floor which supports vegetation for the sustenance of wild animals. There will be soil erosion from the over burden dumps, top soil dumps. It shall cause heavy siltation inside nalas, water courses and water bodies, paddy fields.

ii. Degradation of habitat:

The forest growth in 52.945 ha. may be partly cleared in subsequent Mining Plan period to accommodate mining pits, OB Dumps, haul roads, store yards etc. Besides 12.267 ha. of forest will be cleared for aligning approach road from both the side of lease there by a portion of the habitat will be lost. As narrated above the fringe area of the lease hosts vegetation of Jamun, Kusum, Harida, Bahada, Amla, Mango, Panas, Rai, Sindur, Bela, Karanja, Kendu etc including underground flora continuous to balance area of Nagasari RF will be lost partly excluding the safety zone area of 4.23 ha and undisturbed/virgin area of about 52.945 ha.

iii. Loss of habitat quality:

The habitat not merely means the extent of cover, food and water, but a safe abode where wild life mate, breed, take care of their off-spring and move freely without fear. The anthropogenic pressure likely to be generated due to mining and ancillary activities will disturb the habitat, its tranquillity and serenity and may threaten the health of the existing fauna.

Chances of accidental forest fires will increase, which will affect the flora, fauna and water holding capacity of the soil. The foliage of trees, shrubs etc. is likely to be covered with a thick layer of dust, making it unsuitable for browsing by wild animals. As such the habitat will deteriorate resulting in thinning out of wild life population and affecting their behavioural pattern.

iv. Scarcity of water: -

More than 90 ha. of catchment area inside Nagasari R.F may be lost due to mining and allied activities. Therefore, flow of water in seasonal nalas and perineal nalas originating from the forest area will be reduced to some extent affecting water table in the river systems feeding Jolaput reservoir as narrated above. Beside a water body created by Forest Deptt. inside the lease shall be lost during mining causing water scarcity of wildlife in the project area.

v. Accidental fall of animals:

From the inception of mining, the pit attains considerable size which is enlarged in wedge shape in course of mining. Such deep mining pits are dangerous for wild animals as any fall shall be fatal to them. The fall may even cause serious injury making them invalid for rest of life.

B. PROJECT IMPACT AREA

As narrated in chapter -II of this plan more than 50sqkm of forest comprising of RFs, PFs, PRFs and about 41.5 Sqkm Jolaput reservoir hosts the available wild fauna and aquatic fauna in the project impact area. Due to project implementation and the resultant effect may affect the wildlife habitat to some extent.

The anticipated impact area as under : -

i) Loss of habitat quality: The habitat in the buffer zone is subjected to deterioration by recurring annual forest fire, grazing by livestock, removal of firewood and brush wood by villagers and illicit felling. The nala water gets polluted with fine ore sediments from mines. The foliage of trees, shrubs get cover with a thick layer of dust. Under such condition, the habitat will further deteriorate to some extent and it will have adverse impact on the Wildlife.

ii) Forest fire: Although Forest fire in tropical forest is common in summer months and is a big threat to both flora and fauna, mining activities may further boost the same. Forest fire is likely to burn the ground flora, desiccate the soil, kill the ground dwelling animals, birds, reptiles and their young ones, char their nests and eggs. It may render hilly streams dry and destroy sub-terrain flora and fauna besides causing diseases in the standing trees.

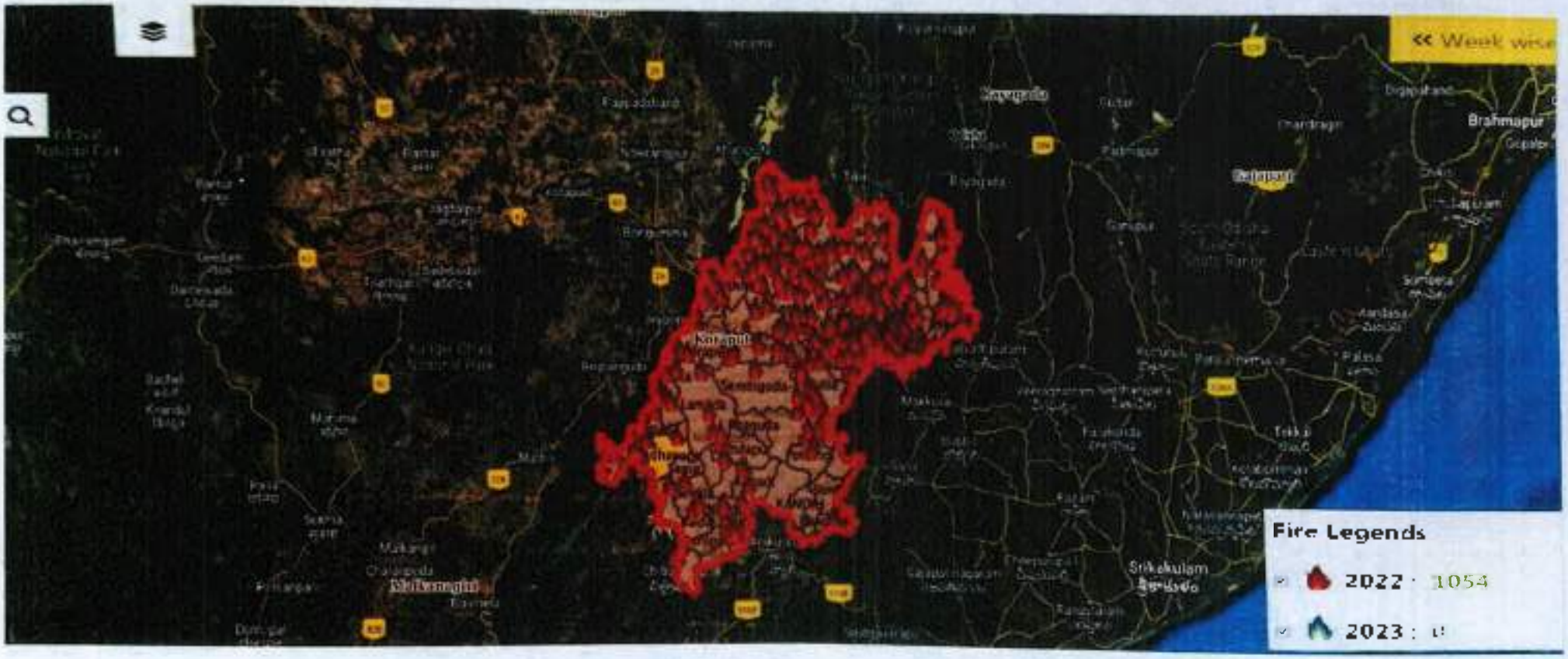
Fire Map of Koraput Division for the year 2021



2021 - 1534

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Fire Map of Koraput Division of the year 2022



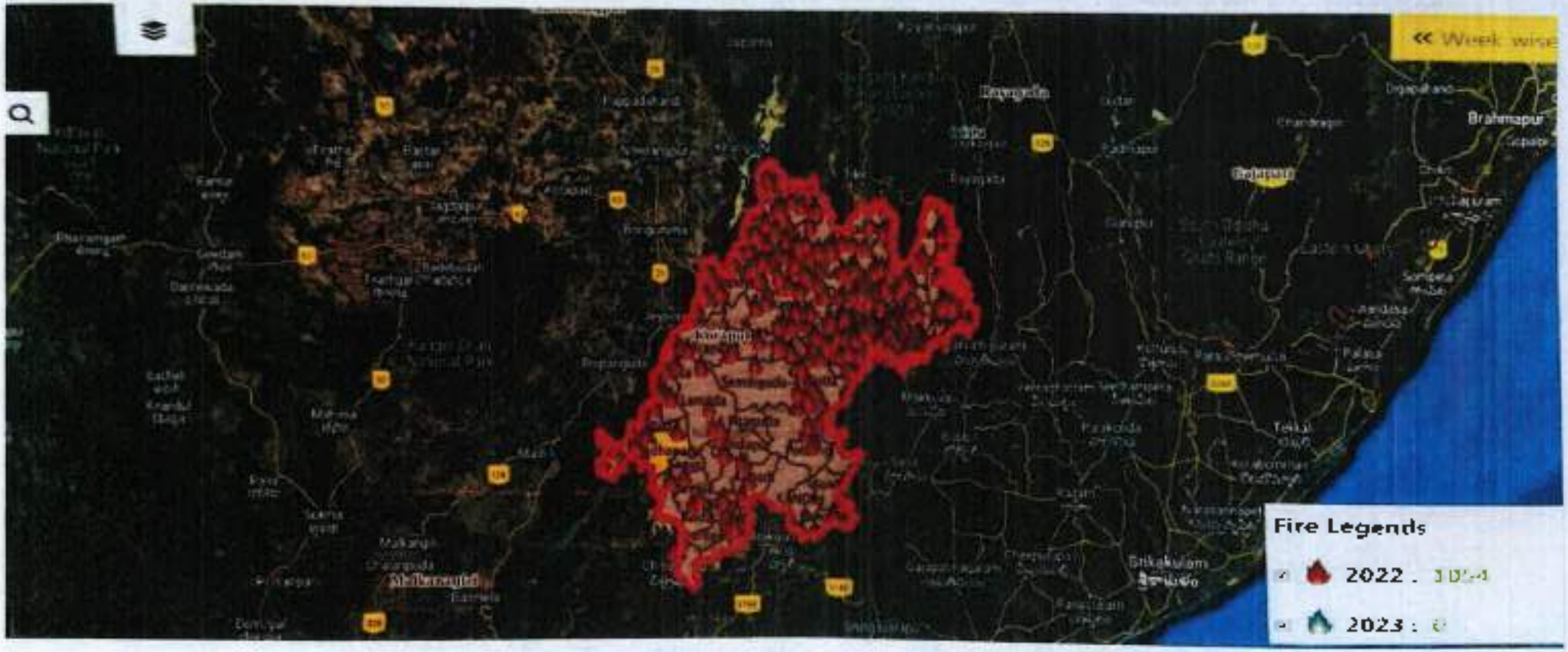
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Fire Map of Koraput Division for the year 2023.

Forest Management Systems | Forest Fire Points

https://odishaforestgis.nrsc.gov.in/forestfire/forest_fire_points

Odisha Forest Management Systems (Forest Fire Mapper)



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iii. Depredation by wild animals:

Increased human presence with greed for wild meat, may pose the threat of poaching for table purposes. The disturbances caused by mining and ancillary activities in the habitat may force the wild animals like Deer, Monkeys, wild Boar, Sloth bear etc. to flee from the forest and visit the nearby villages for forage of standing crops, grains etc. which may lead to **'Man-Animal' conflict**.

iv. Increased Pressure on forests of impact zone:

Ancillary activities such as setting up hotels, restaurants, tea stalls, colonics and different other businesses will necessitate dependence on the existing forest in impact area for meeting their fuel wood small timber and NTFP needs, posing a threat to the habitat outside the project area.

v. Probable increase in the vehicular traffic and its impact:

There shall be increase in vehicular traffic not only for transportation of ore to rail heads etc. but for other ancillary activities.

vi. Effect on local economy:

Though the rural economy of the surrounding areas will improve due to employment opportunity in mines and related activities, there will be still some people left out like old, weak & woman who most cannot find any employment. Hence, they may continue to be dependent on the forest area for meeting their own need of forest produces like fuel wood, small timber & N.T.F.E etc. to eke out a living by selling such produce. Such activities will also affect the biodiversity.

ALUMINA LIMITED

Asst. Conservator of Forest
Koraput Forest Division
KORAPUT

Divisional Forest Officer
Koraput Forest Division

CHAPTER - IV

Mitigation measures required for the project area/impact area

In order to address the probable adverse impact enumerated in chapter-III, the following management strategies are proposed to be adopted in the project area by the project proponent i.e M/s Kalinga Alumina Ltd. under the strict supervision of forest Deptt and project impact area to be implemented by the Divisional Forest Officer, Koraput Division.

As narrated in the previous chapters, the Bauxite lease area spreading over 144.945 ha. finds place inside Nagasari Reserve Forest on the plateau portion surrounding dense forests all around having wild fauna as narrated in chapter-II, some of which are also belong to schedule-I category. But due to mining and allied activities and resultant biotic pressure some wild fauna shall be homeless and may migrate to safer place in search of food and shelter in the impact area. In this way they may be victim to poachers and other predators on their path of movement. Beside a water harvesting structure (WHS) dug inside the lease providing water to the wild fauna shall be utilized in mining causing water scarcity for them.

Besides the lease area and the adjoining area of Nagasari RF serve as catchment area of some seasonal and perineal nalas those feed to Jolaput Reservoir which houses not only to some aquatic fauna but also serve as nesting and feeding ground of migratory birds.

Due to mining and transportation of ore, new roads and extraction paths are to be constructed inside the forest to Balda SH causing severe vegetation and soil loss in the field. Considering the above ground problem, the following interventions are proposed for the project area.

PROJECT AREA (To be implemented by the project proponent)

1. Fire protection measures –

As the lease boundary and safety zone area are continuous to the wild life habitats inside Nagasari R.F, strategic fire protection measures are to be adopted by the project proponent to prevent spread of fire from the lease hold area in to the forest and to the undisturbed virgin area over more than 52 ha. continuous to Nagasari R.F housing wild animals.

i. By creation of fire line at a width of 5m area over 4.23 ha. and over a length of 5.61 Km for the safety zone continuous to balance area of Nagasari RF.

ii. Creation of 5m wide fire line around existing virgin forests of 52 ha. over a length of 6.1 Km inside the lease continuous to balance area of Nagasari RF.

iii. Deployment of a five-member fire protection squad with vehicle, firefighting equipment etc. to extinguish fire caused inside the lease area and to prevent further spreading in to the adjoining forest.

Besides 10 nos. of fire watchers with firefighting equipments shall be engaged during five fire months of the year to detect forest fire occurring in the adjoining forest continuous to the lease and to trace fire line along the safety zone boundary and 52 ha. virgin.

iv. Procurement of **fire blower** for firefighting etc.

v. Awareness campaign among mining work force for prevention of fire in the RF.

2. Proposal for road side avenue plantation:

Avenue plantation with species having wide crown along the internal road sides to arrest the fugitive dust during handling and transportation of ores and also to minimize light illumination from vehicles during night time.

i. Provision for internal road side avenue plantation in single row on either side over a length of about 5 Km with species like Terminalia, Radhachuda, Neem, Karanja, Jack fruit, chhatian, Patuli, Bahunia etc.

ii. Block plantation with 1000 plant per ha. in open spaces, stock yards crusher sites etc. as per availability of area using indigenous wide crown to arrest fugitive dust, minimize light illumination and sound.

Besides blank areas, if available around all infrastructures, mineral storage yard, shall also be planted with suitable plants to arrest the dust emissions. The project proponent shall prepare a scheme in consultation with local forest authorities in this regard.

3. Soil and moisture conservation measures:

i. To implement soil and moisture conservation measures across 7 to 8 seasonal nalas, water channel originating from the lease by construction of loose boulder check dams, gully plugging, wire mesh check dam, contour bonds etc. as per site requirement in order to prevent soil erosion by surface runoff during rain, siltation in nearby nalas, water sources and to divert clean water into nearby nalas.

4. Solar Power Fencing

i. As per guideline solar power fencing around the faces of mining pits with underground cable to prevent entry and fall of wild animals in to the mining pits.

ii. Proper watch and ward to be ensured to rule out accident/deliberate charging of these conductors (solar fencing) by nearby electrical supply lines (LT/HT lines/Transformer).

5. The project proponent shall strictly adhere to the specific TOR conditions laid down in the SEIAA File No. SIA/OR/MIN/439954/2023 dt. 06.11.2023 for protection of flora and fauna in the project area and impact area at the project cost.

Plan Period.

This plan has been prepared for a period of 5 years. Interim revision may be taken up after assessing the results of evaluation done through the monitoring cell with suitable modification.

Intervention to be adopted by the project proponent in the project area at the project cost.

Sl. No.	Particulars	Quantity	Remarks
1	**Fire protection measures-**		
	i. By creation of fire line at a width of 5m over 4.23 ha. having length of 5.61 Km for the safety zone continuous to balance area of Nagasari RF.	5.61 KM	
	ii. Creation and maintenance of 5m wide fire line around existing virgin forests of 52 ha. over a length of 6.1 Km inside the lease area continuous to balance area of Nagasari RF and safety zone.	6.1 KM	
	iii. Deployment of a **five-member** fire protection squad with vehicle, firefighting equipment etc. & 10 nos. of fire watchers to extinguish accidental fire caused from mining side inside the lease and to trace fire line along the safety zone boundary and along the boundary of 52 ha. Virgin forest area whenever and wherever required.	1 no. Squad 2 nos.	At the project cost
	iv. Procurement of **fire blower** for firefighting etc.		
	v. Awareness campaign among mining work force for prevention of fire in the RF		
2	**i.** Provision for internal road side **Avenue plantation** in single row on either side over a length of about 5 Km with species like Krushnachuda, Radhachuda, Neem, Karanja, Jack fruit, Chhatian, Patuli, etc.		
	ii. **Block plantation** with 1000 plant per ha. in open spaces, stock yards crusher sites etc. with		At the project

	provision of Bamboo twig and thorn fencing and watering as per availability of area using indigenous wide crown species to arrest fugitive dust, minimize light illumination and sound. Considering 30 mtr. wide plantation from the periphery of above infrastructures total area comes to about 1.5 ha.	1.5 ha.	cost

Sl. No.	Particulars	Quantity	Remarks
3	i. To implement **soil** and **moisture conservation measures** across 7 to 8 seasonal nalas, water channel originating from the lease by construction of check dams, gully plugging, cement masonry checkdams, contour bonds etc. as per site requirement in order to prevent soil erosion by surface runoff during rain, siltation in nearby nalas, water sources and to divert clean water into nearby nalas.		At project cost
4	**Solar Power Fencing** i. As per guideline solar power fencing around the faces of mining pits with underground cable to prevent entry and fall of wild animals in to the mining pits. The fence shall be shifted after back filling and reclamation is done from the initially excavated pits to the pits of subsequent years during the mining period. ii. Proper watch and ward to be ensured to rule out accident/deliberate charging of these conductors (solar fencing) by nearby electrical supply lines	2.596 KM	At the project cost

	(LT/HT lines/Transformer) on LS.		
6	Contribution of Rs. 2.5 crores for ex-situ conservation of Papadahandi Mini Zoo in Nabarangpur Forest Division in Koraput circle.		At the project cost

The project proponent shall execute above interventions at the project cost strictly in consultation and under supervision of local forest staff.

KALINGA ALUMINA LIMITED

Asst. Conservator of Forest
Koraput Forest Division
KORAPUT

Divisional Forest Officer,
Koraput Forest Division
Divisional Forest Officer
Koraput Forest Division

Principal Chief Conservator of Forests
(Wildlife) & Chief Wildlife Warden
Odisha, Bhubaneswar

PROPOSED MANAGEMENT STRATEGIES WITHIN THE PROJECT IMPACT ZONE

Interventions to be executed by the Divisional Forest Officer in the project impact area:

As narrated in Chapter-II, 18 forest blocks spreading over an area of more than 50 Sqkm constitute the habitat of available wild fauna in 10 KM radius project impact zone. Some schedule-I fauna along with other schedule-II fauna reside in these forest blocks in varying density depending on the habitat condition, food availability and biotic pressure.

Moreover, Nagasari RF where the mining lease has been granted, constitute around 11.81 Sqkm wildlife habitat. Beside Jolaput water reservoir which hosts native and migratory birds occupy an area of about 41 Sqkm.

Mining and allied activities will have considerable adverse impact on the wildlife population residing in Nagasari RF in comparison to other forest blocks of impact zone. In other forest blocks the mining activities may exert anthropogenic pressure resulting in human and wildlife conflict particularly Sloth bear and wild boars etc.

Therefore, in addition to providing required protection to these forest blocks from forest fire, illicit felling, encroachment and other anthropogenic pressures and to the wildlife reside there, intervention such as habitat improvement through enrichment plantation, construction of water bodies, SMC measures are to be taken up.

As per the current working plan, all the 18 forest blocks including the part of Jolaput Reservoir occurring inside impact area comes under Wildlife (Over lapping) working circle.

Objective of Wildlife (Over lapping) circle-

- To conserve, protect and improve wildlife habitats
- To promote wildlife in general and endangered species in particular.
- To create awareness among local people to conserve and protect wildlife habitats.

Working plan prescriptions-

- Development of habitat to provide food, water and shelter to wildlife and to reduce Man-Animal conflict.
- Improving the forest cover.
- Improving availability of food through subsidiary silvicultural operation, prohibition of collection of NTFPs, reduction of forest dependence of local people.
- Water availability.
- Census of wild animals in different forest blocks.
- Identification of migration routes of wild animals.
- Creation and maintenance of fire lines.
- Generating awareness about the wildlife among public.
- Deployment of Antipoaching/Antidepredation squad.
- Wildlife depredation, infrastructure, Training.
- Incentives and Rewards to local VSS for protection of wildlife and their habitat.

Hence basing on the above working plan prescriptions and current **Human-Bear conflict** and above all to provide food and shelter to the wildlife in the impact area the following mitigative measures are proposed with special requirements to mitigate Human-Bear conflict.

Besides in view of Human-Bear Conflict (HBC), particularly in Semiliguda Range strategic mitigative measures are to be taken to prevent human injury, loss of human life and death of Bear there.

1. **Habitat Improvement:**

i) Creation of water bodies

In order to provide water to the wild animals during dry months water bodies of size 40m × 30m × 03m are proposed to be dug out in wildlife habitats as detailed below. As one water body dug out previously inside Nagasari RF have been included in the mining lease area, therefore, to supplement the same a water body is proposed in the RF.

GPS location of water bodies to be dugout/Renovated:

Sl. No	Item of Work	Range	Section	Beat	Name of site	Geo Co-Ordinate	
						Latitude	Longitude
1	Water Body (40m × 30m × 03m)	Balda	Balda	Balda	Barungu palli	N 18.40668	E 82.63597
2	Water Body (40m × 30m × 03m)	Balda	Balda	Hatibari	Hatibari RF (Near Hatibari)	N 18.41190	E 82.76260
3	Water Body (Renovation)	Balda	Balda	Bhimdol	Bhimdol	N 18.39390	E 82.68990
4	Water Body (20m × 20m × 03m	Lamptaput	Jalaput	Sagar	Orubiri	N 18.529383	E 82.596828

ii) It is proposed to construct 4 nos. of small earthen bund Water Harvesting Structure (WHS) with RCC/Masonary spillway of required size as per site requirement across seasonal/perennial nalas inside wildlife habitats to provided water to the animals during dry season. The WHS shall also serve the purpose of soil and measures conservation measures in the catchment area of the nala.

4 nos. @ Rs. 10,00,000/- each totalling to Rs. 40,00,000/-

2. Fire Management Plan :

Fire affects seriously the ecological status of the habitats. It is anthropogenic in origin. Repeated forest fire sets in retrogation and deprives wildlife from their cover and food.

As per enclosed fire map of Koraput forest division almost all the forest blocks of impact zone get affected by forest fire partly or wholly caused by around 12 nos. of forest fringe villagers such as Balda, Rantha, Padua, Bhimdole, Mendhajola, Kasandi, Palam, Sagur, Barengipalli Talaguda, Bonuru etc.

Proposal to mitigate fire hazards.

i) Involving VSS Members/Self Help Group (SHG) in Awareness campaign and firefighting works :

Awareness is necessary to be created amongst the local communities including SHG groups about the harmful effects of fire and the methods of preventing or suppressing fire prior to the fire seasons.

Awareness through sign boards/hoarding shall be installed on the roadside boarding wildlife habitats, market places etc. high lighting harmful effects of fire and conservation of nature and environment.

Besides, pamphlet should be distributed in villages, daily market and schools to prevent forest from fire hazard.

In addition, awareness is to be done among school students through meetings/debates, essay competitions etc. regarding fire protection and conservation of Biodiversity.

The VSS/SHG group shall be involved in awareness campaign and in fire protection works. They will assist the forest staff, protection squad member etc. to extinguish forest fire where ever occur.

Incentives in the form of cash should be paid to 12 nos. of V.S.S./SHG (Self Help Group) for their services annually. Besides special rewards in form of cash or kind are to be given to the SHG groups rendering best performances in mitigating fire hazard.

ii) Procurement of fire blowers :

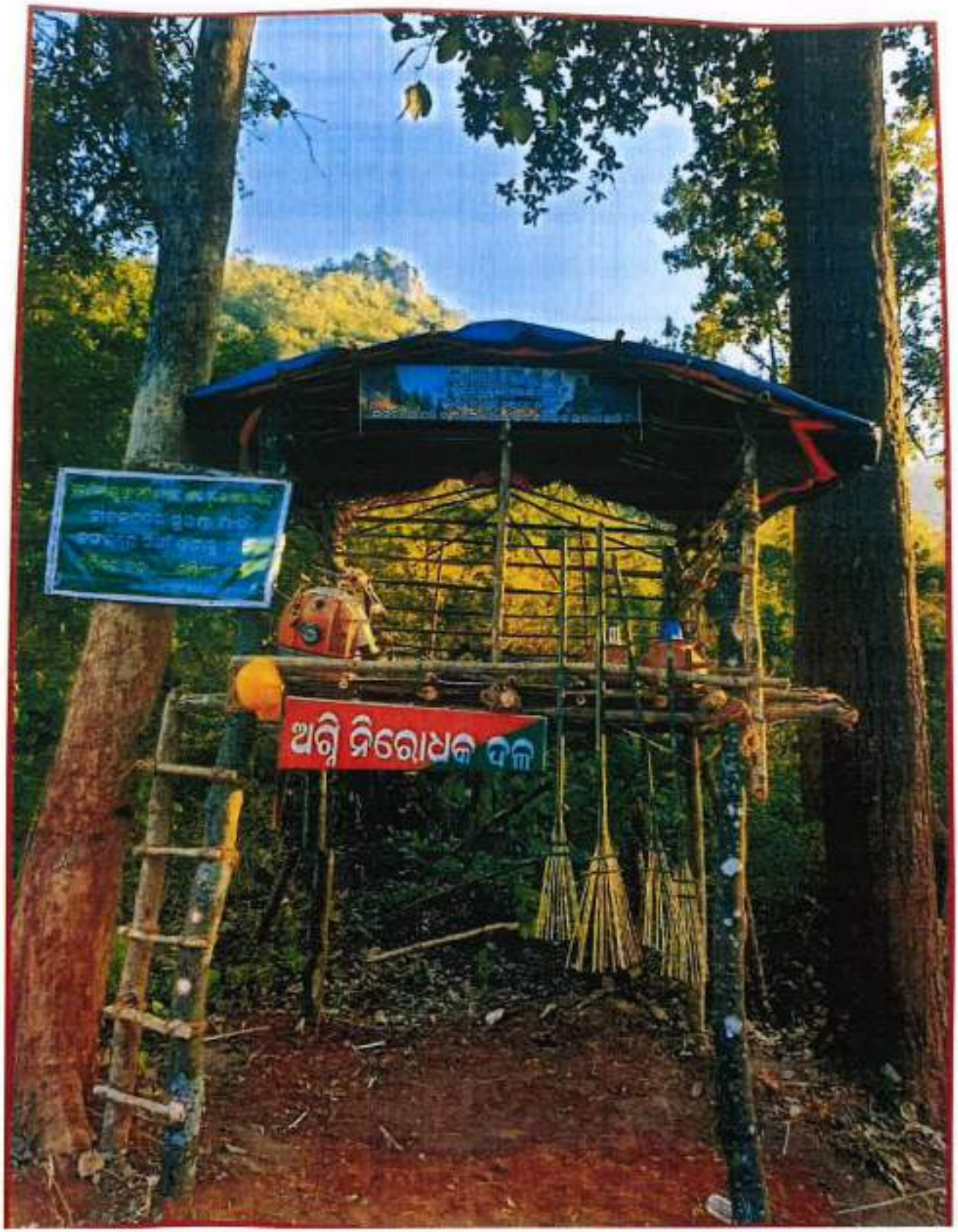
In order to extinguish accidental forest fire and to trace fire lines around the wildlife habitats six numbers of fire blowers are to be procured and be supplied to the skilled operators to handle at the time of firefighting. Annual maintenance of fire blowers are to be done before unset of fire season. It is proposed to 6 nos. of fire blower @ 2 nos. to each Range.

iii) Training and firefighting drills :

Drills should be conducted involving different aspects of detection, communication, transport and firefighting at site. Record of fire in different years should be recorded on fire maps so as to identify vulnerable areas. Fire safety measures, techniques of counter fire need to be taught. Post fire suppression operations viz., extinguishing smouldering logs, assessing extent of fire, fire mapping, evaluation of loss due to fire etc are to be done.

1048

A temporary model shed to house firefighting personnel and to watch forest fires.



3. Provision for Soil and Moisture Conservation works (SMC).

The lease site is located inside Nagasari RF on the ridge portion having dense to medium dense vegetation at the periphery. The RF is the catchment area of rivers which feed Jolaput reservoir as narrated in Chapter-II. A nos. of perennial and seasonal nalas flows within it and ultimately drain in to the river systems, it is proposed to take up required site specific and SMC works like drainage line treatment including LBCD, Cement mesonary check dam/RCC check dam, Gully plugging, Contour bond, Sub-surface dyke, graded bond etc as per field requirement in addition to required above SMC works in Bhimodole RF, Podua RF, Thuba RF & Kansandi PRF of the impact area within an amount of Rs. 50 lakhs.

The location of SMC works inside Nagasari RF is furnished below.

Sl. No	Item of Work	Section	Beat	Name of site	Geo Co-Ordinate	
					Latitude	Longitude
1	SMC Work	Balda	Balda	Nageswari RF (Near Chillam)	N 18.43201	E 82.671101

4. Provision for uprooting of invasive weeds over **200 ha.** @ 20 man-days per ha. in Nagasari RF in order to invite natural regeneration and establishment of degraded forest species for preservation of Biodiversity over a period of 4 years.

Bamboo twig and thorn fencing around the weed clearance patches having potential root stock of forest species for natural regeneration is to ensured as per feasibility.

The location of site of uprooting of invasive weeds is furnished below :

Sl. No	Item of Work	Section	Beat	Name of site	Geo Co-Ordinate	
					Latitude	Longitude
1	Uprooting of Invasive weeds	Balda	Balda	Nagasari RF (area covered with profuse weed growth)	N 18.43201	E 82.671101

ii. Beside an amount of Rs. 6.832 Lakhs is proposed for miscellaneous habitat improvement tools, conventional firefighting tools and other scheme supportive activities etc.

5. Management of interface between man and wild animals.

i) Provision for a wildlife protection squad:

It is proposed to create a Wild life protection squad consisting of 05 members with provision of hired vehicle and other logistics as per the approved cost norm. The team shall be stationed at Padua in order to mitigate Human-Bear conflict, Human-Wild boar conflict, Human-Monkey conflict and prevention of poaching of wild animal, assisting staff in detection of other forest offences etc.

ii) It is also proposed to construct a double storey **Mobile Squad Barrack** of required size with provision of drinking water facility, Solar light system etc. at Padua for housing the protection squad. The shed shall be constructed in pillar structure with ground floor to be used as vehicle parking and 1st floor for housing staff and squad member. An amount of Rs. 15 Lakhs is proposed for the same.

GPS location of Mobile Squad Barrack

Sl. No	Item of Work	Section	Beat	Name of site	Geo Co-Ordinate	
					Latitude	Longitude
1	Barrack	Padua	Padua	Padua	N 18.373604	E 82.679313

a) Mitigation of Human-Bear conflict (HBC):

Provision of Auto Trap Bear cage

It is proposed to supply 01 no. of auto trap bear cage to each Range totalling to 3 nos. to trap Bear causing human attack and injury and even death outside their habitat.

The cages shall be prepared with strong iron angle and flat iron with provision of window and a gate to be operated by lever system. Once the bear step in to the cage with allurement of food kept inside the cage the gate will be closed and locked automatically by the pressure of its foot disallowing the animal to come outside. It is a special designed cage made up of with technique and skill.

i) Construction of a Rescue Bear Enclosure :

After the bear is trapped it may be released in to its natural habitat located at a far-off place or can be kept in side an enclosure proposed to constructed inside forest area nearer to beat house or any other suitable location for observation or treatment etc., if it is injured.

The enclosure of required size shall be constructed with strong Angle Iron PVC Chain link mesh with provision of drinking water (small water moat) and an artificial cave made up of R.R stone masonry. A separate masonry feeding chamber shall be constructed close to the enclosure with sliding door on both the door i.e door close to the enclosure and doors to outside to provide food to the animal with an approximate cost of Rs. 10.00 lakhs.

ii) Procurement of Tranquilizing dart gun, Accessories, Chemical etc.

In case a bear is a rouge one causing Human-Bear conflict, it is required to be tranquilized with the help of dart gun and action shall be taken up to trap the animal with the help of resource personnel to be deputed by the CWLW Odisha.

In order to Tranquilize the animal necessary scientific equipments like Tranquilizer Dart gun, Darts, other required accessories, Chemicals, Chains etc are required for which an amount of Rs. 10 lakh is proposed to procure the same after obtaining necessary approval from the PCCF (WL) & CWLW Odisha.

iii) Provision for a Rescue Van:

Besides to rescue and transport the animal from the site of tranquilisation, a special type rescue van is required for which another Rs. 12 lakh is proposed. The rescue van can also be used for other forest and wildlife protection works whenever necessary.

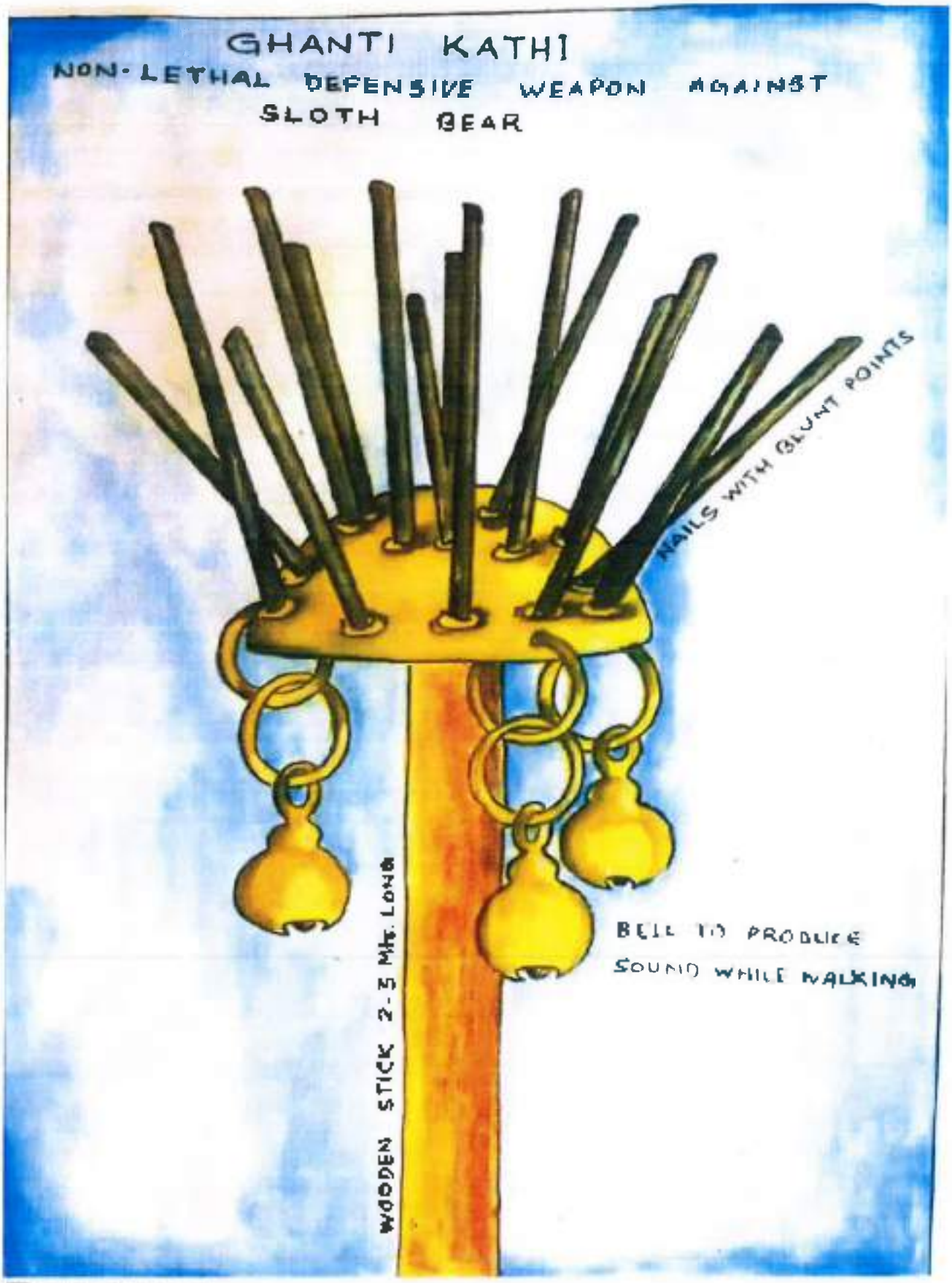
iv) Provision for a Squeeze Cage:

In order to treat the injured bear, it is necessary to procure a **"squeeze cage"** of appropriate size and design for which another Rs. 3.00 lakh is also proposed.

v) Provision for **GHANTI KATHI** non-lethal defensive weapon to use in bear prone villages and also in the peripheral forest fringe villages in order to protect the victims and to mitigate Human-Bear conflict in the impact zone.

Because the bears are very sensitive to sound produced by "Ghanti" and fear to the pointed nails of the weapon. As soon as the weapons are in operation, the bears shall run away from the site without causing any harm.

A model of the weapon is shown below:



Scanned with CamScanner

Monitoring & Evaluation:

The implementation requires skill & dedication. A monitoring cell is proposed to be created at the Division Hqrs. headed by one of the Assistant Conservator of Forests working in the Division office. He will be assisted by one computer data operator. The criteria for evaluation of the out come of this plan may be as follows.

1) Level of Human-Bear conflict indicators like, number of human injuries and death of humans in the zone of influence.
2) Incidence and extent of fire (indicator frequency, area burnt etc.).
3) Grazing pressure (No. of cattle being grazed in the area).
4) Illegal felling (No. of incidents/cases).

Base line data on all the four criteria should be collected during the first year of implementation of the plan and there after done every year for monitoring changes/success.

To begin with, base line data on the following indices will be collected through the range staff assisted by local foresters. The efficacy of the management proposed in this plan will be assessed continuously through systematic observation of the changes which will be recorded.

1) Vegetation indices.
2) Sign survey of herbivores and carnivores at half yearly intervals on fixerd line transects.
3) Forest fire.
4) Incidents of killing of animals and human beings, crop and house damages, removal of timber from forests, habitat destruction, straying of animals in to habitations etc. For this purpose 1.5 lakh have been proposed in the scheme.
5) **Water flow regime and quality :** This information will be collected from the environment monitoring cell, which will function at the project site.

Training: Organisation of short capsule courses in which experts will be invited in relevant fields and shall impart training to the Foresters/Forest Guard/V.S.S/SHG members and protection squads regarding wildlife management, and driving wild boar/monkeys from crop raiding, fire fighting, census of animals, other protection aspects and mitigation of Human-Bear conflict.

Inter-departmental co-ordination .

Various Departments like Agriculture, Horticulture, Soil Conservation, Tribal Welfare, Rural Development, Education, Health and Family Wellfare, Community Development, Pachayat Raj etc. are working in the zone of influence. Effective cross-sectoral coordination is required for synergy among various departments operating in the area. A District Level Coordination Committee (DLCC) under the Chairmanship of District Collector is already in existence. Implementation of various developmental activities as suggested in this plan, relating to Small Industries etc. should be reviewed in the DLCC and appropriate measures taken for success of the programmes.

Plan period

This plan has been prepared for a period of 5 years. Interim revision may be taken up after assessing the results of evaluation done through the monitoring cell. Ms Kalinga Alumina Ltd. has given undertaking to prepare subsequent plan in continuation to this plan one year before expiry of the subsisting plan.

FINANCIAL FORECAST OF INTERVENTIONS IN THE PROJECT IMPACT AREA (TO BE IMPLEMENTED BY DFO KORAPUT DIVISION)

Sl. No.	Particulars	Unit	Rate in Rs.	Amount in Lakh
1	**Habitat Improvement**			
	a. Provision for Water bodies of size (40m × 30m × 3m). New 2 nos.- 1 nos. in Nagasari RF and 1 no. in Hatibari RF of Balda Range @ Rs. 08.00 lakhs per each = 16.00 lakhs Old 1 no. (Renovation) in Bhimodole RF of Balda Range @ Rs. 2.50 lakhs New 1 no. (Mini water body) of size 20m × 20m × 3m in Balel RF of Lamtaput Range @Rs. 3.36 lakhs **Total=16.00+2.50+3.36=21.86 lakhs** Out 2 nos. in Balda Range one is to be supplemented by M/s Kalinga Alumina Ltd. dug out by forest Deptt. in Nagasari RF and now included in mining lease.	4 Nos. Including one Renovation	2 nos. @ Rs. 8.00 lakhs per each 1 no. Renovation @ Rs. 2.50 lakhs 1 no. (Mini water body) @ Rs. 3.36 lakhs	21.86
	b. Provision for 4 nos. of Small Earthen Bund Water Harvesting Structure (WHS) with RCC/Masonary spillway across seasonal/perennial nala inside wildlife habitats to provide water to animals during dry season.	4 nos.	10,00,000.00	40.00

	c. Provision for site specific **SMC** works like drainage line Treatment including LBCD of different size, Cement masonary check dam, RCC check dam, Graded bund and Sub-surface dyke inside Nagasari RF, Bhimodole RF, Podua RF, Thuba RF & Kansadi PRF as per field requirement..	5 forest blocks	On LS 50,00,000.00	50.00
	d. i. Provision for **uprooting of invasive weeds** over 200 ha. @ 20 man-days per ha. @ Rs. 450/- per day in Nagasari RF for 4 years. ii. Bamboo twig and thorn fencing around the weed clearance patches having potential root stock of forest species for natural regeneration as per neccssity.	200 ha LS	9,000/- per ha. 8,56,500.00	72.00 8.565

Sl. No.	Particulars	Unit	Rate in Rs.	Amount in Lakh
2.	**Fire protection measures**			
	a. **Provision for fire blower** @ 2 nos./each Range totaling to 6 nos. for firefighting and tracing of fire line @ Rs. 70,000/- each.	6 nos.	70,000.00	4.20
	b. **Incentive to local SHG Group/ VSS** in firefighting @ Rs. 5,000/- per group per year over 5-year plan period.	30 nos. of group	5,000.00 per year/Group	7.50
	c. **Awareness campaign** in the villages against fire hazards in the wildlife habitat, provision for road side hoardings, sign boards, fire drill and fire mapping @ Rs. 1,00,000/- per year × 5 year = Rs. 5,00,00/-	As per requirement	1 lakh per year	5.00
	d. Other miscellaneous habitat improvement and scheme supportive activities accessories etc.		On LS	6.832
3.	**Antidepredation Measures for Man-Animal conflict**			
	a. Provision for a **Wildlife protection/ Antidepredation squad** consisting of 5 members with hired vehicle and other logistics etc. to mitigate Human-Bear conflict, and protection of wildlife and habitats from poaching, illicit felling in habitat, encroachment, fire protection and mitigation of Human-Monkey and Wild-Boar conflict in impact zone as per approved cost norm 1 squad @ Rs. 17,12,620/- per annum × 5 years = 85,63,100/-.	1 No.	17,12,620.00	85.631
	b. Provision for a two-story **Mobile Squad Barrack** in pillar structure with provision of drinking water facility and solar light for ground floor vehicle parking and 1st floor to house the protection squad and staff during patrolling.	1 No	On LS 15,00,000.00	15.00

Sl. No.	Particulars	Unit	Rate in Rs.	Amount in Lakh
4.	**Mitigative measures against Human-Bear conflict (HBC)**			
	a. Provision for Auto trap bear cage @ 1 no. per each Range @ Rs. 2.50 lakh each	3 Nos.	On LS 2,50,000.00	7.50
	b. Provision for scientific equipment like Tranquilizer Dart gun, Darts, other accessories, chemicals, chains etc. to tranquilize rouge bears.	1 No.	On LS 10,00,000.00	10.00
	c. Provision for a Rescue Van for transportation of bear from menace site to safe place or enclosure.	1 No.	On LS 25,00,000.00	25.00
	d. Provision for a Squeeze cage for treatment of injured Bear with other accessories.	1 No.	On LS 3,00,000.00	3.00
	e. Provision for a Rescue enclosure at strategic location for temporary confinement of rouge bear for observation/treatment etc. with provision of water moat, masonry feeding chamber with double sliding gate and a R.R stone masonry cave etc. asper requirement.	1 No.	On LS 10,00,000.00	10.00
	Provision for procurement of Ghanti Kathi non-lethal defensive handy weapon 200 nos. @ Rs. 850/- per each.	200	850	1.70

5.	**Monitoring and evaluation**			
	a. Provision towards cost of monitoring and GIS Analysis, Research and Analysis, documentation etc. @ Rs. 1,50,000/- per year over 5 years	5 years	1,50,000.00	7.5
	Total			**381.288**
	Add 20% Cost Escalation			76.258
	Grand Total			**457.546**

(Rupees Four Crore Fifty Seven Lakhs Fifty Four Thousands Six Hundred)only.

KALINGA ALUMINA LIMITED

Asst. Conservator of Forests
Koraput Forest Division
KORAPUT

Divisional Forest Division
Koraput Forest Division
Divisional Forest Officer
Koraput Forest Division

Principal Chief Conservator of Forests
(Wildlife) & Chief Wildlife Warden
Odisha, Bhubaneswar

CHAPTER - IV (A)

ANIMAL PASSAGE PLAN

As it is a mining project, animal passage plan is not required in this plan. Besides the project area and its impact area is far away from the wildlife sanctuaries/National Park and Elephant Corridors of the state as narrated in chapter-II of this plan.

Addl. Conservator of Forest
Koraput Forest Division
KORAPUT

Divisional Forest Officer
Koraput Forest Division

CHAPTER-V

FINANCIAL IMPLICATIONS AND MONITORING

Koraput Division	Amount (In Lakhs)	Remarks
Project Area	At the project cost	Page No. 54
Project impact area	457.546	Page No. 72

KALINGA ALUMINA LIMITED

Asst. Conservator of Forest
Koraput Forest Division
KORAPUT

Divisional Forest Officer
Koraput Forest Division
Divisional Forest Officer
Koraput Forest Division

ANNUAL WORK PLANS AND ANNUAL OUT LAY STATEMENT OF FINANCIAL FORECAST OF ACTIVITIES TO BE UNDERTAKEN OVER 05 YEARS SPAN IN THE PROJECT IMPACT AREA (TO BE IMPLEMENTED BY DFO KORAPUT DIVISION).

(Amount in lakhs)

Sl. No	Particular of works	0th & 1st year	2nd year	3rd year	4th year	5th year to 10th year	Total
	Mitigation measures against Human-Bear conflict (HBC)						
1	Provision for Auto trap bear cage	7.50	-	-	-	-	7.50
2	Provision for scientific equipment	10.00	-	-	-	-	10.00
3	Provision for a Rescue Van for transportation of bear from menace site to safe place or enclosure.	25.00	-	-	-	-	25.00
4	Provision for a Squeeze cage for treatment of injured Bear	3.00	-	-	-	-	3.00
5	Provision for a Rescue enclosure at strategic location for temporary confinement of rouge bear for observation/treatment etc.	10.00	-	-	-	-	10.00
6	Provision for a Wildlife protection/Antidepredation squad consisting of 6 members with hired vehicle and other logistics etc.	17.1262	17.1262	17.1262	17.1262	17.1262	85.631
7	Provision for a two-story Mobile squad Barrack in pillar structure with ground floor for parking vehicle and 1st floor to house the protection squad and staff during patrolling.	15.00	-	-	-	-	15.00
8	Procurement off Ghanti Kathi non-lethal weapon 200 nos.	1.7	-	-	-	-	1.7

1063

Sl. No	Particular of works	0th & 1st year	2nd year	3rd year	4th year	5th year	Total
	Habitat Improvement						
9	Provision for water bodies.	21.86	-	-	-	-	21.86
	Provision for Earthen bund WHS with spillway	40.00	-	-	-	-	40.00
10	Provision for Site Specific SMC works like drainage line treatment including LBCD, Cement masonary check dam, RCC check dam, graded bond, sub-surface dyke inside Nagasani RF.	30.00	20.00	-	-	-	50.00
11	Provision for uprooting of invasive weeds and fencing etc.	26.565	18.00	18.00	18.00	-	80.565
12	Provision of fire blower @ 2 nos./each Range totaling to 6 nos. for firefighting and tracing of fire line	4.20	-	-	-	-	4.20
13	Incentive of local SHG Group in firefighting	1.50	1.50	1.50	1.50	1.50	7.50
14	Awareness campaign in the villages against fire hazards in the wildlife habitat, provision for road side hoardings, sign boards, fire drill and fire mapping	1.00	1.00	1.00	1.00	1.00	5.00
15	Scheme supportive activities and accessories	6.832	-	-	-	-	6.832
16	Monitoring and evaluation	1.50	1.50	1.50	1.50	1.50	7.5
	Total	**222.7832**	**59.1262**	**39.1262**	**39.1262**	**21.1262**	**381.288**
	Add 20% Cost Escalation						76.258
	Grand Total						457.5456 or 457.546

(Rupees Four Crore Fifty Seven Lakhs Fifty Four Thousands Six Hundred)only.

10064

KALINGA ALUMINA LIMITED

76

Asst. Conservator of Forest
Koraput Forest Division
KORAPUT

Divisional Forest Officer
Koraput Forest Division

Chapter-VI

Map and Annexures :

1. Topo map/maps in 1:50000 scale showing project area, impact area with forest blocks, Roads, Railway line, Water bodies, Reservoir& movement of mega fauna **Plate-I.**

2. Map showing location of nearby protected area, wildlife corridor etc. **Plate-II.**

3. Survey of India Topo sheets showing proposed interventions to be implemented by DFO Koraput within 10 KM radius impact area of the project **Plate-III.**

Annexure-I

Regd. Post with A/D

GOVERNMENT OF ODISHA
STEEL & MINES DEPARTMENT

No. 2143 /S&M, Bhubaneswar, dated the 01.03.2023
SM-MC2-MC-0007-2023

From
Sri S.K.Swain,
Special Secretary to Government.

To
Mundra Aluminium Limited,
10th Floor (East Wing), Adani Corporate House,
Shantigram, Near Vaishno Devi Circle,
S. G. Highway, Khodiyar,
Ahmedabad-382421
Email – k.anilkumar@adani.com

Sub: Letter of intent with reference to e-auction dated 15.02.2023 for grant of mining lease for Ballada Bauxite Block for Bauxite in Ballada village of Nandapur Tahasil of Koraput District over 144.945 Hectare Area.

1. Background:

1.1 Government of Odisha, pursuant to the Mines and Minerals (Development and Regulation) Act, 1957 (the "**Act**") and the Mineral (Auction) Rules, 2015 as amended from time to time (the "**Auction Rules**"), issued the Notice Inviting Tender (NIT) dated 23.11.2022 to commence the auction process for grant of mining lease for Ballada Bauxite Block located in Koraput District of Odisha. The e-auction process was conducted in accordance with the tender document for the said mineral block and Mundra Aluminium Limited was declared as the 'Preferred Bidder' under Rule 9(9)(iii) or Rule 10 (1A) of Auction Rules, having quoted a Final Price Offer of 72.25 %.

1.2 As required under Rule 10(1) or Rule 10 (1A) of the Auction Rules and the tender document for the said mineral block, Mundra Aluminium Limited has made payment of the first instalment of Rs.6,66,41,122/-(Rupees Six Crore Sixty Eight Lakh Forty One Thousand One Hundred Twenty Two) being 20% (twenty percent) of the upfront payment through e-challan Reference Id-359A9C0976 dtd.27.02.2023 at Koraput, Odisha.

2. Grant of Letter of Intent

Accordingly, pursuant to Rule 10(2) of the Auction Rules and the terms of the Tender Document, the Government of Odisha is pleased to issue this letter of intent for grant of Mining Lease for Ballada Bauxite Block for Bauxite in Ballada village of Nandapur Tahasil of Koraput District over 144.945 Hectare Area to Mundra Aluminium Limited for a period of 50 (fifty) years.

3. Conditions

3.1 This letter of intent and the subsequent grant of aforementioned mining lease shall be subject to the provisions of the Act and the Rules made thereunder, as amended from time to time, and Mundra Aluminium Limited shall be designated as the 'successful bidder' and subsequently granted the mining lease only upon satisfactory completion of all the requirements under the Acts and Rules made thereunder

The State Government may impose such other conditions in the Mine Development and Production Agreement (MDPA) and/or Mining Lease as may be considered by the State Government to be in the interest of mineral development and in public interest.

Mundra Aluminium Limited shall be bound by (i) the enactment, bringing into effect, adoption, promulgation, amendment, modification or repeal of any Applicable Laws (including the Act and Rules) occurring at any time, including prior to or after the Bid Due Date; (ii) any amendments made by the State Government to this effect in the Tender Document, the letter of intent, the MDPA and/or the mining lease deed at any time, including prior to or after the Bid Due Date.

Mundra Aluminium Limited shall ensure that the Bid Security is valid until the Performance Security is furnished to the Government of Odisha.

3.2 For reference, the requirements under the Auction Rules for designation of Mundra Aluminium Limited as the "successful bidder" and subsequent grant of the mining lease are reiterated below. It is clarified that the requirements mentioned below are only for reference and in the event of any change in the Act or the Rules made thereunder, the requirements under the modified Act or the Rules made thereunder, as the case may be, shall be applicable.

a. Designation as the "Successful Bidder":

Mundra Aluminium Limited shall be considered to be the "successful bidder" upon:

i continuing to be in compliance with all the terms and conditions of eligibility;

ii. payment of the second instalment being 20% (twenty per cent) of the upfront payment;

iii. furnishing an irrevocable and unconditional performance security to the State Government from an Acceptable Bank and payable at Bhubaneswar, Odisha pursuant to the Auction Rules; and

iv. satisfying the conditions specified in clause (a) of sub-section (2) of Section 5 of the Act with respect to a mining plan.

b. Signing of the Mine Development and Production Agreement:

Mundra Aluminium Limited shall sign the Mine Development and Production Agreement with the Government of Odisha upon obtaining all consents, approvals, permits, no-objections and the like as may be required under applicable laws for commencement of mining operations.

c. Grant of mining lease

Subsequent to signing of the Mine Development and Production Agreement, Mundra Aluminium Limited shall make payment of the third instalment being 60% (sixty per cent) of the upfront payment; and thereafter the Government of Odisha shall grant the aforementioned mining lease.

4. Validity

4.1 This letter of intent is valid for a period of 3 (Three) years from the date of its issuance, within which time all the above conditions must be fulfilled and the Mining Lease deed must be executed between the Mundra Aluminium Limited and the Government of Odisha. In case there is a delay in execution of Mining Lease Deed due to reasons beyond the control of the Preferred Bidder, then it may submit an application to Government of Odisha, requesting for further extension.

4.2 If the Government of Odisha is satisfied that there is a delay in execution of Mining Lease Deed due to reasons beyond the control of the Preferred Bidder and a longer period is required to enable the Preferred Bidder to satisfy all or any of the above conditions, it may extend the validity of this letter of intent for such period or periods as the Government of Odisha may specify. Provided that: (a) this letter of intent shall be extended for a maximum period of 2 (two) years; and (b) the total period for which this letter of intent would remain valid must not exceed 5 (five) years from the date of issuance.

4.3 The holder of the Letter of Intent shall comply with the terms and conditions of this Letter of Intent, including executing the Mining Lease within the period referred to in Sub-rule 5 of Rule 10 of the Auction Rules, failing which

(a) this Letter of Intent shall be revoked; and
(b) the Bid Security or the Performance Security, as the case may be, and

any instalment of Upfront Payment paid, shall be forfeited and appropriated in full by the State Government.

Mundra Aluminium Limited shall furnish acceptance of the terms and conditions of Letter of Intent within 15 (Fifteen) days from the date of issue of this letter.

Yours faithfully,

01.03.2023

Special Secretary to Government

Memo No. 2144 /SM, Bhubaneswar dated the 01.03.2023

Copy forwarded to the Director of Mines & Geology, Odisha, Bhubaneswar/ the Deputy Director of Mines, Koraput for information and necessary action.

01.03.2023

Special Secretary to Government

Memo No. 2145 /SM, Bhubaneswar dated the 01.03.2023

Copy forwarded to the Collector, Koraput for information and necessary action.

01.03.2023

Special Secretary to Government

IC2-MC-0007-2023/1/2023

GOVERNMENT OF ODISHA
STEEL & MINES DEPARTMENT

*****

PROCEEDING

No. 5995 /SM, Bhubaneswar, Date 09.06.2023
SM-MC2-MC-0012-2023

Sub: Change in name of entity from "Mundra Aluminium Limited" to "Kalinga Alumina Limited" – ***reg.***

ORDER

Whereas, "Mundra Aluminium Limited", a wholly owned subsidiary of Adani Enterprises Limited, took part in the e-auction process and declared as preferred bidder in respect two Bauxite Blocks Kutrumali and Ballada Bauxite Block. Accordingly, Letters of Intent (LoI) were issued in favour of "Mundra Aluminium Limited" on 27.02.2023 and 01.03.2023 for Kutrumali and Ballada bauxite mines respectively.

And whereas, Adani Enterprises Limited, being the holder of mineral concession, vide representation dated 04.04.2023 intimated the State Government regarding change of name from "Mundra Aluminium Limited" to "Kalinga Alumina Limited" w.e.f. 30.03.2023. This name change has also been approved by Registrar of Companies, Ministry of Corporate Affairs, Government of India and issued Certificate of Incorporation on 30.03.2023 as per Rule-29 of the Companies (Incorporation) Rules, 2019.

And whereas, the company has also submitted that this change is a mere change in name and there is no change in the corporate structure, Memorandum and Articles of Association and the shareholding pattern. The renamed entity will continue to be a wholly owned subsidiary of Adani Enterprises Limited, in compliance with clause 5 (b) of the tender documents published under Notice Inviting Tender Dated 23.11.2022.

Therefore, , the State Government, after careful consideration have been pleased to allow the change of name from "Mundra Aluminium Limited" to "Kalinga Alumina Limited" as per rule 61 of MC Rules, 2016 w.e.f.

30.03.2023 at all places wherever the company is required to display its name without change in the corporate structure, Memorandum and Articles of Association and the share holding partners in terms of section 12 of the companies Act, 1956

By order of the Governor

9/6/23

Additional Secretary to Government

Memo No. 5996 /SM, Dated: 09.06.2023

Copy forwarded to the CEO-Aluminium Business, 10th Floor (East Wing), Adani Corporate House, Shantigram, Near Vaishno Devi Circle, S. G. Highway, Khodiyar, Ahmedabad-382421 for information and necessary action.

9/6/23

Additional Secretary to Government

Memo No. 5997 /SM, Dated: 09.06.2023

Copy forwarded to the Director of Mines & Geology, Odisha, Bhubaneswar for information and necessary action.

9/6/23

Additional Secretary to Government

Memo No. 5998 /SM, Dated: 09.06.2023

Copy forwarded to the Collector, Kalahandi/Collector, Rayagada for information and necessary action.

9/6/23

Additional Secretary to Government

Memo No. 5999 /SM, Dated: 09.06.2023

Copy forwarded to the Deputy Director of Mines, Koraput/ DFO, Koraput for information and necessary action.

9/6/23

Additional Secretary to Government

Annexure-II

Form A (Part-I): Diversion of Forest Land

Common Application Form

Project Details

1. Details of Project

1.1 Name of the Project	Baliada Bauxite Mining Project
1.2. Project Proposal for	New
1.3. Project ID (Single Window Number)	SW/139582/2023
1.4. Description of Project	Baliada Block is virgin bauxite block located in Nandapur tehsil of Koraput District in Odisha, total mining leased area is 148.948 Ha. located entirely within Nagaon Reserve Forest. The project contemplates to develop the mine and surrounding infrastructures for commercial production of bauxite ore at 4 MTPA using conventional opencast mining.

2. Details of the Company/Organizaton/User Agency making application

2.1. Legal Status of the Company/Organization/User Agency	Private Limited
2.2. Name of the Company/ Organization/User agency	KALINGA ALUMINA LIMITED

Registered address

2.3. Address	Adani Corporate House, Nr. Vaishno Devi Circle, S.G. Highway, Khodiyar, Ahmedabad-382421
2.4. Village / Town / City	Khodiyar
2.5. State	GUJARAT
2.6. District	AHMADABAD
2.7. Pin Code	382421
2.8. Landmarks	Adani House
2.9. E-mail address	Kalinga.Alumina@adani.com
2.10. Mobile number	7752021010

3. Details of the person making application

3.1. Name	Kassireddy Anil Kumar
3.2. Designation	Associate Vice President

Correspondence address

3.3. Address	Adani Corporate House, Nr. Vaishno Devi Circle, S.G. Highway, Khodiyar, Ahmedabad-382421
3.4. Village /Town / City	Khodiyar
3.5. State	GUJARAT
3.6. District	AHMADABAD
3.7. Pin Code	382421
3.8. Landmarks	Adani House
3.9. E-mail address	Kalinga.Alumina@adani.com
3.10. Mobile number	7752021010

Project Location

Project Location

4. Location of the Project or Activity

4.1. Upload KML	5279873_FC_FORM_C_FOREST_LAND_PROPOSED_DIVERSION_KML_1568101907A1B6_Balogoo KML Patch_42.kml
4.2. Whether the project/activity falling in the state/UT sharing international borders	NO
5. Shape of the Project	Non - Linear

Location Details

Toposheet No	State/UT	District	Sub District	Village	Plot/Survey/Khasra No.
E44K11	ODISHA	Koraput	Paduo	FOREST	Compartment No I-1/VII, I-1/VIII, I-1/IX, I-1/X

Remarks

N/A

6. Land Requirement (in Ha) of the project or activity

6.1. Nature of Land Involved	
6.2. Non-Forest Land [A]	0
6.3. Forest Land [B]	157.212
6.4. Total Land [A+B]	157.212

Project Activity Cost

8. Project/Activity Cost

8.1. Total Cost of the Project at current price level (in Lakhs)	23000 Amount in Words Twenty Three Thousand Lakh(s) Only

7. Employment likely to be generated

7.1. During construction phase

Permanent employment

7.1.1. No. of permanent employment (No.s) [A]	20
7.1.2. Period of employment (No. of days) [B]	180
7.1.3. No. of man-days [X]=[A]*[B]	3600

Temporary employment

7.1.4. Temporary / Contractual employment (No. of Man days) [Y]	27000
7.1.5. Total [X] +[Y]	30600

7.2. During operational phase

Permanent employment

7.2.1. No. of permanent employment (No.s) [A]	30
7.2.2. Period of employment (No. of days) [B]	3050
7.2.3. No. of man-days [X]=[A]*[B]	109500

Temporary employment

7.2.4. Temporary / Contractual employment (No. of Man days) [Y]	350000
7.2.5. Total [X] +[Y]	459500

Others

8. Whether Rehabilitation and Resettlement (R&R) involved?	NO
9. Whether project area involves shifting of watercourse/road/rail/Transmission line/water pipeline, etc required?	NO
10. Whether any alternative site(s) examined or part thereof for the non-site-specific component?	Not applicable as the project or activity is site specific.
11. Whether there is any Government Order or Policy/ Court order relevant or restricting to the site?	NO
12. Whether there is any litigation pending against the project and/or land in which the project is proposed to be set up?	NO
13. Whether the proposal involves violation of Act/Rule/Regulation/Notification of Central/State Government?	NO

Form-A (Part-I): Diversion of Forest land

Project Details

1. Forest Clearance

1.1. State	ODISHA
1.2. Upload a copy of note containing justification for locating the Project in forest land	1. Justification of Locating project in Forest land.pdf
1.3. Project Category	Mining / Quarrying
1.4. Whether any proposal seeking prior approval of Central Government under the Forest (Conservation) Act, 1980 for diversion of forest land required for this project has been submitted in the past?	No

Proposed Land

2. Details of Forestland proposed to be diverted (Village / Division / District Wise Breakup)

2.1. Total area of forestland proposed for diversion (ha.)	157.212
2.2. Total area of non-forestland required for this project (ha.)	0

2.3. Legal Status of forest land proposed for diversion

Area (ha)	Legal Status of Forest Land
157.212	Reserve Forest

2.3.1. Total Area (ha)	157.212
2.4. Total period for which the forestland is proposed to be diverted (No. of years)	50

KML Details

Division	Koraput Division
No. of Patches	3
KML	7831698_FC_KML_1683545866698_5.3 Combined Lease and Access Roads _2.kml

Location Details

Toposheet No.	District	Village	Range	Forest land proposed for diversion (ha)	Non Forest Land (ha)
E44K11	Koraput	BALDA	Koraput	144.945	0
E44K11	Koraput	BANUR	Koraput	5.603	0
E44K11	Koraput	FOREST	Koraput	6.664	0

Patch Details

Patch/ Segment ID	Forest Area (ha)	Non-Forest Area (ha)	Remarks if any
1	144.945	0	ML
2	5.603	0	Access road from west side
3	6.664	0	Access road from east side

Remarks Details

Total Forest diversion requested for Balada Bauxite Mine (144.945 ha ML + 12.267 ha Approach roads)

Total Patch-wise Forest Land in the division (ha)

2.5. Total Forest Land Area (ha)	157.2120
2.6. Total Non Forest Land Area (ha)	0.0000

Total KML-wise Forest Land in the division (ha.)

2.7. Total Forest Land Area (ha)	157.212
2.8. Total Non Forest Land Area (ha)	0
2.9. Total Area (ha)	157.212

3. Component Wise Break Up

Component	Forest Land Proposed for Diversion (ha)	Non-forest Land (ha)
Mining lease	144.945	0
Access road from west side	5.603	0
Access road from east side	6.664	0

4. Total Forest Land(ha)	157.212
5. Total Non Forest Land (ha)	0.0000

6. Upload map of the forest land proposed to be

diverted prepared by using DGPS or Total Station (pdf only) | 2. Map of forest land proposed for diversion (DGPS).pdf

Afforestation Details

7. Details of land identified for Compensatory Afforestation

7.1. Whether Compensatory Afforestation is applicable or not?	Yes
7.1.1. Type of Compensatory Afforestation	Non-forest Land
7.1.1.1. Whether Non-forest land is available?	Yes

7.1.2. Patch wise details

Kml file Name

Updated CA Land 31.08.2023.kml

TopoSheet No.	State	District	Village	Plot No. / Kasra No.	Present Owner	Area
E44K15	ODISHA	Koraput	KANDARA	783	Government Land	32.086
E44K15	ODISHA	Koraput	KANDARA	529	Government Land	115.259
E44K15	ODISHA	Koraput	KANDARA	535	Government Land	7.818
E44K15	ODISHA	Koraput	KANDARA	791	Government Land	12.141
E44K15	ODISHA	Koraput	KHINIBAR	300	Government Land	9.084
E44K15	ODISHA	Koraput	KHINIBAR	301	Government Land	3.784
E44K15	ODISHA	Koraput	KHINIBAR	300	Government Land	43.579
E44K15	ODISHA	Koraput	KHINIBAR	308	Government Land	6.070
E44K15	ODISHA	Koraput	KANDARA	467	Government Land	12.837
E44K15	ODISHA	Koraput	KANDARA	792	Government Land	8.988
E44K15	ODISHA	Koraput	KHINIBAR	305	Government Land	7.363
E44K15	ODISHA	Koraput	KHINIBAR	306	Government Land	2.783
E44K15	ODISHA	Koraput	KANDARA	790	Government Land	16.471
E44K11	ODISHA	Koraput	KANDARA	467	Government Land	6.162
E44K15	ODISHA	Koraput	KHINIBAR	307	Government Land	6.394
E44K16	ODISHA	Koraput	KANDARA	529	Government Land	24.929
E44K11	ODISHA	Koraput	KANDARA	467	Government Land	6.152
E44K15	ODISHA	Koraput	KHINIBAR	303	Government Land	5.894
E44K15	ODISHA	Koraput	KHINIBAR	302	Government Land	3.297

7.1.3. Number of patches.	1
7.1.4. No. of districts involved for raising Compensatory Afforestation.	1
7.1.5. Total CA Land	327.979999999999996

7.1.6. Upload a scanned copy of the map of the land identified for creation of Compensatory Afforestation prepared by using GPS or Total Station (pdf only)	3. Map of CA Land 1-50000.pdf
7.1.7. Whether the area of non-forest land or Revenue forest land required to be provided by User Agency for raising Compensatory afforestation is less than area of forest land proposed to be diverted?	No
7.1.8. Whether NFL is free from Non Encumbrance	Yes
7.1.9. Whether the present owner of NFL is different from the User agency	Yes
7.1.9.1. Upload MoU/agreement executed between the present owner and the user agency	4 CA land allocation Koraput.pdf

Others

8. Cost-Benefit analysis	
8.1. Whether Cost-Benefit analysis for the Project has been made?	Yes
8.1. Total Loss (Against the proposed forest land Diversion in crore)	256.6
8.2. Estimated Benefits of Forest Diversion (In crore)	6350.3
8.3. Cost Benefit Ratio	24.5565
8.4. Upload a copy of Cost-Benefit analysis	5. CBA Ballada Bauxite Mines.pdf
9. Environmental clearance Details	
9.1. Whether the Project requires Clearance under the Environment (Protection) Act 1986 (Environmental clearance)?	Yes
9.1.1. Status of Environmental Clearance	Application submitted
9.1.1.1. Proposal No	SIA/OR/MIN/439954/2023
9.1.1.2. Date of application	12/08/2023
9.1.1.3. MoEFCC / SEIAA File Number	SIA/OR/MIN/439954/2023
9.1.1.4. Status of application [Submitted recently / ToR Granted / PH Conducted / Under appraisal]	Submitted recently
10. Wildlife clearance Details	
10.1. Whether the Project or a part thereof is located in any Protected Area or their Eco sensitive zone?	No

Category Specific Details

11. Sector specific detail/attachments

11. Sector specific detail/attachments

11.1. Copy of approved mining plan along with approval letter	6. Approved Mine plan with approval letter-Ballada.pdf
11.2. Copy of map of the outer boundary of mining lease area (pdf only)	7. Map of outer boundary of ML area.pdf
11.3. Copy of the detailed land use plan in 1:4,000 scale prepared by using DGPS or Total Station (Kml only)	8. Land use plan 1 4000.pdf
11.4. Copy of the prospecting licence and extension of the prospecting licence, if any	9. Letter of Intent -Ballada.pdf
11.5. Copy of the approval accorded for MoEFCC for prospecting	10. In principle stage 1 Form C clearance.pdf
11.6. Copy of note containing details of the plan for the transportation of the minerals proposed to be raised from the mining lease (pdf only)	11. Bauxite Evacuation Plan.pdf

12. Period of validity of Mining Plan

12.1. From	09/09/2023
12.2. To	07/08/2028
13. Period of Mining Lease(Years)	50
14. Name of approving authority for the Mining plan	Indian Bureau of Mines

15. Details of Prospecting undertaken to assess mineral reserves

15.1. Whether detailed prospecting to assess mineral reserves in the lease has been undertaken	No

16. Brief details of Prospecting activities undertaken in the mining lease

16.1. Details of bore holes drilled for prospecting

Forest Land		Non-Forest Land	
No. of Bore holes	Diameters(Inch)	No. of Bore holes	Diameters(Inch)
15	4	0	0

17. Mineral Reserves

Name of Mineral	Proved Reserves	Indicated Reserves	Inferred Reserves	Mineable Reserves	Remarks
Bauxite	0.0001	22.13	0.0001	19.96	

18. Estimated reserves in Forest / Non-Forest land if any

Name of Mineral	Estimated Reserve in Forest Land	Estimated Reserve in Non-Forest Land	Remarks
Bauxite	22.13	0	Entire mining lease area falls within reserve forest. The total estimated mineral resource is 22.13 MT, out of which 19.90 MT (UNFC 122) is considered under Mineable reserve and 2.17 MT (UNFC 222) has been considered under prefeasibility mineral resources as per UNFC classification.

