BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL,

WESTERN BENCH AT PUNE

APPEAL NO.146 OF 2024

IN THE MATTER OF:

FEDERATION OF RAINBOW WARRIORS ... **APPELLANT**

versus

UNION OF INDIA AND ORS. ... **RESPONDENTS**

REPLY ON BEHALF OF THE RESPONDENT NO. 7

1. At the outset, the Respondent No. 7 (the "**Answering Respondent**") denies all and singular the contents of the captioned Appeal and no part thereof be deemed admitted for the lack of specific traverse.

THRESHOLD FOR JUDICIAL REVIEW IN CHALLENGE TO EC

2. Before delving into the merits of the challenge to the EC, it is necessary to set out the facts and circumstances in which the EC dated 23.01.2024 was applied for by the Answering Respondent and was granted to it by the Ministry of Environment, Forest and Climate Change (MoEF&CC). The threshold for judging a challenge to an EC has been laid down by the Hon'ble Supreme Court in ***Rajeev Suri v. DDA,*** (2022) 11 SCC 1. The Hon'ble Court observed in Paras 509 and 529 as follows:

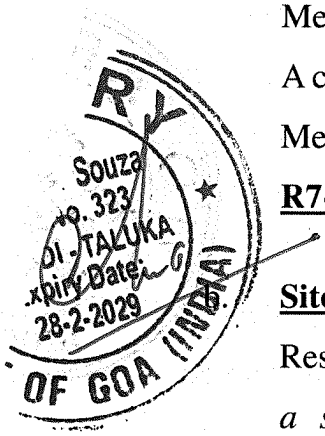
> "509. Once an expert committee has duly applied its mind to an application for [an] EC, <u>any challenge to its decision has to be based on concrete material which reveals **total absence of mind**</u>. Absent that material, due deference must be shown to the decisions of experts [....]".
>
> [Emphasis added]

> "529. [....] The expertise developed by the EAC cannot be undermined in a light manner and as noted above, **due deference must be accorded to expert agencies when their decisions do not attract the taint of legal unjustness** [....]". [Emphasis added]

3. Therefore, a challenge to an EC must be judged keeping this yardstick in mind. The following chronology of events including the elaborate deliberations held by the EAC would show that this threshold is not met in the present case, thereby not warranting any interference with the grant of the EC in question:

a. **Grievances raised in the public hearing dealt with:** A public hearing was held on 11.08.2023 with respect to the proposed project of the Answering Respondent. The objections which have been raised as Grounds in the present Appeal were raised in the public hearing and duly responded to by the Answering Respondent in its letter dated 28.08.2023 addressed to the Member Secretary, Goa State Pollution Control Board (GSPCB).

A copy of the letter dated 28.08.2023 from the Answering Respondent to the Member Secretary, GSPCB is hereto annexed and marked as **ANNEXURE R7-1**.



Site-visit directed by the EAC: The EAC noted the details of the Answering Respondent's project and observed that "*a site visit needs to be conducted by a subcommittee comprising of EAC members and officers from the MoEF&CC...*". Further, the EAC deferred the proposal for want of certain additional information such as specifics of the settling ponds, whether any illegal mining in the project can be attributed to the Answering Respondent, and also sought a video recording of the public hearing.

c. **20th EAC Meeting:** The EAC sought additional details from the Answering Respondent pursuant to deliberations in its 20th Meeting on 22.09.2023. Significantly, these minutes record that the Department of Mines and Geology (DMG) was called as a special invitee, and that they would provide a copy of the report from the SIT and provide the same to the MoEF&CC. Thus, making it evident that the EAC was well aware that mining had taken place in the subject lease in the past albeit by a different entity.

A copy of the minutes of the 20th Meeting of the EAC held on 22.09.2023 is hereto annexed and marked as **ANNEXURE R7-2**.

d. **22nd EAC Meeting:** A site-visit was conducted by the EAC subcommittee on 29-30.10.2023. While a copy of the report of the site visit conducted by the subcommittee, was not provided to the Answering Respondent, the observations and recommendations therein have been reproduced by the EAC in the minutes of its 22nd Meeting held on 14.11.2023. The EAC considered the report in detail and observed that the Answering Respondent ought to implement the recommendations made in the said report. Consequently, it deferred the consideration of the project to await compliance by the Answering Respondent.

e. **Compliance with recommendations in the site visit report:** After complying with the recommendations of the subcommittee, the Answering Respondent by a letter dated 01.12.2023 submitted the additional details sought by the EAC along with the proof of compliance on 04.12.2023 on the *Parivesh* portal.

A copy of the letter dated 01.12.2023 from the Answering Respondent to the Ministry of Environment and Forest is hereto annexed and marked as **ANNEXURE R7-3**.

f. **Issue regarding forests in the mine lease area considered:** The Answering Respondent placed on record a letter dated 12.04.2023, wherein the Forest Department of the State of Goa had confirmed that the lease does not include any forest land.

A copy of the letter dated 12.04.2023 from the Forest Department of the State of Goa to the Answering Respondent is hereto annexed and marked as **ANNEXURE R7-4**.

g. **Issue regarding mining by erstwhile lessee considered:** The EAC had put up a query to the Answering Respondent as to whether it was the erstwhile lessee who was responsible for any illegal mining in the said lease. In response to this, the Answering Respondent placed on record a letter dated 25.07.2023 from the DMG, wherein it was categorically confirmed by the

DMG that the Answering Respondent was not the erstwhile lessee of the said lease.

A copy of the letter dated 25.07.2023 from the DMG to the Answering Respondent is hereto annexed and marked as **ANNEXURE R7-5**.

h. **24th EAC Meeting:** Eventually, the EAC considered the Answering Respondent's project in its 24th Meeting held on 26.12.2023. After being satisfied that the Answering Respondent had taken steps to comply with the recommendations made in the site visit report, it recommended the grant of the EC, while imposing 32 specific conditions on the Answering Respondent, in addition to the standard conditions for mining projects.

4. The above chronology evinces the level of circumspection and scrutiny undertaken by the EAC in granting the EC to the Answering Respondent and this alone, shows complete application of mind by the EAC as opposed to a 'total absence of mind' *vide* ***Rajeev Suri*** (*supra*).

5. With respect to Para 11, it is submitted that the Appellant has placed reliance on a Circular dated 07.10.2014 to allege that the EAC had sought for information beyond the scope of the TOR. However, the allegation is vague inasmuch as the Appellant has failed to specify how the additional information sought was in any manner beyond the TOR. In fact, contrary to the said averment, the additional information sought by the EAC was only to clarify on material which was provided by the Answering Respondent in the EIA Report based on the TOR. In other words, none of the additional information sought was *de hors* the TOR.

6. For instance, the EAC in its 20th Meeting held during 21-22nd September, 2023 noted the details of the Answering Respondent's project including that the plan for backfilling and the design of settling ponds with the projected rainfall to be 3500 mm/year was not convincing.

7. It is submitted that the said query was raised since the settling ponds very much formed a part of the TOR which is evident from the following terms of the TOR dated 16.06.2023:

> "4.4 The Project Proponent needs to submit the detailed site specific protection measures for the surface features such as habitations, water bodies, schools, temple, road in and around the vicinity of the mine lease area
>
> 6.2 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"

8. Significantly, the Answering Respondent had in response to the said terms specifically provided particulars of the settling ponds. The response in the EIA is reproduced below for ease of reference:

> "The impact on the water quality chapter -4 para 4.7 and Necessary safeguard measures like garland drains, **settling ponds** are mentioned in chapter- 10, Para-10.5.2.1" ***[pg. 549, Appeal Paper-book]***
> "10.5.2.1.
> ...
> The surface runoff generated during monsoon season shall be diverted and channelized through ERW pipes, garland drains and **a series of settling ponds (11nos)** , filter beds , check dams before final discharge"
> ***[pg. 549, Appeal Paper-book]***
> [Emphasis added]

9. Thus, the EAC was well within its mandate to seek further clarifications which had a clear and direct nexus with the TOR. The same applies to every additional detail which had been sought by the EAC, and consequently, the Appellants reliance on the Circular dated 07.10.2014 is misplaced, apart from even otherwise being a hyper-technicality.

10. In any case, Para 3 of the Circular states that the EAC may seek additional studies/ information in cases where some new facts have come to the notice of the EAC:

> "In rare cases where, during the appraisal process **some new facts come to the notice of the EAC/SEAC** and it becomes inevitable to go for additional studies/seeking additional information from the project proponent beyond the TORs, the same may be unambiguously reflected in the minutes of the meeting **with complete justification**, besides getting the additional studies conducted/additional information obtained in a time bound manner."
> [Emphasis added]

11. A bare reading of the said Circular shows that it nowhere bars the EAC from seeking additional details/ information at the stage of appraisal. It merely clarifies that additional details/ information which "*do not form a part of the ToRs*" should not be sought by the EAC at the stage of appraisal. In fact, the Circular allows the EAC to seek information beyond the TOR albeit in rare cases. However, in the instant case, the information sought was clearly relatable to the TOR.

12. Therefore, even otherwise, the EAC can seek additional details/ information if some new facts come to its notice by recording reasons for the same.

13. Further, the Appellant's contention that the Answering Respondent has failed to comply with crucial recommendations of the EAC and its subcommittee is without any merit. This is evident from the fact that the EAC, in its 24th Meeting, only after having noted the Answering Respondent's compliance with the recommendations of the site visit report dated 04.12.2023, recommended the grant of the EC to the Answering Respondent.

MERITS

14. The Appeal raises eleven (11) broad grounds to challenge the EC dated 23.01.2024. They allege as follows:

    i. That the wildlife conservation plan has not been approved by the Chief Wildlife Warden considering that there are 29 Schedule-I species within 10kms of the mine lease area.

    ii. That the Answering Respondent has not considered the issue of transportation of mined ores and the feasibility of switching over to the creation of an Over Land Belt Conveyor.

    iii. That the Answering Respondent has suppressed material information.

    iv. That the EIA Report has not considered past destruction on the leased land.

    v. That the EIA Report has not considered the eco-sensitivity of the project site.

    vi. That the Answering Respondent's project has been wrongfully classified as 'greenfield'.

vii. That the hydrological study is inadequate/false.

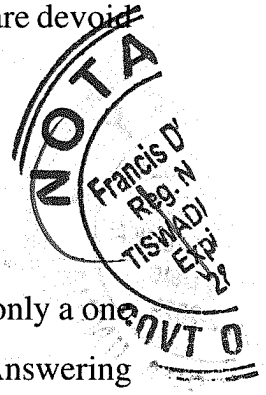
viii. That the EIA Report has not considered socio-economic data & equity for local communities.

ix. That the EIA Report has not considered the possibility of floods and natural disasters.

x. That the public hearing was not conducted in accordance with established norms.

xi. That the EIA Report has not undertaken a cumulative impact assessment study of adjoining blocks.

15. The Answering Respondent submits that each of these ostensible issues are devoid of merit.



WILDLIFE CONSERVATION PLAN DULY SUBMITTED BY THE ANSWERING RESPONDENT

16. With respect to Grounds 19 & 20, it is submitted that the allegation that only a one page conservation plan being provided is baseless, and in fact, the Answering Respondent had at Appendix IV of its EIA Report submitted a detailed wild life conservation plan running into 58 pages. Furthermore, the attempt of the Appellant to mislead this Ld. Tribunal is evident from the fact that reliance is placed on a document dated 26.05.2017 which predates the auction of the mining lease as well as the application for grant of EC.

A copy of the EIA & EMP is hereto marked and annexed as **ANNEXURE R7-6**.

17. It is also pertinent to note that the Answering Respondent has already submitted the wildlife conservation plan for approval of the Chief Wildlife Warden on 19.06.2023.

A copy of acknowledgment from the Chief Wildlife Warden that the Answering Respondent has submitted the wildlife conservation plan is hereto annexed and marked as **ANNEXURE R7-7**.

18. The Answering Respondent informed the EAC in its 22nd Meeting that the wildlife conservation plan has been modified as per its recommendations to incorporate the revised financial outlay and has been submitted to the Forest Department.

19. With respect to the list of Schedule-I species identified in the project area pursuant to the Wildlife (Protection) Amendment Act, 2022, it is submitted that the said list was in fact provided by the Answering Respondent while answering point no. 9 in the additional details sought, wherein the EAC had directed the Answering Respondent to submit a revised list of authenticated Schedule-I species. Pursuant to which, the Answering Respondent obtained the said authenticated list of Schedule-I species from the Dy. Conservator of Forests, Goa by a letter dated 27.11.2023. According to this list, 29 Schedule-I species were identified within 10kms of the study area. The same were accordingly submitted to the EAC on 01.12.2023, as part of the response to the additional details sought in Annexure V.

20. Furthermore, the Answering Respondent thereafter submitted a revised break-up of the conservation activities proposed under the wildlife conservation plan, which was also supplied to the EAC in Annexure VI of the response to the additional details sought. In any case, as per standard term no. 4.2 of the TOR, the Answering Respondent was required to only submit proof of 'submission' of the wildlife conservation plan and there is no requirement of getting the same approved prior to obtaining the EC. Pertinently, the Answering Respondent has already submitted the wildlife conservation plan for approval of the Chief Wildlife Warden on 19.06.2023 and copy of acknowledgment from the Wildlife Warden has been submitted to the EAC. ToR 4.2 has been reproduced below for ease of reference:

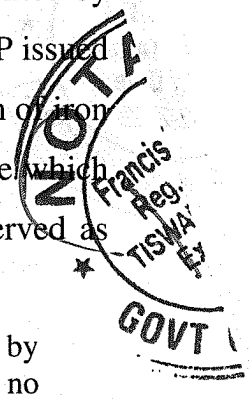
> "A detailed biological study of the study area [core zone and buffer zone] shall be earned out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. PP shall submit list of Schedule-1 species present in core and buffer zone duly authenticated by CWLW. In case of any Scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest/Wildlife Department and details

furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost. **Proof of its submission of conservation plan to the CWLW needs to be submitted**."

[Emphasis added]

ORE TRANSPORTATION DEALT WITH BY HIGH COURT

21. With respect to Ground 21, it is submitted that the issue of transportation of minerals in Goa was the subject matter of PIL WP. No. 06 of 2024 titled ***Mulakh Khajan Farmers Association v. Director of Mines and Geology & Ors.,*** wherein the Answering Respondent had impleaded itself as a party. The Hon'ble Bombay High Court at Goa, while disposing the said petition specifically referred to the various OMs as well as SOPs of the MoEF&CC, including the corrigendum dated 06.06.2023, and held that there were sufficient measures already in place with respect to the transportation of ore, and that the same would be implemented by the State. The Hon'ble High Court also took note of the fact that the SOP issued by DMG is applicable on the e-auction ore and not over the transportation of iron ore from mines allocated by the State Government through auction route which shall be governed by the EC conditions. The Hon'ble High Court observed as follows:



"9. Learned Advocate General has serious objection to the course adopted by us in expanding the scope of the PIL as according to him there are no pleadings to justify such a course. We strongly feel that the **concern of transportation through village roads needs to be addressed** [...]."

"20. What is in issue in this PIL **are the problems caused by bulk transport of minerals (iron ore) through mining villages in the mining zone of Goa that have plagued village communities in the past.** The petitioner expects the Government to accept their rights to a clean, healthy and pollution free environment as the primary consideration which should guide them while granting transport permissions to the mining companies/transporters of the minerals, rather than the commercial interests of the project proponent/transporters. The grievance is that though statutory provisions are in place to regulate such operations, they are grossly inadequate and worse still poorly implemented [...]."

"37. In respect of transportation of 'e-auction ore', vide Corrigendum dated 06.06.2023, the DMG has imposed the following restrictions on traffic movement on different transportation routes. Such restrictions read thus:

CORRIGENDUM

> Subject: Transportation of Ore This Department vide Memorandum No.03/66/2023/Major/Mines/194 dated 05/04/2023 had put restriction on number of trips per hour to avoid traffic congestion on village roads. This restriction stands amended to the extent given below:
>
> The traffic movement on different transportation routes will be monitored by Goa Electronics Limited on real time basis and the number of trips will be staggered between **20 trips to 40 trips per hour depending on the traffic congestion on the roads**."
>
> "39. It is therefore **not as if transportation of the ore through village roads is completely prohibited** as fairly submitted by the learned Counsel for the petitioner. **Moreover, the aforesaid SOPs/measures are put in place to mitigate the adverse impact of mining operations in the case of such habitations/villages.** Learned Counsel for the petitioners fairly submitted that the spirit of the OM dated 29.10.2014 is imbibed in the SOPs issued by the authorities from time to time. The safeguards imposed by way of SOPs, instructions, Rules and Regulations before and after filing of the PIL accords with the spirit of the OM dated 29.10.2014. **These measures be strictly implemented**."
>
> "45. We thus find from the materials that the expert bodies like **GSPCB and the DMG have issued the SOPs and imposed necessary safeguards in the transportation of the 'e-auction ore'**. It is not possible for us to substitute our opinion for that of the expert body like the GSPCB and DMG. The recommendations and decision of the DMG and GSPCB cannot be undermined in a light manner and due deference must be accorded to expert agencies when the decisions do not attract the taint of legal unjustness/infirmity."
>
> [Emphasis added]

22. Significantly, the judgment also records that the restrictions on transportation have been incorporated in conditions 13 to 24 (relating to transportation) of the CTO dated 04.03.2024 granted to the Answering Respondent by the GSPCB:

> "26. The CTO has been granted by the GSPCB under Section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and under Section 21 of the Air (Prevention & Control of Pollution) Act, 1981 and Authorization under Rule 6(i) of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules 2016, as amended thereafter [...]."

A copy of the CTO dated 04.03.2024 granted to the Answering Respondent by the GSPCB is hereto marked and annexed as **ANNEXURE R7-8**.

23. In other words, the issue with respect to transportation of ore by the Answering Respondent has been specifically considered by the Hon'ble High Court and hence, this issue ought not to be gone into by this Hon'ble Tribunal in view of the law laid down by the Hon'ble Supreme Court in ***State of A.P. v. Raghu Ramakrishna Raju Kanumuru***, (2022) 8 SCC 156 (*Paras 12-13*) and this Hon'ble Tribunal in ***Pravir Prabhakar Fadte v. MoEF & Ors.***, 2023 SCC OnLine NGT 4292 (*Para 48*).

A copy of the judgment dated 29.06.2024 of the Hon'ble Bombay High Court at Goa is hereto annexed and marked as **ANNEXURE R7-9**.

24. With respect to Ground 22, it is submitted that the Answering Respondent has adequately responded to this suggestion at point no. 1 with respect to an Over Land Belt Conveyor system, in the additional details sought by the EAC in its 20th Meeting. The Answering Respondent had informed the EAC that a preliminary techno-feasibility study was undertaken, and it was *prima facie* concluded that it would not be feasible to switchover to an Over Land Belt Conveyor system for certain specific reasons, namely, the terrain of the likely route has mounds and low-lying areas, vegetation/forest patches and its likely degradation, accessibility, environmental impacts and safety issues, technologies available, cost of the system, implementation period vis-à-vis remaining reserves in the mining lease. The preliminary techno-feasibility report was also supplied to the EAC by the Answering Respondent.

25. With respect to Ground 23, it is submitted that the EIA Report contains mitigative measures with respect to transportation, which are dealt with at Para 2.6.1.4 of the EIA Report. For instance, one of the mitigative measures is that during the transportation of ore, there are two junctions which the trucks need to cross, namely, Mayem and Pilgao and that during the transportation, the Answering Respondent will provide dedicated personnel to manage the traffic at these junctions.

26. With respect to Grounds 24 & 25, it is submitted that the EIA Report adequately factors the villages, temples, caves and schools near the mine lease area. The same can be seen from Para 2.3.1 of the EIA Report.

27. With respect to Grounds 26 & 27, it is submitted that the EAC was cognisant that the mine had been worked upon in the past as is evident from specific condition no. 4.6 of the ToR, wherein the EAC sought a clarification as to whether the Answering Respondent was responsible for any mining in the past. The EAC had posed the following query to the Answering Respondent:

> "During the meeting, the EAC **noted that old excavated pits exist within the mine lease area**. Hence, the Project Proponent needs to submit a letter from the Department of Geology and Mining, Government of Goa clarifying whether any illegal mining within the mine lease area has been carried out or not and whether the same has been carried out by M/s. Vedanta Limited or not?"
>
> [Emphasis added]

28. Subsequently, the Answering Respondent addressed a letter dated 18.05.2023 seeking a clarification in this regard from the DMG. The DMG by its letter dated 25.07.2023 clarified that the Answering Respondent **"was not the erstwhile lessee of the said Block prior to auction"**.

29. The Appellant has no basis to allege that a letter from the DMG, whose exclusive domain this is, is 'misleading' and 'inadequate'.

30. Moreover, saddling the Answering Respondent for the alleged past conduct of the erstwhile lessee would be a complete ignorance of elementary company law jurisprudence, namely that one cannot equate two separate corporate entities, which have distinct juristic identities.

31. With respect to Ground 28, it is submitted that the Shah Commission Report deals with the ECs granted to Dempo & Co. Pvt. Ltd. & Sesa Goa Ltd. The Answering Respondent cannot be saddled with the responsibility of the alleged illegalities of separate juristic entities as that would lead to a complete ignorance of elementary

company law jurisprudence. Moreover, the Shah Commission Report cannot be the basis to conclude illegality as has been recorded by the Hon'ble Supreme Court in ***Goa Foundation v. Union of India***, (2014) 6 SCC 590 at para 14.

32. With respect to Ground 29, it is submitted that this allegation is too far-fetched, without any record and beyond the scope of the challenge to the EC.

THE EAC WAS COGNIZANT OF PAST MINING ACTIVITIES ON THE LEASE

33. With respect to Grounds 30 & 31, it is submitted that the EAC was very much cognisant that the mine had been worked upon in the past and the same is evident from Sr. No. 4.6 of the ToR, which has been quoted in Para 27 hereinabove.

34. Significantly, any alleged violations by the previous lessee cannot be the basis to reject an application seeking permission/ clearance by the subsequent auction purchaser of a lease. In fact, this position has been accorded statutory recognition by virtue of Rule 9A(9) of the MINERALS (OTHER THAN ATOMIC AND HYDRO CARBONS ENERGY MINERALS) CONCESSION RULES, 2016 ("MCR 2016"), which categorically bars an authority from refusing to grant permissions to the new lessee on account of violations of the previous lessee. Rule 9A(9) reads as follows:

> "No authority shall reject grant of any rights, approvals, clearances, licenses and the like **to the new lessee on account of past violations or outstanding dues of the previous lessee**, which may be agitated before appropriate forums separately without prejudice to any rightful legal claims of the parties." [Emphasis added]

35. Simply put, in terms of Rule 9A of the MCR 2016, there is a statutory bar on an authority from considering past violations of the previous lessee for the grant of any permission to the subsequent lessee, and hence, the EAC was barred from

considering alleged past violations of the erstwhile lessee in granting the EC in question.

36. With respect to Grounds 32 & 33, the contents of paras 30 and 31 are reiterated.

ECO-SENSITIVITY OF THE PROJECT SITE DULY CONSIDERED IN THE EIA REPORT

37. With respect to Ground 35, it is submitted that the proximity of the Mayem Forest has already been considered by the EAC in its 20th Meeting and consequently directed the Answering Respondent to submit a letter from the Forest Department regarding the involvement of forest land in the mine lease area. Accordingly, the Answering Respondent furnished a letter dated 12.04.2023 issued by the Forest Department, wherein the Forest Department has confirmed that "*no forest land falls inside Bicholim Mineral Block-I*".

38. With respect to Grounds 36 and 37, it is submitted that the Appellant has relied on Google Earth images to contend that the Salim Ali Bird Sanctuary falls within the 10km radius (within 9.78kms) of the mine lease area as opposed to a distance of 10.553kms, as submitted by the Answering Respondent by relying on an authenticated map dated 23.01.2023. Pertinently, the EAC has already taken note of the same in its 20th Meeting. The Hon'ble Supreme Court has in ***Noida Memorial Complex, In re,*** (2011) 1 SCC 744 (*para 24*), held that if there is other reliable material on record, Google Earth images should not be relied upon. Therefore, the authenticated map dated 23.01.2023 should be given primacy over the Google Earth images as relied upon by the Appellant to calculate the distance of the Salim Ali Bird Sanctuary.

A copy of the authenticated map dated 23.01.2023 submitted by the Answering Respondent to the EAC is hereto annexed and marked as **ANNEXURE R7-10**.

THE PROJECT HAS BEEN CORRECTLY CLASSIFIED AS GREENFIELD

39. With respect to Grounds 38 & 39, it is submitted that the Appellant's contention that the Answering Respondent's project has been wrongfully classified as greenfield is devoid of merit. This is based on an erroneous understanding of the ENVIRONMENTAL IMPACT ASSESSMENT NOTIFICATION, 2006 (the "EIA Notification 2006") and the EIA process thereunder. Cl. 2 of the EIA Notification 2006 only makes a distinction between a "new project" or an "expansion/modernisation of an existing project or activity". Cl. 2 of the EIA Notification 2006 reads as follows:

> "2. Requirements of prior Environmental Clearance (EC):-
> ... :
> (i) All **new projects** or activities listed in the Schedule to this notification;
> (ii) **Expansion and modernization of existing projects** or activities listed in the Schedule to this notification with addition of capacity beyond the limits specified for the concerned sector, that is, projects or activities which cross the threshold limits given in the Schedule, after expansion or modernization;
> (iii) Any change in product - mix in an existing manufacturing unit included in Schedule beyond the specified range." [Emphasis added]

40. Thus, a greenfield project would be one which falls within Cl. 2(i) of the EIA Notification, 2006 while a brownfield project is one which falls under Cl. 2(ii) of the EIA Notification, 2006 and pertains to expansion and modernization of existing projects.

41. That such is the understanding of the MoEF&CC is evident from a PIB note dated 19.12.2011 titled "Implementation of Green Field Projects", the relevant portion of which reads as follows:

> "The Environmental Impact Assessment (EIA) Notification, 2006 provides that all developmental projects, listed in the Schedule-1 to the Notification require prior environmental clearance for **establishment of new (Greenfield)** projects or for **expansion (Brownfield) of existing projects.**" [Emphasis added]

A copy of the Press Information Bureau note dated 19.12.2011 titled "Implementation of Green Field Projects" is hereto annexed and marked as **ANNEXURE R7-11.**

42. The same is also evident from the instructions issued by the MoEF&CC in its agenda for the 14th EAC Meeting, wherein Para 11 of the said instructions, reads as follows:

> "11. PP needs to submit the documents w.r.t. validity of the mining lease (brown filed projects) and **letter of intent (green filed projects)** along with supporting documents. PP should submit the details of lease renewal/transfer/surrender in chronological manner."
>
> [Emphasis added]

A copy of the agenda for the 14th EAC Meeting issued by the MoEF&CC dated 03/04.05.2024 is hereto annexed and marked as **ANNEXURE R7-12**.

43. Thus, it is evident that the EAC considers a subsisting mining lease as a brownfield project, and a freshly granted mine (by way of a letter of intent pursuant to an auction) to be a greenfield project.

44. It is submitted that the only consequence flowing from such classification is that Para 7 of the EIA Notification 2006 allows a brownfield project i.e., an expansion project to leapfrog to the stage of appraisal by the EAC without having to go through the rigours of screening and scoping. In some scenarios, such brownfield projects, where there is no increase in the pollution load are not put through any rigours of the EIA process.

45. Hence, it is clear that classification of a project as a greenfield project only implies that a project proponent has to make a *de novo* application and has to undergo the rigours of all the steps contemplated in the EIA Notification 2006.

46. In other words, the rigours placed on a greenfield project are far more stringent than that imposed on a brownfield project inasmuch as a brownfield project does not have to undergo the same level of detailed in-depth scrutiny as a greenfield project.

47. It is from this perspective that the MoEF&CC has clarified by an OM dated 31.03.2011, bearing reference no. No. J-11015/200/2008-IA.II(M), as follows:

> "III. Greenfield Projects:

...

(iii) All cases of grant/renewal of EC for any **abandoned mine or sick project under revival etc. would be considered as a green field project** for appraisal under EIA Notification, 2006 and the procedure mentioned above will be followed."

[Emphasis added]

A copy of the OM dated 31.03.2011 issued by the MoEF&CC is hereto annexed and marked as **ANNEXURE R7-13**.

48. The Answering Respondent's project, being a freshly granted mine through an auction process, having been issued a letter of intent, being akin to the aforesaid scenarios, noticed in the OM of 2011, has been classified as a greenfield project as per the instructions issued by the MoEF&CC in its agenda for the 14th EAC Meeting.

49. Thus, even assuming without admitting that the EIA Notification 2006 requires that a project be classified as greenfield or brownfield, the Answering Respondent has correctly classified the project as a greenfield project since there was no existing EC or activity, of which an expansion was sought.

50. Simply put, the Answering Respondent, in the absence of a subsisting EC, could only have applied as a greenfield project.

THE HYDROLOGICAL STUDY IS NOT FALSE OR INADEQUATE

51. With respect to Grounds 40 & 43, it is submitted that the hydrogeological study adequately addresses the impact of mining operations on the groundwater table and has been carried out as per standard term no. 7.3 of the ToR. A water quality study was also conducted in May 2023, wherein 10 samples of groundwater were taken (which were 10 wells in the study area of 10km radius). This study concluded that the core and buffer area of the mining lease area is free from the perspective of ground water development and management. The groundwater extraction in the mining lease area is negligible and hence, there would be no adverse impact on the wells in the proximity.

52. Further, there are additional safeguards in place. For groundwater withdrawal, the Answering Respondent must obtain a NoC from the Central Ground Water Authority (CGWA)/ Concerned Local Authority to whom the CGWA has delegated its powers, as the case may be. The State Pollution Control Board (SPCB) has been directed to not issue a consent to operate before such permission is taken by the Answering Respondent. This measure will essentially help keep in check the withdrawal of groundwater for project activities. In fact, in compliance with this condition, the Answering Respondent has applied for and obtained an NOC from the Office of the Executive Engineer & Ground Water Officer, Water Resources Department, Goa on 21.09.2023.

A copy of the NOC dated 21.09.2023 issued by the Office of the Executive Engineer & Ground Water Officer, Water Resources Department, Goa is hereto annexed and marked as **ANNEXURE R7-14**.

53. With respect to Grounds 41 and 42, the Appellant's contention that because the hydrology report does not consider the NEERI Report, it may be noted that the issue with respect to findings and recommendations of the NEERI Report are specifically under consideration before the Hon'ble Bombay High Court in WP No. 01/2008 and hence, this issue ought not to be gone into by this Hon'ble Tribunal in view of the law laid down by the Hon'ble Supreme Court in ***Raghu Ramakrishna*** (*supra*) and by this Hon'ble Tribunal in ***Pravir Fadte*** (*supra*).

A copy of the order dated 15.06.2009 passed by the Hon'ble High Court in PIL WP No. 01/2008 is hereto annexed and marked as **ANNEXURE R7-15**.

A copy of the order dated 16.11.2009 passed by the Hon'ble High Court in PIL WP No. 01/2008 is hereto annexed and marked as **ANNEXURE R7-16**.

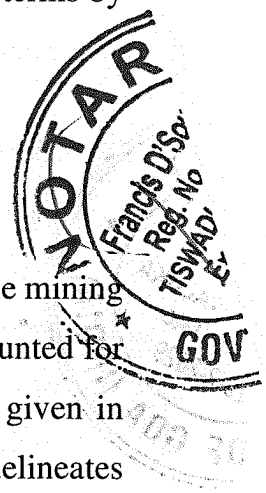
A copy of the order dated 08.07.2010 passed by the Hon'ble High Court in PIL WP No. 01/2008 is hereto annexed and marked as **ANNEXURE R7-17**.

A copy of the order dated 24.06.2024 passed by the Hon'ble High Court in PIL WP No. 01/2008 is hereto annexed and marked as **ANNEXURE R7-18**.

54. With respect to Ground 44, it is submitted that specific condition no. 15.1 in the EC states that regular monitoring and analysis of discharge water at upstream and downstream of Bicholim and Asnora river needs to be carried out quarterly through NABL/MoEF&CC accredited laboratory.

55. Further, the EIA Report at Para 10.13, Table 10.12 notes the presence of Asnora river adjacent to the mining lease area. The protective measure contemplated for the same is that a safety buffer of 50m shall be maintained and planted with plant species. Similarly, construction of garland drains, check-dams, retention walls, settling ponds, filter beds shall reduce sediment run-offs. The EAC, in its 20th Meeting also takes note of the same and observes that even during high flood level, the river will not interact with the pit water. Therefore, adequate safeguards are already in place and the Answering Respondent has already been put to terms by the EAC by imposition of specific conditions.

THE EIA REPORT ADEQUATELY ADDRESSES SOCIO-ECONOMIC IMPACTS



56. With respect to Grounds 46, 47 & 48, it is submitted that the impact of the mining activity on the local population, social benefits etc. have been duly accounted for in the EIA Report. A detailed impact study on the local population is given in Chapter 4, Para 4.10 & Chapter 7, Para 7.1. Further, Chapter 8, Para 8.4 delineates the social benefits to be provided to the local communities.

57. The Appellant is attempting to paint a lopsided view by alleging the supposed negative impacts of the Answering Respondent's project, while completely ignoring the social benefits including benefits to various schools in the nearby area, health care facilities, agriculture, skill and infrastructure development. The same can be seen from Table 7.1 in Chapter 7 of the EIA Report.

58. Specifically, with respect to Ground 47, it is submitted that the action plan at Table 7.1 in Chapter 7 of the EIA Report seeks to provide support for agriculture rejuvenation by providing necessary inputs including seeds, fertilizers, ploughing

etc. which will benefit over 300 farmers. Moreover, it also seeks to supply water for irrigation of horticulture garden in the Mulgao village during the non-monsoon season.

59. With respect to Ground 49, the Appellant contends that the title to the lands within the lease area belongs to the village *comunidades* and not to the Answering Respondent, as recorded in the land records. However, it is submitted that this Hon'ble Tribunal has no jurisdiction to determine a dispute as to title to property and that such disputes cannot be the subject matter of proceedings before this Hon'ble Tribunal and hence, should be agitated before the appropriate court. The inclusion of such grounds in the present matter is unwarranted and exceeds the scope of the proceedings.

60. This Hon'ble Tribunal, in its judgment dated 05.09.2022, in ***Alchemist Asset Reconstruction Company Ltd. v. GCZMA,*** Appeal No. 22 of 2022 (*para 5*), has held that "*In the meanwhile, the litigation was going on with respect to the said property in respect of its title in various forums. We are not referring to the pleadings relating to the said litigation as the same is not of any significance for the purposes of the jurisdiction of this Tribunal* ***as the title of the land in question, does not fall in the domain of this Tribunal.***" Moreover, this Tribunal may not be competent to adjudicate on the aspect of agricultural tenancy especially since the GOA AGRICULTURAL TENANCY ACT, 1964 is not a schedule enactment i.e, not enlisted in Schedule I of the NGT Act.

61. Further, it is submitted that ownership of lands is not a matter relatable to any of the scheduled enactments under the NGT Act. The Ground taken by the Appellant that the surface rights of the local communities outside the lease area have not been considered by the Answering Respondent is premised on an ignorance of Rule 52 of MCR 2016, which contemplates compensation for surface rights owners. In other words, the assertion of the Appellant that the Answering Respondent must necessarily purchase/acquire the lands under which the mine is situated, fails to notice that a lessee obtains the right to operate on the same *ipso*

facto with the grant of the mining lease and the land owner is entitled to compensation under the aforesaid Rule 52 and cannot insist that such land be purchased for all times to come.

THE EIA REPORT ADEQUATELY DEALS
WITH THE POSSIBILITY OF FLOODS AND NATURAL DISASTERS

62. With respect to Grounds 51 & 52, it is submitted that bald allegations of collapse and flooding have been made by the Appellant without providing any particulars or supporting material. Consequently, it is submitted that this allegation must be rejected at the threshold on this count. Further, all the anticipated emergency situations (such as pit slope failure, waste dump failure, water inundation, fire etc.), risk assessment are dealt with in Chapter No. 7 of the EIA Report.

63. Further, keeping in mind the remote possibility of flooding, an additional study on silt load calculation, desiltation management and likelihood of seepage from Asnora river has been undertaken by the Answering Respondent.

PUBLIC HEARING WAS HELD
IN ACCORDANCE WITH ESTABLISHED NORMS

64. With respect to Grounds 53, 54, 55, 56 & 57, it is submitted that the Appellant's claim that the Answering Respondent and their consultants have not met anyone from the village or the panchayat members is completely devoid of merit. This is evident from the fact that the representatives of the Answering Respondent made a presentation concerning the project by explaining the contents thereof in Konkani and then as requested by the public, in the English language.

65. Therefore, the objections raised regarding the public hearing are an exercise in hair-splitting without any real grievance. The grievance of the Appellant primarily has to do with the brief oral explanation provided at the public hearing. This ignores the fact that the EIA Report was already made available to those desirable to attend the meeting, which has not been denied by the Appellant.

66. Moreover, all concerns raised in the public hearing were responded to by the Answering Respondent in a point-wise manner, by way of a letter dated 28.08.2023.

A copy of the Letter dated 28.08.2023 is hereto marked and annexed as **ANNEXURE R7-19**.

67. With respect the involvement of the village panchayat in the public consultation process, it is submitted that the Answering Respondent had responded to the request of the village panchayat for a joint meeting with the panchayat and all committees by its letter dated 04.08.2023.

68. The Answering Respondent in the said letter also gave reasons for seeking adjournment of the joint meeting. It stated that: a) there was already a meeting with the office of the village panchayat on 03.08.2023, where certain issues were discussed and the same were under consideration; and b) there had been meetings with the Communidade of Mulgao and Mulgao Kruti Samiti of Mulgao, where the parties had put up some proposals, which were also under consideration.

69. Therefore, since discussions on various issues had already been initiated by the Answering Respondent with the concerned stakeholders, an adjournment of the joint meeting was sought by the Answering Respondent. The village panchayat, Mulgao by its letter dated 05.08.2023 rejected the request of the Answering Respondent to adjourn the meeting.

A copy of the letter of the Answering Respondent dated 04.08.2023 addressed to the village panchayat is hereto attached and annexed as **ANNEXURE R7-20**.

A CUMULATIVE IMPACT ASSESSMENT HAS BEEN UNDERTAKEN IN PREPARING THE EIA REPORT

70. With respect to Ground 58, it is submitted that the Appellant's understanding of a 'cumulative impact assessment' is contrary to the scope of a cumulative impact assessment as laid down by the Hon'ble Supreme Court in ***Rajeev Suri*** (*supra*) (*para 486*) wherein the Court has held as follows:

> "486. [....] The meaning of the expression "cumulative impact/effect" is not to be understood as an expression of art. It does not shun segregating an independent project. In an examination of this nature, the foremost requirement is to identify the **precise expanse of a project.** It does not mean connecting independent projects upon a subjective notion that it is necessary to do so for a collective appraisal **merely because such projects fall in the same region.** The word **"cumulative" is to be read in conjunction with the word "project"** and idea behind examination of cumulative impact is to assess the impact of the project including all its **functional components, and not of all development activities going on in a region**".
>
> [Emphasis added]

71. The Appellant contends that even though the Answering Respondent has been granted the lease for Bicholim Block-I, it should have done a cumulative impact assessment of the adjoining blocks i.e., Blocks II and III. As per the mining lease dated 22.03.2024, the Answering Respondent has been granted a lease for Block I- Bicholim Mineral Block, located in North Goa. Therefore, the Answering Respondent is under no obligation to undertake an impact assessment of the adjoining blocks, for which it does not have a lease.

72. In view of the law laid down in ***Rajeev Suri*** (*supra*), a cumulative impact assessment does not necessitate a consideration of the effects of past, present and reasonably foreseeable future projects. The only requirement is that the project proponent must undertake an impact assessment of all the components of a project such as air, water, noise, soil quality, land use, socio-economic, ecology & biodiversity components etc. Such a cumulative impact assessment has been duly undertaken by the Answering Respondent and forms a part of the EIA Report. Therefore, the Answering Respondent was not required to undertake a cumulative impact assessment of the adjoining blocks.

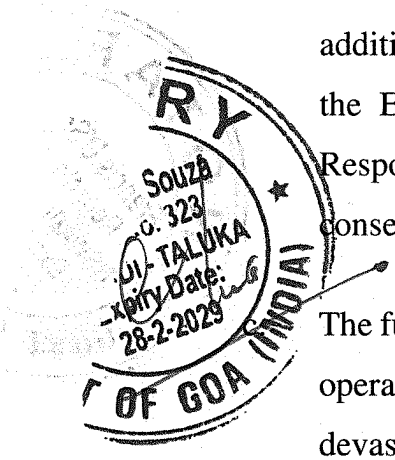
SUMMARY OF ARGUMENTS

73. Hence, in summary, it is submitted that:

    a. A reading of the EAC minutes, which are elaborate and well-reasoned and the fact that the EAC sent a subcommittee for a site visit, which accordingly

visited the mine and made its recommendations, which were agreed to by the EAC and complied with by the Answering Respondent, demonstrate complete application of mind to all relevant issues and also all grievances raised at the public hearing held on 11.08.2023. Thus, the threshold for judicial review of an EC as laid down by the Hon'ble Supreme Court in ***Hanuman Laxman Aroskar v. Union of India,*** (2019) 15 SCC 401 and ***Rajeev Suri*** (*supra*) is not met.

b. The Appellant's allegation that information which had been sought in the additional report pursuant to a site inspection report contrary to the Circular dated 07.10.2014 is baseless and vague. Moreover, the said circular only provides that information ought not be sought beyond the TOR, and clarifies that in case new facts come to the notice of the EAC, it may well seek additional information. In the instant case, the additional details sought by the EAC pertained to facts and particulars provided by the Answering Respondent in response to the TOR, and hence were relatable to the TOR and consequently did not travel beyond the TOR.



The fulcrum of the Appeal is the fact that the lease in question was previously operated by the erstwhile lessee and hence, all alleged past conduct and devastation perpetuated by the erstwhile lessee should have been taken into account while granting the EC in question. The EAC, while granting the EC, has been cognizant of the fact that the mine was previously worked upon and has granted the EC in accordance with the statutory mandate under Rule 9A(9) of the MCR 2016, which gives the new allottee the lease on a clean slate.

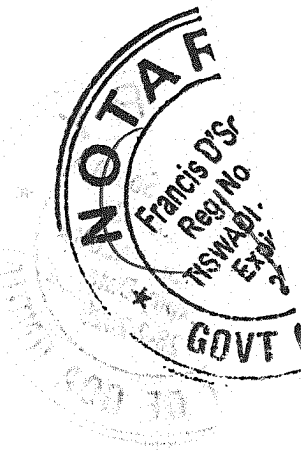
d. The Appeal is premised on misconceived notions of the Appellant such as those relating to what constitutes a brownfield project, which in fact is, a subsisting project that is seeking expansion or modernization. However, that is not the case with the Answering Respondent's project, which has been granted a fresh lease and has been put through more stringent rigours of the

EIA Notification 2006, including most significantly, a public hearing, wherein the grievances raised in the present Appeal were already raised and adequately dealt with by the EAC as well as the Answering Respondent.

e. Various aspects of the Appeal such as transportation of iron ore or the inclusion of the NEERI Report in the hydrology report, are subject matter of writ proceedings before the Bombay High Court at Goa and hence, cannot be gone into by this Hon'ble Tribunal *vide* ***Raghu Ramakrishna*** (*supra*).

f. Various issues raised in the Appeal are *ex facie* incorrect, and do not merit the inference of this Hon'ble Tribunal.

74. In the above conspectus, it is submitted that the instant Appeal be dismissed as being without merit.



Advocate for Respondent No 7

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL,

WESTERN BENCH AT PUNE

APPEAL NO. 101 OF 2024

IN THE MATTER OF:

FEDERATION OF RAINBOW WARRIORS ... **APPELLANT**

versus

UNION OF INDIA AND ORS. ... **RESPONDENTS**

AFFIDAVIT

I, Jagdish Ravindranath Desai, son of Ravindranath Govind Desai, major of age, married, Indian National, residing at UG3, B1, Milroc Temple Towers, Opposite Swami Samarth Temple, Merces, Goa, the authorised representative of the Respondent No. 7 in the captioned appeal, do hereby solemnly affirm and declare as under:-

1. That I am the Head Environment – Sesa Goa – Vedanta Limited of the Respondent No. 7 in the captioned matter and hence am aware of the facts of this case and I have been duly authorised, hence I am competent to swear this affidavit.
2. That contents of the accompanying reply at para 1 to 74 have been drafted by my counsel under my instructions and after going through and carefully understanding the same I state the same to be true and correct to the best of my knowledge and belief based on the records of the case available at hand and the legal submissions made therein are based on legal advice which I believe to be true. No part thereof is false and nothing material has been concealed therefrom.
3. That the annexures enclosed with the said reply are true and/ or typed copies of their respective originals.
4. That the contents of this affidavit are true and correct.

DEPONENT

VERIFICATION

Verified at Panaji Goa on this 7th day of October, 2024 that the contents of the foregoing affidavit are based on my knowledge and belief and that no part thereof is false and that nothing material has been concealed therefrom.

DEPONENT

BEFORE ME

SHRI FRANCIS D'SOUZA
NOTARY FOR TISWADI TALUKA

NOTARY
Francis D'Souza
Reg. No. 323
TISWADI - TALUKA
Expiry Date:
2029
GOVT OF GOA (INDIA)

NOTARIAL NOTARIAL NOTARIAL

I hereby attest the above signature/~~s~~ of Shri/~~Smt./Miss~~ Jagdish Ravindranath Dhari in my presence

Who has been identified before me by GA 07 20040001968 Driving Licence bearing No

~~who is personally known to me~~

Registered under No. 1231/2024

Dtd 07.10.2024

ADV. FRANCIS D'SOUZA
NOTARY
KAMAKSHI PRASAD BLDG
THIRD FLOOR, FLAT NO. 304
PATTO, PANAJI
TISWADI GOA - 403 001

vedanta
transforming elements

sesa goa iron ore

Letter No. VL/MIN/Block I/23-24/006 Date: 28/08/2023

To,
Member Secretary,
Goa State Pollution Control Board
Near Pilerne Industrial Estate, Opp Saligao Seminary,
Saligao - Goa - 403511

Subject: Regarding clarification against the Environmental Public Hearing held on 11/08/2023

Madam,
Please find attached herewith the point wise clarification w.r.t the points raised by the speakers. We have also included the responses w.r.t some of the letters which were shared by your good office.

We request you to kindly forward our responses to MoEF &CC and share the copy with us for further necessary online submissions to MoEF &CC from our end .

Thanking you,

Yours faithfully
For Vedanta Limited

Jagdish Desai
Head Environment- Sesa Goa
Authorized Signatory

VEDANTA LIMITED
Sesa Goa iron ore: Sesa Ghor, 20 EDC Complex, Patto, Panjim, Goa – 403 001, India
T +91 0832 2460600 | Website: www.sesagoaironore.com

Registered Office: Vedanta Limited, 1st Floor, 'C' wing, Unit 103, Corporate Avenue, Atul Projects, Chakala, Andheri (East), Mumbai 400093, Maharashtra, India.
CIN: L13209MH1965PLC291394

Clarification against the Environmental Public Hearing held on 11th August 2023, w.r.t. Block-I, Bicholim Mineral Block

Sr No	NAME & COMMENTS	RESPONSE	BUDGET
1	**Deepak Popkar**	Various air pollution control activities will be undertaken during the mining operations, details are provided in chapter 10. A sufficient buffer of 50m will be maintained from habitation, Drilling and blasting activities are not proposed and hence there are no chances of damage to houses etc. All the necessary erosion control, monsoon preparedness activities will be carried out to prevent flow of silt outside the mining area. The details of the same are mentioned in chapter 10 of EIA document. The Baseline monitoring is carried out during March to May 2023 by NABET accredited consultants.	
	He is the resident of Bicholim.		
	He stated that he stands here on behalf of resident of Bicholim.		
	He stated that dust can cause pollution in villages which affects children and old people, which causes cold and other diseases.		The budget towards Environment Monitoring and Air pollution control measures: 408 Lakhs
	He stated that fields, houses get destroyed. Because of this EC should not be granted, He stated that he had filed RTI in Municipality.		The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs
	The agencies were hired to conduct monitoring. The agency if approved then the report is correct or else it is faulty		
2	**Siddesh Parab, Bicholim**	Thank you for the support.	
	He is the resident of Bicholim.		

Sensitivity: Internal (C3)

	He stated that the mine was closed and now reopening.		
	He stated that all the truck owners etc. are thankful that the mine is reopening as they depend on it.		
3	**Nilesh Dhabolkar, R/o of Mayem**	There is habitation within the mineral block at Mulgao and Lamgao villages, the same is mentioned in the EIA document. A buffer of minimum 50m. would be maintained form the habitation. The allegations made regarding fabrication of EIA are false and baseless. Details of water bodies are provided in EIA report. The habitations, water bodies, places of worship near the mines will not be affected. The EIA document is prepared by Mineral Engineering Services (accredited by QCI-NABET) and based on the Terms of reference issued by MOEF&CC	
	He strongly objects to the operation of the mine, No EC to be granted to the mine.		
	He stated that he stays 1 km away from the mining lease area.		
	He stated that the houses in the villages are one and half kilometre away from the mine, water bodies are located within the lease area, however it is not shown in the EIA report. EIA report is false and fabricated.		
	He stated that the earlier mining activities have impacted our full village.		
4	**Bhimakar H. Pal, r/o Bordem, Bicholim**	The speaker has made generalised statement which cannot be ascertained. He has requested the government authorities for inspection. Agriculture development is one of the key aspect of companies CSR. The company will engage with the farmers and with help of state agriculture dept will help the interested farmers to cultivate their fields. A minimum buffer of 50 m. would be maintained towards all the habitations which are located inside the mineral block. Budget will be provided as part of CER towards agriculture development in the surrounding areas.	
	He stated that he is from Bordem. He is a farmer.		
	His parents were also farmers. He stated the land which is inherited from ancestors is destroyed. Governments Subsidies and funds are provided for farmers. Bordem village is a land of farmers.		
	He requested to conduct a joint survey to see how the land is destroyed.		The budget towards erosion control

Sensitivity: Internal (C3)

	Tractors cannot be used in the fields as the fields are filled with water.		measures, monsoon preparedness on mines and water treatment: 232 Lakhs
	He stated that he does not get to see the farmers and cannot see the fields.		
	He stated that there is a Devasthan but it is also submerged in water.		
	He requested the officials to visit the site and see the problems faced by the villagers of Bordem.		
	He stated that as he can see the photo of his father, but he cannot see him in the same way, he can see his fields in Form I and XIV and not his land.		
	He stated that he cannot do any agricultural activity because of mining.		
5	**Naresh Naik**	A 50m buffer will be maintained from the habitation. The land use of study area is provided in Chapter 3 of EIA. All the necessary environment protective measures would be adopted to safeguard the water bodies from surrounding villages. The speaker (Nagesh Naik) was employee of erst while mine owner i.e., Sesa Mining Corporation limited (SMCL) and was retrenched by SMCL company. The project proponent has provided opportunity to join the work force for all such retrenched employees and many of the employees took benefit of the opportunity and joined the company. State government has auctioned the mine as fresh mineral block and Vedanta ltd is selected as preferred bidder. Total 716 no of employment opportunities would be generated and preference will be given to locals.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs
	He is a resident of Kelbaiwada Mayem.		
	He stated that in ward no.1 and ward no.2 that there are several lakes, Kulagars, springs, water bodies, ponds which are not mentioned in the EIA Report.		
	There are many ponds in the village which are destroyed due to mining, He stated that he was an employee of Sesa and Vedanta and he has proof of it, but he has been retrenched.		
	He sought to know how the company retrenched him when it is still in operation.		

Sensitivity: Internal (C3)

6	**Prashant Dhargalkar** He states that he is supporting mining. He states that Divkar village is totally dependent on the mining company, our all fate is dependent on mining. He states that because we don't have any other source of income. He states that if I am unemployed, how will I take care of my children, their studies and their needs, etc. He further state that Sesa Company has promised many things, it is we people should be united and get it done	Thank you for the support.	
7	**Pritibha Dhargalkar** She states that she lives in Bicholim. She states that since 2012 mining is shut/ closed. Many people suffered, due to unemployment and shortage of money, etc. She states that since we don't have income, we cannot put our children for higher studies. So, I am totally supporting the mining wants mining activities to resume as soon as possible and youngsters should get employment	Thank you for the support.	
8	**Shrikant Dhargalkar**	Thank you for the support.	

Sensitivity: Internal (C3)

	He states that He is resident of Lamgao, Bicholim.		
	He requested to start the Bicholim block.		
	So, he is totally supporting the mining		
9	**Sanjay Parab**	Thank you for the support., Preference will be given to locals for employment	
	He stated that he fully supports the mining activities. He requests the mining company to provide employment to all the nearby villagers.		
10	**Shailesh Navelkar**	Thank you for the support.	
	He stated that he fully supports the mining activities as all the people in the villages will get employment.		
11	**Sanjay Mandrekar , R/o Lamgaon**	Thank you for the support.	
	He stated that he supports the mining activities.		
	He stated that he is stays right next to the mine lease area and that there are no bad effects of the mine to the water bodies or residential houses.		
	He stated that if the mines start there will be a lot of employment opportunities in the villages as trucks drivers, canteen facilities etc will get employment.		
	He stated that around 1000 people are dependent on mining activities.		
	He requests to start the mine and give employment to all.		
12	**Kustulo Pal**		

Sensitivity: Internal (C3)

	He states that he strongly objects to the operations of the mine. He stated that from 2003 a lot of mud has come into his field and destroyed the field	The company will have detailed environmental management plan in place. and will take all the necessary measures to prevent flow of silt outside the mine. The details of EMP are provided in Chapter 10. Company as part of its CSR activities conducts lot of agriculture development programme in association with Agriculture department and any farmer who is interested in cultivating his filed will be provided support by the company. Budget for the same will be provided in CER. We would also like to highlight that the person is a retrenched worker by earlier mine owner.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs
13	**Kamlesh Teli Ex Councillor Bicholim** He states that he strongly supports the operations of the mine. He stated that employment opportunities will be generated, and the truck owners will be benefited	Thank you for the support.	
14	**Anand Naik** He stated that he is happy for the commencement of mining. He has requested that mining should be started. He states that if mining has to start some criteria has to be followed. In Karnataka the mines are 25 to 30 km away from the residential area. Mining has to start as it provides employment opportunities He states that he strongly supports to the operations of the **mine.**	Thank you for the support., Preference will be given to locals for employment. A buffer of 50m will be maintained from habitations. Necessary environment protective measures will be adopted during mining operations.	Budget towards environment management plan: 693 lakhs

Sensitivity: Internal (C3)

	He stated that he was working in the mine and is unemployed now. Hence mining has to start.		
	But he states if the mining starts no temple, no water bodies, no villages should be destroyed.		
	· He stated that that not only the other people but the people living in the area near the mining lease have to be given employment.		
	· He requests the company that if the employers were taken out of the company, they should hold talks with the ex-workers and come to a solution and take them back in the company as employees.		
	· He stated that the company has to start 100% but nothing should be destroyed or affected by the mining operation.		
15	**Sandeep Gaokar- not present**		
16	**Shailesh Gaonkar**	Thank you for the support.	
	· He is a resident of Bicholim.		
	· He stated that there is a mine around his house.		
	· He sought to know whether pollution is caused due to mining industry only?		

Sensitivity: Internal (C3)

	· He stated that that mining company has been taking all the precautions to curb pollution.		
	· He sought to know whether any survey is conducted to know how many people are dependent on mining.		
	· He stated that mining is required in Goa. He supports the project.		
17	**Milind Bharve**	Thank you for the support.	
	· He supports the project.		
	· He requested to grant the EC as soon as possible.		
	· For the last 10-12 years the people dependent on mining are waiting for it to be started.		
	· He stated that if there are any small issues, they can be sought it up.		
	· People can sit together and support mining and solve the problem.		
	· He stated that the State of Goa should be sustainable where ore is available within the State than why it should be imported.		
	· He stated that there will be social benefits due to the mining.		
	· He stated that the EC should be granted to the project proponent.		
18	**Sadashiv Falkar**	Thank you for the support.	
	· He is a resident of Pilgao.		
	· He supports the project.		

Sensitivity: Internal (C3)

	· He requested to grant EC to the project.		
19	**Franco Sequeira**	Thank you for the support.	
	· He requested for sustainable mining by proper discussion as it will provide employment to the youth. He supported the project.		
20	**Sudan Govekar, r/o Lamgaon, councillor**	Thank you for the support, 50m buffer would be maintained from habitation.	Budget towards environment management plan : 693 lakhs
	· He states that he strongly supports the operations of the mine activities as soon as possible.		
	· He states that there are 200 truck owners, garage, shop which were depending on mining operation which have been stopped now. However, he requests to save the temples, village boundaries and water bodies and start the operation.		
	· He thanks the CM for taking a led in the start of mine		
21	**Shailendra Natekar**	Thank you for the support.	
	· He is a resident of Bicholim.		
	· He supports the project.		
	· He requested to grant EC to the project.		
	· He stated that the workers, villagers and the Government should come together and solve the issues.		
22	**Dinesh Divekar**	Thank you for the support.	
	· Mining should start as soon as possible		
	· Mining is shut for 10 years		

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	· Favour of mining as thousand lost their jobs · Mining is backbone of small state like Goa · It is required for development		
23	**Manuel Fernandes Bicholim** · He states that he and his family are fully dependent on the mine, and he supports the operations of the mine activities.	Thank you for the support.	
24	**Pradeep Revodkar Mulgao** · He states that He strongly objects to the operation of the mine. · He states that last 50 years he has seen the people cultivating the fields the Mining operations have destroyed the fields, temples, houses and the water bodies and other plantations in the nearby villages. · He strongly opposes the grant of EC. · He states that this is dictatorship and not democracy.	All the Necessary environment protective measures will be adopted during mining operations as detailed in Chapter 10. A buffer of minimum 50m will be maintained from the habitation and the fields, houses, temples, water bodies within the habitation will be protected.	The budget for environment management plan is 693 lakhs
25	**Kashinath Shivram Parab** · He is a resident of Barazan Wado Bicholim. · He stated that his house is located near the mining pit. · He stated that cracks are developed for his house. · His stated that his company was informed about this for the past 12 years.	There is no drilling and blasting involved in the project. Also, a buffer of 50m would be maintained from the habitation. A proper stake holder engagement and grievance redressal mechanism would be followed in case of any stake holders facing issues due to mining. It is understood that the speaker is in discussion with the erst while company (SMCL)for compensation and till then the monthly house rent is paid by the earlier mining company to him.	

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	· He stated that he is going to the company to get compensation.		
	· He stated that the company asked him to submit the Form I & XIV. He stated that he has spent Rs. 50,000/ towards his mutation.		
	· He stated that the slab of his house is leaking.		
	· He requested to company to give a plot whether the company stated that they have taken the loan on that plot, but we will give you compensation however till date no compensation is paid, i have been given the flat in rental bases. I have remained the company to give the payment.		
	· He requested the company to give him tarpaulin, but the company did not give him tarpaulin. He stated that the company gives lots, but they don't get anything.		
	· He requested the Collector, GSPCB to solve the problems of other workers.		
	· He stated that he wants the company to restart only after these problems are resolved.		
	· He stated that his application may be considered.		

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	· He had asked for the plot however the company stated that they have taken loan in that plot. Hence the company can't give the plot, but the company stated that they will give compensation even after 13 months no compensation is paid.		
	· He stated that he had asked for simple tarpaulin, but the company didn't give the same.		
	· He stated that the company gave him a rental flat and every time he had to remind the company to pay his rent.		
26	**Nikhil Jan Naik**		
	· Mining will affect natural water bodies/ springs /lakes	Necessary environment protective measures will be implemented to safeguard the surrounding areas. A buffer zone of 50 m will be maintained along the habitation. The EIA also addresses the measures taken w.r.t Assnora river. The EIA also comprises of detailed hydrogeology report based on CGWA guidelines which concludes that there won't be any adverse impact of mining on surrounding ground water regime. The water bodies/springs /lakes in surrounding areas will not be affected.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs

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	· Will invite disease-cardiovascular/health issues	Proper dust control measures will be implemented during the operations of mine. The employees will be provided with necessary PPE's. The details of various air pollution control measures are provided in chapter 10 of EIA. Company will provide budget for health-related facilities in surrounding villages as part of CER. It will maintain medical records of all the people visiting the facility. health camps also will be conducted in the villages.	The budget towards Environment Monitoring, Air pollution control measures and PPE's: 423 Lakhs
	· Farms are destroyed by silting	The speaker is making generalised statement. The impacts associated with mining are discussed in Chapter 4. All the necessary safeguards will be followed while carrying out the mining operations.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs
	· Trees which require 10 to 15 years to grow shall be destroyed in 5 mins		
	· Possible chances of landslide		
	· No geographical study is done by the authorities	Details of land use of the study area is provided in Chapter 3 of EIA.	
	· Buddhist caves, etc like worship places shall be affected.	The places of worship like Buddhist caves in Lamgao and other temples within the habitation won't be affected due to mining operations.	
27	**Premnath Hoble**	Preference will be provided to locals w.r.t employment, around 716 no of direct employment opportunities will be available. Habitation/ places of worships etc inside and outside the mineral block will be protected a buffer of 50m will be maintained towards the same. Noise levels will be maintained within the norm's details of Noise level management and control are provided in Chapter 10. Impact on wildlife and measures proposed to prevent any negative impact on wild animals are discussed in EIA. The speaker is referring to retrenchment of the workers executed by earlier mine owner i.e., SMCL. Vedanta Ltd has not retrenched any	
	· He is a resident of Bicholim.		
	· He stated that there are around 1500-2000 locals.		
	· Around 40-50 workers are employed out of which some are locals, and some are outsiders.		
	· He stated that he wanted the security of his village and not mining.		
	· He stated that there are Buddhist caves in Bicholim.		

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	· He stated that the village should be protected.	employee moreover all the retrenched employees were provided opportunity to join the company's work force.	
	· Villagers were not taken into consideration.		
	· Lamgaon is the lease. Plan has to be there.		
	· Lamgao village can be developed through tourisms and through mines.		
	· He stated that who has God faith face problem here.		
	· He stated that if you operate after 10 the animals will come to the village and eat the dogs. There is money but it brings tension.		
	· The area is histories, should we destroy it? We should make it tourist and no mining.		
	· He further stated that his brother is working now he is removed.		
	Village is destroyed.		
28	**Ganesh Govekar – Not present**		
29	**Vasant Gad**	All the procedure stipulated in the EIA notification is followed. EIA as well as executive summary (Konkani and English) of the EIA was submitted to all the surrounding village panchayats. The habitation within the mineral block at Mulgao and Lamgao will be protected and a buffer of 50m will be maintained towards habitation. Various environment protective measures will be carried out during the mining	The budget for environment management plan is 693 lakhs
	· He is the resident of Mulgao.		
	· He stated that people are affected and facing problems.		
	· There is limit of their patience.		
	· He stated that Government should consider everything before given EC.		

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	· When Mulgao Village Panchayat received EIA report in Panchayat, it was kept on table. Sarpanch, Panch did not know anything.	operations to prevent any negative impact on the habitation, the details of the measures are provided in Chapter 10 of EIA. The water bodies referred by speaker within the mineral block in Mulgao are settling ponds which were constructed by the erst while mining company and was regularly maintained by them. The same will be maintained in future also. The land use details of surrounding villages are provided in Chapter 3. The earlier mine owner i.e. SMCL retrenched the workers, however the project proponent provided opportunity to all the retrenched workers to join the company's work force and many of the retrenched workers who wanted jobs took opportunity of the offer. Locals will be given first preference for employment.	
	· If public did not know about it and then how they will place their grievances. 223 houses, 13 temple, Panchayat building, 2 schools,		
	lakes, ponds in Mulgao are not shown in EIA		
	· Our village will be destroyed.		
	· We have written to GSPCB. 30% of area of Mulgao is coming within lease. In my tenure 3 times mining collapsed and Sesa has not given mining support. People were injured.		
	· Surface right is not given. The mine should be restored back to original. No water in Kulaghar.		
	· If still it goes again in the same way, I am sure the villagers are not supporting mining.		
	· Workers are not taken for jobs. All the workers are from Dempo Mining Corporation.		
	· Supreme Court Petition was filed; workers went door to door support.		
	· If Mulgao Villagers problems are not solved, remove from lease. If we are not satisfied no EC to be granted.		

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30	**Pandurang Parab** · Requested GPSCB to restore the earlier damage area by the Sesa Goa and then only grant the EC.	The allegations on Sesa Goa are false. The project proponent Vedanta Ltd will ensure all the necessary environment protective measures during mining operations. Details are provided in Chapter 10 of EIA and Budget for the EMP is also provided.	The budget for environment management plan is 693 lakhs
31	**Bhau Gad – Not present**		
32	**Gajanan Gaonkar –** · He states that he is a resident of Lamgao. · Mining has affected fields/forests · Dust pollution is caused. · Unwanted trees are planted · Springs are destroyed · Fields in the area are affected and no royalty given. They come as and when they want. · Rs. 250 to Rs. 300 is given as compensation which is insufficient · Survey should be made of springs/ lakes. · By sitting in ACs cabins won't give the exact picture. · Ignorant about fields and livelihood · For 5 years Sesa never turned up, 6th year came and said adopting the village · No company is ready to give in writing about the give and take terms	The impacts associated with mining operations are discussed in Chapter 4. Necessary environment protective measures will be carried out during mining operations to prevent air, water, noise pollution. Budget for the EMP is provided in the EIA. Only native plant species (mix of horticulture and forest species (It will be used for plantation in consultation with state forest and agriculture department. Water bodies in the surrounding villages will be protected. The speaker has made general comments. During the course of mining operations, in case of complaints regarding silting of fields, damage to crop due to company operations, the company will take support of state agriculture department or qualified agriculture valuer to determine the damages caused and compensation will be paid accordingly. The company will also scientifically desilt or reclaim the area scientifically.	The budget for environment management plan is 693 lakhs

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	· All said verbally and hence goes unfulfilled		
	· Children of the employees go unemployed after their end in service		
33	**Prashant Shirodkar**	Thank you for the support.	
	· He is a resident of Mayem.		
	· He supports the project.		
	· He stated that the mine has been operating for the past 50 years.		
	· He stated that the workers are 40-50 years old.		
	· He stated that decision should be taken considering both sides.		
	· He stated that the workers are jobless.		
	· Further he stated that nobody will support when you are in need.		
	· That the company has given 50% during the past 12 years.		
	· Whereas other companies have taken out people from their jobs.		
34	**Ramkrishna Kundaikar – Mulgao**	As part of CSR activities, company carry out agriculture development programmes within its buffer zone. Budget for the same will be provided in CER.	
	· He states that he used to sell brown rice but now because of the mine there is a loss of revenue.		The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs

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	· He states that the walls have been collapsed but they have not done anything about it nor have they repaired the same and given.		
	· He states that their ancestors used to live on farming and plantation as there was revenue generated from the same.		
35	**Satyavan Chodankar**	As part of CSR activities, company carry out agriculture development programmes within its buffer zone. The company will engage with the villagers and verify the issue w.r.t retaining wall. In case the request is genuine, the repair work will be executed. It is also understood that the earlier mine owner had desilted the entire affected area in Mulgao in the past however the farmers didn't show any interest in cultivating the same.	
	· He states that he is a resident of Mulgao village.		
	· He states that his 20000sq m area was under cultivation and due to mining he is not able to cultivate the same.		
	· He is having a farmhouse in Sy. no. 70/1, his retaining was near his house has collapsed 16 yrs ago 2 times which hasn't been repaired till date.		
	· The company is a liar as they had said they would build a wall of concrete, but nothing has been done till date.		
	· The farmhouse area is 4000sq m in which betel nut plantation and coconut plantation has been destroyed.		The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs
	· 156 m compound wall has been collapsed.		
	· The trenches are not repaired.		
	· 17000sqm paddy field has been destroyed.		

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	· Once upon a time he was selling rice for Rs.10 per kg and now the same rice he has to buy Rs.70 per kg. · His house is in the lease area. · When the mine collapsed in 2016, 565 pepper plantations were destroyed. · The company didn't compensate for the same. · He fully opposes for the same.		
36	**Prakash Popkar** · Resident of Lamgaon. Entire village is destroyed. · First do survey and then give lease · I am not opposing mining but because of mining everything will be destroyed · Big machines are being bought by Vedanta · Our village is a agricultural Village · 90% of the Village is farming · First do desilting of farms so that we can cultivate the farm. · Lakes are destroyed, name of lake is also removed by the company · 1984 first revolt was done, and I was sent to jail · I request you to do survey first and then give lease	The speaker is asking government to survey the habitation and then issue lease. It is to note that the mine was in operation since several decades and state government has auctioned the same lease area as a fresh mineral block. The area of the mine remains the same and the habitation at Lamgao and Mulgao was always part of the mines. Necessary environment protective measures will be carried out during mining operations. a safety buffer of 50m would be maintained towards the habitation. A budget for agriculture development is provided as part of CER, any farmer group who is interested in cultivation can contact the company for the same.	The budget for environment management plan is 693 lakhs

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37	**Vithal Parab – Not present**		
38	**Gajanand Mandrekar** · He is the Deputy Sarpanch of Mulgao. · He stated that when the company was operated by Dempo, villagers had no issue, Vedanta has created lot of issues. · He opposes mining activity by the company.	The speaker has not raised any specific issues and falsely alleged that Vedanta has created issues. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism.	
39	**Madhukar Halarnkar** · He Strongly opposes the mine operations. · He states that all the points have been discussed. · He thinks that the company has done a One man show as they have submitted an EIA report without taking the villagers, local people and the farmers and the other committee members into account and have done the demarcation. · He states that the company is a liar as they promised that they will come for discussion in front of a joint meeting with the people of the area, however they didn't turn up for the said meeting of the said day.	The EIA document is prepared by Mineral Engineering Services (accredited by QCI-NABET) and based on the Terms of reference issued by MOEF&CC. The officials of company had a meeting with the Village Panchayat members who are elected representatives of the community. Regarding the joint meeting, company had communicated to the concerned in advance their inability to attend the said meeting.	
40	**Gopal Parab** · He Strongly opposes the mine operations and requests not to grant EC clearance to the mine.	Necessary environment protective measures will be carried out during mining operations. Water bodies in the surrounding villages will be protected. Preference will be given to locals w.r.t employment. The EIA also comprises of	

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	· He states that the mining has destroyed the fields and the plantation and the water bodies and the villages in the area.	detailed hydrogeology report based on CGWA guidelines which concludes that there will not be any adverse impact of mining on surrounding ground water regime. Company will provide support to farmers in case they are interested cultivate their fields. Pit water will be pumped and channelised to the horticulture gardens in Mulgao village.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs
	· He states that there is o employment, no land left for cultivation after the mine came into existence.		
	· First there were big fields but now there is no water for the fields and the water table is destroyed completely.		
	· When the mines collapsed the bodies were washed into his fields.		
	· He states that that the company is a liar, and he says everything is done systematically but nothing is done at all.		
41	**Devidas Govenkar – Not present**		
42	**Ganpat Parab**	Thank you for the support.	
	· He supports the mining project.		
43	**Shaikh Nisar**	Preference will be given to locals w.r.t employment. Said Idgah is within lease area and 200m buffer zone will be maintained. The Idgah is maintained by archaeological department. A thick green belt is proposed as a buffer between the mine pit and Idgah.	
	· One issue pertains to workers of the company.		
	· Company had 10-12 years to ensure that the fields in Mulgao Village are cultivated.		
	· He stated that Muslim community in Bicholim i.e. young generation are not given job opportunities by the company.		
	· Idgah at Gaunkarwada has not been supported by the company.		

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	· Company should help poor people of the area. · No financial support is given to the Muslim Wada.		
44	**Nilesh Gosavi** · He states that he strongly supports the operations of the mine activities as soon as possible as he states that the mine has generated a lot of employment.	Thank you for the support.	
45	**Swayam Kamat** · He is a resident of Mayem · Farmers presented their grievances · 12 000 sq. meters field is owned by him, inherited from his father, but now he cannot ask his sons to step down into the fields as they are thickly layered with mud soil. · 600 farmers are registered, and he is representing them, and they are affected by this mining. · He said for consultation purpose we are charged by the government, and we have to pay consultation fee. · He says matter is pending in court and on the other hand this project is considered. · Mayem people are fond of Parboiled rice (Uokde Rice) but in the circumstances	It is understood that Mayem farmers had approached court and as per court directions the earlier mining companies have paid compensation to the farmers. There is no negative impact on agriculture envisaged in Mayem w.r.t the current project.	

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	it seems to be not possible for getting the seeds		
	· Green Field Project is only in pictures, but colour is brown.		
	· If we want to eat Parboiled rice (Uokde Rice), we should give strength to farmers.		
	· He asked to make the farmers strong and then to look into the project.		
46	**Tushar Falari**	Thank you for the support.	
	· He states that he strongly supports the operations of the mine activities and requests to start it as soon as possible as he states that the mine has generated a lot of employment.		
	· He states it will provide employment to the truck owners.		
	· There are skilled youth which are waiting for the mines to start as they are unemployed and need employment in the field of mining related area.		
	· When the mining stopped all the students who studied mining related work had to go out of the state inspite of being qualified.		
	· He requests for starting of the mine.		
47	**Krishna Gadekar**	Necessary environment protective measures will be carried out during mining operations to prevent flow of silt outside the mine area. The EIA also comprises of detailed	The budget towards erosion control measures, monsoon
	· He is the President of All India Kissan Sabha Mayem.		

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	· He stated that a large number of people from Mayem depend on agriculture. · He stated that there are four major water bodies in Mayem. All four water bodies are filled with silt on account of mining activities by the company. · He stated that water shortages for agriculture is caused due to this. · ZAO report is submitted that fields in Mayem are damaged due to mining silt. · Company has dragged more than 600 farmers to the Court. · The effect of granting a 50 year lease to the company on local farmers is not being considered by the Authority. · He stated that the Company does not have a rehabilitation plan. · Further, he stated that continuous mining operation will cause huge water shortages. · He strongly opposes grant of EC to the company.	hydrogeology report which concludes that there won't be any significant impact on ground water in surrounding areas because of the project. As understood, the 600 farmers were paid compensation by the earlier mine owners as per the court order. There is no population to be displaced because of mine hence the rehabilitation plan is not applicable.	preparedness on mines and water treatment: 232 Lakhs
48	**Chandrashekar Palni** · I am supporting the Block 1 project and he further stated that mines should start as fast as possible. · The Trucks should be restarted and given back work.	Thank you for the support. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism.	

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	· The Difficulties of every household should be solved.		
49	**Rutvik Sanjay Mandrekar**	Thank you for the support.	
	He stated that the mining has stopped in 2012.		
	He stated that 2.5% mining operational in Goa.		
	He stated that royalty loss to the Government.		
	He stated that he supports the mining.		
	He stated that the lease owner/ mining truck owner/ worker are given jobs through mining,		
	The truck owners are supported by the mining company.		
	The truck owners have not given any compensation during tenure of 2012 till date.		
	He stated that there are profit and losses in the business and start mining in sustainable manner.		
50	**Narayan Kharade**		
	EIA report seems to be more of Advertisement /Publication.	The EIA document is prepared by Mineral Engineering Services (accredited by QCI-NABET) and based on the Terms of reference issued by MOEF&CC	
	It was informed consent / objective is defied in a EIA, However it is misinformed that Consent has been provided.		
	He refused to call EIA it is more like Advertisement.		

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	He referred to Office Memorandum MOEF of dated 29th October 2014 , which is related to Impact of Mining Activity on Habitations- Issues related to mining project wherein Habitations and Villages are the part of mine lease areas or Habitations and Villages are surrounded by the mine lease area- Regarding, he further requested authorities for the same.	Necessary environment protective measures will be carried out during mining operations as given in EMP of EIA to prevent air, water, noise pollution. Minimum buffer of 50 meters will be maintained from Habitation. No drilling and Blasting will be carried out as stated in EIA	The budget towards Environment Monitoring / Air pollution control measures : 408 Lakhs The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	He found that this Green Field Project is just smeared with new face.	The mine is a fresh grant through auction regime by state govt for which LOI is issued to Vedanta Ltd. As per the MoEF&CC minutes of meeting, in case of LOI grant it is termed as green field.	
	If the company does not have re- habitation and resettlement plan than project proponent does not have right to present before public.	There is no population to be displaced because of mine hence the rehabilitation plan is not applicable.	
	He blamed new media for making false propagating.		
	The productivity of agriculture is affected as certified by agriculture admits compensation has to be given then it moves to collector but in the end nothing happen.		
	he pointed out the company as videshi (foreign) it not a swadeshi, the Sesa head office is located in London so we cannot call them as swadeshi company.	These are false statements, Vedanta ltd is an Indian company.	

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	As CSR activities by companies including the Mining Establishments has become mandatory up to 20% of their financial turn- over, Socio Economic Development of the neighbourhood . Habitats could also be planned and executed by the PPs more systematically based on the Need based door to door survey by established Social Institutes / workers on the lines as required under TOR. " 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.	Socio economic studies have been carried out within scope of TOR. Annual CSR spend of Vedanta Limited is more than 2% (mandatory requirement as per CSR rule) in the previous financial years. There is no displacement involved due to mining therefore the rehabilitation plan is not applicable.	
	2500 Zambia workers represented in UK Court, which judged it as illegal.	Not related to the project	
	He further submitted that he will submit the written submission.		
51	**Sanjay Gaonkar – Not present**		
52	**Rajesh Vaigankar**	Thank you for the support.	
	Mining should be started as fast as possible		
53	**Pandu Kundaikar – Not present**		
54	**Sandesh Palni – Not present**		
55	**Uday Saraf**	Thank you for the support.	
	He states that he strongly supports the operations of the mine activities and requests to start it as soon as possible as he		

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	states that the mine has generated a lot of employment.		
56	**Sitaram Walawalkar**	Thank you for the support.	
	· I am in support of giving EC to this project since we had participated in lot of morcha strike etc to start of this mining in past, so I am confident people will support and Ec will be granted to this project		
57	**Udesh Mandrekar**	Thank you for the support.	
	· He expressed grief about a child wanting to study further and states it is not possible as father is mining affected.		
	· The child in future falls in bad company due to mining bandh.		
58	**Nitesh Parab Gaonkar – Not present**		
59	**Sanjay Pawaskar**	Thank you for the support., Company will engage with the local communities as part of its CSR, stakeholder management and grievance redressal mechanism.	
	· He states that he strongly supports the operations of the mine activities and requests to start it as soon as possible as he states that the mine has generated a lot of employment.		
	He states it will provide employment to the truck owners .		
	· He states Discussion has to be held on the problems faced by the people.		
60	**Prajal Gaonkar – Not present**		
61	**Vishwas Thanekar**	Thank you for the support.	

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	· Many people are depended on mining because of this I am in support of this project.		
62	**Dinesh Naik** · He is a resident of Sankhalim · He starts that mining should be resumed.	Thank you for the support.	
63	**Ajay Anant Gaonkar He supports the mine.** He demands modernisation of education, give employment, legal agreements are required to be made between him and the company	Thank you for the support. Education is one of the important focus areas of development under company's CSR and required support would be provided to local schools for its upgradation. Preference will be given to locals in employment	
64	**Chandra Gaonkar** · I have fully support for the mining Block 1 Bicholim project. · He further requested to start project as earlier as possible.	Thank you for the support.	
65	**Ramchandra Popkar** · He is a resident of Lamgao. · He states that he is in favour of mining.	Thank you for the support.	
66	**Rajesh Parab – Not present**		
67	**Sandip Sinari – Not present**		
68	**Amit Naik** He is a resident of Sirsaim. He states that mining dependents for past 23 years. He is in support for mining. He states that he was paid by the Company during its non- operation.	Thank you for the support.	

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	He requested that mine should be kept in operation.		
69	**Milind T. Pal– Not present**		
70	**Santosh Devari**	Thank you for the support.	
	· He supports the mining project .		
	· He stated that sustainable mining should be carried out in everybody's interest.		
71	**Vaibhav Fadte**	Thank you for the support. Necessary environment protective measures will be carried out during mining operations. As part of its CSR approach and Stakeholders management, stakeholders will be regularly engaged, and grievance redressal mechanism will be followed to address local concerns if any.	
	· He states that he strongly supports the operations of the mine activities and requests to start it as soon as possible as he states that the mine has generated a lot of employment.		
	· He states that the problems faced by the people have to be solved and a sustainable mining has to be done.		
	· A lot of people depend on mining and had taken loans previously and when the mining stopped they faced a lot of problems hence he requests to start the mining operations .		
	· He states to protect the temples, houses and the fields of the villages and solve all the problems they face.		The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
72	**Vithal Gawas**	Thank you for the support.	

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	· I am supporting Block 1 Bicholim · In 2012 mining was closed for past 10 years we are representing the Government to start Mining. · The efforts which we put to start the mining now got result. · Many people say that sustainable mining, he raised the question what is sustainable mining? I feel sustainable mining means all peoples grievances should company resolved by the company. · So I am fully support to the project.		
73	**Sandeep Sinari – Not present**		
74	**Umesh Kadam** - Honda · He states that he strongly supports the operations of the mine activities and requests to start the operation as soon as possible as it will provide employment for the people as the people faced a lot of problems when the mining activities were stopped.	Thank you for the support.	
75	**Lawrence Braganza** · I am fully support of mining activity at Block 1 Bicholim · Today we have got one step to start mining by way of Public Hearing. · But I am of opinion that company should look into people's grievances and resolve by the same.	Thank you for the support.	

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	· Many people is of opinion that Vedanta company is giving false assures but I am disagreeing with the same.		
	· All grievances should go to our company owner Mr.Amit Agrawal he will definitely help us, since during the covid time he supplied with oxygen, he supported education fields.		
76	**Babal Shetgaonkar**	Thank you for the support.	
	· He stated that he is in full support of the mine.		
77	**Kashinath Mayenkar**	Thank you for the support.	
	· From 2012 Mining was stopped , for 11 years everything was in dark		
	· I am the truck owner and we had seen very difficult time.		
	· So I fully support Block 1 Bicholim Project		
78	**Bala Khan Goni**	Thank you for the support. Preference will be given to locals in employment	
	He states that he strongly supports the operations of the mine activities and requests to start the operation as soon as possible as it will provide employment for the people.		
	He represents the Muslim wada and he request to provide employment opportunities to the people of the community as only one person is provided with employment for the time being.		

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	He request to construct a way which is the biggest problem faced by the community.		
	He states that he worked for Sesa and dempo but he states that when Sesa took over there was a huge turnover and the employees were benefitted by the same. however, when dempo was operating the mine no benefits were given to the employees.		
79	**Sanjay Naik**	Thank you for the support.	
	· Company has never had any of its employees.		
	· He is support of the mining company		
80	**Pramod Sawant**	Thank you for the support.	
	· He states that he strongly supports the operations of the mine activities.		
81	**Shivdas Gawade**	Thank you for the support.	
	I fullysupport Block 1 Bicholim Project, since there is lot of employment issue in the village & EC should be granted.		
	Many problems are faced by us due to closure of mining activities, like many graduate's engineer are unemployed and I feel they should get jobs.		
82	**Sameer Kurdikar**	Thank you for the support.	
	He stated that for the upliftment of village, restoration of employment and to get freed from debts.		
	He supports mining.		

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83	**Rajaram Gaonkar -** Representative Bicholim Municipal Council	Thank you for the support. Preference will be given to locals in employment as well as in truck business	
	He states that he strongly supports the operations of the mine activities.		
	He was a truck member and had taken a loan and faced problems regarding the repayment of the same due to the closure of the mines.		
	He requests the management to solve the worker problems and to provides business to the truck owners.		
	He states that he has some issues, but he has given a written representation regarding the same which may be considered.		
	He requests that a sustainable mining shall be done.		
84	**Sandesh Sinari – Not present**		
85	**Sameer Teli – Mayem Bicholim**	Thank you for the support.	
	He states that he strongly supports the operations of the mine activities.		
	He requests to start the operation as soon as possible as it will provide employment for the people as the people faced a lot of problems when the mining activities were stopped.		
	There are skilled youth which are waiting for the mines to start as they are		

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	unemployed and need employment in the field of mining related area.		
	When the mining stopped all the students who studied mining related work had to go out of the state in spite of being qualified.		
	He request for starting of the mine.		
86	**Subhash Kinalkar**	Thank you for the support.	
	I am representing Bicholim Truck Owner as an Association Secretary we have seen many people spoken their grievances but no one has spoken about us. That is effected truck owners who has suffered due to the closure activity of the mining.		
	No company has supported us or given any compensation during the closure of the mining activity, it is Manohar Bhai Parrikar who had brought Umbrella Scheme for effected truck owners, 138 cases running in the court against truck owners but no one has taken note of the same.		
	Many times our children ask to complete their wishes but we can not full fill the same because we are in huge loans. Therefore if mines starts we will be very grateful.		
	Now sustainable mining if Hon'ble Supreme Court wants to start why this peoples are opposing for the same .		

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	I asked GSPCB to have communication with the Government to relax tax levied on them.		
87	**Azad Kadkade** He is a resident of Bicholim He stated that he has seen mining from childhood. He stated that the development in the village is solely due to mining. He clarified that the person who claimed that company did not give place has also paid house rent for 10 long years.	Thank you for the support.	
88	**Samir Teli– Not present**		
89	**Premanand Gaonkar – Not present**		
90	**Vishwajit Chari – Not present**		
91	**Laximan Gaonkar – Not present**		
92	**Ladu Mardolkar – Not present**		
93	**Devanand Parab – Not present**		
94	**Paresh Ghadi – Not present**		
95	**Sujay Parrikar** He supports the mining operation but he states that the youth have done diploma in mine engineering hence he request to provide employment for the people.	Thank you for the support. Preference will be given to locals in employment	
96	**Siddhesh Naik – Not present**		
97	**Sudhir Kamat – Not present**		
98	**Vaman Gawas – Not present**		
99	**Riaz Anwar Baig – Not present**		

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100	**Kashinath Mhato – Not present**		
101	**Sanjay Sawant – Not present**		
102	**Tulsidas Chodankar**	Thank you for the support. Agriculture development is one of the important focus areas of CSR by the company. Based on the needs of the farmers will carry out necessary programmes for crop cultivation. Preference will be given to locals in employment	
	He is a resident of Mayem.		
	He stated that Mayem is a picturesque village. It has lots of orchards and farming activities during mining the farmers undergo lots of difficulties.		
	If ever compensation is sought it has to be only through strikes.		
	Most of the people are directly dependent on mining.		
	The residents should be given first preference with regards to employment.		
	Requisite compensation and other facilities are to be given on time.		
	Mining should be resumed but it should not bring disgrace to the village.		
	He supports mining.		
103	**Dilip Shet – Not present**		
104	**Vasudev Gaonkar – Not present**		
105	**Manohar S. Naik – Not present**		
106	**Rajan Naik – Not present**		
107	**Atmaram Tilve- Bicholim**	Thank you for the support.	
	He states that he strongly supports the operations of the mine activities and requests to start the operation as soon as possible as it will provide employment for		

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	the people as the people faced a lot of problems when the mining activities were stopped.		
108	**Mahesh Mhambre – Not present**		
109	**Surekha Suresh Navelkar**	The Block I Bicholim mineral block does not fall in Pilgao village. The company will engage with the farmers in the surrounding areas and support Agriculture development through CER and through government support.	
	She states that she is a resident of Pilgao.		
	She states that she has an agricultural land in the proposed mining area.		
	She further states that our agricultural land we want for the future, so she strongly opposes the project		
110	**Krupali Kashinath Parab r/o Barazan wada.**	There is no drilling and blasting involved in the project. Also, a buffer of 50m would be maintained from the habitation. A proper stake holder engagement and grievance redressal mechanism would be followed in case of any stake holders facing issues due to mining. It is understood that the speaker's family is in talks with the earlier mine owner to settle their claims till then the earlier mine owner is paying their monthly house rent.	
	She states that her house walls got cracks 12 years ago due to mining.		
	She states that she was promised a plot of 300 Sq meters and 120 Sq mtrs house.		
	She states that she was later promised by Mr. Patil and Mr. Joshi that she will be provided with alternate land.		
	She states that they showed her 2 plots at Borda. She states that there was an agreement done w.r.t that land.		
	She states that later Mr. Joseph Coelho came and said that the land is under the loan and we cannot allot the land.		
	So, Mr. Coelho showed another place at Dhab-Dhaba (waterfall).		

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	She states that they made false promises for 13 years.		
	She further states that she approached Municipality and met Shri. Santosh Mandrekar and told him her grievances.		
	She further states that she approached Honorable Shri. Chandrakant Shetye, the local MLA.		
	The MLA later called the company and asked them about the situation regarding land allotment.		
	She states that they informed the MLA that it will happen.		
	She further met Honorable Chief Minister and discussed about her grievances.		
	She sates that they had made all fake promises that they had sanctioned money but when went to ask, they just ignored us		
	Hence, I strongly oppose the project		
	In 2014 an agreement was done by Mahesh Patil and Upendra Joshi to give my husband Kashinath Parab 300 mts land and 120 mts house in it.		
	And also made and agreement of exchange of deed.		
111	**Neena B. Salelkar**	Thank you for expressing support for mining. All the necessary measures will be carried out to prevent dust pollution. The details of the same are mentioned in chapter	
	She States that she is depended on mining.		
	She wants a mining with proper measures.		

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	she states that her house is just near the plant and near the mining dump.	10 of EIA document. A 50m buffer will be maintained from the habitation. All the retrenched workers of earlier mining company were offered employment, and many of the workers took benefit of the offer and joined the work force of the project proponent.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs
	She states that we are losing our agricultural land due to mining activities.		
	She states that she is facing the dust every second.		The budget towards Environment Monitoring / Air pollution control measures: 408 Lakhs
	She states that there are many people employed and many are unemployed in our locality.		
	He states that one of them is her husband, who went on strike for starting of the mines activities.		
	The Government should give us justice		
112	**Mohini , Pilgao sarpanch**	The speaker is making false allegations on Vedanta ltd. The company operations will not damage the fields, temples and other areas within habitation. Pilgao village doesn't form part of Mineral block. A ll the retrenched workers of earlier mining company were offered employment, and many of the workers took benefit of the offer and joined the work force of the project proponent.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs
	She stated that the Vedanta company is a liar.		
	She stated because of the mining company there are disputes between workers and family members and I request to all to give us justice.		
	She stated the villages, fields the temples are destroyed in other areas and i don't want the same in my village hence I strongly object to the operation o f the operation of the mine.		

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113	**Sunaina Halarnkar – r/o Pilgao**	Necessary environment protective measures will be adopted during mining and transportation activities. The proposed measures are listed in chapter 10 of EIA.EIA document is prepared in line with TOR given by MOEF&CC	
	She Objects to the operation of the mine		
	She states that the environment is effected due to the operation of the mine		The budget towards Environment Monitoring / Air pollution control measures : 408 Lakhs
	There is dust problems , due to transportation and dumping of the Ore		
	She states that the water bodies are destroyed		The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	She states that a proper survey has to be done with village committee and the final report has to be shown to the village committee		
114	**Priya Dinesh Morajkar**	Thank you for the support.	
	She states that she fully supports the mining activities and requests to start the mines activities as soon as possible.		
115	**Manasi M. Khautankar – Not present**		
116	**Sushma S. Sutar**	Thank you for the support.	
	Resident of Dhabdaba.		
	She stated that she supports for mining.		
117	**Ashwita S. Mandrekar – Not present**		
118	**Anil Salelkar**	The person is referring Leopard as the Tiger. Chapter 3 of EIA mentions presence of schedule I species which includes	
	He states that he is from Pilgaom.		

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	He states that few days back that a Tiger entered the village eat dogs in the Mulgao Village as the Tigers don't have a place to stay in the forest area.	Leopard. A detailed wildlife management plan is also prepared and submitted to forest department. All the necessary measures will be carried out to prevent dust pollution as referred in EMP chapter 10 of EIA. The person is not part of monitoring team and the allegations made regarding incorrect monitoring are false and baseless. As part of company's Stakeholders management program, stakeholders will be regularly engaged, and grievance redressal mechanism will be followed to address any local concerns.	
	If this situation remains the same they will start eating the humans.		
	He further requested all to come at the unloading point and see the dust on the houses, almost all the houses are covered with dust, there is no need of painting the houses in that area.		The budget towards Environment Monitoring / Air pollution control measures : 408 Lakhs
	He states that when he was deployed to operate pollution control machine .		
	He asked his senior as why all machines are placed in particular direction, on which his senior replied stating that we should not get the black paper		
	We strongly oppose this project till our all grievances like agricultural land and worker issue, etc are not resolved.		
119	**Mukund S. Prabhugaonkar – Not present**		
120	**Sudesh Vaigankar – Not present**		
121	**Adv. Ajay Prabhugaonkar**		
	He opposes the Project.		
	The mining was operational since 1941.		
	He stated that the mining was started for production of 1.2 to 3.0 million tons.		

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	He stated that the loading, screening, dumping activities damage the fields / national habitat.	All the necessary measures will be carried out to prevent pollution as referred in EMP chapter 10 of EIA. Sufficient buffer would be maintained from the habitation.	The budget towards Environment Monitoring / Air pollution control measures : 408 Lakhs The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	He is the resident of Pilgao Village.		
	He objects to the word Green field used in the EIA report and this project is destroying the Land, fields and other greenery.	The state govt has auctioned mine as a fresh lease and as per minutes of meeting of MoEF&CC in case LOI is issued it is termed as Green field.	
	He stated that the EIA report is bogus and faulty.	The allegation made regarding EIA is false and baseless. The EIA report is prepared as per the TOR issued by MoEF&CC. Detailed list of Flora and Fauna is mentioned in Chapter 3 of EIA.	
	The EIA report at page no. 148 shows only rats and rabbits. No details of other wildlife animals are mentioned.		
	EIA report is not based on ground reality.		
	He stated that recently employment was not given on skilled basis, it was given on compensation basis while doing retrenchment they removed everyone. We want a sustainable mining.	Locals will be given preference for jobs on mines based on the skill and educational qualifications.	

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	Future of Bicholim Taluka will be decided based on this public hearing. He opposes this public hearing.		
	He requested to scrap the EIA report. The EIA report has to be as per the actual.		
122	**Hanumant Salelkar**	Vedanta Ltd has been awarded the LOI. There is no lake within the working / mining area of the mineral block. There are some settling ponds constructed by the earlier mine owner which are referred by the locals as lake. All the necessary measures will be carried out to prevent pollution as referred in EMP chapter 10 of EIA.	
	· He is a resident of Barazan waddo, Bicholim.		
	· He stated that his ancestors land is destroyed by mine.		
	· He stated that plants spread an area of 2.5 kilometres has destroyed the environment. There was a lake within the mine which has been destroyed due to dumping.		The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
123	**Sakharam A. Pednekar**	The person has asked these questions to the government. As part of the EIA detailed biological assessment was conducted and the list of flora and fauna is listed in chapter 3, which is authenticated by the forest department. As a good practice the company will engage with the local biodiversity committees and take into account the local flora while preparing annual environment management plan when the mining operation starts.	
	· He States that he is a Chairman of Mayem Biodiversity Board and various other committees.		
	· We had placed all the grievances before Government		
	· Pior an inspection has to be carried out to check upon damage caused by mines and largely		
	· compensation cases are pending till date.		
	· Technically oppose the project		
	· We have carried out study and found.		

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	· There are 170 birds species.		
	· Questioned the authority, whether the mining companies have fulfilled the terms and condition of lease.		
	· The one who failed earlier cannot be re-considered for fresh lease. Such units, should be blacked listed		
	· Discussion to be conducted at village level, sustainable plan to be prepared.		
124	**Ramesh S. Gawas**		
	He questioned whether the consultants is present here for the Public Hearing.	The Consultant was present for the public hearing throughout the proceedings. The consultant went on the stage only when the collector invited him when he was required to provide the clarifications.	
	As per the EIA report they are supposed to remain present for the hearing or else there is no meaning for public hearing as they have to answer the issues raised in the public area.		
	Vedanta Goa was doing copper mining in Zambia, they were thrown out from there for doing illegal mining.	Allegations made against Vedanta are incorrect and further it is Not related to the project.	
	what is green field mining project may be explained,	The state govt has auctioned mine as a fresh lease and as per minutes of meeting of MoEF in case LOI is issued it is termed as Green field.	
	Vedanta is de-listed from London stock exchange.	Incorrect statement. The current project proponent is Vedanta Ltd which was never listed on London stock exchange. The other issues raised are also not related to the project. The Block I Bicholim mineral block was auctioned in terms of Supreme Court directions only.	
	SC passed judgment saying that they were carrying carry out illegal mining.		
	From 2011 -2012 100 Crores are due by Vedanta to the government.		

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	30 lakhs fine levied by SEBI illegal and misleading.		
	He challenged if anyone proves the water from pit is rain water or it is ground water.	The mine pit comprises of both rainwater which is channelised in to the mine pit as well as ground water. Applied for permission of Ground water withdrawal from Goa state water resources department.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	60 well water went dry as all the ground water is accumulated in the Sirigao pit.	Detailed hydrogeology study is carried out as per CGWA guidelines which is part of EIA report. The water accumulated in pit is not having any impact on surrounding wells.	
	Dr. Mohan Rao prepared siltation reports of mayem lake. As per the report the Mayem lakes is silted due to mining.	Details of Environment management plan is provided in chapter 10 to ensure that there is no water pollution caused to surrounding areas. Proper care will be taken for dump stabilisation as mentioned in the EIA report.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	1:8.39 ratio flooding of Bicholim River and 140 inches rain fall one can imagine how dangerous it will be.		
	No data given regarding tippers used to match with the production to verify its factuality.	Traffic density study is provided in chapter 4 of EIA.	
	Affected football ground.	This is not related to the project	
	Water Body in front of Shantadurga H/S, Surface study is not in EIA. It originates in the mining lease it meets River Bicholim carrying huge silt and emptying it in Mandovi River.	The same nalla flows and mixes with the Bicholim river and Upstream and downstream of the Bicholim river is collected.	
125	**Dilip D. Kudaskar– Not present**		
126	**Hanuman Gaonkar– Not present**		
127	**Ashok Karbe**	Thank you for the support.	

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	· I am resident of sirsai , and I am mining dependent, mines were closed since 2012 all workers have suffered .		
	· We made request to government to start mining activities and also made many representation to Government to know how mining is important to us.		
	· Supreme Court after 9 years passed judgement to start with sustainable mining, so we should welcome this decision.		
	· I am fully in support of mining project.		
	· In 2009 Sesa Goa has purchased this mine and they got hardly one year to run this mining activity, for 50 years back peoples complaints		
	/ grievances , we should not blame/ put the Sesa Goa/ Vedanta.		
128	**Ajay B. Gaonkar – not present**		
129	**Ujwala Uttam Shirodkar**	The anticipated impacts of the mining operations are dealt in chapter 4 of EIA and the necessary measures/EMP required for control of pollution are provided in EMP chapter 10 of EIA. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism. Mayem lake is not destroyed, in fact it is one of the tourist places and is in very good condition.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	· She is resident of Mayem.		
	· She stated that the fields are destroyed by the mining.		
	· She stated that her orchards land is destroyed.		
	· She further stated that the Mayem lake is destroyed due to mining.		
	· She requested fields and orchards lands should be restored.		

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	· She stated that mining should start by restoring the environment.		
130	**Ratan Pednekar**		
	· She is a resident of Mayem.		
	· She stated that money is not given to her for 5 to 7 years. The orchards, fields and water pond are destroyed.	The speaker is mentioning about some money matter pending with Mamlatdar. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism.	
	· She stated that her husband was working in Dempo.		
	· She requested to look into her money matter. She stated that Mamlatdar has not taken any action.		
131	**Kanchan Chodankar**	Thank you for support, as part of CSR activities, company will carry out agriculture development programmes within its buffer zone. Preference will be given to locals in employment.	
	She stated that if farmers believe in sustainable farming than proceed with mining		
	Mayem is affected at large as it is skipped w.r.t. distribution of fertilizer		
	Mining maybe restarted if unemployed youths should be given employment and also our agricultural problems are resolved		
132	**Pundalik Pal – not present**		
133	**Nasir Baig– not present**		
134	**Ganesh Gaonkar**	The allegation made regarding EIA is false and baseless. The EIA report is prepared as per the TOR issued by MoEF&CC. The state govt has auctioned mine as a fresh lease and as per minutes of meeting of MoEF&CC in case LOI is issued it is	
	Resident of Sirgao and is opposing the project		
	Representation are already given by him		

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	report given by mining company is false, pictures shown during presentation are false, no conditions are fulfilled. Data which is shown is manipulated by the mine owners in the report,	termed as Green field. The socio-economic survey was a sample survey wherein data from 25 villages was collected. A detailed study carried out with respect to impact of mine pit on Assonora river and same is annexed to the EIA report as annexure number III which concludes because of the elevation difference, existing environment protective measures inside the mine and the impervious lithology there is no flow of water between mine pit and the river. As per the mining plan backfilling of waste is proposed into the pit near the Assonora river. There are temples and other public utility infrastructure within the habitation however minimum 50m buffer will be maintained from the habitation. As part of CSR activities, company will carry out agriculture development programmes within its buffer zone. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism. Regarding the land rights, the mine has been auctioned as fresh lease and the property rights will be settled once the mining lease is executed.	
	Green field project which is declared is wrong		
	all five villages are destroyed namely Bicholim, mulgao, Lamgao, shirgao etc. requesting authority to practically come on site and do inspection before granting EC.		
	the company person should come to their village and tell from where they collected the data. I am the president of Devastan, no one approached me.		
	4 temples come within the vicinity of mining area. Mining people told that the retaining wall will be built by them and taps will be provided but nothing is done.		
	After 3 years gap we approached the mine company but they told that no funds are available. I have all the photographs of the collapsed retaining wall. One day the temple wall will come down due to the landslide.		
	One mining pit is there near the temple, 50 meters away from the river. No refilling is done in this pit. The depth of river is 3 to 4 meters. The dept of the pit is 25 meters.		

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	Because of this pit all agricultural fields are destroyed.		
	Yearly we harvest 2 types of crops. So, in order to harvest		
	2 types of crops the field should be not be dry, but come to april and may month water is there in field and everything is polluted.		The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	Company told they will pay.		
	Government told they will pay through DMF, but not done.		
	Area occupied by mining is not their land it is communidade land		
	Government asked to produce the land ownership documents, but they failed. The company should produce the Form I and XIV, Property is not theirs than they should not be granted lease.		
135	**Dinanant Gaonkar,**	The EIA report is prepared as per the TOR issued by MoEF&CC. The state govt has auctioned mine as a fresh lease and as per minutes of meeting of MoEF&CC in case LOI is issued it is termed as Green field. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism. The speaker also informed that the fields are restored by the mining company. It is also	
	He is a President of Tenant Association.		
	He stated that the EIA Report is prepared in an office and not by ground visits.		
	Project is specified as Greenfield in report which is false.		
	Villages have written to the Director of Mines and Geology to exclude Shirigao		

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	buildings, Panchayats etc from the mining lease, however the DMG has not replied.	understood that the earlier mining company used to provide access to the villagers to perform religious procession and same will be continued.	
	The road used for religious procession is destroyed by the Mining company.		
	Old survey record shows existence of road used for religious procession yet company denies its existence.		
	High Court directions to restore fields and only after the High Court Directions fields are restored. This was caused due to Mining company activities.		
	Issues are pending before Mamlatdars Courts.		
	When so many issues are pending, I oppose grant of EC and conduct of Mining operation.		
136	**Narendra Prabhugaonkar – not present**		
137	**Santosh Sawant – not present**		
138	**Devidas Prabhugaonkar – not present**		
139	**Anil Naik – not present**		
140	**Anand Gad, Advalpal**	The speaker is making false allegations on the company. The issues raised by the speaker are with respect to the mines in Advalpal village and not related to the existing project namely Block I Bicholim Mineral Block. The EIA report is prepared as per the TOR issued by MoEF&CC.	
	He states that his village is not in Block 1 and is in the other unit of Vedanta.		
	The mine was closed due to some accident and then it was restarted by the impact it caused.		
	He states that the Vedanta company is not fit to run the mine.		

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	He states that The company has changed so many names and they always lie to the villagers.		
	He states that he has 2 field and the company has put dumps in his field.		
	He questioned why should we not oppose because of some people who are dependents on the mine for their living.		
	There was mining silt which came from the mines and destroyed the nallahs & fields.		The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	There was alot of air pollutions when the mines were in previously in operation but the people were very happy when the mines stopped as the air and dust pollution had stopped.		The budget towards Environment Monitoring / Air pollution control measures : 408 Lakhs
	He states that the picture of the EIA report is all false and fabricated.		
	He states that He still is fighting the cases his ancestors have filed against the company for his land.		
141	**Laxmikant Gaonkar – not present**		
142	**Sharmila Volvoikar Panch member of pilgao**	There is no beneficiation plant (washing plant) proposed in the project and hence there will not be any generation of	

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	She states that she is not against mining but against the granting of EC to the lease for 2.00 MTPA.	tailings. The anticipated impacts of the mining operations are dealt in chapter 4 of EIA and the necessary measures/EMP required for control of pollution are provided in EMP chapter 10 of EIA. There are no chemicals used in mining as mentioned by the speaker. Preference will be given to locals in employment. Offer to join the workforce was provided to all the workers who were retrenched by the earlier mine owner. many of them took benefit of the offer and joined the company work force.	
	She states Dempo was allotted 1.3MTPA EC was granted for beneficiation plant to the mining company		
	A tailing pond was constructed but still waste enters in the agricultural fields causing destruction to the fields and other land.		The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	There is contamination of water and 60 Hectares of agricultural field was destroyed due to mining chemicals. If the capacity is increased more 1.3. siltation will increase in agriculture land and will destroy the fertile land.		
	She strongly objects for the mine.		
	The company needs to employ the 35 nos of employees which were removed.		
143	**Ibrahim Shaikh – not present**		
144	**Glen – not present**		
145	**Prakash Parab- Pilgao**	Thank you for the support.	
	He states that he strongly supports the operations of the mine activities as soon as possible as he states that the mine has generated a lot of employment.		
146	**Dr. Govind Parab – not present**	Thank you for the support.	

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147	**Raghuvir K. Karbotkar** He is a resident of Lamgao. His residence is located within 2 Km from the mining area. He stated that the destruction which has taken place should be rectified. He supports the sustainable mining.		
148	**Sebastiao A. Rodrigues** He sought clarification from the project proponent He observed that application for EIA was 16/03/2023 Baseline data collected project proponent stated baseline study carried out pre- monsoon which was locked down period of covid and such wrong dates are mentioned fresh baseline data has to be created fresh PH should be carried out The Project is referred as Green Field which is wrong He questioned so as to how Dempo Mining Corporation got changed to Sesa Mining Corporation, if so done all the prior liabilities should be transferred to the later company. He states that Bicholim is a flood prone area	The EIA report is prepared as per the TOR issued by MoEF&CC. The baseline study was conducted during March to May 2023 for preparation of this EIA. The state govt has auctioned mine as a fresh lease and as per minutes of meeting of MoEF&CC in case LOI is issued it is termed as Green field. All the necessary precautions will be carried out during monsoon to manage the storm water. Details are provided in Chapter 10 of EIA	The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs

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	He states that 2 scientific studies are done in bicholim river pollution by Rane and Matha of marine science department of goa. North goa disaster management Plan pertaining to mining lease of the project proponent.		
	The collector requested copies of these two studies. Both studies were shared on whats app no.9921876712.		
149	**Abhijeet Prabhudessai**	The speaker has made false statements. State government has auctioned the mine as fresh lease, Vedanta limited was declared as a preferred bidder and LOI is issued by the government. The consultant mineral engineering services was present throughout the PH, however he came on the stage only when the collector called him to clarify certain points. The distance between the Mineral Block and Dr. Salim Ali Wildlife Sanctuary is 10.553 Kms. The state govt has auctioned mine as a fresh lease and as per minutes of meeting of MoEF&CC in case LOI is issued it is termed as Green field. EIA does not mention desert in any of the chapters. Details of flora and fauna is provided in chapter 3. Details of environment settings are provided in chapter 2 wherein Asnora creek and mangroves are mentioned. The influence of creek water is also seen in the surface water quality in buffer zone mentioned in chapter 3.	
	He stated that it has been 80 years since lease is granted to this mine		
	He stated that the grievances put forth by farmers states that they are not benefited by mining.		
	He states that the situation of everyone ie. Farmers, Fisherman, workers etc is helpless.		
	He sought to know during the time the mines were not in operation why the loans of the workers were not forgiven if the government was really concerned.		
	He pointed out that the major violations in todays public hearing is that the Consultant is not present for the hearing. Hence there is no point in seeking clarification.		
	Dr. Mohan, representative of GSPCB, clarified that the consultant will be available to answer the concerns.		

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	He stated that Dr. Salim Ali Wildlife Sanctuary is within range of 10 Kms.		
	The report seems to be fraud		
	Fresh lease is clubbed within earlier 5 years and termed as Block-I.		
	He requested that the houses coming under the mining lease be skipped out.		
	He stated that in the name of Greenfield project, the people are deceived.		
	He stated that the EIA report falsely points out that area as desert and in future this will give the wrong notion that it was barren.		
	Before the commencement of mining, everything in the village should be recorded . if not, people will have to leave their homes.		
	Things are hidden in EIA. Back waters are to be covered in the EIA report.		
	He referred to Dr. Mohan Girap's report on Mayem Lake which clearly points out to the entry of Manganese ore.		
	He sought to know the future of the forth coming generation as they have more right on these mining areas.		
	He pointed out that 30% of the mining ore which belongs to future generation has been already extracted.		

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	He requested common man to be involved in the study.		
	He stated that there is no mention of flora /fauna and hydrological life in the EIA Report.		
	In view of above, he stated that the project has to be rejected.		
150	**Manoj Parab**	The speaker has made baseless and general remarks. The EIA report is prepared as per the TOR issued by MoEF&CC. The project is for mining of iron ore. Preference for employment will be given to the locals. Locals will be involved for the transportation of ore from mines to the jetty by using their 10.5 T capacity tipper trucks. The higher capacity trucks mentioned by the speaker are the company owned heavy earth moving machinery which will be used inside the mines. The state govt has auctioned mine as a fresh lease and as per minutes of meeting of MoEF&CC in case LOI is issued it is termed as Green field.	
	EIA report submitted is a false report and joke on Goans.		
	The EIA report contains a chapter on chemical analysis of ore. The report does not mention analysis of 35% of ore sample. This 35% will include heavy metals and rare elements.		
	The EIA report is being hidden from Goans.		
	Goa has gold in its ore and mud. This is not mentioned in the EIA report.		
	Dr. Nandakumar Kamat has done a research on this and submitted a paper on this to Chief Minister and Mining Minister.		
	Vedanta seeks to export this gold to China.		
	Research paper of Dr. kamat states that 6-8 kilo of one ton of ore will be gold.		
	EC states 3 MT of ore will be excavated from mines and as such 20- 24 thousand of kilos of gold amounting to 10,000 crores worth of gold will be excavated by the company.		

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	Why is Goa's gold sold to China and benefit not given to Goans.		
	Research papers of Dr. kamat regarding gold in Goan soil should be refered to.		
	He demands that a sample of ore should be analyse to prove evidence of gold.		
	He states that mining is required .		
	Government should made it compulsory for the mining company to give jobs for locals.		
	Company is using only 20 ton trucks, Volvo trucks. Locals do not have these trucks. Transport contracts will not be given to locals.		
	Government is dividing locals for and against mining.		
	He states that he has worked at a mining company of Vedanta at Codli and it has done huge frauds.		
	He states that 10,000 crores to be earned by the company should be informed to the Goans, but illegal mining is not wanted.		
	Huge loss is being caused to the state due to loss of royalty on gold as ore being excavated.		
	5 villages in mining lease area have unemployed youths. Human resource mapping is not done by the company in the EIA reports.		

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	Details of jobs to be given to locals is not done. In Mopa, locals have been cheated of jobs by the locals.		
	In an LAQ government has stated that mining company will only		
	give preference to Goans in jobs in mining companies. It is not a compulsion.		
	EIA report does not have a social impact study. He states that company has wrongly submitted that the project is Greenfield. It should have been verified before conducting the hearing.		
	He states that the EIA report should be redone and environment and locals of Goa should be saved.		
151	**Jayesh Walawalkar - not present**		
152	**Pandu Pilgoankar**	Thank you for the support.	
	He supports the mining company		
153	**Nilesh Karbotkar - not present**		
154	**Kishor Ishwar Lokre**	The state govt has auctioned mine as a fresh lease and as per minutes of meeting of MoEF&CC in case LOI is issued it is termed as Green field. The EIA report is prepared as per the TOR issued by MoEF&CC.	
	He stated that the Government has removed notification that it is a Green Field Project .		
	He stated that mining is operating from 1941 this is not a green project. And should be taken back.		
	The EIA report is false. The agency has not come on the site and the 3 seasons are not taken into account while preparing the EIA		

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	report peoples problems are not taken into account the authorities have considered this false report and conducted this public Hearing .		
	If now there are problems for the villages then after 50 years what will be the situation.		
	He requested the collector to tell the MoEF that the EIA the report itself is false . he stated that he was working in the mine once.		
	He states that it is not a green project and he strongly objects to the operation of the mine. Fresh EIA report has to be prepared after considering 3 seasons data.		
	It is not green project and prepare EIA report is false.		
155	. **Manohar Shirodkar R/o Lamgao**	State government has freshly auctioned the mine as new mine, Vedanta limited was declared as a preferred bidder and LOI is issued by the government. A buffer of 50m will be maintained from habitations. EIA report is prepared as per the TOR issued by MoEF&CC. The Buddhist caves are located in the habitation within the mineral block in Lamgao village. These caves are not notified monuments and hence were not specifically mentioned in the draft EIA. However, the same will be included in the final EIA. As mentioned above, a buffer of 50m will be maintained from habitations and the distance from the ultimate pit limit and the caves is around 300m. Preference will be provided to	
	The Mining had started from the time of the Portuguese and going on for last 60 years.		
	There are good and bad effects of the mining unit.		
	· It has reached the residential area and still why more 50 years are given to the mine, Unit to excavate the area.		
	· The company if given 30 years of excavation then the mine will reach the field are the humble request to the GSPCB		

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	that before issuing the EC, carry out site visit and survey along with the mining dept, local villagers, committee, GSPCB.	locals w.r.t employment. Necessary environment protective measures will be adopted during mining operations. Company carries out CSR activities in the buffer zone of its area of operations. The focus would be on agriculture, healthcare, education, alternative livelihood, sports, women empowerment.	
	· He stated that the EIA report is false.		
	· He states that the picture shown is one sided that CSR activities will be taken up by the company but will they executes their promise and who will monitor the issues.		
	· He stated that There are Buddhist caves and tourists spot are shown the mining area and this issue has to be taken.		
	· We are not against the mining operation but has to be done in sustainable manner.		
	· The Union workers were having problems with the company.		
	· The temples, the tourist spots and the Buddhist caves are shown in the mining area, the same will be destroyed if the mines are given to operate		The budget for environment management plan is 693 lakhs
	· We want mining but not at the cost of destruction of our houses, water bodies, fields etc.		
	· The CM can solve all our problems if he takes the issue personally.		
156	**Vinayak Samant - not present**		
157	**Arun Naik**	EIA report is prepared as per the TOR issued by MoEF&CC. The anticipated impacts of the mining operations are dealt in	The budget for environment
	· Resident of Lamgaon.		

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	· He stated that the mine has been existing for a long period. · He stated that the previous experiences showed that environment are effected due to mining. The report submitted by the Project Proponent is one sided. · He requested for a detailed survey to be conducted along with the villagers and also by taking in account of previous experiences. · He stated that mining company has never given justice. · They have never fulfilled their promises. · Mining lease should be given for 30 years , he sought to know why this mining project was granted 50 years of lease. · He sought to know whether this lease is revocable, if not the clause should be added in the lease. · He sought to know whether the report are done considering the period when the mine was in operation or for the last 12 years.	chapter 4 of EIA and the necessary measures/EMP required for control of pollution are provided in EMP chapter 10 of EIA. Baseline study is for the period of March to May 2023.	management plan is 693 lakhs
158	**Navin Jan Naik** He is a resident of Lamgaon. He stated that he oppose the project.	A buffer of minimum 50m will be maintained from habitations. The anticipated impacts of the mining operations are dealt in	The budget for environment

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	· He stated that the area marked for mining is below 500 meters.	Chapter 4 of EIA and the necessary measures/EMP required for control of pollution are provided in EMP Chapter 10 of EIA. EIA report is prepared as per the TOR issued by MoEF&CC.	management plan is 693 lakhs.
	· He stated that area which is marked is close to Lamgao and can cause damage to Environment, health safety of locals.		
	· He stated that the mine has an adverse effect on health and our fields.		
	· He stated that the EIA is one-sided mining has destroyed ecosystem.		
159	**Gajanan Karbotkar**	Thank you for the support.	
	· He is a resident of Mayem.		
	· He stated that he is in full support of this project.		
	· He requested the Goa State Pollution Control Board to grant the Environmental Clearance.		
160	**Sagun Gad**	Thank you for the support.	
	· He requested to start the Mining block.		
	· So he is totally supporting the mining activity to start.		
161	**Mansi Kauthankar**	All the steps prescribed in the EIA notification with respect to public consultation are followed. The EIA and executive summary of the report was submitted to all the surrounding Panchayats and Municipal Councils. A buffer of minimum 50m will be maintained from habitations. The mines management had meeting with the panchayat members who are the elected representatives of the community.	
	· She is a Panch member of Mulgao.		
	· She stated that she opposes the project.		
	· She stated that the EIA is given to Village Panchayat.		
	· She stated that the report is not explained to the people.		

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	· Temples, fields which will be destroyed should be checked.		
	· The company was called for a joint meeting in the Panchayat but they sought for police protection.		
	· She stated that the people questioned them during the gram sabha .		
	· She stated that the government should think about the welfare of the people.		
	· She stated that the job is required, food is required but not of the cost of their lives.		
162	**Anil Nagvenkar**	Thank you for the support.	
	· He states that he is from Bicholim.		
	· He states that he is very grateful to Chief Minister and MLA for starting of mining activity.		
163	**Ajay Shetkar**	Thank you for the support.	
	· He states that he is a resident of Mayem Village.		
	· He states that his main grief is about unemployment, if mining is started than our main problem will be resolved.		
164	**Suresh Kudaskar-Not Present**		
165	**Vivek Kudaskar**	Thank you for the support.	
	He is a resident of Mayem.		
	He supports the project.		
	He requested to grant EC to the project .		
166	**Mohan Parab**	Thank you for the support.	

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	He states that he requests the Government to start the company as soon as possible. He strongly supports the project.		
167	**Satish Sutar** · He states that he strongly supports to the operations of the mine. · He stated that employment opportunities will be generated and the truck owners will be benefited.	Thank you for the support.	
168	**Govind Ghatwal** · He states that he is a resident of Shirgao. · He supports the company.	Thank you for the support.	
169	**Shankar Rawale** · He states that he strongly supports the operations of the mine as soon as possible.	Thank you for the support.	
170	**Swapnesh Sheldekar** He states that he is placing objection on granting of EC to M/s Vedanta Ltd for starting of Block I Bicholim Mineral Block, He is a resident of Mulgao Village and the Chairman of Biodiversity from his Village. He states that the EIA report is prepared without consultation or taking local knowledge of the people into consideration. He states that no one has approached their village to collect the baseline data.	EIA report is prepared as per the TOR issued by MoEF&CC. baseline study was conducted during March to May 2023, details are provided in the Chapter 3. Prominent and famous temple like Lairai Devi temple, notified archaeological monuments like Namujgah are mentioned in the EIA. There are several other religious places of worships within the habitation located in mineral block, minimum buffer of 50m will be maintained. The speaker has made false allegations w.r.t the EIA report.	

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	He states that the data collected is inaccurate, unreliable.		
	He states that no authority is aware of any person visiting the village for collection of the data.		
	Data collected from buffer zone .		
	The data provided in the EIA report is nor accurate and appears to be fabricated.		
	False data is given in the report .		
	Temples, caves. Lakes etc does not find mentioned in the EIA report.		
	Entire study to be redone after taking into consideration biodiversity committees and local bodies and then conduct public hearing.		
171	**Vinod Naik - Pirna**	Thank you for the support.	
	· He states that he strongly supports the operations of the mine as soon as possible.		
172	**Shrikant Karbotkar**	Thank you for the support.	
	He states that he strongly supports the operations of the mine activities.		
	He requests to start a sustainable mine without hurting the sentiments of the villagers.		
173	**Prashant Kinalkar - Mayem**	Thank you for the support.	
	He states that he strongly supports the operations of the mine activities.		
	He states that he has his vehicles in the area. ‘		

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	He request company should take into the confidence all the truck owners and other people who they used to provide benefits monetary and others into confident and start the mining operation as soon as possible.		
174	**Prakash Naik – not present**		
175	**Navnath Jannaik** · He is the resident of Lamgao · Production of supari has decreased due to mining . · the cost of fertilizers is more than the input they get from the produce	Agriculture development is one of the key aspects of company's CSR. The company will engage with the farmers and with help of state agriculture dept will help the interested farmers in crop development	
176	**Sumit Talawnekar - Mayem** He states that he strongly supports the operations of the mine activities as soon as possible. · He states that he is a Truck owner and his land is next to the mine lease area. · He states that he is unemployment and no one came to his aid when the mines were shut down.	Thank you for the support.	
177	**Khemlo Sawant – Not Present**		
178	**Pravir Prabhakar Fadte** He states that he has inwarded Goa Foundations' application in Collector office yesterday on 10-08-2023.	EIA report is prepared as per the TOR issued by MoEF&CC. it is true that this particular mineral block was earlier operated by Sesa mining Corporation ltd (formerly known as Dempo mining corporation Ltd). Pursuant to Supreme Court	

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	The necessary environmental information and data which are required to be produced in response to the TOR are missing from the draft EIA document. The suppression of necessary information has been achieved by claiming that the Mining Block is a "Greenfield project" . Such a characterization of what is clearly accepted. The Mining Block has been operated from inception as a series of five leases (TC 11- 15/1941) neighbouring each other in a straight line, and thereafter, amalgamated lease is the relabelled "I-Bicholim" and has the same boundaries.	judgement in Goa Foundation 2 dated 07.02.2018, all the mining leases granted by the state government were cancelled. Thereafter, State Government in terms of the said order and as per the provisions of MMDR Act put this block for auction as a fresh lease/ grant. Vedanta Ltd was selected as the preferred bidder in the said auction for Block I Bicholim mineral block and accordingly LOI was issued to Vedanta Ltd. As per the MoEF&CC EAC minutes of meeting, in case of LOI grant it is classified as green field and hence in the EIA it has been mentioned as green field. There is no hiding of facts as alleged by the speaker/ goa foundation, as the earlier pits can be seen in the surface plan which is provided as plate no 5 of EIA.	
	These 5 leases before and after amalgamation have been in operation since 1941, and have been operated by a variety of actors, including Dempo Mining Corporation and Sesa Mining Corporation Ltd. SMC is a wholly owned subsidiary of Vedanta Ltd., which is now assigned this mineral block. The production data of the 5 leases, from 1941 to 2012, is available in public domain. The leases were also operated between 2015 and 2018 by SMC /Vedanta. In normal and legal terminology, such a mine site could never been cauterised as a Greenfield project for the purpose of obtaining Environmental Clearance.	The EIA also comprises of detailed hydrogeology report based on CGWA guidelines which concludes that there won't be any adverse impact of mining on surrounding ground water regime.	

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	The important thing to emphasis here is that the wilful characterisation of the project site as a “Greenfield” project has been relied upon to withhold data and the past record of this project proponent (PP) required to be made part of the draft EIA and to the public. This includes the environmental data collected since the lease started operation in 1941 as well as studies by academics and entities like NEERI, which data and information must be used to understand past impacts so as to foresee future impacts.	As per our information, the erstwhile leaseholders have complied with all recommendations prescribed by NEERI in PIL no 1/2008. According to the official records, the three erstwhile leaseholders namely Chowgule and Company Private Limited, Rajaram Bandekar Mines Private Limited and Sesa Mining Corporation Limited have submitted an amount of Rs. 65,00,000 with the High Court. Desilting work is being carried out by Water Resource Department.	
	There are people who have their own grievances and hence has to be give sufficient time to place their grievances and requested to adjourn the public hearing as EIA report has suppressed basic data . It series of 5 leases which are amalgamated to single number		
	The investigation report of assessment of depletion of ground water sources and land degradation in Sirgao Village ,and mitigation Measures by National Environmental Engineering Research institute under Council of Scientific & Industrial , Nagpur dated 16/06/2008 in PIL No. 1/2008 was submitted to the Hon. High Court of Bombay at Goa in which it clearly shows the worst condition of natural water		

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	sources and other issues are mentioned in it. Why this report was not included in the draft EIA. Copy of the report is submitted to Goa State Pollution Control Board.		
	He requested the Collector to personally visit the mining lease areas and do the surveys of the critical conditions of the people living there and requested to re-schedule the Public Hearing.		
179	**Narayan Sawant - not present**		
180	**Hanumant Malik - not present**		
181	**Vallabh Parab - not present**		
182	**Vinod Mandrekar**	State government has freshly auctioned the mine as new mine and Vedanta ltd is selected as preferred bidder. As mentioned in the EIA the project will generate employment opportunities to 716 locals and preference will be given to the locals. A buffer of minimum 50 m. will be maintained towards habitation. There are primary schools (at Gaonkarwada (not in use) and Manasbag) in Mulgao village within the Mineral block. A buffer of 120m will be maintained from the Manasbag habitation and will be updated in the EIA report. Necessary protective measures to be taken are mentioned in EMP which also includes drainage details. There is no planned activity in the unused area.	
	He States that he strongly opposes the mine lease		
	He States that he wants to seek clarification from the Project proponent.		
	He questions how many people are employed from the core mining belt.		
	He States that the most important thing is roti kapda and makan.		
	He States that if roti is provided but their homes are taken		
	He requests the GSPCB to excluded the houses and demarcate the area.		

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	He wants clarification whether the GSPCB, have visited all the villages.		
	He States that there are govt primary schools in Manasgao Mulgao which is not mention in the report.		
	He States that he visited the school today and the same is operational but the GSPCB nor Project Proponent has visited the school.		
	He States that the mining lease boundary in my village mulgao, there is no drainage system which has to be taken into account.		The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	He States that he wants a detailed report what activities are proposed in the unused area as the same are not mentioned by the Project Proponent.		
183	**Kalidas Kavlekar**	The speaker has made false allegations. EIA report is prepared as per the TOR issued by MoEF&CC. Land use plan given as an annexure covers all the water bodies in 10km buffer zone including Mayem lake. Important archaeological sites are mentioned in EIA for ex. Namujgah which is located within the mineral block. The presence of habitation within mineral block (in Lamgao and Mulgao Village) is clearly specified in the EIA report. Necessary environment protective measures will be adopted during mining operations and the same is covered in Chapter 10 of EIA. Representatives from mining company	
	He is from Mayem Village. The EIA report is erroneous, It is not known as to who and when survey is conducted.		
	Several complaints against the mining go unattended. Likewise many cases are pending before Mamlatdar which are unsolved.		
	There are 167 water bodies mayem lake not shown on the EIA report.		

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	Heritage sites are omitted. He requested that proper survey be conducted and then processed EC.	and the EIA consultant were present for the PH. the Consultant also clarified the points raised on request of Collector.	
	Ancestors houses not shown or mentioned .		
	Latambarcem / Mayem details not given.		
	If mines can give justice to everyone than they can definitely proceed with lease mining project.		
	No representative present from mine.		
	Lots of dust pollution due to mines which is creating air pollution in the area.		The budget towards Environment Monitoring / Air pollution control measures : 408 Lakhs
	GSPCB should take everyone into confidence and the same presentation should be presented before the villagers.		
184	**Rohan Shirodkar**	The EIA report along with executive summary was submitted to all surrounding Village Panchayats office for further awareness. The presence of habitation within mineral block (in Lamgao and Mulgao Village) is clearly specified in the EIA report and a minimum buffer of 50m will be maintained from the habitation. The notified archaeological monument within the mineral block is listed in the EIA. EIA report is prepared as per the TOR issued by MoEF&CC. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism for any concerns.	
	He strongly objects to the operation of the mine.		
	He states that the EIA report has not reached him.		
	The presentation given states that there are 200 houses which are illegally demarcated.		
	There are archaeological protected sites which are there in the lease area.		

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	He states that no local person or farmers were taken into consideration while preparing the EIA report.		
	Our houses temples, villages have to be taken into account before commencing the mining operations.		
	Previously only few were given employment because their houses were effected . And now there are taken out of employment. Their problems have to be solved first.		
	Their he requests the company to solve their problems first.		
185	**Bhagwant Gaonkar**	Thank you for the support.	
	He is a resident of Mayem.		
	He stated that his house is within 3 kms.		
	He supports the mine.		
186	**Trupti Gad**	The anticipated impacts of the mining operations are dealt in chapter 4 of EIA and the necessary measures/EMP required for control of pollution are provided in EMP chapter 10 of EIA. A minimum buffer of 50m will be maintained from the habitation. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism.	The budget towards Environment Monitoring / Air pollution control measures : 408 Lakhs The budget towards erosion control measures, monsoon preparedness on
	There are different committees in our villages and all the committees had come together and a draft ahd been put up with all the problems faced by the villages of the area.		
	She states that the temples, houses, fields are in the lease area.		
	She states that 2 times the mine had collapsed and they had to face a lot of problems.		

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	She requests to first solve the problems of the villagers affected by the mining operations and then start the mine.		mines and water treatment : 232 Lakhs
187	**Ranjana Chodankar**	The speaker has made general statements like requesting to cut big trees in her area, cleaning the area. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism. Preference will be given to locals for employment. All the retrenched employees of earlier mine owner were offered job and many of them have taken advantage of this opportunity. Company also runs a technical institute (ITI) in Sanquelim village which caters to skill development of local youth and making them employable.	
	She states that there are big trees which have been grown in our area and which have to be cut down and the area has to be cleaned.		
	She states that the area has to be cleaned as there are crocodiles there.		
	She states that no employment is given to our children .		
	She states that mining has destroyed everything.		
	She requested the company to first solve the problems of the people and then start the mining activities.		

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Clarifications provided by the consultant during the Public Hearing on 11th August 2023

Sr No	NAME & COMMENTS	RRESPONSE	BUDGET
1	**Shri. Swapnesh Sheldekar**		
	He sought to know the exact duration for which the baseline data was collected by the consultant for incorporating in the EIA report.	The baseline data initially collected in the year Oct, Nov, Dec 2020, since the data validity was nearing expiry on Sep 2023, the baseline data was again collected from March to May 2023.	
	How is it that the consultant representatives have not been seen or identified by the local villagers during the exercise of collection of baseline data in the village of Mulgao as claimed to be carried out by the Consultant.	It is a sample survey, and the sampling team has collected the baseline data.	
	Does the Consultant posses photograph of the Leopard clicked during the process of data collection?	It is clearly mentioned in the Draft EIA report that the information of presence of Leopard was provided by locals i.e. secondary data. The detailed List of Flora and Fauna is provided in Chapter 3	
	There was no mention of forest in Mulgao Village in EIA report , how is this possible when across the boundary of village of Mayem is shown to have forest in the EIA report and also how can this be possible when there are two temples located in the village of Mulgao dedicated to the Goddess of Forest (Dhaktivan Devi and Vodlivan Devi).	The is no forest land within the Mineral Block and the same is confirmed by the state govt.	
	The EIA report does not mention the presence of large number of water bodies and temples in the Village of Mulgao. How is this possible?	Only major temples like Lairai Devi temple are mentioned in EIA. However, there are several such temples in the habitation for which a buffer of 50 m from the habitation is mentioned. There are no natural water bodies within the mineral block. As per the information there are settling ponds which were developed or constructed by erst while	

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		mining company. These ponds were maintained, desilted by the earlier mining company and the same system will be followed. Flow of water to the Mulgao horticulture area will be ensured as was done by earlier mine owner.		
	The existence of archaeological site that is 2500 year old Buddhist caves at Lamgao are not been mentioned in the EIA report. How is this possible? The Project Proponent is requested to include this in the report	The Lamgao caves are not a notified monument, however the same will be incorporated in final EIA. It is within the habitation of Lamgao and a sufficient safety buffer will be maintained.		
	Project proponent was questioned as to how the consultant being qualified has classified this project as a Greenfield project knowing fully that it is a Brownfield project	The mine is a fresh grant through auction regime by state govt for which LOI is issued to Vedanta Ltd. As per the MoEF&CC minutes of meeting, in case of LOI grant it is classified as green field.		
	With reference to table 2.3 at page no. 15 of 600 of the EIA report, Consultant was requested to clarify as to the feasibility of the figure of 17.05 of Free Feasibility Mineral Resource which requires washing as the mine does not have facility for washing.	Clarified that it is not a proved reserve and will have to undertake further exploration to prove the same.		
	Based on the reserves as stated at Table 2.3 at page 15 of 600 of the EIA report can the Project Proponent windup operations in 10 years?	NO		
	With reference to a corrigendum dated 06/06/2023 issued by the DMG putting a gap of 40 trips per hour on the road on the company, the Company will not be able to transport more than 1 million tons per annum. The Project Proponent was requested to clarify.	The above referred notification is for auction ore only.		
2	**Shri. Ramesh Gauns**			

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	According to EIA the Consultant visited 68 places out of which 58 are the villages having Gram Panchayats. And the Gram Panchayat maintains biodiversity register based on the Biodiversity Act. Whether the consultants approached gram Panchayts to go through the register to find out the Biodiversity of the Village.	NO		
	They studied the surface water but did not study the surface water of the water body flowing infront of Shantadurga School and which emerges from within the mining lease carries lot of silt then meets the River Bicholim and empties into Mandovi River. It is a pollution of water body is concealed.	The same nalla flows and mixes with the Bicholim river and Upstream and downstream of the Bicholim is collected.		
	The water in the pits according to EIA report is stated that pit water is rain water. But when the study is carried out the main period of summer in the month of March, April and May, the pits are full of water in the month of May. The colour of the water clearly states that it is ground water and not rain water.	The rainwater is channelised in to the mine pits and as per the hydrogeological survey there exists bands of impervious layer comprising of Phyllite and clay and hence there is no ground water seepage. However the project proponent will take approval form Water resources Dept for pumping of the rain water/ ground water accumulated in the mine pit.		
	He sought to know whether the wells have been studied from Mulgoa, Mayem, Bicholim, Lamgao, as wells are the indicators of ground water and they should have checked the levels of well water in the month of May not to give any scope to the company that the drying of wells is not because of them. The study would have provided a substantial evidence against the Company to refute on the perennial fresh water in the wells.	All villages mentioned above is covered.		

Sensitivity: Internal (C3)

	Mayem lake is used for surface water study but the 2 springs have gone completely dry because of the pit which has gone deep at Dhabdabha resulting in the depletion of water level of these 2 lakes goes low in the month of May.	There is no connection between the mine pit and Mayem lake. A detailed hydrogeology study is provided as part of EIA.		
	Then there are lakes in Malgao and Mulgao. Among these there are 6 lakes are in Mulgao and 7 lakes in Lamgao according to the RTI sought from the Mamlatdar of Bicholim on 01/07/2009. The total area of all these lakes comes to more than 27,000 sq. mtr which is nearly 3 hector of the land. All these lakes are totally silted which once upon a time feed the agriculture in Mulgao, bittlenut plantation in Mulgao so also in Lamgao. All these lakes find no place in the EIA report. One of the lake in Lamgoa belong to Government having 3375 sq. mtr. This fact is defeated by the company instead they claim it to be their tailing pond. The same lake was used for Ganesh immersion and now no immersion takes place in the tailing ponds.	All the water bodies within the buffer zone are covered under Land use pattern under chapter 3 of EIA		
	A number of tipper/trucks is missing in EIA which would have helped to calculate actually the ore is transported and thereby can be matched up with the production as given in the EIA report.	Covered under Chapter 4 pg No.129		

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	He asked for the gradient of the mining area as the top most point of this area is 169 meter plus a huge waste generated to a tune of 1:8.39 tons based on the annual production of 3 million tons the waste generated will be 2, 51,70,000. Therefore, the gradient is very high to ration. The gradient to was very much important because no mechanism can stop a huge silt moving out of the mining lease when entering into River Bicholim which is connected to the mining lease precisely to the lake which is sy. No. 25/1. The steam is as of now heavily silted used for fishing purpose in the town it self. Everything is wiped off.	The gradient of Dumps is provided in the EIA report. The EIA also contains the environment protective measures which will be carried out for dump stabilisation.		
3	**Shri. Vinod Mandrekar**			
	There is a Government Primay school located at Manasbhag Mulgao which is operational as on 10/08/2023. This school is located within the mining lease/core are of the proposed project. However, this school is not mentioned any where in the EIA report. The Consultant is requested to clarify this point.	We will reconfirm regarding this additional school in Mulgao, Manaswada and functionality of Govt Primary school shall be included. However, a sufficient buffer zone will be maintained towards habitation.		
	In the EIA report there is a mention of unused area (refer Map on page 262 of the detailed EIA report). Consultant is requested to clarify as to the meaning of the term unused area. Further, consultant is specifically requested to clarify as to whether unused area in the EIA that includes the residential areas in the unused area.. If not the Consultant	The residential area is included in unused area as per existing available exploration data. 50 meters buffer zone will be maintained from the residential areas/houses in the village of Mulgao.		

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	should give a specific undertaking in this regard whether it will be used in the future.			
4	**Shri. Pravir Phadte**			
	Do you think that your draft EIA report can be understood by common people without any awareness programme about it? Or what are your suggestions to enable common people /illiterate people to understand this EIA report?	All the procedure stipulated in EIA notification is followed.		
	The amount time taken by you to prepare this EIA report? How is it that though the TOR for the project was granted on 16/06/2023 the draft EIA? report was signed on 20/06/2023 by the Mining Engineering Services Consultant, M.S. Raju.	The work of EIA was started basis the standard TOR issued by the MoEF&CC and the baseline was carried out from march to May. Although the TOR was issued on16th June, the minutes of meeting including all the points was received earlier and the EIA work was continued and completed.		
	Explain in detail how the Consultant has classified this project as a Greenfield project?	Explained earlier		
	Why was the detailed EIA report not explained to the public/ awareness regarding the same not done by the Project Proponent when keeping the report with the Local Panchayat. How does the project Proponent expect the detailed EIA report to be understood by the Public present for today's hearing only on the basis of short Power Point Presentation made today?	Explained earlier		

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	As the time to seek clarification is being restricted to 5 minutes; it is requested that the written submissions submitted to the Collector's Office on 10/08/2023 by The Goa Foundation should be clarified by the project proponent now. Copy of the submission is handed over.	All the issues raised during the PH will be addressed in the final EIA		
	Why has the MoEF terminology not been explained in the EIA report?	EIA is prepared based on the TOR issued		
5	**Dr. Sebastiao A Rodrigues,Convener of Bharat MuktaMorcha (Goa State)**			
	Regarding baseline data presented in EIA, so I want to know periods of data collections . Because the consultant Raju has stated that he had collected data upto September, 2020 .When I questioned on that on this subject Mr Raju informed that indeed baseline study was upto September 2020	Explained earlier. The base line data was done during Mar to May 2023.		
	Regarding project proponent application dated 16/03/2023 seeking TOR ,wherein it is mentioned that the period of baseline data collection as from 01/10/2020 to 31/12/2020.	Explained earlier		
	October 2020 to December 2020 there was covid-19 lock down in Goa. Did company carry out baseline data collection during lockdown period?	Yes, explained earlier. The data was again collected afresh during March to May 2023 which is considered in EIA.		
	When TOR requires baseline data collection of three non monsoons in a year, why baseline data was collected only for one season of march to may 2023?	Mr. Raju answered that only one season data is required. I mentioned that PP has admitted for tweaking TOR on baseline data collection in EIA. Mr. Raju denied.		
	Asked whether the comments received from public will be incorporated in the EIA report and shown to the public again.	Mr. Raju answered all the issues raised shall be addressed and submitted to MoEF&CC.		

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	Now my last clarification is will all the applications received against this mining projects be forwarded to MOEF&CC considering that former environment cum public relation officer of Project proponent Mr. Mahesh Patil is the Chairman of GSPCB, as the case of likely conflict of interest.	All shall be forwarded. Collector North requested the people present that if they so desire, they may file their written objection/suggestion/views within 7 days from today to the GSPCB. The same will be part of the hearing and accordingly it would be forwarded to the concerned Regulatory Authority.	

Clarifications to the letters received w.r.t. the Public Hearing on 11th August 2023

REPLY TO LETTERS RECEIVED			
Sr. No.	**Letter**	**Response**	**Budget**
Letter 1 and letter 2 are same letters hence common response provided	**Dr. Sebastiao A. Rodrigues,** 48/2, P.O. Piedade, Vanxim, lihas, Goa-403403 Mobile:9923336347, 17August2023 **From: Ramesh S. Gauns** 1724, Pajwadda, Bicholim. Goa Mobile:9270085105		

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	17August2023 The Member Secretary Goa State Pollution Control Board, Saligao, Bardez, Goa Subject: Failure of GSPCB to complete minutes of the Public Hearing of Block - | Bicholim Mineral Block on 11 August 2023 at Sarvan Bicholim Madam, Above referred Public Hearing (PH) that began at 09.00 am on 11 August 2023 came to an abrupt end at 01.30 am on 12 August 2023 without minutes being finalized and shared in hard copies to the participants of the PH. It was total mess thanks to incompetent staff in compiling notes at the PH. It was observed that the large number of points raised by several speakers were not recorded in the minutes. In some cases entire presentation of the speakers found to be omitted along with their names. In other cases in spite of rectifications suggested by speakers who were present at the PH venue till mid night minutes could not be completed. Mess created by the on duty staff went out of control of the Presiding Officer who is North Goa Collector and an IAS officer. Presiding officer went on to announce at 1.30 am that the minutes of the PH will be shared online at GSPCB website. This is complete violation of the norms of PH followed where in minutes used ta be finalized immediately after the conclusion of the PH and print copies were shared with the participants present at that time at the venue duly	These are false allegations, the public hearing was completed after the minutes of meeting were read out in presence of public and the finalised minutes were signed by the Chair of the meeting and representative of GSPCB. The entire proceedings of the PH were video graphed by the GSPCB. The consultant was present for the Ph throughout the proceeding; however he went on the stage only when he was invited by the Chair of the meeting for providing clarifications to the speakers. The speaker is making false and baseless allegations on the officials, it appears that he has come with a predetermined agenda. We would like to state that the Minutes of public hearing meeting were finalised on the same day in the presence of the public. The document was signed by the Chair (Collector North Goa) and the GSPCB representative Dr. Girap and the copy of the same was handed over to us as well as the collector immediately after the conclusion of PH. The speaker also could have collected the copy immediately after the conclusion of the PH.	

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	signed by the Collector as the Presiding officer. We are worried that messy situation created thus might be used by vested interests to manipulate/omit/delete part of the contents before the minutes are made available online. Biggest danger we fear to the integrity of minutes is from the Chairman of the GSPCB Mahesh Patil who is an exEnvironment cum Public Relations Officer of Sesa Mining Corporation that is wholly subsidiary of Vedanta who Is currently the project proponent. Tempering of minutes in order to favor Project Proponent is real possibility. And quality of online minutes confirms this further. Therefore we strongly object to the procedures adopted by Presiding Officer of PH of putting minutes of the PH online without giving print copies immediately after the conclusion of the PH. When Ramesh S. Gauns asked for the consultant of EIA Presiding Officer responded saying that Consultant is not present at the PH proceedings. Consultant appeared in the night at around 08.00 pm. Time given for asking queries was only 05 minutes. Ridiculous trend is set in PH by granting only 10 minutes to seek clarification on document that consisted more than 600 pages of EIA/EPM. Several People could not get access to the Hall before 11.00 am because Project Proponent mobilized management and employees from all its buffer zone and out of buffer zone units to enter the Hall and occupied the entire hall to its fullest capacity. Minutes are put online after five days on 16 August 2023. What is recorded in the minutes is different from what was spoken at the meeting. Minutes has innumerable errors,		

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	Pages 12, 31, 32, 33 encompassing 20 people and their presentations are missing from the records of minutes. Your are therefore required to hold Public Hearing afresh based on fresh EIA. Thanking you, Yours Sincere, Dr. Sebastiao A. Rodrigues Copy to: 1. Collector (North Goa), Panaji 2. Union Minister of Environment, Forest and Climate Change, Indira Paryavaran Bhavan, Jorbag Road, New Delhi 110 003 INDIA 3, Chairman and Members of Expert Appraisal Committee, MoEF&CC, Indira Paryavaran Bhavan, Jorbag Road, New Delhi 110 003 INDIA		
Letter 3 and Letter 4 are same hence merged and common	**Dr. Sebastiao A. Rodrigues** 48/2,.P.0 Piedade, Vanxim, Ithas, Goa 403 403 Mobile: 9923336347 Date: 18" August 2023 Member Secretary, Goa State Pollution Control Board, Saligao, Bardez, Goa **Ramesh S. Gauns** 1724, Pajwadda, Bicholim. Goa Mobile: 92 70085105 Date: 18" August 2023 Member Secretary, Goa State Pollution Control Board, Saligao, Bardez, Goa	A detailed traffic density study was conducted and details are provided in Chapter 3 of EIA. The google map showing the transportation route is also part of the EIA. The details of the road are also provided in the traffic density study, Out of the 5.4 km of transportation route around 0.9km of road is public road after which the trucks enter the iron ore loading jetty at Sarmanas(not the public ferry jetty) .The pollution control measures proposed to be taken are detailed in Chapter 10. The entire transport route is shown on the google earth map which is part of the EIA. It is true that there are two	The budget towards environment monitoring and air pollution control measures is 408 lakhs.

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response provided	Subject: Concealment of usage of Public Road in front of the main Gates at Bicholim of Block I Bicholim Mineral Block in ETA report Madam, Road from Bicholim to Chorao Ferry, Narve, Mayem lake, Poira, Siqueri, Mayem, Tikhazan is under crowded vehicles (two wheeler and four wheeler) daily except Sunday. The same road is intersected in front of the gates of the mining area. The road has got a slope and if ends exactly at a point of intersection. Most of the vehicles on road are headed towards the Ferry crossing into Chorao. Local people of all the villages mentioned above use the road to approach to reach Bicholim town for various reasons particularly taking the young children for schooling in Bicholim. Therefore instead of using this public road use a fly-over like structure to avoid risk for the lives of the heavily crowded ruad by all the commuters. Secondly, mining road from within the Project Proponent's mining area also intersects the road to Pilgao village in front of the turn to Sarmanas Ferry. Some fly over like structure is required to be installed to ensure safety of the commuters. 900 meters road as mentioned in EIA does not reveal actually which public road will be uscd for the transportation of the ore. EIA does not speak that it is none other than the Pilgao road which ts also heavily crowded by the two wheeler and the four wheeler to reach Sarmanas ferry to attend to their duties. In fact immediately after that 900 meters of the said road the ferry point hardly at a	junctions namely at Mulgao and Pilgao on the transportation route and both the junctions will be provided with traffic marshals for smooth flow of public as well as ore traffic. Government will be constructing the underpass at the cost of project proponent at Mayem junction so that the interface between ore transportation and public is avoided . Till the underpass is constructed, dedicated manpower would be deployed to facilitate smooth and safe flow of transport.	

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	distance of 100 meters but it is not recorded in EIA, There are two ferries operating indicating that there is a heavy load on the road by the people travelling with two wheeler and four wheeler. Therefore using the 900 meters of public road of Pilgao village is nothing but creating dangerous situations two all the commuters. Also the loaded trucks will create dust pollution which people will face and also the clothes will be severely dusted. Hence the road should not be used for transportation instead a conveyor belt from the road from where trucks move on the public road of 900 meters should be constructed and used. On ground verification of 900 meters road at Pilgao connecting Sarmunas Jetty is 1 km distance and not 900 meters in length as mentioned in EIA report. This means that Project Proponent has cheated with facts on ground. Project Proponents therefore be denied Environmental Clearance for the Block I Bicholim Mineral Block as use of Public Village road is in violation of Terms of Reference. Thanking You. Yours sincerely, **Dr. Sebastiao A. Rodrigues** **Ramesh gauns**		
Letter 5	From: Ramesh S. Gauns 1724, Pajwadda, Bicholim. Goa Mobile: 92 70085105 Date: 17 August 2023 The member secretary, Goa State Pollution Control Board, Saligao, Bardez, Goa SubJect: Discrepancies in baseline data collection in EIA	The base line data was earlier conducted during Oct-Dec 2020. The same was mentioned in the TOR application also. However, as there is a validity of three years for the baseline data, The base line monitoring was again conducted for the period Mar- May 2023. The base line monitoring is carried out as per the TOR issued by MoEF&CC and is valid.	

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	Project Apptlication and Statement of Consultant M.S. Raju of Mineral Engineering Services regarding Block-I Bicholim Mineral Block Madam, We wish to bring to your notice the following discrepancies with regards to period of baseline data collection as stated in above mentioned subject: 1. Project Proponent (PP) Vedanta Limited submitted application to MoEF&CC dated 16 March 2023 seeking Terms of Reference (TOR) to prepare EIA/EMP. In their application PP has stated that the baseline data for EJA Study was collected from the three month post monsoon season period 01 October 2020 to 31 December 2020. 2. EIA report in compliance to TOR 44 by PP states that the baseline data was conducted during summer season 2023. 3. At the Public Hearing held on 1) August 2023 regarding this project consultant M.S. Raju stated during clarification queries by Swapnesh Sherlekar that consultant had collected bascline data upto September 2020 and this is even recorded in the minutes posted online at Goa State Pollution Control Board (GSPCB) on 16" August 2023. 4. Project consultant M.S. Raju confirmed again in response to query raised by Dr. Sebastiao A. Rodrigues that the baseline data collected was upto September 2020. The three months bascline data upto September 2020 would involve data covering monsoon season of July to September 2020 in violation of TOR 44. When it was pointed out to the above consultant that the Project application for TOR states that period of data collection mentioned is of post monsoon season from Of October 2020 10 31 December	Mr. Ramesh Gauns is making false and baseless allegations. Measurement of rain is a very common practise and the same is done every year by the mining companies. The consultant has collected the rain data for last 5 years from the earlier mine owner. All the land use features are provided in the EIA. Details about the habitation aswell as main water resources like river etc are provided.	

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	2020 Mr. Raju denied having collected baseline data during this period stated in the Project Application for FOR. This indicates that the baseline data collection period mentioned in the Project Application as from 01 October 2020 to 33 December 2020 is false. Further Mr. Raju stated the rainfall data stated in EIA as 3500 mm was collected not only from the meteorological department but also from on-site physical monitoring of rainfall at Block -I Bicholim Mineral Block. This means that baseline data collected is of monsoon season. When it was questioned about the credibility of the content of Project Application to MoEF &CC regarding baseline dats collection period M.S. Raju denied his own statement saying his baseline data is upto September 2020 and said period from 01 October 2020 to 31 December 2020 is correct. {f this was indeed correct then why did Mr. Raju stated that his baseline data is upto September 2020? This means that baseline data collection periods stated both in Project Application to MoEF & CC as well as in EIA report are fictitious in nature. 5. Additionally Consultant M.S. Raju was questioned by Dr. Sebastiao A Rodrigues whether his agency really carried on baseline data collection during 01 October 2020 to 31 December 2020 considering that it was strict lockdown period due to Covid-19, Project Consultant M.S. Raju answered affirmatively stating that indeed baseline data in 2020 was collected during COVID-19 lockdown period. 6. Since the stated period of data collection (01 October 2020 to 31 December 2020) stated by PP in Project Application is impossible to believe or accept on the ground of inherent inconsistency the suspicion of the conduct of		

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	the PP manifesting fraud are established beyond doubt. The stated period of baseline data in EIA of March to May 2023 too is suspect due the past record of cheating about baseline period datas as established from above facts and analysis. 7. Baseline data being the foundation of EIA and having established that Consultant ot PP has engaged in gross manipulations fresh documentation and fresh EIA be directed to be conducted by PP. This is required to be done not only because of several defects in EIA relating to baseline data related to lakes, rivers, wells and Perennial flowing rivers but more because PP has violated TOR and cheated on disclosure period of bascline data collection itself thereby violating TOR 44 & 70. Hoping for sincerely and decisive directions from MoEF & CC to direct PP to compile fresh documentation and conduct Public Hearing again as required under TOR 70. Thanking you, Yours sincerely, Ramesh S. Gauns Copy to (1) The Minister of Environment, Forest and Climate Change, New Detha (2) The Chairman and members of the Expert Appraisal Committee, MoEF&CC, New Delhi		
Letter 6	From: Anil D Salekar, Begwada, Pilgao, Bicholim, Goa Mobile: 9850138372 date: The Member Secretary, Goa State Pollution Control Board, Saligao. Bardez, Goa Subject: Grievances regarding choice of venue for Block-I	The venue of the public hearing was selected by the GSPCB as it was the most convenient in all aspects. The venue is also less than 2 km aerial distance from the mine boundary. The project proponent also provided refreshments twice during the hearing. Ample time was provided to the public for	

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	Bicholim Minerai Block Public HearinG (PH) held on 11 AuGust 2023 at Sarvan organised by Goa State Pollution Control Board GSPCB Madam, We have observed that the venue for PH at Zantye Sports Complex, Savona, Bicholim chosen by GSPCB was unreasonably far from the villages in the core zone areas and those impacted directly. Venue was 13 kms from Sirigao, 09 kms from Mulgao, 05 kms from Lamgao, 07 kms from Pilgao, 12 kms from Maem and 03 kms from Bicholim. Case law in india requires that the venue for the PH should be within 01 kms from the proposed mining project. PH was held in Sarvan village Panchayat Jurisdiction that is not in the core zone of the mining project. Several people could not make it to the venue as it was far from the the core zone localities. There were available Halls attached to Temples in Sirigao, Muigao, Lamga Maem, and very big Hirabai Zantye Memorial Hall in Bicholim but the were not taken. The venue of PH at Bicholim was inconvenient because Public Hearing that an at 09.00 am on 11 August 2023 went on till 01.30 am on 12 August 2023 for nearly seventeen hours. There was not a single hotel at the venue of the Public Hearing. Number of people stayed in the hall starving. Women who stayed on till 01.00 am at night had major problems. We were under impression that It was an absolute prerogative of GSPCB to decide on the date and venue of PH. However after the consultation with some knowledgeable	registration. Hence the allegations are of baseless nature as 834 people attended the PH.	

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	people in this matter we realized that venue had to be within 2 kms from the proposed project. if we had to know this in advance then we would have objected to the venue selected by GSPCB to hold this PH. In the light of various judicial directions given by National Green Tribunal B6(NGT) and Gujarat High Court Judgement of 2003 we call upon you to conduct fresh PH close to our localities and villages at core zone of the mining project. Thanking you, Yours sincerely, Anil D Salelkar Copy to 1. The Union Minister for Environment, Forest and Climate Change, Indira Paryavaran Bhavan, Jorbag Road, New Delhi 110 003 INDIA 2. Chairman and the Members of the Expert Appraisal Committee, MoEF & CC, indira Paryavaran Bhavan, Jorbag Road, New Delhi 110 003 INDIA		
Letter 7	From: Mr. Sharadchandra Krishnarao Vishwasrao Desai Son of late Shri. Krishnarac Ravioba Vishwasrao Desai & that of Ms. Sundarabai Krishnarao Vishwasrao Desai Resident of house no: 1996, Vishwasnagar, Larngao, Bicholim Goa. Date: 11.08.2023. To _ The Member Secretary Pollution Control Board Saligao, Bardez Goa. he Deputy collector of Bicholim Taluka Bicholim Goa. SUBJECT: OBJECTION FOR MINING IN LAMGAO VILLAGE & IN BICHOLIM BLOCK Sir, I am permanent resident of Bicholim being born and	With respect to civil suit bearing no. 188/2015, it is our understanding and on the basis of available official records, the matter was filed against the erstwhile leaseholder SMCL. Vedanta Limited is not a party to the proceedings and no adverse orders have been passed against it. With respect to case no. SDM.BICH.133 CRPC,4.2013., it is our understanding and on the basis of available official records, the matter was filed against the erstwhile leaseholder SMCL wherein SMCL had challenged the order dated 20.02.2018 in a criminal revision application before	The budget towards Environment Monitoring and Air pollution control measures: 408 Lakhs The budget towards Erosion Control Measures,

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	brought up at Village Lamgao having my landed properties in Bicholim and in Lamgao Village. I have alse filed civil suit bearing no: 188/2015-C which is pending in the court of Civil Judge Junior division at Bicholim. Already there is intunction granted by the Civil Court in my favour vide order dated 18.04.2022. The said order reads as under: ORDER i. The application for temporary injunction at exhibit D-3 is granted. ii. The Defendants, thcir relatives, servants, agents, or any other person claiming through or under them are hereby restrained from interfering with the suit property and digging pit in the suit property or from carrying out any such mining activity in the suit property bearing survey no; 15/1 of village Lamgao of Bicholim tatuka until the disposal of suit on merits. The Defendants in the above referred order are : i. Sesa Mining Corporation Limited, Bichclim Iron Ore Mines, Dhabdhaba Bicholim Goa, Pincode: 403504. ii. The Mines Manager, Sesa Mining Corporation Limited, Bicholim Iron Ore Mines, Dhabdhaba_ Bicholim Goa, Pincode: 403504. iii. The A.G.M. Sesa Mining Corporation Limited, Bicholim Iron Ore Mines, Dhabdhaba Bicholim Goa, Pincode: 403504. That the above stated order dated 18.04.2022 passed by the civil court is till date operational in force and binding on the defendants of the suit.	the District and Sessions Court, Mapusa. On 04.07.2023, the District and Sessions Court passed an order quashing the order dated 20.02.2018. With respect to case no. MAM.BICH.MINE.08.2016, it is our understanding and on the basis of available official records, the matter was filed against the erstwhile leaseholder SMCL and the same is pending for adjudication. Necessary measures will be put in place to ensure that there is no flow of mine silt in the neighbouring habitations/ agriculture land. The details of various erosion control measures are provided in Chapter 10. Only the water within the mining area is channelised into the pits and harvested. Detailed hydrogeology study is carried out as per CGWA guidelines and attached as anexure to the EIA. The complainant is referring to the incidents happened during earlier mining operations. All necessary safety and environment protective measures will be taken during the mining operations so as to ensure that there is no occurrence of any untoward incident.	Monsoon preparedness on mines and water treatment is 232 lakhs.

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	That the honorable Deputy Collector has passed Judgement and order dated 20.02.2018 in case no: SDM.BICH.133 CRPC, 4.2013. The said order reads as under: ORDER The Opponent is hereby directed to refill the existing pits with mud in the property surveyed under no: 15 and 16 of village Lamgao on or before 15.03.2018 under strict compliance. Pronounced in the open court. The opponent of the above mentioned case is: M/s Sesa Mining Corporation, Dhabdhaba Bicholim Goa. That the Opponent went in appeal in the Session Court and have got the said order set aside and the matter is sub judice before the Deputy Collector of Bicholim. I have also filed contempt application before Deputy collector Bicholim and the same is pending under no: DCB.BICH. 133 CRPC.4. 2013.2019. That I have also filed application to the office of Mamlatdar of Bicholim Taluka which is also pending under no MAM.BICH.MINE.09.2016 with respect to survey numbers 26/1, 18/6, 24/3, 11/1-O, 11/1-L, 11/1 M, 11/1-Q of village Lamgao of Bicholim Taluka. That there is contamination of well water in the area of village Lamgao. I am having Water testing report issued by the office of Pollution control Board. Water wells of Lamgao Village were getting dried up so also were getting pollutants in the water due to mining. I am having my residential house 1856 in the property surveyed under no: 16/1-A of village Lamgao. That one Mr. Narayan Mone has also filed application to the		

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	office of Mamlatdar of Bicholim Taluka which is also pending under no MAM.BICH.MINE.08.2016 with respect to properties situated in village Maem of Bicholim Taluka. The properties of Mone are situated touching the Mining area mining belt. The zonal agricultural officer / official has also deposed that the plantation is getting affected due to running of mining silt in the water pond serving irrigation of plant. There were frequent accidents of mining burst brining mining silt, boulders, stones down in the Bicholim city, Mulgao Village. One such land slide was witnessed on 16.07.2011 at Mulgao, on 06.06.16 at Pajwada Bicholim. Reference of the above incidents has come in the Judgement of Deputy Collector dated 20.2.2018.. That old Temple situated at Lamgao Village had to be reconstructed. The school in village Lamgao had to be reconstructed due to passing of pit water through school building. The mining pit which is existing at present is situated at the higher level than village of Lamgao and Bicholim City. The said mining pit is having huge accumulation of water posing danger to the inhabitants of Lamgao Village and Bicholim City. If any untoward incident takes place there will be flowing away of nearby human habitation causing numerous casualties and countless monetary & economic irreparable loss of property. That the farmers are getting affected due to reckless mining done previously by the Dempo Mining Corporation' / Sesa Mining Corporation / Vedanta limited. The above companies did mining only by changing their names one after another. The names were changed to cheat farmers.		

Sensitivity: Internal (C3)

	Farming and plantation in the nearby areas has become difficult rather impossible. The water in the locality is channelized in one pit affecting water elsewhere in the locality. In Lamgao Villlage previously there use to be water at a just distance of 1 to 3 meters from surface but now it is not possible to have the same due to mining pit taking water dip in the pit. Houses have also got cracks due to mining done in the locality. Environmental damage caused by previous mining is irreparable. Flaura and fauna is affected causing damage to nature, plants, water sources, water courses, animals, birds. Considering all the above facts, I pray that no mining be permitted in "Bicholim Mineral Block" as sought to be proposed. Yours faithfully, .		
Letter 8	GOA FOUNDATION, G-8, St Britto's Apartment, Feira Alta, Mupusa, Goa, INDIA The Collector (I), North GOA District, North Goa Collectorate, Panaji 403001 Goa. Subj: Request to cancel Public Hearing on the Vedanta mineral block I-Bicholim, scheduled for 11 August, 2023 Dear Sir, We are writing to you to seek cancellation of the Public Hearing scheduled in respect of the Vedanta mineral block I-Bicholim on 11 August, 2023.	EIA report is prepared as per the TOR issued by MoEF&CC. it is true that this particular mineral block was earlier operated by Sesa mining Corporation ltd (formerly known as Dempo mining	

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	There are very serious grounds for considering and acceding to this request. These are set out below: a) The necessary environmental information and data which are required to be produced in response to the TOR are missing from the draft ELA document. The suppression of necessary information has been achieved by claiming that the Mining Block is a "greenfield project." Such a characterization of what is clearly a brownfield project as a greenfield project is wholly incorrect and cannot be accepted. The Mining Block has been operated from inception as a series of five leases (TC 11-15/1941) neighbouring each other in a straight line, and thereafter, as an amalgamated lease with a single lease number (08/AMLG). The amalgamated lease is the relabelled "I-Bicholim" and has the same boundaries. b) These 5 leases before and after amalgamation have been in operation since 1941, and have been operated by a variety of actors, including Dempo Mining Corporation and Sesa Mining Corporation Ltd, SMC is a wholly owned subsidiary of Vedanta Ltd, which is now assigned this mineral block. The production data of the 5 leases, from 1941 to 2012, is available in public domain. The leases were also operated between 2015 and 2018 by SMC/Vedanta. In normal and legal terminology, such a mine site could never been characterized as a "Greenfield project" for the purpose of obtaining environment clearance. c) The important thing to emphasize here is that the willful	corporation Ltd). Pursuant to Supreme Court judgement in Goa Foundation 2 dated 07.02.2018, all the mining leases granted by the state government were cancelled. Thereafter, State Government in terms of the said order and as per the provisions of MMDR Act put this block for auction as a fresh lease/ grant. Vedanta Ltd was selected as the preferred bidder in the said auction for Block I Bicholim mineral block and accordingly LOI was issued to Vedanta Ltd. As per the MoEF EAC minutes of meeting, in case of LOI grant it is classified as green field and hence in the EIA it has been mentioned as green field. There is no hiding of facts as alleged by the Goa foundation, as the earlier pits can be seen in the surface plan which is provided as plate no 5 of EIA. As per our information, the erstwhile leaseholders have complied with all recommendations prescribed by NEERI in PIL no 1/2008. According to the official records, the three erstwhile leaseholders namely Chowgule and Company Private Limited, Rajaram Bandekar Mines Private Limited and Sesa Mining Corporation Limited have submitted an amount of Rs. 65,00,000 with the	

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	characterization of the project site as a “Greenfield” project has been relied upon to withhold data and the past record of this project proponent (PP) required to be made part of the draft EIA and to the public. This includes the environmental data collected since the lease started operation in 1941 as well as studies by academics and entities like NEERI, which data and information must be used to understand past impacts so as to foresee future impacts. d) We were not able to write this letter earlier for obvious reasons. The Terms of Reference have been communicated to the PP on 16 June 2023 and the 624 page has been manufactured in 4 days! It is unrealistic to expect the public to be able to read such a report in the space of a month. In fact, all the data produced is related to periods prior to the issue of TOR letter, including a report prepared in 2010! In other words, the draft EIA cannot be considered as conforming to the TOR either in letter and spirit. e) Please note that the lease is now granted for a period of 50 years. During the past existence of these leases unparalleled damaged has been done by the mining activity to water bodies including the Asnoda river, springs, fields (most outside the lease boundary), biodiversity, hill slopes, and most seriously, to the ground water aquifer. This has been permanently destroyed. The entire development has been documented and proven in the NEERI report organized under the directions of the	High Court. Desilting work is being carried out by Water Resource Department. The EIA also comprises of detailed hydrogeology report based on CGWA guidelines which concludes that there won’t be any adverse impact of mining on surrounding ground water regime. Explained as above. The EIA report is prepared on the lines of TOR issued to Vedanta ltd. The Baseline monitoring was carried out in march to May 2023. The EIA work did not wait for the issuance of TOR, as standard TOR is available for this purpose. Other specific points raised during EAC meeting held on 3rd May were immediately noted and studies carried out without waiting for the Minutes of Meeting. The	

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	Bombay High Court. The water resources available to this hitherto water surplus village have evaporated, turning the village into an area of drought. The PP has now sought to eradicate all this history of severe ill-effects of mining by terming it a “Greenfield project”. This makes a complete mockery of the EIA process, and cannot be permitted under any circumstances. For these reasons, the public hearing is important. It is the right of the people, especially the villagers of Sirigao, to represent what happened in the past 50 years, and to hear whether the scenario would be repeated in the next fifty years. No village should be gifted with such a ghastly legacy. f) We set out various items from the Terms of Reference Compliance section draft EIA report (pp.5-18) which have not been complied with. 6. The Project Proponent shall conduct drone survey of the mine lease area and buffer area and submit during the appraisal for EC. **The drone survey was conducted and will be Submitted during appraisal for EC** **Comment of Goa Foundation: This is material information to understand the topography of the site in the context of aspects such as hydrogeology. If the survey has been conducted, why is it being suppressed?** 7. During the meeting, the EAC noted that old excavated pits exist within the mine lease area. Hence, the Project Proponent needs to submit a letter from the Department	complainant is simply trying to make false allegations. The mineral block is auctioned as a fresh lease and EIA is based on the baseline study carried out during the period March to May 2023. The project proponent has detailed out the various impacts and the environment management plan in details to reduce the environmental impact. As clearly specified in the TOR, the drone survey will be submitted to the EAC during appraisal for EC The clarification from State govt is obtained as part of the Final EIA.	

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	of Geology and Mining, Government of Goa clarifying whether any illegal mining within the mine lease area has been carried out or not and whether the same has been carried out by M/s. Vedanta Limited or not? **The state govt. auctioned Block-I Bicholim Mineral Block as fresh mine and Vedanta was preferred bidder. We have requested to state Govt. for the Clarification, and response is awaited and same shall be provided** **Comment of Goa Foundation: This is an absurd statement given that Sesa Mining Corporation/Vedanta was the earlier operator. Whether illegal mining took place by the project proponent is material information for a public hearing** 20. 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. The production details need to submit since inception of mine duly authenticated by Department of Mines & Geology, State Government **GREEN FIELD PROJECT** **Comment of Goa Foundation: This is another absurd statement given that Sesa Mining Corporation/Vedanta was the earlier mine operator. The relevant information required to be produced has not been produced.** 24. The PP should submit the real-time aerial video	The 3 month data collected from two PHC's is representative and sufficient for evaluation for the EIA purpose and budgetary allocations are made in the EIA The state government in compliance to the hon. Supreme court order auctioned the mine as a Fresh lease . Vedanta Ltd was selected as a preferred bidder and LOI issued. In such case past data is not required. In case the application for EC was w.r.t renewal of mine lease or expansion project the past production data etc are required. In this particular case the past production data is not required to be produced. The real time video footage of the mine lease will be submitted at the time of EAC meeting. The point made by complainant is in case of a operational mine which is applying for EC for the purpose of lease renewal or expansion. In this case the mine is auctioned as a Fresh lease and the proposal is accordingly prepared.	

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	footage & video of the mining lease area and of the transportation route. **PP shall submit the real —time video footage of the mining lease at the time EAC Meeting.** **Comment of Goa Foundation: This is material information to understand the vegetation that currently exists in the mine and along the transportation route. It must be provided as a link so that the public can study the facts on the ground.** 34. Compliance of the Ministry's Office Memorandum No. F: 350/2017-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 EJA/EMP Report **The Affidavit is enclosed as Annexure-2** **Comment of Goa Foundation: This relates to violations of the Environmental Clearance by Vedanta and is material information for the public hearing. An affidavit is not equivalent to compliance. Compliance would require a statement of violations, if any, and payment of sums as required as per the MoEFCC OM.** 35. PP Shall Submit a Certificate from Chief Conservator of Forests regarding involvement of forest Land in the Mining lease area if any. In case forest and is involved: i) PP should submit the proof of application made for obtaining forest clearance and ii) a map clearly showing the forest & nonforest area.	The annexure 3 is the letter of approval of mining plan. The surface plan and geological sections are part of EIA as plate no 5 and plate no 4A1 to A4. The auction document of the state government clearly states that there is no forest area within the mineral block. Letter from the state forest department is also attached in the final EIA. Even earlier i.e before auction of the mines , there was no forest land within the mines. Approved lease sketch is attached in the EIA and land classification is provided in final EIA.	

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	As per the auctioned document given by state govt. there is no forest area involved in Block-I Bicholim Mineral Block Comment of Goa Foundation: No certificate is produced as required by the TOR. 36. 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. **NA** **Comment of Goa Foundation: This is another absurd statement considering that the leases have been operated from 1941 till 2018.** 37. PP should submit the details of survey number [viz. survey no, area in hectare, classification of land (government, private, forest, grazing land etc.), villages] duly authenticated by State Government, falling in the mining lease area **Enclosed in lease sketch as Plate.No.2** **Comment of Goa Foundation: The classification of land has not been provided by survey number as required.** 55. 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. **The socio-economic study was conducted Ref. Chapter-3, Para.3.9**	The base line monitoring is carried out as per the TOR . The data is valid as per specific TOR point no 4.1 . Point clarified above. The report from Regional office is required in case of a existing valid EC. In this particular case there is no existing EC. The mine is auctioned as fresh mine and for which purpose EC is being applied for . Once the EC is obtained the lease would be executed and other permissions obtained, then the mining operations will start.	

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	Comment of Goa Foundation: The health survey in para 3.9.1.19 has been conducted by collecting data from two PHCs working in the buffer zone, for just three months prior to the survey. This is absurd as much longer data is available, especially since the PP and Mineral Foundation of Goa partly funded by the PP have been conducting health camps as part of CSR for decades. 68. The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry **Comment of Goa Foundation: There is no response at all by Vedanta. The response to the Questionnaire ts not roduced.** 70. 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. rocess) will entail conducting the PH again with the revised documentation **Baseline collected during summer season, 2023** **Comment of Goa Foundation: The response has little connection with the ToR point. Note that since required information has been suppressed, this would anyway require conducting the PH again with revised documentation**	The project proponent will obtain both CTE and CTO from the GSPCB before starting the mining operations.	

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	71. 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. **Green field Project** **Comment of Goa Foundation: The claim is that because this is a Greenfield project (which is incorrect), the report need not be produced.** g) Other important information relevant for a public hearing has not been provided, most important of which is the mining plan. Without a mining plan, it is not possible to evaluate its environmental impacts. The Annexure 3 of the EIA / EMP also refers to an "*annexure attached of surface mining plan and cross-section*", which is missing. I am confident that once you recognize this glaring misrepresentation and suppression of essential information after receipt of this letter, you will also conclude that the Public Hearing is vitiated due to an incomplete draft EIA report — which is based on the false claim that the project is a green field project when it is actually (and quite clearly and without doubt) a brownfield project. The Public Hearing is being conducted with the assistance of the Goa State Pollution Control Board. The Board will doubtless produce before you, if required, copies of the		

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	consent orders issued to the erstwhile leaseholder (Sesa Mining Corporation/Vedanta) for operation of these leases since the time the Board was constituted in 1987. In fact, if this were a Greenfield project, why is there no consent to establish (CTE) issued by the Board? An environmental Public Hearing is not an occasion to correct blatant errors in the draft EJA nor is the public required to point out such egregious claims. The draft EIA report must conform to the TORs in all respects, and only then can the public hearing proceed. The draft EIA uploaded to the website of the PCB is severely deficient in this regard. This issue needs to be settled first. Your office can sort out this problem with the PCB, especially with regard to the claim of then project being a “Greenfield project.” After a proper draft EIA report conforming with the TORs in all respects is received and verified, the public hearing can be notified and held. We therefore reiterate our demand that the public hearing be cancelled in the circumstances, till a fresh draft E]A — prepared with some degree of honesty and scientific integrity — can be placed before the public. Sincerely, Dr Claude Alvares Director Cc: Goa State Pollution Control Board		
Letter 9	Letter from Village Panchayat Mulgao dtd 7/8/2023		

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	1. Demarcation of village boundaries active mining lease boundaries & Buffer Zone boundaries to be done in presence of all committees and Village Panchayat Mulgao. 2. Company should exclude houses, Temples, Lakes paddy Fields bhagayatis from mulgao mining blocks as per new mining lease. 3. Desilting of paddy fields should be carry out by company on priority. 4. Pending compensations of famers from 2011 to till date to be release on immediate basis. 5. Priority to be given to mulgao villagers for Employment, the Company should also give preference to mulgao villagers for business opportunities. 6. Mulgao Communidade is having 2.21 laks sq.mrts area in the said mining block of which lease rent is in arrears from the year 2011. 7. Mulgao communidad is having three water lakes under Survey No.69/1 & 71/0 which has been filled with mining silt need to be cleaned in original form. 8. Arrangement of smooth flow of water to the kulagars in the area in summer season. 9. Attend and provide solution to the difficulties faced by the ritreched sesa mining worker of the	The mineral block is auctioned by state government. The habitations within the lease were always existing . A safety buffer of minimum50m will be maintained form these habitations which includes houses, temples, agriculture properties etc. Vedanta ltd is a new lessee and the mining operations have not started. There is no compensation liability with Vedanta ltd company. The earlier mine owner was a different entity and the compensation matters would be dealt by them. Employment preference will be given to locals only. There would be lot of indirect employment and business opportunities due to mining which will benefit the local population. The lease needs to be executed first for further needful in this case. It is understood that the earlier mining company had constrcted these ponds which are referred by the villagers as lakes. These ponds were maintained and desilted by earlier mine owner and the practise will follow. Flow of water will be ensured .	

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	mulgao village. 10. Mining grants to Village Panchayat and Devasthan to be increased. 11. Compensation for houses damaged caused due to operation of mines in the VP Jurisdiction. 12. Also brings to your notice that villagers require Public information in details with regards mining in mulgao village. We strongly opposed resumption of mining in mulgao village till we fulfill the above Point.	All the retrenched workers were provided opportunity to join the work force of Vedanta ltd and many of the workers took benefit of this opportunity. Vedanta has won the mine in auction and has not yet started the mining operations. It is to ensure the villagers of mulgao that a safety barrier of minimum 50 m will be maintained towards the habitation. There wont be any drilling and blasting . There is no shifting of habitation proposed.	
Letter 10	Letter from Pilgao village panchayat RefNo.VP/PIL/BICH/2023-24/L.SI To The Mermber Secretary, Goa State Pollution Control Board, Saligao Bardez Goa. Sub :- Point to be discussed in Public Hearing. Sir, With regards to the public Hearing as per the Environmental impact assessment 2006 w.rt Block Bicholim Mineral Block with area of 478.5206 ha located in Bicholim Taluka whích was held on 11/08/2 023. In this regards I would like to bring to your attention to add the following points on the record as the same has not been recorded on the minutes of the hearing. 1) The Dempo Mining Corporation was allotted approximately 1.3 MPTA EC as per the reliable sources.	The current project doesnot include beneficiation plant.	

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	Accordingly they had designed and structure the beneticiation plant (Washing Plantl Known as New Beneficiation Plant in Pligao Village Bicholim Goa. The tailing Pond was also constructed considering the 1.3 MPTA EC still the water from the tailfíng point (silt) enters in the agriculture field which leads to the contamination of soil, ground water and surface water by chemical emitted from mining processes and agriculture field get destroyed, about 60 hector of agriculture field has been destroyed so far. Later on Sesa Mining Corporation Linited took over mining business from Dempo Mining Corporation and presently Vedanta is running the said mining business. 2) The Beneficiation plant has a capacity of 1.3 MPTA if the capacity is increased beyond the 1.3 MPTA than the tailing point will overflowed and silt will enter in the agriculture field and water bodies, which will leads to soil contamination and water pollution. The infrastructure of Mining Company was not enough to handle 1.3 MPTA of Ore and it will destroyed all major fertile land and natural habited if any Mining company is allowed to operate over and above. Hence we have strong objection for production of 2.0 MPTA Ore and all the damages to the fields and land to be restored. 3) Also there is some agriculture land bearing sy.no.66/40,164/01, 184/4,5,9,10,14, 15,16,19,20 &21. 165/8. 187/4,5,6,8, 10,12, 13. 66/40, 154 and others of Village Piligao, where there is illegal encroachment have been done by mining company to run miníng activities.	There is a beneficiation plant of SMCL in Pilgao village. However it is a separate project and not part of the Block I Bicholim mineral block. In case the SMCL company requires to expand its capacity, they would be required to obtain Environment clearance for the same.	

Sensitivity: Internal (C3)

	Hence the issue related to above agriculture land farmers regards to the agriculture land has to be resolved on the priority, until it gets resolved we have strong objectíion for operatíon of míning activities in Piligao Village Bicholim Taluka. Kindly take note of the above point and do the needful.		

Sensitivity: Internal (C3)

Government of India
Ministry of Environment, Forest and Climate Change
IA Division
(Non-Coal Mining)
***

Minutes of Expert Appraisal Committee meeting Non-Coal Mining held from 21/09/2023 to 22/09/2023

Date: 29/09/2023

MoM ID: EC/MOM/EAC/553451/9/2023

Agenda ID: EC/AGENDA/EAC/553451/9/2023

Meeting Venue: N/A

Meeting Mode: Virtual

Date & Time:

21/09/2023	10:30 AM	05:30 PM
22/09/2023	10:30 AM	05:30 PM

1. Opening remarks

The 20th meeting of the Re-constitution of Expert Appraisal Committee (EAC) for Environmental Appraisal of Mining Projects (Non-Coal) of the Ministry of Environment, Forest and Climate Change was held during 21-22 September, 2023 through video conference. The list of participants is annexed herewith. After login of the Committee Members through video conference link provided by NIC discussion on each of the Agenda Items was taken up ad-seriatim.

2. Confirmation of the minutes of previous meeting

The minutes of the 19th EAC meeting held during 24-25 August, 2023 were placed before the members of the EAC.

3. Details of proposals considered by the committee

Day 1 -21/09/2023

3.1. Agenda Item No 1:

3.1.1. Details of the proposal

Majhgawan Diamond Mine of M/s. NMDC Ltd for 0.72 LTPA of overburden removal and processing of kimberlite ore (8 LTPA) for production of 1.00 lakh carats of Diamond per annum within mine lease area of 162.631 Ha (Supplementary Mine Lease) Located at Majhgawan, Tehsil & District Panna, Madhya Pradesh by **NMDC LIMITED** located at **PANNA,MADHYA PRADESH**	
Proposal For	Fresh EC

1.	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.
2.	Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL. HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).
Risk Assessment & Disaster Management	
1.	Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.
2.	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.
3.	A Disaster Management Plan shall be prepared and included in the EIA/EMP Report.
Miscellaneous	
1.	The 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.

3.2. Agenda Item No 2:

3.2.1. Details of the proposal

Block 1- Bicholim Mineral Block for Iron Ore by **VEDANTA LIMITED** located at **NORTH GOA,GOA**			
Proposal For		Fresh EC	
Proposal No	**File No**	**Submission Date**	**Activity (Schedule Item)**

IA/GA/MIN/442593/2023	IA-J-11015/3/2023-IA-II(NCM)	01/09/2023	Mining of minerals (1(a))

3.2.2. Project Salient Features

1. The instant proposal is for mining of Iron Ore in Bicholim Mineral Block – Block 1 (Auction Block) of M/s Vedanta Limited with proposed production capacity of 3.0 MTPA, Waste: 25.162 MTPA (Total Excavation: 28.162 MTPA) along with crushing and screening plant capacity of 4.0 MTPA in the mine lease area of 478.5206 ha, located in Bicholim, Bordem, Lamgao, Mulgoa, Mayem & Sirigao Villages of Bicholim Taluka of North Goa District, Goa.

2. The details of the project as ascertained from the document submitted by the Project Proponent and as revealed from the discussions held during the meeting are given as under:

i. The mine lease area is located between Latitude: 15º34'20.518"N to 15º 36'54.018"Nand Longitude: 73º54'4.754"E to 73º57'09.51"E. The mine lease area falls under the Survey of India Toposheet No: D43B14and falls in Seismic Zone-II.

ii. The proposed project activity is listed at schedule no. 1(a) Mining of Minerals and falls under Category "A" as the mining lease area is greater than 250ha and appraised at the Central level.

iii. Details of Terms of Reference (ToR):

Date of application	File. No/ Proposal No	Consideration	Details	Date of accord
16.03.2023	F.No: IA-J-11015/3/2023-IA-II(NCM) IA/GA/MIN/ 422323/2023	3-4 May, 2023	Terms of Reference (ToR) to M/s Vedanta Limited for mining of Iron Ore in Bicholim Mineral Block – Block 1 (Auction Block) with proposed production capacity of 3.0 MTPA, Waste: 25.162 MTPA (Total Excavation: 28.162 MTPA) along with crushing and screening plant capacity of 4.0 MTPA in the mine lease area of 478.5206 ha, located in Bicholim, Bordem, Lamgao, Mulgoa, Mayem & Sirigao Villages of Bicholim Taluka of North Goa District, Goa	16.06.2023

iv. Details of Mine Lease:

a) The Project Proponent has submitted the Letter of Intent (LoI) granted by the Government of Goa vide Lr No: DMG/25/Auction Cell/LOI-function/2023/2801 dated 13.01.2023 for grant of mining leasefor Block I - Bicholim Mineral Block for Iron Ore in Bicholim, Bordem, Lamgao, Mulgao Mayem & Sirigao villages, Bicholim Taluka, North Goa District over an area of 478.5206 Hectare for a period of 50 (fifty) years in pursuant to Rule 10(2) of the Auction Rules. This letter of intent is valid for a period of 3 (three) years from the date of its issuance.

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

Private land	421.1153 Ha
Government land	57.4053 Ha
Total Mining lease area (MLA)	478.5206 Ha
Private land for crusher, workshop & other infrastructure outside the MLA	Not Applicable

vi. Details of Mining Plan:

Review and Mining Plan approved by Indian Bureau of Mines, Goa	Letter No.	No. MCDR-MPC|1|2O23-GOA-IBM_ RO_ GOA
	Date	26.05.2023
	Mine Lease Area	478.5206 Ha
	Mineral	Iron Ore (Major Mineral)
Mining Parameters	Quantitative Description	
Method of Mining	Opencast mechanized mining without Drilling & Blasting	
Drilling/Blasting	Not Applicable	
Total Reserves and Resources	84.73 Million Tonnes	
Proved Mineral Reserve	36.071 Million Tonnes	
Life of mine	30 years	
Bench Height	7 m	
Bench Width	10 m	
Individual bench slope	70^0	
Overall pit slope	$<26^0$	
RoM output size	Less than 500 mm	
Crushing/Screening	Mobile Dry Crushing and Screening plant shall be available within the proposed mine to handle 4 MTPA of crude ore. The primary crusher will consist of 1 no. of Jaw crusher of capacity 120 TPH with an input feed of -500mm and shall produce output of -70 mm. It shall be followed by secondary crushers, 2 no.s of capacity 300 TPH and 200 TPH respectively. The input feed size shall be -70mm and output feed size obtained shall be -40mm. The Screening Plants of capacity -600TPH shall be installed where input the feed size shall be -70mm to obtain product of -40mm lumps & -10mm fines.	
Transportation details	ROM/Iron ore or Screened/crushed material will be transported by 10.5 Tonne trippers from Mine to Sarmanas jetty through a dedicated road. The total distance from the mine to Jetty is 5.48 km of which 0.94 km stretch is public road and remaining 4.54 km is company owned dedicated road.	
Dumpers capacity	40 tonne (within mines)	
Waste handling and Disposal	During the mining period, the waste generated by mining will be temporarily stacked within the mining lease area as surface dump and backfilled in the exhausted portion of the pits. The total waste to be generated during the plan period is about 69.85 million tonnes. An area of 6.7146 Ha shall be utilized for Dumps and Material stocking at the conceptual stage of mining.	

vii. Water requirement:

Total water requirement	664 KLD	Pit Water	628 KLD
		Ground water	36 KLD
Source	Water from Mine Pit will be used for dust suppression, Vehicle washing and Green belt. Water for domestic requirement will be met from bore well.		
Permission	The Bore wells are registered with Goa State Water Resource department. Application for using mine pit water will be submitted.		

viii. Nearest village / town/ highway/railway station / water bodies/monument:

Particulars	Particular's Name	Distance & Directions
Village	Lamgoa	Within the lease area

Town	Bicholim Town	0.5 km, East
Road	State Highway SH-1	0.65 km, East
Railway Station	Tivim Railwaystation	10.5 km, North
Water Bodies	Asnora River Mayem Lake Mandovi River	Touching lease boundary at one of the points 0.46 km 2.3 km, SW
School	Mulgao Govt. Primary School	Within the lease area
Worship places	Namuzgah/Idgah Shri Lairae Temple	Within the lease area 0.86 km
Caves/Fort	300m buffer from Lamgao caves Khorjuvem Fort: 2 km	

ix. Presence of Environmentally Sensitive areas in the study area:

Forest Land/Protected Area/Environmental Sensitivity Zone	Yes/ No	Details of Certificate/letter/Remarks
Forest Land	Yes	Mayem Forest Common Boundary with the mine lease area The following Reserve Forests are located within 10 km radius of the mine lease area such as Kharapal RF -6.7 km Kasarpal RF - 5.1 km Ambadgaon RF - 7.6 km
National Park/Wildlife Sanctuary, ESZ/ESA etc.,	No	The Project Proponent has submitted the letter from the Office of the Dy. Conservator of Forests vide Lr No: DCF(WP)/Tech/Digi/Vol-I/75/2022-23/ 968 dated 23.01.2023 stating that the proposed Bicholim Mineral Block-I is not situated within 10 km radius from the boundary of any the protected area in the State of Goa. PP also submitted the authenticated map dated 24.01.2023 showing the distance of the following Wildlife Sanctuary from the mine lease area. 1. Madei Wild life Sanctury-14.105 km, E 2. Salim Ali Bird Sanctuary -10.553 km, SW 3. Bondla Wildlife Sanctuary -20.476 km, SE The Project Proponent also submitted the letter dated 22.02.2023 obtained from the Director (Environment) & Member Secretary, Goa-SEIAA stating that the Authority on perusal of Draft Zonal Master Plan for Eco-Sensitive Zones of Goa 2022 noticed that Eco Sensitive Zones declared by the Ministry of Environment & Forest in the State of Goa covers six Talukas such as Sattari, Dharbandora, Ponda, Sanguem, Canacona and Quepem, Bicholim taluka is not inlcuded in Draft Zonal Plan and it is not part of Eco Sensitive Zones. It is also clarified that Block-I Bicholim Mineral Block of Vedanta Ltd is also not a part of any Eco Sensitive Area.
Schedule-I species	Yes	The Project Proponent has submitted the letter from the Office of the Dy. Conservator of Forests vide Lr No: 5/FCA/GEN/F&F/DCFN/TECH/2022-23 dated 04.04.2023 with regard to list of Flora and Fauna species present in core and buffer zone. The following Schedule-I species are found in the study area such as 1 Common leopard (*Felidae*)

		2 White-bellied Sea-Eagle(*Accipitridae*) 3 Indian Peafowl (*Phasianidae*) 4 Crimson rose- Butterfly (*Papilionidae*)
Status of Wildlife Conservation Plan	Yes	Wild Life Conservation Plan is prepared and submitted for approval of Chief Wildlife Warden (CWLW) on 19.06.2023. PP has submitted the copy of the acknowledgement from Chief Wildlife Warden.

x. Green belt/plantation details:

Proposed area for green belt/plantation	105.8894 ha
Budget for green plant& plantation till the end of life of mine.	Rs159.0Lakhs
Particulars for Green belt/plantation	Area covered (in Ha)
7.5 m barrier & non-mineralized zone	25 ha
50 m safety zone of nallah, roads, electric lines	
Additional information (if any)	80.8894 ha (on backfilled area)

xi. Details of Baseline data:

Baseline Data (Air / Water / Noise / Soil / Ground water table/ others)	
Period of baseline data collection	March, 2023 to May, 2023
Season (Summer / Pre-monsoon / Post-monsoon / Winter)	Summer Season
Ambient Air Quality (no. of locations) and results	No. of Locations Parameters Results 9 PM10 27.0 to 56.0 mg/m^3 PM2.5 14.0 to 36.0 mg/m^3 SO2 4.0 to 13.0 mg/m^3 NO2 <4.0 to 18.0 mg/m^3
Noise level (no. of locations) and results	No. of Locations Parameters Results 09 During Day Time [Leq dB(A)] 43.1 to 61.7

	During Night Time [Leq dB(A)] 35.9 to 49.3
Water Quality (no. of locations) and results	Surface water quality No. of Locations Parameters Results 07 pH 6.35 - 7.39 TDS (mg/l) 72 - 11240 Fluoride (mg/l) <0.1 Chloride (mg/l) 18 - 5620 Fe (mg/l) <0.05 Dissolved Oxygen (as O_2), mg/l 6.2 – 6.9 Biochemical Oxygen Demand (as O_2), mg/l <3.0 Chemical Oxygen Demand (COD) mg/l 22.0 – 26.0 Groundwater Quality No. of Locations Parameters Results 10 pH 5.63 – 7.07 TDS (mg/l)

	20 – 150 Fluoride (mg/l) 0.1 Chloride (mg/l) 5.0 - 19.0
Soil Quality (no. of locations) and results	No. of Locations Parameters Results 07 pH 5.38 to 5.78 Electrical Conductivity (mohs/cm) 0.28 to 0.318 Nitrogen (kg/ha) 200 to 275 Phosphorus (kg/ha) 14.3 to 17.8 Potassium (kg/ha) 230 to 263

xii. Public Hearing (PH) Details:

Advertisement for PH with date	07.07.2023 Regional: Bhangar Bhui, Heraldo, Lokmat & Free press journal (Mumbai Edition) News papers
Date of PH	11/08/2023
Venue	Narayan Zantye Multipurpose Sports Complex, Sarvan, Bicholim, Goa
Chaired by	District Collector, North Goa
Main issues raised during PH	Pollution, impact on ponds, Support for Education, Health, Agriculture Development & Skill Development, Employment.
Budget proposed for addressing issues raised during PH	Rs 309.3 Lakhs

xiii. Rehabilitation & Resettlement:

R & R details	There is presence of habitation within ML Area at Mulgao and lamgao villages. Safety

	Buffer of 50m will be maintained from the habitations. No Rehabilitation & Resettlement Plan is proposed during life of mine.

xiv. Court case details:

Court Case	Yes
Additional information (if any)	<u>First Case (Suresh Zantye & ors. v. State of Goa & Ors.):</u> 1. WP(Civil) 2478 of 2022 (Filing number) before the High Court of Bombay at Goa 2. The said writ petition has been filed against the State Government and seeks to challenge the identification of properties bearing survey no. 90/1(part) and 96/0 as part of the recently auctioned Bicholim mine. The petition alleges violation of Rule 5 &6 of Mineral Evidence Rules and Section 10B of MMDR, Act by the State of Goa and DMG. The petitioner has prayed for quashing of auction notice to the extend it includes the property of the petitioner and grant a writ of mandamus against the Respondents. 3. Case status is pending. 4. No adverse orders have been passed. 5. As per the last order the matter has been disposed of by the HC on 17th July 2023 with a direction to the Petitioner to make a representation before the Government and the Government is to dispose of the same within four months. <u>Second Case (MSPL v. State of Goa & Ors.):</u> 1. WP 592 of 2022 2. The said writ petition seeks to challenge the constitutionality of the tender documents of Phase I auction of Goa mines. The petition alleges violation of Rule 5 & 6 of Mineral Evidence Rules by the State of Goa and DMG. The petition alleges non-disclosure of essential facts such as bore hole data, approved mining plan, production data of the previous five years and exploration data. The petitioner has prayed for quashing of auction notice to the extend it fails to include the essential facts and in the alternative to stay the auction. 3. Case status is pending 4. No adverse orders have been passed. 5. As per the last order the matter was listed on 01.09.2023. <u>Third Case (Suresh Govind Gaonkar & Ors v. Directorate of Mines and Geology & Ors):</u> 1. PIL WP 2029/2023 (F) 2. PIL has been filed challenging state's decision to go ahead with the auction of the mining block. The said PIL also challenges the order dated 13.01.2023 which issues LOI to the successful bidder. The primary grievances of the petitioners are that village settlement are included within the mining blocks auctioned. Hence this PIL was preferred under Article 226 and 21 of the Constitution. Vedanta Limited is Respondent No. 3 in the aforementioned PIL. The matter is listed for first hearing on 25.09.23.

xv. Affidavit/Undertaking details:

Affidavit as per Ministry's OM dated 30.05.2018	The Project Proponent has submitted the Affidavit in a non-judicial stamp paper of Rs 100 bearing no: A807037 dated 24.04.2023 stating that they will comply to the directions issued by MoEF&CC vide Office Memorandum F.No.3-50/2017.IA.III (Pt) dated 30th May, 2018 in terms of directions given Hon'ble Supreme Court in judgment dated 2nd August 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of common cause versus Union of India & Ors.
Undertaking of Project Proponent	The Project Proponent has submitted an undertaking stating that the Environmental Impact Assessment Report of Block-1 Bicholim Mineral Block of M/s Vedanta Ltd was prepared by M/s Mineral Engineering Services, QCI/NABET Accredited EIA Consultant at Sr.No. 55 as per list of list of accredited consultant/organizations. The Project Proponent hereby undertaken that the information and data provided in the EIA report and submitted to the Ministry are factually correct and fully accountable for the same.
Consultant submitted an Undertaking vide letter dated 02.06.2023	This is to declare that the prescribed ToRs have been complied with and that the data submitted are factually correct in respect of EIA & EMP report prepared for Block-1 Bicholim Mineral Block of M/s Vedanta Ltd, Goa.

xvi. Details of the Environmental Management Plan (EMP):

Activities	Capital cost (Crores)	Recurring cost (Lakhs/annum)
Plantation	-	7.5
Environment monitoring	44	44
Air pollution control measures	20	300
Water Treatment	-	11
Erosion control /monsoon measures	-	221
Personal protective equipment	-	15
Maintenance of fire protection systems	-	1.5
Environment awareness & training	-	5
Health	8	16
Total	72	621

xvii. Details of project cost and employment:

Particulars	(Rs. In lakhs)
Project Cost	25000 Lakhs
Employment	716 no.s

3.2.3. Deliberations by the EAC in previous meetings

N/A

3.2.4. Deliberations by the EAC in current meetings

The Project Proponent and the Consultant presented the KML file to indicate the site features in the study area of 10 km radius. The Project Proponent has shown the boundary of the mine lease area and informed the EAC that there are two habitations such as Mulgao and Lumgao and schools are located within the mine lease area. Two schools are located in the Mulgao Village. One school is located at a distance of 138m from the Ultimate Pit Limit (UPL) and the other school is located at a distance of 190m from the Ultimate Pit Limit (UPL). No drilling and blasting is involved. Green barriers are maintained to prevent it from the environment hazards. Tributary of Asnora River is touching the mine lease area on the western side. It has been observed that area between river & bottom pit 5 is approximately 6m AMSL which obstructs the flow of water between them, even the high flood condition and at the place where river is touching the block boundary, it is 10.93m AMSL. Hence, even during high flood level, river will not interact with the pit water. The EAC noted that there are few temples, caves and fort are present in the vicinity of the mine lease area. There will be no surface dumping and will be backfilled concurrently and there are voids available for backfilling. Later on the Project Proponent has informed that the pits will be used as a settling ponds. The EAC noted that the Project Proponent is giving two contradictory statements. The EAC asked the Project Proponent to provide the design of the settling ponds in different pits.

The Project Proponent has informed the EAC that Block-I Bicholim block is an old mine and it was auctioned to Vedanta Ltd in the year 2022 and Letter of Intent (LoI) was granted on 13.01.2023. The EAC asked the Project Proponent that after the year 2018 whether any Environmental Clearance has been granted in the State of Goa. The Project Proponent has informed the EAC after the year 2018 there was no mining in Goa and this instant case is the first case for grant of Environmental Clearance. No forest land is involved in the mine lease area. The EAC noted that the Project Proponent has submitted that Mayem Forest common boundary is sharing with the mine lease area. The EAC was of the view that involvement of forest land within the mine lease area is not clear as there are two contradictory information given by the Project Proponent. The EAC also noted that in this regard, the Project Proponent has not submitted the letter from the Forest Dept. No National Park/Wildlife Sanctuary, ESZ/ESA etc., is located within 10km radius of the study area. An application for Groundwater withdrawal was submitted to Water Resource Department submitted on 19.06.2023. No Rehabilitation and resettlement is involved in this proposal.

The Project Proponent has informed the EAC that ROM/Iron ore or Screened/crushed material will be transported by 10.5 Tonne trippers from mine to Sarmanas jetty through a dedicated road. The total distance from the mine to Jetty is 5.48 km of which 0.94 km stretch is public road and remaining 4.54 km is company owned dedicated road. Width of the road is 7.0m. Twenty four hours continuous volume count was manually undertaken during May-2023. The EAC noted that the width of the road is not adequate. About 1205 no. of trips per day will be carried out. No. of working days will be 365. The EAC was of the view that when the rainfall is 3500 mm/year it will be difficult to carry out mining for 365 days. The Project Proponent has informed the EAC that 275 working days are considered for calculation of traffic load. The EAC asked the Project Proponent to bypass the public road and also to explore the possibility of increasing the capacity of the truck so as to reduce the no. of trips. The EAC opined that the Project Proponent needs to revisit the traffic load by considering the cycle time and waiting time. The EAC also asked the Project Proponent to strengthen the road and convert the road into concrete road.

The Project Proponent also informed the EAC that the predominant wind direction was from West to East. Wildlife Conservation Plan has been prepared and submitted to Chief Wildlife Warden (CWLW) on 19.06.2023 for approval with a budget of Rs. 50 Lakhs. At the end of conceptual stage, an area of 105 ha will be under green belt/ plantation. Eco restoration will be carried out in similar to the reclaimed activity carried out in Sanquelim mine. Public hearing was carried out on 11.08.2023 and a budget of Rs 309.3 Lakhs have been earmarked to address the concerns raised during public hearing. The EAC also noted that about 4708 written objections was submitted against the project during the public hearing. The Project Proponent has informed the EAC that the issues are same but the no. of objection letters were more in number and about 5183 no.s of letters were also received in support of the project. The EAC also noted that many complaints were received against the public hearing dated 11.08.2023. The EAC asked the Project Proponent to submit the video recording of the public hearing. There are three court cases at present regarding the auction process and one of the court case was disposed on 17.07.2023 and will abide the directions of the Hon'ble High Court. Other two cases in the matter of MSPL v. State of Goa & Ors. in WP 592 of 2022 and in the matter of Suresh Govind Gaonkar & Ors v. Directorate of Mines and Geology & Ors. in PIL WP 2029/2023 (F) are pending before the Hon'ble High Court and no adverse orders has been passed.

The Department of Mines and Geology, Goa was invited as a special invitee to discuss the present status of mining in Goa. The Deputy Director has informed that the State Govt. is looking positive to restart the mining operations in Goa. Besides 10% DMF, there is also a scheme called Goa Iron Ore permanent fund wherein 10% of the sale value of the mineral will be spent towards community based activities as per the direction of the Hon'ble Supreme Court. The State Govt. has put up a scheme for approval before the Hon'ble Supreme Court in line with Pradhan Mantri Khanij Kshetra Kalyan Yojana (PMKKKY) Scheme. This fund has to be kept for prosperity. The report with regard to illegal mining will be obtained from the SIT and will be provided to the Ministry.

After detailed deliberations made by the Project Proponent and the Consultant, the EAC noted that the handling of waste of 25.162 MTPA will be more than the Iron Ore production capacity of 3.0 MTPA. The EAC was of the view that the pollution potential will be more in handling of waste. The EAC not convinced with plan for backfilling and with the design of settling ponds as the annual rainfall is projected as 3500 mm/year. The EAC observed that the instant mine is located in dense vegetation area. The EAC also noted that the mine lease area is located close to the proximity of the habitations, school, forest (Mayem common boundary), river, temples, caves and fort. The EAC also observed that the Project Proponent has not properly worked out the traffic load. Many litigations were received against the public hearing/project. Further, the EAC also noted that mines were not in operation in Goa from the year 2018 and this instant proposal is a first case for grant of Environmental Clearance (EC) under auction after 5 years. Thus there is a need to ascertain the present scenario and ground reality with regards to handling of waste, settling ponds, location of waste dump w.r.t habitation, school and river, other surface features as forest (Mayem common boundary), temples, caves and fort, mineral transportation route and traffic congestion. The EAC was of the view that a site visit needs to be conducted by a sub-committee comprising of EAC Members and officers from MoEF&CC. The EAC opined that the Ministry may constitute a sub-committee and submit its report to enable the committee to take a decision on the proposal. Therefore, the EAC **deferred** the proposal for want of following additional information: -

i. The site visit report of the subcommittee.

ii. The Project Proponent needs to revisit the plan for backfilling with clearly indicating the voids area and the capacity available/required for backfilling.

iii. The Project Proponent needs to submit the design of settling ponds by considering the annual rainfall, catchment area and its discharge.

iv. The Project Proponent needs to bypass the public road and also to explore the possibility of increasing the capacity of the truck so as to reduce the no. of trips. The EAC opined that the Project Proponent needs to revisit the traffic load by considering the cycle time and waiting time. The Project Proponent needs to submit the action plan for strengthening the road and for converting the unpaved road into concrete road.

v. Since the mine lease area is sharing the Mayem Forest common boundary, the Project Proponent needs to submit the letter from the State Forest Department regarding the involvement of forest land in the mine lease area.

vi. The Project Proponent needs to submit a letter from the Department of Geology and Mining, Government of Goa clarifying whether any illegal mining within the mine lease area has been carried out or not and whether the same has been carried out by M/s. Vedanta Limited or not?

vii. The Project Proponent needs to submit the video recording of the public hearing.

3.2.5. Recommendation of EAC

Deferred for ADS

4. Any Other Item(s)

N/A

5. List of Attendees

Sr. No.	Name	Designation	Email ID	Remarks
1	Mr Pankaj Verma	Scientist E	pankaj.verma@nic.in	
2	Dr Dinesh Misra	IFS (Retired)	dmisra56@gmail.com	
3	Sh Niranjan Kumar Vasu	Member (EAC)	vasuifs@gmail.com	
4	Dr Asha Rajvanshi	Member (EAC)	asharajvanshi@gmail.com	

5	Shri Avijit Gosh	Member (EAC)	avijitmining@gmail.com	
6	Shri Bandi Ramchandra Reddy	Member (EAC)	reddyramchandra8858@gmail.com	
7	Prof Pramod Kumar	Member (EAC)	nita_pramod@yahoo.com	Absent
8	Prof Devesh Walia	Member (EAC)	devesh.eac@gmail.com	Absent
9	Dr Suresh Tiwari	Member (EAC)	smbtiwari@gmail.com	Absent
10	Dr K G Asha Manjari	Member (EAC)	kimberlite2016@gmail.com	
11	Prof Dev Dutt Sharma	Member (EAC)	ddshpu@gmail.com	Absent
12	Dr Y G Kale Representative of IBM	Member (EAC)	ygkale@ibm.gov.in	
13	Shri Mohammad Niyazi	Member (EAC)	dirsnt.dgms@gmail.com	
14	Mr V K Soni Representative of IMD	Member (EAC)	vijay.soni@imd.gov.in	Absent

vedanta
transforming elements

sesa goa iron ore

Date: 01/12/2023

To,
The Member Secretary,
Ministry of Environment, Forest and Climate Change,
Govt. of India, Indira Prayavaran Bhawan,
Jorbag Road, Aliganj, New Delhi-110003

Subject: Block-I Bicholim Mineral Block (Area: 478.5206 Ha) located at Villages Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao Taluka: Bicholim, District: North Goa, State: Goa by Vedanta Ltd._ **Submission of Additional Details Sought (ADS) Reply Reg.**

Ref: **1. Proposal No. IA/GA/MIN/442593/2023 & MoEF&CC File No. IA-J-11015/3/2023-IA-II(NCM)**

2. Proposal Considered: 20th EAC meeting held during 21-22 Sept., 2023 (Agenda Item No. 2.2)

3. Minutes of Meeting of 22nd EAC held during 14-15, Nov., 2023 uploaded on Parivesh 2.0 Web Portal

Respected Sir,

With reference to the aforesaid subject and above cited reference; we would like to apprise that application of the above-mentioned proposal was submitted on Parivesh 2.0 Web Portal for obtaining Environment Clearance. Proposal for EC was present before the EAC (Non-coal Mining) in its 20th Meeting held on 22.09.2023. Minutes of 20th EAC was uploaded on Parivesh Web Portal and committee asked to submit the Reply of Additional Details. The EAC was of the view that a site visit needs to be conducted by a sub-committee comprising of EAC Members and Officers from MoEF&CC.

Accordingly, the Ministry vide letter dated 09.10.2023 constituted a sub-committee to conduct the site visit during 29th to 31st Oct., 2023. Subsequently, the committee undertook the day long field visit on 30.10.2023.

The EAC Meeting held during the 14-15th Nov., 2023 and Report of the Hon'ble sub-committee was discussed.

Now, we are herewith submitting the following documents for further consideration.

A. Reply of Additional Details Sought (ADS) raised in 20th EAC meeting held on 22.09.2023.

B. Reply of the recommendations of the Hon'ble sub-committee.

We request your good self to kindly consider our proposal in upcoming EAC for grant of Environment Clearance.

Thanking you,
Yours faithfully,
For Vedanta Limited

Dhirajkumar Jagdish
Dy Chief Executive Officer-Iron ore Goa
Authorised Signatory

Encl: As above

VEDANTA LIMITED
Sesa Goa iron ore: Sesa Ghor, 20 EDC Complex, Patto, Panjim, Goa – 403 001, India
T +91 0832 2460600 | Website: www.sesagoaironore.com

Registered Office: Vedanta Limited, 1st Floor, 'C' wing, Unit 103, Corporate Avenue, Atul Projects, Chakala, Andheri (East), Mumbai 400093, Maharashtra, India.
CIN: L13209MH1965PLC291394

Sensitivity: Public (C4)

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GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE
(IMPACT ASSESSMENT DIVISION)
NON-COAL MINING SECTOR
****

SUMMARY RECORD OF 20TH MEETING OF THE COMMITTEE OF THE RE-CONSTITUTION OFEXPERT APPRAISAL COMMITTEE FOR ENVIRONMENTAL APPRAISAL OF NON-COAL MINING PROJECTS CONSTITUTED UNDER THE EIA NOTIFICATION, 2006.

The 20th meeting of the Re-constitution of Expert Appraisal Committee (EAC) for Environmental Appraisal of Mining Projects (Non-Coal) of the Ministry of Environment, Forest and Climate Change was held during 21-22 September, 2023 through video conference. The list of participants is annexed herewith. After login of the Committee Members through video conference link provided by NIC discussion on each of the Agenda Items was taken up ad-seriatim.

(1.0) Deliberation & Circulation on the Minutes of 19thEAC (Non-Coal Mining) meeting held during 24-25 August, 2023:

The minutes of the 19th EAC meeting held during 24-25 August, 2023 were placed before the members of the EAC.

Day 1: 21st September, 2023 (Thursday)

1.1 Proposal for Mining of Iron Ore in Jilling Langalotta Iron Ore Mine of M/s Odisha Mining Corporation Limited with total excavation of 17.4385 Million TPA [Saleable Iron ore- 7.7723 Million TPA, Mineral rejects-2.2276 Million TPA, Waste-7.4385 Million TPA, Topsoil: Nil] along with existing: 5 nos. with Total Capacity - 1400 TPH (Stationary Crushing Unit), 2 x 300 TPH, 2 x 200 TPH, 1 x 400 TPH, Existing: 3 nos. with Total Capacity - 150 TPH (Mobile Screening Unit), 1 x 150 TPH Mobile Screening Plant 1 x 50 TPH, Stationary Screening Plant, 1 x 100 TPH Mobile Screening Plant, New: 10 nos. with Total Capacity - 4550 TPH (Crushing Unit), 1x800 TPH, 3 x 600 TPH, 3 x 400 TPH, 1 x 300 TPH, 1 x 250 TPH, 1x 200 TPH, New: 4 nos. with Total Capacity - 1000 TPH (Portable Screening Units), 4 x 250 TPH in the mine lease area of [456.037 ha (as per DGPS)/456.100 ha (as per RoR)] located at Village(s) Jalahari, Jurudi, Banspani, Khuntapani, Bholebeda, Jajang, Baitarani Reserve Forest in Barbil Tehsil, Keonjhar District, Odisha - [Proposal No: IA/OR/MIN/440292/2023, IA-J11015/34/2021-IA-II(M), EIA Consultant: M/s. MECON Ltd] - Environmental Clearance (Auction mine)

The instant proposal is for mining of Iron Ore in Jilling Langalotta Iron Ore Mine of M/s Odisha Mining Corporation Limited with total excavation of 17.4385 Million TPA

xi. The Project Proponent needs to carry out the Public Hearing as per provisions of EIA Notification, 2006. PP should also submit the time bound action plan on concerns of the public through a separate budget with capital expenditure with a timeline of 3 years. The Project proponent shall ensure that the activities proposed under the public hearing shall be different from the CSR activities.

xii. The Project Proponent shall carry out the assessment of impact due to the proposed project as per the guidelines issued by the Central Ground Water Authority from time to time and submit the same as a part of the EIA/EMP. The project proponent shall conduct hydrological study for projects involving intersection of ground water table as per the guidelines issued by the Central Ground Water Authority from time to time and submit the same as a part of the EIA/EMP.

xiii. The Project Proponent shall explore the possibility of reduction of specific water requirement by optimization / technology up gradation, etc. The efforts shall be delineated in the EIA/EMP.

xiv. The Project Proponent shall prepare the scheme for mandatory recycle/re-use of water as specified by the Central Ground Water Authority for different category areas seeking NoC for ground water withdrawal and the shall submit as part of EIA/EMP report.

xv. The Action Plan on the compliance of the recommendations of the CAG as per Ministry's 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.

2.2 Bicholim Mineral Block- Block 1 (Auction Block) of M/s Vedanta Limited for mining of Iron Ore with proposed production capacity of 3.0 MTPA, Waste: 25.162 MTPA(Total Excavation: 28.162 MTPA) along with crushing and screening plant capacity of 4.0 MTPA in the mine lease area of 478.5206 ha, located in Bicholim, Bordem, Lamgao, Mulgoa, Mayem & Sirigao Villages of Bicholim Taluka of North Goa District, Goa - [F.No: IA-J-11015/3/2023-IA-II(NCM), Proposal No: IA/GA/MIN/442593/2023, Consultant: M/s Mineral Engineering Services] – Environmental Clearance (EC)

The instant proposal is for mining of Iron Ore in Bicholim Mineral Block – Block 1 (Auction Block) of M/s Vedanta Limited with proposed production capacity of 3.0 MTPA, Waste: 25.162 MTPA (Total Excavation: 28.162 MTPA) along with crushing and screening plant capacity of 4.0 MTPA in the mine lease area of 478.5206 ha, located in

Bicholim, Bordem, Lamgao, Mulgoa, Mayem & Sirigao Villages of Bicholim Taluka of North Goa District, Goa.

2. The details of the project as ascertained from the document submitted by the Project Proponent and as revealed from the discussions held during the meeting are given as under:

i. The mine lease area is located between Latitude: 15º34'20.518"N to 15º 36'54.018"Nand Longitude: 73º54'4.754"E to 73º57'09.51"E. The mine lease area falls under the Survey of India Toposheet No: D43B14and falls in Seismic Zone-II.

ii. The proposed project activity is listed at schedule no. 1(a) Mining of Minerals and falls under Category "A" as the mining lease area is greater than 250ha and appraised at the Central level.

iii. Details of Terms of Reference (ToR):

Date of application	File. No/ Proposal No	Consideration	Details	Date of accord
16.03.2023	F.No: IA-J-11015/3/2023-IA-II(NCM) IA/GA/MIN/ 422323/2023	3-4 May, 2023	Terms of Reference (ToR) to M/s Vedanta Limited for mining of Iron Ore in Bicholim Mineral Block – Block 1 (Auction Block) with proposed production capacity of 3.0 MTPA, Waste: 25.162 MTPA (Total Excavation: 28.162 MTPA) along with crushing and screening plant capacity of 4.0 MTPA in the mine lease area of 478.5206 ha, located in Bicholim, Bordem, Lamgao, Mulgoa, Mayem & Sirigao Villages of Bicholim Taluka of North Goa District, Goa	16.06.2023

iv. Details of Mine Lease:

a) The Project Proponent has submitted the Letter of Intent (LoI) granted by the Government of Goa vide Lr No: DMG/25/Auction Cell/LOI-function/2023/2801 dated 13.01.2023 for grant of mining leasefor Block I - Bicholim Mineral Block for Iron Ore in Bicholim, Bordem, Lamgao, Mulgao Mayem & Sirigao villages, Bicholim Taluka, North Goa District over an area of 478.5206 Hectare for a

period of 50 (fifty) years in pursuant to Rule 10(2) of the Auction Rules. This letter of intent is valid for a period of 3 (three) years from the date of its issuance.

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

Private land	421.1153 Ha
Government land	57.4053 Ha
Total Mining lease area (MLA)	478.5206 Ha
Private land for crusher, workshop & other infrastructure outside the MLA	Not Applicable

vi. Details of Mining Plan:

Review and Mining Plan approved by Indian Bureau of Mines, Goa	Letter No.	No. MCDR-MPC|1|2O23-GOA-IBM_ RO_ GOA
	Date	26.05.2023
	Mine Lease Area	478.5206 Ha
	Mineral	Iron Ore (Major Mineral)
Mining Parameters	Quantitative Description	
Method of Mining	Opencast mechanized mining without Drilling & Blasting	
Drilling/Blasting	Not Applicable	
Total Reserves and Resources	84.73 Million Tonnes	
Proved Mineral Reserve	36.071 Million Tonnes	
Life of mine	30 years	
Bench Height	7 m	
Bench Width	10 m	
Individual bench slope	70^0	
Overall pit slope	$<26^0$	
RoM output size	Less than 500 mm	
Crushing/Screening	Mobile Dry Crushing and Screening plant shall be available within the proposed mine to handle 4 MTPA of crude ore. The primary crusher will consist of 1 no. of Jaw crusher of capacity 120 TPH with an input feed of -500mm and shall produce output of -70 mm. It shall be followed by secondary crushers, 2 no.s of capacity 300 TPH and 200 TPH respectively. The input feed size shall be -70mm and output feed size obtained shall be -40mm. The Screening Plants of capacity -600TPH shall be installed where input the feed size shall be -70mm to obtain product of -40mm lumps & -10mm fines.	
Transportation details	ROM/Iron ore or Screened/crushed material will be transported by 10.5 Tonne trippers from Mine to Sarmanas jetty through a dedicated road. The total	

	distance from the mine to Jetty is 5.48 km of which 0.94 km stretch is public road and remaining 4.54 km is company owned dedicated road.
Dumpers capacity	40 tonne (within mines)
Waste handling and Disposal	During the mining period, the waste generated by mining will be temporarily stacked within the mining lease area as surface dump and backfilled in the exhausted portion of the pits. The total waste to be generated during the plan period is about 69.85 million tonnes. An area of 6.7146 Ha shall be utilized for Dumps and Material stocking at the conceptual stage of mining.

vii. Water requirement:

Total water requirement	664 KLD	Pit Water	628 KLD
		Ground water	36 KLD
Source	Water from Mine Pit will be used for dust suppression, Vehicle washing and Green belt. Water for domestic requirement will be met from bore well.		
Permission	The Bore wells are registered with Goa State Water Resource department. Application for using mine pit water will be submitted.		

viii. Nearest village / town/ highway/railway station / water bodies/monument:

Particulars	Particular's Name	Distance & Directions
Village	Lamgoa	Within the lease area
Town	Bicholim Town	0.5 km, East
Road	State Highway SH-1	0.65 km, East
Railway Station	Tivim Railwaystation	10.5 km, North
Water Bodies	Asnora River Mayem Lake Mandovi River	Touching lease boundary at one of the points 0.46 km 2.3 km, SW
School	Mulgao Govt. Primary School	Within the lease area
Worship places	Namuzgah/Idgah Shri Lairae Temple	Within the lease area 0.86 km
Caves/Fort	300m buffer from Lamgao caves Khorjuvem Fort: 2 km	

ix. Presence of Environmentally Sensitive areas in the study area:

Forest Land/Protected Area/Environmental Sensitivity Zone	Yes/ No	Details of Certificate/letter/Remarks
Forest Land	Yes	Mayem Forest Common Boundary with the mine lease area

		The following Reserve Forests are located within 10 km radius of the mine lease area such as Kharapal RF -6.7 km Kasarpal RF - 5.1 km Ambadgaon RF - 7.6 km
National Park/Wildlife Sanctuary, ESZ/ESA etc.,	No	The Project Proponent has submitted the letter from the Office of the Dy. Conservator of Forests vide Lr No: DCF(WP)/Tech/Digi/Vol-I/75/2022-23/ 968 dated 23.01.2023 stating that the proposed Bicholim Mineral Block-I is not situated within 10 km radius from the boundary of any the protected area in the State of Goa. PP also submitted the authenticated map dated 24.01.2023 showing the distance of the following Wildlife Sanctuary from the mine lease area. i. Madei Wild life Sanctury-14.105 km, E ii. Salim Ali Bird Sanctuary -10.553 km, SW iii. Bondla Wildlife Sanctuary -20.476 km, SE The Project Proponent also submitted the letter dated 22.02.2023 obtained from the Director (Environment) & Member Secretary, Goa-SEIAA stating that the Authority on perusal of Draft Zonal Master Plan for Eco-Sensitive Zones of Goa 2022 noticed that Eco Sensitive Zones declared by the Ministry of Environment & Forest in the State of Goa covers six Talukas such as Sattari, Dharbandora, Ponda, Sanguem, Canacona and Quepem, Bicholim taluka is not inlcuded in Draft Zonal Plan and it is not part of Eco Sensitive Zones. It is also clarified that Block-I Bicholim Mineral Block of Vedanta Ltd is also not a part of any Eco Sensitive Area.
Schedule-I species	Yes	The Project Proponent has submitted the letter from the Office of the Dy. Conservator of Forests vide Lr No: 5/FCA/GEN/F&F/DCFN/TECH/2022-23 dated 04.04.2023 with regard to list of Flora and Fauna species present in core and buffer zone. The following Schedule-I species are found in the study area such as 1 Common leopard (*Felidae*) 2 White-bellied Sea-Eagle(*Accipitridae*) 3 Indian Peafowl (*Phasianidae*) 4 Crimson rose- Butterfly (*Papilionidae*)

Status of Wildlife Conservation Plan	Yes	Wild Life Conservation Plan is prepared and submitted for approval of Chief Wildlife Warden (CWLW) on 19.06.2023. PP has submitted the copy of the acknowledgement from Chief Wildlife Warden.

x. Green belt/plantation details:

Proposed area for green belt/plantation	105.8894 ha
Budget for green plant& plantation till the end of life of mine.	Rs159.0Lakhs
Particulars for Green belt/plantation	Area covered (in Ha)
7.5 m barrier & non-mineralized zone	25 ha
50 m safety zone of nallah, roads, electric lines	
Additional information (if any)	80.8894 ha (on backfilled area)

xi. Details of Baseline data:

Baseline Data (Air / Water / Noise / Soil / Ground water table/ others)			
Period of baseline data collection	March, 2023 to May, 2023		
Season (Summer / Pre-monsoon / Post-monsoon / Winter)	Summer Season		
Ambient Air Quality (no. of locations) and results	No. of Locations	Parameters	Results
	9	PM10	27.0 to 56.0 μg/m^3
		PM2.5	14.0 to 36.0 μg/m^3
		SO2	4.0 to 13.0 μg/m^3
		NO2	<4.0 to 18.0 μg/m^3
Noise level (no. of locations) and results	No. of Locations	Parameters	Results
	09	During Day Time [Leq dB(A)]	43.1 to 61.7
		During Night Time [Leq dB(A)]	35.9 to 49.3
Water Quality (no. of locations) and results	Surface water quality		
	No. of Locations	Parameters	Results
	07	pH	6.35 - 7.39
		TDS (mg/l)	72 - 11240
		Fluoride (mg/l)	<0.1
		Chloride (mg/l)	18 - 5620
		Fe (mg/l)	<0.05
		Dissolved Oxygen (as O_2), mg/l	6.2 – 6.9
		Biochemical Oxygen Demand	<3.0

		(as O_2), mg/l	
		Chemical Oxygen Demand (COD) mg/l	22.0 – 26.0

Groundwater Quality

No. of Locations	Parameters	Results
10	pH	5.63 – 7.07
	TDS (mg/l)	20 – 150
	Fluoride (mg/l)	0.1
	Chloride (mg/l)	5.0 - 19.0

Soil Quality (no. of locations) and results

No. of Locations	Parameters	Results
07	pH	5.38 to 5.78
	Electrical Conductivity (mohs/cm)	0.28 to 0.318
	Nitrogen (kg/ha)	200 to 275
	Phosphorus (kg/ha)	14.3 to 17.8
	Potassium (kg/ha)	230 to 263

xii. Public Hearing (PH) Details:

Advertisement for PH with date	07.07.2023 Regional: Bhangar Bhui, Heraldo, Lokmat & Free press journal (Mumbai Edition) News papers
Date of PH	11/08/2023
Venue	Narayan Zantye Multipurpose Sports Complex, Sarvan, Bicholim, Goa
Chaired by	District Collector, North Goa
Main issues raised during PH	Pollution, impact on ponds, Support for Education, Health, Agriculture Development & Skill Development, Employment.
Budget proposed for addressing issues raised during PH	Rs 309.3 Lakhs

xiii. Rehabilitation & Resettlement:

R & R details	There is presence of habitation within ML Area at Mulgao and lamgao villages. Safety Buffer of 50m will be maintained from the habitations. No Rehabilitation & Resettlement Plan is proposed during life of mine.

xiv. Court case details:

Court Case	Yes
Additional information (if any)	First Case (Suresh Zantye & ors. v. State of Goa & Ors.):

	1. WP(Civil) 2478 of 2022 (Filing number) before the High Court of Bombay at Goa 2. The said writ petition has been filed against the State Government and seeks to challenge the identification of properties bearing survey no. 90/1(part) and 96/0 as part of the recently auctioned Bicholim mine. The petition alleges violation of Rule 5 &6 of Mineral Evidence Rules and Section 10B of MMDR, Act by the State of Goa and DMG. The petitioner has prayed for quashing of auction notice to the extend it includes the property of the petitioner and grant a writ of mandamus against the Respondents. 3. Case status is pending. 4. No adverse orders have been passed. 5. As per the last order the matter has been disposed of by the HC on 17th July 2023 with a direction to the Petitioner to make a representation before the Government and the Government is to dispose of the same within four months. <u>Second Case (MSPL v. State of Goa & Ors.):</u> 1. WP 592 of 2022 2. The said writ petition seeks to challenge the constitutionality of the tender documents of Phase I auction of Goa mines. The petition alleges violation of Rule 5 & 6 of Mineral Evidence Rules by the State of Goa and DMG. The petition alleges non-disclosure of essential facts such as bore hole data, approved mining plan, production data of the previous five years and exploration data. The petitioner has prayed for quashing of auction notice to the extend it fails to include the essential facts and in the alternative to stay the auction. 3. Case status is pending 4. No adverse orders have been passed. 5. As per the last order the matter was listed on 01.09.2023. <u>Third Case (Suresh Govind Gaonkar & Ors v. Directorate of Mines and Geology & Ors):</u> 1. PIL WP 2029/2023 (F)

	2. PIL has been filed challenging state's decision to go ahead with the auction of the mining block. The said PIL also challenges the order dated 13.01.2023 which issues LOI to the successful bidder. The primary grievances of the petitioners are that village settlement are included within the mining blocks auctioned. Hence this PIL was preferred under Article 226 and 21 of the Constitution. Vedanta Limited is Respondent No. 3 in the aforementioned PIL. The matter is listed for first hearing on 25.09.23.

xv. Affidavit/Undertaking details:

Affidavit as per Ministry's OM dated 30.05.2018	The Project Proponent has submitted the Affidavit in a non-judicial stamp paper of Rs 100 bearing no: A807037 dated 24.04.2023 stating that they will comply to the directions issued by MoEF&CC vide Office Memorandum F.No.3-50/2017.IA.III (Pt) dated 30th May, 2018 in terms of directions given Hon'ble Supreme Court in judgment dated 2nd August 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of common cause versus Union of India & Ors.
Undertaking of Project Proponent	The Project Proponent has submitted an undertaking stating that the Environmental Impact Assessment Report of Block-1 Bicholim Mineral Block of M/s Vedanta Ltd was prepared by M/s Mineral Engineering Services, QCI/NABET Accredited EIA Consultant at Sr.No. 55 as per list of list of accredited consultant/organizations. The Project Proponent hereby undertaken that the information and data provided in the EIA report and submitted to the Ministry are factually correct and fully accountable for the same.
Consultant submitted an Undertaking vide letter dated 02.06.2023	This is to declare that the prescribed ToRs have been complied with and that the data submitted are factually correct in respect of EIA & EMP report prepared for Block-1 Bicholim Mineral Block of M/s Vedanta Ltd, Goa.

xvi. Details of the Environmental Management Plan (EMP):

Activities	Capital cost (Crores)	Recurring cost (Lakhs/annum)

Plantation	-	7.5
Environment monitoring	44	44
Air pollution control measures	20	300
Water Treatment	-	11
Erosion control /monsoon measures	-	221
Personal protective equipment	-	15
Maintenance of fire protection systems	-	1.5
Environment awareness & training	-	5
Health	8	16
Total	72	621

xvii. Details of project cost and employment:

Particulars	(Rs. In lakhs)
Project Cost	25000 Lakhs
Employment	716 no.s

3. Observation and Recommendation of the EAC:-

The Project Proponent and the Consultant presented the KML file to indicate the site features in the study area of 10 km radius. The Project Proponent has shown the boundary of the mine lease area and informed the EAC that there are two habitations such as Mulgao and Lumgao and schools are located within the mine lease area. Two schools are located in the Mulgao Village. One school is located at a distance of 138m from the Ultimate Pit Limit (UPL) and the other school is located at a distance of 190m from the Ultimate Pit Limit (UPL). No drilling and blasting is involved. Green barriers are maintained to prevent it from the environment hazards. Tributary of Asnora River is touching the mine lease area on the western side. It has been observed that area between river & bottom pit 5 is approximately 6m AMSL which obstructs the flow of water between them, even the high flood condition and at the place where river is touching the block boundary, it is 10.93m AMSL. Hence, even during high flood level, river will not interact with the pit water. The EAC noted that there are few temples, caves and fort are present in the vicinity of the mine lease area. There will be no surface dumping and will be backfilled concurrently and there are voids available for backfilling. Later on the Project Proponent has informed that the pits will be used as a settling ponds. The EAC noted that the Project Proponent is giving two contradictory statements. The EAC asked the Project Proponent to provide the design of the settling ponds in different pits.

The Project Proponent has informed the EAC that Block-I Bicholim block is an old mine and it was auctioned to Vedanta Ltd in the year 2022 and Letter of Intent (LoI) was granted on 13.01.2023. The EAC asked the Project Proponent that after the year 2018 whether any Environmental Clearance has been granted in the State of Goa. The

Project Proponent has informed the EAC after the year 2018 there was no mining in Goa and this instant case is the first case for grant of Environmental Clearance. No forest land is involved in the mine lease area. The EAC noted that the Project Proponent has submitted that Mayem Forest common boundary is sharing with the mine lease area. The EAC was of the view that involvement of forest land within the mine lease area is not clear as there are two contradictory information given by the Project Proponent. The EAC also noted that in this regard, the Project Proponent has not submitted the letter from the Forest Dept. No National Park/Wildlife Sanctuary, ESZ/ESA etc., is located within 10km radius of the study area. An application for Groundwater withdrawal was submitted to Water Resource Department submitted on 19.06.2023. No Rehabilitation and resettlement is involved in this proposal.

The Project Proponent has informed the EAC that ROM/Iron ore or Screened/crushed material will be transported by 10.5 Tonne trippers from mine to Sarmanas jetty through a dedicated road. The total distance from the mine to Jetty is 5.48 km of which 0.94 km stretch is public road and remaining 4.54 km is company owned dedicated road. Width of the road is 7.0m. Twenty four hours continuous volume count was manually undertaken during May-2023. The EAC noted that the width of the road is not adequate. About 1205 no. of trips per day will be carried out. No. of working days will be 365. The EAC was of the view that when the rainfall is 3500 mm/year it will be difficult to carry out mining for 365 days. The Project Proponent has informed the EAC that 275 working days are considered for calculation of traffic load. The EAC asked the Project Proponent to bypass the public road and also to explore the possibility of increasing the capacity of the truck so as to reduce the no. of trips. The EAC opined that the Project Proponent needs to revisit the traffic load by considering the cycle time and waiting time. The EAC also asked the Project Proponent to strengthen the road and convert the road into concrete road.

The Project Proponent also informed the EAC that the predominant wind direction was from West to East. Wildlife Conservation Plan has been prepared and submitted to Chief Wildlife Warden (CWLW) on 19.06.2023 for approval with a budget of Rs. 50 Lakhs. At the end of conceptual stage, an area of 105 ha will be under green belt/ plantation. Eco restoration will be carried out in similar to the reclaimed activity carried out in Sanquelim mine. Public hearing was carried out on 11.08.2023 and a budget of Rs 309.3 Lakhs have been earmarked to address the concerns raised during public hearing. The EAC also noted that about 4708 written objections was submitted against the project during the public hearing. The Project Proponent has informed the EAC that the issues are same but the no. of objection letters were more in number and about 5183 no.s of letters were also received in support of the project. The EAC also noted that many complaints were received against the public hearing dated 11.08.2023. The EAC asked the Project Proponent to submit the video recording of the public

hearing. There are three court cases at present regarding the auction process and one of the court case was disposed on 17.07.2023 and will abide the directions of the Hon'ble High Court. Other two cases in the matter of MSPL v. State of Goa & Ors. in WP 592 of 2022 and in the matter of Suresh Govind Gaonkar & Ors v. Directorate of Mines and Geology & Ors. in PIL WP 2029/2023 (F) are pending before the Hon'ble High Court and no adverse orders has been passed.

The Department of Mines and Geology, Goa was invited as a special invitee to discuss the present status of mining in Goa. The Deputy Director has informed that the State Govt. is looking positive to restart the mining operations in Goa. Besides 10% DMF, there is also a scheme called Goa Iron Ore permanent fund wherein 10% of the sale value of the mineral will be spent towards community based activities as per the direction of the Hon'ble Supreme Court. The State Govt. has put up a scheme for approval before the Hon'ble Supreme Court in line with Pradhan Mantri Khanij Kshetra Kalyan Yojana (PMKKKY) Scheme. This fund has to be kept for prosperity. The report with regard to illegal mining will be obtained from the SIT and will be provided to the Ministry.

After detailed deliberations made by the Project Proponent and the Consultant, the EAC noted that the handling of waste of 25.162 MTPA will be more than the Iron Ore production capacity of 3.0 MTPA. The EAC was of the view that the pollution potential will be more in handling of waste. The EAC not convinced with plan for backfilling and with the design of settling ponds as the annual rainfall is projected as 3500 mm/year. The EAC observed that the instant mine is located in dense vegetation area. The EAC also noted that the mine lease area is located close to the proximity of the habitations, school, forest (Mayem common boundary), river, temples, caves and fort. The EAC also observed that the Project Proponent has not properly worked out the traffic load. Many litigations were received against the public hearing/project. Further, the EAC also noted that mines were not in operation in Goa from the year 2018 and this instant proposal is a first case for grant of Environmental Clearance (EC) under auction after 5 years. Thus there is a need to ascertain the present scenario and ground reality with regards to handling of waste, settling ponds, location of waste dump w.r.t habitation, school and river, other surface features as forest (Mayem common boundary), temples, caves and fort, mineral transportation route and traffic congestion. The EAC was of the view that a site visit needs to be conducted by a sub-committee comprising of EAC Members and officers from MoEF&CC. The EAC opined that the Ministry may constitute a sub-committee and submit its report to enable the committee to take a decision on the proposal. Therefore, the EAC **deferred** the proposal for want of following additional information: -

i. The site visit report of the subcommittee.

ii. The Project Proponent needs to revisit the plan for backfilling with clearly indicating the voids area and the capacity available/required for backfilling.

iii. The Project Proponent needs to submit the design of settling ponds by considering the annual rainfall, catchment area and its discharge.

iv. The Project Proponent needs to bypass the public road and also to explore the possibility of increasing the capacity of the truck so as to reduce the no. of trips. The EAC opined that the Project Proponent needs to revisit the traffic load by considering the cycle time and waiting time. The Project Proponent needs to submit the action plan for strengthening the road and for converting the unpaved road into concrete road.

v. Since the mine lease area is sharing the Mayem Forest common boundary, the Project Proponent needs to submit the letter from the State Forest Department regarding the involvement of forest land in the mine lease area.

vi. The Project Proponent needs to submit a letter from the Department of Geology and Mining, Government of Goa clarifying whether any illegal mining within the mine lease area has been carried out or not and whether the same has been carried out by M/s. Vedanta Limited or not?

vii. The Project Proponent needs to submit the video recording of the public hearing.

2.3 Chettichavadi Jaghir Magnesite and Dunite Mine of M/s. Dalmia Bharat Sugar and Industries Limited for Total Excavation of 1.4 million Tonne per annum (MTPA)/ [including 0.06 million tons of Magnesite, 0.12 million tons of Dunite, Waste, O.B, Inter Burden, Top Soil etc.] in the mine lease area of 449.364 ha, located at Chettichavadi Village, Salem Taluk, Salem District, Tamil Nadu - [File No: 23-227/2018-IA.III(V), Proposal No: IA/TN/MIN/241375/2018, Consultant: Aadhi Boomi Mining & Enviro Tech (P) Ltd] - Environmental Clearance (Violation)

The instant proposal is for mining of Magnesite and Dunite in Chettichavadi Jaghir Magnesite and Dunite Mine for Total Excavation of 1.4 million Tonne per annum (MTPA)/ [including 0.06 million tons of Magnesite, 0.12 million tons of Dunite, Waste, O.B, Inter Burden, Top Soil etc.] in the mine lease area of 449.364 ha, located at Chettichavadi Village, Salem Taluk, Salem District, Tamil Nadu.

2. The details of the project as ascertained from the document submitted by the Project Proponent and as revealed from the discussions held during the meeting are given as under:

PART A

REPLY OF ADDITIONAL DETAILS SOUGHT RAISED IN 20TH EAC MEETING HELD ON 22.09.2023

Point wise response to Additional Details Sought w.r.t Block 1 Bicholim mineral Block

Point No. 1 The site visit report of the sub-committee.

Reply: The Ministry vide letter dated 09.10.2023 constituted a sub-committee to conduct the site visit during 29th to 31st Oct., 2023. Subsequently, the committee undertook the day long field visit on 30.10.2023. The EAC Meeting held during the 14-15th Nov., 2023 and Report of the Hon'ble sub-committee was discussed. Reply of the recommendations of the Hon'ble sub-committee has been prepared and same is enclosed as ***Part B.***

Point No. 2 The Project Proponent needs to revisit the plan for backfilling with clearly indicating the voids area and the capacity available/required for backfilling.

Reply: 05 numbers of earlier mined out pits have been identified for backfilling purpose to accommodate waste to be generated in future besides additional pits to be made available progressively with mining till conceptual period. The physical details of available pits to be converted into backfilled areas are as follows:

Existing Available Pits, Area, Depth & Volume for Backfilling (Table 1)							
S. No.	*Mine Pit Location/ ID*	*Total Area of Pit in Ha*	*Area Available for Backfilling (Ha)*	*Depth (m)*	*Top RL (m)*	*Bot RL (m)*	*Vol (m3)*
1	*1 Top*	*22.4367*	*20.9942*	*99*	*62*	*-37*	*19356183*
2	*2 Top*	*13.0803*	*9.9465*	*60*	*60*	*0*	*2968920*
3	*3 Top*	*16.0596*	*13.1650*	*70*	*110*	*40*	*2240000*
4	*¾ Bottom*	*-*	*-*	*109*	*102*	*-7*	*-*
5	*5 Top*	*37.0242*	*35.7242*	*78*	*98*	*20*	*14213124*
6	*5 Top CB*	*-*	*-*	*77*	*124*	*47*	*-*
7	*5 Bottom*	*15.4196*	*12.0840*	*92*	*87*	*-5*	*7035240*
Total		*104.0204*	*91.9139*				*45813467*

Further, the details of pits to be made available progressively with mining till conceptual period and converted into backfilled areas are as follows:

Proposed Working Pits, Area, Depth & Volume will be available for Backfilling (Table 1A)								
S. No.	*Mine Pit Location/ ID*	*Total Area of Pit in Ha*	*Area Available for Backfilling (Ha)*	*Depth (m)*	*Top RL (m)*	*Bot RL (m)*	*Vol (m3)*	*Void availability for Backfilling*
1	*2 Top*	*43.1944*	*39.2331*	*116*	*91*	*-25*	*10518996*	*In 5th year*
2	*¾ Bottom*	*39.4606*	*34.6140*	*169*	*102*	*-67*	*15412643*	*End of 3rd year*
3	*2 Top*	*68.52*	*65.6420*	*113*	*103*	*-10*	*47912000*	*In 6th year to 10th year*
4	*3 Top/ 2top Combined*	*38.2545*	*36.6500*	*118*	*108*	*-10*	*38161200*	*In 11th year to 13th year*
5	*4 Top/3 Top Combined*	*-*	*-*	*84*	*73*	*-11*	*-*	*In 11th year to 13th year*
6	*5 Top CB Pit*	*-*	*-*	*168*	*94*	*-74*	*-*	*In 11th year to 13th year*
Total		*189.4295*	*176.1391*				*112004839*	

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As shown in the above tables, five number of earlier worked out pits will have void volume of 45.81 million m3 and during the Plan & Conceptual period progressive excavation, 112 million m3 of void volume will be available for backfilling. Therefore, a total of 157.98 million M3 of void volume will be available for backfilling in mined out pits having a cumulative area of 268.05 Ha. Additionally, 62 Ha area will be available as voids including 22 ha of water reservoir for storing rain water.

The details of proposed year-wise backfilling in these pits till conceptual period as per available space is given below in Table -2:

Table 2

Year	Waste Generation (m3)	Swelled Waste Volume (m3)	Backfilling Pit Location	Top MRL of Pit	Void Volume Utilised (m3)	Top MRL of Backfilled area	Dumped volume above TOP MRL of Pit (m3)	Remark
Year 1	1244889	1493867	5 Bot	87	1493867	45	0	
Year 1	2238957	2686749	5 Top	98	2686749	80	0	
Year 1	2238957	2686749	1 Top	100	2686749	20	0	
Year 2	732414	878897	5 Bot	87	878897	75	0	
Year 2	1810240	2172288	5 Top	98	2172288	110	0	Backfilling progressing towards 4 Top Area where Top RL is 170 Mts
Year 2	1810240	2172288	1 Top	100	2172288	40	0	
Year 3	500000	600000	5 Bot	87	600000	95	0	
Year 3	2000000	2400000	5 Top	98	2400000	170	0	Backfilling progressing towards 4 Top Area where Top RL is 170 Mts
Year 3	1502000	1802400	1 Top	100	1802400	100	0	
Year 3	1497434	1796920	3 Top	108	1796920	110	0	
Year 4	6768535	8122242	3/4 Bot	102	8122242	10	0	
Year 5	2912829	4992828	3/4 Bot	102	4992828	90	0	
	1497434							Rehandling of Waste
Year 5	8170622	9804746	2 Top	103	9804746	60	0	
From Year 6-Year 10	47750000	57300000	2 Top	103	57300000	100	0	
	5250000	6300000	5 Top	98	6300000	95	0	
From Year 11-Year 13	16075000	30140000	3 Top & 2 Top	108	30140000	73	0	
	10850000							Rehandling of Waste
	10075000	12090000	1 Top	100	11894483	100	195517	Surface Dump (1 Mts Height)
Total	124924550	147439973			147244456		195517	

It is evident from above tables that sufficient space is available to accommodate waste generated during life of mine considering swell factor of 1.2.

The conceptual availability of voids for backfilling is 157.98 (say 158) million CuM. Conceptual waste generation shall be 124.9 million Cum which will have a swelled volume of 149.90 million

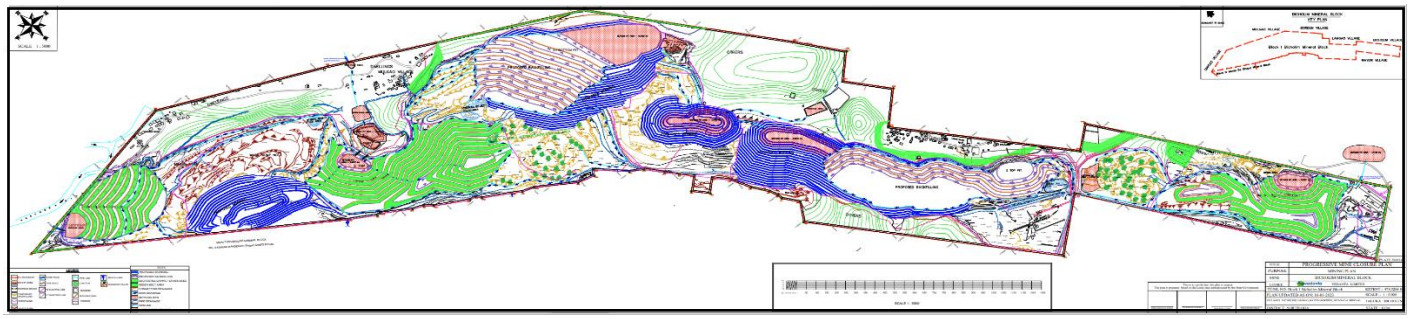
Sensitivity: Public (C4)

CuM (say 150 million CuM). The 0.2 million CuM of swelled waste will be dumped over top of backfilled pits as surface dumps as explained above in Table-2.

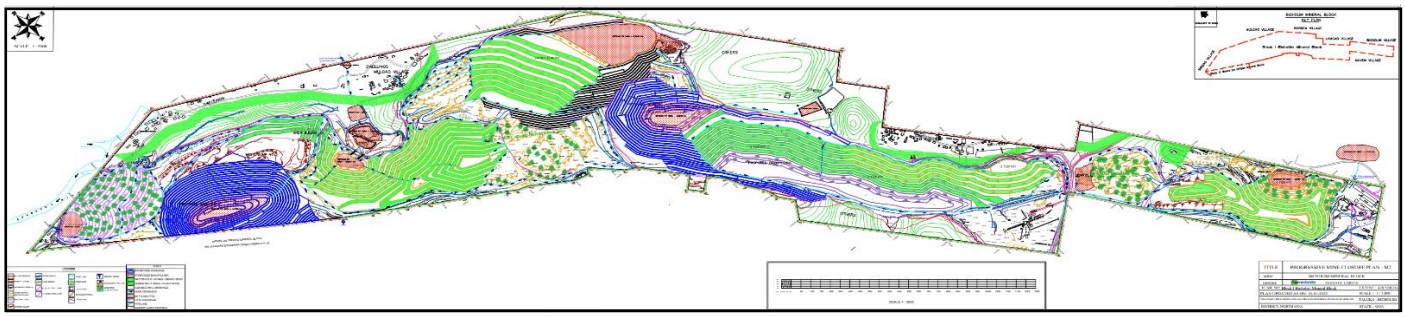
It is notable that the annual waste generation is in range of 4.35 to 12.58 million cum per year with an average of 9.61 million cum per year considering life of the mine as 13 years based on the presently available mineable reserves. It is also notable that life of the mine may reach upto 30 years if entire resources are converted to reserves by removing all encumbrances.

Drawings showing status of pits, reclaimed areas trough backfilling, green belt, siltation pits etc for five yearly block period up to conceptual stage is given below:

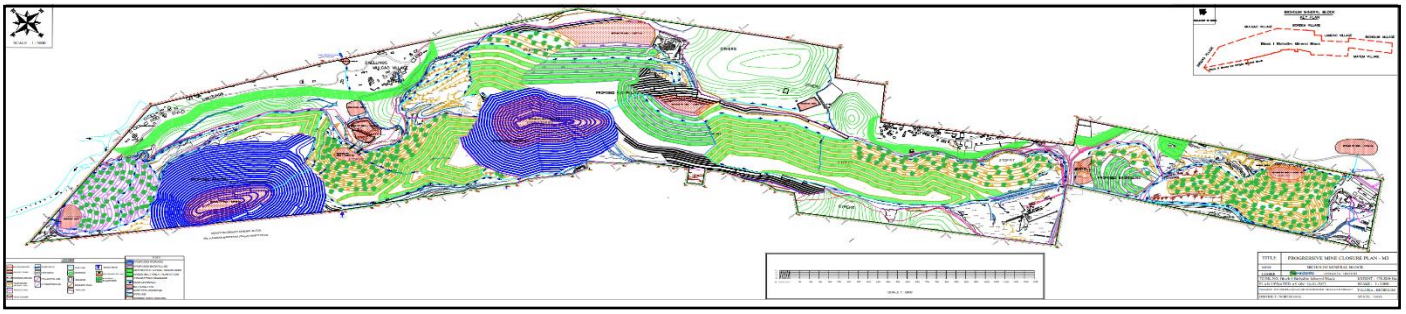
PMCP Plan showing Working Pit, Backfilling, Drainages and settling ponds at the end of Plan Period M1

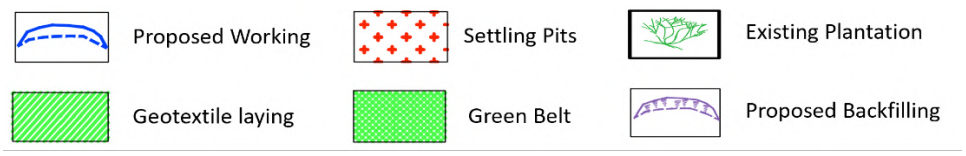


PMCP Plan showing Working Pit, Backfilling, Drainages and settling ponds at the end of Plan Period M2



FMCP Plan showing Working Pit, Backfilling, Drainages and settling ponds at the end of Plan Period M3





Sensitivity: Public (C4)

Point No. 3 **The Project Proponent needs to submit the design of settling ponds by considering the annual rainfall, catchment area and its discharge.**

Reply: As discussed above, this mine is old operational mine where the mining activities were ceased as per Supreme Court judgement in Goa Foundation case dated 07.02.2018 and therefore mine has adequate nos of abandoned pits and siltation ponds having arrangements of garland drains etc besides voids for backfilling.

06 numbers of earlier mined out abandoned pits and 12 nos of interlinked siltation ponds have been identified for collecting surface run off from respective catchment sub basins. The details of pits giving catchment and water holding capacity is as follows.

Table 3

Pit ID	*Area Covered by Pit (Ha)*	*Pit Dimensions (L*W*D) in mts*	*Catchment Area (In Ha)*	*Water holding Capacity. (Million m3)*	*Bottom RL (MRL)*
1 Top Pit	*13.3*	*380x350x52*	*40*	*1.46*	*-37*
2 Top Pit	*9.12*	*380x240x33*	*28*	*0.98*	*-7*
3/4 Bottom	*8.28*	*380x215x80*	*20*	*0.52*	*-7*
5 Top Pit	*12*	*400x300x95*	*40*	*1.40*	*7*
5 Top CB Pit	*6.66*	*370x180x78*	*11*	*0.39*	*64*
5 Bottom Pit	*8.75*	*350x250x40*	*21*	*0.74*	*-31*
TOTAL			*160*	*5.49*	

It is evident from the above table that six number of earlier worked out pits have been identified for collecting surface run-off as depicted in Table 3. A total of 5.49 MM3 of void volume is available for surface run-off holding in six pits having a cumulative area of 58.11 Ha which have a total catchment area of 160 Ha. Map showing pit positions is as follows:

Further, the pit-wise water holding capacities at the end of each plan period up to conceptual stage are as follows:

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Pit ID	Water holding Capacity (Million m3)			
	Existing Pits	Plan Period M1	Plan Period M2	Plan Period M3
1 Top Pit	1.46	0.63	0.63	0.63
2 Top Pit	0.98	1.19	1.51	0.48
3 Top Pit	-	1.23	-	-
3/4 Bottom	0.52	1.25	1.25	4.31
5 Top Pit	1.4	0.23	0.23	0.23
5 Top CB Pit	0.39	0.64	1.43	1.43
5 Bottom Pit	0.74	0.44	0.44	0.44
Total	**5.49**	**5.61**	**5.49**	**7.50**

It is evident from the above table that during entire mine life water holding capacity of 5.49 or more than 5.49 million CuM will be available at any time. Further, a total 12 nos of settling ponds have been earmarked within and outside the ML Area for collecting surface run-off. The details of settling ponds are as follows

Table – 4

Details of Settling Ponds within & outside the ML Area

Pit ID	Area in m2	Depth in mts	Volume in m3	Location
SP1	1824	1.8	3283.2	5 Top pit Area
SP2	1667	1.8	3000.6	
SP3	27879	8	223032	
SP4	5208	2	10416	5 Top Mulgao Area
SP5	8602	2	17204	
SP6	4661	2.5	11652.5	
SP7	3896	1.5	5844	1 Top Area (Sec 43)
SP8	5831	3	17493	2 top area
SP9	3753	1.5	5629.5	3 Top Sec 22
SP10	5564	1.5	8346	
SP11	2443	3	7329	Outside lease (Above 1 Top Area)
SP12	17130	4	68520	
Total			381749.8	

It is clear from the above table that a total of 0.38 Million M3 of void volume is available for surface run-off holding in 12 nos settling ponds having a cumulative area of 8.84 Ha. Considering five fillings in a year, the gross volumes of settling ponds will be 1.90 Million M3.

Layout of settling ponds and drainage network is as follows:

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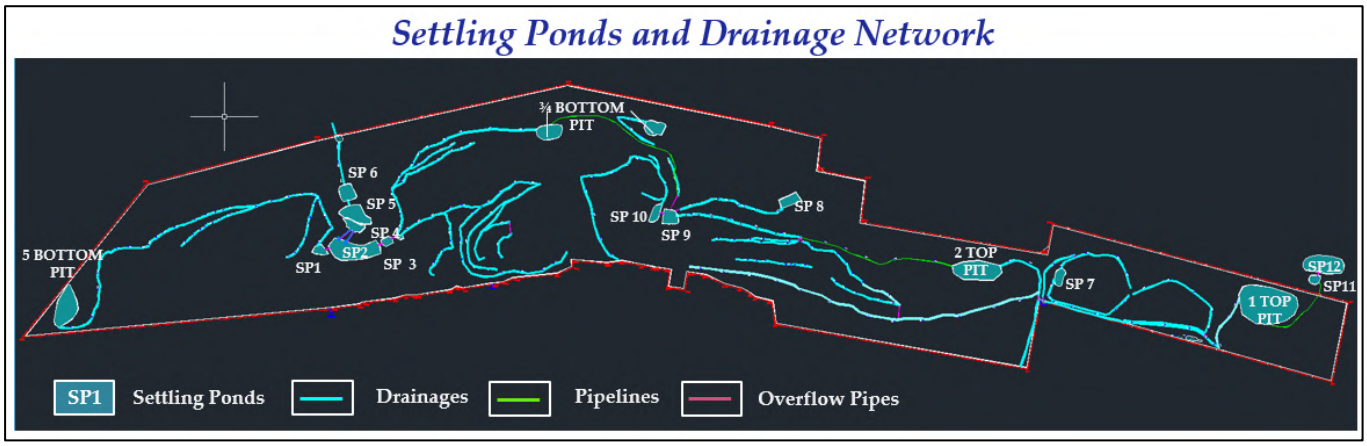

- Catchment area of Pits = 160 ha
- Rainfall received = 160 ha x 3500 mm = 5.6 Million CuM
- Effective surface runoff to be accumulated in voids = 5.6 x 0.7 = 3.92 Million CuM
- Pits water holding capacity = 5.49 Million CuM
- Gross settling ponds capacity = 1.90 Million CuM
- Total water holding capacity of mined pits and settling ponds = 7.39 Million CuM

Since total water holding capacity in pits and settling ponds (7.39 Million CuM) is more than rainfall and surface runoff volume from catchment (3.92 Million CuM), there is sufficient space for effective surface runoff management in during extreme precipitation times.

The dimensions of the drains to be maintained will be 2m in width and 1.5 m in depth everywhere in the mine. A proper height will be maintained on the sides of the garland drain so that water does not get over-flooded from the drains. The available garland drains are 11313 m in length and daily average surface run-off is estimated as 14003 m3. The garland drains have capacity to accommodate instant volume of 33939 m3 as per above dimensions. Therefore, garland drains capacity is more than sufficient to take care of average daily surface run off during raining period. Additional drains are proposed to take care of peak run off during the plan period. Therefore, water management structures comprising of drains, settling ponds and mined out pits are available as well as planned to address the catchment area run-off for conceptual period.

The overflow discharge water will be regularly monitored so that quality of water is maintained as per the prescribed standards and always clear water from ponds / pits meet the natural system. In case required, water treatment would be done in the pits by using lime and flocculants or other organic chemicals.

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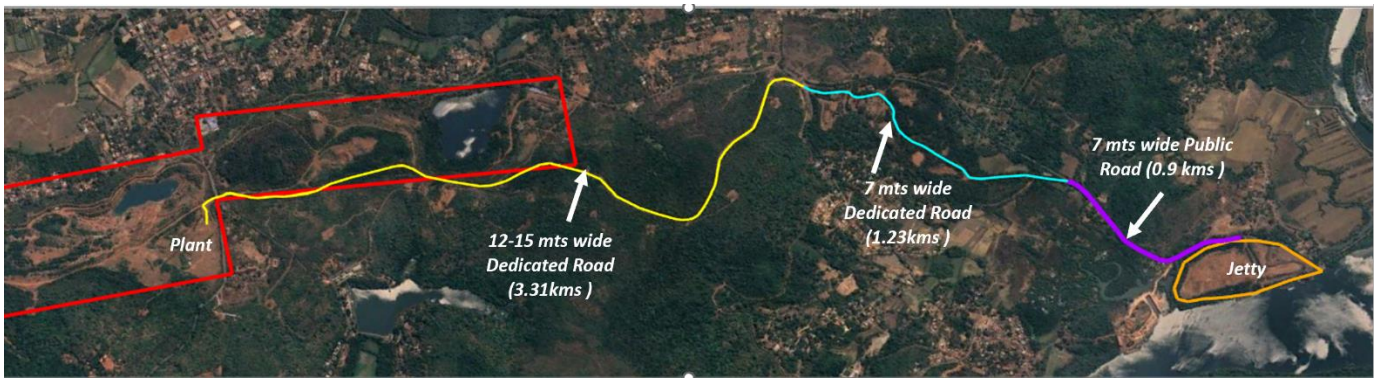
Point No. 4 **The Project Proponent needs to bypass the public road and also to explore the possibility of increasing the capacity of truck so as to reduce the no. of trips. The EAC opined that the Project Proponent needs to revisit the traffic load by considering the cycle time and waiting time. The Project Proponent needs to submit the action plan for strengthening the road and for converting the unpaved road into concrete road.**

Reply: **Traffic load and effective distance between two trucks**

S. No.	*Transportation Working Days*	*Quantity (In TPA)*	*Tonnes/Day*	*Trips per day*	*Mode of Transport*
1	*237*	*30,00,000*	*12658*	*1205*	*Road*
Total trips per day				*1205*	

The total travel distance upto Jetty is 5.48 kms (4.54 dedicated road and 0.94 km MDR-20 Public Road). The Road width details for various segments are as follows:

Dedicated Road corridor		*Public Road*
3.31 Km	*1.23 km*	*0.94 Km*
12-15 mts wide Road	*7 mts wide Road*	*7 mts wide Road*



- Capacity of truck is 10.5 tons as per directives of Deptt. of Mines & Geology, Goa
- Total Handling per day is 12658 tons /day
- Transportation timings are 6.00 am to 7.00 am, 8 :00 am to 12.45 pm and 2 :00 pm to 5.45 pm. Therefore, the effective transportation time is 9.30 hrs.
- Per Hour Handling is: 1332 tons/hour
- No. of Vehicles per Hour (One way): 127 vehicles

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- No. of Vehicles per Hour (to and fro): 254 vehicles
- The Speed of vehicle is 25 KMPH and the lead distance is 5.48 Kms
- The time taken for 5.48 km is 13.15 mins for each truck and loading time is 1min, weighment time at both source location is 2 min, Tarpaulin tying and untying time is 2 min, unloading time 1 min and waiting time 10 min.
- Each truck length is 15'. 5" (4.58 m)
- If we consider distance from truck to truck is 5 m both side = 10 m
- Each vehicle occupies a min. distance of 14.58 m = ~ 15 m
- The length of road is 5.48 Km = 5480 m
- No. of vehicle which can travel on this road for one side= 5480 /15 = 365, However we would be plying only 127 trucks hence effective distance between two vehicles is 43 m.

Measures for transportation are given below:

- Public road is hot mixed and same will be maintained.
- Dedicated road is proposed to be hot mixed in phased manner.
- Entire Dedicated transportation route is surrounded by thick Green Belt
- Transportation vehicles shall be properly maintained to minimize the exhaust emission.
- Regular tests shall be carried out to check exhaust emission and PUC certification of transportation vehicles at prescribed interval.
- Transportation trucks will be loaded with prescribed capacity and covered with tarpaulin before leaving mines premises.
- Overloading of the material will be avoided.
- Regular monitoring of the emission levels.
- Over speeding of Vehicle will not be allowed.
- Traffic Marshals shall be provided for regulating movement of vehicles as well as for safety of persons.
- Training will be given to all drivers about safe driving.

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- Regular water sprinkling by means five hired water tanker of 10KL capacity on haul road and Loading points will be carried out
- Used of fixed dust suppression system on haul roads
- Installation of two wheel washed system (one each at the exit of the dedicated road and jetty exit respectively
- Manual and mechanised machines for road sweeping
- Washing of mine exit points/ Junctions (Mayem, Pilgao and Jetty exit area) after transportation hours/at night with water tanker having pipe arrangements
- Underpass proposed at Mayem junction to prevent interface with public.

(N.B.-The regular mining in the state of Goa stopped since 2012 (it started for brief period in 2018 and again stopped). The truck owners who have already invested in the 10.5 T trucks are severely affected due to the stoppage of mining activity and are against procurement of new / high-capacity trucks, till their losses are covered. The company has already conducted series of meetings with the truck owner's associations for the higher capacity trucks and the truck owners are not agreeing to any changes in short term of 5 years. The MOM is attached for reference. However, the engagement with the truck owners for higher capacity truck will continue.

Company will also engage with all stake holders to explore the feasibility for installing conveyor belt system for transportation in near future, if permitted.)

(Roads: The public road which is used for transportation is only 0.94 km long and the same is a hot mix road and in well maintained condition. The dedicated road of 4.54 km has very thick green belt on both the sides. There is no habitation along the dedicated road. Nearest habitation will be more then 250m from the road. The dedicated road before joining the public road is concreted and provided with the wheel wash system. Dedicated road sweeping machine will also be deployed to maintain the public road clean. The company also undertakes to hotmix the stretch of 4.54 km of dedicated road in a phased manner in three years' time frame. The estimated cost towards hot mixing is worked out as INR 18 crores)

Point No. 5 Since the mine lease area is sharing the Mayem Forest common boundary, the Project Proponent needs to submit the letter from the State Forest Dept. regarding the involvement of Forest land in the mine lease area.

Reply: Total mine lease area is 478.5206 Ha, out of which 421.1153 ha is Private Land and 57.4053 ha is Govt. Land.

Letter confirming that the Bicholim Mineral Block is not falling under the Govt. Forest land and also it does not identify as Private Forest land by State Level Expert Committee headed by Sawan/Dr. Karapurkar/V.T. Thomas issued by the Dy. Conservator of Forests, North Goa Division

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vide letter no. 5/MINES-GEN/DCFN/TECH/2023-24/56, dated 12.04.2023. Copy of Letter is enclosed as ***Annexure I***.

Point No. 6 The Project Proponent needs to submit a letter from the department of geology and mining, Govt. of Goa clarifying whether any illegal mining within the mine lease area has been carried out or not and whether the same has been carried out by M/s. Vedanta Limited or not?

Reply: **The clarification letter from Directorate of Mines and Geology has been enclosed as *Annexure II*.**

The Block-I Bicholim Mineral Block was earlier operated by Sesa Mining Corporation Ltd. (SMCL) formerly known as Dempo Mining Corporation Ltd. Pursuant to Supreme Court Judgement in Goa Foundation 2 dated 07.02.2018, all the mining leases granted by the State Govt. were cancelled. Thereafter, State Govt. in terms of the said order and as per the provisions of MMDR Act put this block for auction as a fresh lease grant.

The e-auction process was conducted in accordance with the Tender Document for said Mineral Block. Vedanta Limited emerged as the highest qualified bidder having submitted the highest final price offer and was declared as the preferred bidder under Rule 9(9) (iii) of auction Rules.

Further, upon submission of the first Installment, being 20% of the upfront payment, Government of Goa issued a Letter of Intent (LOI) vide letter no. DMG/25/Auction Cell/LOI-function/2023/2801 dated 13.01.2023 for the grant of a mining lease for Block-I Bicholim Mineral Block in Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao Villages, of Bicholim Taluka, North Goa District, Goa State over an area of 478.5206 Ha over a period of 50 years. Copy of Letter of Intent is enclosed as ***Annexure III***. Mine lease is yet to be executed and mining has not been carried out by the Vedanta Ltd.

Point No. 7 The Project Proponent needs to submit the video recording of the public hearing.

Reply: The Goa State Pollution Control Board vide their letter No. 11/15/2023-PCB/ Leg/13555 dated 22/09/2023 to the Member Secretary, EAC (Non Coal Mining) has submitted all the documents related to public hearing which also includes the public hearing video. Copy of letter enclosed as ***Annexure IV***

The project proponent will also physically share the video through pendrive to the Member Secretary, EAC (Non Coal Mining), MoEF & CC, New Delhi.

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371/C

GOVERNMENT OF GOA

Office of the Deputy Conservator of Forests,
North Goa Division,
Ponda – Goa, 403 401

Ph No: 0832-2312856 Fax No: 2312095 email:- dcfnorth-forest.goa@nic.in

No.5/MINES-GEN/DCFN/TECH/2023-24/56 Dated:- 12/04/2023

To,
The Conservator of Forests (Conservation)
Van Bhavan,
Panaji- Goa

Sub:- Status of land within Block -1 of Bicholim Mineral Block – reg.

Madam,

With reference to the letter No. CF(C)/General/FD/2022-23/5176 dated 17/02/2023 on the above cited subject , the detail of village wise Survey Nos. (as per the list attached as Annexure-I) within Block -1 of Bicholim Mineral Block is verified and found that the area under the above mentioned Survey Nos is not a Govt. Forest and also does not identified as Private Forest by State Level Expert Committee headed by Sawant / Dr. Karapurkar/ V. T. Thomas. The plan showing Block-1 – Bicholim Mineral Block is enclosed herewith as Annexure-II for kind information.

The Plan & Survey Nos. of Block II, III and IV were not submitted by the User agency, therefore could not be verified by this office.

Yours faithfully,

Dy. Conservator of Forests,
North Goa Division,
Ponda- Goa.

Encl:- As above.

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ASSTT. CONSERVATOR OF FORESTS
PONDA GOA

Government of Goa
Directorate of Mines Geology
Institute Menezes Braganza, Panaji-Goa
Website: dmg.goa.gov.in **e-mail:dir-mine.goa@nic.in**
Phone Nos. 0832 – 2426431/2425287/2422765

File No. 03/24/2023/Major/Mines/Part/ 1489 Date: 25/07/2023

To,
M/s. Vedanta Ltd.
Sesa Ghor, 20 EDC Complex,
Patto, Panaji, Goa.
403001

Sub: Clarification letter with respect to Terms of Reference granted to Vedanta Limited for Block I Bicholim Mine.

Sir,

This has reference to your letter dated 18/5/2023 on the subject cited above. With regards to the special condition no. xvii mentioned in the summary records of the 14th meeting of the Expert Appraisal Committee held on 3-4 May 2023, it is clarified that:-

(a) M/s. Vedanta has been declared as Preferred Bidder for Bicholim Mineral Block- Block I through an auction process conducted by the Government of Goa as per the Mineral Auction Rules, 2015.

(b) M/s. Vedanta Ltd., was not the erstwhile lessee of the said Block prior to auction.

(c) The matter of illegal mining in the State of Goa is under investigation by the Special Investigation Team (SIT).

Yours faithfully,

(Dr. S. Shanbhogue)
Director

Government of Goa
Directorate of Mines & Geology
Institute Menezes Braganza, Panaji-Goa
Website: www.dmg.goa.gov.in **e-mail: auction-dmg@goa.gov.in**

No.DMG/25/Auction Cell/LOI-function/2023/7801 Date:13/01/2023

Letter of Intent for Block I - Bicholim Mineral Block

To,
Vedanta Limited
Sesa Ghor, 20 EDC Complex,
Patto, Panaji, Goa, 403001 India.

Sub: ***Letter of intent with reference to e-auction dated December 14, 2022 for grant of a mining lease for Block I - Bicholim Mineral Block for Iron Ore mineral in Bicholim, Bordem, Lamgao, Mulgao Mayem & Sirigao village, Bicholim Taluka, North Goa District on 478.5206 Hectare Area.***

1. **Background**:

1.1 Government of Goa, 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 dated September 30, 2022 to commence the auction process for grant of mining lease for **Block I - Bicholim Mineral Block** located in North Goa. The e-auction process was conducted in accordance with the tender document for the said mineral block and **Vedanta Limited** was declared as the 'Preferred Bidder' under Rule 9(9)(iii) of Auction Rules, having quoted a Final Price Offer of **63.55% (Sixty three point five five percent)**.

DIRECTORATE OF MINES & GEOLOGY GOVT. OF GOA PANAJI-GOA

1.2 As required under Rule 10(1) of the Auction Rules and the tender document for the said mineral block, **Vedanta Limited** has made payment of the first instalment, being 20% (twenty per cent) of the upfront payment of Rs. 27,16,70,301 (Rupees Twenty Seven Crore Sixteen Lakh Seventy Thousand Three Hundred One) through e-Challan (e-Challan No. 202300008550) dated January 4, 2023, which was received at Goa.

2. Grant of Letter of Intent

2.1. Accordingly, pursuant to Rule 10(2) of the Auction Rules and the terms of the Tender Document, the Government of Goa is issuing this letter of intent for grant of Mining Lease for **Block I - Bicholim Mineral Block** for Iron Ore in Bicholim, Bordem, Lamgao, Mulgao Mayem & Sirigao village, Bicholim Taluka, North Goa District on 478.5206 Hectare Area to **Vedanta 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 the **Vedanta 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.

DIRECTORATE OF MINES & GEOLOGY GOVT. OF GOA

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.

Vedanta 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.

3.2. For reference, the requirements under the Auction Rules for designation of **Vedanta 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":

Vedanta 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 Goa, pursuant to the Auction Rules;

(iv) satisfying the conditions specified in clause (b) of sub-section (2) of Section 5 of the Act with respect to a mining plan; and

DIRECTORATE OF MINES & GEOLOGY GOVT. OF GOA PANAJI-GOA

(b) Signing of the Mine Development and Production Agreement

Vedanta Limited shall sign the Mine Development and Production Agreement with the Government of Goa 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, **Vedanta Limited** shall make payment of the third instalment being 60% (sixty per cent) of the upfront payment and thereafter the Government of Goa shall grant the aforementioned mining lease.

3.3. The State Government reserves the right, but not the obligation, to appropriate and dispose of (whether by way of sale, auction or such other means as the State Government may, in its sole discretion, determine) all or any part of the dumps presently located within the Mineral Block. Provided that such right shall be exercised by the State Government no later than 12 (twelve) months from the date of issuance of this Letter of Intent. It is clarified that the Successful Bidder shall, in accordance with Applicable Law, be entitled to dispose of only such part of the dumps in respect of which the State Government does not exercise the aforesaid right.

DIRECTORATE OF MINES & GEOLOGY GOVT. OF GOA

4. Validity

4.1. This Letter of Intent shall be valid only if **Vedanta Limited** ensures that the Bid Security is valid until the Performance Security is furnished to the Government of Goa failing which this letter of intent shall become invalid from the date of expiry of the Bid Security.

4.2. 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 **Vedanta Limited** and the Government of Goa. 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 Goa, requesting for further extension

4.3. If the Government of Goa 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 Goa 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.

Kindly return the duplicate copy of this letter of intent duly signed by authorized signatory in token of having accepted the above terms and conditions. The accepted copy of Letter of Intent along with Board resolution should be submitted latest by **January 27, 2023.**

(Dr. S. Shanbhogue)
Director

DIRECTORATE OF MINES & GEOLOGY
GOVT. OF GOA

GOA STATE POLLUTION CONTROL BOARD

गोंय राज्य प्रदूषण नियंत्रण मंडळ

(An ISO 9001-2015, ISO 14001:2015, ISO 45001:2018 Certified Board)

Phone Nos : 0832- 2407700,
2407701, 2407703

Email Ids:
Chairman, GSPCB: chairman-gspcb.goa@nic.in
Member Secretary, GSPCB: ms-gspcb.goa@nic.in
Office: mail.gspcb@gov.in

BY SPEED POST
MOST URGENT

No.11/15/2023-PCB/Leg/13555

Date:- 22/09/2023

To,

The Member Secretary,
EAC (Non Coal Mining),
IA Division,
Ministry of Env., Forest and Climate Change
Indira Paryavaran Bhavan, Jor Bagh, New Delhi - 110003

Sub:- Environmental Public Hearing.

Sir,

As per the Environment Impact Assessment Notification (EIA) dated 14/09/2006, issued by the Ministry of Environment, Forests and Climate Change, Government of India, the Goa State Pollution Control Board has conducted Environmental Public Hearing as per the said notification with respect to Block I Bicholim Mineral Block with area of 478.5206 Ha located in Bicholim, Bordem, Lamgao, Mulgao, Mayem and Sirigao villages of Bicholim Taluka, North Goa District, Goa for the production of 3.0 MPTA of iron ore by M/s. Vedanta Ltd.

In this regard, I am to enclose herewith the following documents for your perusal and necessary action.

1. The copy of the dully approved proceedings of the Environmental Public Hearing held on 11/8/2023 reflecting the views and concerns expressed by the public present for the hearing recorded and read out to the public out on the same day, alongwith translation of the same in the official State Language i.e. Konkani – **Annexure "A"**

2. Copy of clarification/objection to in the minutes of Public Hearing held on 11/8/2023 – **Annexure "B".**

- The serial no.3 of the Minutes of the Public hearing i.e Shri. Nilesh Dhabolkar may be read as Shri. Nilesh Karbotkar, as there was a typographical error in the minutes.
- The serial no.95 of the Minutes of the Public hearing i.e Sujay Parrikar may be read as Shri. Sujay Pethikar , as there was a typographical error in the minutes.
- The serial no. 142 of the Minutes of the Public hearing i.e Sharmila Volvoikar may be read as Sharmila Valavalkar, as there was a typographical error in the minutes.

3. Attendance Sheet – **Annexure "C"**

4. Attendance of Speakers – **Annexure "D"**

5. The recordings of the proceedings (Pendrive 1 no.)– **Annexure "E"**

6. The copy of representation/ suggestions/ objections received by the Board– **Annexure "F"**

7. The copy of the supporting received by the Board– **Annexure "G"**

8. Reply to the queries submitted by project proponent raised during the Environmental public hearing in English - **Annexure "H"**

9. The copies of the notices issued in the various newspapers/T.V. Channels - **Annexure "I"**

Kindly acknowledge the receipt of the same.

Yours faithfully,

(Member Secretary I/c)
Goa State Pollution Control Board

Encl: As above.

Copy to:-

1	**M/s. Vedanta Limited, Sesa Goa iron ore: Sesa Ghor, 20 EDC Complex, Patto, Panjim Goa 403001.**
2	Office copy
3	Guard file

GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE
(IMPACT ASSESSMENT DIVISION)
NON-COAL MINING SECTOR
****

SUMMARY RECORD OF 22ND MEETING OF THE COMMITTEE OF THE RE-CONSTITUTED EXPERT APPRAISAL COMMITTEE FOR ENVIRONMENTAL APPRAISAL OF NON-COAL MINING PROJECTS CONSTITUTED UNDER THE EIA NOTIFICATION, 2006.

The 22ndmeeting of the Re-Constituted Expert Appraisal Committee (EAC) for Environmental Appraisal of Mining Projects (Non-Coal) of the Ministry of Environment, Forest and Climate Change was held during 14-15November, 2023 through video conference. The list of participants is annexed herewith. After login of the Committee Members through video conference link provided by NIC discussion on each of the Agenda Items was taken up ad-seriatim.

(1.0) Deliberation & Circulation on the Minutes of 21stEAC (Non-Coal Mining) meeting held during 18-20 October, 2023:

The minutes of the 21st EAC meeting held during 18-20 October, 2023 were placed before the members of the EAC.

Day 1: 14th November, 2023 (Tuesday)

1.1 Amendment in EC dated 17thJuly, 2018 w.r.t Condition No 22 for Guda Clay mine of M/s Harish Clays with enhancement of production capacity from 60,000 TPA to 2,50,000 TPA (ROM) of Clay in the mine lease area of 284.20 ha, located at Village-Guda, Tehsil Kolayat, District Bikaner, Rajasthan - [File No: J11015/163/2014-IA.II(M), Proposal No: IA/RJ/MIN/125957/2014, Consultant: M/s. Enviro Green Consultants (I) Pvt. Ltd] - Amendment in EC

The instant proposal is for amendment in EC dated 17th July, 2018 w.r.t Condition No 22 for Guda Clay mine of M/s Harish Clays with enhancement of production capacity from 60,000 TPA to 2,50,000 TPA (ROM) of Clay in the mine lease area of 284.20 ha, located at Village-Guda, Tehsil Kolayat, District Bikaner, Rajasthan.

2. The details of the project as ascertained from the document submitted by the Project Proponent and revealed from the discussions held during the meeting are given as under:

i. Initially, the Project Proponent has obtained Environmental Clearance (EC) vide EC letter dated 18.02.1998 for the production capacity of 60,000 TPA of clay.