19. Details of Letter of Intent (LoI) / Vesting order / Mining Lease

19.1. Date of issue of LoI/Vesting order/Mining Lease	01/03/2023
19.2. Period of validity of LoI / Vesting order (years and months)	03/00
19.3. Period of lease (years and months)	50/00
19.4. Date of expiry of lease	28/02/2073
19.5. Lease area (in ha) as per LoI/Vesting order/Mining Lease	144.945
19.6. Production capacity (in MTPA) as per LoI / Vesting Order / Mining lease, if any prescribed	4
19.7. Details of Lease renewal(s), if any	NA
19.8. Other information, if any	Peak rated production capacity as per approved Mining plan is 4.0 MTPA. LOI does not define the mining capacity
20. Status of approval of Mining plan	Approved

21. Minerals to be mined

Name of Mineral	Classification	Production Capacity	Remarks
Bauxite	Major	4.0018	The Peak rated production capacity shall be 4001868 Tons per Annum (TPA).

22. Details of Total excavation (Rom) including Topsoil, Overburden, Mining waste, Rejects, etc.

22.1. Total excavation in MTPA	4.0018
22.2. Total Excavation in M.Cu.m/Annum	2.0083
22.3. Stripping Ratio	0.5021
22.4. Other information, if any	The Maximum excavation shall be attained during the fifth year of mining plan period. The stripping ratio during the first five year shall be 1:0.018

23. Life of mine (years and months)

23.1. Life of the mine as per approved mining plan (in years and months)	09/00
23.2. Life of the mine as per total estimated reserves, if any (in years and months)	09/00
23.3. Other information, if any	The Life of mine has been calculated based on the available reserves and resources, subsequently after detail exploration the life of mine may change.

24. Type and method of Mining Method

24.1. Type of mining	Opencast

24.1. Type of mining	Opencast
24.2. Method of mining	Mechanized
24.3. Other information, if any	NA

25. Type of blasting, if any, to be adopted

25.1. Type of blasting	Deep hole Blasting
25.2. Mitigation measures for control of blast induced vibrations	During blasting operation: - Sufficient stemming column will be maintained to prevent air blast Controlled blasting with proper blast design and charging. Controlled blasting also provides a number of hazard mitigation measures including the: By applying appropriate quality control and understanding of the implications of proper blast design, blasting operations can not only improve the safety on the mine, but will most likely improve productivity and the long term sustainability of the mine as well.
25.3. Other information, if any	NA

26. Whether it is proposed to install beneficiation plant/Coal washery within the mining lease area?	Yes
26.1. Capacity of beneficiation/washery (in MTPA)	N/A
26.2. Proposed process	N/A
26.3. Beneficiation/Washing Technology	N/A
26.4. Other information, if any	

27. Whether it is proposed to install crusher within the mining lease area?	Yes
27.1. No. Of crushers	2
27.2. Capacity of crushers	2 N/A
27.3. Total Capacity of crushers	4 N/A

28. Dumping strategy

Description		Area in Ha	Maximum height in m	Remarks
External dump	0.0001	0.0001		No External dumping is proposed
Internal dump	1.94	7		5-7 m
Topsoil dump/ storage	0.250	5		The top soil shall be utilized for plantation

29. Topsoil management

29.1. Total Topsoil excavated during the entire life of the mine (mm3)	0.026

29.2. Utilization strategy of topsoil	The top soil shall be utilized for plantation
29.3. Other information, if any	NA

30 Details of the Quarry/Mine Pit

30.1. Total Quarry Area (ha.)	81.82
30.2. Area of final void (ha.)	80.74
30.3. Maximum Depth of final void (m)	30
30.4. Other information, if any	NA

31. Details of Transportation

31.1. Mode of transportation upto pit head	Haul trucks/dumpers
31.2. Mode of transportation from pit head to siding/loading	30 T dumpers
31.3. Mode of transport from loading point to consumers	Through Road and Railway Mode
31.4. Other information, if any	

32. Details of reclamation/post mining land use

32.1. Plantation area (ha.)	4.23
32.2. Water body (ha.)	1.08
32.3. Public use (ha.)	0.0001
32.4. Other uses (ha.)	1.85

33. Copy of Additional information, if any

S. No.	Document Name	Remark	Document
1	Site specific Wildlife Management Plan undertaking	Site specific Wildlife Management Plan Undertaking	2. WLMP Undertaking.pdf
2	Soil moisture conservation plan Undertaking	Soil moisture conservation plan Undertaking	8. Soil Moisture Undertaking.pdf
3	Land Schedule and Summary of the ML area	Land Schedule and Summary of the ML area	4. Land Schedule& Summary_Balloda Bauxite Block.pdf
4	Board Resolution for authorized Signatory	Board Resolution for authorized Signatory	10. Authorization Letter_Resolution.pdf
5	Undertaking for NO R&R involved	Undertaking for NO R&R involved	3. No R&R Involved _ Undertaking.pdf
6	Note for dispatch of bauxite	Note for dispatch of bauxite	4. Note for Dispatch of Bauxite.pdf
7	Undertaking NPV	Undertaking NPV	1. NPV Undertaking.pdf
8	Evacuation Plan	Bauxite Evacuation plan	11. Bauxite Evacuation Plan.pdf

9	In principle stage I aparova.	In principle stage I Form C approval	10 In principle stage I Form C clearance.pdf
10	Letter of Intent	Letter of Intent-Ballada	9. Letter of Intent -Ballada.pdf
11	Land use plan	Land use plan 1-4000	8. Land use plan 1:4000.pdf
12	Map of outer boundary of ML area	Map of outer boundary of ML area	7. Map of outer boundary of ML area.pdf
13	Approved Mine plan and approval letter	Approved Mine plan and approval letter	6. Approved Mine plan with approval letter-Ballada.pdf
14	CBA	CBA Ballada	5. CBA Ballada Bauxite Mines.pdf
15	CA land allocation	CA land allocation	4. CA land allocation Koraput.pdf
16	Map of CA Land	Map of CA Land 1:50000	3. Map of CA Land 1-50000.pdf
17	Map of forest land proposed for diversion	Map of forest land proposed for diversion	2. Map of forest land proposed for diversion (DGPS).pdf
18	Justification of locating project in forest land	Justification of locating project in forest land	1. Justification of Locating project in Forest land.pdf

Undertaking

I hereby give undertaking that the data and information given in the application and enclosures are true to the best of my knowledge and belief and I am aware that if any part of the data and information is found to be false or misleading at any stage, the project will be rejected and clearance given if any to the project will be revoked at our risk and cost. In addition to the above, I hearby give undertaking that no activity/construction/expansion has been taken up

34.	Name	Kassireddy Anil Kumar
35.	Designation	Associate Vice President
36.	Company	KALINGA ALUMINA LIMITED
37.	Address	Adani Corporate House, Nr. Vaishno Devi Circle, S.G. Highway, Khodiyar, Ahmedabad-382421
38.	Date	01/09/2023

Annexure-III

STATE ENVIRONMENT IMPACT ASSESSMENT AUTHORITY, ODISHA
SRF-2/1, Unit-IX, Bhubaneswar-751022, Tel. 0674-3512075, Email. seiaaodisha@gmail.com
(A statutory body constituted by Ministry of Environment, Forest & Climate Change under Environment (Protection) Act 1986)

File No. SIA/OR/MIN/439954/2023

Dated 06th November, 2023
Bhubaneswar

To

Sri Kassireddy Anil Kumar,
Associate Vice-President of
M/s. Kalinga Alumina Limited
(Formerly known as Kalinga Alumina Ltd.)
Address-Shantigram, Ahmedabad
Gujurat-382421

Subject: Proposal of M/s. Kalinga Alumina Limited for grant of Term of Reference (ToR) for mining of Ballada Bauxite Mine for a Peak Rated Capacity of 4.0 MTPA over a Mining lease area of 144.945 Ha at Village -Ballada, Taluka–Nandapur, District-Koraput and applicant is Sri Kassireddy Anil Kumar, Associate Vice-President of M/s. Kalinga Alumina Ltd.- Reg.

The Project Proponent Sri Kassireddy Anil Kumar on behalf of M/s. Kalinga Alumina Limited has submitted an application for ToR to SEIAA, Odisha through the Parivesh portal of MoEF&CC, GOI vide online application no. SIA/OR/MIN/439954/2023 dated 01.09.2023 for grant of Term of Reference (ToR) for mining of Ballada Bauxite Mine for a Peak Rated Capacity of 4.0 MTPA over a Mining lease area of 144.945 Ha at Village -Ballada, Taluka–Nandapur, District- Koraput.

2. Proposal in brief:

Proposal No.	SIA/OR/MIN/439954/2023
Date of Application	01.09.2023
File No.	439954/109-MINB1/09-2023
Project Type	Proposal for ToR
Category	B1
Project/Activity including Schedule No.	1(a) Mining of minerals
Name of the Project	Proposal for ToR of M/s. Kalinga Alumina Limited for Ballada Bauxite Mine for a Peak Rated Capacity of 4.0 Mtpa over a Mining lease area of 144.945 Ha at Village -Ballada, Taluka–Nandapur, District- Koraput of Sri Kassireddy Anil Kumar

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Name of the company/Organization	Sri Kassireddy Anil Kumar (Associate Vice President) Kalinga Alumina Limited
Location of Project	Village-Ballada, Taluka-Nandapur, District-Koraput
ToR Date	N/A
Name of Consultant	M/s Vardan Environet, Gurugram

3. Project details: The highlights of the project, as ascertained from the application and as revealed from the proceedings/ discussions held during the meetings of SEAC/SEIAA, are given as under:

(i) This is a proposal submitted for grant of Term of Reference (ToR) for mining of Ballada Bauxite Mine for a Peak Rated Capacity of 4.0 MTPA over a Mining lease area of 144.945 Ha at Village -Ballada, Taluka–Nandapur, District- Koraput of Sri Kassireddy Anil Kumar, the applicant.

(ii) The company was declared preferred bidder for this block on 17-02-2023. The letter of Intent has been issued vide letter no. SM-MC2-MC-0007-2023/2143/S&M Bhubaneswar dated 1st March 2023 by Steel and Mines Department, Government of Odisha.

(iii) The project involves open cast mining of Bauxite (ROM) with 4.0 MTPA capacity & setting up of 800 TPH Crusher/screening plant at pit head.

(iv) Mining Plan along with Progressive Mine Closure Plan has been approved by IBM vide letter No. MCDR-MiFL0BXT/5/2023-BBS-IBM_RO-BRS dated 8th August 2023.

(v) Forest application has been submitted vide proposal no. FP/OR/MIN/QRY/442417/2023 dated 1st September 2023. Ballada Block is virgin bauxite block located in Nandapur Tehsil of Koraput district in Odisha, total mining lease area is 144.945 ha, located entirely within Nagasari reserve forest. The project contemplates to develop the mine and surrounding infrastructures for commercial production of bauxite of 4 MTPA peak rated capacity using opencast mining. In addition to ML area 12.267 ha area to be required for evacuation of minerals. Hence forest diversion application has been submitted for 157.212 ha.

(vi) Location and connectivity: Ballada Bauxite Block by opencast mining method with an annual Peak Rated Capacity of ~ 4.0 MTPA of Bauxite (ROM), located at village - Ballada, Tehsil – Nandapur, District – Koraput, Odisha. Ballada Bauxite Block covers an area of about 144.945 ha bounded by latitudes 18°26'05.61588" N to 18°27'13.34448" N and Longitudes 82°39'32.39136" to 82°40'25.36716" E. The lease area is covered under Survey of India toposheet no. E44K11 (65J/11). 144.945 Ha of Mine Lease area is Forest Land (Nagasari RF) under Koraput Forest Division. The mineral bearing plateau is situated about one kilometer west of Ballada village and about 8 km north of Padwa in Koraput district, Odisha. Jeypore, a major town in the

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Koraput district, is about 82 km NNW of the Ballada deposit and is approachable by major district road No.52. Koraput, the district headquarters is at 60 km north of the deposit and is connected by a metalled road via Similiguda on NH 26. Bheja, the nearest Railway Station is about 5 km due north-east. The nearest airport is at Visakhapatnam, about 140 km SE from the lease area. The Nearest Water body is Jalaput reservoir located at a distance of 3 km South and SW. Nearest reserve forest is Nagasari RF i.e., entire mine lease area of 144.945 Ha. Nearest habitation is Ballada village, about 1 km in East.

(vii) Method of Mining: The deposit lies on surface, and it is proposed to be mined by mechanized opencast method of mining with excavator/ dumper combination. Deep hole drilling/Short hole drilling and blasting is proposed after taking prior permission from DGMS. Further, it is proposed to mine with Ripping-Dozing method and/or deployment of Surface Miner at a later date, based on feasibility.

Table: Proposed list of equipment

S No	Particulars	Make	Capacity	No. of equipment
i)	Diesel hydraulic shovel	Volvo EC480/Komatsu PC 450/TATA Hitachi ZX 670	3.1 cum	4
ii)	Dumper	Bharat Benz 3528	16 m^3	11
iii)	DTH drill	Epiroc-T40	Hole Dia -115 mm	3
iv)	Dozer	BEML D-155	324 p)	1

(viii) Transport: Mined bauxite (R.O.M) shall be transported to the crushing/screening plant through mine haul trucks. Evacuation of crushed bauxite is planned through a combination of road and rail route. There is an existing motorable approach road to the east of the mine which connects MDR-52 (Visakhapatnam-Jeypore Road). Bauxite shall be transported through 30 tonner dump trucks via the aforestated road to the nearest "Bheja Railway Station" from where it will be loaded on railway wagons using front end loaders and subsequently despatched to destination. Empty trucks shall return to mine for repeat loading. OB within the lease will be transported through rear-dump trucks to the dump area within the lease.

(ix) Waste generation and management: The waste generated in course of pre-mining development and subsequent mining operation will consist of topsoil and laterite with occasional occurrences of khondalite. During the first five years the rate of generation of waste is expected to be of the order of 0.073 Mm^3 or 0.15 MT of along with generation of 0.026 Mm^3 of Topsoil. Considering this, an average ore to waste ration of 1:0.018 is estimated. It is planned to stack topsoil and waste separately on ground during the initial 4 years of plan period. From 5th year

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onwards, waste material will be dumped systematically. Topsoil, stacked separately, would be spread over the reclaimed areas, to enable planting and growing of trees The waste stacked on ground during the initial years of operation will be utilized to fill the worked-out areas at the end of the working life of the mine as well as during the interim period. as and when practicable. The generation of waste during the 5 year plan period will be very less and shall be dumped systematically. No backfilling is proposed during the initial 5 year period.

Table: Proposed production plan during first five-year period

Year	Top Soil Volume (m^3)	Over Burden/Waste Volume (m^3)	ROM Quantity (t)
Year 1	24072	0	1000120
Year 2	1710	24783	2024020
Year 3	0	44671	2001482
Year 4	0	3800	2002414
Year 5	0	0	4001868

(x) Water requirement and wastewater management: The water requirement of the project during operation phase is 690 KLD. Water will be sourced from nearby Jalaput lake located at distance of 3 km. Wastewater generated from workshop will be treated using oil-water separator and treated water will be used in vehicle washing. Wastewater generated from mine office, rest shelters etc. will be disposed in soak pit via septic tank.

(xi) Power requirement: The estimated average power requirement is 1 MW, the peak requirement being 1.5 MW. Power shall be sourced from nearest substation located at a distance of 8 km at Padwa. Renewable energy source proposed to install is around 160 KW, which will be about 10% contribution for the total power requirement.

(xii) Greenbelt: The greenbelt is proposed as per the following table.

Sr. No	Year	Area Proposed to be Covered (Ha)	Number of Plants Proposed	Expected Survival Rate (%)	Estimated Expenditure (INR)
1	Year 1	0.72	1440	75	2,01,600
2	Year 2	0.86	1720	75	2,40,800
3	Year 3	1.16	2320	75	3,24,800
4	Year 4	0.68	1360	75	1,90,400
5	Year 5	0.80	1600	75	2,24,000
Total		4.22	8440		11,81,600

(xiii) Manpower requirement: Project will generate employment for about 126 persons directly, besides its potential to generate considerable indirect employment and livelihood opportunities.

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(xiv) Project cost: Total cost of the project is about Rs. 230 Crores which includes cost of Infrastructures, Land Acquisition and other development costs.

(xv) Environment Consultant: The Environment consultant M/s Vardan Environet, Gurugram along with the proponent made a presentation on the proposal before the Committee.

4. This proposal conforms to the item no. 1(a) in the schedule of EIA Notification, 2006 as amended time to time, and the proposed project falls under category "B1" of Item of Schedule to the EIA Notification, 2006 or activity 1 (a): Mining of Mineral.

5. Whether SEAC recommended the proposal – Yes, the proposal was placed in SEAC meeting held on 22.09.2023 and after detailed discussion, the SEAC recommended the proposal for issues of both standard and below mentioned specific ToR.

6. The matter was examined in the State Environment Impact Assessment Authority (SEIAA), Odisha in its 141st meeting held on 01.11.2023 & 02.11.2023 in in accordance with the EIA Notification, 2006 and further amendments thereto.

7. **The Terms of Reference (ToR) is granted under the provisions of EIA Notification No. S.O. 1533 (E) dated the 14th September, 2006 of the Government of India in the erstwhile Ministry of Environment and Forests, as amended from time to time for mining of Ballada Bauxite Mine for a Peak Rated Capacity of 4.0 MTPA over a Mining lease area of 144.945 Ha at Village -Ballada, Taluka–Nandapur, District- Koraput and applicant is Sri Kassireddy Anil Kumar, Associate Vice-President of M/s. Kalinga Alumina Ltd. for EIA studies with the specific conditions mentioned below along with Public Hearing and standard conditions (attached in annexure-I).**

Specific Conditions

i) The following information to be submitted.
   a) Compliance of mining plan, including waste and OB dump management, mine closure plan etc.
   b) Compliance to Common cause judgment
   c) Status of R&R
   d) Compliance of plantation
   e) Compliance of public hearing issues
   f) Status of complaints/ court cases/legal action
   g) Any other relevant environmental issue / parameter.
   h) The following studies be undertaken by domain experts, viz:
      - Blast vibration study
      - Socio economic study of the neighbouring habitation
      - Biodiversity study with audit mechanism.
      - Slope stability study for both mines and OB /waste dumps.

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- Surface runoff management along with rainwater harvesting and ground water recharge include the design of drainage structures.
- Traffic density study, both inside the mines and at haulage roads, intersecting points of haulage road with public road.
- Hydrology study: The study findings and the mitigation measures thereof to be submitted.
- Process scheme details of the crusher / screening plant such as dry / wet crushing etc. If dry crushing, then management plan for dust control. If wet crushing, then plan for treating used water and its recycle etc.

ii) Cost of the CER calculated shall be utilized for the concerns of the people in terms of health, education, and infrastructure and environment protection. Project Proponent also shall include the budget for the betterment of schools nearby and to facilitate the online education system by providing Wi-Fi connectivity and desktops/tablets.

iii) The project proponent should provide in the EIA Report details of all the statutory clearances, permissions, no objection certificates, consents etc. required for this project under various Acts, Rules and regulations and their status or estimated timeline after grant of EC.

iv) The project proponent should submit the revenue plan for mining lease, revenue plan should be imposed on the satellite imaginary clearly demarcate the Govt. land, private land, agricultural land etc.

v) The project proponent should submit the real-time photographs during EIA data collection, aerial footage & video of the mining lease area and of the transportation route. The project proponent should submit the detailed plan in tabular format (year-wise for life of mine) for afforestation and green belt development in and around the mining lease. The project proponent should submit the number of saplings to be planted, area to be covered under afforestation & green belt, location of plantation, target for survival rate and budget earmarked for the afforestation & green belt development. In addition to this the project proponent should show on a surface plan (5-year interval for life of mine) of suitable scale the area to be covered under afforestation & green belt clearly mentioning the latitude and longitude of the area to be covered during each 5 years. The capital and recurring expenditure to be incurred needs to be submitted. Presently in India there are many agencies which are developing forest in short interval of time. Thus, for the plantation activities details of the experts/agencies to be engaged needs to be provided with budgetary provisions.

vi) The project proponent should submit the quantity of surface or ground water to be used for this project. The complete water balance cycle needs to be submitted. In addition to this PP should submit a detailed plan for rain water harvesting measures to be taken. PP should submit the year wise target for reduction in consumption of the, ground/surface water by developing alternative source of water through rain

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water harvesting measures. The capital and recurring expenditure to be incurred needs to be submitted.

vii) The project proponent should clearly bring out the details of the manpower to be engaged for this project with their roles /responsibilities/designations. In addition to this the project proponent should mention the number and designation of person to be engaged for implementation of environmental management plan (EMP). The capital and recurring expenditure to be incurred needs to be submitted.

viii) The project proponent should submit the year-wise, activity wise and time bound budget earmarked for EMP, occupational health surveillance & Corporate Environmental Responsibility. The capital and recurring expenditure to be incurred needs to be submitted.

ix) The project proponent should submit the measures/technology to be adopted for prevention of illegal mining and pilferage of mineral. The project proponent should submit the detailed mineralogical and chemical composition of the mineral and percentage of free silica from a NABL/MoEF&CC accredited laboratory.

x) The project proponent should clearly show the transport route of the mineral and protection and mitigative measure to be adopted while transportation of the mineral: The impact from the center line of the road on either side should be clearly brought out supported with the line source modelling and isopleth. Further, frequency of testing of Poly Achromatic Hydrocarbon needs to be submitted along with budget. Based on the above study the compensation to be paid in the event of damage to the crop and land on the either side of the road needs to be mentioned. The project proponent should provide the source of equations used and complete calculations for computing the emission rate from the various sources.

xi) The project proponent should clearly bring out that what is the specific diesel consumption and steps to be taken for reduction of the same. Year-wise target for reduction in the specific diesel consumption needs to be submitted.

xii) The project proponent should bring out the awareness campaign to be carried out on various environmental issues, practical training facility to be provided to the environmental engineer/diploma holders, mining engineer/diploma holders, geologists, and other trades related to mining operations. Target for the same needs to be submitted.

xiii) The budget to be earmarked for the various activities shall be decided after perusal of the Standard EC conditions. After perusal of Standard EC conditions if agreed the project proponent should also submit an undertaking by the way of affidavit for Compliance of Standard EC conditions already prescribed by the Ministry vide O.M. No and Specific condition if prescribed by the SEAC/SEIAA, Odisha.

xiv) The project proponent should ensure that only NABET accredited consultant shall be engaged for the preparation of EIA/EMP Reports. The project proponent shall ensure that accreditation of consultant shall be valid during the collection of baseline date, preparation of EIA/EMP report and during the appraisal process. The project

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proponent and consultant should submit an undertaking the information and data provided in the EIA Report and submitted to the SEIAA, Odisha are factually correct and the project proponent and consultant are fully accountable for the same.

xv) The project proponent should submit the photograph of monitoring stations & sampling locations. The photograph should bear the date, time, latitude & longitude of the monitoring station/sampling location. In addition to this the project proponent should submit the original test reports and certificates of the labs which will analyze the samples.

xvi) "Zero discharge" management & "Zero Dust Re-suppression" management with SOP be submitted.

xvii) Internal roads, drain management with network of the drain, retaining walls and settling tanks with ETPs be submitted.

xviii) Details of air quality monitoring stations of the area and additional stations at entry and exit of mines and haulage roads, habitation to be considered.

xix) Construction and perennial maintenance of haulage road with details of plantation and the species thereof to be submitted.

xx) Parking plaza layout with maximum no. of vehicles and types of vehicles that can be parked with basic amenities and facilities.

xxi) Forest Clearance details with copy of all Forest Clearance.

xxii) Status of complaints/ court cases/legal action regarding to lease along with a detailed write up indicating case no., purpose of the case etc.

xxiii) Copy of lease document.

xxiv) Details of waste management i.e. composition and nature of waste generated, tabulated form showing year wise waste generation, usage and storage.

xxv) Project Proponent shall consider developing a good nursery in nearby village for production of saplings of 4-6 feet height for planting in safety zone, sides of external haulage roads and distribution among villagers for planting in their private land/ community land. The nursery may be developed by company on their own or in collaboration with forest department. A detailed proposal to this effect shall be submitted. The proponent shall ensure to use organic fertilizer in the nursery.

xxvi) Comprehensive water management, water balance with water harvesting and its reuse both monsoon and non-monsoon period.

xxvii) STP plan with design with location in the layout map for domestic waste water treatment.

xxviii) Provision of solar power (percentage wise) with detail plan.

xxix) To submit the network with dimension of concrete cement roads inside the mining lease area and haulage road.

xxx) To submit parking plaza at entry and exit of the mines with basic amenities.

xxxi) Plan and SoP to be submitted for water sprinkling inside the mines and outside in haulage road including regular vacuum cleaning and Zero Dust Resuspension system to completely mitigate and arrest fugitive dust emission.

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xxxii) Total water management including domestic use with sourcing from borewell, rain water harvesting and recycling of waste water from ETP/STP, both for monsoon and non-monsoon be submitted.

xxxiii) Measures to be taken for arresting and mitigation of occupational health hazard including identification of the same, both for employees and nearby/surrounding habitation

xxxiv) Year wise waste/OB management with reference to generation and utilization in consideration with dynamic movement of inventory indicating dump area and dimension of storage be submitted.

xxxv) Find out the possibility of other alternatives for approach road so that felling of 1000 trees proposed can be avoided.

xxxvi) Submit Wildlife Conservation plan duly certified from the concerned DFO.

xxxvii) Submit copy of application of forest diversion proposal and current status of it.

xxxviii) Explore possibility for construction of reservoir or adopt appropriate rainwater harvesting methods for collection of rain water and its usage.

xxxix) Submit Mine closure Plan with supporting documentation.

xl) Submit Standard Operating Procedure for magazine management.

xli) This Bauxite mines is meant for captive use. The proponent has not yet established any refinery in the state. They have to give details of use of Bauxite in absence of refinery and also an undertaking that Bauxite Ore cannot export outside the state.

xlii) Possibility of restoration/ creation of the pond present within lease area so that villagers can use it in future after mining lease period expires.

Yours Faithfully,

Member Secretary

Copy to

1. Additional Chief Secretary, Forest, Environment & Climate Change Dept., Government of Odisha for information.
2. Member Secretary, State Pollution Control Board, Odisha, Paribesh Bhawan, A/118, Nilakantha Nagar, Unit-8, Bhubaneswar for information.
3. Member Secretary, SEAC, Paribesh Bhawan, A/118, Nilakantha Nagar, Unit-VIII, Bhubaneswar for information.
4. Deputy D.G.Forest., Integrated Regional Office (IRO), Ministry of Environment & Forests, A-31, Chandrasekharpur, Bhubaneswar for information.
5. Collector & DM, Koraput /Sub Collector, Koraput, Tahasildar, Nandapur for Information and necessary action.
6. Director Steel & Mines Dept., Govt. of Odisha
7. Guard file for record/Website/Parivesh Portal.

Member Secretary

ANNEXURE - I

TERMS OF REFERENCE (ToR) FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT STUDY AND INFORMATION TO BE INCLUDED IN EIA/EMP REPORT FOR M/S. KALINGA ALUMINA LIMITED OF BALLADA BAUXITE MINE FOR A PEAK RATED CAPACITY OF 4.0 MTPA OVER A MINING LEASE AREA OF 144.945 HA AT VILLAGE - BALLADA, TALUKA – NANDAPUR, DISTRICT-KORAPUT OF SRI KASSIREDDY ANIL KUMAR – TOR.

A. STANDARD TOR FOR MINING PROJECT

1. 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.
2. 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.
3. 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.
4. A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.
5. 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.
6. All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/toposheet, topographic sheet, 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).
7. 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
8. 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.

9. 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 proposed safeguard measures in each case should also be provided.

10. 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.

11. 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 operational phases and submitted. Impact, if any, of change of land use should be given.

12. 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.

13. 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.

14. 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.

15. 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.

16. The vegetation in the RF / PF areas in the study area, with necessary details, should be given.

17. 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.

18. 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 Wildlife and copy furnished.

19. 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 along with 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.

20. 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 SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered.

21. 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 failing under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).

22. 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.

23. 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 PM_{10}, particularly for free silica, should be given.

24. 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 wind roses showing pre-dominant wind direction may also be indicated on the map.

25. 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.

26. Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.

27. 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.

28. 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.

29. 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 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.

30. 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.

31. 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.

32. 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.

33 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.

34. Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.

35. 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.

36. 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.

37. 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.

38. 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.

39. 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.

40. 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.

41. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.

42. The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.

43. A Disaster management Plan shall be prepared and included in the EIA/EMP Report.

44. 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.

45. The activities and budget earmarked for Corporate Environmental Responsibility (CER) shall be as per MoEF&CC, Govt. of India O.M No 22-65/2017-IA. II (M) dated 01.05.2018 and the action plan on the activities proposed under CER shall be submitted at the time of appraisal of the project included in the EIA/EMP Report.

46. The Action Plan on the compliance of the recommendations of the CAG as per MoEF&CC, Govt. of India Circular No. J-11013/71/2016-IA.I (M), dated 25.10.2017 needs to be submitted at the time of appraisal of the project and included in the EIA/EMP Report.

47. Compliance of the MoEF&CC, Govt. of India Office Memorandum No. F: 3-50/2017-IA.III (Pt.), dated 30.05.2018 on the judgement 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 needs to be submitted and included in the EIA/EMP Report.

8. 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.

C. The prescribed TOR would be valid for a period of four years for submission of the EIA/EMP report.

Annexure-IV

By e-mail

GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES
OFFICE OF THE REGIONAL CONTROLLER OF MINES, BHUBANESHWAR

Approved

No. MCDR-MECLOSXT/5/2023-BBS-IBM/RO/BBS Dt : 08/05/2023

Sh/s/Ms KALINGA ALUMINA LIMITED
Adani Corporate House, Shantigram Near Vaishnodevi Circle SG Highway Khodiyar Khodiyar Ballada Bauxite Block (PBO)

Sub: Approval of the Mining Plan along with Progressive Mine Closure Plan (PMCP) in respect of BALLADA BLOCK Mining Lease for Bauxite Ore over an area of 144.945 ha of M/s Kalinga Alumina Ltd. situated in Ballada Village, Padua Taluka, Koraput District of Odisha State

Sir,

In exercise of the powers conferred by clause (b) of sub-section (2) of section 5 of the Mines & Minerals (Development & Regulation) Act, 1957 and clause (5) of Rule 16 of the Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 read with Government of India Order No. S.O. 1857(E) dated 18th May, 2016, I hereby Approve the Mining Plan along with Progressive Mine Closure Plan (PMCP) in respect of BALLADA BLOCK Mining Lease Area for Bauxite Ore over an area of 144.945 ha of M/s.Kalinga Alumina Ltd. situated in Ballada Village, Padua Taluka, KoraputDistrict of Odisha State. This approval is subject to the following conditions.

A--General Conditions:

(1) That 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.

(2) That this approval of aforesaid 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 and other relevant statutes, order and guidelines as may be applicable to the lease area from time to time.

(3). The provisions of the Mines Act, 1952 and Rules and Regulations made thereunder including submission of notices of opening, appointment of manager and other statutory officials as required by the Mines Act, 1952 shall be complied with.

(4).The execution of Mining Plan shall be subjected to outcomes of prohibitory orders / notices, if any.

(5). If anything is found to be concealed as required by the Mines Act in the contents of the mining plan and the proposal for reconstruction has not been made, the approval shall be deemed to have been withdrawn with immediate effect.

(6). This approval for proposed mining operations and associated activities is restricted to the mining lease area only from this date. The mining lease area is as shown on the statutory plans by the Lessee/QP/Applicant and Indian Bureau of Mines has not undertaken any survey verification of mining lease boundary on the ground.

(7). Your attention is invited to the Supreme Court interim order in W.P. (C) No. 202 dated 12.12.1996 for compliance. The approval of above said Mining Plan is therefore, issued without prejudice to and is subject to the said directions of the Supreme Court as applicable.

(8).This department does not undertake any responsibility regarding correctness of the boundaries of the lease area shown on the ground.

(9). At any stage, if it is observed that the information furnished in the document are incorrect or misrepresent facts, the approval of the document shall be revoked with immediate effect.

(10). If this approval conflicts with any other law or court order/ Direction under any statute, it shall be revoked immediately.

(11) It shall be mandatory for the project proponent, abstracting ground water, to obtain "No Objection Certificate" from Central Ground Water Authority or, the concerned State/Union Territory Ground Water Authority, as the case may be.

(12). Lessee shall ensure granting/re-granting of worked out mining lease area in accordance with Hon'ble Supreme Court Order dated 9/1/2020.

(13). Validity of excavation proposal of this document shall expire within 5 (five) financial year from execution of the mining lease.

(14).The next Review of Mining Plan for the subsequent period of five years shall become due 180 days before expiry of this document proposal period.

(15) Copy of the Lease deed, MDPA signed and performance security deposited to the State Government to be submitted before commencement of mining operation.

(16) The feasibility report considered for reserve/resource estimation as per UNFC is submitted by the preferred bidder / lessee which is prepared based on the current data as reported and it may not establishes the future economic viability of mining project, which may be affected by the market dynamics and other related factors.

(17) Disposal of OB/Waste as minor mineral shall be carried out only after obtaining permission under Rule 12(1)(k) of Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016

Yours Faithfully

Bailadu Bauxite Block (PB93)

(B.L.GURJAR)

Regional Controller of Mines,

Indian Bureau of Mines, Bhubaneswar

Copy for information to:-

(1). The Controller of Mines (EZ), Indian Bureau of Mines, CP-13, Sector V, Salt Lake City, Kolkata- 700 091 by mail. ro.kol@ibm.gov.in

(2). The Director of Mines, Directorate of Mines, Government of Odisha, Heads of the Department Building, Bhubaneswar– 751001. Email-directorateofmines@orissaminerals.gov.in.

(3). The Director of Mines Safety, Bhubaneswar, Email-dgmsbbsr@gmail.com

(4).Qualified Person by mail- deepak.rathod@mecpl.com

(5). Concerned MCDR file.

Approved

Annexure-V

CAMPA APO: 2021-2022

COST STRUCTURE FOR DIFFERENT SQUADS

(Wage rate @ Rs. 450/-Md)

SL No.	Items of works	Amount (In rupees)
1	**Wildlife Protection /Anti depredation squad**	
	a) Wages of squad members @ Rs.17,764/-month/ person (5 members squad) Rs. 17,764/- x 12 x 5 = Rs. 10,65,840/- squad	10,65,840.00
	b) Hire charges of Vehicles/ Boats/ Trawlers @ Rs.31,000/- PM x 12 month = Rs. 3,72,000/-	3,72,000.00
	c) POL for the Vehicle/Boats/Trawlers @ Rs. 12,000/- PM x 12 months = Rs. 1,44,000/-	1,44,000.00
	d) Recharging of Mobiles @ Rs.500/month/squad 500 x 12 x 1 = Rs. 6,000/- per squad	6,000.00
	e) Contingent Expenditure	20,560.00
	Total	**16,08,400.00**

(Rupees sixteen lakhs eight thousand four hundred) only.

Annexure-VI

Annexure-7

Base Cost Norms for Compensatory Afforestation through Aided natural Regeneration (ANR) @ 500 Seedlings/Ha.

Wage rate Rs. 311/- per Manday.

Sl. No.	Items of works	Preferable period of Execution	No. of Mandays	Labour cost (in Rs.)	Material cost (in Rs.)	Total (in Rs)
0th Year (Advance work) Pre-Planting Operation						
1	Survey, Demarcation and Pillar Posting	Nov/Dec	2	622	0	622
2	Preparation of Treatment Map (Digital Map)	Nov/Dec	1	311	100	411
3	Site Preparation	Nov/Dec	2	622	0	622
4	Silvicultural Operations including clearance of weed, cutting of climber, high stump cutting, singling of shoots & removal of cut out after drying from the field to blank space	Jan/Feb	15	4665	0	4665
5	Alignment and stacking for digging of pits.	Feb/Mar	1	311	0	311
6	Digging of pits (45cm x 45cm x 45cm) in hard and gravelly soil	Feb/Mar	20	6220	0	6220
	Total		**41**	**12751**	**100**	**12851**
1st Year/Planting year						
1	Refilling of pits by altering the dugout soil of the pits, application of organic compounds/COM/FYM & Mixing the same perfectly.	June/Jul	4	1244	2500	3744
2	Transportation of 18 months old polythene bag seedlings in hired truck/tractor from the permanent/ Mega nursery to planting site including loading, unloding (Average lead of 10 Rkm) & stacking the seedling @ Rs. 6/- seedlings (550 nos.)	Jul/Aug	0	0	3300	3300
3	Watering polythene bag seedlings at stacking site of plantation	Jul/Aug	1	311	0	311
4	Conveyance of polypot seedlings on head load from the stacking site to individual dugout pits within the planting site, applying isecticide, fertilizers & planting after scooping the soil with other applied materials & pressing the soil perfectly around the planted seedlings.	Jul/Aug	11	3421	0	3421

Annexure-VI

Annexure-7

Base Cost Norms for Compensatory Afforestation through Aided natural Regeneration (ANR) @ 500 Seedlings/Ha.

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	Total		**41**	**12751**	**100**	**12851**
	1st Year/Planting year					
1	Refilling of pits by altering the dugout soil of the pits, application of organic compounds/CDM/FYM & Mixing the same perfectly.	June/Jul	4	1244	2500	3744
2	Transportation of 18 months old polythene bag seedlings in hired truck/tractor from the permanent/ Mega nursery to planting site including loading, unloding [Average lead of 10 Rkm] & stacking the seedling @ Rs. 6/- seedlings (550 nos.)	Jul/Aug	0	0	3300	3300
3	Watering polythene bag seedlings at stacking site of plantation	Jul/Aug	1	311	0	311
4	Conveyance of polypot seedlings on head load from the stacking site to individual dugout pits within the planting site, applying isecticide, fertilizers & planting after scooping the soil with other applied materials & pressing the soil perfectly around the planted seedlings.	Jul/Aug	11	3421	0	3421

5	Cost of Fertilizer & Insecticide : (a) NPK/Bio fertilizer @ 50 gms/plant as basal dose = 25kg @ Rs.30/- per kg = Rs.750 00 (b) Urea/ Vermicompost/ Mo Khata/any other fertilizer @ Rs.375/-. (C) Insecticide/Bio-pesticide @ 5 gms/plant = 2.5 Kg. @ Rs. 375/-	Jul/Aug	0	0	1500	1500
6	Casually Replacement @ 10% (50 nos.)	Jul/Aug	1.5	466.5	0	466.5
7	1st weeding & Manuing	Aug/Sept.	5	1555	0	1555
8	2nd weeding, soil working (1mt. Diametre around the plants) and manuring.	Oct/Nov	8	2488	0	2488
9	Fire line tracing & inspection patch	Feb/Mar	3	933	0	933
10	Watch & Ward Including watering as per requirement.	Aug/Mar	8	2488	0	2488
	Total		**41.5**	**12906.5**	**7300**	**20206.5**
	2nd Year Maintanance					
1	Transportation of 50 seedlings from Nursery to plantation site including loading unloading & conveyance by Tractor @ Rs. 6/- per seedlings.	Jul	0	0	300	300
2	Casualty replacement	Jul	1.5	466.5	0	466 5
3	Cost of fertilizer & Insecticide : (a) Cost of Insecticide/Bio-pesticide @ 5 gms/Plant = 0.25 Kg. @ Rs. 150/ per Kg. = Rs. 37.50/-. (b) Urea/ NPK/ Bio-fertilizer/Vermicompost/Mo/Khata/any other fertilizer = Rs. 1400/-	Jul/Aug	0	0	1437.5	1437.5
4	Weeding (Complete weeding), Manuring & soil working (1mt. Diametre around the plants).	Sep/Oct	8	2488	0	2488
5	Fire line tracing (2m. Wide fire line) & Inspection path.	Feb/Mar	3	933	0	933
6	Watch & Ward Including watering as per requirement.	Apr/Mar	12	3732	0	3732
	Total		**24.5**	**7619.5**	**1737.5**	**9357**
	3rd Year maintenance					
1	Cost of Fertilizer : Urea/NPK/Bio-fertilizer/Vermicompost/Mo Khata/any other fertilizer =Rs. 1400/-	Jul/Aug	0	0	1400	1400
2	Weeding (Complete weeding), Manuring & soil working (1mt. Diametre around the plants.	Sep/Oct	8	2488	0	2488
3	Fire line tracing (2m. wide fire line) & Inspection path.	Feb/Mar	3	933	0	933
4	Watch & Ward including watering as per requirement.	Apr/Mar	12	3732	0	3732
	Total		**23**	**7153**	**1400**	**8553**

4th Year maintenance						
1	Fire line tracing (2m. wide fire line) & inspection path	Feb/Mar	3	933	0	933
2	Watch & Ward including watering as per requirement.	Apr- Mar	12	3732	0	3732
	Total		**15**	**4665**	**0**	**4665**
5th Year Operation						
1	Fire line tracing (2m. wide fire line) & inspection path.	Feb/Mar	3	933	0	933
2	Watch & Ward including watering as per requirement.	Apr- Mar	12	3732	0	3732
	Total		**15**	**4665**	**0**	**4665**
6th Year Operation						
1	Fire line tracing (2m. wide fire line) & inspection path.	Feb/Mar	3	933	0	933
2	Watch & Ward including watering as per requirement.	Apr- Mar	12	3732	0	3732
	Total		**15**	**4665**	**0**	**4665**
7th Year Operation						
1	Fire line tracing (2m. wide fire line) & inspection path.	Feb/Mar	3	933	0	933
2	Watch & Ward including watering as per requirement.	Apr- Mar	12	3732	0	3732
	Total		**15**	**4665**	**0**	**4665**
8th Year Operation						
1	Fire line tracing (2m. wide fire line) & inspection path.	Feb/Mar	3	933	0	933
2	Watch & Ward including watering as per requirement.	Apr- Mar	12	3732	0	3732
	Total		**15**	**4665**	**0**	**4665**
9th Year Operation						
1	Fire line tracing (2m. wide fire line) & inspection path.	Feb/Mar	3	933	0	933
2	Watch & Ward including watering as per requirement.	Apr- Mar	12	3732	0	3732
	Total		**15**	**4665**	**0**	**4665**
10th Year Operation						
1	Fire line tracing (2m. wide fire line) & inspection path.	Feb/Mar	3	933	0	933
2	Watch & Ward including watering as per requirement.	Apr- Mar	12	3732	0	3732
	Total		**15**	**4665**	**0**	**4665**

ABSTRACT							
Sl. No.	Item of work	No. of Person days	Labour cost @ Rs. 311/- per day (Rs.)	Material cost (in Rs.)	Monitoring, evaluation, Learning, Documentation and other Contingency (5%) of (4+5)	Cost of seedlings @ Rs. 50.31 per seedlings	Total (Rs)
1	0th Year operation	41	12751	100	549	0	13400.0
2	1st Year operation	41.5	12906.5	7300	993.50	27671	48871.0
3	2nd Year operation	24.5	7619.5	1737.5	443	2516	12316.0
4	3rd Year operation	23	7153	1400	347	0	8900.0
5	4th Year operation	15	4665	0	135	0	4800.0
6	5th Year operation	15	4665	0	135	0	4800.0
7	6th Year operation	15	4665	0	135	0	4800.0
8	7th Year operation	15	4665	0	135	0	4800.0
9	8th Year operation	15	4665	0	135	0	4800.0
10	9th Year operation	15	4665	0	135	0	4800.0
11	10th Year operation	15	4665	0	135	0	4800.0
	TOTAL	235	73085	10537.5	3277.5	30187	117087.0

Note :

1 Priority must be given to the indigenous local species available nearby to the site of plantation.

2 10% indigenous fruit bearing trees must be preferred to plantation.

3 Site Specific Soil Conservation work like LBCK, Gully Plugging, Staggered Trench, Contour Trench, Graded Bund, etc. may be taken up

4 Chain link fencing can be adopted in the CA plantation taken up outside the forest area and Bamboo twigs and thorn fencing may be preferred to CA plantations.

5 Watering facilities for procurement of water & watering may be adopted as per the availability of water.

6 The cost Norm of various items can be changed with the approval of the concerned RCCFs keeping the overall cost norm fixed for each Financial year.

ABSTRACT							
Sl. No.	Item of work	No. of Person days	Labour cost @ Rs. 311/- per day (Rs.)	Material cost (in Rs.)	Monitoring, evaluation, Learning, Documentation and other Contingency (5%) of (4+5)	Cost of seedlings @ Rs. 50.31 per seedlings	Total (Rs)
1	0th Year operation	41	12751	100	549	0	13400.0
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4	3rd Year operation	23	7153	1400	347	0	8900.0
5	4th Year operation	15	4665	0	135	0	4800.0
6	5th Year operation	15	4665	0	135	0	4800.0
7	6th Year operation	15	4665	0	135	0	4800.0
8	7th Year operation	15	4665	0	135	0	4800.0
9	8th Year operation	15	4665	0	135	0	4800.0
10	9th Year operation	15	4665	0	135	0	4800.0
11	10th Year operation	15	4665	0	135	0	4800.0
	TOTAL	235	73085	10537.5	3277.5	30187	117087.0

Note :

1. Priority must be given to the indigenous local species available nearby to the site of plantation.
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4. Chain link fencing can be adopted in the CA plantation taken up outside the forest area and Bamboo twigs and thorn fencing may be preferred to CA plantations.
5. Watering facilities for procurement of water & watering may be adopted as per the availability of water.
6. The cost Norm of various items can be changed with the approval of the concerned RCCFs keeping the overall cost norm fixed for each Financial year.

MATRIX FOR MODEL-II A (ANR-500 PLANTS/HA.

Sl. No.	Commencement year	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	XIX	XX	Total cost (10 years)
Base Norm		13400	48871	32316	8900	4800	4800	4800	4800	4800	4800	4800										
1	2021-22	13400	51335	33377	10300	5834	6126	6432	6754	7092	7446	7819										136098
2	2022-23		14070	53881	14756	10818	6126	6432	6754	7092	7447	7819	8210									142904
3	2023-24			14774	56575	14969	11359	6432	6754	7092	7447	7819	8209	8621								150051
4	2024-25				35513	59404	15717	11927	6754	7092	7447	7819	8210	8619	9052							157554
5	2025-26					62289	62374	16503	12523	7052	7447	7819	8210	8621	9050	9505						165433
6	2026-27						17103	65493	17428	13149	7447	7819	8210	8621	9052	9503	9980					173706
7	2027-28							17958	68708	12194	13806	7819	8210	8621	9052	9505	9975	10479				182390
8	2028-29								18856	77706	19104	14496	8210	8621	9052	9505	9980	10477	11003			191510
9	2029-30									19799	75836	20059	15223	8621	9052	9505	9980	10479	11001	11553		201086
10	2030-31										20789	79007	21062	15982	9052	9505	9980	10479	11003	11551	12131	211141

1108

Annexure-VII

Fencing Model - I

Fencing for Compensatory Plantation raised Inside the Forest Areas using Bamboo Twigs & Thorns

Wage rate @ Rs.311.00 per day

Sl. No	Items of work	Period of Execution	No of Mandays	Labour cost (Rs.)	Material Cost (Rs)	Total Cost in (Rs.)
1	2	3	4	5	6	7
	0th year maintenance					
1	NIL		0	0	0	0
	1st year maintenance					
1	Taking an average perimetre of 250 rmt /ha @ 93.65/mt. (Half bundle Bamboo Twigs/mt. @ 120/Bundle) . Labour + Material = 40.60 (approx).	Sep/Oct,	30	9330.00	14133	23463
2	Bamboo poles of 8" height at a distance of 2rmt. Spacing to be fixed (2" uder soil & 2" above soil) 250/2 =125+1=126 nos. of Bamboo poles 1 Bamboo (approx) 24" =3 poles 126/3 = 24 Bamboo @ 200/Bamboo	Sep/Oct,		0.00	8400	8400
3	Preparation of Bamboo poles. Digging of holes of 2ft. Depth & fixing Bamboo poles @ 20 poles/MD	Sep/Oct.	6.5	2021.50	0	2022
4	Cost of Bamboo for tieing the Bamboo batten (One 6" above ground and other one 4' ft. above ground) (250 x 2)/24=21 Bamboo @ 200/Bamboo	Sep/Oct,		0.00	4200	4200
5	Making Bamboo batten, Finishing the Batten & Tieing the same on double strand on Coirrope etc @ Rs. 11/-Rmt.	Sep/Oct.	9	2799.00		2799
6	Cost of coir rope @ Rs 0.125Kg./Rmt. 500 x 0.0125 Kg. = 62.5 Kg. @ Rs. 70/-/Kg.	Sep/Oct,		0.00	4375	4375.00
7	Making one Bamboo Twigs gate with Bamboo frame.	Sep/Oct,		0.00	500.5	500.50
	Total		**45.5**	**14150.5**	**31608.5**	**45759.00**
Rate per running mt. 45759/205 = 183/-Rmt						
	2nd year maintenance					
1	Repair & Maintenance of Bamboo Twigs fence including Material cost.	Feb/Mar.	20	6220.00	1500	7720
Rate per running mt. 7720/205 = 30.88 or say Rs 31/-Rmt.						
	3rd year maintanance					
1	Repair & Maintenance of Bamboo Twigs fence including Material cost.	Feb/Mar.	20	6220.00	5675	11895
Rate per running mt. 11895/250 = 47.58 or say Rs. 48/-Rmt.						
	4th year maintanance					
1	Repair & Maintenance of Bamboo Twigs fence including Material cost.	Feb/Mar.	20	6220.00	5675	11895
Rate per running mt. 11895/205 = 47.56 or say Rs 48/-Rmt.						

1110

Sl. No	Items of work	Period of Execution	No of Mandays	Labour cost (Rs.)	Material Cost (Rs)	Total Cost in (Rs.)
1	2	3	4	5	6	7
	5th year maintanance					
1	Repair & Maintenance of Bamboo Twigs fence including Material cost.	Feb/Mar.	20	6220.00	5675	11895
Rate per running mt. 11895/205 = 47.58 or say Rs. 48/-Rmt.						

ABSTRACT

Sl. No.	year	No. person days	Labour cost @ Rs. 311/- per day	Material cost	Total Cost (Rs.)
1	0th year	45.5	14150.5	31608.5	45759
2	2nd year	20	6220.00	1500	7720
3	3rd year	20	6220.00	5675	11895
4	4th year	20	6220.00	5675	11895
5	5th year	20	6220.00	5675	11895
	Total	125.5	39030.5	50133.5	89164

MATRIX FOR MODEL-IV FENCING (BAMBOO TWIG)

Sl. No.	Commencement year	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	XIX	XX	Total cost (10 years)
Base Norm		0	45759	7720	11895	11895	11895															
1	2021-22	0	48047	8511	13770	14458	15183															93967
2	2022-23		0	50444	8937	14459	15181	15940														104966
3	2023-24			0	52971	9384	15182	15940	16737													110214
4	2024-25				0	55620	9853	15941	16737	17574												115725
5	2025-26					0	58401	10346	16738	17574	18453											121517
6	2026-27						0	61321	10863	17575	18453	19376										127588
7	2027-28							0	64387	11406	18454	19376	20345									133968
8	2028-29								0	67605	11976	19377	20345	21362								140666
9	2029-30									0	70986	12575	20346	21362	22430							147699
10	2030-31										0	74535	13204	21363	22430	23552						155084

Annexure-VIII

READY RECKONER FOR COMPENSATORY AFFORSTATION SCHEMES FOR 2024-25 FY

Figure in Rs.

Sl No.	CA Code	Core plantation	Watering			Fencing			SMC	Total Cost
			Solar & Drip system	Diesel Pump set with manual	Solar & Manual	Bamboo Twigs	Wire Mesh	SF		
CA 1000 + Watering + Fencing										
1	CA 1000 + SD + BT + SMC	271716	257751	0	0	115725	0	0	41248	686440
2	CA 1000 + SD + WM + SMC	271716	257751	0	0	0	485432	0	41248	1056147
3	CA 1000 + SD + SF+ SMC	271716	257751	0	0	0	0	187474	41248	758189
4	CA 1000 + DP + BT + SMC	271716	0	553688	0	115725	0	0	41248	982377
5	CA 1000 + DP + WM + SMC	271716	0	553688	0	0	485432	0	41248	1352084
6	CA 1000 + DP + SF + SMC	271716	0	553688	0	0	0	187474	41248	1054126
7	CA 1000 + SM + BT + SMC	271716	0	0	546274	115725	0	0	41248	974963
8	CA 1000 + SM + WM + SMC	271716	0	0	546274	0	485432	0	41248	1344670
9	CA 1000 + SM + SF + SMC	271716	0	0	546274	0	0	187474	41248	1046712
CA 1600 + Watering + Fencing										
1	CA 1600 + SD + BT + SMC	358998	257751	0	0	115725	0	0	41248	773722
2	CA 1600 + SD + WM + SMC	358998	257751	0	0	0	485432	0	41248	1143429
3	CA 1600 + SD + SF+ SMC	358998	257751	0	0	0	0	187474	41248	845471
4	CA 1600 + DP + BT + SMC	358998	0	553688		115725	0	0	41248	1069659
5	CA 1600 + DP + WM + SMC	358998	0	553688		0	485432	0	41248	1439366
6	CA 1600 + DP + SF + SMC	358998	0	553688		0	0	187474	41248	1141408
7	CA 1600 + SM + BT + SMC	358998	0	0	546274	115725	0	0	41248	1062245
8	CA 1600 + SM + WM + SMC	358998	0	0	546274	0	485432	0	41248	1431952
9	CA 1600 + SM + SF + SMC	358998			546274	0	0	187474	41248	1133994

Annexure-VIII
READY RECKONER FOR COMPENSATORY AFFORSTATION SCHEMES FOR 2023-24 FY

Figure in Rs.

Sl. No.	CA Code	Core plantation	Watering			Fencing			SMC	Total Cost
			Solar & Drip system	Diesel Pump set with manual	Solar & Manual	Bamboo Twigs	Wire Mesh	SF		
CA 1000 + Watering + Fencing										
1	CA 1000 + SD + BT + SMC	258777	245476	0	0	110214	0	0	39284	653751
2	CA 1000 + SD + WM + SMC	258777	245476	0	0	0	462316	0	39284	1005853
3	CA 1000 + SD + SF+ SMC	258777	245476	0	0	0	0	178547	39284	722084
4	CA 1000 + DP + BT + SMC	258777	0	527321	0	110214	0	0	39284	935596
5	CA 1000 + DP + WM + SMC	258777	0	527321	0	0	462316	0	39284	1287698
6	CA 1000 + DP + SF + SMC	258777	0	527321	0	0	0	178547	39284	1003929
7	CA 1000 + SM – BT + SMC	258777	0	0	520261	110214	0	0	39284	928536
8	CA 1000 + SM - WM + SMC	258777	0	0	520261	0	462316	0	39284	1280638
9	CA 1000 + SM + SF + SMC	258777	0	0	520261	0	0	178547	39284	996869
CA 1600 + Watering + Fencing										
1	CA 1600 + SD + BT + SMC	341903	245476	0	0	110214	0	0	39284	736877
2	CA 1600 + SD + WM + SMC	341903	245476	0	0	0	462316	0	39284	1088979
3	CA 1600 + SD + SF+ SMC	341903	245476	0	0	0	0	178547	39284	805210
4	CA 1600 + DP + BT + SMC	341903	0	527321		110214	0	0	39284	1018722
5	CA 1600 + DP + WM + SMC	341903	0	527321		0	462316	0	39284	1370824
6	CA 1600 + DP + SF + SMC	341903	0	527321		0	0	178547	39284	1087055
7	CA 1600 + SM + BT + SMC	341903	0	0	520261	110214	0	0	39284	1011662
8	CA 1600 + SM + WM + SMC	341903	0	0	520261	0	462316	0	39284	1363764
9	CA 1600 + SM + SF + SMC	341903			520261	0	0	178547	39284	1079995

ANR500 + WATERING+FENCING										
1	ANR 500+SD+BT +SMC	150051	245476	0	0	110214	0	0	39284	545025
2	ANR 500+SD+ WM +SMC	150051	245476	0	0	0	462316	0	39284	897127
3	ANR 500+SD+ SF +SMC	150051	245476	0	0	0	0	178547	39284	613358
4	ANR 500+DP+BT +SMC	150051	0	527321		110214	0	0	39284	826870
5	ANR 500+DP+ WM +SMC	150051	0	527321		0	462316	0	39284	1178972
6	ANR 500+SDP+ SF +SMC	150051	0	527321		0	0	178547	39284	895203
7	ANR 500+SM+BT +SMC	150051	0	0	520261	110214	0	0	39284	819810
8	ANR 500+SM+ WM +SMC	150051	0	0	520261	0	462316	0	39284	1171912
9	ANR500+SM+ SF +SMC	150051			520261	0	0	178547	39284	888143
ANR200 + WATERING + FENCING										
1	ANR 200 +SD+BT+SMC	105986	245476	0	0	110214	0	0	39284	500960
2	ANR 200 +SD+WM+SMC	105986	245476	0	0	0	462316	0	39284	853068
3	ANR 200 +SD+SF+SMC	105986	245476	0	0	0	0	178547	39284	569293
4	ANR 200 +DP+BT+SMC	105986	0	527321		110214	0	0	39284	782805
5	ANR 200 +DP+WM+SMC	105986	0	527321		0	462316	0	39284	1134907
6	ANR 200 +DP+SF+SMC	105986	0	527321		0	0	178547	39284	851138
7	ANR 200 +SM+BT+SMC	105986	0	0	520261	110214	0	0	39284	775745
8	ANR 200+SM+WM+SMC	105986	0	0	520261	0	462316	0	39284	1127847
9	ANR 200+SM+SF+SMC	105986			520261	0	0	178547	39284	844078
	CA - Compensatory Afforestation									
	FY - Financial Year									
	SD - Solar with Drip System Watering									
	DP - Diesel Pump Set with Manual Watering									
	SM-Solar System with Manual Watering									
	BT - Bamboo Twigs Fencing									
	WM - Wire Mesh Fencing									
	SF - Solar Fencing									
	SMC - Soil & Moisture Conservation									

Annexure-IX

BASE COST NORM FOR COMPENSTORY AFFORSTATION (BLOCK PLANTATION) @1600 PLANTS PER HECTER (18 months old seeding)

Wage rate @ Rs.311.00 MANDAY

Sl. No	Items of work	Period of Execution	No of Mandays	Labour cost (Rs.)	Material Cost (Rs)	Total Cost in (Rs.)
1	2	3	4	5	6	7
	0TH YEAR (ADVANCE WORK) PRE-PLANTING OPERATION					
1	Survey, demarcation and pillar posting.	Nov/Dec	2	622.00	0	622
2	Preparation of Traeatment Map (Digital Map)	Nov/Dec	1	311.00	100	411
3	Site preparation (Cleansing & removal of debrises)	Nov/Dec	12	3732.00	0	3732
4	Creation of 4.00 mt wide Inspection Path	Feb/Mar	1	311 00	0	311
5	Alignment and stacking	Feb/Mar	2	622.00	0	622
6	Digging of pits (45 cm x 45 cm x 45 cm) in hard and gravelly soil	Feb/Mar	64	19904.00	0	19904 00
7	Construction of temporary labour shed, drinking water facility and first-aid etc	Jan/Mar		0.00	3500	3500 00
	Total		**82**	**25502**	**3600**	**29102**
	1ST YEAR/PLANTING YEAR					
1	Refilling of pits by altering the dug-out soil of the pits, application of organic compounds/ CDM/PYM & mixing the same properly.	Jun/July	12	3732.00	8000	11732
2	Transportation of 18 months old polypot sillings in hired truck/ tracktor from the permannet/ Mega Nursery to planting site inducing loading & unloading .(average lead of 10 Rkm) & stacking the seedling @ Rs.-6/-per seedling.(1760 nos)	July/Aug	0	0.00	10560	10560.00
3	Watering the polypot seedlings at planting site	July/Aug	3	933.00	0	933.00
4	Conveyance of polypot seedlings on head load from the stacking site to individual dugout pits within the planting site, applying isecticide, fertilizers & planting after scooping the soil with other applied materials & pressing the soil properly around the planted seedlings.	July/Aug	36	11196	0	11196.00
5	Cost of Fertilizer & Insecticide					
	NPK/Bio-fertilizer @ 50 gms/plant as basal dose = 80kg @ Rs.30/- per kg = Rs.1400.00. (b) Urea/Vermicompost/Mo Khala/any other fertilizer in two subsequent doses @ Rs.1200/-. (C) Insecticide/Bio-pesticide @ 5 gms/plant = 8 Kg. @ Rs. 150/- per Kg. = 1200/-.	July/Aug			4800	4800 00

6	Casually Replacement @ 10% (160 nos.)	July/Aug	4	1244.00	0	1244.00
7	1st weeding & Manuing	Aug/Sep	15	4665.00	0	4665.00
8	2nd weeding, soil working (1m1 Diametre around the plants) and manuring.	Oct/Nov	20	6220.00		6220.00
9	Fire line tracing (2m. Wide fire line over 400 m long) including maintenance of inspection patch	Feb/Mar	3	933.00	0	933.00
10	Watch & Ward including watering as per requirement.	Aug-Mar	12	3732.00	0	3732.00
	Total		**105**	**32655**	**23360**	**56015**
	2 ND YEAR MAINTENANCE					
1	Transportation of 160 seedlings from Nursery to plantation site including loading unloading & conveyance by Tractor @ Rs. 6/- per seedlings.	July	0		960	960.00
2	Casualty replacement (10%)	July	4	1244.00	0	1244.00
3	(a) Cost of Insecticide/Bio-pesticide @ 5 gms/Plant = 0 8 Kg. @ Rs. 150/- per Kg. = Rs. 120/-. (b) Urea/NPK/Bio-fertilizer/Vermicompost/Mo/Khata/any other fertilizer @ Rs. 4468/-	Aug/Sep	0			
4	Weeding (Complete weeding), Manuring & soil working (1m1 Diametre around the plants).	Sep/Oct	20	6220.00	4606	10826
5	Fire line tracing (2m. Wide fire line over 400 m. long) including maintenance of Inspection path.	Feb/Mar	3	933.00	0	933
6	Watch & Ward including watering as per requirement	Apr-Mar	18	5598.00	0	5598
7	Maintenance of Temporary Labour shed, Drinking water facility and First-Aid etc.			0.00	1000	1000
	Total		**45**	**13995**	**6566**	**20561**
	3 RD YEAR MAINTENANCE					
1	Cost of Fertilizer Urea/NPK/Bio-fertilizer/Vermicompost/Mo Khata/any other fertilizer	Sep/Oct		0.00	4486	4486
2	Weeding (Complete weeding), Manuring & soil working (1 ml Diametre around the plants.	Sep/Oct	20	6220.00	0	6220
3	Fire line tracing (2m. Wide fire line over 400 m. long) including maintenance of Inspection path.	Feb/Mar	3	933.00	0	933
4	Watch & Ward including watering as per requirement.	Apr-Mar	18	5598.00	0	5598
5	Maintenance of Temporary Labour shed, Drinking water facility and First-Aid etc.	Feb/Mar		0.00	1000	1000
	Total		**41**	**12751.00**	**5486**	**18237.00**

	4 TH YEAR MAINTENANCE					
1	Fire line tracing (2m. Wide fire line over 400 m length) including maintenance of inspection path.	Feb/Mar	3	933.00	0	933
2	Watch & Ward	Apr-Mar	18	5598.00		5598
	Total		**21**	**6531.00**	**0**	**6531**
	5 TH YEAR MAINTENANCE					
1	Fire line tracing (2m. Wide fire line over 400 m length) including maintenance of inspection path.	Feb/Mar	3	933.00	0	933
2	Watch & Ward	Apr-Mar	18	5598.00		5598
	Total		**21**	**6531**	**0**	**6531**
	6TH YEAR MAINTENANCE					
1	Fire line tracing (2m. Wide fire line over 400 m length) including maintenance of inspection path.	Feb/Mar	3	933.00	0	933
2	Pruning of branches, singling out of multiple shoots	Jan/Mar	5	1555.00		1555
3	Watch & Ward	Apr-Mar	18	5598.00		5598
	Total		**26**	**8086**	**0**	**8086**
	7TH YEAR MAINTENANCE					
1	Fire line tracing (2m. Wide fire line over 400 m length) including maintenance of inspection path.	Feb/Mar	3	933.00	0	933
2	Watch & Ward	Apr-Mar	18	5598.00		5598
	Total		**21**	**6531.00**	**0**	**6531**
	8TH YEAR MAINTENANCE					
1	Fire line tracing (2m. Wide fire line over 400 m length) including maintenance of inspection path.	Feb/Mar	3	933.00	0	933
2	Watch & Ward	Apr-Mar	18	5598.00		5598
	Total		**21**	**6531**	**0**	**6531**
	9TH YEAR MAINTENANCE					
1	Fire line tracing (2m. Wide fire line over 400 m length) including maintenance of inspection path.	Feb/Mar	3	933.00	0	933
2	Watch & Ward	Apr-Mar	18	5598.00		5598
	Total		**21**	**6531**	**0**	**6531**
	10TH YEAR MAINTENANCE					
1	Fire line tracing (2m. Wide fire line over 400 m length) including maintenance of inspection path.	Feb/Mar	3	933.00	0	933
2	Watch & Ward	Apr-Mar	18	5598.00		5598
	Total		**21**	**6531**	**0**	**6531**

YEAR WISE ABSTRACT OF COST NORM (SHOWING SEEDLING COST SEPARATELY)

Sl. No	Year	No. Person Day	Labour cost @ Rs.311/- per day (Rs.)	Material cost (Rs.)	Monitoring, Evaluation, Learning, Documentation and other Contingency (5%) of (4+5)	Cost of seedlings @ Rs. 50.31 per seedling	Total cost in (Rs.)
1	0th year	82	25502.00	3600.00	1398.00	0	30500.00
2	1st year	105	32655.00	23360.00	2800.00	88546	147361.00
3	2nd year	45	13995.00	6566.00	1028.00	9050	29639.00
4	3rd year	41	12751.00	5466.00	911.00	0	19148.00
5	4th year	21	6531.00	0.00	326	0	6857.00
6	5th year	21	6531.00	0.00	326	0	6857.00
7	6th year	26	8086.00	0.00	404	0	8490.00
8	7th year	21	6531.00	0.00	326	0	6857.00
9	8th year	21	6531.00	0.00	326	0	6857.00
10	9th year	21	6531.00	0.00	326	0	6857.00
11	10th year	21	6531.00	0.00	326	0	6857.00
	Total	425	132175.00	39012	8497.00	96596.00	276280.00

Note

:

1 Priority must be given to the indigenous local species available nearby to the site of plantation.

2 10% indigenous fruit bearing trees must be preferred to plantation.

3 Site specific Soil Conservation work like LBCK, Gully Plugging, Staggered Trench, Contour Trench, Graded Bund, etc. may be.

4 Chain link fencing can be adopted in the CA plantation taken up outside the forest area and Bamboo twigs fencing may be.

5 Watering facilities for procurement of water & watering may be adopted as per the availability of water.

6 The cost Norm of various items can be changed with the approval of the concerned RCCFs keeping the overall cost norm fixed for each Financial year.

YEAR WISE ABSTRACT OF COST NORM (SHOWING SEEDLING COST SEPARATELY)

Sl. No	Year	No. Person Day	Labour cost @ Rs.311/- per day (Rs.)	Material cost (Rs.)	Monitoring, Evaluation, Learning, Documentation and other Contingency (5%) of (4+6)	Cost of seedlings @ Rs. 50.31 per seedling	Total cost in (Rs.)
1	0th year	82	25502.00	3600.00	1398.00	0	**30500.00**
2	1st year	105	32655.00	23360.00	2800.00	88546	**147361.00**
3	2nd year	45	13995.00	6566.00	1028.00	8050	**29639.00**
4	3rd year	41	12751.00	5486.00	911.00	0	**19148.00**
5	4th year	21	6531.00	0.00	326	0	**6857.00**
6	5th year	21	6531.00	0.00	326	0	**6857.00**
7	6th year	26	8086.00	0.00	404	0	**8490.00**
8	7th year	21	6531.00	0.00	326	0	**6857.00**
9	8th year	21	6531.00	0.00	326	0	**6857.00**
10	9th year	21	6531.00	0.00	326	0	**6857.00**
11	10th year	21	6531.00	0.00	326	0	**6857.00**
	Total	**425**	**132175.00**	**39012**	**8497.00**	**96696.00**	**276280.00**

Note

:

1. Priority must be given to the indigenous local species available nearby to the site of plantation.
2. 10% indigenous fruit bearing trees must be preferred to plantation.
3. Site specific Soil Conservation work like LBCK, Gully Plugging, Staggered Trench, Contour Trench, Graded Bund, etc. may be.
4. Chain link fencing can be adopted in the CA plantation taken up outside the forest area and Bamboo twigs fencing may be.
5. Watering facilities for procurement of water & watering may be adopted as per the availability of water.
6. The cost Norm of various items can be changed with the approval of the concerned RCCFs keeping the overall cost norm fixed for each Financial year.

MATRIX FOR MODEL-I B CONVENTIONAL CA PLANTATION (AR) 1600 PLANTS PER HA.