10. Observation and Recommendation of the EAC: -

The EAC noted that the site visit was conducted by the subcommittee during 15-17 October 2023. The EAC deliberated on the observation and recommendations of the subcommittee. After detailed deliberations, the EAC agreed to the recommendations of the subcommittee.

2.8 Report of the field visit undertaken by EAC sub-committee during 29-31 October, 2023 at Bicholim Mineral Block- Block 1 (Auction Block) of M/s Vedanta Limited for mining of Iron Ore with proposed production capacity of 3.0 MTPA, Waste: 25.162 MTPA (Total Excavation: 28.162 MTPA) along with crushing and screening plant capacity of 4.0 MTPA in the mine lease area of 478.5206 ha, located in Bicholim, Bordem, Lamgao, Mulgoa, Mayem&Sirigao Villages of Bicholim Taluka of North Goa District, Goa - [F.No: IA-J-11015/ 3/2023-IA-II(NCM), Proposal No: IA/GA/MIN/442593/2023] - Environmental Clearance (EC)

The instant proposal is for mining of Iron Ore in Bicholim Mineral Block – Block 1 (Auction Block) of M/s Vedanta Limited with proposed production capacity of 3.0 MTPA, Waste: 25.162 MTPA (Total Excavation: 28.162 MTPA) along with crushing and screening plant capacity of 4.0 MTPA in the mine lease area of 478.5206 ha, located in Bicholim, Bordem, Lamgao, Mulgoa, Mayem&Sirigao Villages of Bicholim Taluka of North Goa District, Goa.

2. The total mine lease area is 478.5206 Ha, out of which Private land is 421.1153 Ha and Government land is 57.4053 Ha. The mine lease area is located between Latitude: 15º34’20.518”N to 15º36’54.018”Nand Longitude: 73º54’4.754”E to 73º57’09.51”E. The mine lease area falls under the Survey of India Toposheet No: D43B14and falls in Seismic Zone-II.

3. The Directorate of Mines & Geology, Govt. of Goa vide letter dated 13.01.2023 granted the Letter of Intent (LoI) for grant of mining lease for Block I - Bicholim Mineral Block for Iron Ore over an area of 478.5206 Hectare for aperiod of 50 (fifty) yearsin pursuant to Rule 10(2) of the Auction Rules. This letter of intent is valid for a period of 3 (three) years from the date of its issuance.

4. Review and Mining Plan was approved by Indian Bureau of Mines, Goa vide letter dated 26.05.2023. Method of Mining will be Opencast mechanized mining without Drilling & Blasting. ROM/Iron ore or Screened/crushed material will be transported by 10.5 Tonne trippers from Mine to Sarmanas jetty through a dedicated road. The total distance from the mine to Jetty is 5.48 km of which 0.94 km stretch is public road and remaining 4.54 km is company owned dedicated road.

5. The Project Proponent obtained Terms of Reference (ToR) vide ToR letter dated 16.06.2023. Baseline data was carried out during March-May, 2023 (Summer Season). Public hearing was conducted on 07.07.2023. About 4708 written objections were submitted against the project and about 5183 no.s of letters were also received in support of the project. Budget of Rs 309.3 Lakhs has been earmarked to address the concerns raised during public hearing.

6. There are two habitations such as Mulgao and Lumgao and schools are located within the mine lease area.Asnora River is touching the mine lease boundary at one of the points and Mayem Lake is found at a distance of 0.46km from the mine lease area. Namuzgah/Idgah is found within the mine lease area. A safety distance of 300m buffer has been left from Lamgao caves.

7. Mayem Forest Common Boundary with the mine lease area. Block-I Bicholim Mineral Block of Vedanta Ltd is not a part of any Eco Sensitive Area. The Schedule-I species such as Common leopard (*Felidae*) White-bellied Sea-Eagle(*Accipitridae*) Indian Peafowl (*Phasianidae*) and Crimson rose- Butterfly (*Papilionidae*)are found in the study area. Wild Life Conservation Plan is prepared and submitted for approval of Chief Wildlife Warden (CWLW) on 19.06.2023.

8. No Rehabilitation & Resettlement Plan is proposed during life of mine. There are three court cases pending against the project w.r.t auction. Total cost of the project is Rs 250 Cr. The Capital cost of EMP is Rs 72.0 Lakhs and about 716 no.s will get employment.

9. The instant proposal was earlier considered in the EAC (Non-Coal Mining) meeting held during 21-22 September, 2023 and the EAC after detailed deliberations opined that there is a need to ascertain the present scenario and ground reality with regards to handling of waste, settling ponds, location of waste dump w.r.t habitation, school and river, other surface features as forest (Mayem common boundary), temples, caves and fort, mineral transportation route and traffic congestion. The EAC was of the view that a site visit needs to be conducted by a sub-committee comprising of EAC Members and officers from MoEF&CC.

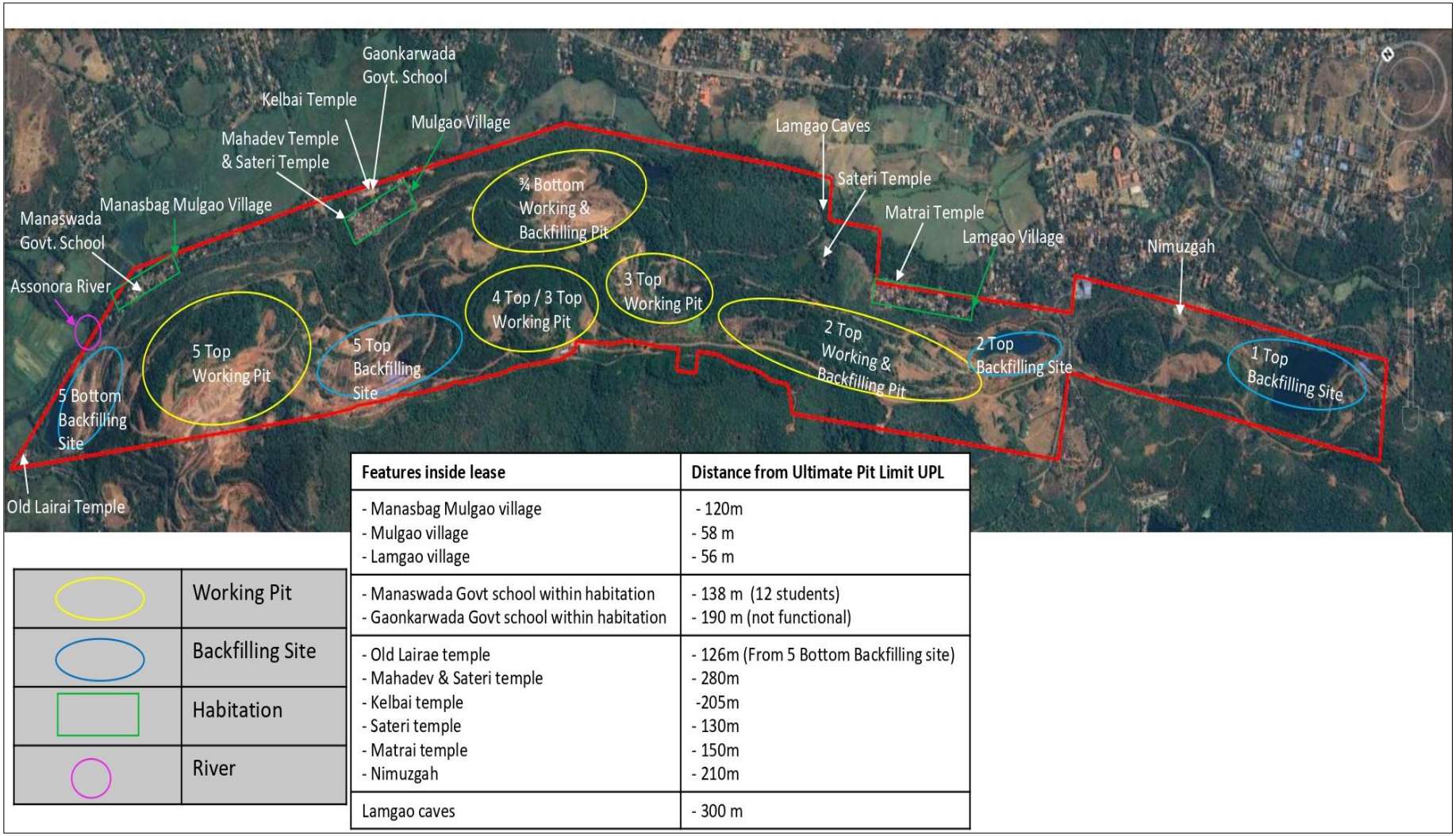
10. Accordingly, the Ministry vide letter dated 09.10.2023 constituted a sub-committee comprising of the following members to ascertain the ground realities of the project.

1. Shri Niranjan kumar Vasu, EAC (Non-Coal Mining), Member,
2. Shri. Avijit Ghosh, EAC (Non-Coal Mining), Member,
3. Shri. Pankaj Verma, Scientist E & Member Secretary EAC (NCM), MoEF&CC,
4. Shri. Saurabh Upadhyay, Scientist C, MoEF&CC,
5. Shri Suresh kumar Adapa, Scientist E, MoEF&CC, Bengaluru;

6. Shri. A. Mohankumar, Consultant, MoEF&CC

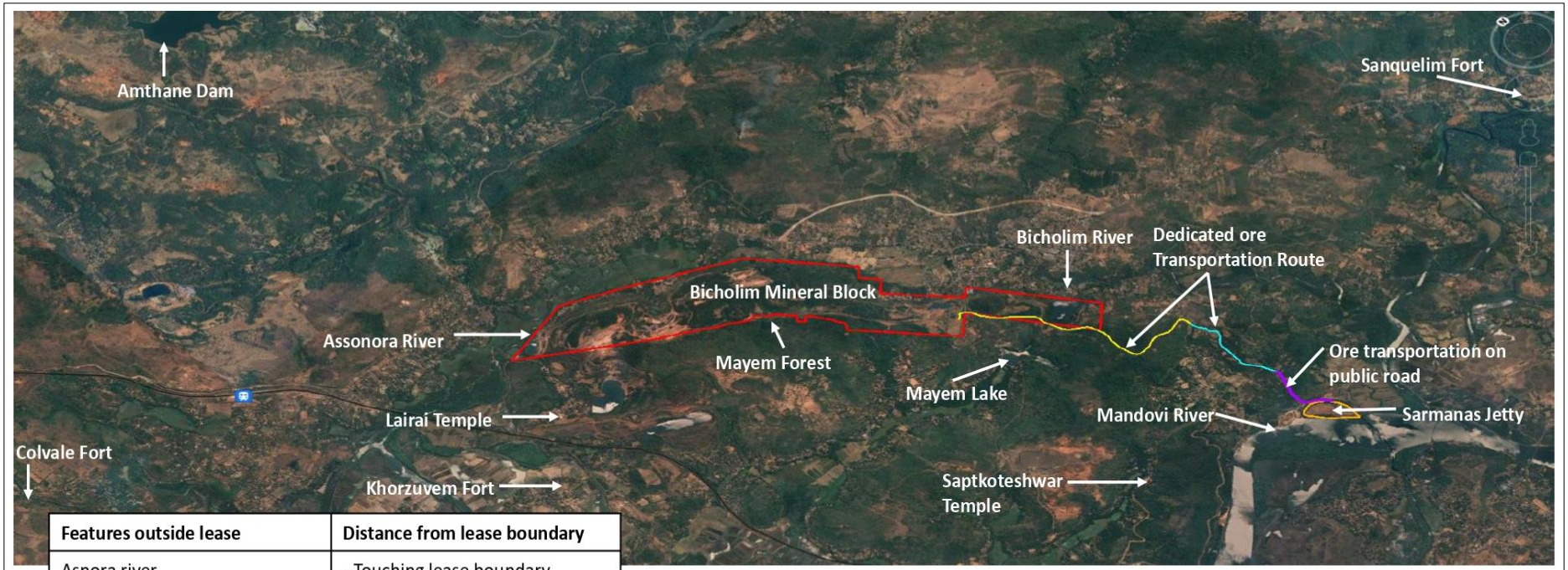
11. The aforesaid committee undertook the day-long field visit on 30th October 2023. The following officers from M/s Vedanta Ltd such as Head of the Mines, Head of the Environment, Mines Manager, Geologist and EIA Coordinator were present during the site visit. The Project Proponent gave a brief about the layout of the mine lease area. The subcommittee during the site visit observed the following: -

1. The subcommittee visited the mine lease area which extends from mines office to the bottom pit by road covering a distance of 7.0 km in the lease area. The subcommittee also observed the boundary pillars erected by the Project Proponent alongside the mine lease boundary.
2. The subcommittee observed the dense vegetation throughout the mine lease area.



Features inside lease	Distance from Ultimate Pit Limit UPL
- Manasbag Mulgao village - Mulgao village - Lamgao village	- 120m - 58 m - 56 m
- Manaswada Govt school within habitation - Gaonkarwada Govt school within habitation	- 138 m (12 students) - 190 m (not functional)
- Old Lairae temple - Mahadev & Sateri temple - Kelbai temple - Sateri temple - Matrai temple - Nimuzgah	- 126m (From 5 Bottom Backfilling site) - 280m -205m - 130m - 150m - 210m
Lamgao caves	- 300 m

Figure 1: Google Image of Bicholim Mineral Block showing working & backfilling pits and surface features in the mine lease area



Features outside lease	Distance from lease boundary
Asnora river Mayem forest (Caju Plantation)	- Touching lease boundary - Touching lease boundary
Mayem lake Bicholim river Mandovi river Amthane dam	- 0.46 km - 0.23 km - 2.3 km -7.0 km
- Lairae temple - Saptakoteshwar temple	- 0.86 km - 2.50km
- Khorjuvem fort - Colvale fort - Sanquelim fort	-2.0 km - 5.96 km -5.97 km

Sensitivity: Public (C4)

Figure 2: Google Image of Bicholim Mineral Block showing surface features in the buffer zone

Figure 3: Project Proponent explaining about mine layout and site features

3. The subcommittee visited the mine pit with stagnant rain water, top and bottom working pits. The Project Proponent has informed that the rain water in the mine pit is being used for dust suppression and agricultural purposes by the local farmers. The rainwater stagnant in the working pits will be pumped out and will be channelized through network of pipes and will be discharged into settling ponds. The Project Proponent also informed that the waste generated during mining will be temporarily stacked within the mining lease and will be backfilled in the exhausted portion in the working pits. The material from one pit will be used to backfill the other exhausted working pit.

Figure 4: Rainwater stagnant in the mined out pit

Figure 5: Rainwater stagnant in the working pit

4. The subcommittee has observed that the permanent water sprinklers are not in place.
5. The subcommittee has observed the temple within the mine lease area and Assonora River touching the mine lease boundary. The Project Proponent has informed that the safety distance of 50m is left on either side of the river. A dense plantation has been carried out in the safety zone.
6. The subcommittee also visited the settling pond in the mine lease area. The subcommittee noted that the settling pond is poorly maintained. The Subcommittee suggested to construct silt check dam based on the rate of inflow. Subcommittee also suggested the Project Proponent not to discharge any water outside lease area without passing it through treatment plant.

Figure 6: Settling Pond

7. The subcommittee visited the Mayem Forest boundary which is demarcated by poles with white flags from the mine lease area. The Project Proponent informed that the forest boundary is about 70-80m away from the mine lease area. The Differential Global Positioning System (DGPS) survey has been carried out by the Forest Dept but pillars are not demarcated by the Forest Dept. The Project Proponent also informed that a letter has been obtained from the Dept. of Forest stating that the forest land is not involved in the mine lease area. The subcommittee suggested that the Project Proponent should consult with the Forest Dept and should erect the pillars to differentiate the mine lease area from the forest boundary.
8. The subcommittee has visited the waste dump to see the dump height, dump slope and plantation made on waste dumps. The subcommittee noted that the plantation has been carried out using coir mats. The subcommittee suggested that the proper terracing has to be done and suitable measures to be undertaken for preventing soil erosion.

Figure 7: Near Waste Dump

9. The subcommittee observed that the villages and schools are located in the mine lease area. The Project Proponent has informed that the villages such as Manasbag Mulgao village (~120m from Ultimate Pit Limit-UPL), Mulgao Village (~58m from UPL) and Lamgao Village (~56m from UPL) are located within the mine lease area. The Project Proponent also informed that the Manaswada Govt. School is located at a distance of ~138m from UPL with 12 no. of students and Gaonkarwada Govt. School is located at a distance of ~190m from UPL which is non-operational.
10. The subcommittee has observed that the crematorium ground is located within the mine lease area. The subcommittee also visited the Idgah located within the mine lease area. The Project Proponent has informed that the mining activity will be carried out by using ripper dozer combination. There will be no activity of drilling and blasting. A buffer zone of 200m will be maintained from Idgah. The subcommittee was of the view that the mining activity shall be strictly carried out by using only ripper dozer combination.
11. The subcommittee has visited the crushing and screening units in the mine lease area. The subcommittee noted that the crushing and screening units are not maintained well. The subcommittee opined that the fabrication works has to be carried out before starting mining operations and also suggested that the crushers and screening plant should have adequate arrangement to suppress dust and also measures should be taken to control noise.

Figure 8: Crushing and Screening Units

12. The subcommittee has observed that there are four Schedule-I species reported in the study area. The subcommittee asked the Project Proponent to ensure that whether any other Schedule-I species has been added as per latest Wildlife (Protection) Amendment Act 2022.
13. The subcommittee has visited the entire mineral transportation route of 5.48 km [4.54 km company owned dedicated road + 0.94 km public road] from the mine lease area to Sarmanas Jetty. The subcommittee has observed that there at two places public road is getting intersected. The width of the road is not adequate. The Project Proponent has informed that the under passes are proposed at the intersecting points and hence the public road will not be disturbed. Traffic marshals will be deployed at the intersecting point to monitor the movement of traffic. During rainy season, no transportation will be carried out and only developmental works will be carried out. The subcommittee also visited the Sarmanas Jetty. The subcommittee opined that the maintenance works has to be carried out at Sarmanas Jetty before commencing mining operations. The subcommittee was of the view that the Over Land Belt Conveyor (OLBC) from the mine lease area to Sarmanas Jetty may be solution for eco friendly transportation and economics.

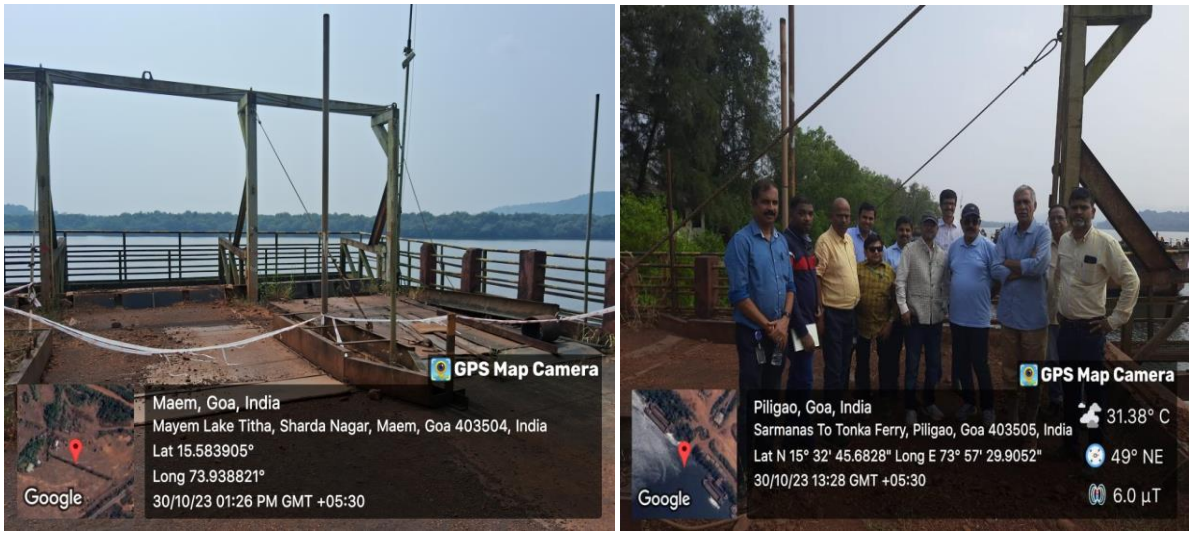


Figure 9: Sarmanas Jetty

14. The subcommittee opined that the Project Proponent needs to develop an own nursery.
15. The subcommittee also visited the nearby Sanquelim mine of Sesa Goa Ltd to see the reclamation activities carried out in the mined out area.

12. Recommendations of the Sub-committee:

1. The Project Proponent needs to submit the techno economic feasibility report for laying Over Land Belt Conveyor (OLBC) from the mine lease area to Sarmanas Jetty.

2. The subcommittee asked the Project Proponent to submit the ecology restoration plan for mined out pits for using as Water reservoir/Pisciculture.

3. The subcommittee noted that the transfer of material from one pit to other working pit will lead to transportation issues. The subcommittee asked the Project Proponent to identify the shortest lead distance and also to explore the possibility of concurrent backfilling. The Project Proponent also needs to submit the sequential stage wise mining in top and bottom working pits and their backfilling plan.

4. The Project Proponent needs to submit the action plan for strengthen the settling pond with proper stone pitching in line with the design of settling pond considering the annual rainfall, flow rate, catchment area and its discharge. The action plan for monitoring the water level and water quality before discharge needs to be submitted.

5. The design of garland drain around the waste dumps to divert the water to settling ponds and the measures to be taken to arrest the suspended solids needs to be submitted. The measures to be taken for preventing the soil erosion on slope of waste dumps needs to be submitted.

6. The Project Proponent needs to submit the action plan for installing permanent water sprinklers.

7. The Project Proponent needs to submit the action plan and timeline to modify the crushing and screening units. The Project Proponent also needs to submit the material flow sheet and material balance.

8. The Project Proponent needs to submit the action plan for developing their own nursery by mentioning the details of the area to be covered, species to be planted and budget proposed. Most of the standing vegetation in the lease area constitutes of *Acacia auriculiformis and Casuarina equisetifolia* and it is further invading the open areas through natural regeneration. The invasion may be checked through planting native species in the region.

9. The Project Proponent needs to ensure that whether any other Schedule-I species has been added as per latest Wildlife (Protection) Amendment Act 2022 or not. Accordingly, the Project Proponent shall submit the revised authenticated Schedule-I species. The Project Proponent also needs to submit the breakup of the conservation activities proposed under Wildlife Conservation Plan.

10. The Project Proponent needs to submit the map demarcating the surface features in the mine lease area and their safety distances left/maintained as per mines acts and rules.

11. The Project Proponent needs to provide proper treatment of channels and nallas flowing in the lease area for soil and water conservation. Scientifically designed and placed check dams and other engineering structures at different places can help control the erosion and loss of productive soil. Necessary study from competent institution/individuals may be done for this purpose.

13. Observation and Recommendation of the EAC: -

The EAC noted that the site visit was conducted by the subcommittee during 29-31 October 2023. The EAC deliberated on the observation and recommendations of the

subcommittee. After detailed deliberations, the EAC agreed to the recommendations of the subcommittee.

*****

List of members of Expert Appraisal Committee participated through VC

S.No	Member Name	Member Address	Designation	14th Nov., 2023	15th Nov., 2023
1	Dr. Dinesh Misra, IFS (Retd.)	Plot No 65, Sector 8, Gandhinagar, Gujarat, 382 008	Chairman	Yes	Yes
2	Sh. Niranjan Kumar Vasu,IFS (Retd.)	816, Shanti Nagar, Opposite Durgapur Railway Station, Jaipur-Rajasthan, 302018	Member	Yes	Yes
3	Dr. Asha Rajvanshi, Scientist 'G' (Retd.), WII	B/104/106 Rock Valley Apartments, GMSRoad, Sewla Kalan, P.O. Majra, Dehradun, Uttarakhand-248171.	Member	No	No
4	Shri. Avijit Ghosh (CMD- Heavy Engineering CorporationLimited) (Retd.)	Singhee Marg, A- 604 Shahadeo Tower, P.P.Compound, Ranchi 834001, Jharkhand	Member	Yes	Yes
5	Shri. BandiRamchandra Reddy (Former CMD-South Eastern Coalfields Limited)-(Retd.)	Flat No-503 A, Jyoti Cosmos, White Fields, Hi-Tech City, Kondapur,Hyderabad-500081	Member	Yes	No
6	Prof. Pramod Kumar, Professor,ShriAurobindoCollege,University of Delhi	Shri Aurobindo College, University of Delhi 1372, B-1, Vasant Kunj, New Delhi-110070	Member	Yes	No
7	Prof.DeveshWalia, Department of Environmental Studies	Department of Environmental Studies, NEHU,Shillong-793022 Meghalaya	Member	Yes	Yes
8	Dr. Suresh Tiwari Scientist-F	Indian Institute of Tropical Meteorology, Pune,New Delhi Branch, Prof. Ram NathVijMargRajinder Nagar, New Delhi – 110060	Member	No	No

PART B

REPLY OF THE RECOMMENDATIONS OF THE HON'BLE SUB-COMMITTEE

ADS Reply

Point No. 1 **The Project Proponent needs to submit the Techno-Economic feasibility report for laying Over Land Belt Conveyor (OLBC) from the mine lease area to Sarmanas Jetty.**

Reply: Transportation route from mine site to jetty currently covers a total distance of 5.48 kms (4.54 dedicated road and 0.94 km MDR-20 Public Road). Based on the present capacity of the tippers, 1205 trips are required per day and the present road network is adequate for the purpose with widening and strengthening of some patches. The preliminary Techno-Economic feasibility study has been undertaken and prima facie it does not look feasible to switchover to OLBC system considering the terrain of the likely route having mounds and low-lying areas, vegetation/forest patches and its likely degradation, accessibility, environmental impacts and safety issues, technologies available, cost of the system, implementation period via-a-vis remaining reserves in the mining lease.

The preliminary Techno-Economic feasibility issues for laying Over Land Belt Conveyor (OLBC) from the mine lease area to the Sarmanas Jetty along with cost and timeline comparison for conveyor system and dedicated road are discussed in ***Annexure I.***

Point No. 2 **The subcommittee asked the Project Proponent to submit the ecology restoration plan for mined out pits for using as water reservoir/pisciculture.**

Reply: The Ecology Restoration or Mine Reclamation activities at Block I Bicholim Mineral block will be carried out concurrently with mining operations. The company has inhouse experienced team having experience of mine land reclamation. The company also proposes to collaborate and take support of various reputed institutes and consultancy firms in ecology restoration of the area more importantly the local stake holders will be consulted in the process of ecology restoration. Detailed ecology restoration plan for mined out pits for using as water reservoir/pisciculture is enclosed as ***Annexure II.***

Point No. 3 **The subcommittee noted that the transfer of material from one pit to other working pit will lead to transportation issues. The subcommittee asked the Project Proponent to identify the shortest lead distance and also to explore the possibility of concurrent backfilling. The Project Proponent also needs to submit the sequential stage wise mining in top and bottom working pits and their backfilling plan.**

Reply: As suggested by the Hon'ble Committee detailed study of mineral transportation from one pit to another pit including sequential mining has been carried out. The company has explored the possibility of concurrent backfilling and the concurrent backfilling will be possible only from 5^{th} to 10^{th} year. Details are enclosed as ***Annexure III.***

Point No. 4 **The Project Proponent needs to submit the action plan for strengthen the settling pond with proper stone pitching in line with the design of settling pond considered the annual rainfall, flow rate, catchment area and its discharge. The action plan for monitoring the water level and water quality before discharge needs to be submitted.**

Reply: At conceptual stage, total 12 nos of settling ponds will be developed and these will be strengthened by the stone pitching. Details of settling ponds considering the annual rainfall, flow rate, catchment area and its discharge is given in ***Annexure IV.***

The entire monsoon runoff is channelized into mine pits and supernatant water flows into series of settling ponds through drains. The clear water is allowed to naturally overflow by Header arrangements or through check dams.

In case required, Lime or combination of Lime and flocculent is used in the mine pit or settling pond so that the particles settle, and clear water is discharged. The discharge water is monitored regularly so that water quality meets the prescribed limits.

The inhouse Environment management cell will undertake the regular monitoring and analysis of discharge water through Environment laboratory recognized by MoEF&CC.

The monitoring reports will be submitted to Goa State Pollution Control Board on monthly basis and MoEF&CC Regional office on six monthly basis.

Surface Water Quality Monitoring

Surface water samples shall be collected at 8 locations which include all the mine discharge points and upstream and downstream of Bicholim and Asnora river. Samples shall be collected once a month. The parameters listed in IS: 2296 shall be monitored.

During monsoon season, in addition to the monthly monitoring, all the discharge points will be regularly monitored (on all the rainy days) and the TSS levels will be checked.

Sampling locations are given below:

Table - 3
Surface Water Sampling Locations

S. No.	Sampling Location	
1	Mine Discharge	1 Top (Bicholim Dhabdabha)
2		2 Top Discharge (Lamgao)
3		5 Top Discharge (Mulgao)
4		5 Bottom Discharge (Shirgao)
5	Bicholim River	Upstream Bicholim River
6		Downstream Bicholim River
7	Asnora River	Upstream Asnora River
8		Downstream Asnora River

Designs of sampling ponds & Action Plan of water monitoring has been prepared and same is enclosed as ***Annexure IV.***

Point No. 5 **The design of garland drain around the waste dumps to divert the settling ponds and the measures to be taken to arrest the suspended solids needs to be submitted. The measures to be taken for preventing the soil erosion on slope of waste dumps needs to be submitted.**

Reply: The dimensions of the drains to be maintained will be 2m in width and 1.5 m in depth everywhere in the mine. A proper height will be maintained on the sides of the garland drain so that water does not get over-flooded from the drains. The available garland drains are 11313 m in length which covers all the dumps within the mine lease area. The same will be strengthened and maintained before the onset of monsoon. The daily

average surface run-off is estimated as 14003 m3. The garland drains have capacity to accommodate instant volume of 33939 m^3 as per above dimensions. Therefore, garland drains capacity is more than sufficient to take care of average daily surface run off during raining period. Additional drains are proposed to take care of peak run off during the plan period. Therefore, water management structures comprising of drains, settling ponds and mined out pits are available as well as planned to address the catchment area run-off for conceptual period.

The detailed design of settling ponds is given in Reply of Point No. 11.

Measures to be taken to arrest the suspended solids and for preventing the soil erosion on slopes of waste dumps for preventing the soil erosion on slope of waste dumps is given below:

MITIGATION MEASURES

- Inward slope will be provided to all the dump benches so that the water doesn't flow over the slope and erodes the dump slope surface
- Covering the finalised dump slope with lateritic material and then covering with coir geotextiles
- Use of ERW pipes between benches to channelise the surface runoff water and diverting to settling ponds.
- Boulder walls 1.5m ht and 2m wide will be provided at the toe of the dump to arrest the flow of silt.
- Garland drains around the dump is constructed 1m bottom width, 2m top width and 1m deep with a length of 6100 m to divert water to settling pond for arresting the suspended solids.
- Use of Styllo grass seeds and Glyricidia cuttings at the onset of monsoon to create green cover on the dump slopes.
- Annual Plantation of native species on waste dump.
- Safety green belt /barrier of 50 mts shall be maintained near the Assonora river from the mine pit.
- Annual de-siltation of the settling ponds, drains.
- Use of lime and flocculants in case required so as to settle the suspended solids in settling pond.

Point No. 6 **The Project Proponent needs to submit the action plan for installing permanent water sprinklers.**

Reply: Permanent water sprinklers with 3.40 km length along the haul road within the ML Area and 2.80 km length outside the ML Area on either side of the road will be installed. Sprinklers will be spaced at 12m distance covering 6m of radius at 180 degree. Estimated budget for the installation of the same is Rs. 191.60 Lakh.

Action plan for installing the permanent water sprinklers for dedicated transport route is given below.

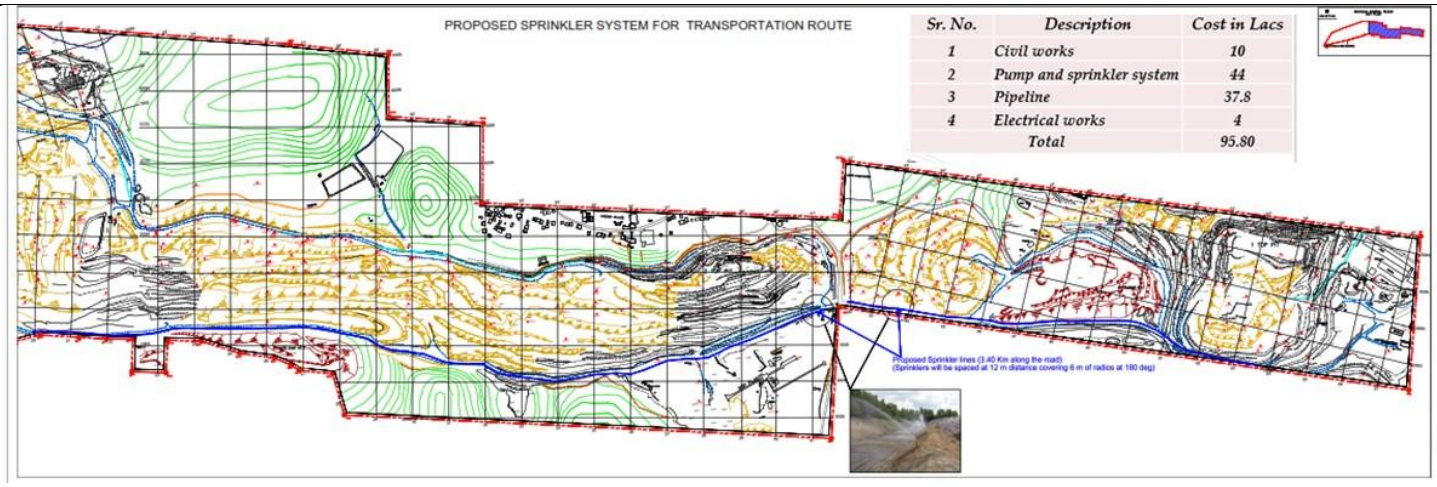


Figure 2 Layout of Proposed Water Sprinkler System within the ML Area

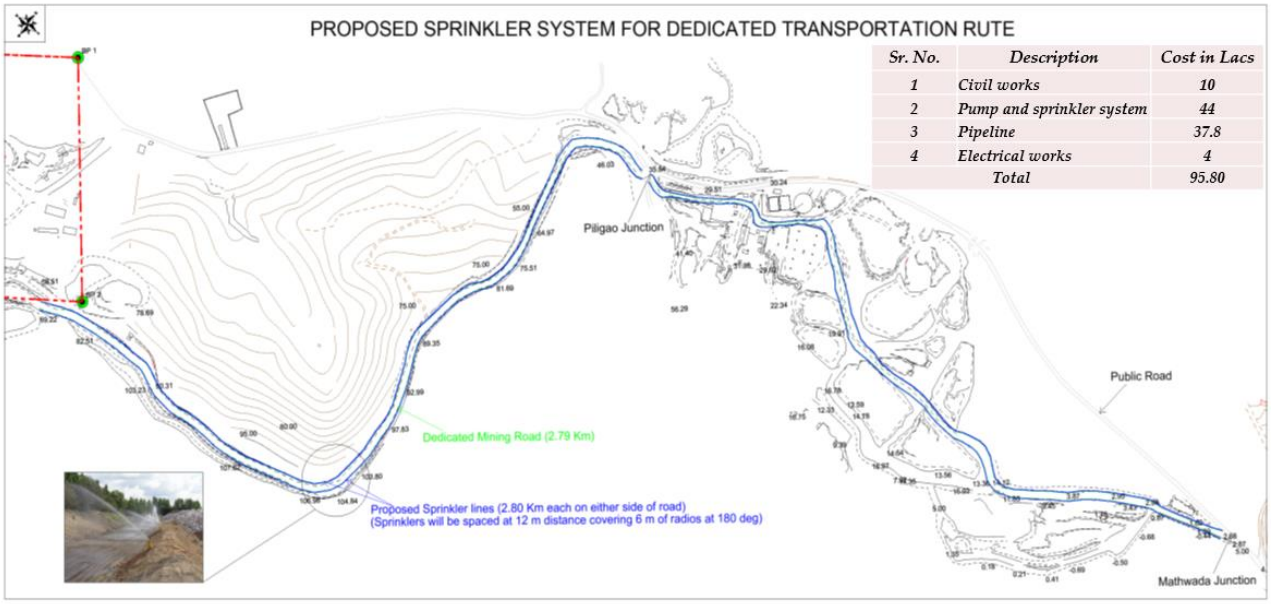


Figure 3 Layout of Proposed Water Sprinkler System for Dedicated Road

Table – 4

Estimated Budget for Proposed Water Sprinkler System

S. No.	Description	Cost (Rs. In Lakh)
1	Civil Works	**20.00**
2	Pump & Sprinkler System	88.00
3	Pipeline	75.60
4	Electrical Works	08.00
Total		**191.60**

Point No. 7. **The Project Proponent needs to submit the action plan and timeline to modify the crushing and screening units. The Project Proponent also needs to submit the material flow sheet and material balance.**

Reply: Crushing & screening will be modified within 4 months after obtaining the Clearances. Budget proposed for the same is Rs. 6.97 Crore.

A flow sheet of modify crushing & screening unit is given below:

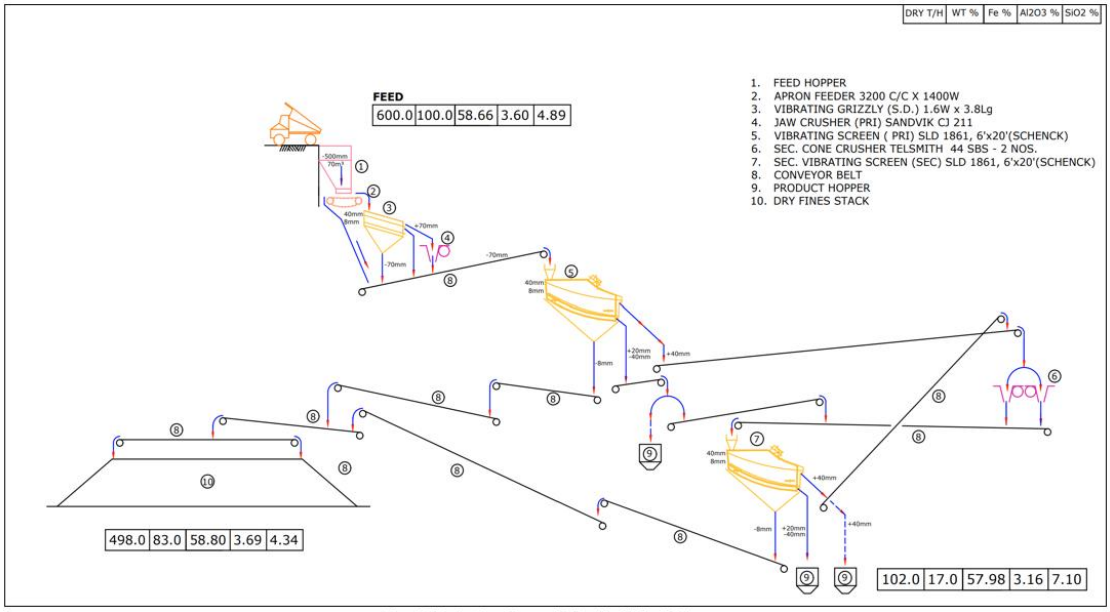


Figure 4 Flow Sheet of modify Crushing & Screening Unit

The Action plan & timeline to modify the crushing & screening units is given below:

Table – 5

Action Plan & timeline to modify the Crushing & Screening Units

Activity	No of days	3	7	7	7	7	7	7	7	7	7	7	7	7	3
CIVIL WORKS (STRENTHENING OF EXISTING STRUCTURE)	Month	DEC'23		JAN'24				FEB'24					MARCH'24		
	Week														
	EXCAVATION														
	RUBBLE SOLING														
	PCC														
	REINFORCEMENT PLACING														
	RAFT CONCRETING														
	SHUTTERING														
	FOUNDN. BOLTS FIXING														
	FOOTING CONCRETING														
MECH & ELECT. WORKS	Month														
	DISMANTLING OF CORRODED STRUCTURES														
	FAB./MODIF. OF STRUCTURES														
	ERECTION OF STRUCTURES														
	ERECTION OF EQUIPMENTS														

	GUARD FAB N FIXING														
	ALLIGNMENT OF EQUIPT														
	ELECTRICAL CONNECTIONS														
	TRIALS N COMMISSIONING														

Table – 6
Proposed Budget to modify the Crushing & Screening Units

S. No.	Description	Cost (Rs. In Crore)
1	Civil works	0.4
2	Equipment	0.74
3	Structural	4.74
4	Electrical works	1.09
Total Cost		**6.97**

Point No. 8. **The Project Proponent needs to submit the action plan for developing their own nursery by mentioning the details of the area to be covered, species to be planted and budget proposed. Most of the standing vegetation in the lease area constitutes of *Acacia auriculiformis* and *Casuarina equisetifolia* and it is further invading the open areas through natural regeneration. The invasion may be checked through planting native species in the region.**

Reply: The company undertakes to develop nursery adjacent to the mineral block (Survey no 72/4 in Bicholim Village). Around 1100 sq.m of area will be utilized for the nursery. A budget of Rs. 5 lakh is kept for the same.

The nursery will comprise of following:

1. A poly house/ nursery shed will be developed where in a root trainer nursery will be established.
2. Production area wherein various jobs like filling of root trainers/polybags will be undertaken store room wherein the nursery equipment's will be stored.

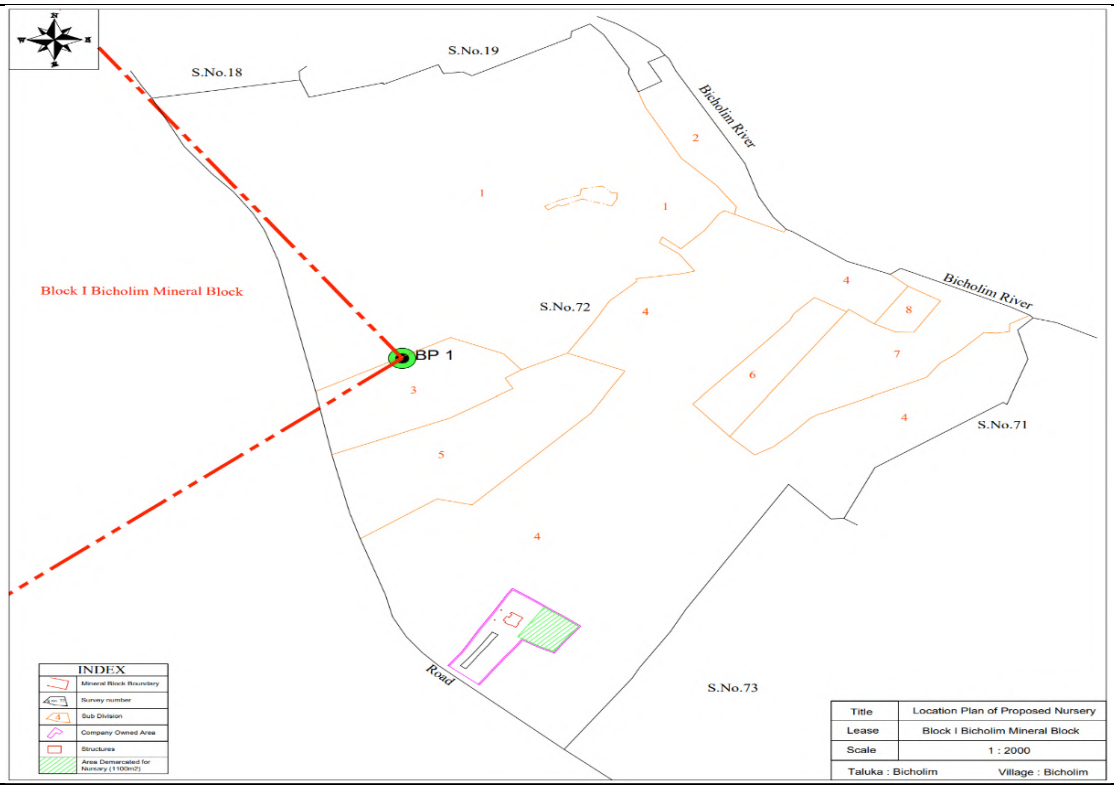


Figure 5 Location Plan of Proposed Nursery

Table – 7

Greenbelt/Plantation Plan for the Next 5 years

Year	7.5m safety, Buffer towards habitation, archaeological site, & river		Plantation on backfilled area		Total		Budget (Rs. In Lakh)
	Area (Ha)	No. of Plants	Area (Ha)	No. of Plants	Area (Ha)	No. of Plants	
1st	4.0432	10108	0	0	4.0432	10108	6
2nd	3.1319	7830	0	0	3.1319	7830	4.7

3rd	2.5537	6384	1.5383	3846	4.092	10230	6.13
4th	0	0	4.7443	11861	4.7443	11861	7.2
5th	0	0	3.1609	7902	3.1609	7902	4.8
Total	**9.7288**	**24322**	**9.4435**	**23609**	**19.1723**	**47930**	**28.83**

List of species proposed for Plantation

Only native / local species of various horticultural and forest species will be grown in inhouse nursery or sourced from forest department nursery for planting in the finalised areas within the Mineral block. Necessary technical support will be taken from state forest department. Company also carries out collaborative mine reclamation projects in association with research institutes like NEERI, Goa university etc.

Horticultural species like Mango, Cashew, Ber, Aonla, Jambul, Tamarind, Jackfruit, citrus species, etc will be grown

Forest species like various Terminalia tomentosa, Terminalia bellerica, Bauhinia species, Teak, Cassia fistula, Arjun, Assan, lagerstromia species, Shiwan, Ficus species, Pongamia pinnata, Reetha, Rain tree, Pangara, Peltoforum, Palas, Saton, Mahagony, bamboo species etc.

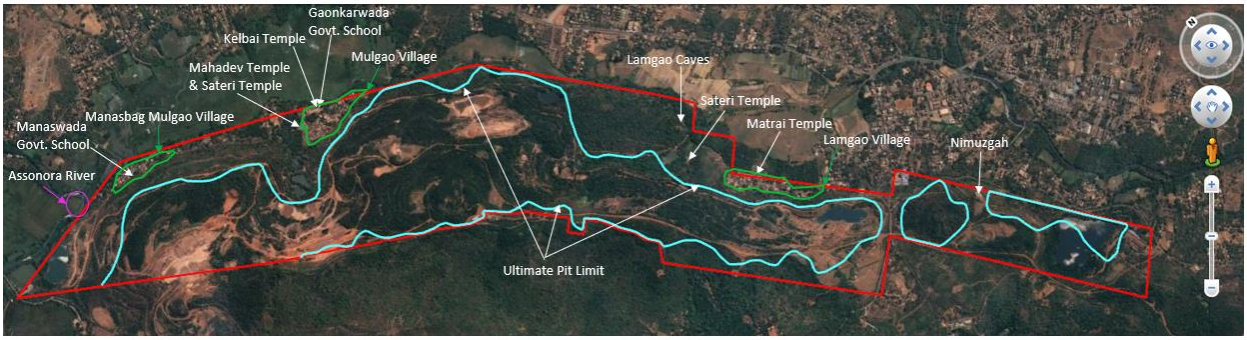
Point No. 9. **The Project Proponent needs to ensure that whether any other Schedule-I species has been added as per latest Wildlife (Protection) Amendment Act 2022 or not. Accordingly, the Project Proponent shall submit the revised authenticated Schedule-I species. The Project Proponent also needs to submit the breakup of the conservation activities proposed under Wildlife Conservation Plan.**

Reply: Authenticated list of Schedule I Species as per Indian Wildlife Protection Act 1972 as amended Gazette Notification of Wildlife (Protection) Amendment Act, 2022 has been obtained from the Dy. Conservator of Forests Wildlife & Eco-Tourism (North), Panji-Goa vide letter no. 1-576-WL&ET(N)/2023-2024/3312, dated 27.11.2023. According to this authenticated list 29 Schedule I Species have been recorded within 10 km study area. Copy of Authenticated list of Schedule I Species is enclosed as ***Annexure V.***

As suggested by the Hon'ble EAC the company revised the break-up of conservation activities proposed under Wildlife Conservation Plan and same is enclosed as ***Annexure VI.***

Point No. 10. **The Project Proponent needs to submit the map demarcating the surface features in the mine lease area and their safety distances left/maintained as per mines Acts and Rules.**

Reply: The surface features in the mine lease area and their safety distances left/maintained as per mines Acts and Rules has been prepared on KML file and same is given below.



	Ultimate Pit Limit
	Habitation
	Assonora River

Figure 6 Map demarcating Surface features and their safety distances

Details of surface features inside the mine lease area along with distance from the Ultimate Pit Limit is given in below table:

Table – 8
Surface Features Inside the ML Area along with distance from the UPL

S. No.	Features inside lease	Distance from Ultimate Pit Limit UPL	Statutory Distances as per MMR
1.	Manasbag Mulgao village	120m	45 mts
2.	Mulgao village	58 m	
3.	Lamgao village	56 m	
4.	Manaswada Govt. School within habitation	138 m (12 Students)	45 mts
5.	Gaonkarwada Govt. School within habitation	190 m (not functional)	
6.	Old Lairai Temple	126m (From 5 Bottom Backfilling site)	45 mts
7.	Mahadev & Sateri Temple	280m	
8.	Kelbai Temple	205m	
9.	Sateri Temple	130m	
10.	Matrai Temple	150m	
11.	Nimuzgah	210m	
12.	Lamgao Caves	300 m	45 mts

Point No. 11. **The Project Proponent needs to provide proper treatment of channels and nallas flowing in the lease area for soil and water conservation. Scientifically designed and placed check dams and other engineering structures at different places can help control the erosion and loss of productive soil. Necessary study from competent institution/individuals may be done for this purpose.**

Reply: Location of settling ponds and drainage network is given below.

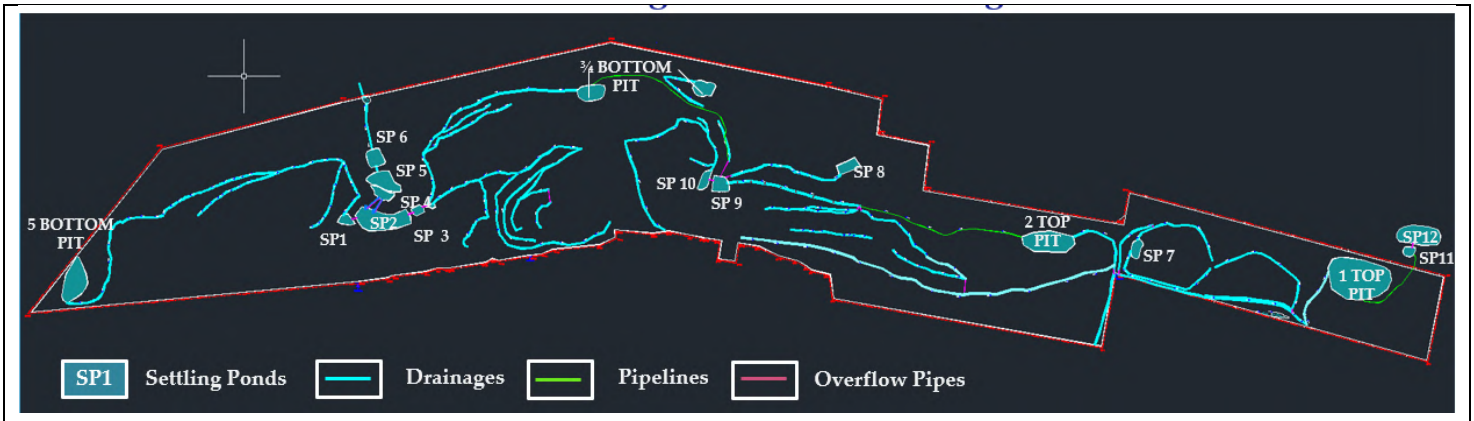


Figure 7 Settling Ponds & Drainage Network

Table – 9
Details of 12 Settling Points Inside & Outside the ML

Pit ID	Area in m^2	Depth in mts	Volume in m^3	Location
SP1	1824	1.8	3283.2	5 Top pit Area
SP2	1667	1.8	3000.6	
SP3	27879	8	223032	
SP4	5208	2	10416	5 Top Mulgao Area
SP5	8602	2	17204	
SP6	4661	2.5	11652.5	
SP7	3896	1.5	5844	1 Top Area (Sec 43)
SP8	5831	3	17493	2 top area
SP9	3753	1.5	5629.5	3 Top Sec 22
SP10	5564	1.5	8346	
SP11	2443	3	7329	Outside lease (Above 1 Top Area)
SP12	17130	4	68520	
Total			**381749.8**	

The drainage pattern is mainly dendritic to sub-dendritic in nature and sparse drainage network is seen. During monsoon, the area receives an average rainfall of about 3500mm. The surface run-off is channelized & collected through a network of drains & pipes into Pits and settling ponds. These surface run-off, as far as possible is directed in to the finalized / working Pits for harvesting the rain-water and using the same for various purposes like dust suppression, afforestation etc. Altogether, there are about 6 Pits in this lease and currently 3 Pits are such where there is retention of accumulated rainwater. In addition to this there are total 12 settling ponds (within and outside lease).

1 Top Pit (Dhabdhaba Side) - The rainwater is channelized through drains and collected in the Pit in between Section 53 to 55. The existing water storage capacity of this pit is estimated to be about 1.46 million m3. For the water management in this Pit during monsoon, 2-3 pumps of 120Hp capacity are used. The water is pumped into settling Pit (SP11, SP12) where it is allowed to settle and clear water is released into the natural drainage system.

2 Top Pit - The rainwater is channelized through drains and collected in the Pit in between Section 38 to 40. The existing water storage capacity of this pit is estimated to be about 0.98 million m3. For the water management in this Pit during monsoon, 1-2 pumps of 120Hp capacity are used. This water is pumped and released through a dedicated pipeline into the settling Pits (SP 9, SP10 and SP8) at Section 23. The water management is through

overflow arrangement which is subsequently followed by passage through a series of filter beds and coco filters ensuring release of clear water.

¾ Bottom Pit - The rainwater is channelized through drains and collected in the Pit in between Section 6 to 8. The existing water storage capacity of this pit is estimated to be about 0.52 million m3. The water management in this Pit is done through overflow pipe arrangement into Settling pits (SP9, SP8), thereby eliminating pumping of water.

5 Top Pit - The rainwater is channelized through drains and collected in the Pit in between Section 5 to 7. The existing water storage capacity of this pit is estimated to be about 1.40 million m3. The water management in this Pit is done through overflow pipe arrangement in settling pits (SP1, SP2, SP3) There are two overflow pipes (headers) installed, one at a higher level and another at a lower. As the water in the Pit rises, it overflows through the header pipes into a series of settling pits (SP4, SP5, SP6) where it is allowed to settle. Thus, pumping is eliminated by this arrangement.

5 Top CB Pit - This Pit has a common area of the adjoining Pit of Block III - Monte De Sirigao Mineral Block. The existing water storage capacity of this pit is estimated to be about 0.39 million m3 which is channelized through drains and collected in the Pit in between Section -1 to 0.. For the water management in this Pit during monsoon, 1 pump of 75Hp capacity is used. This water is pumped to 5 Top Pit in Section 5 to 7.

5 Bottom Pit - The rainwater is channelized through drains and collected in the Pit in between Section -6 to -10 The existing water storage capacity of this pit is estimated to be about 0.50 million m3 and the surplus quantum of water overflows through the channel to the settling area and eventually joining to the natural course.

Extract of Additional study of silt load calculation, de-siltation management and likelihood of seepage from Assonora river to 5 Bottom pits conducted Center for Advance studies department of geology, University of Delhi.

The garland drains are made such that from upstream to the downstream where the drains are meeting the settling ponds will show decrease in elevation, to maintain a free-flowing gradient of rainfall runoff.

The dimension of the drains is maintained to be 2m in width and 1.5m in depth at everywhere in the mine site. A proper height has been maintained on the sides of the garland drain so that water don't' get over-flooded from the drain.

Total length of the Garland drain = 11313 m
Peak rainfall = 154 mm/day
Peak runoff in a day = 110590 m3
Capacity of garland drain = 33939 m3

"All the structures made for the settling of sediments are found to be more than sufficient to accommodate sediments even during peak rainfall".

371/C

GOVERNMENT OF GOA

Office of the Deputy Conservator of Forests,
North Goa Division,
Ponda – Goa, 403 401

Ph No: 0832-2312856 Fax No: 2312095 email:- dcfnorth-forest.goa@nic.in

No.5/MINES-GEN/DCFN/TECH/2023-24/56 Dated:- 12/04/2023

To,
The Conservator of Forests (Conservation)
Van Bhavan,
Panaji- Goa

Text

Sub:- Status of land within Block -1 of Bicholim Mineral Block – reg.

Madam,

With reference to the letter No. CF(C)/General/FD/2022-23/5176 dated 17/02/2023 on the above cited subject , the detail of village wise Survey Nos. (as per the list attached as Annexure-I) within Block -1 of Bicholim Mineral Block is verified and found that the area under the above mentioned Survey Nos is not a Govt. Forest and also does not identified as Private Forest by State Level Expert Committee headed by Sawant / Dr. Karapurkar/ V. T. Thomas. The plan showing Block-1 – Bicholim Mineral Block is enclosed herewith as Annexure-II for kind information.

The Plan & Survey Nos. of Block II, III and IV were not submitted by the User agency, therefore could not be verified by this office.

Yours faithfully,

Dy. Conservator of Forests,
North Goa Division,
Ponda- Goa.

Encl:- As above.

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ASSTT. CONSERVATOR OF FORESTS
PONDA GOA

Government of Goa
Directorate of Mines Geology
Institute Menezes Braganza, Panaji-Goa
Website: dmg.goa.gov.in **e-mail:dir-mine.goa@nic.in**
Phone Nos. 0832 – 2426431/2425287/2422765

File No. 03/24/2023/Major/Mines/Part/ 1489 Date: 25/07/2023

To,
M/s. Vedanta Ltd.
Sesa Ghor, 20 EDC Complex,
Patto, Panaji, Goa.
403001

Sub: Clarification letter with respect to Terms of Reference granted to Vedanta Limited for Block I Bicholim Mine.

Sir,

This has reference to your letter dated 18/5/2023 on the subject cited above. With regards to the special condition no. xvii mentioned in the summary records of the 14th meeting of the Expert Appraisal Committee held on 3-4 May 2023, it is clarified that:-

(a) M/s. Vedanta has been declared as Preferred Bidder for Bicholim Mineral Block- Block I through an auction process conducted by the Government of Goa as per the Mineral Auction Rules, 2015.

(b) M/s. Vedanta Ltd., was not the erstwhile lessee of the said Block prior to auction.

(c) The matter of illegal mining in the State of Goa is under investigation by the Special Investigation Team (SIT).

Yours faithfully,

(Dr. S. Shanbhogue)
Director

FINAL ENVIRONMENTAL IMPACT ASSESSMENT & ENVIRONMENT MANAGEMENT PLAN

Project	**Block-I Bicholim Mineral Block**
Sector and Category	**1(a) – Cat-'A'**
Area	**478.5206 Ha.**
Location	**Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages of Bicholim Taluka, North Goa District, Goa**
Project Proponent	**Vedanta Limited**
Office Address	**Sesa Ghor, 20 EDC Complex Patto, Panjim, Goa- 403001**
Baseline data Collected	**Summer 2023 (March to May-2023)**
Name of MoEF& CC Accredited laboratory	**Environmental Laboratory (unit Mineral Engineering Services), Bengaluru**
Public Hearing conducted & venue	**11.08.2023 at Narayan Zantye Multipurpose Sports Complex, Sarvan Village, Bicholim taluka North Goa district, Goa**

August-2023

EIA Consultant

MINERAL ENGINEERING SERVICES
(Accredited by QCI-NABET ORG000756)
25/XXV, Club Road, Ballari-583103, Karnataka,
Tel 08392-267421, Mob: 0919448367421,
Email : mes_msraju@yahoo.co.uk & mesbly25@gmail.com

vedanta
transforming elements

sesa goa iron ore

Undertaking by Project Proponent

The Environmental Impact Assessment Report of Block-I Bicholim Mineral Block over an area of 478.5206 Ha, located at Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages of Bicholim Taluka, North Goa District, Goa State is prepared by Mineral Engineering Services, QCI/NABET Accredited EIA Consultant at Sr. No. 55 as per List of Accredited Consultant Organizations/ (Alphabetically) Sep 05th, 2022.

We hereby undertake that the information and data provided in the EIA Report and submitted to the Ministry are factually correct and we are fully accountable for the same.

For Vedanta Limited

Dhiraj Kumar Jagdish
Dy Chief Executive Officer - Iron Ore Goa
Authorized Signatory

VEDANTA LIMITED
Sesa Goa Iron Ore, Sesa Ghor, 20 EDC Complex, Patto, Panjim, Goa - 403 001, India
T +91 0832 2460600 | Website: www.sesagoaironore.com

Registered Office: Vedanta Limited, 1st Floor, 'C' wing, Unit 103, Corporate Avenue, Atul Projects, Chakala, Andheri (East), Mumbai 400093, Maharashtra, India.
CIN: L13209MH1965PLC291394

MINERAL ENGINEERING SERVICES

NABET

QCI.No. ORG000756

Recognized by NABET Valid upto 07.08.2023

UNDERTAKING

This is to declare that the prescribed ToRs have been complied with and that the data submitted is factually correct in respect of EIA & EMP report prepared for Block-I- Bicholim Mineral Blcok of Vedanta Limited, Goa.

For Mineral Engineering Services

(M.S.Raju)
Consultant

Date: 20.06.2023

Place: Ballari

25/XXV, Club Road, Ballari-583103, Karnataka. Landline no. : 08392-267421.
E-mail: mes_msraju@yahoo.co.uk
mesbly25@gmail.com
Website : www.envtest.com

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Certificate of Accreditation

Mineral Engineering Services, Bellary

25/XXV, Club Road, Bellary, Karnataka- 583103

*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 open cast and underground mining	1	1 (a) (i)	A
2	Mineral beneficiation	7	2 (b)	A

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated July 04, 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/23/2806 dated July 28, 2023. The accreditation needs to be renewed before the expiry date by Mineral Engineering Services, Bellary following due process of assessment.

Sr. Director, NABET
Dated: July 28, 2023

Certificate No.
NABET/EIA/2326/RA 0296

Valid up to
May 15, 2026

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to the QCI-NABET website.

TOR COMPLIANCE

Compliance of TOR

Sl. No	Specific Terms of Reference	Compliance
1.	**Environmental Monitoring**	
	The Project Proponent needs to monitor the ambient air quality and noise level at the mine lease boundary, nearest village, crusher, predominant downwind direction and at other sensitive receptors. Accordingly, Project Proponent shall propose to install Continuous Ambient Air Quality Monitoring Station within certain timeline	PP have monitored the Air & Noise quality near lease boundary, nearest village other sensitive receptors. Ref Chapter 3 & Annexure- 5 PP is proposing to install continuous air quality monitoring station within one year of execution the lease deed Ref Chapter 6.1.3.2
2.	The Project Proponent should prepare the EMP considering the scenario of pollution to be generated for normative and peak total excavation for assessing air and noise pollution	Detailed Environmental Management Plan is prepared. The budget of Rs. 72 lakhs capital cost and Rs. 621 lakhs recurring cost is presented in the report. Refer Chapter -10 for EMP, budget provided in Para- 10.8 in Table 10.14
3.	**Green belt**	
	The Project Proponent needs to submit the greenbelt/afforestation development plan for undertaking plantation in the periphery of the mine lease boundary, safety zone etc., The details of the no. of saplings proposed, type of species, spacing and the area to be covered including the cost and timeline for completion of plantation needs to be provided in the EIA report	The green belt development plan for five year plan period is about 19.1723 Ha area and 47931 saplings proposed . The detailed plan is given vide Chapter-10, Details of Green Belt Development Plan is provided Table 10.13
4.	**Land Environment**	
	The Project Proponent needs to submit the plan for ecology restoration	Ref Chapter -10, Para- 10.5.6
	Miscellaneous	
5.	The Project Proponent needs to submit the action plan for shifting the School within the mine lease area. PP should also provide the details of the nearest school present within the mine lease area and in the vicinity of the mine lease area by mentioning the distance and direction of the school from the mine lease area, strength of the school, working time of school, blasting time and the measures to be taken for control of ground vibration and fly rock.	There are two Govt. primary schools inside the mineral block in Mulgao habitation There is no drilling and blasting proposed in the project The details of the schools and mitigation measure are dealt with in Chapter 7 in para 7.5.1. & also Chapter 10 in table 10.12.
6.	The Project Proponent shall conduct drone	The drone survey was conducted and will be

	survey of the mine lease area and buffer area and submit during the appraisal for EC.	submitted during appraisal for EC
7.	During the meeting, the EAC noted that old excavated pits exist within the mine lease area. Hence, the Project Proponent needs to submit a letter from the Department of Geology and Mining, Government of Goa clarifying whether any illegal mining within the mine lease area has been carried out or not and whether the same has been carried out by *M/s.* Vedanta Limited or not?	The state govt. auctioned Block-I Bicholim Mineral Block as fresh mine and Vedanta was preferred bidder. Clarification letter from Department of Mines and Geology, Government of Goa is attached as Annex-11
8.	The instant ToR is subject to the outcome of the two said court cases i.e., WP(Civil) 2478 of 2022 (Filing Number) before the High Court of Bombay at Goa and WP 592 of 2022 before the High Court of Bombay at Goa.	PP will abide by the court judgement
9.	The Project Proponent needs to submit the detailed site-specific protection measures for the surface features such as habitations, water bodies, school, temple, road in and around the vicinity of the mine lease area	The action plan for the protective measures proposed by PP around the vicinity of the mine lease area is given vide chapter – 10, Table.No.10.12
10.	The Project Proponent shall ensure the validity of the baseline data and public hearing are valid as per Ministry's OM dated 08.06.2022 at the time of submission of proposal for EC	The baseline data was collected during summer season March to May 2023.
	Socio-Economic	
11.	The Project Proponent needs to carry out the Public Hearing as per provisions of EIA Notification, 2006. PP should also submit the time bound action plan on concerns of the public through a separate budget with capital expenditure with a timeline of 3 years. The Project proponent shall ensure that the activities proposed under the public hearing shall be different from the CSR activities	Public Hearing was conducted on 11.08.2023 The time bound action plan is given chapter -7 table no 7.1 The total budget for proposed is 309.3 lakhs for three years
12.	The Project Proponent needs to submit employment-based skill development plan for the local people and thrust should be to provide employment to local people after imparting training	The employment-based skill development plan is proposed. Ref Chapter-8 , Para.8.4.1 Budget for the skilling is provided in table 8.2. Preference will be given to locals for employment purpose
	Transportation	
13.	The Project Proponent needs to submit the map showing the transport route of the mineral from the mine lease area to the destination, impact of details of habitation at a distance of	The transport route map is given in chapter-3, Para-3.10 , Fig 3.12 Impacts are given in chapter 4 para 4.10 The total distance is 5.48km (4.54 dedicated

	100m from the center on both sides of road, details of no. of trips/day to and fro, capacity of the dumper/tipper to be deployed and the dimensions of the road and the carrying capacity of the road. The Project Proponent shall ensure that the transportation route shall not pass through any village road.	road and 0.94 km MDR-20 public road).
	Waste Management	
14.	The Project Proponent needs to submit the action plan for year wise backfilling	The action plan for year wise backfilling for plan period is given vide Chapter-4, Para- 4.2.3.1 in Table No 4.2
	Water Environment	
15.	The Project Proponent needs to explore the likelihood of river water entering into the mine pit below the RL of the HFL and the measures that are required to be taken for prevention of seepage and in the event of seepage to drain out the water through settling tank.	***1.*** The influence of HFL (3.5m)asnora river have no impact on mining area . As the mine lease is about 10m above MSL. Ref Chapter-7, Para. 7.2 ***point no 3. Water Inundation***
16.	The Project Proponent shall carry out the assessment of impact due to the proposed project as per the guidelines issued by the Central Ground Water Authority from time to time and submit the same as a part of the EIA/EMP. The project proponent shall conduct hydrological study for projects involving intersection of ground water table as per the guidelines issued by the Central Ground Water Authority from time to time and submit the same as a part of the EIA/EMP.	PP has carried out detailed hydrogeological studies as per the guidelines issued by CGWA the same is being attached as Appendix- I in EIA /EMP Report
17.	The EAC noted that the mine lease area is in close proximity to the Assnora River (flowing adjacent to the mine lease boundary on the north western side). The Project Proponent needs to submit the detailed report on the engineering design for garland drain, settling tank and check dams and its efficacy through recognized institution. The study should also include the per day silt load, settling velocity of the silt, retention time required based on the annual rainfall with a provision to monitor the water quality	The detailed Study on engineering design for the protective measures from the recognized institute is attached as Appendix- III

18.	The Project Proponent shall prepare the scheme for mandatory recycle/reuse of water as specified by the Central Ground Water Authority for different category areas seeking NoC for ground water withdrawal and the shall submit as part of EIA/EMP report.	The water harvested inside the pits (rain water plus ground water) will be used only for dust suppression & green belt purpose. Application for NoC for ground water withdrawal Annexure-7
19.	The Project Proponent shall explore the possibility of reduction of specific water requirement by optimization technology up gradation, etc. The efforts shall be delineated in the EIA/EMP.	Measures for reduction of specific water requirement are provided in chapter **10 in para 10.5.2.1**
20.	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. The production details need to submit since inception of mine duly authenticated by Department of Mines & Geology, State Government	The year wise production not applicable as it is a fresh grant. The Goa Government has auctioned the Block I-Bicholim Mineral Block as a fresh Lease. And LOI is issued to Vedanta Ltd. MoEF & CC has considered this project as a Green Field Project The mine operations will commence after obtaining necessary Statutory clearances and execution of lease Deed.
21.	A copy of the document in support of rightful lessee of the mine should be submitted. In case of new mines copy of LoI granted by State Government to be submitted. PP should ensure that LoI is valid at the time of grant of ToR. PP should submit the copy of lease deed/supplementary lease deed/extension letter/transfer deed, from its initial grant to subsequent renewals/ transfer/extension of validity.	The state govt. has auctioned the subject Mineral Block as a fresh mining lease and LOI is issued to Vedanta ltd. LOI is attached as Annexure. No.1
22.	PP should submit the District Survey Report (DSR) as per S.O. 3611(E) dated 25.07.2018 in case of minor minerals	NA
23.	Brief of proposal to be submitted which include total excavation of the material required for the production of certain quantity of the minerals, location of the project, mining lease area, latitude longitude, seismic zone etc. In case of expansion project details of expansion viz. expansion in mining lease area or expansion in production of any particular mineral or expansion in total excavation, latest certified Compliance report (CCR) from IRO of conditions granted in existing EC needs to be submitted	The location of the project falls in Topo sheet no 48 E/14 and bounded by latitude of 15° 34' 20.518" to 15° 36′ 54.018″ N & longitude of 73°54′ 4.754" to 73° 57′ 09.51″ E. The detailed Environmental setting is given Chapter – 2 , Para-2.1, Table. No.2.1
24.	The PP should submit the real-time aerial video	PP shall submit the real –time video footage of the

	footage & video of the mining lease area and of the transportation route.	mining lease at the time EAC Meeting
25.	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).	The high resolution imagery (plate No-3A) Topo sheet (plate No-3) Geomorphology (plate No -9) Geological map (plate No – 8) are enclosed
26.	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 Key Plan is enclosed as Plate.no.3 Ref chapter 3
27.	The PP should collect the Baseline data (BLD) in respect of initial level of the mining lease. For this permanent bench marks (BM) needs to be established at prominent location preferably close to mining leases in question and should have precisely known relationship to the level datum of the area, typically mean sea level	The mining block is linked to permanent bench mark established at the site. Ref Plate No. 20
28	In case of sand mining, the entire mining lease area should be divided suitably into grids of 25 m x 25 m with the help of sections across the width of river and along the direction of flow of the river. The levels (MSL & RL) of the corner point of each grid needs to be recorded. Each Grid should be suitably numbered for identification. PP should identity grids which will be worked out and grids which will come under no mining zone i.e. safety barriers from the river bank. PP should comply with the sustainable sand mining management guidelines 2016 and enforcement and monitoring guidelines, 2020 etc.	NA
29.	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	The green belt development plan for five year plan period is about 19.1723 Ha area and 47931 saplings proposed . The detailed plan is given vide Chapter-10, Details of Green Belt Development Plan is provided Table 10.13

	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	
30.	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.	1. Canteen 2. Rest shelters 3. Drinking water facility on the site 4. Latrines and urinals on the site 5. Dispensary/OHC on site Ref Chapter -2, Para 2.3.6a
31.	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	Ref chapter 10 in para 10.5.6 Enclosed as Plate. Nos. 6a & 6b & Plate No .7
32.	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out	The capital cost of the project is Rs. 25000 lakhs. The proposed EMP cost i.e., Capital cost is about 72 lakhs and recurring cost is 621 lakhs. The detailed distribution is given in EIA report Ref Chapter- 10, Para. 10.8, Table.No.10.14
33.	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.	Refer Chapter – 8
34.	Compliance of the Ministry's 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	The Affidavit is enclosed as ***Annexure-2***
	FOREST	
35.	PP shall submit a certificate from Chief Conservator of Forests regarding involvement of Forest Land in the mining lease area if any. In case forest land is involved i) PP should submit the proof of application made for obtaining forest clearance and ii) a map clearly showing the forest & non-forest area	As per the auctioned document given by state govt. there is no forest area involved in Block-I Bicholim Mineral Block. The letter from forest department clarifying that there is no forest land within the mineral block is attached as Annexure-12
36.	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	NA

	also be furnished.	
	LANDUSE	
37.	PP should submit the details of survey number [viz. survey no, area in hectare, classification of land (government, private, forest, grazing land etc.), villages] duly authenticated by State Government, falling in the mining lease area	Enclosed in lease sketch as **Plate.No.2** The details of land classification as given in the GR report of Mines and Geology Dept. of Govt. of Goa given in the Annexure-13 enclosed
38.	The study area will comprise of 10km 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	Ref Conceptual Plan: Plate No. 6a & 6b
39.	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.	The detailed land use and land breakup is given detail in EIA and EMP Report Ref: Chapter-3, Para- 3.7 Plate.No.18
40.	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 external dumps
41.	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	No wildlife sanctuaries are in the study area. The detailed biological study was conducted in the study area of 10 kms radius . The detailed wild life conservation plan is prepared and submitted to CWLW . For impact of the project on the wildlife in the surrounding & mitigative measures Ref chapter 4 para 4.8 in table 4.8 & Chapter 10 para 10.7
42.	A detailed biological study of the study area [core zone and buffer zone] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. PP shall submit list of Schedule-1 species present in core and buffer zone duly authenticated by CWLW. In case of any	The detailed biological study was conducted in the study area of 10 kms radius . There were recorded some Schedule-1 species like Leopard, Indian Peafowl, White-bellied eagle, Crimson rose. The detailed wild life conservation plan is prepared and submitted to CWLW Enclosed as Appendix-IV The Acknowledgement of submission of conservation plan to Chief Wildlife is enclosed as

	Scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest/Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost. Proof of its submission of conservation plan to the CWLW needs to be submitted	Annexure-8
43.	PP shall submit a certificate from Chief Wildlife Warden regarding distance of mining lease from the protected area falling within 10 KM of the mining lease. In case project requires clearance under Wildlife (Protection) Act, 1972 then copy of application made for the same needs to be submitted	No wildlife Sanctuaries within 10 kms from the project site. Certificate from forest dept. with respect to distance to wildlife Sanctuaries as Annexure-9
44.	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 predominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.	The baseline data was conducted during summer season (march to May,2023) . The report enclosed as **Annexure- 5** Flora and fauna study has been conducted (Ref Chapter -3 para 3.8)
45.	Air quality modelling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modelling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The windrose showing pre-dominant wind direction may also be	The air quality modelling was done using AERMOD software Ref Chapter-4, Para.4.3

	indicated on the map.	
46.	The PP 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, PP should submit the original test reports and certificates of the labs from which samples were analyzed	Photographs enclosed in EIA & EMP Report Chapter -3
	WATER ENVIRONMENT	
47.	The water requirement for the Project, its availability and source should be furnished. Quantity of surface or ground water to be used for the Project should be indicated. A detailed water balance should also be provided. 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. 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. The capital and recurring expenditure to be incurred needs to be submitted.	Water balance and water requirement provided chapter 2 in para 2.6.5 The detailed water conservation measures are given in Chapter-10 para 10.5.2.2.
48.	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	The impact on the water quality chapter -4 para 4.7 and Necessary safeguard measures like garland drains, settling ponds are mentioned in chapter- 10, Para-10.5.2.1
	HYDROGEOLOGY	
49.	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 details water bodies are provided in chapter 2 environmental settings chapeter-2 table -2.1 , Chapter-3 in para 3.5.3 there is no diversion of water bodies proposed
50.	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	Ref chapter 3 para 3.6.6.2 plate no 18 LULC map The detailed hydrogeological report is enclosed as Appendix-I
51.	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working bench will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia shall include details of the aquifers present and impact of mining activities on these	The detailed hydrogeological report is enclosed as Appendix-I The acknowledgment for having submitted the hydrogeological report and application to WRD is enclosed as Annexure-7

	aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished. In case of surface water is proposed to be utilized then Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.	
	TRANSPORTATION	
52.	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.	The traffic density study is carried out as per Indian Road Congress Guidelines . Ref Chapter 3 para 3.10 & Chapter-4, Para-4.10
	LAND ACQUISITION AND R&R	
53.	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority	The state govt. has issued LOI as preferred bidder to Vedanta Limited as fresh mine ref Annexure-1
54.	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	No R& R is involved

	should be discussed in the Report	
	SOCIO-ECONOMIC ENVIRONMENT	
55.	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	Health status of population in the study area Ref. Chapter-3, Para.3.9.1.19 in table 3.38 Health impact on population Chapter -4 Para 4.9.1 (b)
56.	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	Impact study on the local population is done . Detailed study is given in Chapter-4, Para.4.10 Chapter -7 para 7.1 Chapter -8 para 8.1.1, social benefits provided in para 8.4
57.	Activity-wise time-bound action plan on the issues raised and commitment made during public hearing to be submitted as part of the final EMP Report in compliance of the Ministry's OM F.No.22-65/2017-IA.III dated 30th September, 2020.	Ref. Chapter -7 para 7.1 Chapter 10 para 10.8 Table. No. 10.14 for EMP budget
	ENVIRONMENTAL MONITORING AND MANAGEMENT	
59.	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.	Policy ref Chapter 10 para 10.2 The hierarchical system or administrative order of the Company to deal with the environmental issues is given in Chapter-10, Para-10.1 &10.3
	CRITICALLY POLLUTED AREAS, ARAVALI & CRZ	
60.	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	NA

	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.	
	Risk Assessment & Disaster Management	
61.	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.	The detailed impact and preventive measures on occupational health is given vide chapter-7, Para.7.4 Also OH&S plan provided in chapter 10 para 10.10
62.	A Disaster Management Plan shall be prepared and included in the EIA/EMP Report.	Refer Chapter-7, Para, Para.7.3
63	The general points are also to be followed	Shall be followed
64	All documents to be properly referenced with index and continuous page numbering.	Complied
65	Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated	Complied
66	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.	Enclosed as annexure -5
67	Where the documents provided are in a language other than English, an English translation should be provided	Complied
68	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted	Before EAC meeting shall be submitted
69	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	Complied
70.	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	No changes in basic scope and project parameters. EIA prepared as per TORs issued by MoEF&CC Necessary modification in EIA has been done only with points raised in public hearing

	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	
71.	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.	Goa government has auction this mine block as a fresh mineral block. And LOI is issued to Vedanta Ltd. This point is not applicable
72	The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii)geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area	surface plan plate No -5 geological map plate No -4a & 4b geological sections Plate No -4A1 to 4A4

EIA & EMP

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Chapter-1
INTRODUCTION

Sensitivity: Public (C4)

1.0 INTRODUCTION

Vedanta Limited is one of the leading global natural resources conglomerate operating across India, South Africa, Liberia and Namibia.

Vedanta Limited is a uniquely diversified company across the natural resources spectrum with interests in Oil & Gas, Zinc-Lead-Silver, Aluminum, Iron Ore, Steel, Copper, Ferro Alloys, Power, and Nickel. Vedanta Limited is having vast experience in handling Iron Ore projects in India and are known for its Quality & sustainable development.

In pursuant to the notice inviting tender dated 30.09.2022 by the Government of Goa in accordance with Mines and Minerals (Development and Regulation) Act 1957, and the Mineral (Auction) Rules, 2015 and as amended from time to time, Vedanta Limited intends to obtain prior Environmental clearance from MoEF&CC for the production of 3.0 MTPA in Block-I Bicholim Mineral Block located in Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages of Bicholim Taluka, North Goa District, Goa State.

The said Block-I Bicholim Mineral Block was earlier operated by Sesa Mining Corporation Ltd (SMCL) formerly known as Dempo Mining Corporation Ltd. Pursuant to Supreme Court judgement in Goa Foundation 2 dated 07.02.2018, all the mining leases granted by the State Government were cancelled. Thereafter, State Government in terms of the said order and as per the provisions of MMDR Act put this block for auction as a fresh lease grant.

The e-auction process was conducted in accordance with the Tender Document for said Mineral Block. Vedanta Limited emerged as the highest qualified bidder having submitted the highest final price offer, and was declared as the preferred bidder under Rule 9(9) (iii) of auction Rules.

Further, upon submission of the first installment, being 20% of the upfront

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payment, Government of Goa issued a Letter of Intent (LOI) vide letter no. DMG/25/Auction Cell/LOI-function/2023/2801 dated 13.01.2023 for the grant of a mining lease for Block-I - Bicholim Mineral Block in Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages, of Bicholim Taluka, North Goa District, Goa State over an area of 478.5206 Ha over a period of 50 years. The Letter of Intent was accepted by Vedanta Limited (Preferred Bidder/Applicant) vide Letter dated 13.01.2023.

Copy of the Letter of Intent is attached as Annexure No. 1

Vedanta Limited has agreed to deposit an unconditional performance security to become "Successful Bidder" to the State Government pursuant to Auction Rules i.e. before signing of Mine Development and Production Agreement (MDPA) with Government of Goa as per Sr. No. 3.2. (a) (iii) of letter of Intent dated 13-01-2023. Once the MDPA is signed, a mining lease deed will be executed and the mining lease will be valid for 50 years from the date of execution.

Mining Plan was prepared and submitted to Indian Bureau of Mines (IBM) in compliance with the terms and conditions no. 3(3.2)(a)(iv) of the Letter of Intent and under the provisions of Rule 16(1) of MCR 2016 for grant of mining lease over an area of 478.5206 Ha and to obtain Environmental Clearance for the production capacity of 3.0 million tonnes of Iron Ore per annum.

Subsequently, Approval for Mining Plan was issued from Indian Bureau of Mines, Goa vide letter No. MCDR-MPC/1/2O23-GOA-IBM_RO_GOA dated 26.05.2023 enclosed as Annexure No.3.

1.1 *PURPOSE OF THE REPORT*

The project proponent intends to obtain prior Environmental Clearance from MoEF&CC for the production of 3.0 MTPA as it is a prerequisite condition to execute the Mining Lease Deed and commence production activities**.** The proposed project is a **Category A** Project under activity 1(a) as per the Environment Impact Assessment

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(EIA) Notification dated 14th September 2006 and subsequent amendments till date as the total extent of the project is >250 Ha.

The project proponent had applied via online mode to Expert Appraisal Committee (EAC), MoEF&CC for the grant of Terms of Reference(TOR) for the production of 3.0 MTPA of Iron Ore and subsequently, the TOR was granted by MoEF&CC vide its letter no. TO23A0000GA5700309N dated 16.06.2023 and is enclosed as ***Annexure No.4.***

This report is prepared in accordance with the EIA Notification, 2006 and addresses all the conditions of the approved TOR.

This report presents the baseline condition of the project area, the possible impacts in the surroundings due to the project, mitigation measures and management plan.

1.2 IDENTIFICATION OF PROJECT PROPONENT & PROJECT

1.2.1 *IDENTIFICATION OF PROJECT PROPONENT*

Vedanta Limited is the project proponent who is one of the leading global natural resources conglomerate operating across India, South Africa, Liberia and Namibia.

Vedanta Limited is a uniquely diversified company across the natural resources spectrum with interests in Oil & Gas, Zinc-Lead-Silver, Aluminum, Iron Ore, Steel, Copper, Ferro Alloys, Power, and Nickel. Vedanta Limited is having vast experience in handling Iron Ore projects in India and are known for its Quality and sustainable development.

1.2.2 PROJECT

Vedanta Limited is proposing the iron ore production in the mines located at Block 1 - Bicholim Mineral Block in Bicholim, Bordem, Lamgao, Mulgao, Mayem, & Sirigao villages of Bicholim Taluka, North Goa District, Goa State.

The proposed iron ore mining project is spread over an area of 478.5206 Ha and capacity of project is 3 MTPA. The mode of mining will be opencast mechanised

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mining by using Heavy earth moving machinery such as excavators and ripper dozer, Dry screening and Crushing Plant of capacity 4MTPA. There will be no drilling and blasting operations for mining of ore and for removal of waste as majority of the ore are is of soft & friable geological formations.

1.2.3 PROJECT PROPONENT & ADDRESS

Registered Address: Vedanta. Limited.,

Sesa Ghor, 20 EDC Complex, Patto, Panjim

Goa- 403001

Phone no. : (0832) 2460600

Email : mk.reddy@vedanta.co.in

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

1.3.1 Brief Description Of Nature, Size And Location Of The Project

The lease area of 478.5206 Ha falls under Block 1 - Bicholim Mineral Block in Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages of Bicholim Taluka, North Goa District, Goa State. The details of land Classification are given vide Annexure-13

The proposed lease area is having about 84.743 million tonnes of mineral reserves & resources. The mined Iron Ore shall be utilized at the company-owned pig iron plant, other domestic and export markets.

The lease area falls under the Topo sheet No. 48 E/14, Survey of India and bounded by latitude of 15° 34' 20.518" N to 15° 36′ 54.018″ N & longitude of 73°54′ 4.754" E to 73° 57′ 09.51″ E. The general elevation of ML area varies from 169.14 m to -37.24 m above MSL.

The location plan, lease plan and key plan are enclosed vide **Plate No.1, Plate No.2 and Plate No.3** respectively.

State Highway SH-1 is about 0.65 km from ML area, the nearest Railway station is Tivim Railway station which is at a distance of 10.5 km by road, the nearest port is Mopa Airport at a distance of 27.3 km.

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1.3.2 STATUTORY CLEARANCES

Vedanta Limited shall obtain all the necessary Statutory clearances before commencement of work like Environmental Clearance, CTO from GSPCB, NOC from Water resource department of Goa.

All the documents/approvals/permissions including Approved Mining Plan and EIA-EMP shall be compatible with one another in terms of the Mineral Block Area, production levels, waste generation and its management, mining technology etc.

1.3.3 MINING PLAN

The Mining Plan for a block period of 5 years was prepared under rule 16(1) of MCR, 2016 and has been approved by the Indian Bureau of Mines vide their letter No. MCDR-MPC/1/2O23-GOA-IBM_ RO_ GOA dated 26.05.2023 enclosed as **Annexure. No. 3**

1.3.4 OTHER CLEARANCES

There are no National Parks and Sanctuaries, ESZ or ESA within Mining Lease area or in the buffer zone.

The distance of Wildlife sanctuaries is authenticated by Goa State Forest Dept. and attached as Annexure**-9** and distance given below

Madei Wild life Sanctury-14.105 Km

Salim Ali Bird Sanctuary -10.553 Km

Bondla Wild life Sanctuary -20.476 Km

Goa State Environment Dept. has authenticated that Block-1 Bicholim Mineral block of Vedanta Limited is not a part of Eco Sensitive Area. (Annexure-9A)

The drinking water (36KLD) will be drawn from bore wells registered with Water Resource Department, Goa.

The project proponent has already applied for permission for withdrawl of ground water from Water Resource Department, Goa. **Annexure-7**

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1.3.5 IMPORTANCE OF THE PROJECT TO THE COUNTRY AND REGION

The major usage of Iron Ore in India is for manufacturing of steel. The major iron ore producing states are Odisha, Jharkhand, Chhattisgarh, Karnataka and Goa.

India is world's 4th largest Iron Ore producer and 3rd largest exporter after Australia and Brazil.

As per the UNFC system, as on 1.4.2015, India possesses hematite resources of 22487 Million Tonnes, of which 5422 Million Tonnes are under 'Reserves' category and the balance 17065 Million Tonnes are under 'Remaining Resources' category.

Major resources of haematite are located in Odisha (7559 Million Tonnes or 34%), Jharkhand (5286 Million Tonnes or 23%), Chhattisgarh (4858 Million Tonnes or 22%), Karnataka (2,467 Million Tonnes or 11%) and Goa (1189 Million Tonnes or 5%).

The balance 5% is spread in Andhra Pradesh, Assam, Bihar, Madhya Pradesh, Maharashtra, Meghalaya, Rajasthan, Telangana and Uttar Pradesh.

Magnetite is another principal Iron Ore that also occurs in the form of oxide, either in igneous or metamorphosed banded magnetite silica formation, possibly of sedimentary origin. Exports of iron ore decreased considerably from 7.30 Million Tonnes in the 2014-15 to 5.4 Million Tonnes in 2015-16.

In spite of the current turmoil, Indian GDP is expected to grow in multitudes and reach around $ 27 trillion by 2050. Infrastructural development will play an instrumental role in achieving this GDP level. It is an undeniable fact that steel plays a pivotal role particularly in reference to the infrastructural sector. In this context, the production of 500 MT of steel is an imperative by 2050 and for this, 840 MT of iron ore per annum is required. This calls for wise use of our limited resources and to strategically plan for the future to meet the imminent demand, when it finally arrives in India.

The per capita steel consumption of 55 kgs remains very low, compared to the international average of 190 kgs and China's average of 400 kgs. There exists a great prospect for a much higher investment into capacity addition in the country.

Increase in steel capacity, addition will fuel up the demand for Iron Ore in the country.

Rural per capita steel consumption is set to rise in Construction & Infrastructure sector.

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In the case of present project area, the main revenue generating resources are Tourism, Agriculture and Iron Ore Mining.

The state will get revenue in terms of taxes and royalties, DMF and the country will be benefited in terms of income tax and export duty and NMET. This will definitely improve the socioeconomics of the region and the country.

The opening of this Mine shall provide direct employment and indirect employment opportunities in the form of hired truck drivers, hired machine operators, local workshops, contract workers for construction works like parapet wall, silpaulin covering work, plantation work, cleaning works etc. for the local villagers.

1.4 SCOPE OF THE STUDY

The scope of the EIA/EMP Study is as per the approved TORs issued by MoEF&CC vide its letter no TO23A0000GA5700309N dated 16.06.2023 given vide as ***Annexure.no 4 .***

The EIA/EMP Study is also based on baseline environmental data collected in the months of March to May 2023, Mining Plan and related secondary information. The EIA-EMP is prepared as per the generic structure as defined in the EIA notification dated 14th September 2006 and as amended time to time addressing all the TOR conditions given by EAC, MoEF&CC.

1.4.1 BASELINE DATA GENERATION

The study includes a detailed characterization of the baseline environment of core zone covering Mineral Block and Buffer zone over an area covering 10 km radius around the Mineral Block Area. The study includes assessing the environmental parameters like Air, Water, Noise, Land, Biological and Socio-economic aspects covering three months i.e., March to May -2023. Initially the baseline data was collected during post monsoon season i.e., October to December 2020, however as the validity of the said data was three years i.e till September 2023, the baseline data was again collected during summer season i.e., March to May 2023.

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1.4.2 SECONDARY DATA COLLECTION:

Secondary data was collected from the following sources:

India Meteorological Department (IMD)

Geological Survey of India (GSI)

Botanical Survey of India

Zoological Survey of India

CGWB, GOI

NRSC, Survey of India (SOI), ICAR-National Bureau of Soil Survey and Land Use Planning (NBSS&LUP)

Census of India, 2011

Approved Mining Plan

1.4.3 STRUCTURE OF THE EIA & EMP REPORT

This EIA report has been prepared in line with the Generic Structure prescribed by the MoEF&CC vide its EIA Notification 2006 dated 14th Sep, 2006 and its subsequent amendments.

Table 1.1: EIA Report Structure

Chapter Number	EIA Structure
1	Introduction
2	Project Description
3	Description of the Environment
4	Anticipated Environmental Impact & Mitigation Measures
5	Analysis of Alternatives (Technology & Site)
6	Environmental Monitoring Program
7	Additional Studies
8	Project Benefits
9	Environmental Cost Benefits
10	Environment Management Plan (EMP)
11	Summary & Conclusion
12	Disclosure of Consultant Engaged

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Chapter-2
PROJECT DESCRIPTION

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2.0 PROJECT DESCRIPTION

2.1 TYPE of PROJECT

The proposed project falls under screening category of 'A' [EIA notification 2006, Sl. No 1(a) of Schedule: Mining of Minerals] i.e. >250 ha of mining lease area in respect of non-coal mine lease. The project requires prior Environmental Clearance from MoEF&CC to execute the lease.

It is an opencast Iron ore mining project using HEMM. There is no Drilling and Blasting involved in this project.

YEAR - WISE PRODUCTION DETAILS

The Goa Government has auctioned the Block I- Bicholim Mineral Block as a fresh Lease. And LOI is issued to Vedanta Ltd. MoEF & CC has considered this project as a Green Field Project The mine operations will commence after obtaining necessary Statutory clearances and execution of lease Deed.

2.2 NEED FOR THE PROJECT

The present mining project involves production of 3.0 million tonnes of Iron Ore per annum, the life of the mine shall be 30 years and may enhance based on the results of exploration planned during the Mining Plan period. The lease is valid till 50 years.

The finished product, i.e., Dry crushed/screened products (Lumps & Fines)/iron ore /ROM will be used in the company owned pig iron plant and sold to the domestic buyers or domestic consumption & export . This project is expected to yield a positive impact on the socio-economic environment of the region. It helps in sustainable development of this area including further development of physical infrastructural facilities. The opening of this mine will boost the economy of the State and improve socio-economic status of the region.

Besides, the direct and indirect employment opportunities, this project will also generate the revenue to the state in terms of taxes and royalty, DMF and the country will be benefited in terms of income tax and export duty and NMET.

The Lessee shall extend social benefits like supply of water for irrigation purposes, health care measure, and educational benefits to the neighboring villagers.

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2.3 LOCATION OF THE PROJECT

The project located in Bicholim, Bordem, Lamgao, Mulgao, and Mayem & Sirigao villages of Bicholim Taluka, North Goa District, Goa State as shown in the **Plate No.1**. DGPS & key plans are enclosed vide **Plate No.2 & Plate No.3** respectively.

2.3.1. ENVIRONMENTAL SETTING

The geographical aspect of the Mine Location is given below.

Table 2.1: Environmental Setting

Land Details & Survey Nos	478.5206 Ha **Sy.Nos** : Bordem : Parts of Survey No. 19, 21, 23, 31, 32, 33, 34, 40, 41, 42, 43, 44 Bicholim : Survey No. 80, 81 & Parts of Survey No. 72, 77, 78, 79, 82, 83, 84, 86, 88, 89, 90, 95, 96 & 99 Lamgao : Survey No. 20, 24, 25, 26 & Parts of Survey No. 1, 9, 10, 11, 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 27, 28, 29, 30 & 46 Mayem : Survey No. 145, 164, 165 & Parts of Survey No. 84, 85, 86, 114, 142, 143, 144, 146, 162, 163, 166 &167 Mulgao: Survey No. 34, 62, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 89, 91, 110, 114, 115, 116 & Parts of Survey No. 33, 35, 48, 61, 63, 79, 80, 81, 86, 88, 90, 92, 93, 94, 95, 96, 101, 102, 103, 104, 109, 111, 112, 113, 117, 118 & 124 Sirigao : Parts of Survey No. 70, 75, 76, 77, 78, 79, 80, 81 & 82	
Geographical Coordinates	Latitude 15° 34' 20.518" to 15° 36′ 54.018″ N & longitude of 73°54′ 04.754" to 73° 57′ 09.51″ E.	
Survey of India (SOI) Topo-sheet No	48 E/14	
Water requirement	664 KLD	
Power requirement	5.8 MW	
Sanctuary / Tiger Reserve/Elephant / any other Reserve Forest	No sanctuary /Tiger reserve within study area	
	Mayem Forest	Common Boundary with the lease area
	Kharpal RF	6.7 Km
	Kasarpal RF	5.1 Km
	Ambadgaon RF	7.6 Km
Biosphere Reserve	None	-
Water Bodies	Asnora river	Touching lease boundary at one point
	Bicholim River	0.23 Km
	Mandovi River	2.3 kms
	Chapora River	7.5 km

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	Mayem Lake	0.46km
Defence Installation	None	--
Nearest airport	Mopa	27.3 Kms
Nearest Railway Station	Tivim	10.5 kms
Nearest Highway	SH-1	0.65 KM from ML area
Seismic Zone	III	--
Nearest Habitat	Within the lease	Min Buffer of 50mts shall be provided and no drilling and blasting shall be carried out.
Environmental Protection Cost	Capital Cost: Rs. 72 lakhs Recurring Cost: Rs. 621 Lakhs	--
Project Cost	25000 lakhs	
Man Power Requirement	716	Both Direct & Indirect employment
Archaeological monuments/ places of worships/public utilities etc.	Namuzgah/Idgah ;	Archaeological monuments Within ML area. (200m buffer will be maintained from Idgah;
	Lamgao caves Sateri Temple Mhatrai temple Kelbai Temple Mahadev Temple Lairaee Temple (Old)	300m buffer from Lamgao caves) With in the ML Area
	Shri Lairae Temple(new)	0.86 km from ML Area.
	Saptakoteshwar temple and at Narve	2.5 km There are other monuments within 10km radius namely temples, Churches at Old Goa, Site at Gujir,
	Amthane Dam	7 kms
	Fort at Khorjuvem	2 kms, there are few other forts also within study area like fort at Colvale & Sanquelim
	Public ferry point at sarmanas at Pilgao village at an aerial distance of 2.45 km	
Coastal Regulation Zone (CRZ)	--	--

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<table>
<tr><td>Distance from the HFL of the river in m</td><td>Asnora river is touching one part of the lease boundary</td><td>Asnora river is touching one part of the lease boundary but the elevation difference is min 10mts.</td></tr>
<tr><td>Nearest School</td><td>Mulgao Government Primary School (2 schools)

Lamgao Government Primary School</td><td>Within Lease (Gaonkarwada School is non functional since last few years; A buffer of 120m will be maintained from Manaswada habitation wherein the school is located.)

0.015 kms outside the mine lease</td></tr>
<tr><td>List of Schools</td><td colspan="2"><table>
<tr><th>Sr. No.</th><th>School Name</th><th>Strength</th><th>Distance from block boundary in meters</th><th>Direction from Block</th></tr>
<tr><td>1</td><td>Ideal High school, Pilgao</td><td>292</td><td>1525</td><td>S</td></tr>
<tr><td>2</td><td>Govt. high school Sirigao</td><td>56</td><td>874</td><td>W</td></tr>
<tr><td>3</td><td>Govt. high school, Mulgao</td><td>117</td><td>608</td><td>N</td></tr>
<tr><td>4</td><td>Govt. high school, Shriodwadi, Mulgao</td><td>50</td><td>702</td><td>N</td></tr>
<tr><td>5</td><td>Vijyanand high school, Mayem</td><td>94</td><td>3958</td><td>S</td></tr>
<tr><td>6</td><td>Shree Mahamaya High school, Mayem</td><td>170</td><td>1245</td><td>SW</td></tr>
<tr><td>7</td><td>Our lady of grace high school, Bicholim</td><td>1106</td><td>505</td><td>NE</td></tr>
<tr><td>8</td><td>Shree Shantadurga high school, Bicholim</td><td>1286</td><td>616</td><td>NE</td></tr>
<tr><td>9</td><td>Radhakrishn high school, Bicholim</td><td>343</td><td>307</td><td>NE</td></tr>
</table></td></tr>
<tr><td>Mangrove</td><td>Asnora Creek Mangrove</td><td>210 mts from ML area</td></tr>
</table>

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Industries	Cashew factory within the mineral block at Bicholim (85m buffer will be maintained)	Iron ore Beneficiation plant of SMCL at a distance of 1.2 km from mineral block; Iron ore barge loading jetty of SMCL at aerial distance of 3km There are other industrial areas within the study area namely Bicholim Industrial estate (0.42km), and other estates at Mapusa, Thivim, Colvale and Corlim beyond 8km.

2.3.1.1 Geology

As per Geological Survey of India (GSI) studies, Bicholim Mine area forms a part of Bicholim-Sirigao type deposit. Rock formation in this area indicate a major overturned anticlinal fold extending over the length of about 6.5 km. Iron ore was generally found to occur as soft banded beds in the Precambrian meta sedimentary formation. Hard lumpy ores occur close to surface in laterite 5 to 10 m depth followed by soft laminated and friable powdery ores in deeper portions upto 200 m. The general strike of ore body is NW-SE and the general dip of the ore body is NE – NW. The lithology of geological formation is given below

Table 2.2 The lithology of geological formation

Lithology	
Type	**Depth**
Laterite	10-15m
Lumpy Laterite	05 to 10m
Friable Powdery Ores	20 to 45m
Limonitic Clays	5 to 10m
Phyllite Clays	30 to 100m
Manganiferous Clays	10 to 30m
Intrusive / Dykes	02 to 15m

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2.4 SIZE OR MAGNITUDE OF OPERATION (Including associated activities required by or for the project)

The proposed project extends over an area of 478.5206 Ha consisting of non-forest land. The Iron ore reserves estimated as per the approved mining plan as on 26.05.2023 are 84.743 million tonnes.

Parameters:

Total Mineral Reserves & Resource : 84.743million tonnes

Nature of ore : Iron ore

Max. Proposed Production : 3.0 million tonnes

Ore to waste ratio (average) : 1 : 8.39

The complete chemical analysis of ROM ore/Mineral is given below:

Table 2.3: The complete chemical analysis of ROM ore/Mineral

Sl No.	Radical	(%)
1	Fe	53.0
2	Al_2O_3	5.0
3	SiO_2	6.0
4	P	0.05
5	S	0.04
6	Mn	0.98

Table 2.4 Reserves & ResourcesClassification

	Code	Quantity (in Million Tonnes)			Grade	
		Forest	Non-Forest	Total	Forest	Non-Forest
A. Mineral Reserve						
1. Proved Mineral Reserve (A)	111	-	36.071	36.0715	-	+45
2. Probable Mineral Reserve (A)	121	-	-	-	-	-
3. Probable Mineral Reserve (A)	122	-	-	-	-	-
B. Remaining Resources		-	-	-	-	-
1. Feasibility Mineral Resource (B)	211	-	28.452	28.452	-	+45
2. Prefeasibility Mineral Resource (B)	221	-	17.058	17.058	-	+35
3. Prefeasibility Mineral Resource (B)	222	-	-	-	-	-
4. Measured Mineral Resource (B)	331	-	1.498	1.498	-	+45
5. Indicated Mineral Resource (B)	332	-	-	-	-	-
6. Inferred Mineral Resource (B)	333	-	1.664	1.664	-	+45
7. Reconnaissance Mineral Resource (B)	334	-	-	-	-	-
Total Mineral Resources (A+B)			84.743	84.743	-	+45

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The Geological Plan is given vide ***Plate No. 4A & 4B***

2.5 PROPOSAL SCHEDULES FOR APPROVAL & PROJECT IMPLEMENTATION

Mining operations will be commenced after obtaining all the statutory permissions and approvals. The following is the **tentative** schedule for Environmental Clearance by EAC, MoEF&CC.

Table.No. 2.5: Schedule for Approval & Project Implementation

Sr.No.	Activity	Timeline
1	Baseline collection	March to May,2023
2	Submission of EIA and Following the procedure laid under EIA notification and obtaining EC	June to September,2023

The Project shall be implemented immediately after obtaining all the necessary clearances and after executing the mining lease deed.

2.6 TECHNOLOGY AND PROCESS DESCRIPTION

2.6.1 MINING METHODOLGY

2.6.1.1 Existing Mine workings:

Presently the Block-I Bicholim Mineral Block (Mine) is not in operation. The Mining operation will commence after obtaining all statutory permissions/ clearances.

2.6.1.2 Proposed Mine workings:

The mining operations are proposed to be conducted in a very scientific and systematic manner. There are totally 5 pits within the proposed mining lease area. **Table 2.6** gives the details of active pits along with dimensions.

Table 2.6 Details of Active Pits

Sl.No	Pit ID	Area Covered by Pit(Ha)	Pit Dimensions(L*W*D)
1	1 Top pit	13.30	380x350x52
2	2 Top Pit	9.12	380x240x33
3	3/4 Bottom	8.28	380x215x80
4	5 Top Pit	12.00	400x300x95
5	5 Top CB Pit	6.66	370x80x78

The development and production will be done systematically by maintaining a bench

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height of 7 m and width of 10 mts both in the Mineral and overburden benches . The slope of Overburden and Mineral benches shall be maintained at 70 ^{0} and overall slope of <26 ^{0} respectively.

The slope of the bench shall be maintained properly as per the stability of the strata. Gradient of the haulage road will be maintained as 1:16.

The capping of hard laterite cover and Hematite ore will be removed by deploying Eco-Friendly ripper dozer. The use of ripper dozer will eliminate the conventional drilling and blasting.

Slope stability study is already conducted by NIRM.

The year-wise production and development for the first block period is given below:

Table 2.7Details of Production and Development

SI. No.	Year	Pit ID	Total Over Burden Quantity (t)	Total ROM Quantity (t)
1	Year l	3/4 Bottom	8955829.00	1500000.00
2	Year l	5 Top CB	2489778.00	500000.00
3	Year 2	3/4 Bottom	7240960.00	1400000.00
4	Year 2	5 Top CB	1464828.00	600000.00
5	Year 3	3/4 Bottom	10998867.00	2000000.00
6	Year 4	2 Top	13537070.00	2000000.00
7	Year 5	2 Top	18632958.00	1800000.00
8	Year 5	3 Top	6528809.00	1200000.00

The maximum production and development is proposed to be obtained during the 5th year of the plan period.

Table 2.8 Details of Max Material handling

Total handling (T)	2,81,61,767
ROM Qty (T)	30,00,000
Waste Qty (T)	2,51,61,767

2.6.1.3 Loading, Hauling, and Waste Dumping: ROM/ be loaded by hydraulic excavators and transported from the mine face to dump plot or to the dry screening/crushing plant by 40 tonne dumpers.

2.6.1.4 Crushing/ Screening: Dry Crushing and Screening plant shall be available within the proposed mine to handle 4 MTPA of crude ore. The primary crusher will

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consist of 1 no. of Jaw crusher of capacity 120 TPH with an input feed of -500mm and shall produce output of -70 mm. It shall be followed by secondary crushers, 2 no.s of capacity 300 TPH and 200 TPH respectively. The input feed size shall be -70mm and output feed size obtained shall be -40mm.

The Screening Plants of capacity -600TPH shall be installed where input the feed size shall be -70mm to obtain product of -40mm lumps & -10mm fines.

Material balance flow sheet is enclosed vide Fig 2.1

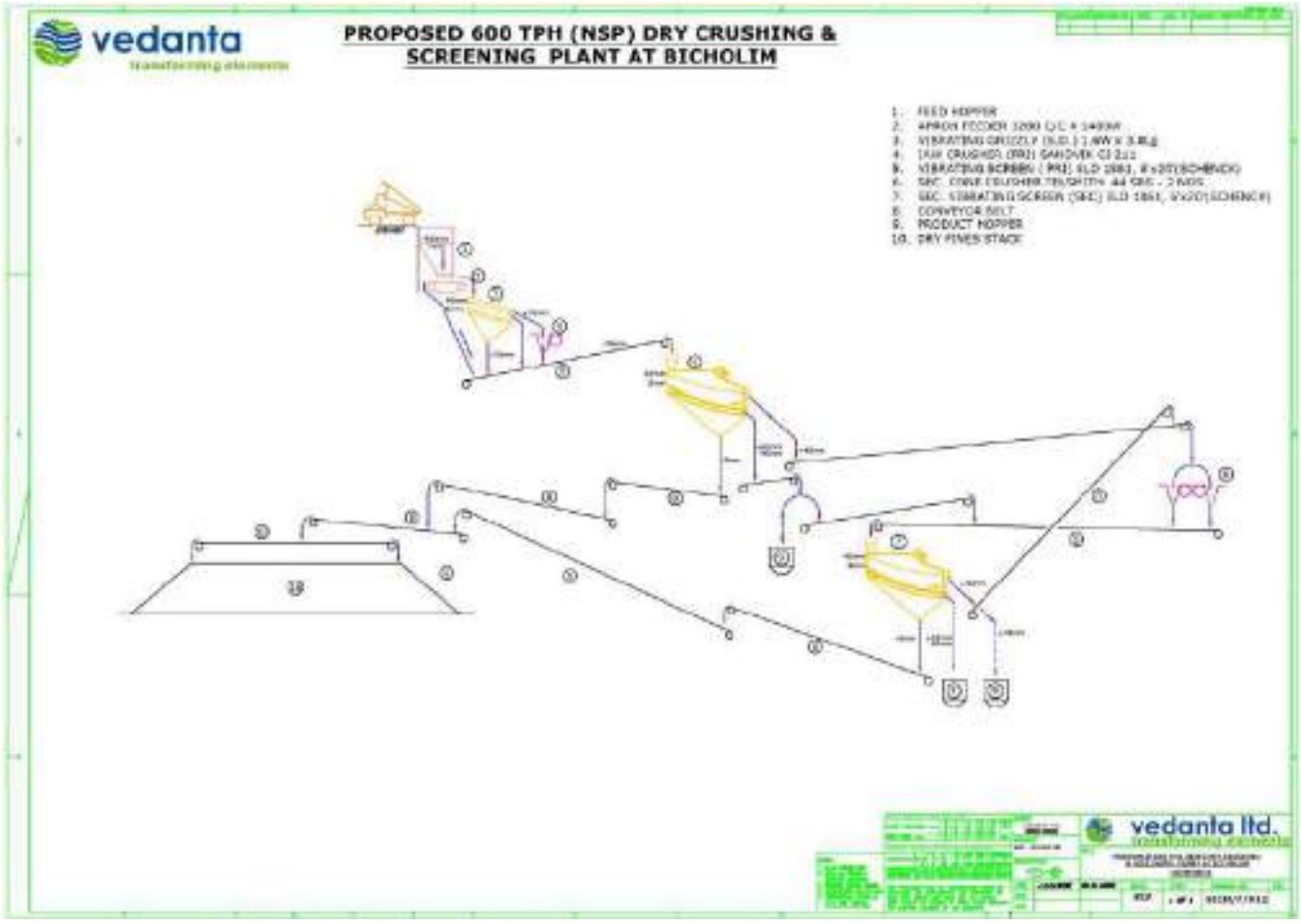

Fig-2.1 Flow chart of crushing and screening plant

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2.6.1.4 Transport: ROM/Iron ore or Screened/crushed material will be transported by 10.5 Tonne trippers from Mine to Sarmanas jetty through a dedicated road. The total distance from the mine to Jetty is 5.58 km of which 0.94 km stretch is public road and remaining 4.64 km is company owned dedicated road. It is to mention that during the transportation of ore there are two junctions which the trucks need to cross namely Mayem junction and Pilgao junction. During the transportation , the company will provide dedicated personnel to manage the traffic at these junctions. Government has already proposed construction of the underpass at Mayem junction at the cost of project proponent. Till that time the existing arrangement of traffic marshals for managing traffic will continue.

The Google image showing the transport route to Sarmanas jetty is shown vide Fig No.2.2

Dedicated road Public Road

Fig. No. 2.2 : Iron Ore Transportation route

2.6.1.5 Mine design parameters: Presently there are 5 no. mining pit within the lease area as worked by previous lessee. The Iron ore deposit is found at a maximum average depth of 100m. The haul road gradient will be maintained at 1:16. Safety bunds will be maintained along the main haulage roads.

2.6.1.6 Briefly giving salient features of the proposed method of working indicating Category of mine.

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- Mining will be carried out by opencast fully mechanized mining method with the use of heavy earth moving machineries.
- The maximum production proposed for this mine is 3.0 million tonnes. It is proposed to operate the mine in three shifts having effective working hours of 19 hrs 30 mins per day. During monsoon minimum excavation will be carried out along with other safety and environment protective measures.
- The heavy earth moving machineries are used for excavation, loading, hauling & transporting of ore and waste rock. There will be no drilling and blasting operations.
- Ripper dozers will be used for ripping hard material for removal of waste and winning of ore. The excavation will be done by hydraulic excavators.
- Wheel loaders will be used for loading and re-handling of ore and waste rock as well as for dozing of material. Ore and waste will be loaded by hydraulic excavators.
- The waste material will be transported from mine face to temporary dumping or backfilling site and ore will be transported to the dry crushing/ screening plant using 40 T dumpers.
- The iron ore will undergo dry crushing & screening within the lease using crushing and screening plant having a capacity to handle of 4MTPA
- Dry crushed & screened ore will be transported by tippers. Wheel Loaders will be used for loading Ore into tippers for transport.
- It is proposed to work the mine by forming systematic benches upto a maximum depth of 100 m.
- Year-wise excavation shall be carried out by leaving the safety barrier of 7.5m from lease boundary wherever possible and statutory barrier of 50m from habitat, public road and Asnora river .
- Mine working will be optimized considering both safety and mineral conservation aspects.

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2.6.2 MACHINERY:

The machinery requirements for this proposed project considering the maximum total handling of 3.0 million tonnes; working in three shifts with 19 hrs 30 mins of effective working per day is given in Table 2.9.

Table 2.9 List of Mining Machineries proposed to be deployed at the mine is as follows:

Sl No.	*TYPE*	*MAKE*	*CAPACITY (m3)*	*NO. OF EQUIPMENT*
1	Hydraulic Excavator	Volvo 700	4.10	09
2	Dumper	Volvo A40E	20.40	72
3	Wheel loader	CAT 962H	3.20	04
		CAT 966H	3.50	03
4	Hydraulic Dozer	CAT D11R	770	01
		CAT D9R	410	03
		KOMATSU D275	449	03

2.6.3 MAN POWER

There number of officers, supervisory staff and other workmen as direct employees is indicated **Table 2.10** below.

Table.No.2.10 Employment details

S.No	Designation	Nos
1	Mines Manager (1st Class)	5
2	Mines Manager (2nd Class)	8
3	Mining Engineer	21
4	Geologist	3
5	Mechanical Engineer	12
6	Electrical Engineer	8
7	Mining Foreman	20
8	Mine-mate	12
9	Skilled workers/operators	220
10	Semi Skilled	70
11	Unskilled	128
12	Other	14
	Total	**521**

The indirect employment shall be 195 Nos

2.6.3.1 Site Services

The normal site services required for mining will be provided within the Mining

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Lease. They include the following:

1. Canteen
2. Rest shelters
3. Drinking water facility on the site
4. Latrines and urinals on the site
5. Dispensary/OHC on site

Safety and firefighting and quality control facilities etc

2.6.4 WASTE HANDLING AND DISPOSAL

During the mining period, the waste generated by mining will be temporarily stacked within the mining lease area as surface dump and backfilled in the exhausted portion of the pits. The total waste to be generated during the plan period is about 69.85 million tonnes. A total of 6.7146 Ha shall be utilized for Dumps and Material stocking at the conceptual stage of mining.

2.6.5 WATER REQUIREMENT /WATER BALANCE

WATER BALANCE : The total water received in year 16748221 m3, the water harvested in mining pits is about 10128221 m3. This collected water in the Mine Pit will be used for water sprinkling and greenbelt development

Total Water requirement is about 664 KLD .

Table No: 2.11 The Breakup of the Water Requirement

Purpose	QTY (KLD)	Source
Dust Suppression	600	Rain water harvested in mine pit
Green Belt	20	
Vehicle Washing	8	
Domestic	36	Bore Well
Total	664	

Source of Water

The area is coastal area rich in rainfall of about 3500 mm. The Rainwater over the catchment area will be harvested into the recharge pits and mine pits. The harvested

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water will be utilised for the mining operations such as dust suppression. Application for permission to withdraw ground water has been made to Water Resources Dept., Goa. Water from borewell registered with Water Resources Dept., Goa will be utilised for the drinking & domestic purposes.

2.6.6 POWER REQUIREMENT

The estimated overall power requirement including utilities and auxiliary facilities for the proposed mine are indicated below:

- Energy consumption per day : 5.0 MW

Source of Power : Electric power supply is available from State Grid.

Standby DG Set with capacity of 1000 KVA -1 no., 500 KVA -1 no., 200 KVA- 3 nos

2.6.7 LIFE OF MINE

Considering the ore production of 84.743 million tonnes during the present mining plan period and subsequent 3.0 million tonnes per annum of ore production, the expected life of the mine is about 30 years from the date of execution of mining operations. Life of the mine will increase based on the exploration proposed during plan period

2.7 PROJECT DESCRIPTION – INCLUDING DRAWINGS SHOWING PROJECT LAYOUT, COMPONENTS OF THE PROJECT ETC.

The lease area of 478.5206 Ha falls under Block 1 - Bicholim Mineral Block in Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages of Bicholim Taluka, North Goa District, Goa State. The lease area falls under the Topo sheet No. 48 E/14, Survey of India and bounded by latitude of 15° 34' 20.518" N to 15° 36′ 54.018″ N & longitude of 73°54′ 4.754" E to 73° 57′ 09.51″ E The location plan, lease plan and surface plan are enclosed vide Plate No.1, Plate No.2 & plate No 5

Mineral Reserves/Resources: Mineral Resources: (Mineral resources may be estimated purely based on level of exploration, with reference to the threshold value of minerals declared by IBM) is given below table 2.12

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Table No.2.12 Level of Exploration

Level of Exploration	Reserve & Resources in million tonnes	Grade
G1 – Detailed Exploration	83.078	+45
G2 – General Exploration	--	--
G3 - Prospecting	1.664	+45
G4 – Reconnaissance	--	--
Total	84.743	+45

The details are given Vide Plate Nos .4A & 4B i.e., Geological Plan enclosed

2.8 DESCRIPTION OF MITIGATIVE MEASURES TO BE IMPLEMENTED

2.8.1 Mitigative measures for control of Air Pollution

Air pollution mitigation measures would be for the point and fugitive sources within the plant.

Mostly, the air pollution mitigation measures guided by the Indian regulatory standards are mostly confined to the control of particulate dust, SO_2 and NO_2 emissions. Dust will be generated from loading/Unloading operations, due to vehicular movement, due to machineries used in the activity.

Proper mitigation measures will be taken to reduce impact from activity like water sprinkling, barricading etc. to prevent dust escaping to atmosphere.

During operation phase, proper maintenance of vehicles and equipment will help in controlling the gaseous emissions. Vehicle meeting PUC norms will be used to further control the gaseous emission. Water sprinkling on roads will prevent fugitive dust.

2.8.2 Mitigative measures for control Water Pollution.

Parameters, which influence the water quality due to mining activities, are suspended solids and dissolved solids generated due to wash off from the dumps, runoff from workings.

Mitigative measures Proposed are afforestation of backfilled areas to stabilize the soil, diverting the surface runoff to the settling ponds through garland drains.

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Retention walls shall be constructed at the toe of dumps to arrest the silt content in the rainwater passing directly from dumps.

2.8.3 Mitigative measures for control of Noise Pollution

Proper noise abatement measures will be taken and persons working close to machine and machine operators will be provided with personal protective equipment viz. Ear plugs / Ear muffs etc. for further protection.

Various measures proposed to reduce noise pollution include reduction of noise at source, provision of acoustic lagging for the equipment & suction side silencers, selection of low noise equipment.

2.8.4 Solid Waste Management

Waste generated at this mine will be transported to backfilling/ temporary dumping site by 40 tonner dumper. The entire waste shall be surface dumped and backfilled in the exhausted portion of the pit. The inactive dump areas shall be stabilized by using geotextile mats and growing local plant species in consultation with the local forest department.

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Chapter-3
DESCRIPTION OF THE ENVIRONMENT

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3.0 DESCRIPTION OF THE ENVIRONMENT

3.1 STUDY AREA

The study area of 10 km radius (from the boundary of Mineral Block) has been considered for assessing the baseline environmental status. Mineral Block Area is the Core Zone and the 10 km radius area around the Mineral Block Area is the Buffer Zone. The study area covering 10 km radius of the Mineral Block falls in Toposheet Number 48 E/14 of Survey of India.

3.2 STUDY PERIOD

The base line data have been collected for various environmental components from March to May- 2023, which is the Summer season was carried out by Environmental Laboratory(Unit of Mineral Engineering Sevices) approved by MoEF&CC & CPCB

3.3 ENVIRONMENTAL COMPONENTS

Considering the Environmental setting of the project, project activities and their interaction, and environmental regulations & standards, the following Environmental Table.3.1 Attributes have been included in EIA Study, as a part of baseline data.

Table.3.1

•	Site Specific Micrometeorological Data (hourly readings from core zone) on wind speed & direction (wind roses), temperature, humidity, atmospheric pressure. There was no rainfall during monitoring period i.e March to May 2023
•	Ambient Air Quality Sampling at 9 Stations on 24-hourly basis, for 2 days in a week for 13 weeks in summer season for the parameters PM_{10}, $PM_{2.5}$, and Heavy Metals analysis in Particulates, SO_2, NO_2, CO, Ozone, Benzene and Benzo(a)pyrene.
•	Noise Level Measurements at 9 locations for, Leqday and night , values once in the season
•	Water Quality Sampling by grab sampling once in the study period
➢	Surface Waters -7 locations
➢	Ground Waters -10 Locations
•	Soil Quality Sampling at 7 locations once in the study period for
➢	Textural & Physical Parameters
➢	Nutrients (like NPK etc.)
•	Land use & Land Cover pattern using LISS IV Mx Data from NRSC
•	Biotic Attributes
➢	Flora & Fauna –Core & Buffer Zones
•	Socio-Economic Profile, based on 2011-Census and Survey 2023:
➢	Total Population / Household Size / Age
➢	Gender Composition
➢	S.C. / S.T.
➢	Literacy Level
➢	Occupational Structure

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3.4 METHODOLOGY

The methodologies followed are detailed below.

3.4.1 MICROMETEOROLOGY

The micrometeorology and microclimatic parameters were recorded by installing a Weather Monitoring Station. The data on wind speed, wind direction, ambient temperature, relative humidity, rainfall was recorded at hourly intervals during the study period.

3.4.2 AMBIENT AIR QUALITY

Calibrated Fine Particulate Samplers were used for sampling PM_{10}. Calibrated Respirable Dust Samplers were used for sampling $PM_{2.5}$. Gaseous samples were collected by using integrated gas sampling assembly.

Table 3.2: Parameters for Air Monitoring

Monitored parameters & duration	Method used
24 hourly monitoring twice a week for one season	
PM_{10} $PM_{2.5}$	Gravimetric Sampling using Respirable Dust Sampler
Sulphur Dioxide (SO_2)	Modified West & Gaeke Method
Nitrogen Dioxide (NO_2)	Jacob & Hoechhiesher Method
Lead	AAS Method after sampling on EPM 2000 or equivalent filter Paper
Ammonia	Independent blue method
Benzene	Adsorption & desorption followed by GC analysis
Nickel	AAS Method after sampling on EPM 2000 or equivalent filter Paper
Arsenic	AAS Method after sampling on EPM 2000 or equivalent filter Paper
Benzo-alco-pyrene	Solvent extraction followed by HPLC/GC analysis
Hourly Monitoring: twice a week for 4 weeks per month for one season of 3 months	
CO	Non dispersive Infrared (NDIR) Spectroscopy
Ozone	Chemical method

3.4.3 NOISE LEVELS

Noise levels were monitored during day time as well as night time. The sound level meters were used in accordance with IS: 9979 and IEC 651 standards for noise surveys. The basic unit of measurement is A-weighted sound level, the most widely used scale. The measurements were taken in the fast mode and were sampled to yield Leq (logarithm equivalent noise level).

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3.4.4 WATER QUALITY

Samples of ground water and surface water were collected by engaging the services of MoEFCC recognized laboratory. The samples were analysed for physico-chemical and bacteriological parameters.

Samples for chemical analysis were collected as per CPCB Guidelines for Water Quality Monitoring DOC no MINARS/27/2007-08. Sterilized bottles were used for collection of water samples for bacteriological analysis. Due care was taken to ascertain the integrity during transportation of samples.

Table 3.3 : Standard/Method followed for Analysis of Water Parameters

Sl.No.	Parameter	Unit	Reference
1	Taste	-	IS:3025 (5)
2	Odour	-	IS:3025 (7)
3	pH	-	IS:3025 (11)
4	Colour	Hazen units	IS:3025(4)
5	Turbidity	NTU	IS:3025 (10)
6	Total Dissolved Solids	mg/l	IS:3025 (16)
7	Total Hardness	mg/l	IS:3025(21)
8	Iron (as Fe)	mg/l	IS:3025 (53)
9	Chlorides (as CI)	mg/l	IS:3025(32)
10	Residual Chlorine	mg/l	IS:3025(26)
11	Calcium (as Ca)	mg/l	IS:3025(40)
12	Magnesium (as Mg)	mg/l	IS:3025(46)
13	Alkalinity (as $CaCO_3$)	mg/l	IS:3025(23)
14	Dissolved Oxygen	mg/l	IS:3025(38)
15	Sulphate (as SO_4)	mg/l	IS:3025(24)
16	Fluoride (as F)	mg/l	IS:3025 (60)
17	Nitrate (as NO_3)	mg/l	IS:3025(34)
18	Cyanide (as CN)	mg/l	IS:3025(27)
19	Pesticides	mg/l	APHA 23nd ED
20	Phenols (as C_6H_5OH)	mg/l	IS:3025(43)
21	Manganese (as Mn)	mg/l	IS:3025 (59)
22	Chromium (as Cr)	mg/l	IS:3025 (52)
23	Copper (as Cu)	mg/l	IS:3025(42)
24	Selenium (as Se)	mg/l	IS:3025 (56)
25	Cadmium (as Cd)	mg/l	IS:3025 (41)
26	Arsenic (as As)	mg/l	IS:3025(37)
27	Boron (as B)	mg/l	IS:3025(57)
28	Mercury (as Hg)	mg/l	IS:3025(48)
29	Lead (as Pb)	mg/l	IS:3025(47)
30	Zinc (as Zn)	mg/l	IS:3025(49)
31	Percent sodium	mg/l	APHA 23nd ED
32	BOD_3 days @ 27 °c	mg/l	IS:3025(44)
33	COD	mg/l	IS:3025 (58)
34	Oil & Grease	mg/l	IS:3025(39)
35	Total Coliform per 100 ml	--	IS:15185:2016

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Sl.No.	Parameter	Unit	Reference
36	E.Coli per 100 ml	--	IS:15185:2016
37	Total Suspended Solids	mg/l	IS: 3025(17)

3.4.5 SOIL CHARACTERSTICS & METHODOLOGY

Soils of the district can be classified into 4 types namely (i) Laterite soil (ii) Saline soil and (iii) Marshy soil and (iv) Alluvial soil.

The soil types observed within the buffer area are as follows:

(i) Lateritic soil is the major soil type in the district. It is highly porous & permeable, slightly acidic with low pH values, low in organic matter, Calcium and Phosphorus.

(ii) Saline soil in the district occurs in the flood plains of Bicholim taluka.

The dominant soil type observed in the mining lease is of lateritic type.

Methodology: Soil samples have been collected from 6 locations during Summer season 2023 using sampling augers for analysis of physical and chemical parameters Prepare a map of the area to be covered in a survey showing different sampling unit boundaries. Each area is traverse separately.

A slice of the plough layeris cut at intervals of 15 to 20 steps or according to the area to be covered. Collect at least 10 to 15 samples from each sampling unit and place in a bucket or tray. Generally, 10 to 20 spots must be taken for one composite sample depending on the size of the field. Scrap away surface liter; obtain a uniform thick slice of soil from the surface to the plough depth from each place. A "V'' shaped cut to a depth of 15 cm in the sampling spot using spade to remove 1 to 2 cm slice of soil. The sample may be collected on the blade of the spade and put in a clean bucket. In this way collect samples from all the spots marked for one sampling unit. In case of hard soil, samples are taken with the help of augur from the plough depth and collected in the bucket. The collected sample from each location is uniformly mixed before homogenizing the soil samples.

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Table : 3.4 Sampling Method for different crops

Sr. No	Crop	Soil Sampling Depth (Cm)
1	Grasses and grasslands	5-7
2	Rice, finger millet, groundnut, pearl millet, small millets etc. (shallow rooted crops)	15-20
3	Cotton, Redgram, sugarcane, banana, tapioca, vegetables etc., (deep rooted crops)	22-25
4	Perennial crops,plantations and orchard crops	Three soil samples at 30,60 and 90 cm

3.4.6 CALIBRATION

The monitoring and analytical instruments with valid calibrations were used. The correction factors, if any, were applied in the computation of the data.

3.4.7 FLORA-FAUNA

A general ecological survey covering an area of 10 km radius around ML Area was conducted using least count quadrate method and reported. Tree species were surveyed by taking quadrates of 100 m x 100 m distributed randomly.

Shrub species were surveyed by taking quadrates of 10m x 10m. Herb species were surveyed by taking quadrates of 1 m x 1 m. The data obtained was further used to estimate Relative Dominance, Relative Density (RD), Relative Frequency (RF) and Importance Value index (IVI) as per the formulae. Faunal survey covered the Terrestrial Fauna, Avian Fauna and Aquatic Fauna. The survey was based on personal observation, enquiry with local population and records available. This study included the identification of endangered and rare species as per Red Book.

3.4.8 SOCIO-ECONOMIC SURVEY

The Socio-Economic profile of the population living in study area was prepared based on Census 2011 data and Survey 2023. The location of the proposed project lies within an earlier Mining Lease Area, thus the project does not involve resettlement/ rehabilitation.

Sensitivity: Public (C4)

3.4.9 LAND ENVIRONMENT:

Landuse and Landcover:

Study of existing land use through satellite image processing. The data used for analysis was sourced from RESOURCESAT-2 LISS IV with satellite data of 5.0 m resolution dated 08.03.2023.

Geology: The geology of the region was studied to understand the rock formations and mineral compositions, terrain using topographic maps and relief maps.

Hydro geology:

The study involved finding sources of water including ground and surface water bodies in the Mineral Block area and buffer zone of 10km radius. The drainage pattern in the region was studied.

3.5 ENVIRONMENTAL SCENERIO

3.5.1 GEOLOGY

3.5.1.2 REGIONAL GEOLOGY

Goa is dominantly covered by the rocks belonging to Dharwar Supergroup of Archean-Proterozoic age, except for a narrow strip along the North-eastern corner occupied by the Deccan Traps of Upper Cretaceous to Lower Eocene age. Iron Ore Formations of Goa indicate two successive and transitional epochs and environments of deposition. Based on the prominent structural discordance and environment of deposition, the Goan Iron Ore Formations can be broadly categorized into two formations namely, North Goa and South Goa Formations. Precambrians at North Goa form the extension of Dharwar Formations noted in Karnataka.

This forms a part and continuation of a major geosyncline, showing a general NNW-SSE elongation. Evolution of geosyncline is accompanied by sub-marine volcanism represented by metavolcanics.

Sensitivity: Public (C4)

This is followed by the deposition of Metagreywacke and Tilloid. Furthermore, the submarine volcanism and Greywacke deposition is accompanied by the deposition of Ferruginous Quartzite mainly along the borders of geosyncline.

The evolutionary stage ends up with three phases of folding, metamorphism and basic intrusions.

The impressions of these folding are marked in North Goa Iron Ore Formations. Dharwar super group of rocks in Goa are locally named as Goa Group of rocks which have characteristic NNW-SSE strike and dips are moderate. Of the above, Bicholim formation has pink phyllite horizon with banded ferruginous and manganiferous quartzite constitute the economically minable manganese and iron ore bearing horizon and extends over the entire length of Goa from north to south. Litho units are highly folded and the rocks have attained green schist facies grade of metamorphism. Extensive development of laterite in the form of capping over the rocks is seen and further, the rocks show the effect of deep weathering

3.5.1.2 LOCAL GEOLOGY

As per Geological Survey of India (GSI) studies, Bicholim Mineral Block area comes under Bicholim-Sirigao type Deposit. The deposit consists of two ore bands running nearly parallel to each other, in which the South-western ore band (Top) is larger extends for a length of 6.5Kms, has width 20 to 45m and North-eastern ore band is comparatively smaller extends over a length of 2Kms which also has 30 to 60m widths. The south-western ore band is in the shape of S and it occurs on the overturned south-western limb of the anticlinal fold and also on the refolded nose portion of the fold. The north-eastern ore band occurs on the other limb of the fold. Both the ore bands occur along the dip slope. Between the two limbs of anticlinal fold, which are ore bearing; there is a barren phyllite occurring, about 250m wide, which represents the axial portion of the fold. The mineral deposit extends over strike length of 7km in at 50-to-60-degree NW-SE direction.

Sensitivity: Public (C4)

The mineralisation occurs in the form of bands dipping at 45 to 70 due NE occupying slopes of the hillocks. Thickness of the strata exposed in the mine varies from place to place.

The average thickness of different litho units is as below; Laterite 10 to 15m, Lumpy Laterite 05 to 10m, Friable Powdery Ores 20 to 45m, Limonitic Clays 5 to 10m, Phyllite Clays 30 to 100m, Manganiferous Clays 10 to 30m, Intrusive / Dykes 02 to 15m.

Litho units are highly folded and the rocks have attained green schist facies grade of metamorphism. The rocks show the effect of deep weathering. Generally, phyllite clays are found along the strike length at footwall sides and phyllite, manganiferous clays and limonitic clays are found at hang wall sides. Banded Hematite Quartzite and Quartz-Chlorite-Schist are found in deeper sections. There are many basic intrusive/ dykes cutting across strike length, which are deeply weathered, occur in the form of variegated soft clays.

Structure: The rock formations in the area indicate a major overturned anticlinal fold extending over the length of about 6.5km along the NW-SE strike direction and plunging about 27 degrees towards Northwest. Entire crest portions of the anticline are eroded away in the past leaving behind two huge limbs of the folds. Both the limbs are steeply dipping / inclined towards North East. Litho-units within the major fold exhibit complex and tight folding. The area has undergone multiple basic igneous intrusions indicated by presence of many dikes and sills cutting across the strike length. Iron ore occur in the limbs of the folds in the hill slopes.

Entire area is covered with laterites. Lateritic Lumpy ores found occurring over the Banded Iron Formations at surface. Iron ores comprise of Hematite as major mineral, Limonite, Goethite and Martite being minor minerals. Silica, Alumina and Manganese occur as associated gangue minerals. Phyllite and Manganiferous clays present on either side of the ore bands as well as intercalations within the ore beds. Deeper sections of the area have BHQs and presence of Siliceous Ores in smaller quantities followed by Quartz-Chlorite-Biotite-Schists at bottoms. The geological formations are given vide **Plate.No. 8**

Sensitivity: Public (C4)

The lithology map is given vide **Plate No.8A**

3.5.2 TOPOGRAPHY/ GEOMORPHOLOGY / PHYSIOGRAPHY

Topography : The topography is undulating low hill terrain extending all along the Mineral Block in the North West and South East direction. There is no forest land within the Mineral Block area. As the area is located on the foot hills of Western Ghats and receives heavy rainfall during monsoon season; the average annual rainfall is about 3500mm.

The Bicholim Mineral Block is situated in north Goa district and extends between Lat 15° 34' 20.518" N to 15° 36′ 54.018″ N & longitude of 73°54′ 4.754" E to 73° 57′ 09.51″ E. The Block Area is 478.5206 ha occupied by a hill range running in a SE-NW direction. The highest and lowest elevations are 169.14 m (amsl) in the South western corner and -37.24 m (amsl) in the North East respectively.

Geomorphology : Geomorphologically, the state is divided into four morphological units namely;

1. The coastal plains with dominant marine land forms on the west,
2. Vast etch plain,
3. Low dissected denudational hills with valleys
4. Deeply dissected high Western Ghats with denudational hills rising to a maximum of 832m amsl and occurring all along the eastern part of the state. Geomorphology of the area is shown in ***Plate No.9***

Physiography : The topography is undulating low hill terrain extending all along the mining lease in the North West and South East direction. Physiographically, the Mineral Block is located on a hilly undulating terrain. Mineral Block does not have any forest land within the lease.

Physiographically Goa, though famous for its beaches, is essentially a rugged hilly and mountainous tract with narrow valleys and sandy linear plains along the coast. The Western Ghats run in a general north-south direction from Salginim to Surla Ghat along the eastern margin of the territory. This segment of Sahyadri ranges are clad with evergreen forests with altitude ranging from 600 m to over 800 m.

Sensitivity: Public (C4)

The highest peak Mamai Devi is 832 m height. In the western margin of the territory, there are long and narrow strips of sandy plains and low flat topped laterite hills ranging in altitude from 50 m to 100 m. having a hillock in the center of the mining lease and sloping in all directions. There are no surface water bodies within the Mining Lease area. The average annual rainfall in the region is about 3881 mm per year since 2008 till date.

Due to the hilly topography, all the rain water flow along the first order drains observed flowing from the hill top downwards along the natural course forming a dendritic drainage pattern.

3.5.3 DRAINAGE PATTERN:

No specific drainage pattern is observed in the Mineral Block area. Bicholim Mineral block study area fall under Mondovi River basin of Taluka Bicholim, Bardez, Sattari, Sanguem, Tiswadi & Ponda. The catchment area of Mondovi River 1580 Sqkm. The Sahyadri hill ranges in the east forms the main watershed. The streams originating here flow in west and north west direction to join the Arabian Sea. The study area drainage pattern is dendritic and sub dendritic.

Main River in study area

Mandovi River -Aerial Distance of 2.30 Km at pilgao Village

Bicholim River - Aerial Distance of 0.23Km at Mandrekarwada (Bicholim)

Assonora River - Assonora river which touch Mining lease area

Chapora River- Aerial Distance of 7.3 Km at Colvale Village.

The drainage pattern in regional scale is sub-dendritic in nature. Principal perennial rivers draining through the district are, Terekhol, Chapora, Mandovi & Zuari and non – perennial (seasonal) river Baga. The river basin of all these westerly flowing short rivers originates from Sahyadri Hill ranges and drain in the Arabian Sea in the west under estuarine environment. Primarily the underlying rocks govern the drainage system in the area. The drainage pattern is generally dendritic type. The major river Zuari follows the major NW synclinal axis.

Sensitivity: Public (C4)

The river valleys are 'V' shaped in the western high hill ranges, but broadens in central midlands and become 'U' shaped in the low lands and coastal plains.

As the area is located on the foot hills of Western Ghats belt and receives heavy rainfall during monsoon season and the average annual rainfall is about 3500 mm. Dendritic to sub dendritic type of drainage is observed in study area. Water is accumulated in these mine pits during monsoon rainfall and seepage from the ore body.

The eastern border of the state generally marks the water divide between easterly and westerly flowing rivers.

The drainage pattern & Digital Elevation Map is given vide drawing ***Plate No 10. & Plate No 11***

3.6 BASE LINE & BASE MAPS -ENVIRONMENTAL COMPONENTS

3.6.1 BASELINE SCHEDULE

The location of air, water, noise and soil sampling stations were selected for appropriate monitoring. A monitoring station was positioned at core zone (project site) for micro-meteorological data collection. The schedule of the environmental monitoring programme is described below:

Table.No.3.5 Baseline Schedule

Environmental component	Monitoring period	Number of Sampling Stations	Parameters
Micro-Meteorology	Mar to May 2023	One	Temp, Relative humidity, Rainfall, Wind speed, wind direction
Air Quality	Mar to May 2023	9 Stations	PM_{10},$PM_{2.5}$,SO_2,NO_2,CO,NH_3,C_6H_6,B(a)P,O3,As, Lead & Nickel
Water Quality	May 2023	7 Samples Surface water & 10 Samples Groundwater	IS : 2296, 1982 Class C Norms , IS-10500:2012 & CPCB NORMS
Noise	April-2023	9 Stations	L_{day}, L_{night}, & L_{eq}
Soil	May-2023	7 Samples	Physical & Chemical parameters of Indian standards IS: 2720
Land use	May-2023	Core & Buffer Zone	--
Ecology & Biodiversity	April 2023	Core & Buffer Zone	Flora & Fauna Survey
Socio-Economic	April -2023	10 Kms Study area	Socio-economic Survey
Hydrogeology	Mar-2023	Core & Buffer Area	Bore well study

Sensitivity: Public (C4)

Table.No.3.6 Environmental Attributes & Frequency of Monitoring

Sl. no	Environmental Component	Sampling Locations	Sampling period	Sampling Parameters	Total Sampling period	Sampling Frequency
1.	Meteorology	Block I Bicholim Mineral Block office	Mar to May 2023	Temp, Relative humidity, Rainfall, Wind speed, wind direction	3 months	Hourly
2	Ambient Air Quality	A1- Bicholim Village (500m ML Area) A2- Lamgao village A3- Mulgao village A4- Sircaim village A5- Calvim village A6- Pilgao village A7- Sarvona village A8- Advalpale village A9- Latambarsem village	Mar to May 2023	PM_{10},$PM_{2.5}$,SO_2, NO_2, CO, NH_3, B(a)P, Heavy Metals : Pb , As, Ni, Hg & Free silica	2 days/ week	24 hourly
3	Noise	N1 – Bicholim Village N2 – Lamgao village N3 – Mulgao village N4 – Sircaim village N5 - Calvim village N6 – Sirigao Village N7 – Sarvona village N8 – Advalpale village N9 - Latambarsem village	April-2023	Day & Night (L_{eq})	24 Hourly	Once during study period
4	Surface Water Quality	SW1- Conflunce of Valvot & Bicholim River SW2- Confluence of Bicholim & Cudnem River SW3 – Bicholim River Upstream SW4 – Bicholim River Down Stream SW5- Assonara Upstream SW6- Assonara Down stream SW7 – Mayem Lake	May-2023	As per IS – IS:2296	Grab Sampling	Once during study period
	Ground Water Quality	GW1 – Bicholim (open well) GW2 - Sarvan village (open well) GW3 - Lamgao village(open well) GW4 - Mulgao village (open well) GW5 – Mavlinge village(open well) GW6- Nanoda Village (Open well) GW7 – Sircaim village (open well) GW8 - Assonora(open well) GW9 - Pilgao village (open well) GW10- Mayem village(open well)	May-2023	As per IS – 10500: 2012		

Sensitivity: Public (C4)

5	Soil	S1 - Top Soil ML Area S2 - Lamgao village S3 - Mayem village S4 - Sircaim village S5- Pilgao village S6 - Sirigao S7- Mulgao Village	May 2023	Physical and Chemical constituents, suitability for agricultural growth	Grab sampling	Once during study period
6	Land use	Core & Buffer Zone	May-2023	--	Grab Sampling	Once during study period
7	Ecology & Biodiversity	Core & Buffer Zone	April-2023	Flora & Fauna Survey		
8	Socio-Economic	10 Km Study area	April - 2023	Socio-economic Survey		Once during study period
9	Hydrogeology	Core & Buffer Area	Mar-2023	Bore well study		

3.6.2 MICROMETEOROLOGICAL STATUS

3.6.2.1 GENERAL CLIMATE

May is the hottest month where the mean daily temperature increases to 30^0C. January is the coolest with mean daily temperature of about 23^0C. The temperature is highest (around 33^oC) in pre – monsoon months of April & May and again in post monsoon months of November & January.

Due to proximity to the Arabian Sea, humidity throughout the year is more than 60% with range from 80 to 90% during monsoon period. As a result of orographic influence, rainfall increases towards the Western Ghats, with average annual rainfall of about 3948.30 mm. Over 90% of annual rainfall occurs during monsoon months of June to September. About 32% of the annual rainfall is received during July.

Table No. 3.7: Annual Rainfall Data from 2018-2022 in mm

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
2018	0	1.63	3.32	13.34	123.33	986.42	1177.28	747.19	113.75	130.98	12.38	1.64	3311.26
2019	0	0	1.97	4.79	2.2	631.17	1477.71	1396.07	779.79	508.25	50.35	0.19	4852.49
2020	0.05	0	6.49	20.48	22.59	934.62	748.26	1368.11	640.71	266.83	0.46	20.23	4028.83
2021	16.31	10.25	0.64	10.26	346.07	971.99	1038.61	401.84	606.93	240.19	192.86	76.55	3912.5
2022	0.75	0	10.39	42.18	121.64	728.32	1249.01	652.56	465.73	197.96	8.1	7.09	3483.73
										Average			**3917.76**

Source: - Hydromet Division, Indian Meterological Department, New Delhi

Sensitivity: Public (C4)

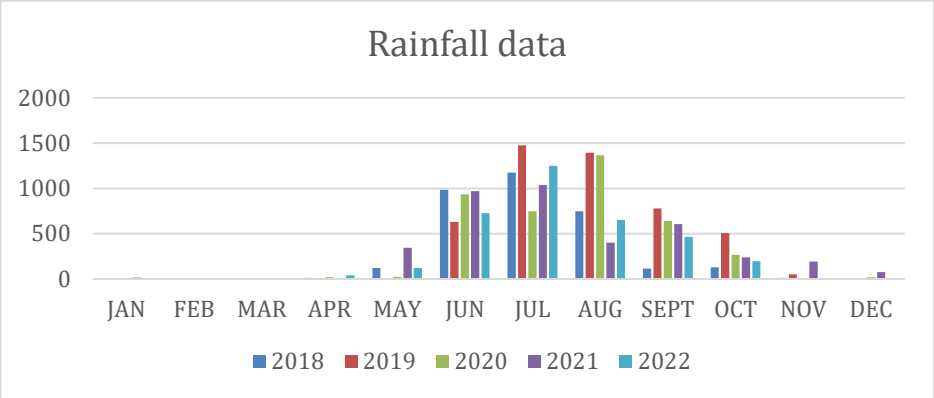


Fig.3.1 Monthly Rainfall for North Goa District

3.6.2.2 *BASE LINE MICROMETEOROLOGICAL STATUS*

In the abstract of collected hourly data during March to May , 2023, data pertaining to three months during Summer Season parameters viz. wind speed, direction, temperature, relative humidity, are presented in **Table 3.7.** Wind roses diagram have been drawn and presented as **Figure 3.2**

Observations:

Observations during the study period are as given below:

- Predominant winds directions were from West to East
- Wind Speed ranged between 1.9-17.3 kmph
- Calm condition prevailed for 36.73% of the study period
- Average Temperature ranged between Avg Min 17 to Avg Max 36 ^{o}C
- Relative humidity values ranged between 18.2% to 99.5%
- The collected meteorological data during this season represents the local weather phenomena.
- No major rainy days during the study period were observed

Table 3.9: Site-Specific Micro-Meteorological Data (March 2023 to May- 2023)

Date	Temperature in^{O}C		Relative Humidity in %		Wind Speed m/sec	
	Min.	Max.	Min.	Max.	Max.	Average
01/03/2023	18.0	34.0	19.5	88.6	15.9	3.1
02/03/2023	19.0	34.0	19.3	89.5	14.3	2.8
03/03/2023	17.0	34.0	29.0	90.1	14.2	3.4
04/03/2023	19.0	34.0	34.2	91.2	11.6	2.8
05/03/2023	19.0	34.0	41.2	92.2	13.1	3.0
06/03/2023	19.0	34.0	48.2	91.3	12.9	3.2
07/03/2023	19.0	33.0	43.0	87.5	14.1	3.5
08/03/2023	19.0	34.0	37.0	92.3	15.7	3.7

Sensitivity: Public (C4)

09/03/2023	20.0	35.0	35.0	89.3	16.5	3.0
10/03/2023	19.0	35.0	30.2	90.6	12.3	3.0
11/03/2023	19.0	35.0	26.3	91.3	14.7	2.9
12/03/2023	19.0	35.0	28.1	91.1	13.5	2.9
13/03/2023	19.0	35.0	31.4	89.2	13.2	3.0
14/03/2023	21.0	36.0	41.3	89.3	15.5	3.3
15/03/2023	18.0	36.0	42.2	88.3	11.6	2.7
16/03/2023	20.0	36.0	41.1	87.2	15.6	2.8
17/03/2023	21.0	36.0	35.0	77.0	14.4	4.1
18/03/2023	21.0	36.0	36.5	88.0	17.3	3.8
19/03/2023	23.0	33.0	34.0	90.1	14.7	3.9
20/03/2023	20.0	33.0	27.3	87.4	15.0	3.8
21/03/2023	22.0	36.0	33.5	90.2	14.7	3.8
22/03/2023	22.0	35.0	30.2	91.3	14.2	3.6
23/03/2023	21.0	36.0	18.2	89.0	10.6	2.7
24/03/2023	22.0	35.0	26.1	89.5	13.6	2.9
25/03/2023	22.0	36.0	26.6	89.2	12.0	3.1
26/03/2023	22.0	36.0	43.2	96.4	9.9	2.3
27/03/2023	22.0	36.0	51.1	99.3	7.0	1.3
28/03/2023	22.0	36.0	47.1	95.4	6.9	1.8
29/03/2023	22.0	36.0	45.2	89.0	8.8	1.9
30/03/2023	22.0	36.0	41.0	94.1	9.7	2.2
31/03/2023	24.3	22.0	39.0	93.1	9.6	2.4

Date	Temperature in^{O}C		Relative Humidity in %		Wind Speed m/sec	
	Min.	Max.	Min.	Max.	Max.	Average
01/04/2023	21.0	37.0	43.3	97.5	9.2	2.3
02/04/20223	22.0	37.0	40.2	95.4	10.9	2.2
03/04/2023	22.0	37.0	32.5	96.0	8.6	1.6
04/04/2023	22.0	36.0	37.2	95.3	6.9	1.6
05/04/2023	23.0	37.0	45.2	93.5	8.6	2.5
06/04/2023	23.0	36.0	48.3	84.2	14.4	3.2
07/04/2023	23.0	37.0	47.0	98.5	10.2	2.1
08/04/2023	23.0	36.0	40.1	98.1	8.3	1.9
09/04/2023	23.0	36.0	53.0	97.5	8.6	2.2
10/04/2023	23.0	35.0	55.6	94.3	6.5	1.9
11/04/2023	21.0	37.0	33.0	91.4	10.8	3.1
12/04/2023	23.0	36.0	54.6	90.1	7.9	2.0
13/04/2023	23.0	37.0	46.1	96.1	13.5	3.5
14/04/2023	24.0	36.0	59.0	94.3	8.0	2.4
15/04/2023	23.0	32.0	45.2	98.0	10.7	1.7
16/04/2023	23.0	37.0	36.0	76.4	11.3	3.0
17/04/2023	19.0	35.0	50.5	90.4	7.8	2.41
18/04/2023	20.0	36.0	37.2	96.1	8.0	2.0
19/04/2023	22.0	37.0	49.1	93.1	7.1	2.1

Sensitivity: Public (C4)

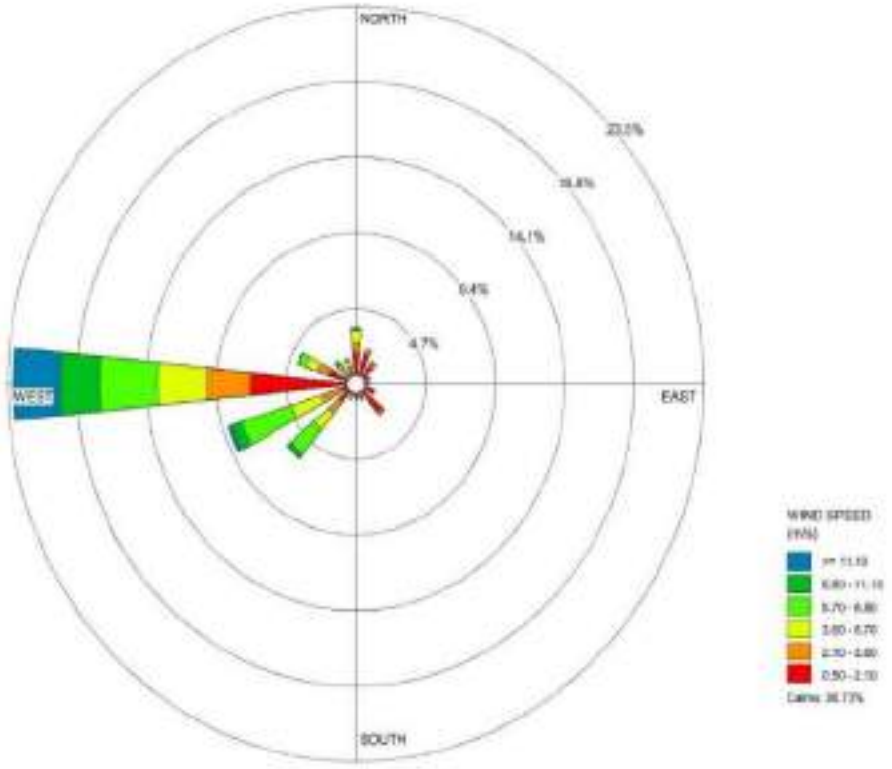
20/04/2023	22.0	37.0	34.1	89.4	8.0	2.0
21/04/2023	24.0	37.0	44.3	94.3	12.2	2.6
22/04/2023	23.0	37.0	31.0	82.4	8.7	1.7
23/04/2023	23.0	37.0	51.0	92.0	8.5	1.4
24/04/2023	22.0	37.0	42.3	98.6	6.3	1.3
25/04/2023	22.0	37.0	45.0	92.0	8.7	2.6
26/04/2023	23.0	37.0	41.3	97.0	8.4	2.1
27/04/2023	22.0	37.0	46.1	99.5	8.1	1.6
28/04/2023	20.0	36.0	59.2	97.0	8.0	2.2
29/04/2023	22.0	36.0	37.5	95.1	6.8	1.8
30/04/2023	21.0	37.0	49.5	95.4	7.2	1.9

Date	Temperature in°C		Relative Humidity in %		Wind Speed m/sec	
	Min.	Max.	Min.	Max.	Max.	Average
01/05/2023	22.0	37.0	42.1	97.0	8.1	2.0
02/05/2023	22.0	37.0	39.2	96.5	7.6	2.0
03/05/2023	23.0	37.0	39.0	98.3	8.6	2.4
04/05/2023	22.0	37.0	40.3	94.4	9.7	1.9
05/05/2023	20.0	36.0	50.5	94.2	7.5	1.8
06/05/2023	22.0	37.0	38.6	95.6	8.8	2.5
07/05/2023	21.0	36.0	42.1	90.0	9.4	2.8
08/05/2023	23.0	37.0	55.1	94.5	9.1	2.3
09/05/2023	23.0	37.0	59.3	91.0	10.1	3.3
10/05/2023	23.0	36.0	58.0	90.1	16.2	4.7
11/05/2023	23.0	28.0	38.5	87.5	10.5	4.4
12/05/2023	21.0	31.0	64.5	95.1	7.8	2.1
13/05/2023	21.0	33.0	59.0	99.2	7.0	1.3
14/05/2023	23.0	36.0	55.2	99.4	8.0	1.4
15/05/2023	22.0	36.0	64.1	99.3	5.4	0.7
16/05/2023	23.0	37.0	56.1	87.0	12.8	3.5
17/05/2023	22.0	33.0	51.4	81.5	10.3	3.6
18/05/2023	21.0	30.0	51.2	98.0	7.7	1.4
19/05/2023	20.0	28.0	52.1	98.5	11.2	2.0
20/05/2023	20.0	22.0	50.4	87.2	8.9	2.6
21/05/2023	19.0	25.0	63.6	99.0	1.9	0.5
22/05/2023	21.0	31.0	51.2	97.6	10.9	3.7
23/05/2023	21.0	33.0	62.5	96.2	8.2	2.7
24/05/2023	22.0	34.0	51.1	99.6	13.1	3.2
25/05/2023	22.0	34.0	46.2	90.0	13.4	4.3
26/05/2023	21.0	34.0	55.1	91.5	16.1	3.6
27/05/2023	21.0	33.0	51.2	89.2	7.7	2.1
28/05/2023	21.0	35.0	51.2	90.3	11.2	2.7
29/05/2023	21.0	35.0	50.4	87.2	8.9	2.6
30/05/2023	22.0	35.0	56.2	88.4	12.4	3.9
31/05/2023	22.0	35.0	56.0	91.1	11.0	3.7

Sensitivity: Public (C4)

The wind rose diagram at site is shown in Fig. 3.2

Fig 3.2 WINDROSE



3.6.3 AMBIENT AIR QUALITY

The ambient air quality of buffer zone covering 10 km radius around the mine was studied to determine the baseline condition.

The study area consisted of mostly rural environment. The various sources of air pollution in the region were dust arising from unpaved village roads, domestic fuel burning, and vehicular traffic.

The prime objective of baseline air quality survey was to assess the existing air quality of the study area. This will also be useful in assessing the conformity to standards of ambient air quality at operational stage.

Sensitivity: Public (C4)

3.6.3.1 SELECTION OF SAMPLING STATIONS

The baseline status of the ambient air quality was assessed through scientifically designed Ambient Air Quality Monitoring Network. The selection of sampling locations for the air quality surveillance programme was based on the following.

(a) Representation of the Mine

(b) Representation of down wind direction

(c) Representation of upwind direction

(d) Representation of cross wind direction

(e) Representation of residential areas

(f) Representation of regional background levels

(g) Representation of sensitive receptors

The AAQ monitoring, stations have been selected on the basis of wind direction. The wind direction conditions have been considered and correlated during the monitoring. The stations monitored for ambient air quality are furnished below and refer **Plate No.12**

Table 3.9 : Location of Ambient Air Quality Monitoring Stations

Location of Air Monitoring Stations									
Code No	Locations	Direction	Distance km	Latitude			Longitude		
				D	M	S	D	M	S
A-1	Bicholim(Within ML area)	--	--	15	34	26.32	73	57	6.30
A-2	Lamgao village	SEE	0.16	15	35	19.22	73	56	30.70
A-3	Mulgao village	N	0.63	15	37	8.81	73	54	56.00
A-4	Sircaim village	NWW	3.10	15	37	20.32	73	52	27.60
A-5	Calvim village	SSW	5.00	15	34	8.20	73	53	16.60
A-6	Pilgao	SSE	1.25	15	33	43.47	73	57	15.90
A-7	Sarvona village	SE	1.90	15	33	58.35	73	58	7.80
A-8	Advalpale village	NNW	3.00	15	38	22.92	73	53	50.90
A-9	Latambercem village	NNE	3.90	15	38	8.09	73	56	46.70

Sensitivity: Public (C4)

Table 3.10: National Ambient Air Quality Standards

Sl. no	Pollutants	Time Weighted Average	Concentration in Ambient Air		Methods of Measurement
			Industrial, Residential, Rural and other Areas	Ecologically, Sensitive Area (Notified by Central, Government)	
1	Sulphur Dioxide (SO2), µg/m³	Annual * 24 Hours **	50 80	20 80	-Improved West and Gaeke Method -Ultraviolet Fluorescence
2	Nitrogen Dioxide (NO2), µg/m³	Annual * 24 Hours **	40 80	30 80	-Jacob & Hochheiser modified (NaOH-NaAsO2) Method -Gas Phase Chemiluminescence
3	Particulate Matter (Size less than 10 µ) or PM_{10}, µg/m³	Annual * 24 Hours **	60 100	60 100	-Gravimetric -TEOM -Beta attenuation
4	Particulate Matter (Size less than 2.5 µ) or $PM_{2.5}$, µg/m³	Annual * 24 Hours **	40 60	40 60	-Gravimetric -TEOM -Beta attenuation
5	Ozone (O3) µg/m³	8 Hours * 1 Hour **	100 180	100 180	-UV Photometric -Chemiluminescence
6	Lead (Pb) µg/m³	Annual * 24 Hours **	0.50 1.0	0.50 1.0	-AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper -ED-XRF using Teflon filter
7	Carbon Monoxide(CO), mg/m³	8 Hours ** 1 Hour **	02 04	02 04	-Non dispersive Infrared (NDIR) Spectroscopy
8	Ammonia (NH3), µg/m³	Annual * 24 Hours **	100 400	100 400	-Chemiluminescence -Indophenol blue method
9	Benzene (C6H6), µg/m³	Annual *	05	05	-Gas Chromatography (GC) based continuous analyzer -Adsorption and desorption followed by GC analysis
10	Benzo(a)Pyrene (BaP) Particulate phase only, ng/m³	Annual *	01	01	-Solvent extraction followed by HPLC/ GC analysis
11	Arsenic (As), ng/m³	Annual *	06	06	-AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper
12	Nickel (Ni), ng/m³	Annual *	20	20	-AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper
13	Free silica				

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

** 24 hourly or 8 hourly or 1 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

NOTE: Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigations.

Sensitivity: Public (C4)

Photographs: Air Monitoring

Bicholim within Mineral Block Area

Lamgao Village

3.6.3.2 FREQUENCY OF MONITORING

Ambient air quality (AAQ) samples were collected on basis of 24-hour sampling and twice a week at each site. The ambient air quality samples were collected for continuous 13-weeks beginning from 1st March to 31st May, 2023.

The samples were preserved and analysed as per the standard methods recommended by Standard Operating Procedure (SOPs) of Central Pollution Control Board (CPCB 2011). Samples for Ozone (O_3) and Carbon Monoxide (CO) were collected by randomly collecting the gas through one hour sampling procedure. Samples for Ammonia (NH_3) were randomly collected for its presence.

3.6.3.3 METHOD OF ANALYSIS

Ambient air samples were analysed with Gravimetric, Colorimetric & Atomic Absorption Spectrophotometric (AAS) method as per standard methods specified by Central Pollution Control Board (CPCB 2011) and IS 5182.

3.6.3.4 OBSERVATIONS

The ambient air quality monitoring results for all the stations for the study period are presented under **Annexure No 5.** The statistical analysis report for SO_2, NO_2, PM_{10} & $PM_{2.5}$, are presented in the below table No.3.10, and all the parameters were found to be well within the limits.

Sensitivity: Public (C4)

Table 3.11 : Ambient Air Quality-Baseline Data- Statistical Analysis

Station Code : A1 Bicholim (Within Mineral Block area)					**A2 Lamgao village**				**A3 Mulgao village**			
	SO_2	**NO_2**	**PM 10**	**PM 2.5**	**SO_2**	**NO_2**	**PM 10**	**PM 2.5**	**SO_2**	**NO_2**	**PM 10**	**PM 2.5**
Min.	6	<9	27	14	5	9	30	15	7	9	35	18
98%	13	16	52	35	11	16	43	27	13	17	55	33
Max.	13	16	53	36	11	17	43	27	13	18	56	34
Avg.	9	12	42	24	9	12	38	21	10	13	46	25
SD	2	2	6	5	2	2	4	3	2	2	6	4
No. of obs	26				26				26			
Station Code : A4 Sircaim village					**A5 Calvim village**				**A6 Pilgao**			
	SO_2	**NO_2**	**PM 10**	**PM 2.5**	**SO_2**	**NO_2**	**PM 10**	**PM 2.5**	**SO_2**	**NO_2**	**PM 10**	**PM 2.5**
Min.	6	9	30	15	6	<9	29	15	6	9	34	18
98%	12	15	53	31	12	17	47	29	13	15	48	29
Max.	12	16	53	31	12	17	48	29	13	15	48	29
Avg.	9	12	44	24	9	12	38	21	9	11	40	23
SD	2	2	7	4	2	2	5	4	2	3	4	3
No. of obs	26				26				26			
Station Code : A7 Sarvona village					**A8 Advalpale village**				**A9 Latambarsem village**			
	SO_2	**NO_2**	**PM 10**	**PM 2.5**	**SO_2**	**NO_2**	**PM 10**	**PM 2.5**	**SO_2**	**NO_2**	**PM 10**	**PM 2.5**
Min.	6	9	30	15	<4	9	33	16	5	9	34	17
98%	13	18	50	34	9	14	52	28	10	16	50	30
Max.	13	18	51	36	9	14	54	29	10	16	50	30
Avg.	9	12	42	22	7	11	41	22	8	11	40	23
SD	2	3	6	5	1	2	5	3	1	2	5	4
No. of obs	26				26				26			

Limits for Industrial, Residential, Rural and other Areas for 24 hrs	**SO_2**	**NO_2**	**PM 10**	**PM 2.5**
	80	80	100	60

RESULTS:

The results of the air quality monitoring were found to be well within the permissible limits for the industrial, residential, rural and other areas as per the National Ambient Air Quality Standards (NAAQS) of Central Pollution Control Board (CPCB).

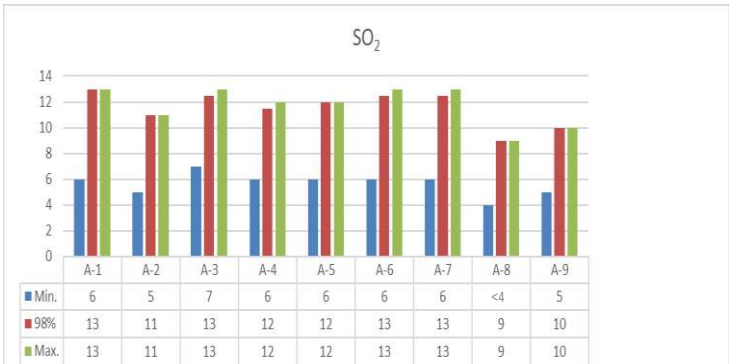
The quantities of Ammonia, Benzene, Benzo-(a)-pyrene, Arsenic & Nickel analyzed were below the detectable limit.

Analysis of Particulate Matter showed that there was no free silica in the PM_{10}, other heavy metal contents like lead, nickel, and arsenic were below the detection limit.

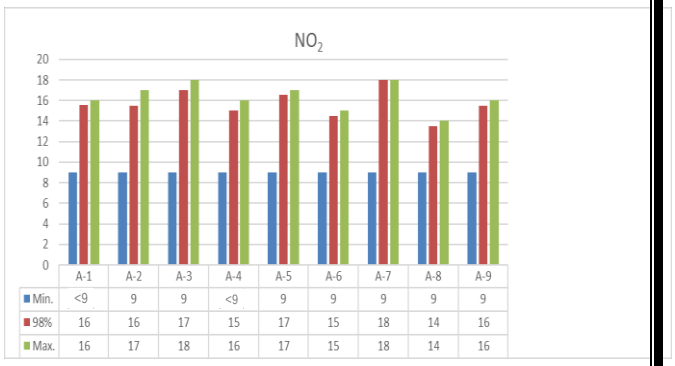
Sensitivity: Public (C4)

The details on the levels of the various parameters as observed during the AAQ study are as summarized below:

Results

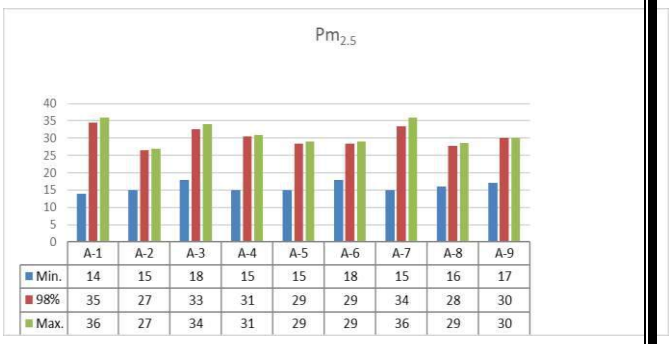


	A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9
Min.	6	5	7	6	6	6	6	<4	5
98%	13	11	13	12	12	13	13	9	10
Max.	13	11	13	12	12	13	13	9	10



	A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9
Min.	<9	9	9	<9	9	9	9	9	9
98%	16	16	17	15	17	15	18	14	16
Max.	16	17	18	16	17	15	18	14	16

	A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9
Min.	27	30	35	30	29	34	30	33	34
98%	52	43	55	53	47	48	50	52	50
Max.	53	43	56	53	48	48	51	54	50



	A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9
Min.	14	15	18	15	15	18	15	16	17
98%	35	27	33	31	29	29	34	28	30
Max.	36	27	34	31	29	29	36	29	30

A-1 Within ML Area Bicholim, A-2 Lamgao village, A-3 Mulgao village, A-4 Sircaim village, A-5 Calvim village, A-6 Pilgao, A-7 Sarvona village, A-8 Advalpale village, A-9 Latambarsem village

Fig.3.3 Graph Showing Air values

Particulate Matter (PM_{10}):

A maximum value of 56.0 µg/m^3 was observed at Mulgao Village. This was mainly due to the public transportation. A minimum value of 27.0 µg/m^3 was observed at Bicholim Village. The average values were observed to be in the range of 38.0 to 46.0 µg/m^3.

Respirable Particulate Matter ($PM_{2.5}$)

A maximum value of 36.0 µg/m^3 was observed at Bicholim (within ML area) and Sarvona village and minimum value of 14.0µg/m^3 was observed at Bicholim (within ML area). The average values were observed to be in the range of 21.0 to 25.0 µg/m^3.

Sulphur Dioxide (SO_2)

A maximum value of 13.0 µg/m^3 was observed at Bicholim (within ML area), Mulgao,

Sensitivity: Public (C4)

Piligao and Sarvona villages and minimum value of 4 μg/m^3 was observed at the Advalpale village. The average values were observed to be in the range of 7.0 to 10.0 μg/m^3.

Oxides of Nitrogen (NO_2)

A maximum value of 18.0 μg/m^3 was observed at Sarvona & Mulgao villages, and minimum value of <4μg/m^3 was observed at Pilgao village . The average values were observed to be 11 to 13.0 μg/m^3.

Ozone (O_3)

The O_3 concentrations at all the locations in the study area were observed to be well within the limits as specified by CPCB standards.

Ammonia (NH_3)

Concentrations of Ammonia at all the locations in the study area were observed to be below detectable limits. They were well within the limits as specified by CPCB standards.

Lead (Pb)

Concentrations of lead at all the locations in the study area were observed to be below detectable limits as Specified by CPCB standards.

Benzo (a)pyrene (BaP)

PAH concentrations at all the locations in the study area were below detectable limits.

Arsenic (As)

Concentrations of arsenic at all the locations in the study area were below detectable limits.

Nickel (Ni)

Concentrations of nickel at all the locations in the study area were below detectable limits.

Benzene (C_6H_6)

Benzene values at all the locations in the study area were observed below detectable limits.

Sensitivity: Public (C4)

3.6.4 MINERALOGICAL COMPOSITION OF PM_{10}

The Free Silica content in ore and waste was estimated as <0.043% using personal dust samplers as per DGMS circular which is much lower than the 5% limit of Free Silica. A copy of the report on Air borne dust and free silica analysis is enclosed vide **Annexure No. 5**

3.6.5 NOISE LEVEL

3.6.5.1 MONITORING STATIONS

The location of the sampling stations for studying noise levels during Summer, 2023 is given in Table 3.12.

Table 3.12: Location of Noise Level Monitoring Stations

Location of Noise Monitoring Stations										
Code No	Locations	Distance km	Direction	Latitude			Longitude			Zone
				D	M	S	D	M	S	
N1	Bicholim(Mineral Block office)	--	--	15	34	26.32	73	57	06.30	Industrial area
N2	Lamgao village	0.16	SEE	15	35	17.96	73	56	28.53	Residential area
N3	Mulgao village	0.63	N	15	37	8.81	73	54	56.00	Commercial area
N4	Sircaim village	3.1	NWW	15	37	17.83	73	52	47.98	Residential area
N5	Calvim village	5	SSW	15	34	8.20	73	53	16.60	Residential area
N6	Sirigao Village	1.25	SSE	15	36	18.58	73	53	53.15	Residential area
N7	Sarvona village	1.9	SE	15	33	58.35	73	58	7.80	Residential area
N8	Advalpale village	3	NNW	15	38	22.92	73	53	50.90	Residential area
N9	Latambarsem village	3.9	NNE	15	38	22.92	73	53	50.90	Residential area

The Location of Noise Monitoring Stations is given vide **Plate No. *13***

Photographs : Noise Monitoring

Sircaim Village

Lamgao Village

Sensitivity: Public (C4)

3.6.5.2 NOISE LEVEL BASELINE DATA

The reports for the ambient noise levels monitored during the Summer season, 2023 are presented in **Annexure No.5**

Observations: There is no mining activity in the core zone as it is a new auctioned mine . Only minimal movement of vehicles in the study area were observed during the survey.

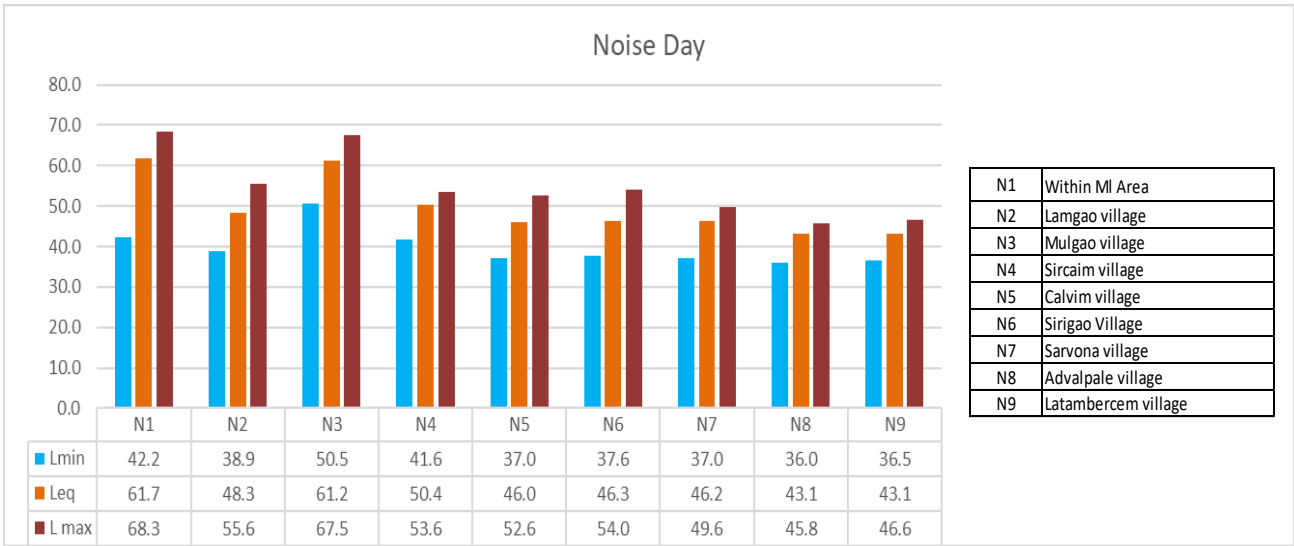
Table No 3.13 Results:

Code No.	Monitoring stations	Area	Day	Night
			L_{eq}	L_{eq}
Buffer Zone				
N1	Bicholim(Mineral Block office)	Industrial areas	61.7	49.3
N2	Lamgao village	Residential area	48.3	35.9
N3	Mulgao village	Commercial area	61.2	39.6
N4	Sircaim village	Residential area	50.4	40.0
N5	Calvim village	Residential area	46.0	39.0
N6	Sirigao Village	Residential area	46.3	44.9
N7	Sarvona village	Residential area	46.2	38.1
N8	Advalpale village	Residential area	43.1	38.1
N9	Latambarsem village	Residential area	43.1	37.3

Noise Quality Standards

Permissible limits as per ILO Code of Practice	Ambient Noise Levels	Leq. Limit dB(A)	
		Day	Night
For Unprotected ear - 8 hrs working shift	Industrial areas	75	70
Warning limit - 85 dB(A)	Commercial area	65	55
Danger limit - 90 dB(A)	Residential area	55	45
Worker not to be exposed for more than 115 dB(A)	Silence Zone	50	40

Sensitivity: Public (C4)



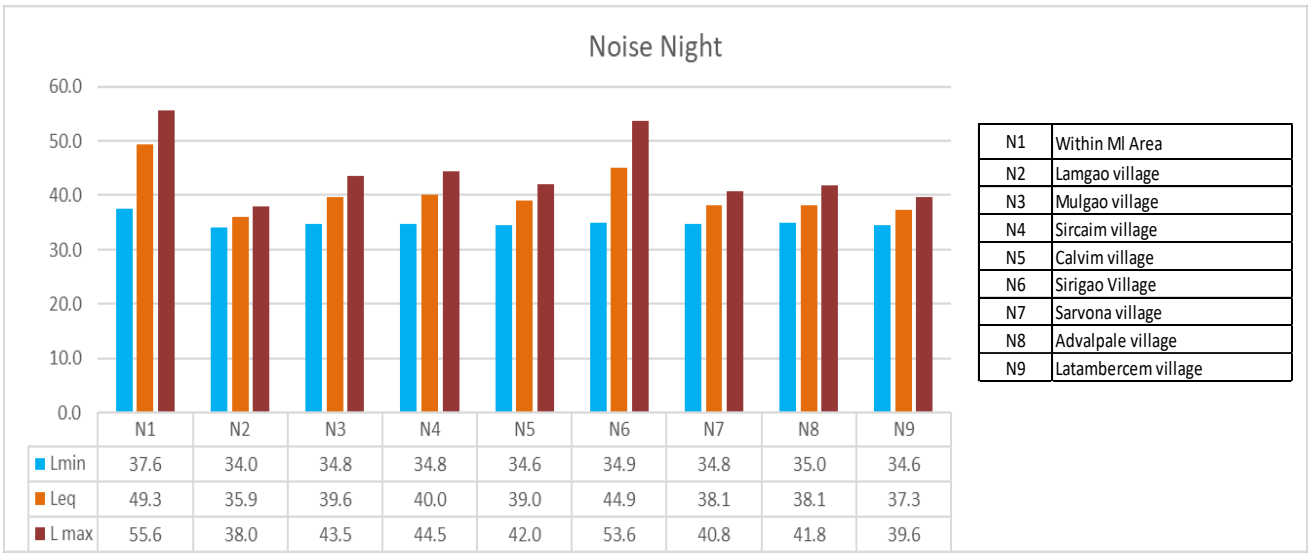


Fig.No: 3.4 Graph value for Noise Levels

The results are observed to be well within the permissible limits.

3.6.6 WATER ENVIRONMENT

3.6.6.1 WATER STREAMS/TANKS

There are no surface water bodies within the lease area. There is one river touching the lease boundary towards North-West direction. Main rivers in study area are:

Mandovi River -Aerial Distance of 2.30 Km at Pilgao Village

Bicholim River - Aerial Distance of 0.23Km at Mandrekarwada (Bicholim)

Assonora River - Assonora river which is touching Mineral Block boundary in North-West direction

Sensitivity: Public (C4)

Chapora River- Aerial Distance of 7.3 Km at Colvale Village

Mayem Lake- Aerial Distance of 0. 46 km

Amthane dam at 7 km

Assonora River originates near Mencurem village in Bicholim Taluka, Assonora River is one of the main tributaries of Mandovi River. The river flows through areas like Assonora, Sirsaim. The drainage area of this tributary is about 55 Sq. km.

3.6.6.2 GROUND WATER REGIME

The ground water table in the Mineral Block is at 10m bgl.. During rainy season most of the rain water from broken up area and dumps is diverted to the proposed mine pit through garland drain/trenches. The rain water will accumulate into the proposed mine pit which will recharge the ground water.

The detaile ground water study is given vide in Hydogeological report enclosed as **Appendix-I**

3.6.6.3 WATER QUALITY BASELINE DATA

The baseline data collected to assess the water quality in the study are included both surface water and ground water.

3.6.6.3.1 LOCATION OF SURFACE WATER & GROUND WATER QUALITY SAMPLING STATIONS

The Surface and ground water samples were collected during Summer season-2023. Location of Surface & Ground Sampling Stations Plan is given vide ***Plate No.14 & 15***

Table 3.14: Location of Surface Water & Ground Water Sampling Stations

Code No	Locations	Physical Observation	Distance km	Direction	Latitude			Longitude		
					D	M	S	D	M	S
SURFACE WATER										
SW1	Confluence of Valvot & Bicholim River	Light brown color was observed due to algae formation, fishy odour	3.5	SE	15	33	12.80	73	58	33.35
SW2	Confluence of Bicholim & Cudnem River	Light brown color was observed due to algae formation, suspended solids were observed	4.2	SE	15	33	2.07	73	59	0.55
SW3	Bicholim River Upstream	Some suspended solids were observed, light brown color	0.71	SEE	15	35	15.41	73	57	2.35
SW4	Bicholim River	Suspended solids were	0.52	SE	15	34	30.92	73	57	26.27

Sensitivity: Public (C4)

	Down stream	present and sample color was observed to be brown color								
SW5	Assonora Up stream Water	The stream were observed to be green color due to stagnant water and algae formation, fishy odour, small aquatic fishes were observed	0.58	NW	15	37	11.25	73	54	21.28
SW6	Assonora Down stream Water	The stream where observed to be green color due to and algae formation, fishy smell odour	0.63	NWW	15	36	36.21	73	53	48.89
SW7	Mayem Lake	Green color observed due to algae , water is odour less and suspended solids were present	0.74	SSE	15	34	30.21	73	56	20.62
GROUND WATER										
GW1	Bicholim	Open Well. The water observed to be colorless, Less suspended solids, used for domestic purpose	0.5	SEE	15	35	11.61	73	56	58.35
GW2	Sarvan village	Open Well water Colorless, odour free & seen some dry leaves on the surface of the well	2.00	SE	15	33	58.35	73	58	7.80
GW3	Lamgao village	Open Well water Colorless and no suspended solids	0.086	SE	15	34	42.33	73	57	2.68
GW4	Mulgao village	Open Well water , No suspended matter , colorless and odour free	0.46	NNW	15	37	8.14	73	54	43.80
GW5	Mavlinge Village	Open Well water, Observed to be clear and colorless and less suspended matter	4.74	NE	15	37	1.75	73	58	30.10
GW6	Nanoda village	Open Well water , The sample is clear and observed to be no suspended solids	2.67	N	15	38	5.77	73	55	29.37
GW7	Sircaim village	Open Well water Colorless, odorless and less suspended matter	2.19	NWW	15	37	9.42	73	52	54.61
GW8	Assonora	Open Well water, No odour, less suspended matter	0.42	NW	15	37	1.12	73	54	5.43
GW9	Pilgao village	Open Well water Colorless , odour less and less suspended matter	1.25	SEE	15	33	43.47	73	57	15.90
GW10	Mayem village	Open Well water Colorless , odour less and less suspended matter	0.677	SSE	15	34	34.33	73	56	10.20

Sensitivity: Public (C4)

Photograph : Surface Water Samples

Mayem Lake

Assonora Downstream water

Photograph : Ground Water Samples

Piligao Village

Mulgao village

3.6.6.3.2 SURFACE WATER QUALITY

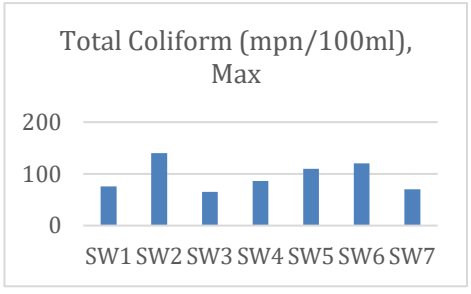
The surface water samples collected during Summer Season -2023 were analyzed and the results were compared with IS: 2296. The analysis reports of surface water are presented under **Annexure No.5**

Sensitivity: Public (C4)

Table.3.15 RESULTS

Sl.No.	Parameters	Limits For Stream Water Standards	Sample						
			SW1	SW2	SW3	SW4	SW5	SW6	SW7
i	pH	6.5 to 8.5	6.35	6.82	7.06	7.26	6.9	7.39	6.64
ii	Dissolved Oxygen (as O_2), mg/l, Min	4	6.2	6.9	6.3	6.2	6.7	6.8	6.2
iii	Biochemical Oxygen Demand (as O_2), mg/l,	3	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
iv	Total Coliform (mpn/100ml)	5000	84	148	63	94	109	120	70
v	Colour (Hazen Units)	300	5	5	5	5	5	5	5
vi	Fluoride (as F), mg/l	1.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
vii	Cadmium (as Cd), mg/l	0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
viii	Chloride (as Cl), mg/l	600	5620	5348	108	110	1250	1430	18
ix	Chromium (as Cr^{+6}), mg/l	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
x	Cyanides (as CN), mg/l	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
xi	Total Dissolved Solids (mg/l)	1500	11240	10300	260	290	2600	2960	72
xii	Selenium (as Se), mg/l	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
xiii	Sulphates as SO_4 (mg/l)	400	840	830	40	60	390	410	10
xiv	Lead (as Pb) mg/l	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
xv	Copper (as Cu), mg/l	1.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
xvi	Arsenic as As (mg/l)	0.2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
xvii	Iron (as Fe), mg/l	50	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
xviii	Phenolic compounds (as C_6H_5OH), mg/l	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
xix	Zinc (as Zn), mg/l	15	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
xx	Insecticides, mg/l	Absent	NA	NA	NA	NA	NA	NA	NA
xxi	Anionic detergents (as MBAS),mg/l	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
xxii	Oils and grease, mg/l	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
xxiii	Nitrates (as NO_3), mg/l	50	12.6	10.8	11.9	14	12.8	17.8	14.2
xxiv	Alpha Emitters (µcurie/ml)	10^{-9}	NA	NA	NA	NA	NA	NA	NA
xxv	Beta Emitters (µcurie/ml)	10^{-8}	NA	NA	NA	NA	NA	NA	NA
xxvi	Chemical Oxygen Demand (COD) mg/l	-	26	24	22.0	26.0	24	26	24.0
xxvii	Total Hardness (as $CaCO_3$), mg/l,	--	1400	1220	40	46	240	210	80
xxviii	Total Suspended Solids, mg/l	--	12	16	18	10	8	10	12

Surface Water :



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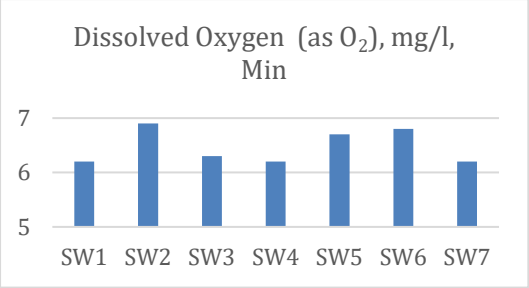
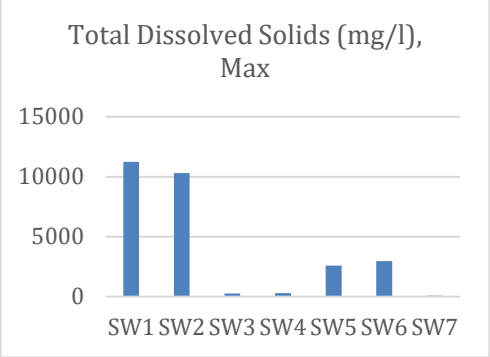
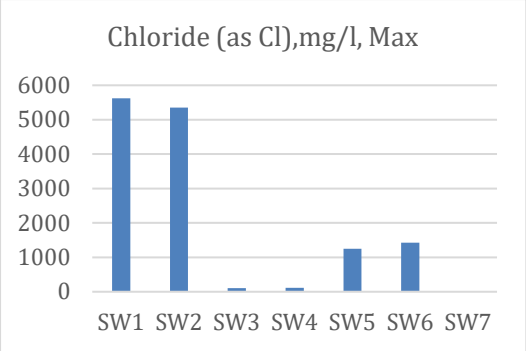
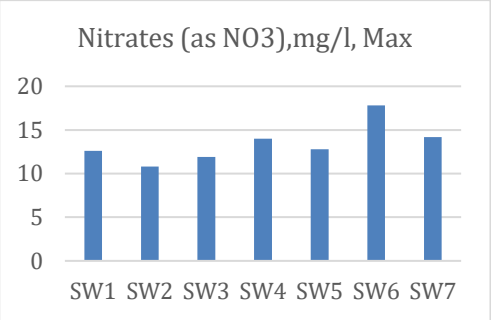








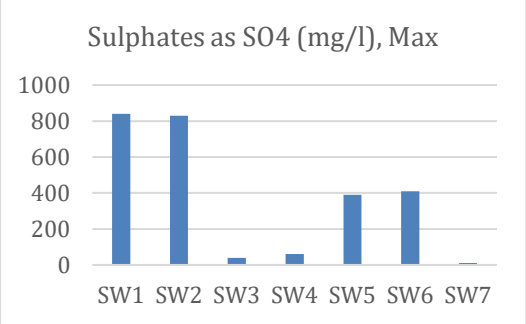


Fig.No. 3.5 Graph for Surface Water results

Results Interpretation:

The results of the analysis of the samples revealed that surface water samples of four locations i.e., Confluence of Valvot & Bicholim River, Confluence of Bicholim & Cudnem River, Assonora Up stream Water & Assonora down stream Water were having high TDS, Total hardness, Sulphates, and Chlorides. This is mainly because of the influence of creek water.

The sample collected at Confluence of Valvot & Bicholim River location was observed to be slightly acidic in nature. Whereas all the parameters of other locations were found to be within permissible limits.

3.6.6.3.3 GROUND WATER QUALITY

10 Nos. of Ground water Samples were collected from Core Zone and Buffer Zone and analysed as per IS 10500:2012 standards.

The parameter-wise results are given below and the test report is enclosed under

Sensitivity: Public (C4)

Annexure.No. 5

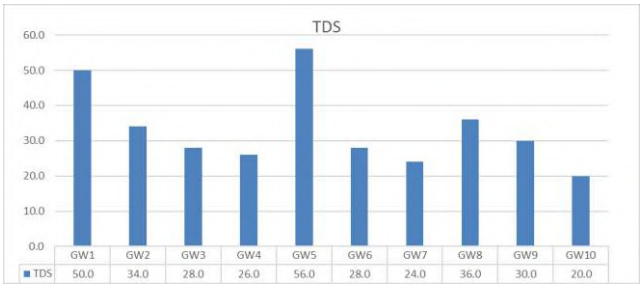
Table.No. 3.15A Results:

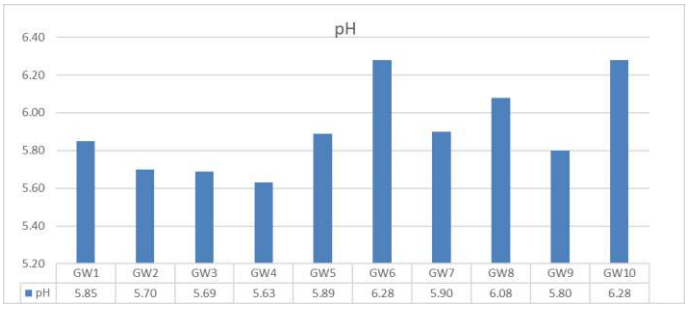
Parameters	GW1	GW2	GW3	GW4	GW5	Permissible Limits
Colour (Hazen Units),	1.0	<1	1.0	<1	1.0	15
Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
pH	5.85	5.70	5.69	5.63	5.89	6.5 - 8.5
Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Turbidity, NTU, Max	0.8	0.90	1.2	0.5	1.6	5
Total Dissolved Solids, mg/l, Max	50.0	50.0	28.0	28.0	56.0	2000
Aluminium (as Al), Max	<0.01	<0.01	<0.01	<0.01	<0.01	0.2
Ammonia (as to tal Ammonia -N), mg/l, Max	<0.1	<0.1	<0.1	<0.1	<0.1	0.5
Anionic Detergents (as MBAS), mg/l, Max	<0.1	<0.1	<0.1	<0.1	<0.1	1.0
Barium (as Ba), mg/l, Max	0.08	<0.005	0.014	0.01	<0.005	0.7
Boron (as B), mg/l, Max	<0.1	<0.1	<0.1	<0.1	<0.1	1
Calcium (as Ca), mg/l, Max	10.62	7.35	6.54	6.54	12.26	200
Chloramines (as Cl_2), mg/l. Max	NA	NA	NA	NA	NA	4.0
Chloride as Cl (mg/l), mg/l, Max	17.00	16.10	15.10	15.10	20.13	1000
Copper (as Cu), mg/l, Max	<0.005	<0.005	<0.005	<0.005	<0.005	1.5
Fluoride (as F), mg/l, Max	<0.1	<0.1	<0.1	<0.1	0.30	1.5
Residual, Free Chlorine, mg/l, Max	<0.1	<0.1	<0.1	<0.1	<0.1	1
Iron (as Fe), mg/l, Max	0.072	<0.005	0.261	0.08	<0.005	1.0
Magnesium (as Mg) mg/l, Max	5.94	3.96	2.97	2.97	6.54	100
Manganese (as Mn), mg/l, Max	0.007	<0.001	0.038	0.013	<0.001	0.3
Mineral Oil, mg/l, Max	<0.5	<0.5	<0.5	<0.5	<0.5	0.5
Nitrates (as NO_3), mg/l, Max	4.2	1.8	3.5	3.5	2.8	45
Phenolics (as C_6H_5OH), mg/l, Max	<0.001	<0.001	<0.001	<0.001	<0.001	0.002
Selenium (as Se), mg/l, Max	<0.005	<0.005	<0.005	<0.005	<0.005	0.01
Silver (as Ag), mg/l. Max	<0.005	<0.005	<0.005	<0.005	<0.005	0.1
Sulphates (as SO_4), mg/l, Max	10.6	8.9	8.4	8.4	12.6	400
Sulphide (as H_2S), mg/l, Max	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Alkalinity (as $CaCO_3$) mg/l, Max	10.0	10.0	10.0	10.0	10.0	600
Total Hardness (as $CaCO_3$), mg/l, Max	51.00	34.68	28.56	28.56	46.92	600
Zinc (as Zn), mg/l, Max	0.01	<0.005	0.015	0.015	<0.005	15
Cadmium (as Cd), mg/l, Max	<0.001	<0.001	<0.001	<0.001	<0.001	0.003
Cyanide (as CN), mg/l, Max	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Lead (as Pb), mg/l, Max	<0.005	<0.005	<0.005	<0.005	<0.005	0.01
Molybdenum (as Mo), mg/l, Max	<0.001	<0.001	<0.001	<0.001	<0.001	0.07
Mercury (as Hg), mg/l, Max	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001
Nickel (as Ni), mg/l, Max	<0.001	<0.001	<0.001	<0.001	<0.001	0.02
Pesticides, mg/l, Max	NA	NA	NA	NA	NA	0.001
Polychlorinated biphenyls mg/l, Max	NA	NA	NA	NA	NA	0.0005
Polynuclear Aromatic Hydrocarbons (as PAH), mg/l, Max	NA	NA	NA	NA	NA	0.0001
Arsenic (as As), mg/l, Max	<0.002	<0.002	<0.002	<0.002	<0.002	0.01
Chromium (as Cr^{+6}), mg/l, Max	<0.03	<0.03	<0.03	<0.03	<0.03	0.05
Trihalomethanes, mg/l, Max	NA	NA	NA	NA	NA	--
Radioactive materials, Bq/l, mg/l	NA	NA	NA	NA	NA	--
Total Coliform (/100ml)	Absent	Absent	Absent	Absent	Absent	Absent
E-Coli (cfu/100ml)	Absent	Absent	Absent	Absent	Absent	Absent
Conductivity, µS/cm	102	89	80	80	164	--
Sodium, mg/l, Max	3.6	4.0	5.5	5.5	12.0	--
Potassium, mg/l, Max	<1.0	<1.0	<1.0	<1.0	<1.0	--
	1.0	<1	1.0	<1	1.0	

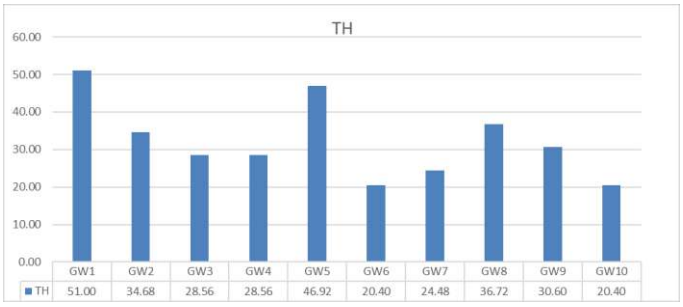
Sensitivity: Public (C4)

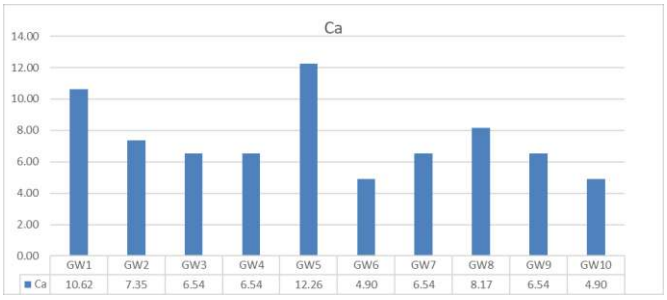
Parameters	GW6	GW7	GW8	GW9	GW10	Permissible Limits
Colour (Hazen Units), Max	<1	<1	1.0	<1	<1	15
Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
pH	6.28	5.90	6.08	5.80	6.28	6.5 - 8.5
Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Turbidity, NTU, Max	0.9	0.7	0.6	0.8	0.9	5
Total Dissolved Solids, mg/l, Max	48.0	24.0	36.0	30.0	48.0	2000
Aluminium (as Al), Max	<0.01	<0.01	<0.01	<0.01	<0.01	0.2
Ammonia (as total Ammonia -N), mg/l, Max	<0.1	<0.1	<0.1	<0.1	<0.1	0.5
Anionic Detergents (as MBAS), mg/l, Max	<0.1	<0.1	<0.1	<0.1	<0.1	1.0
Barium (as Ba), mg/l, Max	<0.005	0.077	0.022	0.076	<0.005	0.7
Boron (as B), mg/l, Max	<0.1	<0.1	<0.1	<0.1	<0.1	1
Calcium (as Ca), mg/l, Max	4.90	6.54	8.17	6.54	4.90	200
Chloramines (as Cl_2), mg/l. Max	NA	NA	NA	NA	NA	4.0
Chloride as Cl (mg/l), mg/l, Max	14.09	12.08	50.33	30.20	14.09	1000
Copper (as Cu), mg/l, Max	<0.005	<0.005	<0.005	<0.005	<0.005	1.5
Fluoride (as F), mg/l, Max	0.2	<0.1	<0.1	<0.1	<0.1	1.5
Residual, Free Chlorine, mg/l, Max	<0.1	<0.1	<0.1	<0.1	<0.1	1
Iron (as Fe), mg/l, Max	<0.005	0.13	0.06	0.09	<0.005	1.0
Magnesium (as Mg), mg/l, Max	1.98	1.98	3.96	3.47	1.98	100
Manganese (as Mn), mg/l, Max	<0.001	0.009	0.019	0.028	<0.001	0.3
Mineral Oil,mg/l, Max	<0.5	<0.5	<0.5	<0.5	<0.5	0.5
Nitrates (as NO_3), mg/l, Max	2.8	0.8	2.4	2.2	2.8	45
Phenolics (as C_6H_5OH), mg/l, Max	<0.001	<0.001	<0.001	<0.001	<0.001	0.002
Selenium (as Se), mg/l, Max	<0.005	<0.005	<0.005	<0.005	<0.005	0.01
Silver (as Ag), mg/l. Max	<0.005	<0.005	<0.005	<0.005	<0.005	0.1
Sulphates (as SO_4), mg/l, Max	7.4	8.0	6.8	8.4	7.4	400
Sulphide (as H_2S), mg/l, Max	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Alkalinity (as $CaCO_3$) mg/l, Max	50.0	20.0	25.0	25.0	50.0	600
Total Hardness (as $CaCO_3$), mg/l, Max	20.40	24.48	36.72	30.60	20.40	600
Zinc (as Zn), mg/l, Max	<0.005	0.036	0.024	0.014	<0.005	15
Cadmium (as Cd), mg/l, Max	<0.001	<0.001	<0.001	<0.001	<0.001	0.003
Cyanide (as CN), mg/l, Max	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Lead (as Pb), mg/l, Max	<0.005	<0.005	<0.005	<0.005	<0.005	0.01
Molybdenum (as Mo), mg/l, Max	<0.001	<0.001	<0.001	<0.001	<0.001	0.07
Mercury (as Hg), mg/l, Max	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001
Nickel (as Ni), mg/l, Max	<0.001	<0.001	<0.001	<0.001	<0.001	0.02
Pesticides, mg/l, Max	NA	NA	NA	NA	NA	0.001
Polychlorinated biphenyls mg/l, Max	NA	NA	NA	NA	NA	0.0005
Polynuclear Aromatic Hydrocarbons (as PAH), mg/l, Max	NA	NA	NA	NA	NA	0.0001
Arsenic (as As), mg/l, Max	<0.002	<0.002	<0.002	<0.002	<0.002	0.01
Chromium (as Cr^{+6}), mg/l, Max	<0.03	<0.03	<0.03	<0.03	<0.03	0.05
Trihalomethanes, mg/l, Max	NA	NA	NA	NA	NA	--
Radioactive materials, Bq/l, mg/l	NA	NA	NA	NA	NA	--
Total Coliform (/100ml)	Absent	Absent	Absent	Absent	Absent	Absent
E-Coli (cfu/100ml)	Absent	Absent	Absent	Absent	Absent	Absent
Conductivity, µS/cm	91	91	105	92	91	--
Sodium, mg/l, Max	12.0	10.0	8.0	11.0	12.0	--
Potassium, mg/l, Max	<1.0	<1.0	<1.0	<1.0	<1.0	--

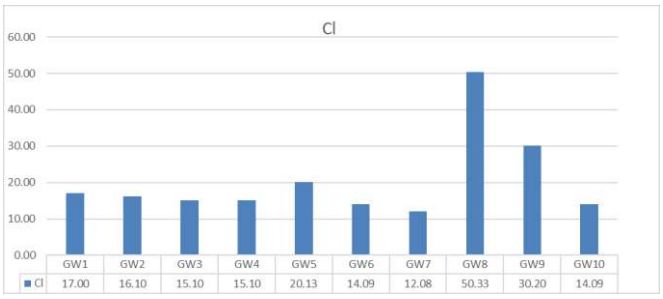
Sensitivity: Public (C4)

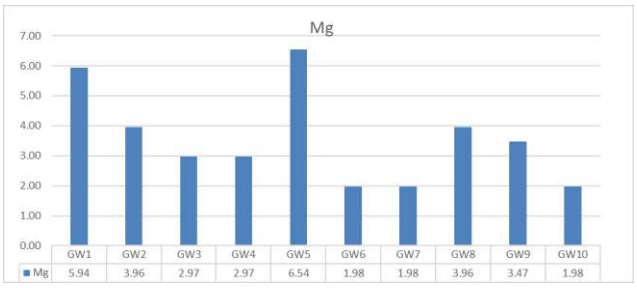












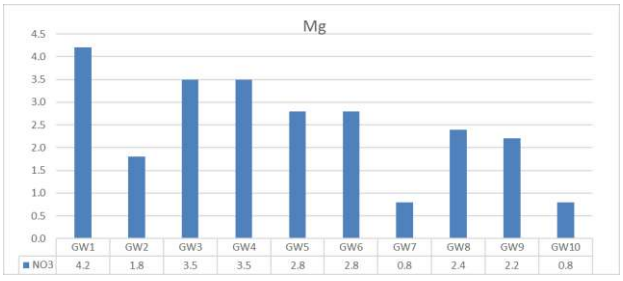


Fig.No. 3.6 Graphs Showing Ground water parameters

Results Interpretation: *The open well samples were found to have pH in slightly acidic in nature. This is possibly due to the occurrence of lateritic ore. The soil is rich in iron and aluminum oxides and hence it makes the ground water slightly acidic in nature. The other parameters were seen to be within the limits.*

Sensitivity: Public (C4)

3.6.5 SOIL QUALITY

3.6.5.1 LOCATION OF SOIL SAMPLING STATIONS

The locations of the sampling stations to assess soil quality during Summer season, 2023 are given in Table 3.16. Location of Soil Sampling Stations Plan ***Plate No.16***

Table 3.16: Location of Soil Quality Sampling Stations

Code No	Locations	Physical Obs.	Distance km	Direction	Latitude			Longitude		
					D	M	S	D	M	S
S1	Dump Soil Within ML Area	--	--	--	15	34	25.60	73	56	56.45
S2	Lamgao village	Agricultural soil	0.31	SEE	15	35	26.84	73	56	30.21
S3	Mayem village	Fairly dense forest Cashew Plantation	1.9	SW	15	35	3.27	73	54	48.54
S4	Sircaim village	Agricultural soil	2.9	NNW	15	37	13.43	73	52	29.72
S5	Pilgao village	Agricultural soil	1.3	SSE	15	33	42.23	73	57	15.72
S6	Sirigao	Agricultural soil	0.6	W	15	36	26.32	73	53	57.00
S7	Mulgao Village	Agricultural soil	0.3	N	15	36	50.04	73	55	11.62

3.6.5.2 SOIL QUALITY BASELINE DATA

The quality soil observed in the core zone and buffer zones are presented under **Annexure.No-5.**

Photographs: Soil Samples

Mayem Village

Pilgao Village

Table.3.16 A Results

Sensitivity: Public (C4)

SL. No.	PARAMETERS	Unit	S1	S2	S3	S4	S5	S6	S7	Normal	High
PHYSICAL PROPERTIES											
1	Colour	--	Red soil	Red soil	Red soil	Red soil	Red soil	Red soil	Red soil	--	--
2	Textural class	--	Sandy clay loam	Clay loam	Clay loam	Clay loam	Clay loam	Clay loam	Clay loam	--	--
3	**Size Distribution**										
	Sand	%	48.60%	44.96%	34.50%	42.62%	39.63%	36.55%	34.63 %	--	--
	Silt	%	27.60%	35.46%	33.63%	34.28%	34.85%	34.62%	35.62 %	--	--
	Clay	%	23.80%	19.58%	31.87%	23.10%	25.52%	28.83%	29.75 %	--	--
4	Moisture Content	%	14.30	11.3	10.6	11.65	9.82	9.48	8.96	--	--
5	Bulk Density	gm/cc	1.36	1.44	1.30	1.44	1.33	1.41	1.38	--	--
6	Porosity	%	48.87	45.86	51.13	45.86	50.00	46.99	48.12	--	--
7	Water holding capacity	%	35.26	30.26	33.63	30.47	30.42	31.05	32.56	--	--
8	pH	--	5.78	5.63	5.48	5.38	5.44	5.65	5.78	6.3	>8.3
9	EC	M mohs/cm	0.296	0.315	0.296	0.315	0.296	0.318	0.28	1.0 to 2.0	>2
Chemical Properties											
10	Organic Carbon	%	0.76	0.85	1.08	0.82	0.75	1.18	1.08	0.5 to 0.75	>0.75
11	Nitrogen as N	Kg/Ha	218	206	200	216	220	275	226	280-560	>560
12	Phosphorous as P	Kg/Ha	17.6	14.3	15.6	14.6	16.5	14.6	17.8	9 to 22	>22
13	Potassium as K_2O	Kg/Ha	255	247	230	240	260	246	263	50 to 120	>120
14	Calcium as Ca^{++}	mg/kg	760	480	630	790	680	768.00	586	--	--
15	Magnesium as Mg^{++}	mg/kg	136	128	134	122	146	230	140	--	--
16	Sodium as Na_2O	mg/Kg	170.00	172.00	160.00	144.00	162.000	156.00	160.000	--	--
17	Chloride as Cl	mg/Kg	196.00	200.00	185.00	164.00	190.00	176.00	170.00	--	--
18	Sodium Absorption Ratio	%	1.11	1.34	1.13	0.94	1.10	0.95	1.15	--	--
19	Salinity	ppt	0.35	0.36	0.33	0.30	0.34	0.32	0.31	--	--
20	Sulphate as SO_4	%	116	105	120	110	105	114	128	--	--
Micro-nutrients											
21	Boron (as B)	mg/Kg	0.28	0.36	0.47	0.35	0.29	0.18	0.34	--	--
22	Zinc (as Zn)	mg/Kg	0.22	0.16	0.42	0.35	0.47	0.27	0.28	--	--
23	Copper (as Cu)	mg/Kg	0.24	0.22	0.25	0.18	0.23	0.27	0.24	--	--
24	Iron (as Fe)	%	2.63	3.42	2.48	4.55	4.19	3.65	3.22	--	--

Sensitivity: Public (C4)

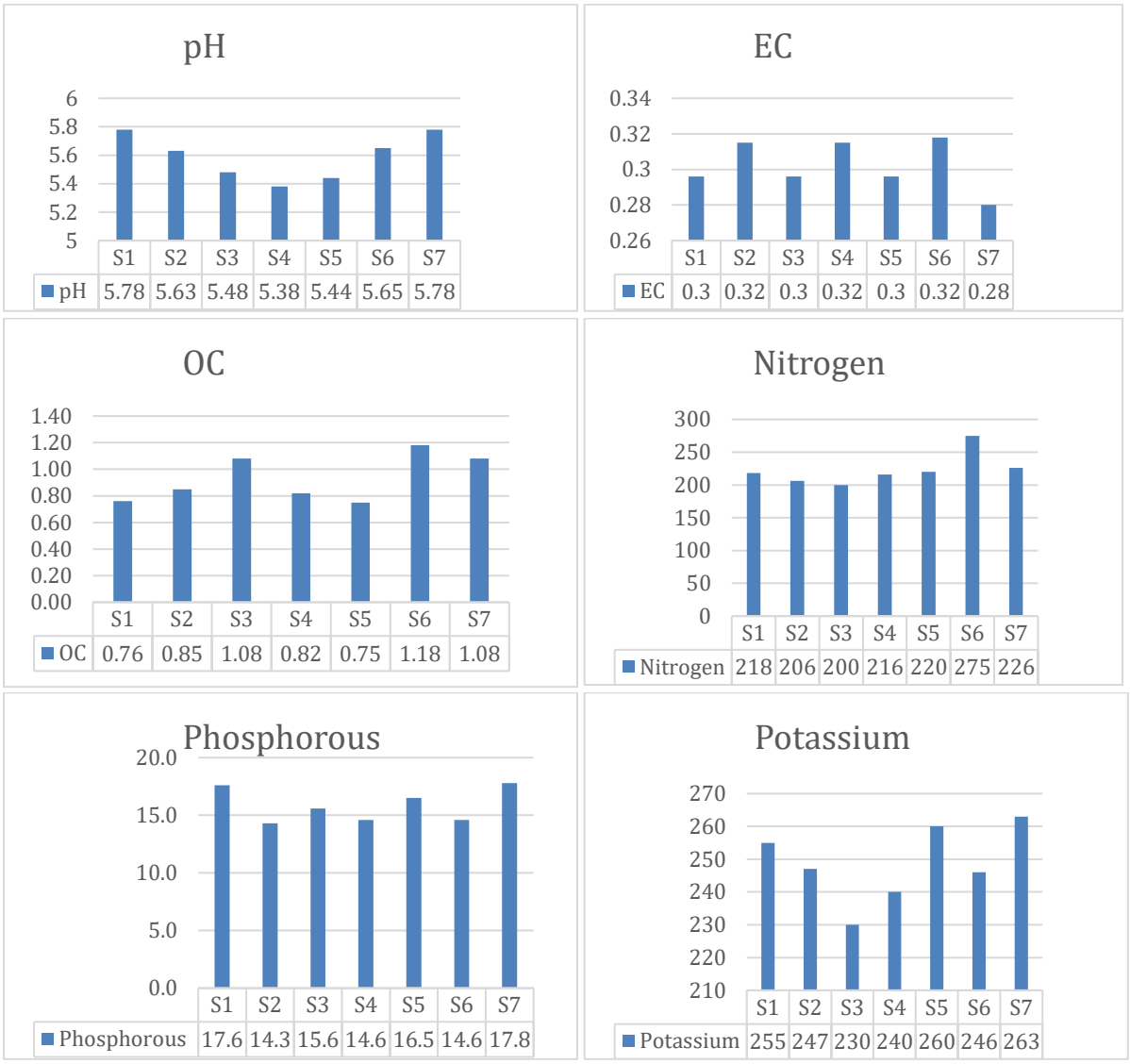


Fig.No. 3.7 Graphs : The graphs showing some critical Soil parameters

Results Interpretation

The dominant soil type observed in the mining lease is of lateritic type. The results show that the soils are with pH varies from 5.38 to 5.78, texture varies from sandy clay to clay loam, , Electrical Conductivity ranges from 0.296 to 0.315 µS/cm which is a measure of the soluble salts and ionic activity in the soil. The observed parameters are within the permissible limits.

3.7. LAND ENVIRONMENT

3.7.1 LAND USE AND LAND COVER FOR 10 KM RADIUS OF MINE

The map showing land use details within 10 km radius from the ML Area is furnished below. The land use of the entire study area is as given below in Table 3.17. The detailed plan showing the Land use and vegetation index is enclosed as drawing no.

Sensitivity: Public (C4)

Plate No.17 and *Plate No.18* respectively.

Table. No. 3.17 Land use of study area around 10 kms radius

Sl.no	Particulars	Area Ha	%
1	Forest Area	429.5	0.92
2	Mangroves	991.0	2.12
3	Water Bodies	3092.1	6.61
4	Open mixed forest/Cashew Plantation	21017.0	44.91
5	Flooded Vegetation	1328.0	2.84
6	Agricultural Land	2917.5	6.23
7	Settlements	7210.2	15.41
8	Scrub Land	9811.9	20.97
Total Area		46797	100.00

3.7.1.1 LAND USE - ML AREA

The Mineral Block Area consists of 478.5206Ha of land. Land use details of the existing period are given below in Table No. 3.17.

Table 3.18: Land Use - Mineral Block Area

Sr.No	Land use	Current land use Area (Ha.)
1	Settlements	32.4047
2	Pits & Excavation	306.8497
3	Dumps & Material Stocking	41.6116
4	Covered under Mine Infrastructure (plants & sheds)	6.4707
5	Land under Public Infrastructure / Utilities	1.021
6	Barren / Waste land with small bushes & shrubs/Archaelogical Monument	90.1629
7	Total area	478.5206

Sensitivity: Public (C4)

3.8 ECOLOGY AND BIODIVERSITY BASELINE DATA

3.8.1 A STUDY REGION

3.8.1.1 Study Region

The biodiversity study was undertaken to assess the biodiversity of Mining Lease Area and its buffer area of 10 Km radius with the following objectives.

1. Collection and synthesis of secondary information on the status of biodiversity in study region
2. Field survey to assess the status of flora and fauna component in core and buffer areas of project site
3. Identification and listing of flora and fauna which are important as per the Wildlife (protection) Act 1972.

The authenticated list of flora and fauna obtained from the Forest Department, is enclosed as **Annexure 6.**

3.8.1.2 Approach

A participatory and consultative approach was followed in executing the assignment on Ecology & Biodiversity assessment of the Mineral Block and 10-km buffer region. Further enquiries were made with forest officials, revenue department and local villagers. Literature survey included a review of the forest working plan, Census hand book, Gazetteer and other records related to the ecology of the region.

A team comprising flora and fauna specialist from Mineral Engineering Services along with Mr. M. S. Raju (EIA Co-Ordinator) had visited the Block-I Bicholim Mineral Block Iron Ore Mine and 10-km buffer area during 6th to 9th April 2023; and held discussion with Mr. Jagdish (Head Env Officer) & Ms. Sneha (Env officer).

For the study, "EIA Guidance manual for mining of minerals" prepared by the administrative staff college of Hyderabad was followed along with the internal standard operating procedure.

The baseline data on biodiversity of the region during collected during April, 2023 is presented in the format provided in model TOR in EIA Guidance manual prepared by Administrative Staff College of Hyderabad, 2010 on behalf of MoEF&CC, Government of India.

Sensitivity: Public (C4)

3.8.1.3 FLORAL STUDIES

Forest Types: Forest types were closely observed on the ground and identified using Champion & Seth, forest classification of India. The identified forest types were verified, and confirmed from forest working plan for the north Goa Forest Division with specific emphasis on Bicholim forest ranges, Bicholim village, Bicholim taluka published and other authenticated sources.

Quartile Approach: In order to provide representative ecological status 10-km buffer was divided into four quartiles for biodiversity sampling, i.e., NE (Q-1), NW (Q-2) SW (Q-3) and SE (Q-4) as given in Fig. 3.8.

Each of the quartiles were examined for representative flora on randomly sampled quadrats for trees (25x25-m), shrubs (10x10-m) and herbs (2x2-m) depending upon prevailing geographical conditions and bio-diversity aspects of study area.

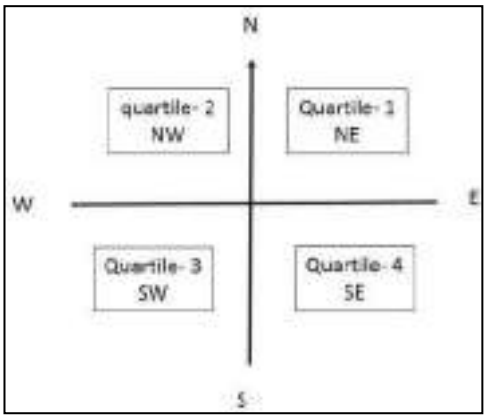


Figure. 3.8. Schematic diagram shown 10- km radius buffer area representation under four quartiles for ecology and biodiversity sampling.

Phyto-sociological parameters, viz., Abundance, Density, Frequency (%) were measured as given below. A total of 10 quadrats were laid down randomly within core area and 40 quadrats were laid down within four quartiles randomly (10/quartile) in buffer area each quadrat trees, shrubs, and herbs as per the Fig.3.8

Quadrats method: Quadrats of 25 × 25-m were laid down randomly within core and 10-km buffer area; each quadrat was laid to assess the trees (>5 cm GBH) and one, 10 × 10-m sub-quadrat nested within the quadrat for shrubs, and two, plots 2 × 2-m for

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herbs, climbers & grass is given in **Fig. 3.9**. The quadrats were laid randomly to cover the area to maximize the sampling efforts and minimize the species homogeneity, such as small stream area, trees in agricultural bunds, tank bunds, farm forestry plantations, wildlife areas, natural forest area, avenue plantations, house backyards, etc.

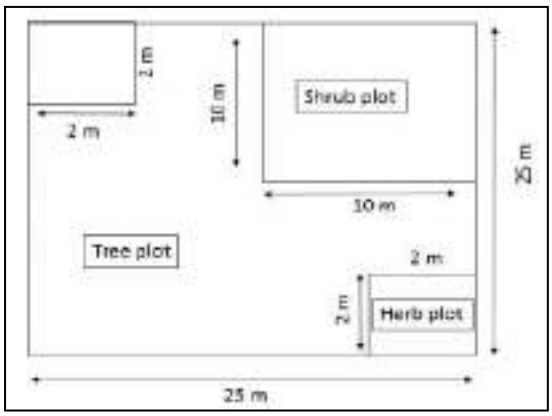

Figure.3.9. Schematic representation of quadrats for trees, shrubs, herbs & grass.

Following formulae was used for calculating the frequency (%), abundance and density of the floral species

$$\%\ \text{Frequency of species A} = \frac{\text{Number of quadrats of occurrence of species A}}{\text{Total number of quadrats studied}} \times 100$$

$$\text{Abundance of species A} = \frac{\text{Number of individuals of species A in total quadrats studied}}{\text{Number of quadrats of occurrence of species A}}$$

$$\text{Density of species A} = \frac{\text{Number of individuals of species A in total quadrats studied}}{\text{Total area studied}}$$

Biodiversity Analysis using index: Species diversity will be calculated by using Shannon and Wiener (1963) formula as follows:

$$H' = -\sum_{i=1}^{R} p_i \ln p_i$$

Whereas H' is Shannon index of general diversity, p_i is often the proportion of individuals belonging to the i^{th} species in the dataset of interest.

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Screening IUCN and other sources for species Conservation status: Besides measuring these parameters, other biodiversity aspects in the form of endemic status, keystone species, threatened status, and IUCN, Red-data books of the Botanical Survey of India (BSI), have been verified for their conservation status (*see* http://www.iucnredlist.org/static/categories_criteria_3_1).A **keystone species** is a species that has a disproportionately large effect on its environment relative to its abundance. Such species are described as playing a critical role in maintaining the structure of an ecological community, affecting many other organisms in an ecosystem and helping to determine the types and numbers of various other species in the community. The IUCN Species Programme of the IUCN Species Survival Commission (SSC), has for more than four decades been assessing the conservation status of species, subspecies, varieties and even selected sub-populations on a global scale in order to highlight taxa threatened with extinction and therefore promote their conservation.

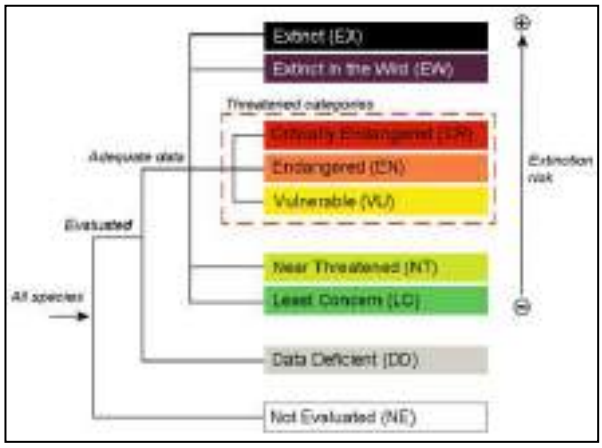

Figure 3.10. IUCN categories showing threatened species categories

The IUCN Red List of Threatened Species provides taxonomic, conservation status and distribution information on plants and animals that have been globally evaluated using the IUCN Red List Categories and Criteria (Fig. 3.10.).This system is designed to determine the relative risk of extinction, and the main purpose of the IUCN Red List is to catalogue and highlight those plants and animals that are facing a higher risk of

Sensitivity: Public (C4)

global extinction (i.e., those listed as *Critically Endangered, Endangered* and *Vulnerable*). The IUCN Red List also includes information on plants and animals that are categorised as *Extinct* or *Extinct in the Wild*; on taxonomic group that cannot be evaluated because of insufficient information (i.e., are *Data Deficient*); and on plants and animals that are either close to meeting the threatened thresholds or that would be *threatened* if not considered for an ongoing taxon-specific conservation programme (i.e., *Near Threatened*).

3.8.1.5 FAUNAL DIVERSITY

Mammals: Mammals were observed using indirect methods such as faecal matter (i.e., scat) and pug mark by establishing 10 × 100-m linear transects depending on the habitat (i.e., existing wildlife game routes/forest trails used). Few mammals were documented by direct sighting.

Bird: Point count method was used for bird documentation as per standard method by Sutherland (1996), which involved 10-minute observation in each point during early morning hours (6.00 to 10.00 AM). 20 point-counts were enumerated in each quartile, which constituted a total of 80 points-counts (20 × 4) within 10-km radius area.

Butterfly: The butterfly was enumerated by two linear transects, of 10 × 100 m were laid at each quartile at an interval of 1 km. Further, reptiles and fishes documented in existing literature and secondary information in consultation with local people and wildlife experts were recorded. Apart from field observation, consultations were held with knowledgeable persons of the villages and frontline forest department officials to validate the field observation and information cited in the literature.To know the endemic or conservation status of the fauna, Schedule 1 of the Wildlife Preservation Act (1972) was screened.

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Fig No. 3.11 Study area quartile I, II, III, & IV

3.8.2 OBSERVATIONS AND DISCUSSIONS

3.8.2.1 Overview of project areas

The forest of the region was categorized as southern moist deciduous mixed forests and southern secondary moist mixed deciduous forests (Champion & Seth, 1967), in 'A revised survey of the forest types of India'. The region presents a wide range of altitudes, aspects, slopes, drainage, and spills giving rise to a variety of locality factors reflected in the occurrence of number of forest types from tropical semi-evergreen to mangrove forests. These types are broadly differentiated and described here as per recognized and revised forest classification of Champion & Seth.

- 3BC2 – Southern moist mixed deciduous forests
- 3BC2S1 – Southern secondary moist mixed deciduous forests

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Photo.

Open grass regenerated with Acacia auriculiformis in open area

Native vegetation with coconut trees etc,

Mixed forest with cashew plantation and Trema orientalis species

Coconut trees in and arround Village settlement

FLORA: Total 34 species were recorded within core area, of which 21 species trees (5/ ha), and 7 species shrubs (13 /ha), and 6 species herbs (115/ha) recorded (Table 3.19)

Table . 3.19 List of plants (trees, shrubs and herbs) reported from Core area

Sl.No	Species name	Family	Common Name
TREE			
1	*Anacardium occidentale*	Anacardiaceae	Cashew
2	*Acacia auriculiformis* *	Fabaceae	Acacia
3	*Eucalyptus sps*	Myrtaceae	Nilgiri
4	*Casuringa equisettifolia*	Casuarinaceae	Suru
5	*Alstonia scholaris*	Apocynaceae	Saten
6	*Samanea saman*	Fabacaeae	Rain tree
7	*Bauhinia racemose*	Fabacaeae	Apto
8	*Artocarpus heterophyllus*	Moraceae	Phanas
9	*Bombox ceiba*	Bombacaceae	Sanwar
10	*Delonix regia*	Fabacaeae	Gulmohar
11	*Emblica officinalis*	Phyllanthaceae	Aonia
12	*Garcinia indica*	Clusiaceae	Kokum

Sensitivity: Public (C4)

13	*Gmelina arborea*	Lamiaceae	Shivan
14	*Leucaena leucocephala*	Fabacaeae	Subabul
15	*Mangifera indica*	Anacardiaceae	Mango
16	*Syzygium cumini*	Myrtaceae	Jamun
17	*Trema orientalis*	Cannabaceae	Charcoal tree
18	*Acacia catechu*	Fabacaeae	Khair
19	*Canthium dicoccum*	Rubiaceae	Ceylon boxwood
20	*Ziziphus mauritiana*	Rhamnaceae	Indian jujube
21	*Macaranga peltata*	Euphorbiaceae	Chandada
SHRUBS			
1	*Acacia paniculate*	Mimosaceae	sickle wattle
2	*Calotropis gigantean*	Asclepidiaceae	crown flower
3	*Carissa congesta*	Apocynaceae	Karamda
4	*Crotolaria virosa.*	Fabacaeae	Rattlepod
5	*Helictris isora*	Malvaceae	Marodphali
6	*Lantana camara**	Verbenaceae	Lantana
7	*Ziziphus oenoplea*	Rhamnaceae	Jackal jujube
HERBS AND CLIMBERS			
1	*Asparagus racemosa*	Asparagaceae	Satavar
2	*Bidens biternata*	Asteraceae	Chirchitta
3	*Ipomea cmuricata*	Convolvulaceae	Bhingari
4	*Ocimum sanctum*	Lamiaceae	*Tamole*
5	*Parthenium hysterophorus*	Asteraceae	Santa-Maria
6	*Smilax zeylanica*	Smilacaceae	Kumarika

NOTE: * Invasive species

FAUNA: Total 17 species were observed within the core area, of which 12 species are birds, 2 species of mammals and 3 species of reptiles **(Table 3.20).**

Table 3.20 List of faunal species – Birds, Mammals and Reptiles in the core area

Sl. No.	Common name	Scientific name	Family	IUCN / WPA status
	BIRDS			
1	Common Iora	*Aegithina tiphia*	Irenidae	R/IV
2	Common Myna	*Acridotheres tristis*	Sturnidae	R/IV
3	Crow Pheasant	*Centropus sinensis*	Cuculidae	R/IV
4	Green Bee Eater	*Merops orientalis*	Meropidae	MR/IV
5	House Crow	*Corvus splendens*	Corvidae	R/IV
6	House Sparrow	*Passer domesticus*	Passeridae	R/IV
7	House Swift	*Apus affinis*	Apodidae	R/IV
8	Indian Robin	*Saxicoloides fulicata*	Turdinae	R/IV
9	Jungle Crow	*Corvus macrorhynchos*	Corvidae	R/IV
10	Jungle Myna	*Acridotheres fuscus*	Sturnidae	R/IV

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11	Red-wattled Lapwing	*Vanellus indicus*	Charadriidae	R/IV
12	Red-whiskered Bulbul	*Pycnonotus jocosus*	Pycnonotidae	R/IV
	MAMMALS			
13	Indian Hare	*Lepus nigricollis*	Leporidae	Lower risk/ IV
14	Rat	*Rattus rattus*	Muridae	Sch-V
	REPTILES			
15	Green Forest lizard	*Calotes calotes*	Agamidae	Common
16	Roux's Forest lizard	*Calotes rouxii*	Agamidae	Common
17	Garden lizard	*Calotes elloti*	Agamidae	Common

3.8.3 BUFFER AREA

Overview of buffer area (10-km radius) in all 4 directional quartiles - eco-sensitive areas, plantations, and development activities so on (Table 3.21).

Table. 3.21 General description of landscape within 10 km radius from core area (all 4 directions of North, East, West and South).

Table. 3.21

Quartiles	Trees/ Shrubs	Species richness	Density/ha	Species diversity (H')	Habitat Characteristics
Quartile 1 North-East	Trees	42	1834	2.37	Kharpal and Ambadgaon Reserve Forest Cashew mixed forest, Open scrub rest Main powerline (High tension wire) Maharashtra State boundary (<5 km)
	Shrubs	13	4710	2.14	
	Herbs	10	86500	2.16	
Quartile 1 North-West	Trees	35	1714	2.78	Konkan Railway track, Reserve Forest Amthane Dam. Main power line
	Shrubs	9	2120	1.84	
	Herbs	9	2050	2.36	
Quartile 3 South-West	Trees	54	234	1.87	Diwadi Island. Mandovi river and its tributaries Mangrove forest and swamps, Konkan railway track
	Shrubs	8	1220	1.84	
	Herbs	10	2500	1.36	
Quartile 4 South-East	Trees	44	734	2.17	Mandovi River and its tributaries, Mangrove Forest / swamps, Open scrub, Kudne river, Volvot river, Harvalem Waterfalls
	Shrubs	11	3820	2.64	
	Herbs	9	11500	2.06	
Overall	Trees	62			
	Shrubs	16			
	Herbs	15			

Sensitivity: Public (C4)

Detailed Eco-Sensitive Areas

Table 3.22 Ecologically Important habitat from the core area boundary

Sl. No.	Important ecosystem	Distance from Core area	Quartile direction
1	Ambadgaon RF	7.6 Km	Q 1 (North-East)
2	Kharpal RF	6.7 Km	Q 1 (North-East)
3	Kasarpal RF	5.1 Km	Q 1 (North-East)
4	Amthane dam & up-stream	5.8 km	Q 2 (North-East)
5	Chapora River	7.5 km	Q2 (North-West)
6	Mayem Forest	Common Boundary to Lease Area	Q2 (North-West)
7	Assonora River	Touches the Lease Area	Q2 (North-West)
8	Mapusa River	2.0 Km	Q2 (North-West)/ Q3 (South-West)
9	Mangroves	0.23 Km	Q2 (North-West)/ Q3 (South-West) & Q4 (South-East)/
10	Moira River	2.45 km	Q3 (South-West)
11	Mayem Lake	0.45 Km	Q3 (South-West)
12	Divar Island	5.8 Km	Q3 (South-West)
13	Mandovi River	5.3 Km	Q4 (South-East)/ Q3 (South-West)
14	Volvoti River	3.3 Km	Q4 (South-East
15	Bicholim River	0.2 Km	Q4 (South-East

FLORAL DIVERSITY

TREE: Overall 62 species of trees were enumerated from the reserve forest and riparian habitats.

Table 3.23 Trees growing buffer area of 10-km radius

Sl.No.	Species name	Family
1	*Acacia catechu (L.f.) Willd. var.*	Fabaceae
2	*Adina cordifolia Hook. f. ex Brandis*	Dipterocarpaceae
3	*Alstonia scholaris (L.) R.Br.*	Apocynaceae
4	*Annona squamosa L.*	Annonaceae
5	*Arlocapus lakoochu Wall. ex Roxb*	Moraceae
6	*Artocarpus heterophyllus Lam.*	Moraceae
7	*Artocapus integrifolius Auct.*	Moraceae
8	*Bischofia javanica Bl.*	Phyllanthaceae
9	*Bombax malabaricum DC.*	Bombacaceae
10	*Buchanania latifolia Roxb.*	Anacardiaceae
11	*Butea monosperma (Lam.) Taub.*	Fabaceae
12	*Caesalpinia bonducella (L.) Fleming*	Caesalpinaceae
13	*Canthium dicoccum (Gaert.) T. & B.*	Rubiaceae
14	*Careya arborea Roxb.*	Lecythidaceae
15	*Caryota urens L. (Kithul) sap.*	Arecaceae

Sensitivity: Public (C4)

16	*Cassia fistula L.*	Fabacaeae
17	*Casearia ovoidea Sleumer*	Salicaceae
18	*Cassia siamea Lam.*	Fabaceae
19	*Celtis cinnamomea Lindl. ex Planch.*	Ulmaceae
20	*Clerodendron sp.,*	Lamiaceae
21	*Cordia wallichii L.*	Boraginaceae
22	*Dalbergia calofolia Roxb.*	Fabaceae
23	*Delonix regia (Hk.) Raf.*	Fabaceae
24	*Diospyros montana Roxb.*	Ebenaceae
25	*Erythrina indica L.*	Fabaceae
26	*Ficus arnottiana (Miq.) Miq.*	Moraceae
27	*Ficus glomerata Roxb.*	Moraceae
28	*Ficus microcarpa L.f.*	Moraceae
29	*Flueggea leucopyrus Willd.*	Phyllanthaceae
30	*Gliricidia sepium (Jacq.) Kunth*	Fabaceae
31	*Glochidion velutinum L.*	Euphorbiaceae
32	*Grewia robusta L.*	Tiliaceae
33	*Grewia tiliifolia Vahl.*	Tiliaceae
34	*Holoptelea integrifolia (Roxb.) Planch.*	Ulmaceae
35	*Holarrhena pubescens (Buch.-Ham.)*	Apocynaceae
36	*Hopia perviflora Bedd.*	Lythraceae
37	*Hydnocarpus wightiana Bl.*	Achariaceae
38	*Lannea grandis (Dennst.) Engl.*	Anacardiaceae
39	*Macaranga peltata (Roxb.) Muell.*	Euphorbiaceae
40	*Mallotus philippensis (Lam.) Muell.*	Euphorbiaceae
41	*Mangifera indica L.*	Anacardiaceae
42	*Memecylon umbellatum Burm.*	Melastomataceae
43	*Mitragyna parviflora (Roxb.) Korth.*	Rubiaceae
44	*Olea dioica L.*	Oleaceae
45	*Peltophorum pterocarpum (DC.)*	Fabaceae
46	*Polyalthia longifolia Sonn.*	Annonaceae
47	*Pterocarpus marsupium Roxb.*	Fabaceae
48	*Radermachera xylocarpa (Roxb.) Schm.*	bignoniaceae
49	*Randia dumetorum L.*	Rubiaceae
50	*Sapindus emarginatus L.*	Sapindaceae
51	*Schleichera oleosa (Lour.) Oken*	Euphorbiaceae
52	*Semecarpus anacardium L. f.*	Anacardiaceae
53	*Spondias mangifera Willd.*	Anacardiaceae
54	*Syzygium caryophyllatum (L.) Alton*	Myrtaceae
55	*Syzygium cumini (L.) Skeels*	Myrtaceae
56	*Terminalia paniculata Roth*	Combretaceae
57	*Thespesia populnea (L.) Correa*	Malvaceae
58	*Trema orientalis (L.) Bl.*	Cannabinaceae

Sensitivity: Public (C4)

59	*Vitex alticima L. f.*	Verbenaceae
60	*Wrightia tinctoria*	Apocynaceae
61	*Xylia xylocarpa (Roxb.) Taub.*	Mimosaceae
62	*Ziziphus mauritiana Lam.*	Rhamnaceae

Shrubs: Total 16 species recorded in 10 km buffer area .

Table 3.24 Shrubs growing 10-km radius from lease boundary of Block I Bicholim mineral block

Sl.No.	Species name	Family
1	*Acacia paniculata Willd.*	Mimosaceae
2	*Amaranthus spinosus L.*	Amarantheceae
3	*Annona murocata L.*	Annonaceae
4	*Calotropis gigantean L.*	Asclepidiaceae
5	*Canthium parviflorum Lam.*	Rubiaceae
6	*Carissa congesta L.*	Apocynaceae
7	*Chromolaena odorata (L.) K.R.*	Astraceae
8	*Crotolaria virosa (Roxb.) Bake.*	Fabacaeae
9	*Dendrocalamus strictus*	Poaceae
10	*Helictris isora*	Malvaceae
11	*Ixora brachiata Roxb. ex DC*	Rubiaceae
12	*Jatropha gossypiifolia*	Euphorbiaceae
13	*Lantana camara L.*	Verbenaceae
14	*Rosa chinensis Jacq.*	Rosaceae
15	*Vitex negundo*	Verbenaceae
16	*Ziziphus oenoplea Miller.*	Rhamnaceae

Herbs: Total 15 species recorded in 10 km buffer area. The dominant species were *Acrostichum aureum, Asparagus racemose, Borreria articulata,* and *Cymbopogon citratus,*

Table 3.25. Checklist of herbsreported within 10-km radius from lease boundary of Block I Bicholim mineral block

Sl. No	*Species name*	Family
1	*Acrostichum aureum*	Pteridaceae
2	*Ageratum conyzoides*	Astraceae
3	*Asparagus racemose*	Asparagaceae
4	*Atlantia species*	Rutaceae
5	*Bidens biternata*	Asteraceae
6	*Borreria articulata*	Rubiaceae
7	*Cassia tora*	Caesalpinaceae
8	*Cymbopogon citratus*	Poaceae
9	*Cyperus difformis*	Cyperaceae

Sensitivity: Public (C4)

10	*Ipomea cmuricata*	Convolvulaceae
11	*Ocimum sanctum*	Lamiaceae
12	*Parthenium spp*	Asteraceae
13	*Premna coriacea*	Verbenaceae
14	*Sida cordifolia*	Malvaceae
15	*Solanum indicum*	Solanaceae

Mangrove forest

Total 16 species recorded from the mangrove estuary nearby Assonora and Mandovi River and closer to Salim Ali Bird Sanctuary. The dominant family was Rhizophoraceae and followed by Lythraceae and Acanthaceae

Table 3.26 Checklist of Mangrove species recorded from the 10 km radius from lease boundary of Block I Bicholim Mineral block

Sl. No.	Species Name	Family
1	*Rhizophora mucronata*	Rhizophoraceae
2	*Rhizophora apiculata*	Rhizophoraceae
3	*Avicennia marina*	Acanthaceae
4	*Avicennia officinalis*	Acanthaceae
5	*Sonneratia alba*	Lythraceae
6	*Sonneratia caseolaris*	Lythraceae
7	*Ceriops tagal*	Rhizophoraceae
8	*Bruguira gymnorhiza*	Rhizophoraceae
9	*Bruguiera cylindrica*	Rhizophoraceae
10	*Kandelia candel*	Rhizophoraceae
11	*Lumnitzera racemosa*	Combretaceae
12	*Aegiceras corniculatum*	Primulaceae
13	*Dolichandron spathecae*	Bignoniaceae
14	*Excocaria agalocha*	Euphorbiaceae
15	*Acanthus ilicifolius*	Acanthaceae
16	*Acrostichum aureum*	Pteridaceae

OUTSIDE FOREST LANDSCAPE:

Avenue trees and human settlement:

Total 25 species were recorded in the roadside and human settlement; most of these species were planted and some are naturally regenerated.

Sensitivity: Public (C4)

Table. 3.27 Checklist of species recorded from avenue forest and nearby human settlement within 10 km radius.

Sl. No	Species name	common name	Family	habit
1	*Tamarindus indica*	Tamrind/imli	Cesalpinaceae	Tree
2	*Annona reticulata*	Ramphal	Annonaceae	Tree
3	*Bambusa sp*	Bamboo	Bambocaceae	Tree
4	*Bougainvillea spectabilis*	Bouganvilla	Nyctaginaceae	Tree
5	*Cassia fistula*	Amaltas	Fabaceae	Tree
6	*Dalbergia latifolia*	Shisam/ Shisoo	Fabaceae	Tree
7	*Delonix regia*	Gulmohar	Fabaceae	Tree
8	*Phyllanthus emblica*	Awala/.Avala	Phyllanthaceae	Tree
9	*Psidium guajava*	Peru/Gauva	Myrtaceae	Tree
10	*Samanea saman*	Rain tree	Fabaceae	Tree
11	*Sapindus mukorossi*	Ritha/Reetha	Sapindaceae	Tree
12	*Swetenia mahagoni*	Mohagony	Meliaceae	Tree
13	*Syzygium cumini*	Jamun	Myrtaceae	Tree
14	*Terminalia bellerica*	Ghoting/behada	Combretaceae	Tree
15	*Acacia auriculiformis*	Babul	Mimosaceae	Tree
16	*Garcinia indica*	kokum	Clusiaceae	Tree
17	*Pongamia pinnata*	Karuaini	Fabaceae	Tree
18	*Ficus benghalensis*	Banyan tree	Moraceae	Tree
19	*Ficus religiosa*	Peepal Tree	Moraceae	Tree
20	*Vitex negundo*	Nirgundi	Lamiaceae	Shrub
21	*Mucuna pruriens*	Kavachkuiri	Fabaceae	Climber
22	*Dioscorea bulbifera*	Aerial yam	Dioscoreaceae	Climber
23	*Zornia diphylla*	Two-Leaf Zornia	Fabaceae	Herb
24	*Justicia simplex*	Simple Justicia	Acanthaceae	Herb
25	*Cynodon dactyl*	Lawn Grass	Poaceae	Grass

DOMESTICATED / CULTIVATED SPECIES

The landscape had many horticulture plants which were grown around the backyard of village houses. In addition, large scale plantations like Cashew, Coconut, Mango, and Areca nut were found in farmlands. There were seasonal paddy and vegetable cultivations within the 10 km buffer area.

Sensitivity: Public (C4)

Table. 3.28 List of species from 10 km radius which are domesticated or cultivated from the farmland

Sl. No.	Species name	common name	Family	habit
1	*Annona reticulata*	Ramphal	Annonaceae	Tree
2	*Phyllanthus emblica*	Awala/.Avala	Phyllanthaceae	Tree
3	*Psidium guajava*	Peru/Gauva	Myrtaceae	Tree
4	*Carica papaya*	Papaya	Caricaceae	Tree
5	*Musa paradisiaca*	Bannana	Musaceae	Tree
6	*Acacia auriculiformis*	Babul	Mimosaceae	Tree
7	*Anacardium occidentale*	Cashew	Anacardiaceae	Tree
8	*Areca catechu*	Areca Nut	Arecaceae	Tree
9	*Cocos nucifera*	Coconut	Arecaceae	Tree
10	*Garcinia indica*	Kokum	Clusiaceae	Tree
11	*Tamarindus indica*	Tamarind	Cesalpinaceae	Tree
12	*Mangifera indica*	Mango	Anacardiaceae	Tree
13	*Piper betle*	Betel leaves	Piperaceae	climber
14	*Oryza sativa*	Paddy	Poaceae	Herbs

The plant species recorded in the study area were grouped into three categories i.e. endemic, rare and threatened and keystone species and are given in below Table 3.26 Overall, 6 important species were recorded within the study area. Within buffer area, 5 keystone, one endemic species was recorded.

Table 3.29 Endemic, Keystone and Threatened species recorded in 10-km radius area

Sl. No.	Species	Family	Core/buffer region	Habitat	Status
1	*Artocarpus heterophyllus* Lam.	Moraceae	Buffer	Open / Reserve Forest	Endemic
2	*Ficus arnottiana* (Miq.) Miq.	Moraceae	Buffer	Open	Keystone
3	*Ficus benghalensis* L.	Moraceae	Buffer	Open	Keystone
4	*Ficus glomerata* Roxb.	Moraceae	Buffer	Open	Keystone
5	*Ficus racemosa* L.	Moraceae	Buffer	Open	Keystone
6	*Ficus religiosa* L.	Moraceae	Buffer	Open/ Rivulets	Keystone

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Overall, 239 species were recorded in the study area. These were recorded through primary observation and from secondary publications and reports. In case of fauna Mammals (10 species), frogs and toads (17 species), Birds (153), butterfly (27) and aquatic fishes and crabs (16) were reported from the region.

Sensitivity: Public (C4)

The details are listed below -

Mammals: Total 10 mammal species were reported within core and buffer areas of which one species Schedule- I, 2 species of Schedule-II, 1 of Schedule-III and 3 species Schedule - IV, and 2 from Schedule V were recorded.

Table 3.30. List of the mammal species reported from 10-km radius.

Sl. No	Local Name	Scientific name	Family	IUCN Status/ WPA Schedule
1	Common grey mongoose	*Herpestes edwardsii*	Herpestidae	Lower risk/ IV
2	Indian Hare	*Lepus nigricollis*	Leporidae	Lower risk/ IV
3	Flying fox bat	*Pteropus giganteus*	Pteropodidae	Sch-V
4	Rat	*Rattus rattus*	Muridae	Sch-V
5	Indian porcupine	*Hystrix indica*	Hystricidae	Lower risk/IV
6	Wild boar	*Sus scrofa*	Suidae	Lower risk/III
7	Striped squirrel	*Funambulus palmarum*	Sciuridae	Sch-IV
8	Common leopard	*Panthera pardus*	Felidae	Lower risk/I
9	Small Indian civet	*Viverricula indica*	Viverridae	Lower risk/II
10	Bonnet macaque	*Macaca radiate*	Cercopithecidae	Lower risk/II

Reptiles: Total 16 reptile species were recorded within core and buffer areas. Out of which, 11 species of snakes and 5 species of lizards were recorded. As per IUCN, they are of least concern. Further, as per the wildlife Protection Act, 4 snake species and 1 lizard species are of Schedule-II.

Table 3.31 List of Reptile's reported from the 10-km radius.

Sl. No.	Common name	Scientific name	Family	IUCN status / WPA schedule
1	Common Sand Boa	*Gongylophis conicus*	*Boidae*	Common
2	Montane trinket snake	*Coelognathus helena monticollaris*	*Colubridae*	Common
3	Indian rat Snake	*Ptyas muscosa*	*Colubridae*	Sch-II
4	Common Kukri Snake	*Oligodon arnensis*	*Colubridae*	Common
5	Western Kukri Snake	*Oligodon affinis*	*Colubridae*	Uncommon
6	Checkered Keelback	*Xenochrophis piscator*	*Colubridae*	Sch-II
7	Striped Keelback	*Amphiesma stolatum*	*Colubridae*	Common
8	Hill keelback	*Amphiesma monticola*	*Colubridae*	Endemic to WGs
9	Saw scaled Viper	*Echis carinathus*	*Viperidae*	Sch-IV
10	Cobra	*Naja naja*	*Elapidae*	Rare/II
11	Russell's Viper	*Daboia russelii*	*Viperidae*	Sch-II
12	Green Forest lizard	*Calotes calotes*	*Agamidae*	Common

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13	Roux's Forest lizard	*Calotes rouxii*	*Agamidae*	Common
14	Indian Garden lizard	*Calotes versicolor*	*Agamidae*	Common
15	Bark/Marbled Tree gecko	*Hemidactylus leschenaultia*	*Gekkonidae*	Common
16	Common Indian monitor lizard	*Varanus bengalensis*	*Varanidae*	Least concern/II

AMPHIBIANS

Total 17 species of frogs were recorded within the various habitat ranges from paddy field, scrub jungle, riparian forest, streams, and evergreen forest patches . The Jordon's narrow mouthed frog and Bronzed frog are near threatened and one Konkan bush frog vulnerable under IUCN was reported and the rest were under the least concern category.

As per WPA, 9 species were recorded under Schedule-IV and 8 species under common.

Table 3.32 List of toads and amphibians reported from 10-km radius.

Sl. No.	Common name	Scientific name	Family	IUCN status / WPA schedule
1	Common Indian toad	*Bufo melanostictus*	Bufonidae	LC
2	Jerdon's narrow mouthed frog	*Ramanella Montana*	Microhylidae	NT
3	Konkan bush frog	*Philautus bombayensis*	Rhacophoridae	VU
4	Marten's bush frog	*Philautus leucorhinus*	Rhacophoridae	LC
5	Bamboo tree frog	*Polypedates leucomystax*	Rhacophoridae	LC
6	Common tree frog	*Polypedates maculatus*	Rhacophoridae	LC
7	Malabar gliding frog	*Rhacophorus malabaricus*	Rhacophoridae	LC
8	Skipper frog	*Euphlyctis cyanophlyctis*	Ranidae	LC/IV
9	Jerdon's bull frog	*Hoplobatrachus crassus*	Ranidae	LC/IV
10	Indian bull frog	*Hoplobatrachus tigerinus*	Ranidae	LC/IV
11	Brown leaping frog	*Indirana semipalmata*	Ranidae	LC/IV
12	Paddyfield frog	*Limnonectes limnocharis*	Ranidae	LC/IV
13	Hill cricket frog	*Limnonectes syhadrensis*	Ranidae	LC/IV
14	Fungoid frog	*Rana malabaricus*	Ranidae	LC/IV
15	Bronzed frog	*Rana temporalis*	Ranidae	NT/IV
16	Indian burrowing frog	*Tomopterna breviceps*	Ranidae	LC/IV
17	Dobson's burrowing frog	*Tomopterna dobsoni*	Dicroglossidae	LC

Note: *LC - Least concern, NT - near threaten, VU – Vulnerable, Wildlife Protection Act -Schedule IV*

Sensitivity: Public (C4)

BIRDS

Total 153 species of birds were recorded within the habitat ranges from paddy field to evergreen forest . As per the Wildlife Protection Act 1972, 2- species were of Schedule I and 151 species were of Schedule IV and one threatened species was recorded. Out of that 126 species were resident locally, 2 were endemic belonging to the Western Ghats. 28 specie of migratory birds were recorded, in which 11 species were local migratory birds and two were vulnerable species.

Table 3.33 List of birds reported from 10-km radius.

Sl. No.	Common name	Scientific name	Family	IUCN status/ WPA schedule
1	Little Grebe	*Tachybaptus ruficollis*	Podicipedidae	R/IV
2	Little Cormorant	*Phalacrocorax niger*	Phalacrocoracidae	R/IV
3	Indian Shag	*Phalacrocorax fuscicollis*	Phalacrocoracidae	R/IV
4	Great Cormorant	*Phalacrocorax carbo*	Phalacrocoracidae	M/IV
5	Darter	*Anhinga melanogaster*	Phalacrocoracidae	RV/IV
6	Little Egret	*Egretta garzetta*	Ardeidae	R/IV
7	Western Reef Egret	*Egretta gularis*	Ardeidae	RM/IV
8	Grey Heron	*Ardea cinerea*	Ardeidae	RM/IV
9	Purple Heron	*Ardea purpurea*	Ardeidae	R/IV
10	Large Egret	*Casmerodius albus*	Ardeidae	R/IV
11	Median Egret	*Mesophoyx intermedia*	Ardeidae	M/IV
12	Cattle Egret	*Bubulcus ibis*	Ardeidae	R/IV
13	Indian Pond-Heron	*Ardeola grayii*	Ardeidae	R/IV
14	Little Green Heron	*Butorides striatus*	Ardeidae	R/IV
15	Black-crowned Night Heron	*Nycticorax nycticorax*	Ardeidae	RM/IV
16	Malayan Night Heron	*Gorsachius melanocephalus*	Ardeidae	M/IV
17	Chestnut Bittern	*Ixobrychus cinnamomeus*	Ardeidae	M/IV
18	Black Bittern	*Dupetor flavicollis*	Ardeidae	M/IV
19	Painted Stork	*Mycteria leucocephala*	Cioniidae	M/IV
20	Lesser Whistling-Duck	*Dendrocygna javanica*	Anatidae	MR/IV
21	Cotton Teal	*Nettapus coromandelianus*	Anatidae	MR/IV
22	Spot-billed Duck	*Anas poecilorhyncha*	Anatidae	M/IV
23	Oriental Honey-buzzard	*Pernis ptilorhyncus*	Accipitridae	T/IV
24	Black Kite	*Milvus migrans*	Accipitridae	R/IV
25	Brahminy Kite	*Haliastur indus*	Accipitridae	R/IV
26	White-bellied Sea-Eagle	*Haliaeetus leucogaster*	Accipitridae	R/I
27	Long-billed Vulture	*Gyps indicus*	Accipitridae	CE/IV
28	Crested Serpent Eagle	*Spilornis cheela*	Accipitridae	R/IV
29	Eurasian Marsh Harrier	*Circus aeruginosus*	Accipitridae	R/IV

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30	Crested Goshawk	*Accipiter trivirgatus*	Accipitridae	MR/IV
31	Shikra	*Accipiter badius*	Accipitridae	R/IV
32	Besra Sparrowhawk	*Accipiter virgatus*	Accipitridae	R/IV
33	Black Eagle	*Ictinaetus malayensis*	Accipitridae	R/IV
34	Jungle Bush Quail	*Perdicula asiatica*	Phasianidae	R/IV
35	Red Spurfowl	*Galloperdix spadicea*	Phasianidae	R/IV
36	Grey Junglefowl	*Gallus sonneratii*	Phasianidae	R/IV
37	Indian Peafowl	*Pavo cristatus*	Phasianidae	R/I
38	Common Buttonquail	*Turnix suscitator*	Turnicidae	R/IV
39	Blue-breasted Rail	*Gallirallus striatus*	Rallidae	R/IV
40	White-breasted Waterhen	*Amaurornis phoenicurus*	Rallidae	R/IV
41	Purple Moorhen	*Porphyrio porphyrio*	Rallidae	RM/IV
42	Pheasant-tailed	*Hydrophasianus chirurgus*	Jacanidae	R/IV
43	Bronze-winged Jacana	*Metopidius indicus*	Jacanidae	R/IV
44	Common Ringed Plover	*Charadrius hiaticula*	Charadriidae	M/IV
45	Little Ringed Plover	*Charadrius dubius*	Charadriidae	M/IV
46	Kentish Plover	*Charadrius alexandrines*	Charadriidae	M/IV
47	Yellow-wattled Lapwing	*Vanellus malarbaricus*	Charadriidae	M/IV
48	Red-wattled Lapwing	*Vanellus indicus*	Charadriidae	R/IV
49	Eurasian Woodcock	*Scolopax rusticola*	Scolopacidae	R/IV
50	Nilgiri Wood Pigeon	*Columba elphinstonii*	Columbidae	RV/ IV
51	Spotted Dove	*Streptopelia chinensis*	Columbidae	R/IV
52	Emerald Dove	*Chalcophaps indica*	Columbidae	R/IV
53	Green Imperial Pigeon	*Ducula aenea*	Columbidae	R/IV
54	Mountain Imperial-Pigeon	*Ducula badia*	Columbidae	R/IV
55	Indian Hanging-Parrot	*Parrot Loriculus vernalis*	Psittacidae	R/IV
56	Rose-ringed Parakeet	*Psittacula krameri*	Psittacidae	R/IV
57	Plum-headed Parakeet	*Psittacula cyanocephala*	Psittacidae	R/IV
58	Blue-winged Parakeet	*Psittacula columboides*	Psittacidae	RE/IV
59	Brain fever Bird	*Hierococcyx varius*	Cuculidae	R/IV
60	Indian Cuckoo	*Cuculus micropterus*	Cuculidae	U/IV
61	Common Cuckoo	*Cuculus micropterus*	Cuculidae	M/IV
62	Banded Bay Cuckoo	*Cacomantis sonneratii*	Cuculidae	RM/IV
63	Indian Plaintve Cuckoo	*Cacomantis passerinus*	Cuculidae	R/IV
64	Drongo Cuckoo	*Surniculus lugubris*	Cuculidae	R/IV
65	Asian Koel	*Eudynamys scolopacea*	Cuculidae	R/IV
66	Small Green-billed Malkoha	*Phaenicophaeus viridirostris*	Cuculidae	R/IV
67	Greater Coucal	*Centropus sinensis*	Cuculidae	R/IV
68	Lesser Coucal	*Centropus bengalensis*	Cuculidae	U/IV
69	Oriental Scops-Owl	*Otus sunia*	Strigidae	R/IV
70	Forest Eagle-Owl	*Bubo nipalensis*	Strigidae	U/IV

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71	Ketupa zeylonensis	*Brown Fish-Owl*	Strigidae	R/IV
72	Brown Wood Owl	*Strix leptogrammica*	Strigidae	R/IV
73	Glaucidium radiatum	*Jungle Owlet*	Strigidae	R/IV
74	Spotted Owlet	*Athene brama*	Strigidae	R/IV
75	Indian Jungle Nightjar	*Caprimulgus indicus*	Caprimulgidae	RM/IV
76	Indian Edible-nest Swiftlet	*Collocalia unicolor*	Apodidae	RM/IV
77	White-rumped Needletail-Swift	*Zoonavena sylvatica*	Apodidae	M/IV
78	Brown-backed Needletail-Swift	*Hirundapus giganteus*	Apodidae	M/IV
79	Asian Palm Swift	*Cypsiurus balasiensis*	Apodidae	R/IV
80	Alpine Swift	*Tachymarptis melba*	Apodidae	U/IV
81	Pacific Swift	*Apus pacificus*	Apodidae	U/IV
82	House Swift	*Apus affinis*	Apodidae	R/IV
83	Crested Tree-swift	*Hemiprocne coronata*	Hemiprocnidae	R/IV
84	Malabar Trogon	*Harpactes fasciatus*	Trogonidae	R/IV
85	Small Blue Kingfisher	*Alcedo atthis*	Alcedinidae	R/IV
86	Oriental Dwarf Kingfisher	*Ceyx erithacus*	Alcedinidae	R/IV
87	Stork-billed Kingfisher	*Halcyon capensis*	Alcedinidae	R/IV
88	White-breasted Kingfisher	*Halcyon smyrnensis*	Alcedinidae	R/IV
89	Black-capped Kingfisher	*Halcyon pileata*	Alcedinidae	R/IV
90	Collared Kingfisher	*Todiramphus chloris*	Alcedinidae	R/IV
91	Blue-eared Kingfisher	*Alcedo meningting*	Alcedinidae	R/IV
92	Ceryle rudis	*Lesser Pied Kingfisher*	Alcedinidae	R/IV
93	Blue-bearded Bee-eater	*Nyctyornis athertoni*	Meropidae	R/IV
94	Small Bee-eater	*Merops orientalis*	Meropidae	R/IV
95	Blue-tailed Bee-eater	*Merops philippinus*	Meropidae	M/IV
96	Chestnut-headed Bee-eater	*Merops leschenaulti*	Meropidae	R/IV
97	Brown-headed Barbet	*Megalaima zeylanica*	Capitonidae	R/IV
98	Crimson-throated Barbet	*Megalaima rubricapilla*	Capitonidae	R/IV
99	Coppersmith Barbet	*Megalaima haemacephala*	Capitonidae	R/IV
100	Brown-capped Pygmy woodpecker	*Dendrocopos nanus*	Picidae	R/IV
101	Yellow-fronted Pied woodpecker	*Dendrocopos mahrattensis*	Picidae	R/IV
102	Wire-tailed Swallow	*Hirundo smithii*	Hirudinidae	R/IV
103	Red-rumped Swallow	*Hirundo daurica*	Hirudinidae	R/IV
104	Large Pied Wagtail	*Motacilla maderaspatensis*	Motacillidae	R/IV
105	Yellow Wagtail	*Motacilla flava*	Motacillidae	M/IV

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106	Paddyfield Pipit	*Anthus rufulus*	Motacillidae	R/IV
107	Large Cuckoo-shrike	*Coracina macei*	Campephagidae	R/IV
108	Small Minivet	*Pericrocotus cinnamomeus*	Campephagidae	R/IV
109	Scarlet Minivet	*Pericrocotus flammeus*	Campephagidae	R/IV
110	Red-whiskered Bulbul	*Pycnonotus jocosus*	Pycnonotidae	R/IV
111	Red-vented Bulbul	*Pycnonotus cafer*	Pycnonotidae	R/IV
112	White-browed Bulbul	*Pycnonotus luteolus*	Pycnonotidae	R/IV
113	Yellow-browed Bulbul	*Iole indica*	Pycnonotidae	R/IV
114	Common Iora	*Aegithina tiphia*	Irenidae	R/IV
115	Asian Fairy-Bluebird	*Irena puella*	Irenidae	R/IV
116	Jerdon's Chloropsis	*Chloropsis cochinchinensis*	Irenidae	R/IV
117	Malabar Whistling Thrush	*Myophonus horsfieldii*	Turdinae	R/IV
118	Orange-headed Thrush	*Zoothera citrinacyanotus*	Turdinae	R/IV
119	Oriental Magpie-Robin	*Copsychus saularis*	Turdinae	R/IV
120	White-rumped Shama	*Copsychus malabaricus*	Turdinae	R/IV
121	Indian Robin	*Saxicoloides fulicata*	Turdinae	R/IV
122	Pied Bushchat	*Saxicola caprata*	Turdinae	R/IV
123	Spotted Babbler	*Pellorneum ruficeps*	Timaliinae	R/IV
124	Indian Scimitar Babbler	*Pomatorhinus horsfieldii*	Timaliinae	R/IV
125	Rufous-bellied Babbler	*Dumetia hyperythra*	Timaliinae	R/IV
126	Black-headed Babbler	*Rhopocichla atriceps*	Timaliinae	R/IV
127	Yellow-eyed Babbler	*Chrysomma sinense*	Timaliinae	R/IV
128	Rufous Babbler	*Turdoides subrufus*	Timaliinae	RE/IV
129	Jungle Babbler	*Turdoides striatus*	Timaliinae	R/IV
130	Quaker Tit-Babbler	*Alcippe poioicephalA*	Timaliinae	R/IV
131	Streaked Fantail-Warbler	*Cisticola juncidis*	Sylviinae	R/IV
132	Franklin's Prinia	*Prinia hodgsonii*	Sylviinae	R/IV
133	Ashy Prinia	*Prinia socialis*	Sylviinae	R/IV
134	Plain Prinia	*Prinia inornata*	Sylviinae	R/IV
135	Common Tailorbird	*Orthotomus sutorius*	Sylviinae	R/IV
136	Tickell's Blue-Flycatcher	*Cyornis tickelliae*	Muscicapinae	R/IV
137	Tickell's Flowerpecker	*Dicaeum erythrorynchos*	Dicaeidae	R/IV
138	Plain Flowerpecker	*Dicaeum concolor*	Dicaeidae	R/IV
139	Purple-rumped Sunbird	*Nectarinia zeylonica*	Nectariniidae	R/IV
140	Black-headed Munia	*Lonchura malacca*	Estrildidae	MR/IV
141	House Sparrow	*Passer domesticus*	Passeridae	R/IV
142	Yellow-thraoted Sparrow	*Petronia xanthocollis*	Passeridae	R/IV
143	Common Myna	*Acridotheres tristis*	Sturnidae	R/IV
144	Jungle Myna	*Acridotheres fuscus*	Sturnidae	R/IV
145	Common Hill-Myna	*Gracula religiosa*	Sturnidae	R/IV
146	Black Drongo	*Dicrurus macrocercus*	Dicruridae	R/IV
147	Ashy Drongo	*Dicrurus leucophaeus*	Dicruridae	M/IV

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148	Bronzed Drongo	*Dicrurus aeneus*	Dicruridae	R/IV
149	Greater Racket-tailed Drongo	*Dicrurus paradiseus*	Dicruridae	R/IV
150	Indian Treepie	*Dendrocitta vagabunda*	Corvidae	R/IV
151	White-bellied Tree Pie	*Dendrocitta leucogaster*	Corvidae	U/IV
152	House Crow	*Corvus splendens*	Corvidae	R/IV
153	Jungle Crow	*Corvus macrorhynchos*	Corvidae	R/IV

Note: *M - Migratory, R - Resident, U - unclear, E - Endemic, CE - Critically endangered, NT - Near threatened, V – Vulnerable, I – IV – Schedule species as per WPA*

BUTTERFLY: Total 27 species of butterfly were recorded within various habitats such as paddy fields, degraded habitat, scrub forest, open grassland, evergreen forest, and near settlements. Out of these 1 species was under schedule-I, 4 were under Schedule-II and one in Schedule-IV, and 21 were common in these habitats.

Table 3.34 List of butterfly species recorded within 10-km radius around Bicholim Iron ore mine, Goa.

Sl. No.	Common name	Scientific name	Family	IUCN status/ WPA schedule
1	Spot swordtail	*Graphium nomius* Esper	Papilionidae	Common
2	Crimson rose	*Pachiopta hector* Linnaeus	Papilionidae	Schedule I
3	Common rose	*Pachliopta aristolachiae* Fabricius	Papilionidae	Common
4	Red helan	*Princepes helenus helenus* Hampson	Papilionidae	Common
5	Malabar banded peacock	*Papilio buddh* Westwood	Papilionidae	Schedule II
6	Lime butterfly	*Papilio demoleus* Linnaeus	Papilionidae	Common
7	Chocolate albatross	*Appias lyncida* Cramer	Pierinae	Schedule II
8	Common Jezebel	*Delias eucharis* Drury	Pierinae	Common
9	Common emigrant	*Catopsilla pomona* Fabricius	Coliadinae	Common
10	Common grass Yellow	*Eurema hecabe contubernalis* Moore	Coliadinae	Common
11	Angled Sunbeam	*Curetis dentata* Moore	Curetinae	Common
12	Common Silverline	*Spindasis vulcans fusca* Moore	Theclinae	Common
13	Angled pierrot	*Caleta caleta decidia* Cromer	Polypmmatinae	Common
14	Pea Blue	*Lamipes boeticus* Linneaus	Polypmmatinae	Schedule II
15	Common pierrot	*Castalius rosimon rosimon*	Polypmmatinae	Schedule II
16	Dark pierrot	*Tarueus ananda*	Polypmmatinae	Schedule IV
17	Common four ring	*Ypthima hubenri hubenri* Fabricius	Polypmmatinae	Common

Sensitivity: Public (C4)

18	Common nawab	*Polyura athamas athamas* Drury	Charaxinae	Common
19	Angled Castor	*Ariadne ariadne pallidior* Frusthorfer	Nymphalinae	Common
20	Common castor	*Ariadne merione assama* Evans	Nymphalinae	Common
21	Lemon pansy	*Precis lemonias lemonias* L	Nymphalinae	Common
22	Commander	*Moduza procis procis* Cramer	Nymphalinae	Common
23	Tree Nymph	*Idea malabarica* Moore	Danainae	Common
24	Common Indian Crow	*Euploea core* Cramer	Danainae	Common
25	Plain Tiger	*Danaus (Anosia) chrysippus* L	Danainae	Common
26	Grass demon	*Edaspes folcus* Cramer	Hesperiidae	Common
27	Common dart	*Potanthus spp* Fabricius	Hesperiidae	Common

AQUATIC SPECIES: FISHES & CRABS

Total 16 species of fishes were recorded in the study area and two species of crabs in the streams, rivers, and estuaries. The species *Thunnus albacares was* under near threatened and *Thunnus obesus* are Vulnerable category. Most of them were not evaluated under IUCN status and no schedule species were recorded.

Table 3.35 List of Aquatic species reported from 10-km radius.

Sl.No.	Common name	Scientific name	Family	IUCN status/ WPA Schedule
Fishes				
1	Spangled emperor	*Lethrinus nebulosus*	Lethrinidae	Not evaluated
2	Mangrove red snapper	*Lutjanus argentimaculatus*	Lutjanidae	Not evaluated
3	Malabar blood snapper	*Lutjanus malabaricus*	Lutjanidae	Not evaluated
4	John's snapper	*Lutjanus johni*	Lutjanidae	Not evaluated
5	Yellowfin tuna	*Thunnus albacares*	Lutjanidae	Near Threatened
6	Bigeye tuna	*Thunnus obesus*	Lutjanidae	Vulnerable
7	Indian mackerel	*Rastrelliger kanagurta*	Lutjanidae	Data Deficient
8	Black marlin	*Makaira indica*	Lutjanidae	Data Deficient
9	Goatee croaker	*Dendrophysa russelli*	Sciaendae	Not evaluated
10	Blotched croaker	*Nibea maculate*	Sciaendae	Not evaluated
11	Indian oil-Sardinella	*Sardinella longiceps*	Sciaendae	Least Concern
12	Indian spiny turbot	*Psettodes erumei*	Psettodidae	Not evaluated
13	Malabar tonguesole	*Cynoglossus macrostomus*	Cynoglossidea	Not evaluated
14	Dorab wolf-herrings	*Chirocentrus dorab*	Chirocentridae	Not evaluated
15	Chacunda gizzard-shad	*Anodontostoma Chacunda*	Clupeidae	Not evaluated
16	Engraved catfish	*Arius caelatus*	Ariidae	Not evaluated
Crabs				
17	Christian crabs	*Charybdis cruciate*	Portunidae	Not evaluated
18	Blue swimming crab	*Portunus Pelagicus*	Portunidae	Not evaluated

Sensitivity: Public (C4)

3.9 SOCIAL ENVIRONMENT

3.9.1 BRIEF METHODOLOGY OF DATA COLLECTION

DESCRIPTION OF ENVIRONMENT

Generally, population and environment are dependent upon each other in echo balance. People's livelihood and their lifestyles are to a large extent depend upon the environment. However, the fragile balance between population and environment may be disturbed when people over exploit the natural resources more than required.

An attempt was made to understand the current socio-economic status of the study area and to predict the impact of the mining project on their lives and surroundings. The data would also help in designing suitable CSR (Corporate Social Responsibility) activities in the mining buffer zone to bring positive changes on the livelihood of the population in the area.

The data for the study was collected in April 2023 using methods like random sample survey of households, in-depth interviews and Focus Group Discussions (FGDs). Data on socioeconomic status of population was collected using random sample survey of households. Data on the infrastructure facilities was collected from the village elders, local officials and secondary sources. Assessment of minimum needs of the community was collected using FGDs and in-depth interviews. Data on morbidity pattern was collected from any one or more heath institutions (PHC or CHC or Clinic or Dispensary) either in buffer zone or nearby buffer zone. Data on village population, caste composition, literacy status, labor force participation, and occupational and industrial classification of workers have been collected from Census 2011 and through a sample survey.

There are 68 villages/towns - 56 villages and 12 census towns (CT), in the buffer zone. Of these, 68 villages/towns, 48 villages and 12 towns are located in 6 talukas of North Goa and 8 villages in one taluka in Maharashtra. As the data pertains to large number of villages and towns are in North Goa, the buffer zone is compared to North Goa District.

Five Villages/towns, namely Mayem, Bicholim, Sirigao, Lamgao and Pilgao, were selected randomly probability proportional to population size. All households were listed in selected villages and town for the selection of households. Twenty households were selected randomly with equal probability from each village/town. In all, data

Sensitivity: Public (C4)

were collected from 100 households for the study.

The Census 2011 data was tabulated and was projected by using statistical tools to arrive at probable data for 2021. The Census 2011 and projections for 2021 were compared to see the trend and were then compared with the survey 2023 data to make meaningful conclusion.Detailed methodology, sampling, aims and objectives, data collection methods, schedules, tabulation plan, quality checks, report layout and other techniques are presented in SoP. The Socio-Economic survey was conducted on 12th to 16th of April 2023.

The list of villages in which the survey was conducted are give below table No.3.36

Table No : 3.36

Villages Names	Nos of Households
Mayem	25
Bicholim	15
Sirigao	30
Lamgao	10
Pilgao	20

A special emphasis was given on the educational institutions present near to the proposed mining area. The educational institutes present are tabulated below:

Table No 3.37

Sl. No.	Name of the School	Strength of the School	School time	Distance from mine (Km)	Direction
1.	Bicholim - ITI	450	8.30 am to 5.30 pm	0.17	NE
2.	Goa Polytechnic School	400	9.00 am to 5.30 pm	0.02	SW
3.	Mulgao School	Currently not in operation/Closed	NA	Within mining lease	N
4.	Lamgao School	09	7.45 am to 1.30 pm	0.015	NE
5	Ideal High school, Pilgao	292	9.00 am to 5.30 pm	1.525	S
6	Govt. high school Sirigao	56	9.00 am to 5.30 pm	0.874	W
7	Govt. high school, Mulgao	117	9.00 am to 5.30 pm	0.608	N
8	Govt. high school, Shriodwadi, Mulgao	50	9.00 am to 5.30 pm	0.702	N
9	Vijyanand high school, Mayem	94	9.00 am to 5.30 pm	3.958	S
10	Shree Mahamaya High school,	170	9.00 am to	1.245	SW

Sensitivity: Public (C4)

	Mayem		5.30 pm		
11	Our lady of grace high school, Bicholim	1106	9.00 am to 5.30 pm	0.505	NE
12	Shree Shantadurga high school, Bicholim	1286	9.00 am to 5.30 pm	0.616	NE

Out of these Mulgao school is not operational and is closed.

3.9.1.1 Demographic Status:

Population size and sex composition are presented in Tables 3.38 and 3.39 from census and survey. Generally, population size is expected to grow steadily over time, but small habitats like villages and small towns may sometimes experience negative growth because of migration and other rare causes like endemic diseases.

***3.9.1.1a* Population in the Buffer Zone- Broad Findings:**

The total population of buffer zone was 253,834 according to census 2011 and marginally grew to 272,287 according to projections 2021.

The village population size varied widely from a minimum of 93 persons in Ambarim to a maximum of 7544 in Mayem.

Ten villages had population less than 1000, followed by 22 villages between 1000 and 1999, 13 villages between 2000 and 2999, nine villages between 3000 and 3999, and two villages and 12 towns more than 4000.

All towns were having more than 4000 population.

The sex ratio in buffer zone was found to be balanced as it is closed to 1000 - 978 females per 1000 males according to 2011 census and 955 according to Survey 2023.

There were 22 villages/towns having less than 950 females per 1000 males, followed by 19 villages/towns between 950 and 999 females per 1000 males, 27 villages/towns more than 1000 females per 1000 males.

The average number of persons per household was similar according to census 2011 (4.2) than in survey 2023 (4.0) buffer zone.

Table 3.38: Population in buffer zone villages, 2011 Census.

Village	Number of households	Male	Female	Total	Sex ration/(F/M per 1000)
Alorna	600	1351	1300	2651	962
Ibrampur	555	1262	1167	2429	925
Cansarvornem	310	752	630	1382	838
Dargalim	1331	2872	2824	5696	983
Tuem	652	1422	1329	2751	935
Oxel	633	1329	1465	2794	1102

Sensitivity: Public (C4)

Revora	631	1308	1322	2630	1011
Nadora	295	648	609	1257	940
Pirna	632	1267	1301	2568	1027
Assonora	944	1898	1972	3870	1039
Sircaim	713	1442	1408	2850	976
Paliem	314	778	599	1377	770
Ucassaim	278	509	568	1077	1116
Nachinola	645	1360	1365	2725	1004
Corjuem	640	1303	1422	2725	1091
Calvim	113	180	223	403	1239
Olaulim	172	308	351	659	1140
Pomburpa	757	1554	1541	3095	992
Mapusa (M Cl)	9466	20322	19667	39989	968
Salvador do Mundo (CT)	1516	3228	3145	6373	974
Aldona (CT)	1624	2925	3345	6270	1144
Ambarim	27	44	49	93	1114
Navelim	280	522	611	1133	1170
Goltim	423	755	879	1634	1164
Malar	382	813	817	1630	1005
Bainguinim	388	754	747	1501	991
Jua (CT)	1057	1971	2163	4134	1097
Corlim (CT)	1583	3386	3182	6568	940
Goa Velha (CT)	1055	2129	2193	4322	1030
Mercurim (CT)	1233	2329	2641	4970	1134
Dumacem	59	147	149	296	1014
Salem	761	1724	1703	3427	988
Adwalpale	326	686	726	1412	1058
Sirigao	361	820	797	1617	972
Mulgao	926	1998	1894	3892	948
Ona	167	336	349	685	1039
Maulinguem North	323	739	718	1457	972
Curchirem	435	1033	1010	2043	978
Sarvona	787	1865	1721	3586	923
Maem	1728	3763	3781	7544	1005
Vainguinim	156	347	359	706	1035
Aturli	112	234	233	467	996
Naroa	419	952	945	1897	993
Piligao	600	1295	1348	2643	1041
Cudnem	763	1714	1594	3308	930
Amone	694	1482	1481	2963	999
Navelim	611	1387	1316	2703	949
Bicholim (M Cl)	3978	8771	8215	16986	937
Sanquelim (M Cl)	3239	7071	6580	13651	931
Podocem	241	479	487	966	1017
Ravona	256	606	559	1165	922
Morlem	762	1674	1616	3290	965
Maloli	90	218	198	416	908
Tivrem	454	960	918	1878	956
Betqui	382	871	836	1707	960
Adcolna	385	883	805	1688	912
Cundaim	913	1988	1871	3859	941
Ponda (M Cl)	5818	11729	10935	22664	932
Candola (CT)	1280	2742	2612	5354	953

Sensitivity: Public (C4)

Orgao (CT)	1156	2264	2338	4602	1033
Maneri	472	945	1026	1971	1086
Kasai	931	1964	1847	3811	940
Girode	64	145	121	266	834
Vazare	342	698	695	1393	996
Ambadgaon	283	552	565	1117	1024
Matane	467	1073	921	1994	858
Ayee	386	850	803	1653	945
Talekhol	278	630	571	1201	906
Buffer Zone	60654	128356	125478	253834	978
North Goa	191766	416677	401331	818008	963

Table 3.39: Survey population in buffer zone villages, Survey 2023.