Sl. No.	Commencement year	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	XIX	XX	Total cost (10 years)
Base Norm		30500	147361	29639	16148	6857	6857	8490	6857	6857	6857	6857										
1	2021-22	30500	154729	32674	22166	8335	8751	11377	9648	10131	10637	11169										310117
2	2022-23		32025	162465	34308	25274	8752	9189	11946	10130	10638	11169	11727									325623
3	2023-24			33626	170588	26029	24438	9190	9648	12589	10637	11170	11727	12313								341903
4	2024-25				35307	179117	37824	25660	9650	10130	13170	11169	11729	12313	12929								358998
5	2025-26					37072	188073	39715	26943	10133	10637	13829	11727	17315	12929	13575						376908
6	2026-27						38926	197477	41701	28290	10640	11169	14520	17913	12931	13575	10254					395796
7	2027-28							40872	207351	29706	29706	11172	11727	15246	17929	13578	10254	14967				415553
8	2028-29								42916	217719	45570	31190	11731	12813	16008	13575	10257	14967	15715			436366
9	2029-30									45062	228605	48274	32750	12818	12929	16808	14754	14970	15715	16601		458186
10	2030-31										47315	240035	50688	34388	12944	13575	17648	14967	15719	16601	17526	481096

1120

TOPOGRAPHICAL MAP SHOWING PROJECT AREA (144.945 HA) / 10 KM RADIUS PROJECT IMPACT AREA OF BALDA BAUXITE BLOCK OF M/S KALINGA ALUMINA LTD. (FORMERLY KNOWN AS MUNDRA ALUMINIUM LTD.) IN VILLAGE BALDA, TAHASIL NANDAPUR, DISTRICT - KORAPUT, ODISHA ON COMPOSITE SURVEY OF INDIA TOPO SHEET NO. E44K10, E44K11, E44K14 AND E44K15.

PLATE - I

1:50,000

REFERENCE

CP Cashew Plantation.

NOTES :-

Heights are in metres and above Indian mean sea level.
Contours are approximate.
The state boundary between Andhra Pradesh and Orissa States has been surveyed as pointed out by the local officials on the ground but has not been verified by the Governments concerned.
The Reserved Forest boundaries in Vishakhapatnam District in this sheet have been surveyed as pointed out by the local forest officials on the ground but have not been verified by the Forest authorities.
The subdivision boundary between Jeypur and Koraput Subdivisions has been surveyed as pointed out by the local officials on the ground, but has not been verified by the District authority.
The kilometre stone numbers along roads and the railway are shown in slant type, e.g. 3, whereas milestone numbers are shown in upright type, e.g. 3.
The exterior boundaries of areas of Reserved or Protected Forests are shown by green

COMPILATION INDEX

A. Compiled from 1:25,000 survey 1980-81. Updated for major details from satellite imagery IRS-P5 2008.

Projection – UTM *Datum – WGS 84*

Magnetic Variation from True North about 1° West in 2005.
(Annual change negligible).

500 m to 1 cm 1:50,000 2 cm to 1 km

Metres 1000 500 0 1 2 3 Kilometres

CONTOUR INTERVAL 20 METRES

For further details about this map, please contact

Director
Orissa Geo-Spatial Data Centre
Survey of India
Survey Bhawan, PO – R R Laboratory
Bhubaneshwar-751013

OPEN SERIES MAP

No. E44K11

Scale 1:50,000

E44K6 (65J/6)	E44K10 (65J/10) Koraput ORISSA	E44K14 (65J/14)
Malkangiri ORISSA E44K7 (65J/7)	E44K11 (65J/11)	E44K15 (65J/15)
E44K8 (65J/8)	E44K12 (65J/12) Vishakhapatnam ANDHRA PRADESH	E44K16 (65J/16)

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CONVENTIONAL SYMBOLS

Expressway: with toll; with bridge; with distance stone
Roads, metalled: according to importance
Roads, double carriageway: according to importance
Unmetalled road. Cart-track. Pack-track with pass. Foot-path.
Streams: with track in bed; undefined. Canal
Dams: masonry or rock-filled; earthwork. Weir
River: dry with water channel; with island & rocks. Tidal river
Submerged rocks. Shoal. Swamp. Reeds
Wells: lined; unlined. Tube-well. Spring. Tanks: perennial; dry
Embankments: road or rail; tank. Broken ground
Railways, broad gauge: double; single with station; under constrn.
Railways, other gauges: double; single with distance stone; de.
Mineral line or tramway. Kilns. Cutting with tunnel
Contours with rock-features. Rocky slopes. Cliffs
Sand features: (Yoke,Q)sand-hills (permanent)S. (Submerged)Bar
Towns or Villages: inhabited; deserted. Fort
Huts: permanent; temporary. Tower. Antiquities.
Temple. Chhatri. Church. Mosque. Idgah. Tomb. Graves
Lighthouse. Lightship. Buoys: lighted; unlighted. Anchorage
Mine. Vine on trellis. Grass. Scrub
Palms: palmyra; other. Plantain. Conifer. Bamboo. Other trees
Areas: cultivated; wooded. Surveyed tree
Boundary, international
" state: demarcated; undemarcated
" district, subdivision, tahsil or taluk; forest
Boundary pillars: surveyed; unfenced.
Heights, triangulated: station; point; approximate. △ 200 . 200 .200
Bench-mark: geodetic; tertiary; canal ... BM 63·3 .BM 63·3
Post office. Telegraph office. Overhead tank
Rest house or Inspection bungalow. Circuit house. Police station
Camping ground. Forest: reserved; protected
Spaced names: administrative; locality or tribal KIKRI NAGA
Hospital. Dispensary. Veterinary: Hospital / Dispensary
Aerodrome. Heliport. Tourist site
Power line: with pylons surveyed; with poles unsurveyed

Asst. Conservator of Forest
Koraput Forest Division
KORAPUT

Forest Range Officer
Semiliguda Forest Range

Forest Range Officer
Balda Range

Divisional Forest Officer
Koraput Forest Division

NOTES :-

E44K10 E44K14 E44K11 E44K15

Legend
PROJECT AREA
10 KM RADIUS PROJECT IMPACT AREA

PLATE - II

LOCATION OF BALLADA BAUXITE BLOCK M/S KALINGA ALUMIN LTD IN VILLAGE BALLADA TAHSIL NANDANPUR,DISTRICT- KORAPUT SHOWINGTHE DISTANCES OF PROTECTED AREAS,ELEPHANT CORRIDOR, TIGER RESERVE ETC.FROM THE PROJECT SITE IN THE STATE OF ODISHA.

Scale

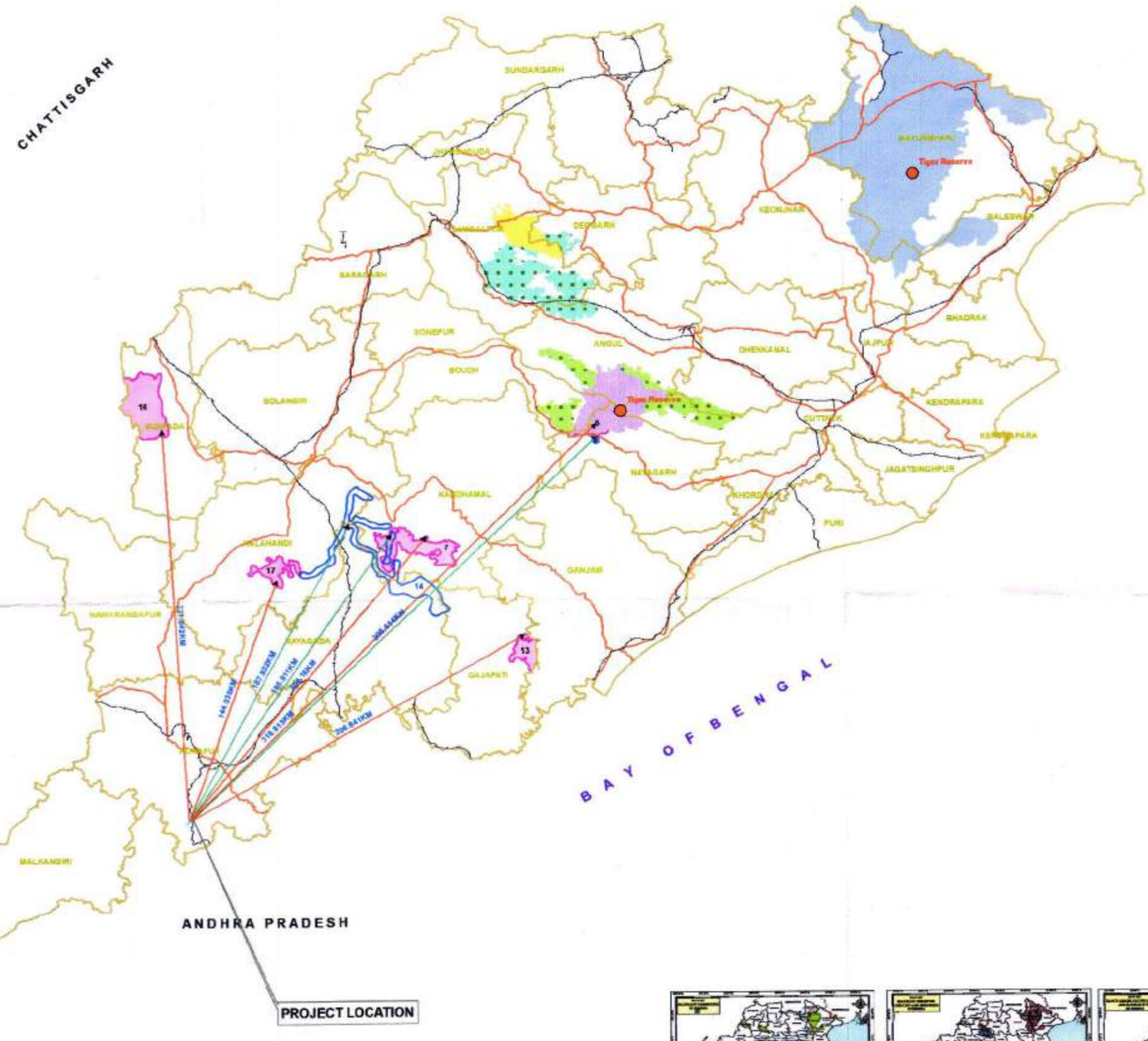
0 15 30 60 90 120 Kilometers

Legend

- TIGER RESERVE
- RAILWAY LINE
- ROAD NETWORK
- DISTRICT BOUNDARY
- ELEPHANT CORRIDORS
- PROPOSED PROJECT SITE
- 10 KM BUFFER AREA
- NATIONAL PARK BOUNDARY
- TIGER RESERVE BOUNDARY
- SIMILIPAL CORE AREA
- SANCTUARIES BOUNDARY
- MAHANADI ELEPHANT RESERVE-EXISTING
- MAHANADI ELEPHANT RESERVE-PROPOSED
- MAYURBHANJ ELEPHANT RESERVE
- SAMBALPUR ELEPHANT RESERVE PROPOSED
- SAMBALPUR ELEPHANT RESERVE-EXISTING

List of Sanctuaries/ National Parks/Tiger Reserves/Elephant Reserves in Orissa

SL.NO	SCANTURIES	
1	Baisipalli	204.16KM
2	Kotagarh	206.841KM
3	Lakhari Valley	221.642KM
4	Sunabeda	310.613KM
5	Karlapat	144.038KM
SL.NO	**Elephant Corridors**	
1	Buguda-Central RF of Nayagarh Divn	306.614KM
2	Kotagarh-Chandrapur	195.911KM
3	Karlapat-Urladani	187.922KM



KALINGA ALUMINA LIMITED

Asst. Conservator of Forest
Koraput Forest Division
KORAPUT

Divisional Forest Officer
Koraput Forest Division

Forest Range Officer
Balda Range

Forest Range Officer
Semiliguda Forest Range



MAP SHOWING LOCATION OF INTERVENATIONS PROPOSED IN THE PROJECT IMPACT AREA OF BALDA BAUXITE BLOCK OF M/S KALINGA ALUMINA LTD. (FORMERLY KNOWN AS MUNDRA ALUMINIUM LTD.) IN VILLAGE BALDA, TAHASIL NANDAPUR, DISTRICT - KORAPUT, ODISHA ON COMPOSITE SURVEY OF INDIA TOPOSHEET NO. E44K10, E44K11, E44K14 & E44K15

PLATE - III

1:50,000

E44K10 | E44K14 | E44K11 | E44K15

REFERENCE

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Submerged rocks. Shoal. Swamp. Reeds
Wells: lined; unlined. Tube-well. Spring. Tanks: perennial: dry
Embankments: road or rail; tank. Broken ground
Railways, broad gauge: double; single with station; under construc.
Railways, other gauges: double; single with distance stone; do
Mineral line or tramway. Kiln. Cutting with tunnel
Contours with sub-features. Rocky slopes. Cliffs
Sand features: (flat,(2)sand-hills (permanent). (3)dunes(shifting).
Towns or Villages: inhabited; deserted. Fort
Huts: permanent; temporary. Tower. Antiquities.
Temple. Chhatri. Church. Mosque. Idgah. Tomb. Graves
Lighthouse. Lightship. Buoys: lighted; unlighted. Anchorage
Mine. View on prefix. Grass. Scrub.
Palms: palmyra; other. Plantain. Conifer. Bamboo. Other trees
Areas: cultivated; wooded. Surveyed tree
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Camping ground. Forest: reserved; protected. RF PF
Spaced names: administrative; locality or tribal . KIKRI NĀGA
Hospital. Dispensary. Veterinary: Hospital / Dispensary
Aerodrome. Heliyard. Tourist site
Power line: with pylons surveyed; with poles unsurveyed

Forest Range Officer
Semiliguda Forest Range

Divisional Forest Officer
Koraput Forest Division

Forest Range Officer
Balda Range

NOTES :-

INDEX

- LOCATION OF MOBILE BARRACK
- LOCATION OF WATER BODY
- LOCATION OF UPROOTING OF INVASIVE WEEDS
- LOCATION OF SMC WORK

Legend
- PROJECT AREA
- 10 KM RADIUS PROJECT IMPACT AREA

ANNEXURE - VIII

Biodiversity Study with Audit Mechanism

for

Ballada Bauxite Block

Over 144.945 ha. in Nandapur Tehsil of Koraput District, Odisha

Project Proponent:

M/s Kalinga Alumina Ltd.

(Formerly known as M/s Mundra Aluminium Limited)

Adani Corporate House,

Near Vaishnodevi Circle,

S.G Highway, Khodiyar Ahmedabad 382421, Gujarat

In compliance of Specific Terms of Reference (TOR) condition no. i. (h) for Biodiversity study with audit mechanism for project requiring Environmental clearance vide F. No. SIA/OR/MIN/439954/2023 dt. 06.11.2023 of State Environment Impact Assessment Authority, Odisha.

Prepared By:

M/s Vardan EnviroNet LLP



Biodiversity Study with Audit Mechanism for Ballada Bauxite Block over 144.945 ha. in Nandapur Tehsil of Koraput District, Odisha

Project Proponent: M/S Kalinga Alumina Ltd. (Formerly known as Mundra Aluminium Limited)Adani Corporate House,Near Vaishnodevi Circle,S.G Highway, Khodiyar Ahmedabad 382421, Gujarat

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CONTENTS

Chapter 1- Preamble 1
1.1. Biodiversity and Biodiversity Action Plan (BAP) 1
1.1.1. The CBD defines biodiversity as: 1
1.2. Impacts of Mining on Biodiversity 1
1.3. About Project 2
1.4. Report Coverage 3
Chapter 2 – Project Description 4
2.1. Brief Description Nature, Size & Location of the Project 4
2.1.1. Location of the Project 4
Chapter 3– Methodology 8
3.1. Methodology of Biodiversity Assessment 8
3.1.1. Community Structure 10
3.1.1.1. Floral Diversity: Nested quadrat sampling method was used for the study of community structure of the vegetation. 10
3.1.1.2. Faunal Diversity: Transect method was used to evaluate the birds, reptiles, mammals and insect diversity in the project area. The sampling consisted of randomly located transects of 100m length 11
3.1.2. Ecosystem Service Matrix (ESM) 12
3.1.3. Biodiversity Action Plan (BAP) 13
Chapter 4- Diversity of the Project Area 14
4.1. Biological Diversity 14
4.1.1. FORESTS AND FOREST TYPES OF IMPACT ZONE 14
4.1.2. Fauna/Wildlife 23
Chapter 5- Impact of Mining Activities 32
5.1. Probable impact of the project on flora and fauna 32
5.1.1. Project Area 32
5.1.1.1. Dust Pollution 32
5.1.1.2. Pollution due to noise and vibrations 32
5.1.1.3. Pollution due to Bauxite fines 32
5.1.1.4. Light/Illumination 33
5.1.1.5. Waste lubricant and grease 33
5.1.1.6. Pollution due to Solid waste 33
5.2. Degradation anticipated on account project implementation. 33
5.2.1. Soil Erosion 33

5.2.2. Degradation of habitat....33
5.2.3. Loss of habitat quality....34
5.2.4. Scarcity of water....34
5.2.5. Accidental fall of animals....34
5.1.2 PROJECT IMPACT AREA....35
Chapter 6- Biodiversity Management Plan....36
6.1. Mitigation measures required for the project area/impact area....36
6.1.1. PROJECT AREA (To be implemented by the project proponent)....36
6.1.1.1. Fire protection measures....36
6.1.1.2. Development of green belt....37
6.1.1.3. Prevention of entry & fall of Wild animals in to mining pits:....37
6.1.1.4. Proposal for road side avenue plantation....38
6.1.1.5. Measure to check up soil loss and water management plan....38
6.1.1.5.1. Proposed Methodology to be adopted as per approved Mining plan:....38
6.1.1.5.2. The Salient features of the drainage management plan are as follows:....39
6.2. Environmental Management Plan.....39
6.2.1. Minimizing the impact of active mining:....40
6.2.1.1. Blasting....40
6.2.1.2. Dust....40
6.2.1.3. Noise and Vibration....40
6.2.1.4. Lighting....41
6.2.1.5. Air pollution....41
6.2.2. Stabilization and Vegetation on Dumps....41
6.2.3. Measures for Minimizing Adverse Effect on Water Regime:....41
6.2.4. Measures for Ground Vibration.....42
Chapter 7- Ecosystem Services....43
7.1. ECOSYSTEM SERVICE MATRIX (ESM)....43
Chapter 8- Biodiversity Action Plan....47
8.1. BIODIVERSITY ACTION PLAN (BAP)....47
8.1.1. Action Plan for BAP....47
8.1.1.1. Top soil conservation....47
8.1.1.2. Afforestation on the overburden and mined out area....49
8.1.1.3. Installation of nest boxes for wildlife....51
Chapter 9- Biodiversity Audit Plan....59

9.1. Introduction 59
9.1.1. Existence and quantification of biodiversity 60
9.1.2. Biodiversity in India 60
9.2. Objective of the Audit: 61
9.3. Audit Criteria based on regulation: 62
9.4. Methodology for Biodiversity Audit: 62
9.4.1. For Biodiversity: - 63
9.4.1.1. For Flora: - 64
9.4.1.2. For Fauna: - 64
9.4.1.3. For Aquatic: - 64
9.4.2. Collection Methods: 64
9.4.2.1. Collection of Trees, Shrubs, and Herbs: 65

Chapter 1- Preamble

1.1. Biodiversity and Biodiversity Action Plan (BAP)

India has a long history of conservation and sustainable use of natural resources. Perhaps India is the first developing country in the world to enact a formal forest conservation act at a national level. Over the years, India has developed a stable organizational structure and a strong legal and policy framework for protection of environment in the country. India is also a Party to the Convention on Biological Diversity (CBD), which requires all Parties to prepare national biodiversity strategy and action plans for conservation and sustainable use of biological diversity. The objectives of the convention are to Conserve biodiversity, sustainably use the various components of biodiversity; and Share the benefits arising from the commercial and other uses of biodiversity in a fair and equitable manner.

1.1.1. The CBD defines biodiversity as:

The variability among living organisms from all sources including inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

Simply put, biodiversity encompasses the variety and variability of life on Earth. It refers to the differences within and between all living organisms at their different levels of biological organization – genes, individuals, species and ecosystems. Biodiversity embraces all living organisms and their genetic diversity, a vast and complex array of ecosystems and habitats, as well as the processes that underpin and result from this diversity, such as photosynthesis, nutrient cycling or pollination. Different species – plant, animal, fungal and microbial – interact with each other in a variety of ecological processes to form ecosystems. These processes are in turn the result of the interactions between species and with their physical and chemical environments.

The intent of a BAP is to create a framework for the optimal management of biodiversity to ensure that systems which are in a good functional state remain this way while systems which have become degraded and non-functional, for whatever reasons, are returned to a better functional state.

1.2. Impacts of Mining on Biodiversity

Mining has the potential to affect biodiversity throughout the life cycle of a project, both directly and indirectly. Direct or primary impacts from mining can result from any activity that involves land clearance (such as access road construction, exploration drilling, and overburden stripping or tailings impoundment construction) or direct discharges to water bodies (riverine tailings disposal or tailings impoundment releases) or the air (such as dusts or smelter emissions). Direct impacts are usually readily identifiable. Indirect or secondary impacts can result from social or environmental changes induced by mining operations and are often harder to identify.

Due to the continuing demand for minerals, the depletion of resources in readily accessible areas, changing technologies and economics, mining is increasingly being proposed in remote and biodiversity-rich areas that were previously unexplored and undeveloped for minerals.

Despite the significant potential for negative impacts on biodiversity from mining operations, there is a great deal that companies can do to minimize or prevent such impacts in areas identified as being appropriate for mining. There are also many opportunities for companies to enhance biodiversity conservation within their areas of operations. Being proactive in the assessment, management and monitoring of biodiversity is important for mines in biodiversity rich areas. With this objective BAP of Ballada Bauxite Mine will be developed.

1.3. About Project

Kalinga Alumina Limited (formerly known as Mundra Aluminum Limited), a wholly owned subsidiary of Adani Enterprises Limited, has a vision of setting up an integrated greenfield alumina refinery of 4.0 MTPA capacity and also to develop bauxite mines in the vicinity for captive / commercial use. Recently Kalinga Alumina Limited has secured two bauxite blocks in Odisha, viz. Ballada in Koraput district and Kutrumali in Kalahandi/Rayagada district through an auction process.

The Government of Odisha, issued letter of intent vide letter SM-MC2-MC-0007-2023/2143/S&M Bhubaneswar dated 1st March 2023 for grant of mining lease for Ballada bauxite block in Village - Ballada, Taluka – Nandapur, District- Koraput, Odisha for an area of 144.945 ha to Mundra Aluminum Limited (now Kalinga Alumina Limited) for period of 50 years. The Copy of letter is attached as **Annexure –I.**
The proposed project entails mining of Bauxite by opencast mining method with an annual Peak Rated Capacity of ~ 4.0 MTPA of Bauxite (ROM). The project also involves generation of 1,46,508 tonnes of Overburden/waste and 51,564 tonnes (25,782 m3) of top soil during initial 5 years of operations. Besides, it is envisaged to have crushing/Screening facilities within the lease area with a capacity of 800 TPH at rated production level over an area of 144.945 Ha located at Village - Ballada, Taluka – Nandapur, District- Koraput, Odisha between latitudes 18°26'05.61588" N to 18°27'13.34448" N and Longitude 82°39'32.39136" to 82°40'25.36716" E. & is covered under the Survey of India toposheet no. No. E44K11 (65J/11).

Accordingly, M/s. Vardan Environet LLP. has been engaged to prepare report on Biodiversity study with audit mechanism per granted TOR vide letter File No. SIA/OR/MINl439954/2023 dated 06-11-2023.

1.4. Report Coverage

This Report is prepared in accordance with the Biodiversity Management Plan to cover the biodiversity of the area and impacts due to mining operation. This report also delt the management plan and audit plan for operational phase. All related aspects have been covered in this report as briefed hereunder:

Chapter 1 – Preamble
Chapter 2 – Project Description
Chapter 3– Methodology
Chapter 4- Diversity of the Area
Chapter 5- Impact of Mining Activities
Chapter 6- Biodiversity Management Plan
Chapter 7- Ecosystem Services
Chapter 8- Biodiversity Audit Plan

Chapter 2 – Project Description

2.1. Brief Description Nature, Size & Location of the Project

The proposed project entails mining of Bauxite by opencast mining method with an annual Peak Rated Capacity of ~ 4.0 MTPA of Bauxite (ROM). The project also involves generation of 146508 tonnes of Overburden/waste and 51564 tonnes (25782 m3) of top soil during initial 5 years of operations. Besides, it is envisaged to have crushing/Screening facilities within the lease area with a capacity of 800 TPH at rated production level over an area of 144.945 ha, of Kalinga Alumina Limited (formerly known as Mundra Aluminum Limited) at Village - Ballada, Taluka – Nandapur, District- Koraput, Odisha.

2.1.1. Location of the Project

The Project is located at Village - Ballada, Taluka – Nandapur, District- Koraput, Odisha between latitudes 18°26'05.61588" N to 18°27'13.34448" N and Longitude 82°39'32.39136" to 82°40'25.36716" E. & is covered under the Survey of India toposheet no. No. E44K11 (65J/11).

The site is situated about one to two kilometer west of Ballada and about 8 km north of Padua in Koraput district, Odisha. Jeypore, a major town in the Koraput district, is about 82 km north-north-west of the Ballada deposit and is approachable by major district road No.52. Koraput, the district headquarters is at 60 km north of the deposit and is connected by a metalled road via Similiguda on NH 26. Bheja, the nearest Railway Station is about 5.0 km due north-east. The nearest airport is at Visakhapatnam (140 km) from the lease.

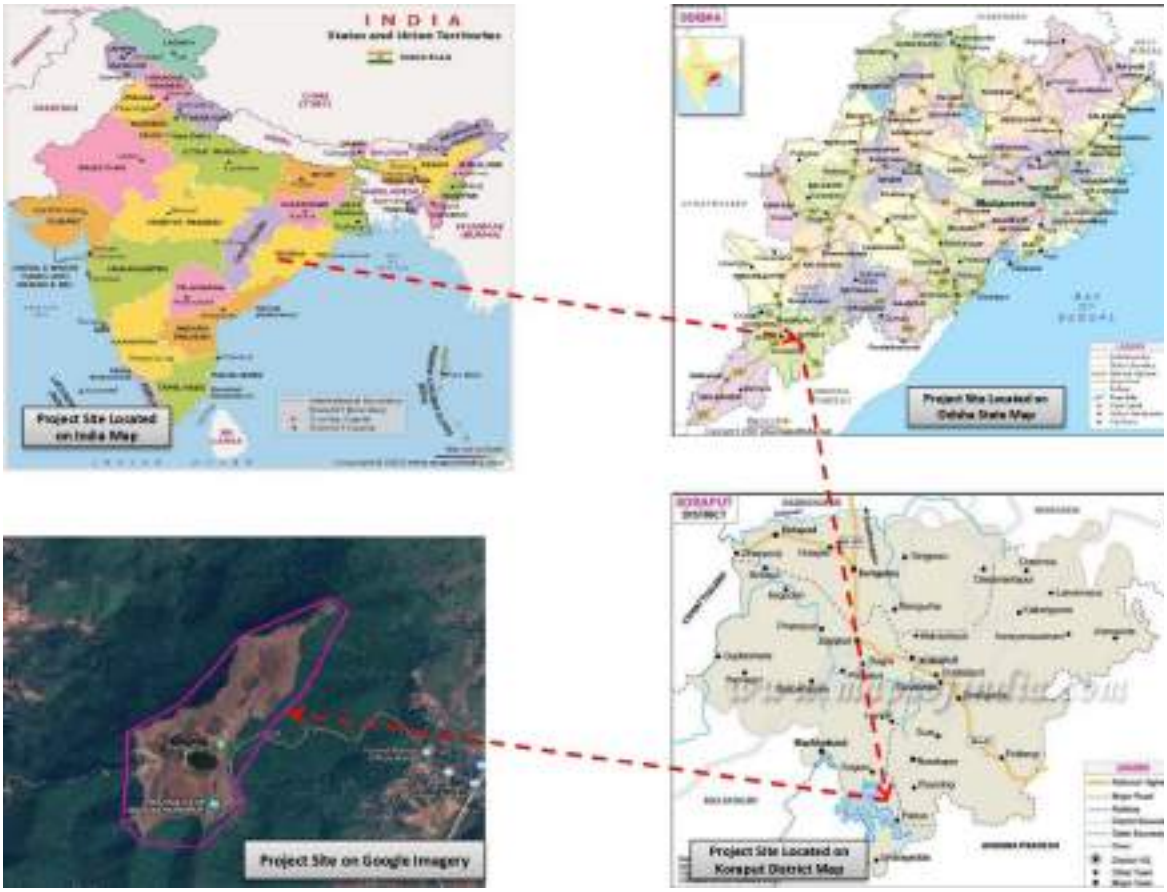


Figure 2. 1: Location of the Project Site

Table 2. 1: Environmental Setting of the Project

S. No.	Particulars	Details		
1.	Project	Mining of 4.0 MTPA Bauxite (ROM), being the Peak Rated Capacity, 1,46,508 tonnes of Overburden/waste and 51,564 tonnes (25,782 m3) of top soil over a period of 5 years and setting up of Crushing/ Screening facilities of 800 TPH capacity within the lease area spanning over an area of 144.945 ha		
2.	Mining lease area	144.945 ha		
3.	Villages	Ballada		
4.	Tehsil, District and State	Tehsil-Nandapur, District – Koraput, State- Odisha		
5.	Type of Land	Forest land		
6.	Elevation	1037.57 to 1266.89 to m from MSL		
7.	Nearest highway	State Highway – 2km		
8.	Nearest railway station	Bheja at 5.0 km.		
9.	Nearest airport	Visakhapatnam at 140 km from Block		
10.	Nearest Town/City	Koraput, the district headquarters is at 60 km north.		
11.	Nearest water bodies	Jolaput Reservoir-3 Km		
12.	Reserve / Protected Forest	Nagasari RF	0.0 Km	Within Site
		Luluburu RF	2.25 km	SE
		Bhimodoli RF	5.00 km	E
		Padua RF	6.5 km	SSE
		Rantha RF	7.9 km	SSE
		Polput RF	6.0 km	SW
		Jabagarh RF	8.6 km	West
		Palam RF	8.8 km	West
		Balel	8.65 km	NW
		Thuba RF	5.0 km	North
		Kasandi RF	6.3 km	NE
		Kalladi RF	9.5 km	East
13.	Other historical and	None within 10 km radius		

S. No.	Particulars	Details
	archaeological places	
14.	Ecology sensitive/ Protected areas as per Wild Life Protection Act 1972 and its Ammendment (National Park/ Wild life Sanctuary/ Bio-sphere reserves)	There is no Wildlife Sanctuary, Biosphere Reserves, Tiger Reserves, Wildlife Corridors, etc. within 10 km radius.
15.	Defense installations	None within 10 km
16.	Industries	None within 10 km
17.	Critically polluted area	None
18.	Transmission line	None
19.	Seismic zone	Zone-II as per IS-1893 (Part-1)-2002

Source: Mining Plan

Chapter 3– Methodology

3.1. Methodology of Biodiversity Assessment

In the process of conducting this study, it has been taken care into the current status and issues of biodiversity in the Ballada Bauxite mining in the context of their operational impact on local ecosystem and biodiversity and vice versa. The biodiversity assessment was carried out for Ballada Bauxite mine within 10 km radius of the mining site.

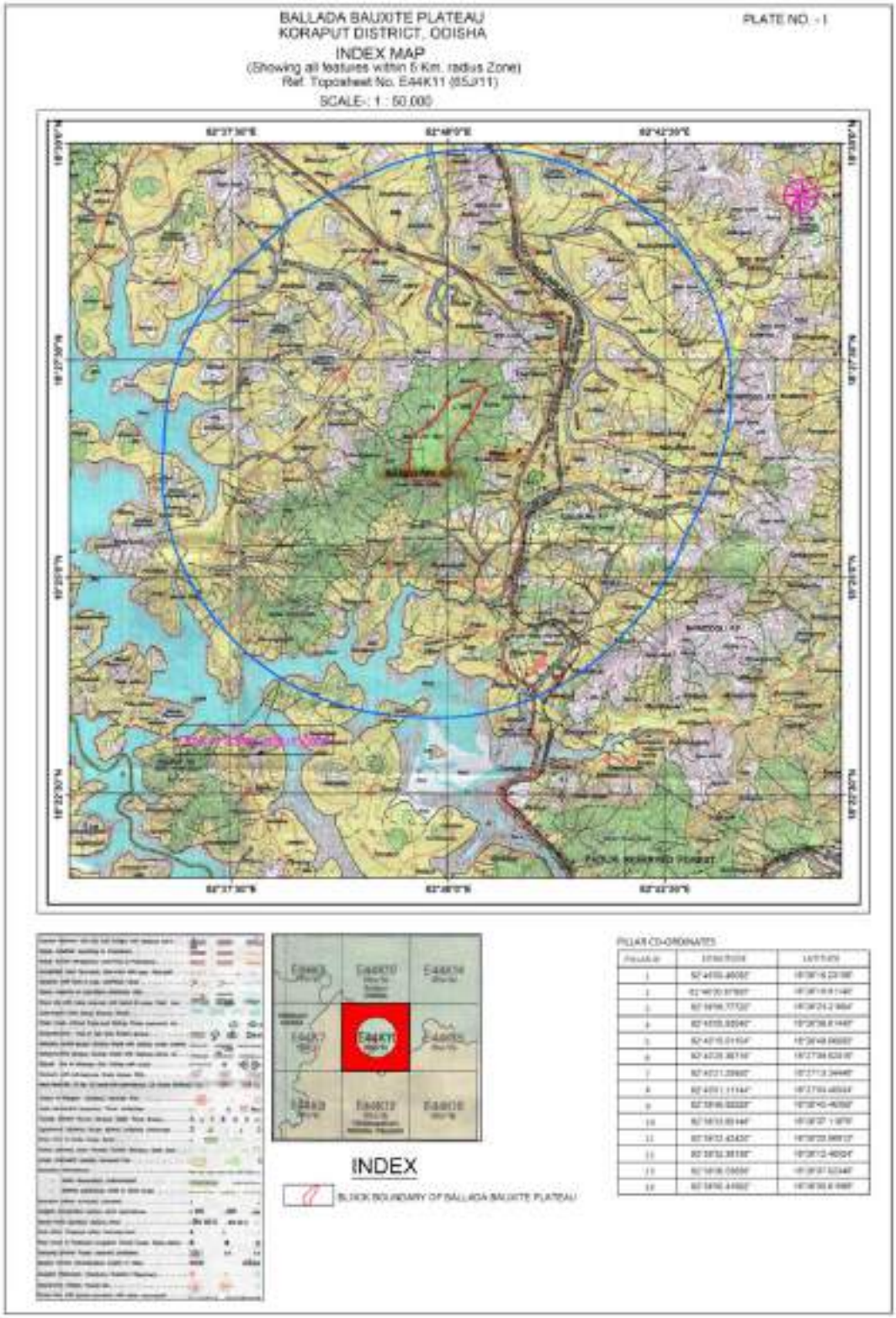
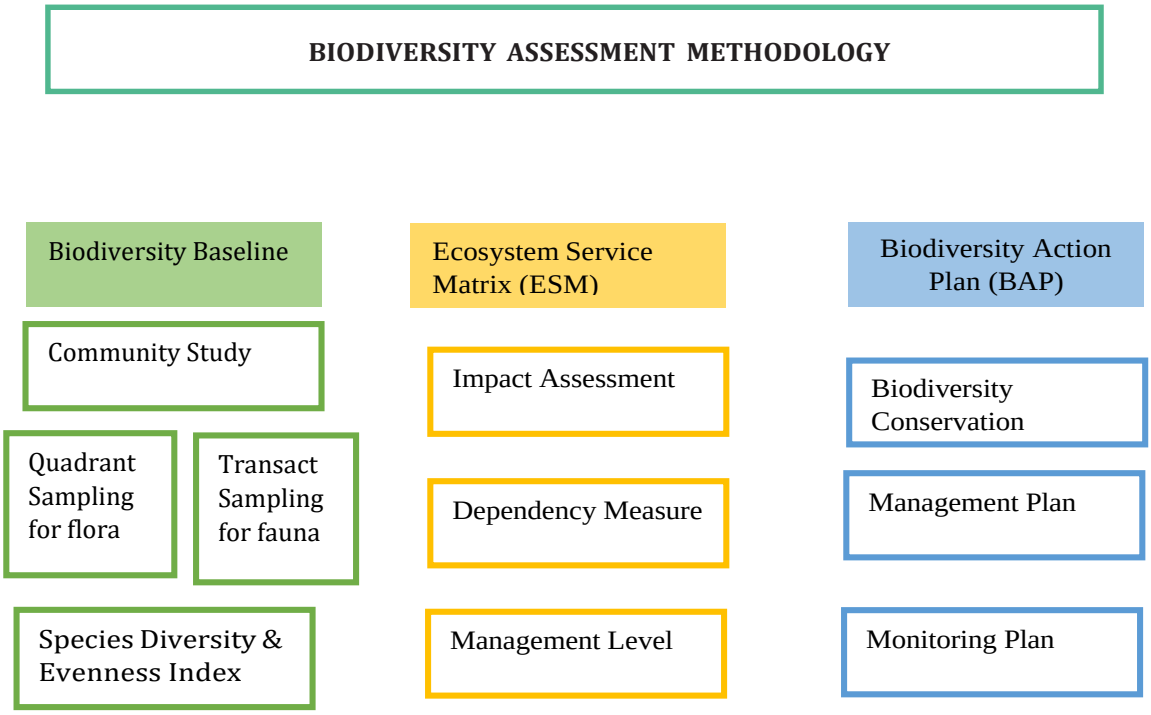


Figure 3. 1: **Study area consisting 10 km radius from mine site**



3.1.1. Community Structure

Taxonomic Enumeration of biodiversity

The one season field trip was done to enlist the floristic and faunal wealth of the project. Field identification of flora and fauna was done with the help of regional available literatures.

3.1.1.1. Floral Diversity: Nested quadrat sampling method was used for the study of community structure of the vegetation.

- The sampling consisted of randomly placed quadrats of 10m x 10m for trees.
- The size and number of quadrats were determined using the species- area curve (Misra, 1968).
- The data of vegetation was quantitatively analyzed for abundance, density, frequency as per Curtis & McIntosh (1950).
- The Important Value Index (IVI) for trees was determined as the sum of relative density, relative frequency and relative dominance (Curtis, 1959).

- The Importance Value Index (IVI) was calculated by using the relative density, relative frequency and relative dominance of the tree species for the area. Higher IVI shows the dominant tree or dominant community of the forest area.

A high IVI indicates that Species A is well represented in the stand because of some combinations: a) A large number of individuals of Species A

compared with other species in the stand, or b) A smaller number of individuals of Species A, but the trees are large compared with others in the stand.

- The quantitative data for the shrub and herbs is not calculated due to start of summer season.

For the calculation of dominance basal area was determined by using following formula.

$$\textbf{Basal area} = \pi r^2$$

3.1.1.2. Faunal Diversity: Transect method was used to evaluate the birds, reptiles, mammals and insect diversity in the project area. The sampling consisted of randomly located transects of 100m length.

The data was quantitatively analyzed for abundance, density, frequency as per Curtis & McIntosh (1950).

Species Diversity & Evenness Index

The species diversity index (H) for floral and faunal diversity is calculated by the use of Shannon Wiener Index (Shannon Wiener, 1963) as:

$H = - \Sigma (ni/n) \times \ln (ni/n)$

Where, ni is individual density of a species and n is total density of all the species. The Evenness Index (E) is calculated by using Shannon's Evenness formula (Magurran, 2004).

Evenness Index (E) = H / ln(S)

Where, H is Shannon Wiener Diversity index; S is number of species.

3.1.2. Ecosystem Service Matrix (ESM)

ESM has been developed for the project to highlight the ecosystem available within project area and in the periphery and the ecosystem services used by the project. The level of dependencies, impacts and management measures initiated for management of ecosystem services are analysed based on the scale given in table 3.1

Table 3. 1: Scale for Dependency, Impacts and Management analysis

Dependency	Code	Definition
High Dependency	HD	Direct dependency on the B&ES with no alternative available
Medium Dependency	MD	Direct dependency on B&ES with short term alternative
Low Dependency	LD	Low direct dependency with many alternatives
No Dependency	ND	Not dependent on B&ES for any project operation

Impact	Code	Definition
High Impact	HI	Project having direct impact on the B&ES and shall be minimized through management plan
Medium Impact	MI	Project having secondary impact on the B&ES and shall be minimized through management plan
Low Impact	LI	Project having tertiary impacts on B&ES
No Impact	NI	No impacts of project on B&ES

Management Level	Code	Definition
Not Managing	NM	No management plan initiated by the company
Partially Managing	PM	Managing impacts and dependencies indirectly through other measures or not fully managed
Fully Managed	FM	Specific management plans implemented to mitigate impacts and to minimize dependencies on B&ES
Alternative idea implemented	AM	Alternative methods are identified and implemented for B&ES man- agreement

3.1.3. Biodiversity Action Plan (BAP)

BAP helps identify biodiversity concerns and management priorities, as well as actions for monitoring and reviewing impacts and dependencies of the project. In addition, it can act as a stakeholder consultation tool for those with biodiversity interests in the area.

At a site level a BAP need not only focuses on sensitive components of site biodiversity, but serves as a tool: to manage biodiversity, to ensure the sustained health of good quality ecosystems, to define interventions necessary, to improve ecosystem functioning in integrated ecosystems and to provide specific direction for the management of sensitive components of biodiversity at the level of species, habitat, ecosystem or ecosystem services.

The BAP is based on the following areas:

1. Biodiversity baseline assessment in area.

2. Species having high conservation importance as per IUCN Red list and Wildlife Protection Amendment Act 2022.

3. Identification of important ecosystem and ecosystem services provided in the study area.

4. Assessing project impacts and dependencies on the biodiversity and ecosystem services.

5. Development of action plan for conservation and restoration of local biodiversity

Chapter 4- Diversity of the Project Area

4.1. Biological Diversity

The project impact area falls in three ranges (Balda, Lomtaput and Similiguda) under Koraput Forest Division partly or wholly. Details are mentioned below in the table.

Table 4. 1: Block and range wise area as per WP

Sl. No.	Name of the forest block	Name of the Range	Full/part	Area as per W.P/ (Approximate in ha.)
1	Nagasari RF	Balda	Full	1181.1852 WP
2	Powlput RF		Full	246.0130 WP
3	Palma RF		Part	230.12 (Approx.)
4	Bhimodole RF		Full	618.7863 WP
5	Bhimodole Ext.		Full	162.8108
6	Hatibari PRF		Part	151.00 (Approx.)
7	Hatibari Ext. PRF		Full	74.0197
8	Padua RF		Part	720.648 (Approx.)
9	Rantha DPF		Part	206.309 (Approx.)
10	Luluburu PRF		Full	76.4074 WP
11	Champaput PRF		Full	32.5379
12	Jabagarh RF	Lomtaput	Part	152.68 (Approx.)
13	Balel RF		Part	319.271 (Approx.)
14	Bilaput RF		Full	32.7807
15	Thuba RF	Similiguda	Full	343.9950
16	Kalladi PRF		Part	52.791 (Approx.)
17	Kansandi PRF		Full	398.0225
18	Kituba RF		Full	8.058
		Total-		5007.4355 ha.

4.1.1. FORESTS AND FOREST TYPES OF IMPACT ZONE

Forest type is defined as a unit of vegetation which possesses similar characteristics of physiognomy, structure, function, floristic composition and phenology influenced by climate and topography (Champion & Seth (1968). The climatic and edaphic factors

coupled with biotic disturbances in Koraput Division have given rise to a rich and varied flora. According to Champion & Seth, the forest types in the division are categorized as under.

Forests of Koraput Forest Division are mainly Tropical dry deciduous type and broadly classified in to two major groups such as Moist Tropical Forests, Dry Tropical Forests. According to Champion & Seths revised classification of forest types of India, these forests have been further classified in to different sub types depending upon physiognomy moisture conditions, flora composition and other variables. As per the above classification the forest of project area and impact area fall under the following category.

1. Northern dry mixed deciduous forests:

Group 5	:	Tropical dry deciduous forests.
Sub group 5B	:	Northern tropical dry deciduous forests.
Type 5B/C_2	:	Northern dry mixed deciduous forests.

Nagasari RF which is a dense mixed jungle and partly degraded fall under the above type.

The top canopy of this type of forests includes species like Shore Robusta (Sal), *Pterocarpus marsupium* (Piasal), *Terminalia tomantosa* (Asan), *Bombax ceiba* (Simul), *Mitragyna parviflora* (Mitkania), *Anogeissus latifolia* (Dhoura) and *Gmelina arborea* (Gambhar) etc.

The middle storey consists of Bridelia retusa (Kasi), *Dalbergia sissoo* (sisoo), *Desmodium oojeinensis* (Bandhan), *Lannea coromandelica* (Mai), *Lagerstroemia parviflora* (siddha), *Buchanania lanzan* (Chara), *Aegle marmelos* (Bela), *Terminalia belerica* (Bahada), *Terminalia chebula* (Harida), *Semicarpus anacardium* (Bhalia), *Syzygium cumini* (Jamun), *Diospyros melanoxylon* (Kendu), *Schleichera oleosa* (Kusum), *Madhuca indica* (Mahul), *Cleistanthus collinus* (Karda), *Morinda tinctoria*(Achu), *Sterculia urens* (Genduli), *Dellenia pentagyna* (Rai), *Emblica officinalis* (Anla), *Tamarindus indica* (Tentuli), *Anogeissus ccuminata* (Phasi), *Mangifera indica* (Amba), *Bauhinia variegate* (Kanchan), *Mallotus phillippensis* (Kamala Gundi) and *Pongamia pinnta* (Karanja) etc.

Undergrowth like *Woodfordia fructiosa* (Dhatiki), *Holarrhena antidysenterica* (Kurei), *Indigofera pulchela* (Girli), *Andrographis paniculate* (Bhuinim), *Phoenix acaulis* (Bana

Khajuri), *Tridax procumbens* (Bishalya Karani), *Eupatorium odoratum* (Pokosunga) and *Clerodendron infortunatum* (Bhant) etc. are also noticed in this forest type.

2. Dry deciduous scrub forests:

Group 5	:	Tropical dry deciduous forests.
Type 5/DS_1	:	Dry deciduous scrub forests (Biotic climax type).

Powlput RF, Bhimodole RF and adjoining RFs having scrub forests more or less comes under the above type. Such forests are result of continued biotic interferences and known as biotic climax type. The vegetation of this types of forests are *Adina cardifolia* (Kuruma), *Anogeissus latifolia* (Dhaura), *Bombax ceiba* (Simili), *Boswellia serrata* (Salai), *Bridelia retusa* (Kashi), *Dalbergia latifolia* (Pahadi sissoo), *Diospyros melanoxylon* (Kendu), *Bursera serrata* (Rajamai), *Lagerstroemia parviflora* (Sidha), Linnea coromondelica (Mai), Madhuca indica (Mahula), Mitragyna parviflora (Mundi), *Peteocarpus marsupium* (Piasal), *Shorea robusta* (Sal), *Syzigium cumini* (Jamun), *Terminalia belerica* (Bahada), *Terminalia tomentosa* (Asan) & Miscellaneous species. Species composition relating to middle storey and under growth are similar to Northern dry mixed deciduous forests. The regeneration status is very poor in this type of forests.

3. Southern dry mixed deciduous forests:

Group 5	:	Tropical dry deciduous forests.
Sub group 5A	:	Southern tropical dry deciduous forests
Type 5A/C_2	:	Southern dry mixed deciduous forests.

Hatibari PRF having open mixed jungle and in partly degraded condition. Luluburu PRF& Padua RF having open forests in highly degraded condition and adjoining forest blocks in impact zone have been grouped in this category. The floristic composition is like *Terminalia tomentosa* (Asan), *Anogeissus latifolia* (Dhaura), *Boswellia serrata* (Salai), *Ougenia oojenensis* (Tinsa), *Sterculia urens*(Genduli), *Shorea robusta*(Sal), *Pterocarpus masupium*(Piasal), *Bridellia retusa*(Kasi) and *Diospyros melanoxylon*(Kendu) etc.

The middle storey consists of *Chloroxylon swietenia* (Bheru), *Emblica officinalis* (Anla), *Morinda tinctoria* (Achu), *Cassia fistula* (Sunari), *Bauhinia racemose* (Amata), *Dalbergia latifolia* (Pahadisisoo), *Buchanania lanzan*(Char) and *Careya arborea*(Kumbhi) etc.

Under storey consists of *Woodfordia fructicisa* (Dhatiki), *Holarrhena antidysenterica* (Kurei), *Lantana camara* (Nagauiri), *Zizyphus oenoplea* (Kanteikoli) etc. with main climbers being *Bauhinia vahlii* (Siali), *Butea superb* (Lata Palasa), *Smilax macrophylla* (Muturi) and *Combretum, deandrum* (Atundi). These forests are subject to heavy grazing, burnt annually and regeneration is very poor.

List of flora of Koraput Division with reference to working plan prepared for the project 2006-07 to 2015-16.

Table 4. 2: List of common tree in the Study area

S.No	LOCAL NAME	BOTANICAL NAME	FAMILY
		TREES	
1.	Achu	*Morinda tinctoria*	Rubiaceae
2.	Agasti	*Sesbania grandiflora*	Fabaceae
3.	Amata	*Bauhinia racemosa*	Caesalpinlaceae
4.	Amba	*Mangifera indica*	Anacardiaceae
5.	Ambada	*Spondiu smangifera*	Anacardiaceae
6.	Ambalata	*Bauhinia racemosa*	Caesalpiniaceae
7.	Amrud(Pijuli)	*Psidium guajava*	Myrtaceae
8.	Andini (Rajmai)	*Bursera serrata*	Burseraceae
9.	Ankula	*Alangium lamarckii*	Alangiaceae
10.	Aonla	*Emblica officinalis*	Euphorbiaceae
11.	Ashoka	*Saraca asoca*	Caesalpinlaceae
12.	Babul	*Acacia nilotica*	Mimosaceae
13.	Badopatri	*Callicarpa arborea*	Verbenaceae
14.	Bahada	*Terminalia bellirica*	Combretaceae
15.	Balthia(paldhua)	*Erythrina suberosa*	Fabaceae
16.	Bandhan	*Desmodium oojeinensis*	Fabaceae
17.	Bankapasia	*Kydia calycina*	Malvaceae
18.	Barbakulia	*Dalborgia paniculata*	Fabaceae
19.	Baro	*Ficus benghalensis*	Moraceae
20.	Barun	*Crateva religiosa/ C.nurvala*	Capparaceae
21.	Belo	*Aegle marmelos*	Rutaceae
22.	Bhalia	*Semecarpus anacardium*	Anacardiaceae
23.	Bhenta	*Limoniaacidissima*	Rutaceae
24.	Bheru	*Chloroxylon swietenia*	Rutaceae
25.	Bija	*Pterocarpus marsupium*	Fabaceae
26.	Bishnuchuda	*Jacaranda mimosifolia*	Bignoniaceae
27.	Blue gum (Nilagiri)	*Eucalyptus globulus*	Myrtaceae
28.	Bod-kurhein	*Wrightia tomentosa*	Apocynaceae

S.No	LOCAL NAME	BOTANICAL NAME	FAMILY
29.	Chadaigudi	*Vitex peduncularis*	Verbenaceae
30.	Chakunda(Bada)/Ra	*Samanea saman*	Mimosaceae
31.	Chakundi	*Cassia siamea*	Caesalpinlaceae
32.	Champa	*Michelia champaca*	Magnoliaceae
33.	Chandan	*Santalum album*	Santalaceae
34.	Char	*Buchanania lanzan*	Anacardiaceae
35.	Chhatin	*Alstonia scholaris*	Apocynaceae
36.	Dam kuruda	*Gardenia latifolia*	Rubiaceae
37.	Dauranja	*Holoptella integrifolia*	Ulmaceae
38.	Debadaru (Ashoka)	*Polyalthia longifolia*	Annonaceae
39.	Dhaman	*Grewia tiliifolia*	Tiliaceae
40.	Dhaura	*Anogeissus latifolia*	Combretaceae
41.	Dimiri	*Ficus glomerata*	Moraceae
42.	Gadapanasa	*Litsea macrophylla*	Lauraceae
43.	Gambhari	*Gmelina arborea*	Verbenaceae
44.	Gandhapalasa	*Miliusa velutina*	Annonaceae
45.	Genduli	*Sterculia urens*	Sterculiaceae
46.	Ghanto	*Zizyphus mauritiana*	Rhamnaceae
47.	Giringa	*Pterospermum heyneamum*	Sterculiaceae
48.	Gohira	*Acacia leucophloea*	Mimosaceae
49.	Gondaguria	*Macaranga peltata*	Euphorbiaceae
50.	Goniari (Kantapalas)	*Cochlospermum gossipium*	Cochlospermaceae
51.	Haldi	*Diospyros montana*	Ebenaceae
52.	Haldu(Halamda)	*Haldina cordifolia (Adina cor*	Rubiaceae
53.	Harida	*Terminalia chebula*	Combretaceae
54.	Hinjal	*Barringtonia acutangula*	Barringtoniaceae
55.	Jamun	*Sysygium cumini*	Myrtaceae
56.	Japhra	*Bixa orellana*	Bixaceae
57.	Jeoktba (Makeyjack)	*Artocarpus lakoocha*	Moraceae
58.	Kadamba	*Anthocephalus cadamba*	Rubiaceae
59.	Kaitho	*Feronia elephantum*	Rutaceae
60.	Kaju(Lanka Badam)	*Anacardium occidentale*	Anacardiaceae
61.	Kalasiris	*Albizia lebbeck*	Mimosaceae
62.	Kamalagundi	*Mallotus phillippensis*	Euphorbiaceae
63.	Kanchan	*Bauhinia variegata*	Caesalpiniaceae
64.	Kansa	*Hymenodictyon excellsum*	Rubiaceae
65.	Karanja	*Pongamia pinnata*	Fabaceae
66.	Karda	*Cleistanthuscollinus*	Euphorbiaceae
67.	Kasi	*Bridellia retusa*	Euphorbiaceae
68.	Kendu	*Diospyros melanoxylon*	Ebenaceae
69.	Kenkat	*Garuga pinnata*	Burseraceae

S.No	LOCAL NAME	BOTANICAL NAME	FAMILY
70.	Khaira	*Acacia catechu*	Mimosaceae
71.	Khajuri	*Phoenix sylvestris*	Arecaceae
72.	Kochila	*Strychnosnux-vomica*	Strychnaceae
73.	Koniyari	*Cascabela thevetia*	Apocynaceae
74.	Krushna	*Delonix regia*	Caesalpinlaceae
75.	Kuilari	*Bauhinia purpurea*	Caesalpinlaceae
76.	Kusum	*Schleichera oleosa*	Sapindaceae
77.	Machhkund/Giringa	*Pterospermum heyneanum*	Sterculiaceae
78.	Mahagni	*Swietenia mahagoni*	Meliaceae
79.	Mahul	*Madhuca indica*	Sapotaceae
80.	Mankadakendu	*Diospyros malabarica*	Ebenaceae
81.	Moi	*Lannea coromandelica*	Anacardiaceae
82.	Mokha/Mukha	*Schrebera swietenioides*	Oleaceae
83.	Munagha(Sajana)	*Moringa oleifera*	Moringaceae
84.	Mundi	*Mitragyna parvifolia*	Rubiaceae
85.	Neem/Limba	*Azadiracta indica*	Meliaceae
86.	Nilagiri	*Eucalyptus species*	Myrtaceae
87.	Padhel (Chuinpatoli)	*Pterospermum suaveolens*	Sterculiaceae
88.	Pahadisisoo	*Dalbergia latifolia*	Fabaceae
89.	Palasa	*Butea monosperma*	Fabaceae
90.	Panas	*Artocarpus heterophyllus*	Moraceae
91.	Panigambhari	*Trewia nudiflora*	Euphorbiaceae
92.	Phasi	*Anogeissus accuminata*	Combretaceae
93.	Phemphana	*Oroxylum indicum*	Bignoniaceae
94.	Pine(Khasi) Pipal	*Pinus insularis/P.khasia*	Pinaceae
95.	Pipal	*Ficus religiosa*	Moraceae
96.	Pitajamu (poi-gam)	*Syzygium operculate*	Myrtaceae
97.	Radhachuda	*Peltophorum ferrugineum*	Caesalpiniaceae
98.	Rai	*Dellenia pentagyna*	Dilleniaceae
99.	Ram phala	*Annona reticulata*	Annonaceae
100.	Rithaphala	*Sapindus mucorosis*	Sapindaceae
101.	Rohini	*Soymida febrifuga*	Meliaceae
102.	Safed siris	*Albizzia procera*	Mimosaceae
103.	Saguan (Teak)	*Tectona grandia*	Verbenaceae
104.	Sahada	*Strebulus aspera*	Moraceae
105.	Sahaja (Asan)	*Terminalia tomentosa*	Combretaceae
106.	Sal	*Shorea robusta*	Dipterocarpaceae
107.	Salai	*Boswellia serrata*	Burseraceae
108.	Salap (Toddypalm)	*Caryota urens*	Arecaceae
109.	Semili	*Bombax ceiba*	Bombacaceae
110.	Sennha (Sidha)	*Lagerstroemia parviflora*	Lythraceae

S.No	LOCAL NAME	BOTANICAL NAME	FAMILY
111.	Silver oak	*Grevellia robusta*	Proteaceae
112.	Sisoo	*Dalbergia sissoo*	Fabaceae
113.	Sunajhari	*Acacia auriculiformia*	Mimosaceae
114.	Sunari	*Cassia fistula*	Caesalpiniaceae
115.	Tala	*Borassus flabellifer*	Arecaceae
116.	Tangini	*Xyliaxylo carpa*	Mimosaceae
117.	Tentuli	*Tamarindus indica*	Caesalpiniaceae
118.	Thelka	*Tamilnadia uliginosa*	Rubiaceae
119.	Toon	*Toona ciliata*	Meliaceae
120.	Tulip tree (African)	*Spathodea campanulata*	Bignoniaceae
HERBS AND SHRUBS			
1.	Amada/Ama-haldi	*Curcuma amada*	Zingiberaceae
2.	Anata-mula	*Hemidesmus indicus*	Asclepiadaceae
3.	Antia (Murmuria)	*Helicteres isora*	Sterculiaceae
4.	Apamaranga	*Achyranthes aspera*	Amaranthaceae
5.	Arakha (arka)	*Calotropis procera*	Asclepiadaceae
6.	Ashwagandha	*Withania somnifera*	Solanaceae
7.	Ata/Seetaphal	*Annona squamosa*	Annonaceae
8.	Baigaba	*Jatropha carcus*	Euphorbiaceae
9.	Bana-tulasi	*Ocimum gratissimum*	Lamiaceae
10.	Ban-Khajuri	*Phoenix acaulis*	Arecaceae
11.	Barkoli	*Ziziphus mauritiana*	Rhamnaceae
12.	Basanga	*Justicia adhatoda*	Acanthaceae
13.	Besharam/Omori	*Ipomea carnea*	Convolvulaceae
14.	Bhant	*Clerodendron infortunatum*	Verbenaceae
15.	BhejiBaigana	*Solanum xanthocarpum*	Solanaceae
16.	Bhuin-Nim	*Andrographis paniculata*	Acanthaceae
17.	Bhursunga	*Murraya koenigii*	Rutaceae
18.	Bisalya-	*Tridax procumbens*	Asteraceae
19.	Bisiripi/Bajramuli	*Sida cordifolia*	Malvaceae
20.	Brahmi/Thalkuni	*Hydrocotyle asiatica*	Apiaceae
21.	Datura (Duddura)	*Datura stramonium*	Solanaceae
22.	Dhatiki	*Woodfordia fructicosa*	Lythraceae
23.	Dholachakunda	*Cassia tora*	Caesalpiniaceae
24.	Gangasiuli	*Nyctanthes arbortriatis*	Oleaceae
25.	Girli	*Indigofera pulchela*	Fabaceae
26.	Gokhara	*Tribulus terrestris*	Averrhoaceae
27.	Gudamari	*Premna herbacea*	Verbenaceae
28.	Hansalata	*Aristolochia bracteata*	Aristolochiaceae
29.	Hariharika	*Euphorbia hirta*	Euphorbiaceae

S.No	LOCAL NAME	BOTANICAL NAME	FAMILY
30.	Jada	*Ricinus communis*	Euphorbiaceae
31.	Kaminic	*Murrya exotica*	Rutaceae
32.	Kanteikoli	*Zizyphus oenoplea*	Rhamnaceae
33.	Karibira	*Nerium indicum*	Apocynaceae
34.	Khadisiju	*Euphorbia tirucalli*	Euphorbiaceae
35.	Khakada (Kakali)	*Casearia tomentosa*	Flacourtiaceae
36.	Khuradu	*Gardenia gummifera*	Rubiaceae
37.	Kila keruan	*Ixora parviflora*	Rubiaceae
38.	Kundaphula	*Jasminum pubescens*	Oleaceae
39.	Kundo-phul	*Jasminum humile*	Oleaceae
40.	Kurei/Kurmi	*Holarrhena antidysenterica*	Apocynaceae
41.	Mehandi (Manjuati)	*Lawsonia inermis*	Lythraceae
42.	Mohana (Pottua)	*Randia dumetorum*	Rubiaceae
43.	Murga	*Agave americana*	Agavaceae
CLIMBERS			
1.	Arkawla	*Millettia auriculata*	Fabaceae
2.	Atundi	*Combretum decandrum*	Combretaceae
3.	Dantari (Nali-	*Acacia sinuata*	Mimosaceae
4.	Desi Alu	*Dioscorea deltoidea*	Dioscoreaceae
5.	Dudhi-mal	*Cryptolepis buchananii*	Periplocaceae
6.	Gilo	*Entada acandens/E.pursaitha*	Mimosaceae
7.	Gunja (Kaincha)	*Abrusprecatorius*	Fabaceae
8.	Kalmi sag	*Ipomea reptans*	Convolvulaceae
9.	KaruKando/Kulihak	*Dioscorea hispida*	Dioscoreaceae
10.	Lata palasa	*Butea superba*	Fabaceae
11.	Madang	*Loranthus scurrula*	Loranthaceae
12.	Madhumalati	*Hiptage madablota*	Malpighiaceae
13.	Meheriaphulo	*Gloriosa superba*	Liliaceae
14.	Muturi	*Smilax macrophylla*	Smilaceae
15.	Nirmuli	*Cassytha filiformis*	Cassytha
16.	Petchurimal(Torida)	*Ventilago madraspatana*	Rhamnaceae
17.	Pitchuli/Kantamali	*Ventilago denticulata*	Rhamnaceae
18.	Satawari	*Asperagus racemosus*	Liliaceae
19.	Siali	*Bauhinia vahlii*	Caesalpiniaceae
BAMBOO			
1.	BadiaBauns	*Bambusa nutans*	Poaceae
2.	Bauns(Salia	*Dendricalamus strictus*	Poaceae
3.	DabaBauns (Kanta	*Bambusa arundinacea*	Poaceae
4.	Sundarkani	*Bambussa vulgaris*	Poaceae
5.	TaledaBauns	*Bambusa tulda*	Poaceae

S.No	LOCAL NAME	BOTANICAL NAME	FAMILY
		GRASSES	
1.	Balunga	*Oryza rufipogon*	Poaceae
2.	Basana	*Bethriochoapertma*	Poaceae
3.	Chhana	*Imperata arundinaceae*	Poaceae
4.	Dhanwaritari	*Cymbopogon flexuosus*	Poaceae
5.	Duba (Dhubo)	*Cynodon dactylon*	Poaceae
6.	Ghodalanji	*Aristida setacea*	Poaceae
7.	Gondabena	*Bothriochloa bladhii*	Poaceae
8.	Guguchia	*Chrysopogon gryllus*	Poaceae
9.	Jharu	*Arundinella setosa*	Poaceae
10.	Kasatandi (Chadeia)	*Saccharum spontaneum*	Poaceae
11.	Khus-Khus (Bena)	*Vetiveria zizaniodes*	Poaceae
12.	Koji jhipa (Kuti)	*Eragrostis coaretata*	Poaceae
13.	Noto	*Phragmites karka*	Poaceae
14.	Phulbadhun	*Thysanolaena maxima*	Poaceae
15.	PhuriPhuri	*Eragrostis unioloides*	Poaceae
16.	Rosa grass	*Cymbopogon matinii*	Poaceae
17.	Sabai (Panasi)	*Eulaliopsis binata*	Poaceae
18.	Sinkulia	*Heteropogon contortus*	Poaceae
19.	Tandi (kasatandi)	*Saccharum spontaneum*	Poaceae
20.	Tuli	*Ichaemum rugosum*	Poaceae

List of Orchids Species present in the Study area

S.No	BOTANICAL NAME	STATUS	FAMILY
1.	*Acampe ochracea*	Occasional	Orchidaceae
2.	*Acampe praemorsa*	Freequent	Orchidaceae
3.	*Aerides odorata*	Occassional	Orchidaceae
4.	*Aerides ringens*	Occassional	Orchidaceae
5.	*Bulbophyllum carniflorum*	Occassional	Orchidaceae
6.	*Bulbophyllum guttulatum*	Rare	Orchidaceae
7.	*Bulbophyllum polyrhizum*	Occassional	Orchidaceae
8.	*Crepidium mackinnonii*	Scarce	Orchidaceae
9.	*Demdrobum aphyllum*	Occassional	Orchidaceae
10.	*Demdrobumbic ameratum*	Occassional	Orchidaceae
11.	*Demdrobum regium*	Scarce	Orchidaceae
12.	*Dendrobium herbaceum*	Occassional	Orchidaceae
13.	*Dendrobium crepidatum*	Scarce	Orchidaceae
14.	*Dendrobium crepidatum*	Scarce	Orchidaceae
15.	*Dendrobium herbaceum*	Occassional	Orchidaceae

S.No	BOTANICAL NAME	STATUS	FAMILY
16.	*Dendrobium macrostachyum*	Freequent	Orchidaceae
17.	*Dendrobium macrostachyum*	Freequent	Orchidaceae
18.	*Dendrobium transparens*	Occassional	Orchidaceae
19.	*Dendrobium transparens*	Occassional	Orchidaceae
20.	*Gastrochileus inconspicuum*	Freequent	Orchidaceae
21.	*Geodorum recurvum*	Freequent	Orchidaceae
22.	*Habenaria commelinifolia*	Freequent	Orchidaceae
23.	*Habenaria furcifera*	Occassional	Orchidaceae
24.	*Habenaria grandifloriformis*	Scarce	Orchidaceae
25.	*Habenaria longicorniculata*	Scarce	Orchidaceae
26.	*Habenaria marginata*	Scarce	Orchidaceae
27.	*Habenaria panigrahiana*	Occassional	Orchidaceae
28.	*Habenaria plantaginea*	Occassional	Orchidaceae
29.	*Habenaria roxburgmii*	Freequent	Orchidaceae
30.	*Kingidium deliciosum*	Occassional	Orchidaceae
31.	*Liparis viridiflora*	Scarce	Orchidaceae
32.	*Luisa trichorhiza*	Freequent	Orchidaceae
33.	*Luisia zeylanica*	Occassional	Orchidaceae
34.	*Nervilia aragoana*	Occassional	Orchidaceae
35.	*Nervilia crociformis*	Scarce	Orchidaceae
36.	*Nervilia plicata*	Abundant	Orchidaceae
37.	*Oberonia ensiformis*	Occassional	Orchidaceae
38.	*Oberonia falconeri*	Occassional	Orchidaceae
39.	*Pecteilis henryi*	Rare	Orchidaceae
40.	*Pelatanthera insectifera*	Occassional	Orchidaceae
41.	*Peristylus constrictus*	Occassional	Orchidaceae
42.	*Peristylus plantagineus*	Scarce	Orchidaceae
43.	*Pholidota imbricata*	Freequent	Orchidaceae
44.	*Polystachya concreta*	Rare	Orchidaceae
45.	*Rhynchostylis retusa*	Freequent	Orchidaceae
46.	*Seidenfia rheedii*	Occassional	Orchidaceae
47.	*Thunia bracteata*	Occassional	Orchidaceae
48.	*Vanda tessellata*	Freequent	Orchidaceae
49.	*Vanda testacea*	Freequent	Orchidaceae

4.1.2. Fauna/Wildlife

Koraput Division is a part of Eastern plateau, Biotic Province under the Decan peninsula Bio Geographic Zone. The Division was once rich in variety of wildlife. The varied terrain and dense, compact, contiguous forest of different types significantly

contributed to the richness of wildlife which still continues to be so in spite of severe pressure on their habitat. However, with the passage of time, denudation of forests and depletion of wildlife have been faster in Koraput Division.

The project impact area of the lease spreading over three Ranges cited above comprises 18 forest blocks having approximate area about 50 Sqkm excluding the existing Revenue Forests. Some of the forest blocks are also dense, medium dense, scrub forest and highly degraded in condition. Still, it houses the available wildlife population since long in depleted condition. The fauna of the impact area is as under.

Among the species of *Canide Hyaena* (Schedule-I), Indian Fox (Schedule-I), Jackel (Schedule-I), Sloth Bear (Schedule-I), Common mongoose, three stripped squirrel, Indian porcupine (Schedule-I), Indian Pangolin (Schedule-I), Otters (Schedule-I) and Hares are common in the forest blocks, may be in small number and large number.

Among the **harvibours** Barking deer, Chital, Sambar (Schedule-I), Wild boar, Common langur and common patimankada are available in the forest block.

Avifauna like Peafowl (Schedule-I), Red jungle fowl, Common quail, green pigeon, the Imperial pigeon, Doves, Drongoes, blue rock pigeon, Racket tailed drongoe or Bhringaraj, the Hill Mynas, the grey headed Mynas, the bays, the red vented bulbuls, the golden black and the pied wood peckers, the Koels, the crow pheasants, large Indian parakeets, the common king fisher, the common horn bills, the common Indian night jar, the screech owl, the great horned owl, white backed vulture, the swifts, pariah kite, the eagle, bush quail (*Perdicula asiatica*), the grey patridge, the cattle egret, stocks, pond herons, the jungle crow, pipits and wagtails.

Migratory birds like spot bill and open billed stork visit Jolaput reservoir in Lampaput and Balda Range. Snipes, Teals and Water hen are also seen in Jolaput reservoir. The details study of migratory birds visit Jolaput reservoir spreading over 41.5 sqkm is furnished below along with Mid-winter waterfowl census report – 2023 in three Ranges.

Snakes like Dhamana, India Cobra, (Schedule-I) Viper, Krait and Python (Schedule-I) in the project impact area. Common tortoise & variety of fishes and crabs are also found in the reservoir.

List of fauna with Local name, English name and Scientific name with schedule found in Koraput Division are furnished below (Source Working Plan of Koraput Division).

The schedule to which the wildlife belongs to has been categorised according to the latest. The Wildlife (Protection) Amendment Act, 2022 dt. 19.12.2022 published in The Gazette of India (20.12.2022).