Village	Number of households	Male	Female	Total	Sex ration (F/M per 1000)
Buffer Zone	100	221	211	432	955

The age structure of the population is presented in **Table 3.40** from survey 2023. Age structure by sex is very important parameter because it influences many socioeconomic and medical needs of population.

3.9.1.1b Percentage distribution of population by age and sex in buffer zone- Broad Findings:

Fertility seems to be low in buffer zone, as the percentage of population less than 14 years is around 22 according to the survey (proportion of population age less than 15 is a rough indicator of level of birth rate for 15-year period).

The buffer zone is going through the second state of demographic transition.

About 14 per cent of the population is in school going age (5-14) needing support in the form of scholarships to needy students, transport facility etc.

About 63 per cent of the population is in the working age group (15-59).

Many of them are in need of employment, especially females. Therefore, Supporting self help groups for establishment of microenterprises, vocational training for youth, Agriculture & dairy development programs will help .About 8 per cent of the population aged 15-19 is potential entrants into labor force.

Skill development/ Vocational programs can be designed and implemented to make a job ready talent pool in the area. They can be trained in vocational centers taking local needs of the industry into consideration.

About 50 per cent of females are in adult reproductive ages, Specialized health camps, awareness programme on health hygiene will help them.. About 14 percent of children are in less than 9 years of age are in need of support in education and recreation. About

Sensitivity: Public (C4)

7% of females are in adolescent age of 10-14 years and need awareness on personal hygiene and support in sanitation hygiene.

Table 3.40 : Percentage distribution of population by age and sex in buffer zone, Survey 2023.

Age	Male	Female	Total
0- 4	7.0	6.8	6.9
5- 9	7.4	7.1	7.3
10-14	7.8	7.5	7.6
15-19	8.1	7.5	7.8
20-24	9.6	8.4	9.0
25-29	9.2	9.0	9.1
30-34	8.6	8.7	8.6
35-39	8.6	8.7	8.7
40-44	7.5	7.4	7.5
45-49	6.5	6.5	6.5
50-54	5.3	5.3	5.3
55-59	4.3	4.7	4.5
60-64	3.9	4.5	4.2
65-69	2.6	3.1	2.8
70-74	1.7	2.3	2.0
75-79	1.0	1.3	1.1
80+	0.8	1.3	1.1
Total	100.0	100.0	100.0

3.9.1.2 Social Status

The percentage distribution of population by caste from census 2011 and survey 2023 has been presented in **Tables 3.41A** and **3.41B**. The SCs and STs are socially disadvantage groups needing special attention to integrate them into the main stream of socioeconomic development. So, SC and ST groups needs to be given special focus. It is, generally, not desirable to describe SC and ST population growth trends because caste composition keep changing by addition of new castes in each census and due to conversions into other denomination.

Broad Findings:

The percentage of SC population in the buffer zone is 2.5 per cent according to census 2011 and 3.0 according to the survey 2023.

The percentage of SC population varies widely from 0.1 per cent in Bainguinim and 12.9 per cent in Maulinguem North.

Sensitivity: Public (C4)

The SC population is not listed in 13 villages/towns, followed by less than one per cent in 17 villages/towns; between one and less than 5 per cent per cent in 28 villages/towns, and more than 5 per cent in 10 villages/towns.

The percentage of ST population in buffer zone is 3.5 per cent according to census 2011 and 4.0 per cent in survey 2023.

The percentage of ST population varies widely from 0.1 per cent in Vainguinim to 40.9 per cent in Betqui.

The percentage of ST population is not listed in 24 villages/towns, followed by less than one per cent in 21 villages/towns, between one and less than 5 per cent in 9 villages/towns and more than 5 per cent in 14 villages/towns.

Table 3.41A: Percentage Distribution of Population by Broad Caste Groups in Buffer Zone, 2011 Census.

Village	% SC	% ST	% Others	Total
Alorna	5.9	0.2	94.0	100.0
Ibrampur	6.8	0.4	92.8	100.0
Cansarvornem	2.4	0.0	97.6	100.0
Dargalim	5.0	0.0	95.0	100.0
Tuem	4.9	0.1	95.0	100.0
Oxel	0.3	0.0	99.7	100.0
Revora	4.3	0.3	95.4	100.0
Nadora	0.0	0.0	100.0	100.0
Pirna	1.8	0.0	98.2	100.0
Assonora	1.8	0.2	98.0	100.0
Sircaim	2.2	0.1	97.7	100.0
Paliem	0.9	0.0	99.1	100.0
Ucassaim	0.0	0.7	99.3	100.0
Nachinola	3.8	1.7	94.6	100.0
Corjuem	9.2	2.0	88.8	100.0
Calvim	0.0	5.0	95.0	100.0
Olaulim	4.4	0.6	95.0	100.0
Pomburpa	0.5	0.3	99.2	100.0
Mapusa (M Cl)	4.1	0.4	95.5	100.0
Salvador do Mundo (CT)	3.2	2.4	94.5	100.0
Aldona (CT)	3.3	3.2	93.5	100.0
Ambarim	0.0	0.0	100.0	100.0
Navelim	1.6	26.0	72.4	100.0
Goltim	0.5	16.0	83.5	100.0
Malar	0.3	4.7	95.0	100.0
Bainguinim	0.1	0.7	99.3	100.0
Jua (CT)	0.9	2.0	97.0	100.0
Corlim (CT)	0.5	18.4	81.1	100.0
Goa Velha (CT)	0.5	2.7	96.9	100.0
Mercurim (CT)	0.3	12.1	87.6	100.0
Dumacem	0.0	0.0	100.0	100.0
Salem	3.1	0.0	96.9	100.0

Sensitivity: Public (C4)

Adwalpale	8.1	0.0	91.9	100.0
Sirigao	0.0	0.0	100.0	100.0
Mulgao	4.3	0.0	95.7	100.0
Ona	5.5	0.0	94.5	100.0
Maulinguem North	12.9	0.1	87.0	100.0
Curchirem	0.0	0.0	100.0	100.0
Sarvona	1.6	1.0	97.4	100.0
Maem	1.0	0.0	99.0	100.0
Vainguinim	0.0	0.1	99.9	100.0
Aturli	0.0	0.0	100.0	100.0
Naroa	4.4	9.2	86.4	100.0
Piligao	1.7	38.2	60.2	100.0
Cudnem	1.9	0.9	97.2	100.0
Amone	0.5	0.0	99.5	100.0
Navelim	0.2	14.7	85.1	100.0
Bicholim (M Cl)	2.2	0.5	97.3	100.0
Sanquelim (M Cl)	1.2	0.7	98.2	100.0
Podocem	0.6	0.0	99.4	100.0
Ravona	0.9	0.0	99.1	100.0
Morlem	3.6	0.0	96.4	100.0
Maloli	0.0	0.0	100.0	100.0
Tivrem	1.0	6.5	92.5	100.0
Betqui	4.7	40.9	54.4	100.0
Adcolna	0.6	27.1	72.3	100.0
Cundaim	2.0	23.4	74.5	100.0
Ponda (M Cl)	1.2	0.5	98.3	100.0
Candola (CT)	0.5	15.1	84.5	100.0
Orgao (CT)	0.0	12.6	87.4	100.0
Maneri	9.0	0.0	91.0	100.0
Kasai	3.8	0.8	95.3	100.0
Girode	0.0	0.0	100.0	100.0
Vazare	5.0	0.0	95.0	100.0
Ambadgaon	0.7	0.1	99.2	100.0
Matane	1.6	0.1	98.4	100.0
Ayee	8.5	1.3	90.2	100.0
Talekhol	0.0	0.3	99.7	100.0
Buffer Zone	2.5	3.5	94.0	100.0
North Goa	2.2	6.9	90.9	100.0

Table 3.41B: Percentage Distribution of Survey Population by Broad Caste Groups in Buffer Zone, Survey 2023.

Village	% SC	% ST	% Others	Total
Buffer Zone	3.0	4.0	93.0	100.0

3.9.1.3 Educational Status

Literacy status: The literacy rates from the census 2011 and survey 2023 have been presented in Tables 3.41C and 3.41D. The literacy rates are defined as percentage of literates to the population aged 6+. This is according to the definition of census and

Sensitivity: Public (C4)

the same is being followed across India. Literacy is a social as well as economic measure. It is said that literacy helps society to integrate with the ongoing developmental process.

Percentage of literacy among males and females is steadily growing over many years, but the percentage of male literacy is always higher than females with a wide margin. However, the difference between male and female literacy rates are narrowing in the recent years.

Broad Findings:

The literacy rates are higher in projections 2021 than in 2011 in buffer zone and the census. The literacy rates in the buffer zone are the same according to survey 2023 (90.7 per cent).

The literacy rates moderately vary from 70.6 per cent in Matane to 94.6 per cent in Vainguinim.

The literacy rates are less than 80 per cent in 6 villages/towns, followed by between 80 and less than 90 per cent in 33 villages/towns and more than 90 per cent in 28 villages/towns.

The literacy rates are higher among males than females and the different varies widely from less than 5 percentage points in 9 villages, followed by between 5 and less than 10 percentage points in 28 villages, between 10 and less than 15 percentage points 22 villages and more than 15 percentage points in 9 villages.

Table 3.41C: Literacy Rates in Buffer Zone, 2011 Census.

Village	Male	Female	Total
Alorna	92.7	81.2	87.0
Ibrampur	88.8	76.3	82.8
Cansarvornem	87.9	74.6	81.9
Dargalim	95.6	85.1	90.4
Tuem	92.8	83.1	88.1
Oxel	95.8	87.7	91.6
Revora	96.2	88.8	92.5
Nadora	96.4	87.2	92.0
Pirna	92.7	83.8	88.2
Assonora	95.7	91.0	93.3
Sircaim	94.6	89.3	92.0
Paliem	94.3	86.6	91.0
Ucassaim	91.9	84.3	87.9
Nachinola	90.9	86.4	88.6
Corjuem	92.8	87.5	90.0

Sensitivity: Public (C4)

Calvim	87.4	76.5	81.3
Olaulim	92.6	82.9	87.3
Pomburpa	96.2	89.1	92.6
Mapusa (M Cl)	94.4	89.6	92.0
Salvador do Mundo (CT)	93.5	89.3	91.4
Aldona (CT)	94.0	88.2	90.9
Ambarim	90.2	93.2	91.8
Navelim	92.3	83.7	87.7
Goltim	96.3	88.5	92.1
Malar	97.3	87.8	92.5
Bainguinim	92.6	88.4	90.5
Jua (CT)	91.3	91.9	91.6
Corlim (CT)	93.1	86.0	89.7
Goa Velha (CT)	92.7	85.7	89.2
Mercurim (CT)	93.4	86.1	89.5
Dumacem	95.5	88.0	91.8
Salem	93.7	83.3	88.5
Adwalpale	92.7	77.7	84.9
Sirigao	97.0	86.4	91.8
Mulgao	95.2	87.1	91.3
Ona	93.6	80.5	86.9
Maulinguem North	87.6	70.8	79.2
Curchirem	84.0	68.0	76.0
Sarvona	92.5	86.9	89.8
Maem	94.3	85.0	89.7
Vainguinim	97.8	91.6	94.6
Aturli	92.6	79.5	86.2
Naroa	93.5	79.7	86.6
Piligao	94.1	82.4	88.1
Cudnem	94.0	83.2	88.8
Amone	96.4	86.4	91.4
Navelim	93.4	82.4	88.1
Bicholim (M Cl)	94.6	88.9	91.9
Sanquelim (M Cl)	94.2	88.5	91.5
Podocem	90.5	77.0	83.7
Ravona	90.5	70.9	81.1
Morlem	92.7	79.6	86.3
Maloli	92.3	78.9	86.0
Tivrem	93.4	88.5	91.0
Betqui	91.4	78.1	84.9
Adcolna	90.8	80.5	85.9
Cundaim	94.2	83.5	88.9
Ponda (M Cl)	95.9	93.0	94.5
Candola (CT)	94.1	86.3	90.3
Orgao (CT)	95.8	88.9	92.3
Maneri	89.6	74.9	81.8
Kasai	93.8	84.1	89.1
Girode	95.2	74.3	85.7
Vazare	85.0	58.7	72.0
Ambadgaon	86.1	60.0	72.9
Matane	82.9	56.7	70.6
Ayee	87.4	65.7	76.6
Talekhol	94.9	82.9	89.3

Sensitivity: Public (C4)

Buffer Zone	93.8	86.2	90.0
North Goa	93.4	85.6	89.6

Table 3.41D: Literacy Rates in Buffer Zone, Survey 2023.

Village	Male	Female	Total
Literacy rates	93.9	87.5	90.7
Mean years of schooling	9.5	8.7	9.1

3.9.1.4 Homestead land

Of the 38,299 hectare of land area in buffer zone, 11.1 per cent is being used for homestead.

3.9.1.5 Employment

The labor force participation rates (percentage of workers to the total population) from the census 2011 and survey 2023 have been presented in **Tables 3.42A** and **3.42B**. The labor force participation rate is a measure of economically active population. As the work is getting complex with industrialization, simple manual work does not suffice until workers acquire special skills to get employment.

The skills generally are acquired by schooling and vocational training at home or in institutions.

Any secular trend in labor force participation cannot be described because female participation is uncertain and entry into and exit from labor force is frequent. Also, the definitional changes of 'worker' itself influence female labor force more than male. Therefore, it is not advisable to describe trend in labor force participation.

Broad Findings:

The labor force participation is marginally higher (41.3 per cent) according to census 2011 than the survey 2023 (40.3 per cent) in buffer zone.

The labor force participation rates vary among villages from 39.3 per cent in Oxel to 54.8 per cent in Maloli. The male labour force participation rates vary from 46.1 per cent in Calvim to 64.9 per cent in Ambadgaon with a difference of 19 percentage points.

Whereas, the female labor force participation rates vary from 12.4 per cent in Sirigao to 53.0 per cent in Maloli, a difference of 41 percentage points.

There is a definite need to promote skill development for female population to bring

Sensitivity: Public (C4)

them into labor force. Total participation rates will be higher if female participation rates will also be higher.

Table 3.42A: Labor force Participation Rates (% workers) in Buffer Zone, 2011 Census.

Village	Male	Female	Total
Alorna	54.6	25.5	40.3
Ibrampur	56.3	21.3	39.5
Cansarvornem	60.6	16.8	40.7
Dargalim	59.6	26.0	43.0
Tuem	54.7	24.8	40.2
Oxel	52.5	13.2	31.9
Revora	60.9	26.6	43.6
Nadora	57.4	20.4	39.5
Pirna	57.2	17.7	37.2
Assonora	58.1	32.4	45.0
Sircaim	56.7	18.8	38.0
Paliem	54.1	19.7	39.1
Ucassaim	52.8	19.4	35.2
Nachinola	58.2	27.3	42.7
Corjuem	47.3	21.2	33.7
Calvim	46.1	22.0	32.8
Olaulim	57.5	49.0	53.0
Pomburpa	54.9	22.5	38.8
Mapusa (M Cl)	58.3	22.4	40.6
Salvador do Mundo (CT)	56.9	24.9	41.1
Aldona (CT)	52.2	20.1	35.1
Ambarim	47.7	34.7	40.9
Navelim	52.7	18.3	34.2
Goltim	51.1	21.3	35.1
Malar	55.0	25.2	40.1
Bainguinim	61.3	29.9	45.6
Jua (CT)	55.8	16.5	35.2
Corlim (CT)	62.0	27.0	45.1
Goa Velha (CT)	54.9	27.5	41.0
Mercurim (CT)	47.4	23.2	34.6
Dumacem	55.1	27.5	41.2
Salem	54.4	13.6	34.1
Adwalpale	59.6	26.6	42.6
Sirigao	52.6	12.4	32.8
Mulgao	55.3	17.4	36.9
Ona	52.4	21.8	36.8
Maulinguem North	52.2	16.6	34.7
Curchirem	56.1	24.0	40.2
Sarvona	57.7	16.2	37.8
Maem	55.7	20.7	38.1
Vainguinim	53.0	15.3	33.9
Aturli	55.1	24.5	39.8
Naroa	59.2	19.6	39.5
Piligao	55.8	19.9	37.5
Cudnem	59.5	16.0	38.5
Amone	54.6	13.2	33.9

Sensitivity: Public (C4)

Navelim	55.4	16.3	36.4
Bicholim (M Cl)	56.2	17.9	37.7
Sanquelim (M Cl)	59.3	19.9	40.3
Podocem	63.0	31.0	46.9
Ravona	63.2	40.6	52.4
Morlem	57.7	28.8	43.5
Maloli	56.4	53.0	54.8
Tivrem	58.0	21.8	40.3
Betqui	54.4	19.0	37.1
Adcolna	57.4	21.1	40.1
Cundaim	55.9	24.9	40.9
Ponda (M Cl)	59.2	22.3	41.4
Candola (CT)	57.8	24.4	41.5
Orgao (CT)	58.8	25.9	42.1
Maneri	58.5	19.4	38.2
Kasai	53.6	13.3	34.1
Girode	63.4	36.4	51.1
Vazare	60.5	35.3	47.9
Ambadgaon	64.9	15.0	39.7
Matane	60.7	22.4	43.0
Ayee	61.6	18.2	40.5
Talekhol	62.1	40.5	51.8
Buffer Zone	57.1	21.9	39.7
North Goa	57.4	22.1	40.1

Table 3.42B: Labor force Participation Rates in Buffer Zone, Survey 2023.

Village	Male	Female	Total
Buffer zone	59.5	20.8	40.3

3.9.1.6 Industrial status

The percentage distribution of workers by industry according to the census 2011 is presented in **Table 3.42C**. It has been documented that there a significant shift from primary sector (agriculture) to secondary and tertiary sectors of economy.

Generally, there is underemployment in the agriculture sector pushing labor force to non-agriculture sector, mostly to service sector. Thus, the percentage of work in primary sector is declining and other sectors (secondary and tertiary) is growing.

The same is being observed in the talukas and buffer zone.

Broad Findings:

Of all workers, only 12 per cent in buffer zone and 9 per cent in the district are engaged in agriculture sector. About 80 per cent of net area sown is unirrigated area depending upon rain.

Therefore, cultivation depends upon rainfall and vagaries of weather. This may negatively impact household income.

Sensitivity: Public (C4)

Table 3.42C: Percentage distribution of workers in Buffer zone and in Rural District by industry, Census 2011 and 2021 (Projected).

Census 2011	Male	Female	Total
Buffer zone			
Cultivators	5.4	8.2	6.2
Agriculture laborers	4.3	8.4	5.4
Household industry	3.0	3.4	3.1
Others	87.2	80.0	85.2
Total	**100.0**	**100.0**	**100.0**
District			
Cultivators	3.9	7.0	4.7
Agriculture laborers	3.6	6.2	4.3
Household industry	2.5	3.2	2.7
Others	90.0	83.6	88.3
Total	**100.0**	**100.0**	**100.0**
Projections 2021			
Buffer Zone			
Cultivators	4.6	7.5	5.6
Agriculture laborers	4.1	7.9	4.9
Household industry	3.2	3.3	3.1
Others	88.1	81.3	86.4
Total	**100.0**	**100.0**	**100.0**
Cultivators	3.4	6.4	5.1
Agriculture laborers	3.2	5.7	4.3
Household industry	2.4	3.1	2.6
Others	91.0	84.8	88.0
Total	**100.0**	**100.0**	**100.0**

Village Level Industrial Status: The percentage of workers in primary sector of economy is presented in **Table 3.42D**. These data indicate the village economy. Mining and other related activities have brought in the non-agriculture activities into villages. The activities mostly related to transportation of iron ore and patty shops.

Broad Findings:

The percentage of workers in agriculture sector varies across villages in the buffer zone. It ranges from 4.2 per cent in Bainguinim to 82.9 per cent in Maloli. The percentage of workers engaged in agriculture sector is less than 50 per cent in 8 villages.

Sensitivity: Public (C4)

Table 3.42D: Percentage of workers engaged in primary sector (agriculture) by village, Census 2011.

Village	Total
Alorna	35.5
Ibrampur	28.2
Cansarvornem	16.4
Dargalim	17.1
Tuem	16.6
Oxel	11.6
Revora	27.1
Nadora	13.3
Pirna	20.4
Assonora	11.4
Sircaim	10.4
Paliem	12.1
Ucassaim	5.8
Nachinola	10.0
Corjuem	13.6
Calvim	16.7
Olaulim	45.8
Pomburpa	11.5
Mapusa (M Cl)	1.4
Salvador do Mundo (CT)	2.7
Aldona (CT)	5.8
Ambarim	13.2
Navelim	15.2
Goltim	10.6
Malar	16.5
Bainguinim	4.2
Jua (CT)	1.7
Corlim (CT)	5.2
Goa Velha (CT)	4.6
Mercurim (CT)	16.9
Dumacem	17.2
Salem	26.6
Adwalpale	21.4
Sirigao	8.3
Mulgao	11.4
Ona	8.3
Maulinguem North	11.7
Curchirem	42.9
Sarvona	10.6
Maem	20.0
Vainguinim	16.3
Aturli	23.1
Naroa	19.9

Sensitivity: Public (C4)

Piligao	9.2
Cudnem	14.1
Amone	12.8
Navelim	10.9
Bicholim (M Cl)	1.8
Sanquelim (M Cl)	3.5
Podocem	19.6
Ravona	60.8
Morlem	27.4
Maloli	82.9
Tivrem	9.9
Betqui	27.5
Adcolna	10.9
Cundaim	11.1
Ponda (M Cl)	2.6
Candola (CT)	3.9
Orgao (CT)	5.9
Maneri	55.1
Kasai	22.8
Girode	57.4
Vazare	75.4
Ambadgaon	77.7
Matane	43.9
Ayee	50.1
Talekhol	50.3
Buffer Zone	11.6
North Goa	9.0

3.9.1.7 Information on agriculture situation

The percentage distribution of households by size of land holdings from the survey 2023 is presented in **Table 3.43**. The buffer zone is having low concentration of economically and socially weaker section of the population (SCs and STs) excepting in small number of villages.

Many of them are dependent on secondary and tertiary sectors due to lack of farming land to cultivate. It can be observed that only one household each from SCs and STs reported having land to cultivate.

Many households from other castes reported having farm land. Of them, 20 per cent have no land to cultivate, followed by 39 percent less than one hector, 27 per cent one to less than 2.5 hectors and 14 per cent more than 2.5 hectors.

The Socioeconomic and Caste Census (SECC) 2011 indicates population in North Goa do not depend on agriculture.

Sensitivity: Public (C4)

According to SECC 2011, the percentage of rural household owning un-irrigated land is only 4.6 per cent, owning irrigated land is 4.4 per cent and owning other land is 3.8 per cent. The percentage of landless households (14.4 per cent) is deriving household income from manual labor.

According to the SECC 2011, about 18 per cent of the total rural households is depending upon monthly salary from government or public sector establishments and 42 per cent from private sector establishments. Locally, mining related activities provide major opportunity for employment.

Therefore, mining industry and allied activities will supplement the local economy.

Table 3.43: Percentage Distribution of Households by Size of Land Holdings and Caste, Survey 2023.

Land holdings	SC	ST	Others	Total
No land	66.7	75.5	20.4	24.0
< 1 Ha	33.3	25.5	38.7	38.0
1.0 to <2.5 Ha	-	-	26.9	25.0
2.5+ Ha	-	-	14.0	13.0
Total	100.0	100.0	100.0	100.0

3.9.1.8 Annual household income from various sources

The estimated average household income per annum is more than Rs 95,000. Of the total household income, about 85 per cent is contributed by non-agriculture sector and 15 per cent by agriculture sector. According to the SECC 2011, about 39 per cent of rural households are getting monthly income of rupees less than 5,000, about 40 per cent between rupees 5,000 and less than 10,000 and about 29 per cent above rupees 10,000. Therefore, the household's income is not high.

3.9.1.9 Information on family budget

The family expenses are mostly on food items (68 per cent), followed by childrens' schooling, on transport, and others (8 per cent), entertainment (7 per cent), personal hygiene (6 per cent), health care (6 per cent), and other emergencies (5 per cent).

3.9.1.10 Savings

The respondents often reported that the savings are very low, lower than one percent. Often there is a need to borrow to supplement the family expenses.

Sensitivity: Public (C4)

3.9.1.11 Family amenities and assets

Household Amenities: The percentage of households having various amenities from the census 2011 is presented in **Table 3.44A**. People's living conditions can be assessed by household amenities.

Any deficiencies in amenities can be recommended to the project proponent to incorporate into the CSR activities.

People always would be aspiring for comfortable living with all amenities. Therefore, percentage of households having amenities will steadily increase with time.

Broad Findings:

In general, households have good amenities in buffer zone. It is observed that about 99 per cent of all households are living in good or livable house, 97 per cent living in house having one or more than one room, 83 per cent living in their own house, 80 per cent have treated tap water supply within the house, 96 per cent use electricity for lighting, 20.5 per cent have any type of latrine facility within the house, 91 per cent use any type of bath room facility within the house, 65 per cent have some type of drainage facility, 74 per cent use LPG/NPG for cooking. The variations in the percentage of household amenities are significant across villages.

Table 3.44A: Percentage of households living in good house with amenities, Census 2011.

Village	Percentage of households living in/having/using								
	Good or liveable house	House having at least one room	Own house	Treated tap water	Electricity as main source of lighting	Any type of latrine within house	Any type of bath room	Any type of drainage	LPG/ NPG for cooking
Alorna	96.3	97.8	97.1	87.5	96.7	51.1	63.5	31.2	29.8
Ibrampur	98.9	94.6	85.7	82.0	96.1	32.8	75.7	48.1	37.1
Cansarvornem	99.3	94.5	93.4	84.2	96.0	45.6	79.8	9.9	14.0
Dargalim	99.6	97.7	94.7	77.9	97.5	24.9	85.8	36.2	59.2
Tuem	99.5	96.7	96.3	91.7	97.5	33.8	92.3	25.8	70.5
Oxel	100.0	99.2	96.4	90.2	98.1	23.6	93.8	86.1	91.5
Revora	98.4	98.5	95.6	80.4	97.5	31.6	90.1	56.6	64.1
Nadora	98.7	98.7	95.0	93.4	99.0	22.3	86.7	48.5	90.4
Pirna	99.2	99.3	92.8	69.4	98.4	32.8	91.0	29.1	67.8
Assonora	99.9	96.3	83.3	93.4	97.5	21.4	89.8	69.5	87.6
Sircaim	99.5	96.9	93.2	87.6	98.8	5.5	94.5	71.7	92.6
Paliem	99.6	99.3	90.4	82.3	98.5	23.6	93.0	64.2	93.0
Ucassaim	98.7	97.4	94.8	28.3	97.4	13.9	90.4	89.1	87.4
Nachinola	99.6	97.5	77.7	90.6	99.5	3.2	95.1	94.1	92.1
Corjuem	98.9	99.2	96.7	69.7	98.6	9.8	92.1	64.1	79.0

Sensitivity: Public (C4)

Calvim	100.0	99.1	100.0	95.7	99.1	0.0	100.0	99.1	98.3
Olaulim	97.7	99.4	97.7	41.1	99.4	20.0	94.9	93.7	93.7
Pomburpa	99.4	98.5	95.1	62.4	98.5	17.7	93.0	69.1	86.9
Mapusa (M Cl)	98.8	96.9	77.5	89.4	98.4	11.2	97.5	93.2	85.9
Salvador do Mundo (CT)	96.1	97.7	81.4	81.6	98.6	13.4	93.8	41.0	89.3
Aldona (CT)	99.3	98.7	93.2	65.8	97.6	7.9	98.0	84.2	86.8
Ambarim	100.0	93.1	100.0	86.2	96.6	13.8	82.8	55.2	82.8
Navelim	100.0	98.9	94.3	90.0	98.6	14.6	82.9	17.8	88.6
Goltim	100.0	97.2	91.2	85.5	99.8	7.1	97.5	0.5	90.1
Malar	99.7	98.6	93.2	90.8	99.5	22.0	83.5	39.3	90.0
Bainguinim	86.9	98.6	71.1	73.1	91.9	15.6	89.9	79.5	81.8
Jua (CT)	99.0	99.1	90.5	96.3	99.0	11.7	96.9	13.7	91.0
Corlim (CT)	99.1	99.0	69.2	91.1	98.2	6.2	97.5	47.9	81.1
Goa Velha (CT)	97.7	98.8	91.5	89.5	97.7	17.6	98.1	13.9	90.9
Mercurim (CT)	98.7	97.8	87.9	85.8	94.6	12.9	91.4	35.6	76.7
Dumacem	100.0	100.0	74.3	50.0	74.3	59.5	97.3	77.0	14.9
Salem	98.0	96.8	92.8	84.4	97.4	30.1	88.4	94.8	42.7
Adwalpale	99.1	97.8	91.0	42.9	96.9	33.6	90.1	95.1	49.4
Sirigao	99.2	99.4	99.2	96.1	99.4	15.7	92.5	95.6	81.5
Mulgao	99.4	96.2	76.3	73.6	91.5	23.6	81.1	78.5	63.7
Ona	100.0	100.0	95.8	80.7	95.2	60.8	90.4	98.2	59.6
Maulinguem North	99.7	98.8	94.7	55.3	92.2	80.0	53.1	57.2	27.8
Curchirem	98.0	96.8	98.6	54.1	87.9	83.1	22.7	7.0	12.8
Sarvona	99.3	92.7	71.0	88.8	96.1	26.3	88.1	65.1	65.3
Maem	99.1	94.5	91.8	65.8	94.8	29.8	84.6	63.7	67.8
Vainguinim	100.0	98.7	91.8	76.7	95.0	28.9	86.2	69.2	77.4
Aturli	100.0	100.0	96.2	49.1	99.1	55.7	94.3	25.5	53.8
Naroa	98.5	96.4	91.8	54.9	91.3	46.7	71.3	49.4	60.7
Piligao	99.8	98.8	96.0	69.3	91.4	45.3	74.1	62.5	55.0
Cudnem	98.3	99.9	87.0	67.9	98.8	31.9	89.3	48.3	73.3
Amone	100.0	96.2	91.6	95.3	99.3	12.5	92.8	83.5	83.0
Navelim	99.5	96.8	94.5	79.0	96.6	21.0	89.3	81.7	81.5
Bicholim (M Cl)	98.7	97.3	68.4	87.1	96.3	15.6	95.9	87.4	82.1
Sanquelim (M Cl)	100.0	94.6	89.2	67.5	79.3	13.3	96.1	54.7	80.8
Podocem	94.9	99.6	78.4	95.3	93.2	48.3	72.9	80.9	47.9
Ravona	98.9	98.9	98.1	37.5	95.4	67.0	95.4	47.1	13.4
Morlem	99.2	98.3	95.5	71.7	96.4	25.2	87.6	16.1	57.9
Maloli	97.8	98.9	95.5	0.0	89.9	41.6	43.8	34.8	47.2
Tivrem	99.5	98.8	79.3	88.9	96.8	21.0	95.4	94.5	73.5
Betqui	100.0	95.7	94.6	58.8	95.4	73.6	59.6	4.3	39.6
Adcolna	93.6	98.2	79.3	86.2	97.4	24.6	86.4	62.1	65.5
Cundaim	98.9	95.4	80.5	91.8	98.2	27.9	88.5	69.9	68.8
Ponda (M Cl)	99.3	98.1	67.7	98.0	99.1	3.4	98.3	94.8	85.4
Candola (CT)	98.9	97.8	75.4	80.3	98.3	24.2	92.0	67.6	79.6
Orgao (CT)	99.2	98.2	80.1	88.3	99.6	11.1	94.3	78.0	93.1
Maneri	98.4	99.8	97.1	54.5	93.8	43.1	87.9	9.8	6.0
Kasai	98.6	95.1	78.3	13.3	94.1	29.0	85.9	25.2	34.4
Girode	95.0	95.0	100.0	96.7	91.7	90.0	38.3	0.0	1.7
Vazare	92.5	99.7	96.9	4.1	82.7	82.1	78.3	3.5	2.2
Ambadgaon	99.0	99.3	99.3	0.0	77.3	78.0	98.9	0.0	0.0

Sensitivity: Public (C4)

Matane	100.0	99.8	96.8	0.2	70.8	79.6	61.3	0.5	0.7
Ayee	100.0	100.0	96.2	67.0	85.0	70.0	93.6	1.3	4.0
Talekhol	97.9	95.3	92.5	25.1	80.3	47.7	94.3	40.9	2.2
Buffer Zone	98.8	97.4	83.4	79.6	95.8	20.5	91.4	65.4	73.9
North Goa	98.7	81.3	81.3	80.7	97.1	21.3	89.3	64.2	74.0

3.9.1.13 Household Assets: The percentage of households having various assets from the census 2011 is presented in **Table 3.44B**. Most of the assets presented relate to communications and transportation facilities. The data will help in assessing the people's, mobility and their awareness of developmental activities. This will help the households in utilizing welfare programs effectively. Also, it will be easy for the project proponent in implementing CSR activities.

Transport and communication facilities are needed when the local economy is being integrated with market economy. Therefore, transport and communication facilities are growing rapidly.

Broad Findings:

It is observed that about 85 per cent of all households have a bank account; 28 per cent have radio or transistor, 81.7 per cent have television, 32 per cent have laptop with or without internet connection, 88 per cent have landline or mobile phone; 23 per cent have bicycle, 56 per cent have scooter or motorcycle or moped and 24 per cent have car or jeep or van.

The variations in the percentage of household assets are significant across villages.

Table 3.44 B: Percentage of households having the following assets, Census 2011.

Village	Percentage of households having							
	Bank account	Radio or tran-sistor	Television	Computer or laptop with or without internet	Landline or mobile or both	Bicycle	Scooter or motorcycle or moped	Car or jeep or van
Alorna	86.4	12.2	63.3	17.9	76.6	22.5	38.8	7.4
Ibrampur	81.5	6.6	70.7	30.1	85.5	16.4	29.3	6.4
Cansarvornem	87.1	3.3	76.1	12.2	83.5	19.1	62.1	7.7
Dargalim	95.2	18.9	79.7	21.1	90.1	20.3	53.5	13.6
Tuem	98.3	8.2	82.7	17.3	86.2	20.3	49.9	7.7
Oxel	94.5	12.3	90.5	18.7	92.6	25.9	62.2	19.1
Revora	98.2	28.6	79.3	20.2	82.8	26.5	58.4	18.9
Nadora	96.3	17.9	82.1	18.3	90.3	20.6	54.5	15.9
Pirna	95.1	14.9	78.6	15.4	85.4	30.1	53.8	10.3
Assonora	97.8	25.5	86.5	30.9	91.7	18.3	49.5	20.3
Sircaim	95.6	23.2	87.3	23.5	89.1	13.3	53.8	20.1
Paliem	85.2	42.4	81.5	29.9	91.2	28.4	64.9	23.6

Sensitivity: Public (C4)

Ucassaim	81.7	60.0	84.3	32.1	83.9	33.0	59.1	23.0
Nachinola	93.3	47.5	93.9	28.8	95.6	23.7	75.2	30.9
Corjuem	93.8	31.0	86.0	45.4	92.2	17.1	53.8	21.6
Calvim	98.3	67.5	84.6	100.0	95.8	40.2	55.6	11.1
Olaulim	94.9	57.1	86.9	21.7	89.1	37.1	47.4	20.6
Pomburpa	89.3	48.3	89.6	39.0	86.1	20.3	61.7	22.0
Mapusa (M Cl)	89.8	45.7	90.8	42.4	95.1	26.8	65.4	36.4
Salvador do Mundo (CT)	93.2	48.2	89.9	44.4	95.9	30.4	71.3	40.1
Aldona (CT)	92.9	42.6	88.7	29.8	89.0	25.0	56.7	25.0
Ambarim	100.0	58.6	86.2	13.7	68.9	3.4	48.3	20.7
Navelim	95.7	66.2	86.8	24.9	90.8	22.8	63.3	22.1
Goltim	96.8	43.3	89.4	22.6	91.2	15.9	63.8	30.6
Malar	95.1	20.1	87.5	16.8	87.5	23.6	56.1	18.7
Bainguinim	87.3	46.0	83.2	47.7	94.2	25.7	59.8	46.8
Jua (CT)	91.1	55.5	86.9	20.3	89.2	23.7	58.3	20.5
Corlim (CT)	81.3	24.2	85.3	23.7	91.3	23.7	50.8	20.8
Goa Velha (CT)	96.7	53.8	89.6	33.2	85.2	34.5	62.5	26.1
Mercurim (CT)	91.9	44.9	81.6	37.6	93.1	40.0	66.9	31.3
Dumacem	71.6	16.2	63.5	16.2	79.8	37.8	50.0	9.5
Salem	92.3	8.6	75.1	11.9	78.1	22.8	43.5	10.1
Adwalpale	87.3	7.1	71.3	18.2	52.5	19.8	42.6	11.7
Sirigao	95.0	11.9	83.4	22.4	89.5	15.2	66.0	15.7
Mulgao	79.6	28.3	70.9	34.5	90.4	24.6	52.4	22.8
Ona	80.7	43.4	75.3	16.2	80.1	33.1	54.2	13.3
Maulinguem North	28.1	6.6	60.9	7.5	48.5	8.1	25.9	6.9
Curchirem	25.3	10.0	42.9	11.1	51.1	17.2	22.3	6.0
Sarvona	62.1	15.6	79.4	26.2	93.0	20.7	54.9	18.7
Maem	74.4	18.9	76.3	31.1	84.6	27.3	50.4	13.6
Vainguinim	86.2	28.9	71.1	25.8	75.5	40.9	45.3	15.7
Aturli	54.7	8.5	88.7	14.1	89.7	26.4	61.3	7.5
Naroa	63.9	19.0	71.1	27.5	82.4	19.0	49.2	14.5
Piligao	88.4	14.6	71.1	19.3	75.4	15.3	45.5	14.0
Cudnem	80.7	8.2	78.7	19.7	82.3	9.8	47.2	17.6
Amone	72.4	10.6	78.9	19.7	86.1	16.8	54.3	15.9
Navelim	75.5	29.1	83.3	36.4	90.6	24.2	53.6	22.7
Bicholim (M Cl)	83.8	25.2	82.9	38.5	93.4	23.6	58.9	25.0
Sanquelim (M Cl)	87.2	5.9	88.2	47.8	95.5	21.2	59.1	21.7
Podocem	58.9	9.3	69.9	16.9	82.6	9.7	39.0	12.3
Ravona	77.8	3.8	52.9	24.5	65.9	14.9	36.8	4.6
Morlem	87.5	31.6	68.8	16.8	74.2	23.9	48.1	7.6
Maloli	79.8	13.5	52.8	16.8	42.7	18.0	40.4	4.5
Tivrem	91.9	28.3	82.3	49.6	91.9	18.2	53.2	20.3
Betqui	46.9	7.3	63.9	10.7	71.7	8.1	39.4	8.4
Adcolna	80.1	11.5	78.5	11.5	86.6	11.5	41.9	13.6
Cundaim	71.5	21.0	74.4	20.3	78.3	19.4	42.0	18.8
Ponda (M Cl)	89.2	26.6	88.3	47.7	95.7	20.2	63.7	39.5

Sensitivity: Public (C4)

Candola (CT)	83.7	22.1	82.6	40.6	90.0	16.7	58.4	20.3
Orgao (CT)	88.5	31.4	87.1	32.8	92.5	18.4	53.8	24.1
Maneri	83.5	20.8	52.0	8.1	70.1	12.9	26.6	3.8
Kasai	77.4	7.8	67.3	11.0	82.0	20.8	37.9	8.6
Girode	65.0	6.7	50.0	1.7	80.0	28.3	46.7	10.0
Vazare	41.5	16.4	37.1	1.6	40.0	27.4	28.9	3.1
Ambadgaon	27.8	0.0	32.1	12.3	24.6	2.5	9.4	0.0
Matane	34.8	7.0	29.5	8.4	30.9	14.4	17.2	0.9
Ayee	30.8	15.5	39.7	1.4	52.0	22.5	23.3	2.4
Talekhol	63.4	8.2	39.4	5.0	54.8	16.5	24.4	2.2
Buffer Zone	84.8	28.0	81.7	32.3	87.9	22.7	55.7	23.7
North Goa	87.2	32.2	81.7	31.4	88.8	23.3	56.6	24.8

3.9.1.14 Respondent's perception about the proposed mining project

Mining and related activities are the only industry creating direct well as indirect employment in the surrounding villages. The local economy became vibrant because of mining in terms of all round cash flow and service activity. Therefore, mining is going to be a dominant regional economic activity.

The local population is optimistic about the mining project and has a very positive view.

3.9.1.15 Employment and income

Broad Findings: The percentage of workers age 10+ engaged in various activities from the survey 2023 has been presented in **Table 3.45.**

Mining is the dominant economies in the buffer zone as well as in district. Of the total 38299 hectares of land area, 42 per cent is under net area sown and 6 per cent is under forest. The agriculture is dominated by Rice cultivation and Coconut gardens.

About 7 per cent of the population is engaged in agriculture sector as cultivators and another 12 per cent as agriculture laborers.

While 7 per cent of the population is employed in public and private sectors, another 9.2 per cent is working in mining related activities like truck drivers, cleaners, garage workers, petty shop owners.

Table 3.45: Percentage distribution of workers (age 10+) by occupation in Buffer Zone, Survey 2023.

Industry and occupation, buffer zone	Male	Female	Total
Housewife	0.0	45.8	23.1
Student	22.3	19.4	20.8
Not working	20.9	13.4	17.1

Sensitivity: Public (C4)

Disabled	0.0	0.0	0.0
Retired	3.7	0.5	2.0
Cultivators	7.3	5.7	6.5
Agriculture Laborers	13.4	10.1	11.8
Professionals	2.8	0.2	1.5
Employed (private or public)	7.4	2.8	5.1
Bank employee	0.9	0.5	0.7
Drivers, cleaners, garage workers	6.6	0.0	3.3
Truck business	4.5	1.1	2.8
Traditional occupation	0.9	0.0	0.4
Self-employed Hotel	2.2	0.5	1.3
Self-employed other business	2.9	0.0	1.4
Mine workers	4.2	0.0	2.1
Total	**100.0 (189)**	**100.0 (181)**	**100.0 (370)**

3.9.1.16 Data relating to historically, culturally, and ecologically important places in core as well as buffer zone.

Idgah which is archeological monument exists within the mine area. There are several temples in the surrounding villages which are culturally important to the locals, there are several archaeological monuments in the study area.

3.9.1.17 Information on notified tribal settlements, if any.

Notified tribal settlements are not there in buffer zone.

3.9.1.18 Details of private lands with ownership in the core area indicating financial loss annually.

The mining lease is private and government land. There is no compensation involved. There is no financial loss.

3.9.1.19 Health status of the population in the study area.

Morbidity status: Morbidity data presented in Table 3.46 were collected from two PHCs working in the buffer zone. Three months data prior to the survey was collected. Morbidity data in a small geographic area will not show the general pattern. However, an attempt is made to get the local morbidity episodes which are useful for the purpose of providing health care and medicines.

Broad findings:

The frequently reported diseases, more than 5 per cent, are Anaemia, Disease of eye, Cough and fever, Cough cold without fever and Influenza.

Those reported, one to 5 per cent, are Gastroenteritis, Dysentery, Disease of ENT,

Sensitivity: Public (C4)

Vomiting, Skin diseases, Gastroenteritis, Disease of mouth, teeth, gums, Arthritis, Rheumatism-pain, Disease of Kidney, Accidents, Asthma, Bronchitis, Diabetes, Throat infection and Blood Pressure.

Many diseases like Cholera, Tetanus, Filariasis, Pleurisy, Whooping cough, Poliomyelitis and Pregnancy related diseases have not been reported in the last three months. Rarely reported diseases, less than one per cent, are Leprosy, AIDS, Malnutrition, Cancer, Epilepsy, STD, Tuberculosis (TB), Malaria, Burns, Dengue fever, Heart disease, Mental disorder, Pneumonia, Goitre, Disease of thyroid gland, Measles, Jaundice, Food poisoning, Cough cold with fever, Fever not classified elsewhere, Gout or any joint problems accompanied by fever, Typhoid/paratyphoid and Piles.

The possibility of any health hazards due to toxic elements does not arise because iron ore does not contain any toxic elements. The management shall be taking enough care to minimize occupational health hazards like noise-induced hearing loss, any occupational lung diseases due to inhalation of dust. There are few cases of hearing loss mostly associated with old age. The percentage of pneumonia episodes is very negligible (0.1143 per cent). The percentage of Asthma or Bronchitis is reported at 3.6985 per cent because of vices like consumption of tobacco and alcohol, especially among males. The number of skin allergy cases are substantial (2.1989 per cent) because of lack of personal hygiene.

Table 3.46: Number of Patients suffering from the following Diseases in Buffer Zone and around it, Survey 2023.

Sl. No.	Morbidity	% patients visited doctor or clinic
1	Cholera	0.0000
2	Typhoid/paratyphoid	0.8809
3	Gastroenteritis	2.2662
4	Gastroenteritis, Dysentery	1.2037
5	Tuberculosis (TB)	0.0740
6	Leprosy	0.0067
7	Tetanus	0.0000
8	Dengue fever	0.0874
9	Jaundice	0.1950
10	Malaria	0.0807
11	Filariasis	0.0000
12	STD	0.0403
13	AIDS	0.0067
14	Cancer	0.0336
15	Goitre, Disease of thyroid gland	0.1681
16	Diabetes	3.7657
17	Blood Pressure	4.7071
18	Disease of Kidney	3.1807

Sensitivity: Public (C4)

19	Heart disease	0.0874
20	Asthma, Bronchitis	3.6985
21	Pleurisy	0.0000
22	Influenza	20.5837
23	Pneumonia	0.1143
24	Whooping cough	0.0000
25	Poliomyelitis	0.0000
26	Measles	0.1748
27	Epilepsy	0.0336
28	Piles	0.9145
29	Disease of eye	6.4959
30	Disease of ENT	1.3113
31	Gout or any joint problems accompanied by fever	0.4371
32	Arthritis, Rheumatism-pain	3.0529
33	Skin diseases	2.1989
34	Disease of mouth, teeth, gums	2.5957
35	Throat infection	3.9137
36	Malnutrition	0.0067
37	Anemia	5.4267
38	Pregnancy related diseases	0.0000
39	Food poisoning	0.2219
40	Accidents	3.4026
41	Burns	0.0807
42	Mental disorder	0.0941
43	Vomiting	2.0308
44	Cough and fever	11.7141
45	Cough cold without fever	11.8755
46	Cough cold with fever	0.2421
47	Fever not classified elsewhere	0.2421
48	Others	2.3536
49	Total	100.0000 (14871)

Medical lab facilities: The data on nearest medical laboratory facilities are presented in Table 3.47.

Villagers have to travel to Bicholim (about 2 Kms) to avail various medical lab facilities.

Table 3.47: Distance of medical laboratories conducing following Tests from the Buffer Zone, Survey 2023.

Medical test	Distance
X-ray	Bicholim PHC about 2 Kms
Pulmonary functions test	Bicholim PHC about 2 Kms
Testing of hearing	Bicholim PHC about 2 Kms
Identifying tuberculosis	Bicholim PHC about 2 Kms
Blood test	Bicholim PHC about 2 Kms
Urine test	Bicholim PHC about 2 Kms

Sensitivity: Public (C4)

3.9.1.20 Summary of socio-economic and demographic survey, and need assessment study:

Socio-economic and Demographic Status

Population size of village varies in buffer zone. There are more males than females according to census and survey in buffer zone and in the district, but the sex ratio is balanced.

The SC and ST population is very small, concentrated only in small number of villages.

The literacy rates are high both in buffer zone and in the district. There is significant variation in literacy rates across villages and between males and females.

Agriculture sector is not an important economy because villages largely depend upon tertiary sector (service) secondary sector (industrial) in both buffer zone and in the district.

The local economy is characterized by labor force participation in mining and mining related activities.

The general morbidity pattern is found that mining related diseases are not high, but chronic diseases have to be monitored.

Skin allergy is substantial due to poor hygiene.

Oral hygiene is very poor and need to be attended to.

The households, in general, are having better amenities to live comfortably. However, protected tap water for drinking and the use of LPG/NPG for cooking need to be addressed.

The possession of assets indicates households have good communication facilities, highly mobile and well connected with outside world. Therefore, population is open to receive new ideas and modern lifestyles.

The population in buffer zone can easily be integrated with many development programs under CSR activities.

Indirect assessment of community needs

Reproductive health care for females in general and in villages/towns where the sex ratio is imbalanced in particular can be considered.

Separate heath camps, water supply and sanitation facilities and the like may be considered in villages having high concentration of SC and ST groups.

Elderly (60+) are in need assistance like general health checkups, eye checkups, vision

Sensitivity: Public (C4)

glasses and old age supporting equipment like walking sticks, and the like.

School going population will require support in terms of improving educational aids in schools, scholarships to needy students and strengthening of transport facilities provided by government to school students.

About 15 per cent of the population aged 10-19 is potential entrants into labor force. They can be trained in vocational centers taking local needs of the industry into consideration.

About 63 per cent of the population is in the working age group (15-59). Supporting self help groups for establishment of microenterprises, vocational training for youth, Agriculture & dairy development programs will support the target group.Females in reproductive ages and children in less than 5 years of age are in need of reproductive and child health (RCH) care.

Regular health camps to monitor chronic diseases and general health should be organized.

In general, female labor force participation is lower than males. Some welfare programs like milk dairy and poultry etc., and child care assistance can be designed. Villages having low labor force participation among males/females can be selected for implementation of welfare programs.

There is a need to revamp agriculture with support of zonal agriculture office and subject matter experts by adopting new advanced techniques in the field of agriculture and make it less labour intensive, conduct agriculture camps etc.

Although dependence on agriculture is low in buffer zone, it is high in some villages. So, welfare programs for farmers and agriculture laborers and vocational training for youth may be considered.

The project proponent can contribute in facelifting of the surrounding educational institutes by repairing and renovating existing infrastructure and introduce vocational courses relevant to the nearby industries.Providing educational aids to school. The school children require transport, sanitation and clean drinking water facilities.

Sensitivity: Public (C4)

3.10 TRAFFIC DENSITY MEASUREMENT:

The traffic survey is essential to assess the prevailing traffic volumes and travel characteristics realistically and accurately by undertaking classified volume count. The objective of traffic volume count survey is to assess the traffic intensity on the most vulnerable section of the road under question. 24 hours continuous volume count was manually undertaken during May-2023.as given below table no 3.48A

The Iron Ore will be transported from Mine to Sarmanas jetty through dedicated road with only 0.94km stretch of public road i.e., MDR 20. Width of the Road is 7.0m.

The total distance is 5.48km (4.54 dedicated road and 0.94 km MDR-20 public road).
It is to mention that during the transportation of ore there are two junctions which the trucks need to cross namely Mayem junction and Pilgao junction. During the transportation , the company will provide dedicated personnel to manage the traffic on these junctions. Government has already proposed construction of the underpass at Mayem junction at the cost of project proponent. Till that time the existing arrangement of manpower for managing traffic will continue.

The analysis of traffic counts provides an estimate of average daily traffic (ADT). In order to convert recorded vehicles into a common scale, the passenger car units (PCU) equivalent factor as per IRC: 64 has been adopted. The following tables reveal ADT (Average daily Traffic) in terms of number which translates into PCU (Passengers Cars Units). The details given below table no 3.48A to 3.48C

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Table No 3.48A

Time	Motor Cycle		Passenger Car		Agricultural tractor, Light Commercial Vehicle		Truck or Buses		Agricultural tractor Trailer, Truck Trailer	
	To	From	To	From	To	From	To	From	To	From
0:00:00	5	2	1	0	0	0	0	0	0	0
1:00:00	4	3	0	1	0	0	0	0	0	0
2:00:00	2	3	0	0	0	0	0	0	0	0
3:00:00	3	2	0	0	0	0	0	0	0	0
4:00:00	0	0	0	00	0	0	0	0	0	0
5:00:00	6	5	2	3	0	0	0	0	0	0
6:00:00	10	8	1	3	0	0	0	0	0	0
7:00:00	15	13	2	4	0	0	0	0	0	0
8:00:00	44	45	5	9	2	3	3	2	0	0
9:00:00	70	61	15	13	8	10	6	9	0	0
10:00:00	82	70	20	15	12	10	8	6	0	0
11:00:00	61	56	16	12	8	13	9	4	0	0
12:00:00	57	63	13	14	9	12	5	5	0	0
13:00:00	53	54	8	10	5	13	9	3	0	0
14:00:00	40	36	6	7	7	4	2	3	0	0
15:00:00	43	46	8	7	7	5	2	1	0	0
16:00:00	36	32	6	8	5	4	3	2	0	0
17:00:00	28	18	10	12	6	3	02	01	0	0
18:00:00	16	13	8	6	8	4	3	2	0	0
19:00:00	20	18	7	3	3	2	1	1	0	0
20:00:00	18	23	2	4	6	3	0	0	0	0
21:00:00	10	12	3	2	7	4	0	0	0	0
22:00:00	8	13	4	5	6	2	0	0	0	0
23:00:00	6	5	0	0	2	3	0	0	0	0
Total	637	601	137	138	101	95	53	39	0	0

PCU factor given below table Table No.3.48B

Type of Vehicle	PCU Factor	No. of Vehicles /Day	No. PCU/ Day
Motor Cycle	0.5	1238	619
Passenger Car	1	238	238
Agricultural tractor, Light Commercial Vehicle	1.5	196	294
Truck or Buses	3	92	276
Agricultural tractor Trailer, Truck Trailer	4.5	0	0
Total			1427

Sensitivity: Public (C4)

As per guidelines for capacity of roads in rural areas of IRC, recommended design series volumes for two lane roads are 15000 PCU/day.

Present Traffic & Loss of services (LOS) is given below table

Table No .3.48C

Road	V (Volume in PCU/day.)	C (Capacity in PCU/day.)	Existing V/C Ratio	LOS
Mine To Jetty	1427	15000	0.095	A Excellent

Transportation route works only 237 days in year & capacity of truck is 10.5 tonne as instructed by Dept. of Mines & Geology, Goa

Fig 3.12 Transportation Route Mines to Sarmanas jetty

Sensitivity: Public (C4)

Chapter-4
ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

Sensitivity: Public (C4)

4.0 ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

4.1 ENVIRONMENTAL IMPACTS

The mining activities proposed will have both positive and negative effects on the surroundings. This change is called an impact. The impact could be either useful or detrimental to the environment. The net impact could be determined by evaluating the impact on various parameters.

The parameters with adverse impact due to certain unavoidable reasons have to be nullified, kept to the minimum or brought to have positive effects by taking suitable corrective measures. With a proper understanding of cause and effect and designing suitable measures, it is possible to create better environment.

The proposed project will have a bearing on the socio-economic aspects as well as on the environment due to mining and other incidental activities. The impact depends upon the magnitude, mechanization and method of mining, extent of infrastructural facilities, environmental profile and characteristics of environment.

The impact prediction due to the project has been made in respect of the parameters considered in the present scenario. The quality parameters of ambient air, water, socio-economics aspects, inventory of flora due to mining operations in the buffer zone over a period of one year are available. These help in prediction of the impact more correctly.

The Environmental Impacts can be broadly categorized into Primary and Secondary Impacts. If the impact is directly due to the Project Activity, it is termed as Primary Impact. In case, the impacts are indirectly induced, then it is called Secondary Impact. The project can create impact in two phases. One is during the construction phase, which is temporary and short term in nature, while the impacts created during the operation phase can have long term impacts.

Environmental impacts due to project location, possible accidents, project design, project construction, regular operations, final decommissioning or rehabilitation of a completed project are discussed in this Chapter.

Sensitivity: Public (C4)

4.2 IMPACT DUE TO PROJECT LOCATION & PROPOSED MITIGATIVE MEASURES FOR THE PROJECT

The Block 1 Bicholim Mineral Block Mine is located in Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages, of Bicholim Taluka, North Goa District, Goa State over an area of 478.5206 Ha.

4.2.3 IMPACTS ON LAND ENVIRONMENT

IMPACTS ON LAND USE DUE TO MINING ACTIVITY

The land within the Mining Lease is a non forest land. Due to proposed mining activity in this area, there will be change in the ground profile in the form of pit and waste dumps. The ore bearing area will be mechanically mined-out up to the ultimate pit limit maintaining required bench height and width with due consideration towards the slope stability. Assnora river touches one end of the lease boundary. The elevation difference from mine workings and river level is found to be more than 10mts . The safety buffer of minimum of 50 mts shall be maintained from the Assnora river and proper mitigative measures proposed to reduce surface-runoff shall have no major impact on the Assnora river and nearest streams. Detailed study as proposed in TOR w.r.t proposed environment protection measures to be taken up w.r.t Assnora River is given vide **Appendix No.III**

Vegetation Loss:

The proposed Mining Block is already stripped off the major vegetative cover to win the ore. Once the lease is executed some vegetative cover shall be removed. The vegetation proposed to cut for mining activities is of Acacia Auriculiformis which was planted by the earlier lessee.

4.2.3.1 IMPACT DUE TO WASTE GENERATION OF THE MINING ACTIVITIES

The project proponent intends to produce a maximum quantity of 3.0 MTPA of Iron Ore. The ore to overburden ratio is 1:8.39. The Max. quantity of material handling which shall be generated in the fifth year is given in the Table No.4.1 below

Sensitivity: Public (C4)

Table No.4.1

S.No.	Particulars	Quantity in Tonnes
1	ROM	3000000
2	Waste	25161767
3	Total handling	28161767

The hard material generated during the next five years of mining plan period will be utilized for environmental protective measures like creation of bunds, retention walls, covering on dump portions ,mulching etc.

Table No. 4.2: Proposed backfilling during the plan period is given below

Year	Waste Quantity (M3)	Pit ID	Area Ha
I	1244889.0	5 Top	7.87
I	2238957	5 Top	17.83
I	2238957	1 top	12.78
II	732414	5 Top	5.11
II	1810240	5 Top	16.70
II	1810240	1 top	10.98
III	500000	5 Top	2.36
III	2000000	5 Top	11.19
III	1502000	1 top	11.75
III	1497434	3 Top	13.17
IV	6768535	3/4 bottom	21.60
IV	4410262	3 /4 bottom	18.38
V	8170622	2 Top	10.36

MITIGATION MEASURES

PROPOSED PROTECTIVE MEASURES:

During the plan period appropriate protective measures will be undertaken to prevent any surface run-off from the working area, dumping and backfilled areas.

- Entire waste dump area covered during the present plan period shall be concurrently reclaimed by plantation.

Sensitivity: Public (C4)

- The finalized areas on the waste dump will be covered with biodegradable geotextiles to prevent the soil erosion.
- Inward slope will be maintained on the dump top to prevent erosion of dump slope.
- Laterite boulder walls will be constructed all along the toe of the dump followed by trenches which would be connected to series of settling ponds.
- Storm water management will be important aspect of dump management plan and use of metal pipes and garland drains will be made to channelize the rain water from dump top to the settling ponds such that minimum erosion takes place.

  Just before the onset of monsoon, the geotextile laid areas will be sprayed with a mix of organic manure and grass seeds so as to develop a green cover
- Further, such areas will be taken up for plantation of native species under the guidance of State Forest department
- Native forest and horticultural plant species will be used for afforestation activity. Some of the plant species which would be planted are Cashew, Kokum, Avla, Arjun, Bayo, Bamboo, ber, Glyricidia, Ficus, Mango, terminalis species etc .
- Entire rain water that is encountered in the mining area will be properly channelized through trenches into the mining pit.
- The accumulated water into the mining pit will be treated with lime and flocculent if required for faster settling of suspended solids.

By taking all these protective measures, suspended solids in the runoff water flowing through the dump is reduced considerably.

Sensitivity: Public (C4)

Table.No.4.3: The various protective measures that will be undertaken are as follows:

Plan Period	Plantation			Retaining Wall (m)	Garland Drains (m)	Settling Pond (No.)
	Area (Ha.)	No. of Sapling	Name of species			
I	4.0432	10108	Mix of forest and horticulture Species like, Ficus species, Terminalia Sp., Cassia Sp. Bamboo Sp . Cashew, Mango ,Jambul Aonla ,etc.	--	1600	--
II	3.1319	7830		--	2000	--
III	4.092	10230		--	1700	--
IV	4.7443	11861		--	300	--
V	3.1609	7902		--	500	--
Conceptual Stage	105	2,65,000		--	--	--

4.2.4 IMPACT DUE TO POSSIBLE ACCIDENTS & PROPOSED MITIGATIVE MEASURES

The impact due to possible accidents on the Environment and the mitigative measures are as proposed below.

4.2.4.1 IMPACT DUE TO ACCIDENTS CAUSED BY VEHICLES USED IN MINING OPERATIONS

The accidents on mines involving men and machinery may lead to damage to vehicles, Spillage of Diesel & Oil, Injury to employee

MITIGATION MEASURES ON THE LAND ENVIRNMENT

Safety will be given prime importance in the mining operations. All the employees working on the mines will be provided with safety training and awareness about various risks and hazards in the mines.

Sensitivity: Public (C4)

Following measures would be taken to prevent accidents:

1. Haulage roads will be maintained regularly
2. Proper illumination on the roads and mine
3. Regular maintenance of all the mining machinery to meet the requirement of environmental standards
4. Speed limit of 30km/ hr will be implemented in the mine, sign boards will be displayed at regular intervals at the mines
5. Proper wide roads and gradient will be maintained
6. Proper Personal Protective Equipment (PPE) will be provided to all employees

In case of accidents the vehicles / machinery will be taken to work shop and repaired. Any diesel and oil, which shall be spilled are cleared, collected and places of spillage shall be cleaned immediately. The Waste Diesel and oil are stored in the airtight containers and handed over to GSPCB authorized dealers.

Treatment and rest shall be provided to injured persons until restoring the normal health condition to enable them to get back to work to function effectively

4.2.4.2 IMPACTS DUE TO LAND SLIDE

IMPACT

Opencast mining particularly in areas of heavy rainfall is vulnerable to landslides causing loss of human life, property and deforestation.

MITIGATION MEASURES

A proper and scientific geological study is conducted to study the strata before commencement of mining operations and maximum care shall be taken to avoid the slope failures. Mining will be carried out by forming benches with maximum height of the each bench as 7 m. shall be maintained. The width of the benches shall be 10m. The slope of the benches shall be maintained at 70^0 with overall pit slope of 26^0. Hence, there are no possibilities of failure of mine bench slopes. Internal dumps are stabilized by using coir mats, afforestation of slopes and other engineering structures as envisaged in R&R Plans.

Sensitivity: Public (C4)

The detailed bench stability study is undertaken by National Institute of Rock Mechanics (NIRM) and concluded that the existing bench faces are stable and fit for further mining .

The report is enclosed vide **Appendix No. II**

4.3 IMPACTS DUE TO PROJECT DESIGN AND PROJECT CONSTRUCTION, REGULAR OPERATIONS AND PROPOSED MITIGATIVE MEASURES, FINAL DECOMMISSIONING OR REHABILITATION OF COMPLETED PROJECT.

4.3.1 LAND USE

The previous lessee already works the mining project in the past and the previous lessee has undertaken all the construction activities such as mine office, canteen, and other infrastructure facilities. As such, no further construction activity is required to be undertaken. During the mining operations, the land use shall be altered to win the ore. The current land use and conceptual Land use are in the show vide plate No 6A & 6B and its tables are given below in Table 4.4 and Table 4.5

Table No: 4.4 Current Land use

Sr.No	Land use	Current land use Area (Ha.)
1	Settlements	32.4047
2	Pits & Excavation	306.8497
3	Dumps & Material Stocking	41.6116
4	Covered under Mine Infrastructure (plants & sheds)	6.4707
5	Land under Public Infrastructure / Utilities	1.021
6	Barren / Waste land with small bushes & shrubs/ Archaeological site	90.1629
7	Total area	478.5206

Sensitivity: Public (C4)

Table No. 4.5 Land Use at the Conceptual Stage

Sr.No	Land use	Conceptual land use Area (Ha.)
1	Settlements	32.4047
2	Pits & Excavation	355.5659
3	Dumps & Material Stocking	6.7146
4	Covered under Mine Infrastructure (plants & sheds)	6.4707
5	Land under Public Infrastructure / Utilities	1.021
6	Barren / Waste land with small bushes & shrubs/Archaeological site	76.3437
7	Total area	478.5206

Mitigation measures for mined out land and mine closure

The land degraded within the ML by mining, waste dumping and other infrastructures is reclaimed by afforestation. At conceptual stage the area of 105.8894 Ha will be reclaimed by planting 2,65,000 plants and fruit bearing trees like Cashew, Bamboo, Arjuna, Alva etc which will be beneficial to the society and also for immigration of avifauna.

Retaining walls with drains are provided at the toe of the dump. Before taking up active afforestation the inactive / dead waste dumps are terraced and planted with suitable grass and leguminous local plant species as a temporary stabilization measure. In critical areas geo-textiles are used along the dump slopes.

The Environment Plan and Protective measures Plan are enclosed as **Plate. No 19** and **Plate No. 20** respectively.

Mine Closure will be carried out considering the following aspects:

1. Compensate the damage to vegetation due to opening and operation of the mine.
2. Prevent the spread of fugitive dust and noise generated due to mining and allied activities.

Sensitivity: Public (C4)

3. Help stabilize the slope of waste dump and control soil erosion
4. Increase green cover and improve aesthetics
5. Attract birds to re-colonize the area when the mine is abandoned

4.4 IMPACTS DUE TO OPERATIONS & PROPOSED MITIGATIVE MEASURES

The Bicholim Mineral Block is auctioned ass a new/ fresh mine and shall be operated by taking all precautionary measures to reduce the impact of mining operations on Air, Water, Noise , Soil , Land use and Biological environment.

The impacts on Land environment is evaluated in detail in section 4.11

4.5 IMPACT ON AIR ENVIRONMENT & PROPOSED MITIGATIVE MEASURES

The various activities proposed to be carried out in the Mine viz., loading & unloading, transportation, Crushing and screening at plant etc., are likely to generate dust, which will have impact on Air Environment.

4.5.1 IMPACT ON AIR QUALITY

The proposed mine with its capacity of 3.0 million TPA of ROM and other ancillary activities , is likely to generate dust, NO_2 and SO_2. The impact on air quality of integrated mining complex depends on the magnitude of iron ore extraction operations and transportation & handling.

The intensity of operation is directly related to the rate of production of ore and waste from the mine and its dry size classification.

The ambient air quality monitoring results show that in the villages around the ML area, PM_{10} concentrations are within the prescribed limits (CPCB standards) However, at present the only source of pollution is due to domestic activities and vehicular movement in the surrounding villages .

Once the mining operation starts, it is anticipated that marginal increase in the particulate levels of the core and the buffer zones will occur. Dust suppression

Sensitivity: Public (C4)

measures are, therefore, of utmost importance. Vehicular movements within the mine site will add marginally to NO_2 and CO concentrations.

Monitored values of SO_2, NO_2 and CO in the ambient air are reported to be low in the study area. It is proposed that the Lessee ensures regular maintenance of vehicles so that the emission levels remain within the stipulated limits. As adequate dust suppression measures will be provided, the dust particles will not get transported to villages in the downwind direction of the impact area.

PM levels will be higher within the active operational areas (mine area) due to excavation and transportation, however, the buffer zone is not likely to be affected with dust problems, if proper dust suppression and mitigation measures are taken up.

Air pollution sources at the proposed opencast mine can be classified into four categories, viz., Point Source, Area Sources, Line Sources and instantaneous Point Sources as described below:

Point Source/Single Source: These are stationary sources, which emit air pollutants into the atmosphere from a certain fixed point. In the proposed mine, the following sources or activities form the point sources, which emit particulate matter.

Mining: Top OB/Ore benches would be developed in horizontal slicing pattern; hence hydraulic excavator along with matching dumpers would be deployed.

Loading & unloading of waste/ore: The loading of Waste/Ore is proposed by excavators. These activities are likely to contribute air pollution in the form of dust/ particulate matter during discharge of material from bucket and gaseous pollutant like SO_2, NO_2 and hydrocarbons due to combustion of diesel in the loading machinery. The generated waste/ore will be transported by dumpers and unloaded at the designated locations i.e. at dump site or plant site .

During unloading operation at the dump site of the waste/Ore, air pollution in the form of dust (PM) and gaseous pollutants namely SO_2, NO_2 and hydrocarbons due to consumption of diesel in dumpers is anticipated.

Crushing and Screening activity at plants: The ore will be crushed and screened at the

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plant having capacity of 4 MTPA. The Goan ore has inherent moisture of about 11% and hence the generation of dust is minimum.

All the point sources where there is likely hood of dust generation (PM) will be covered. Wherever required the conveyor belts would be covered.

Line Sources: These are normally mobile sources, which emit pollutants in the area through which they pass. The following are the sources of air pollution falling under this category.

Transportation: Surface transport consists of transport of overburden and Iron Ore. Overburden will be transported by dumpers to respective waste dumps. Haul roads have been provided for movement of dumpers. Transportation also includes movement of iron ore to the nearest jetty. The traffic on the haul roads is likely to contribute towards increase in dust and gaseous pollutants concentration in the mining area.

Dozing: Dozing is envisaged during mining operations. The dozing activity is likely to contribute to air pollution in the form of PM, SO_2, NO_2 and hydrocarbons due to use of diesel operated machines.

Area Sources/Multiple Sources : The total mine area with all mining activities like operation of equipment/machinery, active mine pit, mineral stock yard and waste dump locations and haul roads constitute the area source, which lead to increase in air pollution in and around mine lease area.

The size of the dust particles emitted into the atmosphere plays a major role in deciding the distance to which they may be transported. Particles of larger size fall fairly rapidly and closer to their source because of gravitational settling.

The composition of these particles largely depends on the composition of the mineral being processed i.e. iron Ore in this case.

Prediction of fugitive dust level in the surrounding area is carried out with the help of AERMOD. This AERMOD model for area sources uses the steady state Gaussian plume equation for a continuous source. The model was developed by 'Envitrans'.

Sensitivity: Public (C4)

4.5.2 AIR QUALITY PREDICTION THROUGH MATHEMATICAL MODELLING– IMPACT OF MINING OPERATIONS ON ENVIRONMENT - AIR QUALITY PREDICTION THROUGH MATHEMATICAL MODELLING.

Prediction of fugitive dust level in the surrounding is carried out with the help of AIRMOD. This model for area sources uses the steady state Gaussian plume equation for a continuous source. Isopleths representing PM10 ,So2,Nox & CO are presented herewith along with ground-level concentrations at core and buffer zone to estimate the total impact load.

4.5.2.1 *AIR QUALITY PREDICTIONS THROUGH MATHEMATICAL MODELLING FOR BLOCK-I BICHOLIM MINERAL BLOCK*

Air Pollution Modeling:

Air quality models are the primary tools for relating emissions to air quality impacts. Models, in turn, require acceptable input data for emissions, surface topography, meteorological parameters, receptor configurations, baseline air quality and initial boundary conditions for each modeling scenario.

Since the quality and reliability of model outputs can never be any better than the inputs, input of the quality data is very important.

Prediction of impacts on air environment has been carried out using mathematical model based on a steady state Gaussian plume dispersion model designed for area sources for short term. In the present case, AERMOD dispersion model based on steady state Gaussian plume dispersion, designed for area sources for short term and developed by United States Environmental Protection Agency [USEPA] has been used for simulations from point sources.

Pollutants Considered for Computation:

The model simulations are done for the air pollutant arising from the mining operations, namely, PM_{10}, $PM_{2.5}$, SO_2 & NO_X. GLCs for PM_{10}, $PM_{2.5}$, SO_2 & NO_X have been computed using hourly meteorological data

Sensitivity: Public (C4)

Modeling is done for maximum production & development to know the GLC. The maximum production of 3.0 MTPA is expected to be achieved from this project. Out of this around 85% would be wet fines and around 15% lumps which would require crushing. Hence for this model purpose the study details are as follows:

EMISSION SOURCES:

Pollution source type from the activities of Block I- Bicholim Mineral Block are as follows:

ACTIVITY

A. Excavation of ore & Waste and Dry Screening and Crushing of Ore

B. Ore & Waste transportation

SOURCE TYPE

Open pit : Area

Line: Point

Quantification of particulate emissions has been carried out by the emission factor technique. Emission factor is a statistical average of the rate at which a pollutant is released during an activity.

This factor when multiplied by the level of that activity in a given situation will give the overall effect. Particulate emissions have been predicted by using standard equations given in "Indian Mine and Engineering Journal" and suggested by USEPA for mining & allied activities. Equations for various activities are:

Activity A. Excavation of Waste & Ore and Dry Screening and Crushing of Ore

B. Ore & Waste transportation

Emission factor is calculated by the following empirical formulas

Equation for Excavation of Waste and Ore

23.6 kg/hr particulate matter for every 1000 Tonnes per hour material handling

Equation for Transportation of ore and waste

0.2 kg/vehicle/km.

Sensitivity: Public (C4)

A. Excavation of Waste, Ore and Dry Screening and Crushing of ore:

The maximum production and development of Block -I Bicholim Mineral Block

28.161767 MTPA.

Particulars of activity	**Total**
Excavation of Waste , Ore , crushing & screening (T/A)	28.161767 (MTPA) or 2,81,61,767 T/annum
Excavation of Waste , Ore , crushing & screening TPD taking 365 working days	77,155 Tones/day
Material excavated/tph(24hrs)	3215 tones/hr
Dust emission kg/hr during excavation	76 Kg/hr 21.1 g/sec.

B. Ore & Waste transportation:

Dust emission from the transport vehicles plying for the movement of Iron ore & waste are estimated using the empirical value of

0.2 kg/vehicle/km.

From Excavation of ore and waste transport

DT = Tv x 0.2 x d

DT = Dust emission in kg/hr

Tv = No. of transport vehicles plying in one hour

Waste & Ore Excavated - 3215TPH

Vehicle capacity for transportation: 40 T

Lead: 4.5Kms

Maximum no of Trips per hour

Dust emission due to excavation:

- 40 T Dumpers utilizing 3215 tonnes/hr =80.37

Sensitivity: Public (C4)

Using empirical formula 0.2 kg/vehicle/km.

- 80.37 x 0.2 x 4.5 = 72.33 kg/hr or 20.1 gm/sec

From transport of ROM from mine to Sarmanas Jetty outside the lease

DT = Tv x 0.2 x d

DT = Dust emission in kg/hr

Tv = No. of transport vehicles plying in one hour

Ore to be Transported outside - 30,00,000Tpa

Ore to be transported outside Nos: 30,00,000/256 days x 10 hrs

=1172 T/hr

Capacity of the Transportation Trucks : 10.5 T

No of vehicles plying per hour : 1172/10.5=111.6 or say 112

Lead :5.4 Kms

Waste generated in Kg/hr= 112x 0.2 x 5.4

=120.96 Kg/hr = 33.6 gms/sec

far less than the established emissions. Considering the above, the emission rates are derived and used in the model.

Total diesel consumption: 7556 tons per annum

Total Diesel Consumption for inside Machinery 995 kg/hr

Total Diesel Consumption for Truck :- 196 Kg/hr

Gases Emissions

SO_2 emission is calculated based on the hourly fuel consumption of each equipment and the sulphur content in the fuel as provided by the fuel supplier.

Excavation

The daily max consumption of Fuel is 995 Kg/hr and assuming the Diesel fuel emits 100 mg/kg of fuel consumed, the emission rate will be 0.02763g/s

Sensitivity: Public (C4)

Transportation & Miscellaneous

The daily max consumption of Fuel is 196 Kg/hr and assuming the Diesel fuel emits 100 mg/kg of fuel consumed, the emission rate will be 0.00054gm/s

NO_X emission is calculated based on hourly fuel consumption of each equipment and the Nitrogen oxides content in the fuel as provided by the fuel supplier.

Excavation

The daily max consumption of Fuel is 995 Kg/hr and assuming the Diesel fuel emits 200 mg/kg of fuel consumed is 0.0553 g/s

Based on the above, the expected emission rate due to various operations in this project without control measures is calculated and is given below: Emission rate and Emission sources without control measures

EMISSION SOURCE COORDINATES:

The center of mine was considered (0, 0) in the mathematical modeling.

MATHEMATICAL MODEL FOR POLLUTANTS DISPERSION:

In the present case Aermod model has been used to predict the impacts. This model for area sources uses the steady state Gaussian plume equation for a continuous source.

Further the model has following specialties:

- Simulates dispersion from single/multiple/area/line/volume sources. Allows calculations to be made at a user specified regular rectangular/radial grid or at specified special receptors.
- Provides estimates of concentrations for any averaging time period for the entire period of input meteorology.
- Allows calculations to be underwritten for source groups as selected by the user. Uses Pasquill-Gifford or Briggs dispersion curves (for urban areas) as selected by the user, to derive the plume spread parameters.Adjusts dispersion curves to account for user specified information on aerodynamic roughness.

Sensitivity: Public (C4)

Adjusts for wind speed variation with height, using user specified default urban/rural power law coefficients.Simulates dispersion from buoyant, non-buoyant point sources, non- buoyant area, non-buoyant volume sources and non-buoyant line sources.Simulates dry deposition using a simple tilted plume model with user specified reflection coefficients.Simulates building wake effects.Can include the effects of exponential decay.Uses Briggs' 1975 plume rise algorithm to calculate plume height.

4.5.2.2 METEOROLOGICAL CONDITIONS USED IN PREDICTIONS:

The hourly meteorological data has been generated at the site for Summer season of 2023 (Mar to May-2023) and the same has been used in the predictions.

4.5.2.3 RESULTS AND DISCUSSIONS:

Ground level concentrations (GLC) have been computed. Its details are given below:

The results of the Peak GLC's for various environmental parameters with control measures are given below:

ACTIVITIES/ POLLUTANTS	PM10 (g/sec)	PM2.5 (g/sec)	SO2 (g/sec)	NOX (g/sec)
Excavation	21.1	6.33	0.02763	0.0553
Transportation & Miscellaneous	53.7	12.81	0.00054	0.0109
Total	74.8	19.14	0.028	0.0662

The Isopleths of PM 10, PM2.5, SO2 & NOX concentrations is given in Figure 4.1 to Fig No.4.4.

It is observed that the peak incremental concentration for PM_{10}, $PM_{2.5}$, SO_2 & NO_X is occurring very near the source only. At away places from the active source, the values are getting reduced due to wind dispersion and distance effects.

However, various mitigation measures as mentioned above will be strictly enforced in this project during working and the GLC values will be brought down substantially less.

Sensitivity: Public (C4)

The predicted concentrations at Receptors i.e Villages within the buffer zone area where baseline data was collected and Aermod was run by selecting this villages as receptors.

The predicted concentrations of PM_{10}, $PM_{2.5}$, SO_2 & NO_X is given in the table 4.6

Table:4.6

Location	PM10 (µg/m3)			PM 2.5(µg/m3)			SO2 (µg/m3)			NOX (µg/m3)		
	Base line	Incre-ment	Total	Base line	Incre-ment	Total	Base line	Incre-ment	Total	Base line	Incre-ment	Total
A-1 With ML Area	52	4.78	56.78	35	1.56	36.56	13	0.029	13.029	16	0.0024	16.0024
A-2 Lamgao	43	14.54	57.54	27	4.84	31.84	11	0.089	11.089	16	0.0074	16.0074
A-3 Mulgao	55	2.99	57.99	33	0.99	33.99	13	0.018	13.018	17	0.0015	17.0015
A-4 Sircaim	53	0.912	53.912	31	0.3	31.3	12	0.0056	12.0056	15	0.0005	15.0005
A-5 Calvim	47	0.961	47.961	29	0.32	29.32	12	0.0059	12.0059	17	0.0005	17.0005
A-6 Pilgao	48	2.76	50.76	29	0.91	29.91	13	0.017	13.017	15	0.0014	15.0014
A-8 Sarvona	50	5.17	55.17	34	1.72	35.72	13	0.0319	13.0319	18	0.0026	18.0026
A-9 Advalpale	52	0.87	52.87	28	0.29	28.29	9	0.0054	9.0054	14	0.0004	14.0004
A-10 Latamberce	50	0.68	50.68	30	2.05	32.05	10	0.0127	10.0127	16	0.001	16.001

NAAQS standards (µg/m3)

	SO_2	NO_2	PM_{10}	$PM_{2.5}$
24hrs	80	80	100	60
Annual	50	40	60	40

From the predict concentration the values of PM_{10}, $PM_{2.5}$,SO_2 & NO_X is within the permissible limits

Sensitivity: Public (C4)

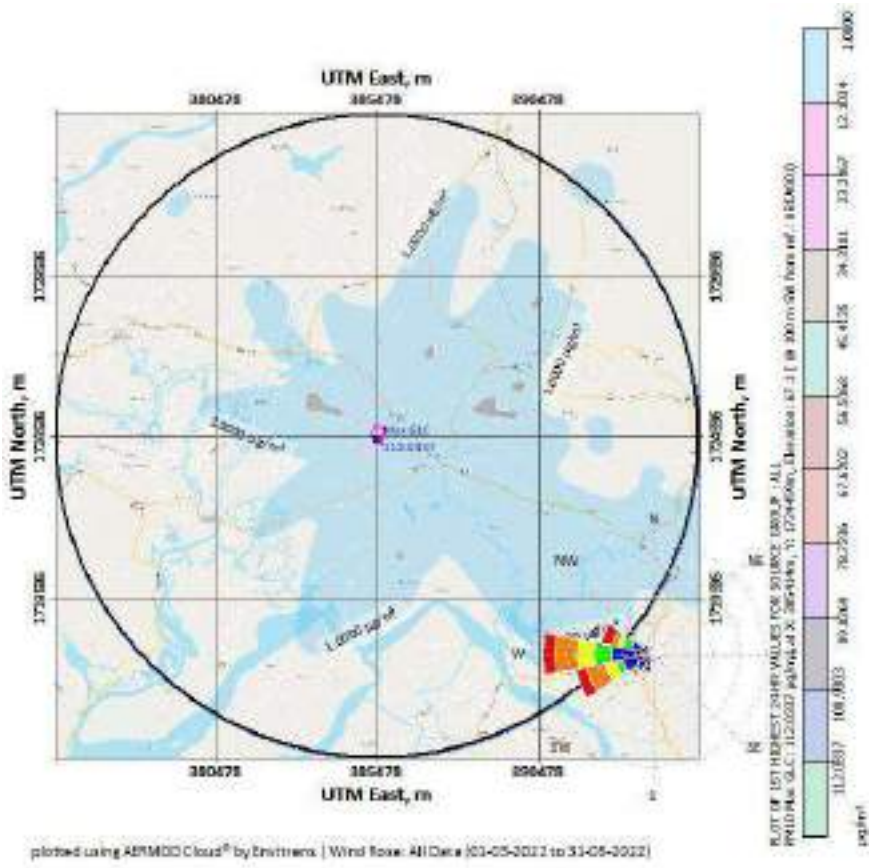

Fig.4.1 PM10 Prediction

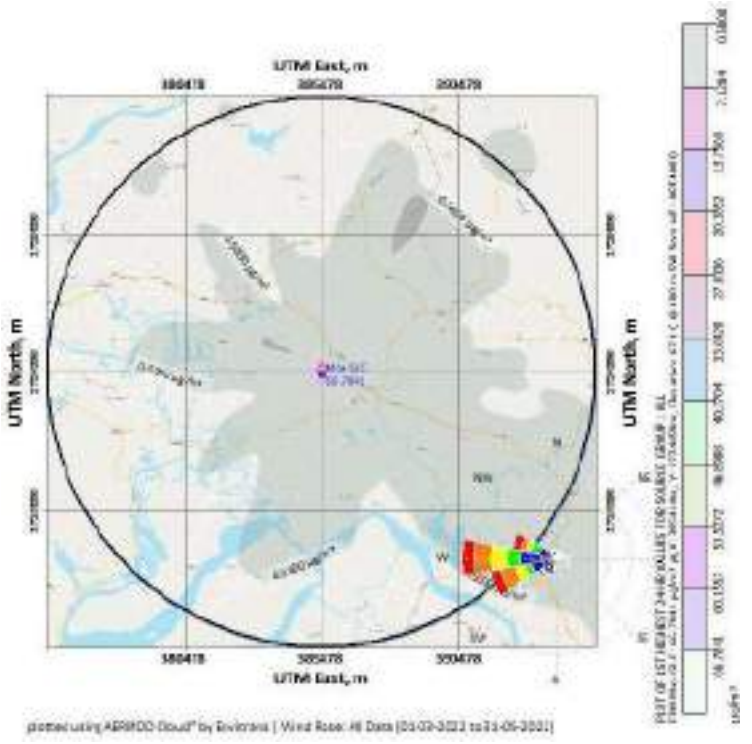

Fig.4.2 PM2.5 Prediction

Sensitivity: Public (C4)

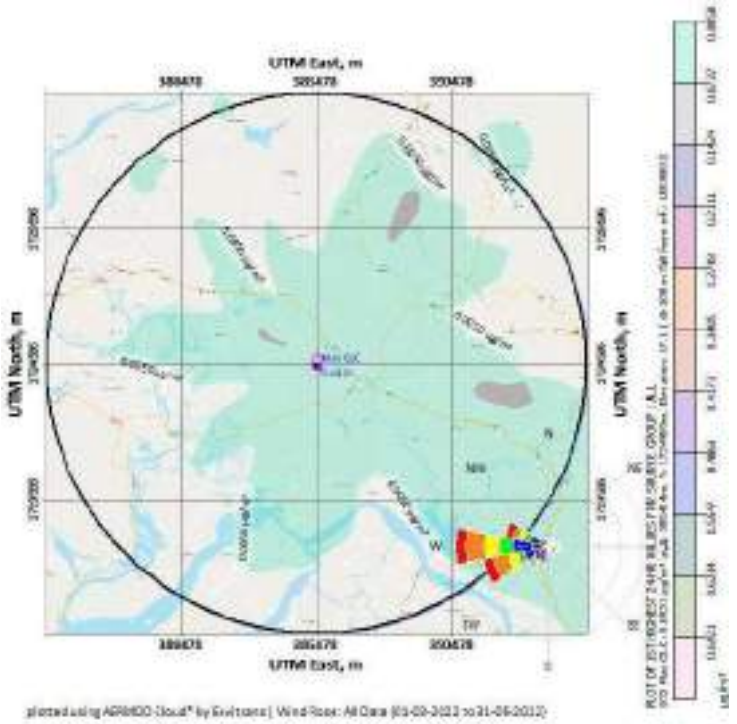

Fig.4.3 SO_2 Prediction

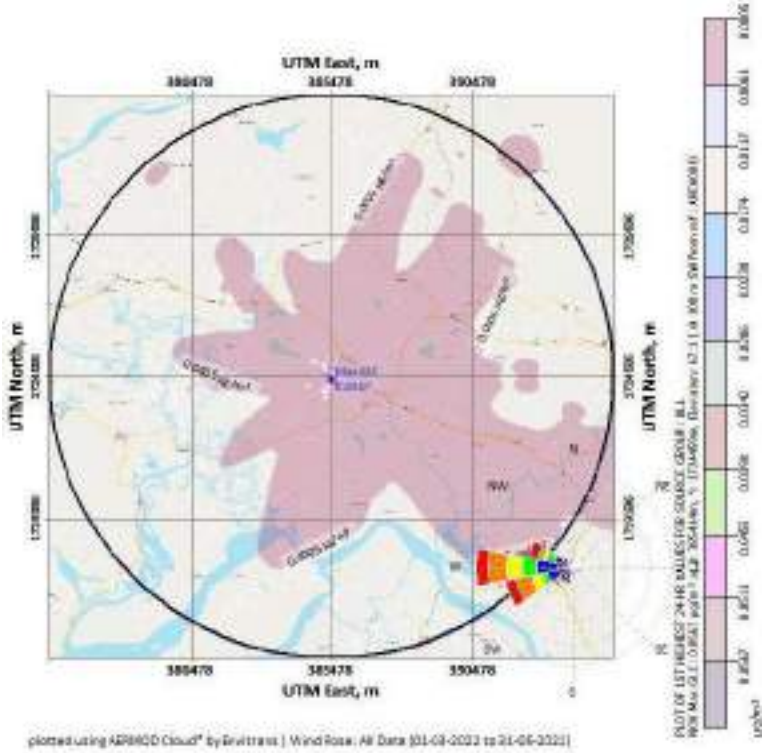

Fig.4.5 NO_x Prediction

Sensitivity: Public (C4)

Table.No.4.7 Proposed Impacts and Mitigative measures of Air pollution

Sl. No.	Activities in Mines	Air Pollutants	Mitigative measures undertaken
1	Ripping& Dozing	PM_{10} & $PM_{2.5}$	No drilling & Blasting involved during mining operations and well maintenance of ripper and dozer machines.
1	Loading & unloading	PM_{10} & $PM_{2.5}$ SO_2 & NO_2	Continuous Water spray over the areas, , proper maintenance of machinery & equipment as per manufactures specification, avoiding over loading of trucks
2	Haul Road	PM_{10} & $PM_{2.5}$, SO_2 & NO_2	Water spray on mine haul roads, It is proposed about 600 KLD of water for dust suppression , speed restriction, proper Maintenance of roads, proper maintenance of machinery & equipment as per manufactures specification, all the HEMM will be with air conditioned cabins
3	Mining area	PM_{10} & $PM_{2.5}$, SO_2 & NO_2	Wide green belt surrounding ML area. Proper maintenance of machinery & equipment. Introducing the state-of-the-art dust suppression system, Fixing permanent pipe sprinklers along the haul road wherever possible. Enclosures to all the dust generating areas on crushing and screening plant;
4	Transportation	PM_{10} & $PM_{2.5}$, SO_2 & NO_2	No overloading of trucks, speed restriction, all the trucks will be covered with tarpauline before going out on public road, plantation along the road side proper maintenance of machinery & equipment as per manufactures specification, PUC for transport vehicle, maintenance of surrounding transport roads , most of the road used for transportation is company owned dedicated road
5	Waste & Topsoil Handling	PM_{10} & $PM_{2.5}$	Stabilization of waste dumps with proper wind erosion control measures, covering with geo-textiles immediately, plantation with initial reclamation crops of grasses and mulches, afforestation with shrub and tree species

4.5.3 AIR QUALITY PREDICTION –IMPACT OF TRAFFIC ON ENVIRONMENT

The off site traffic will be resulting from movement of trucks in and out of the Mine. The entire transportation of Iron Ore will be through trucks. Major transportation of ore from mine to Sarmanas jetty is by company's own road of 4.64 km. and limiting utilization of public road to only 0.94 km. The total distance from the mine to Sarmanas jetty is 5.58 km.

Sensitivity: Public (C4)

The vehicles, trucks, will comply with the standards prescribed by CPCB and will be regularly checked for PUC certificate. Transportation of Ore from mines is mainly through existing transport route passing through the Mining Lease. Ore will be transported through trucks, which are fully covered by tarpaulin sheets, so dust generated from movement of vehicle is intrinsic in nature. The regular maintenance of the road and regular dust suppression will be carried out. The junctions and mine exits will be washed on daily basis at night time

4.6 IMPACT OF NOISE LEVEL & VIBRATION ON ENVIRONMENT

During the mine operation phase, noise will be generated from all sources. With increasing distance from the source, the noise level decreases due to wave divergence. Additional decrease also occurs due to atmospheric effects and interaction with objects in the transmission paths.

Machinery / equipment proposed to be deployed in mining complex are used as input as noise generating sources. Noise generation is assumed 1 m above ground and spreading on a flat terrain devoid of any barriers.

Noise attenuation effects due to barriers like shrubs, bushes and trees, absorption by air, wind, temperature and humidity shall also reduce the noise levels.

The noise level will remain well within the prescribed CPCB standards and thus the impact of the project operation on the ambient noise level of study area will be insignificant.

No impact of vibration on environment as there is no drilling and blasting involved in the mining.

Sensitivity: Public (C4)

4.6.1 MITIGATION MEASURES

4.6.1.1 CONTROLLING NOISE LEVEL OF MACHINERIES-ENGINEERING CONTROLS

The following mitigation measures can be adopted to control noise.

No drilling operations generating high noise level and blasting operations generating impulsive noise are completely avoided.

The ML is enclosed by wide green barrier.

Following management measures will be adopted to control noise levels:

1. Reduction of noise level at source is achieved by proper maintenance of machinery and the equipment. Interruption of noise path from the source to the receiver is achieved by the development of wide green belts in-between.
2. Provision of acoustic cabins for operators deployed on HEMM
3. Vehicular traffic within the mine is restricted by reducing the number of trips, using heavy duty dumpers of capacity 40 T within the ML.
4. Selection of new low-noise equipment from the manufactures failing which use of additional retrofits if available.
5. Green belt developed acts as an acoustic barrier.

4.6.1.2 USE OF PROTECTIVE EQUIPMENT- ADMINISTRATIVE CONTROL

As part of a hearing protection the proponent shall consider:

- Defining hearing protector areas
- Issuing of hearing protection equipment to individuals
- Cleaning, maintenance and replacement of hearing protectors
- Training and education of people wearing hearing protectors.
- Provision of job rotation in noisy areas that will reduce personal exposure
- Setting targets for noise levels in existing work areas
- Training on noise impact and consequences
- Including Noise aspects in work agreements with contractors

Sensitivity: Public (C4)

4.7IMPACTS ON WATER AND PROPOSED MITIGATIVE MEASURES

Impact on Surface Water

Asnora river is touching to the block boundary. Bicholim Mineral Block study area fall under Mondovi River basin of Talukas Bicholim, Bardez, Sattari, Sanguem, Tiswadi & Ponda. The catchment area of Mondovi River is 1580 Sqkm. The Sahyadri hill ranges in the east forms the main watershed. The streams originating here flow in west and north west direction to join the Arabian Sea.

The study area drainage pattern is dendritic and sub dendritic

Main River in study area

Mandovi River -Aerial Distance of 2.30 Km at Pilgao Village

Bicholim River - Aerial Distance of 0.23Km at Mandrekarwada (Bicholim)

Asnoara River - Assonra river is touching to the block boundary

Chapora River- Aerial Distance of 7.3 Km at Colvale Village

The impact on the surface waterbodies is envisage during monsoon season due discharging of mine runoff in the surrounding water bodies in the streams. In case the mine runoff is not treated / managed properly, it may lead to silition of water bodies

Impact on Ground water

The mining operations shall intersect the ground water table as the deepest mine workings in the mining plan period is -67 mts. Average depth of Ground water level within the mine is about 10m bgl Therefore, it requires major pumping operations. Average annual rainfall in the area is about 3500 mm.

The total monsoon water either drains outside the lease area through natural valleys and surface runoff from the operational area is collected in the mining pits.

The average depth of water table varies from 37m to 45m below ground level respectively in Lamgao village, 2m to 27m below ground level in Mandrekarwada,4 to 58m below ground level in Mulgao village . No leachable heavy/toxic metals/elements are present in the ore and the wastes. The suspended solids content in the surface water samples are also well within the limits and therefore there shall be no effect on aquatic life.

Sensitivity: Public (C4)

These clearly establish the Taluk in general and study area of Bicholim Mineral Block is in **SAFE** category in ground water development point of view.

MITIGATION MEASURES

The proposed mitigative measures for surface and ground water

1. Boulder walls will be provided at the foot of the dump to arrest the flow of silt.
2. Garland drain around the dump yard is constructed 1m bottom width, 2m top width and 1m deep with a length of 6100 m to divert water to settling pond for arresting the suspended solids .
3. Covering slopes of the dumps with lateritic material , coir mat and planting grasses, legumes and bush variety of species to prevent erosion
4. Mining : Garland drains to divert rain water to settling pond for settling of suspended solids. Construction of rubble walls to arrest suspended solids. Collecting the rainwater in a sump at the bottom of the Mine Pit to settle the suspended solid particles
5. Proposed rain water harvesting measures: The total water received in year 16748221 m^3, the water harvested in mining pits is about 10128221 m^3. This collected water in the Mine Pit will be used for water sprinkling and greenbelt development
6. The. Proper safety barrier of 50 mts shall be maintained near the Assnora river from the mine pit. The entire surface runoff water is diverted in to mine pit allowed to settle.
7. There shall be no generation of industrial waste water from Mining Operations
8. Ground Water Intersection: Detailed hydrogeological report is given vide **Appendix No. I**
9. Detailed study on proposed engineering measures to prevent pollution of Assnora river is enclosed vide **Appendix No. IV**

The detailed evaluation of impact using BEE's methodology is undertaken which is a weighing scaling checklist under the **section 4.11**

Sensitivity: Public (C4)

4.8 ANTICIPATED IMPACTS ON BIOLOGICAL ENVIRONMENT

Identification of all potential environmental impacts due to a project is an essential step of Environmental Impact Assessment. In generally Mining are normally carried out over a long period till the ore gets exhausted.

The impact on biodiversity would be high if the project is located close to a sensitive area. So, impact of biological environment was assessed based on the ground observation and distance from the project.

The impact will be assessed 1 to 10 scale, if the scale 1 indicate higher chances of impact on biodiversity and 10 score will be least impact on biodiversity as given in the Table 4.8.

Table 4.8. Significance of Impact on Biological Environment (Score 1 higher impact and 10 – least impact on biodiversity)

Issues	**Observations**
Proximity to national park / wildlife sanctuary/ reserve forest/mangroves/ coastline/estuary/sea	Amthane dam (7km)and Mandovi River (2.3 km) upstream river riparian vegetation closer to the core area (<3.5 km range) Eco-sensitive scale ranges 2 (higher sensitive area).
	Mangrove ecosystem nearest south east and west region <3 km Eco sensitive scale range 1
	Salim Ali Bird Sanctuary and Mangrove ecosystem >10 km from core area Eco-sensitive scale would be 8. (Less sensitive area).
	Assnora, Bicholim and Mandovi river aquatic life and riparian vegetation, eco-sensitive scale ranges 1 (high sensitive areas)
Activities of the project affects the breeding/nesting sites of birds and animals	Migratory bird species may be effected due to the Mining activity due to noise, dust and ground vibrations from the vehicles etc . Yellow wattled lapwing and Red wattled lapwings birds prefers the ground for their nesting may be impacted. Eco-sensitive scale would be 9
	The butterfly may get affected due to host plant availability and due to dust deposition on the host plant nearby area. Eco-sensitive scale would be 9
	Fishes and crabs may be effected due to downstream soil erosion to the Assnora, and Mandovi river and its aquatic species. Eco-sensitive scale would be 9
Located near an area populated by rare or endangered species	The fauna's species is given in chapter 3, from the given species list dominate species are locally resident and seasonal migratory species. Eco-sensitive scale would be 10

Sensitivity: Public (C4)

Proposed project restricts access to waterholes for wildlife.	There is possibility of wild boars venture into the core areas for water/foraging . Eco-sensitive scale would be 9
Proposed mining project impact on surface water quality that also provide water to wildlife	No such water effectively used for wildlife, the large proportion of water utilized itself for native species plantations and land stabilization process. Eco-sensitive scale would be 9
Proposed mining project increase siltation that would effect nearby Biodiversity area.	There are chances of soil erosion, but use of geotextiles, proper garland trench and followed by settling ponds avoids damages to aquatic biodiversity at the downstream orders. Eco-sensitive scale would be 8
Risk of fall/slip or cause death to wild animals due to project activities	By chance any such incident or wild animals are reported inside the mine; local forest department would be informed and with their support the animal will be rescued, emergency contact number of forest department would be made available in the mine office . . Eco-sensitive scale would be 8
The project release effluents into a water body that also supplies water to a wildlife	No such effluents coming from Block area,. Eco-sensitive scale would be 10
Mining project effect the forest based livelihood/ any specific forest product on which local livelihood depended	The proposed ML, have no such non-timber forest product depending communities. There is small hamlet of them who are depending upon Agriculture.
	Many village households will be employed in the mines for various types of technical as well as non-technical jobs . Eco-sensitive scale would be 9
Project likely to effect migration routes	No such wildlife corridors . Eco-sensitive scale would be 10
Project likely to effect flora of an area, which have medicinal value.	No such significantly important medicinal value species within the mine area. Eco-sensitive scale would be 10
The project likely to affect wetlands, fish breeding grounds, marine ecology	There is very less chance of soil erosion to the nearby rivers Assnora, and Mandovi and 1st and 2nd order stream. There will be proper mine EMP to be followed to not to let out any sedimentation from the mine lease area . Eco-sensitive scale would be 7

Outside the mine areas degraded landscape were colonized by fast growing, exotic species such as Acacia auriculiformis, Chromolina sp., and L. camara species, which suppress the native species and effects the soil seed bank for future establishment of native forest.

The common threats observed in the buffer zone are grazing, invasive and exotic species proliferation and fuel wood collection by local communities.

Sensitivity: Public (C4)

The given study site receives higher precipitation level (ranges 3000-35000 mm), such intensive rainfall, may contributes proportionally higher turbidity due to the adding up of soil erosion; irrespective of how much precautions been taken. These may affect both lentic and lotic ecosystem and also riparian vegetation. Further transportation / vehicle movement act as a barrier for many elusive / cryptic mammals and also often road transportation may kill many cold-blooded animals like snakes, lizards, frogs and butterflies.

Network of electric line not only cause mechanical injuries but makes many species prone to electrocution to wide span winged birds, flying foxes, macaque and panthers some time become prone to electrocution.

MITIGATION MEASURES

The proposed project, threats may arise as a result of developmental activities in the buffer zone of the mine area . As mentioned in the MoEF&CC guidelines eco-sensitive zones need to be identified around the protected area, which acts as a wildlife corridor or as a shock absorber. The likely disruptive activities include road construction, mining, and dumping of excavated material and human population pressure on land and biological resources of the sanctuary. The mine lease area is close to the aquatic ecosystem may cause significant impacts on downstream aquatic and riparian ecosystem.

The flora and faunal conservation point of view, we are hereby suggesting biodiversity conservation and management plan for the region with the following objectives in mind:

- Sustainable development of natural ecosystems and areas which may hold potentially important species from the conservation and/or economic significance;
- Preservation of natural habitats in the core and buffer zone and identification of areas that require special attention;
- Special efforts for in-situ or ex-situ conservation of rare/endangered/threatened (RET) plant species;
- Mitigation of biotic and/or abiotic pressures/influences on the habitats;

Sensitivity: Public (C4)

- To improve habitat conditions by taking up afforestation with bamboo and fruit yielding species, which attract faunal diversity and soil conservation measures;
- To create awareness regarding conservations, and ensure people's participation in the conservation efforts.

The following areas require special attention with reference to conservation and management of flora and fauna:

- Mine greenbelt area and its buffer zone ecosystems (both aquatic and terrestrial)
- Development of ex-situ area for conservation of RET plant species
- Riparian areas buffer area with protection and restoration of river bank vegetation
- Downstream and upstream areas of river from the mine site.

The nearby forest should be free from fire, fuel wood collection, poaching, invasion of weeds, grazing pressure etc., which are the main limiting factors affecting wildlife habitats and their corridors directly. These threats will cause the following problems in the region.

- Human–Wildlife conflicts
- Reduction in food availability for herbivores
- Soil erosion and water shortage in summer
- Create imbalance in tropic level and food chain
- Disease propagation from livestock to mammals
- Reduction in area of wilderness needed for the wildlife
- Frugivorous birds replace insectivorous birds
- Lack of pollinators and fruit dispersal agents

The detailed evaluation of Impact on Biological environment is given under section 4.11

4.9 SOCIOECONOMIC IMPACT OF BLOCK-I BICHOLIM MINERAL BLOCK (ANTICIPATED IMPACT)

4.9.1 Impact on human habitations.

a) Displacement of population in the core block area.

There are 2 villages within the ML area namely Lamgao and Mulgao villages . The mining operations and habitat are co-existing since many decades and there is no issue

Sensitivity: Public (C4)

as the mining operations shall involve no drilling and blasting and sufficient barrier of 50mts from each villages shall be maintained. No Population has to be displaced because of mine.

Household income from agriculture being low, farmers are looking for income from other sources. The mining is the only other source providing direct or indirect employment for local people rejuvenating household income.

b) Impact on health on pollution in buffer zone

The major impact on the nearby villages would be within 2 kms radius due to factors like Air pollution and noise pollution. Although sufficient safety buffer/ green belt would be maintained from habitations , there could be some influence on the health of the population.

As per the base line study the impact of pollutants will be some of the impacts are listed below:

- Respiratory diseases due to dust
- Loss of sleep due to noise and lights
- Skin diseases due to pollution/ dust etc

Mitigation Measures to minimise health impact on the population:

Various mitigation measures to prevent environmental pollution are detailed in Chapter 10, some of the measures w.r.t air and noise are listed below:

- Dust suppression on the mines
- Green belt development
- Safety buffer of 50m towards habitation
- Well maintained roads on the mines
- Regular maintenance of machinery to reduce the noise generation
- Regular monitoring of air, water and noise levels in core and buffer zone to keep a check on the same.

Sensitivity: Public (C4)

- Various interventions are proposed in the neighbouring village's w.r.t health and a budget of 102 lakhs is provided in CER which would be spent in a span of three years.

c) Impact on population in buffer zone.

The villages covered over the 10 kms of ML area is given in the Fig 4.5 below

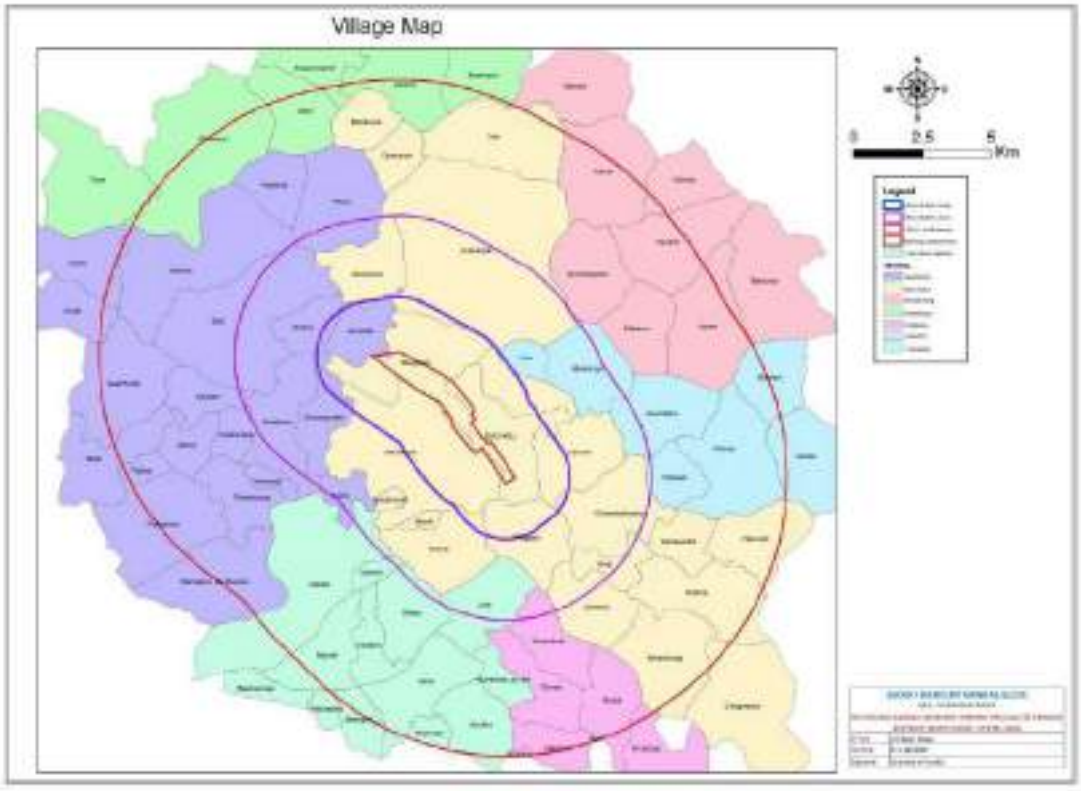

Fig No: 4.5 Village Map

Sl. No	Villages Names within 0-2 km radius	Impact of mining on the nearby population	Mitigative Measures
1	Asnoda	***Environment Pollution*** : **Air:** The major impact on the nearby villages within 2 kms radius is Air pollution in which the pollutants like PM10, PM2.5, SO2 & NOX are predicted by using Aermod in which the incremental values were observed are about PM10-14.45 at Mulgao, PM2.5 -4.84 at Lamgao, SO2 – 0.089 at Lamgao & NOx- 0.0074 at Lamgao	***Air Pollution*** : Dust Suppression : Water sprinkling on the haul roads to control dust emission , Tarpaulin covering of trucks during transportation , Plantation of trees on the either side of the haul roads to minimize dust emission Green belt area :
2	Mulgaon		
3	Dicholi(Lamgao)		
4	Mayem		

Sensitivity: Public (C4)

		Water : Majorly water pollution will be the suspended matter which flow from the mine during rainy season into the nearby nallahs. There are two water bodies nearby 1. Assnora river adjacent to ML area 2. Mandovi River -Aerial Distance of 2.30 Km at Pilgao Village 3. Bicholim River - Aerial Distance of 0.23Km at Mandrekarwada **Noise** : The noise impact from the HEMM and due to transportation of the vehicles	Lamgao : 2.55 Ha (50m wide) Mulgaon : 9.881 Ha (50 m barrier shall be provided) Archeological monuments : Idgah Masque : 1.3414 Ha green belt(200m width) High conopy planataion(local species like Cashew , Avla, Arjuna, Bamboo etc) shall be carried out . ***Ref: Map showing sensitive areas and safety barriers vide plate No.20*** ***Water Pollution*** : Construction of garland drains through out the mine pit near Assnora river bed which is adjacent to ML area which channelizes the water inside the pit and no workings are carried out at 50m width , check dams and settling pond to prevent the sediments runoff in the nearby water bodies . ***Ref: Map showing sensitive areas and safety barriers vide plate No.20*** ***Noise Pollution*** : No drilling and blasting involved in the mining , Maintenance of vehicles to reduce the noise

Sl. No	**Villages Names within 2-5 km radius**	**Impact of mining on the nearby population**	**Mitigative Measures**
1	Advalpal	***Environment Pollution*** : **Air**: The impact on the villages within 5 kms will have less impact in Air pollution in which the pollutants like PM10, PM2.5, SO2 & NOX .	***Air Pollution***: Dust Supression : Water sprinkling on the haul roads to control dust emission , Tarpauline covering of trucks during transportation ,
2	Kasarpal		
3	Mavlinge		
4	Sarvan		
5	Gowandwada		

Sensitivity: Public (C4)

6	Virdi		Plantation of trees on the either side of the haul roads to minimize dust
7	Narva		
8	Aturli		
9	Vayangini		
10	Kalvi		
11	Khorujuven	***Water*** : There are surface water bodies Mandovi river - - 2.3 kms	***Water Pollution*** : Construction of garland drains, check dams and settling pond to prevent the sediments runoff in the nearby water bodies .
12	Aldona		
13	Sirsai	**Noise** : The noise impact shall from the HEMM and due to transportation of the vehicles	***Noise Pollution*** : No drilling and blasting involved in the mining , Maintenance of vehicles to reduce the noise

Already, the State and the Central Governments have been implementing many rural developmental and welfare programs. The mining company will also engage with government and try to utilize the DMF fund for carrying out various development and social works in the surrounding villages.Company will also focus on implementing the CER activities which will be planned basis the suggestions which come during the public hearing.

These activities will impact village economy and socio-economic development.

These activities, may includelike provision of drinking water, health care like medicines, first aid, heath camps and dispensary with a doctor and basic medicines, education and training by providing school uniforms, rain wear, notebooks etc, recreation facilities by donating to sports and to social and cultural organizations and infrastructural facilities like proving street light fixtures, building materials, etc.

The welfare programs may bring some changes in the community and in the individual lifestyles. They have been listed below. The list is not complete and mutually exclusive.

- Use of latest technology in agriculture thus making it less labour intensive
- Employment in non-agriculture sector will increase,
- The literacy rates will improve,
- Money circulation will increase,

Sensitivity: Public (C4)

- Standard of living will improve,
- Aspirations among people will increase, and
- Infrastructural facilities like transport and communication will improve.

There are some aspects which will not change because of mining activity. They are listed below:

- Water quality will remain the same,
- Human settlements will not be disturbed,
- Common property resources, in particular, grazing land will not decline, and

4.9.2 LIVELIHOOD

In general, along with mining agriculture sectors will also flourish. Cash flow in the local market will have greater impact on cash transfers. Income from non-agriculture is going to be the significant source of household economy.

4.9.3 ECONOMICS.

Local economy will become vibrant because of mining activities. The village economy will be rejuvenated because of money flow and monetization of economy.

4.9.4 INFRASTRUCTURE

The mining authorities are going to spent large amount of money in development of infrastructural facilities and this will have positive impact on quality of life.

4.9.5 *IMPACT ON THE CROPPING PATTERN AND THE CROP PRODUCTION IN THE BUFFER ZONE.*

It is observed from the informal meetings, focus group discussions and in-depth interviews that mining will have least impact on agriculture yield.

4.9.6 COMPENSATION FOR LOSS OF LAND AND CROPS.

The project is a fresh grant of mining lease and as such there are no compensation claims towards the company. There would be a structured system of grievance redressal for any external complaints. Advise will be taken from zonal agriculture office as well as Agricultural consultants to improve the agriculture in the surrounding areas.

Sensitivity: Public (C4)

4.9.7 IMPACT ON THE COMMUNITY RESOURCES SUCH AS GRAZING LAND.

The mining activities will have least impact on the common property resources.

4.9.8 MITIGATION MEASURES.

The some of the following tentative mitigating measures are being implemented with well designed plan of action and adequate budget. This list is not exhaustive, but only suggestive.

- Supply of drinking water to villagers,
- Construction and renovation of schools,
- Laying and maintenance of village roads,
- Construction of houses for economically and socially weaker sections,
- Construction and renovation of temples,
- Self-employment program (such as tailoring, wire netting, doll making, cane furniture, etc.) for women members of SHGs,
- Vocational training schools for general or self-employment,
- Afforestation or tree plantation, either fruit bearing or timber or any forest plant,
- Community Health Center/ mobile health van
- Health, safety and medical facilities like first aid and basic medicines provided by their medical facility.
- Education and Training (transport facility for students, educational aids to students), and
- Direct employment for locals for both skilled and unskilled workers.

4.10 IMPACT ON LOCAL TRANSPORT INFRASTRUCTURE DUE TO THE PROJECT. TRANSPORTATION STUDY CONDUCTED AS PER INDIAN ROAD CONGRESS GUIDELINES.

Sl.No	ROM	Quantity TPA	Tones /Day	Trips per Day	Mode of Transport
1	Iron ore	30,00,000	12658	1205	Road
Total Trips per day				1205	

Sensitivity: Public (C4)

To & from

1205 * 2 = 2410

Addition Load of Traffic

Total PCU = 2410 * 3= 7230 PCU

Additional Load is 7230 PCU per day

Road	V (Volume in PCU/day.)	C (Capacity in PCU/day.)	Existing V/C Ratio	LOS
Mine To Jetty	8657	15000	0.577	C Good

Sl.No	V/C Ratio	LOS
1	0-0.2	A Excellent
2	0.2-0.4	B very good
3	0.4-0.6	C Good
4	0.6-0.8	D Fair/ Average
5	0.8-1.0	E Poor
6	1.0 above	F Very Poor

4.10.1 Mitigation Measures

1. The project proponent will deploy road safety marshals for preventing any nuisance to the normal commuters.
2. It is proposed to construct an underpass at the Mayem junction to prevent interface between ore transport and general public
3. The transportation on the public road is stopped during the school timings i.e 7to 8am in the morning, 12.45 to 2 pm in the afternoon. The transportation activity is stopped at 6.30pm in the evening

The impact evaluation on the Social environment (Human Interest) is given under section 4.11.

4.11 EVALUATION OF IMPACTS

For the purpose of evaluation of quality of the environment at Block 1 - Bicholim Mineral Block Project, Battelle Environmental Evaluation System (BEES) methodology

Sensitivity: Public (C4)

has been adopted. This methodology is the most commonly adopted method for evaluation, through a weighing-scaling checklist. The checklist for the present opencast iron ore project would consist of 48 selected parameters identified for this purpose. All these parameters have been assigned importance weight by the experts in different fields. The resultant importance weight points i.e., Parameters Importance Unit (PIU) are presented in Fig… by indicating the numbers in the parenthesis. Typical functional relationships also called value function graphs have been developed for various parameters.

The Environmental Quality (EQ) is represented on a scale of 0 to 1, 0 representing poor environmental quality and 1 representing good environmental quality.

An Index is obtained in Environmental Impact Unit (EIU) for each alternative and baseline environmental conditions (i.e., EIU with EMP (Environmental Management Plan) EMP & EIU without EMP).

$$EIU_j = \sum_{i=1}^{n} (EQ)_{ij} \quad X \quad (PIU)_i$$

Where,

EIUj = Environmental Impact units for Jth alternative

EQij = Environmental Quality Scale for ith factor

PIUi = Parameter Importance Unit for ith factor

All the parameters identified for this project have been distributed in four major categories viz., All the parameters identified for this project have been distributed in four major categories viz.,

1) Biological Environment
2) Environmental Pollution
3) Aesthetics
4) Human Internet

Sensitivity: Public (C4)

ENVIRONMENTAL IMPACT (1000)

Biological Environment (300)

TERRESTRIAL		(200)
.	Natural Vegetation	(40)
.	Crops	(30)
.	Species diversity	(30)
.	Foodweb Index	(20)
.	Rare & Endangered Plant species	(30)
.	Pest Species	(20)
.	Soil Microbiology	(30)
AQUATIC		(100)
Natural vegetation		30
Foodweb Index		10
Species diversity		15
Rare and endangered Species		10
Ground water Characteristics		20
Pests species		15

Environmental Pollution (450)

WATER		(100)
.	Temperature	(10)
.	pH	(15)
.	B.O.D	(15)
.	D.O	(10)
.	Nutrients	(10)
.	T.D.S	(10)
.	Turbidity	(10)
.	Feacal Coliform	(10)
.	Toxic substances	(10)
AIR		(150)
.	SPM	(70)
.	SO_2	(40)
.	Nox	(40)
LAND		(140)
.	Landuse Pattern	(80)
.	Soil erosion	(30)
.	Soil chemistry	(30)
NOISE		(60)
.	Community noise	(15)
.	Occupational noise	(45)

Aesthetics (100)

.	Topographic character	(20)
.	Appearance of Water body	(10)
.	Odor	(10)
.	Landscape	(10)
.	Sound	(10)
.	Visual quality Of air	(20)
.	Natural fauna	(10)
.	Green belt	(10)

Human Interest (150)

.	Economy output	(20)
.	Employment	(25)
.	Housing	(15)
.	Education	(15)
.	Drinking water supply	(15)
.	Sanitation	(10)
.	Transportation & Communication	(15)
.	Community health	(20)
.	Occupational health	(15)

FIG.NO. 4.6 ASSIGNED WEIGHTS FOR ENVIRONMETAL PARAMETERS

Sensitivity: Public (C4)

4.11.1 Biological Environment :

(A) Terrestrial Environment :

The impacts of Iron Ore mining activities are presented in table No.4. Natural vegetation of study area or core zone is very scanty and consists of only bushy growth.

The tree species found within the core zone represent the dry-deciduous type. Due to mining activities community structure of the forest is changing. Diversity of plant species and foodweb Index of the area reduces to certain extent.

However, if the proposed reclamation of the mining area and dumped out area using proper revegetation techniques and development of green belt around the ultimate pit limit, there shall be an improvement in the species diversity and foodweb Index.

(B) Aquatic Environment :

The existing quality of natural vegetation in the aquatic environment is good. However, due to the dumping of overburden from the mines may lead to soil erosion ultimately affecting the turbidity and chemical characteristics of surface water. This in turn will alter the aquatic natural vegetation by way of change in species diversity. With the provision of check dams and vegetation of dumped areas there shall be reduction in soil erosion. This in turn will improve the natural vegetation by improving the species diversity, foodweb Index and surface water characteristics.There are no rare and endangered aquatic species reported in the study area. There are no aquatic weeds reported in the surface waters. Hence no change in this parameters are anticipated.

In general, due to various mining activities, adverse impacts are anticipated in terrestrial and aquatic components of the Biological Environment. However, with the implementation of the EMP, which is being proposed, there will be significant improvement in the parameters of biological environment (Table No.4).

Sensitivity: Public (C4)

Table No.4.9 **ENVIRONMENTAL EVALUATION: BIOLOGICAL ENVIRONMENT**

Environmental Parameters	PIU/EQU EIU	Baseline (A) EIU	Without EMP (B) EIU	With EMP (C) EIU	Change In EIU (C-B)	Change In EIU (B-A)	NET Change EIU (C-A)
TERESTRIAL							
Natural vegetation	40	28	20	32	12	-8	4
Crops	30	18	15	18	3	13	0
Species diversity	30	15	12	18	6	-3	3
Foodweb Index	20	16	10	14	4	-6	-2
Rare and endangered	30	18	12	18	6	-6	0
Plant Species	20	12	8	12	4	-4	0
Pests species	20	12	8	12	4	-4	0
Soil microbiology	30	21	15	21	6	-6	0
Sub-Total	200	128	92	133	41	-36	5
AQUATIC							
Natural vegetation	30	24	15	21	6	-9	-3
Foodweb Index	10	7	4	8	4	-3	1
Species diversity	15	9	6	12	9	-3	3
Rare and endangered	10	7	5	7	2	-2	0
Species Ground water	20	12	8	12	4	-4	0
Characteristics Pests species	15	9	6	9	3	-3	0
Sub-Total	100	68	44	69	25	-24	1
Total	300	196	136	202	66	-60	6

4.11.2 ENVIRONMENTAL POLLUTION:

Due to the continuity of the mining activities of the project the following four components are affected. Viz.,

Air

Water

Land

Noise & Vibration

Sensitivity: Public (C4)

Air Environment :

In the proposed opencast mine operations like ripping,dozing, loading, crushing and screening ,transportation and unloading operations of overburden and iron ore may deteriorate the air quality. The baseline levels of ambient air quality in the buffer zone villages are well within the permissible limits. However, the dust concentrations in the fugitive sources are likely to increase during mining operations . The concentration of NOx and SO2 are very much below the permissible limits.

Reduction in dust concentration is anticipated by green belt development and water spraying on all the haul roads and at the screening plant.

Water Environment :

Major Parameters which represent the water environment are BOD, DO, Total Solids (TS), Turbidity, Faecal coliforms, toxic metals, pH, temperature and nutrients.

The water flowing through the overburden dumps will carry suspended solids, dissolved metals and nutrients, which will affect the quality of the groundwater as well as surface waters.

Provision of rubble walls, garland drains, settling ponds and plantations of trees, grasses, legumes etc., on the overburden dumps will arrest soil erosion to a great extent. This will improve the surface and ground water quality.

Land Environment:

Excepting the mining lease area, there will not be any adverse effect on the land in the buffer zone area. With the measures proposed under EMP there will not be any effect of land degradation other than the mining lease area.

Noise:

The sources of noise in mining area are due to ripping, dozing, loading, haulage, crushing, screening and unloading of ore and waste using shovels, Unloading of overburden using dumpers and transportation of ore to the crushing and screening

Sensitivity: Public (C4)

plant, and transportation of ore to the sidings.

Table No.4.10 ENVIRONMENTAL EVALUATION OF: ENVIRONMENTAL POLLUTION

Environmental Parameters	PIU/EQU	Baseline (A) EIU	Without EMP (B) EIU	With EMP (C) EIU	Change In EIU (C-B)	Change In EIU (B-A)	NET Change EIU (C-A)
WATER							
Temperature	10	4	3	4	1	-1	0
pH	15	9	6	7.5	1.5	-3	-1.5
B.O.D	15	7.5	6	7.5	1.5	-1.5	0
D.O	10	8	6	7	1	-2	-1
Nutrients	10	4	3	4	1	-1	0
T.D.S	10	7	6	7	1	-2	-1
Turbidity	10	6	4	5	1	-2	-1
Faecal Coliform	10	9	5	7	2	-4	-2
Toxic Substances	10	8	6	7	1	-2	-1
Sub-Total	100	62.5	45	56	11	-17.5	6.5
AIR							
PM_{10}	70	56	35	52.5	17.5	-21	-3.5
SO2	40	32	24	31	7	-8	-1
NOx	40	32	24	31	7	-8	-1
Sub-Total	150	120	83	114.5	31.5	-37	-5.5
LAND							
Land use pattern	80	56	40	52	12	-16	-4
Soil erosion	30	24	18	23	5	-6	-1
Soil Chemistry	30	21	15	20	5	-6	-1
Sub-Total	140	101	73	95	22	-28	-6
NOISE							
Community Noise	15	12	9	11	2	-3	-1
Occupational noise	45	38	26.5	36	9.5	-11.5	-2
Sub-Total	60	50	35.5	45.5	10	-14.5	-3
TOTAL	450	333.5	236.5	311.0	74.5	-97	-8

4.11.3 AESTHETIC ENVIRONMENT

The topography of the mining area i.e., gently hilly terrain shall alter to certain extent due to excavation of ore and dumping of overburden. The development of proposed green belt around the ultimate pit limit and afforestation of backfilled areas will enhance diversity of vegetation. The visual quality of water any change slightly. .

Sensitivity: Public (C4)

The aesthetic parameters with EMP and without EMP have been presented in Table No.4.11.

Table No.4.11 ENVIRONMENTAL EVALUATION OF: AESTHETIC ENVIRONMENT

Environmental Parameters	PIU/EQU	Baseline (A) EIU	Without EMP (B) EIU	With EMP (C) EIU	Change In EIU (C-B)	Change In EIU (B-A)	NET Change EIU (C-A)
Topographic Character	20	14	10	14	4	-4	0
Appearance of waterbody	10	6	4	6	2	-2	0
Odour	10	8	7	8	1	-1	0
Land scape	10	9	5	8	3	-4	-1
Sound	10	8	6	7	1	-2	-1
Visual Quality Of air	20	14	10	14	4	-4	0
Natural fauna	10	6	4	6	2	-2	0
Greenbelt	10	8	5	9	4	-3	1
Total	100	73	51	72	21	-22	-1

4.11.4 HUMAN INTEREST

Operation of mining and associated activities will result in some socio-economic impacts, of direct consequence and some of indirect nature. The social status of the people will improve due to increased income for workers as a result of increase in employment opportunities. There will be occupational problems due to the mining activity, but these problems can be contained by adopting all the measures suggested in EMP.

Education and sanitation status will improve in this are due to this project. The respective score for all the human interest parameters are presented in Table No.4.12.

Table No.4.12 ENVIRONMENTAL EVALUATION OF : HUMAN INTEREST

Environmental Parameters	PIU/EQU	Baseline (A) EIU	Without EMP (B) EIU	With EMP (C) EIU	Change In EIU (C-B)	Change In EIU (B-A)	NET Change EIU (C-A)
Economy output	20	6	14	18	4	8	12
Employment	25	12.5	15	20	5	2.5	7.5
Housing	15	4.5	9	10.5	1.5	4.5	6
Education	15	6	9	10.5	1.5	3	4.5
Drinking Water Supply	15	9	7.5	10.5	3	-1.5	1.5

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Sanitation	10	5	7	8	1	2	3
Transportation & Community	15	9	10.5	12	1.5	1.5	3
Community Health	20	12	12	16	4	0	4
Community Health	20	12	12	16	4	0	4
Occupational Health	15	9	7.5	12	4.5	-1.5	3
Total	150	73	91.5	117.5	26	18.5	44.5

The Net Environmental Impact of Block I Bicholim Block for biological category is +6. This is due to the increased plantation and proper land use as envisaged in the EMP.

The Net Impact under environmental pollution category is -ve with -8 points. This -ve impact is due to mining operations and transportation activities. The dust levels are bound to increase. The noise levels also will increase due to the operation of various mining equipment and screening plants.

The Aesthetic category marks minor – ve impacts due to change in appearance of water, diversity of vegetation and marginal change in visual quality. The human interest parameters show +ve impact due to increased job opportunities, transportation, medical facilities etc.,

It is observed that the estimated change in EIU from baseline to the project without EMP is -160.5. the overall change in EIU due to the project with EMP over the baseline is a +ve of +42. The total Net impact is therefore +ve for the iron ore mining project. The summary of environmental evaluation is presented vide Table No.4.13.

Table No.4.13 SUMMARY OF ENVIRONMENTAL EVALUTION

Environmental Parameters	PIU/EQU	Baseline (A) EIU	Without EMP (B) EIU	With EMP (C) EIU	Change In EIU (C-B)	Change In EIU (B-A)	NET Change EIU (C-A)
Biological Environment	300	196	136	202	66	-60	6
Environmental Pollution	450	333.5	236.5	311.0	74.5	-97	-8
Aesthetic	100	73	51	72	21	-22	-1
Human Interest	150	73	91.5	117.5	26	18.5	45
Total	1000	675.5	515	702.5	187.5	-160.5	42

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With a view to analyse subjectivity and uncertainty in decision making for the continuation of this mining project, two evaluation scenarios with equal and unequal PIUs are considered. The results are tabulated in table No.4.14. the project evaluation scores with assigned set of PIUs and those with equal PIUs have been analysed. The current evaluation score with unequal PIUs is+42 units whereas with equal PIUs (Hypothetical Evaluation) the score is +64.5. Therefore, the continuity of project contributes positively.

Table No.4.14

SCENARIO A : UNEQUAL PIUs (CURRENT EVALUATION)

Environmental Parameters	PIU/EQU	Baseline (A) EIU	Without EMP (B) EIU	With EMP (C) EIU	Change In EIU (C-B)	Change In EIU (B-A)	NET Change EIU (C-A)
Biological Environment	300	196	136	202	66	-60	6
Environmental Pollution	450	333.5	236.5	311.0	74.5	-97	-8
Aesthetic	100	73	51	72	21	-22	-1
Human Interest	150	73	91.5	117.5	26	18.5	45
Total	1000	675.5	515	702.5	187.5	-160.5	42

ENVIRONMENTAL EVALUTION WITH EQUAL AND UNEQUAL PIUs

SCENARIO B : EQUAL PIUs (HYPOTHETICAL EVALUATION)

Environmental Parameters	PIU/EQU	Baseline (A) EIU	Without EMP (B) EIU	With EMP (C) EIU	Change In EIU (C-B)	Change In EIU (B-A)	NET Change EIU (C-A)
Biological Environment	250	163	113	168	55	-50	5
Environmental Pollution	250	185	130	172.5	42.5	-55	-12.5
Aesthetic	250	182	128	180	52	-54	-2
Human Interest	250	122	152.5	196	43.5	30.5	74
Total	1000	652	523.5	716.5	193	-128.5	64.5

Sensitivity: Public (C4)

Chapter-5

ANALYSIS OF ALTERNATIVES (TECHNOLOGY & SITE)

Sensitivity: Public (C4)

5.0 ANALYSIS OF ALTERNATIVES (TECHNOLOGY & SITE)

5.1 ALTERNATIVE TECHNOLOGIES

This proposal is for Environmental Clearance under EIA Notification 2006 and as amended time to time. The proponent proposes to adopt systematic mechanized open cast mining with HEMM technology for mining the ore, which is a conventional methodology used all over the world. The project proponent plans to adopt the State of Art technology in mining and to procure new generation HEMM for mining of Iron Ore deposits. Hence, no other alternative technology for mining is considered as the present technology is proven, tested and viable technology.

5.2 ALTERNATIVE SITES

Vedanta Limited is intending to start iron ore mining in Block-I Bicholim Mineral Block, located at Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages, of Bicholim Taluka, North Goa District, Goa State over an area of 478.5206 Ha, to be leased over a period of 50 years after fulfillment of conditions of LOI issued by the Department of Mines and Geology, Government of Goa. The proposed Mining Lease area falls in Toposheet no. 48 E /14 of Survey of India. The 'Block-I Bicholim Mineral Block'' will be provided with all necessary infrastructural facilities for the production of Iron Ore. The proposed production of 3.0 MTPA is planned within the existing Mining Lease Area. There is no forest land involved in the said Mining Lease. Since the Mining activity is site specific activity, seeking alternative site is not applicable.

Sensitivity: Public (C4)

Chapter-6

ENVIRONMENTAL MONITORING PROGRAM

Sensitivity: Public (C4)

ENVIRONMENTAL MONITORING PROGRAMME

6.0GENERAL

The monitoring and evaluation of the management measures envisaged are critical activities in implementation of the proposed project. Monitoring involves periodic checking to ascertain whether activities are performed according to the plan. This provides necessary feedback for project management to check the efficacy of environmental performance. The purpose of the environmental monitoring plan is to ensure that the envisaged purpose of the project is achieved and accrues desired benefit. To ensure the effective implementation of the proposed mitigation measures, the broad objectives of monitoring plan are:

- To evaluate the performance of mitigation measures proposed in the EMP.
- To evaluate the adequacy of Environmental Impact Assessment
- To suggest improvements in environmental management plan, if required
- To enhance environmental quality.
- To undertake compliance monitoring of the proposed project operation.

A separate department, the "Environment Management Department (EnMD) shall be constituted to carry out day to day environmental monitoring/ inspection requirements at the project site.

6.1 TECHNICAL ASPECTS

6.1.1 METHODOLOGIES

Environmental monitoring is required to know the Quality of Ambient Air, Water and Noise Levels during the operation phase of the proposed project and take required corrective measures, in case of any non-compliance with the norms stipulated by regulatory authorities. The methodologies adopted for environmental monitoring will be in accordance with the CPCB guidelines.

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Environmental Monitoring will be done in accordance with National Ambient Air Quality Monitoring Series: NAAQS/2003-04, Guidelines for Ambient Air Quality Monitoring, Central Pollution Control Board, April, 2003, Guidelines For The Measurement Of Ambient Air Pollutants Central Pollution Control Board May, 2011, Minars/27/2007-08, Guidelines For Water Quality Monitoring, Pollution Control Board Methods of Monitoring and Analysis, Annex IV of guidelines. A planned monitoring program to evaluate the effectiveness of various/specific aspects of technological/ mitigation measures shall be drawn.

Monitoring shall be conducted by the environmental management cell by engaging a laboratory recognized by MoEF&CC.

6.1.2 FREQUENCY & LOCATIONS OF ENVIRONMENTAL MONITORING

A comprehensive monitoring programme is given under

Table 6.1: Monitoring Schedule for Environmental Parameters

S.No.	Particulars	Frequency of Monitoring	Sampling	Parameters Required to be Monitored
Air Quality				
1	Ambient Air quality in and around the Mine	Twice a week	24 hours continuously	$PM_{2.5}$, PM_{10}, SO_2 & NO_2
Water Quality				
2	Water Quality around the Mine (Surface & Ground Water)	Once in a Month	Grab Sampling	As per IS: 10500
Noise Level Monitoring				
3	Ambient Noise levels & work place Noise monitoring	Once in a Quarter	Continuous for 24 hours with 1-hour interval	Noise Level
Soil Quality				
4	Soil Quality around the Mine	Once in a year	Grab Sampling	IS: 2720

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6.1.3 DATA ANALYSIS

The procedures that will be followed for analyzing the parameters are indicated below:

- Water samples will be analyzed for various parameters as per IS: 10500
- $PM_{2.5}$ & PM_{10} will be analyzed as per IS: 5182 Part IV, SO_2& NO_2 as per IS: 5182 Part II & Part VI respectively using APM 550 dust sampler or equivalent.
- SO_2 samples will be analyzed using improved West-Gaeke method for air samples with the help of spectrophotometer.
- NO_2 samples will be analyzed using Jacob and Hocheiser modified (Na-As) method for air samples with the help of spectrophotometer.

6.1.3.1 MICROMETEOROLOGY

A micro-meteorological station will be set-up at an approximately central location of the mine lease. The site selected shall be free from obstructions to ensure free movement of air. An "Automatic Weather Station" will be installed at least 5 m above the ground. The following attributes will be measured at one-hour interval continuously round the clock:

- Wind Speed
- Wind Direction
- Air Temperature
- Relative Humidity

Precipitation will be recorded on a daily basis.

The data will be recorded automatically on a data logger.

6.1.3.2 Air Quality

Air quality will be monitored at 8 locations on a regular basis. Totally 4 buffer zone stations and 4 core zone stations - 1 ambient air quality station and 3 fugitive dust monitoring stations shall be monitored in the up-wind and down-wind w.r.t. the ML area. The number of stations may be increased if directed by State Pollution Control Board (SPCB) or the Regional Office of MoEF&CC. The locations shall be selected in consultation with the Regional Officer of SPCB.

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Selected parameters of National Ambient Air Quality Norms [PM_{10}, $PM_{2.5}$, SO_2 & NO_2,] shall be monitored. Ambient air and Core zone stations will be monitored on 24 hourly basis and shall be collected twice a week at all the stations. The fugitive dust samples shall be collected as per IBM and DGMS guidelines.

It is proposed to set up One Continuous Ambient Air Quality Monitoring (CAAQM) station near the mining office inside the lease for monitoring dust particles (PM_{10} & $PM_{2.5}$) within a period of 1year from the date of execution of lease deed.

6.1.3.3 Work Zone Air Quality

Work-zone air quality shall be monitored at various strategic locations (mine faces, crushing plant, loading-unloading points, screening plant, and haulage road). 8 hourly samples shall be collected at each of the locations twice a month.