Table 4. 3: List of mammals in the project area

S.No	Local Name	English Name	*Scientific Name*	IUCN	IWPAA Schedule
MAMMALS					
1.	Badudi	Short nosed fruitbat	*Cynopterus sphinx*	LC	-
2.	Bagha	Tiger	*Panthera tigris*	EN	I
3.	Bagrakapta	Pangolin	*Manis crassicaudata*	EN	I
4.	BaliaKukur	Wild dog or Dholes	*Cuon alpinus*	EN	I
5.	Banbiradi	Jungle cat	*Felis chaus*	LC	I
6.	Barha	Wild boar	*Sus scrofa cristamus*	LC	II
7.	Bhalu	Sloth bear	*Melursus ursinus*	VU	I
8.	Bilua	Jackal	*Canis aureus*	LC	I
9.	Chausingha	The Four horned antelope	*Tetracerus quadricornis*	VU	I
10.	Cheetah Biradi	Leopard cat	*Felis bengalensis*	LC	I
11.	Chhuchhundra	Grey musk shrew	*Suncus murinus*	LC	-
12.	Gada Bhalu	Ratel	*Mellivora capensis*	LC	I
13.	Gunduchimusa	3 stripped palm squirrel	*Funambulus palmarum*	LC	-
14.	Gunduchimusa	5 stripped palm squirrel	*Funambulus pennanti*	LC	-
15.	Gurandi	Mouse deer	*Tragulus meminna*	LC	I
16.	Harina	Spotted deer	*Axis axis*	LC	II
17.	HetaBagha	Hyaena	*Hyaena hyaena*	NT	I
18.	Jhinka	porcupine	*Hystrix indica*	LC	I
19.	KalarapatriaBagha	Leopard (Panther)	*Panthera pardus*	VU	I
20.	Kokisiali	Fox	*Vulpes bengalensis*	LC	I
21.	Kutura	Barking deer	*Muntiacus muntijack*		
22.	Mankada (Hanu)	Monkey	*Semnopithecus entellus*	LC	II
23.	Mankada (Pati)	Rhesus monkey	*Macaca mulatta*	LC	II
24.	Musa	Rat	*Rattus rattus*	LC	-
25.	Musa	White tailed wood rat	*Rattus blanfordi*	LC	-
26.	Musa	Long tailed tree mouse	*Vandeleuria oleracea*	LC	-
27.	Musa (Nepali)	Gaintindian squirrel	*Ratufa indica*	LC	-

S.No	Local Name	English Name	*Scientific Name*	IUCN	IWPAA Schedule
28.	Neula (Hatia)	Common mongoose	*Urva edwardsii*	LC	I
29.	Neula (Kuji)	Small indian mongoose	*Urva auropunctata*	LC	I
30.	Odha	Smooth Indian otter	*Lutra perspicillata*	VU	I
31.	Ramsiali	Wolf	*Canis lupus*	VU	I
32.	Saliapatani	Small Indian civet	*Viverricula indica*	LC	I
33.	Saliapatani	Toddy cat	*Paradoxurus hermaphroditus*	LC	I
34.	Sambar	Sambar	*Cervus unicolor*	VU	I
35.	Thekua	Hare	*Lepus nigricollis*	LC	II
REPTILES					
1.	Ahiraja	King cobra	*Ophiphagus hannah*	VU	I
2.	Ajagarh	Indian python	*Python molurus*	NT	I
3.	Boda	Common boa	*Boa constricta*	LC	II
4.	Chiti	Common Indian krait	*Bungarus caeruleus*	LC	II
5.	Dhamana	Rat snake	*Ptyas mucosa*	LC	I
6.	Dhandaboda	Russels viper	*Daboia russelii*	LC	I
7.	Dhulinag	Saw scale viper	*Echis carinatus*	LC	II
8.	Kandanali	Tree snake	*Ahetulla spp*	-	-
9.	Laudankia	Common green whipsnake	*Dryophisna sutrus*	-	-
10.	Naga (Gokhar)	Indian cobra	*Naja species*	LC	I
11.	Panidhanda	Checkered keel back	*Natrix piscator*	LC	I
12.	Rana	Krait	*Bungarus candidus*	LC	
13.	Telisapa	Common blind snake	*Typhlops brahminus*	LC	II
14.	Bahurupi	Indian chameleon	*Chameleon zeylanicus*	LC	I
15.	BahurupiKuasap	Garden geeko	*Calotes versicolor*	LC	-
16.	Champainoil	Skink	*Mabuya bibro*	-	II
17.	Endua	Rock geeko	*Hemidactylus maculatus*	LC	-
18.	Godhi	Land monitor	*Varanus bengalensis*	NT	I
19.	Jhitipiti	House lizard	*Hemidactylus flaviviridis*	LC	-
20.	PaniGodhi	Water monitor	*Varnus salvador*	LC	I
TORTOISE					
21.	Chebedakainch a	Land tortoise	*Trionyx gangeticus*	EN	I
22.	Kurma	Indian tent turtle	*Pangshura tentoria*	LC	I

S.No	Local Name	English Name	*Scientific Name*	IUCN	IWPAA Schedule
23.	Panikaincha	Terrapin	*Lissemys punctata*	VU	I

Avifaunal Diversity from Study Area

S.No	Local Name	English Name	Scientific Name	IUCN	IWPAA Schedule
1.	Baga	Egret cattle	*Bubulcus ibis*	LC	II
2.	Banakukuda	Jungle fowl grey	*Gallus sonneratii*	LC	I
3.	Banakukuda	Jungle fowl red	*Gallus gallus*	LC	II
4.	Bani	Mynaindian	*Acridotheres tristis*	LC	II
5.	Batak	Teal common	*Anas crecca (Linnaeus)*	LC	II
6.	Baya	Baya weaver bird	*Ploceus philippinus*	LC	II
7.	Bhadbhadalia	Roller or blue jay	*Coracias benghalensis*	LC	II
8.	Bhaliakhai	Hornbill Common grey	*Ocyceros birostris*	LC	II
9.	Bhrungaraja	Drongo rocket tailed	*Dicrurus paradiseus*	LC	II
10.	Bulbul or Gobrachadhei	Bulbul (red vented)	*Pycnonotus cafer*	LC	II
11.	Chakua-chakoi	Duck Ruddy sheldrake	*Tadorna ferruginea*	LC	II
12.	Chatak	Cuckoo pied crested	*Clamator jacobinus*	LC	II
13.	Chataka	Swift House	*Apus affinis*	LC	II
14.	Chilla	Kite common pariak	*Milvus migrans*	LC	II
15.	Damara kau	Crow jungle	*Corvus macrorhynchos*	LC	II
16.	Deuliapara	Pigeon Bluerock	*Columba livia*	LC	NL
17.	Gandalia	Stork openbilled	*Anastomus oscitans*	LC	II
18.	Gharchatia	Soarriw House	*Passer domesticus*	LC	II
19.	Ghukalika	Myna pied	*Gracupica contra*	LC	II
20.	Gunduri	Quail blue legged	*Turnix suscitator*	LC	II
21.	Haladibasanta	Oriole black headed	*Oriolus xanthornus*	LC	II
22.	Hansa	Duck Grey or spotbill	*Anas poecilorhyncha*	LC	II
23.	Hansarali	Grebe little or Debachick	*Tachybaptus ruficollis*	LC	II
24.	Kajalpati	Drongo black or King crow	*Dicrurus macrocercus*	LC	II

S.No	Local Name	English Name	Scientific Name	IUCN	IWPAA Schedule
25.	Kantiabaga	Heron pond or paddy bird	*Ardeola grayii*	LC	II
26.	Kapota	Dove king	*Streptopelia decaocto*	LC	II
27.	Kapota	Dove spotted	*Spilopelia chinensis*	LC	II
28.	Kathkhumpa	Woodpecker	*Yungipicus nanus*	LC	II
29.	Kathkhumpa	Woodpecker golden backed	*Dinopium benghalense*	LC	II
30.	Kau	House Crow	*Corvus splendens*	LC	NL
31.	Koili	Cuckoo common Hawk	*Hierococcyx varius*	LC	II
32.	Koili	Cuckoo indian	*Cuculus micropterus*	LC	II
33.	Kuchilakhai	Hornbill malabar pied	*Anthracoceros coronatus*	NT	I
34.	Kumbhatua	Crowpheasant	*Centopus sinensis*	LC	II
35.	Kunda	Babbler common	*Argya caudata*	LC	II
36.	Machharanka	King fisher pied	*Ceryle rudis*	LC	II
37.	Mayur	Peafowl common	*Pavo cristatus (Linnaeus)*	LC	I
38.	Nilkantha	Robin magpie	*Copsychus saularis*	LC	II
39.	Pahadi bulbul	Bulbul (red whiskered)	*Pycnonotus jocosus*	LC	II
40.	Panikua	Cormorant little	*Microcarbo niger*	LC	II
41.	Para	Pigeon imperial green	*Ducula aenea*	NT	II
42.	Pecha	Owl indian greathorned	*Bubo bubo*	LC	II
43.	Pecha	Owlet spotted	*Athene brama*	LC	II
44.	Phutki	Tailor bird	*Orthotomus sutorius*	LC	II
45.	Saguna	Vulture white backed or bengal	*Gyps bengalensis*	CE	I
46.	Sankhachilla	Kite Brahminy	*Haliastur indus*	LC	II
47.	Sari	Myna hill	*Gracula religiosa*	LC	I
48.	Sua	Parakeet large indian	*Psittacula eupatria*	NT	II
49.	Teetiri	Patridge grey	*Ortygornis pondicerianus*	LC	II
50.	Teetri	Quail Bush jungle	*Perdicula asiatica*	LC	II
51.	Teetri	Quail Bushpainted	*Perdicula erythrorhyncha*	LC	II

Table 4. 4: List of mid winder-waterfowl in the project area

Mid-Winter Waterfowl Census-2023 Report.

Sl. No.	Name of the water fowl	Name of the Range			
		Lamtaput	Balda	Semiliguda	Total No.
1	Little corinorant	44	449	415	908
2	Brahminy Shelduck	-	-	-	0
3	Indian Pond Heron	21	87	46	154
4	Indian Shag	7	-	9	16
5	Common King Fisher	3	16	40	59
6	Little Egret	7	330	114	451
7	Great Egret	41	-	53	94
8	Red Wattle Lapwing	2	21	56	79
9	Cattle Egret	21	-	-	21
10	Intermediate Egret	-	-	-	0
11	Great Cormorant	164	-	3	167
12	Common Coot	-	-	-	0
13	Common Shelduck	9	-	264	273
14	Grey Heron	2	-	32	34
15	Lapwing	3	212	27	242
16	Common Crane	60	-	-	60
17	White Breasted Water hen	-	20	1	21
18	Raddhi Shelduck	-	-	69	69
19	Barn Swallow	-	-	120	120
20	White Threated Kingfisher	-	-	3	3
21	Lesser Whistling Shelduck	-	-	40	40
	G.Total	384	1135	1292	2811

Additional Species

Sl. No.	Name of the Species	Name of the Range			
		Lamtaput	Balda	Semiliguda	Total No.
1	King Fisher	-	-	2	2
2	Spotted Dove	3	64	-	67
3	Rock Pigeon	31	14	-	45
4	Unidentified Species	-	-	-	0
5	Common Myna	79	100	27	206
6	Openbill Stroke	-	59	-	59
7	Common Sand Piper	-	31	-	31
8	Greeb Sand Pipper	-	25	4	29
9	Asian Openbill	-	56	-	56
10	Little Grab	-	6	-	6
11	Black Drongo	7	13	-	20
12	Rufous Tree Pie	-	2	-	2
13	Oriental Darter	-	-	10	10
14	Oriental Tartle Dove	-	-	2	2
15	Asian Pied Straling	-	-	15	15
16	White Browd Wegtil	-	-	2	2
17	Swap Bird	-	-	15	15
18	Great White Pelican	-	-	-	0
19	Little Ringer Plover	-	-	4	4
20	Jungle Owlet	2	-	-	2
21	Green Bee Eater	10	-	-	10
22	Eurosin Hoopee	2	-	-	2
23	Black Rumped Flemback	4	-	-	4
24	Indian Koel	4	-	-	4
25	Black Necked Gribs	-	-	-	0
	G.Total	142	370	81	593

The project area and project impact area do not form part of any National Park, wildlife sanctuary, Elephant Corridor, Tiger reserve and Eco-sensitive zone. The nearest wildlife sanctuary i.e Karlapat wildlife sanctuary and its eco-sensitive zone is about 144.038 KM and 134.038 KM respectively from the boundary of the project/ML

However, other sanctuaries and elephant corridors of the state occurring around the project site at far off places as furnished below.

Table 4. 5: List of wildlife sanctuary and elephant corridor in the project area

SL. NO	SANCTURIES	
1	Baisipalli	204.16 KM
2	Kotagarh	206.841 KM
3	Lakhari Valley	221.642 KM
4	Sunabeda	310.613 KM
5	Karlapat	144.038 KM
SL. NO	ELEPHANT CORRIDOR	
1	Karlapat-Urladani	187.922 KM
2	Kotagarh-Chandrapur	195.911 KM
3	Bugudi-Central RF of Nayagarh Division	306.614 KM

Chapter 5- Impact of Mining Activities

5.1. Probable impact of the project on flora and fauna

The main pollutants of an open cast mine are fugitive dust, noise and vibration, silt with gaseous exhaust fumes, light, waste lubricant, grease etc. This shall be assessed, while conducting EIA study and mitigative prescriptions to be prescribed while approving environmental management plan by the MoEF & CC, Govt. of India in order to address those pollutant at the site. However, the main pollutants anticipated to be generated during mining operation and its impact on wildlife and surrounding areas are narrated below.

5.1.1. Project Area

5.1.1.1. Dust Pollution

Fugitive dust will be generated due to drilling, cutting, handling of over burden and operative Dumpers and Trucks on haul roads. It will also be generated at the loading and unloading points.

The dusts from various sources will accumulate on foliages of the different floral composition which are food for wild herbivores. Besides dust emission may cause respiratory problems in wild fauna residing in the vicinity, who will migrate to other places. In course of migration they may be victim to poachers.

5.1.1.2. Pollution due to noise and vibrations

Excavation, loading, unloading, haulage of Bauxite and movement of people will create noise and vibrations, which not only will affect the tranquillity of the area, but also will affect the health and reproduction process of wild animals. Many of them may desert the area out of fear and anxieties and get killed or run over by vehicles outside their habitat.

5.1.1.3. Pollution due to Bauxite fines

The Bauxite silt and fines generated in the process of mining may pollute the soil and water. Water running off the OB dumps, Bauxite stacks, roads and unused land surface may carry Bauxite fines, which may contaminate the streams down below, affecting use of stream water by aquatic and terrestrial animals.

5.1.1.4. Light/Illumination

Light from High Masts, Roads, moving vehicles will affect wildlife which love the tranquillity in dark night. Artificial light disturbs their diurnal/nocturnal cycle of activity. Such disturbances affect physiology, metabolism and sets stress leading to disorientation and natural behaviour. Prolonged stress may terminate in death.

5.1.1.5. Waste lubricant and grease

With improper maintenance of vehicle/machineries spillage of such material will pollute the soil and water. In addition to fumes generated from machineries and vehicle shall also pollute the surrounding air in the nearby wildlife habitats. There shall be generation of CO, CO_2 and some extent of NO and SO_2, hence fugitive may be generated along the road and wildlife habitats.

5.1.1.6. Pollution due to Solid waste

The principal solid waste produced in an open cast mine is overburden. The waste generation in Ballada Bauxite quarries can be classified into two types i.e waste from the bauxite band (intercalated waste) and the overburden. The intercalated waste may be about 10% of the total excavation. The waste generated from mines shall be dumped in the proposed dump in the non-mineralized zone which will cover an area of about 3.15 ha.

5.2. Degradation anticipated on account project implementation.

5.2.1. Soil Erosion

The mining activities, laying out of extraction path and construction of two approach roads to the lease area by utilising 12.267 ha. of forest area across the hilly slope and other activities will subject the hill slopes to soil erosion. This will denude the forest floor which supports vegetation for the sustenance of wild animals. Beside there will be soil erosion from the over burden dumps, top soil dumps. It shall cause heavy siltation inside nalas, water courses and water bodies, paddy fields. Unless controlled this will pose serious consequences in future.

5.2.2. Degradation of habitat

Although, about 92 ha. is plateau devoid of any vegetation and 52.945 ha. hosts forest vegetation inside the ML of 144.945 ha. the forest growth in 52.945 ha. may be cleared to accommodate mining pits, OB Dumps, haul roads, store yards etc. Besides 12.267 ha. of forest will be cleared for aligning approach road from both the side of lease there by a portion of the habitat will be lost. As narrated above the fringe area of the lease hosts

vegetation of Jamun, Kusum, Harida, Bahada, Amla, Mango, Panas,Rai, Sindur, Bela, Karanja, Kendu etc including underground flora continuous to balance area of Nagasari RF will be lost partly excluding the safety zone area of 4.23 ha and undisturbed/virgin area of about 52.945 ha.

Besides, due to mining operation and increasing mining work force, Hotels & Restaurants, development of other infrastructures outside the lease in the foot hill of RF and increase human settlements there shall be impact on the floral and faunal composition of the area due to anthropogenic pressure.

5.2.3. Loss of habitat quality

The habitat not merely means the extent of cover, food and water, but a safe abode where wild life mate, breed, take care of their off-spring and move freely without fear. The anthropogenic pressure likely to be generated due to mining and ancillary activities will disturb the habitat, its tranquillity and serenity and may threaten the health of the existing fauna. With increased human presence the demand for forest produce particularly fuel wood, small timber and brushwood will increase, affecting the density of vegetation.

Chances of accidental forest fires will increase, which will affect the flora, fauna and water holding capacity of the soil. The water in the nalas and water holes is likely to be polluted with fine calcareous sediments. The foliage of trees, shrubs etc. is likely to be covered with a thick layer of dust, making it unsuitable for browsing by wild animals. As such the habitat will deteriorate to some extent, resulting in thinning out of wild life population and affecting their behavioural pattern.

5.2.4. Scarcity of water

More than 90 ha. of catchment area inside Nagasari R.F will be lost due to mining and allied activities. Therefore, seasonal nalas and perineal nalas originating from the forest area will be dried up partly causing scarcity of water in the river systems feeding Jolaput reservoir as narrated above. The scenario will be more acute during summer months.

5.2.5. Accidental fall of animals

From the inception of mining, the pit attains considerable size which is enlarged in wedge shape in course of mining. Such deep mining pits are dangerous for wild animals as any fall shall be fatal to them. The fall may even cause serious injury making them invalid for rest of life.

5.1.2 PROJECT IMPACT AREA

More than 50sqkm of forest comprising of RFs, PFs, PRFs and about 41.5 Sqkm Jolaput reservoir hosts the available wild fauna and aquatic fauna in the project impact area. Due to project implementation area and the resultant effect may affect the wildlife habitat to some extent.

The anticipated impact area as under: -

i) Loss of habitat quality: The habitat is not merely the quantity and extent of cover, food, water, community structure, their distribution and arrangement but freedom from fear and ability to move freely. Mosaic of mine, habitation and cultivation is adaptable but the disturbance is not.

The habitat in the buffer zone is subjected to deterioration by recurring annual forest fire, grazing by livestock, removal of firewood and brush wood by villagers and labour force of several mines operating in the area and illicit felling. The nala water gets polluted with fine ore sediments from mines. The foliage of trees, shrubs get cover with a thick layer of dust. Under such condition, the habitat will further deteriorate to some extent and it will have adverse impact on the Wild Life for a short period.

ii) Forest fire: Although Forest fire in tropical forest is common in summer months and is a big threat to both flora and fauna, mining activities may further boost the same. Forest fire is likely to burn the ground flora, desiccate the soil, kill the ground dwelling animals, birds, reptiles and their young ones, char their nests and eggs. It may render hilly streams dry and destroy sub-terrain flora and fauna besides causing diseases in the standing trees. Forest fire is mainly caused by N.T.F.P collectors who do not extinguish fire created for clearing the ground by negligence and leave lighted “bidi” on the forest floor. Therefore, fire control will be one of the major conservation activities.

Chapter 6- Biodiversity Management Plan

6.1. Mitigation measures required for the project area/impact area

In order to address the probable adverse impact enumerated in chapter- V, the following management strategies are proposed to be adopted in the project area by the project proponent i.e M/s Kalinga Alumina Ltd. under the strict supervision of forest Deptt and project impact area to be implemented by the Divisional Forest Officer, Koraput Division, Odisha.

As narrated in the previous chapters, the Bauxite lease area spreading over 144.945 ha. finds place inside Nagasari Reserve Forest on the plateau portion surrounding dense forests all around having wild fauna as narrated in chapter-IV, some of which are also belong to schedule-I category. But due to mining and allied activities and resultant biotic pressure some wild fauna shall be homeless and may migrate to safer place in search of food and shelter in the impact area. In this way they may be victim to poachers and other predators on their path of movement. Beside a water harvesting structure (WHS) dug inside the lease providing water to the wild fauna shall be utilized in mining causing water scarcity for them.

Beside the lease area and the adjoining area of Nagasari RF serve as catchment area of some seasonal and perineal nalas those feed to Jolaput Reservoir which houses not only to some aquatic fauna but also serve as nesting and feeding ground of migratory birds.

Due to mining and transportation of ore, new roads and extraction paths are to be constructed inside the forest to Balda SH causing severe vegetation and soil loss in the field. Considering the above ground problem, the following interventions are proposed for the project area.

6.1.1. PROJECT AREA (To be implemented by the project proponent)

6.1.1.1. Fire protection measures

As the lease boundary and safety zone area are continuous to the wild life habitats inside Nagasari R.F, strategic fire protection measures are to be adopted by the project proponent to prevent spread of fire from the lease hold area in to the forest and to the undisturbed virgin area over more than 50 ha. continuous to Nagasari R.F housing wild animals.

Therefore, permanent fire line should be created at a width of 15m all along the inner boundary of the lease including safety zone prior to fire season i.e before 15th February every year. **A firefighting squad** consisting of 5 young youths should be deployed inside the lease with logistic tools to fight accidental fire wherever occur in side the lease area.

In addition, **four fire watchers** should be deployed during four fire months to watch incidental fire and to co-ordinate with the squad to extinguish the same. The mining work force should also be sensitized in general through awareness programs regarding fire hazards inside wildlife habitats. Two no. of **fire blowers** should be provided by the user agency to the squad members for firefighting and laying of fire line.

6.1.1.2. Development of green belt

It is proposed to protect and improve the existing forest in the 7.5m width safety zone over 4.23 ha. as a green belt in the proposed mining project in the following manner to arrest dust, noise, light and preventing to spread in to the adjoining forests and wildlife habitats. If some permanent gaps exist in the safety zone and undisturbed area of 61.18 ha., gap plantation with 1.5-year-old indigenous and fruit bearing seedlings like Amla, Bahada, Harida, Jamun, Jack Fruit and Mahula shall be planted by the project proponent there for food of wild animals. The existing degraded vegetation where ever available should be tended silviculturaly on ANR (Artificial Natural Regeneration) mode with required SMC measures. Provision of watering should be kept to water the seedling in dry month.

A separate scheme for fencing, protection and regeneration of safety zone and road side plantation shall be prepared as per TOR for EIA and EMP study/Stage-I Forest clearance, as the case may be.

6.1.1.3. Prevention of entry & fall of Wild animals in to mining pits:

The mining pits are deep and wedge shaped. There is possibility of fall of wild animals in to the pits in course of wandering from the adjoining forest area. It is proposed to construct **photovoltaic fencing** as per the guideline of CWLW, Odisha around the faces of the mining pits to prevent entry & fall of wild animals in to the mining pits at the project cost. The project proponent shall erect the fencing in consultation with the local forest authorities.

6.1.1.4. Proposal for road side avenue plantation

It is proposed to plant avenue species having wide crown along the internal road sides to arrest the fugitive dust during handling and transportation of ores and also to minimize light illumination from vehicles during night time as per the approved EMP & Mining plan.

The road sides are to be planted with ornamental plants and fruit bearing species such as Krushnachuda, Radhachuda, Neem, Karanja, Jack fruit, Chhatian, Patuli, Mahula, Mango etc. in single row on either side at a spacing of 3 meters. The project proponent shall take up the plantation after laying out the roads and avenues in the lease area at the project cost under the supervision of Forest Authority.

Besides blank areas, if available around all infrastructures, mineral storage yard, shall also be planted with suitable plants to arrest the dust emissions. The project proponent shall prepare a scheme in consultation with local forest authorities in this regard.

6.1.1.5. Measure to check up soil loss and water management plan

The principal solid waste produced in the opencast mine is over burden. The waste generated during mining from the quarries will be dumped in barren zone. So, at the conceptual period the total extent of over burden dump will be back filled as per the approved mining plan and Environmental management plan. There after top soil shall be spread over the back filled areas to take up plantation of indigenous species to bring back original vegetation that existed previously to provide food and shelter to wild animals.

Besides a scheme to be prepared by M/s Kalinga Alumina Ltd. and be implemented for "Construction of check dams, retention/toe walls to arrest sliding down of the excavated material, where ever occur.

The objective of the scheme is to prevent erosion of sediment due to surface runoff, obstruction of natural water source, flow of eroded soil from the mining areas to the cultivable lands, natural streams, water bodies and habitations.

6.1.1.5.1. Proposed Methodology to be adopted as per approved Mining plan:

- Propose to construct retaining wall and garland drain around the waste dumping sites.
- Propose to develop the dump by terracing method. The height of all the terraces

will vary from 10 to 12 m and width being 6 to 12m.

- Provision of inwardly sloping, soil bund at the edge of each terraced channel at the toe end of terrace will be made following the rain water management.
- Propose to construct catch water drain on the steep slope.
- Propose to develop garland drains with settling tanks at the toe of the dumps to allow the settling of silt.

6.1.1.5.2. The Salient features of the drainage management plan are as follows:

1. The overall drainage planning has to be done in such a manner which follows the existing pre mining drainage routing to the extent possible, maintaining the overall slope in the direction of pre mining flow direction so that run off distribution is not affected.
2. Garland drains are to be planned on the sides of quarries and external dumps (depending on contours).
3. The garland drains shall be routed through catch pits and settling tanks to settle out suspended solids in the storm water. The purified water will be discharged to natural water source.
4. Grass and bushes in drains hold back solid particles during the flow of water in the drain. Small stone barriers constructed across the drain will check water flow and arrest solids.
5. Stone pitching will be made at suitable places to regulate the slope and hence water flow will not be obstructed.
6. Settling pits and drains shall be cleaned intermittently, especially during monsoon.
7. Outer side of the cross-check dams on the drainage lines shall be re- enforced with green cover of non-browsable species like *Jatropha curcas, Vitex negunda, Gliricidia maculate.*

6.2. Environmental Management Plan.

To maintain ecological balance and to check harmful effects due to mining and allied activities at Ballada Bauxite mining, environmental control measures shall be integrated into the process of mine planning. Strategic environmental safeguards should be undertaken after environmental clearance and as per the approved mining plan.

6.2.1. Minimizing the impact of active mining:

The following measures shall be adopted to minimize the adverse impacts of mining on wildlife, including avi-fauna in the mining area.

6.2.1.1. Blasting

It scares away the wild animals, who may run out of the mining area to the villages and get killed. Therefore, low noise muffled blasting technique or any other new technique should be used. Over charging of blast holes should be avoided. Controlled blasting technique using delay detonation shall be applied. Blasting shall be limited to minimum and where-ever possible, ripping or use of surface miners should be deployed. Blasting shall be carried out during day time only synchronizing with the blasting timing of other nearby mines. PETN has been tried to minimize noise. If feasible, this can be used. The drills shall either be operated with dust extractors or equipped with water injection system. During blasting sufficient stemming column shall be maintained to prevent air blast.

6.2.1.2. Dust

It is a major problem in mining areas, particularly during drier months. Mining activity, movement of earth movers and other vehicles, raises dust, which covers the leaf surface impairing photo synthesis. It also creates health problem for wild animals. The following steps are suggested to minimize dust emission.

- Mineral handling areas shall be provided with adequate number of high efficiency dust extraction system. Loading and unloading areas including all the transfer points should also have efficient dust control arrangement. These should be properly maintained and operated.
- Water spraying arrangements on all haul roads, loading, unloading and transfer points should be provided and properly maintained.
- Approach and main roads should be paved and spread with plastic granules.
- Heavy transport vehicles be used to minimize the movements.
- Extraction paths should be well planned to minimize the road length and movement.
- Ore, while being transported, be covered with tarpaulins.

6.2.1.3. Noise and Vibration

These are irritating to wild life. All equipment selected for use at the mining site shall be eco-friendly and will confirm to prescribe noise standards of below 85 dBA. Properly designed silencers shall be provided on all equipment and it shall be

maintained periodically. Effective equipment maintenance like periodic lubrication, replacement of gears and deducting shall be done to prevent generation of noise and vibrations during operation of equipment. Operation of high noise producing equipment shall be avoided. Blowing of horns shall be avoided while driving on roads through forest areas. Playing of musical instruments and loud speakers should be avoided.

6.2.1.4. Lighting

Lightening from the high masts near mining site, offices, colonies and vehicles affect wild life, who love the darkness of night. Use of high intensity focusing lights shall be avoided at the mine site. Localized lighting should be provided on mine working faces, main mine head, roads and stock pile area. Suitable hoods should be provided on all lights so as to direct the light towards the worksite. Dispersion of light shall be avoided. Tower lights should not be used in the mining area.

6.2.1.5. Air pollution

It is a major environmental hazard, which affect all life forms. Ambient air quality-monitoring shall be done at regular intervals in the core zone as well as in the buffer zone which shall regularly monitor and the levels of RSPM, SPM, SO2 & NOX and Vehicular emissions shall be recorded. Appropriate measures should be taken to maintain the prescribed standards.

6.2.2. Stabilization and Vegetation on Dumps

The waste dumps will be compacted and levelled to prevent erosion from rain and wind. Garland drains should be proposed to be developed around the quarry to divert the water to the natural drain. Settling tanks are proposed to be erected across the garland drain to settle the sediments. In addition to these, check dams are also to be constructed around the dump by the boulders to arrest the waste-offs.

6.2.3. Measures for Minimizing Adverse Effect on Water Regime:

A part of surface water is diverted through natural slopes along the course of Nala, check dam & settling tank should be constructed around the waste dump, garland drain will be developed & settling tank will also be made across the nala to settle the wash offs and to divert the clean water to nearby seasonal nalas. Ground water (for drinking purpose) and surface water at the intake (mine) and outlet (from settling tank) will be analyzed periodically.

In addition to the above, the following measures shall be undertaken to treat the waste/effluent water.

- Wastewater from office, canteen workshop etc. is combined with soak pit overflow and led to a treatment plant.
- Human excreta are channelized to septic tank/soak pit
- Mines discharge water will be treated by an Effluent Treatment Plant (ETP) is treated chemically.
- Sources of water in the area are rainwater, surface run-off water, mine water (rain + runoff + seepage) and ground/ underground/Sub-surface water.
- Water flowing from the waste dump will be treated through retaining wall, garland drain & settling tank.

6.2.4. Measures for Ground Vibration.

Vibration caused due to blasting has not been objectionable so far. However, delay detonators will be used for reduction of the large vibration package into a number of small vibration levels as and when required.

Chapter 7- Ecosystem Services

Ecosystem services are the benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as carbon storage and sequestration, flood and disease control; cultural services such as spiritual, recreational, and cultural benefits; and supporting services, such as pollination of crops and soil formation, nutrient cycling, that maintain the conditions for life on Earth.

- Ecosystem services do the following:
- Moderate weather extremes and their impacts (ex. drought, floods, etc.)
- Mitigate climate change n Absorb and store CO2
- Protect water channels and shores from erosion
- Regulate disease-carrying organisms
- Provide ingredients for pharmaceutical, biochemical and industrial products
- Are a source of energy and biomass fuels
- Decompose waste and detoxify pollution
- Generate, maintain and renew soil fertility (nutrient cycling)
- Pollinate crops and plants, and disperse seeds
- Control agricultural pests and diseases
- Produce food (such as crops, wild foods and spices, seafood)
- Produce wood and fibre
- Produce oxygen, purify air and water

7.1. ECOSYSTEM SERVICE MATRIX (ESM)

The ESM analysis is the easiest way to identify and evaluate the ecosystem services provided by the various ecosystems within the project area and surrounding areas to the Project. The Ballada Bauxite Mine was analysed based on the ESM methodology in order to identify the level of impacts, dependencies and management measures implemented to mitigate the risk.

The critical areas are identified based on the impacts and dependencies of the project on various ecosystems and ecosystem services. The management level is analysed to prioritize the management plans. The ESM analysis of the project is given in table……

	Ecosystems											
Ecosystem Services	**Forest Area**			**Drainage Systems**			**Plantation on OB**			**Agriculture**		
	Dep	**Imp**	**Manag**	**Dep**	**Imp**	**Manag**	**Dep**	**Imp**	**Manag**	**Dep**	**Imp**	**Manag**
Aesthetic Information	ND	HI	NM									
Air Quality	HD	HI	NM				HD	HI	NM			
Carbon Storage & Sequestration	ND	HI	NM				HD	HI	PM			
Dust Control	HD	HI	PM				HD	HI	PM	HD	HI	PM
Energy and Raw Materials	ND	HI	NM									
Food & Fodder	ND	HI	NM									
Flood Control	HD	HI	PM	HD	HI	FM						
Habitat and Nursery	ND	HI	NM									
Noise Control	HD	HI	PM				HD	HI	PM			
NTFPs (Non Timber Forest Produce)	ND	HI	NM									
Pollination	ND	HI	NM							HD	HI	PM
Recreation	ND	HI	NM									
Soil Formation	ND	HI	NM				HD	HI	PM	HD	HI	PM
Soil Retention	ND	HI	NM				HD	HI	PM	HD	HI	PM
Water Regulation	ND	HI	PM	HD	HI	FM	HD	HI	PM	HD	HI	PM
Water Supply	HD	HI	PM	HD	HI	FM				HD	HI	PM

Dependencies Category	
High Dependency	HD
Medium Dependency	MD
Low Dependency	LD
No Dependency	ND

Impacts Category	
High Impact	HI
Medium Impact	MI
Low Impact	LI
No Impact	NI

Management level	
Not Managed	NM
Partially Managed	PM
Fully Managed	FM
Alternative identified and under use	AM

Chapter 8- Biodiversity Action Plan

8.1. BIODIVERSITY ACTION PLAN (BAP)

The baseline assessment and EMS analysis identified some of the critical areas of impacts and dependencies on the biodiversity and ecosystem services. The BAP will provide an action plan to minimise or mitigate the impacts and dependencies.

8.1.1. Action Plan for BAP

8.1.1.1. Top soil conservation

Topsoil is an essential component for reclamation of old mines and overburden areas for growth of vegetation and has to be preserved for reuse. The period between initial removal of the topsoil and final laying of the same over the reclaimed area might be a long time lapse. So the properties of stockpiled soil deteriorate and become biologically unproductive after sixth year of storage . The action plan for topsoil management is provided in table no. 12.

Table 8. 1: Top soil conservation actions

Objective	Top soil conservation
Target	Use of top soil stored within 3 years
Actions	Activity
1. Topsoil Stripping	a. Analyse the soil quality and depth for stripping b. Topsoil stripping will be undertaken in areas of planned mining activity including bauxite preparation and handling plant, the active pit areas, out-of-pit dumps, haul roads, hardstands, access roads and other general infrastructure.
2. Storage of top soil	a. Separate stockpiles for topsoil should be formed in low mounds of minimum height (3 m maximum) and maximum flat surface area, consistent with the storage area available. b. Stockpiling using a greater number of low (<2 m high)

	mounds, rather than a few high spoil type dumps, is preferable. c. Long term stockpiles will be revegetated to minimise loss of soil quality. Revegetating stockpiles will minimise weed infestation, maintain soil organic matter levels, maintain soil structure and microbial activity and maximise the vegetative cover of the stockpile.
3.Topsoil Management	a. Stockpiling of topsoil should preferably be kept to the shortest possible period (for 2 to 3 years) b. Stockpiles area should be delineated for vehicle and pedestrian traffic and accidental removal/ disturbance.

Table 8. 2: Soil erosion control

Objective	Control of soil erosion
Target	Control of soil loss and siltation in storage ponds
Actions	Activity
1. Erosion control and cleared land	a. Restrict clearing to areas essential for the works b. Windrow vegetation debris along the contour c. Minimise length of time soil is exposed d. Divert run-off from undisturbed areas away from the works
2. Contour plantation on overburden slopes	a. Slopes of overburden areas and other area should be terrace or benched and then plantation of local grasses and shrub species should be undertaken b. Use of geomat on the slopes with shrubs and grass plantation
3. Contour Banks	Earth mounds are the most common physical control measures. The size of these structures is determined by the size of their catchment area. These structures should not be constructed out of highly erodible materials.
4. Absorption and Pondage Banks	a. These banks are similar in design to contour banks but laid out such that they pond water - thereby causing greater infiltration and less run-off. b. They are applicable only to low slopes (less than 1%) and should

	be avoided in materials which become dispersive when saturated.
5. Waterways	Additional treatment and special precautions may be required to protect waterways from erosion. The on-site suitability of the following available treatment measures will be made: a. Jute mesh may be used for natural waterways on the restored areas rather than plastic b. Stone pitching along the waterways c. Concrete filled bags with an underlying filter blanket of sand and gravel near the openings or critical areas d. Gabions and mattresses (rock-filled wire baskets) along the fragile edges of the restored areas.

8.1.1.2. Afforestation on the overburden and mined out area

The primary target of afforestation is to increase the biodiversity value of the area with the use of native species communities. The afforestation will be undertaken on the overburden areas and restored mined areas. Use of top soil on the overburden and mined areas will provide a medium to the plants community to establish themselves on the new restored areas.

Afforestation Plan

Objective	Afforestation on the overburden and mine reclaimed area
Target	Enhancement of biodiversity in the mine lease area
Actions	Activity
1. Selection of plant species	a. Only local indigenous species to be used in rehabilitation practices Sal (Shore robusta), Tendu (Diospyros melanoxylon), Mahua (Madhuka longifolia), Chironji (Buchanania cocchinchinensis), Biba (Semecarpus anacardium), Sidha / Arjun (Terminalia arjuna), Jamun (Syzigium cumini) and Bahada (Terminalia bellirica) Details list of trees and shrubs species provided in table no. 17 b. Use of native plants in afforestation will be helpful in many ways such as 1. Sal tree is one of the important plant for the local tribes for collection of leafs and using them as packaging material 2. Mahua flowers and fruits are important Non Timber Forest (NTFP) produce for local tribes as an income source 3. Collection of Tendu leafs provides an source of income for locals 4. Some of the plants are having medicinal values and are of medical importance to the local people c. Mixing of different types of species in afforestation areas and avoiding monoculture plantation d. Fencing of the area for first 4 years of plantation to control the grazing e. Wired fencing with shrubs would be preferred for the fencing
2. Development of grassland and water holes in restored area	Grassland and water holes provide feeding and roosting habitat to wild animals.

3. Installation of bird nests	Installation of bird nest in reclamation after achieving 4 to 5 m growth of trees. A variety of nest boxes would be installed for use by birds, arboreal mammals, and bats. Nest boxes will be designed to maximise the likelihood that local hollow-dwelling fauna, will use them for shelter and breeding.
4. Control of invasive species	Raimuniya (Lantana camera) and Sulbabul (Lucenia leucocephala) are recorded from the project area. Both species are considered as a highly invasive species for degradation of natural as well as afforested areas. a. Regular monitoring of afforested areas for growth of this species b. Complete removal of invasive species and plantation of native species at the location.
5. Managing grazing	Opening afforested area for gazing after 4 years of plantation with a rotational grazing with a gap of 4 to 5 month will be beneficial to the enhancement of ground cover, distribution of seeds of plants, add organic matter to soil and control of over growth of grasses and herbaceous species.
6. Fireline in afforested area	a. Demarcation of 1 m area as a fireline between the afforestation area b. No planation in the fireline area c. Regular clearance of grasses and herbs from fire line d. Monitoring of plantation in summer season for nay fire incidents.

8.1.1.3. Installation of nest boxes for wildlife

During the biodiversity assessment 26 bird species are recorded for the study area. The species like Spotted Dove, House Sparrow, Common Mayna, Black Drongo, Rose-ringed Parakeet, Large-billed Crow, Green Bee-eater, Black Ibis, Small Minivet, White-bellied Drongo, Brown-headed Barbet, Coppper smith Barbet, etc are recorded form the study area.

Bird diversity is important in maintaining a healthy and sustainable forest landscape. Birds are often considered to be good indicators of the general condition of the environment, although doubts exists over their ability to directly and rapidly indicate changes in ecosystem properties and the impacts of such changes on other taxa. Nesting is a critically important stage in the natural history of all bird species. Many birds use cavities in trees for

their nesting site; such birds are called cavity nesting birds. Cavity nests are less vulnerable to predation than open nests.

Nest boxes are an important aspect to wildlife conservation in any areas where natural nesting hollows are not available. Artificial tree hollows and nest boxes, have been identified as a management tool that can be used by a range of bird species as a replacement for natural hollows in the landscape in the afforestation areas. The details of neat boxes for local birds are provided in Table no 8.3.

Table 8. 3: Installation of nest boxes

Objective	Installation of nest boxes
Target	Supporting native birds diversity
Actions	Activity
1. Site Selection	a. An area with native vegetation should preferred for nest box installation b. Selected area should be connected to other areas of native vegetation (natural forest) c. Presence of native feed trees in the area should be primary importance (table 17). d. Avoid cutting of large, dying trees that have potential for nesting cavities in afforested areas e. Avoiding strong sunlight and the wettest winds sides for nest installation f. Reduce clearing of vegetation in nest box installed areas
2. Box Desiogn	Nest box design will vary between species and the main design elements influencing use include; entrance size, box volume, hollow depth below entrance and wall thickness. a. Materials used for nest box construction should provide effective insulating properties to minimise thermal variation in boxes b. Materials should also be chosen to withstand weathering from rain, sun and heat c. Nest box dimension for different birds are provided in table 19.

3. Selection of trees & nest box installation	a. Nest boxes should be mounted on live, healthy trees b. Place them so that the entrance hole is approximately 2.5 metres (8 feet) above the ground (higher for owls and kestrels) c. Secure the box with 4-inch nails, two in the top and two in the bottom.
4. Maintenance	a. Once the boxes have been used, annual maintenance will promote the highest use rates b. The most important maintenance items are to ensure there is always 3 to 4 inches (8 to 10 cm) of nesting material in the box and that the box is still securely attached to the tree c. Regular monitoring of boxes will also be required to identify and evict pest species such as Blue-rock Pigeons, Myna, Bees and ants. These species will exclude target species using the box and should be removed.
5. Documentation	a. Closer monitoring of your nest boxes should be undertaken to assess usage of the nest boxes to evaluate the success of box placement and to guide installation of additional boxes. b. Taking a photo of any animals in your nest box, while ensuring you minimise disturbance, is a great way of recording box use and will aid in accurately identifying animals. c. Records could be kept in a spreadsheet or diary and should include details of the time of monitoring, any animals using the boxes

Table 8. 4: Nest box dimension for different birds

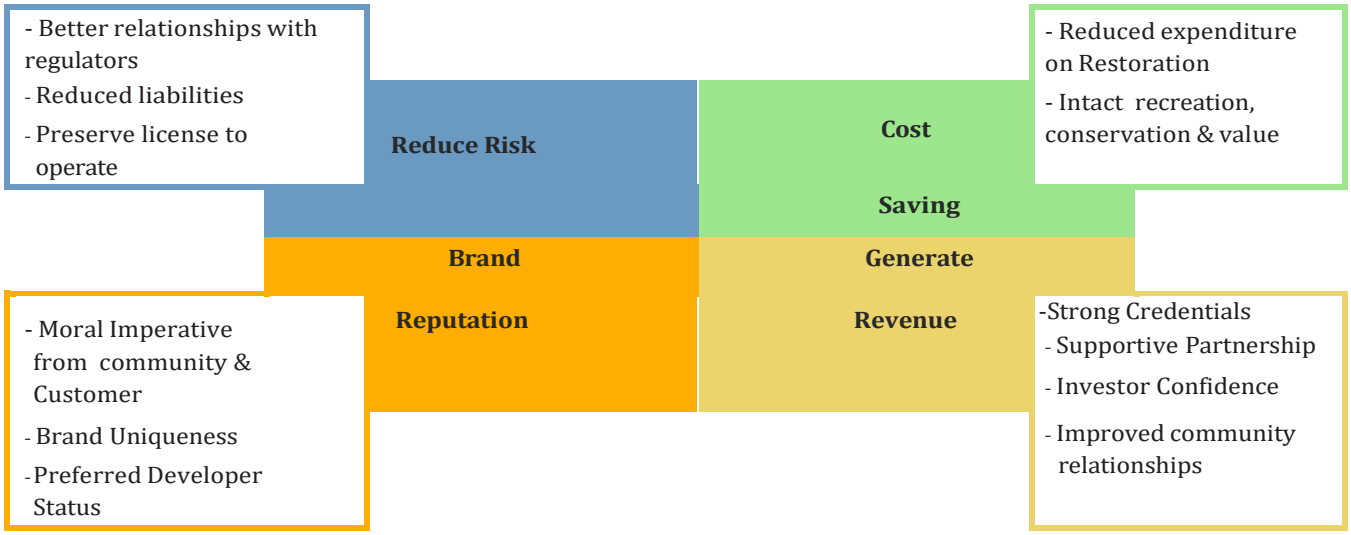
Birds	Height (cm)	Width (cm)	Length (cm)	Hole diameter (cm)
Sparrows, Muniya, Woodpeckers, Minivet, Petronia, Flycathers	20	13	13	5
Parakeets, Indian Roller, Barbets, Drongo, Kingfisher	40	25	25	8
Owlets, Dove	50	30	30	10
Treepie, Crow, Owls, Squirrels, Civets	60	38	38	13

Table 8. 5: BAP monitoring Plan

Action point	Monitoring frequency	Responsibility
5.1.1 Top soil conservation	2-3 years	Stockpiling
5.1.2 Reclamation of overburden and mined reclaimed areas		
1. Reclamation of Overburden areas	Regular intervals	• Maintenance of slope at 45 degree • Construction of bunds • Netting and drainage maintenance
2. Rehabilitation backfilling of mined-out area	Regular intervals	• Profiling and netting • Replacement of striped top soil
5.1.3 Control of soil erosion	Regular intervals	• Diversion of run-off • Slope maintenance • Timely plantation
5.1.4 Afforestation on the overburden and mined out area		

1. Selection of plant species	Seasonal intervals	Local indigenous species plantation
2. Development of grassland and water holes in restored area	Regular intervals	Maintenance of grassland and waterholes
3. Installation of bird nests	At plant growth of 4 to 5 m	Installing nest box
4. Control of invasive species	Regular intervals	Monitoring for growth and complete removal
5. Managing grazing	Intervals of 4 to 5 months	Opening of afforested area for grazing
6. Fireline in afforested area	Regular intervals and summer season	Clearing of grasses and herbs
5.1.5 Installation of nest boxes for wildlife	- Installation after 3 to 5 years of afforestation - Seasonal Monitoring after installation	• Annual maintenance will promote the highest use rates • Ensure there is always 3 to 4 inches (8 to 10 cm) of nesting material in the box and that the box is still securely attached to the tree • Regular monitoring of boxes will also be required to identify and evict pest species such as Blue-rock Pigeons, Myna, Bees and ants. These species will exclude target species using the box and should be removed.

5.1.6 Management of drainage system	Regular intervals	• Construction of bunds, gully plugs and check dams • Plantation at check dams • Stream bank protection



Plates: Site Visit Photographs











Chapter 9- Biodiversity Audit Plan

9.1.Introduction

The diversity of all species on Earth, or biodiversity, is disappearing from the planet at an alarming rate. Ecosystems are drastically declining, ranging from lakes and oceans to forests and deserts. Approximately one million species of plants and animals face extinction.

The CBD (Convention on Biological Diversity) defines biological diversity, also known as biodiversity, as the diversity of life forms found in all habitats, including terrestrial, marine, and other aquatic ecosystems as well as the ecological complexes of which they are a part. This covers diversity in ecosystems as well as within and between species.

India is a Party to the Convention on Biological Diversity (CBD) (1992). Recognizing the sovereign rights of States to use their own biological resources, the Convention expects the Parties to facilitate access to genetic resources by other Parties subject to national legislation and on mutually agreed upon terms (Article 3 and 15 of CBD). Article 8(j) of the Convention on Biological Diversity recognizes contributions of local and indigenous communities to the conservation and sustainable utilization of biological resources through traditional knowledge, practices and innovations and provides for equitable sharing of benefits with such people arising from the utilization of their knowledge, practices and innovations. (http://nbaindia.org/uploaded/docs/biological-diversityact-ii.pdf).

At rates never seen in human history, biodiversity is disappearing. The number of animal, plant, and microorganism species is known as biodiversity, and it is fast declining. This has an impact on our ecosystems, the natural world, and human existence.
Forests play an important role in environmental and economic sustainability. They provide the life support systems necessary for life on Earth in addition to offering a wide range of commodities and services. The main food sources for wildlife are declining because of changes in the composition and quality of forests and the habitat type those results.

A biodiversity audit mechanism, also known as a biodiversity assessment or biodiversity monitoring system, is a systematic process used to assess and evaluate the biological diversity within a specific area, such as a region, ecosystem, or habitat. It helps to gather data on the variety and abundance of living organisms, their interactions, and the health of ecosystems. Biodiversity audits are essential for conservation efforts, environmental management, and sustainable development. Here's a detailed overview of the components and steps involved in a biodiversity audit mechanism:

9.1.1. Existence and quantification of biodiversity

The biosphere is filled with evidence of biodiversity. It encompasses all living things, from microscopic bacteria to more sophisticated plants, and it can be found both on land and in water, in deep ocean trenches and at high elevations.

According to the Millenium Ecosystem Assessment, only 1.7–2 million species have been scientifically recognized, out of an estimated five to thirty million total species on Earth. India has only 2.5% of the world's total land area, but it is home to 7.8% of all known species.

There are numerous ways to quantify biodiversity. A single, significant metric that is valuable as the universal currency of life's diversity is species richness, or the number of species in a particular area. However, in order to truly capture biodiversity, species richness must be combined with other metrics.

Moreover, IUCN or the International Union for Conservation of Nature is the oldest as well as the largest global environmental organization. IUCN develops major conferences as well as international agreements like “the Convention on Biological Diversity” as well as “Ramsar Convention” and so many others

IUCN has access to different kinds of information on species. The Red List of Threatened Species provides global assessments of the conservation status of species. The IUCN Red List, compiled by the IUCN, is considered the world’s most comprehensive information source about the extinction risk status of plants, animals and fungus species. It provides data on hazards, usage and/or trade, ecology, habitat, population size, distribution, and conservation efforts, all of which are important for making the decisions that must be made regarding conservation.

9.1.2. Biodiversity in India

The rich and varied biodiversity of India is well-known. This country is home to an extensive range of ecosystems and species, being one of the world's 17 megadiverse nations. Geographical factors, climate, and geography all vary throughout the nation, which affects biodiversity. Here are some key aspects of biodiversity in India:

1. Flora and Fauna
2. Protected Areas
3. Marine Biodiversity

4. Biosphere Reserve
5. Conservation Reserve (105 nos.)
6. Community Reserve (220 nos.)
7. Bio-geographic regions (10 nos. in India)
8. Bio-diversity hotspot (4 nos. in India)
9. Bio geographic provinces (26 nos. in India)
10. Biomes (5 nos. in India)
11. Biographic realms (2 nos. in India)

9.2. Objective of the Audit:

The importance of biodiversity has of late drawn severe attention due to several inherent benefits that has been provided to the biosphere as a whole being present within it. Some species within the ecosystem are known as "key stone species" when the complete spectrum of biodiversity is quantified, because they serve a "key role" in the management of the ecosystem as a whole. In order to manage the ecosystem as a whole, their conservation is necessary.

In India, major challenge lies in adopting an instrument to realize the objectives of equitable sharing of benefits specified in CBD. After an extensive and intensive consultation process involving the stakeholders, the Central Government has brought Biological Diversity Act, 2002. Specific objectives of the audits are as follows:

1. Identification and documentation of the flora mainly trees,
2. Geotagging the flora using Open Data Kit (Geospatial technology)
3. Mapping of the flora with the help of open-source software QGIS (GIS technology)
4. Preparation of QR codes for each plant species.
5. To calculate the Species based distribution of plants and number of plants per species
6. Suggestions and Solutions for Ecological restoration and management.
7. Planning and promoting conservation practices by involving the nonteaching, teaching and student community.
8. To prepare a management plan
9. Necessary infrastructure and institutional mechanisms should be provide for in an effective manner for protection of forests and biodiversity.
10. Calculation of Carbon sequestration and carbon sink

9.3.Audit Criteria based on regulation:

Audit findings are based on criteria derived from:

- ✓ Indian Wildlife Protection Amendment Act (IWPAA), 2022
- ✓ National Wildlife Action Plan (NWAP), 2002-16,
- ✓ The Biological Act, 2002 and rules 2004,
- ✓ Management Plans (MPs) of Protected Areas/ Tiger conservation Plans (TCP) of Tiger Reserves formulated by the PAs in the State,
- ✓ Guidelines issued by National Tiger Conservation Authority (NTCA),

 Orders of the Hon"ble Supreme Court of India, guidelines/ orders issued by the GoI/ GoWB/ Wildlife Institute of India (WII), International Union for Conservation of Nature (IUCN) etc.

9.4.Methodology for Biodiversity Audit:

There are different methodologies proposed by ecologists for sampling of angiosperms. The most important and widely used method for a general assessment is belt transect method. The study area was divided according to habitat types followed the random sampling method in the selected area. For plant biodiversity study in the ecosystems, the transect method was followed, and accordingly, transects or straight lines were marked starting from the base of the study area to the end of the vegetation zone in each selected site.

The Biodiversity Audit Approach
Establish stakeholder group and steering committee
Define region and boundary e.g. National Character Area, Biodiversity Action Plan Area or Nature Improvement Area (NIA)

Species Audit	**Management Audit**

Compile all available species records (using Recorder software), including those from local Biological Records Centers, NBN gateway, national and county natural history societies, plus documents/reports not captured by recording networks.		Collate autecological information for priority species from accounts in Recorder software, Atlas accounts, specialist literature, supplemented where necessary by consultation with expert natural historians. Code each species against a consistent set of ecological processes and structures.
Validate provisional species (in Breckland by a taxonomist workshop and correspondence with 50, in The Broads 20, recorders and taxonomists) to highlight suspect and missing species: refine record data-base as necessary		Classify management guilds to define cross-taxa groups of species with shared requirements for processes and microhabitat structures. Quantify numbers of priority species and regional specialists requiring different approaches to management
Confirm final species list		
Identify regional specialists (i.e. entirely or largely restricted, primary stronghold) through key words, literature, consultation.		**Management workshops** with landowners, site managers and conservation advisers: present Biodiversity Audit results, discuss management prescriptions suitable for guilds, collate experience of management outcomes (e.g. in Breckland a workshop of heathland managers, and a workshop of arable managers and advisers)
Generate list of priority species using status designations (from JNCC), provisional Red Data lists, plus regional specialists		Compare guild requirements to current practice, offer recommendations
Dissemination Through on-line report, media coverage, local engagement, presentations to stakeholder groups including local Biodiversity Partnerships; provide summary guidance on prescriptions to conservation advisers, land-owners and site managers; notify natural history societies and recorder networks of under-recorded groups and sites		

9.4.1. For Biodiversity: -

1) Using quadrat method for identifying species diversity in a given quadrat area
2) Using line transect survey for identification of flora and fauna in the given area
3) Using point sampling method along fixed transect

9.4.1.1. For Flora: -

1) Preparation of Inventory of plant by identifying different plant species
2) To assess the plant community and identification of RET (Rare Endangered and threatened) species
3) Identification of Impacts of project activities on plant community
4) Identification of flora with help of field guides and books
5) Categorize flora in trees, shrubs, herbs, grasses etc.
6) Preparation of IUCN list using the data published by Forest Research Institute, Dehradun
7) 3. Collection of information about the plants – Common name, Botanical Name, Local Name, IUCN status, medicinal use, commercial use, traditional use and other important information

9.4.1.2. For Fauna: -

1) Preparation of faunal Inventory
2) Identification of different faunal species by spotting with help of binoculars, photographs etc.
3) Using fauna Identification with help of field guides and books related to Indian survey
4) Categorizing fauna in mammals, birds, reptiles, birds and butterflies
5) Listing out Endangered and Scheduled-I species in the study area
6) Preparation of Conservation plan for Sch-I species.

9.4.1.3. For Aquatic: -

1) Identification of Macrophytes in the study area
2) Identification of fish species in nearby waterbodies
3) Listing fishes used by locals for aquaculture

9.4.2. Collection Methods:

Collection of specimens is one of the key components in studying floral variety. Field notebooks must be use to record descriptions of the plants encountered during the specimen collection process. The scientific name, vegetation, local use, collector's name, date of collection, local name of the species, family, locality of the collection, altitude, habit and habitat, and scientific name of each plant species were all noted in the field notebooks. These attributes be note in order to create appropriate herbaria.

In addition to the aforementioned traits, each specimen also had unique characteristics that should be note, such as the presence or absence of latex and its color, the color, size, and scent of the flower, the shape and size of the stem, the presence or absence of hairs, the height of the plant, the presence and size of thrones and species association, and the root and rhizome character.

9.4.2.1. Collection of Trees, Shrubs, and Herbs:

An excellent herbarium must be prepared, and this requires the acquisition of plant specimens.
A herbarium sheet measures 28 by 42 centimeters. Although the plant collection is always organized according to the size of the herbarium sheet, long specimens like tall grass, creepers, and other large plant parts occasionally bend into the M, N, and V shapes. The primary characteristic used to determine a specimen's scientific name in the case of angiosperms (flowering plants) is its flower. Field visits must use to gather specimens of trees and shrubs with flowering and fruiting twigs, small herbs with the entire plant and occasionally the roots as well, creepers with flowering and fruiting, and grasses with subterranean sections. Plant parts such as bark, roots, leaves, and fruits should also be collected and preserved in a laboratory.

Monitoring and interpreting changes in biodiversity Monitoring is the process of collecting information to determine progress against agreed biodiversity objectives. Indicators are the factors that are measured during monitoring – for example, to assess the extent of impact on biodiversity, the success of mitigation measures or the outcomes of measures to enhance biodiversity conservation. There is no simple measure for biodiversity due to its complex and dynamic nature, which presents challenges in choosing effective indicators.

As the biodiversity at a particular site has numerous components, each interacting with the other over varying periods of time, seasons and space, the framework selected will need to be readily adaptable to observed changes. At some sites, groups or associations of species of plants and animals may better reflect change than intensive assessment of individual species. For example, a species that occupies a particular development stage of an ecosystem may be monitored to provide an indication of change either positive or negative. Given that development stages are dynamic, the challenge is to determine which are positive and negative changes. Invertebrates are often used for this purpose. It is sometimes difficult to measure impacts on a single species, particularly if that species is already threatened or vulnerable or otherwise difficult to monitor. Each mining operation should, in conjunction with government regulators and stakeholders,

determine what set of indicators will be required to measure and manage impacts on biodiversity. Site indicators are to be determined based on the biodiversity context and values already identified. Desirable characteristics of the suite of indicators are that they: •reflect pressures (threats) to biodiversity values, the condition of biodiversity and management responses to impacts on biodiversity; •include species-based, ecosystem structure-based and ecosystem function based indicators of biodiversity; and •fulfil legislative and policy requirements. Indicators are divided into: •condition indicators, such as species richness or composition; •pressure indicators, such as extent of native vegetation clearance; and • response indicators, such as area of weed control or area revegetated. Expert assistance may be required in selecting and reviewing the most appropriate indicators of biodiversity to be measured, particularly regarding the measurability of the indicators. In addition, the initial suite of site-specific biodiversity indicators selected for the site is likely to alter during the life of the project. Before final selection of measurable indicators, consultation with stakeholders should be undertaken to ensure the suite of indicators selected is socially acceptable. In identifying and measuring change, it will be necessary to take into account: • the ability of an ecosystem, habitat or species to recover; • the local value and role of biodiversity; • interactions with natural processes; and • the global, national or local significance of the biodiversity. Furthermore, biodiversity assessments benefit from obtaining knowledge from indigenous and local people on biodiversity, land use and local plants and animals and their uses, including harvesting, breeding and cultivation techniques.

Annexure - IX

M/s Kalinga Alumina Limited

Socio-Economic Survey(SES) Report For Ballada Bauxite Block, Nandapur Tehsil of Koraput District, Odisha

2023-24

Environment Consultant:

VARDAN ENVIRONET

(QCI/NABET ACCREDITATION NO. NABET/EIA/2326/RA 0284)

PLOT NO.: 82A, SECTOR-5, IMT MANESAR, GURUGRAM- 122052, HARYANA

INTRODUCTION

Background

Kalinga Alumina Limited (KAL), formerly known as Mudra Aluminium Limited (MAL), has been provided a Letter of Intent (LoI) to mine the Ballada Bauxite Block, located in the Nandapur Tahsil of Koraput District by the Government of Odisha. The KAL is a wholly owned subsidiary of Adani Enterprises Limited (AEL), incorporated to carry out the business of mining, refining, smelting, development, production, and operations of bauxite, alumina, and aluminium. AEL has already committed to investing ₹57,575 crore in setting up an alumina refinery and an iron ore project in Odisha. The group plans to establish the alumina refinery near the bauxite reserves, which is a key source of the raw material required to produce aluminium.

As per the assessment made by the KAL, the Ballada Bauxite Block is located at a place that does not necessitate the project to acquire any private land. Hence, as per the land acquisition requirement, there will not be any families displaced or affected under the project. However, there are human habitations/villages located around the project area that might be accessing the forest and other resources from the project area and may partially or indirectly affect these inhabitants. So, to assess the existing problems and needs of people residing around the project areas, Socio-Economic Survey (SES) was conducted of households in the villages located within 5kms radius of the Ballada Bauxite Block.

Salient Features of Ballada Bauxite Block	
Name of Mine/ Block	Ballada Bauxite Block
District/State	Koraput/ Odisha
Nearest Township	Semiliguda (40 km) / Koraput (60 km)
Nearest Rail	Bheja (3km)
Nearest Airport	Visakhapatnam (150 km)
Status	Explored under G2 Category
Strike/Dip	Foliation trend -NE-SW , Dip - 300 to 800, SE
Exploration	15 boreholes (Meterage of 291.65 m), GSI
Grade	Avg. 43.64% Al_2O_3, 3.904% SiO_2
Average thickness	20.0 m (Avg.)
Resources	40.00 million tonnes
Category of the project	A
Method of Mining	Opencast Mechanized Mining
Peak Capacity of the project	5 million tons per annum
Total block Area	144.945 ha
Land Type	Forest Land
Topo sheet No.	E44K11 (65J/11).

Salient Features of Ballada Bauxite Block

The Necessity of Base Line Socio-Economic Survey

The purpose of conducting the SES study is to know or understand the socio-economic status and development needs of the people residing within the 5 km radius of the Ballada Bauxite Block. The findings will enable the project proponent to develop a Corporate Social Responsibilities (CSR) Plan for the peripheral development of the people and area surrounding the Ballada Bauxite Block.

Study Design

The SES study will be conducted by applying a cross-sectional study design. We will use a mixed-method approach to conduct the study, combining both quantitative and qualitative (participatory) research methods. The idea behind using such methods is to understand the existing social and economic status of the families and their needs and preferences through a participatory mode where in the families themselves play an important role in sharing their socio-economic status and preferences relating to their social and economic development. The study will require the collection and analysis of data from both primary and secondary sources.

Data Collection Techniques Used for Primary Data Survey

- The sample frame of this study consists of villages within the 10 km of mining site.
- Quantitative and qualitative data collection techniques namely Participatory Rural Appraisal (PRA) tools, direct observations through questionnaire-based survey through villagers' meetings were employed.

Participatory Rural Appraisal

Face-to-face interview conducted with the villagers to obtain information regarding household heads, live stocks, income, dependency on forest, impacts of mining, choice of species for reclamation from nearby communities in the study area.

Direct Observation

Direct observation was used throughout the pre-structured questionnaire-based survey.

Secondary Data Collection

Preparation of Work Plan including information collected from secondary sources, profile of the study site, criteria for assessment etc.

Secondary data obtained from the sources was verified during the primary survey carried out in the study area.

Household Coverage and Geographic Scope of the Study

Based on the requirements 22 revenue villages located within the 5 kms radius were identified from the Ballada Bauxite Block. These villages have been categorized as Level 1 and Level 2 based on their dependence on the forests and other resources located at the Bauxite Block. As shown in the buffer map presented alongside the text here, 8 villages fall within the core buffer zone created around 3kms from the Bauxite Block, named Level 1, and the remaining 13 villages fall inside the next buffer zone created at a distance of 3 to 5kms from the Bauxite Block, named as Level 2. Because of the proximity to the Bauxite Block, it is expected that the level of dependence of households residing in the core zone villages is more on the forests and other resources located at the project site than the villages in the buffer zone.

PROFILE OF THE PROJECT AREA

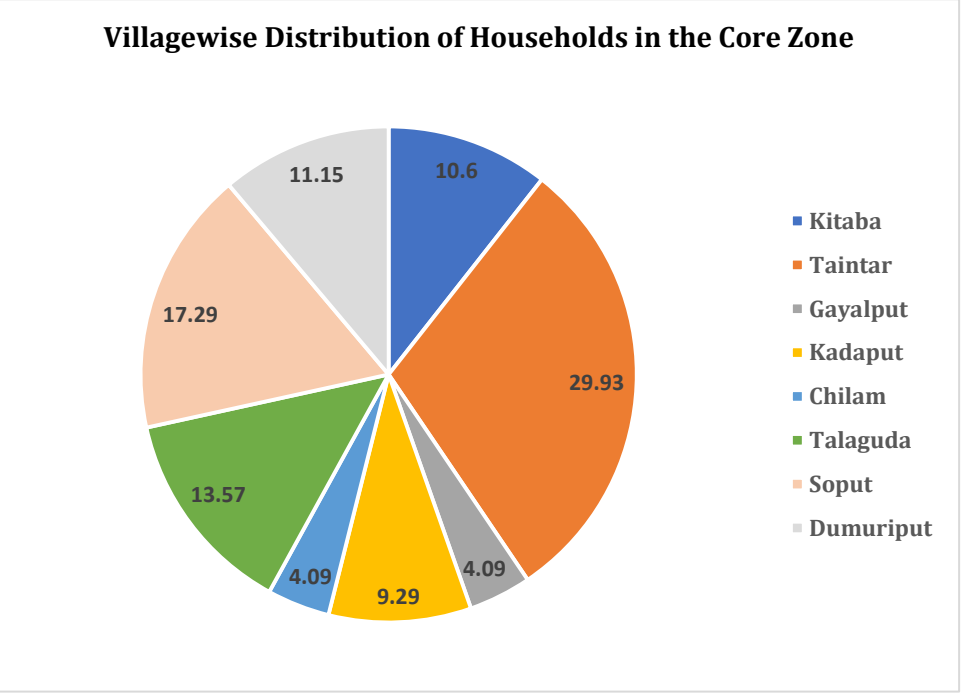
Demographic Profile of Level 1 (Around 3 kms) and Level 2 (3-5kms) villages

Demographic structure of the villages was estimated for the selected parameters as households, population, scheduled caste, scheduled tribes, literacy from Census of India 2011 of Odisha State.

Village-wise distribution of Households and Population in the Core Zone (Around 3 kms)

Name of the Villages	Number of Households	% of Households	Total Population	Male Population	Female Population
Kitaba	57	10.60	223	109	114
Taintar	161	29.93	715	297	418
Gayalput	22	4.09	70	35	35
Kadaput	50	9.29	189	94	95
Chilam	22	4.09	75	32	43
Talaguda	73	13.57	249	133	116
Soput	93	17.29	315	148	167
Dumuriput	60	11.15	251	125	126
Total	**538**	**100**	**2087**	**973**	**1114**

Source: Census of India 2011, Odisha State

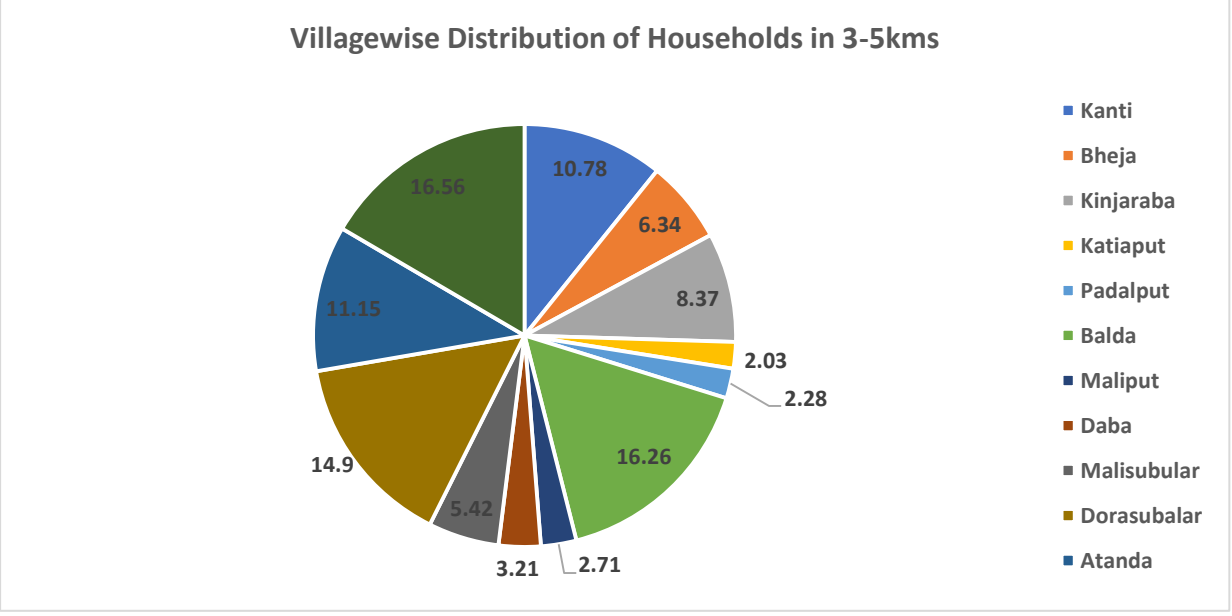


The total households covered in the Level 1 villages are about 538 with the total population of about 2087 with male population around 973 and female population 1114 while the Level 2 villages cover 1624 households with the population of about 6455, male population(2821) and female population 3634. It can be obtained from the data that the major households

coming in the core zone are from Taintar village followed by Soput village. While in the buffer zone major households covered are from Balda and Somili villages. Female population is observed to be higher in the area as compared to Male population.