6.1.3.4 Ground water levels

Water levels in wells at varying distances all around the project area shall be monitored every month.

6.1.3.5 Surface and Ground water quality

Surface water samples shall be collected at 8 locations which include all the mine discharge points and upstream and down stream of Bicholim and Asnora river.. Samples shall be collected once a month. The parameters listed in IS: 2296 shall be monitored.

Ground water samples shall be collected at five different locations around the mine site. Samples will be collected once on a seasonal basis. The parameters listed in IS: 10500 shall be monitored.

6.1.3.6 Ambient Noise

Ambient noise levels shall be monitored at 6 locations in the surrounding villages including the habitation near transportation route. Noise levels shall be recorded at one-hour intervals continuously for 24 hours at each of the locations once in a season. The frequency of monitoring may be altered if directed by the concerned statutory authorities.

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6.1.3.7 ***Work zone Noise***

Work-zone noise levels shall be monitored at various strategic locations (mine faces, crushing plant, loading-unloading points, mine workshop(s), mine office, etc.).

Additional locations may be covered if directed by concerned statutory authorities (SPCB, MoEF&CC, and DGMS). Noise levels shall be recorded at one-hour intervals continuously for 8 hours at each of the locations once a month.

6.1.3.8 Occupational ***health and safety***

An Occupational Health Centre (OHC) for Bicholim Mine shall be established. A systematic programme for medical check-up at regular intervals will be followed at the Occupational Health Centre (OHC) for all workers to ascertain any changes in health condition due to the working conditions.

All workmen employed in hazardous working conditions will be provided with adequate Personnel Protective Equipments (PPE).

6.1.3.9 Plantation and green belt development

Green belt development vis-a-vis safety zone management and progressive plantation in and around the project site shall be developed and maintained. There already exist a green belt in the mine lease, The same will be maintained and also strengthened . Annual plantation programme would be carried out during monsoon season and the data on list of species, area of green cover, survival rate etc. shall be maintained. Native species will be planted under the guidance of State Forest Department.

Annual plans for tree plantation with specific number of trees to be planted shall be made. The fulfillment of the plan shall be monitored by the Environment department . Necessary after care to the plants like watering of the plants, manuring, weeding etc will be carried out for minimum 5 years by involving the local population.

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6.1.3.10 SOCIO-ECONOMIC DEVELOPMENT

CSR activities are expected to play a significant role in the peripheral development of the region. The project will improve the infrastructure & economic conditions leading to overall socio-economic development of the region.

The communities, which are likely to be benefited by the project, are thus one of the key stakeholders for the mining project. Vedanta Limited will plan structured interactions with the community to disseminate the measures taken and also to elicit suggestions for overall improvement for the development of the area.

6.1.4 REPORTING SCHEDULE

After completion of analysis, the results of analysis will be sent to Goa State Pollution Control Board on a monthly basis and MoEF&CC & CPCB on a six-monthly basis.

Copies of the reports will be maintained at the Mine and will be made available to the concerned inspecting authorities like Indian Bureau of Mines (IBM), GSPCB, MOEF &CC etc.

6.1.5 EMERGENCY PROCEDURE

As there is no point source of emission and no generation of any industrial effluent, the possibility of emission/waste water discharge exceeding the norm & leading to emergency situation is not envisaged.

6.1.6 DETAILED BUDGET & PROCUREMENT SCHEDULES

The budgetary allocation for Environmental Monitoring is around Rs. 44 lakhs per annum. A third-party laboratory recognized by CPCB, MoEF&CC shall be engaged to monitor all the environmental parameters. Hence, no procurement of any monitoring equipment is required except the CAAQM's which is one time capital investment 44 lakhs which shall be procured within 1 year of commencement of mining operations.

Half yearly compliance report in respect of stipulated prior environmental clearance terms & conditions will be submitted on 1st June and 1st Dec of each calendar year to MoEF&CC.

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Environmental Issue/ Impacts	Mitigation Measure	Approximate Location	Responsibility
Meteorology	Meteorological parameters through a continuous monitoring system.	Near Mine office	EMD
Ambient Air Quality	Ambient Air Quality with respect to RPM, SO_2, NOx shall be monitored	1 control station in upwind side and remaining stations in downwind side w.r.t quarries and external dumps	EMD
Work Zone Air Quality	Work Zone Air Quality with respect to RPM, SO_2, NOx shall be monitored	At loading/unloading point near Mine & main haul road	EMD
Ambient Noise	Periodic measurement with Noise meter	At nearest villages/settlements alongside the lease	EMD
Work Zone Noise levels	Periodic measurement with Noise meter	At loading/unloading point near quarry & main haul road	EMD
Surface Water Quality	Changes in surface water quality will be monitored by water quality analysis.	All mine discharge points, Upstream and Downstream of Bicholim and Assnora river	EMD
Ground Water Quality	Changes in ground water quality will be monitored through water quality analysis.	Changes in ground water quality will be monitored in the up-gradient and down gradient w.r.t. the mine	EMD
Solid Waste Generation, OB Dumping & Backfilling	Overburden generated during mining operations will be either dumped in pre-identified dumping area or will be backfilled within the exhausted quarry areas.	Backfilled areas	Mines manager/ Technical services
Slope Failure	Regular examination will be carried out to look for slope failure on open cast mine faces, ore and overburden benches etc.	Backfilled areas / Quarry benches/ Fines stacks	Mine manager/ Technical services
Maintenance of Storm Water Drainage System	The drains will be periodically cleared to maintain storm water flow.	Drainage network within the lease area.	Operations
Green Belt and Progressive Afforestation	Progressive afforestation, green belt development & maintenance of safety zone.	Planting trees in the open area	EMD
Occupational Health	Health checkup, Training	Workers at Mine site, workshop, siding, crusher house & other units in the premises.	Plant Medical Unit
Socio-economic Development	Structured interactions with the community	Stake Holders	Operations/CSR/ EMD

Environmental Monitoring Programme

Note: EMP = Environmental Management Plan, EMD = Environment Management Division, CSR = Corporate Social Responsibility

Sensitivity: Public (C4)

Chapter-7

ADDITIONAL STUDIES

Sensitivity: Public (C4)

7.0 ADDITIONAL STUDIES

7.1 PUBLIC CONSULTATION

This EIA & EMP Report has been prepared in compliance with the EIA Notification dated 14th September 2006 and the Terms of Reference (ToR) issued by the Ministry of Environment, Forests & Climate Change vide letter **No F.No IA-J-11015/3/2023-IA-II(NCM) dated 16.06.2023.** The input on various mining parameters, mining lease area, production levels, mining technology, waste generation, handling & storing etc. have been taken from the mining plan approved by Indian Bureau of Mines, for the preparation of the EIA Report. The public hearing was conducted on 11.08.2023 at Narayan Zantye Multipurpose Sports Complex, Sarvan, and Bicholim taluka North Goa district, Goa and, the proceedings of the same, were recorded by Goa State Pollution Control Board and hard copy of the proceedings of the public hearing were received by Project proponent on the same day. The proposed action plan with the budget, to comply with points raised in public consultantion is presented in the Final EIA Report.

Advertisement

Press notification regarding the date, time and venue of the Environmental public hearing for Block-1 Bicholim Mineral Block on 07/07/2023 in BhangarBhui, Heraldo, Lokmat & Free press journal (Mumbai Edition) News papers. The details are given below:

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BhangarBhui News Paper	**Heraldo News Paper**	**Lokmat News paper**
Date of Advertising : 07/07/2023	**Date of Advertising : 07/07/23**	**Date of Advertising : 07/07/2023**

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Minutes of the meeting and Response

The minutes of the public hearing is enclosed along with the attendance sheet. Speaker wise and Point-wise concerns raised during public hearing and response with detailed time bound action plan and budgetary provisions are presented in **Annexure-10**

Representations received as part of public consultation, and Response with detailed time bound action plan and budgetary provisions per MoEF&CC O.M. dated 30/09/2020 is presented in Table 7.1.

Public Hearing Photos

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Table No 7.1 Action plan as per MoEF&CC O.M. dated 30/09/2020

Sr. No.	Activities	Budget (Rs. In Lakhs)	Yearwise Physical targets & Budget		
			Year1	Year2	Year3
I	**Education**				
1	Educative wall Paintings in 16 Govt. Primary Schools in Mulgao, Piligao, Sirigao, Mayem and Lamgao villages.	17.00	Benefit to 5 schools namely: 1. Govt.Primary School-Piligao; 2. Govt.Primary School-Sirigao; 3. Govt.Primary School-Lamgao; 4. Govt.Primary School- Bordem and 5. Govt.Primary School-Kantar Dabdaba villages. (170 students) **Rs. 5lakh**	Benefit to 5 schools namely: 1. Govt.Primary School-Bagwada, Mulgao; 2. Govt.Primary School-Manasbag, Mulgao; 3. Govt.Primary School-Shirodwadi, Mulgao; 4. Govt.Primary School-Bagwada, Piligao; and 5. Govt.Primary School-Mathwada, Piligao (80 students) **Rs. 5lakh.**	Benefit to 6 schools in Mayem-Vaiguinim Panchayat namely: 1. Govt.Primary School-Bhavkai; 2. Govt.Primary School-Kelbaiwada; 3. Govt.Primary School-Haturli; 4. Govt.Primary School-Gaonkarwada; 5. Govt.Primary School-Haldanwadi; and 6. Govt.Primary School-Sikerim. (100 students) Rs. 7 lakh

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2	Teaching learning kits and Sports kits to 16 Government Primary Schools in Mulgao, Sirigao, Mayem, Lamgao, Bordem, Dabdaba and Piligao villages	8.50	Benefit Govt.Primary School-Bhavkai, Govt.Primary School-Kelbaiwada ,Govt.Primary School-Haturli, Govt.Primary School-Gaonkarwada, Govt.Primary School-Haldanwadi, and Govt.Primary School-Sikerim in Mayem-Vaiguinim Panchayat. **Rs 3.5lakh**	Benefit Govt.Primary School-Bagwada, Mulgao Govt.Primary School-Manasbag Mulgao, Govt.Primary School-Shirodwadi Mulgao and Govt.Primary School-Bagwada, Piligao and Govt.Primary School-Mathwada Piligao. (80 students) **Rs 2.5lakh**	Benefit Govt.Primary School-Piligao, Govt.Primary School-Sirigao, Govt.Primary School-Lamgao, Govt.Primary School- Bordem & Govt.Primary School-Kantar Dabdaba villages. (170 students) **Rs. 2.5lakh**
3	Outdoor play equipments in Govt. Primary School Manasbag Mulgao.	1.00	-	Govt. Primary School Manasbag, Mulgao. (12 students) 1Lakh	-
4	Construction/Repair of Anganwadi building at Lamgao village	20.00	Construct/repair new building for anganwadi at Lamgao village.(approx.20 children) 20Lakh	-	-

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5	Computer Labs in 4 high Schools in the buffer zone	14.00	Each computer Lab will be provided with 10, computers, tables & chairs. Benefit 4 High Schools (~2800 students) namely: 1.Our lady of Grace High school-Bicholim; 2.Radhakrishana Vidyalaya -Bicholim; 3.Ideal High school, Piligao and 4 Govt. High School Mulgao. 10.9lakh	Continue operation of all 4 computer labs in year 2. (benefitting ~2800 students) 1.5lakh	Continue operation of all 4 computer labs in year 3. (benefitting ~2800 students) 1.6Lakh
6	Construction of 2 classrooms in Vijayanand High school, Tikhajan-Mayem	20.00	Construct 2 classrooms in Vijayanand High School, Mayem. 20 Lakh	-	-
II	**Health Care Facilities**				
7	Mobile Health Van (MHU) catering to Mulgao, Mayem, Piligao, Lamgao and Sirigao villages providing basic medical care services at doorstep. Additionally 10 specialised health camps per year for women, children and elderly.	102.00	Weekly two MHU visits to each targetted villages (5nos) namely Mayem, Mulgao, Piligao, Lamgao and Sirigao. 2 specialised health camps in each targetted village (5nos.) 30Lakh	Weekly two MHU visits to each targetted village (5nos) namely Mayem, Mulgao, Piligao, Lamgao and Sirigao. 2 specialised health camps in each targetted village (5nos.) 34Lakh	Weekly two MHU visits to each targetted village (5nos) namely Mayem, Mulgao, Piligao, Lamgao and Sirigao. 2 specialised health camps in each targetted village (5nos.) 38 Lakh

Sensitivity: Public (C4)

III	**Agriculture Development**				
8	Support for agriculture rejuvenation by providing necessary inputs like Seeds, Fertiliser, ploughing, Fencing support etc in Mayem, Mulgao, Piligao, Bicholim villages to benefit over 300 farmers. Farmers awareness and motivational workshop by involving Agriculture department and other experts.	45.00	100 farmers beneficiary 10 lakh	100 farmers beneficiary 15lakh	100 farmers beneficiary 20 lakh
9	Supplying water for irrigation of horticulture garden (Orchards of coconut, arecanut plantation) in Mulgao village during non monsoon season.	1.80	20 farmers of Mulgao, apprx. Area 7000m2 0.6Lakh	20 farmers of Mulgao apprx. Area 7000m2 0.6Lakh	20 farmers of Mulgao apprx. Area 7000m2 0.6Lakh
IV	**Skill Development**				
10	Start 2 computer skilling /vocational training centres in Mayem Panchayat and Bicholim Municipal Council offering courses Like DCA, Tally & GST, Web designing, Advance excel and DTP.	23.00	Centre will be equiped with 10 computers, chairs , tables, internet facility and trainer. Training 240 local youths from Mayem-Vaiguinim Panchayat and Bicholim Municipal Council areas. 10lakh	Operation of 2 computer skilling centres in year 2. Training 240 local youths. 6lakh	Operation of 2 computer skilling centres in year 3. Training 240 local youths. 7Lakhs

Sensitivity: Public (C4)

11	10 Skill training workshops covering around 300 women self help group members on rural enterprise development. Creating 10 women enterprises	35.00	2 training workshops in each village namely Piligao, Mulgao, Mayem, Sirigao and Bicholim. 6Lakh	2 training workshops in each village namely Piligao, Mulgao, Mayem, Sirigao and Bicholim. Support 3 groups/individual for micro enterprises 12lakh	10 women enterprises from Piligao, Mulgao, Mayem, Piligao and Bicholim villages. 17lakh
V	**Infrastructure Development**				
12	Retaining wall to agriculture field of Satyavan Chodankar, Mulgao village	22.00	-	Retaining wall of 40m x5m area. 22lakhs	-
	Total	**309.30**	**116**	**99.6**	**93.7**

Sensitivity: Public (C4)

7.2 RISK ASSESSMENT

Vedanta Limited has developed the management system to accomplish the objectives set out in the health and safety policies. It is oriented towards the provision and maintenance of a healthy, safe, and sustainable work environment; to the satisfaction of the stake holders, in accordance with legislation, by providing adequate training to staff to ensure competency and pro-actively reducing the risk of accidents or environmental issues. The proposed operations, storage and handling of raw materials have been studied to identify & assess the Risks (Hazards) and prepare Emergency Preparedness and Response Plan & Disaster Management Plan for natural calamities.

Based on the Hazard Identification and Analysis, the major emergency scenarios have been predicted to estimate the consequence of failure.

In the proposed open-cast mining operations at Bicholim Mine, the following Risks are identified as shown under:

1. Pit slope failure
2. Waste Dump slope failure
3. Water Inundation
4. Fire

1. Pit slope failure

In order to cope up with dangers due to open cast slope failure, slope stability estimations will be made for the mine quarries after determining various physical parameters of the ground mass like uni-axial compressive strength, tri-axial compressive strength, cohesion, angle of friction, specific gravity of the rock, water pressure etc.

Besides, the identification and pragmatic preventive action shall be taken if there is any chance of planer failure or wedge failure resulting due to discontinuities.

The slope stability study was done by NIRM IN Aug 2010 for the old workings.

Pit were maintained as per the study conducted and suggestions provided are summarised below:

i. The analysis for the individual benches in different lithological units under dry as well as fully saturated condition indicated that the maximum angle of the individual benches shall be 70°, and the maximum height shall be 7m. However, for the benches in Phyllitic clay, Limonitic clay and Manganiferous clay, a maximum slope angle of 64° is required with bench height of 6m. The width of all the individual benches shall be minimum 12 m.

ii. The existing overall slope profiles at different Sections in 1 Top pit at Bicholim iron ore mine under dry as well as fully saturated conditions are having safety factor more than 1.3, indicating the stability of the slopes.

iii. The overall safe slope angle for the maximum depth of 100 m of the pit is estimated as 23° under fully saturated conditions. However, the ultimate pit slope for a depth of 130 m is estimated as 21°.

This can be achieved by maintaining the Phyllite clay bench height at 5 m and the width of these benches shall be 15 m for the depth range of 100 m to 130 m. To achieve the safe ultimate pit slope, at least two high grade ore benches have to be left against the ultimate pit slope in order to provide the recommended safety factor.

While approaching the ultimate pit limits, regular monitoring of slope/crack movement shall be carried out using instruments such as inclinometers, total station, crack meters, piezometers etc. It is appropriate here to mention that, measures such as stabilization features for the dumps using geotextiles exist. Precautions are taken for improving the drainage system by providing systematic garland drains throughout the periphery of the mine.

The slopes will be monitored at regular intervals to check for any possible failure. However, the well-developed drainage system within the lease area will minimize the development of hydrostatic pressure during rainy season. Regular inspection of these measures shall be carried out. Maximum number of benches proposed for working in this mine are two numbers with a height of not more than 6 m each. The formations being hard laterite and ore, the possibility of slope failure is almost nil.

2. Waste Dump slope failure

The slopes of dumps shall be planned at an overall angle of less than 27° with individual lifts at less than 37°. The dumps shall be planned by retreating method of dumping. The

advantage of this method is that adequate area can be made available for plantation to be carried out.

Use of geotextiles , grass and plantation with native species will help to stabilize the dump slopes and prevent slope failure. Inward slope will be provided to each dump step so that the run off water is channelized properly in to garland drains and then to the settling ponds. Laterite boulder walls will be constructed at the toe of the dump .

3. 10.5.2

During monsoon, mine pit will receive water due to precipitation over mine area. This accumulation of water may flood the mine pit leading to inundation of working area. This may cause drowning of workmen & equipments.

Bicholim Mineral block study area fall under Mondovi River basin of Taluka Bicholim, Bardez, Sattari, Sanguem, Tiswadi & Ponda. The catchment area of Mondovi River 1580 Sqkm. The Sahyadri hill ranges in the east form the main watershed. The streams originating here flow in west and north west direction to join the Arabian Sea. The study area drainage pattern is dendritic and sub dentric which is in shown Vide ***Plate.No.10***

Main River in study area

Mandovi River -Aerial Distance of 2.30 Km at pilgao Village

Bicholim River - Aerial Distance of 0.23Km at Mandrekarwada (Bicholim)

Assonara River - Assonara river which touch Mining lease area

Chapora River - Aerial Distance of 7.3 Km at Colvale Village

Assonora River originates near Mencurem village in Bicholim Taluka, Assonora is one of the main tributary of Mandovi River. The river flows through areas like Assonora, Sirsaim. The drainage area of this tributary is about 55 Sq. Km.

HFL of Assonora River is 3.5m MSL

Flood Analysis

Source WRD Goa

The mine boundary is about 10.9 m MSL hence is there is no impact of flood of Assonara River as the mine elevation is 7.4m above the HFL of Assonora river

Drainage Density is 724.642km/467.97sq km = 1.548 km/sqkm

4. Action plan to prevent fire

In the mining premises, cutting burners, welding appliances or any other equipment which may generate sparks of any kind would be used only with prior permission of concerned authorities where there is a risk of fire. Fire extinguishers shall be kept at engine rooms, generator, workshops, near transformer etc. Automatic fire extinguishers will be installed on all the Heavy earth moving Machinery.

A competent person shall examine all equipment, material and arrangement provided for fire**10.5.2.1** hting at least once in a month and record of the examination shall be maintained in a register. Fire extinguisher shall be examined by a competent person at least once in 3 months.

Risk Management

No impact of HFL to mine site.

Storage of explosives

No explosives shall be used.

7.2.1 EMERGENCY SCENARIOS & CONTROL MEASURES

Table 7.2: Risks, Cause & Control Measures

S.No.	Activity/ Scenario	Risk	Cause	Control Measure
1.	Removal of Mineral	Landslide	Loose Soil Angle of Bench being steep	The following safety measures will be followed and the same will be ensured for the proposed project also. Bench height of 7 m with individual bench slope of 70^0 and overall slope angle of less than 26^0 maintained. Inactive slopes will be terraced and mulched , covered with geotextiles and planted with grasses, legumes and bush variety of species
2.	Movement of Mineral, Top Soil/Wastes etc., in trucks	Accident causing injuries to human/ /damage to properties	Operating vehicle in reverse direction Loss of control of trucks while driving Speeding Overtaking Overloading	Providing awareness training to truck drivers on safe driving, clearly explaining DOs & DON'Ts and also providing refresher training every year. Providing and ensuring use of appropriate Personal Protective Equipment. Undertaking Alcohol Checks, Speed limit, regular inspection of vehicles

S.No.	Activity/ Scenario	Risk	Cause	Control Measure
			Not using hand brake Drinking & Driving	
3.	Fire Accident	Causing injuries to human/ /damage to properties	Electrical Short Circuit	Ensuring storing of inflammable materials separately. Restricting smoking to only smoking zone area allotted. Keeping Fire Extinguishers near the storage area, Automatic fire extinguisher system for HEMM.
4.	Water inundation	Threat to life of mine operators Damage to mining machinery/ trucks	Heavy rain/ flood Intersection of ground water table	No impact of HFL or water inundation on mine site. Sufficient capacity pumps will be installed to pumpout water from the mine pits to maintain safe level.

7.2.2. EMERGENCY PREPAREDNESS & RESPONSE PLAN

7.2.2.1 OBJECTIVES OF EMERGENCY PREPAREDNESS & RESPONSE PLAN

The Emergency Preparedness and Response Plan is aimed to ensure safety of life, protection of environment, protection of equipment and restoration of production in this same order of priorities.

For effective implementation of Emergency Preparedness and Response Plan, it shall be widely circulated and personnel shall be trained through mock drills.

To tackle the consequences of a major emergency inside the mine, an Emergency Preparedness and Response Plan has been formulated.

The objective of the Emergency preparedness and Response Plan is to make use of the combined resources of the Mine and the outside services to achieve the following.

- Control and bring the emergency situation to a safe condition
- Safeguard employees
- Arrange rescue and medical treatment of causalities
- Minimize damage to property and the environment
- Secure the affected areas
- Preserve subsequent records and equipment for subsequent enquiry to identify the cause and circumstances leading to emergency.
-

7.2.2.2 EMERGENCIES

The emergencies that could be envisaged in the Mine are as follows:

- Drowning
- Collision
- Fall of vehicle
- Fire (to machines and plantation)
- Dump slide / bench collapse
- Fall of person

SITUATION: DROWNING

Overall Responsibility: Mines Manager

In absence of Mines Manager, Shift In-charge shall take the charge of the situation.

Resources needed:

1) Safety equipment such as nylon/jute ropes, wireless sets, mobile phones, life buoys, life jackets and life line
2) Personal Protective Equipment
3) First Aiders

Emergency Response Plan:

a. Work Person: Work person accompanying the victim shall throw the life buoy tied to the rope/lifeline towards the drowning person. If he finds that this help is not yielding any result, he shall give a wireless message to the Supervisor or Shift Engineer.
b. Shift Engineer: As soon as the information is given to the Shift Engineer, he shall inform the Shift in-charge and Land Transport In-charge as applicable through wireless message/phone and ask for ambulance.
c. Land Transport In-charge: Land transport in-charge will arrange for the ambulance.
d. Shift In-charge: Shall inform the Mines Manager and will rush to the site.
e. Doctor/Nurse/First Aider: After receiving the information will rush to the site with ambulance with the First Aid Kit and give necessary First Aid to the victim.
f. Mines Manager: Will rush to the site and make additional arrangement to deal with the emergency if required.

Mitigation Measures:

1. A strong life-line and adequate number of life buoys and life jackets shall be kept at each pump site.
2. In case of land-based pumps, the area shall be adequately fenced.
3. A safe approach road on dry ground shall be maintained to the pump sites on which track- mounted machinery can travel safely.
4. Persons engaged in water pumping operations shall be only those who know swimming.
5. No person shall be allowed to board a pontoon/float without wearing life jacket.
6. Whenever a person gets on to the float, at least one person shall be present nearby the shore to assist in case of any untoward incident. Not more than 4 persons shall ride the float at any time.
7. Water pumping operations shall be carried out under the supervision of a competent person / De-watering In-charge.
8. The pontoons used for floating of water pumps shall be inspected and certified for buoyancy at least once a year by a competent authority.
9. The pontoons in use shall be adequately secured / anchored by ropes.

Legal obligations in case of emergency, if any:

In case of any incident in the mine involving serious injury or fatality, the same will be reported to DGMS/DMS by Mines Manager.

Records to be maintained:

- Mock Drill Report
- Incident report
- Incident Investigation Report

Reporting of emergency:

Report emergency internally to Head – Safety, Business Manager and at corporate level within timeline.

SITUATION: COLLISION

COLLISION: Includes Collision of dumpers with light vehicle, dumper with dumper, dumper with shovel, dumper with compressor, or collision with permanent / temporary structures etc.

Overall Responsibility: Mines Manager

In absence of Mines Manager, Shift In-charge shall take control of the situation.

Resources needed:

1. Safety equipment such as hand-held Walkie-talkies, wireless sets in vehicles and/or mobile phones
2. Personal Protective Equipment
3. First Aiders

Emergency Response Plan:

a. Work Person/ Driver of the vehicle: Work person or driver of either of the vehicle, if in a position of informing to the supervisor, shall do so immediately. If the driver is not in a position to inform, then the work person witnessing the accident shall inform the supervisor/Engineer nearest available.
b. Shift Engineer: As soon as the information is given to the Shift Engineer, he shall inform the same to the Shift in-charge and Land Transport In-charge on wireless set/phone and ask for ambulance.
c. Land Transport In charge: Land transport in-charge shall arrange for ambulance.
d. Shift In-charge: Shall inform the Mines Manager and rush to the site.
e. Doctor/Compounder/First Aider: After receiving the information will rush to the site with ambulance with the First Aid Kit and give necessary First Aid to the victim.
f. Mines Manager: Shall rush to the site and make additional arrangements to deal with the emergency if required.

Mitigation Measures:

I. Mock Drills shall be conducted as per schedule.
II. Training and refresher training shall be conducted as per the schedule and drivers shall be assessed.
III. Drivers with rough performance or bad records shall be given special attention and training.

IV. Reverse cameras for all vehicles and dumpers

Legal obligations in case of emergency, if any:

In case of any incident in the mine involving serious injury or fatality, the same will be reported to DGMS/DMS by Mines Manager.

Records to be maintained:

- Mock Drill Report
- Incident report
- Incident Investigation Report

Reporting of emergency:

Report emergency internally to Head - Safety, Business Manager and at corporate level within timeline

SITUATION: FALL OF VEHICLE

Overall Responsibility: Mines Manager

In absence of Mines Manager, Shift In-charge shall take hold of situation.

Resources needed:

i. Safety equipment such as hand-held Walkie-talkies, wireless sets in vehicles and/or mobile phones

ii. Personal Protective Equipment

iii. First Aiders

Emergency Response Plan:

1. Work Person: Any Work Person including the driver of the vehicle witnessing the accident shall give the information to the nearest available supervisor / Engineer.
2. Shift Engineer: As soon as the information is given to shift Engineer, he shall inform the same to the shift in-charge and Land Transport In-charge on wireless set/phone and ask for ambulance.
3. Land Transport In charge: Land Transport In-charge shall arrange for ambulance.
4. Shift In-charge: Shall inform the Mines Manager and rush to the site
5. Doctor/Compounder/First Aider: After receiving the information will rush to the site with ambulance with the First Aid Kit and give necessary First Aid to the victim
6. Mines Manager: Shall rush to the site and make additional arrangements to deal with the emergency if required.

Mitigation Measures:

1) Mock Drills shall be conducted as per the schedule.
2) Road markings, sign boards, convex mirrors, speed breakers, escape lanes, embankments, fluorescent poles, traffic islands, etc. shall be provided as per requirement.
3) Haul road width and gradient shall be maintained as per law enforce.
4) Roll over cabin protection shall be provided on dumpers as applicable.

Legal obligations in case of emergency, if any:

In case of any incident in the mine involving serious injury or fatality, the same will be reported to DGMS/DMS by Mines Manager.

Records to be maintained:

- Mock Drill Report
- Incident report
- Incident Investigation Report

Reporting of emergency:

Report emergency internally to Head - Safety, Business Manager and at corporate level within timeline.

SITUATION: FIRE

FIRE: Includes fire to the hauling or loading machines.

Overall Responsibility: Mines Manager

In absence of Mines Manager, Shift In-charge shall take control of the situation.

Resources needed:

1) Safety equipment such as fire extinguishers, fire suppression system and wireless sets
2) Water tankers with water hose
3) First Aiders & Fire fighters
4) Personal Protective Equipment

Emergency Response Plan:

a. Operator: Operator shall be well versed with the operation of fire extinguishers and fire suppression system. Operator shall also inform the available supervisor.
b. Supervisor: Supervisor shall inform the shift In-charge and assist in extinguishing the fire.

c. Shift In-charge: On getting information shall visit the incident site and if required, make arrangements for Water tanker and extra fire extinguishers if required.

d. Shift In-charge shall also send information to the Mines Manager, Land Transport In-charge as applicable and Workshop In-charge for rescue operations.

e. The General Emergency Preparedness Plan (EPP) shall be kept in place for the mine by Mines Manager.

Mitigation Measures:

1) All HEMM shall be equipped with operational fire extinguishers and fire suppression system.
2) Regular housekeeping of HEMM shall be followed.
3) Mock drills shall be conducted as per schedule.
4) Response time analysis of mock drill will be carried out for further improvement.
5) All operators/supervisors shall be trained in firefighting and operating fire extinguishers and fire suppression system.

Legal obligations in case of emergency, if any:

In case of any incident in the mine involving serious injury or fatality or major fire incident, the same will be reported to DGMS/DMS by Mines Manager

Records to be maintained:

- Mock Drill Report
- Incident report
- Incident Investigation Report

Reporting of emergency:

Report emergency internally to Head - Safety, Business Manager and at corporate level within timeline

SITUATION: PLANTATION FIRE

Overall Responsibility: Mines Manager

In absence of Mines Manager, Shift In-charge shall take control of the situation.

Resources needed:

1) Safety equipment such as Fire Extinguishers, Fire brigade and wireless sets
2) Water tankers/sprinklers with water hose

3) First Aiders / Fire fighters and Security personnel
4) Personal Protective Equipment

Emergency Response Plan:

1. Security: Security personnel shall inform the Mines Manager / Security Officer about the fire.
2. Mines Manager / Security Officer shall make arrangements for Fire Fighters / Security personnel & Water tankers & rush to the site.
3. If required, Mines Manager shall make arrangements to call Fire Brigade
4. Shift In-charge: On getting information shall visit the incident site and if required, make arrangements for more Water tankers/Sprinklers.
5. Mines Manager and team shall ensure that the plantation fire is brought under control and does not spread further and destroy green cover.

Mitigation Measures:

a. All security check points shall be facilitated with fire extinguishers.
b. Mock Drills shall be conducted as per schedule.
c. Response time analysis of mock drill will be carried out for further improvement.
d. The plantation areas shall be inspected once in a while and protective measures taken.

Legal obligations in case of emergency, if any: Nil

Records to be maintained:

- Mock Drill Report
- Incident report
- Incident Investigation Report

Reporting of emergency:

Report emergency internally to Head - Safety, Business Manager and at corporate level within timeline.

SITUATION: DUMP SLIDE

Overall Responsibility: Mines Manager

In absence of Mines Manager, Shift In-charge shall take control of the situation.

Resources needed:

1) Safety equipment's such as wire ropes and wireless sets/mobile phones
2) First Aiders
3) Personal Protective Equipment

Emergency Response Plan:

1. Work Person: Work Person or Operator whose dumper is stuck up while dump collapse shall inform the supervisor.
2. As soon as the information is given to the Supervisor / Engineer, the same will be also communicated to the Shift In-charge and Land Transport In-charge as applicable on wireless set and ask for Extra Tow Chains.
3. Spotter: Who is near the site shall immediately put the wire rope to the dumper and the Dozer which is available near the spot.
4. Shift In-charge: Shall inform the Mines Manager and rush to the site along with extra Tow Chains and wheel loader if required.
5. Mines Manager: Shall rush to the site and make additional arrangements like dump cutting with ripper dozer, making access road, additional excavator, etc. to deal with the emergency if required

Mitigation Measures:

1. Mock Drills shall be conducted as per schedule.
2. Dumping activity shall be carried out systematically in the form of steps and maintaining safe height and slope as per law in force, under the control of the Mines Manager/Location In-charge and the environment department personnel.
3. Pulpy/wet material shall be unloaded separately and not on the active dump side to prevent collapse.
4. Inward slope shall be maintained for each step of the dump for proper drainage during monsoons.
5. Regular dump slope monitoring shall be carried out.
6. Geo-textiles shall be laid along the slopes of finalized/inactive position of the waste dump before monsoon for stability of the dump.

Legal obligations in case of emergency, if any: Nil

Records to be maintained:

- Mock Drill Report
- Incident report
- Incident Investigation Report

Reporting of emergency:

Report emergency internally to Head – Safety, Business Manager and at corporate level within time

SITUATION: FALL OF PERSON

Overall Responsibility: Mines Manager

In absence of Mines Manager Shift In-charge shall take charge of the situation.

Resources needed:

1) Safety equipment such as ropes and wireless sets
2) First-Aiders
3) Personal Protective Equipment

Emergency Response Plan:

a. Work Person: Work person accompanying the victim shall throw rope towards the fallen person.
b. If this does not help or fallen person is severely injured, he shall give a wireless message to the shift engineer or shift in-charge or land transport office. If the injured person has been pulled up, immediate first-aid shall be provided
c. Shift Engineer: As soon as the information is received by the Shift Engineer, the engineer shall inform Shift In-charge & Land Transport office on wireless set and ask for ambulance.
d. Land Transport In-charge: Land transport In-charge will arrange for the ambulance.
e. Shift In-charge: Shall inform the Mines Manager and will rush to the site.
f. Doctor/Compounder/First Aider: After receiving the information will rush o the site with ambulance with the First Aid Kit and give necessary First Aid to the victim.
g. Mines Manager: Will rush to the site and make additional arrangements to deal with the emergency if required.
h. The General Emergency Preparedness Plan (EPP) in place for the mine shall be followed by Mines Manager.

Mitigation Measures

a. Mock Drills shall be conducted as per schedule.
b. Areas with loose strata, undercut shall be barricaded.

c. Workers shall be given training and refresher training on unsafe act/conditions.
d. Workers shall be motivated & rewarded in reporting unsafe acts/conditions and near-misses.
e. During dark hours illumination shall be provided

Legal obligations in case of emergency, if any:

In case of any incident in the mine involving serious injury or fatality or major fire incident, the same will be reported to DGMS/DMS by Mines Manager

Records to be maintained:

- Mock Drill Report
- Incident report
- Incident Investigation Report

Reporting of emergency:

Any emergency will be immediately reported to Mines Manager, Head of operations, Head – Safety, Security In-charge and Inhouse Doctor and if required Local police (100) , Ambulance (108) and government officials

7.3 DISASTERS

A disaster is catastrophic situation in which suddenly, people get into a situation of helplessness and suffering and as a result, need protection, clothing, shelter, medical and social care and other necessities of life. Disasters from natural phenomena like earthquakes, cyclones, storms, floods, landslides etc., are considered here.

There can be no set criteria for assessing the gravity of a disaster in the abstract as it depends, to a large extent, on the physical, economic and social environment in which it occurs.

However, all disasters call for immediate action, whether at the local, national or international level, for the rescue and relief of the victims. This includes the search for the dead and injured, medical and social care, removal of the debris, the provision of temporary shelter for the homeless food, clothing and medical supplies, and the rapid re-establishment of essential services.

The disasters due to natural phenomena are to be handled in a proper manner with the help of local administration immediately on occurrence. Further supports required,

depending upon the severity, are to be provided by District/State/National Level Authorities.

The resources available in the mine will be extended to the maximum possible extent by the project proponent in the event of occurrence of any such natural disasters to provide rescue, first aid, ambulance service, medicines, shelter & food, to the affected people.

7.4 OCCUPATIONAL HEALTH & SAFETY

As no additional construction of any civil structures are envisaged in this mine, the Occupational Health and Safety related issues are restricted to operational stage only. The existing practices with regard to Occupational Health & Safety will be ensured for the existing mining operations.

The Occupational Health and Safety (OHS) Plan aims to

- ensure that all known safety factors are taken into account in the operation and maintenance of HEMM and trucks
- allocate sufficient resources to maintain safe and healthy conditions at work place
- ensure that adequate OHS knowledge is imparted to all employees
- provide necessary protective equipment and safety appliances and ensure their proper use
- make the employees aware of the mine operations and the potential hazards
- train the employees to take preventive steps in a proactive manner and execute the work safely and understand occupational health issues
- review all operations and methods of work for making necessary changes from the safety point of view in the light of experience and up to date knowledge
- provide appropriate facilities for first aid and prompt treatment of injuries and illness at work
- ensure that adequate publicity is given to OHS matters
- ensure proper precautions are taken to prevent fire and provide appropriate firefighting facilities
- publish instructions and notices in the local language to employees
- prepare safe operating procedure for all operations
- ensure regular inspection by a competent person at regular intervals for identifying any deviations in safety and occupational health related matters
- provide rrelaxation facilities to workers with good ventilation & air circulation

- ensure Good Housekeeping Practices
- provide enclosure for noise generating sources
- isolate diesel storage areas
- rotate employees in specific areas to avoid continuous exposure

7.4.1 OCCUPATIONAL HEALTH RISKS

The principal Occupational Health Risks associated with the project are likely incidence of tuberculosis, silicosis, hearing loss, accidents due to inundation of mine working pits, fire and slope failure. The order of severity on health status of workers in mining is tuberculosis, silicosis, respiratory diseases and hearing loss.

7.4.2 PRECAUTIONARY MEASURES

a. Dust

As dust is a major pollutant, that can cause a heath disorder, the following precautionary measures are followed.

- Sprinkling of water on the haul roads and working places
- Maintenance of the mining machinery and vehicles used as per the manufactures specifications to ensure their efficient operation
- Ensuring usage of Personal Protective Equipment like respiratory masks, ear plugs, helmet, safety shoes by the employees
- Development of wide green belt proposed to attenuate the spread of dust and also the noise generated from mining operations

b. Noise

Workmen and staff exposed to higher sound levels will be provided with ear plugs/mufflers of approved type by DGMS to guard them against any hearing impairment is being followed to ensure noise levels are within limits.

c. Injuries

By ensuring that all employees are following safe operating procedure and using the required Personal Protective Equipment, the risk of injuries due to accidents can be prevented.

7.4.3 PERSONAL PROTECTIVE EQUIPMENT (PPE)

The following Personal Protective Equipment (PPE) are provided to the Mine employees

❖ Industrial Safety Helmets

- ❖ Zero power plain goggles with cut type filters on both ends
- ❖ Cylindrical type earplugs/Earmuffs
- ❖ Industrial safety shoes with steel toe
- ❖ Reflectary jackets

7.4.4 TRAINING

All the workers shall be imparted with initial vocational training (Induction) as per the statute to make them familiar with their jobs covering the occupational hazards involved, need to use Personal Protective Equipment, following safe operating procedures and the safety precautions to be taken while doing their jobs. Awareness programme for the workers on work related health hazard, HIV prevention etc. are being conducted. They shall also be given refresher training as per statute after completing one year of service.

7.4.5 OCCUPATIONAL HEALTH SURVEILLANCE

Impact of mining on health shall be assessed by a trained doctor in occupational health and the tests conducted include general health checkup, spirometry, audiometry and vision test in addition to X-Ray and ECG examination.

In order to evaluate the impacts on mining on the health of workers, baseline health studies shall be carried out on every worker at the time of joining duty. Medical examinations will be conducted for employees every year.

7.4.6 PIT SAFETY COMMITTEE

The pit safety committee headed by Mines Manager consists of

Mines Manager	-	1
Geologist	-	1
Mine Foreman	-	1
Mining Engineer/Environmental Officer	-	1
Company Doctor	-	1
Workers	-	2

The functions of the Safety Committee are:

- Ensuring remedial measures against the unsafe conditions and practices in the mine as pointed out by the workmen or Inspectors or otherwise brought to the notice of the committee

- Planning safety and health measures including related codes of practice and making appropriate recommendations before commencement of any new section of the mine or introduction of any new mining technique
- Ensuring investigation of accidents that take place in the Mine and making appropriate recommendations
- Ensuring meeting at least once in 30 days to consider the matters placed before it and any other matter that may be raised by the members and making such recommendations as it may deem fit
- Serving as a forum of communication on safety and occupational health matters

7.4.7 FIRE PROTECTION

Firefighting equipment such as Carbon dioxide, DCP, Soda acid type, Fire buckets shall be provided. Regular inspection of Fire Extinguishers to ensure replacement of refills and the working condition of the extinguishers shall be carried out.

7.4.8 BUDGET

An annual budget of Rs. 32.5 lakhs will be allocated for safety and occupational health activities.

7.5 R & R ACTION PLAN

There is presence of habitation within ML Area at Mulgao and lamgao villages. Safety Buffer of 50m will be maintained from the habitations. No Rehabilitation & Resettlement Plan is proposed.

7.5.1 Schools within the Mineral block:

There are two government primary schools located inside the Block 1 , Bicholim mineral block . These schools are located inside the habitation in Mulgao village at Gaonkarwada and Manasbaag . These schools were in existence during the tenure of earlier mining operations also.

Out of these two schools, The school at Gaonkarwada is not functional since few years. The no of students studying in Manasbag school is also very less (only 12 no of students during the current year). There are many other schools both government and

private with good infrastructure in the Bicholim town which are well connected with the villages and are preferred in general.

Mitigation measures w.r.t School:

1. In General a safety buffer of 50m will be maintained towards the habitation .
2. W.r.t the schools , the distance from ultimate pit limit to the Manasbag school is 138 m and from Gaonkar wada school is 190 m
3. These schools are situated inside the habitation and has a direct road approach from the village, there is no hindrance from mining activity or transportation.
4. There is no drilling and blasting proposed during the mining operations and as such there is no possibility of fly rock or ground vibrations
5. Support will be provided to the schools in terms of improving infrastructure , teaching facilities, play equipment etc. and budget for same is provided in CER.

We would like to state that there won't be any significant impact of the mining operations on the schools mentioned above and as such shifting of these schools wont serve any purpose and hence shifting is not proposed.

7.6 CARE AND MAINTENANCE DURING TEMPORARY DISCONTINUANCE

a) Precautions to be taken

An emergency plan for the situation of temporary discontinuance due to court order or due to statutory requirements or any other unforeseen circumstances may indicate measures of care, maintenance and monitoring of status of discontinued mining operations expected to re-open in near future.

Although no temporary closure is planned or expected, the following protective measures would be taken to deal with the unforeseen circumstances which may be created due to temporary closure of the mine.

1. All heavy earthmoving mining machineries deployed in various blocks of iron ore mine will be withdrawn and brought to the safe place so that these do not get buried

due to bench collapse, if any, and get damaged during discontinuance. These will be subjected to preventive maintenance.

2. The entries to the pits in various blocks will be fenced off with display of notice boards at the fence prohibiting entry into the pits by unauthorized persons.
3. Pit boundaries would be fenced and high berms will be provided to prevent cattle from entering the pit. At the entrance and strategic points in the mine areas, sentries and watchman would be deployed to guard the sensitive/important mine area, explosive magazine and other sensitive stores and services. They would be provided with mobile phones / walky-talkies to contact mine authorities/police/fire station etc. for help during emergency.
4. The mine area would be kept well illuminated during night time.
5. Audible warning sirens would be established at strategic points to be used during emergency so that prompt help can be received from proper sources and protective measures are immediately taken by all personnel available.
6. Managerial, supervisory and competent persons of the mine would be engaged elsewhere in other mines of the company as per the needs.

b) Economic repercussions of closure of mine and manpower retrenchments. Manpower retrenchment, compensation to be given, socio-economic repercussions and remedial measures consequent to the closure of mines should be described, specifically stating the following:

It is too early to discuss the socio-economic repercussions and remedial measures consequent to the closure of mines. However, the workers shall be employed from surrounding areas who are basically agricultural labourer. In case of closure, they will go back to their family occupation.

i) Number of local residents employed in the mine, status of the continuation family occupation and scope of joining the occupation back:

Most of the workers shall be employed from the surrounding areas who are basically dependent upon agriculture activity. In case of closure, they will go back to their family occupation.

ii) Compensation given or to be given to the employees connecting with sustenance of himself and their family members:

The employees will get compensation as per the government and company rules and system

iii) Satellite occupations connected to the mining industry number of persons engaged therein continuance of such business after mine closes:

There can be no satellite occupation connected to the mining industry.

iv) Continued engagement of employees in the rehabilitated status of mining lease area and any other remnant activities:

Not Applicable.

Chapter-8
PROJECT BENEFITS

8.0PROJECT BENEFITS

8.1 PROJECT BENEFITS

Project benefits are attributed in various ways as under:

1) Environment

2) Employment

3) Social

8.1.1 SOCIO-ECONOMIC DEVELOPMENT

The proposed project area is barren private land over an area of 478.5206 Ha, with indigenous species including fruit and flower varieties; it promotes immigration of avifauna into this area.

No Rehabilitation or Resettlement is involved and it is a forestland and there are no human settlements or PAPs within the ML area, which requires Rehabilitation and Resettlement. There are 68 villages/towns - 56 villages and 12 census towns (CT), in the buffer zone. Of these, 68 villages/towns, 48 villages, and 12 towns are located in 6 talukas of North Goa and 8 villages in one taluka in Maharashtra. As the data pertains to large number of villages and towns are in North Goa, the buffer zone is compared to North Goa District. The total population of these villages is 253834. Due to the proposed mining activity, no significant adverse changes are visualized in the traditional way of life of the people residing in the villages in the buffer zone.

This mine shall provide employment for about 521 people by direct and indirect employment which includes mine officials, skilled, semi-skilled and unskilled labour and indirect employment, in contractual works & transport. Preference shall be given to local people for employment.

The company is conscious of its obligations to society at large & is bound to contribute in overall socioeconomic development of the area in the coming years by increasing its efforts towards overall development of the proposed project area.

8.2 ENVIRONMENTAL BENEFITS

Mining project will be beneficial for environment in many ways which are as following:

- At the conceptual stage total excavated area will be 355.5659 ha out of which 293.5 ha area will be backfilled. The pit will be used as reservoir. The water reservoir will be helpful for recharging the ground water
- At end of life of mine, total Greenbelt/Plantation of over 105 Ha will be developed by planting 2,65,000 saplings which will be beneficial to the Environment & will also create an aesthetic appeal.

8.3 EMPLOYMENT BENEFITS

8.3.1 EMPLOYMENT OPPORTUNITY

This mine shall provide employment to about 521 people by the way of direct employment which include mine officials, skilled, semi-skilled and unskilled labour.

Table No 8.1 Employment details

S.No	Designation	Nos
1	Mines Manager (1st Class)	5
2	Mines Manager (2nd Class)	8
3	Mining Engineer	21
4	Geologist	3
5	Mechanical Engineer	12
6	Electrical Engineer	8
7	Mining Foreman	20
8	Mine-mate	12
9	Skilled workers/operators	220
10	Semi Skilled	70
11	Unskilled	128
12	Other	14
	Total	**521**

In addition, about 195 semi-skilled and un-skilled workers will be employed. Apart from this, there will be employment by way of indirect works such as truck drivers, machinery operators of contractors, road maintenance, garage, watch & ward, canteen etc.

8.4 SOCIAL BENEFITS

Vedanta Limited will undertake activities for the upliftment of the social community through community development in various ways as given under:

i. Education
ii. Health & Family Welfare Programme
iii. Infrastructure Development
iv. Social Welfare & Skill Development Activities
v. Sustainable Livelihood

i. Education

- Providing support to schools/educational institutions to promote various activities towards development of children.
- Providing support to Anganwadi centers /schools for building/ upgrading infrastructure (by undertaking or supporting construction work or equipping

them with furniture, , books, note books, musical instrument, etc.) for promoting education.

- Scholarship to underprivileged and meritorious students for undertaking/ continuing technical and professional courses.
- Imparting employability training, vocational courses and skill development.

ii. Health & Family Welfare Programmes

- Arranging specialized Health Camps for villagers.
- Supply of drinking water through installation of water tanks and construction / repairing of existing water systems.
- Declaration of ODF Village by way of constructing toilets.
- Awareness program on AIDS disease and their preventive measures.

iii Infrastructure Development

- Construction of community halls and centers at nearby villages.
- Construction of CC roads of nearby villages
- Construction of retaining wall, stone pitching, pond desilting work and construction of school, boundary wall at village.
- Construction of various structures like school boundary in nearby villages.
- Facilities development at Govt Departments / Panchayats, police stations

iv se

- Promotion of Art and Culture by associating with various agencies through sponsorship, support, contribution, etc.
- Construction work at various temples
- Other CSR programme coordination including brochures, painting, leaflets, CSR documentary film, display boards inauguration function etc.
- Providing saplings/ plants for villagers / nearby localities / schools for plantation

Table No 8.roposed CSR Expenditure (Rs.in lakhs) for 5 years

Sr. No.	Thematic area	1st year	2nd year	3rd year	4th year	5th year
1	Agri & Animal Husbandry	1,000,000	1,200,000	1,500,000	1,500,000	1,700,000

2	Health Care	1,000,000	1,200,000	1,500,000	1,500,000	2,000,000
3	Education	4,850,000	4,200,000	4,200,000	4,400,000	4,300,000
4	Community Asset	700,000	900,000	1,000,000	1,200,000	1,500,000
5	Drinking water & sanitation	600,000	700,000	700,000	700,000	700,000
6	Skilling	500,000	750,000	750,000	800,000	800,000
7	Cultural	100,000	100,000	200,000	200,000	200,000
8	Sports	100,000	100,000	200,000	200,000	300,000
9	Women Empowerment	800,000	1,000,000	1,000,000	1,200,000	1,200,000
10	Environment - Community plantation	100,000	100,000	100,000	100,000	100,000
	Total	**9,750,000**	**10,250,000**	**11,150,000**	**11,800,000**	**12,800,000**

Medical assistance:

Specialized Health camps in the buffer zone villages shall be organized awareness programme on health and sanitation and blood donation camps.

Primary education:

Transport facility for students, to provide educational aids to students . Repairing of school buildings at nearby villages shall be taken up.

This policy continues with adequate budgetary support.

- In order to improve the educational activities in the area, following assistance will be provided.
- Repair/Rebuilding of village schools
- scholarships for meritorious & needy students
- Encouraging pre-primary school education
- Supporting adult education programs
- Drinking water to villagers
- Training for self-help groups & Supporting SHG for establishment of microenterprises.
- Orientation programs for self-employment in collaboration with District Industries Centre and Rural Development Agencies
- The local people especially the women from the downtrodden community and women self-help group shall be involved in afforestation, in the nursery

development and avenue plantation programmes, developing fruit orchid, fodder farms and in vocational training including tailoring, embroidery, other cottage industries.

- Youth shall be given technical vocational training so that they can get employment in service sector as technicians or in self-employment schemes.
- Assistance in availing government schemes
- Collaborate with the local private hospitals and primary health centers in providing primary health care
- Rainwater harvesting

Thus, this project is expected to yield a positive impact on the socio-economic environment of the region. It will help in sustainable development of this area including further development of physical & social infrastructural facilities. This project would create direct and indirect employment, a skilled and educated talent pool and entrepreneurs through its various social beneficiary programs. The production of iron ore would generate revenue to the country in terms of taxes on ore production and exchequer revenue for the State in terms of royalty etc.

8.4.1Employment-based skill development plan for the local after imparting training

As part of its CSR, Vedanta is running Sesa Pvt ITI in Sanquelim, Bicholim Goa, offering NCVT affiliated courses in electrician, fitter, instrument mechanic, and machinist since 1994.

The institute enrolls students from across communities and ensures 100% job placements.

Company is planning to start Computer Operator and Programming Assistant (COPA) course exclusively for girls. To encourage and support girls in technical fields scholarship will be provided to girl students who take admission in ITIs across Goa.

Company also runs "Sesa Football Academy" – having two residential facilities at Sanquelim & Sirsaim, in Bicholim taluka , Goa. It provides for professional football training for 4 years. It supports women empowerment through sports by way of Vedanta Women's League wherein more than 150 girls participate. Nonresidential

Grassroot football centers for children, Youth leagues, and football camps etc. are organized as part of grassroot program. Going ahead, it plans to start two non-residential football centers exclusively for girls.

Company also runs a computer training center in Bicholim which provides for Diploma in Computer Application and advance courses such as coral draw, web designing, tally/GST etc. Every year +120 youths will be benefiting from this initiative thereby equipping them for various job opportunities. Company has plans to start one more center in the Bicholim area to cater to larger local population of the area.

In addition to this, company under its women empowerment thematic area, will initiate women entrepreneurship development program which to benefit hundreds of women every year.

Employment: Preference will be given to locals while providing direct employment to work on the mines. The mining operations will also provide significant employment opportunities to local in the form of ore transportation contracts. The mining operations will also lead to employment opportunities to locals in the form of setting up businesses to provide ancillary facilities like garages, hotels, etc.

CHAPTER-9

Environmental Cost Benefits

Environmental Cost Benefit Analysis is not recommended at the Scoping stage

Chapter-10

ENVIRONMENTAL MANAGEMENT PLAN

10 ENVIRONMENTAL MANAGEMENT PLAN

10.0 OBJECTIVE

The major objectives and benefits of utilizing Environmental Impact Assessment in project planning stage itself, is to prevent losses to Environmental Resources. Environmental Management includes protection/mitigation/ enhancement measures as well as suggesting post project monitoring programme.

The mining activity in the study area needs to be intertwined with judicious utilization of non-renewable resources and Environmental degradation should be within the assimilative capacity. The assimilative capacity of the study area is the maximum amount of pollution load that can be discharged in the Environment without affecting the designated use and is governed by dilution, dispersion, and removal of possible pollutants generated during the operation. The Environment Management Plan (EMP) is required to ensure Sustainable Development. Hence it needs to be comprehensive plan for which the Industries, Government, Regulating agencies and more importantly the population of the study are contented.

The Environmental Management Plan will address the possible impacts on the Environmental attributes in the region viz., Air Quality, Water Quality, Land Use, Ecology and Public Health and the control measures that will be put in place to protect the Environment in and around the study area.

The Management Action Plan aims at controlling pollution at the source level to the maximum possible extent with the available and affordable technology followed by treatment measures before they are discharged.

Environmental Management Plan aims at the preservation of ecosystem by considering the pollution abatement facilities at the inception stage. For the proposed Iron Ore Mine, the pollution abatement has become an integral part of planning and design.

10.1 ENVIRONMENTAL MANAGEMENT CELL

The Environmental Management Cell (EMC) is headed by Head-Environment Health and Safety (EHS) having adequate experience in the fields of EHS. The Head-EHS will report to the Business Head of the Unit and also to Corporate Head Environment and shall have direct access to Head of Organisation.

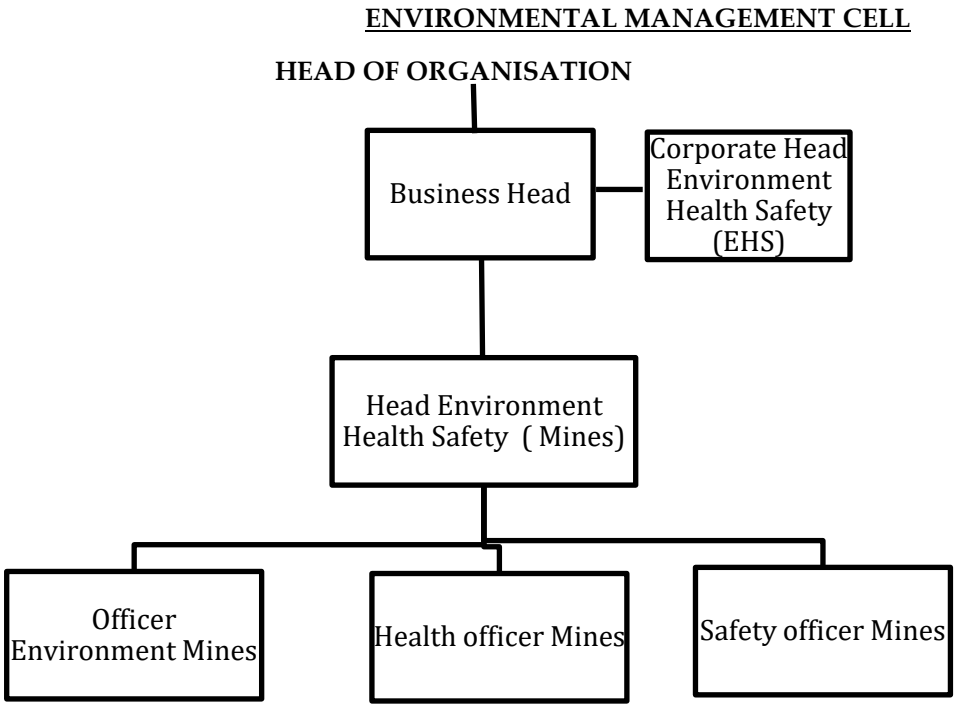

Fig No.10.1 Environmental Management Cell

A built-in mechanism for reporting on compliance of the Environmental/ Forest and other related aspects have been evolved. As per guidelines of MoEFCC, New Delhi, the status of environment compliance will be put up on the website of the company regularly. Periodic auditing and performance measurement will also be taken up to look for improvement areas.. The Environment Management Plan (EMP) which includes works like storm water management (drainages, settling ponds, trenches, desilting etc), dump stabilization (inward slope to dump, laying of geotextiles , grass seeds) , afforestation etc will be planned jointly by a team comprising of mines manager, surveyor, geologist and environment Officer.

The team will meet frequently to assess the progress of the EMP so that the storm water management and dump stabilization jobs are completed well before the onset of monsoon and plantation is carried out in monsoon. The status will be reviewed by senior management on weekly basis. For successful implementation of the environmental management plan other agencies will also be involved by mines, if required (for regulatory requirement or technical support). The coordinating agencies, which may be involved for specific environmental and project related activities, are given below:-

i) Interaction with State Pollution Control Board for legal compliance , new updates in environmental law, awareness etc

ii) Interaction with State Agriculture and forest department for engagement w.r.t plantation

iii) Interaction with consultants, reputed institutes for various projects related to mine reclamation, water positivity study, projects on carbon foot print.

The Environment management Cell will also coordinate to carry out environment monitoring as stipulated by the authorities. The monitoring will be undertaken by a Environment laboratory recognized by MoEF&CC. the monitoring data will be regularly submitted to the authorities like GSPCB, regional office of MoEF&CC.

10.2 HEALTH, SAFETY &ENVIRONMENT POLICY :

The project proponent Vedanta ltd. has a very well defined policy on Health safety and environment which is produced below

vedanta
transforming for good

Health, Safety & Environment Policy

Document No: HSES/POL-01

We are committed to achieving excellence in Occupational Health, Safety and Environment (HSE) management.

The policy applies to all Vedanta subsidiaries, operations and managed sites including new acquisitions, corporate offices and research facilities and to all new and existing employees and contractor employees, business partners suppliers and consultants who should be required to comply with the policy when they act on behalf of Vedanta. This Policy is applicable to the entire operational lifecycle (including exploration and planning, evaluation, operation, and closure) as well as applicable to downstream operations (including distribution, logistics, and sale of products & services up to the customer).

Vedanta will:

- Comply with applicable national, regional, and local HSE regulations and statutory obligations, in the absence (or lack) of appropriate legislation, industry best practices and applicable international standards will be used;
- Develop, implement, and improve HSE management systems, with our commitments and beliefs and consistent with world class standards;
- Set targets and objectives to avoid, reduce or mitigate HSE related impacts on people and planet;
- Continuously monitor performance, identify, prioritize, assess and take actions to mitigate HSE risks and opportunities;
- Drive continuous HSE improvement through setting and reviewing targets using appropriate best available practices and providing all employees with appropriate training to understand the impacts of their work activities on the environment;
- Promote a positive HSE culture through effective communication, participation and consultation with employees and business partners;
- Communicate with all our stakeholders on the progress and performance of Health, Safety, Environment and Sustainability management;
- Prevent injury and ill-health to employees and business partners by eliminating hazards and providing a safe and healthy work environment and minimizing the risks associated with occupational hazards;
- Drive positive healthcare outcomes for our employees, business partners and the local community;
- Implement regular health surveillance and risk-based exposure monitoring of employees and ensure the participation and consultation of workers, and their representatives (when applicable) in the decision-making process for Occupational Health and Safety matters;
- Conserve natural resources by adopting environment-friendly and energy-efficient technologies and through process improvements;
- Manage waste from our operations and adopt the principles of waste avoidance, reuse, recycling and beneficial utilization to minimize discharge and disposal to the environment;
- Consistently assess our climate-related risk, manage our emissions, take appropriate mitigation and adaptation measures and communicate our climate strategy to our stakeholders;
- Ensure that all tailings storage facilities are designed, constructed, operated and closed in compliance with all applicable laws and regulations and in alignment with accepted international practice;
- Work with employees and local community representatives to educate them on the nature of our impacts, how we manage them, our environmental obligations, and our performance;
- Raise awareness and train employees, business partners, suppliers and other stakeholders to adopt principles and practices in alignment with our policies;

The Policy is part of the Vedanta Sustainability Framework and each Vedanta business shall implement this policy and its related technical and performance standards. This policy is oversighted by Vedanta Board of Directors. Business leaders will be held accountable for HSE performance and line managers are responsible for the full implementation of the HSE related standards. We will measure and report performance on a periodic basis to ensure on-going management of health, safety, and environment including the sharing of good practices throughout the Vedanta organization. The content and implementation of this policy will be reviewed periodically.

Vedanta sustainability policies:
https://www.vedantalimited.com/Pages/VSFDocuments.aspx

Date: June 2022

Mr Sunil Duggal
Chief Safety Officer & Group CEO

10.3 SYSTEM OF COMPLYING WITH LEGAL REQUIREMENTS AND REVIEWING BY MANAGEMENT/ BOARD MEMBERS

A. Responsibility

· The departments for ensuring and implementing compliance are identified.

· The Checklist is disseminated to the Head of departments (HODs) and lower level for understanding and ensuring compliance requirements;

· Responsibility is fixed on a particular person in each department for ensuring compliance; and

· Person responsible for ensuring compliance , reports the compliance status to the HOD on monthly/periodically basis.

B. Reporting Mechanism

· HOD reviews the compliance status reported to him and submits it in the internal portal which is reviewed by compliance department;

All the compliances filed are audited by the third party on monthly basis

· If any non-compliance is reported, HOD devises an action plan and target date to close the non-compliance;

· Legal department prepares monthly and quarterly exception report based on compliances status reported by responsible person and internal audit; and

· Monthly non compliance report shared with senior management and internal auditors for appraisal and review.

C. System of Positive Assurance

· Compliance certificate and quarterly compliance exception report is signed by CEO and sent to audit committee and the Board;

· The report is discussed and reviewed in the audit committee/Board meeting

D. Independent Audit

· Internal compliance team checks line items mapped on portal;

· Independent third-party agency audits the compliance status of the company on monthly basis ; and

· Audits are conducted to assess the robustness of compliance framework and accuracy of reporting at each unit every year.

10.4 TRAINING

- Employees will be provided trainings as per job requirements on various aspects like environment management, natural resource conservation, reporting of environmental incidents, legal requirements, environmental monitoring, waste management; general environment awareness etc . The training will be provided by Internal as well as external resources .

10.5 ENVIRONMENTAL MANAGEMENT PLAN

The Environmental Impact Assessment revealed that the study area has not been affected adversely and is likely to get new economical boost.

The Block I- Bicholim Mineral Block is auctioned as a new/ fresh mine and it will be operated taking all precautionary measures to reduce the impact of mining operations on Air, Water, Noise and Soil and ensuring all control measures to comply with the prescribed standards.

The proposed production of Iron Ore within the exiting Block Area will be carried out following the Open Cast conventional type of mining, which involves no drilling and blasting. All the necessary environment protective measures will be implemented.

Further, regular Environmental Monitoring will be conducted during life of the mine in the project site and in the surroundings to maintain the pollutants level from the mining activity within the permissible limits.

10.5.1 AIR POLLUTION CONTROL

Control of Fugitive Emissions

- Proper Maintenance of the haul roads and implementing speed limit to prevent dust pollution
- Regular water sprinkling by means of five hired water tanker of 10KL capacity on haul roads & loading points will be carried out
- Use of fixed dust suppression systems like sprinklers; fog cannons etc

- Enclosures for all the dust generation sources at crushing and screening plant
- Washing of mine exits, junction (Mayem junction, Pilgao Junction & road near jetty exit gate), after transportation hours
- Transportation trucks are loaded to the prescribed capacity and covered with tarpaulin before leaving the mine premise
- Manual and mechanised machine for road sweeping
- The dump slopes are covered with geotextile which will also help to prevent dust generation
- Development of green belt/plantation around the mine boundary, roads side & dumps etc
- Safety buffer of 50m will be maintained towards habitation
- No drilling and blasting
- All the Heavy Earth Moving machineries with air-conditioned cabins.
- Regular maintenance of transport vehicles and Machineries
- General aspects of air quality management will be included in induction training to all employees
- Regular monitoring shall be conducted to check the status of Air Quality levels.
- Installation of Wheel wash system at the mine exit

Table : 10.1 Air Pollution Management and Control

Potential Impact	Action	Parameters for Monitoring	Timing
Air Emissions	All equipment are operated within specified design parameters.	Random checks of equipment	During site clearing & Operation of mine
	Vehicle trips to be minimized to the extent possible	Vehicle logs / automatic vehicle monitoring system/ Increase the capacity of vehicle	During Operation of mine
	Ensure regular checks of vehicular pollution	Pollution under control certificate of vehicle	During operation of mine.
	Covering of Vehicles transporting the mined mineral	No. of Trucks with covering / Random checks of trucks on roads	During operation of mine.

	Plantation of trees on the boundary of lease area, these will reduce dust and noise in the vicinity area.	No. of Saplings per year and area covered by plantation	During operation of Mine till closure as per approved mining plan
	Regular water spraying shall be done	Quantity of water requirement shall be monitored	During operation of mine.
	Ambient air quality within the premises of the proposed unit to be monitored. Continuous Ambient Air Quality Monitoring CAAQM) station shall be set up near the mine office inside the lease within a period of 1year from the date of execution of lease deed.	The Ambient Air Quality shall conform to the standards	As per CPCB guidelines during operation of Mine

10.5.2 WASTEWATER MANAGEMENT

- No generation of wastewater from the mining operation
- Treatment of domestic wastewater generated from the domestic usage shall be treated in septic tank and soak pit arrangement.

10.5.2.1 WATER MANAGEMENT

- The environment protective structures within the Block I –Bicholim Mine Block implemented by earlier lesse are still in good and effective condition. The project proponent after execution of the lease shall continue to utilize the existing protective structures and shall put additional structures to arrest the silt content.
- The surface runoff generated during monsoon season shall be diverted and channelized through ERW pipes, garland drains and a series of settling ponds (11nos) , filter beds , check dams before final discharge
- Annual Desiltation of the settling ponds, drains.
- Regular monitoring of surface and ground water.
- The inactive dump slopes will be stabilized by Geotextile coir mats , planting grasses, legumes and local native plant species in consultation with the Forest Department.

- The dump bottom shall be provided with retention walls to arrest the silt content
- Use of Lime and flocculants for water treatment
- The water stored in the pits will be utilized for various mining operations like water sprinkling , plantation of trees etc.
- A buffer of 50m from assnora river
- The proposed Year wise construction of Garand Drains during the plan period given below

Table 10.2 Proposed Construction of Garland Drians

Year	Garland Drains (m)
1st	1600
2nd	2000
3rd	1700
4th	300
5th	500

The drains are connected to the series of settling ponds of dimensions as given below:

Table 10.3 Dimension and capacity of settling ponds

Settlong pond ID	Area in m^2	Depth in m	Volume in m^3	Location
pond 1	1824	1.8	3283.2	5 top area
Pond 2	1667	1.8	3000.6	
Pond 3	27879	8	223032	
Pond 4	5208	2	10416	
Pond 5 5	8602	2	17204	
Pond6	4661	2.5	11652.5	
Pond 7	3896	1.5	5844	1 top area
Pond 8	3753	1.5	5629.5	3 top area
Pond 9	5564	1.5	8346	
Pond 10	6728	5	33640	3-4 bottom area
Pond 11	22556	20	451120	5 bottom

Table -10.4 Dimension and capacity of Existing Boulder wall and Garland drains

Existing boulder wall (width-height-length)	(1.5m x 2m x 4267m)
Existing garland drainage (width- depth-length)	(2.0m x 1.5m x 11313m)

As part of the environment management plan , various jobs like desilting of settling ponds, construction of boulder walls, drainages ,laying of geotextiles etc will be completed every year before the onset of monsoon. The existing measures within the Block-I Bicholim Mineral Block are depicted in picture shown below :

Dump slopes with geotextiles and garland drains

laterite boulder walls at toe of dump

Filter-beds

water channelization

The **Environmental Plan** showing the various Environmental protective measures is given vide **Plate.No.19.**

The impact of Mining operations on the Assnora river and management is given vide **Appendix.No-III**

The study concluded that the garland drains, settling pits and check dams are made properly in the mine lease area and being maintained for the proper flow of rainfall runoff generated during year. The de-siltation work shall be monitored and done before the monsoon season. The de-siltation will be done through series of ponds which has

been provided by natural slope and enough time is maintained for the proper settling of sediments. The daily silt load calculated is found to be 53.82 mg/l. All the structures which are made in the lease area to avoid erosion and settling of sediments are maintained and checked before monsoon season. All the structures made for the settling of sediments are found to be more than sufficient to accommodate sediments even during peak rainfall.

The likelihood of seepage from Assonora River in the 5 bottom pit is studied very carefully and in detailed manner. The lithology of the beds nearby the river and pit is observed through borehole logs and cross-section which clearly depicts that the dip of the bedding plane and the clay rich lithology obstruct the seepage of water from the river to the 5 bottom pit. The depth of the river nearby pit is only 2.5 meter and underlain by clay rich lithology, so leakage water inside the mine is negligible.

10.5.2.2Water Conservation Measures:

The project proponent shall take all the necessary steps to conserve water and reduce the specific water consumption as given below

Channelising the rain water into mine pits and harvest the rain water

Use of harvested rain water during the mining operations like dust suppression and vehicle washing etc

To carry out water foot print study to become water positive

Use of water tankers with special nozzles to make optimum use of water and covering more areas with less water

Feasibility of using lignin based or other environment friendly dust suppressants to reduce the water consumption for dust suppression

Use of fixed dust suppression systems like sprinklers, fog guns etc which will further reduce water consumption as well as reduce fuel consumption for plying water tankers

Use of waterless urinals to reduce domestic water consumption

Monitoring of specific water consumption on monthly basis and take annual specific water consumption reduction targets

10.5.3 NOISE POLLUTION CONTROL

The ambient noise levels will be ensured to less than 75 dBA during daytime & less than 70 dBA during night time by taking all required measures.

- Development of wide green belt along the mine boundary , cushing and screening plant area and all along the haulage road which will act as an acoustic barrier
- No Drilling and Blasting is involved.
- All the HEMM are provided with air conditioned, noise proof cabins
- Possibility of using Polyurathane liners for feed chutes of primary and secondary crusher.
- Providing protective devices like acoustic wool, earplugs and earmuffs to the workmen in noise prone zones in the mine
- Green belt all along the lease boundary and all along the haulage roads
- Regular monitoring of noise levels in core and buffer zone
- Safety buffer of 50m will be maintained from habitation
- Imposing Speed limit and proper maintenance of roads and machineries

Table : 10.5 Noise Pollution Management and Control

Potential Impact	Action	Parameters for Monitoring	Timing
Noise	List of all noise generating machinery onsite along with age to be prepared. Equipment to be maintained in good working order.	Equipment logs, noise reading	During mining operations.
	Generation of vehicular noise	Maintenance records of vehicles	During transportation.

Implement good working practices (equipment selection and siting) to minimize noise and also reduce its impacts on human health (ear muffs, safe distances and enclosures).	Site working practices records, noise level readings and record of PPE's issued.	During Mining operations
Noise to be monitored in ambient air near the lease boundaries.	Noise levels	As per prescribed standards and requirement
The Noise level should not exceed the permissible limit both during day and night time.		
All equipment operated within specified design parameters.	Random checks of equipment logs/ manuals	During mining operation
Vehicle trips to be minimized to the extent possible	Vehicle logs	During mining operation
Plantation of dense hedges on the boundary of lease area, these will reduce dust and noise in the vicinity area.	No of Saplings per Year	During Each year from operations till closure as per approved mining plan

10.5.4 PROTECTIVE MEASURES FOR GROUND VIBRATIONS/AIR BLAST CAUSED BY BLASTING:

No drilling and blasting involved

10.5.5 SOLID & HAZARDOUS WASTE MANAGEMENT

10.5.5.1 SOLID WASTE MANAGEMENT

The solid waste generated are Overburden , intercalated waste and Mineral rejects . Annually 2,51,61,767 T of waste will be generated to produce 30,00,000 T of waste. The mineral rejects is stacked seprately and overburden waste is dumped in the designated dump yards with proper terracing and slopes. The lateritic waste will be used for the erection of bunds below the dumps, and used as safety barriers and all along the road passing through the block Area

Table 10.6 Proposed backfilled during the plan period is given below

Year	Waste Quantity (M3)	Pit ID	Area Ha
I	1244889.0	5 Bottom	7.87
I	2238957	5 Top	17.83
I	2238957	1 top	12.78
II	732414	5 Bottom	5.11
II	1810240	5 Top	16.70
II	1810240	1 top	10.98
III	500000	5 Bottom	2.36
III	2000000	5 Top	11.19
III	1502000	1 top	11.75
III	1497434	3 Top	13.17
IV	6768535	3/4 bottom	21.60
IV	4410262	3/4 bottom	18.38
V	8170622	2 Top	10.36

The following environment management measures are undertaken to prevent soil erosion

- Terracing, mulching, planting grasses, legumes and bush variety of species, on the inactive slopes to prevent erosion
- Concurrent back filling using generated waste to reclaim & afforest the mined out portion of the pit
- The wastes and ore generated are non toxic, no heavy metals area present and also non-acidic. The possible pollutants in the water are the suspended solids which are derived from erosions within the mining areas and dumps. Rainwater directly falling over the pit area will be allowed to settle in the pit itself thereby helping in groundwater recharge. During the rainy season, the pumped out water from the pit is passed through settling pit to remove the solid suspensions, such that clear water shall leave the ML area.
- Provision of boulder walls at the toe of the waste dump to arrest erosions

- Provision of garland drains around the dump yard and diversion of water to sedimentation pits to separate the soil particles
- Connecting the drains along the roads to sedimentation pit to separate the soil particles
- Conversion of mined out pit (as and when it happens) into rainwater harvesting reservoir
- The following engineering control structures will be constructed like check dams, retaining walls, gully plugs and settling tanks to store the run off water
- Covering the dump slopes with biodegradable geotextiles and carrying out afforestation on the slope.
- The domestic bio-degradable waste will be treated in pits and converted to compost.
- The other non-biodegradable dry waste will be segregated and disposed to local collection center of Bicholim municipality

10.5.5.2 Hazardous waste :

The mine shall generate minor quantities of Hazardous waste due to maintenance of plants and machineries . Hazardous waste authorization will be obtained from GSPCB for proper collection, storage and disposal of hazardous waste. The quantity of hazardous waste likely to be generated are namely spent oil (60 TPA) , waste residue contaminated with oil (9 TPA), Filters contaminated with oil (5 TPA) ,Empty paint tins (0.1 TPA). The hazardous waste will be properly segregated and stored at dedicated place and disposed to recyclers registered with CPCB and having vaild authorization from SPCB.

10.5.6 LAND RECLAMATION / ECORESTORATION

The plantation will comprise of saplings of native species, which are generally grown in the state of Goa. Fruit Trees like cashew, mango, jamun, avla which attract lot of birds and can generate revenue to the locals in future will be given preference. The plantation would be a mix of various forest and fruit tree species technical advice would be taken

from state forest and agriculture departments. The saplings will be procured from various nurseries like forest department nursery , nurseries developed by locals and also a small inhouse nursery will be developed

10.5.6.1 Plantation along mining lease boundary

The Block-I Bicholim Mineral Block is already having a 7.5m wide green belt all along the mine block boundary except the areas where the mine block shares a common boundary with adjoining mine block. A 50m green belt exists towards the habitation within the lease and the same would be further strengthened and maintained. A dedicated 200m green belt would be developed and maintained towards the Idgah area. A density of 2500 saplings per ha will be maintained.

10.5.6.2 Plantation around Office Building & Road

Avenue Plantation is provided around the built-up areas and in open spaces. Extensive plantation would also be done along the sides of connecting roads.

10.5.6.3 Plantation on Dump Slopes

Plantation on slope of the dump should start after the stages are ready. The terraces on the slopes should be sloped inward. Pits of size 60cm x 60cm should be dugs at 1.5m interval and filled with a mixture of top soil, organic manure and phosphate fertilizer. The slopes and terraces should be covered with a layer of soil held with coir net blanket. Seeds of grass and small shrubs of local varieties should be sprinkled on the soil covering the dump slope. Seedling of the plants should be planted in pit in the slopes.

10.5.6.4 Plantation on Backfilled areas

Plantation on the mining benches can also be taken up once the active pit is closed for mining. The abandoned pit, after backfilling and levelling, a layer of lateritic material should be spread. Grass seed/ seedlings should be planted on the soil layer to stabilize the soil. Plants selected for plantation on mining benches should be draught hardy, with fast growth rate and with glabrous/ pendulous leaves.

Garland drains sloping along the mining benches to facilitate conveying of water from higher benches to the next lower benches should be constructed.

The mining operations will change the land use of the area and will create pits, waste dumps etc. At the conceptual stage around 355.5659 ha of area will be degraded due to pits and excavation, around 6.8 ha due to dumping and material stacking and around 6.5 ha with mining infrastructure like plants and buildings.The entire block area at the end of mine life should be restored in such a way that it compliments with the surrounding areas and nature at large Vedanta Ltd has a lot of experience in scientific mining and mine reclamation. They have developed and implemented a systematic mine eco-restoration work in one of its mine called Sanquelim iron ore mine in the state of Goa. The said mine is considered as one of the case study for eco-restoration of mines and appreciated all over the country and internationally.

The company will adopt following practices for carrying out scientific and systematic eco-restoration of the mines, namely:

1. Concurrent mining and mine reclamation activities
2. Use of latest software for mine planning
3. Associating with various research institutes like NEERI, ICAR, ICFRE and consultants for mine reclamation projects
4. Associating with various technical departments of state government like Forest department, Agriculture department, Fisheries department, Water Resource department etc.
5. Identifying all the stakeholders and engaging with them in a structured manner throughout the life of the mine. This will help to identify the issues , concerns of the stake holders and satisfying them in a systematic method. It will also help to take inputs form the stakeholders in eco-restoration in the mines
6. Regular Biodiveristy Assessment and preparing and implementing of Biodiversity Management Plan which help the company to achieve a No Net Loss w.r.t biodiversity.
7. Converting of mining pits into water reservoirs, pond with other ecotourism

facilities like water sports, boating, fishing etc.

8. Develop Pisciculture in mine pits and also involving the community for cage fishing to make it a commercially viable venture.
9. Developing theme based gardens like medicinal gardens, horticulture gardens, spice gardens
10. Developing garden near the Idgah which is within the mining block area and providing proper road for access of visitors and pilgrims .
11. Converting the mining infrastructure like office buildings, workshops etc into public utility infrastructure like school, training centre, medical centre etc

The objective of the Eco restoration would be to create a positive land scape which will help the community or the mining employees to generate revenue even after the mining operations close. Develop vast tracts of scientifically developed green belts, water bodies , and other infrastructure . Develop the place in to a ecotourism area which will attract lot of tourist.

At the conceptual stage around 105 ha of land will be brought under plantation and around 20ha under water bodies.

Before the commencement of the monsoon, the side slopes of mining benches should be covered with a layer of soil by means of mechanical binders like coir net / blanket and sprinkle with water. Seeds of grass and scrub of indigenous variety should be sprinkled on the soil covering the bench side slopes.

Table.10.7. Green belt planning next 5 years

Plan Period	Plantation			Retaining Wall (m)	Garland Drains (m)	Settling Pond (No.)
	Area (Ha.)	No. of Sapling	Name of species			
I	4.0432	10108	Species like Cashew, Mango ,Jambul Aonla ,etc.	--	1600	--
II	3.1319	7830		--	2000	--
III	4.092	10230		--	1700	--
IV	4.7443	11861		--	300	--
V	3.1609	7902		--	500	--

Potential species for green belt listed in Table 10.5

Table 10.8 List of Species suggested for future Greenbelt development

S.No	Botanical Name	Family	Common Name	S/T	Habitat	Height
Shrubs - < 5m (1st tier of Plantation)						
1	*Citrus limon*	Rutaceae	Lemon	T	Shrub	3m
2	*Duranta repens*	Verenaceae	Golden Dew Drop	T	Shrub	3m
3	*Hibiscus rosa sinensis*	Malvaceae	China Rose/ DasavaLa	T	Shrub	3m
4	*Nerium indicum*	Apocynaceae	Oleander/Chandaatha	T	Shrub	5m
Trees 5 - 10m (2nd tier of Plantation)						
6	*Acacia nilotica*	Mimoseae	Gum Arabic/ Babli	T	Tree	8m
7	*Bauhinia varigata*	Caesalpinaceae	Kachnar/ Arisinantige	T	Tree	5m
8	*Annona squamosa*	Annonaceae	Setha palla	T	Tree	6m
9	*Butea monosperma*	Fabaceae	Flame of the Forest/ Muttuga	T	Tree	10m
10	*Gardenia jasminoides*	Rubiaceae	Cape jasmine/ Suvasane Malle	T	Tree	5m
11	*Moringa oleifera*	Moringaceae	Drumstick Tree/Guggala	S	Tree	10m
12	*Pithecellobium dulce*	Mimosaceae	Manilla Tamarind/Seeme hunase	T	Tree	8m
13	*Thevetia peruviana*	Apocynaceae	Mexican oleander	T	Shrub	6m
14	*Phyllanthus emblica*	Phyllanthaceae	Ambla	T	Shrub	7m
Trees >10m (3rd tier of Plantation)						
15	*Aegle marmelos*	Rutaceae	Maredu / Bilva	T	Tree	12m
16	*Albizia lebbeck*	Mimoseae	Siris tree	T	Tree	20m
17	*Albizia procera*	Mimoseae	White siris/Belari	T	Tree	20m
18	*Alstona scholaris*	Apocynaceae	Devil Tree/ Aelele Haale	T	Tree	15m
19	*Azadirachta indica*	Meliaceae	Neem/ Turakabevu	T	Tree	20m
20	*Bambusa vulgaris*	Poaceae	Yellow Bamboo	T	Perennial grass	15m
21	*Cassia fistula*	Caesalpinaceae	Golden Shower/ Kakke	T	Tree	12m
22	*Delonix regia*	Caesalpinaceae	Flame Tree/ Kempu torai	T	Tree	15m
23	*Ficus benghalensis*	Moraceae	Banyan tree/ Aaladamara	T	Tree	20m
24	*Ficus religiosa*	Moraceae	Peepal/ Arali	T	Tree	20m
25	*Mangifera indica*	Anacardiaceae	Mango/ Mavinamara	S	Tree	15m
26	*Polythia longifolia*	Anonaceae	Ashok/Ubbina	S	Tree	15m
27	*Wrightia tinctoria*	Apocynaceae	Alae mara	T	Tree	12 m
28	*Hardwickia binata*	Fabaceae	Small leaves	T	Shrub	6m
29	*Syzygium cumini*	Myrtaceae	Neredu/ Neereedu	T	Tree	20m
30	*Tectona grandis*	Verbenaceae	Teak	T	Tree	20m

vii) Post Plantation Care

Post plantation care is very important and will be an integral part of mine management. A dedicated cell in the mine will be made to care of post plantation, which include, regular watering, weeding, manuring, protective measures etc. Diseased and dead plants shall be uprooted and replaced by fresh saplings. Regular monitoring on survival rate and remedial action should be done in an organized and planned manner.

viii) Plan for Reduction of Impact on Fauna

The impact on fauna species in the mining area is mostly due to noise and loss of vegetation cover. The strong light in the project premises during night may cause some disturbance to fauna of nearby forests. The light posts along the ML boundary should face inwards and downwards with reflector facing downward, so those lights do not spread outside ML area. The green belt developed all along the mine pits will also help as a buffer.

10.6 CONSERVATION OF MANGROVE AND MANAGEMENT

MANGROVE FOREST RESTORATION

Mangrove forest restoration management strategy to compensate for degraded and lost ecosystem goods and services. It has the potential to increase the mangrove resource base, provide employment to local populations, protect fragile tropical coastlines and enhance biodiversity and fisheries productivity.

Mangrove Restoration through planting of mangrove propagules and saplings is recommended when:

- There is limited waterborne propagules due to lack of nearby parent trees or hydrological connection which inhibit dispersal;
- There is need to introduce valuable specific species which have been lost in the area
- Degradation due to human encroachments in the mangrove habitats

1. **Natural Regeneration:** This approach uses natural occurring mangrove propagules (or seeds) to restock degraded sites. In this case, regeneration is from direct, freely falling and dispersed mangrove propagules, where species composition of the regenerated forest depends on the species types and combinations of the adjacent

forest from where propagules are dispersed. In the family Rhizophoraceae for example, propagules furnished with pointed hypocotyls fall freely from the parent and can plant themselves into the mud.

2. **Artificial Regeneration:** Artificial regeneration entails direct planting of desired propagules and saplings (of less than 1.2 m high), and rarely the use of small trees (of up to 6 m high) of chosen species at the designated restoration site.
3. Use of propagules and nursery-raised saplings is the most common method of mangrove restoration. The techniques of mangrove planting have not been perfected for many species. Most mangrove restoration projects have used families, Rhizophoraceae and Avicenniaceae.
4. The listed mangrove species (Table 10.4) for restoration at Asnora & Mandovi river wherever it has been degraded due to illegal shrimp farming or agricultural practices, to be identified with the help of the local forest department, and the proponent collaborate with the forest department to carry out the mangrove restoration.

Table 10.9. List of species recommended for mangrove species restoration

Scientific Name	Family	Vernacular name
Rhizophora mucronata Lamk.	Rhizophoraceae	Kandal
Rhizophora apiculata Blume	Rhizophoraceae	Kandal
Ceriops tagal (Perr.)V B. Rob	Rhizophoraceae	kirkiri
Avicennia marina (Forsk.) Vierh	Avicenniaceae	Tivar
Avicennia officinalis L	Avicenniaceae	Tivar
Sonneratia alba J. Smith	Sonneratiaceae	Chipi
Aegiceras corniculatum (L.) Blanco.	Myrsinaceae	Sugandha
Lumnitzera racemosa Willd.	Combretaceae	
Acanthus ilicifolius L.	Acanthaceae	Marandi
Excoecaria agllocha L.	Euphorbiaceae	Huri

10.7. WILDLIFE MANAGEMENT AND CONSERVATION PLAN

The project area does not involve any forest area for mining purpose. Wildlife management needs to considered multifaceted factors such as food-web, resources competitions, anthropogenic factors, forest fragmentation, and sociological issues such community livelihoods, culture, ethics and forest dependency etc. The detailed Wild Life Conservation Plan study is enclosed as **Appendix-IV** and the acknowledgement from Chief Wildlife Warden is enclosed as **Annexure-8**

Total of 4 species of fauna falls within the category of Wildlife Protection Act 1972 under Schedule I. The details of each species ecology and conservation issues given below.

Table.10.10 List of Scheduled I Wildlife species

Sl. No.	Common Name	Scientific name	Family	IUCN / WPA schedule
	Mammals			
1	Common leopard	Felidae	*Panthera pardus*	I
	Birds			
2	White-bellied Sea-Eagle	Accipitridae	*Haliaeetus leucogaster*	I
3	Indian Peafowl	Phasianidae	*Pavo cristatus*	I
	Butterflies			
4	Crimson rose	Papilionidae	*Pachiopta hector*	I

BRIEF MITIGATION MEASURES FOR CONSERVATION OF WILDLIFE:

MITIGATION MEASURES FOR CONSERVATION OF WILDLIFE:

(i) Water holes for habitat improvement:

Animals and birds need a regular water source for their daily consumption. As the area receives copious amount of Avg. 3500 mm rainfall annually. During hot summer wild animals and birds stray outside forest in search of water source for quenching thirst. It is therefore proposed to construct water holes/check-dams in the forested area at buffer zone at convenient points.

These water holes would be sufficient to store the water to meet drinking requirement of animals and birds.

The water holes should be provided with cement concrete bedding, side walls with stone pitching and grass should be grown in gap for gripping while animals enter into the water holes.

These water holes are cleaned at regular intervals to remove leaf litter, de-silting and refilling water. Few shades are provided around water holes for animal resting during summer season. Fruit bearing trees shall be grown around water holes to nesting and food for birds and shade for wild animals.

(ii) Noise levels

During mine operation noise levels will increase due to Machinery movement of HEMM. Wildlife is sensitive to higher noise levels like human beings. To reduce the

noise levels during mining operations the following steps are proposed.

i) Use of well-maintained loading machines with sharp bucket teeth

ii) Well maintained roads. No over speeding of vehicles

(iii) Air Quality:

The ambient air quality in the buffer zone shall be maintained within the CPCB limits in respect of PM_{10}, $PM_{2.5}$ SO_2, NO_2 and CO emissions. For this the following steps are proposed.

i) Regular sprinkling of water on roads

ii) No overloading to avoid spillage, trucks covered with tarpaulins.

iii) Creation of green belt around the mine area and avenue plantation with thick foliage to arrest dust.

(iv) Green Belt Development

- The area shall be earmarked for green belt development to mitigate the effects of air and noise pollution from the project activity. Kindly refer the Environmental Plan vide plate No.19
- The species proposed to be planted shall be selected based on the criteria prescribed by CPCB as "Guidelines for Developing Greenbelts" and also in consultation with local forest department.

Table 10.12: Tree Species for green belt development

Sr. No.	Vernacular Name	Scientific Name	Family
1	Asan	*Terminalia alata*	Combretaceae
2	Awala	*Emblica officinalis*	Euphorbiaceae
3	Bor	*Ziziphus jujuba*	Rhamnaceae
4	Chich	*Albiziaodo ratissima*	Caesalpiniaceae
5	DesiBadam	*Terminailia catapa*	Combretaceae
6	Karanj	*Pongamia pinnata*	Fabaceae
7	Coconut	*Coconut nucifera*	Arecaceae
8	Mango	*Mangifera indica*	Anacardiaceae
9	Cashew	*Anacardium occidentale*	Anacardiaceae
10	Teakwood	*Tectona grandis*	Lamiaceae
11	Jamun	*Syzygium cumini,*	Myrtaceae

12	Cocum	*Garcinia indica*	Clusiaceae

Table 10.13:Details of Green Belt Development Plan(Rs in lakhs)

Year	Afforestation/Development of green belt(Ha)	No of saplings	Expenditure (Rs)
1st	4.0432	10108	414428
2nd	3.1319	7830	321020
3rd	4.092	10230	419430
4th	4.7443	11861	486291
5th	3.1609	7902	323992

(iv) Training staff and Awareness activity :

All the mine workers and staff shall be provided awareness and training in conservation of wildlife and develop a liking for wildlife conservation by celebrating Environment Day involving local village people and school students. The drivers shall be trained to give way for wildlife with the support of local forest department.

The villagers are also made aware of wildlife conservation by conducting meetings using pamphlets, audio and video means. Various biodiversity./ wild life awareness activities like conducting quiz, drawing, painting competitions and essay writing for school students.

Villagers are awarded for protecting and preventing wood theft and tree cutting helping Forest Dept. Guards in catching Poachers. Conservation activities for protection of flora & fauna shall be implemented in consultation of Forest Department officials.

(v) Watch towers:

One machan (watch tower) shall be erected near the water reservoir to prevent any poaching in the area.

(vi) Fund for wildlife conservation:

The approved wild life conservation plan will be implemented by forest department and financially supported by the project proponent. The budgetary allocation of funds

towards wildlife conservation shall be 50 Lakhs for five years

The habitat management in and around the study area must be adopted by planting suitable fodder species to enable wild herbivores to thrive upon.

Following suggestions, if implemented will encourage the native fauna to return to the areas:

- A dense green belt consisting of shrubs and trees of different species must be created around the mine area and also along the roads which will act also as a dust and noise barrier.
- Awareness programs amongst the local people as well as mine staff, regarding the importance of wildlife, their habits and habitats, should be organized so that stray and displaced fauna (due to degradation and de-fragmentation of their habitat) is not killed.
- Rock fill dams and check dams shall be constructed in the forest area of buffer zone to prevent the soil erosion. This will be able to store sufficient quantity of filtered water in the area and will act as water holes for the faunal life present in the region.
- The green cover loss due to construction of roads and heavy vehicular movements will restrict the animal movements to the adjoining areas. Therefore, development of a green belt and massive afforestation program of local species and shade giving plant species in the forest area along with approach road shelter for them.
- Awareness programme for the local people/schools children as well as project staff shall be carried out regarding the importance of regional biodiversity and need for their conservation for posterity.
- Fire lines should also be cleared along permanent features like roads, nallas and footpaths at suitable intervals to prevent forest fire from spreading, in case it breaks out.
- People should be trained with forest fire fighting measures and equipped with necessary materials like rakes, shovels, billhook, bucket etc and suitable dresses.
- Obviously, all this would be done at project cost and would be apart from what the local forest department traditionally practices.

10.8 EMP Budget

Table. No. 10.14 EMP Cost per annum

Details	Capital Cost	Recurring Cost	Remarks
	(Rs in lakhs)		
Plantation	-	7.5	Green belt, Plantation on dump slopes etc
Environment monitoring	44	44	Air, Water, Noise, CAAQMS, AMCs
Air pollution control measures	20	300	It includes maintenance of wheel wash, operation of road sweeping machine, tarpaulin covering for trucks, road washing with water tanker, dust suppression on mines, maintenance of roads. Capex-fixed dust suppression system
Water Treatment	-	11	Use of lime and flocculants
Erosion control /monsoon measures	-	221	De-silting trenches-settling pits, boulder wall construction , geotextile, stack covering with silpaulin, Making trenches
Personal protective equipment	-	15	Safety shoes & gumboots, helmet, ear plugs, dust masks, goggles
Maintenance of fire protection systems	-	1.5	Providing Fire extinguishers; fire suppression systems
Environment awareness & training	-	5	Training sessions for employees and community; celebration of environment week, vanamahotasav and various significant days
Health	8	16	Premedical test; Occupational health centre on mines
Total	72	621	
CER Cost			
Budget for meeting the demands of public	-	309.3	Action plan keeping the demands of Public hearing
Grand Total	72	930.3	

The project proponent shall assess the health conditions of the workers as per DGMS guidelines to abate the likely adverse impacts relating to occupational health. However, Workers in the mines will not be exposed to any extreme or hazardous environment. Noise, Climatic conditions, water and other such parameters which will be maintained well within the limits. Air may get slightly affected.

The projected level of damage will also be within the permissible limits but slight damage to the health cannot be over ruled as the process (of damage to the health) is irreversible one due to mine air pollution. Regular monitoring the health of the workers shall be undertaken.

10.9 ENVIRONMENTAL MONITORING STRATEGY

The monitoring of various environmental parameters is necessary which forms part of the environmental protection measures. Monitoring is an important feature because the efficiency of control measures can only be determined by monitoring.

For analysis of Environmental Parameters and monitoring, the services of an approved and recognized laboratory is being utilized. A budgetary allocation of Rs. 44 lakhs/annum has been earmarked for Environmental monitoring. A comprehensive monitoring programme is given under.

Table 10.11 : Monitoring Schedule for Environmental Parameters

S.No.	Particulars	Frequency of Monitoring	Sampling	Parameters Required to be Monitored
Air Quality				
1	Ambient Air quality in and around the Mine	Twice a week	24 hours continuously	PM2.5, PM10, SO2 & NO2
Water Quality				
2	Water Quality around the Mine	Once in a Month	Grab Sampling	As per IS: 10500
Noise Level Monitoring				
3	Ambient Noise levels in and around the Mine	Once in a Quarter	Continuous for 24 hours with 1 hour interval	Noise Level
Soil Quality				
4	Soil Quality around the Mine	Once in a year	Grab Sampling	IS: 2720

The company also proposes to install a Continuous Ambient Air Quality Monitoring System within a period of 1 year from the date of execution of lease.

10.10 OCCUPATIONAL SAFETY AND HEALTH PLAN

10.10.1 HEARING IMPAIRMENT.

The most significant occupational health hazard is noise induced hearing loss. There are no reported cases of hearing loss due to noise pollution as per the observation of local doctors. However, mining authorities will conduct periodic health checkups by in-house medical team for any hearing impairment of workers. This is according to health plan policy and such policy will continue as long as mining is in operation.

10.10.2 SKIN DISEASES.

According to local doctors, 2.2 per cent of the patients have suffered from skin diseases, which is because of lack of personal hygiene rather than dust pollution due to mining. The mining authorities will take enough precautionary measures to minimize the dust pollution.

However, mining authorities will conduct periodic health checkups by in-house medical team to detect any skin allergies among mining workers and the population, especially school children. This is according to health plan policy and such policy will continue as long as mining is in operation.

10.10.3 EYE DISEASES.

According to local doctors, patients suffering from eye related problems are absent. The eye infections are generally not related to dust pollution due to mining. It is mostly due to general infection and old age. The mining authorities will take adequate precautionary measures to minimize the dust pollution. However, mining authorities will conduct periodic health checkups by in-house medical team for eye diseases among mining workers and school children. This is according to health plan policy and such policy will continue as long as mining is in operation.

10.10.4 JOB STRESS BECAUSE OF WORKING IN ACCIDENT PRONE PLANT ENVIRONMENT

The job stress is expected to be low because of incentives like providing food in work place, weekly holidays and recreational facilities. This is according to health plan policy

and such policy will continue as long as mining is in operation.

10.10.5 RESPIRATORY DISEASES

Iron ore does not contain toxic elements. Hence, the possibility of any health hazards due to toxic elements does not arise. The most significant occupational health is lung diseases due to inhalation of dust. However, management is taking enough care to minimize these occupational health hazards.

The percentage of Pneumonia episodes is 0.11 is very low. The percentage of Asthma or Bronchitis is moderately high (3.7). The Pneumonia and Asthma episodes are because of vices like consumption of tobacco and alcohol, especially among males. However, mining authorities will conduct periodic health checkups by in-house medical team for any respiratory infections among mining workers and villagers.

This is according to health plan policy and such policy will continue as long as pellet plant is in operation.

10.10.6 MATERIALS LIKE ASBESTOS, SILICA, CHROME DUST ETC. ARE HAZARDOUS TO MINE WORKERS.

The hazardous materials are not used on the mining site. However, mining authorities will take care not to use any hazardous material either for construction or for any other use. This is according to health plan policy and such policy will continue as long as mining is in operation.

10.11 OCCUPATIONAL SAFETY

10.11.1 Provision of rest shelter for workers with facilities of drinking water.

Rest room with fresh drinking water and toilets facilities with running water for wash are provided on the work site for all workers. Canteen and Dispensary/OHC shall also be provided.

10.11.2 *Awareness of safety and ensure using personal protective equipment (PPE) by workers.*

All workers will be made aware of safety measures to be followed on the work site. The awareness programmes will be conducted by professionals who have graduated in the industrial safety. All the workers are given helmet, gum boots, safety shoes and working

dress. These equipments will be replaced periodically.

10.11.3 ***Regular maintenance of testing of equipment.***

The safety and testing equipment's will be maintained regularly.

10.11.4 ***Periodic medical examination of all workers.***

Periodic medical check up of all the employees will be carried out regularly. The mine also will have a dedicated OHC .

10.11.5 ***Safety measures of risk assessment in underground mining.***

There is no underground mining activity

10.11.6 ***Conduct of mock drill.***

Mock drill will be regularly conducted for all the emergency situations identified, like fire, land slide, drowning etc..

10.11.7 ***Safe storage of handling of explosives.***

No explosives will be used**.**

10.12 *SOCIO-ECONOMIC CONDITIONS OF THE REGION*

10.12.1 Medical assistance.

Medical facilities in the state of Goa are very well developed. Occupational Health centre will be established in the mines . Regular health check ups of workers will be conducted . Medical camps would be conducted in surrounding villages . This will be continued with adequate annual budget. This is according to health policy of the company.

10.12.2 Primary education

Budgetary provision will be made to support educational scheme/assistance towards development of children , upgrading educational infrastructure in existing schools, scholarships to underprivileged and meritorious students. Imparting employability training, vocational courses and skill development

10.12.3 Animal husbandry

Animal husbandry will be included in the welfare with proper budgetary allocation in the course of time.

10.12.4 Rural water supply

All the villages are connected with government water supply. In case of any such requirement support will be provided to strengthen the government system.

10.12.5 Agriculture improvement

It is also proposed to support the agriculture by providing various inputs like good quality seeds, manure to the farmers . know how about latest agricultural techniques will be imparted to the farmers with help of experts and agriculture department.

10.12.6 Vocational training.

Vocational training will be included in the welfare programs in future. It is going to be an important welfare program that can counter the unemployment.

10.12.7 Assistance in utilizing government programs.

The in-house medical team will work with the local medical sub-centers and primary health centers in providing primary health care and referring patients to the government health facilities. This policy will continue in future.

10.12.8 Employment

The mining project will create lot of direct and indirect employment opportunities in the surrounding villages. Apart from direct employment on the mines, a lot of employment will be generated due to activity of transportation of ore.

10.12.9 Communication and Accessibility

All Villages are well connected by roads leading to taluka or district headquarters. Mining authorities will provide street light fixtures to Panchayats.

10.13 Environmental Management plan towards the sensitive receptors within the ML area

The following sensitive receptors like habitat, water body and archeological monument is already presented . The Fig showing the location of sensitive receptors and safety buffer from Mine workings is shown in Plate No. 20. The action plan proposed towards management of sensitive receptors is given vide Table No. 10.12

Table No.10.12 Action Plan for EMP

Sl.No	Site Specific	Major Impact	Protective Measures
1.	Habitations (Within ML area) Mulgaon Lamgao	Dust Emission Fly rocks due Blasting and Drilling	Air Pollution shall be minimized by following measures. Buffer of 50mts shall be maintained from mine workings High canopy plantation shall be done which reduces the dust emission (local species like Cashew , Alva, Arjuna, Bamboo etc) shall be carried out Green belt area : Lamgao : 2.55 Ha (50 m wide) Mulgao : 9.881 Ha (50 m width) Arrangement of water sprinklers for dust suppression No Drilling & Blasting operation proposed
2.	Archeological monuments	Dust Emission Fly rocks due Blasting and Drilling	Idgah Mosque: 1.3414 Ha (200m width) around green belt High canopy planation(local species like Cashew , Alva, Arjuna, Bamboo etc) shall be carried out No Drilling & Blasting operation proposed
3.	Water bodies • Asnora river adjacent to ML area • Mandovi River - Aerial Distance of 2.30 Km • Bicholim River - Aerial Distance of 0.23Km • Mayem lake	Runoff water through mines during monsoon carry the suspended matter into the river and HFL	Safety buffer of 50m shall be maintained and planted with plant species .Construction of garland drains , Check-dams, Retention walls settling ponds, filter beds shall reduce sediment run-off's. HFL of Assonora River is 3.5m MSL , The mine boundary is about 10.9 m MSL hence is there is no impact of flood of Assonara River
4.	Schools within the Mineral block: There are two government primary schools located inside the	Dust Emission	6. In General a safety buffer of 50m will be maintained towards the habitation .

	Block--I , Bicholim mineral block. These schools are located inside the habitation in Mulgao village at Gaonkarwada and Manasbaag . These schools were in existence during the tenure of earlier mining operations also. Out of these two schools, The school at Gaonkarwada is not functional since few years. The no of students studying in manasbag school is also very less (only 12 no of students during the current year). There are many other schools both government and private with good infrastructure in the Bicholim town which are well connected with the villages and are preferred in general.	Fly rocks due Blasting and Drilling	7. W.r.t the schools , the distance from ultimate pit limit to the Manasbag school is 138 m and from Gaonkar wada school is 190 m 8. These schools are situated inside the habitation and has a direct road approach from the village, there is no hindrance from mining activity or transportation. 9. There is no drilling and blasting proposed during the mining operations and as such there is no possibility of fly rock or ground vibrations 10. Support will be provided to the schools in terms of improving infrastructure , teaching facilities, play equipment etc. and budget for same is provided in CER. We would like to state that there wont be any significant impact of the mining operations on the schools mentioned above and as such shifting of these schools wont serve any purpose and hence shifting is not proposed.

			No Drilling & Blasting operation proposed
5.	Temples Shri Lairaidevi temple Lamgao caves Sateri Temple(Lamgao) Kelbai Temple Mahadev Temple & other places of worship	Dust Emission Fly rocks due Blasting and Drilling	Plantation of green belt with canopy trees to reduce the emission of dust, No mine workings are carried out at 50m width around the temple area. No Drilling & Blasting operation proposed

*Mitigation measures w.r.t School:

Chapter-11

SUMMARY & CONCLUSION

11.0 SUMMARY AND CONCLUSION

This Chapter provides the concise summary of the Key Project Parameters along with overall justification for implementation of the project and explanation of how the possible impacts have been mitigated as required under the generic structure of Appendix III of the EIA Notification 2006. Further, the conclusion on the studies undertaken is also included in this Chapter.

11.1 INTRODUCTION

In pursuant to the notice inviting tender dated 30.09.2022 by the Government of Goa in accordance with Mines and Minerals (Development and Regulation) Act 1957, and the Mineral (Auction) Rules, 2015 and as amended from time to time, Vedanta Limited intends to obtain prior Environmental clearance from MoEF&CC for the production of 3.0 MPTA in Block-I Bicholim Mineral Block located in Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages of Bicholim Taluka, North Goa District, Goa State.

The e-auction process was conducted in accordance with the Tender Document for said Mineral Block. Vedanta Limited emerged as the highest qualified bidder having submitted the highest final price offer and was declared as the preferred bidder under Rule 9(9) (iii) of Auction Rules.

Further, upon submission of the first installment, being 20% of the upfront payment, Government of Goa issued a **Letter of Intent (LOI) vide letter no. DMG/25/Auction Cell/LOI-function/2023/2801 dated 13.01.2023** for the grant of a mining lease for Block-I - Bicholim Mineral Block in Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages of Bicholim Taluka, North Goa District, Goa State over an area of 478.5206 Ha over a period of 50 years.

11.2 PROJECT DESCRIPTION

The Block area of 478.5206 Ha falls under Block 1 - Bicholim Mineral Block in Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages of Bicholim Taluka, North Goa District, Goa State.

The proposed lease area is having about 84.743 million tonnes of mineral reserves & resources. The mined Iron Ore shall be utilized at the company-owned pig iron plant, other domestic and export markets.

The block area falls under the Toposheet No. 48 E/14, Survey of India and bounded by latitude of 15° 34' 20.518" N to 15° 36′ 54.018″ N & longitude of 73°54′ 4.754" E to 73° 57′ 09.51″ E. The general elevation of ML area varies from 169.14 m to -37.24 m above MSL. State Highway SH-1 is about 0.65 km from ML area, the nearest Railway station is Thivim Railway station which is at a distance of 10.5 km by road, the nearest Airport is Mopa Airport at a distance of 27.3 km.

11.3 ENVIRONMENTAL SENSITIVITY

No National Park, Wildlife Sanctuary or Migratory Corridors of Fauna is present inside the Project Site or within 10 Km radius area of the Project Site. Assonora river is touching NW end of the lease area . Few habitats like Mulgao and Lamgao exists within the Block I-Bicholim Mine Block. Idgah which is an archeological monument exists within the lease area.

11.4 GRANT OF TOR & BASE LINE DATA MONITORING

The MOEF&CC accorded the TOR for the Project vide TOR identity TO23A0000GA5700309N dated 16/06/2023 The Baseline Data was collected during the period from March to May 2023.

11.5 MINING METHODOLOGY

The proposal of obtaining environment clearance is for 3.0 Million tonnes per year with overall overburden ratio of 1 : 8.39. Mining operations will be by way of mechanized opencast method without drilling & blasting, complying with all the statutory requirements using Heavy earth moving machineries like Rippers & Dozers, shovels, dumpers, wheel loaders and tippers. Rippers & Dozers will be used for ripping of hard material and wheel loaders are used for loading and dozers for levelling. The Run of Mine (ROM) Iron Ore will be subjected to the dry crushing and screening. Finished product (Lumps & Fines)/ROM will be utilized in the Pig Iron plant of the company other domestic and export markets. The ore transportation from mine to the jetty will be carried out by tippers with the capacity of 10.5 Tonnes.

11.6 PRODUCTION, RESERVES AND LIFE OF MINE

The total reserves/resources as on 13.01.2023 are 84.743 Million Tonnes, which is considered for defining the Life of the Mine. The life of the mine will be 30 years which may enhance based on the future results of exploration planned during the Mining Plan period. However, the lease is valid till 50 years.

11.7 MANPOWER, WATER & POWER REQUIREMENT

The Project shall provide direct employment to about 521 people, which includes mine officials, skilled, semi-skilled and unskilled labour and about 195 indirect employment opportunities to the locals. Over and above this a lot of employment will be generated in the form of contracts like transportation, plantation, workshops and garages, and allied activities .

The Water Requirement of the Project is estimated to be maximum 664 KLD. Out of this, 36 KLD of the water is required for domestic, 20KLD for green belt, 8KLD for wheel washing and the balance 600 KL/Day for dust suppression. The entire water requirement except that of domestic consumption will be met through Rain water harvested within the mine pits . Efforts will be put for reduction of specific water consumption year on year.

LED lights will be used, within the office and workshop premises. Feasibility of using Solar energy for office area will be carried out. Diesel Fuel is used by Heavy Earth Moving Machineries like excavator, loader and transport vehicles etc. Trials of using electric HEMM like wheel loaders and excavators will also be taken.

11.8 RESETTLEMENT & REHABILITATION

There is no proposal for Resettlement & Rehabilitation during the entire life of the mine.

11.9 DESCRIPTION OF THE ENVIRONMENT

The Block-I Bicholim Mineral Block is the core zone for the present EIA study. The area encompassing 10 km radius from the boundary of the core zone has been defined as the buffer zone. The core zone and the buffer zone together constitute the study area.

The Baseline Environmental data with respect to Air, Water, Noise and Soil Quality in the study area for the present EIA study is considered for the Summer Season 2023. The various studies on hydrogeology, flora, fauna, and socioeconomic study were also conducted during the same period. Sampling and analysis has been
carried out by M/s. Environmental Laboratory (Unit of Mineral Engineering Services), Bangalore, Laboratory accredited by NABL and recognized
by CPCB/MoEF&CC.

11.9.1 Topography

The topography is undulating low hill terrain extending all along the mining block in the North West and South East direction. Mine does not have any forest land within the lease. The area is located on the foot hills of Western Ghats belt and receives heavy rainfall during monsoon season, the average annual rainfall is about 3500mm.

The Block I- Bicholim Mineral Block is situated in North Goa district and extends between Lat 15° 34' 20.518" N to 15° 36′ 54.018″ N & longitude of 73°54′ 4.754" E to 73° 57′ 09.51″ E. The mine block area is about 478.5206 ha. The Mine is located on a hill range running in a SE-NW direction. The general elevation of ML area varies from 169.14 m to -37.24 m above MSL.

11.9.2 Drainage

The drainage pattern in the study area is dendritic and sub dendritic. Bicholim Mineral block study area falls under Mondovi River basin of Taluka Bicholim, Bardez, Satari, Sanguem, Tiswadi & Ponda. The catchment area of Mondovi River 1580 Sqkm. The Sahyadri hill ranges in the east form the main watershed. The streams originating here flow in west and north west direction to join the Arabian Sea.

11.9.3 Ambient Air Quality

For Ambient air quality, 9 stations have been fixed covering all the directions, the frequency of monitoring is 2 days/ week for 3 months and the parameters covered were as per CPCB NAAQS guidelines.

The statistical analysis of Ambient Air Quality is as follows, the maximum values of SO_2, NO_2, PM10 & PM2.5 in the core zone are observed to be 13, 18, 56 & 36 µg/m3 respectively All the parameters including CO, Pb, and O3 as per NAAQ are monitored and monitoring

results compared to AAQM are observed to be well within the limits.

11.9.4 Noise Levels

For noise quality 9 stations including one station in core zone and 8 in buffer zone villages were monitored and Leq during day & night are observed. The Leq value during day in the core zone is observed as 61.7 dB(A) and in night 49.3 dB(A) and monitoring results when compared to Noise Quality Standards are well within limits.

11.9.5 Water quality

Water Quality Monitoring was done by grab sampling once in a season for 7 surface Water and 10 Ground Water samples. IS: 3025, APHA, & IS:1622 standards are used for analysis. Thus, the analysis results are compared to IS standards IS:2296 & IS:10500:2012. The results of few surface water samples shows high TDS, Total hardness, Sulphates, and Chlorides. This is mainly because of the influence of creek water. The open well samples were found to have pH slightly acidic in nature. This is possibly due to the occurrence of lateritic ore.. Whereas other parameters are within permissible limits of respective standards.

11.9.6 Soil Quality

Soil Quality Monitoring at 7 locations including one from the ML area and others from nearby village agricultural fields are collected and analysed, during the study period for Physical Parameters and chemical parameters. They are all observed to be within normal soil quality fit for cultivation.

11.9.7 Land Environment

The existing major land use of study area covering 10 km radius are 6.61% of water bodies, 0.9% reserve forests, 2.12% of mangroves, 6.23% of agriculture land, 20.97% of scrub land and 15.41% of Settlement area.

After the ore is exhausted in the pits the broken-up land will be backfilled and will be progressively planted and rehabilitated with local species like Cashew, mango, Jamun, Cocum, Terminalia etc. All the efforts will be taken for maximum survival and growth of

the plants.

11.9.8 Biological Environment

The Mine area is located at the distance of around 10.553 km from the Salim Ali Bird Sanctuary, hence, there is very less chance of threat to the sanctuary and mangrove ecosystem, however, mine management could work with downstream riparian and mangrove forest and assist ecologically restoration as per the EMP suggested species.

The Mine pit area is already degraded and been away from community settlement usage, hence there is not much additional impact or social ecological constraints.

In case of conservation of flora and fauna as per suggested EMP, greenbelt shall be developed all along the boundary, unused areas, inactive dump slopes and roadside of core and buffer areas.

The proposed biodiversity management plan will be implemented as per the standard guidelines prescribed by regulatory authorities.

Budget allocations and time bound interventions will be monitored by local authority to ensure that the conservation of biodiversity and no damage occurs to the existing ecosystem habitats in the study area.

The dominant species in the reserved forest were Anacardium occidentale, Cassurina equisatifoilia and Acacia auriculiformis, which have been promoted significantly on both private and degraded government land. The Mango and Coconut orchards is significantly promoted to farmers on agricultural bunds and house backyards. There are no endangered or endemic species of flora or fauna in the core zone.

11.9.8 Socio-economic environment

There are 68 villages/towns - 56 villages and 12 census towns (CT), in the buffer zone. Of these, 68 villages/towns, 48 villages and 12 towns are located in 6 talukas of North Goa and 8 villages in one taluka in Maharashtra. As the data pertains to large number of villages and towns are in North Goa, the buffer zone is compared to North Goa District.

Usually, villagers grow coconuts, cashew or mango in the small piece of land. In the absence of mining activity, agriculture and tourism are the only source for employment.

The infrastructure and amenities available in the study area denotes the economic well-being of the region. It is observed that good infrastructure facilities are available in the

project study area, which consists of education, health care, drinking water facilities, communications, transportation, etc.

Due to the proposed mining activity, no significant adverse changes are visualized in the traditional way of life of the people residing in the villages in the buffer zone. Further people residing in the nearby villages will be benefited by the direct and indirect employment opportunities created by the mining activities along with the various socio-economic development activities taken by company. The communication, health and education facilities will improve and thus the mining activity will be beneficial and will have a positive impact in the region.

11.10 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The Block-I Bicholim Mineral Block is yet to start mining and shall operate taking all precautionary measures to reduce the impact of mining operations on Air, Water, Noise and Soil and ensuring all control measures to comply with the prescribed standards.

11.10.1 Air Environment

The impacts on Air Environment are assessed through Aermod Modelling and results show the cumulative impacts on the surrounding buffer zone villages after commencement of mining operations are within the permissible limits

Following measures will be undertaken to control the Air pollution/dust generation during the mining activities:-

- Due to high inherent moisture of the ore as well as waste, generation of dust while loading will be minimal. Speed limit of transport vehicles will be enforced.
- Transportation trucks will be loaded to the prescribed capacity and covered with tarpaulin.
- Dust Sprinkling system with a fine mist spray will be used for dust suppression along the road as well as stacks.
- The dump slopes will be covered with geotextiles, which will prevent generation of dust. during the monsoon the finalized geotextile laid areas will be taken up for plantation.
- Plantation done on the slope of waste dump itself act as a wind breaker.

- Latest machinery having air-conditioned cabin will be used for loading and dozing operations.
- Proper maintenance of transport machinery with regular PUC will be done.
- Providing acoustic enclosure and proper exhaust chimney height to DG set.
- Proper dust suppression measures at crushing and screening plant.
- General aspects of air quality management will be included in induction training to be provided to all employees.
- Installation of Wheel wash at mine exit
- Manual and machanised machine for road sweeping, washing of mine exits, junctions after transportation hours

11.10.2 Water Environment

The rain water is harvested into mine pits is used for various mining activities like dust suppression, vehicle washing, gardening etc. Though the ground water shall be encountered in the pit, there shall be no adverse impact due to pit dewatering as the radius of influence due to pit dewatering falls 10m from the periphery of the ML area. The protective measures in the form of garland drainages, trenches, settling tanks, retention wall application of coco logs will be undertaken to control the water pollution. Thus, there shall be no adverse impacts on surface and ground waters. In fact, the local villagers will be benefited by supply of pit discharge water after treatment.

11.10.3 Noise Environment

Maximum noise is produced from operation of earth moving machineries & movement of dumpers. No drilling and blasting operations are involved. Wide green belt shall be provided surrounding ML to attenuate noise pollution. Regular maintenance of mining equipment, machinery & all vehicles as per the manufactures recommendations to minimize the Noise generation shall be followed. Following management measures will be adopted to control noise levels:

1. Provision of acoustic cabins for operators deployed on HEMM
2. Selection of new low-noise equipment from the manufactures failing which use of additional retrofits if available.
3. Green belt developed all around the mine acts as an acoustic barrier.

11.10.4 Impact on Land Environment

At the conceptual stage around 105 ha of land will be brought under plantation by planting mix fruit bearing trees like Cashew, Jack fruit and forestry species. Around 20 Ha of the area will be reclaimed by forming a water reservoir . This water reservoir will serve in augmenting the ground water condition of the region and also the pit discharge water will be supplied to local villagers for agricultural purpose.

The BEES methodology was employed to evaluate the impact on Environmental Pollution Parameter and the Impact score obtained was -8.

11.10.5 Impact on Biological Environment

As there exists schedule I species falling within 10 km radius of the ML, a full-fledged biodiversity assessment study has been taken up by the proponent along with wildlife conservation plan with financial outlay to assist the local forest department. The proponent shall take mitigation steps within ML area for immigration of wildlife through massive afforestation. The BEES methodology was employed to evaluate the impact and the impact score obtained was +6. This positive score is due to the massive afforestation the project proponent has proposed to be taken up on the already stripped area.

11.10.6 Impact on socio economic environment

This mine shall provide direct employment to about 521 people, which includes mine officials, skilled, semi-skilled and unskilled labour and about 195 indirect employment opportunities to locals in the form of hired truck drivers, hired machine operators, local workshops, contract workers for construction works like parapet wall, work of covering trucks with tarpauline, , plantation work, cleaning works etc.. The mining activities help in sustainable development of this area including further development of physical & social infrastructural facilities. The mining activity provides revenue to the state and center in form of taxes and royalty etc. The project proponent shall assess the health conditions of the workers as per the DGMS guidelines. Noise, air, water quality will be maintained well within the limits. The BEES methodology was employed to evaluate the impact and the score obtained was +45.

The overall impact score obtained from BEES methodology is +42 which shows the project shall be beneficial to the local community and the local Government.

11.11 ADDITIONAL STUDIES

In additional studies, Risk Analysis followed by Disaster Management Plan, which will help in identifying the possible risks and to promote towards preparedness to counter any mishap. Risk analysis and disaster management plan have been prepared and incorporated in EIA Report.

11.12 ENVIRONMENT MANAGEMENT PLAN

A Comprehensive Environment Management Plan including development of Green Belt has been suggested. Identification of all potential environmental impacts of a project is an essential step of Environmental impact Assessment. These are critically examined and major impacts are further studied. In case of mining projects, change in topography and land use, air pollution, water pollution, waste management, biodiversity and socio-infrastructure issues are significant. The Mine will be operated taking all precautionary measures to reduce the impact of mining operations on Air, Water, Noise and Soil and ensuring all control measures to comply with the prescribed standards. The impact of change of land use will be positive only, as portion of abandoned pit is partly backfilled and afforested and balance portion is left as water reservoir beneficial to local villagers. Development of green belt along the boundary of ML area will ensure a better environment. The budget of Rs. 72 lakhs capital cost and Rs. 621 lakhs recurring cost is presented in the report.

11.13 CORPORATE SOCIAL RESPONSIBILITY

The Lessee proposes to undertake a number of activities under the Corporate Social Responsibility Initiative during the operation of Mining Project. The company carries out CSR activties under following thematic areas namely Agriculture, Health care, Education, Skill dovelpement, Sports, women empowerment etc. The CSR interventions by the company will help to improve social economic status surrounding villages.

11.14 CORPORATE ENVIRONMENT RESPONSIBILITY

In addition to the C R, the Lessee proposes to undertake a number of activities as one time measure under the Corporate Environment Responsibility Initiative during the operation of Mining Project. The demands made in public hearing and during

consultation with public representatives. The list of activities envisaged with a total cost of Rs. 309.3 lakhs is presented in the report.

11.15 ENVIRONMENTAL MONITORING PROGRAM

Environmental monitoring is required to know the Quality of Ambient Air, Water and Noise Levels during the operation phase of the proposed project and take required corrective measures, in case of any non-compliance with the norms stipulated by regulatory authorities. The methodologies adopted for environmental monitoring will be in accordance with the CPCB. SPCB and Indian Bureau of Mines requirement.

11.16 EXPLANATION ON HOW ADVERSE EFFECTS ARE MITIGATED

The EIA/EMP Report has established the Base Line Environment of the Project Area and has assessed anticipated impacts of the Project on the overall ecology & environment. Accordingly, general as well as specific mitigation measures for management of the Key Environmental Parameters have been suggested. Further, specific measures towards monitoring and implementation of the Environment Management Plan along with details of the funds required towards implementation of the Pollution Control Measures are also included in the Report. By implementing the suggested Environment Management Plan adverse effects of the Project can be mitigated.

11.18 CONCLUSION

The Block- I Bicholim Mine Block is newly auctioned mineral block. The Impacts predicted for various Environmental Attributes were found to be on the positive scale. The EMP proposed will have a positive impact on the surrounding environment and the landscape of the area. The local population will be benefitted from this project by way of employment and CSR activities carried out by the company.

Chapter-12
DISCLOSURE OF CONSULTANTS ENGAGED

DISCLOSURE OF CONSULTANTS

Declaration by ACO and Experts contributing to the EIA Report

I, hereby, certify that I was a part of the EIA team in the following capacity that developed the above EIA.