Village-wise distribution of Households and Population in the Buffer Zone (Around 3-5kms)

Name of the Villages	Number of Households	% of Households	Total Population	Male Population	Female Population
Kanti	175	10.78	575	280	295
Bheja	103	6.34	401	203	198
Kinjaraba	136	8.37	513	249	264
Katiaput	33	2.03	132	67	65
Padalput	37	2.28	155	66	89
Balda	264	16.26	1385	445	940
Maliput	44	2.71	151	70	81
Daba	52	3.21	216	102	114
Malisubular	88	5.42	337	168	169
Dorasubalar	242	14.90	967	395	572
Atanda	181	11.15	669	320	349
Somili	269	16.56	954	456	498
Total	**1624**	**100**	**6455**	**2821**	**3634**

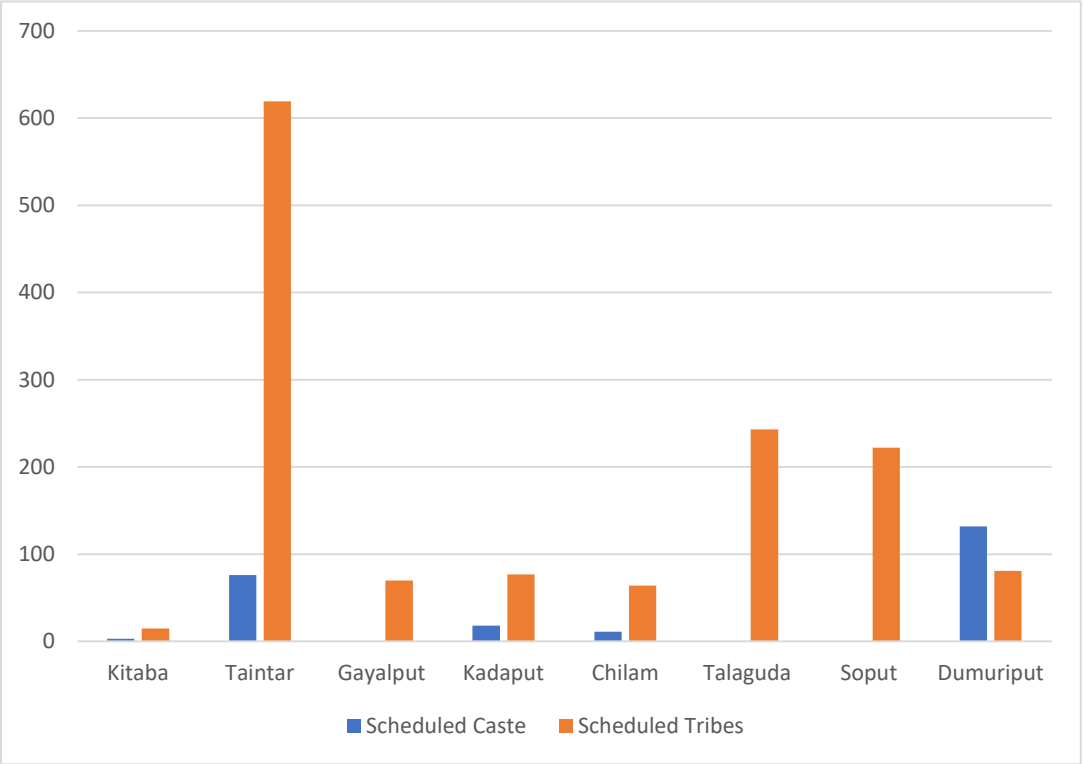


Village wise details of Scheduled Caste & Scheduled Tribes Population in the project area

The table below indicates the caste wise breakup of the project displaced families. The chart represents the percentage of Scheduled Caste & Scheduled Tribes in the project area.

Village wise details of Scheduled Caste & Scheduled Tribes Population around 3Kms

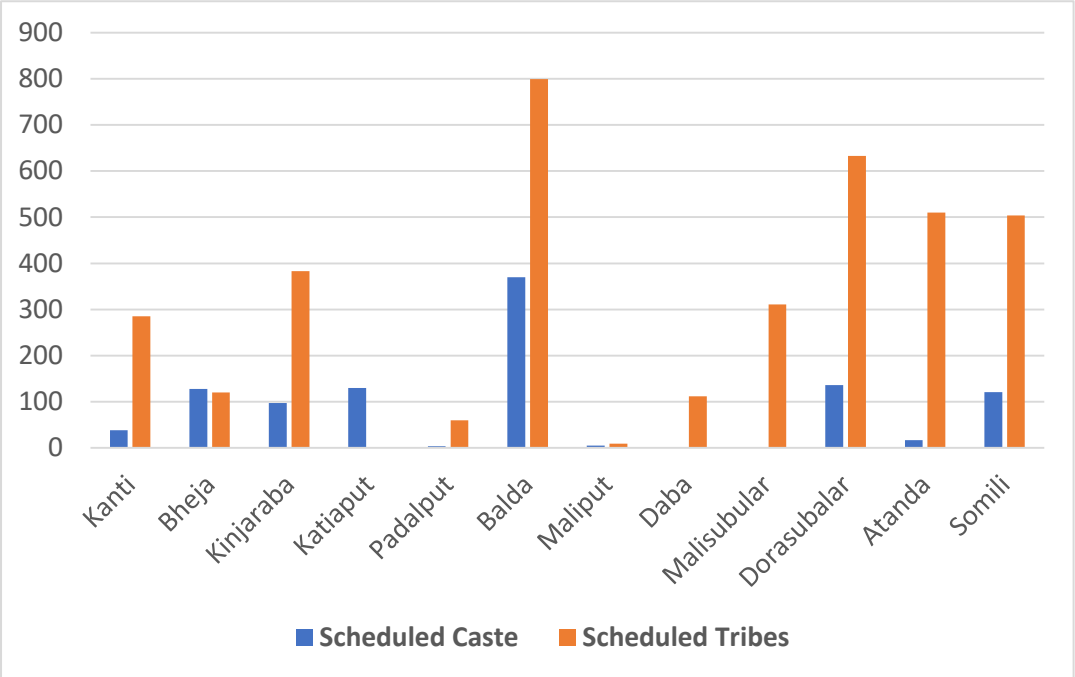
Village	Scheduled Caste	Scheduled Tribes
Kitaba	3	15
Taintar	76	619
Gayalput	0	70
kadaput	18	77
Chilam	11	64
Talaguda	0	243
Soput	0	222
Dumuriput	132	81
Total	**240**	**1391**



As regards the caste wise distribution in the villages coming in the 3 kms area the scheduled tribe population is observed to be higher in Taintar village.

Village wise details of Scheduled Caste & Scheduled Tribes Population around 3-5 Kms

Village	Scheduled Caste	Scheduled Tribes
Kanti	38	285
Bheja	128	120
Kinjaraba	97	383
Katiaput	130	0
Padalput	4	60
Balda	370	799
Maliput	5	9
Daba	0	112
Malisubular	0	311
Dorasubalar	136	633
Atanda	17	510
Somili	121	504
Total	**1046**	**3726**



Among the villages coming in the 3-5kms of the project area it has been observed that the Scheduled tribe population is higher in Balda village and subsequently in Dorasubalar, Atanda and Somili villages.

Literacy Level in the Project Area

Among the total population in the 3kms radius the total literate population is about 741 i.e 34.21% of which 422(59.10%) are Male literates and 292(40.89%) are female literates While in the 3-5 kms area the total literate population is about 2407 i.e 37.29% having male literates of about 1309(54.38%) and female literates of about 1098(45.61%).

Village	**Villages Around 3kms from project site**			**Villages**	**Villages Around 3-5kms**		
	Total Literates	**Male Literates**	**Female Literates**		**Total Literates**	**Male Literates**	**Female Literates**
Kitaba	39	27	12	Kanti	176	141	35
Taintar	355	172	183	Bheja	186	127	59
Gayalput	24	17	7	Kinjaraba	136	107	29
kadaput	80	58	22	Katiaput	46	36	10
Chilam	29	19	10	Padalput	73	44	29
Talaguda	59	38	21	Balda	863	290	573
Soput	71	59	12	Maliput	46	30	16
Dumuriput	57	32	25	Daba	77	42	35
Total	**714**	**422**	**292**	Malisubular	85	60	25
				Dorasubalar	447	222	225
				Atanda	164	130	34
				Somili	108	80	28
				Total	**2407**	**1309**	**1098**

Occupation pattern in the Project Area

As regards occupational pattern, cultivation is found to be the main stay of the population. It was found that in the villages in the core zone around 846 i.e 69.40% families were dependent on agriculture as their main source of livelihood. In addition; 265 i.e 21.73% of the families were engaged as agricultural labour as their major income source. It means that around **90%** of the families are dependent on agriculture for their livelihood while in the 3-5kms radius the 1691 i.e 45.80% families are Cultivators and 1634 i.e 44.26% of the families were engaged as agricultural labour as their major income source. It means that around **89%** of the families are dependent on agriculture for their livelihood.

It can be concluded that the major dependency is on Agriculture and Cultivation.

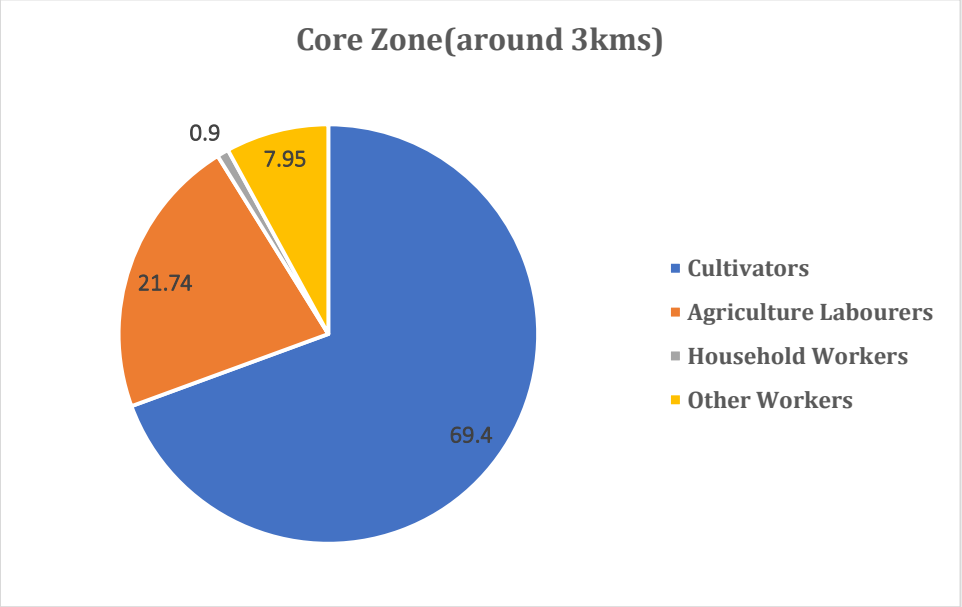
The details of the village wise occupational pattern are shown in the below Table.

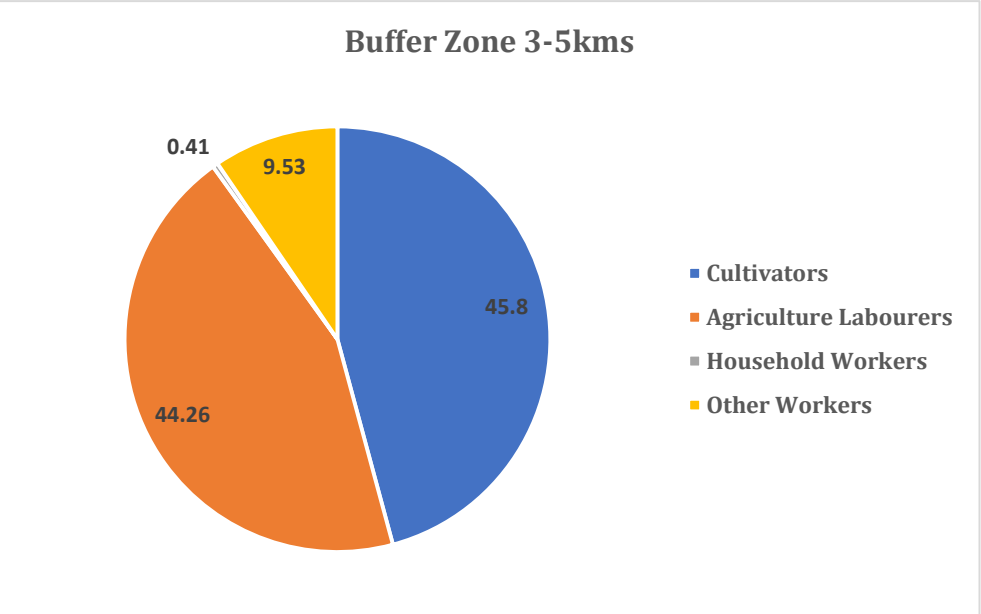
Occupational Pattern in villages around 3kms radius

Villages	Cultivators	Agriculture Laborer's	Household Workers	Other Workers
Kitaba	138	1	0	2
Taintar	224	42	2	55
Gayalput	39	8	0	0
kadaput	84	0	0	9
Chilam	49	6	0	0
Talaguda	0	163	0	3
Soput	224	4	9	10
Dumuriput	88	41	0	18
Total	**846**	**265**	**11**	**97**

Occupational Pattern in villages around 3-5kms radius

Villages	Cultivators	Agriculture Laborer's	Household Workers	Other Workers
Kanti	150	217	0	6
Bheja	242	3	2	27
Kinjaraba	73	229	4	58
Katiaput	64	0	0	2
Padalput	70	0	0	8
Balda	119	313	1	159
Maliput	36	61	0	2
Daba	4	127	3	4
Malisubular	59	130	0	1
Dorasubalar	58	358	0	20
Atanda	171	185	5	59
Somili	645	11	0	6
Total	**1691**	**1634**	**15**	**352**





Land use pattern in the Project Area

Land use pattern in the villages around 3kms radius of the Project area

Sr.No.	Type of Land	Area in Hectares
1.	Net Sown Area (Cultivated Land)	392.35
2.	Total Unirrigated Land Area (in Hectares)	338.14
3.	Total Unirrigated Land Area (in Hectares)	54.21

Land use pattern in the villages around 3-5 kms radius of the Project area

Sr.No.	Type of Land	Area in Hectares
1.	Net Sown Area (Cultivated Land)	1943.76
2.	Total Unirrigated Land Area (in Hectares)	1791.98
3.	Area irrigated by Source (in Hectares)	151.78

As per the data available it can be inferred that the net sown area mostly covers area under unirrigated land and the irrigated land is mostly sourced by waterfall.

Cropping pattern in the Project area

The table below indicates the cropping pattern of the affected villages.

The district economy mainly depends on agriculture and which mainly depends on rainfall. The rainfall depends on South-West monsoon. Out of total cropping area of 296000 ha in Koraput, irrigation potential in Kharif is 30.71% and in Rabi is 21.51%. Generally, crops grown during Rabi like Paddy, Wheat, Maize, Ragi, Mung, Biri, Groundnut, Mustard, Field Pea, Sunflower etc. needs assured irrigation.

The suitability of soil and climatic condition for production of coffee, cashew, cotton, tobacco, vegetable and fruits and the production of these crops strengthen the economy of the Koraput District.

Infrastructure Resources in the Project Area

During the survey an assessment of the community assets available in the villages coming under the project area. It is an important aspect that will help to determine the quality of life of the villages in the area and will help to determine the areas in which development can be made for improving the lifestyle and status of the villagers in the area.

The details of the infrastructure facility available in the core and buffer zone of the project area is described in the Table below:

Educational Institutions in the Core Zone (Around 3 kms) of the Project Area

Name of the Village	Primary School	Upper Primary School	High School	College
Kitaba	1	1	0	0
Gayalput	1	0	0	0
Taintar	1	0	0	0

Kadaput	1	1	1	0
Chilam	1	0	0	0
Talaguda	1	0	0	0
Soput	1	0	0	0
Dumuriput	1	0	0	0
Total	**8**	**2**	**1**	**0**

It is obtained from the data that the educational facility is available in the form of primary school is available in all the 8 villages, while middle school or upper primary school is available in Kitaba and Kadaput villages and senior secondary school is in Kadaput village. No college facility is available in the area, villagers go to Nandapur or Similguda for pertaining higher education.

Educational Institutions in the Buffer Zone (3-5 kms) of the Project Area

Name of the Village	Primary School	Upper Primary School	High School	College
Kanti	1	1	0	0
Bheja	1	0	0	0
Kinjaraba	1	0	0	0
Balda	1	0	0	0
Padalput	0	0	0	0
Katiaput	0	0	0	0
Maliput	0	0	0	0
Luluburu	1	1	0	0
Malisubular	1	1	0	0
Dorasubalar	1	1	0	0
Daba	1	0	0	0
Atanda	1	0	0	0
Somili	1	1	0	0
Total	**10**	**5**	**0**	**0**

The educational facility is available in the form of primary school is available in 10 villages, while middle school or upper primary school is available in Kanti, Luluburu, Malisubular, Dorasubular and Somili villages and no villages have senior secondary school and college facility. Villagers go to Nandapur or Similguda for obtaining higher education.

Medical Facility

Health facility seems to be poor in the area and is available in the form of Primary health

Sub-centre only in Bheja, Dorasubalar and Atanda villages of the buffer zone area.

Approach Roads

The condition of roads is not satisfactory and mostly are kuccha in nature. Among the villages in the project area only 3 villages in the core zone area have pucca roads while 4 villages of the buffer zone villages have pucca roads. Villagers face difficulty to travel during the monsoon season.

Drinking Water Facility

The most common source of drinking water is available through Handpumps of which mostly are not working while the Tap water connection under Har Ghar Jal Mission is still underway in the villages of the project area.

SOCIO-ECONOMIC IMPACTS BY THE PROJECT

No Rehabilitation and Resettlement

There is no human settlement within the mine lease area. No human settlement will be disturbed due to the mining activity and there shall be no Rehabilitation and Resettlement to be proposed by the project.

Increase in Job Opportunities

As per the survey it has been observed that the non-worker population is about 40% in the area so the project in general will help to reduce the unemployment rate by providing direct and indirect job opportunities for auxiliary and ancillary works etc. The proposed mining project will generate employment and preference of the employment shall be given to the nearby villagers. The proposed mine is projected to generate approximately 300-400 direct and indirect employment opportunities for both skilled and unskilled individuals. The project prioritizes the recruitment of local residents for various mining activities.

Impacts on Tribal People

Deeply attached to their ancestral surroundings, the tribal people in the area are worried about the economic loss due to the project as villagers are dependent on forest produce. However, with the development of project alternate employment opportunities will increase in the area and no disturbances shall be on the community life, customs, traditions, festivals, rituals, beliefs, and culture.

Impact of Skill Development

It is revealed from the study that the male members have knowledge in computer use, driving, plumbing, and carpentry works and most of female members are conversant in tailoring, food processing, and incense stick manufacturing among others. A part of the CSR plan will be the skill up gradation of eligible candidate from the families in the project area to make him/her 'employable' in their project.

NEEDS AND REQUIREMENTS OF THE COMMUNITY

Survey Data analysis and inference drawn from the informal consultation revealed the following areas wherein the supports of project implementing authorities are required.

- Development of Physical Infrastructure in the villages,
- Creation of adequate employment/self-employment opportunities to the villagers in the project area,
- Development of Healthcare facilities,
- Improvement of Educational facilities,
- Development of Safe drinking water and sanitation facilities, and
- Creating transportation and connectivity facilities

Other Specific Needs of the people in the area are:

- Awareness generation on various welfare schemes run by the Government and KAL
- Arranging mobile healthcare services and free ambulance services for basic healthcare in the villages
- Livelihood and skill development programs to be introduced in the areas.
- Steps may be taken for micro-enterprise development through forming of self-help groups giving priority to women.

ECONOMIC CONTRIBUTION OF THE BALLADA BAUXITE MINES

Use of Bauxite mining for different projects is an indispensable factor in a developing economy like India. Bauxite mining in India contributes significantly to the economy by providing raw materials for the aluminium industry, creating jobs, and generating revenue for states and the government. India possesses substantial bauxite reserves, ranked fourth globally, and is a major producer of bauxite, with Odisha leading in production.

Furthermore, the revenue generated from mining is expected to be reinvested by the State government in further developmental initiatives. Notably, the project will stimulate economic development in the state.

The proposed mine is projected to generate approximately 300-400 direct and indirect employment opportunities for both skilled and unskilled individuals. The project prioritizes the recruitment of local residents for various mining activities.

Emphasis will be placed on providing employment opportunities to Scheduled Tribe families, including women, thereby enhancing the socio-economic status of the local population. The mining activity is expected to have a positive impact on the social and economic conditions of the area by providing employment, increasing per capita income, and improving housing, education, medical, transportation, and agricultural facilities, the release added.

GOVERNMENT SCHEMES FOR STS AND SCS

When it comes to welfare programs of the state and central government, much emphasis is given to educational advancement of these two communities. The aim is to empower these economically and socially backward communities effectively to bring them over to the mainstream population in the country. There are 62 ST and 95 SC communities in the state. The people belonging to the recognized and notified communities are entitled for following benefits.

(a) Programs for Improvement of Educational Standards

1. Pre-matric Scholarship and Stipend for ST students
2. Post Matric Scholarship for SC
3. Construction, Completion and Repair of Educational Institutions including Staff Quarters with electrification
4. Construction of ST Girls hostels
5. Scheme for providing quality education for ST/SC students in partnership with Urban Educational Institution (ANWESHA)
6. Post-Matric Scholarship and Stipend for ST students
7. Pre-Matric Scholarship for SC students
8. Extra-Curricular Activities in Schools
9. Construction of Hostel for students
10. Financial Assistance to ST students for pursuing studies in National Institutes
11. Pre-matric Scholarship for the children whose parents are engaged in unclean occupation
12. Odisha Girl's Incentive Programme (OGIP) for Pre-Matric Scholarship to ST & SC Day-Scholars.
13. Subhadra Yojana for eligible women in the age group of 18-60

(b) Programs relating to culture and heritage

14. Preservation and Promotion of Tribal Culture & Craft
15. Promotion of tribal products through state level fares and exhibitions like the

Adivasi Mela and Dance Festival, Sargifula, and other events

(c) Programs for Awareness and Economic improvement

16. Information, Education & Communication (IEC)

17. Economic Development of ST and SCs below poverty line

(d) Programs for social equity

18. Awareness generation through state, district, and block level training and orientation programs

(e) CENTRAL SECTOR SCHEMES

1. Special Central Assistance (SCA) for Scheduled Caste Sub Scheme for SCs

2. Grants under Article 275(I) of the Constitution of India

3. Post Matric Scholarship for ST (Umbrella Scheme)

4. Tribal Development Projects implemented with Special Central Assistance

5. Pradhan Mantri Adarsh Gram Yojana (PMAGY)

6. Enforcement of Protection of Civil Rights (PCR) Act, 1955 and Prevention of Atrocities (POA) Act 1989

7. Pre-Matric Scholarship for ST students (Umbrella Scheme)

8. Pre-Matric Scholarship and Stipend for SC students

9. Post-Matric Scholarship for SC students

Rate of Scholarships for Students

Type	Group-1	Group– 2	Group– 3	Group– 4
Dayschollar	350	335	210	160
Hosteller	750	510	400	260

Scholarship also includes reimbursement of non-refundable compulsory fee charged by educational institutions as per Govt. ceiling.

- ✓ Odisha Girl Incentive Programme (OGIP) for Pre-Matric Scholarship to ST & SC Day-Scholars.

- ✓ Tribal Development Projects implemented with Special Central Assistance.

The State Government has been assigned special responsibility to implement provisions of the Protection of Civil Rights Act, 1955 and Scheduled Caste and Scheduled Tribes (Prevention of Atrocities) Act, 1989. Cash awards to couples getting into inter-caste marriage and grant-in-aid to non-official Organizations engaged in creating awareness are given under this scheme.

Annexure – X

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Cost-Benefit Analysis of Ballada Bauxite Block Project

Dated 2nd Aug 2023

This project involves diversion of 154.945 Ha of forest land (Mining lease area 144.945 Ha and 10 Ha for approach roads on east and west side of mine) for Ballada Bauxite mining project located at Nandapur Tahasil of Koraput District, Odisha. The entire forest land falls within Nagasari reserve forest of Koraput forest division.

Table –A: Cases under which a cost-benefit analysis for forest diversion are required

Sl. No.	Nature of Proposal	Applicability of Cost Benefit Analysis	Remarks
1	All categories of proposals involving forest land up to 20 Ha in plain and up to 5 Ha in hills	Not Applicable	-
2	Proposal for defense installation purposes and oil prospecting (prospecting only)	Not Applicable	-
3	Habitation, establishment of industrial units, tourist lodges complex and other building construction.	Not Applicable	-
4	All other proposals involving forestland more than 20 Ha in plains and more than 5 Ha in hills including roads, transmission lines, minor, medium and major irrigation projects, hydro projects, mining activity, railway lines, location specific installation like microwave stations, auto repeater Centre TV tower etc.	Applicable	The proposed project is for diversion of 154.945 Ha of forest land for Ballada Bauxite Block project located at Nandapur Tahasil of Koraput District, Odisha. The entire forest land falls within Nagasari reserve forest of Koraput forest division. 144.945 Ha is the mining lease area while 10 Ha accounts for approach roads within forest land on east and west side of the mine

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Table – B: Estimation of cost of forest diversion

Sl. No.	Parameters	Cost in INR Cr.	Remarks
1	Ecosystem services losses due to proposed forest diversion.	14.840	Economic value of loss of eco-system services due to diversion of forests shall be the net present value (NPV) of the forest land being diverted (144.945 Ha Mining Lease Area + 10 Ha for approach roads) as prescribed by the Central Government, (MoEF & CC). **Eco-Class-III**, Tropical Dry Deciduous Forest with **Open** canopy density (10% - 40% tree cover) has been considered.
2	Loss of Animal Husbandry	1.484	The entire mining lease area, hence, the forest land under consideration for diversion is located at an elevated plateau surrounded by steep slope. The mineral bearing plateau is devoid of any vegetation, however, the steep slope surrounding the plateau does have green cover which is not envisaged to be tampered with. However, a notional valuation equivalent to 10% NPV which is INR 14.840 crore x 10% = Rs.1.484 crore has been considered.
3	Cost of Human Resettlement	0	The mining lease area is devoid of any human habitation. Hence, there is no R&R involved.
4	Loss of public facilities and administrative infrastructure (Roads, building, schools, dispensaries, electric lines, railways etc) on forest land, which would require forest land if these facilities were diverted due to the project.	0	There is no public infrastructure available in the instant proposal except for the approach roads on the east and west side of the mine which shall be further strengthened, widened for movement of vehicular traffic during the development and operation of the mine.
5	Possession value of forest land diverted (Max. of circle rate of adjoining area in the district OR 30% of NPV)	4.452	a. Average circle rate of adjoining area is ~ Rs. 2,00,000 / Ha. Accordingly, possession value of land works out to **Rs 3.099 crore**
			b. 30% of NPV due to loss of forests (14.84 x 0.30 = Rs. **4.452 crore**)
			c. Maximum of a & b = **Rs. 4.452 Cr.**

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6	Cost of suffering to Oustees.	0	No human habitation exists on forest land proposed to be diverted as such there is no social cost of rehabilitation of oustees.
7	Habitat Fragmentation Cost.	7.42	The cost due to fragmentation has been pegged at 50% of NPV applicable as thumb rule i.e. 14.84 x 50% = **Rs. 7.42 crore**
8	Compensatory afforestation and soil & moisture conservation cost.	Included in B1.1	The actual cost of compensatory afforestation and soil & moisture conservation and its maintenance in future at present discounted value is estimated as 30% of NPV, i.e., ~ Rs. 4.452 Cr and is included in Project Cost
28.196			

Table – B1: Project Cost Estimate

Sl. No.	Item / Activity	Amount, INR Cr.	Remarks
1	Land Acquisition, NPV & CA	50	
2	Lease Deed, Stamp-Duty & Registration	45	
3	Studies & Clearances,	25	
	Surveys & Statutory Fees		
	Wild Life Management,		
	Additional Exploration & Testing		
	Lease Boundary Fixing, DGPS etc.		
4	HEMM & Mining Equipment including Crushers & Mining Infrastructures	80	
5	Buildings / Workshop	5	
6	HR, Admin, Preoperative and Associated Expenses	10	
7	CSR	5	
8	Contingency	10	
Sub-Total of Mine Development:		**230**	
Outside Mining Lease Area			
Logistics Facilities (Road & Rail)		60	
Grand Total:		**290**	

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Table – C: Estimation of Forest Diversion Benefit

Project Phase:	1 Year
Estimated Mine Life (Production Phase):	10 Years

Sl. No.	Parameters	Parameters	Rate (Rs. / T)	Production, Mn T (Over Life of Mine)	Amount (INR Cr.)
1	**Net Revenue from Bauxite Sale**	Gross Revenue	3,537.6	19.399	6,862.6
		Operating Cost	3,185.0	19.399	6,178.6
		Net Revenues	**352.6**		**684.0**
2	**Benefits to Different Govt. Bodies**	Auction Premium	2,193.9	19.399	4,255.9
		Royalty	281.9	19.399	546.8
		DMF @ 10% of Royalty	28.2	19.399	54.7
		NMET @ 2% of Royalty	5.6	19.399	10.9
		Total Benefit	2,509.6		**4,868.3**
3	No. of population Benefited due to the Project				2000
4	**Economic Benefits due to Direct & Indirect Employment created due to Project & Operations** (500 People x 10 Years x Avg. Rs. 2,00,000 / Year)				**100.0**
5	**Economic benefits due to Compensatory Afforestation Benefits from Compensatory Afforestation (CA) accruing over next 50 years monetize and discounted to the Present Value has been included as benefits from CA.** (FV=PV/(1+i)^n where FV is future value, PV is present value, "i" is discounting rate (assumed 4%), "n" is period. As per NPV/CA guidelines, environmental value benefit of CA land are Rs. 126.74 Lakh/Ha and Rs. 63.37 Lakh/Ha for density of 1.0 & 0.5 respectively.)				**697.8**
Total Benefits (1+2+4+5)					**6,350.1**

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Table – D: Calculation of Cost Benefit Ratio

Total Benefits (As per **Table C**:Estimation of benefits of Forest Diversion)	**INR 6,350.1 Cr.**
Total Cost (As per **Table (B+B1)**: losses of forests + Cost of the Project)	**INR 258.2 Cr.**
Hence, Benefit/Cost Ratio	**24.59**

Thus, the project gives positive Benefit/Cost Ratio. The monetary returns of the Project are positive over the environmental losses.

Authorised Signatory



K Anil Kumar
Associated Vice President - Projects
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Annexure – XI

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UNDERTAKING – COMPLIANCE TO COMMON CAUSE JUDGEMENT

Dated 10th Nov 2023

As per the prescribed Terms of Reference (ToR) File No. SIA/OR/MIN/439954, dated 6th Nov 2023 for Ballada Bauxite Mine, Koraput District, Odisha, it has been advised to comply to "Common Cause Judgement" under specific conditions.

To this effect, the Project Proponent undertakes to 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 others. This undertaking inter-alia includes commitment of the Project Proponent not to involve in any such violation in future.

The Project Proponent submits that a duly notarized affidavit to this effect shall be produced before the final EIA report submission at the time of grant of EC.

Authorised Signatory



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Annexure – XII

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UNDERTAKING – BLAST VIBRATION STUDY

Dated 10th Nov 2023

As per the prescribed Terms of Reference (ToR) File No. SIA/OR/MIN/439954, dated 6th Nov 2023 for Ballada Bauxite Mine, Koraput District, Odisha, it has been advised to undertake Blast vibration study. To this effect, the Project proponent undertakes as under:

Vibration studies will be carried out immediately upon commencement of mining operations to evaluate the zone of influence and impact of blasting along with its mitigation plan on the neighborhood. As such, within 500 meters of mining area there is no existence of human habitation. As proposed in the approved mining plan, controlled blasting shall be carried out with minimal impact in the neighbourhood. However, as stated herein, suitable scientific studies shall be carried out as per industry norms and practices and the results of the same shall be submitted to IBM for necessary evaluation and advice, if any.

The guidelines of DGMS and other competent agencies will be strictly followed in addition to the provisions of safety precautions as laid down in the Metalliferous Mines Regulation 1961.

The Project Proponent submits that after commencement of mining operation, blast vibration study will be carried out by deploying domain experts and study report will be submitted to MoEF, IBM and other relevant Statutory Authorities.

Authorised Signatory

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Annexure – XIII

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UNDERTAKING – SLOPE STABILITY STUDY

Dated 10th Nov 2023

As per the prescribed Terms of Reference (ToR) File No. SIA/OR/MIN/439954, dated 6th Nov 2023 for Ballada Bauxite Mine, Koraput District, Odisha, it has been advised to undertake Slope stability study for both mines and OB/Waste dumps. To this effect, the Project proponent undertakes as under:

Slope stability studies for mines as well as for OB/Waste dumps shall be carried out upon commencement of mining operations. It may be noted that the required geotechnical data and related geological information can be gathered only after commencement of mining operations and subsequent progress of mining to a certain extent so as to carry out such studies.

The physical parameters of the OB dumps like height, width and angle of slope will be governed as per the approved Mining Plan as per the guidelines/circulars issued by D.G.M.S with respect to safety in mining operations shall be strictly adhered to maintain the stability of topsoil/waste dumps.

The Project Proponent submits that after commencement of mining operation, Slope Stability Study for both mines and OB/Waste dumps will be carried out by deploying domain experts and study report will be submitted to MoEF, IBM and other relevant Statutory Authorities.

Authorised Signatory



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Annexure – XIV

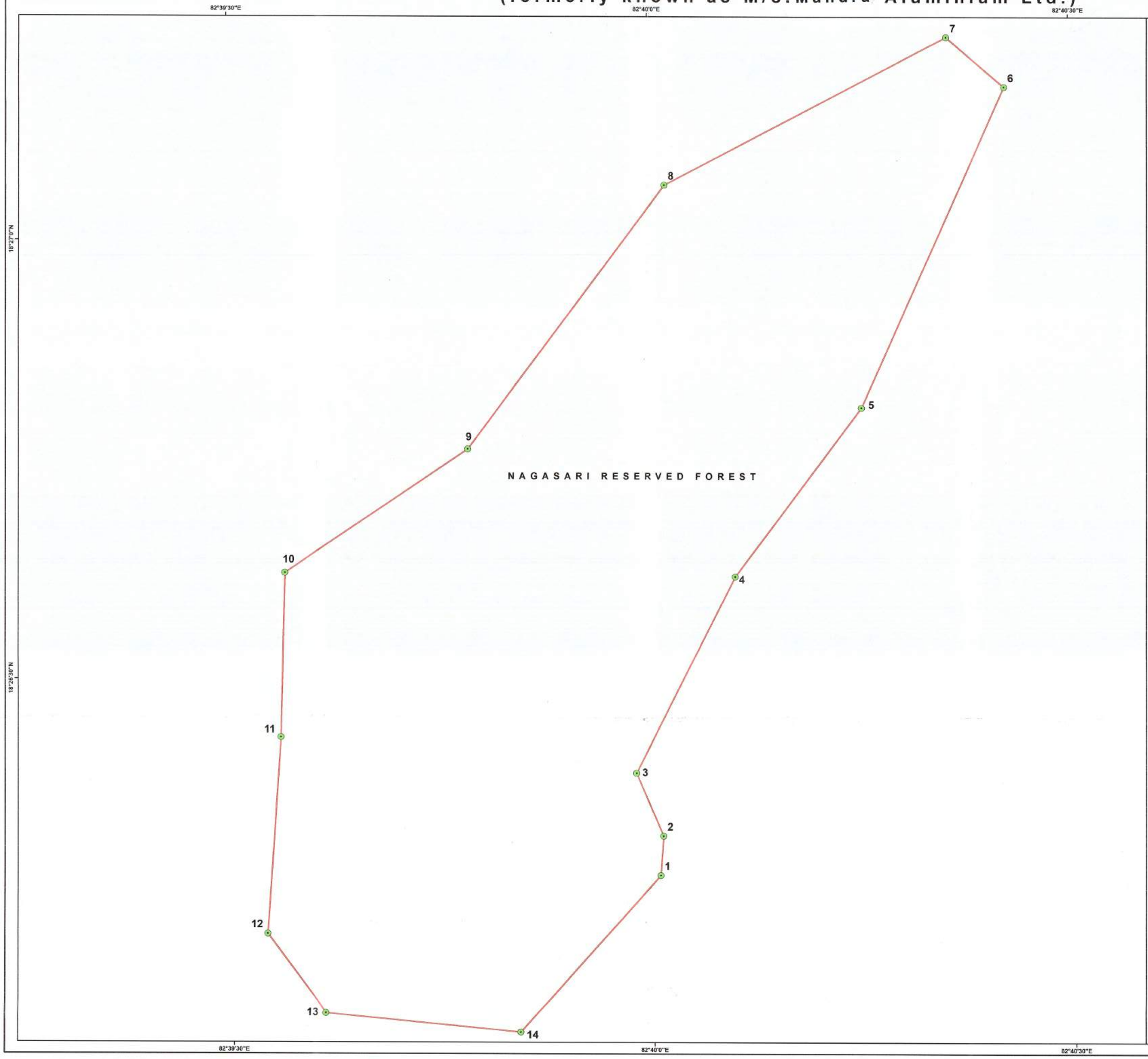
Nursery opening estimate (Tentative) for one hectare area with 1 lac saplings to be developped first year						
S. No.	**Head Wise Activity**	**Quantity**	**Unit**	**Rate (Rs./Unit)**	**Amount (In Rs.)**	**Remarks**
A	**Direct cost**					
1	Preparation of nursery plot - 01 hectare area. 10 manday per day require for 20 days = 200 nos. approx.	200	No.	500	100000.00	
2	Filling Polythene Bag (25cmx10cm) 500 kgs (approx 200 nos of bags in one kg) Filling bags by 01 mandays approx 250 nos./day. If manpower cost is Rs500/day, filling cost of one bag = Rs 2/bag Required manpower for the same 10 mandays per day for 40 days. total - 400 mandays	400	No.	500.00	200000.00	
3	Sowing seeds in nusery, planting of saplings in polly bags, watering, weedin/hoeing & maintenance during entire year. Required manpower after completing above sl. 1 & 2 jobs, 10 mandays is require per day for 10 months or 305 days = 3050 manday	3050	No.	500.00	1525000.00	
4	Cost of Biodegradable polythene Bag (25cmx10cm) 500 kgs (approx 200 nosof bags in one kg)	500	Kg	200.00	100000.00	Sweet soil will be provided by company
5	Farm Yard Mannure (FYM)	400	M3	1300.00	520000.00	
6	**Forestry Plant Seed**					
a	Saja	150	Kg	150.00	22500.00	
b	Beeja	150	Kg	150.00	22500.00	
c	Mundi	150	Kg	150.00	22500.00	
d	Shishu	50	Kg	150.00	7500.00	
e	Saal			0.00	0.00	To be collected from forest

f	Neem	100	Kg	150.00	15000.00	
g	Bargad	2	Kg	1100.00	2200.00	
h	Pipal	2	Kg	1100.00	2200.00	
i	Desi Mango	100	Kg	70.00	7000.00	
j	Jamun	100	Kg	100.00	10000.00	
k	Mahua	50	Kg	100.00	5000.00	
l	Arjun	150	Kg	150.00	22500.00	
7	Chemical fertilisers (Urea, MOP, DAP, ZnSo4 & SSP etc.		Lumpsum	10000.00	10000.00	
8	Insecticides/Pesticides	1	Lumpsum	5000.00	5000.00	
Sub Total-A					**2598900.00**	
B	**Required Infrastructure**					
1	Borehole	1	No.	100000.00	100000.00	
2	Submersible Pump & installation	1	No.	30000.00	30000.00	
3	Water storage tank and stand	1	No.	15000.00	15000.00	
4	Insecticide spray machine	2	No.	3000.00	6000.00	
5	Khurapi	20	No.	50.00	1000.00	
6	Weeder	20	No.	50.00	1000.00	
7	Fawara	10	No.	200.00	2000.00	
8	PVC pipe	1	Lumpsum	5000.00	5000.00	
9	Installation of Pop-up irrigation system		Lumpsum	100000.00	100000.00	
10	Water cane 10 liter cacity	10	No.	1000.00	10000.00	
11	Fencing	1	Lumpsum	150000.00	150000.00	
12	Miscellaneous items	1	Lumpsum	15000.00	15000.00	
	Sub Total-B				**435000.00**	
	Grand Total (A+B)				**3033900.00**	

(Rs Thirty lacs thirty three thousand nine hundred only)

Annexure – XV

DGPS SURVEY GEOREFERENCED MINING LEASE AREA MAP FOR BALLADA BAUXITE BLOCK IN KORAPUT DISTRICT
(M/s. Kalinga Alumina Ltd.)
(formerly known as M/s.Mundra Aluminium Ltd.)





Scale-: 1:3960

DGPS SURVEYED ML PILLAR CO-ORDINATES					
SL_NO	PILLAR_ID	EASTING	NORTHING	LONGITUDE	LATITUDE
1	1	676030.656	2039437.762	82°40'00.46092"	18°26'16.23156"
2	2	676036.273	2039520.219	82°40'00.67800"	18°26'18.91140"
3	3	675979.282	2039652.066	82°39'58.77720"	18°26'23.21664"
4	4	676185.380	2040065.893	82°40'05.93040"	18°26'36.61440"
5	5	676448.566	2040420.427	82°40'15.01104"	18°26'48.06600"
6	6	676746.223	2041095.116	82°40'25.36716"	18°27'09.92016"
7	7	676624.713	2041199.287	82°40'21.25920"	18°27'13.34448"
8	8	676036.397	2040888.254	82°40'01.11144"	18°27'03.40524"
9	9	675625.234	2040332.823	82°39'46.92528"	18°26'45.46356"
10	10	675242.514	2040072.737	82°39'33.80148"	18°26'37.11876"
11	11	675234.611	2039726.773	82°39'33.42420"	18°26'25.86912"
12	12	675208.076	2039314.415	82°39'32.39136"	18°26'12.46524"
13	13	675331.300	2039148.228	82°39'36.53856"	18°26'07.02348"
14	14	675738.934	2039108.682	82°39'50.41692"	18°26'05.61588"

DGPS SURVEYED ML AREA - 144.945 ha.

Legend

- ML Pillar
- ML Boundary

Disclaimer: The map has been prepared based on the field survey data of joint survey team using DGPS/ETS.

ORSAC

4013/12
16.6.2023

Odisha Space Applications Centre
Dept. of Science and Technology
Govt. of Odisha
Bhubaneswar

1231

Annexure – XVI

Baseline Monitoring Photographs



Air Monitoring



Noise Monitoring



Soil Monitoring



Ground Water Monitoring



Surface Water Monitoring

1234

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Name & Address of the Project: Ballada Bauxite mine
Village - Ballada, Tehsil - Nandapur,
District - Koraput,
Odisha – 764038

Monitoring Period: March 2023 to May 2023

Name of company: Kalinga Alumina Limited.

Date	Albedo	Wind Speed	Wind Direction	Temperature	Precipitation Rate	Relative Humidity	Surface Pressure	Cloud Cover
		m/s		K	mm/hr	%	mb	tenths
01-03-2023	0.66	2.81	SSE	294.15	0.00	34.67	913.71	0.79
02-03-2023	0.66	3.01	SSE	294.98	0.00	30.63	913.79	0.46
03-03-2023	0.66	4.20	SSE	295.58	0.00	32.29	914.33	0.88
04-03-2023	0.66	3.07	SSE	295.31	0.00	32.75	914.42	0.63
05-03-2023	0.65	2.65	S	295.31	0.00	29.46	913.79	0.21
06-03-2023	0.65	3.36	SW	295.30	0.00	29.38	912.33	1.33
07-03-2023	0.65	3.18	SSE	295.19	0.00	32.50	912.08	4.00
08-03-2023	0.65	3.42	SE	294.82	0.00	38.63	912.21	3.79
09-03-2023	0.65	2.78	SE	294.98	0.00	37.42	911.79	6.58
10-03-2023	0.65	3.51	SSE	294.59	0.00	43.21	911.46	4.79
11-03-2023	0.65	4.65	ESE	295.16	0.00	37.71	911.29	3.50
12-03-2023	0.65	3.90	SSE	295.18	0.00	28.63	911.17	0.38
13-03-2023	0.65	3.69	SSE	295.65	0.00	24.04	910.00	1.83
14-03-2023	0.65	3.10	SSW	296.58	0.00	25.29	908.71	7.63
15-03-2023	0.65	3.02	WSW	296.12	0.00	30.42	908.13	6.88
16-03-2023	0.65	1.87	SSE	295.66	0.00	47.08	909.21	8.38
17-03-2023	0.65	1.94	SSW	293.66	0.00	64.04	909.96	8.08
18-03-2023	0.65	2.64	SSW	293.42	0.94	64.42	908.46	6.83
19-03-2023	0.65	3.29	WSW	293.80	0.20	66.58	907.00	6.88
20-03-2023	0.65	2.50	SSW	294.20	0.33	60.63	906.46	4.38
21-03-2023	0.65	2.35	SSE	295.55	0.00	52.79	906.92	3.71
22-03-2023	0.65	2.23	SSE	296.19	0.00	53.13	907.04	5.08
23-03-2023	0.65	3.47	WSW	296.73	0.00	51.54	907.08	6.58
24-03-2023	0.64	3.33	SW	296.94	0.00	52.50	907.71	5.67
25-03-2023	0.64	2.56	SSE	296.78	0.00	55.79	908.92	5.54
26-03-2023	0.64	3.02	S	296.46	0.18	60.33	908.00	7.00
27-03-2023	0.64	2.62	WSW	297.78	0.03	53.71	907.46	5.29
28-03-2023	0.64	2.54	S	298.22	0.00	46.46	907.67	5.88
29-03-2023	0.64	2.17	S	297.59	0.00	52.88	908.63	8.33
30-03-2023	0.64	2.96	SSW	297.90	0.01	50.54	907.42	2.42
31-03-2023	0.64	3.69	SSW	298.15	0.00	46.96	906.88	5.08
01-04-2023	0.64	3.51	SW	297.37	0.01	56.79	907.04	5.75
02-04-2023	0.64	2.36	SW	297.48	0.00	49.25	906.88	6.00
03-04-2023	0.64	2.89	SSW	298.03	0.00	41.13	906.67	6.79
04-04-2023	0.64	3.34	SSW	297.55	0.00	52.42	907.67	8.33
05-04-2023	0.64	2.49	S	298.10	0.00	51.92	907.88	5.08
06-04-2023	0.64	2.96	SSE	299.38	0.00	44.13	908.54	5.75
07-04-2023	0.64	3.66	S	298.30	0.01	51.63	910.33	5.92
08-04-2023	0.64	2.57	SSE	298.21	0.03	49.33	911.79	5.71
09-04-2023	0.64	2.66	SSW	298.68	0.00	45.54	911.71	4.79
10-04-2023	0.64	2.84	S	299.53	0.00	42.13	910.46	4.92
11-04-2023	0.64	2.98	SE	300.26	0.00	39.63	910.29	3.79
12-04-2023	0.64	3.24	SSE	300.87	0.00	34.58	909.75	2.83
13-04-2023	0.64	2.56	SW	301.26	0.00	34.96	909.08	3.46
14-04-2023	0.64	3.03	SSW	301.31	0.00	35.67	908.58	7.46

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Date	Albedo	Wind Speed	Wind Direction	Temperature	Precipitation Rate	Relative Humidity	Surface Pressure	Cloud Cover
		m/s		K	mm/hr	%	mb	tenths
15-04-2023	0.64	3.31	SSW	301.31	0.00	33.92	908.33	9.04
16-04-2023	0.64	1.74	E	301.51	0.00	29.96	907.29	8.25
17-04-2023	0.64	2.98	SSE	301.69	0.00	32.58	907.58	4.71
18-04-2023	0.64	3.28	SSE	302.05	0.00	31.04	908.54	3.58
19-04-2023	0.64	3.10	S	301.56	0.00	31.83	906.25	3.71
20-04-2023	0.64	3.26	SW	300.70	0.01	34.29	904.83	3.96
21-04-2023	0.64	4.02	SSE	297.81	0.79	48.33	905.63	5.58
22-04-2023	0.64	2.96	SSE	298.67	0.00	46.83	905.04	4.33
23-04-2023	0.64	4.13	SE	295.98	0.27	61.33	906.42	6.29
24-04-2023	0.64	3.00	SSE	296.47	0.02	62.17	908.21	7.08
25-04-2023	0.64	2.40	S	297.40	0.01	59.21	908.58	7.04
26-04-2023	0.64	1.98	SW	297.75	0.00	61.13	907.79	5.54
27-04-2023	0.64	2.35	SE	297.68	0.30	56.33	908.25	3.88
28-04-2023	0.64	2.60	SSE	297.13	0.48	62.38	908.83	5.96
29-04-2023	0.64	2.68	SE	297.05	0.33	58.38	908.00	6.17
30-04-2023	0.64	1.88	S	298.53	0.00	50.25	906.42	7.13
01-05-2023	0.63	3.18	SSW	294.54	0.00	69.13	907.04	7.46
02-05-2023	0.63	1.86	S	296.34	0.01	63.38	907.54	7.63
03-05-2023	0.63	2.83	SSE	295.91	0.12	73.29	908.42	9.58
04-05-2023	0.63	2.47	SE	296.26	1.06	72.79	907.50	9.54
05-05-2023	0.63	1.84	SSE	297.72	0.11	67.42	906.17	8.88
06-05-2023	0.63	1.49	S	298.79	0.04	64.92	905.50	9.38
07-05-2023	0.63	1.80	SSW	299.07	0.00	59.92	905.58	9.04
08-05-2023	0.63	2.69	SSE	301.05	0.00	48.83	905.33	7.63
09-05-2023	0.63	2.54	S	299.88	0.26	55.21	906.13	8.83
10-05-2023	0.63	2.63	ESE	299.92	0.13	57.21	905.88	7.08
11-05-2023	0.63	3.62	SE	300.70	0.00	50.21	905.92	8.63
12-05-2023	0.63	3.12	NE	300.79	0.00	34.38	905.17	7.38
13-05-2023	0.63	3.82	SSW	300.62	0.00	27.96	904.21	7.88
14-05-2023	0.62	4.65	SW	302.11	0.00	17.25	902.46	9.13
15-05-2023	0.62	4.30	SSW	303.52	0.00	18.58	903.71	7.63
16-05-2023	0.62	4.20	SSW	303.23	0.00	28.08	905.63	6.00
17-05-2023	0.62	2.94	SW	302.55	0.00	36.13	907.00	6.33
18-05-2023	0.62	2.86	SSW	301.18	0.01	40.00	908.25	4.17
19-05-2023	0.62	3.70	S	300.71	0.00	46.21	907.17	3.75
20-05-2023	0.62	3.49	SSW	300.42	0.15	48.54	906.71	6.71
21-05-2023	0.62	3.53	SW	300.88	0.00	46.04	907.25	4.67
22-05-2023	0.62	2.73	SSE	298.97	1.30	54.71	908.50	7.38
23-05-2023	0.62	2.43	SSE	300.28	0.01	47.96	908.08	5.33
24-05-2023	0.62	3.64	SSW	301.25	0.00	41.96	907.00	2.04
25-05-2023	0.62	3.99	SW	300.29	0.00	50.71	906.83	5.75
26-05-2023	0.62	4.26	WSW	301.75	0.00	42.42	906.96	5.63
27-05-2023	0.62	2.67	SW	301.29	0.00	38.21	906.38	4.63
28-05-2023	0.62	3.43	S	301.29	0.00	41.71	905.83	4.96
29-05-2023	0.62	3.44	SSW	300.14	0.00	50.38	906.83	4.92
30-05-2023	0.62	2.74	SSW	299.10	0.26	58.21	907.21	8.21
31-05-2023	0.62	1.90	S	300.39	0.01	54.79	906.25	9.58

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No:	VEL/KAL/AA/001-026	Report No:	VEL/AA/001-026
Name & Address of the Project:	Ballada Bauxite mine Village - Ballada, Tehsil - Nandapur, District - Koraput, Odisha - 764038	Reporting Date:	29/06/2023
		Ref. No:	NIL
		Monitoring Period:	March 2023 to May 2023
Name of company:	Kalinga Alumina Limited.	Equipment Used:	RDS & FPS with all accessories
Sample Collected By:	Vardan Envirolab Representative	Parameter Required:	As per Standard TOR
Sample Description:	Ambient Air Quality Monitoring		
Location:	Site (A1)		

RESULTS

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m3)
01.03.2023	56.2	40.0	23.9	13.8	0.72
02.03.2023	57.2	37.2	21.2	12.9	0.46
08.03.2023	51.1	36.2	27.0	13.8	0.79
09.03.2023	51.4	40.9	26.2	12.6	0.77
15.03.2023	51.8	37.1	25.5	11.8	0.74
16.03.2023	52.0	38.6	24.9	13.7	0.69
22.03.2023	52.9	37.6	21.6	13.8	0.76
23.03.2023	53.4	31.2	20.2	13.7	0.78
29.03.2023	54.2	32.2	19.8	13.9	0.76
30.03.2023	51.6	33.2	26.3	13.7	0.68
05.04.2023	54.7	34.1	25.8	13.6	0.78
06.04.2023	54.8	34.2	25.8	10.8	0.79
12.04.2023	51.0	36.2	24.1	12.7	0.77
13.04.2023	52.6	37.1	23.8	13.6	0.78
19.04.2023	52.8	37.6	21.2	13.4	0.60
20.04.2023	50.5	39.1	22.8	13.5	0.76
26.04.2023	55.4	30.2	26.7	13.2	0.76
27.04.2023	55.9	31.1	25.6	13.4	0.75
03.05.2023	56.1	32.2	25.9	11.6	0.69
04.05.2023	56.2	31.2	24.3	12.8	0.70
10.05.2023	56.8	31.6	23.8	13.7	0.74

(Checked By)

(Approved By)

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Report No:					VEL/AA/001-026
Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m3)
11.05.2023	54.2	34.5	21.8	13.8	0.79
17.05.2023	53.2	36.2	20.0	11.8	0.62
18.05.2023	52.1	35.2	26.2	12.0	0.71
24.05.2023	57.5	35.1	24.6	13.9	0.76
25.05.2023	54.2	35.5	21.8	13.9	0.76

Limit as per NAAQS	Parameter	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
	---	100	60	80	80	4

[1]National Ambient Air Quality Standards.

VARDAN ENVIROLAB GURGAON

(Checked By)

(Approved By)
Gaurav Pratap Singh

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No:	VEL/KAL/AA/027-052	Report No:	VEL/AA/027-052
Name & Address of the Project	Ballada Bauxite mine Village - Ballada, Tehsil - Nandapur, District - Koraput, Odisha – 764038	Reporting Date:	29/06/2023
		Ref. No:	NIL
		Monitoring Period:	March 2023 to May 2023
Name of company:	Kalinga Alumina Limited.	Equipment Used:	RDS & FPS with all accessories
Sample Collected By:	Vardan Envirolab Representative	Parameter Required:	As per Standard TOR
Sample Description:	Ambient Air Quality Monitoring		
Location:	Near Forest Range of Ballada (A2)		

RESULTS

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
01.03.2023	71.6	49.6	31.6	21.6	0.96
02.03.2023	70.9	50.8	30.9	18.6	0.88
08.03.2023	68.7	48.3	33.8	19.1	0.91
09.03.2023	67.9	47.5	29.5	20.4	0.80
15.03.2023	72.2	46.3	27.4	17.8	0.93
16.03.2023	73.8	45.8	26.8	19.3	1.02
22.03.2023	71.6	49.1	30.9	21.2	0.90
23.03.2023	73.9	48.8	32.6	20.8	0.87
29.03.2023	74.2	50.7	31.5	19.8	1.01
30.03.2023	76.7	47.5	33.8	18.7	0.98
05.04.2023	70.8	46.2	34.6	17.6	0.86
06.04.2023	69.8	49.1	31.5	16.8	0.91
12.04.2023	67.4	48.8	29.1	20.9	1.00
13.04.2023	72.2	50.1	28.7	19.2	0.87
19.04.2023	71.6	46.3	30.5	21.5	1.02
20.04.2023	70.9	45.7	32.6	18.8	0.98
26.04.2023	68.4	47.8	33.8	20.9	0.88
27.04.2023	70.3	46.9	31.9	17.6	0.92
03.05.2023	69.1	49.8	29.1	19.4	0.87
04.05.2023	73.9	48.4	30.5	18.8	0.95
10.05.2023	71.5	46.2	26.8	21.6	1.00

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Report No:					VEL/AA/027-052
Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
11.05.2023	70.9	45.7	27.1	20.1	0.80
17.05.2023	68.9	47.1	31.2	18.7	0.96
18.05.2023	67.4	48.9	26.2	16.9	1.02
24.05.2023	72.2	37.2	34.5	18.4	0.88
25.05.2023	76.9	50.9	34.8	21.8	1.03

Limit as per NAAQS	Parameter	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
	--	100	60	80	80	4

[a] National Ambient Air Quality Standards.

VARDAN ENVIROLAB GURGAON

(Checked By)

VARDAN ENVIROLAB
Gaurav
Pratap Singh

(Approved By)

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No:	VEL/KAL/AA/053-078	Report No:	VEL/AA/053-078
Name & Address of the Project:	Ballada Bauxite mine Village - Ballada, Tehsil - Nandapur, District - Koraput, Odisha – 764038	Reporting Date:	29/06/2023
		Ref. No:	NIL
		Monitoring Period:	March 2023 to May 2023
Name of company:	Kalinga Alumina Limited.		
Sample Collected By:	Vardan Envirolab Representative	Parameter Required:	As per Standard TOR
Sample Description:	Ambient Air Quality Monitoring		
Location:	Near Primary School Mulda (A3)		

RESULTS

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
01.03.2023	58.4	41.9	23.9	14.6	0.72
02.03.2023	59.6	43.7	21.2	12.9	0.69
08.03.2023	61.2	44.2	27.4	15.0	0.84
09.03.2023	63.7	40.9	28.0	12.6	0.77
15.03.2023	64.1	39.5	25.5	11.8	0.82
16.03.2023	60.9	38.6	24.9	13.7	0.69
22.03.2023	58.4	37.9	21.6	14.5	0.80
23.03.2023	59.6	41.2	20.2	15.0	0.83
29.03.2023	56.9	43.8	24.7	13.9	0.76
30.03.2023	61.2	40.5	26.3	14.1	0.68
05.04.2023	60.8	42.2	27.4	12.6	0.80
06.04.2023	64.8	36.2	25.8	11.1	0.79
12.04.2023	64.0	44.2	24.1	12.7	0.77
13.04.2023	61.9	39.4	23.8	13.6	0.85
19.04.2023	59.8	37.6	21.2	14.1	0.67
20.04.2023	56.7	39.1	22.8	15.0	0.80
26.04.2023	58.1	41.6	26.7	13.2	0.76
27.04.2023	61.3	40.8	28.1	14.1	0.85
03.05.2023	60.5	39.5	25.9	11.6	0.69
04.05.2023	64.8	37.6	24.3	12.8	0.70
10.05.2023	62.0	41.8	23.8	13.7	0.74

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Test Report

Report No:					VEL/AA/053-078
Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
11.05.2023	59.8	42.2	21.8	14.1	0.85
17.05.2023	57.3	43.8	20.0	11.8	0.66
18.05.2023	52.4	44.4	28.2	12.0	0.71
24.05.2023	61.2	35.9	24.6	15.4	0.86
25.05.2023	64.9	41.1	21.8	13.9	0.76

Limit as per NAAQS	Parameter	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
	--	100	60	80	80	4

[1]National Ambient Air Quality Standards.

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Gaurav Pratap Singh

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Test Report

Sample No:	VEL/KAL/AA/079-104	Report No:	VEL/AA/079-104
Name & Address of the Project:	Ballada Bauxite mine Village - Ballada, Tehsil - Nandapur, District - Koraput, Odisha – 764038	Reporting Date:	29/06/2023
		Ref. No:	NIL
		Monitoring Period:	March 2023 to May 2023
Name of company:	Kalinga Alumina Limited.	Equipment Used:	RDS & FPS with all accessories
Sample Collected By:	Vardan Envirolab Representative	Parameter Required:	As per Standard TOR
Sample Description:	Ambient Air Quality Monitoring		
Location:	Bheja Village (A4)		

RESULTS

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
03.03.2023	58.4	41.9	23.9	14.6	0.72
04.03.2023	70.4	43.7	21.2	12.9	0.69
10.03.2023	61.2	44.2	27.4	15.4	0.84
11.03.2023	63.7	40.9	28.6	12.6	0.77
17.03.2023	64.1	39.5	25.5	11.8	0.82
18.03.2023	60.9	38.6	24.9	13.7	0.69
24.03.2023	50.4	37.9	21.6	14.5	0.80
25.03.2023	59.6	41.2	20.2	15.6	0.83
31.03.2023	56.9	43.8	24.7	13.9	0.76
01.04.2023	61.2	40.5	26.3	14.1	0.68
07.04.2023	60.8	42.2	27.4	12.6	0.80
08.04.2023	64.8	36.2	25.8	11.8	0.79
14.04.2023	65.3	44.6	24.1	12.7	0.77
15.04.2023	61.9	39.4	23.8	13.6	0.85
21.04.2023	59.8	37.6	21.2	14.1	0.67
22.04.2023	56.7	39.1	22.8	15.9	0.88
28.04.2023	58.1	41.6	26.7	13.2	0.76
29.04.2023	61.3	40.8	28.1	14.1	0.89
05.05.2023	60.5	39.5	25.9	11.6	0.69
06.05.2023	64.8	37.6	24.3	12.8	0.70

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Test Report

Report No:	VEL/AA/079-104				
Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
12.05.2023	59.8	44.8	21.8	14.1	0.85
13.05.2023	57.3	43.8	28.8	11.8	0.66
19.05.2023	52.4	39.6	27.5	16.1	0.71
20.05.2023	61.2	38.1	24.6	15.6	0.91
26.05.2023	60.8	41.1	21.8	13.9	0.76
27.05.2023	59.8	44.8	21.8	14.1	0.85

Limit as per NAAQS	Parameter	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
	--	100	60	80	80	4

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(Approved By)
Gaurav Pratap Singh
Authorised Signatory

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Test Report

Sample No:	VEL/KAL/AA/105-130	**Report No:**	VEL/AA/105-130
Name & Address of the Project:	Ballada Bauxite mine Village - Ballada, Tehsil - Nandapur, District - Koraput, Odisha – 764038	**Reporting Date:**	29/06/2023
		Ref. No:	NIL
		Monitoring Period:	March 2023 to May 2023
Name of company:	Kalinga Alumina Limited.	**Equipment Used:**	RDS & FPS with all accessories
Sample Collected By:	Vardan Envirolab Representative	**Protocol Used:**	IS-5182 & CPCB Guidelines
Sample Description:	Ambient Air Quality Monitoring	**Parameter Required:**	As per Standard TOR
Location:	Kakua Village (A5)		

RESULTS

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
03.03.2023	58.4	40.0	23.9	14.0	0.72
04.03.2023	59.6	41.2	21.2	12.9	0.46
10.03.2023	60.0	41.2	27.0	14.0	0.80
11.03.2023	60.2	40.9	26.2	12.6	0.77
17.03.2023	60.0	39.5	25.5	11.8	0.80
18.03.2023	60.2	38.6	24.9	13.7	0.69
24.03.2023	58.4	41.1	21.6	14.0	0.76
25.03.2023	59.6	41.2	20.2	14.0	0.80
31.03.2023	56.9	41.0	19.8	13.9	0.76
01.04.2023	60.0	40.5	26.3	14.0	0.68
07.04.2023	60.8	41.0	25.8	14.0	0.80
08.04.2023	60.0	36.2	25.8	10.8	0.79
14.04.2023	51.0	40.6	24.1	12.7	0.77
15.04.2023	58.8	39.4	23.8	13.6	0.78
21.04.2023	59.8	37.6	21.2	14.0	0.60
22.04.2023	50.5	39.1	22.8	14.0	0.80
28.04.2023	58.1	41.6	26.7	13.2	0.76
29.04.2023	59.8	40.8	25.6	14.0	0.80
05.05.2023	60.5	39.5	25.9	11.6	0.69
06.05.2023	60.2	37.6	24.3	12.8	0.70

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Test Report

Report No:	VEL/AA/105-130				
Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
12.05.2023	59.8	34.2	21.8	14.1	0.80
13.05.2023	57.3	40.2	20.0	11.8	0.62
19.05.2023	52.4	39.6	26.2	12.0	0.71
20.05.2023	60.0	35.9	24.6	14.0	0.76
26.05.2023	60.5	41.1	21.8	13.9	0.76
27.05.2023	59.8	34.2	21.8	14.1	0.80

Limit as per NAAQS	Parameter	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
	--	100	60	80	80	4

[1] National Ambient Air Quality Standards.

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Test Report

Sample No:	VEL/KAL/AA/131-156	Report No:	VEL/AA/131-156
Name & Address of the Project:	Ballada Bauxite mine Village - Ballada , Tehsil - Nandapur, District - Koraput, Odisha – 764038	Reporting Date:	29/06/2023
		Ref. No:	NIL
		Monitoring Period:	March 2023 to May 2023
Name of company:	Kalinga Alumina Limited.	Equipment Used:	RDS & FPS with all accessories
Sample Collected By:	Vardan Envirolab Representative	Parameter Required:	As per Standard TOR
Sample Description:	Ambient Air Quality Monitoring		
Location:	Alanda Village (A6)		

RESULTS

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
03.03.2023	58.4	40.0	23.9	13.8	0.72
04.03.2023	59.6	41.2	21.2	12.9	0.46
10.03.2023	60.0	41.2	27.0	13.8	0.80
11.03.2023	59.4	40.9	26.2	12.6	0.77
17.03.2023	60.0	39.5	25.5	11.8	0.80
18.03.2023	60.0	38.6	24.9	13.7	0.69
24.03.2023	58.4	41.1	21.6	14.0	0.76
25.03.2023	59.6	41.2	20.2	14.0	0.80
31.03.2023	56.9	41.0	19.8	13.9	0.76
01.04.2023	60.0	40.5	26.3	14.0	0.68
07.04.2023	59.7	41.0	25.8	14.0	0.80
08.04.2023	60.0	36.2	25.8	10.8	0.79
14.04.2023	51.0	40.6	24.1	12.7	0.77
15.04.2023	58.8	39.4	23.8	13.6	0.78
21.04.2023	59.8	37.6	21.2	14.0	0.60
22.04.2023	50.5	39.1	22.8	14.0	0.80
28.04.2023	58.1	41.0	26.7	13.2	0.76
29.04.2023	59.8	40.8	25.6	14.0	0.80
05.05.2023	60.0	39.5	25.9	11.6	0.69
06.05.2023	59.7	37.6	24.3	12.8	0.70

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Test Report

Report No:					VEL/AA/131-156
Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
12.05.2023	59.8	34.2	21.8	13.8	0.80
13.05.2023	57.3	40.2	20.0	11.8	0.62
19.05.2023	52.4	39.6	26.2	12.0	0.71
20.05.2023	60.0	35.9	24.6	14.0	0.76
26.05.2023	60	41	21.8	13.9	0.76
27.05.2023	59.8	34.2	21.8	13.8	0.80

Limit as per NAAQS	Parameter	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
	--	100	60	80	80	4

[1]National Ambient Air Quality Standards.

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Test Report

Sample No:	VEL/KAL/AA/157-182	Report No:	VEL/AA/157-182
Name & Address of the Project:	Baliada Bauxite mine Village - Ballada, Tehsil - Nandapur, District - Koraput, Odisha – 764038	Reporting Date:	29/06/2023
		Ref. No:	NIL
		Monitoring Period:	March 2023 to May 2023
Name of company:	Kalinga Alumina Limited.		
Sample Collected By:	Vardan Envirolab Representative	Parameter Required:	As per Standard TOR
Sample Description:	Ambient Air Quality Monitoring		
Location:	Soput Village (A7)		

RESULTS

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
05.03.2023	58.4	41.9	23.9	14.6	0.72
06.03.2023	59.6	43.7	21.2	12.9	0.69
12.03.2023	61.2	44.2	27.4	15.0	0.84
13.03.2023	63.7	40.9	28.0	12.6	0.77
19.03.2023	64.1	39.5	25.5	11.8	0.82
20.03.2023	60.9	38.6	24.9	13.7	0.69
26.03.2023	58.4	37.9	21.6	14.5	0.80
27.03.2022	59.6	41.2	20.2	15.0	0.83
02.04.2023	56.9	43.8	24.7	13.9	0.76
03.04.2023	61.2	40.5	26.3	14.1	0.68
09.04.2023	60.8	42.2	27.4	12.6	0.80
10.04.2023	64.8	36.2	25.8	11.1	0.79
16.04.2023	64.0	44.2	24.1	12.7	0.77
17.04.2023	61.9	39.4	23.8	13.6	0.85
23.04.2023	59.8	37.6	21.2	14.1	0.67
24.04.2023	56.7	39.1	22.8	15.0	0.80
30.04.2023	58.1	41.6	26.7	13.2	0.76
01.05.2023	61.3	40.8	28.1	14.1	0.85
07.05.2023	60.5	39.5	25.9	11.6	0.69
08.05.2023	64.8	37.6	24.3	12.8	0.70
14.05.2023	62.0	41.8	23.8	13.7	0.74
15.05.2023	58.4	41.9	23.9	14.6	0.72

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Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Report No:					VEL/AA/157-182
Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
21.05.2023	59.8	42.2	21.8	14.1	0.85
22.05.2023	57.3	43.8	20.0	11.8	0.66
28.05.2023	52.4	39.6	27.5	12.0	0.71
29.05.2023	61.2	35.9	24.6	15.0	0.85

Limit as per NAAQS[#]	Parameter	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
	--	100	60	80	80	4

[#] National Ambient Air Quality Standards.

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VARDAN ENVIROLAB GURGAON

(Approved By)

VARDAN ENVIROLAB Gaurav Pratap Singh

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Test Report

Sample No:	VEL/KAL/AA/183-208	Report No:	VEL/AA/183-208
Name & Address of the Project:	Ballada Bauxite mine Village - Ballada, Tehsil - Nandapur, District - Koraput, Odisha – 764038	Reporting Date:	29/06/2023
		Ref. No:	NIL
		Monitoring Period:	March 2023 to May 2023
Name of company:	Kalinga Alumina Limited.	Equipment Used:	RDS & FPS with all accessories
Sample Collected By:	Vardan Envirolab Representative	Parameter Required:	As per Standard TOR
Sample Description:	Ambient Air Quality Monitoring		
Location:	Badahanjar Village (A8)		

RESULTS

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
05.03.2023	55.9	31.9	19.3	11.9	0.59
06.03.2023	54.3	32.8	21.2	10.5	0.62
12.03.2023	56.1	29.6	18.4	9.8	0.81
13.03.2023	68.2	28.7	17.6	14.2	0.77
19.03.2023	60.7	36.7	18.4	13.6	0.83
20.03.2023	56.2	35.4	16.9	12.7	0.65
26.03.2023	57.5	32.6	19.4	13.2	0.71
27.03.2022	54.9	31.5	21.5	10.6	0.82
02.04.2023	59.3	30.9	20.8	9.8	0.59
03.04.2023	61.2	36.2	19.6	14.1	0.57
09.04.2023	60.8	34.6	18.7	12.6	0.62
10.04.2023	59.3	31.8	16.5	13.7	0.77
16.04.2023	57.4	30.6	17.9	10.5	0.82
17.04.2023	56.3	32.8	21.2	12.9	0.66
23.04.2023	55.6	29.6	18.4	13.7	0.73
24.04.2023	54.8	28.7	17.9	14.1	0.54
30.04.2023	56.7	32.4	21.5	9.6	0.71
01.05.2023	57.2	31.6	20.8	10.8	0.80
07.05.2023	54.6	36.7	19.2	11.6	0.69
08.05.2023	55.7	32.6	18.7	13.4	0.53
14.05.2023	58.1	31.0	16.2	14.4	0.68
15.05.2023	55.9	31.9	19.3	11.9	0.59

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ISO 9001 | ISO 14001 | ISO 45001

Test Report

Report No:					VEL/AA/183-208
Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
21.05.2023	61.3	28.9	17.4	13.6	0.79
22.05.2023	60.8	29.1	18.9	10.2	0.81
28.05.2023	68.5	31.6	21.6	14.1	0.77
29.05.2023	58.4	37.0	20.9	12.6	0.82

Limit as per NAAQS	Parameter	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
	--	100	60	80	80	4

[1]National Ambient Air Quality Standards.