EIA coordinator (EC): M. S. Raju

Name: M. S. Raju

Signature and Date :

Period of involvement: 15.02.2023

Contact information: 9448367421

Functional area experts:

S. No.	Functional areas	Name of the expert/s	Involvement (period and task**)	Signature and date
1	AP*	M. Sachin Raju	15.02.2023 to Jun 2023	
	Team Member	M.R.Durga Prasad	Mar-2023 to Jun-2023	
2	WP*	M.Sachin Raju	15.02.2023 to Jun 2023	
	Team Member	K. Janaki	15.02.2023 to Jun 2023	
3	SHW*	M.S.Raju	15.02.2023 to Jun 2023	
4	SE*	K.N.M.Raju	Apr-2023	
5	EB*	H C Chetan	Apr-2023	
6	HG*	M.C.Reddy	Apr-2023	
7	GEO*	M.S.Raju	15.02.2023 to Jun 2023	
8	SC*	Nagaraja B C	May- 2023	
9	AQ*	M. Sachin Raju	15.02.2023 to Jun 2023	
10	NV*	M.S.Raju	15.02.2023 to Jun 2023	
11	LU*	Nagaraja B C	15.02.2023 to Jun 2023	
12	RH*	M.S.Raju	15.02.2023 to Jun 2023	

*One TM against each FAE may be shown

**Please attach additional sheet if required

PLATES

LOCATION MAP

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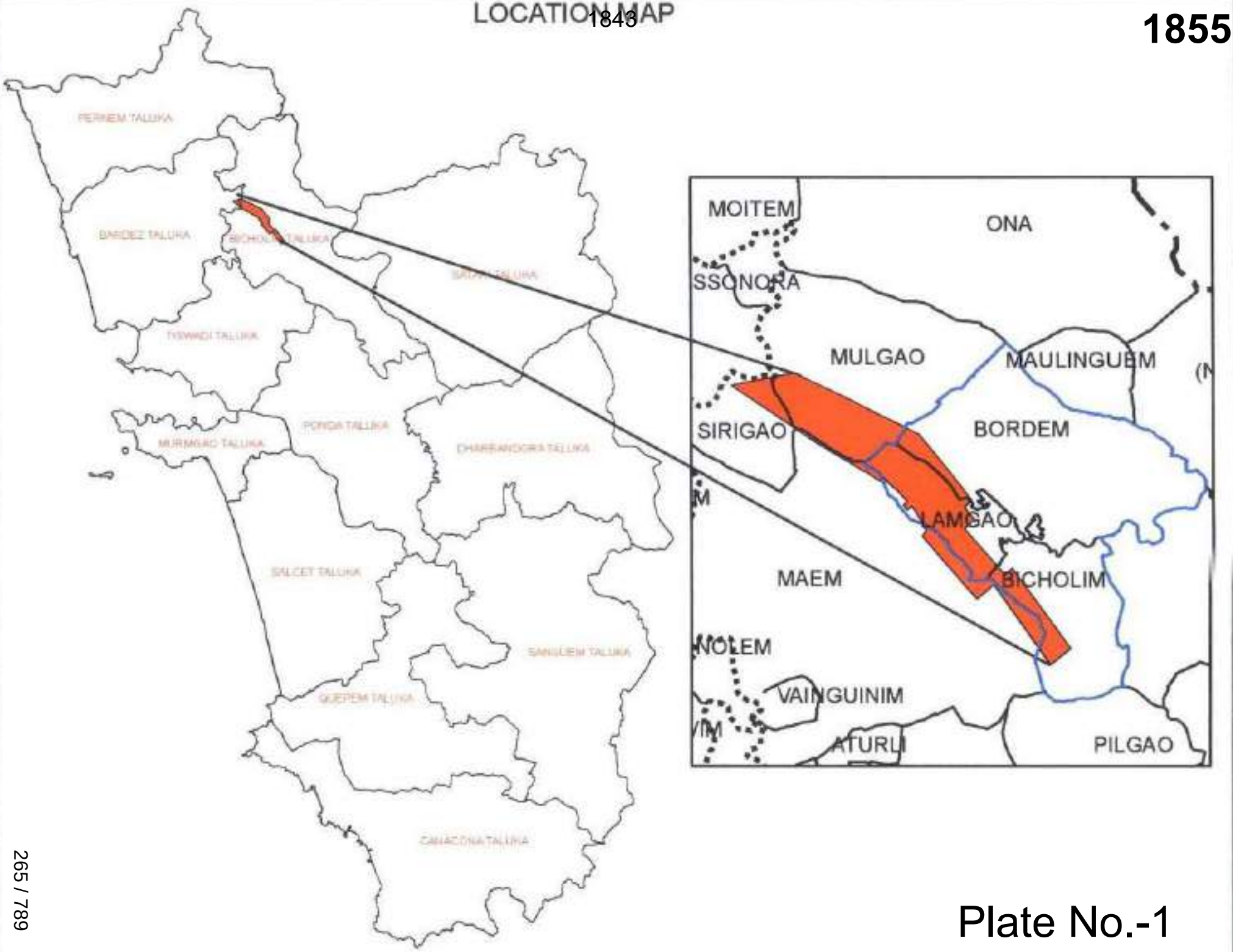

Plate No.-1

265 / 789

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Plan Showing Mining Lease Boundary of BLOCK I - BICHOLIM MINERAL BLOCK on Georeferenced and Vectorised Cadastral Map
Situated at Lamgao, Bicholim, Mayem, Mulçao, Bordem & Sirigao Villages of Bicholim Taluka of North Goa District, Goa

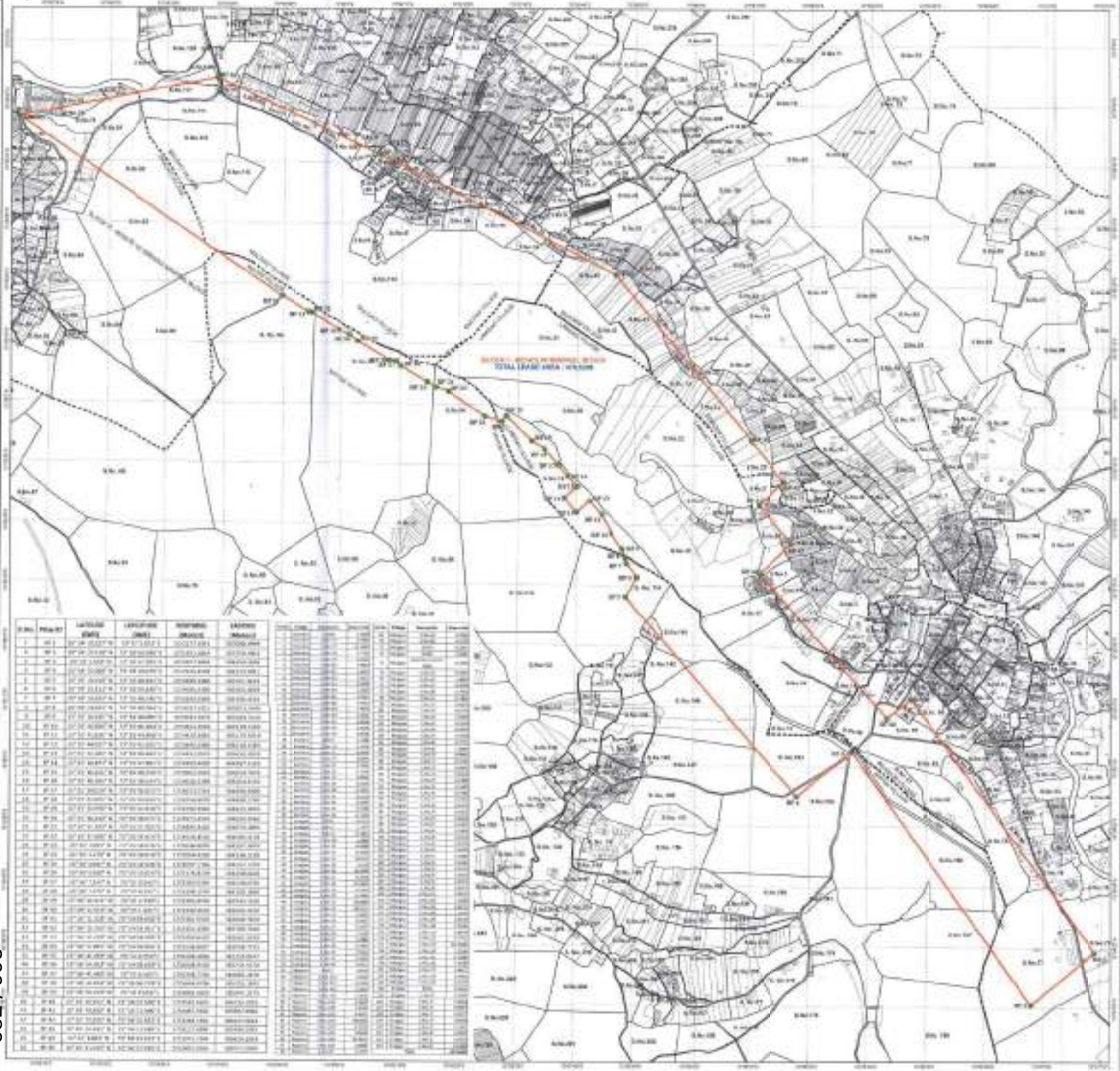

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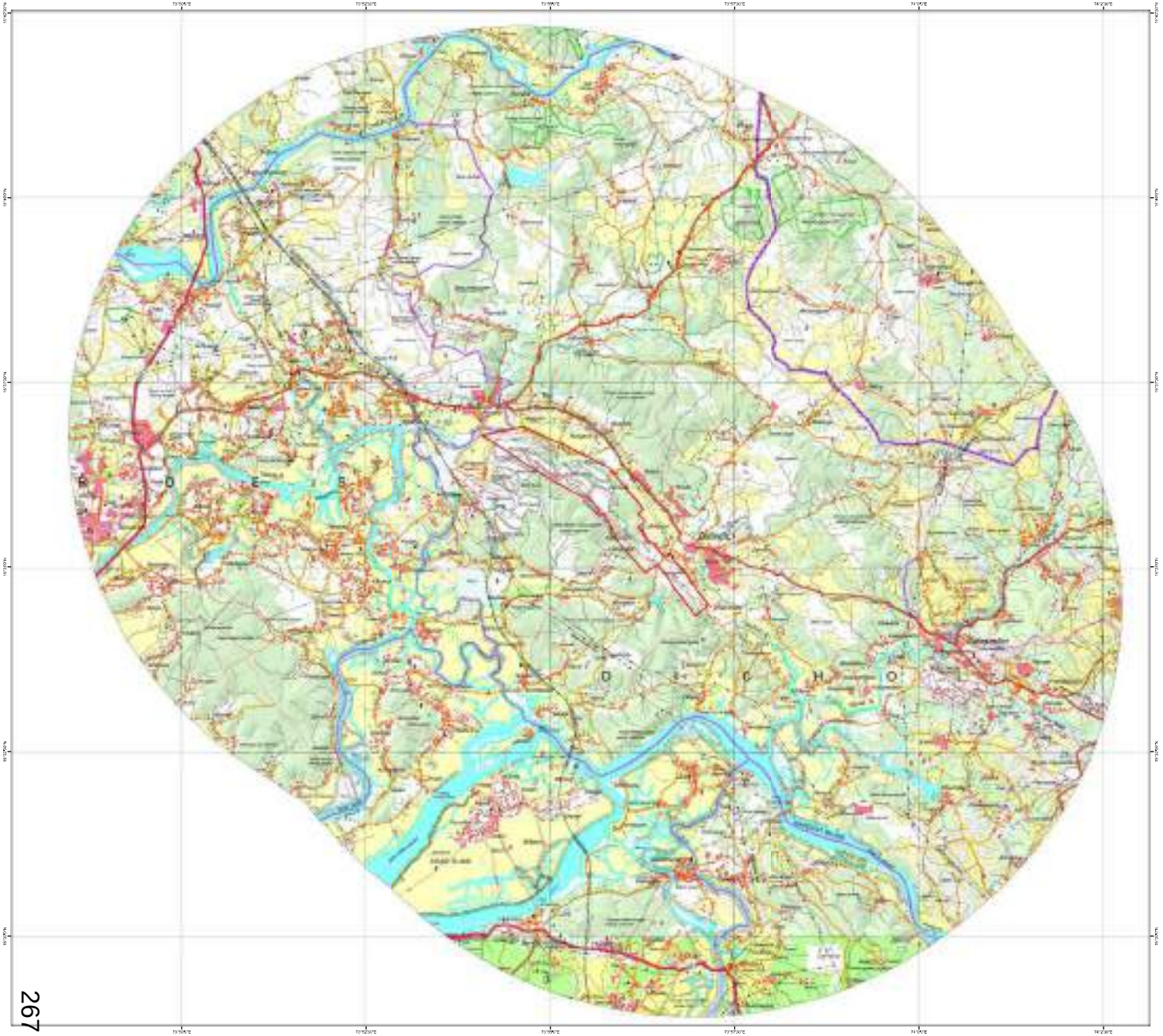
Plate No - 2

266 / 789

Key Plan



N

W E

S

0 2.5 5 Km

Legend

Mining Lease Area

10km bufferzone

Plate. - 3

BLOCK-I BICHOLIM MINERAL BLOCK Vedanta Limited BICHOLIM,LAMGAO,BORDEM, MAYEM DISTRICT: NORTH GOA STATE : GOA	
TITLE	key Plan
SCALE	1:50,000
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	Old : 48E/14, 48E/15, 48I/2 & 48I/3

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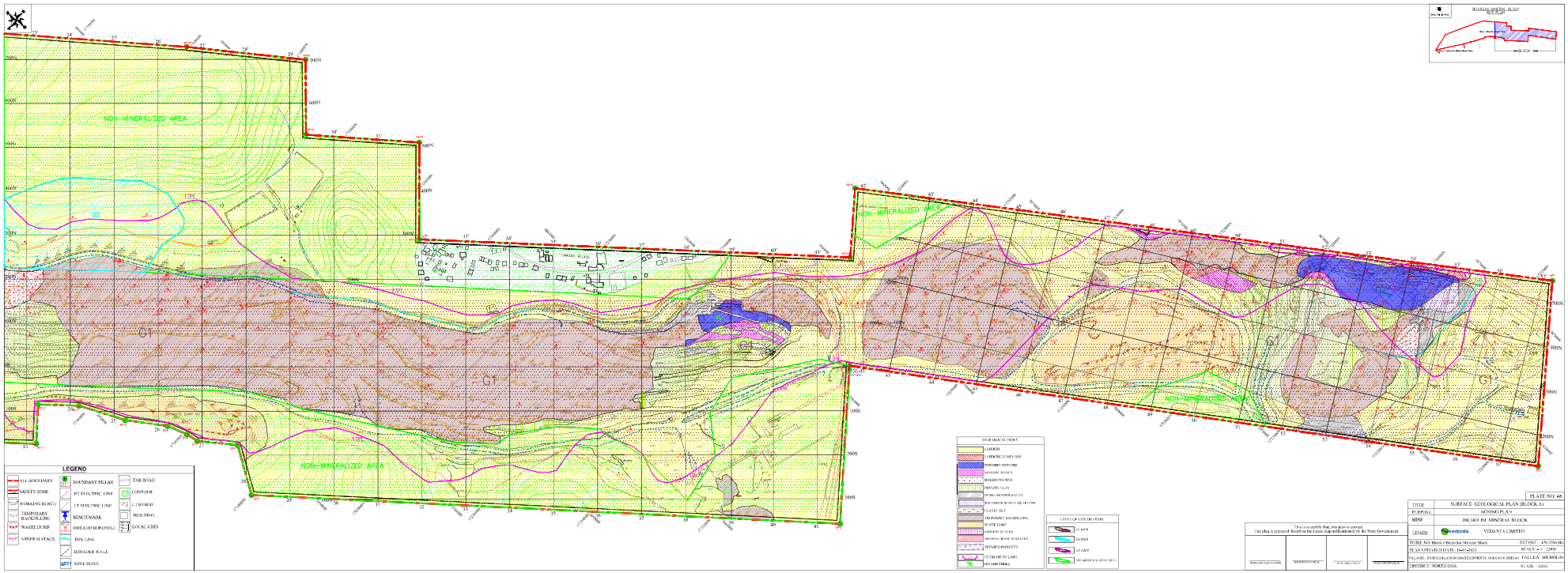
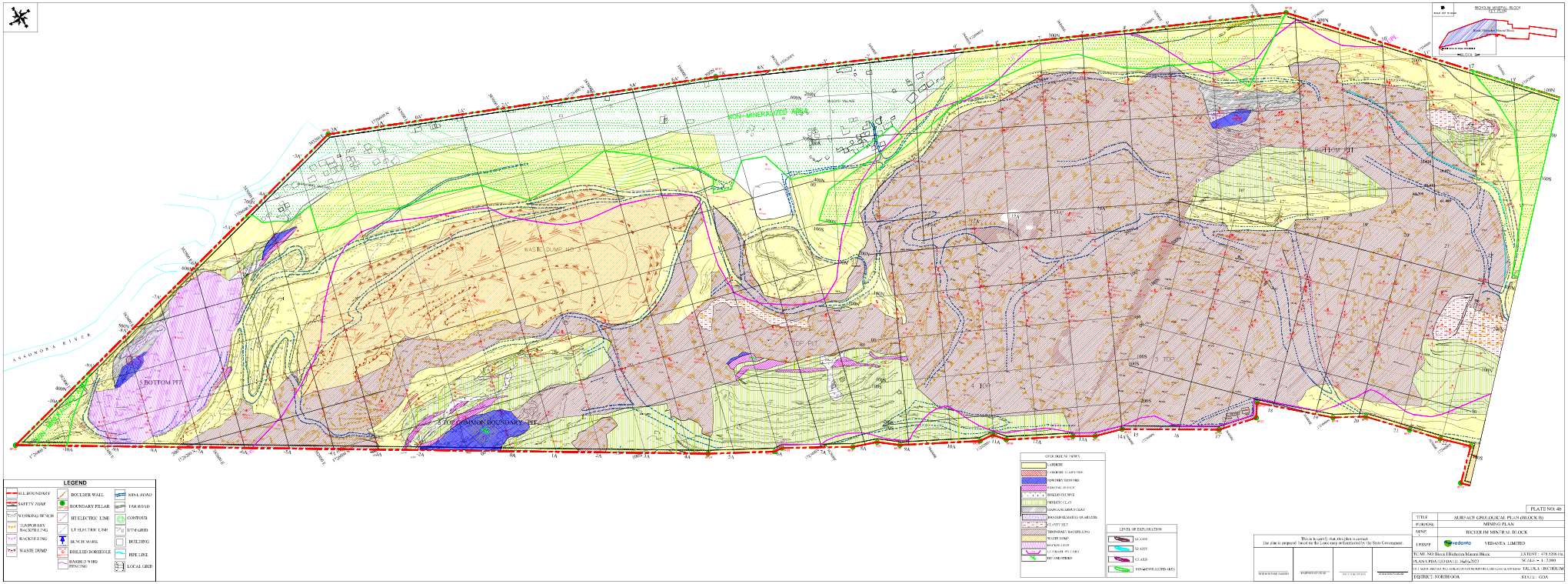

NON - MINERALIZED AREA
NON - MINERALIZED AREA
NON - MINERALIZED AREA
LEGEND
PLATE NO: 48
TITLE
SURFACE GEOLOGICAL PLAN (BLOCK A)
PURPOSE
MINING PLAN
MINE
BICHOLIM MINERAL BLOCK
LESSEE
VEDANTA LIMITED
DISTRICT : NORTH GOA
STATE : GOA


LEGEND
S.L.BOUNDARY
SAFETY ZONE
WORKING BENCH
TEMPORARY BACKFILLING
BACKFILLING
WASTE DUMP
BOULDER WALL
BOUNDARY PILLAR
HT ELECTRIC LINE
LT ELECTRIC LINE
BENCH MARK
DRILLED BOREHOLE
BARBED WIRE FENCING
MINE ROAD
TAR ROAD
CONTOUR
UTM GRID
BUILDING
PIPE LINE
LOCAL GRID
BOTTOM PIT
TOP COMMON BOUNDARY PIT
WASTE DUMP
ASKANOKA RIVER
NOT UNDISTURBED AREA
GEOLOGICAL NEWS
LATERITE
LATERITIC CLAY/GRAVEL
SOFT ROCK
WEATHERED ROCK
RESIDUAL SOIL
CLAYEY SILT
TEMPORARY BACKFILLING
WASTE DUMP
BACKFILLED
LATERITE/PISOLITE
HILL AREA
LEVEL OF EXPLORATION
GL 6X50
GL 6X25
GL 6X12
TOPOGRAPHY(LISTED AREA)
PLATE NO: 4B
TITLE : SURFACE GEOLOGICAL PLAN (BLOCK II)
PURPOSE : MINING PLAN
MINE : BICHOLIM MINERAL BLOCK
LESSEE : VEDANTA LIMITED
TC NO. NO Block I Bicholim Mineral Block
PLAN UPDATED DATE : 30-05-2023
SCALE : 1 : 2,000
DISTRICT : NORTH GOA
STATE : GOA

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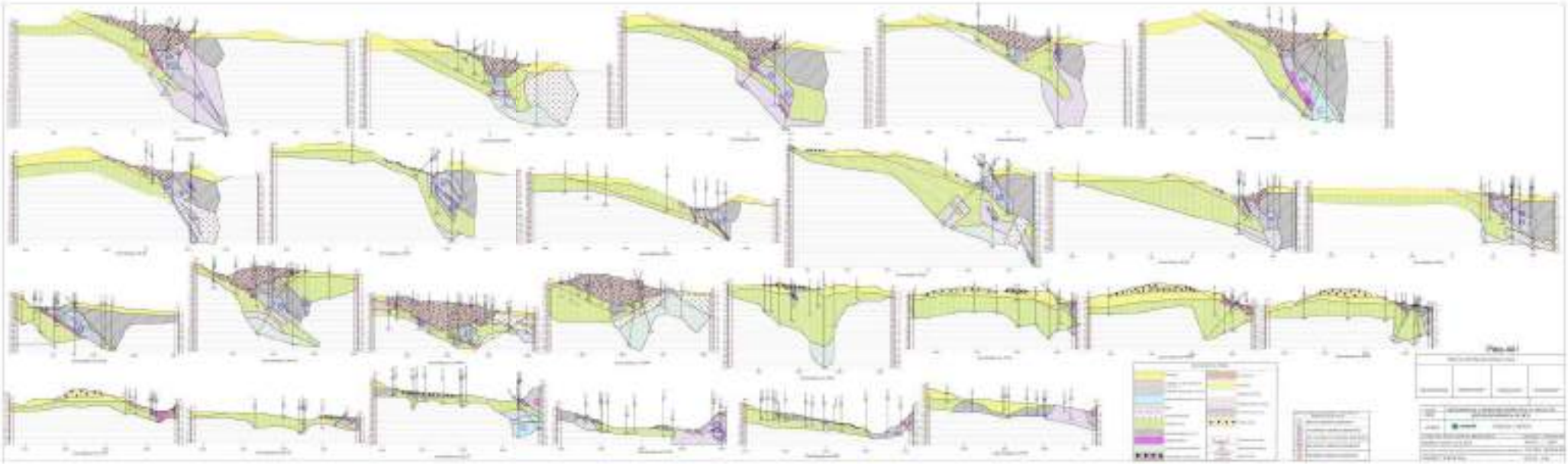

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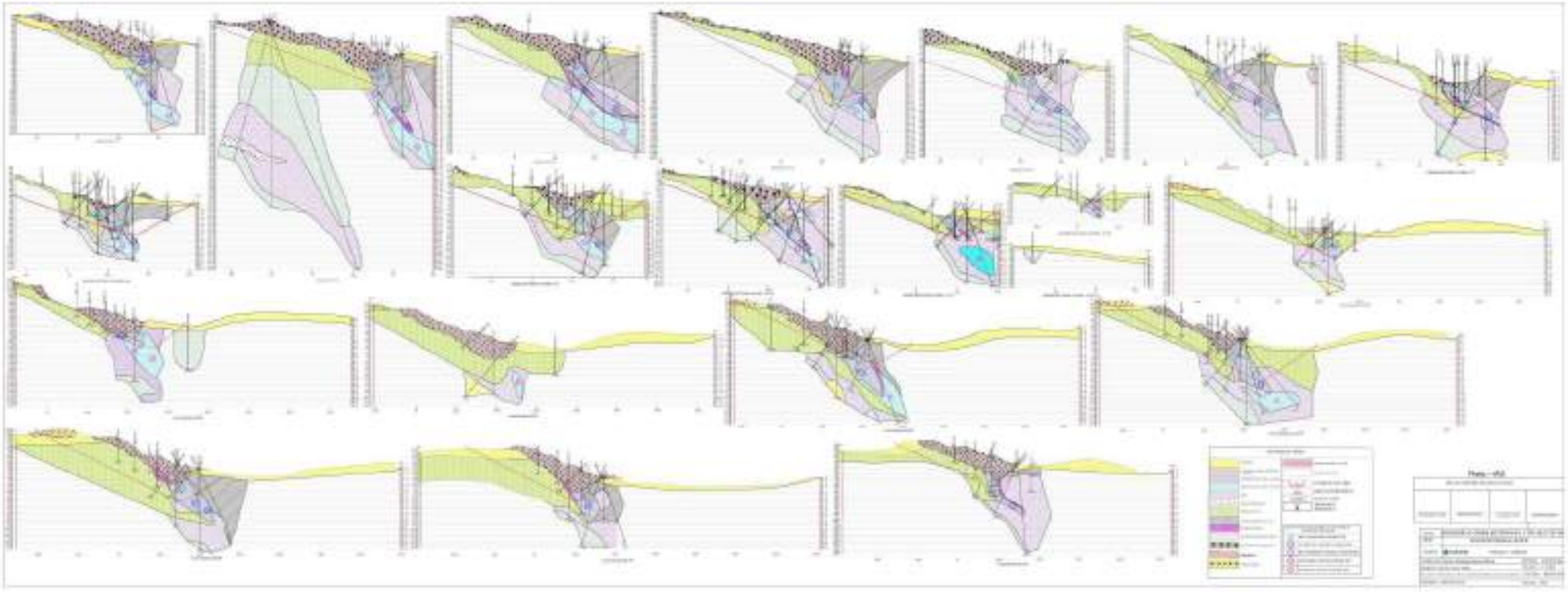

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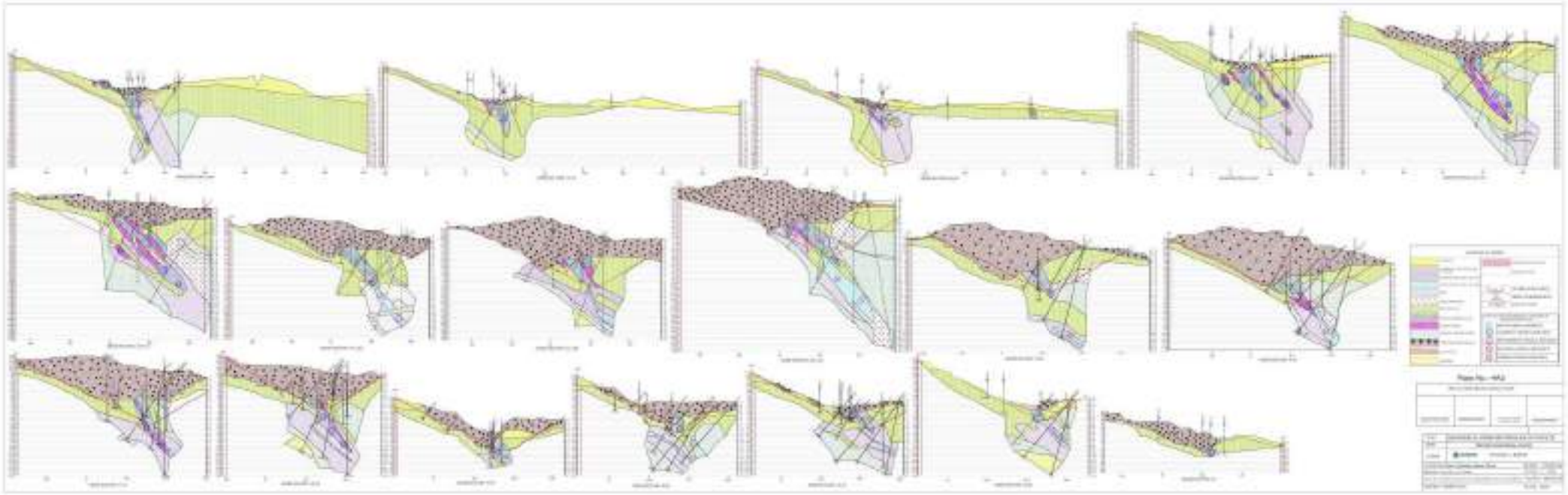

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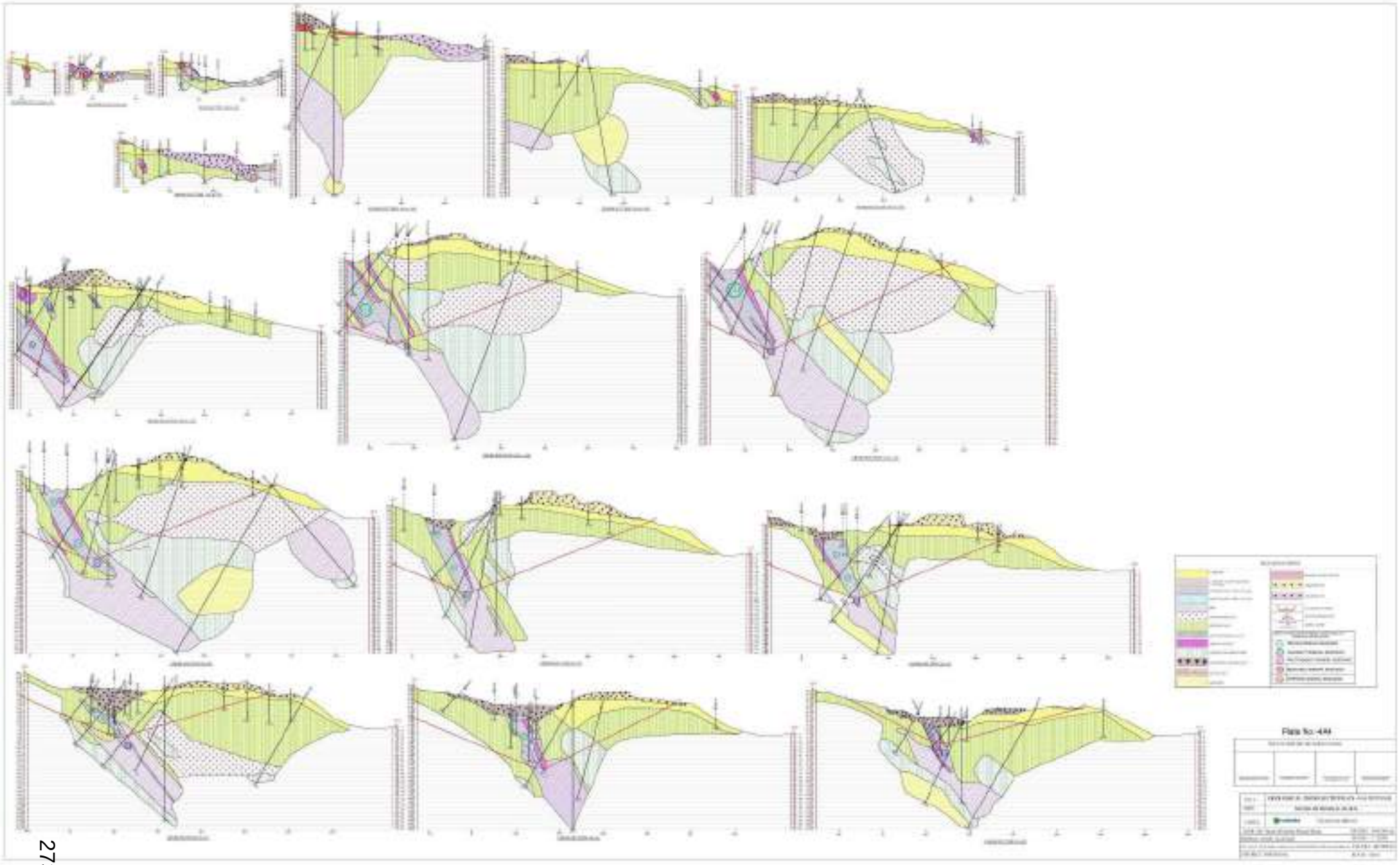

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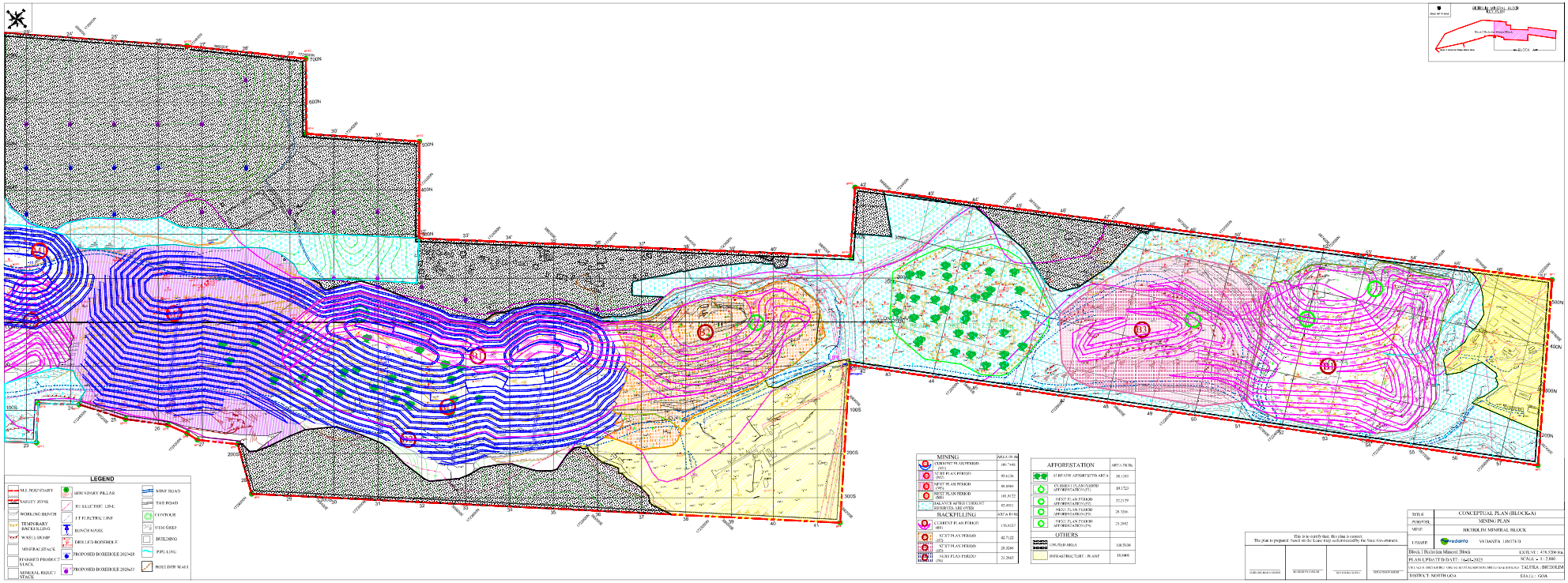
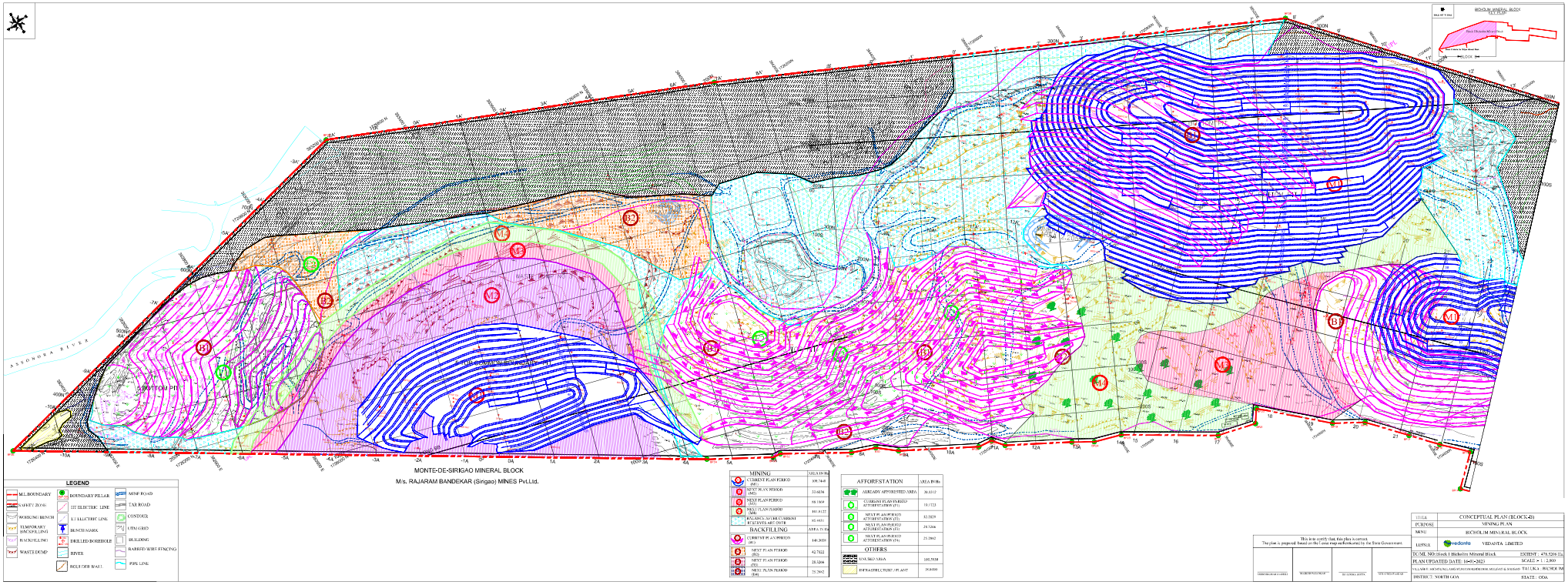
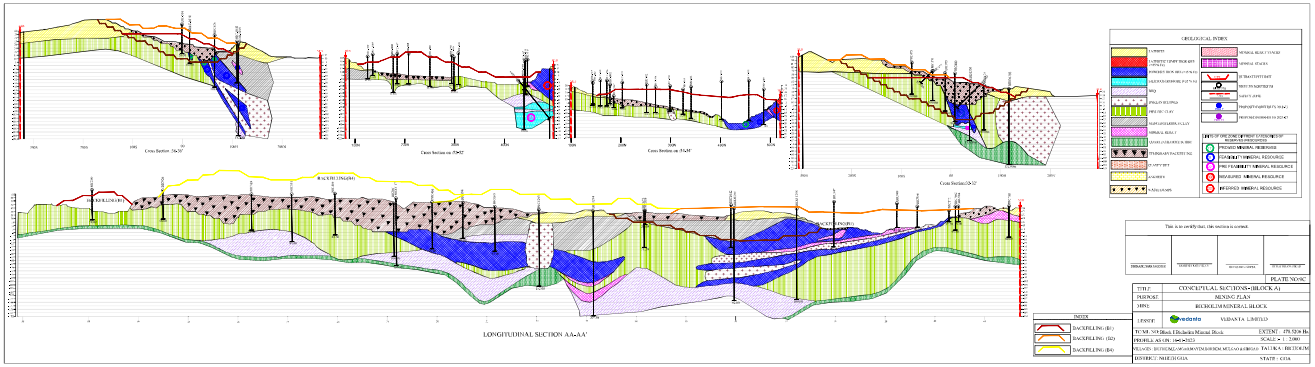
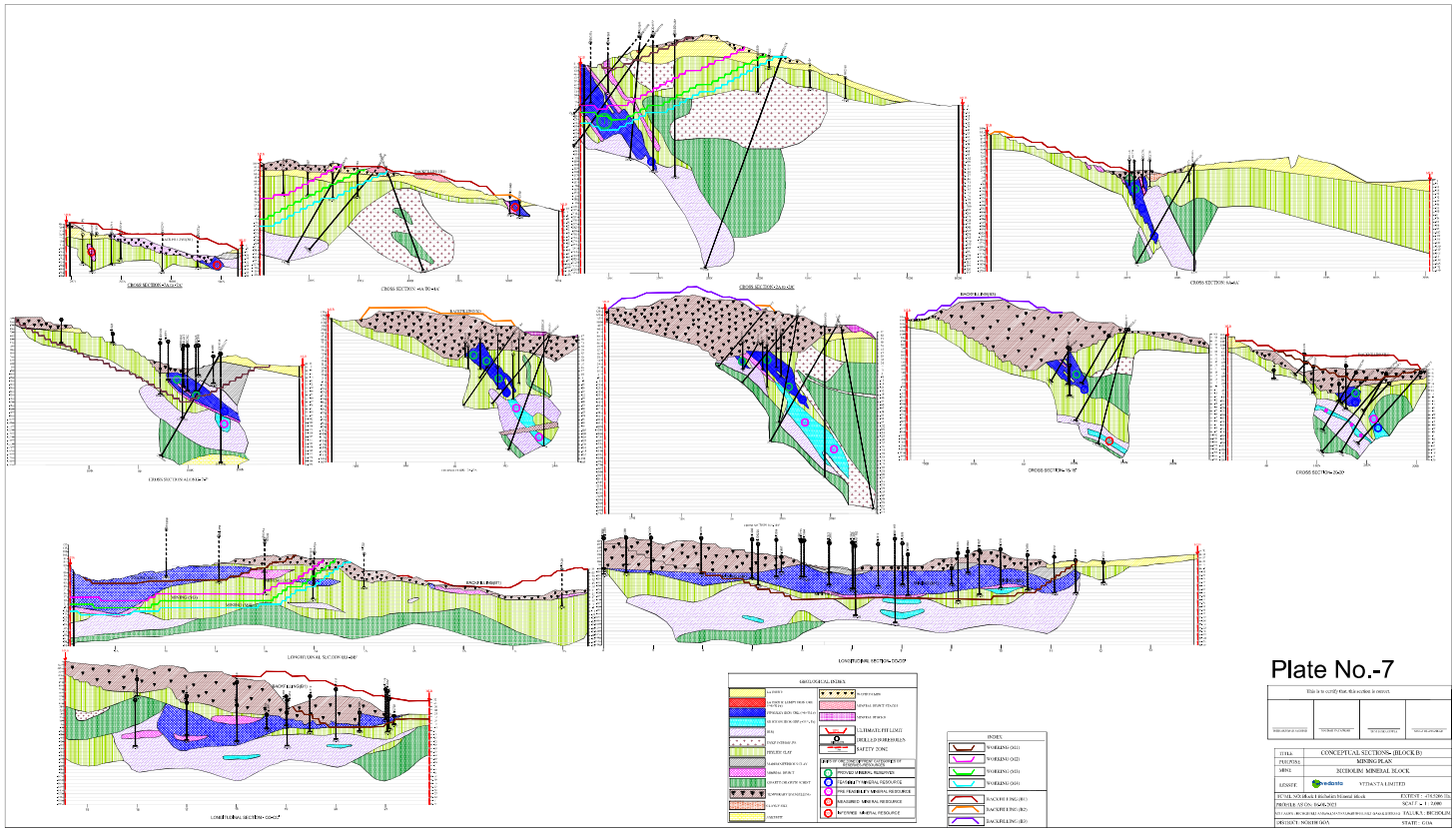
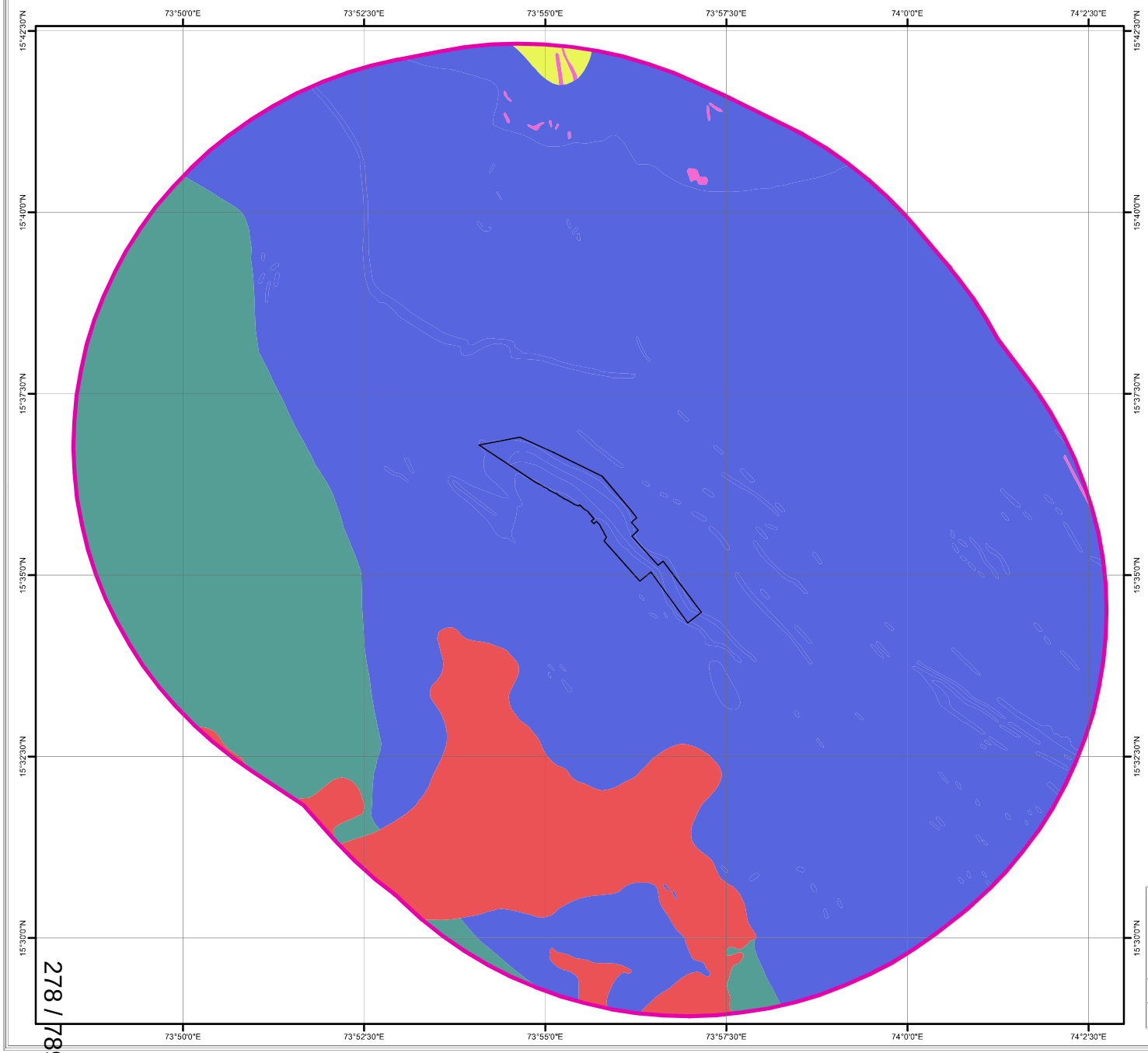

LEGEND
M.L. BOUNDARY
SAFETY ZONE
WORKING BENCH
TEMPORARY BACKFILLING
WASH DUMP
MINERAL STACK
FINISHED PRODUCT STACK
MINERAL REJECT STACK
BOUNDARY PILLAR
HT ELECTRIC LINE
LT ELECTRIC LINE
BENCH MARK
DRILLED BOREHOLE
PROPOSED BOREHOLE 2022-23
PROPOSED BOREHOLE 2028-33
MINE ROAD
TAR ROAD
CONTOUR
UTM GRID
BUILDING
PIPE LINE
BOULDER WALL
MINING
BACKFILLING
AFFORESTATION
OTHERS
CONCEPTUAL PLAN (BLOCK-A)
MINING PLAN
BICHOLIM MINERAL BLOCK
Vedanta
VEDANTA LIMITED
Block / Reclusion Mineral Block
PLAN UPDATED DATE : 16-01-2023
SCALE = 1:2,000
TALUKA : BICHOLIM
DISTRICT, NORTH GOA
STATE : GOA


MONTE-DE-SIRIGAO MINERAL BLOCK
M/s. RAJARAM BANDEKAR (Sirigao) MINES Pvt.Ltd.
LEGEND
M.L.BOUNDARY
SAFETY ZONE
WORKING BENCH
TEMPORARY DUMP/FILLING
BACKFILLING
WASTE DUMP
BOUNDARY PILLAR
HT ELECTRIC LINE
LT ELECTRIC LINE
BENCH MARK
DRILLED BOREHOLE
RIVER
MINE ROAD
TAR ROAD
CONTOUR
UTM GRID
BUILDING
RABBITED WIRE FENCING
PIPE LINE
MINING
BACKFILLING
OTHERS
AFFORESTATION
CONCEPTUAL PLAN (BLOCK-B)
MINING PLAN
BICHOLIM MINERAL BLOCK
VEDANTA LIMITED
PLAN UPDATED DATE: 16-07-2023
SCALE :- 1 : 2,000
DISTRICT: NORTH GOA
STATE : GOA


LONGITUDINAL SECTION AA1-AA'
GEOLOGICAL INDEX
PLATE NO.9C
CONCEPTUAL SECTIONS-(BLOCK A)
MINING PLAN
RICHGUM MINERAL BLOCK
VEDANTA LIMITED
BACKFILLING (IB1)
BACKFILLING (IB2)
BACKFILLING (IB3)


LONGITUDINAL SECTION-EE1-EE'
LONGITUDINAL SECTION-DD1-DD'
LONGITUDINAL SECTION-CC1-CC'
GEOLOGICAL INDEX
Plate No.-7
CONCEPTUAL SECTIONS- (BLOCK B)
MINING PLAN
RICHGUM MINERAL BLOCK
VEDANTA LIMITED

Geoloical Formation



N

W E

S

Scale 1:100,000

0 5 10 Km

Legend

- Mining Lease Area
- 10km bufferzone

Geology Formation

- BARCEM
- BICHOLIM
- MANDOVI
- SANVORDEM
- USGAON
- VAGERI

Plate No.-8

BLOCK-I BICHOLIM MINERAL BLOCK

Vedanta Limited

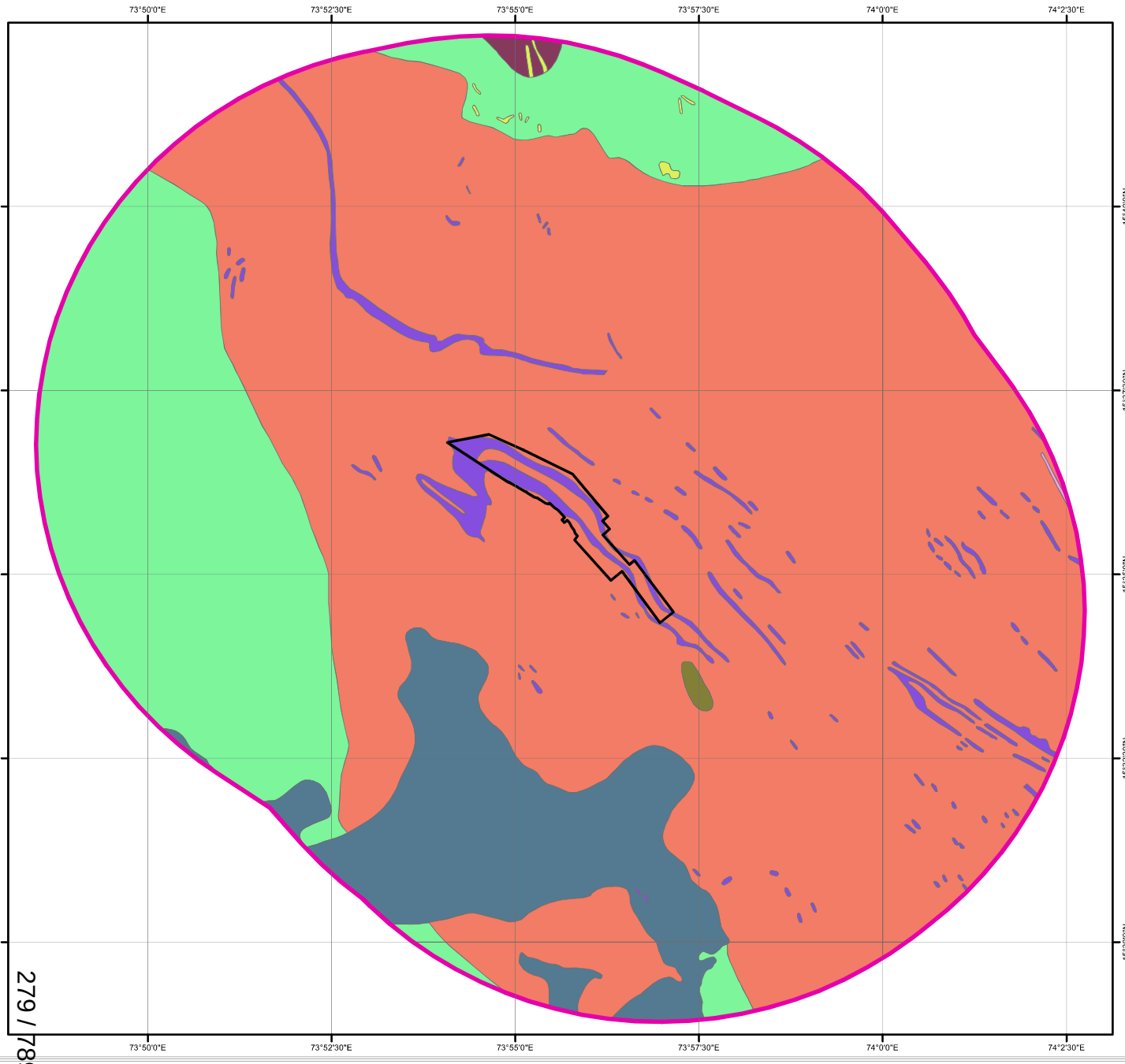
BICHOLIM,LAMGAO,BORDEM, MAYEM ,MULGAO & SIRIGAO

DISTRICT: NORTH GOA STATE : GOA

TITLE	Geological Formation
SCALE	1:1,00,000

278 / 789

Lithology Map



N

W E

S

Scale 1:100,000

0 5 10 Km

Legend

- Mining Lease Area
- 10km bufferzone

Lithology

- ARGILLITE
- BANDED IRON FORMATION
- CHLORITE SCHIST
- CLAYEY SAND (ACTIVE FLOODPLAIN)
- GABBRO
- GRAYWACKE
- META-BASALT
- META-GABBRO

Plate No.- 8A

BLOCK-I BICHOLIM MINERAL BLOCK

Vedanta Limited

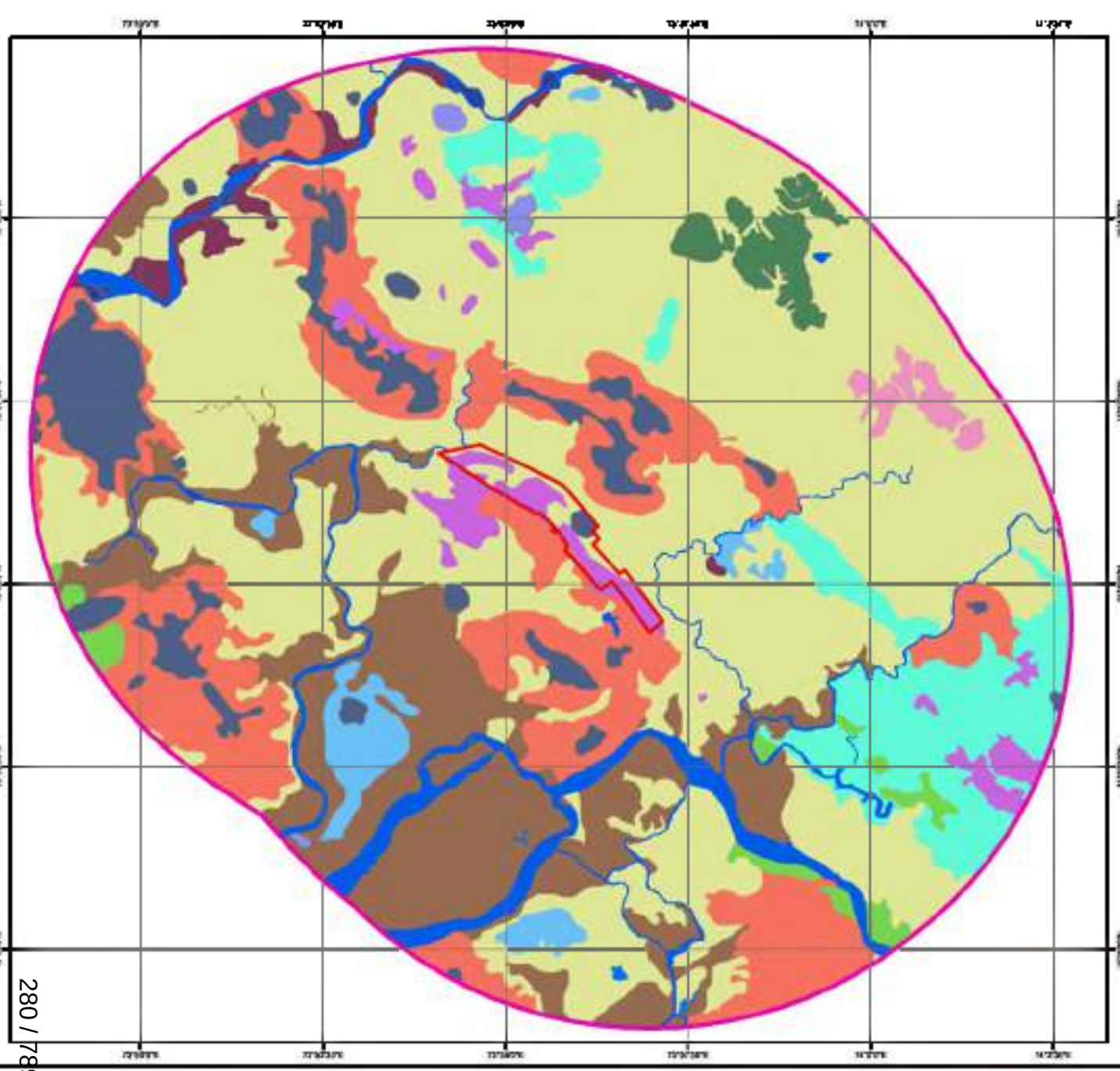
BICHOLIM,LAMGAO,BORDEM, MAYEM ,MULGAO & SIRIGAO

DISTRICT: NORTH GOA STATE : GOA

TITLE	Lithology
SCALE	1:1,00,000

279 / 789

GEOMORPHOLOGY MAP



N

W E

S

Scale 1:100,000

0 5 10 Km

Legend

Mining Lease Area

NNP BUFFER

GEOMORPHOLOGY

Archaeological Terrain

Older Coastal Plain

Younger Coastal Plain

Low Dissected Hills and Valleys

Moderately Dissected Hills and Valleys

Pediment-Pediplain Complex

Active Flood plain

Older Flood plain

Low Dissected Hills and Valleys

Low Dissected Lower Plateau

Moderately Dissected Hills and Valleys

Moderately Dissected Lower Plateau

Moderately Dissected Upper Plateau

Water Bodies

Plate No.-9

BLOCK-I BICHOLIM MINERAL BLOCK

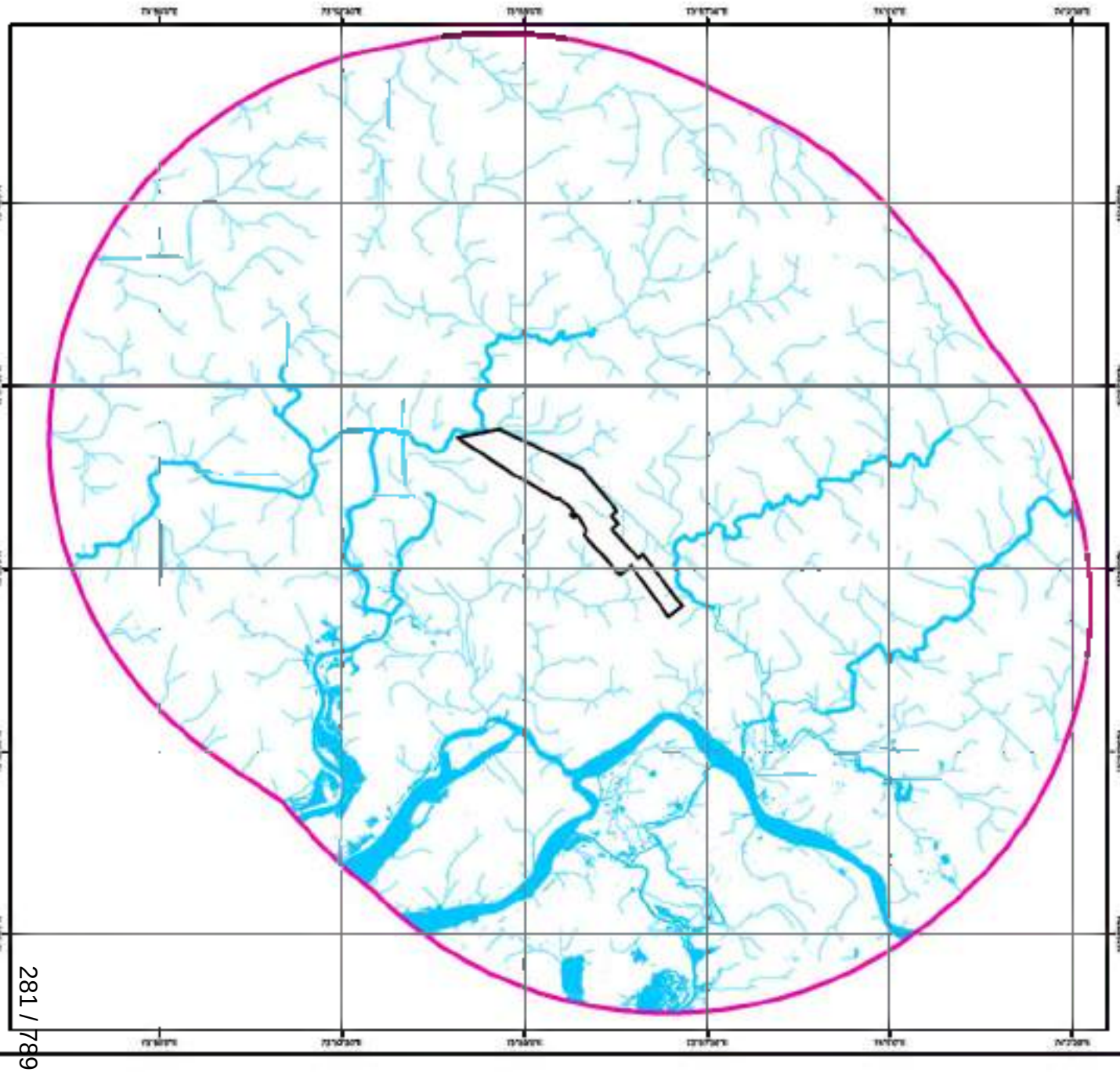
Vedanta Limited

BICHOLIM,LAMGAO,BORDEM, MAYEM, MULGAO & SIRIGAO

DISTRICT. NORTH GOA STATE : GOA

TITLE	GEOMORPHOLOGY
SCALE	1:1,00,000

Drainage Map



N

W E

S

Scale 1:100,000

0 5 10 Km

Legend

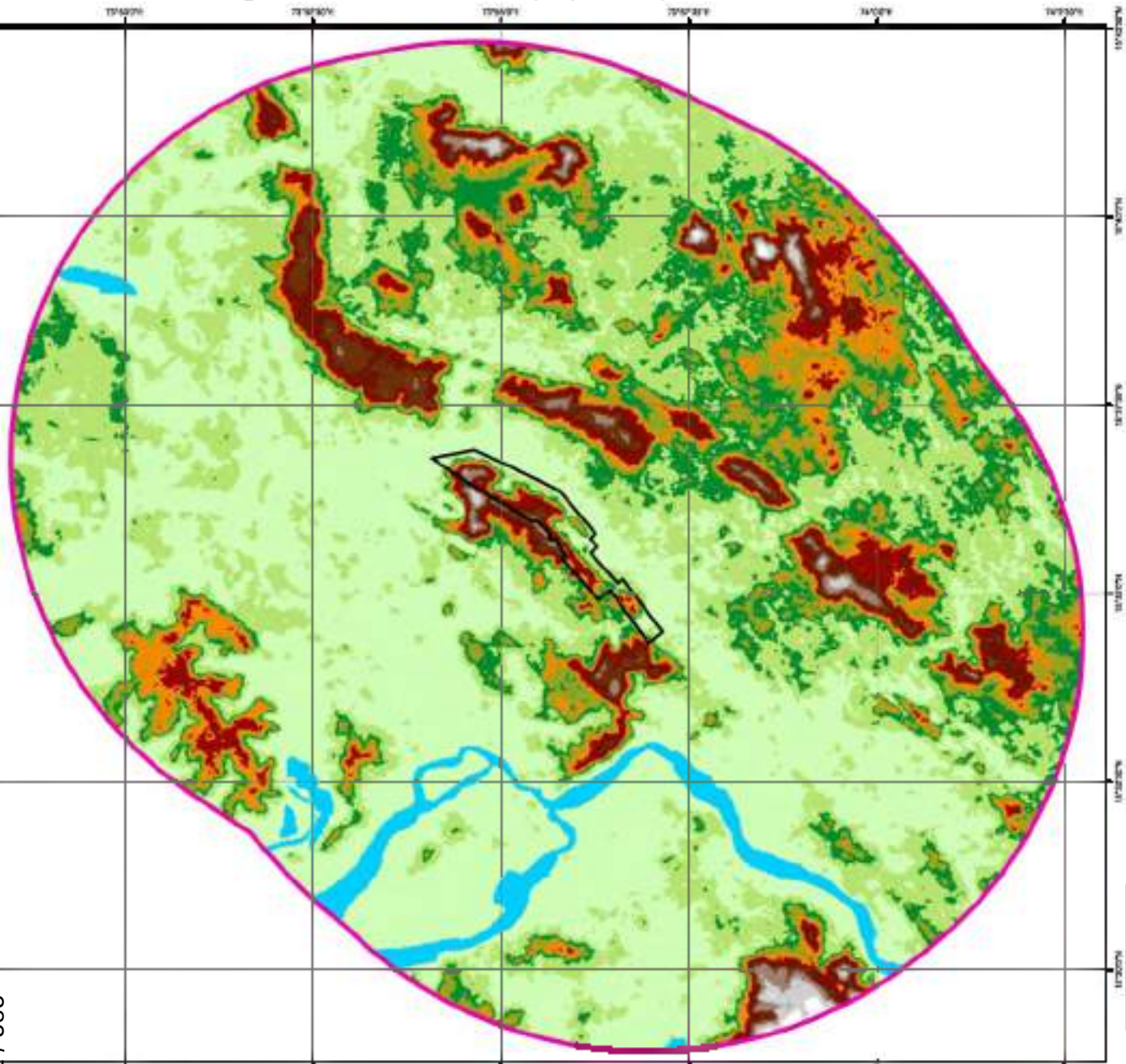
- Mining Lease Area
- 10km bufferzone
- River
- Drainage Pattern

Plate No.-10

BLOCK-I BICHOLIM MINERAL BLOCK
Vedanta Limited
BICHOLIM,LAMGAO,BORDEM, MAYEM , MULGAO & SIRIGAO
DISTRICT: NORTH GOA STATE : GOA

TITLE	Drainage Map
SCALE	1:1,00,000

Digital Elevation Map (DEM)



N

W E

S

Scale 1:100,000

0 5 10 Km

Legend

- Mining Lease Area
- 10km bufferzone

Value

- 0 - 3
- 3.01 - 20
- 20.1 - 40
- 40.1 - 53
- 53.1 - 66
- 66.1 - 79
- 79.1 - 94
- 94.1 - 110
- 111 - 127
- 128 - 149
- 150 - 179
- 180 - 246

Plate No.-11

BLOCK-I BICHOLIM MINERAL BLOCK

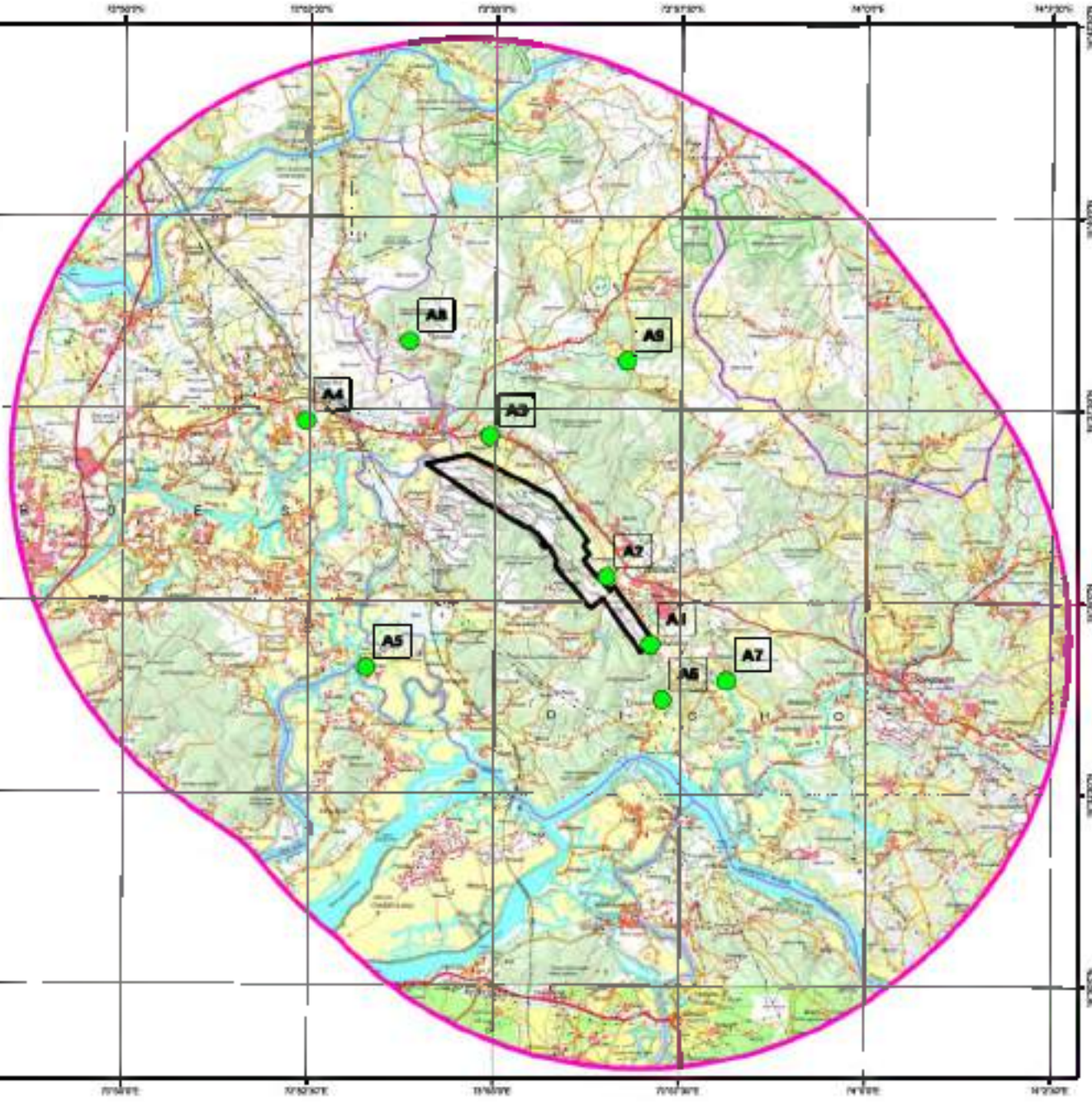
Vedanta Limited

BICHOLIM,LAMGAO,BORDEM, MAYEM, MULGAO & SIRIGAO

DISTRICT: NORTH GOA STATE : GOA

TITLE	Digital Elevation Map
SCALE	1:1,00,000

Key Plan Showing Air Monitoring Locations



Scale 1:100,000

0 2.5 5 Km

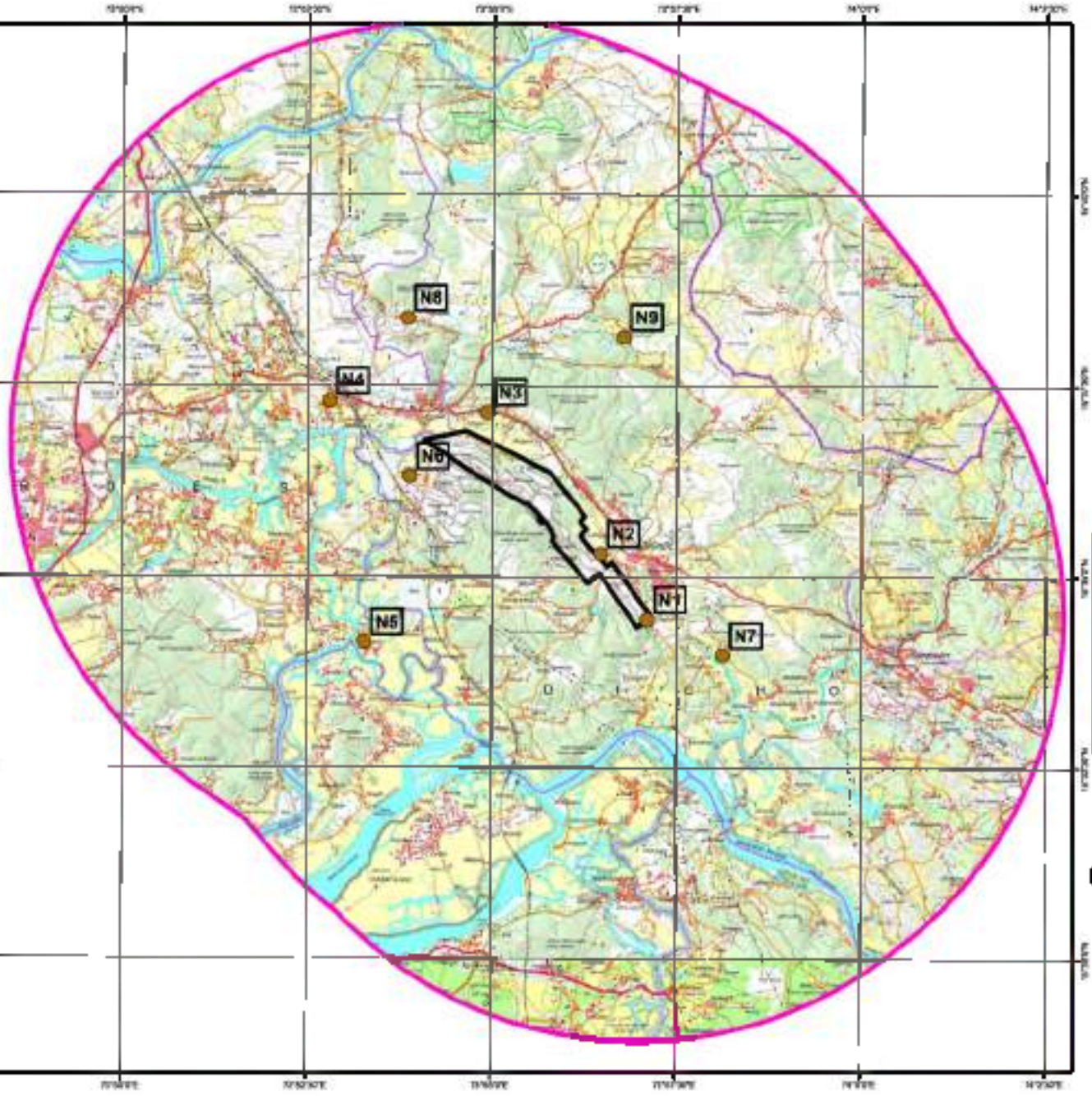
Code	Location	Distance (Kms)	Direction	Elevation	Latitude			Longitude		
					D	M	S	D	M	S
A1	Ashta Mi. Aqua (Bicholim Village)	-	-	-	15	34	26.22	73	57	4.56
A2	Lamgao village	1.16	NW	111	15	35	19.33	73	58	56.76
A3	Mulgao village	1.63	N	111	15	37	8.81	73	58	39.08
A4	Sirsaim village	3.3	N-NW	111	15	37	20.22	73	58	27.68
A5	Cajuna village	3	NW	111	15	34	8.79	73	58	58.68
A6	Pilgao	2.75	SSE	111	15	33	48.47	73	59	44.36
A7	Ganguna village	1.5	SE	111	15	33	56.38	73	59	5.64
A8	Navelim village	3	NNW	111	15	36	22.90	73	58	34.08
A9	Latambarcem village	1.6	NNE	111	15	36	8.66	73	58	56.76

Plate No.12

BLOCK-I BICHOLIM MINERAL BLOCK
Vedanta Limited
BICHOLIM, LAMGAO, BORDEM, MAYEM, MULGAO & SIRIGAO
DISTRICT: NORTH GOA STATE : GOA

TITLE	Air Monitoring Locations
SCALE	1:100,000

Key Plan Showing Noise Monitoring Stations



N
W
E
S

Scale 1:100,000

0 2.5 5 Km

Legend

Code	Location	Distance (Km)	Direction	Latitude			Longitude		
				D	M	S	D	M	S
N1	Within ML Area (Shedrishale Village)	—	—	15	34	46	73	57	0
N2	Lohariem village	0.1	East	15	35	48	73	56	54
N3	Mulgao village	0.7	N	15	35	6	73	54	56
N4	Bicholim village	3.4	NNW	15	34	48	73	53	48
N5	Colvale village	3	SSW	15	34	6	73	55	11
N6	Sirigao village	1.25	SW	15	34	41	73	54	55
N7	Bandora village	3.1	SE	15	35	36	73	56	6
N8	Mayem village	3	NNW	15	36	23	73	53	34
N9	Bicholim town village	3.5	NNE	15	36	6	73	58	47

Plate.-13

BLOCK-I BICHOLIM MINERAL BLOCK

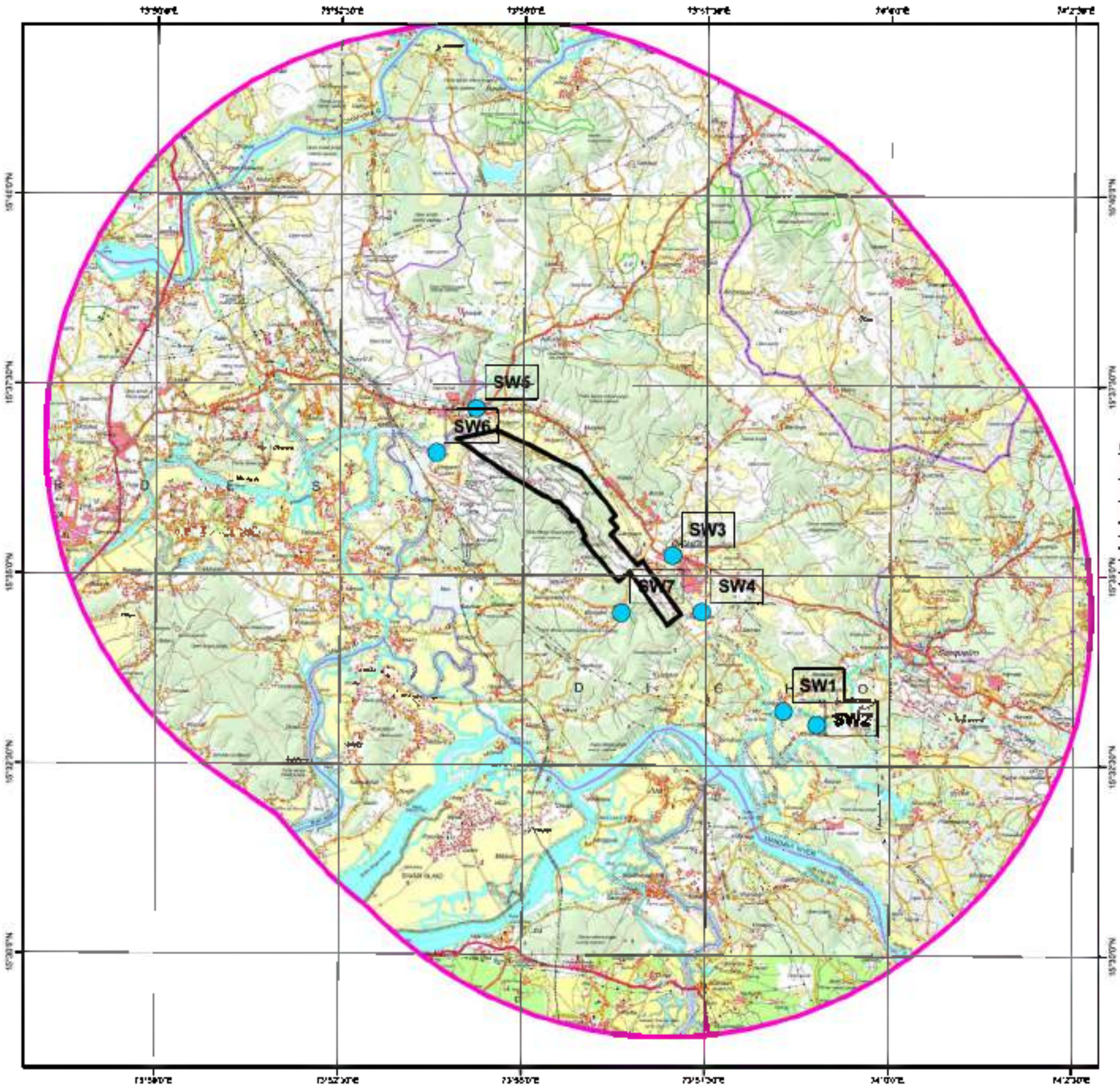
Vedanta Limited

BICHOLIM,ILAMGAO,BORDEM, MAYEM, MULGAO & SIRIGAO

DISTRICT: NORTH GOA STATE : GOA

TITLE	Noise Monitoring Stations
SCALE	1:100,000

Key Plan Showing Surface Water Sampling Locations



Scale 1:100,000

0 2.5 5 Km

Legend

Water_SAmpling

Location of Surface Water Sampling Stations

Code	Location	Remarks	Discharge (Cusec)	Latitude			Longitude		
				D	M	S	D	M	S
SW1	Confluence of Valvoi & Sanvordem Stream	NE	1.56	15	31	12.58	73	59	10.56
SW2	Confluence of Valvoi Stream & Kushavati River	SE	4.38	15	31	2.67	73	59	9.85
SW3	Sanvordem Stream Upstream	SE	0.71	15	31	15.41	73	57	3.38
SW4	Kushavati River Downstream	SE	0.52	15	30	59.32	73	57	54.29
SW5	Sanvordem Up stream reservoir	NNW	0.56	15	32	11.25	73	54	21.26
SW6	Sanvordem Down stream Water	NNW	0.63	15	30	36.24	73	53	48.89
SW7	Kushavati River	SW	0.76	15	30	59.21	73	56	39.62

Plate No.-14

BLOCK-I BICHOLIM MINERAL BLOCK

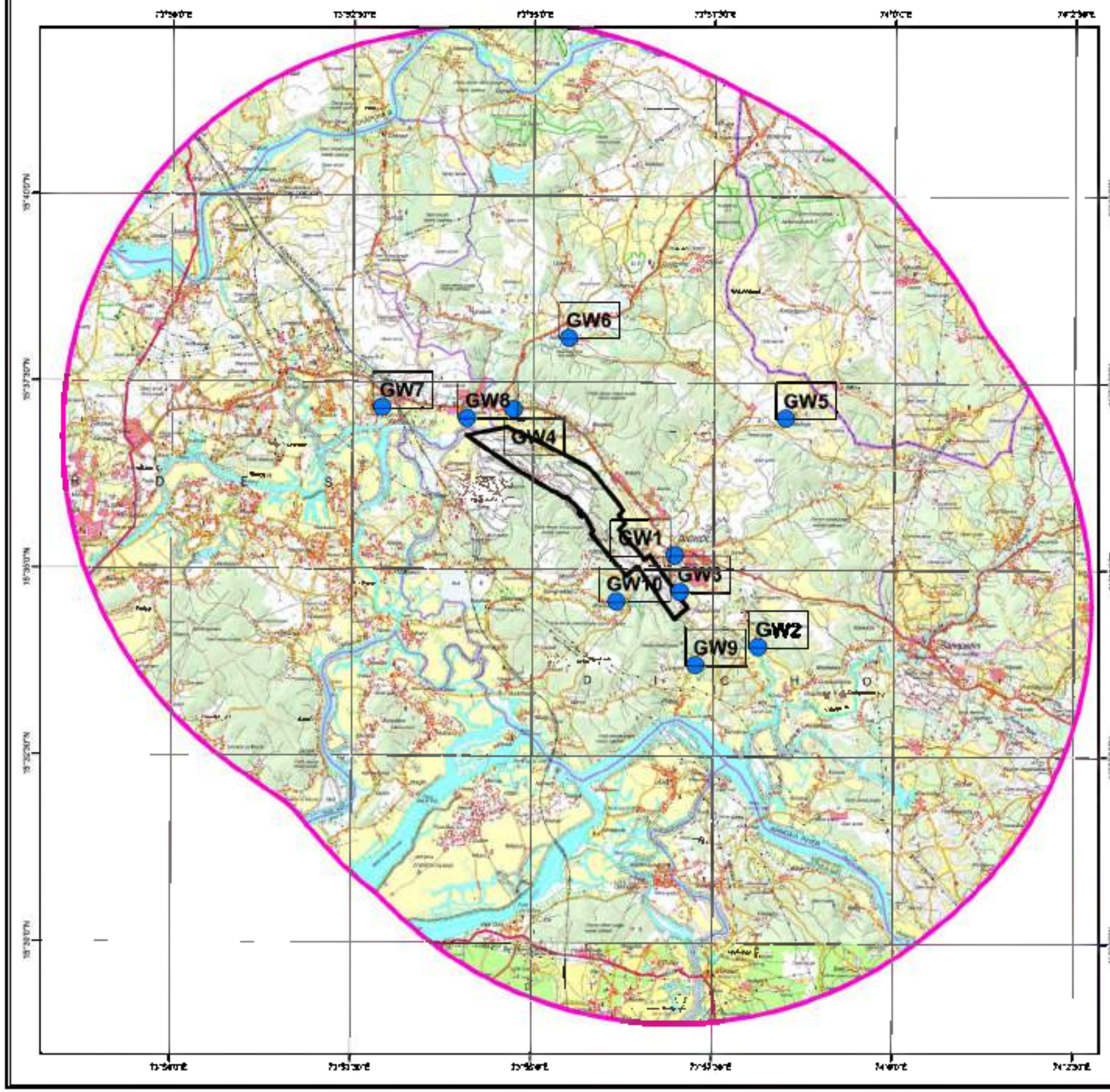
Vedanta Limited

BICHOLIM, LAMGAO, BORDEM, MAYEM , MULGAO & SIRIGAO

DISTRICT: NORTH GOA STATE : GOA

TITLE	Surface Water Sampling Locations
SCALE	1:100,000

Key Plan Showing Ground Water Sampling Locations



Scale 1:100,000

0 2.5 5 Km

Legend

Ground_Water

Buffer boundary

Mining Lease Area

Location of Ground Water Sampling Stations

Code	Location	Distance (KM)	Direction	Latitude			Longitude		
				D	M	S	D	M	S
GW1	Well water Bethlem	0.5	SSE	15	23	21.48	74	06	58.76
GW2	Well water Sonas village	0	SE	15	22	59.58	74	06	3.48
GW3	Well water Uchgaon village	0.886	SE	15	24	42.53	74	05	2.68
GW4	Well water Mulgao village	0.68	NNW	15	23	4.14	73	58	47.48
GW5	Well water Mayem village	4.34	NE	15	21	1.75	73	59	49.14
GW6	Well water Bethlem village	3.93	N	15	24	5.77	74	06	29.57
GW7	Well water Sirigao village	3.18	Middle	15	20	9.43	73	56	56.63
GW8	Well water Arvalem	0.43	NW	15	22	1.19	73	58	5.81
GW9	Well water Pilgao village	3.23	SSE	15	20	49.43	73	57	35.98
GW10	Well water Mayem village	99.77	SSE	15	20	36.43	73	59	30.39

Plate No.-15

BLOCK-I BICHOLIM MINERAL BLOCK

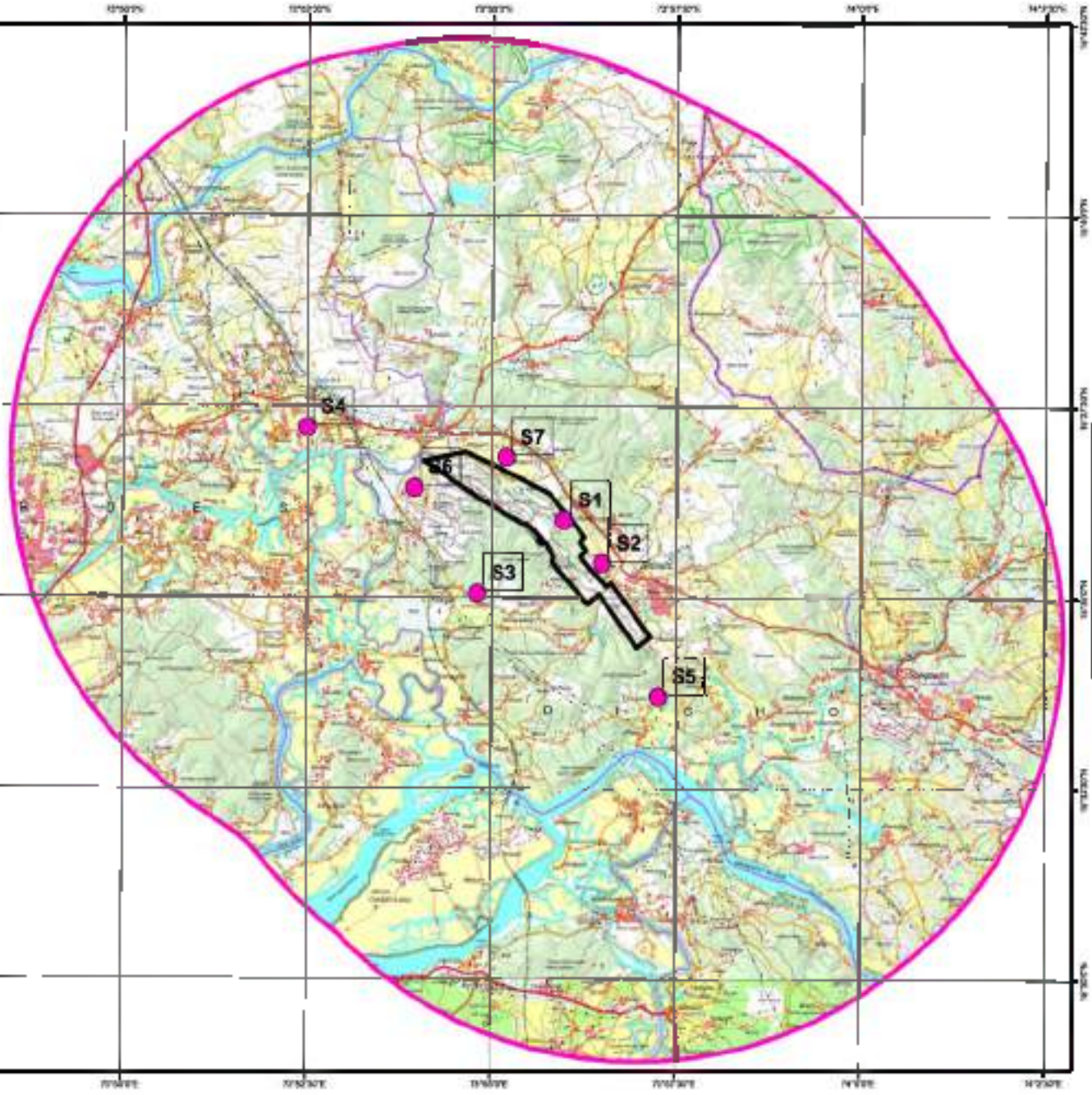
Vedanta Limited

BICHOLIM,LAMGAO,BORDEM, MAYEM , MULGAO & SIRIGAO

DISTRICT: NORTH GOA STATE : GOA

TITLE	Ground Water Sampling Locations
SCALE	1:100,000

Key Plan Showing Soil Sampling Locations



Scale 1:100,000

0 2.5 5 Km

Legend

Code	Location	Elevation / Depth	Direction	Latitude			Longitude		
				D	M	S	D	M	S
S1		–	–						
S2									
S3									
S4									
S5									
S6									
S7									

Plate No.-16

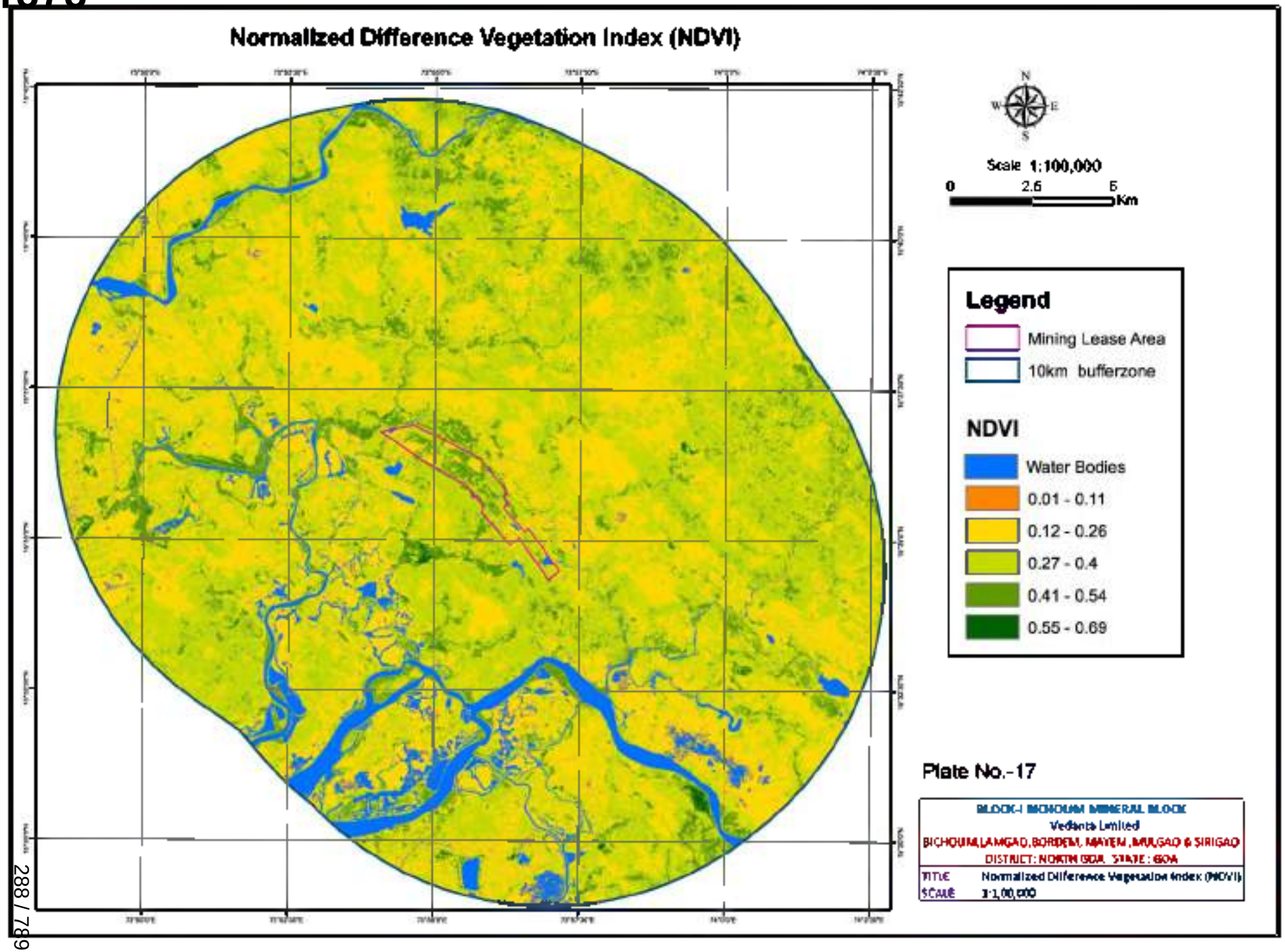
BLOCK-I BICHOLIM MINERAL BLOCK

M/s. Vedanta Limited

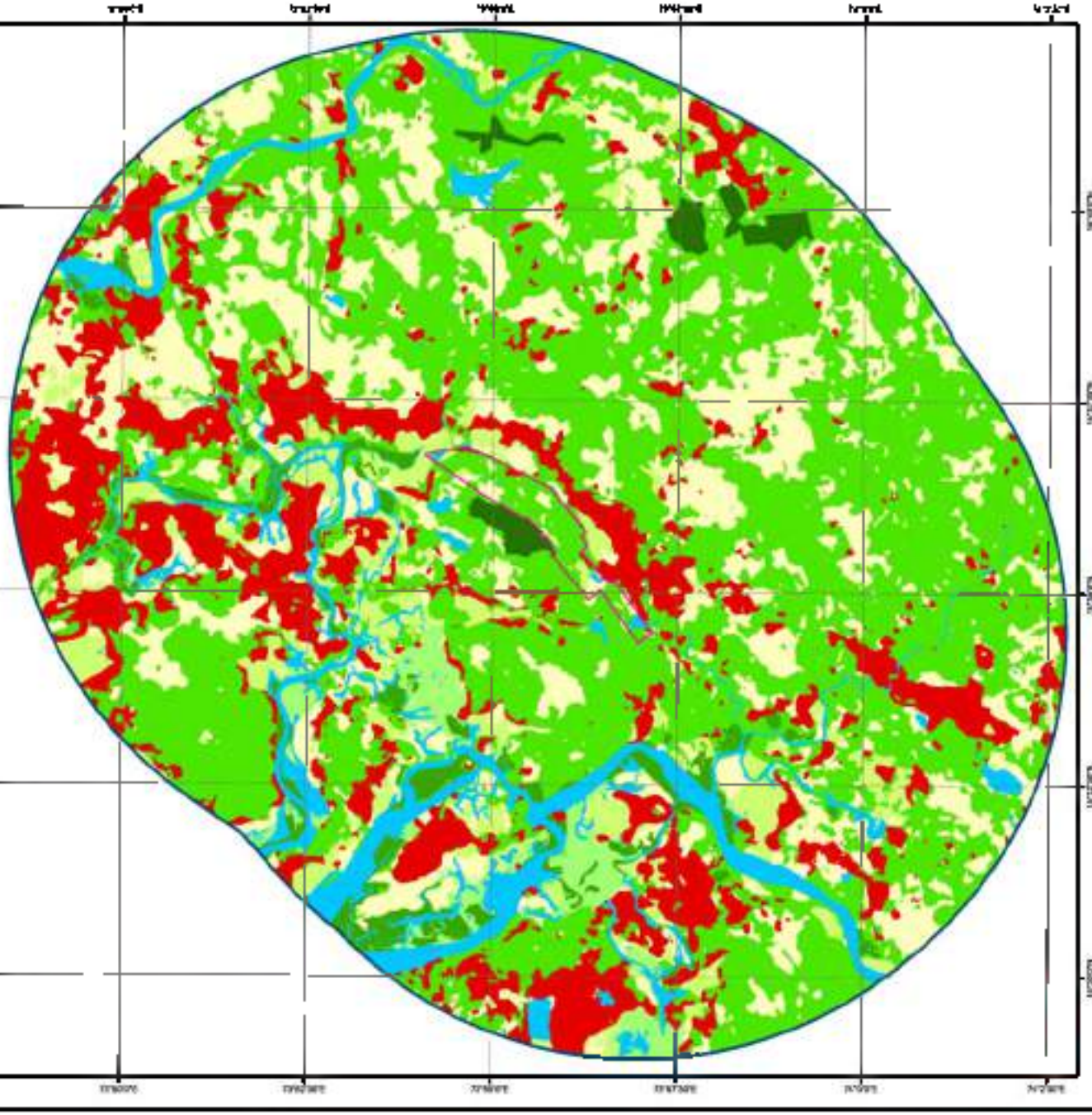
BICHOLIM, LAMGAO, BORDEM, MAYEM, MULGAO & SIRIGAO

DISTRICT: NORTH GOA STATE : GOA

TITLE	Soil Samplingh Locations
SCALE	1:100,000


Normalized Difference Vegetation Index (NDVI)
N
W
E
S
Scale 1:100,000
0
2.5
5
Km
Legend
Mining Lease Area
10km bufferzone
NDVI
Water Bodies
0.01 - 0.11
0.12 - 0.26
0.27 - 0.4
0.41 - 0.54
0.55 - 0.69
Plate No.-17
BLOCK-I BICHOLIM MINERAL BLOCK
Vedanta Limited
BICHOLIM,LAMGAO,BORDEM, MAYEM ,MULGAO & SIRIGAO
DISTRICT: NORTH GOA STATE : GOA
TITLE
Normalized Difference Vegetation Index (NDVI)
SCALE
1:100,000

Land Use and Land Cover



Scale 1:100,000

0 2.6 5 Km

Legend

- Mining Lease Area
- 10km Buffer Zone
- Forest Area
- Mangroves
- Water
- Open Mixed Jungle/Cashew Plantation
- Flooded Vegetation
- Agricultural land
- Settlements
- Barren ground
- Grass land

Sl. no	Particulars	Area_Ha	%
1	Forest Area	429.5	0.92
2	Mangroves	991.0	2.12
3	Water Bodies	3092.1	6.61
4	Open mixed forest/Cashew Plantation	21017.0	44.91
5	Flooded Vegetation	1328.0	2.84
6	Agricultural Land	2917.5	6.23
7	Settlements	7210.2	15.41
8	Scrub Land	9811.9	20.97
	Total Area	46797	100.00

BLOCK-I BICHOLIM MINERAL BLOCK

Vedanta Limited

BICHOLIM,ULAMGAD,BORDEM,MAYEM ,MULGAO & SIRIGAO

DISTRICT: NORTH GOA STATE : GOA

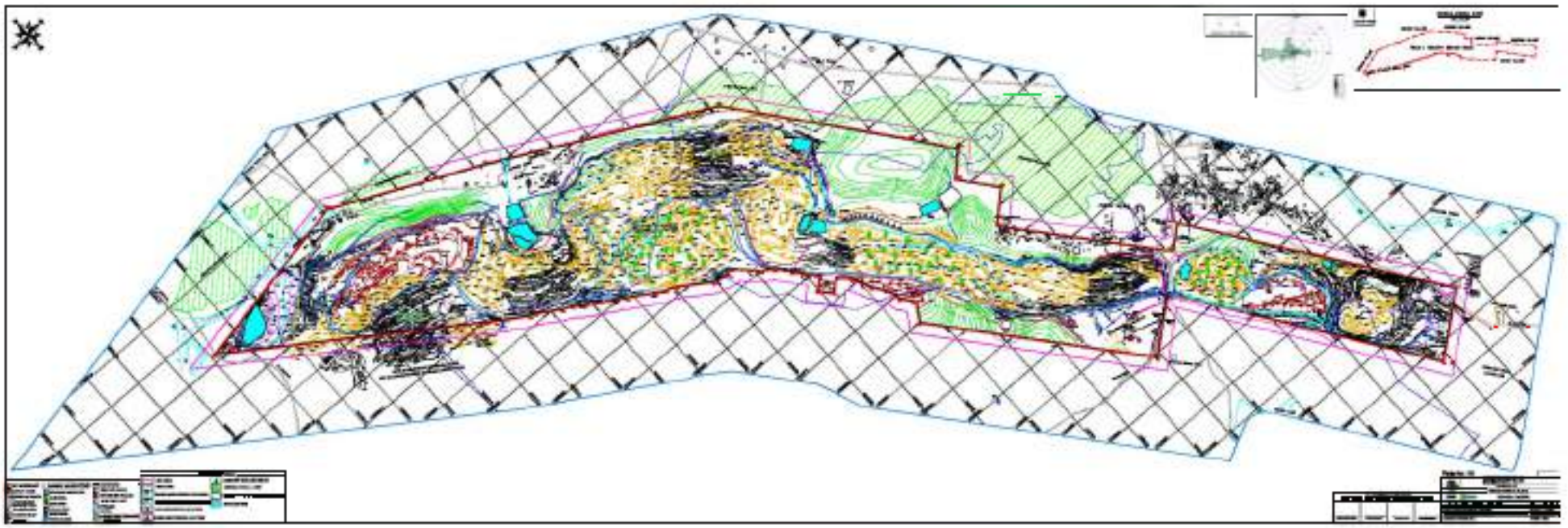
TITLE Land Use Land Cover

SCALE 1:1,00,000

Plate No.-18

1880

1868



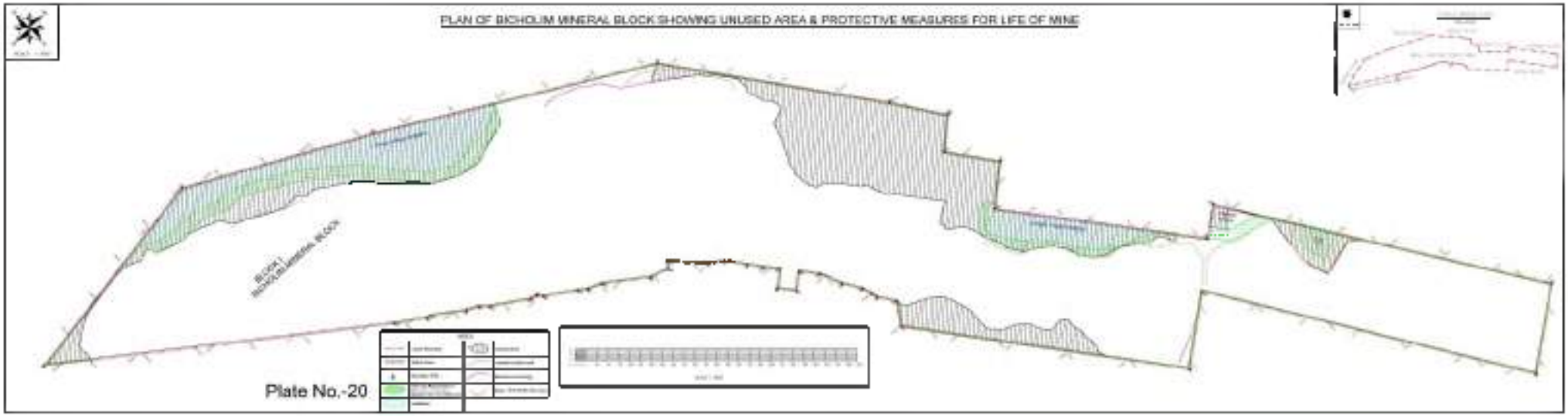

PLAN OF BICHOLIM MINERAL BLOCK SHOWING UNUSED AREA & PROTECTIVE MEASURES FOR LIFE OF MINE
Plate No.-20

Plate No.21

BENCHMARK: GCP68

BENCHMARK DETAILS					
Point Id	Easting [m]	Northing [m]	Height [m] above MSL	WGS84 Latitude [°]	WGS84 Longitude [°]
GCP68	387469.58	1722491.57	16.384	15° 34' 39.43" N	73° 57' 01.65" E

ANNEXURES

Government of Goa
Directorate of Mines & Geology
Institute Menezes Braganza, Panaji-Goa
Website: www.dmg.goa.gov.in **e-mail: auction-dmg@goa.gov.in**
No.DMG/25/Auction Cell/LOI-function/2023/2801 Date:13/01/2023

Letter of Intent for Block I - Bicholim Mineral Block

To,
Vedanta Limited
Sesa Ghor, 20 EDC Complex,
Patto, Panaji, Goa, 403001 India.

***Sub:** Letter of intent with reference to e-auction dated December 14, 2022 for grant of a mining lease for Block I - Bicholim Mineral Block for Iron Ore mineral in Bicholim, Bordem, Lamgao, Mulgao Mayem & Sirigao village, Bicholim Taluka, North Goa District on 478.5206 Hectare Area.*

1. **Background:**

1.1 Government of Goa, 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 dated September 30, 2022 to commence the auction process for grant of mining lease for **Block I - Bicholim Mineral Block** located in North Goa. The e-auction process was conducted in accordance with the tender document for the said mineral block and **Vedanta Limited** was declared as the 'Preferred Bidder' under Rule 9(9)(iii) of Auction Rules, having quoted a Final Price Offer of **63.55% (Sixty three point five five percent)**.

DIRECTORATE OF MINES & GEOLOGY GOVT. OF GOA PANAJI-GOA

1.2 As required under Rule 10(1) of the Auction Rules and the tender document for the said mineral block, **Vedanta Limited** has made payment of the first instalment, being 20% (twenty per cent) of the upfront payment of Rs. 27,16,70,301 (Rupees Twenty Seven Crore Sixteen Lakh Seventy Thousand Three Hundred One) through e-Challan (e-Challan No. 202300008550) dated January 4, 2023, which was received at Goa.

2. Grant of Letter of Intent

2.1. Accordingly, pursuant to Rule 10(2) of the Auction Rules and the terms of the Tender Document, the Government of Goa is issuing this letter of intent for grant of Mining Lease for **Block I - Bicholim Mineral Block** for Iron Ore in Bicholim, Bordem, Lamgao, Mulgao Mayem & Sirigao village, Bicholim Taluka, North Goa District on 478.5206 Hectare Area to **Vedanta 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 the **Vedanta 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.

DIRECTORATE OF MINES & GEOLOGY GOVT. OF GOA

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.

Vedanta 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.

3.2. For reference, the requirements under the Auction Rules for designation of **Vedanta 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":

Vedanta 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 Goa, pursuant to the Auction Rules;

(iv) satisfying the conditions specified in clause (b) of sub-section (2) of Section 5 of the Act with respect to a mining plan; and

DIRECTORATE OF MINES & GEOLOGY GOVT. OF GOA

(b) Signing of the Mine Development and Production Agreement

Vedanta Limited shall sign the Mine Development and Production Agreement with the Government of Goa 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, **Vedanta Limited** shall make payment of the third instalment being 60% (sixty per cent) of the upfront payment and thereafter the Government of Goa shall grant the aforementioned mining lease.

3.3. The State Government reserves the right, but not the obligation, to appropriate and dispose of (whether by way of sale, auction or such other means as the State Government may, in its sole discretion, determine) all or any part of the dumps presently located within the Mineral Block. Provided that such right shall be exercised by the State Government no later than 12 (twelve) months from the date of issuance of this Letter of Intent. It is clarified that the Successful Bidder shall, in accordance with Applicable Law, be entitled to dispose of only such part of the dumps in respect of which the State Government does not exercise the aforesaid right.

DIRECTORATE OF MINES & GEOLOGY GOVT. OF GOA

4. Validity

4.1. This Letter of Intent shall be valid only if **Vedanta Limited** ensures that the Bid Security is valid until the Performance Security is furnished to the Government of Goa failing which this letter of intent shall become invalid from the date of expiry of the Bid Security.

4.2. 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 **Vedanta Limited** and the Government of Goa. 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 Goa, requesting for further extension

4.3. If the Government of Goa 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 Goa 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.

Kindly return the duplicate copy of this letter of intent duly signed by authorized signatory in token of having accepted the above terms and conditions. The accepted copy of Letter of Intent along with Board resolution should be submitted latest by **January 27, 2023.**

(Dr. S. Shanbhogue)
Director

DIRECTORATE OF MINES & GEOLOGY
GOVT. OF GOA

गोवा GOA

A 807037

Serial No 1707 Date of Vendor for Purchaser 23/11/22
Value of Stamp Paper 100
Name of Purchaser Vedanta Ltd
Residence
Purpose Undertaking Affidavit
Sign of Stamp Vendor
Mangesh N. Kerkar
License No AC/ST-

NOTARY
Francis D'Souza
Reg. No: 323
TISWADI TALUKA
Expiry Date
28-2-2024
GOVT. OF GOA

Date: 24.04.2023

UNDERTAKING AFFIDAVIT

I, Dhiraj Kumar Jagdish of Vedanta Limited, son of late Shri Namdeo Shankarrao Jagdish, major of age, Indian National, unmarried, residing at Flat no. SF3, Miranda Apartment, Gokulwadi, Sanquelim – 403505, do hereby solemnly affirm and swear in as under:-

1. That we have been granted "Letter of Intent" for grant of mining lease for mining Iron Ore mineral in the land admeasuring 478.5206 Ha of Block I- Bicholim Mineral block located at Bicholim, Bordem, Lamgao, Mulgoa, Mayem & Sirigao Villages of Bicholim Taluka of North Goa District, Goa.

2. We have made an application to MoEF&CC, New Delhi seeking Terms of Reference (ToR) for preparation of EIA & EMP for seeking Environmental Clearance as a part of stautory clearances vide our application no IA/GA/MIN/422323/2023 dated 16-03-2023. We hereby assure that mining operations shall be commenced after obtaining all statutory clearances under the Environment (Protection) Act, 1986, the Water (prevention and control of pollution) Act, 1974, the Air (prevention and control of pollution) Act,1981 and the Mines & minerals (Development & Regulation) Act, 1957.

3. We hereby assure that we will comply with the directions issued by MoEF&CC vide office memorandum F.No.3-50/2017.IA.III(Pt) dated 30th May 2018 in terms of directions given by the Honble Supreme Court, in judgment dated 2nd August 2017 in writ petition (civil) No. 114 of 2014 in the matter of common cause versus Union of India and ors .

For Vedanta Limited

Authorised Signatory

Mr. Dhiraj Kumar Jagdish

VEDANTA LIMITED PANJIM - GOA

BEFORE ME

SHRI FRANCIS D'SOUZA
NOTARY FOR TISWADI TALUKA
STATE OF GOA (INDIA)

NOTARY Francis D'Souza Reg. No. 323 TISWADI TALUKA Expiry Date: 28-2-2024 GOVT. OF GOA

I hereby attest the above signature/s of Shri/Smt./Miss. Dhiraj Kumar Jagdish Tulsi deponent who has been identified before me by ..... who is personally known to me registered under No. 809/2023 Dtd 24/04/2023

ADV. FRANCIS D'SOUZA
NOTARY
AMAKSHI PRASAD BLDG
IIRD FLOOR, FLAT NO. 304
PATTO, PANAJI
TISWADI GOA - 403 001

By e-mail

GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES
OFFICE OF THE REGIONAL CONTROLLER OF MINES, GOA

Approved

No. MCDR-MPC/I/2023-GOA-IBM_RO_GOA Dt. 26/05/2023

Shri/M/s. Vedanta Limited ,
Sesa Goor. EDC complex, Patto - Panaji Tisvadi

BLOCK I BICHOLIM MINERAL BLOCK (PB49)

Sub : Approval of Review and Mining Plan in respect of your Mining Lease Area for Iron Ore over an area of 478.5206 Ha. situated in Lamgao Village, Bicholim Taluka, North Goa District of Goa State.

Ref : (i) Receipt of draft Mining Plan in respect of aforesaid Block in MPAS Portal on 23.03.2023.

(ii) This office scrutiny comments on the examination of the draft copy of the Mining plan sent through the MPAS portal of MTS on 10.05.2022

(iii) Online submission of the modified document i.r.o. aforesaid block on MPAS Portal on 24.05.2023

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 read with Government of India Order No. S.O.1857(E) dated 18.05.2016; and in the exercise of the powers conferred under sub-rule (3) of Rule 16 of Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016, I hereby approve the Mining Plan with Progressive Mine Closure Plan in respect of your Block No. I Bicholim Mineral Block over an extent of 478.5206 Ha. situated in Lamgao Village of Bicholim Taluka, North Goa District of Goa State submitted under Rule 16(1) of Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules 2016. This approval is subject to the following conditions:

1. That 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. The proposals shown on the plates and/or given in the document are based on the sanctioned Mineral Block/lease map/sketch submitted by the applicant/lessee and are applicable from the date of approval.

3. It is clarified that the approval of the aforesaid Mining Plan does not in any way imply the approval of the Government in terms of any other provisions of the Mines & Minerals (Development & Regulation) Act, 1957 or the Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 and any other laws including Forest (Conservation) Act, 1980, Environment (Protection) Act, 1986 or the rules made there under, Mines Act, 1952 and Rules and Regulations made thereunder

4. Indian Bureau of Mines has not undertaken verification of the sanctioned Mineral Block/ Mining Lease Boundary on the ground and does not undertake any responsibility regarding the correctness of the boundaries of the Mineral Block/leasehold shown on the ground with reference to the lease map & other plans furnished by the applicant

5. At any stage, if it is observed that the information furnished, or data incorporated in the document is incorrect or misrepresents facts, the approval of the document shall be revoked with immediate effect.

6. If the approval conflicts with any other law or court order/direction under any statute, it shall be revoked immediately.

7. Terms and conditions of the Mine Development and Production Agreement (MDPA), whenever signed with State Govt; shall be complied with. The preferred bidder shall submit a copy of the Mine Development & Production Agreement & Mining lease deed executed with the State Govt. to this office within 15 days of their execution along with a copy of Performance Security furnished.

8. The Preferred bidder has to comply with the terms & conditions laid down in the LOI issued by the State Govt. If any comments are received from the State Govt., then the necessary action as per comments shall be taken immediately.

9. It shall be mandatory for the project proponent, abstracting groundwater to obtain a No Objection Certificate from Central Ground Water Authority or the Goa State Ground Water Authority.

BLOCK I BICHOLIM MINERAL BLOCK (PB49)

10. The preferred bidder of the auctioned block shall complete detailed exploration (G1 level exploration) over the potential mineralized area in accordance with Rule 12(4) of MCDR Amendment rules 2021 (notified dated 03.11.2021) and prepare a detailed feasibility study report conforming to Part IV and V of the Mineral (Evidence of Mineral Contents) Rules, 2015 over the entire area; within five years from the date of commencement of such mining lease.

Yours faithfully,

26/05/23

(Naresh Kumar Kataria)

Deputy Controller of Mines & Officer In charge

Indian Bureau of Mines, Goa

Approved

Copy forwarded for information to:

1. The Controller of Mines (SZ), Indian Bureau of Mines, Bangalore
2. The Director, Directorate of Mines & Geology, Institute of Menezes Braganza Bldg. Panaji, Goa 403001
3. Technical Persons: S/Shri. Mahesh Patankar, Devendra Gupta, Suraj Dhuruskar

(email ID: Mahesh.patankar@vedanta.co.in; gupta.devendra@vedanta.co.in; suraj.dhuruskar@vedanta.co.in)

24/05/23

(Naresh Kumar Kataria)

Deputy Controller of Mines & Officer In charge

File No: IA-J-11015/3/2023-IA-II(NCM)
Government of India
Ministry of Environment, Forest and Climate Change
IA Division
***

Dated **16/06/2023**

To,

Krishna Reddy
VEDANTA LIMITED
Sesa Ghor, 20 EDC Complex, Patto, Panjim, NORTH GOA, GOA, 403001
MK.Reddy@vedanta.co.in

Subject: Grant of Terms of Reference (ToR) under the provision of the EIA Notification 2006-regarding.

Sir/Madam,

This is in reference to your application for Grant of Terms of Reference (EC) under the provision of the EIA Notification 2006-regarding in respect of project Block 1- Bicholim Mineral Block for Iron Ore submitted to Ministry vide proposal number IA/GA/MIN/422323/2023 dated 09/06/2023.

2. The particulars of the proposal are as below :

(i) ToR Identification No.	TO23A0000GA5700309N
(ii) File No.	IA-J-11015/3/2023-IA-II(NCM)
(iii) Clearance Type	Fresh ToR
(iv) Category	A
(v) Project/Activity Included Schedule No.	1(a) Mining of minerals
(vi) Sector	Non-Coal Mining
(vii) Name of Project	Block 1- Bicholim Mineral Block for Iron Ore
(viii) Name of Company/Organization	VEDANTA LIMITED
(ix) Location of Project (District, State)	NORTH GOA, GOA
(x) Issuing Authority	MoEF&CC
(xi) ToR Date	16/06/2023
(xii) Applicability of General Conditions	no
(xiii) Applicability of Specific Conditions	yes

This has reference to the online proposal no. IA/GA/MIN/422323/2023 dated 16.03.2023 for grant of terms of reference (ToR) for mining of Iron Ore in Bicholim Mineral Block – Block 1 (Auction Block) of M/s Vedanta Limited with proposed production capacity of 3.0 MTPA, Waste: 25.162 MTPA (Total Excavation: 28.162 MTPA) along with crushing and screening plant capacity of 4.0 MTPA in the mine lease area of 478.5206 ha, located in Bicholim, Bordem, Lamgao, Mulgoa, Mayem & Sirigao Villages of Bicholim Taluka of North Goa

District, Goa.

The details of the project and the recommendations of the EAC is at Annexure-I

Details of Products & By-products

Name of the product /By-product	Product / By-product	Quantity	Unit	Mode of Transport / Transmission	Remarks (eg. CAS number)
Iron Ore	Iron Ore	3000000	Tons per Annum (TPA)	Combination of two or three modes	mine to Iron Ore loading jetty by road and from jetty to port by water way (Through Barges)

Specific Terms of Reference

Specific Terms of Reference Mining of minerals

1. Waste Management

Sr. No	Specific Terms of Reference
1.1	The Project Proponent needs to submit the action plan for year wise backfilling

2. Land Environment

Sr. No	Specific Terms of Reference
2.1	The Project Proponent needs to submit the plan for ecology restoration

3. Water Environment

Sr. No	Specific Terms of Reference
3.1	The Project Proponent shall prepare the scheme for mandatory recycle/reuse of water as specified by the Central Ground Water Authority for different category areas seeking NoC for ground water withdrawal and the shall submit as part of EIA/EMP report.
3.2	The Project Proponent shall explore the possibility of reduction of specific water requirement by optimization / technology up gradation, etc. The efforts shall be delineated in the EIA/EMP.
3.3	The Project Proponent shall carry out the assessment of impact due to the proposed project as per

Sr. No	Specific Terms of Reference
	the guidelines issued by the Central Ground Water Authority from time to time and submit the same as a part of the EIA/EMP. The project proponent shall conduct hydrological study for projects involving intersection of ground water table as per the guidelines issued by the Central Ground Water Authority from time to time and submit the same as a part of the EIA/EMP.
3.4	The Project Proponent needs to explore the likelihood of river water entering into the mine pit below the RL of the HFL and the measures that are required to be taken for prevention of seepage and in the event of seepage to drain out the water through settling tank.
3.5	The EAC noted that the mine lease area is in close proximity to the Assnora River (flowing adjacent to the mine lease boundary on the north western side). The Project Proponent needs to submit the detailed report on the engineering design for garland drain, settling tank and check dams and its efficacy through recognized institution. The study should also include the per day silt load, settling velocity of the silt, retention time required based on the annual rainfall with a provision to monitor the water quality

4. Miscellaneous

Sr. No	Specific Terms of Reference
4.1	The Project Proponent shall ensure the validity of the baseline data and public hearing are valid as per Ministry's OM dated 08.06.2022 at the time of submission of proposal for EC.
4.2	The Project Proponent needs to submit the action plan for shifting the School within the mine lease area. PP should also provide the details of the nearest school present within the mine lease area and in the vicinity of the mine lease area by mentioning the distance and direction of the school from the mine lease area, strength of the school, working time of school, blasting time and the measures to be taken for control of ground vibration and fly rock.
4.3	The Project Proponent shall conduct drone survey of the mine lease area and buffer area and submit during the appraisal for EC.
4.4	The Project Proponent needs to submit the detailed site specific protection measures for the surface features such as habitations, water bodies, school, temple, road in and around the vicinity of the mine lease area.
4.5	The instant ToR is subject to the outcome of the two said court cases i.e., WP(Civil) 2478 of 2022 (Filing Number) before the High Court of Bombay at Goa and WP 592 of 2022 before the High Court of Bombay at Goa.
4.6	During the meeting, the EAC noted that old excavated pits exist within the mine lease area. Hence, the Project Proponent needs to submit a letter from the Department of Geology and Mining, Government of Goa clarifying whether any illegal mining within the mine lease area has been carried out or not and whether the same has been carried out by M/s. Vedanta Limited or not?

5. Greenbelt

Sr. No	Specific Terms of Reference
5.1	The Project Proponent needs to submit the greenbelt/afforestation development plan for undertaking plantation in the periphery of the mine lease boundary, safety zone etc., The details of the no. of saplings proposed, type of species, spacing and the area to be covered including the cost and timeline for completion of plantation needs to be provided in the EIA report

6. Socio Economic

Sr. No	Specific Terms of Reference
6.1	The Project Proponent needs to submit employment based skill development plan for the local people and thrust should be to provide employment to local people after imparting training
6.2	The Project Proponent needs to carry out the Public Hearing as per provisions of EIA Notification, 2006. PP should also submit the time bound action plan on concerns of the public through a separate budget with capital expenditure with a timeline of 3 years. The Project proponent shall ensure that the activities proposed under the public hearing shall be different from the CSR activities.

7. Transportation

Sr. No	Specific Terms of Reference
7.1	The Project Proponent needs to submit the map showing the transport route of the mineral from the mine lease area to the destination, impact of details of habitation at a distance of 100m from the centre on both sides of road, details of no. of trips/day to and fro, capacity of the dumper/tipper to be deployed and the dimensions of the road and the carrying capacity of the road. The Project Proponent shall ensure that the transportation route shall not pass through any village road.

8. Environment Monitoring

Sr. No	Specific Terms of Reference
8.1	The Project Proponent should prepare the EMP considering the scenario of pollution to be generated for normative and peak total excavation for assessing air and noise pollution
8.2	The Project Proponent needs to monitor the ambient air quality and noise level at the mine lease boundary, nearest village, crusher, predominant downwind direction and at other sensitive receptors. Accordingly, Project Proponent shall propose to install Continuous Ambient Air Quality Monitoring Station within certain timeline

Standard Terms of Reference for 1(a) Mining of minerals

Activity: Mining of minerals

Standard Terms of Reference Mining of minerals

1. Project Details

Sr. No	Standard Terms of Reference
1.1	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994. The production details need to submit since inception of mine duly authenticated by Department of Mines & Geology, State Government.
1.2	A copy of the document in support of rightful lessee of the mine should be submitted. In case of new mines copy of LoI granted by State Government to be submitted. PP should ensure that LoI is valid at the time of grant of ToR. PP should submit the copy of lease deed/supplementary lease deed/extension letter/transfer deed, from its initial grant to subsequent renewals/ transfer/extension of validity.
1.3	PP should submit the District Survey Report (DSR) as per S.O. 3611(E) dated 25.07.2018 in case of minor minerals.
1.4	Brief of proposal to be submitted which include total excavation of the material required for the production of certain quantity of the minerals, location of the project, mining lease area, latitude longitude, seismic zone etc. In case of expansion project details of expansion viz. expansion in mining lease area or expansion in production of any particular mineral or expansion in total excavation, latest certified Compliance report (CCR) from IRO of conditions granted in existing EC needs to be submitted.
1.5	The PP should submit the real-time aerial video footage & video of the mining lease area and of the transportation route.
1.6	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).
1.7	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.
1.8	The PP should collect the Baseline data (BLD) in respect of initial level of the mining lease. For this permanent bench marks (BM) needs to be established at prominent location preferably close to mining leases in question and should have precisely known relationship to the level datum of the area, typically mean sea level.
1.9	In case of sand mining, the entire mining lease area should be divided suitably into grids of 25 m x 25 m with the help of sections across the width of river and along the direction of flow of the river. The levels (MSL & RL) of the corner point of each grid needs to be recorded. Each Grid should be suitably numbered for identification. PP should identity grids which will be worked out and grids which will come under no mining zone i.e. safety barriers from the river bank. PP should comply with the sustainable sand mining management guidelines 2016 and enforcement and monitoring guidelines, 2020 etc.
1.10	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.

Sr. No	Standard Terms of Reference
	Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.
1.11	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.
1.12	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
1.13	Compliance of the Ministry's 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.

2. Forest

Sr. No	Standard Terms of Reference
2.1	PP shall submit a certificate from Chief Conservator of Forests regarding involvement of Forest Land in the mining lease area if any. In case forest land is involved i) PP should submit the proof of application made for obtaining forest clearance and ii) a map clearly showing the forest & non-forest area.
2.2	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.

3. Land Environment

Sr. No	Standard Terms of Reference
3.1	PP should submit the details of survey number [viz. survey no, area in hectare, classification of land (government, private, forest, grazing land etc.), villages] duly authenticated by State Government, falling in the mining lease area.
3.2	The study area will comprise of 10km 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.
3.3	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.
3.4	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.

4. Wildlife

Sr. No	Standard Terms of Reference
4.1	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.
4.2	A detailed biological study of the study area [core zone and buffer zone] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. PP shall submit list of Schedule-1 species present in core and buffer zone duly authenticated by CWLW. In case of any Scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest/Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost. Proof of its submission of conservation plan to the CWLW needs to be submitted.
4.3	PP shall submit a certificate from Chief Wildlife Warden regarding distance of mining lease from the protected area falling within 10 KM of the mining lease. In case project requires clearance under Wildlife (Protection) Act, 1972 then copy of application made for the same needs to be submitted.

5. Baseline Environment

Sr. No	Standard Terms of Reference
5.1	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.
5.2	Air quality modelling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modelling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The windrose showing pre-dominant wind direction may also be indicated on the map.
5.3	The PP 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, PP should submit the original test reports and certificates of the labs from which samples were analyzed.

6. Water Environment

Sr. No	Standard Terms of Reference
6.1	The water requirement for the Project, its availability and source should be furnished. Quantity of surface or ground water to be used for the Project should be indicated. A detailed water balance should also be provided. 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. 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. The capital and recurring expenditure to be incurred needs to be submitted.
6.2	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.

7. Hydro Geology

Sr. No	Standard Terms of Reference
7.1	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.
7.2	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.
7.3	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working bench will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished. In case of surface water is proposed to be utilized then Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.

8. Transportation

Sr. No	Standard Terms of Reference
8.1	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.

9. Land Acquisition and R&R

Sr. No	Standard Terms of Reference
9.1	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

Sr. No	Standard Terms of Reference
	from State land use board or the concerned authority.
9.2	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.

10. Socio-Economic Environment

Sr. No	Standard Terms of Reference
10.1	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.
10.2	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.
10.3	Activity-wise time-bound action plan on the issues raised and commitment made during public hearing to be submitted as part of the final EMP Report in compliance of the Ministry's OM F.No.22-65/2017-IA.III dated 30th September, 2020.

11. Environmental Monitoring and Management

Sr. No	Standard Terms of Reference
11.1	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.

12. Critically Polluted Areas, Aravali & CRZ

Sr. No	Standard Terms of Reference
12.1	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

Sr. No	Standard Terms of Reference
	State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered.

13. Risk Assessment & Disaster Management

Sr. No	Standard Terms of Reference
13.1	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.
13.2	A Disaster Management Plan shall be prepared and included in the EIA/EMP Report.

14. Miscellaneous

Sr. No	Standard Terms of Reference
14.1	The general points are also to be followed: - a) All documents to be properly referenced with index and continuous page numbering. b) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated. c) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project. d) Where the documents provided are in a language other than English, an English translation should be provided. e) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted. f) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed. g) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation. h) As per the circular no. J-11011/618/2010-IA.II (I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable. i) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.

Additional Terms of Reference

1.The prescribed TOR would be valid for a period of four years for submission of the EIA/EMP report, as per the notification S.O 751 (E) dated 17.02.2020. The instant TOR is valid up to four years from the date of issuance of TOR.

2.The Project Proponent should submit the EIA/EMP report as per the generic structure prescribed in Appendix-III of the EIA Notification, 2006 after incorporating the details of public hearing conducted and covering the above-mentioned issues, to take further necessary action for obtaining environmental clearance in accordance with the procedure prescribed

under the EIA Notification, 2006.

Copy To

1. **The Secretary,** Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.
2. **The Secretary,** Department of Mines and Geology, Ground Floor of Institute Menezes Braganza, Government of Goa.
3. **The Director,** Department of Environment and Climate Change (DoE and CC), Government of Goa.
4. **The Secretary,** Department of Forests, Government of Goa, Goa Van Bhavan, Goa.
5. **The Chief Wildlife Warden**, Goa Van Bhavan, Forest Department, Altinho, Panaji Goa. 403001.
6. **The Deputy Director General of Forests (C),** Ministry of Env., Forest and Climate Change, Integrated Regional Office, Kendriya Sadan, 4th Floor, E&F Wings, 17th Main Road, Koramangala II Block, Bangalore - 560034.
7. **The Member Secretary,** Central Pollution Control Board, Parivesh Bhawan, CBD-Cum-Office Complex, East Arjun Nagar, New Delhi-110 032.
8. **The Member Secretary,** Central Ground Water Authority, 18/11, Jam Nagar House, Man Singh Road, New Delhi-110011.
9. **The Member Secretary,** Goa State Pollution Control Board, Nr. Pilerne Industrial Estate, Opp. Saligao Seminary, Saligao, Goa 403511.
10. **The Controller General,** Indian Bureau of Mines, Indira Bhavan, Civil Lines, Nagpur- 440 001.
11. **The District Collector,** North Goa District, Government of Goa.
12. **Guard File.**
13. **PARIVESH Portal.**

Annexure I

The details of the project as ascertained from the documents submitted by the Project Proponent and as revealed from the discussions held during the meeting are given as under:

i. The mine lease area is located between Latitude: 15º34'20.518"N to 15º 36'54.018"Nand Longitude: 73º54'4.754"E to 73º57'09.51"E. The mine lease area falls under the Survey of India Toposheet No: D43B14and falls in Seismic Zone-II.

ii. The proposed project activity is listed at schedule no. 1(a) Mining of Minerals and falls under Category "A" as the mining lease area is greater than 250ha and appraised at the Central level.

iii. Details of Mine Lease:

a) The Project Proponent has submitted the Letter of Intent (LoI) granted by the Government of Goa vide Lr No: DMG/25/Auction Cell/LOI-function/2023/2801 dated 13.01.2023 for grant of mining lease for Block I - Bicholim Mineral Block for Iron Ore in Bicholim, Bordem, Lamgao, Mulgao Mayem & Sirigao villages, Bicholim Taluka, North Goa District over an area of 478.5206 Hectare for a period of 50 (fifty) years in pursuant to Rule 10(2) of the Auction Rules. This letter of intent is valid for a period of 3 (three) years from the date of its issuance.

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

Private land	421.1153 Ha
Government land	57.4053 Ha
Total Mining lease area (MLA)	478.5206 Ha
Private land for crusher, workshop & other infrastructure outside the MLA	Not Applicable

v. Details of Mining Plan:

a) The Project Proponent has submitted that the Mining Plan is submitted to Indian Bureau of Mines (IBM), Goa for approval and is under process.

b) The method of mining will be opencast mechanized without drilling and blasting. Total Mineral Reserves & Resources estimated as 84.743 million tonnes. Life of the mine will be 30 years @ 3.0 MTPA.

c) The proposed bench height and width will be 7m and 10-12 m respectively. The individual bench slope will be 70° and overall pit slope will be 27°.

d) The ore will be transported from Mine to Sarmanas jetty through dedicated road with only 0.9km stretch of public road in use.

vi. Water requirement:

Total water requirement	664 KLD	Pit Water	628 KLD

		Ground water	36 KLD
Source	Water from Mine Pit will be used for dust suppression, Vehicle washing and Green belt. Water for domestic requirement will be met from bore well.		
Permission	The Bore wells are registered with Goa State Water Resource department. Application for using mine pit water will be submitted.		

vii. Nearest village / town/ highway/railway station / water bodies/monument

Particulars	Particular's Name	Distance & Directions
Village	Lamgoa	Within the lease area
Town	Bicholim Town	0.5 km, East
Road	State Highway SH-1	0.65 km, East
Railway Station	Tivim Railwaystation	10.5 km, North
Water Bodies	Asnora River Mandovi River	Touching lease boundary at one of the points 2.3 km, SW
School	Mulgao Govt. Primary School	Within the lease area
Worship places	Namuzgah/Idgah Shri Lairae Temple	Within the lease area 0.86 km

viii. Presence of Environmentally Sensitive areas in the study area:

Forest Land/Protected Area/Environmental Sensitivity Zone	Yes/ No	Details of Certificate/letter/Remarks
Forest Land	No	No Forest land is involved in the mine lease area. The following Reserve Forests are located within 10 km radius of the mine lease area such as Kharapal RF -6.7 Km Ambadgaon RF - 7.4 Km
National park	No	The Project Proponent has submitted the letter from the Office of the Dy. Conservator of Forests vide Lr No: DCF(WP)/Tech/Digi/Vol-I/75/2022-23/ 968 dated 23.01.2023 stating that the proposed Bicholim Mineral Block-I is not situated within 10 km radius from the boundary of any the protected area in the State of Goa. PP also submitted the authenticated map dated 24.01.2023 showing the distance of the following Wildlife Sanctuary from the mine lease area. i. Madei Wild life Sanctury-14.105 km, E ii. Salim Ali Bird Sanctuary -10.553 km, SW iii. Bondla Wild life Sanctuary -20.476 km, SE
Wildlife Sanctuary	No	
Eco-Sensitive Zone(ESZ)/Eco-Sensitive Area(ESA)	No	

ix. Green belt/plantation details:

Proposed area for green belt/plantation	105.8894 ha
Budget for green plant & plantation till the end of life of mine.	Rs159.0Lakhs
Particulars for Green belt/plantation	Area covered (in Ha)
7.5 m barrier & non-mineralized zone	25 ha
50 m safety zone of nallah, roads, electric lines	
Additional information (if any)	80.8894 ha (on backfilled area)

x. Rehabilitation & Resettlement:

R & R details	Not Applicable, as no resettlement is proposed during life of mine.

xi. Details of Court Cases:

Court Case	Yes
Additional information (if any)	First Case: 1. WP(Civil) 2478 of 2022 (Filling number) before the High Court of Bombay at Goa 2. The said writ petition has been filed against the State Government and seeks to challenge the identification of properties bearing survey no. 90/1(part) and 96/0 as part of the recently auctioned Bicholim mine. The petition alleges violation of Rule 5 &6 of Mineral Evidence Rules and Section 10B of MMDR, Act by the State of Goa and DMG. The petitioner has prayed for quashing of auction notice to the extend it includes the property of the petitioner and grant a writ of mandamus against the Respondents. 3. Case status is pending. 4. No adverse orders have been passed. 5. As per the last order Vedanta limited was added as a party to the petition as it has won the mine in auction. Second Case: 1. WP 592 of 2022 before the High Court of Bombay at Goa 2. The said writ petition seeks to challenge the constitutionality of the tender documents of Phase I auction of Goa mines. The petition alleges violation of Rule 5 & 6 of Mineral Evidence Rules by the State of Goa and DMG. The petition alleges non-disclosure of essential facts such as bore hole data, approved mining plan, production data of the previous five years and exploration data. The petitioner has prayed for quashing of auction notice to extend it fails to include the essential facts and in the alternative to stay the auction. 3. Case status is pending 4. No adverse orders have been passed.

	5. As per the last order Vedanta limited was added as a party to the petition as it has won the mine in auction

xii. The Project Proponent submitted the Affidavit in a non-judicial stamp paper of Rs 100 bearing no: A807037 dated 24.04.2023 stating that they will directions issued by MoEF&CC vide Office Memorandum F.No.3-50/2017.IA.III (Pt) dated 30th May, 2018 in terms of directions given Hon'ble Supreme Court in judgment dated 2nd August 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of common cause versus Union of India &Ors.

xiii. The total project cost estimated as Rs 250.0 Cr. The employment potential of direct employment will be 433 no.s and indirect employment will be 195 no.s.

2. The proposal was considered by the EAC of Non Coal Mining projects in its 14th meeting held on 3-4 May, 2023. Wherein the Project Proponent informed the EAC that the instant mine lease was obtained through auction and the Government of Goa granted the Letter of Intent (LoI) dated 13.01.2023 for grant of mining lease for Block I - Bicholim Mineral Block for Iron Ore in Bicholim, Bordem, Lamgao, MulgaoMayem & Sirigao villages, Bicholim Taluka, North Goa District over an area of 478.5206 Ha for a period of 50 (fifty) years in pursuant to Rule 10(2) of the Auction Rules. This letter of intent is valid for a period of 3 (three) years from the date of its issuance. Then, the Project Proponent presented the KML file to indicate the site features in the vicinity of the mine lease area and in the study area of 10km radius. The EAC asked the Project Proponent to show the locations of the village, school and road in and around the mine lease area. The Project Proponent informed the EAC that the Assnora River is flowing adjacent to the mine lease boundary on the north western side. Few habitations, a temple and a primary school exists within the mine lease area. Habitations will not be disturbed. No forest land is involved in the mine lease area. Only acacia plantations exist within the mine lease area. The Project Proponent also informed the settling ponds are under construction. The EAC on viewing the KML file noted that old excavated pits exist within the mine lease area and Assnora River is located close to the proximity of the mine lease area. The Project Proponent informed the EAC that the ore will be transported from Mine to Sarmanas jetty through dedicated road with only 0.9km stretch of public road in use.

The EAC asked the Project Proponent whether there is any ban on mining activity in Goa. The Project Proponent informed the EAC that mining activity was not stopped because of CRZ and it may relate to sand mining only. The Project Proponent informed the EAC that the instant mine is a first auction mine in Goa. The Project Proponent also informed the EAC that there will be no activity of drilling and blasting. Mining Plan has been submitted to Indian Bureau of Mines (IBM) for approval. Nearest Village of ESA of Western Ghats is Bayalvada Village - 11.84 km. Waste will be dumped and backfilled within the mine lease area. The Project Proponent informed the EAC that there are two court cases filed against the State Govt. regarding auction procedure and the Project Proponent has been added as a party. There is no stay order or any adverse orders and the court case is in preliminary stage. The EAC was of the view that the instant ToR is subject to the outcome of the two said court cases i.e., WP(Civil) 2478 of 2022 (Filing Number) before the High Court of Bombay at Goa and WP 592 of 2022 before the High Court of Bombay at Goa. The EAC asked the

Project Proponent to inform about the present status of the mining in Goa w.r.t Hon'ble Supreme Court order dated 07.02.2018. The Project Proponent informed the EAC that as per Hon'ble Supreme Court order dated 07.02.2018 in Special Leave to Appeal (Civil) No. 32138 of 2015 in the matter of the Goa Foundation vs M/s Sesa Sterlite Ltd. And Ors it was stated the State of Goa was not under any constitutional obligation to grant fresh mining leases through the process of competitive bidding or auction and the Ministry of Environment and Forest was obliged to grant fresh environmental clearances in respect of fresh grant of mining leases in accordance with law.

After detailed deliberations made by the Project Proponent and the Consultant, the EAC in its EAC (Non-Coal Mining) meeting held during 3-4 May, 2023, the EAC under the provisions of EIA Notification 2006 and its subsequent amendments, the EAC **recommended** the proposal for grant of Terms of Reference (ToR) to M/s Vedanta Limited for mining of Iron Ore in Bicholim Mineral Block – Block 1 (Auction Block) with proposed production capacity of 3.0 MTPA, Waste: 25.162 MTPA (Total Excavation: 28.162 MTPA) along with crushing and screening plant capacity of 4.0 MTPA in the mine lease area of 478.5206 ha, located in Bicholim, Bordem, Lamgao, Mulgoa, Mayem & Sirigao Villages of Bicholim Taluka of North Goa District, Goa for undertaking detailed EIA/EMP study subject to the specific conditions in addition to the standard ToR conditions applicable for non-coal mining projects.

Validity unknown

Digitally Signed by : Mr Pankaj Verma
Member Secretary, MoEFCC (EC)

Date: 16/06/2023

BASELINE DATA FOR ENVIRONMENTAL MONITORING REPORT

SUMMER SEASON, 2023

(March to May, 2023)

PROJECT: **Block I – Bicholim Mineral Block**

Lease Area : 478.5206 hectares

Villages : Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao

Taluka : Bicholim

District : North Goa,

State : Goa

Lessee: VEDANTA LIMITED.,

Sesa Ghor, 20 EDC Complex, Patto,
Panaji, Goa – 403001 India

CONSULTANT

MINERAL ENGINEERING SERVICES
(Accredited by QCI-NABET ORC000756)
25/XXV, Club Road, BELLARY-583103, Karnataka, Tel 08392-267421, Mob: 09194483367421, Email : mes_msraju@yahoo.co.uk mesbly25@gmail.com

ENVIRONMENTAL LABORATORY
Unit of Mineral Engineering Services)
(Accredited by NABL &. MOEF&CC Under EIP| 1996|
#948, 2nd Cross. Kammanahalli Main Road. St Thomas Town Post, Bangalore-560 084, Karnataka,

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ISO 45001:2018

TEST REPORT

Table No. 1

AMBIENT AIR QUALITY

Project	: Block I - Bicholim Mineral Block
	Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa
Client	: M/s. Vedanta Limited
Station at & Code	: A1 Bicholim Within ML Area
Duration	: 24 Hrs
Date of Report	: 10.06.2023
Reference	IS 5182

Date of Sampling	Concentration					
	Sulphur Dioxide (SO_2), µg/m³	Nitrogen Dioxide (NO_2), µg/m³	PM_{10}, (µg/m³)	$PM_{2.5}$, (µg/m³)	Ammonia (NH_3), µg/m³	Benzene (C_6H_6), µg/m³
02.03.2023	8	<9	38	20	<20	<1
06.03.2023	8	12	42	23	<20	<1
09.03.2023	9	11	39	22	<20	<1
13.03.2023	9	10	39	24	<20	<1
16.03.2023	8	11	34	27	<20	<1
20.03.2023	7	12	50	36	<20	<1
23.03.2023	10	14	45	25	<20	<1
27.03.2023	7	9	37	18	<20	<1
30.03.2023	8	11	42	25	<20	<1
Limits for Industrial, Residential, Rural and other Areas	80 24 Hrs	80 24 Hrs	100 24 Hrs	60 24 Hrs	400 24 Hrs	5 Annual

Date of Sampling	Concentration					
	Lead (Pb), µg/m³	Nickel (Ni), ng/m³	Arsenic (As), ng/m³	Benzo(a)Pyrene (BaP), ng/m³	Carbon Monoxide* (CO), mg/m³	Ozone* (O_3), µg/m³
02.03.2023	<0.05	<0.5	<0.5	<0.5	0.10	20
06.03.2023	0.11	<0.5	<0.5	<0.5	0.14	22
09.03.2023	0.05	<0.5	<0.5	<0.5	0.11	29
13.03.2023	0.17	<0.5	<0.5	<0.5	0.27	27
16.03.2023	0.09	<0.5	<0.5	<0.5	0.23	24
20.03.2023	0.12	<0.5	<0.5	<0.5	0.19	30
23.03.2023	0.07	<0.5	<0.5	<0.5	0.10	22
27.03.2023	0.05	<0.5	<0.5	<0.5	0.17	24
30.03.2023	0.07	<0.5	<0.5	<0.5	0.23	20
Limits for Industrial, Residential, Rural and other Areas	1.0 24 Hrs	20 Annual	6 Annual	1 Annual	4 1 Hr	180 1 Hr

Note : * Parameters monitored for a period of 1 hr

Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968, E-mail : mesbng@gmail.com, www.envtest.in

Note : This report is subject to the terms and conditions mentioned overleaf.

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TEST REPORT

Table No. 2

AMBIENT AIR QUALITY

Project : Block I - Bicholim Mineral Block
Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa
Client : M/s. Vedanta Limited
Station at & Code : A2 Lamgao village
Duration : 24 Hrs
Date of Report : 10.06.2023
Reference IS 5182

Date of Sampling	Concentration					
	Sulphur Dioxide (SO_2), µg/m³	Nitrogen Dioxide (NO_2), µg/m³	PM_{10}, (µg/m³)	$PM_{2.5}$, (µg/m³)	Ammonia (NH_3), µg/m³	Benzene (C_6H_6), µg/m³
02.03.2023	11	13	32	20	<20	<1
06.03.2023	9	14	36	20	<20	<1
09.03.2023	10	17	40	20	<20	<1
13.03.2023	10	12	41	24	<20	<1
16.03.2023	5	9	39	26	<20	<1
20.03.2023	6	9	37	17	<20	<1
23.03.2023	8	12	33	18	<20	<1
27.03.2023	9	11	42	21	<20	<1
30.03.2023	10	11	43	26	<20	<1
Limits for Industrial, Residential, Rural and other Areas	80 24 Hrs	80 24 Hrs	100 24 Hrs	60 24 Hrs	400 24 Hrs	5 Annual

Date of Sampling	Concentration					
	Lead (Pb), µg/m³	Nickel (Ni), ng/m³	Arsenic (As), ng/m³	Benzo(a)Pyrene (BaP), ng/m³	Carbon Monoxide* (CO), mg/m³	Ozone* (O_3), µg/m³
02.03.2023	0.16	<0.5	<0.5	<0.5	0.32	25
06.03.2023	0.13	<0.5	<0.5	<0.5	0.16	27
09.03.2023	0.08	<0.5	<0.5	<0.5	0.06	20
13.03.2023	0.13	<0.5	<0.5	<0.5	0.15	23
16.03.2023	0.08	<0.5	<0.5	<0.5	0.22	20
20.03.2023	0.12	<0.5	<0.5	<0.5	0.14	24
23.03.2023	0.08	<0.5	<0.5	<0.5	0.24	24
27.03.2023	0.09	<0.5	<0.5	<0.5	0.12	20
30.03.2023	0.11	<0.5	<0.5	<0.5	0.16	21
Limits for Industrial, Residential, Rural and other Areas	1.0 24 Hrs	20 Annual	6 Annual	1 Annual	4 1 Hr	180 1 Hr

Note : * Parameters monitored for a period of 1 hr

Govt. Analyst / Authorised Signatory

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Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesbng@gmail.com, www.envtest.in

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ISO 45001:2018

TEST REPORT

Table No. 3

AMBIENT AIR QUALITY

Project	: Block I - Bicholim Mineral Block
	Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa
Client	: M/s. Vedanta Limited
Station at & Code	: A3 Mulgao village
Duration	: 24 Hrs
Date of Report	: 10.06.2023
Reference	IS 5182

Date of Sampling	Concentration					
	Sulphur Dioxide (SO_2), µg/m³	Nitrogen Dioxide (NO_2), µg/m³	PM_{10}, (µg/m³)	$PM_{2.5}$, (µg/m³)	Ammonia (NH_3), µg/m³	Benzene (C_6H_6), µg/m³
03.03.2023	11	14	46	23	<20	<1
07.03.2023	12	13	41	28	<20	<1
10.03.2023	8	12	43	25	<20	<1
14.03.2023	9	13	39	24	<20	<1
17.03.2023	11	15	50	27	<20	<1
21.03.2023	10	11	47	26	<20	<1
24.03.2023	13	18	54	27	<20	<1
28.03.2023	10	11	43	26	<20	<1
31.03.2023	8	16	37	19	<20	<1
Limits for Industrial, Residential, Rural and other Areas	80 24 Hrs	80 24 Hrs	100 24 Hrs	60 24 Hrs	400 24 Hrs	5 Annual

Date of Sampling	Concentration					
	Lead (Pb), µg/m³	Nickel (Ni), ng/m³	Arsenic (As), ng/m³	Benzo(a)Pyrene (BaP), ng/m³	Carbon Monoxide* (CO), mg/m³	Ozone* (O_3), µg/m³
03.03.2023	0.05	<0.5	<0.5	<0.5	0.30	20
07.03.2023	0.11	<0.5	<0.5	<0.5	0.19	21
10.03.2023	0.10	<0.5	<0.5	<0.5	0.12	20
17.03.2023	0.15	<0.5	<0.5	<0.5	0.12	20
21.03.2023	0.16	<0.5	<0.5	<0.5	0.07	21
24.03.2023	0.08	<0.5	<0.5	<0.5	0.12	20
24.03.2023	0.06	<0.5	<0.5	<0.5	0.12	20
28.03.2023	0.07	<0.5	<0.5	<0.5	0.19	21
31.03.2023	0.12	<0.5	<0.5	<0.5	0.30	22
Limits for Industrial, Residential, Rural and other Areas	1.0 24 Hrs	20 Annual	6 Annual	1 Annual	4 1 Hr	180 1 Hr

Note : * Parameters monitored for a period of 1 hr

Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
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ISO 45001:2018

TEST REPORT

Table No. 4

AMBIENT AIR QUALITY

Project	: Block I - Bicholim Mineral Block
	Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa
Client	: M/s. Vedanta Limited
Station id & Code	: A4 Sircaim village
Duration	: 24 Hrs
Date of Report	: 10.06.2023
Reference IS 5182	

Date of Sampling	Concentration					
	Sulphur Dioxide (SO_2), µg/m³	Nitrogen Dioxide (NO_2), µg/m³	PM_{10}, (µg/m³)	$PM_{2.5}$, (µg/m³)	Ammonia (NH_3), µg/m³	Benzene (C_6H_6), µg/m³
03.03.2023	10	16	51	31	<20	<1
07.03.2023	9	12	53	21	<20	<1
10.03.2023	11	14	49	22	<20	<1
14.03.2023	9	11	48	26	<20	<1
17.03.2023	10	12	53	28	<20	<1
21.03.2023	11	14	40	21	<20	<1
24.03.2023	9	12	50	26	<20	<1
28.03.2023	7	9	46	24	<20	<1
31.03.2023	10	11	40	22	<20	<1
Limits for Industrial, Residential, Rural and other Areas	80 24 Hrs	80 24 Hrs	100 24 Hrs	60 24 Hrs	400 24 Hrs	5 Annual

Date of Sampling	Concentration					
	Lead (Pb), µg/m³	Nickel (Ni), ng/m³	Arsenic (As), ng/m³	Benzo(a)Pyrene (BaP), ng/m³	Carbon Monoxide* (CO), mg/m³	Ozone* (O_3), µg/m³
03.03.2023	0.07	<0.5	<0.5	<0.5	0.16	23
07.03.2023	0.12	<0.5	<0.5	<0.5	0.11	21
10.03.2023	0.05	<0.5	<0.5	<0.5	0.21	22
17.03.2023	0.07	<0.5	<0.5	<0.5	0.26	26
21.03.2023	0.05	<0.5	<0.5	<0.5	0.09	20
24.03.2023	0.15	<0.5	<0.5	<0.5	0.33	21
24.03.2023	0.15	<0.5	<0.5	<0.5	0.33	21
28.03.2023	0.06	<0.5	<0.5	<0.5	0.13	22
31.03.2023	0.06	<0.5	<0.5	<0.5	0.21	25
Limits for Industrial, Residential, Rural and other Areas	1.0 24 Hrs	20 Annual	6 Annual	1 Annual	4 1 Hr	180 1 Hr

Note : * Parameters monitored for a period of 1 hr

Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
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ISO 45001:2018

TEST REPORT

Table No. 5

AMBIENT AIR QUALITY

Project	: Block I - Bicholim Mineral Block
	Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa
Client	: M/s. Vedanta Limited
Station at & Code	: A6 Calvim village
Duration	: 24 Hrs
Date of Report	: 10.03.2023
Reference	: IS 5182

Date of Sampling	Concentration					
	Sulphur Dioxide (SO_2), µg/m³	Nitrogen Dioxide (NO_2), µg/m³	PM_{10}, (µg/m³)	$PM_{2.5}$, (µg/m³)	Ammonia (NH_3), µg/m³	Benzene (C_6H_6) µg/m³
02.03.2023	7	11	30	20	<20	<1
06.03.2023	11	12	35	22	<20	<1
09.03.2023	8	11	38	18	<20	<1
13.03.2023	6	<9	32	15	<20	<1
16.03.2023	8	<9	29	18	<20	<1
20.03.2023	10	12	37	20	<20	<1
23.03.2023	11	14	29	15	<20	<1
27.03.2023	12	13	38	20	<20	<1
30.03.2023	6	9	30	15	<20	<1
Limits for Industrial, Residential, Rural and other Areas	80 24 Hrs	80 24 Hrs	100 24 Hrs	60 24 Hrs	400 24 Hrs	5 Annual

Date of Sampling	Concentration					
	Lead (Pb), µg/m³	Nickel (Ni), ng/m³	Arsenic (As), ng/m³	Benzo(a)Pyrene (BaP), ng/m³	Carbon Monoxide* (CO), mg/m³	Ozone* (O_3), µg/m³
02.03.2023	0.22	<0.5	<0.5	<0.5	0.20	20
06.03.2023	0.12	<0.5	<0.5	<0.5	0.16	22
09.03.2023	0.11	<0.5	<0.5	<0.5	0.23	27
13.03.2023	0.12	<0.5	<0.5	<0.5	0.12	21
16.03.2023	0.11	<0.5	<0.5	<0.5	0.23	23
20.03.2023	0.09	<0.5	<0.5	<0.5	0.11	22
23.03.2023	0.10	<0.5	<0.5	<0.5	0.22	26
27.03.2023	0.08	<0.5	<0.5	<0.5	0.13	25
30.03.2023	0.14	<0.5	<0.5	<0.5	0.32	22
Limits for Industrial, Residential, Rural and other Areas	1.0 24 Hrs	20 Annual	6 Annual	1 Annual	4 1 Hr	180 1 Hr

Note : * Parameters monitored for a period of 1 hr

Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.

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ISO 45001:2018

TEST REPORT

Table No. 6

AMBIENT AIR QUALITY

Project : Block I - Bicholim Mineral Block
Bicholim, Bordem, Langao, Mulgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa
Client : M/s. Vedanta Limited
Station at & Code : A6 Pilgao
Duration : 24 Hrs
Date of Report : 18.06.2023
Reference IS 5182

Date of Sampling	Concentration					
	Sulphur Dioxide (SO_2), µg/m³	Nitrogen Dioxide (NO_2), µg/m³	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)	Ammonia (NH_3), µg/m³	Benzene (C_6H_6) µg/m³
02.03.2023	9	12	47	23	<20	<1
06.03.2023	11	14	37	23	<20	<1
09.03.2023	9	11	42	24	<20	<1
13.03.2023	8	12	40	25	<20	<1
16.03.2023	13	10	38	21	<20	<1
20.03.2023	9	12	46	27	<20	<1
23.03.2023	8	9	35	20	<20	<1
27.03.2023	10	13	48	27	<20	<1
30.03.2023	6	9	43	28	<20	<1
Limits for Industrial, Residential, Rural and other Areas	80 24 Hrs	80 24 Hrs	100 24 Hrs	60 24 Hrs	400 24 Hrs	5 Annual

Date of Sampling	Concentration					
	Lead (Pb), µg/m³	Nickel (Ni), ng/m³	Arsenic (As), ng/m³	Benzo(a)Pyrene (BaP), ng/m³	Carbon Monoxide* (CO), mg/m³	Ozone* (O_3), µg/m³
02.03.2023	0.11	<0.5	<0.5	<0.5	0.23	26
06.03.2023	0.06	<0.5	<0.5	<0.5	0.11	26
09.03.2023	0.11	<0.6	<0.6	<0.5	0.22	21
13.03.2023	0.16	<0.5	<0.5	<0.5	0.13	21
16.03.2023	0.10	<0.6	<0.6	<0.5	0.16	25
20.03.2023	0.07	<0.5	<0.5	<0.5	0.14	20
23.03.2023	0.13	<0.6	<0.6	<0.5	0.30	20
27.03.2023	0.11	<0.5	<0.5	<0.5	0.28	23
30.03.2023	0.08	<0.5	<0.6	<0.6	0.19	24
Limits for Industrial, Residential, Rural and other Areas	1.0 24 Hrs	20 Annual	6 Annual	1 Annual	4 1 Hr	100 1 Hr

Note : * Parameters monitored for a period of 1 hr

Govt. Analyst / Authorised Signatory

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TEST REPORT

Table No. 7

AMBIENT AIR QUALITY

Project	: Block I - Bicholim Mineral Block
	Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa
Client	: M/s. Vedanta Limited
Station at & Code	: A7 Sarvona village
Duration	: 24 Hrs
Date of Report	: 10.06.2023
Reference	IS 5182

Date of Sampling	Concentration					
	Sulphur Dioxide (SO_2), µg/m³	Nitrogen Dioxide (NO_2), µg/m³	PM_{10}, (µg/m³)	$PM_{2.5}$, (µg/m³)	Ammonia (NH_3), µg/m³	Benzene (C_6H_6), µg/m³
02.03.2023	12	15	49	18	<20	<1
06.03.2023	10	13	45	25	<20	<1
09.03.2023	8	12	43	36	<20	<1
13.03.2023	13	18	43	21	<20	<1
16.03.2023	9	10	35	20	<20	<1
20.03.2023	8	11	46	26	<20	<1
23.03.2023	11	13	30	15	<20	<1
27.03.2023	12	13	37	17	<20	<1
30.03.2023	12	18	40	22	<20	<1
Limits for Industrial, Residential, Rural and other Areas	80 24 Hrs	80 24 Hrs	100 24 Hrs	60 24 Hrs	400 24 Hrs	5 Annual

Date of Sampling	Concentration					
	Lead (Pb), µg/m³	Nickel (Ni), ng/m³	Arsenic (As), ng/m³	Benzo(a)Pyrene (BaP), ng/m³	Carbon Monoxide* (CO), mg/m³	Ozone* (O_3), µg/m³
02.03.2023	0.08	<0.5	<0.5	<0.5	0.13	25
06.03.2023	0.11	<0.5	<0.5	<0.5	0.21	21
09.03.2023	0.15	<0.5	<0.6	<0.5	0.32	22
16.03.2023	0.17	<0.5	<0.5	<0.5	0.30	22
20.03.2023	0.11	<0.5	<0.5	<0.6	0.14	23
23.03.2023	0.11	<0.5	<0.5	<0.5	0.23	26
23.06.2023	0.11	<0.5	<0.5	<0.5	0.23	26
27.03.2023	0.14	<0.5	<0.5	<0.5	0.10	20
30.03.2023	0.07	<0.5	<0.5	<0.5	0.15	21
Limits for Industrial, Residential, Rural and other Areas	1.0 24 Hrs	20 Annual	6 Annual	1 Annual	4 1 Hr	180 1 Hr

Note : * Parameters monitored for a period of 1 hr

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TEST REPORT

Table No. 8

AMBIENT AIR QUALITY

Project : Block I - Bicholim Mineral Block
Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa
Client : M/s. Vedanta Limited
Station at & Code : A8 Advalpale village
Duration : 24 Hrs
Date of Report : 10.06.2023
Reference IS 5182

Date of Sampling	Concentration					
	Sulphur Dioxide (SO_2), µg/m³	Nitrogen Dioxide (NO_2), µg/m³	PM_{10}, (µg/m³)	$PM_{2.5}$, (µg/m³)	Ammonia (NH_3), µg/m³	Benzene (C_6H_6), µg/m³
04.03.2023	6	9	38	18	<20	<1
08.03.2023	6	9	42	24	<20	<1
11.03.2023	5	13	40	21	<20	<1
15.03.2023	7	9	34	19	<20	<1
18.03.2023	4	9	37	23	<20	<1
22.03.2023	9	11	38	16	<20	<1
25.03.2023	6	9	43	23	<20	<1
29.03.2023	7	9	49	25	<20	<1
Limits for Industrial, Residential, Rural and other Areas	80 24 Hrs	80 24 Hrs	100 24 Hrs	60 24 Hrs	400 24 Hrs	5 Annual

Date of Sampling	Concentration					
	Lead (Pb), µg/m³	Nickel (Ni), ng/m³	Arsenic (As), ng/m³	Benzo(a)Pyrene (BaP), ng/m³	Carbon Monoxide* (CO), mg/m³	Ozone* (O_3), µg/m³
04.03.2023	0.08	<0.5	<0.5	<0.5	0.21	21
08.03.2023	0.05	<0.5	<0.5	<0.5	0.08	23
11.03.2023	0.11	<0.5	<0.5	<0.5	0.31	26
15.03.2023	0.07	<0.5	<0.5	<0.5	0.09	22
22.03.2023	0.05	<0.5	<0.5	<0.5	0.10	23
25.03.2023	0.11	<0.5	<0.5	<0.5	0.08	21
25.03.2023	0.11	<0.5	<0.5	<0.5	0.06	21
29.03.2023	0.06	<0.5	<0.5	<0.5	0.13	23
Limits for Industrial, Residential, Rural and other Areas	1.0 24 Hrs	20 Annual	6 Annual	1 Annual	4 1 Hr	180 1 Hr

Note : * Parameters monitored for a period of 1 hr

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TEST REPORT

Table No. 9

AMBIENT AIR QUALITY

Project	: Block II - Bicholim Mineral Block
	Bicholim, Bordem, Lanegao, Mulgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa
Client	: M/s. Vedanta Limited
Station at & Code	: A9 Latambarcem village
Duration	: 24 Hrs
Date of Report	: 10.06.2023
Reference IS 5182	

Date of Sampling	Concentration					
	Sulphur Dioxide (SO_2), µg/m³	Nitrogen Dioxide (NO_2), µg/m³	PM_{10}, (µg/m³)	$PM_{2.5}$, (µg/m³)	Ammonia (NH_3), µg/m³	Benzene (C_6H_6), µg/m³
04.03.2023	10	16	35	25	<20	<1
08.03.2023	9	15	33	19	<20	<1
11.03.2023	7	9	36	27	<20	<1
15.03.2023	8	11	34	19	<20	<1
18.03.2023	7	11	39	23	<20	<1
22.03.2023	9	11	38	20	<20	<1
25.03.2023	8	9	35	17	<20	<1
29.03.2023	7	10	46	20	<20	<1
Limits for Industrial, Residential, Rural and other Areas	80 24 Hrs	80 24 Hrs	100 24 Hrs	60 24 Hrs	400 24 Hrs	5 Annual

Date of Sampling	Concentration					
	Lead (Pb), µg/m³	Nickel (Ni), ng/m³	Arsenic (As), ng/m³	Benzo(a)Pyrene (BaP), ng/m³	Carbon Monoxide* (CO), mg/m³	Ozone* (O_3), µg/m³
04.03.2023	0.05	<0.5	<0.5	<0.5	0.15	<20
08.03.2023	0.07	<0.5	<0.5	<0.5	0.18	26
11.03.2023	0.12	<0.5	<0.5	<0.5	0.15	21
15.03.2023	0.06	<0.5	<0.5	<0.5	0.12	26
15.03.2023	0.06	<0.5	<0.5	<0.5	0.12	26
22.03.2023	0.06	<0.5	<0.5	<0.5	0.10	<20
25.03.2023	0.06	<0.5	<0.5	<0.5	0.20	23
29.03.2023	0.07	<0.5	<0.5	<0.5	0.15	26
Limits for Industrial, Residential, Rural and other Areas	1.0 24 Hrs	20 Annual	6 Annual	1 Annual	4 1 Hr	180 1 Hr

Note : * Parameters monitored for a period of 1 hr

Govt. Analyst / Authorised Signatory

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TEST REPORT

Table No. 10

AMBIENT AIR QUALITY

Project	: Block I - Bicholim Mineral Block
	Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa
Client	: M/s. Vedanta Limited
Station at & Code	: A1 Bicholim Within ML Area
Duration	: 24 Hrs
Date of Report	: 10.05.2023
Reference IS 5182	

Date of Sampling	Concentration					
	Sulphur Dioxide (SO_2), µg/m³	Nitrogen Dioxide (NO_2), µg/m³	PM_{10}, (µg/m³)	$PM_{2.5}$, (µg/m³)	Ammonia (NH_3), µg/m³	Benzene (C_6H_6), µg/m³
03.04.2023	10	16	45	22	<20	<1
06.04.2023	12	13	41	25	<20	<1
10.04.2023	13	15	37	27	<20	<1
13.04.2023	10	11	42	28	<20	<1
17.04.2023	8	10	40	25	<20	<1
20.04.2023	13	12	45	27	<20	<1
24.04.2023	6	9	33	24	<20	<1
27.04.2023	7	11	43	14	<20	<1
Limits for Industrial, Residential, Rural and other Areas	80 24 Hrs	80 24 Hrs	100 24 Hrs	60 24 Hrs	400 24 Hrs	5 Annual

Date of Sampling	Concentration					
	Lead (Pb), µg/m³	Nickel (Ni), ng/m³	Arsenic (As), ng/m³	Benzo(a)Pyrene (BaP), ng/m³	Carbon Monoxide* (CO), mg/m³	Ozone* (O_3), µg/m³
03.04.2023	0.08	<0.5	<0.5	<0.5	0.16	22
06.04.2023	0.13	<0.5	<0.5	<0.5	0.05	21
10.04.2023	0.05	<0.5	<0.5	<0.5	0.13	23
13.04.2023	0.12	<0.5	<0.5	<0.5	0.08	26
17.04.2023	0.05	<0.5	<0.5	<0.5	0.12	21
20.04.2023	0.09	<0.5	<0.5	<0.5	0.18	21
24.04.2023	0.11	<0.5	<0.5	<0.5	0.16	25
27.04.2023	0.07	<0.5	<0.5	<0.5	0.22	23
Limits for Industrial, Residential, Rural and other Areas	1.0 24 Hrs	20 Annual	6 Annual	1 Annual	4 1 Hr	180 1 Hr

Note : * Parameters monitored for a period of 1 hr

Govt. Analyst / Authorised Signatory

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TEST REPORT

Table No. 11

AMBIENT AIR QUALITY

Project	: Block I - Bicholim Mineral Block
	Bicholim, Bordem, Langao, Mulgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa
Client	: M/s. Vedanta Limited
Station at & Code	: A2 Langao village
Duration	: 24 Hrs
Date of Report	: 10.05.2023
Reference IS 5182	

Date of Sampling	Concentration					
	Sulphur Dioxide (SO_2), µg/m³	Nitrogen Dioxide (NO_2), µg/m³	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)	Ammonia (NH_3), µg/m³	Benzene (C_6H_6), µg/m³
03.04.2023	7	13	43	20	<20	<1
06.04.2023	8	10	36	20	<20	<1
10.04.2023	11	12	40	21	<20	<1
13.04.2023	10	11	42	20	<20	<1
17.04.2023	7	9	39	15	<20	<1
20.04.2023	11	13	31	20	<20	<1
24.04.2023	9	10	40	26	<20	<1
27.04.2023	10	11	39	20	<20	<1
Limits for Industrial, Residential, Rural and other Areas	80 24 Hrs	80 24 Hrs	100 24 Hrs	60 24 Hrs	400 24 Hrs	5 Annual

Date of Sampling	Concentration					
	Lead (Pb), µg/m³	Nickel (Ni), ng/m³	Arsenic (As), ng/m³	Benzo(a)Pyrene (BaP), ng/m³	Carbon Monoxide* (CO), mg/m³	Ozone* (O_3), µg/m³
03.04.2023	0.06	<0.5	<0.5	<0.5	0.16	26
06.04.2023	0.15	<0.5	<0.5	<0.5	0.24	20
10.04.2023	0.06	<0.5	<0.5	<0.5	0.16	21
13.04.2023	0.06	<0.5	<0.5	<0.5	0.27	24
17.04.2023	0.07	<0.5	<0.5	<0.5	0.11	21
20.04.2023	0.08	<0.5	<0.5	<0.5	0.16	22
24.04.2023	0.08	<0.5	<0.5	<0.5	0.18	21
27.04.2023	0.09	<0.5	<0.5	<0.5	0.19	24
Limits for Industrial, Residential, Rural and other Areas	1.0 24 Hrs	20 Annual	6 Annual	1 Annual	4 1 Hr	180 1 Hr

Note : * Parameters monitored for a period of 1 hr

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ENVIRONMENTAL LABORATORY

(UNIT OF MINERAL ENGINEERING SERVICES)

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MoEFCC(CPCB) under E(P) Act 1986 recognition valid upto 23.08.2025

ISO 45001:2018

TEST REPORT

Table No. 12

AMBIENT AIR QUALITY

Project : Block I - Bicholim Mineral Block
Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa
Client : M/s. Vedanta Limited
Station at & Code : A3 Mulgao village
Duration : 24 Hrs
Date of Report : 10.05.2023
Reference IS 5182

Date of Sampling	Concentration					
	Sulphur Dioxide (SO_2), µg/m³	Nitrogen Dioxide (NO_2), µg/m³	PM_{10}, (µg/m³)	$PM_{2.5}$, (µg/m³)	Ammonia (NH_3), µg/m³	Benzene (C_6H_6), µg/m³
04.04.2023	12	14	53	26	<20	<1
07.04.2023	10	12	40	22	<20	<1
11.04.2023	11	13	35	20	<20	<1
14.04.2023	9	11	48	24	<20	<1
18.04.2023	11	12	39	21	<20	<1
21.04.2023	9	11	59	25	<20	<1
25.04.2023	7	9	48	26	<20	<1
28.04.2023	9	11	54	28	<20	<1
Limits for Industrial, Residential, Rural and other Areas	80 24 Hrs	80 24 Hrs	100 24 Hrs	60 24 Hrs	400 24 Hrs	5 Annual

Date of Sampling	Concentration					
	Lead (Pb), µg/m³	Nickel (Ni), ng/m³	Arsenic (As), ng/m³	Benzo(a)Pyrene (BaP), ng/m³	Carbon Monoxide* (CO), mg/m³	Ozone* (O_3), µg/m³
04.04.2023	0.13	<0.5	<0.5	<0.5	0.25	28
07.04.2023	0.08	<0.5	<0.5	<0.5	0.13	25
11.04.2023	0.05	<0.5	<0.5	<0.5	0.21	27
14.04.2023	0.11	<0.5	<0.5	<0.5	0.31	25
18.04.2023	0.08	<0.5	<0.5	<0.5	0.13	23
21.04.2023	0.13	<0.5	<0.5	<0.5	0.22	20
25.04.2023	0.08	<0.5	<0.5	<0.5	0.16	25
28.04.2023	0.11	<0.5	<0.5	<0.5	0.31	21
Limits for Industrial, Residential, Rural and other Areas	1.0 24 Hrs	20 Annual	6 Annual	1 Annual	4 1 Hr	180 1 Hr

Note : * Parameters monitored for a period of 1 hr

Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
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ENVIRONMENTAL LABORATORY

(UNIT OF MINERAL ENGINEERING SERVICES)

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MoEFCC(CPCB) under E(P) Act 1986 recognition valid upto 23.05.2025

ISO 45001:2018

TEST REPORT

Table No. 14

AMBIENT AIR QUALITY

Project : Block I - Bicholim Mineral Block
Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa
Client : M/s. Vedanta Limited
Station at & Code : A5 Calvim village
Duration : 24 Hrs
Date of Report : 10.05.2023
Reference : IS 5182

Date of Sampling	Concentration					
	Sulphur Dioxide (SO_2), µg/m³	Nitrogen Dioxide (NO_2), µg/m³	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)	Ammonia (NH_3), µg/m³	Benzene (C_6H_6), µg/m³
03.04.2023	7	11	48	29	<20	<1
06.04.2023	11	16	40	19	<20	<1
10.04.2023	9	12	39	17	<20	<1
13.04.2023	7	10	38	16	<20	<1
17.04.2023	8	10	40	28	<20	<1
20.04.2023	10	11	44	25	<20	<1
24.04.2023	7	12	35	25	<20	<1
27.04.2023	12	15	31	17	<20	<1
Limits for Industrial, Residential, Rural and other Areas	50 24 Hrs	50 24 Hrs	100 24 Hrs	60 24 Hrs	400 24 Hrs	5 Annual

Date of Sampling	Concentration					
	Lead (Pb), µg/m³	Nickel (Ni), ng/m³	Arsenic (As), ng/m³	Benzo(a)Pyrene (BaP), ng/m³	Carbon Monoxide* (CO), mg/m³	Ozone* (O_3), µg/m³
03.04.2023	0.12	<0.6	<0.5	<0.5	0.11	20
06.04.2023	0.06	<0.6	<0.5	<0.5	0.13	23
10.04.2023	0.08	<0.5	<0.5	<0.5	0.14	21
13.04.2023	0.08	<0.6	<0.5	<0.5	0.24	24
17.04.2023	0.11	<0.5	<0.5	<0.5	0.11	25
20.04.2023	0.05	<0.5	<0.5	<0.5	0.19	22
24.04.2023	0.06	<0.5	<0.5	<0.5	0.11	22
27.04.2023	0.09	<0.5	<0.5	<0.5	0.24	23
Limits for Industrial, Residential, Rural and other Areas	1.0 24 Hrs	20 Annual	6 Annual	1 Annual	4 1 Hr	180 1 Hr

Note : * Parameters monitored for a period of 1 hr

Govt. Analyst / Authorised Signatory

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ISO 45001:2018

TEST REPORT

Table No. 15

AMBIENT AIR QUALITY

Project	: Block I - Bicholim Mineral Block
	Bicholim, Bordem, Langeo, Malgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa
Client	: M/s. Vedanta Limited
Station wt & Code	: A6 Pilgao
Duration	: 24 Hrs
Date of Report	: 19.06.2023
Reference	: IS 5182

Date of Sampling	Concentration					
	Sulphur Dioxide (SO_2), µg/m³	Nitrogen Dioxide (NO_2), µg/m³	PM_{10}, (µg/m³)	$PM_{2.5}$, (µg/m³)	Ammonia (NH_3), µg/m³	Benzene (C_6H_6), µg/m³
03.04.2023	7	9	42	28	<20	<1
06.04.2023	10	12	38	20	<20	<1
10.04.2023	9	11	44	21	<20	<1
13.04.2023	10	13	34	23	<20	<1
17.04.2023	8	10	41	22	<20	<1
20.04.2023	9	9	35	19	<20	<1
24.04.2023	10	11	39	26	<20	<1
27.04.2023	9	10	43	26	<20	<1
Limits for Industrial, Residential, Rural and other Areas	80 24 Hrs	80 24 Hrs	100 24 Hrs	60 24 Hrs	400 24 Hrs	5 Annual

Date of Sampling	Concentration					
	Lead (Pb), µg/m³	Nickel (Ni), ng/m³	Arsenic (As), ng/m³	Benzo(a)Pyrene (BaP), ng/m³	Carbon Monoxide* (CO), mg/m³	Ozone* (O_3), µg/m³
03.04.2023	0.05	<0.5	<0.5	<0.5	0.12	22
06.04.2023	0.11	<0.5	<0.5	<0.5	0.13	24
10.04.2023	0.15	<0.5	<0.5	<0.5	0.16	20
13.04.2023	0.05	<0.5	<0.5	<0.5	0.08	21
17.04.2023	0.08	<0.5	<0.5	<0.5	0.05	20
20.04.2023	0.11	<0.5	<0.5	<0.5	0.19	22
24.04.2023	0.06	<0.5	<0.5	<0.5	0.09	23
27.04.2023	0.13	<0.5	<0.5	<0.5	0.21	26
Limits for Industrial, Residential, Rural and other Areas	1.0 24 Hrs	20 Annual	6 Annual	1 Annual	4 1 Hr	180 1 Hr

Note : * Parameters monitored for a period of 1 hr

Govt. Analyst / Authorised Signatory

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TEST REPORT

Table No. 16

AMBIENT AIR QUALITY

Project : Block I - Bicholim Mineral Block
Bicholim, Bordem, Lamgao, Mulgao, Mayem & Shigao villages, Bicholim Taluka, North Goa
Client : M/s. Vedanta Limited
Station wt & Code : A7 Sarvona village
Duration : 24 Hrs
Date of Report : 10.06.2023
Reference IS 5182

Date of Sampling	Concentration					
	Sulphur Dioxide (SO_2), µg/m³	Nitrogen Dioxide (NO_2), µg/m³	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)	Ammonia (NH_3), µg/m³	Benzene (C_6H_6), µg/m³
03.04.2023	9	11	35	16	<20	<1
06.04.2023	6	9	42	22	<20	<1
10.04.2023	10	12	36	16	<20	<1
13.04.2023	9	11	46	26	<20	<1
17.04.2023	6	10	38	16	<20	<1
20.04.2023	7	9	41	22	<20	<1
24.04.2023	9	11	35	16	<20	<1
27.04.2023	8	9	41	23	<20	<1
Limits for Industrial, Residential, Rural and other Areas	80 24 Hrs	80 24 Hrs	100 24 Hrs	60 24 Hrs	400 24 Hrs	5 Annual

Date of Sampling	Concentration					
	Lead (Pb), µg/m³	Nickel (Ni), ng/m³	Arsenic (As), ng/m³	Benzo(a)Pyrene (BaP), ng/m³	Carbon Monoxide* (CO), mg/m³	Ozone* (O_3), µg/m³
03.04.2023	0.05	<0.5	<0.5	<0.5	0.13	22
06.04.2023	0.13	<0.5	<0.5	<0.5	0.09	24
10.04.2023	0.07	<0.5	<0.5	<0.5	0.21	21
13.04.2023	0.11	<0.5	<0.5	<0.5	0.31	22
17.04.2023	0.06	<0.5	<0.5	<0.5	0.11	20
20.04.2023	0.07	<0.5	<0.5	<0.5	0.05	21
24.04.2023	0.05	<0.5	<0.5	<0.5	0.12	23
27.04.2023	0.13	<0.5	<0.5	<0.5	0.05	21
Limits for Industrial, Residential, Rural and other Areas	1.0 24 Hrs	20 Annual	6 Annual	1 Annual	4 1 Hr	180 1 Hr

Note : * Parameters monitored for a period of 1 hr

Govt. Analyst / Authorised Signatory

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TEST REPORT

Table No. 17

AMBIENT AIR QUALITY

Project : Block I - Bicholim Mineral Block
Bicholim, Bordem, Langao, Mulgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa
Client : M/s. Vedanta Limited
Station at & Code : AS Advalpale village
Duration : 24 Hrs
Date of Report : 19.06.2023
Reference : IS 5182

Date of Sampling	Concentration					
	Sulphur Dioxide (SO_2), µg/m³	Nitrogen Dioxide (NO_2), µg/m³	PM_{10}, (µg/m³)	$PM_{2.5}$, (µg/m³)	Ammonia (NH_3), µg/m³	Benzene (C_6H_6), µg/m³
01.04.2023	7	10	40	24	<20	<1
05.04.2023	9	12	42	22	<20	<1
08.04.2023	6	9	40	26	<20	<1
12.04.2023	8	10	38	19	<20	<1
15.04.2023	9	11	36	16	<20	<1
19.04.2023	7	9	41	26	<20	<1
21.04.2023	9	10	33	18	<20	<1
26.04.2023	6	12	39	19	<20	<1
29.04.2023	<4	11	42	23	<20	<1
Limits for Industrial, Residential, Rural and other Areas	80 24 Hrs	80 24 Hrs	100 24 Hrs	60 24 Hrs	400 24 Hrs	5 Annual

Date of Sampling	Concentration					
	Lead (Pb), µg/m³	Nickel (Ni), ng/m³	Arsenic (As), ng/m³	Benzo(a)Pyrene (BaP), ng/m³	Carbon Monoxide* (CO), mg/m³	Ozone* (O_3), µg/m³
01.04.2023	0.05	<0.5	<0.5	<0.5	0.21	22
05.04.2023	0.11	<0.5	<0.5	<0.5	0.13	27
08.04.2023	0.06	<0.5	<0.5	<0.5	0.22	20
12.04.2023	0.15	<0.5	<0.5	<0.5	0.11	21
15.04.2023	0.07	<0.5	<0.5	<0.5	0.05	21
19.04.2023	0.09	<0.5	<0.5	<0.5	0.12	22
21.04.2023	0.05	<0.5	<0.5	<0.5	0.11	23
26.04.2023	0.07	<0.5	<0.5	<0.5	0.28	24
29.04.2023	0.05	<0.5	<0.5	<0.5	0.24	20
Limits for Industrial, Residential, Rural and other Areas	1.0 24 Hrs	20 Annual	6 Annual	1 Annual	4 1 Hr	180 1 Hr

Note : * Parameters monitored for a period of 1 hr

Govt. Analyst / Authorised Signatory

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TEST REPORT

Table No. 18

AMBIENT AIR QUALITY

Project	: Block I - Bicholim Mineral Block
	Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa
Client	: M/s. Vedanta Limited
Station at & Code	: AP Latambarcem village
Duration	: 24 Hrs
Date of Report	: 18.06.2023
Reference	IS 5182

Date of Sampling	Concentration					
	Sulphur Dioxide (SO_2), µg/m³	Nitrogen Dioxide (NO_2), µg/m³	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)	Ammonia (NH_3), µg/m³	Benzene (C_6H_6), µg/m³
01.04.2023	8	9	38	25	<20	<1
05.04.2023	7	10	40	29	<20	<1
08.04.2023	9	12	40	22	<20	<1
12.04.2023	7	9	36	17	<20	<1
15.04.2023	7	10	49	30	<20	<1
19.04.2023	8	9	50	27	<20	<1
21.04.2023	8	12	44	30	<20	<1
26.04.2023	6	13	48	27	<20	<1
29.04.2023	10	12	43	22	<20	<1
Limits for Industrial, Residential, Rural and other Areas	80 24 Hrs	80 24 Hrs	100 24 Hrs	60 24 Hrs	400 24 Hrs	5 Annual

Date of Sampling	Concentration					
	Lead (Pb), µg/m³	Nickel (Ni), µg/m³	Arsenic (As), ng/m³	Benzo(a)Pyrene (BaP), ng/m³	Carbon Monoxide* (CO), mg/m³	Ozone* (O_3), µg/m³
01.04.2023	0.08	<0.5	<0.5	<0.5	0.17	26
05.04.2023	0.06	<0.5	<0.5	<0.5	0.22	21
08.04.2023	0.15	<0.5	<0.5	<0.5	0.05	24
12.04.2023	0.06	<0.5	<0.5	<0.5	0.16	22
15.04.2023	0.06	<0.5	<0.5	<0.5	0.16	25
19.04.2023	0.05	<0.5	<0.5	<0.5	0.23	23
21.04.2023	0.16	<0.5	<0.5	<0.5	0.15	20
26.04.2023	0.08	<0.5	<0.5	<0.5	0.14	22
29.04.2023	0.09	<0.5	<0.5	<0.5	0.26	24
Limits for Industrial, Residential, Rural and other Areas	1.0 24 Hrs	20 Annual	6 Annual	1 Annual	4 1 Hr	180 1 Hr

Note : *Parameters monitored for a period of 1 hr

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ISO 45001:2018

TEST REPORT

Table No. 19

AMBIENT AIR QUALITY

Project	: Block I - Bicholim Mineral Block
	Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa
Client	: M/s. Vedanta Limited
Station at & Code	: A1 Bicholim Within ML Area
Duration	: 24 Hrs
Date of Report	: 10.06.2023
Reference	IS 5182

Date of Sampling	Concentration					
	Sulphur Dioxide (SO_2), µg/m³	Nitrogen Dioxide (NO_2), µg/m³	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)	Ammonia (NH_3), µg/m³	Benzene (C_6H_6), µg/m³
01.05.2023	8	13	53	33	<20	<1
04.05.2023	9	10	49	28	<20	<1
08.05.2023	8	12	27	15	<20	<1
11.05.2023	9	11	39	22	<20	<1
15.05.2023	11	14	46	20	<20	<1
18.05.2023	8	10	51	25	<20	<1
22.05.2023	10	12	43	27	<20	<1
25.05.2023	7	11	43	25	<20	<1
29.05.2023	11	14	42	23	<20	<1
Limits for Industrial, Residential, Rural and other Areas	80 24 Hrs	80 24 Hrs	100 24 Hrs	60 24 Hrs	400 24 Hrs	5 Annual

Date of Sampling	Concentration					
	Lead (Pb), µg/m³	Nickel (Ni), ng/m³	Arsenic (As), ng/m³	Benzo(a)Pyrene (BaP), ng/m³	Carbon Monoxide* (CO), mg/m³	Ozone* (O_3), µg/m³
01.05.2023	0.16	<0.5	<0.5	<0.5	0.27	22
04.05.2023	0.22	<0.5	<0.5	<0.5	0.28	26
08.05.2023	0.16	<0.5	<0.5	<0.5	0.33	24
11.05.2023	0.14	<0.5	<0.5	<0.5	0.22	23
15.05.2023	0.22	<0.5	<0.5	<0.5	0.44	27
18.05.2023	0.16	<0.5	<0.5	<0.5	0.29	20
22.05.2023	0.14	<0.5	<0.5	<0.5	0.33	23
25.05.2023	0.13	<0.5	<0.5	<0.5	0.27	25
29.05.2023	0.22	<0.5	<0.5	<0.5	0.28	25
Limits for Industrial, Residential, Rural and other Areas	1.0 24 Hrs	20 Annual	6 Annual	1 Annual	4 1 Hr	180 1 Hr

Note : * Parameters monitored for a period of 1 hr

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ISO 45001:2018

TEST REPORT

Table No. 20

AMBIENT AIR QUALITY

Project	: Block I - Bicholim Mineral Block
	Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa
Client	: M/s. Vedanta Limited
Station at & Code	: A2 Lamgao village
Duration	: 24 Hrs
Date of Report	: 10.06.2023
Reference IS 5182	

Date of Sampling	Concentration					
	Sulphur Dioxide (SO_2), µg/m³	Nitrogen Dioxide (NO_2), µg/m³	PM_{10}, (µg/m³)	$PM_{2.5}$, (µg/m³)	Ammonia (NH_3), µg/m³	Benzene (C_6H_6), µg/m³
01.05.2023	11	12	41	23	<20	<1
04.05.2023	8	11	43	27	<20	<1
08.05.2023	10	13	36	22	<20	<1
11.05.2023	7	9	39	20	<20	<1
15.05.2023	10	11	42	21	<20	<1
18.05.2023	8	10	38	25	<20	<1
22.05.2023	7	12	30	18	<20	<1
25.05.2023	10	10	36	20	<20	<1
29.05.2023	9	14	39	20	<20	<1
Limits for Industrial, Residential, Rural and other Areas	50 24 Hrs	80 24 Hrs	100 24 Hrs	60 24 Hrs	400 24 Hrs	5 Annual

Date of Sampling	Concentration					
	Lead (Pb), µg/m³	Nickel (Ni), ng/m³	Arsenic (As), ng/m³	Benzo(a)Pyrene (BaP), ng/m³	Carbon Monoxide* (CO), mg/m³	Ozone* (O_3), µg/m³
01.05.2023	0.22	<0.5	<0.5	<0.5	0.16	26
04.05.2023	0.23	<0.5	<0.5	<0.5	0.22	22
08.05.2023	0.18	<0.5	<0.5	<0.5	0.17	28
11.05.2023	0.24	<0.5	<0.5	<0.5	0.22	26
15.05.2023	0.23	<0.5	<0.5	<0.5	0.32	22
18.05.2023	0.16	<0.5	<0.5	<0.5	0.19	24
22.05.2023	0.24	<0.5	<0.5	<0.5	0.24	28
25.05.2023	0.22	<0.5	<0.5	<0.5	0.31	26
29.05.2023	0.16	<0.5	<0.5	<0.5	0.27	27
Limits for Industrial, Residential, Rural and other Areas	1.0 24 Hrs	20 Annual	6 Annual	1 Annual	4 1 Hr	180 1 Hr

Note : * Parameters monitored for a period of 1 hr

Govt. Analyst / Authorised Signatory

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Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesbng@gmail.com, www.envtest.in

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ENVIRONMENTAL LABORATORY

(UNIT OF MINERAL ENGINEERING SERVICES)

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ISO 45001:2018

TEST REPORT

Table No. 21

AMBIENT AIR QUALITY

Project	: Block I - Bicholim Mineral Block
	Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa
Client	: M/s. Vedanta Limited
Station at & Code	: A3 Mulgao village
Duration	: 24 Hrs
Date of Report	: 19.06.2023
Reference	: IS 5182

Date of Sampling	Concentration					
	Sulphur Dioxide (SO_2), µg/m³	Nitrogen Dioxide (NO_2), µg/m³	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)	Ammonia (NH_3), µg/m³	Benzene (C_6H_6), µg/m³
02.05.2023	11	13	56	29	<20	<1
05.05.2023	8	11	53	27	<20	<1
09.05.2023	10	14	47	31	<20	<1
12.05.2023	12	13	37	19	<20	<1
16.05.2023	10	14	53	28	<20	<1
19.05.2023	9	13	48	25	<20	<1
23.05.2023	11	11	40	26	<20	<1
26.05.2023	7	11	43	34	<20	<1
30.05.2023	10	12	42	18	<20	<1
Limits for Industrial, Residential, Rural and other Areas	50 24 Hrs	50 24 Hrs	100 24 Hrs	60 24 Hrs	400 24 Hrs	5 Annual

Date of Sampling	Concentration					
	Lead (Pb), µg/m³	Nickel (Ni), ng/m³	Arsenic (As), ng/m³	Benzo(a)Pyrene (BaP), ng/m³	Carbon Monoxide* (CO), mg/m³	Ozone* (O_3), µg/m³
02.05.2023	0.18	<0.5	<0.5	<0.5	0.33	22
05.05.2023	0.13	<0.5	<0.5	<0.5	0.26	29
09.05.2023	0.22	<0.5	<0.5	<0.5	0.44	27
12.05.2023	0.22	<0.5	<0.5	<0.5	0.35	28
16.05.2023	0.18	<0.5	<0.5	<0.5	0.19	26
19.05.2023	0.15	<0.5	<0.5	<0.5	0.25	24
23.05.2023	0.22	<0.5	<0.5	<0.5	0.16	21
26.05.2023	0.16	<0.5	<0.5	<0.5	0.17	22
30.05.2023	0.11	<0.5	<0.5	<0.5	0.16	26
Limits for Industrial, Residential, Rural and other Areas	1.0 24 Hrs	20 Annual	6 Annual	1 Annual	4 1 Hr	180 1 Hr

Note : * Parameters monitored for a period of 1 hr

Govt. Analyst / Authorised Signatory

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ENVIRONMENTAL LABORATORY

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ISO 45001:2018

TEST REPORT

Table No. 22

AMBIENT AIR QUALITY

Project : Block I - Bicholim Mineral Block
Bicholim, Bordem, Lamgao, Mulgao, Mayem & Shigao villages, Bicholim Taluka, North Goa
Client : M/s. Vedanta Limited
Station at & Code : A4 Sircaim village
Duration : 24 Hrs
Date of Report : 16.06.2023
Reference : JS:5182

Date of Sampling	Concentration					
	Sulphur Dioxide (SO_2), µg/m³	Nitrogen Dioxide (NO_2), µg/m³	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)	Ammonia (NH_3), µg/m³	Benzene (C_6H_6), µg/m³
02.05.2023	8	13	46	25	<20	<1
05.05.2023	11	14	38	15	<20	<1
09.05.2023	8	12	45	29	<20	<1
12.05.2023	12	13	46	30	<20	<1
16.05.2023	8	12	30	19	<20	<1
19.05.2023	6	9	49	20	<20	<1
23.05.2023	8	12	36	27	<20	<1
26.05.2023	11	13	48	29	<20	<1
30.05.2023	7	10	50	30	<20	<1
Limits for Industrial, Residential, Rural and other Areas	80 24 Hrs	80 24 Hrs	100 24 Hrs	60 24 Hrs	400 24 Hrs	5 Annual

Date of Sampling	Concentration					
	Lead (Pb), µg/m³	Nickel (Ni), ng/m³	Arsenic (As), ng/m³	Benzo(a)Pyrene (BaP), ng/m³	Carbon Monoxide* (CO), mg/m³	Ozone* (O_3), µg/m³
02.05.2023	0.09	<0.5	<0.5	<0.5	0.07	23
05.05.2023	0.05	<0.5	<0.5	<0.5	0.24	23
09.05.2023	0.11	<0.5	<0.5	<0.5	0.12	23
12.05.2023	0.09	<0.5	<0.5	<0.5	0.14	20
16.05.2023	0.13	<0.5	<0.5	<0.5	0.21	20
19.05.2023	0.09	<0.5	<0.5	<0.5	0.11	21
23.05.2023	0.15	<0.5	<0.5	<0.5	0.16	22
26.05.2023	0.11	<0.5	<0.5	<0.5	0.22	26
30.05.2023	0.06	<0.5	<0.5	<0.5	0.30	20
Limits for Industrial, Residential, Rural and other Areas	1.0 24 Hrs	20 Annual	6 Annual	1 Annual	4 1 Hr	180 1 Hr

Note : * Parameters monitored for a period of 1 hr

Govt. Analyst / Authorised Signatory

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ISO 45001:2018

TEST REPORT

Table No. 23

AMBIENT AIR QUALITY

Project	: Block I - Bicholim Mineral Block
	Bicholim, Bordem, Langao, Molgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa
Client	: M/s. Vedanta Limited
Station at & Code	: A5 Galvim village
Duration	: 24 Hrs
Date of Report	: 10.05.2023
Reference IS 5182	

Date of Sampling	Concentration					
	Sulphur Dioxide (SO_2), µg/m³	Nitrogen Dioxide (NO_2), µg/m³	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)	Ammonia (NH_3), µg/m³	Benzene (C_6H_6), µg/m³
01.05.2023	8	13	39	16	<20	<1
04.05.2023	11	10	36	27	<20	<1
08.05.2023	10	11	44	25	<20	<1
11.05.2023	11	17	42	22	<20	<1
15.05.2023	8	15	48	24	<20	<1
18.05.2023	10	13	38	17	<20	<1
22.05.2023	8	12	43	25	<20	<1
25.05.2023	11	12	41	28	<20	<1
29.05.2023	7	10	39	21	<20	<1
Limits for Industrial, Residential, Rural and other Areas	80 24 Hrs	80 24 Hrs	100 24 Hrs	60 24 Hrs	400 24 Hrs	5 Annual

Date of Sampling	Concentration					
	Lead (Pb), µg/m³	Nickel (Ni), ng/m³	Arsenic (As), ng/m³	Benzo(a)Pyrene (BaP), ng/m³	Carbon Monoxide* (CO), mg/m³	Ozone* (O_3), µg/m³
01.05.2023	0.14	<0.5	<0.5	<0.5	0.34	26
04.05.2023	0.13	<0.5	<0.5	<0.5	0.29	27
08.05.2023	0.22	<0.5	<0.5	<0.5	0.44	28
11.05.2023	0.16	<0.5	<0.5	<0.5	0.29	24
15.05.2023	0.17	<0.5	<0.5	<0.5	0.36	22
18.05.2023	0.15	<0.5	<0.5	<0.5	0.44	29
22.05.2023	0.13	<0.5	<0.5	<0.5	0.25	23
25.05.2023	0.22	<0.5	<0.5	<0.5	0.18	24
29.05.2023	0.18	<0.5	<0.5	<0.5	0.22	22
Limits for Industrial, Residential, Rural and other Areas	1.0 24 Hrs	20 Annual	6 Annual	1 Annual	4 1 Hr	180 1 Hr

Note : * Parameters monitored for a period of 8 hr

Govt. Analyst / Authorised Signatory

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TEST REPORT

Table No. 24

AMBIENT AIR QUALITY

Project	: Block I - Bicholim Mineral Block
	Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa
Client	: M/s. Vedanta Limited
Station at & Code	: A8 Pilgao
Duration	: 24 Hrs
Date of Report	: 10.06.2023
Reference	IS 5182

Date of Sampling	Concentration					
	Sulphur Dioxide (SO_2), µg/m³	Nitrogen Dioxide (NO_2), µg/m³	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)	Ammonia (NH_3), µg/m³	Benzene (C_6H_6), µg/m³
01.05.2023	11	10	37	19	<20	<1
04.05.2023	9	13	41	26	<20	<1
08.05.2023	10	11	40	22	<20	<1
11.05.2023	7	14	43	29	<20	<1
15.05.2023	8	12	35	25	<20	<1
18.05.2023	12	13	40	24	<20	<1
22.05.2023	11	15	37	19	<20	<1
25.05.2023	9	14	37	18	<20	<1
29.05.2023	10	11	40	25	<20	<1
Limits for Industrial, Residential, Rural and other Areas	80 24 Hrs	80 24 Hrs	100 24 Hrs	60 24 Hrs	400 24 Hrs	5 Annual

Date of Sampling	Concentration					
	Lead (Pb), µg/m³	Nickel (Ni), ng/m³	Arsenic (As), ng/m³	Benzo(a)Pyrene (BaP), ng/m³	Carbon Monoxide* (CO), mg/m³	Ozone* (O_3), µg/m³
01.05.2023	0.17	<0.5	<0.5	<0.5	0.34	20
04.05.2023	0.11	<0.5	<0.5	<0.5	0.33	22
08.05.2023	0.15	<0.5	<0.5	<0.5	0.28	23
11.05.2023	0.22	<0.5	<0.5	<0.5	0.24	24
15.05.2023	0.16	<0.5	<0.5	<0.5	0.18	22
18.05.2023	0.17	<0.5	<0.5	<0.5	0.22	27
22.05.2023	0.16	<0.5	<0.5	<0.5	0.33	23
25.05.2023	0.22	<0.5	<0.5	<0.5	0.17	21
29.05.2023	0.14	<0.5	<0.5	<0.5	0.16	22
Limits for Industrial, Residential, Rural and other Areas	1.0 24 Hrs	20 Annual	6 Annual	1 Annual	4 1 Hr	180 1 Hr

Note : * Parameters monitored for a period of 1 hr

Govt. Analyst / Authorised Signatory

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TEST REPORT

Table No. 25

AMBIENT AIR QUALITY

Project	: Block I - Bicholim Mineral Block
	Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa
Client	: M/s. Vedanta Limited
Station at & Code	: A7 Sarvona village
Duration	: 24 Hrs
Date of Report	: 19.06.2023
Reference	: 8 5182

Date of Sampling	Concentration					
	Sulphur Dioxide (SO_2), µg/m³	Nitrogen Dioxide (NO_2), µg/m³	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)	Ammonia (NH_3), µg/m³	Benzene (C_6H_6), µg/m³
01.05.2023	8	9	51	18	<20	<1
04.05.2023	6	9	45	27	<20	<1
08.05.2023	10	12	43	22	<20	<1
11.05.2023	7	10	45	25	<20	<1
15.05.2023	11	13	49	17	<20	<1
18.05.2023	8	17	47	26	<20	<1
22.05.2023	11	15	35	15	<20	<1
25.05.2023	7	12	49	31	<20	<1
29.05.2023	10	14	42	28	<20	<1
Limits for Industrial, Residential, Rural and other Areas	80 24 Hrs	80 24 Hrs	100 24 Hrs	60 24 Hrs	400 24 Hrs	5 Annual

Date of Sampling	Concentration					
	Lead (Pb), µg/m³	Nickel (Ni), ng/m³	Arsenic (As), ng/m³	Benzo(a)Pyrene (BaP), ng/m³	Carbon Monoxide* (CO), mg/m³	Ozone* (O_3), µg/m³
01.05.2023	0.11	<0.5	<0.5	<0.5	0.22	26
04.05.2023	0.08	<0.5	<0.5	<0.5	0.15	28
08.05.2023	0.06	<0.5	<0.5	<0.5	0.19	22
11.05.2023	0.11	<0.5	<0.5	<0.5	0.23	26
15.05.2023	0.07	<0.5	<0.5	<0.5	0.22	24
18.05.2023	0.05	<0.5	<0.5	<0.5	0.10	23
22.05.2023	0.09	<0.5	<0.5	<0.5	0.30	21
25.05.2023	0.12	<0.5	<0.5	<0.5	0.08	22
29.05.2023	0.13	<0.5	<0.5	<0.5	0.11	20
Limits for Industrial, Residential, Rural and other Areas	1.0 24 Hrs	20 Annual	6 Annual	1 Annual	4 1 Hr	180 1 Hr

Note : * Parameters monitored for a period of 1 hr

Govt. Analyst / Authorised Signatory

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TEST REPORT

Table No. 26

AMBIENT AIR QUALITY

Project : Block I - Bicholim Mineral Block
Bicholim, Bordem, Lamgao, Molgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa
Client : M/s. Vedanta Limited
Station at & Code : AS Advalpale village
Duration : 24 Hrs
Date of Report : 10.06.2023
Reference IS 5182

Date of Sampling	Concentration					
	Sulphur Dioxide (SO_2), µg/m³	Nitrogen Dioxide (NO_2), µg/m³	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)	Ammonia (NH_3), µg/m³	Benzene (C_6H_6), µg/m³
03.05.2023	6	11	39	19	<20	<1
06.05.2023	8	13	48	26	<20	<1
10.05.2023	6	12	45	25	<20	<1
13.05.2023	7	9	47	29	<20	<1
17.05.2023	8	14	40	22	<20	<1
20.05.2023	6	9	44	22	<20	<1
24.05.2023	7	13	38	26	<20	<1
27.05.2023	8	11	54	27	<20	<1
31.05.2023	6	12	36	20	<20	<1
Limits for Industrial, Residential, Rural and other Areas	80 24 Hrs	80 24 Hrs	100 24 Hrs	60 24 Hrs	400 24 Hrs	5 Annual

Date of Sampling	Concentration					
	Lead (Pb), µg/m³	Nickel (Ni), ng/m³	Arsenic (As), ng/m³	Benzo(a)Pyrene (BaP), ng/m³	Carbon Monoxide* (CO), mg/m³	Ozone* (O_3), µg/m³
03.05.2023	0.06	<0.5	<0.5	<0.5	0.15	21
06.05.2023	0.16	<0.5	<0.5	<0.5	0.08	20
10.05.2023	0.12	<0.5	<0.5	<0.5	0.14	22
13.05.2023	0.12	<0.5	<0.5	<0.5	0.23	22
17.05.2023	0.25	<0.5	<0.5	<0.5	0.32	24
20.05.2023	0.16	<0.5	<0.5	<0.5	0.11	24
24.05.2023	0.17	<0.5	<0.5	<0.5	0.21	<20
27.05.2023	0.09	<0.5	<0.5	<0.5	0.30	21
31.05.2023	0.05	<0.5	<0.5	<0.5	0.15	<20
Limits for Industrial, Residential, Rural and other Areas	1.0 24 Hrs	20 Annual	6 Annual	1 Annual	4 1 Hr	180 1 Hr

Note : * Parameters monitored for a period of 8 hr

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ISO 45001:2018

TEST REPORT

Table No. 27

AMBIENT AIR QUALITY

Project : Block I - Bicholim Mineral Block
Bicholim, Bordem, Langao, Mulgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa
Client : M/s. Vedanta Limited
Station at & Code : A9 Lalambercem village
Duration : 24 Hrs
Date of Report : 10.06.2023
Reference IS 5182

Date of Sampling	Concentration					
	Sulphur Dioxide (SO_2), µg/m³	Nitrogen Dioxide (NO_2), µg/m³	PM_{10}, (µg/m³)	$PM_{2.5}$, (µg/m³)	Ammonia (NH_3), µg/m³	Benzene (C_6H_6), µg/m³
06.05.2023	6	9	40	20	<20	<1
10.05.2023	8	11	39	20	<20	<1
13.05.2023	7	10	36	19	<20	<1
17.05.2023	7	10	38	27	<20	<1
20.05.2023	6	9	35	18	<20	<1
24.05.2023	7	10	36	21	<20	<1
27.05.2023	5	10	40	22	<20	<1
31.05.2023	9	10	45	24	<20	<1
Limits for Industrial, Residential, Rural and other Areas	80 24 Hrs	80 24 Hrs	100 24 Hrs	60 24 Hrs	400 24 Hrs	5 Annual

Date of Sampling	Concentration					
	Lead (Pb), µg/m³	Nickel (Ni), ng/m³	Arsenic (As), ng/m³	Benzo(a)Pyrene (BaP), ng/m³	Carbon Monoxide* (CO), mg/m³	Ozone* (O_3), µg/m³
06.05.2023	0.08	<0.5	<0.5	<0.5	0.07	21
10.05.2023	0.09	<0.5	<0.5	<0.5	0.33	26
13.05.2023	0.15	<0.5	<0.5	<0.5	0.27	27
17.05.2023	0.22	<0.5	<0.5	<0.5	0.36	26
20.05.2023	0.16	<0.5	<0.5	<0.5	0.25	28
24.05.2023	0.22	<0.5	<0.5	<0.5	0.31	27
27.05.2023	0.14	<0.5	<0.5	<0.5	0.28	22
31.05.2023	0.11	<0.5	<0.5	<0.5	0.31	29
Limits for Industrial, Residential, Rural and other Areas	1.0 24 Hrs	20 Annual	6 Annual	1 Annual	4 1 Hr	180 1 Hr

Note : * Parameters monitored for a period of 1 hr

Govt. Analyst / Authorised Signatory

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TEST REPORT

Table No. 28

STATISTICAL AMBIENT AIR QUALITY DATA

Project : Block I - Bicholim Mineral Block
Bicholim, Bordem, Lamgao, Malgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa
Client : Vedanta Limited
Season : Summer, 2023 (March to May, 2023)

Station Code : A1 Bicholim Village (500m ML Area					A2 Lamgao village				A3 Malgao village			
	SO_2	NO_2	PM_{10}	$PM_{2.5}$	SO_2	NO_2	PM_{10}	$PM_{2.5}$	SO_2	NO_2	PM_{10}	$PM_{2.5}$
Min.	6	<9	27	14	6	9	30	15	7	9	35	18
10%	7	10	36	18	7	9	33	18	8	11	38	20
25%	8	11	39	22	8	10	36	20	9	11	40	23
50%	9	11	42	25	9	11	39	20	10	13	46	26
75%	10	13	45	27	10	13	41	23	11	14	52	26
98%	13	16	52	35	11	16	43	27	13	17	55	33
Max.	13	16	53	36	11	17	43	27	13	18	56	34
Avg.	9	12	42	24	9	12	38	21	10	13	46	25
SD	2	2	6	5	2	2	4	3	2	2	6	4
No. of obs	26				26				26			

Station Code : A4 Sircaim village					A5 Canvim village				A6 Pilgao village			
	SO_2	NO_2	PM_{10}	$PM_{2.5}$	SO_2	NO_2	PM_{10}	$PM_{2.5}$	SO_2	NO_2	PM_{10}	$PM_{2.5}$
Min.	8	9	30	15	6	<9	29	15	6	8	34	18
10%	7	9	34	19	7	10	30	16	8	9	35	19
25%	8	10	40	21	7	11	35	17	8	10	37	21
50%	9	12	46	24	9	12	38	20	9	12	40	24
75%	10	13	49	26	11	13	41	25	10	13	43	26
98%	12	15	53	31	12	17	47	29	13	15	48	29
Max.	12	16	53	31	12	17	48	29	13	15	48	29
Avg.	9	12	44	24	9	12	38	21	9	11	40	23
SD	2	2	7	4	2	2	5	4	2	3	4	3
No. of obs	26				26				26			

Station Code : A7 Sarvona village					A8 Advalpale village				A9 Latambarcem village			
	SO_2	NO_2	PM_{10}	$PM_{2.5}$	SO_2	NO_2	PM_{10}	$PM_{2.5}$	SO_2	NO_2	PM_{10}	$PM_{2.5}$
Min.	6	9	30	15	<4	9	33	16	5	9	34	17
10%	6	9	35	16	6	9	36	18	6	9	35	19
25%	7	10	37	18	6	9	38	19	7	9	37	20
50%	9	12	43	22	7	11	40	23	7	10	39	22
75%	11	13	46	25	8	12	43	25	8	11	44	27
98%	13	16	50	34	9	14	52	28	10	16	50	30
Max.	13	16	51	36	9	14	54	29	10	16	50	30
Avg.	9	12	42	22	7	11	41	22	8	11	40	23
SD	2	3	6	5	1	2	5	3	1	2	5	4
No. of obs	26				26				26			

Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesbng@gmail.com, www.envtest.in

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ISO 45001:2018

TEST REPORT

Table No. 29

Analysis Report of Free Silica (Quartz) in Core Zone

Project : Block I - Bicholim Mineral Block Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa

Client : Vedanta Limited

Date of Report : 24.02.20223

Test Method Reference : NIOSH 7601

Sl No.	Location	Date of Sampling	Free Silica Content (%)	Free Silica Limits (%)
1	Bicholim Within ML Area	01.05.2023	ND	5
2	Lamgao village	04.05.2023	ND	5
3	Mulgao village	09.05.2023	ND	5
4	Sircaim village	12.05.2023	ND	6
5	Calvim village	15.05.2023	ND	5
6	Pilgao	18.05.2023	ND	5
7	Sarvona village	26.05.2023	ND	6
8	Advalpale village	10.05.2023	ND	5
9	Latambercem village	24.05.2023	ND	5

Note: ND-Not Detected, Detection Level : 0.0005%

Govt. Analyst / Authorised Signatory

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Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesbng@gmail.com, www.envtest.in

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ISO 45001:2018

TEST REPORT

Table No 30

NOISE LEVEL DATA

Project : Block I - Bicholim Mineral Block Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa

Client : Vedanta Limited

Season : Summer, 2023

Date of Report : 06.06.2023

Code No.	Date of Monitoring	Monitoring stations	Area	Day			Night		
				L_{min}	L_{eq}	L_{max}	L_{min}	L_{eq}	L_{max}
N1	03.04.2023	Bicholim Village (500m ML Area)	Industrial areas	42.2	61.7	68.3	37.6	49.3	55.6
N2	06.04.2023	Lamgao village	Residential area	38.9	48.3	55.6	34.0	35.9	38.0
N3	10.04.2023	Mulgao village	Commerecial area	50.5	61.2	67.5	34.8	39.6	43.5
N4	13.04.2023	Sircaim village	Residential area	41.6	50.4	53.8	34.8	40.0	44.5
N5	17.04.2023	Calvim village	Residential area	37.0	46.0	52.6	34.6	39.0	42.0
N6	04.04.2023	Sirigao village	Residential area	37.6	46.3	54.0	34.9	44.9	53.6
N7	07.04.2023	Sarvona village	Residential area	37.0	46.2	49.6	34.8	38.1	40.8
N8	08.04.2023	Advalpale village	Residential area	36.0	43.1	45.8	35.0	38.1	41.8
N9	12.04.2023	Latambercem village	Residential area	36.5	43.1	46.6	34.6	37.3	39.6

Permissible Limits of Ambient Noise Levels as per CPCB Guidelines

	Leq. Limit dB(A)	
	Day	Night
Industrial areas	75	70
Commerecial area	65	55
Residential area	55	45
Silence area	50	40

Govt. Analyst / Authorised Signatory

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Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesbng@gmail.com, www.envtest.in

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Table No. 31

SURFACE WATER TEST REPORT

Format No. : 10/Rev 06

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TEST REPORT

Issued To: Vedanta Ltd
Block-I Bicholim Mineral Block, Bicholim, Bardem, Lamgao,
Mulgao & Sirigao Village, Bicholim Taluk,
North Goa-Goa

Report No.: ED0039923061
Issue Date : 10/06/2023
Your ref. : LETTER
Ref.Date : 29/05/2023

Sample collected by : Environmental Laboratory Representative
Date of sample collection : 29/05/2023
Particulars of sample collected : SW1-Confluence of Valvot & Bicholim River
Date of sample receipt : 03/06/2023
Lab Code : ED/23/06/1-0039
Sample quantity : 5 Ltrs
Date of Commencement of testing : 03/06/2023
Date of Completion of testing : 10/06/2023
Condition of the sample : Satisfactory
Sampling Type : Grab

TEST RESULTS

Sl. No.	Test Parameters	Results	Limits as per Class C Norms Stream Water (IS 2296)	Test Methods
1	Color, Hazen Units	5.0	300	IS:3025 (P 4) 2021
2	pH	6.35	6.5 to 8.5	IS:3025 (P 11) 2022
3	Dissolved Oxygen as O2,mg/l	6.2	Min 4	IS:3025 (P 38) 1989 RA 2019
4	Oil and Grease, mg/l	<0.5	1	IS:3025 (P 39) 2021
5	Total Dissolved Solids, mg/l	11240.0	1500	IS:3025 (P 16) 2023
6	Total Suspended Solids, mg/l	12	--	IS:3025 (P 17) 2017
7	Nitrate as NO3, mg/l	12.6	50	IS:3025 (P 34) 1988 RA 2019
8	Anionic Detergents as MBAS, mg/l	<0.1	1.0	IS:3025 (P 68)
9	Total Hardness as CaCO3, mg/l	1400	--	IS:3025 (P 21) 2014
10	Copper as Cu, mg/l	<0.005	1.5	IS:3025 (P 2) 2019
11	Chloride as Cl, mg/l	5920.0	600	IS:3025 (P 32) :1988 RA 2019
12	Fluoride as F, mg/l	<0.1	1.5	APHA 23rd Edition 4500F
13	Iron as Fe, mg/l	<0.005	50	IS:3025 (P 2) 2019
14	Phenolic Compounds as C6H5OH, mg/l	<0.001	0.005	Is:3025 (p 43) Sec 1 2022
15	Selenium as Se, mg/l	<0.005	0.05	IS:3025 (P 2) 2019
16	Sulphate as SO4, mg/l	640.0	400	IS:3025 (P 24) Sec 1 2022
17	Zinc as Zn, mg/l	<0.005	15	IS:3025 (P 2) 2019
18	Cadmium as Cd, mg/l	<0.001	0.001	IS:3025 (P 2) 2019
19	Cyanide as CN,mg/l	<0.01	0.05	IS:3025 (P 27) Sec 1 2021
20	Lead as Pb, mg/l	<0.005	0.1	IS:3025 (P 2) 2019
21	Total Arsenic as As, mg/l	<0.002	0.2	IS:3025 (P 2) 2019

ARSHIA KOUSAR
Dy. Chief Chemical
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesbng@gmail.com, www.envtest.in

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TEST REPORT

Report No. ED003923061 Report Issued Date: 10/08/2023

TEST RESULTS

Sl. No.	Test Parameters	Results	Limits as per Class C Norms Stream Water (IS 2296)	Test Methods
22	Hexavalent Chromium as Cr+6, mg/l	<0.03	0.05	IS:3025 (P 52) 2014
23	Bio Chemical Oxygen Demand as O2 (3days @ 27° Med), mg/l	<3	3	IS:3025 (P 44):2014
24	Chemical Oxygen Demand as O2 mg/l	28	—	IS:3025 (P 58) 2017
25	Total Coliforms/100ml	84	5000	IS:1622:1981

END OF REPORT

ARSHIYA KOUSAR
By T.V. Chemical
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesbng@gmail.com, www.envtest.in

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TEST REPORT

Issued To: Vedanta Ltd
Block-I Bicholim Mineral Block, Bicholim, Bardem, Lamgao, Mulgao & Sirigao Village, Bicholim Taluk, North Goa-Goa

Report No. : EDD04023061
Issue Date : 10/06/2023
Your ref. : LETTER
Ref.Date : 29/05/2023

Sample collected by : Environmental Laboratory Representative
Date of sample collection : 29/05/2023
Particulars of sample collected : SW2-Confluance of Valvol & Bichdim & Cudnem River
Date of sample receipt : 03/06/2023
Lab Code : ED/23/06/1-0040
Sample quantity : 5 Ltrs
Date of Commencement of testing : 03/06/2023
Date of Completion of testing : 10/06/2023
Condition of the sample : Satisfactory
Sampling Type : Grab

TEST RESULTS

Sl. No.	Test Parameters	Results	Limits as per Class C Norms Stream Water (IS 2296)	Test Methods
1	Color, Hazen Units	5.0	300	IS:3025 (P 4) 2021
2	pH	6.82	6.0 to 8.5	IS:3025 (P 11) 2022
3	Dessolved Oxygen as O2,mg/l	6.9	Min 4	IS:3025 (P 38) 1989 RA 2019
4	Oil and Grease,mg/l	<0.5	1	IS:3025 (P 39) 2021
5	Total Dissolved Solids, mg/l	10300.0	1500	IS:3025 (P 16) 2023
6	Total Suspended Solids, mg/l	16	-	IS:3025 (P 17) 2017
7	Nitrates as NO3, mg/l	10.80	50	IS:3025 (P 34) 1988 RA 2019
8	Anionic Detergents as MBAS, mg/l	<0.1	1.0	IS:3025 (P 68)
9	Total Hardness as CaCO3, mg/l	1220	-	IS:3025 (P 21) 2017
10	Copper as Cu, mg/l	<0.005	1.5	IS:3026 (P-2) 2019
11	Chloride as Cl, mg/l	6349.0	600	IS:3025 (P 32) :1988 RA 2019
12	Fluoride as F, mg/l	<0.1	1.5	APHA 23rd Edition 4500F
13	Iron as Fe, mg/l	<0.005	50	IS:3026 (P 2) 2019
14	Phenolic Compounds as C6H5OH, mg/l	<0.001	0.005	Is:3025 (p 43) Sec 1 2022
15	Selenium as Se, mg/l	<0.005	0.05	IS:3025 (P 2) 2019
16	Sulphate as SO4, mg/l	830.0	400	IS:3025 (P 24) Sec 1 2022
17	Zinc as Zn, mg/l	<0.005	15	IS:3025 (P 2) 2019
18	Cadmium as Cd, mg/l	<0.001	0.001	IS:3025 (P 2) 2019
19	Cyanide as CN,mg/l	<0.01	0.05	IS:3025 (P 27) Sec 1 2021
20	Lead as Pb, mg/l	<0.005	0.1	IS:3026 (P 2) 2019
21	Total Arsenic as As, mg/l	<0.002	0.2	IS:3025 (P 2) 2019

ARSHIYA KOUSAR
Dy. T.M. Chemical
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesbng@gmail.com, www.envtest.in

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TEST REPORT

Report No.ED004023061

Report Issued Date: 10/06/2023

TEST RESULTS

Sl. No.	Test Parameters	Results	Limits as per Class C Norms Stream Water (IS 2296)	Test Methods
22	Hexavalent Chromium as Cr+6, mg/l	<0.03	0.05	IS:3025 (P 52) 2014
23	Bio Chemical Oxygen Demand as O2 (3days @ 27° Max), mg/l	<3	3	IS:3025 (P 44):2014
24	Chemical Oxygen Demand as O2 mg/l	24	-	IS:3025 (P 58) 2017
25	Total Coliforms/100ml	148	5000	IS:1622:1981

END OF REPORT

SINGARAVEL
Mini - Mineral Dairy

ARSHIYA KOUSAR
Dy. T.M. Chemical
Govt. Analyst / Authorised Signatory

949, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone . 080-25432965 Tel/fax : 25432968. E-mail : mesblr@gmail.com, www.envtest.in

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TEST REPORT

Report No. ED004123061

Report Issued Date: 10/06/2023

TEST RESULTS

Sl. No.	Test Parameters	Results	Limits as per Class C Norms Stream Water (IS 2296)	Test Methods
22	Hexavalent Chromium as Cr+6, mg/l	<0.03	0.05	IS:3025 (P 52) 2014
23	Bio Chemical Oxygen Demand as O2 (3days @ 27° Max), mg/l	<3	3	IS:3025 (P 44).2014
24	Chemical Oxygen Demand as O2,mg/l	22	-	IS 3025 (P 58) 2017
25	Total Coliforms/100ml	83	5000	IS:1622:1981

END OF REPORT

ARSHIYA KOUSAR
Dy. T.M. Chemist
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesbng@gmail.com, www.envtest.in

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ISO 45001:2018

TEST REPORT

Issued To: Vedanta Ltd
Block-I Bicholim Mineral Block, Bicholim, Bardem, Lamgao, Mulgao & Sirigao Village, Bicholim Taluk
North Goa-Goa

Report No. : EDI004223061
Issue Date : 10/06/2023
Your ref. : LETTER
Ref.Date : 29/05/2023

Sample collected by : Environmental Laboratory Representative
Date of sample collection : 29/05/2023
Particulars of sample collected : SW4-Bicholim River Downstream
Date of sample receipt : 03/06/2023
Lab Code : EDI/23/06/1-0042
Sample quantity : 5 Ltrs
Date of Commencement of testing : 03/06/2023
Date of Completion of testing : 10/06/2023
Condition of the sample : Satisfactory
Sampling Type : Grab

TEST RESULTS

Sl. No.	Test Parameters	Results	Limits as per Class C Norms Stream Water (IS 2296)	Test Methods
1	Color, Hazen Units	60	300	IS:3025 (P 4) 2021
2	pH	7.26	6.9 to 8.5	IS:3025 (P 11) 2022
3	Dissolved Oxygen as O2,mg/l	6.2	Min 4	IS:3025 (P 38) 1989 RA 2019
4	Oil and Grease,mg/l	<0.5	1	IS:3025 (P 39) 2021
5	Total Dissolved Solids, mg/l	290.0	1500	IS:3025 (P 16) 2023
6	Total Suspended Solids, mg/l	10	-	IS:3025 (P 17) 2017
7	Nitrates as (NO3, mg/l	14.0	50	IS:3025 (P 34) 1988 RA 2019
8	Anionic Detergents as MBAS, mg/l	<0.1	1.0	IS:3025 (P 65)
9	Total Hardness as CaCO3, mg/l	48	-	IS:3025 (P 21) 2014
10	Copper as Cu, mg/l	<0.005	1.5	IS:3025 (P-2) 2019
11	Chloride as Cl, mg/l	110.0	600	IS:3025 (P 32) :1988 RA 2019
12	Fluoride as F, mg/l	<0.1	1.5	APHA 23rd Edition 4500F
13	Iron as Fe, mg/l	<0.1	50	IS:3025 (P 2) 2019
14	Phenolic Compounds as C6H5OH, mg/l	<0.001	0.005	Is:3025 (p 43) Sec 1 2022
15	Selenium as Se, mg/l	<0.005	0.05	IS:3025 (P 2) 2019
16	Sulphate as SO4, mg/l	60.0	400	IS:3025 (P 24) Sec 1 2022
17	Zinc as Zn, mg/l	<0.005	15	IS:3025 (P 2) 2019
18	Cadmium as Cd, mg/l	<0.001	0.001	IS:3025 (P 2) 2019
19	Cyanide as CN,mg/l	<0.01	0.05	IS:3025 (P 27) Sec 1 2021
20	Lead as Pb, mg/l	<0.005	0.1	IS:3025 (P 2) 2019
21	Total Arsenic as As, mg/l	<0.002	0.2	IS 3025 (P 2) 2019

ARSHIYA KOUSAR
Dy. T.M. Chemical
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesbng@gmail.com, www.envtest.in

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TEST REPORT

Report No. ED004223061

Report Issued Date: 10/06/2023

TEST RESULTS

Sl. No.	Test Parameters	Results	Limits as per Class C Norms Stream Water (IS 2296)	Test Methods
22	Hexavalent Chromium as Cr+6, mg/l	<0.03	0.05	IS:3025 (P 52) 2014
23	Bio Chemical Oxygen Demand as O2 (3days @ 27° Max), mg/l	<3	3	IS:3025 (P 44):2014
24	Chemical Oxygen Demand as O2 mg/l	26	--	IS:3025 (P 58) 2017
25	Total Coliforms/100ml	24	5000	IS:1622:1981

END OF REPORT

ARSHIYA BOUSAR
Dy. F.M. Chemist
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesblr@gmail.com, www.envtest.in

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TEST REPORT

Issued To: Vedanta Ltd
Block-I Bicholim Mineral Block, Bicholim, Bardem, Lamgao, Mulgao & Sirigao Village, Bicholim Taluk, North Goa-Goa

Report No.: ED004323061
Issue Date : 10/06/2023
Your ref. : LETTER
Ref.Date : 29/05/2023

Sample collected by : Environmental Laboratory Representative
Date of sample collection : 29/05/2023
Particulars of sample collected : SW5-Asnoda River Upstream Water
Date of sample receipt : 03/06/2023
Lab Code : ED/23/06/1-0043
Sample quantity : 5 Ltrs
Date of Commencement of testing : 03/06/2023
Date of Completion of testing : 10/06/2023
Condition of the sample : Satisfactory
Sampling Type : Grab

TEST RESULTS

Sl. No.	Test Parameters	Results	Limits as per Class C Norms Stream Water (IS 2296)	Test Methods
1	Color, Hazen Units	5.0	300	IS:3025 (P 4) 2021
2	pH	6.90	6.0 to 8.5	IS:3025 (P 11) 2022
3	Dissolved Oxygen as O2,mg/l	6.7	Min 4	IS:3025 (P 38) 1989 RA 2019
4	Oil and Grease,mg/l	<0.5	1	IS:3025 (P 39) 2021
5	Total Dissolved Solids, mg/l	2600.0	1500	IS:3025 (P 16) 2023
6	Total Suspended Solids, mg/l	8	--	IS:3025 (P 17) 2017
7	Nitrates as NO3, mg/l	12.8	50	IS:3025 (P 34) 1988 RA 2019
8	Anionic Detergents as MBAS, mg/l	<0.1	1.0	IS:3025 (P 68)
9	Total Hardness as CaCO3, mg/l	240	-	IS:3025 (P 21) 2014
10	Copper as Cu, mg/l	<0.005	1.5	IS:3025 (P-2) 2019
11	Chloride as Cl, mg/l	1250.0	600	IS:3025 (P 32) :1988 RA 2019
12	Fluoride as F, mg/l	<0.1	1.5	APHA 23rd Edition 4500F
13	Iron as Fe, mg/l	<0.005	50	IS:3025 (P 2) 2019
14	Phenolic Compounds as C6H5OH, mg/l	<0.001	0.005	IS:3025 (p 43) Sec 1 2022
15	Selenium as Se, mg/l	<0.005	0.05	IS:3025 (P 2) 2019
16	Sulphate as SO4, mg/l	380.0	400	IS:3025 (P 24) Sec 1 2022
17	Zinc as Zn, mg/l	<0.005	15	IS:3025 (P 2) 2019
18	Cadmium as Cd, mg/l	<0.001	0.001	IS:3025 (P 2) 2019
19	Cyanide as CN,mg/l	<0.01	0.05	IS:3025 (P 27) Sec 1 2021
20	Lead as Pb, mg/l	<0.005	0.1	IS:3025 (P 2) 2019
21	Total Arsenic as As, mg/l	<0.002	0.2	IS:3025 (P 2) 2019

ARSIDIA KOUSAR
Dy. Chief Chemical
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesbng@gmail.com, www.envitest.in

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Format No. : 10/Rev 06

ENVIRONMENTAL LABORATORY

(UNIT OF MINERAL ENGINEERING SERVICES)

Accredited by NABL (TC-6172) Recognised by BIS, FSSAI, ISO:45001:2018 Certified Laboratory
MoEFCC(CPCB) under E(P) Act 1986 recognition valid upto 23.05.2025

TEST REPORT

Report No. ED004323061

Report Issued Date: 10/06/2023

TEST RESULTS

Sl. No.	Test Parameters	Results	Limits as per Class C Norms Stream Water (IS 2296)	Test Methods
22	Hexavalent Chromium as Cr+6, mg/l	<0.03	0.05	IS:3025 (P 52) 2014
23	Bio Chemical Oxygen Demand as O2 (3days @ 27° Max), mg/l	<3	3	IS:3025 (P 44):2014
24	Chemical Oxygen Demand as O2 mg/l	24	-	IS:3025 (P 58) 2017
25	Total Coliforms/100ml	109	5000	IS-1622:1981

END OF REPORT

ARSHIYA KOUSAR
Dy. T.M. Chemical
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesbng@gmail.com, www.envtest.in

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ENVIRONMENTAL LABORATORY

(UNIT OF MINERAL ENGINEERING SERVICES)

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MoEFCC(CPCB) under E(P) Act 1986 recognition valid upto 23.05.2025

TEST REPORT

Issued To: Vedanta Ltd
Block-I Bicholim Mineral Block, Bicholim, Bardem, Lamgao, Mulgao & Sirigao Village, Bicholim Taluk, North Goa-Goa

Report No. : ED0044423061
Issue Date : 10/06/2023
Your ref. : LETTER
Ref.Date : 29/05/2023

Sample collected by : Environmental Laboratory Representative
Date of sample collection : 29/05/2023
Particulars of sample collected : SW8-Assonora River Downstream Water
Date of sample receipt : 03/06/2023
Lab Code : ED/23/06/1-0044
Sample quantity : 5 Ltrs
Date of Commencement of testing : 03/06/2023
Date of Completion of testing : 10/06/2023
Condition of the sample : Satisfactory
Sampling Type : Grab

TEST RESULTS

Sl. No.	Test Parameters	Results	Limits as per Class C Norms Stream Water (IS 2296)	Test Methods
1	Color, Hazen Units	5.0	300	IS:3025 (P 4) 2021
2	pH	7.39	6.9 to 8.5	IS:3025 (P 11) 2022
3	Dissolved Oxygen as O2,mg/l	6.80	Min 4	IS:3025 (P 38) 1989 RA 2019
4	Oil and Grease,mg/l	<0.5	1	IS:3025 (P 39) 2021
5	Total Dissolved Solids, mg/l	2900.0	1500	IS:3025 (P 16) 2023
6	Total Suspended Solids, mg/l	10	–	IS:3025 (P 17) 2017
7	Nitrates as NO3, mg/l	17.80	50	IS:3025 (P 34) 1988 RA 2019
8	Anionic Detergents as MBAS, mg/l	<0.1	1.0	IS:3025 (P 65)
9	Total Hardness as CaCO3, mg/l	210	–	IS:3025 (P 21) 2014
10	Copper as Cu, mg/l	<0.005	1.5	IS:3025 (P-2) 2019
11	Chloride as Cl, mg/l	1430.0	600	IS:3025 (P 32) :1988 RA 2019
12	Fluoride as F, mg/l	0.2	1.5	APHA 23rd Edition 4500F
13	Iron as Fe, mg/l	0.20	50	IS:3025 (P 2) 2019
14	Phenolic Compounds as C6H5OH, mg/l	<0.001	0.005	is:3025 (p 43) Sec 1 2022
15	Selenium as Se, mg/l	<0.005	0.05	IS.3025 (P 2) 2019
16	Sulphate as SO4, mg/l	410.0	400	IS:3025 (P 24) Sec 1 2022
17	Zinc as Zn, mg/l	<0.005	15	IS:3025 (P 2) 2019
18	Cadmium as Cd, mg/l	<0.001	0.001	IS:3025 (P 2) 2019
19	Cyanide as CN,mg/l	<0.01	0.05	IS:3025 (P 27) Sec 1 2021
20	Lead as Pb, mg/l	<0.005	0.1	IS.3025 (P 2) 2019
21	Total Arsenic as As, mg/l	<0.002	0.2	IS:3025 (P 2) 2019

ARSHIYA KOUSAR
Dy. T.M. Chemical
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesbng@gmail.com, www.envtest.in

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ENVIRONMENTAL LABORATORY

(UNIT OF MINERAL ENGINEERING SERVICES)

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MoEFCC(CPCB) under E(P) Act 1986 recognition valid upto 23.05.2025

TEST REPORT

Report No. ED004423061 Report Issued Date: 10/06/2023

TEST RESULTS

Sl. No.	Test Parameters	Results	Limits as per Class C Norms Stream Water (IS 2296)	Test Methods
22	Hexavalent Chromium as Cr+6, mg/l	<0.03	0.05	IS:3025 (P 52) 2014
23	Bio Chemical Oxygen Demand as O2 (3days @ 27° Max), mg/l	<3	3	IS:3025 (P 44)2014
24	Chemical Oxygen Demand as O2 mg/l	28	--	IS:3025 (P 58) 2017
25	Total Coliforms/100ml	120.0	5000	IS:1622:1981

END OF REPORT

ARSHIYA KOUSAR
Dy. T.M. Chemical
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/Fax : 25432968, E-mail : mesblr@gmail.com, www.envtest.in

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ENVIRONMENTAL LABORATORY

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MoEFCC(CPCB) under EIP Act 1986 recognition valid upto 23.05.2025

TEST REPORT

Issued To: Vedanta Ltd
Block-I Bicholim Mineral Block, Bicholim, Bardem, Lamgao, Mulgao & Sirigao Village, Bicholim Taluk, North Goa-Goa

Report No. : ED004623061
Issue Date : 10/06/2023
Your ref. : LETTER
Ref.Date : 29/05/2023

Sample collected by : Environmental Laboratory Representative
Date of sample collection : 29/05/2023
Particulars of sample collected : SW7-Mayem Lake
Date of sample receipt : 03/06/2023
Lab Code : EO/23/06/1-0045
Sample quantity : 5 Ltrs
Date of Commencement of testing : 03/06/2023
Date of Completion of testing : 10/06/2023
Condition of the sample : Satisfactory
Sampling Type : Grab

TEST RESULTS

Sl. No.	Test Parameters	Results	Limits as per Class C Norms Stream Water (IS 2296)	Test Methods
1	Color, Hazen Units	5.0	300	IS:3025 (P 4) 2021
2	pH	6.84	6.9 to 8.6	IS:3025 (P 11) 2022
3	Dissolved Oxygen as O2,mg/l	6.20	Min 4	IS:3025 (P 38) 1989 RA 2019
4	Oil and Grease,mg/	<0.5	1	IS:3025 (P 39) 2021
5	Total Dissolved Solids, mg/l	72.0	1500	IS:3025 (P 16) 2023
6	Total Suspended Solids, mg/l	12	–	IS:3025 (P 17) 2017
7	Nitrates as NO3, mg/l	14.2	50	IS:3025 (P 34) 1988 RA 2019
8	Anionic Detergents as MBAS, mg/l	<0.1	1.0	IS:3025 (P 68)
9	Total Hardness as CaCO3, mg/l	60	–	IS:3025 (P 21) 2014
10	Copper as Cu, mg/l	<0.005	1.5	IS:3025 (P-2) 2019
11	Chloride as Cl, mg/l	18.0	600	IS:3025 (P 32) :1988 RA 2019
12	Fluoride as F, mg/l	<0.1	1.5	APHA 23rd Edition 4500F
13	Iron as Fe, mg/l	<0.005	50	IS:3025 (P 2) 2019
14	Phenolic Compounds as C6H5OH, mg/l	<0.001	0.005	is:3025 (p 43) Sec 1 2022
15	Selenium as Se, mg/l	<0.005	0.05	IS:3025 (P 2) 2019
16	Sulphate as SO4, mg/l	10.0	400	IS:3025 (P 24) Sec 1 2022
17	Zinc as Zn, mg/l	<0.005	15	IS:3025 (P 2) 2019
18	Cadmium as Cd, mg/l	<0.001	0.001	IS:3025 (P 2) 2019
19	Cyanide as CN,mg/l	<0.01	0.05	IS:3025 (P 27) Sec 1 2021
20	Lead as Pb, mg/l	<0.005	0.1	IS:3025 (P 2) 2019
21	Total Arsenic as As, mg/l	<0.002	0.2	IS:3025 (P 2) 2019

ARSHIYA TOUSAR
By. T.M.S Chemical
Govt. Analyst / Authorised Signatory

#948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/Fax : 25432968. E-mail : mesbng@gmail.com, www.envtest.in

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ENVIRONMENTAL LABORATORY

(UNIT OF MINERAL ENGINEERING SERVICES)

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MoEFCC(CPCB) under E(P) Act 1986 recognition valid upto 23.05.2025

TEST REPORT

Report No. ED004523061

Report Issued Date: 10/06/2023

TEST RESULTS

Sl. No.	Test Parameters	Results	Limits as per Class C Norms Stream Water (IS 2296)	Test Methods
22	Hexavalent Chromium as Cr+6, mg/l	<0.03	0.05	IS:3025 (P 52) 2014
23	Bio Chemical Oxygen Demand as O2 (3days @ 27° Max), mg/l	<3	3	IS:3025 (P 44):2014
24	Chemical Oxygen Demand as O2 mg/l	24.0	--	IS:3025 (P 58) 2017
25	Total Coliforms/100ml	70.0	5000	IS:1622:1981

END OF REPORT

ARSHIYA KOUSAR
Dy. T.M. Chemist
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/Fax : 25432968. E-mail : mesblr@gmail.com, www.envtest.in

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Table No. 32

GROUND WATER TEST REPORT

Format No. : 10/Rev 06

ENVIRONMENTAL LABORATORY

(UNIT OF MINERAL ENGINEERING SERVICES)

Accredited by NABL (TC-6172) Recognised by BIS, FSSAI, ISO:45001:2018 Certified Laboratory
MoEF&CC(CPCB) under E(P) Act 1986 recognition valid upto 23.05.2025

TEST REPORT

Issued To: M/s.Vedanta Ltd
Block-I Bicholim Mineral Block, Bicholim, Bardem, Lamgao, Mulgao & Sirigao Village, Bicholim Taluk, North Goa-Goa

Report No. : ED000123061
Issue Date : 10/06/2023
Your ref. : LETTER
Ref.Date : 29/05/2023

Sample collected by : Environmental Laboratory Representative
Date of sample collection : 29/05/2023
Particulars of sample collected : GW-1 Bicholim Well Water
Date of sample receipt : 01/06/2023
Lab Code : ED/23/06/1-0001
Sampling Type : Grab
Sample quantity : 10 Ltrs
Date of Commencement of testing : 01/06/2023
Date of Completion of testing : 10/06/2023
Condition of the sample : Satisfactory

TEST RESULTS

Sl. No.	Test Parameters	Results	ACCEPTABLE LIMITS AS PER IS:10500-2012	PERMISSIBLE LIMITS AS PER IS:10500-2012	Test Methods
1	Color, Hazen Units	1.0	5	15	IS:3025 (P 4) 202:
2	Odour	Agreeable	Agreeable	Agreeable	IS:3025 (P 5) 2018
3	pH	5.85	6.5 to 8.5	6.5 to 8.5	IS:3025 (P 11) 2022
4	Taste	Agreeable	Agreeable	Agreeable	IS:3025 (P 8) 1984 RA 2017
5	Turbidity as NTU	0.8	1	5	IS:3025 (P 10) 1984 RA 2017
6	Conductivity,µmhos/cm	102.0	--	--	IS:3025 (P 14)
7	Total Dissolved Solids, mg/l	50.0	500	2000	IS:3025 (P 16) 1984 RA 2017
8	Temperature ,°C	25.0	--	--	IS:3025 (P 9)
9	Aluminium as Al, mg/l	<0.01	0.03	0.2	IS:3025 (P 55) 2003 RA 2019
10	Ammonia (as total ammonia-N) mg/l	<0.1	0.5	0.5	IS:3025 (P 34) 1988 RA 2019
11	Anionic Detergents as MBAS, mg/l	<0.1	0.2	1.0	Annexure-K of IS:13428 Amm 11 2022
12	Barium as Ba mg/l	0.006	0.7	0.7	IS:3025 (P-2) 2019
13	Boron as B, mg/l	<0.1	0.5	2.4	IS:3025 (P-57) 2021
14	Calcium as Ca, mg/l	10.62	75	200	IS:3025(P 40) 1991 RA 2019
15	Copper as Cu, mg/l	<0.005	1.0	1.5	IS:3025 (P-2) 2019
16	Chloride as Cl, mg/l	17.0	250	1000	IS:3025 (P 32) 1988 RA 2019
17	Fluoride as F, mg/l	<0.1	1.0	1.5	IS:3025 (P 60) 2008 RA 2019
18	Residual Free Chlorine, mg/l	<0.1	0.2	1.0	IS:3025 (P 26) 2021
19	Chloramines as Cl2,mg/l	<0.1	4.0	4.0	IS:3025 (P 26) 2021
20	Iron as Fe, mg/l	0.072	1.0	1.0	IS:3025 (P 2) 2019

ARSHIYA KOUSAR
Dy. T.M. Chemist
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesbng@gmail.com, www.envtest.in

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ENVIRONMENTAL LABORATORY

(UNIT OF MINERAL ENGINEERING SERVICES)

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MoEFCC(CPCB) under E(P) Act 1986 recognition valid upto 25.05.2025

TEST REPORT

Report No. ED000123061 Report Issued Date: 10/08/2023

TEST RESULTS

Sl. No.	Test Parameters	Results	ACCEPTABLE LIMITS AS PER IS:10500-2012	PERMISSIBLE LIMITS AS PER IS:10500-2012	Test Methods
21	Magnesium as Mg, mg/l	6.94	30	100	IS:3025 (P 46) 1994 RA 2019
22	Manganese as Mn, mg/l	0.007	0.1	0.3	IS:3025 (P 2) 2019
23	Mineral Oil, mg/l	<0.5	1.0	1.0	Clause 6 of IS:3025 (P-39) 2021
24	Nitrate as NO3, mg/l	4.2	45	45	IS:3025 (P 34) 1988 RA 2019
25	Phenolic Compounds as C6H5OH, mg/l	<0.001	0.001	0.002	IS:3025 (P 43) Sec 1 2022
26	Selenium as Se, mg/l	<0.005	0.01	0.01	IS:3025 (P 2) 2019
27	Silver as Ag ,mg/l	<0.005	0.1	0.1	IS:3025 (P 2) 2019
28	Molybdenum as Mo, mg/l	<0.001	0.07	0.07	IS: 3025 (P 2) 2019
29	Sulphate as SO4, mg/l	10.6	200	400	IS:3025 (P 24) Sec 1 2022
30	Sulphide as H2S, mg/l	<0.01	0.05	0.05	IS:3025 (P 29) :1988 RA 2019
31	Total Alkalinity as CaCO3, mg/l	10.0	200	600	IS:3025 (P 23) :1986 RA 2019
32	Total Hardness as CaCO3, mg/l	51.0	200	600	IS:3025 (P 21) :2009 RA 2019
33	Zinc as Zn, mg/l	0.010	5	15	IS:3025 (P 2) 2019
34	Cadmium as Cd, mg/l	<0.001	0.003	0.003	IS:3025 (P 2) 2019
35	Cyanide as CN,mg/l	<0.01	0.05	0.05	IS:3025 (P 27) Sec 1 2021
36	Lead as Pb, mg/l	<0.005	0.01	0.01	IS: 3025 (P 2) 2019
37	Mercury as Hg, mg/l	<0.0005	0.001	0.001	USEPA 200.7 Rev 4.4
38	Nickel as Ni, mg/l	<0.001	0.02	0.02	IS:3025 (P 2) 2019
39	Total Arsenic as As, mg/l	<0.002	0.01	0.05	IS:3025 (P 2) 2019
40	Sodium as Na, mg/l	9.6	–	–	IS:3025 (P 45) :1993 RA 2019
41	Potassium as K, mg/l	<1	–	–	IS:3025 (P 45)
42	Hexavalent Chromium as Cr+6, mg/l	<0.03	–	–	IS:3025 (P 52) 2014
43	Escherichia coli/100ml	Absent	–	–	IS:1622:1981
44	Total Coliforms/100ml	<1	–	–	IS:1622:1981

END OF REPORT

ARSHIYA KOUSAR
Dy. T.M. Chemical
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesbng@gmail.com, www.envtest.in

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ENVIRONMENTAL LABORATORY

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MoEF&CC(CPCB) under E(P) Act 1986 recognition valid upto 23.05.2026

TEST REPORT

Issued To: .Vedanta Ltd
Block-I Bicholim Mineral Block, Bicholim, Bardem, Lamgao, Mulgao & Sirigao Village, Bicholim Taluk, North Goa-Goa

Report No. : ED004623061
Issue Date : 12/06/2023
Your ref. : LETTER
Ref.Date : 29/05/2023

Sample collected by : Environmental Laboratory Representative
Date of sample collection : 29/05/2023
Particulars of sample collected : GW-2 Sarvan Village Well Water
Date of sample receipt : 03/06/2023
Lab Code : ED/23/06/1-0046
Sampling Type : Grab
Sample quantity : 10 Ltrs
Date of Commencement of testing : 03/06/2023
Date of Completion of testing : 10/06/2023
Condition of the sample : Satisfactory

TEST RESULTS

Sl. No.	Test Parameters	Results	ACCEPTABLE LIMITS AS PER IS:10500-2012	PERMISSIBLE LIMITS AS PER IS:10500-2012	Test Methods
1	Color, Hazen Units	<1	5.0	15	IS:3025 (P 4) 2021
2	Odour	Agreeable	Agreeable	Agreeable	IS:3025 (P 5) 2018
3	pH	6.70	6.5 to 8.5	6.5 to 8.5	IS:3025 (P 11) 2022
4	Taste	Agreeable	Agreeable	Agreeable	IS:3025 (P 8) 1984 RA 2017
5	Turbidity as NTU	0.90	1	5	IS:3025 (P 10) 1984 RA 2017
6	Conductivity,µmhos/cm	89	--	--	IS:3025 (P 14)
7	Temperature ,°C	25	--	--	IS:3025 (P 9)
8	Total Dissolved Solids, mg/l	50	500	2000	IS:3025 (P 16) 1984 RA 2017
9	Aluminium as Al, mg/l	<0.01	0.03	0.2	IS:3025 (P 55) 2003 RA 2019
10	Ammonia (as total ammonia-N) mg/l	<0.1	0.5	0.5	IS:3025 (P 34) 1988 RA 2019
11	Anionic Detergents as MBAS, mg/l	<0.1	0.2	1.0	Annexure-K of IS:13428 Amn 11 2022
12	Barium as Ba mg/l	<0.005	0.7	0.7	IS:3025 (P-2) 2019
13	Boron as B, mg/l	<0.1	0.5	2.7	IS:3025 (P-57) 2021
14	Calcium as Ca, mg/l	7.36	75	200	IS:3025(P 40) 1991 RA 2019
15	Copper as Cu, mg/l	<0.005	1.0	1.5	IS:3025 (P-2) 2019
16	Chloride as Cl, mg/l	16.10	250	1000	IS:3025 (P 32) 1988 RA 2019
17	Fluoride as F, mg/l	<0.1	1.0	1.5	IS:3025 (P 60) 2008 RA 2019
18	Residual Free Chlorine, mg/l	<0.1	0.2	1.0	IS:3025 (P 26) 2021
19	Chloramines as Cl2,mg/l	<0.1	4.0	4.0	IS:3025 (P 26) 2021
20	Iron as Fe, mg/l	<0.005	1.0	1.0	IS:3025 (P 2) 2019

ARSHIYA KOUSAR
Dy. T.M. Chemical
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesbng@gmail.com, www.envtest.in

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ENVIRONMENTAL LABORATORY

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MoEFCC(CPCB) under E(P) Act 1986 recognition valid upto 23.05.2025

TEST REPORT

Report No. ED004823061

Report Issued Date: 12/06/2023

TEST RESULTS

Sl. No.	Test Parameters	Results	ACCEPTABLE LIMITS AS PER IS:10500-2012	PERMISSIBLE LIMITS AS PER IS:10500-2012	Test Methods
21	Magnesium as Mg, mg/l	3.96	30	100	IS:3025 (P 46) 1994 RA 2019
22	Manganese as Mn, mg/l	<0.001	0.1	0.3	IS:3025 (P 2) 2019
23	Mineral Oil, mg/l	<0.5	1.0	1.0	Clause 6 of IS:3025 (P-39) 2021
24	Sodium as Na, mg/l	4.0	--	--	IS:3025 (P 45) :1993 RA 2019
25	Potassium as K, mg/l	<1.0	--	--	IS:3025 (P 45)
26	Nitrate as NO3, mg/l	1.8	45	45	IS:3025 (P 34) 1988 RA 2019
27	Phenolic Compounds as C6H5OH, mg/l	<0.001	0.001	0.002	IS:3025 (P 43) Sec 1 2022
28	Selenium as Se, mg/l	<0.005	0.01	0.01	IS:3025 (P 2) 2019
29	Silver as Ag ,mg/l	<0.005	0.1	0.1	IS:3025 (P 2) 2019
30	Molybdenum as Mo, mg/l	<0.001	0.07	0.07	IS: 3025 (P 2) 2019.
31	Sulphate as SO4, mg/l	6.9	200	400	IS:3025 (P 24) Sec 1 2022
32	Sulphide as H2S, mg/l	<0.01	0.05	0.05	IS:3025 (P 29) :1986 RA 2019
33	Total Alkalinity as CaCO3, mg/l	10.0	200	600	IS:3025 (P 23) :1986 RA 2019
34	Total Hardness as CaCO3, mg/l	34.68	200	600	IS:3025 (P 21) :2009 RA 2019
35	Zinc as Zn, mg/l	<0.005	5	15	IS:3025 (P 2) 2019
36	Cadmium as Cd, mg/l	<0.001	0.003	0.003	IS:3025 (P 2) 2019
37	Cyanide as CN,mg/l	<0.01	0.05	0.05	IS:3025 (P 27) Sec 1 2021
38	Lead as Pb, mg/l	<0.005	0.01	0.01	IS: 3025 (P 2) 2019
39	Mercury as Hg, mg/l	<0.0005	0.001	0.001	USEPA 200.7 Rev 4.4
40	Nickel as Ni, mg/l	<0.001	0.02	0.02	IS:3025 (P 2) 2019
41	Total Arsenic as As, mg/l	<0.002	0.01	0.01	IS.3025 (P 2) 2019
42	Hexavalent Chromium as Cr+6, mg/l	<0.03	--	--	IS:3025 (P 52) 2014
43	Escherichia coli/100ml	Absent	--	--	IS:1622:1981
44	Total Coliforms/100ml	<1	--	--	IS:1622:1981

END OF REPORT

ARSHIYA KOUSAR
Dy. T.M. Chemist
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : meslng@gmail.com, www.envtest.in

Note : This report is subject to the terms and conditions mentioned overleaf.

Format No. : 10/Rev 06

ENVIRONMENTAL LABORATORY

(UNIT OF MINERAL ENGINEERING SERVICES)

Accredited by NABL (TC-8172) Recognised by BIS, FSSAI, ISO:45001:2018 Certified Laboratory
MoEFCC(CPCB) under E(P) Act 1986 recognition valid upto 23.05.2025

TEST REPORT

Issued To: Vedanta Ltd
Block-I Bicholim Mineral Block, Bicholim, Bardem, Lamgao, Mulgao & Sirigao Village, Bicholim Taluk, North Goa-Goa

Report No.: ED000223061
Issue Date : 10/06/2023
Your ref : LETTER
Ref.Date : 29/05/2023

Sample collected by : Environmental Laboratory Representative
Date of sample collection : 29/05/2023
Particulars of sample collected : GW-3 Lamgao Village Well Water
Date of sample receipt : 01/06/2023
Lab Code : ED/23/06/1-0002
Sampling Type : Grab
Sample quantity : 10 Ltrs
Date of Commencement of testing : 01/06/2023
Date of Completion of testing : 10/06/2023
Condition of the sample : Satisfactory

TEST RESULTS

Sl. No.	Test Parameters	Results	ACCEPTABLE LIMITS AS PER IS:10500-2012	PERMISSIBLE LIMITS AS PER IS:10500-2012	Test Methods
1	Color, Hazen Units	1.0	5.0	15	IS:3025 (P 4) 2021
2	Odour	Agreeable	Agreeable	Agreeable	IS:3025 (P 5) 2018
3	pH	6.69	6.5 to 8.5	6.5 to 8.5	IS:3025 (P 11) 2022
4	Taste	Agreeable	Agreeable	Agreeable	IS:3025 (P 8) 1984 RA 2017
5	Turbidity as NTU	1.2	1	5	IS:3025 (P 10) 1984 RA 2017
6	Conductivity,µmhos/cm	80.0	–	–	IS:3025 (P 14)
7	Total Dissolved Solids, mg/l	26.0	500	2000	IS:3025 (P 16) 1984 RA 2017
8	Temperature ,°C	25	–	–	IS:3025 (P 9)
9	Aluminium as Al, mg/l	<0.01	0.03	0.2	IS:3025 (P 55) 2003 RA 2019
10	Ammonia (as total ammonia-N) mg/l	<0.1	0.5	0.5	IS:3025 (P 34) 1988 RA 2019
11	Anionic Detergents as MBAS, mg/l	<0.1	0.2	1.0	Annexure-K of IS:13428 Amm 11 2022
12	Barium as Ba mg/l	0.014	0.7	0.7	IS:3025 (P-2) 2019
13	Boron as B, mg/l	<0.1	0.5	2.4	IS:3025 (P-57) 2021
14	Calcium as Ca, mg/l	6.54	75	200	IS:3025(P 40) 1991 RA 2019
15	Copper as Cu, mg/l	<0.005	1.5	1.5	IS:3025 (P-2) 2019
16	Chloride as Cl, mg/l	15.10	250	1000	IS:3025 (P 32) 1988 RA 2019
17	Fluoride as F, mg/l	<0.1	1.0	1.5	IS:3025 (P 60) 2008 RA 2019
18	Residual Free Chlorine, mg/l	<0.1	0.2	1.0	IS:3025 (P 26) 2021
19	Chloramines as Cl2,mg/l	<0.1	4.0	4.0	IS:3025 (P 26) 2021
20	Iron as Fe, mg/l	0.261	1.0	1.0	IS:3025 (P 2) 2019

ARPITA SOUSA
Dy. T.M. Chemical
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesbng@gmail.com, www.envtest.in

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Format No. : 10/Rev 06

ENVIRONMENTAL LABORATORY

(UNIT OF MINERAL ENGINEERING SERVICES)

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MoEFCC(CPCB) under E(P) Act 1986 recognition valid upto 23-05-2025

TEST REPORT

Report No. ED000223061 Report Issued Date: 10/06/2023

TEST RESULTS

Sl. No.	Test Parameters	Results	ACCEPTABLE LIMITS AS PER IS:10500-2012	PERMISSIBLE LIMITS AS PER IS:10500-2012	Test Methods
21	Magnesium as Mg, mg/l	2.97	30	100	IS:3025 (P 46) 1994 RA 2019
22	Manganese as Mn, mg/l	0.038	0.1	0.3	IS:3025 (P 2) 2019
23	Mineral Oil, mg/l	<0.5	1.0	1.0	Clause 6 of IS:3025 (P-39) 2021
24	Nitrate as NO3, mg/l	3.5	45	45	IS:3025 (P 34) 1988 RA 2019
25	Phenolic Compounds as C6H5OH, mg/l	<0.001	0.001	0.002	IS:3025 (P 43) Sec 1 2022
26	Selenium as Se, mg/l	<0.005	0.01	0.01	IS:3025 (P 2) 2019
27	Silver as Ag ,mg/l	<0.005	0.1	0.1	IS:3025 (P 2) 2019
28	Molybdenum as Mo, mg/l	<0.001	0.07	0.07	IS: 3025 (P 2) 2019
29	Sulphate as SO4, mg/l	8.40	200	400	IS:3025 (P 24) Sec 1 2022
30	Sulphide as H2S, mg/l	<0.01	0.05	0.05	IS:3025 (P 29) :1986 RA 2019
31	Total Alkalinity as CaCO3, mg/l	10.0	200	600	IS:3025 (P 23) :1986 RA 2019
32	Total Hardness as CaCO3, mg/l	28.56	200	600	IS:3025 (P 21) :2009 RA 2019
33	Zinc as Zn, mg/l	0.015	5	15	IS:3025 (P 2) 2019
34	Cadmium as Cd, mg/l	<0.001	0.003	0.003	IS:3025 (P 2) 2019
35	Cyanide as CN,mg/l	<0.01	0.05	0.05	IS:3025 (P 27) Sec 1 2021
36	Lead as Pb, mg/l	<0.005	0.01	0.01	IS: 3025 (P 2) 2019
37	Mercury as Hg, mg/l	<0.0005	0.001	0.001	US EPA 200.7 Rev 4.4
38	Nickel as Ni, mg/l	<0.001	0.02	0.02	IS:3025 (P 2) 2019
39	Total Arsenic as As, mg/l	<0.002	0.01	0.01	IS:3025 (P 2) 2019
40	Sodium as Na, mg/l	5.5	--	--	IS:3025 (P 45) 1993 RA 2019
41	Potassium as K, mg/l	<1	--	--	IS:3025 (P 45)
42	Hexavalent Chromium as Cr+6, mg/l	<0.03	--	--	IS:3025 (P 52) 2014
43	Escherichia coli/100ml	Absent	--	--	IS:1622:1981
44	Total Coliforms/100ml	<1	--	--	IS:1622:1981

END OF REPORT

ARSHIYA TOUSAR
Dy. T.M. Chemist
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesbng@gmail.com, www.envtest.in

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MoEFCC(CPCB) under E(P) Act 1986 recognition valid upto 23.05.2025

ISO 45001:2018

TEST REPORT

Issued To: .Vedanta Ltd
Block-I Bicholim Mineral Block, Bicholim, Bardem, Lamgao,
Mulgao & Sirigao Village, Bicholim Taluk,
North Goa-Goa

Report No.: EDO00622061
Issue Date : 10/06/2023
Your ref. : LETTER
Ref.Date : 29/05/2023

Sample collected by : Environmental Laboratory Representative
Date of sample collection : 29/05/2023
Particulars of sample collected : GW-4 Mulgao Village Well Water
Date of sample receipt : 01/06/2023
Lab Code : ED/23/06/1-0003
Sampling Type : Grab
Sample quantity : 10 Litre
Date of Commencement of testing : 01/06/2023
Date of Completion of testing : 10/06/2023
Condition of the sample : Satisfactory

TEST RESULTS

Sl. No.	Test Parameters	Results	ACCEPTABLE LIMITS AS PER IS:10500-2012	PERMISSIBLE LIMITS AS PER IS:10500-2012	Test Methods
1	Color, Hazen Units	<1	5.0	15	IS:3025 (P 4) 2021
2	Odour	Agreeable	Agreeable	Agreeable	IS:3025 (P 5) 2018
3	pH	5.69	6.5 to 8.5	6.5 to 8.5	IS:3025 (P 11) 2022
4	Taste	Agreeable	Agreeable	Agreeable	IS:3025 (P 8) 1984 RA 2017
5	Turbidity as NTU	0.5	1	5	IS:3025 (P 10) 1984 RA 2017
6	Conductivity,µmhos/cm	80.0	-	-	IS:3025 (P 14)
7	Total Dissolved Solids, mg/l	28.0	500	2000	IS:3025 (P 16) 1984 RA 2017
8	Temperature ,°C	25.0	--	--	IS:3025 (P 9)
9	Aluminium as Al, mg/l	<0.01	0.03	0.2	IS:3025 (P 55) 2003 RA 2019
10	Ammonia (as total ammonia-N) mg/l	<0.1	0.5	0.5	IS:3025 (P 34) 1988 RA 2019
11	Anionic Detergents as MBAS, mg/l	<0.1	0.2	1.0	Annexure-K of IS:13428 Amm 11 2022
12	Barium as Ba mg/l	0.010	0.7	0.7	IS:3025 (P-2) 2019
13	Boron as B, mg/l	<0.1	0.5	2.4	IS:3025 (P-57) 2021
14	Calcium as Ca, mg/l	6.54	75	200	IS:3025(P 40) 1991 RA 2019
15	Copper as Cu, mg/l	<0.005	0.05	1.5	IS:3025 (P-2) 2019
16	Chloride as CL mg/l	15.19	250	1000	IS:3025 (P 32) 1988 RA 2019
17	Fluoride as F, mg/l	<0.1	1.0	1.5	IS:3025 (P 60) 2008 RA 2019
18	Residual Free Chlorine, mg/l	<0.1	0.2	1.0	IS:3025 (P 26) 2021
19	Chloramines as Cl2,mg/l	<0.1	4.0	4.0	IS:3025 (P 26) 2021
20	Iron as Fe, mg/l	0.078	1.0	1.0	IS:3025 (P 2) 2019

ARSHIYA KOUSAR
Dy. T.M. Chemist
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesblr@gmail.com, www.enwtest.in

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ENVIRONMENTAL LABORATORY

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MoEFCC(CPCB) under E(P) Act 1986 recognition valid upto 23.05.2025

ISO 45001:2018

TEST REPORT

Report No. ED000323061 Report Issued Date: 10/06/2023

TEST RESULTS

Sl. No.	Test Parameters	Results	ACCEPTABLE LIMITS AS PER IS:10500-2012	PERMISSIBLE LIMITS AS PER IS:10500-2012	Test Methods
21	Magnesium as Mg, mg/l	2.97	30	100	IS:3025 (P 46) 1994 RA 2019
22	Manganese as Mn, mg/l	0.013	0.1	0.3	IS:3025 (P 2) 2019
23	Mineral Oil, mg/l	<0.5	1.0	1.0	Clause 6 of IS 3025 (P-39) 2021
24	Nitrate as NO3, mg/l	3.6	45	45	IS:3025 (P 34) 1988 RA 2019
25	Phenolic Compounds as C6H5OH, mg/l	<0.001	0.001	0.002	IS:3025 (P 43) Sec 1 2022
26	Selenium as Se, mg/l	<0.005	0.01	0.01	IS:3025 (P 2) 2019
27	Silver as Ag ,mg/l	<0.005	0.1	0.1	IS:3025 (P 2) 2019
28	Molybdenum as Mo, mg/l	<0.001	0.07	0.07	IS: 3025 (P 2) 2019
29	Sulphate as SO4, mg/l	8.4	200	400	IS:3025 (P 24) Sec 1 2022
30	Sulphide as H2S, mg/l	<0.01	0.05	0.05	IS:3025 (P 29) :1986 RA 2019
31	Total Alkalinity as CaCO3, mg/l	10.0	200	600	IS:3025 (P 23) :1986 RA 2019
32	Total Hardness as CaCO3, mg/l	26.86	200	600	IS:3025 (P 21) :2009 RA 2019
33	Zinc as Zn, mg/l	0.015	5	15	IS:3025 (P 2) 2019
34	Cadmium as Cd, mg/l	<0.001	0.003	0.003	IS:3025 (P 2) 2019
35	Cyanide as CN,mg/l	<0.01	0.05	0.05	IS:3025 (P 27) Sec 1 2021
36	Lead as Pb, mg/l	<0.005	0.01	0.01	IS: 3025 (P 2) 2019
37	Mercury as Hg, mg/l	<0.0005	0.001	0.001	USEPA 200.7 Rev 4.4
38	Nickel as Ni, mg/l	<0.001	0.02	0.02	IS:3025 (P 2) 2019
39	Total Arsenic as As, mg/l	<0.002	0.01	0.01	IS:3025 (P 2) 2019
40	Sodium as Na, mg/l	5.8	--	--	IS:3025 (P 45) :1993 RA 2019
41	Potassium as K, mg/l	<1	--	--	IS:3025 (P 45)
42	Hexavalent Chromium as Cr+6, mg/l	<0.03	--	--	IS:3025 (P 52) 2014
43	Escherichia coli/100ml	Absent	--	--	IS:1622:1981
44	Total Coliforms/100ml	<1	--	--	IS:1622-1981

END OF REPORT

ANSHIYA KOUSAR
Dy. T.M. Chemical
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesbng@gmail.com, www.envtest.in

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ENVIRONMENTAL LABORATORY

(UNIT OF MINERAL ENGINEERING SERVICES)

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MoEFCC(CPCB) under E(P) Act 1986 recognition valid upto 23.05.2026

TEST REPORT

Issued To : Vedanta Ltd
Block-I Bicholim Mineral Block, Bicholim, Bardem, Lamgao,
Mulgao & Sirigao Village, Bicholim Taluk,
North Goa-Goa

Report No. : ED004723061
Issue Date : 12/06/2023
Your ref. : LETTER
Ref.Date : 29/05/2023

Sample collected by : Environmental Laboratory Representative
Date of sample collection : 29/05/2023
Particulars of sample collected : GW-5 Mavlinge Well Water
Date of sample receipt : 03/06/2023
Lab Code : ED/23/06/1-0047
Sampling Type : Grab
Sample quantity : 10 Ltrs
Date of Commencement of testing : 03/06/2023
Date of Completion of testing : 10/06/2023
Condition of the sample : Satisfactory

TEST RESULTS

Sl. No.	Test Parameters	Results	ACCEPTABLE LIMITS AS PER IS:10500-2012	PERMISSIBLE LIMITS AS PER IS:10500-2012	Test Methods
1	Color, Hazen Units	1.0	5.0	15	IS:3025 (P 4) 2021
2	Odour	Agreeable	Agreeable	Agreeable	IS:3025 (P 5) 2018
3	pH	5.89	6.5 to 8.5	6.5 to 8.5	IS:3025 (P 11) 2022
4	Taste	Agreeable	Agreeable	Agreeable	IS:3025 (P 8) 1984 RA 2017
5	Turbidity as NTU	1.6	1	5	IS:3025 (P 10) 1984 RA 2017
6	Conductivity,µmhos/cm	164	--	--	IS:3025 (P 14)
7	Temperature ,°C	25	--	--	IS:3025 (P 9)
8	Total Dissolved Solids, mg/l	98	500	2000	IS:3025 (P 16) 1984 RA 2017
9	Aluminium as Al, mg/l	<0.01	0.03	0.2	IS:3025 (P 55) 2003 RA 2019
10	Ammonia (as total ammonia-N) mg/l	<0.1	0.5	0.5	IS.3025 (P 34) 1988 RA 2019
11	Anionic Detergents as MBAS, mg/l	<0.1	0.2	1.0	Annexure-K of IS:13428 Amn 11 2022
12	Barium as Ba mg/l	<0.005	0.7	0.7	IS:3025 (P-2) 2019
13	Boron as B, mg/l	<0.1	0.5	2.4	IS:3025 (P-57) 2021
14	Calcium as Ca, mg/l	12.28	75	200	IS:3025(P 40) 1991 RA 2019
15	Copper as Cu, mg/l	<0.005	0.05	1.5	IS:3025 (P-2) 2019
16	Chloride as Cl, mg/l	20.13	250	1000	IS:3025 (P 32) 1988 RA 2019
17	Fluoride as F, mg/l	0.3	1.0	1.5	IS:3025 (P 60) 2008 RA 2019
18	Residual Free Chlorine, mg/l	<0.1	0.2	1.0	IS.3025 (P 26) 2021
19	Chlorinates as ClZ,mg/l	<0.1	4.0	4.0	IS:3025 (P 26) 2021
20	Iron as Fe, mg/l	<0.005	1.0	1.0	IS:3025 (P 2) 2019 Amd 1

ARSHIYA KOUSAR
Dy. T.M. Chemical
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968 E-mail : mesblng@gmail.com, www.envtest.in

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ISO 45001:2018

TEST REPORT

Report No. ED004723061 Report Issued Date: 12/06/2023

TEST RESULTS

Sl. No.	Test Parameters	Results	ACCEPTABLE LIMITS AS PER IS:10500-2012	PERMISSIBLE LIMITS AS PER IS:10500-2012	Test Methods
21	Magnesium as Mg, mg/l	6.54	30	100	IS:3025 (P 46) 1994 RA 2019
22	Manganese as Mn, mg/l	<0.001	0.1	0.3	IS:3025 (P 2) 2019
23	Mineral Oil, mg/l	<0.5	1.0	1.0	Clause 6 of IS:3025 (P-39) 2021
24	Sodium as Na, mg/l	12.0	--	--	IS:3025 (P 45) :1993 RA 2019
25	Potassium as K, mg/l	<1	--	--	IS:3025 (P 45)
26	Nitrate as NO3, mg/l	2.8	45	45	IS:3025 (P 34) 1988 RA 2019
27	Phenolic Compounds as C6H5OH, mg/l	<0.001	0.001	0.002	IS:3025 (P 43) Sec 1 2022
28	Selenium as Se, mg/l	<0.005	0.01	0.01	IS:3025 (P 2) 2019
29	Silver as Ag ,mg/l	<0.005	0.1	0.1	IS:3025 (P 2) 2019
30	Molybdenum as Mo, mg/l	<0.001	0.07	0.07	IS: 3025 (P 2) 2019
31	Sulphate as SO4, mg/l	12.6	200	400	IS:3025 (P 24) Sec 1 2022
32	Sulphide as H2S, mg/l	<0.01	0.05	0.05	IS:3025 (P 29) :1986 RA 2019
33	Total Alkalinity as CaCO3, mg/l	50.0	200	600	IS:3025 (P 23) :1986 RA 2019
34	Total Hardness as CaCO3, mg/l	46.92	200	600	IS:3025 (P 21) :2009 RA 2019
35	Zinc as Zn, mg/l	<0.005	5	15	IS:3025 (P 2) 2019
36	Cadmium as Cd, mg/l	<0.001	0.003	0.003	IS:3025 (P 2) 2019
37	Cyanide as CN,mg/l	<0.01	0.05	0.05	IS:3025 (P 27) Sec 1 2021
38	Lead as Pb, mg/l	<0.005	0.01	0.01	IS: 3025 (P 2) 2019
39	Mercury as Hg, mg/l	<0.0005	0.001	0.001	USEPA 200.7 Rev 4.4
40	Nickel as Ni, mg/l	<0.001	0.02	0.02	IS:3025 (P 2) 2019
41	Total Arsenic as As, mg/l	<0.002	0.01	0.01	IS:3025 (P 2) 2019
42	Hexavalent Chromium as Cr+6, mg/l	<0.03	--	--	IS:3025 (P 52) 2014
43	Escherichia coli/100ml	Absent	--	--	IS:1622:1981
44	Total Coliforms/100ml	<1	--	--	IS:1622:1981

END OF REPORT

ARSHIYA KOUSAR
By. T.M. Chemical
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesbng@gmail.com, www.envtest.in

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Format No. : 10/Rev 06

ENVIRONMENTAL LABORATORY

(UNIT OF MINERAL ENGINEERING SERVICES)

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MoEFCC(CPCB) under E(P) Act 1986 recognition valid upto 23.05.2025

TEST REPORT

Issued To: ..Vedanta Ltd
Block-I Bicholim Mineral Block, Bicholim, Bardem, Lamgao, Mulgao & Sarigao Village, Bicholim Taluk, North Goa-Goa

Report No. : ED/004823061
Issue Date : 12/06/2023
Your ref. : LETTER
Ref.Date : 29/05/2023

Sample collected by : Environmental Laboratory Representative
Date of sample collection : 29/06/2023
Particulars of sample collected : GW-6 Nanoda Well Water
Date of sample receipt : 03/06/2023
Lab Code : ED/23/06/1-0046
Sampling Type : Grab
Sample quantity : 10 Ltrs
Date of Commencement of testing : 03/06/2023
Date of Completion of testing : 10/06/2023
Condition of the sample : Satisfactory

TEST RESULTS

Sl. No.	Test Parameters	Results	ACCEPTABLE LIMITS AS PER IS:10500-2012	PERMISSIBLE LIMITS AS PER IS:10500-2012	Test Methods
1	Color, Hazen Units	<1	5	15	IS:3025 (P 4) 2021
2	Odour	Agreeable	Agreeable	Agreeable	IS:3025 (P 5) 2018
3	pH	6.26	6.5 to 8.5	6.5 to 8.5	IS:3025 (P 11) 2022
4	Taste	Agreeable	Agreeable	Agreeable	IS:3025 (P 8) 1984 RA 2017
5	Turbidity as NTU	0.9	1	5	IS:3025 (P 10) 1984 RA 2017
6	Conductivity,µmhos/cm	91.0	-	-	IS:3025 (P 14)
7	Temperature ,°C	25.0	-	-	IS:3025 (P 9)
8	Total Dissolved Solids, mg/l	48.0	500	2000	IS:3025 (P 16) 1984 RA 2017
9	Aluminium as Al, mg/l	<0.01	0.03	0.2	IS:3025 (P 55) 2003 RA 2019
10	Ammonia (as total ammonia-N) mg/l	<0.1	0.5	0.5	IS:3025 (P 34) 1988 RA 2019
11	Anionic Detergents as MBAS, mg/l	<0.01	0.2	1.0	Annexure-K of IS:13428 Amen 11 2022
12	Barium as Ba mg/l	<0.005	0.7	0.7	IS:3025 (P-2) 2019
13	Boron as B, mg/l	<0.1	0.5	2.4	IS:3025 (P-57) 2021
14	Calcium as Ca, mg/l	4.90	75	200	IS:3025(P 40) 1991 RA 2019
15	Copper as Cu, mg/l	<0.05	1.0	1.5	IS:3025 (P-2) 2019
16	Chloride as Cl, mg/l	14.09	250	1000	IS:3025 (P 32) 1988 RA 2019
17	Fluoride as F, mg/l	0.2	1.0	1.5	IS:3025 (P 60) 2008 RA 2019
18	Residual Free Chlorine, mg/l	<0.1	0.2	1.0	IS:3025 (P 26) 2021
19	Chloramines as Cl2,mg/l	<0.1	4.0	4.0	IS:3025 (P 26) 2021
20	Iron as Fe, mg/l	<0.005	1.0	1.0	IS:3025 (P 2) 2019

ARSHIYA KOUSAR
Dy. Chief Chemical
Govt. Analyst / Authorised Signatory

946, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesblr@gmail.com, www.envtest.in

Note : This report is subject to the terms and conditions mentioned overleaf.

Format No. : 10/Rev 06

ENVIRONMENTAL LABORATORY

(UNIT OF MINERAL ENGINEERING SERVICES)

Accredited by NABL (TC-6172) Recognised by BIS, FSSAI, ISO:45001:2018 Certified Laboratory
MoEFCC(CPCB) under E(P) Act 1986 recognition valid upto 23.06.2025

TEST REPORT

Report No. ED004823061 Report Issued Date: 12/06/2023

TEST RESULTS

Sl. No.	Test Parameters	Results	ACCEPTABLE LIMITS AS PER IS:10500-2012	PERMISSIBLE LIMITS AS PER IS:10500-2012	Test Methods
21	Magnesium as Mg, mg/l	1.98	30	100	IS:3025 (P 46) 1994 RA 2019
22	Manganese as Mn, mg/l	<0.001	0.1	0.3	IS:3025 (P 2) 2019
23	Mineral Oil, mg/l	<0.5	1.0	1.0	Clause 6 of IS:3025 (P-39) 2021
24	Sodium as Na, mg/l	12.0	--	--	IS:3025 (P 45) :1999 RA 2019
25	Potassium as K, mg/l	<1	--	--	IS:3025 (P 45)
26	Nitrate as NO3, mg/l	0.8	45	45	IS:3025 (P 34) 1988 RA 2019
27	Phenolic Compounds as C6H5OH, mg/l	<0.001	0.001	0.002	IS:3025 (P 43) Sec 1 2022
28	Selenium as Se, mg/l	<0.005	0.01	0.01	IS:3025 (P 2) 2019
29	Silver as Ag , mg/l	<0.005	0.1	0.1	IS:3025 (P 2) 2019
30	Molybdenum as Mo, mg/l	<0.001	0.07	0.07	IS: 3025 (P 2) 2019
31	Sulphate as SO4, mg/l	7.4	200	400	IS:3025 (P 24) Sec 1 2022
32	Sulphide as H2S, mg/l	<0.01	0.05	0.05	IS:3025 (P 29) :1986 RA 2019
33	Total Alkalinity as CaCO3, mg/l	20.0	200	600	IS:3025 (P 23) :1986 RA 2019
34	Total Hardness as CaCO3, mg/l	20.4	200	600	IS:3025 (P 21) :2009 RA 2019
35	Zinc as Zn, mg/l	<0.005	15	15	IS:3025 (P 2) 2019
36	Cadmium as Cd, mg/l	<0.001	0.003	0.003	IS:3025 (P 2) 2019
37	Cyanide as CN,mg/l	<0.01	0.05	0.05	IS:3025 (P 27) Sec 1 2021
38	Lead as Pb, mg/l	<0.005	0.01	0.01	IS: 3025 (P 2) 2019
39	Mercury as Hg, mg/l	<0.0005	0.001	0.001	USEPA 200.7 Rev 4.4
40	Nickel as Ni, mg/l	<0.001	0.02	0.02	IS:3025 (P 2) 2019
41	Total Arsenic as As, mg/l	<0.002	0.01	0.01	IS:3025 (P 2) 2019
42	Hexavalent Chromium as Cr+6, mg/l	<0.03	--	--	IS:3025 (P 52) 2014
43	Escherichia coli/100ml	Absent	--	--	IS:1622 1981
44	Total Coliforms/100ml	<1	--	--	IS 1622 1981

---END OF REPORT---

ARCHANA KOUSAR
Dy. Chief Chemical
Govt. Analyst / Authorised Signatory

946, 2nd Cross, St Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesbng@gmail.com, www.envtest.in

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ENVIRONMENTAL LABORATORY

(UNIT OF MINERAL ENGINEERING SERVICES)

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MoEF&CC(CPCB) under E(P) Act 1986 recognition valid upto 29.09.2026

TEST REPORT

Issued To: . .Vedanta Ltd
Block-I Bicholim Mineral Block, Bicholim, Bardem, Lamgao,
Mulgao & Sirigao Village, Bicholim Taluk,
North Goa-Goa

Report No. : ED000423061
Issue Date : 10/06/2023
Your ref. : LETTER
Ref.Date : 29/05/2023

Sample collected by : Environmental Laboratory Representative
Date of sample collection : 29/05/2023
Particulars of sample collected : GW-7 Sircaim Village Well Water
Date of sample receipt : 01/06/2023
Lab Code : ED/23/05/1-0004
Sampling Type : Grab
Sample quantity : 10 Ltrs
Date of Commencement of testing : 01/06/2023
Date of Completion of testing : 10/06/2023
Condition of the sample : Satisfactory

TEST RESULTS

Sl. No.	Test Parameters	Results	ACCEPTABLE LIMITS AS PER IS:10500-2012	PERMISSIBLE LIMITS AS PER IS:10500-2012	Test Methods
1	Color, Hazen Units	<1	5.0	15	IS:3025 (P 4) 2021
2	Odour	Agreeable	Agreeable	Agreeable	IS.3025 (P 5) 2018
3	pH	5.90	6.5 to 8.5	6.5 to 8.5	IS:3025 (P 11) 2022
4	Taste	Agreeable	Agreeable	Agreeable	IS:3025 (P 8) 1984 RA 2017
5	Turbidity as NTU	0.7	1	5	IS:3025 (P 10) 1984 RA 2017
6	Conductivity,micro/cm	91.0	–	–	IS:3025 (P 14)
7	Total Dissolved Solids, mg/l	24.0	500	2000	IS:3025 (P 16) 1984 RA 2017
8	Temperature ,°C	26.0	--	–	IS:3025 (P 9)
9	Aluminium as Al, mg/l	<0.01	0.03	0.2	IS:3025 (P 55) 2003 RA 2019
10	Ammonia (as total ammonia-N) mg/l	<0.1	0.5	0.5	IS.3025 (P 34) 1988 RA 2019
11	Anionic Detergents as MBAS, mg/l	<0.1	0.2	1.0	Annexure-K of IS:13428 Amnt 11 2022
12	Barium as Ba mg/l	0.077	0.7	0.7	IS:3025 (P-2) 2019
13	Boron as B, mg/l	<0.1	0.5	2.4	IS:3025 (P-57) 2021
14	Calcium as Ca, mg/l	6.54	75	200	IS.3025(P 40) 1991 RA 2019
15	Copper as Cu, mg/l	0.009	1.0	1.5	IS:3025 (P-2) 2019
16	Chloride as Cl, mg/l	12.06	250	1000	IS:3025 (P 32) 1988 RA 2019
17	Fluoride as F, mg/l	<0.1	1.0	1.5	IS:3025 (P 60) 2008 RA 2019
18	Residual Free Chlorine, mg/l	<0.1	0.2	1.0	IS:3025 (P 26) 2021
19	Chloramines as Cl2,mg/l	<0.1	4.0	4.0	IS:3025 (P 26) 2021
20	Iron as Fe, mg/l	0.127	1.0	1.0	IS:3025 (P 2) 2019

ARSHIYA KOUSAR
Dy. Chemical
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/Fax : 25432968. E-mail : mesbng@gmail.com, www.enwtest.in

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Format No. : 10/Rev 06

ENVIRONMENTAL LABORATORY

(UNIT OF MINERAL ENGINEERING SERVICES)

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MoEF&CC(CPCB) under E(P) Act 1986 recognition valid upto 23-05-2025

TEST REPORT

Report No. ED000423061 Report Issued Date: 10/06/2023

TEST RESULTS

Sl. No.	Test Parameters	Results	ACCEPTABLE LIMITS AS PER IS:10500-2012	PERMISSIBLE LIMITS AS PER IS:10500-2012	Test Methods
21	Magnesium as Mg, mg/l	1.95	30	100	IS:3025 (P 46) 1994 RA 2019
22	Manganese as Mn, mg/l	0.009	0.1	0.3	IS:3025 (P 2) 2019
23	Mineral Oil, mg/l	<0.5	1.0	1.0	Clause 6 of IS:3025 (P-39) 2021
24	Nitrate as NO3, mg/l	1.64	45	45	IS:3025 (P 34) 1988 RA 2019
25	Phenolic Compounds as C6H5OH, mg/l	<0.001	0.001	0.002	IS:3025 (P 43) Sec 1 2022
26	Selenium as Se, mg/l	<0.005	0.01	0.01	IS:3025 (P 2) 2019
27	Silver as Ag ,mg/l	<0.005	0.1	0.1	IS:3025 (P 2) 2019
28	Molybdenum as Mo, mg/l	<0.001	0.07	0.07	IS: 3025 (P 2) 2019
29	Sulphate as SO4, mg/l	8.0	200	400	IS:3025 (P 24) Sec 1 2022
30	Sulphide as H2S, mg/l	<0.01	0.05	0.05	IS:3025 (P 29) :1988 RA 2019
31	Total Alkalinity as CaCO3, mg/l	25.0	200	600	IS:3025 (P 23) :1986 RA 2019
32	Total Hardness as CaCO3, mg/l	24.48	200	600	IS:3025 (P 21) :2009 RA 2019
33	Zinc as Zn, mg/l	0.038	5	15	IS:3025 (P 2) 2019
34	Cadmium as Cd, mg/l	<0.001	0.003	0.003	IS:3025 (P 2) 2019
35	Cyanide as CN,mg/l	<0.01	0.05	0.05	IS:3025 (P 27) Sec 1 2021
36	Lead as Pb, mg/l	<0.005	0.01	0.01	IS: 3025 (P 2) 2019
37	Mercury as Hg, mg/l	<0.0005	0.001	0.001	USEPA 200.7 Rev 4.4
38	Nickel as Ni, mg/l	<0.001	0.02	0.02	IS:3025 (P 2) 2019
39	Total Arsenic as As, mg/l	<0.002	0.01	0.01	IS:3025 (P 2) 2019
40	Sodium as Na, mg/l	10.0	--	--	IS:3025 (P 45) :1993 RA 2019
41	Potassium as K, mg/l	<1	--	--	IS:3025 (P 45)
42	Hexavalent Chromium as Cr+6, mg/l	<0.05	--	--	IS:3025 (P 52) 2014
43	Escherichia coli/100ml	Absent	--	--	IS:1622:1981
44	Total Coliforms/100ml	<1	--	--	IS:1622:1981

END OF REPORT

ANSHIYA KOUSAR
Dy. T.M. Chemical
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesblr@gmail.com, www.envtest.in

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Format No. : 10/Rev 06

ENVIRONMENTAL LABORATORY

(UNIT OF MINERAL ENGINEERING SERVICES)

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No:EPC/(CPCB) under E(P) Act 1986 recognition valid upto 23.05.2025

TEST REPORT

Issued To: :. Vedanta Ltd
Block-I Bicholim Mineral Block, Bicholim, Bardem, Lamgao,
Malgao & Sirigao Village, Bicholim Taluk,
North Goa-Goa

Report No. : ED000523061
Issue Date : 10/06/2023
Your ref. : LETTER
Ref.Date : 29/05/2023

Sample collected by : Environmental Laboratory Representative
Date of sample collection : 29/05/2023
Particulars of sample collected : GW-6 Assonora Village Well Water
Date of sample receipt : 01/06/2023
Lab Code : ED/23/06/1-0005
Sampling Type : Grab
Sample quantity : 10 Ltrs
Date of Commencement of testing : 01/06/2023
Date of Completion of testing : 10/06/2023
Condition of the sample : Satisfactory

TEST RESULTS

Sl. No.	Test Parameters	Results	ACCEPTABLE LIMITS AS PER IS:10500-2012	PERMISSIBLE LIMITS AS PER IS:10500-2012	Test Methods
1	Color, Hazen Units	1.0	5.0	15	IS:3025 (P 4) 2021
2	Odour	Agreeable	Agreeable	Agreeable	IS:3025 (P 5) 2018
3	pH	6.08	6.5 to 8.5	6.5 to 8.5	IS:3025 (P 11) 2022
4	Taste	Agreeable	Agreeable	Agreeable	IS:3025 (P 8) 1984 RA 2017
5	Turbidity as NTU	0.8	1	5	IS:3025 (P 10) 1984 RA 2017
6	Conductivity,µmhos/cm	105.0	--	--	IS:3025 (P 14)
7	Total Dissolved Solids, mg/l	36.0	500	2000	IS:3025 (P 16) 1984 RA 2017
8	Temperature ,°C	25.0	--	--	IS:3025 (P 9)
9	Aluminium as Al, mg/l	<0.01	0.03	0.2	IS:3025 (P 55) 2003 RA 2019
10	Ammonia (as total ammonia-N) mg/l	<0.1	0.5	0.5	IS:3025 (P 34) 1988 RA 2019
11	Anionic Detergents as MBAS, mg/l	<0.1	0.2	1.0	Annexure-K of IS:13428 Aman 11 2022
12	Barium as Ba mg/l	0.022	0.7	0.7	IS:3025 (P-2) 2019
13	Boron as B, mg/l	<0.1	0.5	2.4	IS:3025 (P-57) 2021
14	Calcium as Ca, mg/l	8.17	75	200	IS:3025(P 40) 1991 RA 2019
15	Copper as Cu, mg/l	<0.005	0.05	1.5	IS:3025 (P-2) 2019
16	Chloride as Cl, mg/l	50.33	250	1000	IS:3025 (P 32) 1988 RA 2019
17	Fluoride as F, mg/l	<0.1	1.0	1.5	IS:3025 (P 60) 2008 RA 2019
18	Residual Free Chlorine, mg/l	<0.1	0.2	1.0	IS:3025 (P 26) 2021
19	Chloramines as Cl2,mg/l	<0.1	4.0	4.0	IS:3025 (P 26) 2021
20	Iron as Fe, mg/l	0.051	1.0	1.0	IS:3025 (P 2) 2019

ARSHIYA KOUSAR
B.Sc, M.Sc, Chemical
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesblng@gmail.com, www.envtest.in

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ENVIRONMENTAL LABORATORY

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ISO 45001:2018

TEST REPORT

Report No.ED000523061 Report Issued Date: 10/06/2023

TEST RESULTS

Sl. No.	Test Parameters	Results	ACCEPTABLE LIMITS AS PER IS:10500-2012	PERMISSIBLE LIMITS AS PER IS:10500-2012	Test Methods
21	Magnesium as Mg, mg/l	3.96	30	100	IS:3025 (P 46) 1994 RA 2019
22	Manganese as Mn, mg/l	0.019	0.1	0.3	IS:3025 (P 2) 2019
23	Mineral Oil, mg/l	<0.5	1.0	1.0	Clause 6