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Test Report

Sample No:	VEL/KAL/AA/209-234	Report No:	VEL/AA/209-234
Name & Address of the Project:	Ballada Bauxite mine Village - Ballada, Tehsil - Nandapur, District - Koraput, Odisha – 764038	Reporting Date:	29/06/2023
		Ref. No:	NIL
		Monitoring Period:	March 2023 to May 2023
Name of company:	Kalinga Alumina Limited.	Equipment Used:	RDS & FPS with all accessories
Sample Collected By:	Vardan Envirolab Representative	Parameter Required:	As per Standard TOR
Sample Description:	Ambient Air Quality Monitoring		
Location:	Badel Village (A9)		

RESULTS

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
05.03.2023	54.1	30.4	16.1	9.4	0.54
06.03.2023	54.3	32.8	21.2	10.5	0.62
12.03.2023	56.1	29.6	18.4	9.8	0.81
13.03.2023	68.2	28.7	17.6	14.2	0.77
19.03.2023	60.7	36.7	18.4	13.6	0.83
20.03.2023	56.2	35.4	16.9	12.7	0.65
26.03.2023	57.5	32.6	19.4	13.2	0.71
27.03.2022	54.9	31.5	21.5	10.6	0.82
02.04.2023	59.3	30.9	20.8	9.8	0.59
03.04.2023	61.2	36.2	19.6	14.1	0.57
09.04.2023	60.8	34.6	18.7	12.6	0.62
10.04.2023	59.3	31.8	16.5	13.7	0.77
16.04.2023	57.4	30.6	17.9	10.5	0.82
17.04.2023	56.3	32.8	21.2	12.9	0.66
23.04.2023	55.6	29.6	18.4	13.7	0.73
24.04.2023	54.8	28.7	17.9	14.1	0.54
30.04.2023	56.7	32.4	21.5	9.6	0.71
01.05.2023	57.2	31.6	20.8	10.8	0.80
07.05.2023	54.6	36.7	19.2	11.6	0.69
08.05.2023	55.7	32.6	18.7	13.4	0.53
14.05.2023	58.1	31.0	16.2	14.4	0.68
15.05.2023	54.1	30.4	16.1	9.4	0.54

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Test Report

Report No:	VEL/AA/209-234				
Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
21.05.2023	61.3	28.9	17.4	13.6	0.79
22.05.2023	60.8	29.1	18.9	10.2	0.81
28.05.2023	59.3	31.6	21.6	14.1	0.77
29.05.2023	58.4	32.4	20.9	12.6	0.82

Limit as per NAAQS	Parameter	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
	--	100	60	80	80	4

[a]National Ambient Air Quality Standards.

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Test Report

Sample No:	VEL/KAL/AA/235-260	Report No:	VEL/AA/235-260
Name & Address of the Project:	Ballada Bauxite mine Village - Ballada, Tehsil - Nandapur, District - Koraput, Odisha – 764038	Reporting Date:	29/06/2023
		Ref. No:	NIL
		Monitoring Period:	March 2023 to May 2023
Name of company:	Kalinga Alumina Limited.	Equipment Used:	RDS & FPS with all accessories
Sample Collected By:	Vardan Envirolab Representative	Parameter Required:	As per Standard TOR
Sample Description:	Ambient Air Quality Monitoring		
Location:	Sagar Village (A10)		

RESULTS

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
05.03.2023	58.4	41.9	23.9	14.6	0.72
06.03.2023	59.6	42.5	21.2	12.9	0.69
12.03.2023	61.2	41.2	27.4	14.1	0.80
13.03.2023	61.5	40.9	27.2	12.6	0.77
19.03.2023	62.5	39.5	25.5	11.8	0.82
20.03.2023	60.9	38.6	24.9	13.7	0.69
26.03.2023	58.4	37.9	21.6	14.5	0.80
27.03.2022	59.6	41.2	20.2	14.0	0.80
02.04.2023	56.9	43.8	24.7	13.9	0.76
03.04.2023	61.2	40.5	26.3	14.1	0.68
09.04.2023	60.8	42.2	27.4	12.6	0.80
10.04.2023	62.2	36.2	25.8	10.8	0.79
16.04.2023	51.0	40.6	24.1	12.7	0.77
17.04.2023	58.8	39.4	23.8	13.6	0.78
23.04.2023	59.8	37.6	21.2	14.1	0.67
24.04.2023	56.7	39.1	22.8	14.0	0.80
30.04.2023	58.1	41.6	26.7	13.2	0.76
01.05.2023	59.8	40.8	25.6	14.1	0.80
07.05.2023	60.5	39.5	25.9	11.6	0.69
08.05.2023	60.2	37.6	24.3	12.8	0.70
14.05.2023	56.0	41.8	23.8	13.7	0.74
15.05.2023	58.4	41.9	23.9	14.6	0.72

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Test Report

Report No:					VEL/AA/235-260
Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
21.05.2023	59.8	42.2	21.8	14.1	0.80
22.05.2023	57.3	40.2	20.0	11.8	0.62
28.05.2023	52.4	39.6	27.5	12.0	0.71
29.05.2023	61.2	35.9	24.6	14.5	0.76

Limit as per NAAQS	Parameter	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)
	--	100	60	80	80	4

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Gaurav Pratap Singh

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Test Report

Location Code	Location Name	PM_{10} ($\mu g/m^3$)	Free Silica (%)	Test Method
A1	Site	57.5	1.31	VEL/EN/STP/174, Issue No.01, Issue Date – 01/11/2023
A2	Near Forest Range of Ballada	76.9	1.79	
A3	Near Primary School Mulda	64.9	1.52	
A4	Bheja Village	70.4	1.60	
A5	Kakua Village	60.8	1.42	
A6	Alanda Village	60.0	1.36	
A7	Soput Village	64.8	1.51	
A8	Badahanjar Village	68.5	1.58	
A9	Badel Village	68.2	1.55	
A10	Sagur Village	62.5	1.42	

(Reviewed By)

(Authorized Signatory)

Vardan EnviroLab
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ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/01	**Report No.:**	VEL/W/2304/10/001
Name & Address of the Project:	Ballada Bauxite mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha – 764038	**Format No.:**	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Description:	Ground Water Sample	**Period of Analysis:**	10/04/2023-14/04/2023
Sample Location:	Village Ballada (GW1)	**Receipt Date:**	10/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	**Sampling Date:**	08/04/2023
Sampling and Analysis Protocol:	IS 3025 & APHA 23rd Edition 2017	**Sampling Quantity:**	5.0 Ltr + 250ml
Preservation:	Ice Box	**Sampling Type:**	Grab

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
1.	pH (at 25 °C)	APHA ,4500-H⁺ B Electrometric Method	8.15	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BLQ (**LOQ 1.0 Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BLQ (**LOQ 1.0 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Disagreeable	--	Agreeable	Agreeable
6.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	153.21	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	45.10	mg/l	75	200
8.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	126.00	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl⁻ B, Argentometric Method	86.21	mg/l	250	1000
10.	Cyanide as CN	APHA , 4500 CN⁻ D	*BLQ(**LOQ 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	8.12	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	346.0	mg/l	500	2000
13.	Sulphate as SO_4	APHA , 4500 E, Turbidimetric Method	104.00	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F⁻ D, SPADNS Method	0.50	mg/l	1.0	1.5
15.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	22.00	mg/l	45	No Relaxation
16.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.24	mg/l	1.0	No relaxation
17.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.03	0.2
18.	Boron	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.5	2.4
19.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.05	No Relaxation

(Checked By) 14/04/2023

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ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/KAL/W/01 — Report No.: VEL/W/2304/10/001

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005 mg/l)	mg/l	0.001	0.002
21.	Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1 mg/l)	mg/l	1.0	No Relaxation
22.	Anionic Detergents as MBAS	Annex K of IS 13428, IS 3025 (P-68)	*BLQ(**LOQ 0.05 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	0.41	mg/l	5	15
24.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	0.02	mg/l	0.05	1.5
25.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.001 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.01	No Relaxation
30.	Mercury as Hg	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.0005 mg/l)	mg/l	0.001	No Relaxation
31.	Total Coliform	IS 1622,1981, RA-2019	<2	MPN/100ml	Shall not be detectable in any 100 ml sample	
32.	E. Coli	IS 1622,1981, RA-2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

Note: - *BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

(Checked by)

14/04/2023

(Approved By)

14/04/2023

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/02	**Report No.:**	VEL/W/2304/10/002
Name & Address of the Project:	Ballada Bauxite mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha – 764038	**Format No.:**	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Description:	Ground Water Sample	**Period of Analysis:**	10/04/2023-14/04/2023
Sample Location:	Village Atanda (GW2)	**Receipt Date:**	10/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	**Sampling Date:**	08/04/2023
Sampling and Analysis Protocol:	IS 3025 & APHA 23rd Edition 2017	**Sampling Quantity:**	5.0 Ltr + 250ml
Preservation:	Ice Box	**Sampling Type:**	Grab

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	8.24	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BLQ (**LOQ 1.0 Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BLQ (**LOQ 1.0 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	DisAgreeable	--	Agreeable	Agreeable
6.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	265.19	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	51.0	mg/l	75	200
8.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	132.00	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	81.89	mg/l	250	1000
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(**LOQ 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	7.89	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	356.00	mg/l	500	2000
13.	Sulphate as SO_4	APHA , 4500 E, Turbidimetric Method	110.00	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	0.68	mg/l	1.0	1.5
15.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	26.24	mg/l	45	No Relaxation
16.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.22	mg/l	1.0	No relaxation
17.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.03	0.2
18.	Boron	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.5	2.4
19.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.05	No Relaxation

(Checked by) 14/04/2023

(Approved By) 14/04/23

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/KAL/W/02 | Report No.: VEL/W/2304/10/002

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005 mg/l)	mg/l	0.001	0.002
21.	Mineral Oil	Cause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1 mg/l)	mg/l	1.0	No Relaxation
22.	Anionic Detergents as MBAS	Annex K of IS 13428, IS 3025 (P-68)	*BLQ(**LOQ 0.05 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	1.13	mg/l	5	15
24.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	0.04	mg/l	0.05	1.5
25.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.001 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.01	No Relaxation
30.	Mercury as Hg	IS 3025 (P-65):2014(RA:2019)	*BLQ (**LOQ 0.0005 mg/l)	mg/l	0.001	No Relaxation
31.	Total Coliform	IS 1622,1981, RA-2019	<2	MPN/100ml	Shall not be detectable in any 100 ml sample	
32.	E. Coli	IS 1622,1981, RA-2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

Note: - *BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

(Checked by) 14/04/2023

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/03	Report No.:	VEL/W/2304/10/003
Name & Address of the Projec	Bullada Bauxite mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha – 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Description:	Ground Water Sample	Period of Analysis:	10/04/2023-14/04/2023
Sample Location:	Village Jabagada (GW3)	Receipt Date:	10/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	08/04/2023
Sampling and Analysis Protocol:	IS 3025 & APHA 23rd Edition 2017	Sampling Quantity:	5.0 Ltr + 250ml
Preservation:	Ice Box	Sampling Type:	Grab

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	7.83	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BLQ (**LOQ 1.0 Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BLQ (**LOQ 1.0 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	142.20	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	46.85	mg/l	75	200
8.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	113.24	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	85.21	mg/l	250	1000
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(**LOQ 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	3.63	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	330.0	mg/l	500	2000
13.	Sulphate as SO_4	APHA , 4500 E, Turbidimetric Method	97.38	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	0.54	mg/l	1.0	1.5
15.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	25.30	mg/l	45	No Relaxation
16.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.40	mg/l	1.0	No relaxation
17.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.03	0.2
18.	Boron	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.5	2.4
19.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.05	No Relaxation

(Checked by) 14/04/2023

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/KAL/W/03 — Report No: VEL/W/2304/10/003

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005 mg/l)	mg/l	0.001	0.002
21.	Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1 mg/l)	mg/l	1.0	No Relaxation
22.	Anionic Detergents as MBAS	Annex K of IS 13428, IS 3025 (P-68)	*BLQ(**LOQ 0.05 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	0.76	mg/l	5	15
24.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	0.05	mg/l	0.05	1.5
25.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.001 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.01	No Relaxation
30.	Mercury as Hg	IS 3025 (P-65):2014(RA:2019)	*BLQ (**LOQ 0.0005 mg/l)	mg/l	0.001	No Relaxation
31.	Total Coliform	IS 1622,1981, RA-2019	<2	MPN/100ml	Shall not be detectable in any 100 ml sample	
32.	E. Coli	IS 1622,1981, RA-2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

Note: -*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/04	**Report No.:**	VEL/W/2304/10/004
Name & Address of the Project:	Ballada Bauxite mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha – 764038	**Format No.:**	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Description:	Ground Water Sample	**Period of Analysis:**	10/04/2023-14/04/2023
Sample Location:	Village Banjalaput (GW4)	**Receipt Date:**	10/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	**Sampling Date:**	08/04/2023
Sampling and Analysis Protocol:	IS 3025 & APHA 23rd Edition 2017	**Sampling Quantity:**	5.0 Ltr + 250ml
Preservation:	Ice Box	**Sampling Type:**	Grab

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	7.86	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BLQ (**LOQ 1.0 Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephlelometric Method	*BLQ (**LOQ 1.0 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	DisAgreeable	--	Agreeable	Agreeable
6.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	151.36	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	37.57	mg/l	75	200
8.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	130.01	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	95.20	mg/l	250	1000
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(LOQ 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	10.26	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	360.0	mg/l	500	2000
13.	Sulphate as SO_4	APHA , 4500 E, Turbidimetric Method	130.00	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	1.04	mg/l	1.0	1.5
15.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	25.60	mg/l	45	No Relaxation
16.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.30	mg/l	1.0	No relaxation
17.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.03	0.2
18.	Boron	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.5	2.4
19.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.05	No Relaxation

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/KAL/W/04					Report No.: VEL/W/2304/10/004	
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005 mg/l)	mg/l	0.001	0.002
21.	Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1 mg/l)	mg/l	1.0	No Relaxation
22.	Anionic Detergents as MBAS	Annex K of IS 13428, IS 3025 (P-65)	*BLQ(**LOQ 0.05 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	1.19	mg/l	5	15
24.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	0.07	mg/l	0.05	1.5
25.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.001 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.01	No Relaxation
30.	Mercury as Hg	IS 3025 (P-65):2014(RA:2019)	*BLQ (**LOQ 0.0005 mg/l)	mg/l	0.001	No Relaxation
31.	Total Coliform	IS 1622,1981, RA-2019	<2	MPN/100ml	Shall not be detectable in any 100 ml sample	
32.	E. Coli	IS 1622,1981, RA-2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

Note: - *BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

(Checked by) 19/04/2023

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/05	**Report No.:**	VEL/W/2304/10/005
Name & Address of the Project:	Ballada Bauxite mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha – 764038	**Format No.:**	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Description:	Ground Water Sample	**Period of Analysis:**	10/04/2023-14/04/2023
Sample Location:	Village Somli (GW5)	**Receipt Date:**	10/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	**Sampling Date:**	08/04/2023
Sampling and Analysis Protocol:	IS 3025 & APHA 23rd Edition 2017	**Sampling Quantity:**	5.0 Ltr + 250ml
Preservation:	Ice Box	**Sampling Type:**	Grab

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	7.74	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BLQ (**LOQ 1.0 Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BLQ (**LOQ 1.0 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	300.44	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	68.30	mg/l	75	200
8.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	282.18	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	86.10	mg/l	250	1000
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(**LOQ 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	12.00	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	375.0	mg/l	500	2000
13.	Sulphate as SO_4	APHA , 4500 E, Turbidimetric Method	120.60	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	1.06	mg/l	1.0	1.5
15.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	26.20	mg/l	45	No Relaxation
16.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.19	mg/l	1.0	No relaxation
17.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.03	0.2
18.	Boron	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.5	2.4
19.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.05	No Relaxation

(Checked by) 14/04/2023

(Approved by) 14/04/23

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/KAL/W/05					Report No.: VEL/W/2304/10/005	
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005 mg/l)	mg/l	0.001	0.002
21.	Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1 mg/l)	mg/l	1.0	No Relaxation
22.	Anionic Detergents as MBAS	Annex K of IS 13428, IS 3025 (P-68)	*BLQ(**LOQ 0.05 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	1.16	mg/l	5	15
24.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	0.04	mg/l	0.05	1.5
25.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.001 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.01	No Relaxation
30.	Mercury as Hg	IS 3025 (P-65):2014(RA:2019)	*BLQ (**LOQ 0.0005 mg/l)	mg/l	0.001	No Relaxation
31.	Total Coliform	IS 1622,1981, RA-2019	<2	MPN/100ml	Shall not be detectable in any 100 ml sample	
32.	E. Coli	IS 1622,1981, RA-2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

Note: - *BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

(Checked by) 14/09/2023

(Approved By) 14/09/23

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/06	Report No.:	VEL/W/2304/10/006
Name & Address of the Project:	Ballada Bauxite mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha – 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Description:	Ground Water Sample	Period of Analysis:	10/04/2023-14/04/2023
Sample Location:	Village Kandaput (GW6)	Receipt Date:	10/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	08/04/2023
Sampling and Analysis Protocol:	IS 3025 & APHA 23rd Edition 2017	Sampling Quantity:	5.0 Ltr + 250ml
Preservation:	Ice Box	Sampling Type:	Grab

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	7.65	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BLQ (**LOQ 1.0 Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephlelometric Method	*BLQ (**LOQ 1.0 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	175.45	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	51.44	mg/l	75	200
8.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	154.50	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	74.00	mg/l	250	1000
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(**LOQ 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	10.000	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	340.0	mg/l	500	2000
13.	Sulphate as SO_4	APHA , 4500 E, Turbidimetric Method	140.81	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	1.20	mg/l	1.0	1.5
15.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	34.23	mg/l	45	No Relaxation
16.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.30	mg/l	1.0	No relaxation
17.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.03	0.2
18.	Boron	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.5	2.4
19.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.05	No Relaxation

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/KAL/W/06 | Report No.: VEL/W/2304/10/006

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005 mg/l)	mg/l	0.001	0.002
21.	Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1 mg/l)	mg/l	1.0	No Relaxation
22.	Anionic Detergents as MBAS	Annex K of IS 13428, IS 3025 (P-68)	*BLQ(**LOQ 0.05 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	1.14	mg/l	5	15
24.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	0.05	mg/l	0.05	1.5
25.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.001 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.01	No Relaxation
30.	Mercury as Hg	IS 3025 (P-65):2014(RA:2019)	*BLQ (**LOQ 0.0005 mg/l)	mg/l	0.001	No Relaxation
31.	Total Coliform	IS 1622,1981, RA-2019	<2	MPN/100ml	Shall not be detectable in any 100 ml sample	
32.	E. Coli	IS 1622,1981, RA-2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

Note: - *BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

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14/04/2023

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14/04/23

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/07	Report No.:	VEL/W/2304/10/007
Name & Address of the Project:	Ballada Bauxite mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha – 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Description:	Ground Water Sample	Period of Analysis:	10/04/2023-14/04/2023
Sample Location:	Village Near Raising (GW7)	Receipt Date:	10/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	08/04/2023
Sampling and Analysis Protocol:	IS 3025 & APHA 23rd Edition 2017	Sampling Quantity:	5.0 Ltr + 250ml
Preservation:	Ice Box	Sampling Type:	Grab

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	7.65	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BLQ (**LOQ 1.0 Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BLQ (**LOQ 1.0 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	DisAgreeable	--	Agreeable	Agreeable
6.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	181.50	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	41.20	mg/l	75	200
8.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	145.33	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	101.36	mg/l	250	1000
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(**LOQ 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	17.00	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	380.00	mg/l	500	2000
13.	Sulphate as SO_4	APHA , 4500 E, Turbidimetric Method	121.88	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	0.40	mg/l	1.0	1.5
15.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	30.60	mg/l	45	No Relaxation
16.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.27	mg/l	1.0	No relaxation
17.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.03	0.2
18.	Boron	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.5	2.4
19.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.05	No Relaxation

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Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/KAL/W/07					Report No.: VEL/W/2304/10/007	
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005 mg/l)	mg/l	0.001	0.002
21.	Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1 mg/l)	mg/l	1.0	No Relaxation
22.	Anionic Detergents as MBAS	Annex K of IS 13428, IS 3025 (P-68)	*BLQ(**LOQ 0.05 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	1.31	mg/l	5	15
24.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	0.05	mg/l	0.05	1.5
25.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.001 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.01	No Relaxation
30.	Mercury as Hg	IS 3025 (P-65):2014(RA:2019)	*BLQ (**LOQ 0.0005 mg/l)	mg/l	0.001	No Relaxation
31.	Total Coliform	IS 1622,1981, RA-2019	<2	MPN/100ml	Shall not be detectable in any 100 ml sample	
32.	E. Coli	IS 1622,1981, RA-2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

Note: - *BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/08	Report No.:	VEL/W/2304/10/008
Name & Address of the Project:	Ballada Bauxite mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha – 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Description:	Ground Water Sample	Period of Analysis:	10/04/2023-14/04/2023
Sample Location:	Village Kandara (GW8)	Receipt Date:	10/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	08/04/2023
Sampling and Analysis Protocol:	IS 3025 & APHA 23rd Edition 2017	Sampling Quantity:	5.0 Ltr + 250ml
Preservation:	Ice Box	Sampling Type:	Grab

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	7.55	--	6.5 to 8.5	No Relaxation
2.	Colour	APHA ,2120 B, Visual Comparison Method	*BLQ (**LOQ 1.0 Hazen)	Hazen	5	15
3.	Turbidity	APHA, 2130 B, Nephelometric Method	*BLQ (**LOQ 1.0 NTU)	NTU	1	5
4.	Odour	APHA, 2150 B , Threshold Odour Method	Agreeable	--	Agreeable	Agreeable
5.	Taste	APHA , 2160 B, Threshold Test Method	DisAgreeable	--	Agreeable	Agreeable
6.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	176.28	mg/l	200	600
7.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	53.25	mg/l	75	200
8.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	159.28	mg/l	200	600
9.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	78.23	mg/l	250	1000
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(**LOQ 0.02 mg/l)	mg/l	0.05	No Relaxation
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	12.00	mg/l	30	100
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	320.00	mg/l	500	2000
13.	Sulphate as SO_4	APHA , 4500 E, Turbidimetric Method	122.73	mg/l	200	400
14.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	0.75	mg/l	1.0	1.5
15.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	26.98	mg/l	45	No Relaxation
16.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.11	mg/l	1.0	No relaxation
17.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.03	0.2
18.	Boron	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.5	2.4
19.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.05	No Relaxation

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Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/KAL/W/08			Report No.: VEL/W/2304/10/008			
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable) Limit	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005 mg/l)	mg/l	0.001	0.002
21.	Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1 mg/l)	mg/l	1.0	No Relaxation
22.	Anionic Detergents as MBAS	Annex K of IS 13428, IS 3025 (P-68)	*BLQ(**LOQ 0.05 mg/l)	mg/l	0.2	1.0
23.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	1.34	mg/l	5	15
24.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	0.04	mg/l	0.05	1.5
25.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01 mg/l)	mg/l	0.1	0.3
26.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.003	No Relaxation
27.	Lead as Pb	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002 mg/l)	mg/l	0.01	No Relaxation
28.	Selenium as Se	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.001 mg/l)	mg/l	0.01	No Relaxation
29.	Arsenic as As	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005 mg/l)	mg/l	0.01	No Relaxation
30.	Mercury as Hg	IS 3025 (P-65):2014(RA:2019)	*BLQ (**LOQ 0.0005 mg/l)	mg/l	0.001	No Relaxation
31.	Total Coliform	IS 1622,1981, RA-2019	<2	MPN/100ml	Shall not be detectable in any 100 ml sample	
32.	E. Coli	IS 1622,1981, RA-2019	Absent	MPN/100ml	Shall not be detectable in any 100 ml sample	

Note: - *BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

(Checked by) 14/04/2023

(Approved By) 14/04/23

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/12	**Report No.:**	VEL/W/2304/10/012
Name & Address of the Project:	Ballada Bauxite mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	**Format No.:**	7.8 F-01
		Party Reference No.:	NIL
Name of company:	Kalinga Alumina Limited.	**Reporting Date:**	14/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	**Sampling Date:**	08/04/2023
Preservation:	Ice Box	**Sampling Quantity:**	5.0 Ltr + 250ml
Sample Location	Near Paduwa River (SW4)		
Sampling and Analysis Protocol:	IS 3025 & APHA, 23rd Edition 2017	**Sampling Type:**	Grab

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	7.67	--
2.	Colour	APHA ,2120 B, Visual Comparison Method	18.0	Hazen
3.	Turbidity	APHA, 2130 B, Nephelometric Method	34.00	NTU
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--
5.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	78.0	mg/l
6.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	28.1	mg/l
7.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	66.0	mg/l
8.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	36.0	mg/l
9.	Residual free Chlorine	APHA, 4500 Cl B Iodometric Method	*BLQ(**LOQ 0.15)	mg/l
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(**LOQ 0.02)	mg/l
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	1.88	mg/l
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	325.0	mg/l
13.	Total Suspended solids	APHA,2540 D Gravimetric Method	37.61	mg/l
14.	Dissolved Oxygen	APHA,4500 O B Iodometric Method	6.8	mg/l
15.	Sulphate as SO^{-1}	APHA , 4500 E, Turbidimetric Method	180.00	mg/l
16.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	*BLQ(**LOQ 0.2)	mg/l
17.	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025,P-44	6.00	mg/l
18.	COD	APHA, 5220 B, Open Reflux Method	20.00	mg/l

(Checked by)

14/04/2023

(Approved By)

VARDAN ENVIRO LAB
Dr. Shiv Prakash Singh
Authorised Signatory

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/KAL/W/12 | Report No.: VEL/W/2304/10/012

S. No.	Parameter	Test-Method	Result	Unit
19.	Conductivity (at 25 °C)	APHA, 2510 B, Conductivity Meter Method	0.524	mS/cm
20.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	21.5	mg/l
21.	Sodium as Na	APHA,3500 Na B, Flame Photometric Method	25.0	mg/l
22.	Potassium as K	APHA 3500 K B, Flame Photometric Method	5.0	mg/l
23.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.30	mg/l
24.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005)	mg/l
25.	Boron	IS 3025 (P-65):2014(RA:2019)	0.37	mg/l
26.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002)	mg/l
27.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005)	mg/l
28.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1)	mg/l
29.	#Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BLQ(**LOQ 0.05)	mg/l
30.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	2.18	mg/l
31.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002)	mg/l
32.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01)	mg/l
33.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002)	mg/l
34.	Total Coliform	IS 1622,1981, RA-2019	1500	MPN/100ml
35.	Fecal Coliform	IS 1622,1981, RA-2019	1100	MPN/100ml

Note: -#These parameter are not covered in our NABL scope.
*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

(Checked by) 10/04/2023

(Approved By) Dr. Shiv Prakash Singh 10/4/2023
VARDAN ENVIROLAB Authorised Signatory

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/13	Report No.:	VEL/W/2304/10/013
Name & Address of the Project:	Ballada Bauxite mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
Name of company:	Kalinga Alumina Limited.		
		Reporting Date:	14/04/2023
		Receipt Date:	10/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	08/04/2023
Preservation:	Ice Box	Sampling Quantity:	5.0 Ltr + 250ml
Sampling Location:	Pond Near village kumiput (SW5)		
Sampling and Analysis Protocol:	IS 3025 & APHA, 23rd Edition 2017	Sampling Type:	Grab

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	7.51	--
2.	Colour	APHA ,2120 B, Visual Comparison Method	20.0	Hazen
3.	Turbidity	APHA, 2130 B, Nephlelometric Method	24.00	NTU
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--
5.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	80.0	mg/l
6.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	26.0	mg/l
7.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	68.0	mg/l
8.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	32.0	mg/l
9.	Residual free Chlorine	APHA, 4500 CTB Iodometric Method	*BLQ(**LOQ 0.15)	mg/l
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(**LOQ 0.02)	mg/l
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	12.4	mg/l
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	400.0	mg/l
13.	Total Suspended solids	APHA,2540 D Gravimetric Method	24.00	mg/l
14.	Dissolved Oxygen	APHA,4500 O B Iodometric Method	6.0	mg/l
15.	Sulphate as SO^4	APHA , 4500 E, Turbidimetric Method	26.0	mg/l
16.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	0.20	mg/l
17.	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025,P-44	10.00	mg/l
18.	COD	APHA, 5220 B, Open Reflux Method	60.00	mg/l

(Checked by)

14/04/2023

(Approved By)

VARDAN ENVIROLAB
Shiv Prakash Singh
Authorised Signatory

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/KAL/W/13 | Report No.: VEL/W/2304/10/013

S. No.	Parameter	Test-Method	Result	Unit
19.	Conductivity (at 25 °C)	APHA, 2510 B, Conductivity Meter Method	0.645	mS/cm
20.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	16.2	mg/l
21.	Sodium as Na	APHA,3500 Na B, Flame Photometric Method	22.6	mg/l
22.	Potassium as K	APHA 3500 K B, Flame Photometric Method	4.9	mg/l
23.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.30	mg/l
24.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005)	mg/l
25.	Boron	IS 3025 (P-65):2014(RA:2019)	0.56	mg/l
26.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002)	mg/l
27.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005)	mg/l
28.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1)	mg/l
29.	#Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BLQ(**LOQ 0.05)	mg/l
30.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	2.06	mg/l
31.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002)	mg/l
32.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01)	mg/l
33.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002)	mg/l
34.	Total Coliform	IS 1622,1981, RA-2019	1000	MPN/100ml
35.	Fecal Coliform	IS 1622,1981, RA-2019	800	MPN/100ml

Note: -#These parameter are not covered in our NABL scope.
*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

(Checked by) 10/08/2023

VARDAN ENVIROLAB PVT. LTD. GURGAON

(Approved By)

Dr. Shiv Prakash Singh
Authorised Signatory

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/14	**Report No.:**	VEL/W/2304/10/014
Name & Address of the Project:	Ballada Bauxite mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	**Format No.:**	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Collected by:	Vardan Enviro Lab Representative	**Sampling Date:**	08/04/2023
Preservation:	Ice Box	**Sampling Quantity:**	5.0 Ltr + 250ml .
Sampling Location:	Near Parata River(SW6)		
Sampling and Analysis Protocol:	IS 3025 & APHA, 23rd Edition 2017	**Sampling Type:**	Grab

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	7.56	--
2.	Colour	APHA ,2120 B, Visual Comparison Method	14.0	Hazen
3.	Turbidity	APHA, 2130 B, Nephlelometric Method	46.00	NTU
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--
5.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	74.0	mg/l
6.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	24.0	mg/l
7.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	64.0	mg/l
8.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	34.0	mg/l
9.	Residual free Chlorine	APHA, 4500 CTB Iodometric Method	*BLQ(**LOQ 0.15)	mg/l
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(**LOQ 0.02)	mg/l
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	10.02	mg/l
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	244.0	mg/l
13.	Total Suspended solids	APHA,2540 D Gravimetric Method	12.0	mg/l
14.	Dissolved Oxygen	APHA,4500 O B Iodometric Method	7.2	mg/l
15.	Sulphate as SO_4	APHA , 4500 E, Turbidimetric Method	20.2	mg/l
16.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	*BLQ(**LOQ 0.2)	mg/l
17.	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025,P-44	6.00	mg/l
18.	COD	APHA, 5220 B, Open Reflux Method	24.00	mg/l

(Checked by)

14/04/2023

(Approved By)

VARDAN ENVIROLAB Pratibha Singh Authorised Signatory

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/KAL/W/14 — Report No.: VEL/W/2304/10/014

S. No.	Parameter	Test-Method	Result	Unit
19.	Conductivity (at 25 °C)	APHA, 2510 B, Conductivity Meter Method	0.398	mS/cm
20.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	4.6	mg/l
21.	Sodium as Na	APHA,3500 Na B, Flame Photometric Method	20.2	mg/l
22.	Potassium as K	APHA 3500 K B, Flame Photometric Method	4.8	mg/l
23.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.30	mg/l
24.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005)	mg/l
25.	Boron	IS 3025 (P-65):2014(RA:2019)	0.64	mg/l
26.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002)	mg/l
27.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005)	mg/l
28.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1)	mg/l
29.	#Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BLQ(**LOQ 0.05)	mg/l
30.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	1.20	mg/l
31.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002)	mg/l
32.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01)	mg/l
33.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002)	mg/l
34.	Total Coliform	IS 1622,1981, RA-2019	900	MPN/100ml
35.	Fecal Coliform	IS 1622,1981, RA-2019	500	MPN/100ml

Note: -#These parameter are not covered in our NABL scope.
*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

(Checked by)

14/04/2023

(Approved by)

VARDAN ENVIROLAB PVT. LTD. GURGAON
Pradeep Singh
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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/15	**Report No.:**	VEL/W/2304/10/015
Name & Address of the Project:	Ballada Bauxite mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	**Format No.:**	7.8 F-01
		Party Reference No.:	NIL
Name of company:	Kalinga Alumina Limited.	**Reporting Date:**	14/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	**Sampling Date:**	08/04/2023
Preservation:	Ice Box	**Sampling Quantity:**	5.0 Ltr + 250ml .
Sampling Location:	Basukigarha Nala Near Sangamagurha vill. (SW7)		
Sampling and Analysis Protocol:	IS 3025 & APHA, 23rd Edition 2017	**Sampling Type:**	Grab

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	APHA ,4500-H^+ B Electrometric Method	7.62	–
2.	Colour	APHA ,2120 B, Visual Comparison Method	16.0	Hazen
3.	Turbidity	APHA, 2130 B, Nephelometric Method	48.00	NTU
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	–
5.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	76.0	mg/l
6.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	24.8	mg/l
7.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	64.4	mg/l
8.	Chloride as Cl	APHA, 4500-Cl^- B, Argentometric Method	34.6	mg/l
9.	Residual free Chlorine	APHA, 4500 CL B Iodometric Method	*BLQ(**LOQ 0.15)	mg/l
10.	Cyanide as CN	APHA , 4500 CN^- D	*BLQ(**LOQ 0.02)	mg/l
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	16.45	mg/l
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	260.0	mg/l
13.	Total Suspended solids	APHA,2540 D Gravimetric Method	12.0	mg/l
14.	Dissolved Oxygen	APHA,4500 O B Iodometric Method	5.9	mg/l
15.	Sulphate as SO^4	APHA , 4500 E, Turbidimetric Method	162.00	mg/l
16.	Fluoride as F	APHA , 4500-F^- D, SPADNS Method	*BLQ(**LOQ 0.2)	mg/l
17.	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025,P-44	8.00	mg/l
18.	COD	APHA, 5220 B, Open Reflux Method	30.00	mg/l

(Checked by)

(Approved By)

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/KAL/W/15 — Report No.: VEL/W/2304/10/015

S. No.	Parameter	Test-Method	Result	Unit
19.	Conductivity (at 25 °C)	APHA, 2510 B, Conductivity Meter Method	0.390	mS/cm
20.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	5.2	mg/l
21.	Sodium as Na	APHA,3500 Na B, Flame Photometric Method	22.2	mg/l
22.	Potassium as K	APHA 3500 K B, Flame Photometric Method	4.2	mg/l
23.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.32	mg/l
24.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005)	mg/l
25.	Boron	IS 3025 (P-65):2014(RA:2019)	0.66	mg/l
26.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002)	mg/l
27.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005)	mg/l
28.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1)	mg/l
29.	#Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BLQ(**LOQ 0.05)	mg/l
30.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	1.24	mg/l
31.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002)	mg/l
32.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01)	mg/l
33.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002)	mg/l
34.	Total Coliform	IS 1622,1981, RA-2019	940	MPN/100ml
35.	Fecal Coliform	IS 1622,1981, RA-2019	490	MPN/100ml

Note: -#These parameter are not covered in our NABL scope.
*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

(Checked by)

14/04/2023

(Approved By)

Prakash Singh
Authorised Signatory

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/16	**Report No.:**	VEL/W/2304/10/016
Name & Address of the Project:	Ballada Bauxite mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	**Format No.:**	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Collected by:	Vardan Enviro Lab Representative	**Sampling Date:**	08/04/2023
Preservation:	Ice Box	**Sampling Quantity:**	5.0 Ltr + 250ml .
Sampling Location:	Pond Near Balda village (SW8)		
Sampling and Analysis Protocol:	IS 3025 & APHA, 23rd Edition 2017	**Sampling Type:**	Grab

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	7.67	--
2.	Colour	APHA ,2120 B, Visual Comparison Method	60.0	Hazen
3.	Turbidity	APHA, 2130 B, Nephlelometric Method	57.0	NTU
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--
5.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	74.0	mg/l
6.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	25.4	mg/l
7.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	65.2	mg/l
8.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	34.6	mg/l
9.	Residual free Chlorine	APHA, 4500 Cl B Iodometric Method	*BLQ(**LOQ 0.15)	mg/l
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(**LOQ 0.02)	mg/l
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	12.2	mg/l
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	285.0	mg/l
13.	Total Suspended solids	APHA,2540 D Gravimetric Method	14.2	mg/l
14.	Dissolved Oxygen	APHA,4500 O B Iodometric Method	5.2	mg/l
15.	Sulphate as SO^{-4}	APHA , 4500 E, Turbidimetric Method	18.2	mg/l
16.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	0.32	mg/l
17.	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025,P-44	14.00	mg/l
18.	COD	APHA, 5220 B, Open Reflux Method	57.00	mg/l

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VARDAN ENVIROLAB * Authorized Signatory

Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/KAL/W/16			Report No.: VEL/W/2304/10/016	
S. No.	Parameter	Test-Method	Result	Unit
19.	Conductivity (at 25 °C)	APHA, 2510 B, Conductivity Meter Method	0.462	mS/cm
20.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	32.25	mg/l
21.	Sodium as Na	APHA,3500 Na B, Flame Photometric Method	108.00	mg/l
22.	Potassium as K	APHA 3500 K B, Flame Photometric Method	38.67	mg/l
23.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	1.72	mg/l
24.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005)	mg/l
25.	Boron	IS 3025 (P-65):2014(RA:2019)	0.32	mg/l
26.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002)	mg/l
27.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005)	mg/l
28.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1)	mg/l
29.	#Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BLQ(**LOQ 0.05)	mg/l
30.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	1.44	mg/l
31.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002)	mg/l
32.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01)	mg/l
33.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002)	mg/l
34.	Total Coliform	IS 1622,1981, RA-2019	1200	MPN/100ml
35.	Fecal Coliform	IS 1622,1981, RA-2019	900	MPN/100ml

Note: -#These parameter are not covered in our NABL scope.
*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

(Checked by) 14/04/2023

(Approved By)

VARDAN ENVIROLAB Pvt. Ltd. Authorised Signatory

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/09	**Report No.:**	VEL/W/2304/10/009
Name & Address of the Project:	Ballada Bauxite mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	**Format No.:**	7.8 F-01
		Party Reference No.:	NIL
Name of company:	Kalinga Alumina Limited.	**Reporting Date:**	14/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	**Sampling Date:**	08/04/2023
Preservation:	Ice Box	**Sampling Quantity:**	5.0 Ltr + 250ml
Sample Location	Water Body Site (SW1)		
Sampling and Analysis Protocol:	IS 3025 & APHA, 23rd Edition 2017	**Sampling Type:**	Grab

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	7.72	--
2.	Colour	APHA ,2120 B, Visual Comparison Method	10.0	Hazen
3.	Turbidity	APHA, 2130 B, Nephlelometric Method	41.00	NTU
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--
5.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	81.00	mg/l
6.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	30.00	mg/l
7.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	69.2	mg/l
8.	Chloride as Cl	APHA, 4500-Cl- B, Argentometric Method	39.4	mg/l
9.	Residual free Chlorine	APHA, 4500 Cl B Iodometric Method	*BLQ(**LOQ 0.15)	mg/l
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(**LOQ 0.02)	mg/l
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	1.46	mg/l
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	260.0	mg/l
13.	Total Suspended solids	APHA,2540 D Gravimetric Method	47.34	mg/l
14.	Dissolved Oxygen	APHA,4500 O B Iodometric Method	6.8	mg/l
15.	Sulphate as SO_4	APHA , 4500 E, Turbidimetric Method	146.41	mg/l
16.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	0.18	mg/l
17.	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025,P-44	6.00	mg/l
18.	COD	APHA, 5220 B, Open Reflux Method	40.00	mg/l

(Checked by)

14/04/2023

VARDAN ENVIRO LAB GURGAON

(Approved By)

VARDAN ENVIROLAB Dr Shiv Prakash Singh Authorised Signatory

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/KAL/W/09 — Report No.: VEL/W/2304/10/009

S. No.	Parameter	Test-Method	Result	Unit
19.	Conductivity (at 25 °C)	APHA, 2510 B, Conductivity Meter Method	0.392	mS/cm
20.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	4.6	mg/l
21.	Sodium as Na	APHA,3500 Na B, Flame Photometric Method	21.4	mg/l
22.	Potassium as K	APHA 3500 K B, Flame Photometric Method	4.7	mg/l
23.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.04	mg/l
24.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005)	mg/l
25.	Boron	IS 3025 (P-65):2014(RA:2019)	0.62	mg/l
26.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002)	mg/l
27.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005)	mg/l
28.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.01)	mg/l
29.	#Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BLQ(**LOQ 0.05)	mg/l
30.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	0.09	mg/l
31.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002)	mg/l
32.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01)	mg/l
33.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002)	mg/l
34.	Total Coliform	IS 1622,1981, RA-2019	1200	MPN/100ml
35.	Fecal Coliform	IS 1622,1981, RA-2019	800	MPN/100ml

Note: -#These parameter are not covered in our NABL scope.
*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

(Checked by)
14/04/2023

VARDAN ENVIROLAB PVT. LTD.

(Approved By)
Dr Pradeep Sharma
14/04/23
VARDAN ENVIRO LAB
Authorised Signatory

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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/10	Report No.:	VEL/W/2304/10/010
Name & Address of the Project:	Ballada Bauxite mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
Name of company:	Kalinga Alumina Limited.	Reporting Date:	14/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	Sampling Date:	08/04/2023
Preservation:	Ice Box	Sampling Quantity:	5.0 Ltr + 250ml
Sample Location	Near Jalaput Reservoir (SW2)		
Sampling and Analysis Protocol:	IS & APHA, 23rd Edition 2017	Sampling Type:	Grab

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	APHA ,4500-H+ B Electrometric Method	7.68	--
2.	Colour	APHA ,2120 B, Visual Comparison Method	20.0	Hazen
3.	Turbidity	APHA, 2130 B, Nephlelometric Method	12.0	NTU
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--
5.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	76.0	mg/l
6.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	24.6	mg/l
7.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	66.4	mg/l
8.	Chloride as Cl	APHA, 4500-CI- B, Argentometric Method	34.6	mg/l
9.	Residual free Chlorine	APHA, 4500 CTB Iodometric Method	*BLQ(**LOQ 0.15 mg/l)	mg/l
10.	Cyanide as CN	APHA , 4500 CN- D	*BLQ(**LOQ 0.02 mg/l)	mg/l
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	3.52	mg/l
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	236.0	mg/l
13.	Total Suspended solids	APHA,2540 D Gravimetric Method	41.21	mg/l
14.	Dissolved Oxygen	APHA,4500 O B Iodometric Method	6.9	mg/l
15.	Sulphate as SO^{-1}	APHA , 4500 E, Turbidimetric Method	34.0	mg/l
16.	Fluoride as F	APHA , 4500-F- D, SPADNS Method	0.21	mg/l
17.	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025,P-44	4.00	mg/l
18.	COD	APHA, 5220 B, Open Reflux Method	16.00	mg/l

(Checked by)

14/04/2023

(Approved By)

Dr. Shiv Pratap Singh
Authorised Signatory

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Sample No.: VEL/KAL/W/10

Report No.: VEL/W/2304/10.010

Test Report

S. No.	Parameter	Test-Method	Result	Unit
19.	Conductivity (at 25 °C)	APHA, 2510 B, Conductivity Meter Method	0.384	mS/cm
20.	Nitrate as NO_3	IS 3025 (P-34) ,Chronotropic Method	4.2	mg/l
21.	Sodium as Na	APHA,3500 Na B, Flame Photometric Method	21.0	mg/l
22.	Potassium as K	APHA 3500 K B, Flame Photometric Method	5.2	mg/l
23.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.02	mg/l
24.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005)	mg/l
25.	Boron	IS 3025 (P-65):2014(RA:2019)	0.70	mg/l
26.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002)	mg/l
27.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005)	mg/l
28.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1)	mg/l
29.	#Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BLQ(**LOQ 0.05)	mg/l
30.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	0.06	mg/l
31.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002)	mg/l
32.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01)	mg/l
33.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002)	mg/l
34.	Total Coliform	IS 1622,1981, RA-2019	1100	MPN/100ml
35.	Fecal Coliform	IS 1622,1981, RA-2019	800	MPN/100ml

Note: -#These parameter are not covered in our NABL scope.
*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

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14/04/2023

(Approved By)

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/W/11	**Report No.:**	VEL/W/2304/10/011
Name & Address of the Project:	Ballada Bauxite mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	**Format No.:**	7.8 F-01
		Party Reference No.:	NIL
Name of company:	Kalinga Alumina Limited.	**Reporting Date:**	14/04/2023
Sample Collected by:	Vardan Enviro Lab Representative	**Sampling Date:**	08/04/2023
Preservation:	Ice Box	**Sampling Quantity:**	5.0 Ltr + 250ml
Sample Location	Near Daba Reservoir (SW3)		
Sampling and Analysis Protocol:	IS 3025 & APHA, 23rd Edition 2017	**Sampling Type:**	Grab

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	APHA ,4500-H^+ B Electrometric Method	7.68	--
2.	Colour	APHA ,2120 B, Visual Comparison Method	8.0	Hazen
3.	Turbidity	APHA, 2130 B, Nephlelometric Method	16.0	NTU
4.	Odour	APHA, 2150 B , Threshold Test Method	Agreeable	--
5.	Total Hardness as $CaCO_3$	APHA , 2340 C, EDTA Titrimetric Method	70.0	mg/l
6.	Calcium as Ca	APHA, 3500 Ca B, EDTA Titrimetric Method	22.1	mg/l
7.	Alkalinity as $CaCO_3$	APHA , 2320 B, Titrimetric Method	62.0	mg/l
8.	Chloride as Cl	APHA, 4500-Cl^- B, Argentometric Method	32.0	mg/l
9.	Residual free Chlorine	APHA, 4500 Cl B Iodometric Method	*BLQ(**LOQ 0.15)	mg/l
10.	Cyanide as CN	APHA , 4500 CN^- D	*BLQ(**LOQ 0.02)	mg/l
11.	Magnesium as Mg	APHA , 3500 Mg B, Calculation Method	3.58	mg/l
12.	Total Dissolved Solids	APHA , 2540 C, Gravimetric Method	246.0	mg/l
13.	Total Suspended solids	APHA,2540 D Gravimetric Method	34.14	mg/l
14.	Dissolved Oxygen	APHA,4500 O B Iodometric Method	6.8	mg/l
15.	Sulphate as SO^4	APHA , 4500 E, Turbidimetric Method	20.6	mg/l
16.	Fluoride as F	APHA , 4500-F^- D, SPADNS Method	*BLQ(**LOQ 0.2)	mg/l
17.	BOD (3 Days at 27°C)	APHA, 5210 C / IS 3025,P-44	4.00	mg/l
18.	COD	APHA, 5220 B, Open Reflux Method	20.00	mg/l

(Checked by) 14/04/2023

(Approved By)

VARDAN ENVIROLAB Pankaj Authorised Signatory

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: **VEL/KAL/W/11** | Report No.: **VEL/W/2304/10/011**

S. No.	Parameter	Test-Method	Result	Unit
19.	Conductivity (at 25 °C)	APHA, 2510 B, Conductivity Meter Method	0.399	mS/cm
20.	Nitrate as NO_3	IS 3025 (P-34) ,Chromotropic Method	4.2	mg/l
21.	Sodium as Na	APHA,3500 Na B, Flame Photometric Method	20.6	mg/l
22.	Potassium as K	APHA 3500 K B, Flame Photometric Method	4.6	mg/l
23.	Iron as Fe	IS 3025 (P-65):2014(RA:2019)	0.02	mg/l
24.	Aluminium as Al	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.005)	mg/l
25.	Boron	IS 3025 (P-65):2014(RA:2019)	0.21	mg/l
26.	Chromium as Cr	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002)	mg/l
27.	Phenolic Compounds	APHA, 5530 C Chloroform Extraction Method	*BLQ(**LOQ 0.0005)	mg/l
28.	#Mineral Oil	Clause 6 of IS:3025(Part 39)	*BLQ(**LOQ 0.1)	mg/l
29.	#Anionic Detergents as MBAS	APHA, 5540 C MBAS Method	*BLQ(**LOQ 0.05)	mg/l
30.	Zinc as Zn	IS 3025 (P-65):2014(RA:2019)	0.03	mg/l
31.	Copper as Cu	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002)	mg/l
32.	Manganese as Mn	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.01)	mg/l
33.	Cadmium as Cd	IS 3025 (P-65):2014(RA:2019)	*BLQ(**LOQ 0.002)	mg/l
34.	Total Coliform	IS 1622,1981, RA-2019	1200	MPN/100ml
35.	Fecal Coliform	IS 1622,1981, RA-2019	900	MPN/100ml

Note: -#These parameter are not covered in our NABL scope.
*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification

(Checked by) 14/04/2023

VARDAN ENVIROLAB Dr Shiv Authorised Signatory 13/04/23

(Approved By)

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Test Report

Sample Number:	VEL/KAL/AN/01	**Report No:**	VEL/AN/2304/10/001
Name & Address of the Project:	Ballada Bauxite Mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	**Format No:**	7.8 F-03
		Party Reference No:	NIL
		Reporting Date:	14/04/2023
		Receipt Date:	10/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Description:	AMBIENT NOISE LEVEL MONITORING		

General Information:-

Sample collected by	:	Vardan Envirolab Representative
Sampling Location	:	**Project Site ((N1)**
Instrument Used	:	Sound Level Meter- 15
Instrument Calibration Status	:	Calibrated
Meteorological condition during monitoring	:	**Clear Sky**
Date of Monitoring	:	**05/04/2023-06/04/2023**
Time of Monitoring	:	06:00 AM to 06:00 AM
Surrounding Activity	:	Mining, Vehicular & Human Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS-9989
Sampling Duration	:	24 Hours
Parameter Required	:	L_{max},L_{min},L_{eq}

RESULT

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS -9989:1981 (RA-2014)	64.2	58.4	dB(A)
2.	L_{min}	IS- 9989 :1981 (RA2014)	41.7	35.0	dB(A)
3.	L_{eq}	IS -9989:1981 (RA-2014)	49.8	38.4	dB(A)
4.	**Limits in dB(A) Leq (Residential Area)**	-	**55.0**	**45.0**	dB(A)

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Test Report

Sample Number:	VEL/KAL/AN/02	**Report No:**	VEL/AN/2304/10/002
Name & Address of the Project:	Ballada Bauxite Mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	**Format No:**	7.8 F-03
		Party Reference No:	NIL
		Reporting Date:	14/04/2023
		Receipt Date:	10/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Description:	AMBIENT NOISE LEVEL MONITORING		

General Information:-

Sample collected by	:	Vardan Envirolab Representative
Sampling Location	:	**Near Forest Range of Ballada (N2)**
Instrument Used	:	Sound Level Meter- 16
Instrument Calibration Status	:	Calibrated
Meteorological condition during monitoring	:	Clear Sky
Date of Monitoring	:	**05/04/2023-06/04/2023**
Time of Monitoring	:	06:00 AM to 06:00 AM
Surrounding Activity	:	Human & Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS-9989
Sampling Duration	:	24 Hours
Parameter Required	:	L_{max},L_{min},L_{eq}

RESULT

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS -9989:1981 (RA-2014)	62.4	56.9	dB(A)
2.	L_{min}	IS- 9989 :1981 (RA2014)	43.5	37.2	dB(A)
3.	L_{eq}	IS -9989:1981 (RA-2014)	51.64	43.38	dB(A)
4.	**Limits in dB(A) Leq (Residential Area)**	-	**55.0**	**45.0**	dB(A)

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(Approved By) Gaurav Pratap Singh

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Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
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Test Report

Sample Number:	VEL/KAL/AN/03	**Report No:**	VEL/AN/2304/10/003
Name & Address of the Project:	Ballada Bauxite Mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	**Format No:**	7.8 F-03
		Party Reference No:	NIL
		Reporting Date:	14/04/2023
		Receipt Date:	10/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Description:	AMBIENT NOISE LEVEL MONITORING		

General Information:-

Sample collected by	:	Vardan Envirolab Representative
Sampling Location	:	**Near Primary School Mulda (N3)**
Instrument Used	:	Sound Level Meter- 17
Instrument Calibration Status	:	Calibrated
Meteorological condition during monitoring	:	Clear Sky
Date of Monitoring	:	**05/04/2023-06/04/2023**
Time of Monitoring	:	06:00 AM to 06:00 AM
Surrounding Activity	:	Human & Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS-9989
Sampling Duration	:	24 Hours
Parameter Required	:	L_{max},L_{min},L_{eq}

RESULT

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS -9989:1981 (RA-2014)	58.6	46.6	dB(A)
2.	L_{min}	IS- 9989 :1981 (RA2014)	40.9	31.4	dB(A)
3.	L_{eq}	IS -9989:1981 (RA-2014)	47.28	37.85	dB(A)
4.	**Limits in dB(A) Leq (Residential Area)**	-	**55.0**	**45.0**	dB(A)

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VARDAN ENVIRO LAB PVT. LTD. Gaurav Pratap Singh

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Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
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Test Report

Sample Number:	VEL/KAL/AN/04	**Report No:**	VEL/AN/2304/10/004
Name & Address of the Project:	Ballada Bauxite Mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	**Format No:**	7.8 F-03
		Party Reference No:	NIL
		Reporting Date:	14/04/2023
		Receipt Date:	10/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Description:	AMBIENT NOISE LEVEL MONITORING		

General Information:-

Sample collected by	:	Vardan Envirolab Representative
Sampling Location	:	**Bheja Village (N4)**
Instrument Used	:	Sound Level Meter- 18
Instrument Calibration Status	:	Calibrated
Meteorological condition during monitoring	:	Clear Sky
Date of Monitoring	:	**06/04/2023-07/04/2023**
Time of Monitoring	:	06:00 AM to 06:00 AM
Surrounding Activity	:	Human & Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS-9989
Sampling Duration	:	24 Hours
Parameter Required	:	L_{max},L_{min},L_{eq}

RESULT

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS -9989:1981 (RA-2014)	61.6	48.0	dB(A)
2.	L_{min}	IS- 9989 :1981 (RA2014)	38.9	35.2	dB(A)
3.	L_{eq}	IS -9989:1981 (RA-2014)	45.26	38.91	dB(A)
4.	**Limits in dB(A) Leq (Residential Area)**	-	**55.0**	**45.0**	dB(A)

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Test Report

Sample Number:	VEL/KAL/AN/05	**Report No:**	VEL/AN/2304/10/005
Name & Address of the Project:	Bullada Bauxite Mine Village - Bullade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	**Format No:**	7.8 F-03
		Party Reference No:	NIL
		Reporting Date:	14/04/2023
		Receipt Date:	10/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Description:	AMBIENT NOISE LEVEL MONITORING		

General Information:-

Sample collected by	:	Vardan Envirolab Represeniative
Sampling Location	:	**Kakua Village (N5)**
Instrument Used	:	Sound Level Meter- 15
Instrument Calibration Status	:	Calibrated
Meteorological condition during monitoring	:	Clear Sky
Date of Monitoring	:	**06/04/2023-07/04/2023**
Time of Monitoring	:	06:00 AM to 06:00 AM
Surrounding Activity	:	Human & Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS-9989
Sampling Duration	:	24 Hours
Parameter Required	:	L_{max},L_{min},L_{eq}

RESULT

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS -9989:1981 (RA-2014)	53.4	49.3	dB(A)
2.	L_{min}	IS- 9989 :1981 (RA2014)	32.0	28.1	dB(A)
3.	L_{eq}	IS -9989:1981 (RA-2014)	41.59	34.2	dB(A)
4.	**Limits in dB(A) Leq (Residential Area)**	-	**55.0**	**45.0**	dB(A)

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Test Report

Sample Number:	**VEL/KAL/AN/06**	**Report No:**	**VEL/AN/2304/10/006**
Name & Address of the Project:	Ballada Bauxite Mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	**Format No:**	**7.8 F-03**
		Party Reference No:	**NIL**
		Reporting Date:	**14/04/2023**
		Receipt Date:	**10/04/2023**
Name of company:	Kalinga Alumina Limited.		
Sample Description:	**AMBIENT NOISE LEVEL MONITORING**		

General Information:-

Sample collected by	:	Vardan Envirolab Representative
Sampling Location	:	**Alanda Village (N6)**
Instrument Used	:	Sound Level Meter- 16
Instrument Calibration Status	:	Calibrated
Meteorological condition during monitoring	:	Clear Sky
Date of Monitoring	:	**06/04/2023-07/04/2023**
Time of Monitoring	:	06:00 AM to 06:00 AM
Surrounding Activity	:	Human & Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS-9989
Sampling Duration	:	24 Hours
Parameter Required	:	L_{max},L_{min},L_{eq}

RESULT

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS -9989:1981 (RA-2014)	51.5	44.5	dB(A)
2.	L_{min}	IS- 9989 :1981 (RA2014)	40.3	30.2	dB(A)
3.	L_{eq}	IS -9989:1981 (RA-2014)	46.43	38.65	dB(A)
4.	**Limits in dB(A) Leq (Residential Area)**	*	**55.0**	**45.0**	dB(A)

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14/04/2023

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Test Report

Sample Number:	VEL/KAL/AN/07	**Report No:**	VEL/AN/2304/10/007
Name & Address of the Project:	Ballada Bauxite Mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	**Format No:**	7.8 F-03
		Party Reference No:	NIL
		Reporting Date:	14/04/2023
		Receipt Date:	10/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Description:	AMBIENT NOISE LEVEL MONITORING		

General Information:-

Sample collected by	:	Vardan Envirolab Representative
Sampling Location	:	**Soput Village (N7)**
Instrument Used	:	Sound Level Meter- 17
Instrument Calibration Status	:	Calibrated
Meteorological condition during monitoring	:	Clear Sky
Date of Monitoring	:	**07/04/2023-08/04/2023**
Time of Monitoring	:	06:00 AM to 06:00 AM
Surrounding Activity	:	Human & Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS-9989
Sampling Duration	:	24 Hours
Parameter Required	:	L_{max},L_{min},L_{eq}

RESULT

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS -9989:1981 (RA-2014)	52.5	47.9	dB(A)
2.	L_{min}	IS- 9989 :1981 (RA2014)	38.5	32.1	dB(A)
3.	L_{eq}	IS -9989:1981 (RA-2014)	45.7	39.6	dB(A)
4.	**Limits in dB(A) Leq (Residential Area)**		**55.0**	**45.0**	dB(A)

Note *The Principal Rules were published in the Gazette of India, vide S.O. 123(E), dated 14.2.2000 and subsequently amended by the Noise Pollution (Regulation and Control) (Amendment) Rules, 2000 vide S.O. 1046(E), dated 22.11.2000 and by the Noise Pollution (Regulation and Control) (Amendment) Rules, 2002 vide S.O. 1088(E), dated 11.10.2002, under the Environment (Protection) Act, 1986.

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VARDAN ENVIROLAB Gaurav Pratap Singh

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Test Report

Sample Number:	VEL/KAL/AN/08	**Report No:**	VEL/AN/2304/10/008
Name & Address of the Project:	Ballada Bauxite Mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	**Format No:**	7.8 F-03
		Party Reference No:	NIL
		Reporting Date:	14/04/2023
		Receipt Date:	10/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Description:	AMBIENT NOISE LEVEL MONITORING		

General Information:-

Sample collected by	:	Vardan Envirolab Represeniative
Sampling Location	:	**Kariya RF Near Mota Andra (N8)**
Instrument Used	:	Sound Level Meter- 18
Instrument Calibration Status	:	Calibrated
Meteorological condition during monitoring	:	Clear Sky
Date of Monitoring	:	**07/04/2023-08/04/2023**
Time of Monitoring	:	06:00 AM to 06:00 AM
Surrounding Activity	:	Human & Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS-9989
Sampling Duration	:	24 Hours
Parameter Required	:	L_{max},L_{min},L_{eq}

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS -9989:1981 (RA-2014)	50.7	44.9	dB(A)
2.	L_{min}	IS- 9989 :1981 (RA2014)	38.4	31.6	dB(A)
3.	L_{eq}	IS -9989:1981 (RA-2014)	43.5	37.6	dB(A)
4.	**Limits in dB(A) Leq (Residential Area)**	-	**55.0**	**45.0**	dB(A)

Note:*The Principal Rules were published in the Gazette of India, vide S.O. 123(E), dated 14.2.2000 and subsequently amended by the Noise Pollution (Regulation and Control) (Amendment) Rules, 2000 vide S.O. 1046(E), dated 22.11.2000 and by the Noise Pollution (Regulation and Control) (Amendment) Rules, 2002 vide S.O. 1088(E), dated 11.10.2002, under the Environment (Protection) Act, 1986.

(Checked By) 14/04/2023

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/AN/09	**Report No:**	VEL/AN/2304/10/009
Name & Address of the Project:	Ballada Bauxite Mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	**Format No:**	7.8 F-03
		Party Reference No:	NIL
		Reporting Date:	14/04/2023
		Receipt Date:	10/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Description:	AMBIENT NOISE LEVEL MONITORING		

General Information:-

Sample collected by	:	Vardan Envirolab Representative
Sampling Location	:	**Badel Village (N9)**
Instrument Used	:	Sound Level Meter- 18
Instrument Calibration Status	:	Calibrated
Meteorological condition during monitoring	:	Clear Sky
Date of Monitoring	:	**07/04/2023-08/04/2023**
Time of Monitoring	:	06:00 AM to 06:00 AM
Surrounding Activity	:	Human & Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS-9989
Sampling Duration	:	24 Hours
Parameter Required	:	L_{max},L_{min},L_{eq}

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS -9989:1981 (RA-2014)	58.7	47.9	dB(A)
2.	L_{min}	IS- 9989 :1981 (RA2014)	46.5	35.4	dB(A)
3.	L_{eq}	IS -9989:1981 (RA-2014)	52.2	41.5	dB(A)
4.	**Limits in dB(A) Leq (Residential Area)**	-	**55.0**	**45.0**	dB(A)

Note:-The Principal Rules were published in the Gazette of India vide S.O. 123(E), dated 14.2.2000 and subsequently amended by the Noise Pollution (Regulation and Control) (Amendment) Rules, 2000 vide S.O. 1046(E), dated 22.11.2000 and by the Noise Pollution (Regulation and Control) (Amendment) Rules, 2002 vide S.O. 1088(E), dated 11.10.2002, under the Environment (Protection) Act, 1986.

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/AN/10	**Report No:**	VEL/AN/2304/10/010
Name & Address of the Project:	Ballada Bauxite Mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	**Format No:**	7.8 F-03
		Party Reference No:	NIL
		Reporting Date:	14/04/2023
		Receipt Date:	10/04/2023
Name of company:	Kalinga Alumina Limited.		
Sample Description:	AMBIENT NOISE LEVEL MONITORING		

General Information:-

Sample collected by	:	Vardan Envirolab Representative
Sampling Location	:	**Sagur Village (N10)**
Instrument Used	:	Sound Level Meter- 18
Instrument Calibration Status	:	Calibrated
Meteorological condition during monitoring	:	Clear Sky
Date of Monitoring	:	**07/04/2023-08/04/2023**
Time of Monitoring	:	06:00 AM to 06:00 AM
Surrounding Activity	:	Human & Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS-9989
Sampling Duration	:	24 Hours
Parameter Required	:	L_{max},L_{min},L_{eq}

RESULT

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS -9989:1981 (RA-2014)	59.2	48.7	dB(A)
2.	L_{min}	IS- 9989 :1981 (RA2014)	39.1	32.6	dB(A)
3.	L_{eq}	IS -9989:1981 (RA-2014)	50.6	39.2	dB(A)
4.	**Limits in dB(A) Leq (Residential Area)**	-	**55.0**	**45.0**	dB(A)

Note:*The Principal Rules were published in the Gazette of India, vide S.O. 123(E), dated 14.2.2000 and subsequently amended by the Noise Pollution (Regulation and Control) (Amendment) Rules, 2000 vide S.O. 1046(E), dated 22.11.2000 and by the Noise Pollution (Regulation and Control) (Amendment) Rules, 2002 vide S.O. 1088(E), dated 11.10.2002, under the Environment (Protection) Act, 1986.

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/S/01	Report No.:	VEL/S/2304/10/001
Name & Address of the Project:	Ballada Bauxite mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.	Period of Analysis:	10/04/2023-14/04/2023
		Receipt Date:	10/04/2023
Sample Description:	Soil Sample	Sampling Date:	08/04/2023
Sample Location:	Project site (S1)	Sampling Quantity:	2.0 Kg
Sample Collected by:	Vardan Enviro Lab Representative	Packing Status:	Sealed Packed
		Parameter Required:	As per Standard TOR
Sampling and Analysis Protocol:	IS & STP	Sampling Type:	Composite

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26)	7.58	--
2.	Conductivity	IS:14767	0.338	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.-01, 01/11/2021	Sand –53 Silt - 35 Clay – 12	%
4.	Color	VEL/STP/EN/67, Issue No.-01, 01/11/2021	Yellowish Brown	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.-01, 01/11/2021	32.21	%
6.	Bulk density	VEL/STP/EN/59, Issue No.-01, 01/11/2021	1.46	gm/cc
7.	Chloride as Cl	VEL/STP/EN/69, Issue No.-01, 01/11/2021	28.65	mg/100g
8.	Calcium as Ca	VEL/STP/EN/72, Issue No.-01, 01/11/2021	15.41	mg/100g
9.	Sodium as Na	VEL/STP/EN/62, Issue No.-01, 01/11/2021	38.62	mg/kg
10.	Potassium as K	VEL/STP/EN/61, Issue No.-01, 01/11/2021	127.62	kg/hec.
11.	Organic Matter	IS : 2720 (P-22), Titrimetric Method	0.31	%
12.	Magnesium as Mg	VEL/STP/EN/72, Issue No.-01, 01/11/2021	3.12	mg/100g
13.	Available Nitrogen as N	IS:14684 Distillation Method	150.21	kg./hec.
14.	Available Phosphorus	VEL/STP/EN/73, Issue No.-01, 01/11/2021	28.23	kg./hec.
15.	Zinc (as Zn)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	2.07	mg/kg
16.	Manganese (as Mn)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	4.51	mg/kg
17.	Lead (as Pb)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.45	mg/kg
18.	Cadmium (as Cd)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.38	mg/kg
19.	Chromium (as Cr)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.27	mg/kg
20.	Copper (as Cu)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	1.64	mg/kg

Note- STP-Laboratory Standard Testing Procedure

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/ KAL/S/02	Report No.:	VEL/S/2304/10/002
Name & Address of the Project:	Ballada Bauxite mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.	Period of Analysis:	10/04/2023-14/04/2023
		Receipt Date:	10/04/2023
		Sampling Date:	08/04/2023
Sample Description:	Soil Sample	Sampling Quantity:	2.0 Kg
Sample Location:	Sindhiput (S2)	Packing Status:	Sealed Packed
Sample Collected by:	Vardan EnviroLab Representative	Parameter Required:	As per Standard TOR
Sampling and Analysis Protocol:	IS & STP	Sampling Type:	Composite

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26)	7.60	–
2.	Conductivity	IS: 14767	0.315	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.-01, 01/11/2021	Sand – 50	%
			Silt - 34	
			Clay – 16	
4.	Color	VEL/STP/EN/67, Issue No.-01, 01/11/2021	Yelowish Brown	–
5.	Water holding capacity	VEL/STP/EN/86, Issue No.-01, 01/11/2021	35.23	%
6.	Bulk density	VEL/STP/EN/59, Issue No.-01, 01/11/2021	1.70	gm/cc
7.	Chloride as Cl	VEL/STP/EN/69, Issue No.-01, 01/11/2021	37.26	mg/100g
8.	Calcium as Ca	VEL/STP/EN/72, Issue No.-01, 01/11/2021	22.14	mg/100g
9.	Sodium as Na	VEL/STP/EN/62, Issue No.-01, 01/11/2021	42.15	mg/kg
10.	Potassium as K	VEL/STP/EN/61, Issue No.-01, 01/11/2021	148.25	kg/hec.
11.	Organic Matter	IS : 2720 (P-22), Titrimetric Method	0.40	%
12.	Magnesium as Mg	VEL/STP/EN/72, Issue No.-01, 01/11/2021	9.18	mg/100g
13.	Available Nitrogen as N	IS: 14684 Distillation Method	161.23	kg./hec.
14.	Available Phosphorus	VEL/STP/EN/73, Issue No.-01, 01/11/2021	36.52	kg./hec.
15.	Zinc (as Zn)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	1.74	mg/kg
16.	Manganese (as Mn)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	7.00	mg/kg
17.	Lead (as Pb)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.37	mg/kg
18.	Cadmium (as Cd)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.42	mg/kg
19.	Chromium (as Cr)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.29	mg/kg
20.	Copper (as Cu)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	1.47	mg/kg

Note- STP-Laboratory Standard Testing Procedure

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/ KAL/S/03	Report No.:	VEL/S/2304/10003
Name & Address of the Project:	Ballada Bauxite mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.	Period of Analysis:	10/04/2023-14/04/2023
		Receipt Date:	10/04/2023
		Sampling Date:	08/04/2023
Sample Description:	Soil Sample	Sampling Quantity:	2.0 Kg
Sample Location:	Atanda (S3)	Packing Status:	Sealed Packed
Sample Collected by:	Vardan EnviroLab Representative	Parameter Required:	As per Standard TOR
Sampling and Analysis Protocol:	IS & STP	Sampling Type:	Composite

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26)	7.68	--
2.	Conductivity	IS:14767	0.327	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.-01, 01/11/2021	Sand – 49 Silt - 33 Clay – 18	%
4.	Color	VEL/STP/EN/67, Issue No.-01, 01/11/2021	Yellowish Brown	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.-01, 01/11/2021	34.78	%
6.	Bulk density	VEL/STP/EN/59, Issue No.-01, 01/11/2021	1.46	gm/cc
7.	Chloride as Cl	VEL/STP/EN/69, Issue No.-01, 01/11/2021	48.25	mg/100g
8.	Calcium as Ca	VEL/STP/EN/72, Issue No.-01, 01/11/2021	21.45	mg/100g
9.	Sodium as Na	VEL/STP/EN/62, Issue No.-01, 01/11/2021	45.14	mg/kg
10.	Potassium as K	VEL/STP/EN/61, Issue No.-01, 01/11/2021	127.25	kg/hec.
11.	Organic Matter	IS : 2720 (P-22), Titrimetric Method	0.50	%
12.	Magnesium as Mg	VEL/STP/EN/72, Issue No.-01, 01/11/2021	11.21	mg/100g
13.	Available Nitrogen as N	IS:14684 Distillation Method	149.12	kg/hec.
14.	Available Phosphorus	VEL/STP/EN/73, Issue No.-01, 01/11/2021	28.25	kg/hec.
15.	Zinc (as Zn)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	2.67	mg/kg
16.	Manganese (as Mn)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	9.39	mg/kg
17.	Lead (as Pb)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.46	mg/kg
18.	Cadmium (as Cd)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.38	mg/kg
19.	Chromium (as Cr)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.30	mg/kg
20.	Copper (as Cu)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	1.71	mg/kg

Note: STP: Laboratory Standard Testing Procedure

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/ KAL/S/04	Report No.:	VEL/S/2304/10/004
Name & Address of the Project:	Balloda Bauxite mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.	Period of Analysis:	10/04/2023-14/04/2023
		Receipt Date:	10/04/2023
		Sampling Date:	08/04/2023
Sample Description:	Soil Sample	Sampling Quantity:	2.0 Kg
Sample Location:	Near Somli (S4)	Packing Status:	Sealed Packed
Sample Collected by:	Vardan EnviroLab Representative	Parameter Required:	As per Standard TOR
Sampling and Analysis Protocol:	IS & STP	Sampling Type:	Composite

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26)	7.78	–
2.	Conductivity	IS:14767	0.390	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.-01, 01/11/2021	Sand – 50	%
			Silt - 31	
			Clay – 19	
4.	Color	VEL/STP/EN/67, Issue No.-01, 01/11/2021	Yellowish Brown	–
5.	Water holding capacity	VEL/STP/EN/86, Issue No.-01, 01/11/2021	33.25	%
6.	Bulk density	VEL/STP/EN/59, Issue No.-01, 01/11/2021	1.51	gm/cc
7.	Chloride as Cl	VEL/STP/EN/69, Issue No.-01, 01/11/2021	36.25	mg/100g
8.	Calcium as Ca	VEL/STP/EN/72, Issue No.-01, 01/11/2021	18.54	mg/100g
9.	Sodium as Na	VEL/STP/EN/62, Issue No.-01, 01/11/2021	43.69	mg/kg
10.	Potassium as K	VEL/STP/EN/61, Issue No.-01, 01/11/2021	156.82	kg/hec.
11.	Organic Matter	IS : 2720 (P-22), Titrimetric Method	0.42	%
12.	Magnesium as Mg	VEL/STP/EN/72, Issue No.-01, 01/11/2021	9.01	mg/100g
13.	Available Nitrogen as N	IS:14684 Distillation Method	187.22	kg./hec.
14.	Available Phosphorus	VEL/STP/EN/73, Issue No.-01, 01/11/2021	37.36	kg./hec.
15.	Zinc (as Zn)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.93	mg/kg
16.	Manganese (as Mn)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	4.88	mg/kg
17.	Lead (as Pb)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.65	mg/kg
18.	Cadmium (as Cd)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.49	mg/kg
19.	Chromium (as Cr)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.34	mg/kg
20.	Copper (as Cu)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.90	mg/kg

Note- STP-Laboratory Standard Testing Procedure

(Checked by) 14/04/2023

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/S/05	Report No.:	VEL/S/2304/10/005
Name & Address of the Project:	Ballada Bauxite mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.	Period of Analysis:	10/04/2023-14/04/2023
		Receipt Date:	10/04/2023
		Sampling Date:	08/04/2023
Sample Description:	Soil Sample	Sampling Quantity:	2.0 Kg
Sample Location:	Nuaput (S5)	Packing Status:	Sealed Packed
Sample Collected by:	Vardan EnviroLab Representative	Parameter Required:	As per Standard TOR
Sampling and Analysis Protocol:	IS & STP	Sampling Type:	Composite

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26)	7.82	--
2.	Conductivity	IS:14767	0.324	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.-01, 01/11/2021	Sand –42 Silt -38 Clay-20	%
4.	Color	VEL/STP/EN/67, Issue No.-01, 01/11/2021	Yellowish Brown	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.-01, 01/11/2021	37.64	%
6.	Bulk density	VEL/STP/EN/59, Issue No.-01, 01/11/2021	1.42	gm/cc
7.	Chloride as Cl	VEL/STP/EN/69, Issue No.-01, 01/11/2021	49.26	mg/100g
8.	Calcium as Ca	VEL/STP/EN/72, Issue No.-01, 01/11/2021	24.26	mg/100g
9.	Sodium as Na	VEL/STP/EN/62, Issue No.-01, 01/11/2021	52.15	mg/kg
10.	Potassium as K	VEL/STP/EN/61, Issue No.-01, 01/11/2021	129.25	kg/hec.
11.	Organic Matter	IS : 2720 (P-22), Titrimetric Method	0.69	%
12.	Magnesium as Mg	VEL/STP/EN/72, Issue No.-01, 01/11/2021	11.89	mg/100g
13.	Available Nitrogen as N	IS:14684 Distillation Method	149.24	kg./hec.
14.	Available Phosphorus	VEL/STP/EN/73, Issue No.-01, 01/11/2021	29.22	kg./hec.
15.	Zinc (as Zn)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	2.19	mg/kg
16.	Manganese (as Mn)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	8.39	mg/kg
17.	Lead (as Pb)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.56	mg/kg
18.	Cadmium (as Cd)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.35	mg/kg
19.	Chromium (as Cr)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.29	mg/kg
20.	Copper (as Cu)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	1.19	mg/kg

Note- STP-Laboratory Standard Testing Procedure

(Checked by) 14/04/2023

(Approved By)

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/S/06	Report No.:	VEL/S/2304/10/006
Name & Address of the Project:	Balluda Bauxite mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.	Period of Analysis:	10/04/2023-14/04/2023
		Receipt Date:	10/04/2023
		Sampling Date:	08/04/2023
Sample Description:	Soil Sample	Sampling Quantity:	2.0 Kg
Sample Location:	Near Kutarba (S6)	Packing Status:	Sealed Packed
Sample Collected by:	Vardan EnviroLab Representative	Parameter Required:	As per Standard TOR
Sampling and Analysis Protocol:	IS & STP	Sampling Type:	Composite

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26)	7.64	–
2.	Conductivity	IS:14767	0.287	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.-01, 01/11/2021	Sand – 45 Silt - 35 Clay – 20	%
4.	Color	VEL/STP/EN/67, Issue No.-01, 01/11/2021	Yellowish Brown	–
5.	Water holding capacity	VEL/STP/EN/86, Issue No.-01, 01/11/2021	34.26	%
6.	Bulk density	VEL/STP/EN/59, Issue No.-01, 01/11/2021	1.45	gm/cc
7.	Chloride as Cl	VEL/STP/EN/69, Issue No.-01, 01/11/2021	33.96	mg/100g
8.	Calcium as Ca	VEL/STP/EN/72, Issue No.-01, 01/11/2021	20.25	mg/100g
9.	Sodium as Na	VEL/STP/EN/62, Issue No.-01, 01/11/2021	41.25	mg/kg
10.	Potassium as K	VEL/STP/EN/61, Issue No.-01, 01/11/2021	103.12	kg/hec.
11.	Organic Matter	IS : 2720 (P-22), Titrimetric Method	0.62	%
12.	Magnesium as Mg	VEL/STP/EN/72, Issue No.-01, 01/11/2021	7.75	mg/100g
13.	Available Nitrogen as N	IS:14684 Distillation Method	116.25	kg./hec.
14.	Available Phosphorus	VEL/STP/EN/73, Issue No.-01, 01/11/2021	22.26	kg./hec.
15.	Zinc (as Zn)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	3.00	mg/kg
16.	Manganese (as Mn)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	5.89	mg/kg
17.	Lead (as Pb)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.43	mg/kg
18.	Cadmium (as Cd)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.32	mg/kg
19.	Chromium (as Cr)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.23	mg/kg
20.	Copper (as Cu)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	1.63	mg/kg

Note- STP-Laboratory Standard Testing Propedure

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Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/S/07	Report No.:	VEL/S/2304/10/007
Name & Address of the Project:	Ballada Bauxite mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.	Period of Analysis:	10/04/2023-14/04/2023
		Receipt Date:	10/04/2023
		Sampling Date:	08/04/2023
Sample Description:	Soil Sample	Sampling Quantity:	2.0 Kg
Sample Location:	Near Parajabhimdol (S7)	Packing Status:	Sealed Packed
Sample Collected by:	Vardan EnviroLab Representative	Parameter Required:	As per Standard TOR
Sampling and Analysis Protocol:	IS & STP	Sampling Type:	Composite

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26)	7.64	–
2.	Conductivity	IS:14767	0.269	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.-01, 01/11/2021	Sand – 55 Silt - 30 Clay – 15	%
4.	Color	VEL/STP/EN/67, Issue No.-01, 01/11/2021	Yellowish Brown	–
5.	Water holding capacity	VEL/STP/EN/86, Issue No.-01, 01/11/2021	34.20	%
6.	Bulk density	VEL/STP/EN/59, Issue No.-01, 01/11/2021	1.56	gm/cc
7.	Chloride as Cl	VEL/STP/EN/69, Issue No.-01, 01/11/2021	32.46	mg/100g
8.	Calcium as Ca	VEL/STP/EN/72, Issue No.-01, 01/11/2021	16.82	mg/100g
9.	Sodium as Na	VEL/STP/EN/62, Issue No.-01, 01/11/2021	38.96	mg/kg
10.	Potassium as K	VEL/STP/EN/61, Issue No.-01, 01/11/2021	132.42	kg/hec.
11.	Organic Matter	IS : 2720 (P-22), Titrimetric Method	0.38	%
12.	Magnesium as Mg	VEL/STP/EN/72, Issue No.-01, 01/11/2021	5.96	mg/100g
13.	Available Nitrogen as N	IS:14684 Distillation Method	154.56	kg./hec.
14.	Available Phosphorus	VEL/STP/EN/73, Issue No.-01, 01/11/2021	33.18	kg./hec.
15.	Zinc (as Zn)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.89	mg/kg
16.	Manganese (as Mn)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	1.98	mg/kg
17.	Lead (as Pb)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.66	mg/kg
18.	Cadmium (as Cd)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.42	mg/kg
19.	Chromium (as Cr)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.38	mg/kg
20.	Copper (as Cu)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.77	mg/kg

Note- STP-Laboratory Standard Testing Procedure

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ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/KAL/S/08	Report No.:	VEL/S/2304/10/008
Name & Address of the Project:	Ballada Bauxite mine Village - Ballade, Tehsil - Nandapur, District - Koraput, Odisha - 764038	Format No.:	7.8 F-01
		Party Reference No.:	NIL
		Reporting Date:	14/04/2023
Name of company:	Kalinga Alumina Limited.	Period of Analysis:	10/04/2023-14/04/2023
		Receipt Date:	10/04/2023
		Sampling Date:	08/04/2023
Sample Description:	Soil Sample	Sampling Quantity:	2.0 Kg
Sample Location:	Near Hatibari (S8)	Packing Status:	Sealed Packed
Sample Collected by:	Vardan EnviroLab Representative	Parameter Required:	As per Standard TOR
Sampling and Analysis Protocol:	IS & STP	Sampling Type:	Composite

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS : 2720 (P-26)	7.69	–
2.	Conductivity	IS:14767	0.225	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.-01, 01/11/2021	Sand – 50 Silt - 35 Clay – 15	%
4.	Color	VEL/STP/EN/67, Issue No.-01, 01/11/2021	Yellowish Brown	–
5.	Water holding capacity	VEL/STP/EN/86, Issue No.-01, 01/11/2021	36.28	%
6.	Bulk density	VEL/STP/EN/59, Issue No.-01, 01/11/2021	1.49	gm/cc
7.	Chloride as Cl	VEL/STP/EN/69, Issue No.-01, 01/11/2021	42.86	mg/100g
8.	Calcium as Ca	VEL/STP/EN/72, Issue No.-01, 01/11/2021	22.81	mg/100g
9.	Sodium as Na	VEL/STP/EN/62, Issue No.-01, 01/11/2021	41.65	mg/kg
10.	Potassium as K	VEL/STP/EN/61, Issue No.-01, 01/11/2021	198.26	kg/hec.
11.	Organic Matter	IS : 2720 (P-22), Titrimetric Method	0.52	%
12.	Magnesium as Mg	VEL/STP/EN/72, Issue No.-01, 01/11/2021	9.99	mg/100g
13.	Available Nitrogen as N	IS:14684 Distillation Method	212.41	kg./hec.
14.	Available Phosphorus	VEL/STP/EN/73, Issue No.-01, 01/11/2021	42.72	kg./hec.
15.	Zinc (as Zn)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	2.40	mg/kg
16.	Manganese (as Mn)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	9.89	mg/kg
17.	Lead (as Pb)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.53	mg/kg
18.	Cadmium (as Cd)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.34	mg/kg
19.	Chromium (as Cr)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	0.26	mg/kg
20.	Copper (as Cu)	VEL/STP/EN/165, Issue No.-01, 20/06/2022	1.02	mg/kg

Note- STP-Laboratory Standard Testing Procedure

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Annexure – XVII

1308

Government of India

Ministry of Environment, Forest and Climate Chnage

(Forest Conservation Division)

Online Proposal No.:
FP/OR/MIN/QRY/456733/2023

Dated: **23/12/2024**

To,

Additional Chief Secretary (Forests)
Government of Odisha
Bhubaneswar

Subject: Proposal for seeking prior approval of the Central Government under Section 2 (1) (ii) of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 in favour of M/s Kalinga Alumina Limited for non-forestry use of 157.212 ha (144.945 ha ML area + 12.267 ha approach road outside ML) of Forest land (including 4.23 ha earmarked for Safety Zone) within Nagasari RF under Ballada Range of Koraput Forest Division in Koraput District for Ballada Bauxite Mines within Mining Lease area of 144.945 ha.

Sir/Madam,

I am directed to refer to the Government of Odisha's letter No letter No. FE-DIV-FLD-0052-2024-13003/FE&CC dated 19.07.2024 on the above subject seeking prior approval of the Central Government under Section 2 (1) (ii) of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 and additional information submitted through online on PARIVESH 2.0 portal as sought by the Ministry and to say that the proposal has been examined by the Advisory Committee constituted by the Central Government under Section - 3 of the aforesaid Act.

2. After careful examination of the proposal of the Government of Odisha and on the basis of the recommendations of the Advisory Committee, and approval of the same by the competent authority of the MoEF&CC, New Delhi, the Central Government hereby accords ***'in-principle'*** approval under Section - 2 (1) (ii) of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 in favour of M/s Kalinga Alumina Limited for non-forestry use of 157.212 ha (144.945 ha ML area + 12.267 ha approach road outside ML) of Forest land (including 4.23 ha earmarked for Safety Zone) within Nagasari RF under Ballada Range of Koraput Forest Division in Koraput District for Ballada Bauxite Mines within Mining Lease area of 144.945 ha. of Odisha subject to the fulfilment of the following conditions:

1. General Conditions

S. No	Conditions
1.1	Legal status of the diverted forest land shall remain unchanged
1.2	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
1.3	The User Agency shall transfer the cost of raising and maintaining the compensatory afforestation, at the current wage rate, to the State Forest Department. The scheme may include appropriate provision for anticipated cost increase for works scheduled for subsequent years
1.4	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
1.5	All the funds received from the user agency under the project, except the funds realized for regeneration/ demarcation of safety zone, shall be transferred to Ad-hoc CAMPA in the Savings Bank Account pertaining to the State concerned
1.6	The User Agency shall obtain the Environment Clearance as per the provisions of the Environmental (Protection) Act, 1986, if required
1.7	The boundary of the diverted forest land, shall be demarcated on ground at the project cost, by erecting four feet high reinforced cement concrete pillars, each inscribed with its serial number, forward and back bearing and distance from pillar to pillar
1.8	The User agency, if required, will undertake comprehensive soil conservation measures in the area being diverted at the project cost in consultation with the State Forest Department. A scheme of the same may be submitted along with the compliance report
1.9	No labour camp shall be established on the forest land
1.10	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
1.11	The forest land shall not be used for any purpose other than that specified in the proposal
1.12	The layout plan of the proposal shall not be changed without the prior approval of the Central Government
1.13	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
1.14	No damage to the flora and fauna of the adjoining area shall be caused
1.15	Any tree felling shall be done only when it is unavoidable and that too under strict supervision of the State Forest Department
1.16	The user agency in consultation with the State Government shall create and maintain alternate habitat/home for the avifauna, whose nesting trees are to be cleared in this project. Bird's nests artificially made out of eco-friendly material shall be used in the area, including forest area and

S. No	Conditions
	human settlements, adjoining the forest area being diverted for the project
1.17	The User Agency shall submit six monthly self-compliance reports as on 1st January and 1st July of every year to this office as well as to the Nodal Officer of the State
1.18	The State Government shall monitor compliance of conditions of Forest Clearance and shall submit in this regard yearly report as on 31st December of every year
1.19	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
1.20	The User Agency and the State Government shall ensure compliance to provisions of the all Acts, Rules, Regulations and Guidelines, for the time being in force, as applicable to the project
1.21	The State Government shall charge the Net Present Value (NPV) of the forest land being diverted under this proposal from the User Agency 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 (Pt.) dated06.01.2022 read with the letter dated 22.03.2022 in this regard.
1.22	The non-forest land transferred and mutated in favour of the State Forest Department or the revenue forest land, as the case may be, shall be notified by the State Government as Protected Forests under section 29 of the Indian Forest Act, 1927 or under the relevant section(s) of the local Forest Act, before issue of the 'Final' approval under the Adhiniyam. The Nodal Officer shall report compliance in this regard along with a copy of the original notification declaring the non-forest land as PF, along with compliance of 'in-principle' approval;
1.23	**Safety Zone Management:** Following activities, at project cost, shall be undertaken by the user agency for the management of safety zone as per relevant guidelines issued by the Ministry's guidelines: a. User agency shall ensure demarcation of safety zone (7.5-meter strip all along the inner boundary of the mining lease area), and its fencing, protection and regeneration by erecting adequate number of 6 feet high RCC boundary pillars inscribed with DGPS coordinates with barbed wire fencing and deploying adequate number of watchers under the supervision of the. State Forest Department; b. Boundary of the safety zone of the mining lease, adjacent to habitation/roads, should be properly fenced by the user agency; c. Safety zone shall be maintained as green belt around mining lease and to ensure dense canopy in the area, regeneration shall be taken up in this area by the user agency at project cost under the supervision of the State Forest Department; d. The State Government and the user agency shall ensure that safety zone is maintained as per the prescribed norms;

2. Standard conditions

S. No	Conditions
2.1	The 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 & Regulating) Act, 1957, as amended or Rules framed there under, subject to a maximum period of 30 or 50 years.
2.2	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 are satisfactorily executed.
2.3	The user agency shall prepare a schedule for surrender of the mined out and reclaimed forest land in accordance with existing mining plan and submit the same along with an undertaking to surrender the mined out and reclaimed forest land as per such schedule to the MoEF&CC before grant of Stage-II approval under the FC Act for diversion of the said forest land;
2.4	In case of under-ground mines, areas on surface shall be fenced and afforested from the funds to be provided by the user agency.
2.5	The user Agency shall implement the R & R Plan as per the R & R Policy of State Government in consonance with National R&R Policy, Government of India before the commencement of the project work and implementation. The said R & R Plan will be monitored by the State Government/Regional Office of MoEF along with indictors for monitoring and expected observable milestones.
2.6	Adequate care shall be taken to check any rolling of overburden/dumps beyond diverted area and also to check soil erosion caused due to mining activities;
2.7	The user agency shall undertake de-silting of the village tanks and other water bodies located within five km from the mine lease boundary so as to mitigate the impact of siltation of such tanks/water bodies, whenever required;
2.8	Following activities shall be undertaken by the User Agency at the project cost: (a) Preparation and implementation of a plan containing appropriate mitigative measures to minimize soil erosion and choking of streams; (b) Planting of adequate drought hardy plant species and sowing of seeds in the appropriate area within the mining lease to arrest soil erosion; (c) Construction of check dams, retention /toe walls along the contour to arrest sliding down of the excavated material; (d) Stabilize the overburden dumps by appropriate grading/benching so as to ensure that that angles of repose at any given place is less than 28o;
2.9	The User agency will undertake comprehensive soil conservation measures at the project cost in consultation with the State Forest Department. A scheme of the same shall be submitted to the Regional Office along with the Stage-I compliance report

S. No	Conditions
2.10	No damage shall be caused to the top-soil and the user agency will follow the top soil management plan;
2.11	A site-specific Wildlife Management Plan shall be prepared by the State Government in consultation with the PCCF (Wildlife) for the protection and conservation of wildlife of the area. A copy of approved Plan shall be submitted to the Ministry along with the compliance of Stage-I approval. Entire cost of implementation of the provisions of the Wildlife Management Plan shall be deposited into the account of CAMPA of the State;
2.12	The user agency shall explore the possibility of translocation of maximum number of trees identified to be felled and 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
2.13	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 concern Addl. Principle Chief Conservator of Forests (Central) may direct that the mining activities shall remain suspended till such time, such reclamation activities area satisfactorily executed;
2.14	The User Agency shall comply with the Hon'ble Supreme Court order on re- grassing, and re-grass the mining area and any other areas which may have been disturbed due to mining to restore them to a condition which is fit for growth of fodder, flora, fauna, etc. in a timely manner;
2.15	The user agency shall comply all the provisions of the all Acts, Rules, Regulations, Guidelines, Hon'ble Court Order (s) and NGT Order (s) including the complete compliance of the FRA, 2006 as per the Rules 11 (7) of the VSES Rules 2023 pertaining to this project, if any, for the time being in force, as applicable to the project.
2.16	Violation of any of these conditions will amount to violation of Forest (Conservation) Act, 1980 and action would be taken as prescribed in para 1.21 of Chapter 1 of the Handbook of comprehensive guidelines of Forest (Conservation) Act, 1980 as issued by this Ministry's letter No. 5-2/2017-FC dated 29.12.2023.
2.17	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;

3. Specific Conditions

S. No	Conditions
3.1	The State Govt. shall ensure that the area earmarked as green belt i.e. 48.56 ha shall be kept as

S. No	Conditions
	green or used as admissible as per the extant rules and guidelines and no change in the land use shall be affected without the prior approval of the Central Govt.
3.2	The shallow water body within the mine lease area is a manmade formation created by forest department. The said water body (admeasuring 76 m X 54 m X 1 m) was created under CAMPA by the Department of Forest during the year 2020-21. In order to compensate the construction made and to provide the alternative, the State shall create other such suitable waterbody in the nearby surrounding area at the cost of the user agency. The funds in this regard shall be deposited by the User Agency in NA CAMPA.
3.3	The State Govt. shall ensure that the User Agency will not carry out any mining activity near the caves as recommended by the State and Regional Officer and take suitable measure to provide safe passage for accessibility to the local people for their religious belief, rituals and worships, if any.

After receipt of the compliance report on the fulfillment of the conditions mentioned above, the proposal shall be considered for final approval under section Section 2 (1) (ii) of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980. Transfer of forest land shall not be affected till final approval is granted by the Government in this regard.

Copy To

1. PCCF (HoFF), State Forest Department, Government of Odisha, Bhubaneswar
2. PCCF & Nodal Officer (FCA), O/o PCCF, State Forest Department, Government of Odisha, Bhubaneswar.
3. CEO, National Authority CAMPA, MoEF&CC, New Delhi.
4. DDGF (Central), Regional Office of MoEF&CC at Bhubaneswar.
5. User Agency.
6. Monitoring Cell, FC Division, MoEF&CC, New Delhi
7. Guard File.

Your's faithfully

(Suneet Bhardwaj)
Assistant Inspector General of Forests

Signed by
Suneet Bhardwaj
Date: 23-12-2024 18:21:40
Reason: Verified and signed

Annexure – XVIII

Government of Odisha
Department of Water Resources

*****

No. 30630 /WR., Date: 8/11/2024
WR-MAJII-WRC-0127/2024(OSWAS File No.)
Irr-II-WRC-110/2024(Physical File No.)

From

Smt. Arati Rout, O.A.S. (SAG),
Additional Secretary to Government.

To

M/s Kalinga Alumina Limited,
Dist- Koraput.

Sub: Application for allocation of 0.282 cusec of surface water from Jalaput reservoir for operation purposes in favour of M/s Kalinga Alumina Limited, Koraput.

Ref:- Application No- 2024070441000681 dated 04.07.2024.

Sir,

In inviting reference to the subject and application cited above, I am directed to say that after careful consideration, Government in Department of Water Resources have been pleased to allocate 0.282 cusec of surface water from Jalaput Reservoir in favour of M/s Kalinga Alumina Limited, Koraput from 01.04.2025 for a period 5 years for operational purpose without assurance during the lean period/scarcity time with intake location having Latitude: 18° 26' 48.06" N & Longitude: 82° 36' 16.89" E, with the terms & conditions mentioned below.

Further, you are requested to construct a water storage facility to meet the water requirement during the lean period/scarcity time.

TERMS AND CONDITIONS:-

1. M/s Kalinga Alumina Limited, Koraput shall make suitable arrangements to take the water from the Irrigation works at which it will be supplied. M/s Kalinga Alumina Limited, Koraput shall not use the water supplied to him for any purpose other than that which is specified in the schedule.
2. If the special water rate for the aforesaid quantity of water or any part thereof, is not paid on or before the date specified in the agreement it shall become payable at once (unless the Government sanctions for special reason an extension of time) and M/s Kalinga Alumina Limited, Koraput 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.

3. (i) M/s Kalinga Alumina Limited, Koraput 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 the person or persons affected by the permission granted.

(ii) M/s Kalinga Alumina Limited, Koraput shall not without prior permission in writing from the Government lay the pipeline on Government or communal lands. If the pipelines 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 the Government or community, as the case may be.

(iii) M/s Kalinga Alumina Limited, Koraput 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-II except with the prior approval of the Government. The Superintending Engineer of WR 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 shall be charged on the quantity of excess drawl, in addition to the normal bill on the allocated quantity. The excess drawl is permissible for a maximum period of six months, within which the licensee shall have to apply for a higher allocation of water with reason where the licensee fails to 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 Kalinga Alumina Limited, Koraput from liability to payment of water charges lawfully assessable at the rate as may be prescribed by Govt. from time to time.

(v) The government reserves the right to suspend or cancel the permission in case of violation of any of the covenants.

4. M/s Kalinga Alumina Limited, Koraput at his own cost shall install an IoT Flow Meter for measurement of water drawn or lifted by him from the Irrigation Works as per the procedure laid down in rule 23-A(b). The Superintending Engineer of WR shall visit the location of the drawl or lifting of water, verify the quantities of water drawn or lifted by M/s Kalinga Alumina Limited, Koraput, and ensure such control as may be necessary for administering the drawl or lifting of water. Assessment of the water rate shall be made as per the quantity of water drawn or allocated whichever is higher. 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 of WR forthwith and take appropriate steps to remove the defects in the Meter or for replacement thereof within 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 of WR or fails to remove the defects in the Meter or to replace the same, as the case may be, within

three months, the agreement shall be liable to cancellation and thereafter the water supply shall be stopped.

5. M/s Kalinga Alumina Limited, Koraput shall construct a full-proof effluent discharge plant before the commissioning of the project. For proper test of such effluent there shall be computerized testing system and M/s Kalinga Alumina Limited, Koraput shall give details of effluent discharged in the natural source (in River or Nala).
6. For the construction of head works and control mechanism i.e. intake well, pump house and other related facilities, M/s Kalinga Alumina Limited, Koraput 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 a long-term lease to M/S Kalinga Alumina Limited, Koraput. The continuance of the lease agreement will be subject to the condition that the industry shall pay water rates as per the prevailing water rate and all other dues of the Government and IDCO from time to time.
7. M/s Kalinga Alumina Limited, Koraput would be required to pay 3 (three) months advance water charges in favour of Superintending Engineer concerned 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 of WR. The onus of maintaining the Bank Guarantee lies with M/S Kalinga Alumina Limited, Koraput.
8. In case of water supply for M/s Kalinga Alumina Limited, Koraput 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.
9. M/s Kalinga Alumina Limited, Koraput drawing or allocated water from the reservoir for its uses, shall sign a supplementary agreement with the Odisha Hydra Power Corporation Ltd., to compensate for the loss of energy generation due to its over drawl and the Odisha Hydra Power Corporation Ltd., shall raise demands for compensation of loss of energy generation within the first week of every month against the excess quantity of water drawn than the allocated quantity.
10. M/s Kalinga Alumina Limited, Koraput will not disturb the normal flow of water so that riparian rights in downstream will be affected and the company shall have no claim on the account.
11. The drawl mechanism for raw water and disposal system of effluent to be established by the industry without disturbing the existing ecosystem and environmental setup.
12. 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.
13. M/s Kalinga Alumina Limited, Koraput should not claim as a matter of right to get the desired quantity of water during non-monsoon and lean periods to meet their full industrial use and the Company has to make adequate storage facility in their land for supply of water to their plant during such period.
14. The safety design of all the structures lies fully on M/s Kalinga Alumina Limited, Koraput.

15. In case of any dispute/interpretation required, the decision of the Government in the Water Resources Department shall be final.
16. Any surplus power from the Captive Power Plant shall be sold by M/s Kalinga Alumina Limited, Koraput to GRIDCO or any other entity to be notified by the State Government under mutually acceptable terms & conditions.
17. The allocation of water will automatically lapse if the company does not use the water for the purpose applied for within three years of allotment.
18. This agreement shall be valid for three years from the date of execution subject to the renewal of agreement by the Superintending Engineer of WR. For renewal of the agreement, M/s Kalinga Alumina Limited, Koraput has to apply a minimum of three months before the expiry of the agreement.
19. If it is found that the industry is drawing water unauthorizedly before signing the agreement/installation of the flow meter, the Superintending Engineer of WR will charge a penal rate at six times the normal rate as provided in Schedule-II of the Rule.
20. The government shall be at liberty to review the water allocation unilaterally in case of exigencies.
21. The Superintending Engineer of WR or his authorized representative reserves the right to inspect all installations of drawl and disposal mechanism during and after construction including the intake structure, flow meter, and treatment plant.
22. M/s Kalinga Alumina Limited, Koraput will have to show clearly in the 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.
23. M/s Kalinga Alumina Limited, Koraput may engage at their 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 Irrigation works 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.
24. The exact place for lifting will be decided in consultation with the competent authority of the Water Resources Department.
25. The Department of Water Resources (DoWR) will not be held responsible for the non-availability of water due to dry season, disruption, repair & maintenance of the Canal/Reservoir.
26. The agreement to be executed by Industry/ commercial establishment with the local Superintending Engineer of WR must be approved by the DoWR before drawl of water.
27. M/s Kalinga Alumina Limited, Koraput will have to adopt water harvesting, rooftop water harvesting, groundwater recharge, and recycling of wastewater measures in its plant premises as per the approved water management plan.
28. M/s Kalinga Alumina Limited, Koraput shall follow the zero effluent discharge principle, satisfy State Pollution Control Board (SPCB) norms, and obtain requisite permissions from the SPCB, Odisha before drawl of operational water.
29. In case, M/s Kalinga Alumina Limited, Koraput intends to supply bulk water to Municipalities, Notified Area Councils, other local authorities, and the cluster of villages, M/s Kalinga Alumina Limited, Koraput shall install separate flow meters or measuring device, as the case may be, at a suitable place along the pipeline 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-II.

30. M/s Kalinga Alumina Limited, Koraput shall abide by the conditions laid down by the competent authority of DoWR during the approval of the scheme of drawl.
31. M/s Kalinga Alumina Limited, Koraput shall undertake a water utilization audit every three years and make the report available for scrutiny by the competent authority of DoWR.
32. Special water rate shall be charged and collected at the rate as specified in Schedule -II per unit or quantity of water drawn or allocated whichever is higher and shall be enhanced at the rate of ten percent per annum with effect from the first day of April.
33. M/s Kalinga Alumina Limited, Koraput is acquiring/ has acquired irrigated land for industrial purposes under unavoidable circumstances, it has to comply with the conditions laid down vide DoWR Notification No. 4538, dt.24.02.2016.
34. M/s Kalinga Alumina Limited, Koraput shall register the project on the IWCRCM website within 7 days of entry, after due execution of the agreement with the concerned Superintending Engineer of DoWR.

Yours faithfully,

08.11.24

Additional Secretary to Government

Memo No. 30631 **/WR. Dtd.** 8/11/2024

Copy forwarded to the EIC, P & D, BBSR / Chief Engineer, Water Services, BBSR/ the Chief Construction Engineer, Potteru Irrigation Project, Balimela/ Superintending Engineer, Earth Dam Division, Chitrakonda for information and necessary action.

Sanatan 08.11.2024

Under Secretary to Government

Memo No. 30632 **/WR. Dtd.** 8/11/2024

Copy forwarded to the Industries Department/ IPICOL for information and necessary action.

Sanatan 08.11.2024

Under Secretary to Government

Memo No. 30633 **/WR, Dtd.** 8/11/2024

Copy forwarded to the Member Secretary, State Pollution Control Board (SPCB), BBSR for information and necessary action.

Sanatan 08.11.2024

Under Secretary to Government

Memo No. 30634 **/WR. Dtd.** 8/11/2024

Copy forwarded to the Collector & District Magistrate, Koraput for information and necessary action.

Sanatan 08.11.2024

Under Secretary to Government

Annexure – XIX

E-mail: publichearing@ospcboard.org
Web site : https://ospcboard.odisha.gov.in

STATE POLLUTION CONTROL BOARD, ODISHA

(Forest, Environment & Climate Change Department, Govt. of Odisha)
Paribesh Bhawan, A/118, Nilakantha Nagar, Unit-VIII, Bhubaneswar – 751012

No. 7101 / **IND-II-PH-1195** Date 4-4-2025

Through Speed Post

To

The Member Secretary,
SEIAA, Odisha, Qr. No 5 RF -2/1,
Unit – IX, Bhubaneswar -22.

Sub: **Proceedings of Public Hearing for Ballada Bauxite Mine of M/s Kalinga Alumina Limited for Peak Rated Capacity of 4.0 MTPA over mining lease area of 144.945 ha. At village Ballada under Nandapur tahsil of Koraput district** –Reg

Sir,

In inviting a reference to the subject cited above, this is to inform that public hearing of the above-mentioned project proposed by M/s **Kalinga Alumina Limited for Ballada Bauxite Mine was conducted on 06-03-2025 at 11.00 A.M at Mouza-Bheja (Khata No.27, Plot No.225, Area-2.48 Ac, Kissam- D-III) under Nandapur tahasil of Koraput district** in accordance with the Ministry of Environment, Forest & Climate Change, Govt. of India, EIA Notification No. SO-1533(E) dt.14.09.2006.

As per the above Notification, notice inviting comments, views, objection, and suggestions from the public in respect of the above project was published in newspapers namely **"The New Indian Express" and "Sambad" on 04-02-2025.**

Further 2141 Nos. of representations received during the public hearing, 1 No. representation received by the Regional Office, Koraput before public hearing date and 1 No. representation received by the Regional Office, Koraput after public hearing date and 277 Nos. of representations received directly by the Board which is enclosed herewith for kind reference and further action during the consideration of Environmental Clearance.

A copy of the proceedings of the Public Hearing along with the following documents is enclosed for kind information and necessary action at your end.

1. Video in DVD of Public Hearing.
2. Statement of issues raised by Public Hearing meeting and comments of applicant prepared in local language and in English.
3. Copies of the newspaper advertisement.
4. List of persons who participated in the public hearing.
5. Views and suggestions from the public recorded by the Board during the Public Hearing.
6. 2141 (Two Thousand One hundred Forty One) Nos. of representations received

during the public hearing, 1 (One) No. representation received by the Regional Office, SPC Board, Koraput before public hearing date and 1(One) No. representation received by the Regional Office, SPC Board, Koraput after public hearing date and 277 (Two hundred Seventy Seven) Nos. of representations received directly by the Board.

Yours faithfully,

Encl: As above

4/4/25

MEMBER SECRETARY

Memo No 7102 **/dt.** 4-4-2025

Copy along with copy of the proceedings of Public Hearing forwarded to the **Addl. Chief Secretary, Department of Forest, Env& Climate Change, Govt. of Odisha** for kind information and necessary action.

Encl: As above

04/4/25

CHIEF ENV. ENGINEER

Memo No. 7103 dtd. 4-4-2025

Copy forwarded to the **Additional Director, Eastern Regional Office, MoEF & CC Govt. of India,** A-3, Chandrasekharpur, Bhubaneswar for kind information and necessary action.

Encl: As above.

04/4/25

CHIEF ENV. ENGINEER

Memo No. 7104 dtd. 4-4-2025 **(By Speed Post)**

Copy along with proceedings of Public Hearing forwarded to **Sri Kassireddy Anil Kumar, Associate Vice President, M/s Kalinga Alumina Limited,(Formerly known as Kalinga Alumina Ltd.), Adani Corporate House,Shantigram, Ahmedabad- 382421** for information.

Encl: As above

04/4/25

CHIEF ENV. ENGINEER

PROCEEDINGS OF THE PUBLIC HEARING OF BALLADA BAUXITE MINES OF M/S KALINGA ALUMINA LTD. FOR PEAK RATED CAPACITY OF 4.0 MTPA OVER A MINING LEASE AREA OF 144.945 HA AT VILLAGE BALLADA UNDER NANDAPUR TEHSIL OF KORAPUT DISTRICT HELD ON DATE 06.03.2025 AT 11:00 A.M. AT MOUZA- BHEJA, KHATA NO. 27, PLOT NO. 225, AREA- AC 2.48, KISAM-D-III UNDER NANDAPUR TEHSIL OF KORAPUT DISTRICT

The public hearing in respect of the above project was held on 06.03.2025 as per the schedule and at the venue in accordance with the EIA Notification S. O. 1533 (E) dt. 14.09.2006 and subsequent amendments. The details of the public hearing including place of Public Hearing and time was published in the daily newspapers: Sambada (Odia edition) and The New Indian Express (English edition) on 04th February 2025. Additionally, the notice regarding the public hearing was displayed on the Notice Board of the Balda, Kulabir & Atanda Panchayat Office on 28th February 2025. Notices were displayed at Badel & Bheja Panchayat Office on 1st March 2025. All due procedures were followed during the public hearing. The public hearing with regard to date, place and time was announced in Public Address System on 28th February 2025 & 1st March 2025 in all the villages coming under Balda, Kulabir, Atanda, Badel & Bheja Panchayat which are located nearby the proposed project site.

All the people who wished to participate in the public hearing were allowed to the venue and law and order was maintained throughout the public hearing. Although about 1500 people were gathered at the venue, only 109 persons have signed the attendance sheet and the rest denied to give their attendance during the hearing.

Er. Deepesh Kumar Biswal, Regional Officer, State Pollution Control Board, Koraput welcomed the public to the hearing and briefed about the objectives, process & procedures followed for conducting such public hearing. He requested the public to give their views about the project in the form of written or oral submissions. He also requested them to confine their submissions to the instant project and the environmental threats that they perceived from the same.

Mrs. Alomani Sethy, OAS (SAG), Additional District Magistrate (General), Koraput highlighted the importance of such hearing & presided over the public hearing. She briefed about the project and requested the general public to offer their views on the project during the hearing.

Sri Nabal Kishore Sharma (Vice President, ADANI Enterprises Ltd. Natural Resources) & Sri. Prasanna Kumar Panda (Advisor, ADANI Enterprises Ltd. Natural Resources) of M/s Kalinga Alumina Ltd. explained in detail about the proposed project and briefed about the pollution control measures to be adopted in the Project. He assured the attendees that the project proponent would take all necessary steps to mitigate the environmental impact of the project and ensure the operation of the mine in a sustainable manner.

This was followed by oral submissions made by all the attendees who wished to speak about the same. All others submitted their written petitions which were duly received at the venue. Although a total of 32 people spoke during the hearing, only 11 people signed the attendance sheet of oral deliberation, rest denied to give their attendance. Shri Trinath Khara of Hikimput Gram Panchayat gave his attendance, but did not speak.

Regional Officer
State Pollution Control Board
Koraput

1/8

Addl. Dist. Magistrate
KORAPUT

The following is the summary of the public hearing proceedings, reflecting all the views and concerns expressed by the assembled public at the venue. The entire proceedings were video recorded by the officials of the Regional Office, State Pollution Control Board, Odisha, Koraput.

1. **Sri. Chaitanya Hantal, Nandapur**

Sri Hantal emphasized that industrialization is essential for the development of the area, state, and country. He highlighted that industrial growth would lead to the generation of employment opportunities. Furthermore, he stated that the company should operate in a manner that does not harm the environment or forests in the area. He also stressed that, the the company should focus on various developmental activities, particularly in the areas of education and healthcare for the local population. Sri Hantal specifically pointed out that Balda cave located in the Nageswari Hill should not be affected by the project. Additionally, he urged that educated students from the local area should be given priority in employment opportunities in the mine.

2. **Sri. Madan Hadaputia, Balda GP**

Sri Hadaputia expressed concerns regarding the potential adverse effects of the project on the surrounding environment. He said that the villagers in the locality worship the goddess of Balda cave and also mentioned that the area is a popular tourist destination, thus requiring protection. He requested the company to ensure the preservation of the cave and also provide a high-quality road leading to the cave for better accessibility. Furthermore, he urged the company to offer health, education, and road infrastructure facilities in the nearby affected villages. Sri Hadaputia also emphasized that priority should be given to employing local educated individuals in the mine. Lastly, he requested the government to be prepared for any potential calamities that may arise as a result of the mining activities.

3. **Sri. Ramachandra Khara, Hikimput GP**

Sri Khara emphasized the importance of developing the affected villages. He stressed that the project should not cause harm to the forest and mountains in the area. He highlighted the cave as a tourist destination and urged the project proponent to take steps for its development. Sri Khara also addressed the company to provide essential facilities, including schools, hospitals, and roads for better connectivity for the affected Panchayats. Additionally, he requested that educated students from the affected villages should be given priority for employment opportunities in the company.

4. **Sri. Bhagaban Petia, Hikimput GP**

Sri Petia reiterated the promises made by the company such as; the company would protect and develop the cave to attract more tourists, the company would undertake plantation activities after mining activities are completed and that the company would provide educational, healthcare, and road connectivity facilities. Sri Petia stated that if the company fulfils these promises, it would lead to development in the surrounding areas. He requested that the company shall provide employment opportunities to the affected villagers at the Alumina Refinery plant to be located in Rayagada, as the mining operations are expected to generate limited local employment. Additionally, he expressed concern about the inadequate funds allocated by the company for developmental activities and urged that a minimum of 10% of the royalty paid to the government should be allocated for developmental activities. Lastly,

Regional Officer
State Pollution Control Board
Koraput

Addl. Dist. Magistrate
KORAPUT

he emphasized that, as the area contains mostly tribal population, the company should prioritize the overall development of the affected villagers.

5. **Sri. Lakshmidhar Badam, Attanda GP**

Sri Badam was apprehensive about the project and shared an anecdote expressing that, in the past, locals were being displaced due to the construction of a dam and other projects in the locality and the affected individuals were deprived of getting essential benefits. He also urged the company to ensure the provision of water to the agricultural lands in the area to support farming activities. Furthermore, he requested the company to establish a high school in the locality, along with hostel facilities to accommodate students. He also requested the company to provide employment opportunities to the affected villagers and concluded by saying that if the aforementioned demands are met, he will support the project.

6. **Smt. Lakshmi Sisa, Bheja GP**

Smt. Lakshmi Sisa expressed strong opposition to the project, stating that the villagers do not wish to surrender their land and forest to the company. She specifically raised concerns about the deforestation and potential displacement of their Goddess of Nageswari Hill due to the mining activities. She questioned where the villagers would live if their lands were taken and who would protect their forest rights. She emphasized that the community is entirely dependent on the forest for food and other necessities. Additionally, she pointed out that they had not been properly informed about the public hearing and that the Gram Sabha had not been conducted in relation to the project. She questioned about the facilities that the government has provided to safeguard the interests of the tribal communities. She said that the villagers have their forest rights and concluded by expressing her opposition to the project.

7. **Sri. Jana Sisa, Balda GP**

Sri Sisa stated that the project will impact the people of five Gram Panchayats. He further highlighted that the soil quality, water, and air in the area will be adversely affected due to deforestation caused by mining activities. He emphasized that the villagers are currently living in harmony with the environment. In conclusion, he opposed the project, saying that the land belongs to the people and they have rights over their land.

8. **Sri. Mana Khara, Balda GP**

Sri Khara expressed concerns about the existing challenges faced by the villagers, including frequent power cuts, electricity failure and water shortages. He highlighted that the community depends on farming for their livelihood and questioned how they would survive if the forest will be cleared. He concluded by stating his opposition to the project.

9. **Smt. Bobita Muduli, Bheja GP**

Smt. Muduli stated that they have been living in the area for generations & they are worshipping Goddess present in the Nageswari hill. She emphasized that the villagers benefit from the forest, as it provides essential resources such as vegetables, wood & water. Smt. Muduli further mentioned that the forest is worshiped by the community as their mother. She expressed concern that the public hearing was being conducted without a prior Gram Sabha in their village violating PESA act and 5th schedule of the Indian constitution and expressed that they had not been informed about the hearing. She highlighted that the people of the five

Regional Officer
State Pollution Control Board

Addl. Dist. Magistrate
KORAPUT

surrounding panchayats are entirely dependent on the forest for their livelihood. Smt. Muduli also made it clear that they do not seek any compensation or benefits from the company in exchange for their forest land. She concluded by expressing her opposition to the project.

10. Sri. Reli Sisa, Balda GP

Sri Sisa stated that the villagers had not yet received any benefits from the various mining and industrial establishments that are operating in the vicinity of their villages. He raised concerns about the lack of proper healthcare access, stating that it takes up to 30 minutes for villagers to transport a patient using their own means. He also addressed several other issues, highlighting that the other villagers at various places have not received the promised benefits from other companies. Sri Sisa emphasized that the community is entirely dependent on the forest for essential resources such as food, vegetables, and fruits. He concluded by expressing his opposition to the project.

11. Sri. Madhusudhan Dadia, Balda GP

Sri Dadia stated that conducting the Gram Sabha without the implementation of forest rights is a violation. He further emphasized that the local communities have rights over the water, forests, and land in the area. He expressed that the villagers live in harmony with the birds, animals, natural resources, forest, and the environment. He also noted that the mining activities would lead to an increase in the temperature of the region, which could negatively impact the crops. He expressed concern about their livelihood if mining activities will take place. He mentioned that during the COVID pandemic, the villagers were able to survive as they were living in a healthy environment. Sri Dadia requested the government to protect their forest rights. He concluded by stating his opposition to the project.

12. Sri. Raghunath Khara, Balda GP

Sri Khara stated that the villagers have not yet received their rights under the Forest Rights Act, despite applying for them since 2015. He emphasized that only after getting their rights, a decision can be made regarding granting the company permission to establish operations on their land and forest by the village committee. He concluded by expressing his opposition to the project.

13. Smt. Bimla Pujari, Bheja GP

Smt. Pujari stated that the villagers benefit from the forest in various ways. She mentioned that, since childhood, they have been sustaining themselves by collecting vegetables, harvesting crops, and engaging in fishing activities in the area. She said that they are surviving by eating whatever the forests offer to them. She emphasized that the villagers sustain themselves only through farming. She concluded by expressing her opposition to the project.

14. Smt. Tula Sisa, Bheja GP

Smt. Sisa shared that she is a widow with two children. She stated that she does not receive any government assistance and is completely dependent on forest products, which she collects and sells to sustain her family. Smt. Sisa emphasized that the forest is of vital importance to the tribal community, providing essential resources in many ways. She

Regional Officer
State Pollution Control Board
Koraput

Addl. Dist. Magistrate
KORAPUT

concluded by stating that their survival is dependent on the existence of the forest. She concluded by expressing her opposition to the project.

15. Smt. Gouri Sisa, Bheja GP

Smt. Sisa said that the villagers have rights to their forest, mountain and the worship of Goddess Nageswari. She emphasized that the traditional Ayurvedic medicines collected from the hill are essential for their survival. She stated that they are reliant on these forest resources for their livelihood. She concluded by expressing her opposition to the company and the project.

16. Smt. Gangu Khara, Attanda GP

Smt. Khara expressed her opposition to the company and the project. She stated that she would not support the destruction of the cave where the Goddess is worshipped. Smt. Khara raised concerns about the survival of future generations if mining activities will take place. She also highlighted the ongoing water shortage in their village. She stated that if the mountain is mined, they will be deprived of access to medicines, food, essential leaves, and other resources which are necessary for their survival. Additionally, she mentioned that the villagers have been fighting for their rights through rallies and other efforts to reach out to the government, but have not been successful. She concluded by strongly opposing the project.

17. Smt. Kamala Sisa, Balda GP

Smt. Sisa expressed that they do not wish to receive any benefits from the company. She said that the villagers are sceptical about the project and are having sleepless nights thinking that where will they go, what they will eat and where will they conduct their traditional cultural activities. She further stated that they are willing to engage in labour work, fishing, and other similar activities to sustain themselves but are not willing to give up their land for mining operations.

18. Smt. Dalima Khara, Somuli, Attanda GP

Smt. Khara highlighted that their forest land provides a variety of crops, vegetables, medicines and millets, along with many essential resources for daily life. She raised concerns about the impact of mining on the mountain and forest, questioning how they would survive and what they would eat if the mining activities were to take place. Additionally, she mentioned that they worship Goddess Nageswari on the mountain and are leading a prosperous life under her blessings. In conclusion, she expressed her opposition to the proposed project.

19. Sri. Narayan Khillo, Balda GP

Sri. Khillo stated that they sustain their livelihood through hard work and self-effort. He expressed concern that the government has not yet fulfilled the basic necessities in their villages. He also mentioned that they celebrate the festival of Goddess Nageswari on the mountain and was skeptical where will they worship if the mountain is mined out. He opposed the commencement of mining activities in that area. In conclusion, he expressed his opposition to the proposed project.

Regional Officer
State Pollution Control Board
Koraput

Addl. Dist. Magistrate
KORAPUT

20. Smt. Golapi Khara, Balda GP

Smt. Khara stated that they worship Goddess on the mountain and consider the forest as their mother. She emphasized that the forest, mountain, water, and other natural resources belong to them, and they have rights over these resources. She further expressed that they do not require assistance from either the government or the company. She highlighted that they are used to living in coordination with the forest and depend on it for their survival. In conclusion, she expressed her opposition to the proposed project.

21. Sri. Sanyas Khillo, Bheja GP

Sri. Khillo raised concerns about the potential adverse impacts on air and water quality resulting from the deforestation. He stated that over 10,000 people across five panchayats rely entirely on the forest for their livelihood. He also expressed dissatisfaction that the company had not consulted the affected villagers nor explained the potential challenges they would face due to the proposed mining activities. Sri. Khillo referred to the ongoing issue at Niyamgiri Hills of Lanjigarh, Kalahandi. He highlighted that various types of crops are cultivated around the forest. He questioned where the people would go who depend on agriculture for their sustenance, if mining will take place.

22. Sri. Rabindra Pangi, Balda GP

Sri. Pangi stated that five villages are entirely dependent on Nageswari Hills for their sustenance. He further mentioned that the proposed mountain is a popular tourist destination, even attracting visitors from the neighboring states of Andhra Pradesh and Chhattisgarh. He emphasized that the forest is worshipped by the villagers, as it provides essential resources such as wood, leaves, water, etc. He expressed concern that the forest is now on the verge of destruction. He stated that, they are unable to bear the medical expenses in case of illness and are reliant on the medicinal herbs from the forest for their healthcare needs. Sri. Pangi urged all present to carefully consider how the local communities would survive if mining activities will take place.

23. Sri. Jayaram Galori, Mali Sublar, Kulabir GP

He said that they have rights over the forest and would not permit the company to carry out mining activities in the area. He further emphasized their tribal rights in relation to the forest. In conclusion, he expressed his opposition to the proposed project.

24. Sri. Nath Guru, Kitaba, Badel GP

Sri Nathguru stated that the mining activity will lead to food and water scarcity for the villagers and will have an adverse impact on agriculture. He stated that they would not permit the company to carry out mining activities that would put their forest & mountain at risk. He further emphasized that the people would strongly resist any mining activities, as they are determined to protect their livelihoods and the forest. In conclusion, He expressed his opposition to the proposed project.

25. Sri Sunadar Muduli, Attanda GP

Sri. Muduli urged the villagers to consider the long-term benefits of preserving the forest and emphasized the importance of protecting it. He stated that during the construction of the

Regional Officer
State Pollution Control Board
Koraput

Addl. Dist. Magistrate
KORAPUT

Jalaput Dam, many villagers were displaced from their land. He also mentioned that, for his sustenance, he is engaged in agricultural activities on the mountain.

26. Sri. Budura Khillo, Attanda GP

He said that he is completely dependent on the mountain as various crops are grown over there. He questioned how the community would survive if the Nageswari Hill will be mined.

27. Sri. Suba Sisa, Badel GP

He stated that the villagers were not properly informed about the public hearing and he said that villagers got to know about the hearing on very short notice. He said that people in his village are worried and disturbed hearing about this mining project. He expressed his opposition to the proposed project.

28. Sri. Kamesh Kamodi, Nandapur

He expressed concern that, if the project is approved, it may lead to displacement of people, similar to what has occurred in other areas with similar projects. He requested the project proponent to explain the benefits that the community would gain from the project and to address the potential pollution that may result from mining activities. He also urged the company to consult with the local people, discuss the proposed developmental activities and provide information on the employment opportunities that the project will generate. Additionally, He highlighted that the community currently benefits from good quality air and water due to the presence of the green forest.

29. Sri. Gopal Mattam, Nandapur

He stated that the company should have sought the opinions of the local people regarding the project before conducting the public hearing. He also mentioned that the community offers prayers to the goddess using resources from the surrounding forest. He highlighted the suffering of the people due to the construction of dams in the past. He expressed concerns that mining activities would lead to pollution. In conclusion, he opposed the proposed project.

30. Sri. Narsun Kamudi, Koraput

He suggested that the public hearing should be re-conducted and said that the company should seek the opinions of the villagers. He further stated that the government should consider the preservation of the local forests.

31. Sri. Bikram Sisa, Balda GP

Sri. Sisa raised questions regarding the potential benefits and negative impacts of the project and requested a detailed explanation.

32. Sri Ajay Muduli, Bheja GP

Sri. Muduli stated that the public hearing is being conducted in violation of the PESA Act, the Forest Rights Act, the Fifth Schedule of the Indian Constitution and the Scheduled Castes and Scheduled Tribes (Prevention of Atrocities) Act. In conclusion, he expressed his opposition to the proposed project.

Regional Officer
State Pollution Control Board
Koraput

Addl. Dist. Magistrate
KORAPUT

The Regional Officer, SPCB, Koraput read over the issues raised by the public in the hearing and Sri Nabal Kishore Sharma (Vice President, ADANI Enterprises Ltd. Natural Recourses) & Sri. Prasanna Kumar Panda (Advisor, ADANI Enterprises Ltd. Natural Recourses) of the project responded to all the issues raised for the proposed project and said that the mining will be done in a sustainable manner without causing any damage to the local environment and livelihoods of locals. The issues raised by the public and corresponding comments of the applicant were prepared in Odia and English and it is annexed with the proceedings as **Annexure-I & II** respectively.

Mrs. Alomani Sethy, OAS (SAG), Additional District Magistrate (General), Koraput has given concluding remarks on the hearing and elaborated the process to be followed for submission of the proceeding to the MoEF & CC, Govt. of India for grant of Environmental Clearance. She extended thanks to the public participated in the hearing and for offering their views, suggestions relating to the project.

The list of the oral deliberators and participants in the hearing is annexed as **Annexure-III & IV** respectively. 2141 nos. of written representations were received on the spot on the day of public hearing which are enclosed as **Annexure-V**. 1 no. of written representation was received by this office before the public hearing (enclosed as **Annexure-VI**, refer page number 5889 to 5984) and another 1 no. of written representation was received through physical submission at Regional Office, SPCB, Odisha, Koraput after the public hearing (enclosed as **Annexure-VII**, refer page number 5884 to 5888). The videography of proceedings are recorded and submitted as DVD (One number).

The entire exercise was conducted systematically in accordance with provisions of the EIA Notification S. O. 1533 (E) dt. 14.09.2006 and subsequent amendments and no restrictions were placed on anybody who wished to attend the same. All those who wished to speak at the venue were allowed to, including all those who were not resident in the affected area, while the others submitted their written statements. All attempts were made to ensure free and fair hearing.

Hearing ended with thanks to the chair.

06/03/25

Er. Deepesh Kumar Biswal
Regional Officer, SPCB Koraput
Regional Officer
State Pollution Control Board
Koraput

6.03.2025

Mrs. Alomani Sethy, OAS (SAG)
Additional District Magistrate, Koraput
Addl. Dist. Magistrate
KORAPUT

Annexure-I

କୋରାପୁଟ ଜିଲ୍ଲାର ନନ୍ଦପୁର ତହସିଲ ଅନ୍ତର୍ଗତ ବଲଡ଼ା ଗ୍ରାମାଞ୍ଚଳରେ ୧୪୪.୯୪୫ ହେକ୍ଟର ଖଣି କ୍ଷେତ୍ରଫଳ ଉପରେ ୪.୦MTPA ଶୀର୍ଷ ମୂଲ୍ୟାଙ୍କିତ କ୍ଷମତା ପାଇଁ ମେସର୍ସ କଳିଙ୍ଗ ଆଲୁମିନା ଲିମିଟେଡ୍ ପାଇଁ ବଲାଡ଼ା ବକ୍ସାଇଟ୍ ଖଣି ପାଇଁ ତା.୦୬.୦୩.୨୦୨୫ ରିଖ ରେ ସକାଳ ୧୧.୦୦ଟା ରେ ନନ୍ଦପୁର ତହସିଲ ଜିଲ୍ଲା-କୋରାପୁଟ ଅନ୍ତର୍ଗତ ମୌଜା ବେଜା (ଖାତା ନମ୍ବର ୨୭, ପ୍ଲଟ୍ ନମ୍ବର ୨୨୫ ଏରିଆ-୨.୪୮ ଏସି, କିସମ-ଡି-III) ଠାରେ ଜନଶୁଣାଣୀ କାର୍ଯ୍ୟକ୍ରମ ଅନୁଷ୍ଠିତ ହୋଇଥିଲା ଉକ୍ତ ଜନଶୁଣାଣୀ କାର୍ଯ୍ୟକ୍ରମରେ ଜନସାଧାରଣ ଦ୍ୱାରା ଉଠାଯାଇଥିବା ପ୍ରସଙ୍ଗ ଏବଂ ସାଧାରଣ ଶୁଣାଣୀରେ ପ୍ରସ୍ତାବଙ୍କ ମତାମତର ବିବରଣୀ ନିମ୍ନରେ ଉପସ୍ଥାପନ କରାଗଲା ।

କ୍ରମିକ ସଂ ଖ୍ୟା	ଜନସାଧାରଣଙ୍କ ଦ୍ୱାରା ଶୁଣାଣିରେ ଉଠାଯାଇଥିବା ପ୍ରସଙ୍ଗଗୁଡିକ	ପ୍ରକଳ୍ପ ପ୍ରସ୍ତାବକଙ୍କ ଉତ୍ତର	ପ୍ରସ୍ତାବିତ ଖର୍ଚ୍ଚ (ଟଙ୍କା)
୧.	ପ୍ରକଳ୍ପ ପ୍ରଭାବିତ ଲୋକଙ୍କ (PAP) ପାଇଁ R&R ଯୋଜନା/ କ୍ଷତିପୂରଣ ବିବରଣୀ ପ୍ରଦାନ କରାଯିବା ଉଚିତ।	ବ୍ଲକ ମଧ୍ୟରେ କୌଣସି ଜନବସତି ନଥିବାରୁ ବର୍ତ୍ତମାନର ପ୍ରସ୍ତାବରେ କୌଣସି ଗବେଷଣା ଏବଂ ଗବେଷଣା କାର୍ଯ୍ୟ ଜଡିତ ନୁହେଁ। ସମ୍ପୂର୍ଣ୍ଣ ଖଣି ଲିଜ୍ କ୍ଷେତ୍ର ହେଉଛି ୧୪୪.୯୪୫ ହେକ୍ଟର (ବନଜମି)। ପ୍ରକଳ୍ପ କାର୍ଯ୍ୟକଳାପ ପାଇଁ ଯଦି କୌଣସି କ୍ଷତିପୂରଣ ଆବଶ୍ୟକ ହୁଏ, ତେବେ ପ୍ରକଳ୍ପ ପୃଷ୍ଠପୋଷାକ ଏଥିପାଇଁ ବଜେଟ୍ ବ୍ୟବସ୍ଥା ସ୍ଥିର କରିବେ।	୫୦,୦୦,୦୦୦
୨.	ଶିକ୍ଷା ପ୍ରାଥମିକ ବିଦ୍ୟାଳୟ/ଉଚ୍ଚ ମାଧ୍ୟମିକ ବିଦ୍ୟାଳୟର ନବୀକରଣ, ବିଦ୍ୟାଳୟରେ ମାଗଣା ଶିକ୍ଷା।	ନିମ୍ନଲିଖିତ ବିଦ୍ୟାଳୟଗୁଡ଼ିକୁ ନବୀକରଣ କାର୍ଯ୍ୟ କରିବା ପାଇଁ ଲକ୍ଷ୍ୟ ଉଖାଯାଇଛି ; • ସରକାରୀ ଉନ୍ନତ ହାଇସ୍କୁଲ, ବଲଦା • ଉଚ୍ଚ ପ୍ରାଥମିକ ବିଦ୍ୟାଳୟ, ତେନ୍ତର। • ଉଚ୍ଚ ପ୍ରାଥମିକ ବିଦ୍ୟାଳୟ, ବାତେଲ • ବଲଦା ଏସଏସସି ହାଇସ୍କୁଲ ଇତ୍ୟାଦି। ଉପରୋକ୍ତ କାର୍ଯ୍ୟକଳାପ ବ୍ୟତୀତ ପ୍ରକଳ୍ପ ପ୍ରସ୍ତାବକ ଦ୍ୱାରା ଅଧ୍ୟୟନ କ୍ଷେତ୍ରର ସାମାଜିକ ସ୍ଥିତିକୁ ଉନ୍ନତ କରିବା ପାଇଁ ନିମ୍ନଲିଖିତ କାର୍ଯ୍ୟକଳାପ ମଧ୍ୟ କରାଯିବ। • ସ୍ଥାନୀୟ ସରକାରୀ ବିଦ୍ୟାଳୟଗୁଡ଼ିକୁ ଛାତ୍ରବୃତ୍ତି ପ୍ରଦାନ କରି ଶିକ୍ଷା ସୁବିଧାକୁ ସୁଦୃଢ଼ କରିବା। • ସ୍ଥାନୀୟ ଛାତ୍ରଛାତ୍ରୀଙ୍କ ପାଇଁ ସ୍ୱତନ୍ତ୍ର ଶିକ୍ଷଣ ସହାୟତା।	୫୦,୦୦,୦୦୦

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೩	ಮಾಡಿದ ಸಹ ಮಾಡಿದ	ಮಾಡಿದ ಸಹ ಮಾಡಿದ	೦೦೦,೦೦,೦೬
೪	ಮಾಡಿದ ಸಹ ಮಾಡಿದ	ಮಾಡಿದ ಸಹ ಮಾಡಿದ	೦೦೦,೦೦,೦೬
೫	ಮಾಡಿದ ಸಹ ಮಾಡಿದ	ಮಾಡಿದ ಸಹ ಮಾಡಿದ	೦೦೦,೦೦,೦೬
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KORAPUT

	ବିବରଣୀ		୦୦୦,୦୦୬,୮୫
୫୫	ଅଣ୍ଡରଗ୍ରାଉଣ୍ଡ ଖଣି ପାଇଁ ଅତିରିକ୍ତ ଜମି ଅଧିଗ୍ରହଣ ପାଇଁ ଆବଶ୍ୟକ ଅର୍ଥ ଯୋଗାଣ ପାଇଁ ଜିଲ୍ଲାପାଳଙ୍କ ନିକଟରେ ଦାଖଲ କରାଯାଇଥିବା ଆବେଦନ ପତ୍ର	ଖଣି ପାଇଁ ଅତିରିକ୍ତ ଜମି ଅଧିଗ୍ରହଣ ପାଇଁ FMD ଯୋଗାଇଁବା ଅର୍ଥ	
୫୫	୧୯୫୭ ମସିହା ଖଣି ଆଇନ ଧାରା ୫୫ ଅନୁଯାୟୀ ଖଣି ଅଞ୍ଚଳରେ ଥିବା ଜମି ଉପରେ ଖଣି ଅଧିକାରୀଙ୍କ ଅଧିକାର ଅର୍ଜନ ପାଇଁ ଆବଶ୍ୟକ ଅର୍ଥ ଯୋଗାଣ ପାଇଁ ଜିଲ୍ଲାପାଳଙ୍କ ନିକଟରେ ଦାଖଲ କରାଯାଇଥିବା ଆବେଦନ ପତ୍ର	ଖଣି ପାଇଁ ଅତିରିକ୍ତ ଜମି ଅଧିଗ୍ରହଣ ପାଇଁ FMD ଯୋଗାଇଁବା ଅର୍ଥ	
୫୫	୧୯୫୭ ମସିହା ଖଣି ଆଇନ ଧାରା ୫୫ ଅନୁଯାୟୀ ଖଣି ଅଞ୍ଚଳରେ ଥିବା ଜମି ଉପରେ ଖଣି ଅଧିକାରୀଙ୍କ ଅଧିକାର ଅର୍ଜନ ପାଇଁ ଜିଲ୍ଲାପାଳଙ୍କ ନିକଟରେ ଦାଖଲ କରାଯାଇଥିବା ଆବେଦନ ପତ୍ର	ଖଣି ପାଇଁ ଅତିରିକ୍ତ ଜମି ଅଧିଗ୍ରହଣ ପାଇଁ FMD ଯୋଗାଇଁବା ଅର୍ଥ	
୫୫	୧୯୫୭ ମସିହା ଖଣି ଆଇନ ଧାରା ୫୫ ଅନୁଯାୟୀ ଖଣି ଅଞ୍ଚଳରେ ଥିବା ଜମି ଉପରେ ଖଣି ଅଧିକାରୀଙ୍କ ଅଧିକାର ଅର୍ଜନ ପାଇଁ ଜିଲ୍ଲାପାଳଙ୍କ ନିକଟରେ ଦାଖଲ କରାଯାଇଥିବା ଆବେଦନ ପତ୍ର	ଖଣି ପାଇଁ ଅତିରିକ୍ତ ଜମି ଅଧିଗ୍ରହଣ ପାଇଁ FMD ଯୋଗାଇଁବା ଅର୍ଥ	
୫୫	୧୯୫୭ ମସିହା ଖଣି ଆଇନ ଧାରା ୫୫ ଅନୁଯାୟୀ ଖଣି ଅଞ୍ଚଳରେ ଥିବା ଜମି ଉପରେ ଖଣି ଅଧିକାରୀଙ୍କ ଅଧିକାର ଅର୍ଜନ ପାଇଁ ଜିଲ୍ଲାପାଳଙ୍କ ନିକଟରେ ଦାଖଲ କରାଯାଇଥିବା ଆବେଦନ ପତ୍ର	ଖଣି ପାଇଁ ଅତିରିକ୍ତ ଜମି ଅଧିଗ୍ରହଣ ପାଇଁ FMD ଯୋଗାଇଁବା ଅର୍ଥ	
୫୫	୧୯୫୭ ମସିହା ଖଣି ଆଇନ ଧାରା ୫୫ ଅନୁଯାୟୀ ଖଣି ଅଞ୍ଚଳରେ ଥିବା ଜମି ଉପରେ ଖଣି ଅଧିକାରୀଙ୍କ ଅଧିକାର ଅର୍ଜନ ପାଇଁ ଜିଲ୍ଲାପାଳଙ୍କ ନିକଟରେ ଦାଖଲ କରାଯାଇଥିବା ଆବେଦନ ପତ୍ର	ଖଣି ପାଇଁ ଅତିରିକ୍ତ ଜମି ଅଧିଗ୍ରହଣ ପାଇଁ FMD ଯୋଗାଇଁବା ଅର୍ଥ	
୫୫	୧୯୫୭ ମସିହା ଖଣି ଆଇନ ଧାରା ୫୫ ଅନୁଯାୟୀ ଖଣି ଅଞ୍ଚଳରେ ଥିବା ଜମି ଉପରେ ଖଣି ଅଧିକାରୀଙ୍କ ଅଧିକାର ଅର୍ଜନ ପାଇଁ ଜିଲ୍ଲାପାଳଙ୍କ ନିକଟରେ ଦାଖଲ କରାଯାଇଥିବା ଆବେଦନ ପତ୍ର	ଖଣି ପାଇଁ ଅତିରିକ୍ତ ଜମି ଅଧିଗ୍ରହଣ ପାଇଁ FMD ଯୋଗାଇଁବା ଅର୍ଥ	
୫୫	୧୯୫୭ ମସିହା ଖଣି ଆଇନ ଧାରା ୫୫ ଅନୁଯାୟୀ ଖଣି ଅଞ୍ଚଳରେ ଥିବା ଜମି ଉପରେ ଖଣି ଅଧିକାରୀଙ୍କ ଅଧିକାର ଅର୍ଜନ ପାଇଁ ଜିଲ୍ଲାପାଳଙ୍କ ନିକଟରେ ଦାଖଲ କରାଯାଇଥିବା ଆବେଦନ ପତ୍ର	ଖଣି ପାଇଁ ଅତିରିକ୍ତ ଜମି ଅଧିଗ୍ରହଣ ପାଇଁ FMD ଯୋଗାଇଁବା ଅର୍ଥ	
	(ଅକ୍ଷରେ ଟଙ୍କା ୦୦ ୬ ୬ ୫୫ ଶତ ୫୫) ସମୁଦାୟ		
	ଆଜି ତାରିଖରୁ ଏହି ଟଙ୍କା ୬ ୬ ୬ ଟଙ୍କା ଆଦାୟ ହେବା ୦୫ ୦୫ ୨୦୨୨		
	ଏତଦ୍ଦ୍ୱାରା ଏଥିରେ ଉଲ୍ଲେଖିତ ତାରିଖରୁ ଏହି ଟଙ୍କା ଜମାହେଉଛି		

ବିଭାଗର
ଜିଲ୍ଲା ସଂଯୁକ୍ତ ଯୋଜନା ଅଧିକାରୀ
ଆଲିଙ୍ଗା ଆଲୁମିନା ଲିମିଟେଡ୍
ଜିଲ୍ଲାପାଳ, SCPS
ଆଲିଙ୍ଗା ଆଲୁମିନା ଲିମିଟେଡ୍

ANNEXURE – II

STATEMENT OF ISSUES RAISED BY THE PUBLIC AND COMMENTS OF THE PROPONENT IN THE PUBLIC HEARING FOR BALLADA BAUXITE MINES FOR M/S KALINGA ALUMINA LIMITED FOR PEAK RATED CAPACITY OF 4.0 MTPA OVER MINING AREA OF 144.945 HA IN VILLAGE BALLADA UNDER NANDAPUR TAHSIL OF KORAPUT DISTRICT HELD ON 06.03.2025 AT 11.00 AM AT MOUZA BHEJA (KHATA NO. 27. PLOT NO. 225 AREA -2.48 AC, KISSAM-D-111) UNDER NANDAPUR TEHSIL DISTRICT-KORAPUT.

Sl. No.	Issues raised by the public during hearing	Response of the Project proponent	Proposed Expenditure (in Rs)
1.	Resettlement and Rehabilitation (R&R) Plan/Compensation details for the Project Affected People (PAP) should be furnished.	No R&R is involved in the present proposal as there is no habitation within the Block. The complete mine lease area is 144.945 Ha (Forest Land), If any compensation is required due to project activities, the project proponent has committed to earmark the budgetary provision for same.	50,00,000
2.	Education Renovation of Primary school/Higher Secondary School, Free education in schools.	The project proponent has proposed to renovate the following schools: • Govt. High School, Balda • Upper Primary School Taintar. • Upper Primary School Badel, • Balda SSC High School etc. In addition to the above physical activities the following activities are also proposed to be carried out by the Project Proponent to uplift the social status of the study area. • Strengthening of education facility by providing scholarships to the local government schools. • Specialized learning support for local students. • Coaching support for higher class students. • Specialized coaching for youths for competitive examinations.	50,00,000
3.	Healthcare facilities like provision of Ambulance, Distribution of free medicine,	In order to uplift the existing health care regime in the study area, the project proponent has	60,00,000

	conducting health Camps	proposed to collect data from sources like the National Family Health Survey (NFHS) which shall be used in tracking progress and identifying areas needing attention. Conducting periodic health assessments will aid in evaluating the effectiveness of interventions and making necessary adjustments. Outreach of Health care initiatives in the study area is proposed to be done through Mobile Health Care Units.	
4.	**Infrastructure Development:** Construction of road, Water coolers and purifier, for Drinking water **Physical Work:** Strengthening/maintenance of village roads, Rainwater Harvesting at Community Area, Provision of Plantation and Streetlights in Community Area, Provision. Water Cooler for Potable Drinking water	M/s. Kalinga Alumina Limited envisages social development programs so that health care, educational facilities for the community, providing drinking water to the villages, building / strengthening of existing roads in the area. Suitable drinking water supply shall be provided by the proponent through hand pumps, dug wells and tube wells to certain extent, besides supplying drinking water through the mobile tankers in the affected villages and/ or on request of the local populace. The project proponent has already taken steps for installation of solar streetlights and bore well in adjoining villages.	1,00,00,000
5.	**Skill Development and Employment** Wick making, Stitching, Mushroom Production and Computer Training.	As informed, the industry mine shall generate 300-400 jobs directly and indirectly. First preference would be given to the local population for employment. Direct and indirect Employment would be generated by upgrading the skilled and unskilled by providing appropriate training.	-

		Wages for employment would be as per prevailing labour laws and are not part of Public Hearing Cost.	
6.	What about the Ballada Cave, it will be destroyed due to mining activity.	The approved mining plan stipulates that mining activity shall not be carried out in a distance of 100 meters from the Cave. Hence the cave shall remain undisturbed and on the contrary, the cave and its vicinity shall be developed and beautified so as to attract tourism. The mine has ear marked Rs. **20 Lakhs** for beautification of the cave which would be regularly maintained under the CSR initiative of the Project.	20,00,000
7.	Agriculture of villages will be affected.	Agriculture training would be provided to help villagers to earn their live hoods. **Agricultural Facilities** Physical Work: Donation of seeds, saplings, block plantation in village area, Plantation in school, fertilizers, manure to needy farmers, Financial assistance for Irrigation facilities, Construction of farm ponds for needy farmers, Training related to Modern Agricultural techniques to the farmers. For meeting the needs of physical demands of the farmers a fund of **Rs. 70 Lakh** is allocated from the Public Hearing Budget of the project proponent.	70,00,000
8.	The Forest Right Act is to be adopted for diversion of forest and R&R plan.	Cost of Forest Diversion has been calculated which is Rs. 36.27 Cr. The project proponent shall adhere to the forest right act and the affected individuals would be settled and compensated as per the Law. As informed, there is no habitation inside the Mine Lease area therefore no FRA or R&R is applicable.	-

9.	Applicability & Implementation of the PESA Act.	Reportedly, PESA Act is not applicable as no Private Land is involved in the lease area. Mine lease area is 144.945 Ha which totally reserve forest area.	-
10.	Stream Water Affect	The area has no perennial nalla or stream; hence there would not be any impact of mining on surface water regime. Hence, there is no possibility of any siltation in natural streams and reduction of vertical percolation. Reportedly, the rainwater flow towards the catchment area would not flow through the lease area as garland drains would be made around the lease area and the water would be collected in Holding ponds. Hence, solid wash off will not occur. The cost of Garland drain has been taken under the EMP Cost.	20,00,000
11.	What measures will be taken to prevent air pollution in this project	Air pollution control measures like development of greenbelt and avenue plantation, water sprinkling along haul roads would be deployed to minimize the impact on surroundings. Transportation would be done with covered trucks/Conveyor. The crushed bauxite from Ballada mine would be transported by trucks to Bheja railway siding, located at a distance of about 6 km from the lease boundary. Existing road from mine pit to railway siding to be strengthened and widened during the operation phase. Intra-mine movement of ore and OB would be carried out using dumpers of appropriate capacity as per provisions of the Approved Mine Plan. Budget for Control of air pollution has been taken into account while preparation of the EIA/EMP and would be increased upon the recommendations of the competent authority.	-

12.	Overburden protection & subsequent plantation	Proponent has proposed to plant 8,440 number of trees on 4.22 Ha area as green belt within the mine lease are in 5 years with 90% survival rate. Native species have been proposed to be planted in the Mine lease/ mined out area in phased manner. Regular guidance from the forest department would be taken before plantation. For plantation of 8440 trees, it is proposed to spend **Rs 112 Lakh** (Taking per plant cost to Rs 1200)	1,12,00,000
13.	Cutting down Trees	Reportedly, no tree cutting involved in this project. However, the proponent has proposed to plant 8,440 no. of trees on 4.22 Ha area as green belt within the mine lease area in 5 years with 90% survival rate.	-
14.	Increase of DMF fund for development	As per the rules of State government the DMF would be paid to state government. Approx. Rs. 55 Cr would be paid to government exchequer over the life of mine.	-
Total			**4,82,00,000**

For Project Cost of Rs 230 Crore it is proposed to spend Rs **4.82 Crore** towards Public Hearing Commitment. This is over and above the govt. exchequers pertaining to different mining taxes and duties such as auction premium, royalty, NMET & DMF which would be paid to government authorities over life of mine.

Signature of the Proponent

KALINGA ALUMINA LIMITED

Regional Officer
SPCB, Koraput

Regional Officer
State Pollution Control Board
Koraput

Additional District Magistrate,
Koraput

Addl. Dist. Magistrate
KORAPUT

ANNEXURE-III

ATTENDANCE SHEET OF ORAL DELIBERATORS PARTICIPATED DURING PUBLIC HEARING OF M/S KALINGA ALUMINA LIMITED FOR BALLADA BAUXITE MINES TO BE HELD ON 06.03.2025 AT 11.00 AM AT MOUZA BHEJA (KHATA NO. 27, PLOT NO. 225 AREAR – 2.48 AC, KISSAM-D-III) UNDER NANDAPUR TEHSIL DISTRICT- KORAPUT.

Sl. No.	NAME AND ADDRESS	MOBILE NUMBER	SIGNATURE/THUMB
1.	Chaitanya Hantal Nandapur GP.	8249636004	
2.	Madan Hadputi'a Balda GP	7978018167	
3.	Ramachandra Khara Khilua, Hekimput	9348972135	
4.	Bhagaban Peti'a Hekimput GP	6370513123	
5.	Lakshmi Dar Badam Attnda, Attanda GP	6371699392	
6.	Trinath Khora Khilua, Hekimput	8144268861	
7.	Lakchmi Stsc Taintan, Bheja GP		
8.	Jana Stsc Soput, Balda	8328878813	
9.	Mana Khara Soput, Balda GP	8249347672	
10.	Bobita Muduli' Taintan, Bheja GP	7855936608	
11.	Reli Stsc Malidimidal, BaldaGP	7855810294	
	Madhusudhan Dadia Soput, Balda	7978250679	
	Raghunath Khara Balda GP		

Contd...

1342

SL. No.	NAME AND ADDRESS	MOBILE NUMBER	SIGNATURE/THUMB
	Bimla Pujari Taintar, Bheja		

Contd...

ANNEXURE- IV

ATTENDANCE SHEET OF PARTICIPANTS PRESENT DURING PUBLIC HEARING OF M/S KALINGA ALUMINA LIMITED FOR BALLADA BAUXITE MINES TO BE HELD ON 06.03.2025 AT 11.00 AM AT MOUZA BHEJA (KHATA NO. 27, PLOT NO. 225 AREAR - 2.48 AC, KISSAM-D-III) UNDER NANDAPUR TEHSIL DISTRICT- KORAPUT.

SL. No.	NAME	VILLAGE	SIGNATURE/THUMB
1.	Bibhisan Pujari	Maldabandal	
2.	umesh Kumar Khola	Nandpur	
3.	Pankaj Khemu	Nandpur	
4.	Jatu Pangi	Nandpur	
5.	Mohan das Gurbha	Chhelia Munda	
6.			
7.	Madan Hadapatra	Balda.	
8.		Hikemput	
9.	Bhagaban Petra	"	
10.	Ganeswar Dora	Bheja.	
11.	Narayan Pujari	Maldabandal	
12.	Ram Chandra Pradhan	Maldabandal	
13.	Dhanaraya Khemu	Gumpandi	
14.	Gopinath Pujari	Maldabandal	
15.	Daitary Kenara.	Khilica	
16.			
17.			
18.	Padma Sisa	Balda	
19.	Purna Sethi	Balda	
20.	Balram Pujari	Maldabandal	
21.	Subas Kurkuria	Maldabandal	
22.	Ankul Gadia	Maldabandal	
23.	Jaya Khara	Pauta bandal.	
24.			

SL. No.	NAME	VILLAGE	SIGNATURE/THUMB
25.	Parmuasisa	Olu	
26.	Kamala Anta	Marta	
27.	Jamuna Jarei	Marta	
28.	Champa Anta	Marta	
29.	Lankeswari Pujari	Parsabindai	
30.	Lahami Pujari	Parsabimandai	
31.	Pramila Pujari	Parsabimandai	
32.	Indu Pujari	Parsabimandai	
33.	Susani Hanra	Parsabimandai	
34.	Chameabati Nayak	Malibimandai	
35.	Anjana Nayak	Malibimandai	
36.	Jubati Pujari	Malibimandai	
37.	Parabati Nayak	Mali bimandai	
38.	Mati Hujari	Mali bimandai	
39.	Parbati Nayak	Mali bimandai	
40.	Buduri Pradhani	Malibimandai	
41.	Gaiadhi Nayak	Malibimandai	
42.	Parbita Pujari	Malibimandai	
43.	Nelma Nayak	Malibimandai	
44.	Sumitri Pradhani	Mali bimandai	
45.	Jagada Hantal	Borai	
46.	Lachana Hantal	Anjarpent	
47	Subarna Badanayak	Anjarpent	
48.	Jau gunda	Anjarpent	
49.	Manina Badanayak	Anjarpent	
50.	Subha Bajari	Anjarpent	

Contd...

Sl. No.	NAME	VILLAGE	SIGNATURE/THUMB
51.	Gangadhar Nayak	Mali Bimdal	
52.	Dina Bandhu Khara	Mali Bimdal.	
53.	Gandli Pangi	Paraja Bimdal	
54.	Dinesh Khara.	Sameli	Dinesh Khara
55.	Kanu Pujari	Mali Bimdal.	Kanu Pujari
56.	Sanmath Pangi	Mali Bimdal	
57.	Bagavan Pujari	Mali Bimdal.	
58.	Bima Nayak	Mali Bimdal	
59.	Bandhu Mahiya	Mali Bimdal	
60.	Basanta dhar Pujari	Mali Bimdal	
61.	Sofana Sisa	Mali Bimdal.	
62.	Dhulabo Sisa	Paraja Bimdal	
63.	Ratan Batagaria	Mali Bimdal	Ratan Batagaria
64.	Purusotam Nayak	Mali Bimdal	
65.	Debendra Nayak	Mali Bimdal.	
66.	Jagannath Pangi	Paraja Bimdal	
67.	Nakula Anthal.	Paraja Bimdal	NAKUL HUNTAL
68.	Balu Sisa	Paraja Bimdal	
69.	Jalandar Pangi	Paraja Bimdal	
70.	Bhudu Ram Khara	Godi put	Bhudu ram Khara
71.	Balal Shiy Nayak	Mali Bimdal.	
72.	Tanath Kilo	Atanda	
73.	Kamal Lachan	Mali Bimdal.	Kamal Lachan
74.	Pradeep Pujari	Mali Bimdal	
75.	Jijikal Hapaparika	Baldar	
76.	Hemant Hapaparika	Balda	Hemanta Hapaparika

Contd...

SL. No.	NAME	VILLAGE	SIGNATURE/THUMB
77.	Sitha Gatara	Kotlapet	
78.	Dana mali	Kotlapet	
79.	Pratap malam	Kotlapet	
80.	Sahadeb Khara	Kotlapet	Sahadeb Khara
81.	Gyasi mali	Kotlapet	
82.	Dambara Sethi	Balda	Dambara Sethi
83.	Binod Kumar Sethi	Balda	Binod Kumar Sethy
84.	Sri Ram Pangi	Balda	
85.	Tukuna sethi	Balda	Tukuna Sethy
86.	Rasu Hatpati	Balda	

Conta...

SL. No.	NAME	VILLAGE	SIGNATURE/THUMB
87.	Madhu Sisa	Balda	
88.	Rano Pangi	Upar Balda	
89.	Basu Pangi	Upar Balda	
90.	Sunil Kumar Shidy	Upar Balda	Sunil Kr Pradhan

Contd...

Sl. No.	NAME	VILLAGE	SIGNATURE/THUMB
91.	Bimala Hankimya	Anjarrent	
92.	Sumitra Khilar	Anjarrent	
93.	[illegible]	[illegible]	[illegible]
94.	Laxmi Hartael	Kiellabeir	
95.	Radhika Nayak	Parjabimandal	
96.	Lachama Pujari	Parjabimandal	
97.	Daimba Sukure:	Baden	Daimba Sukuri
98.	Tela Ansha	Maturi	[illegible]
99.	Sagta Sukri	Atubu Padua Nandary	
100.	Chamea Ghanta	Atubu	
101.	Tuabati Ghanta	Atubu	[illegible]
102.	Gauri Sukri	Atubu	
103.	Sabitri Kindu	Babbhanput	
104.	Pramila Hada	Atubu	
105.	[illegible]	Atubu	
106.	Mayabati Hada	Atubu	
107.	Ganguri Hada	Atubu	
108.	Bimda Golori	Khujahori	
109.	Rukmani Kada	Atubu	

Contd...

STATE POLLUTION CONTROL BOARD, ODISHA
(Forest, Environment & Climate Change Department, Govt. of Odisha)
Paribesh Bhawan, A/118, Nilakantha Nagar, Unit-VIII, Bhubaneswar – 751012
E-mail: publichearing@ospcboard.org Web site : https://ospcboard.odisha.gov.in

No 2032 IND-II-PH-1195 Date 01/02/2025

NOTICE

CAD:-

It is brought to the notice of all concerned that M/s Kalinga Alumina Limited has proposed to have Environmental Impact Assessment for proposed **Ballada Bauxite Mine for Peak Rated Capacity of 4.0 MTPA over mining lease area of 144.945 ha. At village Ballada under Nandapur tahsil of Koraput district** to obtain Environmental Clearance from State Environment Impact Assessment Authority (SEIAA), Odisha. The proponent has applied to the State Pollution Control Board, Odisha, Bhubaneswar for a Public Hearing.

By virtue of Ministry of Environment, Forests & Climate Change, Government of India Notification No. S.O. 1533 (E) Dtd. 14.09.2006, the Board has been authorized to conduct public hearing for Environmental Clearance and as such invites suggestions, views, comments and objections on matters relating to environmental aspects of the proposed project from all the persons including bonafide residents, environmental groups and others located at the proposed site / sites of displacement / sites likely to be affected.

For the above purpose, a person will only mean

A. Any person who is likely to be affected by the grant of Environmental Clearance
B. Any person who owns his control over the project with respect to which an application has been submitted for environmental clearance.
C. Any association of persons whether incorporated or likely to be affected by the project and or functioning in the field of environment.
D. Any local authority within any part of whose local limits is within the neighborhood wherein the project is proposed to be located.

Persons as above who desire to submit their views, comments, objections etc. relevant to the project, may do so in writing within **30 days** from the date of publication of this notice addressing the same to the Member Secretary, State Pollution Control Board, Odisha through Registered Post. Besides this, persons interested to submit their views relevant to the proposed mining project in writing or orally may also do so during the public hearing to be conducted **on 06-03-2025 at 11.00 A.M at Mouza-Bheja (Khata No.27, Plot No.225, Area-2.48 Ac, Kissam- D-III) under Nandapur tahasil of Koraput district.**

Persons desirous of participating in the public hearing may go through the Environmental Impact Assessment (EIA) /Environmental Management Plan (EMP) of the said project which will be available at the following offices. Copy of the Executive Summary both in English & Odia is also available in the following offices & the same can also be downloaded from the website https://ospcboard.odisha.gov.in free of cost.

1. District Collector's Office, **Koraput**
2. District Industries Center, **Koraput**
3. Office of the Chief Executive Officer, **Zilla Parishad, Koraput**
4. Head Office of the State Pollution Control Board, Odisha, Paribesh Bhawan, A/118, Nilakanthanagar, Unit – VIII, Bhubaneswar -12
5. Regional Office, State Pollution Control Board, Odisha, **Koraput**

Department of Forest & Environment (Environment), Govt. of Odisha, Bhubaneswar.

For any further clarification in the matter, the **Regional Officer, State Pollution Control Board, Koraput** or the **Member Secretary, State Pollution Control Board, Odisha** at Bhubaneswar may be contacted.

OIPR-08012/11/0167/2425

Sd/-
MEMBER SECRETARY

The New Indian Express 04.2.25 P.6

Central Library
S.P.C. Board
A/118, Nilakantha Nagar
Unit-VIII, Bhubaneswar-12

ରାଜ୍ୟ ପ୍ରଦୂଷଣ ନିୟନ୍ତ୍ରଣ ବୋର୍ଡ, ଓଡ଼ିଶା

(ଜଙ୍ଗଲ, ପରିବେଶ ଓ ଜଳବାୟୁ ପରିବର୍ତ୍ତନ ବିଭାଗ, ଓଡ଼ିଶା ସରକାର)

ପରିବେଶ ଭବନ, ଏ/୧୧୮, ନୀଳକଣ୍ଠ ନଗର, ୟୁନିଟ-୮, ଭୁବନେଶ୍ୱର-୭୫୧୦୧୨

ସଂଖ୍ୟା. ୨୦୩୯-IND-II-PH-୧୧୯୫ ତା.୦୧.୦୨.୨୦୨୫

ବିଜ୍ଞାପନ

CAD-2465: ଏତଦ୍ଦ୍ୱାରା ସମସ୍ତଙ୍କ ଅବଗତି ନିମନ୍ତେ ଜଣାଇ ଦିଆଯାଉଛି ଯେ ମେସର୍ସ ଜଲିଙ୍ଗ ଆକ୍ୱାମିନା ଲିମିଟେଡ, ଓଡ଼ିଶାର କୋରାପୁଟ ଜିଲ୍ଲା, ନନ୍ଦପୁର ତହସିଲ ଅନ୍ତର୍ଗତ ଭରାଡ଼ା ଗ୍ରାମରେ ୧୪୪.୯୪୫ ହେକ୍ଟର ଜିଲ୍ ଅଞ୍ଚଳରେ ସ୍ଥିତ ଭଲାଡ଼ା ବକ୍ସାଇଟ ଖଣିର ପର୍ଯ୍ୟାଧିକ ମୂଲ୍ୟାଙ୍କିତ କ୍ଷମତା ୪.୦ ଏମଟିପିଏ କରିବା ପାଇଁ ପରିବେଶୀୟ ମଞ୍ଜୁରୀ ନିମନ୍ତେ ଆବଶ୍ୟକ ପବ୍ଲିକ୍ ହିଅରିଂ ସର୍ବସାଧାରଣ ଶୁଣାଣୀ ପାଇଁ ରାଜ୍ୟ ପରିବେଶ ପ୍ରଭାବ ମୂଲ୍ୟାଙ୍କନ କର୍ତ୍ତୃପକ୍ଷ (State Environment Impact Assessment Authority (SEIAA),) ଓଡ଼ିଶା ଦ୍ୱାରା ପରିବେଶୀୟ ମଞ୍ଜୁରୀ ନିମନ୍ତେ ଆବଶ୍ୟକ ପବ୍ଲିକ୍ ହିଅରିଂ ସର୍ବସାଧାରଣ ଶୁଣାଣୀ ନିମନ୍ତେ ଓଡ଼ିଶା ପ୍ରଦୂଷଣ ନିୟନ୍ତ୍ରଣ ବୋର୍ଡକୁ ଆବେଦନ କରିଛନ୍ତି।

ଭାରତ ସରକାର ପରିବେଶ, ଜଙ୍ଗଲ ଏବଂ ଜଳବାୟୁ ପରିବର୍ତ୍ତନ ମନ୍ତ୍ରଣାଳୟର ପରିବେଶୀୟ ମଞ୍ଜୁରୀ ନିମନ୍ତେ ଅଧୀସୂଚନା ସଂଖ୍ୟା ଏସ୍.ଓ.୧୫୩୩(ଇ), ତା.୧୪.୦୯.୨୦୦୬ରିଖ ଅନୁଯାୟୀ ରାଜ୍ୟ ପ୍ରଦୂଷଣ ନିୟନ୍ତ୍ରଣ ବୋର୍ଡ, ଓଡ଼ିଶା, ଭୁବନେଶ୍ୱରକୁ ସର୍ବସାଧାରଣ ଶୁଣାଣି କରିବାର କ୍ଷମତା ପ୍ରଦାନ କରିଛନ୍ତି। ଏଥି ନିମନ୍ତେ ବୋର୍ଡ, ସର୍ବସାଧାରଣଙ୍କ ସମେତ ପ୍ରକୃତ ଅଧିବାସୀ, ପରିବେଶୀୟ ସଂସ୍ଥା ଏବଂ ପ୍ରସ୍ତାବିତ ପ୍ରକଳ୍ପ ସ୍ଥାପନ ହେଉଥିବା ସ୍ଥାନରେ ଜନବର୍ଗ, ପ୍ରକଳ୍ପ ଯୋଗୁଁ ଉଚ୍ଛେଦ ହେଉଥିବା ବାସିନ୍ଦା, ପ୍ରକଳ୍ପ ଯୋଗୁଁ ପ୍ରଭାବିତ ହେଉଥିବା ବାସିନ୍ଦାମାନଙ୍କ ପାଖରୁ ପ୍ରକଳ୍ପ ସ୍ଥାପନ ଯୋଗୁଁ ପରିବେଶରେ ପ୍ରଭାବ ସମ୍ବନ୍ଧୀୟ ପ୍ରସ୍ତାବ, ମତାମତ, ମନ୍ତବ୍ୟ ଓ ଆପତ୍ତି ପତ୍ର ଆହ୍ୱାନ କରୁଛନ୍ତି। ଏଥି ନିମନ୍ତେ ବ୍ୟକ୍ତିର ଅର୍ଥ କେବଳ ନିମ୍ନମତେ ବୁଝାଯାଇଛି:

(କ) ପରିବେଶୀୟ ମଞ୍ଜୁରୀ ଦ୍ୱାରା ପ୍ରଭାବିତ ହେଉଥିବା ବା ହେବାକୁ ଥିବା ଯେ କୌଣସି ବ୍ୟକ୍ତି।

(ଖ) ପ୍ରକଳ୍ପ ସମ୍ବନ୍ଧୀତ ପରିବେଶୀୟ ମଞ୍ଜୁରୀ ପାଇଁ ଆଗତ ଦରଖାସ୍ତ ପରିପ୍ରେକ୍ଷୀରେ ନଜର ଉପରେ କର୍ତ୍ତୃତ୍ୱ ଜାହିର କରିପାରୁଥିବା କୌଣସି ବ୍ୟକ୍ତିବିଶେଷ।

(ଗ) ପରିବେଶ କ୍ଷେତ୍ରରେ କାର୍ଯ୍ୟ କରୁଥିବା ଜିନ୍ଦା/ ଏବଂ ପ୍ରସ୍ତାବିତ ପ୍ରକଳ୍ପ ଦ୍ୱାରା ପ୍ରଭାବିତ ହେଉଥିବା (ପଞ୍ଜିକୃତ ବା ଅପଞ୍ଜିକୃତ) ଯେ କୌଣସି ବ୍ୟକ୍ତି ସମୂହଙ୍କ ସଂଘ।

(ଘ) ପ୍ରସ୍ତାବିତ ପ୍ରକଳ୍ପର ସ୍ଥାନୀୟ ସୀମାକୁକ୍ତ ନିକଟବର୍ତ୍ତୀ ଅଞ୍ଚଳରେ ଯେ କୌଣସି ସ୍ଥାନୀୟ କର୍ତ୍ତୃପକ୍ଷ।

ଉପରୋକ୍ତ ବ୍ୟକ୍ତିମାନେ ସେମାନଙ୍କର ପ୍ରସ୍ତାବ, ମତାମତ, ମନ୍ତବ୍ୟ ଏବଂ ଆପତ୍ତି ଇତ୍ୟାଦିକୁ ସଦସ୍ୟ ସଚିବ, ରାଜ୍ୟ ପ୍ରଦୂଷଣ ନିୟନ୍ତ୍ରଣ ବୋର୍ଡ, ଓଡ଼ିଶାଙ୍କୁ ଲିଖିତ ଆକାରରେ ଏହି ବିଜ୍ଞାପନ ପ୍ରକାଶନର ୩୦ ଦିନ ମଧ୍ୟରେ ରେଜିଷ୍ଟ୍ରି ଡାକଯୋଗେ ଜଣାଇ ପାରିବେ। ଏହାଛଡ଼ା ଉକ୍ତ ପ୍ରସ୍ତାବିତ ପ୍ରକଳ୍ପ ଉପରେ ଲିଖିତ ବା ମୌଖିକ ଭାବେ ମତାମତ ଦେବା ପାଇଁ ଇଚ୍ଛୁକ ବ୍ୟକ୍ତିମାନେ **ତା.୦୬.୦୩.୨୦୨୫ରିଖ ଦିବା ୧୧:୦୦ ଘଟିକା ସମୟରେ କୋରାପୁଟ ଜିଲ୍ଲା, ନନ୍ଦପୁର ତହସିଲ ଅନ୍ତର୍ଗତ ଭେଳ ମୌଜା (ଖାତା ନଂ.୨୭, ପ୍ଲଟ ନଂ.୨୨୫, ୨.୪୮ ଏକର ଅଞ୍ଚଳ, ଡ଼ି-III କିସମ)** ଠାରେ ଧାର୍ଯ୍ୟ ସର୍ବସାଧାରଣ ଶୁଣାଣୀ ସମୟରେ ମଧ୍ୟ ଉପସ୍ଥାପନ କରିପାରିବେ।

ପ୍ରସ୍ତାବିତ ପ୍ରକଳ୍ପ ବିଷୟରେ ବିଶଦ ଭାବରେ ଜାଣିବା ପାଇଁ ପରିବେଶୀୟ ପ୍ରଭାବ ମୂଲ୍ୟାୟନ ବିବରଣୀ (Environmental Impact Assessment) ଏବଂ ଏହାର ନିର୍ବାହୀ ସାରାଂଶ (Executive Summary) ଓଡ଼ିଆ ଏବଂ ଇଂରାଜୀ ଭାଷାରେ ନିମ୍ନଲିଖିତ ସ୍ଥାନମାନଙ୍କରେ ମିଳିପାରିବ।

୧) ଜିଲ୍ଲାପାଳଙ୍କ କାର୍ଯ୍ୟାଳୟ, **କୋରାପୁଟ**। ୨) ଜିଲ୍ଲା ଶିଳ୍ପକେନ୍ଦ୍ର, **କୋରାପୁଟ**। ୩) ଜିଲ୍ଲା ପରିଷଦ ମୁଖ୍ୟ ନିର୍ବାହୀ ଅଧିକାରୀଙ୍କ କାର୍ଯ୍ୟାଳୟ, **କୋରାପୁଟ**। ୪) ମୁଖ୍ୟ କାର୍ଯ୍ୟାଳୟ, ରାଜ୍ୟ ପ୍ରଦୂଷଣ ନିୟନ୍ତ୍ରଣ ବୋର୍ଡ, ଓଡ଼ିଶା, ପରିବେଶ ଭବନ, ଏ/୧୧୮, ନୀଳକଣ୍ଠ ନଗର, ଭୁବନେଶ୍ୱର-୭୫୧୦୧୨। ୫) ଆଞ୍ଚଳିକ କାର୍ଯ୍ୟାଳୟ, ରାଜ୍ୟ ପ୍ରଦୂଷଣ ନିୟନ୍ତ୍ରଣ ବୋର୍ଡ, ଓଡ଼ିଶା, **କୋରାପୁଟ**। ୬) ଜଙ୍ଗଲ, ପରିବେଶ ଓ ଜଳବାୟୁ ପରିବର୍ତ୍ତନ ବିଭାଗ, ଓଡ଼ିଶା ସରକାର, ଭୁବନେଶ୍ୱର। ଏତଦବ୍ୟତୀତ ପରିବେଶୀୟ ପ୍ରଭାବ ମୂଲ୍ୟାୟନ ବିବରଣୀର ନିର୍ବାହୀ ସାରାଂଶ (Executive Summary) ଓଡ଼ିଆ ଏବଂ ଇଂରାଜୀ ଭାଷାରେ ରାଜ୍ୟ ପ୍ରଦୂଷଣ ନିୟନ୍ତ୍ରଣ ବୋର୍ଡ, ଓଡ଼ିଶାର ୱେବସାଇଟ୍ https://ospcboard.odisha.gov.in ରୁ ମଧ୍ୟ ମିଳିପାରିବ।

ଏ ବିଷୟରେ ସବିଶେଷ ବିବରଣୀ ପାଇଁ ରାଜ୍ୟ ପ୍ରଦୂଷଣ ନିୟନ୍ତ୍ରଣ ବୋର୍ଡ, ଓଡ଼ିଶାର **ଆଞ୍ଚଳିକ କାର୍ଯ୍ୟାଳୟ, କୋରାପୁଟ** ସ୍ଥିତ ଆଞ୍ଚଳିକ ଅଧିକାରୀ କିମ୍ବା ଭୁବନେଶ୍ୱର ସ୍ଥିତ ମୁଖ୍ୟ କାର୍ଯ୍ୟାଳୟରେ ସଦସ୍ୟ ସଚିବଙ୍କ ସହ ଯୋଗାଯୋଗ କରାଯାଇପାରେ।

OIPR 08012/11/0166/2425

ସ୍ୱା/- ସଦସ୍ୟ ସଚିବ

Central Library

Annexure – XX

1352

IN-GJ10023637109240X

INDIA NON JUDICIAL
Government of Gujarat

सत्यमेव जयते

Rs. 100

Certificate of Stamp Duty

Certificate No.	:	**IN-GJ10023637109240X**
Certificate Issued Date	:	06-May-2025 03:48 PM
Account Reference	:	IMPACC (AC)/ gj13001011/ GULBAI TEKRA/ GJ-AH
Unique Doc. Reference	:	SUBIN-GJGJ13001011292117877024 41X
Purchased by	:	Kalinga Alumina Limited
Description of Document	:	Article 4 Affidavit
Description	:	Affidavit
Consideration Price (Rs.)	:	0 (Zero)
First Party	:	Kalinga Alumina Limited
Second Party	:	Not Applicable
Stamp Duty Paid By	:	Kalinga Alumina Limited
Stamp Duty Amount(Rs.)	:	100 (One Hundred only)

V. C. SHAH AHMEDABAD GJ13001011

PF 0004635358

VOID VOID VOID

Statutory Alert:

1. The authenticity of this Stamp Certificate should be verified at "www.shcil.com" or using e-Stamp Mobile App of Stock Holding. Any discrepancy in the details on this Certificate and as available on the website renders it invalid.
2. The onus of checking the legitimacy is on the users of the certificate.
3. In case of any discrepancy please inform the Competent Authority.



NOTICE

- The contents of this e-stamp certificate can be verified at www.shcilestamp.com, Stock Holding mobile application "EStamping" or at Stock Holding Branch/ Centre (the details of which are available at www.stockholding.com).
- Any alteration to this certificate renders it invalid and would constitute a criminal offence.
- Kindly contact Stock Holding Branch / Centre in case of discrepancy.
- For information related to e-Stamping you may write to us on our email id estamp.ahmedabad@stockholding.com or visit our Branch/Centre.

સૂચના

- આ ઈ-સ્ટેમ્પ પ્રમાણપત્રની વિગતો www.shcilestamp.com દ્વારા અથવા સ્ટોક હોલ્ડિંગની "ઈસ્ટેમ્પિંગ" મોબાઈલ એપ્લિકેશન અથવા સ્ટોક હોલ્ડિંગની શાખા / કેન્દ્ર (જેની વિગતો www.stockholding.com પર ઉપલબ્ધ છે) પર જઈ ને ચકાસી શકાય છે.
- આ પ્રમાણપત્રમાં કરેલ કોઈપણ ફેરફાર અમાન્ય છે અને તે ફોજદારી ગુનો બને છે.
- આ ઈ-સ્ટેમ્પ પ્રમાણપત્રમાં કોઈપણ વિસંગતતા જણાય તો સ્ટોક હોલ્ડિંગની શાખા / કેન્દ્ર પર સંપર્ક કરવો.
- ઈ-સ્ટેમ્પિંગ સંબધિત જાણકારી માટે અમને estamp.ahmedabad@stockholding.com પર ઈ-મેઈલ કરવો અથવા અમારી શાખા / કેન્દ્ર ની મુલાકાત લેવી.

1354

S. No. 3507 /2025

VIJAY C. SHAH
NOTARY
GOVT. OF INDIA
6 MAY 2025

AFFIDAVIT

Proposal for **"Proposed Ballada Bauxite Mine of M/s Kalinga Alumina Limited with 4.0 MTPA production capacity over ML area 144.945 ha, located at village Ballada, Taluka – Nandapur, District- Koraput, Odisha.."**

I, Kassireddy Anil Kumar, S/o- Kassireddy Satyarao, Vice President- Aluminium, of M/s. Kalinga Alumina Limited, resident of resident of B-301, Dwarkesh Green, Nr. Shilaj Circle, Shilaj, Ahmedabad, Gujarat, authorized signatory of the above Project " Ballada Bauxite Mine of M/s Kalinga Alumina Limited with 4.0 MTPA capacity of 144.945 Ha area, located at Villages Ballada, Taluka – Nandapur, District- Koraput, Odisha." do hereby solemnly state as follows:

1. The budget earmarked for the various activities have been decided after perusal of the Standard EC conditions already prescribed by the MoEF&CC New Delhi.
2. That, we will comply all the Standard EC conditions already prescribed by the MoEF&CC New Delhi and Specific condition if prescribed by the SEAC/SEIAA, Odisha.

The company, further undertake that the contents of this declaration are true and correct to best of my knowledge and belief, that nothing has been concealed.

Date: 06.05.2025

Place: Ahmedabad, Gujarat.

M/s Kalinga Alumina Limited

SOLEMNLY AFFIRMED BEFORE ME

VIJAY C. SHAH
NOTARY
GOVT. OF INDIA
6 MAY 2025

Annexure – XXI

adani
Metals

The Divisional Forest Officer,
Koraput Forest Division,
DFO Office- Koraput,
Odisha- 764020

Dated 06th May 2025

Ref: ToR issued by State Environment Impact Assessment Authority (SEIAA), Odisha vide File No. SIA/OR/MIN/439954/2023 dated 06.11.2023.

Subject: Request for attestation of Map of Odisha depicting distance of various National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/Elephant Reserves from the Ballada Bauxite Mine, Nandapur, Koraput.

Dear Sir,

With Reference to the Terms of Reference (ToR) issued by State Environment Impact Assessment Authority (SEIAA), Odisha vide File No. SIA/OR/MIN/439954/2023 dated 06.11.2023, in order to prepare the final EIA/EMP report, an NOC is needed stating the absence of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/Elephant Reserves from the Ballada Bauxite Mine, Nandapur, Koraput. The same is depicted in the map attached.

We kindly request you to attest the map so that the same can be produced for obtaining an NOC from the Department of Forest, Environment & Climate Change, Odisha. This is necessary to finalize the Final EIA-EMP report before submission to the Ministry of Environment, Forest and Climate Change (MoEF&CC).

We are hereby looking forward to your esteemed office for the requested documents as per the aforesaid mentioned subject above at the earliest.

Thanking you,

KALINGA ALUMINA LIMITED

K Anil Kumar,
Vice President – Projects,
Kalinga Alumina Limited,
Shantigram, Ahmedabad,
Gujarat-382421

Encl: Map of Odisha

Received.
06/5/2025
SECTION OFFICER
Koraput Forest Division

Cc:
1. Oiifice of the PCCF & HoFF, Bhubaneswar, Odisha.

Kalinga Alumina Limited
(Formerly Known as Mundra Aluminium Limited)
Adani Corporate House, Shantigram,
Nr. Vaishno Devi Circle, S. G. Highway,
Khodiyar, Ahmedabad - 382421
Gujarat, India

Tel + 91 79 2656 5555
Fax + 91 79 2555 5500
info.nr@adani.com

CIN: U09900GJ2021PLC128064

Registered Office: Adani Corporate House, Shantigram, Nr. Vaishno Devi Circle, S. G. Highway, Khodiyar, Ahmedabad – 382 421

Annexure – XXII

adani

The Collector & District Magistrate,
Koraput, Collectorate Main Road,
Koraput, Odisha – 764020

Dated 27th Nov 2023

Sub: Application for issuance of FRA certificate required for Forest Diversion Proposal of 144.945 Ha of forest land in Ballada Bauxite Block located in Nandapur tahasil, Koraput district.

Ref:
1. LoI No. SM/MC2/MC/0007/2023/2143 Dated 1st March 2023, issued by Steel & Mines Department, GoO.
2. Forest Diversion Proposal No. FP/OR/MIN/QRY/442417/2023.

Dear Sir,

As you are aware, Kalinga Alumina Limited (formerly known as Mundra Aluminium Limited) was awarded a Letter of Intent (LoI) bearing no. SM/MC2/MC/0007/2023/2143 Dated 1st March 2023 for development of Ballada Bauxite Block in Nandapur Tahasil of Koraput District. The entire mining lease area falls within Nagasari reserve forest of Koraput district.

The forest diversion proposal for a mining lease area admeasuring 144.945 Ha has been submitted on Parivesh portal vide application no. FP/OR/MIN/QRY/442417/2023. As you may be aware, a certificate from your good office under Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 ("FRA") is a prerequisite for obtaining forest clearance. A certified copy of the land schedule is enclosed, brief particulars of which is mentioned hereinunder.

Village	Govt. Land, Ha	Forest Land, Ha	DLC Land, Ha	Private Land, Ha	SC Land, Ha	ST Land, Ha	Total, Ha
Nagasari Reserve Forest	0	144.945	0	0	0	0	144.945

With the above background, we request you to issue a FRA certificate as per prescribed format of MoEFCC, Government of India. An early issuance of the certificate will facilitate early commencement of the mine, contributing to the socio-economic development of the region.

Thanking you,

Yours truly,

KALINGA ALUMINA LIMITED

Ajit Samal
CEO - Aluminium Business

Encl:
1. LoI No. SM/MC2/MC/0007/2023/2143 Dated 1st March 2023, issued by Steel & Mines Department, GoO.
2. Proforma of MoEF, Government of India's letter No.11-9/98-FC (pt.) dated 3rd August 2009.
3. Land Schedule, Ballada Bauxite Mines.

Received
27/11/23
Primary Section

Kalinga Alumina limited
(Formerly Known as Mundra Aluminium Limited)
Adani Corporate House, Shantigram,
Nr. Vaishno Devi Circle, S. G. Highway,
Khodiyar, Ahmedabad - 382421
Gujarat, India

Tel: + 91 79 2656 5555
Fax: + 91 79 2555 5500

CIN: U13203GJ2021PLC128064
Registered Office: Adani Corporate House, Shantigram, Nr. Vaishno Devi Circle, S. G. Highway, Khodiyar, Ahmedabad – 382 421

RECEIVED
Collectorate
Koraput

Scanned with CamScanner

ପ୍ରାପ୍ତି ସ୍ୱୀକାର ରସିଦ୍

ANNEXURE A-11

ମୁଁ ଶ୍ରୀମତୀ/ଶ୍ରୀ ସୁବୋଧ କୁମାର ଶିଶୁ, ପଦବୀ କନିଷ୍ଠ ସହାୟକ, ଉପଖଣ୍ଡ ସ୍ତରୀୟ କମିଟି, କୋରାପୁଟ, ଜିଲ୍ଲା- କୋରାପୁଟ ଙ୍କ ତରଫରୁ ସମଲୀ ଗ୍ରାମ, ଅଡକ୍ତା ପଞ୍ଚାୟତ- ଜଦପୁର, ବ୍ଲକ- କୋରାପୁଟ, ଜିଲ୍ଲାର ଗ୍ରାମବାସୀ/ ଜଙ୍ଗଲ ଅଧିକାର କମିଟି ପାଖରୁ ସେମାନଙ୍କ ଗ୍ରାମର ଗୋଷ୍ଠୀଗତ ଅଧିକାର ଦାବି, ଗୋଷ୍ଠୀଗତ ସମ୍ବଳ ଅଧିକାର ଦାବି ଓ ବ୍ୟକ୍ତିଗତ ଅଧିକାର ଦାବି ପତ୍ର ଗ୍ରହଣ କରି ସେମାନଙ୍କୁ ଏହି ପ୍ରାପ୍ତି ସ୍ୱୀକାର ରସିଦ ପ୍ରଦାନ କଲି ।

କ୍ରମିକ ସଂଖ୍ୟା	ଦାବିର ପ୍ରକାର	ସଂଖ୍ୟା
୧ ✓	ଗୋଷ୍ଠୀଗତ ଅଧିକାର ଦାବି	୦୧
୨ ✓	ଗୋଷ୍ଠୀଗତ ସମ୍ବଳ ଅଧିକାର ଦାବି	୦୧
୩	ବ୍ୟକ୍ତିଗତ ଅଧିକାର ଦାବି	—

ମଙ୍ଗଳ ସମ୍ପ୍ରସାରଣ ଅଧିକାରୀ/ ଅଧ୍ୟକ୍ଷ, ଉପଖଣ୍ଡ ସ୍ତରୀୟ କମିଟିଙ୍କ ସ୍ୱାକ୍ଷର

OFFICE OF THE SUB-COLLECTOR ★ KORAPUT ★
Received
S.K. Mishra
20.02.2025

ମୋହର

ତାରିଖ :

ସ୍ଥାନ :

1360

ପ୍ରାପ୍ତି ସ୍ୱୀକାର ରସିଦ୍

ମୁଁ ଶ୍ରୀମତୀ/ଶ୍ରୀ ଶଙ୍କୋଷ କୁମାର ମିଶ୍ର, ପଦବୀ ଜିଲ୍ଲା ଆଇନ୍ଜୀବୀ ସଦସ୍ୟ, ଉପଖଣ୍ଡ ସ୍ତରୀୟ କମିଟି, ଲକ୍ଷ୍ମୀପୁର, ଜିଲ୍ଲା- କୋରାପୁଟ ଙ୍କ ତରଫରୁ ଏଡାପୁଟ, କାଜୁଖାଲୁ, ଧେନ୍ଦଗିରି ଗ୍ରାମ, ଜାଲୁଡା ପଞ୍ଚାୟତ- ନନ୍ଦପୁର, ବ୍ଲକ- କୋରାପୁଟ, ଜିଲ୍ଲାର ଗ୍ରାମବାସୀ/ ଜଙ୍ଗଲ ଅଧିକାର କମିଟି ପାଖରୁ ସେମାନଙ୍କ ଗ୍ରାମର ଗୋଷ୍ଠୀଗତ ଅଧିକାର ଦାବି, ଗୋଷ୍ଠୀଗତ ସମ୍ବଳ ଅଧିକାର ଦାବି ଓ ବ୍ୟକ୍ତିଗତ ଅଧିକାର ଦାବି ପତ୍ର ଗ୍ରହଣ କରି ସେମାନଙ୍କୁ ଏହି ପ୍ରାପ୍ତି ସ୍ୱୀକାର ରସିଦ ପ୍ରଦାନ କଲି ।

କ୍ରମିକ ସଂଖ୍ୟା	ଦାବିର ପ୍ରକାର	ସଂଖ୍ୟା
୧	ଗୋଷ୍ଠୀଗତ ଅଧିକାର ଦାବି	01
୨	ଗୋଷ୍ଠୀଗତ ସମ୍ବଳ ଅଧିକାର ଦାବି	01
୩	ବ୍ୟକ୍ତିଗତ ଅଧିକାର ଦାବି	—

ମଙ୍ଗଳ ସମ୍ପ୍ରସାରଣ ଅଧିକାରୀ/ ଅଧ୍ୟକ୍ଷ, ଉପଖଣ୍ଡ ସ୍ତରୀୟ କମିଟିଙ୍କ ସ୍ୱାକ୍ଷର

OFFICE OF THE SUB-COLLECTOR ★ KORAPUT ★
Received
21 FEB 2025
20.02.2025

ମୋହର

ତାରିଖ :

ସ୍ଥାନ :

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ପ୍ରାପ୍ତି ସ୍ୱୀକାର ରସିଦ୍

ମୁଁ ଶ୍ରୀମତୀ/ଶ୍ରୀ ସନ୍ତୋଷ କୁମାର ମିଶ୍ର, ପଦବୀ ନିର୍ବାହୀ ଅଧିକାରୀ ଉପଖଣ୍ଡ ସ୍ତରୀୟ କମିଟି, ବୋୟାପୁର, ଜିଲ୍ଲା- ବୋୟାପୁର ଙ୍କ ତରଫରୁ ଜାମୁଲି, ଗ୍ରାମ, ପଡୁଆ ପଞ୍ଚାୟତ- ନଦିପୁର, ବ୍ଲକ- ବୋୟାପୁର, ଜିଲ୍ଲାର ଗ୍ରାମବାସୀ/ ଜଙ୍ଗଲ ଅଧିକାର କମିଟି ପାଖରୁ ସେମାନଙ୍କ ଗ୍ରାମର ଗୋଷ୍ଠୀଗତ ଅଧିକାର ଦାବି, ଗୋଷ୍ଠୀଗତ ସମ୍ବଳ ଅଧିକାର ଦାବି ଓ ବ୍ୟକ୍ତିଗତ ଅଧିକାର ଦାବି ପତ୍ର ଗ୍ରହଣ କରି ସେମାନଙ୍କୁ ଏହି ପ୍ରାପ୍ତି ସ୍ୱୀକାର ରସିଦ ପ୍ରଦାନ କଲି ।

କ୍ରମିକ ସଂଖ୍ୟା	ଦାବିର ପ୍ରକାର	ସଂଖ୍ୟା
୧ ✓	ଗୋଷ୍ଠୀଗତ ଅଧିକାର ଦାବି	୦୧
୨ ✓	ଗୋଷ୍ଠୀଗତ ସମ୍ବଳ ଅଧିକାର ଦାବି	୦୧
୩	ବ୍ୟକ୍ତିଗତ ଅଧିକାର ଦାବି	—

ମଙ୍ଗଳ ସମ୍ପ୍ରସାରଣ ଅଧିକାରୀ/ ଅଧ୍ୟକ୍ଷ, ଉପଖଣ୍ଡ ସ୍ତରୀୟ କମିଟିଙ୍କ ସ୍ୱାକ୍ଷର

OFFICE OF THE SUB-COLLECTOR * KORAPUT *
Received
25 FEB 2025
20.02.2025

ମୋହର

ତାରିଖ :

ସ୍ଥାନ :

1362

ପ୍ରାପ୍ତି ସ୍ୱୀକାର ରସିଦ୍

ମୁଁ ଶ୍ରୀମତୀ/ଶ୍ରୀ ସଞ୍ଜୀବକୁମାର ମିଶ୍ର, ପଦବୀ କନିଷ୍ଠ ଯୁନିୟର ସହାୟକ, ଉପଖଣ୍ଡ ସ୍ତରୀୟ କମିଟି, କୋରାପୁଟ, ଜିଲ୍ଲା- କୋରାପୁଟ ଙ୍କ ତରଫରୁ ବାଗେଲୋଙ୍ଗାଲୁଗୁ ଗ୍ରାମ, ଅତଲା ପଞ୍ଚାୟତ- ନନ୍ଦପୁର, ବ୍ଲକ- କୋରାପୁଟ, ଜିଲ୍ଲାର ଗ୍ରାମବାସୀ/ ଜଙ୍ଗଲ ଅଧିକାର କମିଟି ପାଖରୁ ସେମାନଙ୍କ ଗ୍ରାମର ଗୋଷ୍ଠୀଗତ ଅଧିକାର ଦାବି, ଗୋଷ୍ଠୀଗତ ସମ୍ବଳ ଅଧିକାର ଦାବି ଓ ବ୍ୟକ୍ତିଗତ ଅଧିକାର ଦାବି ପତ୍ର ଗ୍ରହଣ କରି ସେମାନଙ୍କୁ ଏହି ପ୍ରାପ୍ତି ସ୍ୱୀକାର ରସିଦ ପ୍ରଦାନ କଲି ।

କ୍ରମିକ ସଂଖ୍ୟା	ଦାବିର ପ୍ରକାର	ସଂଖ୍ୟା
୧	ଗୋଷ୍ଠୀଗତ ଅଧିକାର ଦାବି	
୨	ଗୋଷ୍ଠୀଗତ ସମ୍ବଳ ଅଧିକାର ଦାବି	
୩	ବ୍ୟକ୍ତିଗତ ଅଧିକାର ଦାବି	

ମଙ୍ଗଳ ସମ୍ପ୍ରସାରଣ ଅଧିକାରୀ/ ଅଧ୍ୟକ୍ଷ, ଉପଖଣ୍ଡ ସ୍ତରୀୟ କମିଟିଙ୍କ ସ୍ୱାକ୍ଷର

ମୋହର

ତାରିଖ :

ସ୍ଥାନ :

OFFICE OF THE SUB-COLLECTOR
Received
S.K. Mishra
20.02.2025

1363

ପ୍ରାପ୍ତି ସ୍ୱୀକାର ରସିଦ୍

ମୁଁ ଶ୍ରୀମତୀ/ଶ୍ରୀ ସତ୍ୟେନ୍ଦ୍ର କୁମାର ମିଶ୍ର, ପଦବୀ ବରିଷ୍ଠ ଅଧସ୍ତନ ସହାୟକ, ଉପଖଣ୍ଡ ସ୍ତରୀୟ କମିଟି, କୋରାପୁଟ, ଜିଲ୍ଲା- କୋରାପୁଟ ଙ୍କ ତରଫରୁ କିଡିଙ୍ଗା ଗ୍ରାମ, ଜାଡିଲ୍ ପଞ୍ଚାୟତ- ନନ୍ଦପୁର, ବ୍ଲକ- କୋରାପୁଟ, ଜିଲ୍ଲାର ଗ୍ରାମବାସୀ/ ଜଙ୍ଗଲ ଅଧିକାର କମିଟି ପାଖରୁ ସେମାନଙ୍କ ଗ୍ରାମର ଗୋଷ୍ଠୀଗତ ଅଧିକାର ଦାବି, ଗୋଷ୍ଠୀଗତ ସମ୍ବଳ ଅଧିକାର ଦାବି ଓ ବ୍ୟକ୍ତିଗତ ଅଧିକାର ଦାବି ପତ୍ର ଗ୍ରହଣ କରି ସେମାନଙ୍କୁ ଏହି ପ୍ରାପ୍ତି ସ୍ୱୀକାର ରସିଦ ପ୍ରଦାନ କଲି ।

କ୍ରମିକ ସଂଖ୍ୟା	ଦାବିର ପ୍ରକାର	ସଂଖ୍ୟା
୧	ଗୋଷ୍ଠୀଗତ ଅଧିକାର ଦାବି	01
୨	ଗୋଷ୍ଠୀଗତ ସମ୍ବଳ ଅଧିକାର ଦାବି	01
୩	ବ୍ୟକ୍ତିଗତ ଅଧିକାର ଦାବି	—

ମଙ୍ଗଳ ସମ୍ପ୍ରସାରଣ ଅଧିକାରୀ/ ଅଧ୍ୟକ୍ଷ, ଉପଖଣ୍ଡ ସ୍ତରୀୟ କମିଟିଙ୍କ ସ୍ୱାକ୍ଷର

OFFICE OF THE SUB-COLLECTOR ★ KORAPUT ★
Received
20.02.2025

ମୋହର

ତାରିଖ :

ସ୍ଥାନ :

1364

ପ୍ରାପ୍ତି ସ୍ୱୀକାର ରସିଦ

ମୁଁ ଶ୍ରୀମତୀ/ଶ୍ରୀ ସାବିତ୍ରି ମାଝୀ ପଦବୀ ଜଙ୍ଗଲ ସଂରକ୍ଷଣ କମିଟି ଉପଖଣ୍ଡ ସ୍ତରୀୟ କମିଟି, ଲୋଡାପୁଟ ଜିଲ୍ଲା- କୋରାପୁଟ ଙ୍କ ତରଫରୁ ଚିଲ୍କା ଗ୍ରାମ, ଶାଳଗଡା ପଞ୍ଚାୟତ- ମାଧବପୁର ବ୍ଲକ- ଲୋଡାପୁଟ ଜିଲ୍ଲାର ଗ୍ରାମବାସୀ/ ଜଙ୍ଗଲ ଅଧିକାର କମିଟି ପାଖରୁ ସେମାନଙ୍କ ଗ୍ରାମର ଗୋଷ୍ଠୀଗତ ଅଧିକାର ଦାବି, ଗୋଷ୍ଠୀଗତ ସମ୍ବଳ ଅଧିକାର ଦାବି ଓ ବ୍ୟକ୍ତିଗତ ଅଧିକାର ଦାବି ପତ୍ର ଗ୍ରହଣ କରି ସେମାନଙ୍କୁ ଏହି ପ୍ରାପ୍ତି ସ୍ୱୀକାର ରସିଦ ପ୍ରଦାନ କଲି ।

କ୍ରମିକ ସଂଖ୍ୟା	ଦାବିର ପ୍ରକାର	ସଂଖ୍ୟା
୧	ଗୋଷ୍ଠୀଗତ ଅଧିକାର ଦାବି	✓
୨	ଗୋଷ୍ଠୀଗତ ସମ୍ବଳ ଅଧିକାର ଦାବି	✓
୩	ବ୍ୟକ୍ତିଗତ ଅଧିକାର ଦାବି	✗ ନାହିଁ

ମଙ୍ଗଳ ସଂଗ୍ରହାଗର ଅଧିକାରୀ/ ଅଧ୍ୟକ୍ଷ, ଉପଖଣ୍ଡ ସ୍ତରୀୟ କମିଟିଙ୍କ ସ୍ୱାକ୍ଷର

ତାରିଖ : ୦୮/୧୧/୨୦୨୫
ସ୍ଥାନ : ଲୋଡାପୁଟ

1365

ପ୍ରାପ୍ତି ସ୍ୱୀକାର ରସିଦ୍

ମୁଁ ଶ୍ରୀମତୀ/ଶ୍ରୀ ବାସନ୍ତି ବାଗ୍ଚୀ, ପଦବୀ କନିଷ୍ଠ ଏଣ୍ଡ୍ରା ସହାୟକ, ଉପଖଣ୍ଡ ସ୍ତରୀୟ କମିଟି, କୋରାପୁଟ, ଜିଲ୍ଲା- କୋରାପୁଟ ଙ୍କ ତରଫରୁ ବାଙ୍କୁର ତଣ୍ଡାଭଲିଟି ଗ୍ରାମ, କୋଟପୁର ପଞ୍ଚାୟତ- ମଧ୍ୟପୁର, ବ୍ଲକ- କୋରାପୁଟ, ଜିଲ୍ଲାର ଗ୍ରାମବାସୀ/ ଜଙ୍ଗଲ ଅଧିକାର କମିଟି ପାଖରୁ ସେମାନଙ୍କ ଗ୍ରାମର ଗୋଷ୍ଠୀଗତ ଅଧିକାର ଦାବି, ଗୋଷ୍ଠୀଗତ ସମ୍ବଳ ଅଧିକାର ଦାବି ଓ ବ୍ୟକ୍ତିଗତ ଅଧିକାର ଦାବି ପତ୍ର ଗ୍ରହଣ କରି ସେମାନଙ୍କୁ ଏହି ପ୍ରାପ୍ତି ସ୍ୱୀକାର ରସିଦ ପ୍ରଦାନ କଲି ।

କ୍ରମିକ ସଂଖ୍ୟା	ଦାବିର ପ୍ରକାର	ସଂଖ୍ୟା
୧	ଗୋଷ୍ଠୀଗତ ଅଧିକାର ଦାବି	✓
୨	ଗୋଷ୍ଠୀଗତ ସମ୍ବଳ ଅଧିକାର ଦାବି	✓
୩	ବ୍ୟକ୍ତିଗତ ଅଧିକାର ଦାବି	ନାହିଁ

ମଙ୍ଗଳ ସମ୍ପ୍ରସାରଣ ଅଧିକାରୀ/ ଅଧ୍ୟକ୍ଷ, ଉପଖଣ୍ଡ ସ୍ତରୀୟ କମିଟିଙ୍କ ସ୍ୱାକ୍ଷର

OFFICE OF THE SUB-COLLECTOR KORAPUT

ମୋହର

ତାରିଖ : ୦୬/୦୧/୨୦୨୨

ସ୍ଥାନ : କୋରାପୁଟ

06/1/22

1366

ପ୍ରାପ୍ତି ସ୍ୱୀକାର ରସିଦ୍

ମୁଁ ଶ୍ରୀମତୀ/ଶ୍ରୀ ସନ୍ତୋଷ କୁମାର ମିଶ୍ର, ପଦବୀ କନିଷ୍ଠ ସହାୟକ, ଉପଖଣ୍ଡ ସ୍ତରୀୟ କମିଟି, କୋରାପୁଟ, ଜିଲ୍ଲା- କୋରାପୁଟ ଙ୍କ ତରଫରୁ କାଟିଙ୍ଗି ଗ୍ରାମ, କାଜିଲ ପଞ୍ଚାୟତ- ମାଦୁଗୁ, ବ୍ଲକ- କୋରାପୁଟ, ଜିଲ୍ଲାର ଗ୍ରାମବାସୀ/ ଜଙ୍ଗଲ ଅଧିକାର କମିଟି ପାଖରୁ ସେମାନଙ୍କ ଗ୍ରାମର ଗୋଷ୍ଠୀଗତ ଅଧିକାର ଦାବି, ଗୋଷ୍ଠୀଗତ ସମ୍ବଳ ଅଧିକାର ଦାବି ଓ ବ୍ୟକ୍ତିଗତ ଅଧିକାର ଦାବି ପତ୍ର ଗ୍ରହଣ କରି ସେମାନଙ୍କୁ ଏହି ପ୍ରାପ୍ତି ସ୍ୱୀକାର ରସିଦ ପ୍ରଦାନ କଲି ।

କ୍ରମିକ ସଂଖ୍ୟା	ଦାବିର ପ୍ରକାର	ସଂଖ୍ୟା
୧	ଗୋଷ୍ଠୀଗତ ଅଧିକାର ଦାବି	01
୨	ଗୋଷ୍ଠୀଗତ ସମ୍ବଳ ଅଧିକାର ଦାବି	01
୩	ବ୍ୟକ୍ତିଗତ ଅଧିକାର ଦାବି	—

ମଙ୍ଗଳ ସମ୍ପ୍ରସାରଣ ଅଧିକାରୀ/ ଅଧ୍ୟକ୍ଷ, ଉପଖଣ୍ଡ ସ୍ତରୀୟ କମିଟିଙ୍କ ସ୍ୱାକ୍ଷର

OFFICE OF THE SUB-COLLECTOR KORAPUT
Received
S.K. Mishra
20.02.2024

ମୋହର

ତାରିଖ :

ସ୍ଥାନ :

1367

ପ୍ରାପ୍ତି ସ୍ୱୀକାର ରସିଦ

ମୁଁ ଶ୍ରୀମତୀ/ଶ୍ରୀ ଶ୍ରୀମନ୍ତ ପାଣିଗ୍ରାହୀ ପତ୍ନୀ/ପୁତ୍ର ଶ୍ରୀ ଜିତୁ, ଗ୍ରାମ ସାହାଡ଼ଗୁଡ଼ି ଉପଖଣ୍ଡ ସରାଇ ଜମିଟି ଗୋଷ୍ଠୀପୁର ଜିଲ୍ଲା ଗୋଷ୍ଠୀପୁର ର ତରଫରୁ ଗୋଷ୍ଠୀପୁର ଗ୍ରାମ ବାଲୁଡ଼ିଆ ପଞ୍ଚାୟତ ବାଲୁଡ଼ିଆ ର ନଥିପତ୍ର ଜିଲ୍ଲାର ସ୍ଥାନୀୟ/ ଉପଯୁକ୍ତ ଅଧିକାର ଜମିଟି ପାଇଥିବା ସେମାନଙ୍କ ସ୍ଥାନର ଗୋଷ୍ଠୀଗତ ଅଧିକାର ଦାବି, ଗୋଷ୍ଠୀଗତ ସମନ୍ତ ଅଧିକାର ଦାବି ଓ ବ୍ୟକ୍ତିଗତ ଅଧିକାର ଦାବି ପତ୍ର ଗ୍ରହଣ କରି ସେମାନଙ୍କୁ ଏହି ପ୍ରାପ୍ତି ସ୍ୱୀକାର ରସିଦ ପ୍ରଦାନ କଲି ।

ଦାବିର ସଂଖ୍ୟା	ଦାବିର ପ୍ରକାର	ସଂଖ୍ୟା
୧	ଗୋଷ୍ଠୀଗତ ଅଧିକାର ଦାବି	✓
୨	ଗୋଷ୍ଠୀଗତ ସମନ୍ତ ଅଧିକାର ଦାବି	✓
୩	ବ୍ୟକ୍ତିଗତ ଅଧିକାର ଦାବି	✓ ନାହିଁ

ସମନ୍ତ ସମ୍ପ୍ରସାରଣ ଅଧିକାରୀ/ ଅଧ୍ୟକ୍ଷ, ଉପଖଣ୍ଡ ସ୍ତରୀୟ ଜମିଟିର ସ୍ୱାକ୍ଷର

OFFICE OF THE SUB-COLLECTOR * KHANDAPADA *
ତାରିଖ 05/04/2023
ଗୋଷ୍ଠୀପୁର

Acknowledgement Receipt

I, Smt./Shri **Santosh Kumar Mishra**, designation **Junior Revenue Assistant**, on behalf of the **Sub-Divisional Level Committee, Koraput**, District: **Koraput**, received the claims towards Community Forest Rights, Community Forest Resource Rights and Individual Forest Rights from the Villagers/Forest Rights Committee of **Samli** Village, **Atanda** Gram Panchayat, **Nandapur** Block, **Koraput** District. Upon receiving their claims, I am hereby providing this acknowledgement receipt.

Serial No.	Category of Claim	Total Number
1✓	Community Forest Rights Claim	01
2✓	Community Forest Resource Rights Claim	01
3	Individual Forest Rights Claim	–

Signature of Welfare Extension Officer/
Chairperson, Sub-Divisional Level Committee

Seal:
Date: 20-02-2025
Place:

Acknowledgement Receipt

I, Smt./Shri **Santosh Kumar Mishra**, designation **Junior Revenue Assistant**, on behalf of the **Sub-Divisional Level Committee, Koraput**, District: Koraput, received the claims towards Community Forest Rights, Community Forest Resource Rights and Individual Forest Rights from the Villagers/Forest Rights Committee of **Kadaput, Kantasaru, Chandanbadi** Villages, **Balda** Gram Panchayat, **Nandapur** Block, **Koraput** District. Upon receiving their claims, I am hereby providing this acknowledgement receipt.

Serial No.	Category of Claim	Total Number
1✓	Community Forest Rights Claim	01
2✓	Community Forest Resource Rights Claim	01
3	Individual Forest Rights Claim	–

Signature of Welfare Extension Officer/
Chairperson, Sub-Divisional Level Committee

Seal:
Date: 20-02-2025
Place:

Acknowledgement Receipt

I, Smt./Shri **Santosh Kumar Mishra**, designation **Junior Revenue Assistant**, on behalf of the **Sub-Divisional Level Committee, Koraput**, District: **Koraput**, received the claims towards Community Forest Rights, Community Forest Resource Rights and Individual Forest Rights from the Villagers/Forest Rights Committee of **Banur** Village, **Atanda** Gram Panchayat, **Nandapur** Block, **Koraput** District. Upon receiving their claims, I am hereby providing this acknowledgement receipt.

Serial No.	Category of Claim	Total Number
1✓	Community Forest Rights Claim	01
2✓	Community Forest Resource Rights Claim	01
3	Individual Forest Rights Claim	–

Signature of Welfare Extension Officer/
Chairperson, Sub-Divisional Level Committee

Seal:
Date: 20-02-2025
Place:

Acknowledgement Receipt

I, Smt./Shri **Santosh Kumar Mishra**, designation **Junior Revenue Assistant**, on behalf of the **Sub-Divisional Level Committee, Koraput**, District: **Koraput**, received the claims towards Community Forest Rights, Community Forest Resource Rights and Individual Forest Rights from the Villagers/Forest Rights Committee of **Barengpali** Village, **Atanda** Gram Panchayat, **Nandapur** Block, **Koraput** District. Upon receiving their claims, I am hereby providing this acknowledgement receipt.

Serial No.	Category of Claim	Total Number
1✓	Community Forest Rights Claim	
2✓	Community Forest Resource Rights Claim	
3	Individual Forest Rights Claim	

Signature of Welfare Extension Officer/
Chairperson, Sub-Divisional Level Committee

Seal:
Date: 20-02-2025
Place:

Acknowledgement Receipt

I, Smt./Shri **Santosh Kumar Mishra**, designation **Junior Revenue Assistant**, on behalf of the **Sub-Divisional Level Committee, Koraput**, District: **Koraput**, received the claims towards Community Forest Rights, Community Forest Resource Rights and Individual Forest Rights from the Villagers/Forest Rights Committee of **Kitba** Village, **Badel** Gram Panchayat, **Nandapur** Block, **Koraput** District. Upon receiving their claims, I am hereby providing this acknowledgement receipt.

Serial No.	Category of Claim	Total Number
1✓	Community Forest Rights Claim	01
2✓	Community Forest Resource Rights Claim	01
3	Individual Forest Rights Claim	–

Signature of Welfare Extension Officer/
Chairperson, Sub-Divisional Level Committee

Seal:
Date: 20-02-2025
Place:

Acknowledgement Receipt

I, Smt./Shri **Basanti Pangi**, designation **Junior Revenue Assistant**, on behalf of the **Sub-Divisional Level Committee, Koraput**, District: **Koraput**, received the claims towards Community Forest Rights, Community Forest Resource Rights and Individual Forest Rights from the Villagers/Forest Rights Committee of **Chilam** Village, **Balda** Gram Panchayat, **Nandapur** Block, **Koraput** District. Upon receiving their claims, I am hereby providing this acknowledgement receipt.

Serial No.	Category of Claim	Total Number
1	Community Forest Rights Claim	✓
2	Community Forest Resource Rights Claim	✓
3	Individual Forest Rights Claim	Not Available

Signature of Welfare Extension Officer/
Chairperson, Sub-Divisional Level Committee

Seal:
Date: 06-01-2025
Place:

Acknowledgement Receipt

I, Smt./Shri **Basanti Pangi**, designation **Junior Revenue Assistant**, on behalf of the **Sub-Divisional Level Committee, Koraput**, District: **Koraput**, received the claims towards Community Forest Rights, Community Forest Resource Rights and Individual Forest Rights from the Villagers/Forest Rights Committee of **Taintar and Gayalput** Villages, **Taintar** Gram Panchayat, **Nandapur** Block, **Koraput** District. Upon receiving their claims, I am hereby providing this acknowledgement receipt.

Serial No.	Category of Claim	Total Number
1	Community Forest Rights Claim	✓
2	Community Forest Resource Rights Claim	✓
3	Individual Forest Rights Claim	Not Available

Signature of Welfare Extension Officer/
Chairperson, Sub-Divisional Level Committee

Seal:
Date: 06-01-2025
Place:

Acknowledgement Receipt

I, Smt./Shri **Santosh Kumar Mishra**, designation **Junior Revenue Assistant**, on behalf of the **Sub-Divisional Level Committee, Koraput**, District: **Koraput**, received the claims towards Community Forest Rights, Community Forest Resource Rights and Individual Forest Rights from the Villagers/Forest Rights Committee of **Kanti** Village, **Badel** Gram Panchayat, **Nandapur** Block, **Koraput** District. Upon receiving their claims, I am hereby providing this acknowledgement receipt.

Serial No.	Category of Claim	Total Number
1✓	Community Forest Rights Claim	01
2✓	Community Forest Resource Rights Claim	01
3	Individual Forest Rights Claim	–

Signature of Welfare Extension Officer/
Chairperson, Sub-Divisional Level Committee

Seal:
Date: 20-02-2025
Place:

Acknowledgement Receipt

I, Smt./Shri **Basanti Pangi**, designation **Junior Revenue Assistant**, on behalf of the **Sub-Divisional Level Committee, Koraput**, District: **Koraput**, received the claims towards Community Forest Rights, Community Forest Resource Rights and Individual Forest Rights from the Villagers/Forest Rights Committee of **Balda** Village, **Balda** Gram Panchayat, **Nandapur** Block, **Koraput** District. Upon receiving their claims, I am hereby providing this acknowledgement receipt.

Serial No.	Category of Claim	Total Number
1	Community Forest Rights Claim	✓
2	Community Forest Resource Rights Claim	✓
3	Individual Forest Rights Claim	Not Available

Signature of Welfare Extension Officer/
Chairperson, Sub-Divisional Level Committee

Seal:
Date: 06-01-2025
Place: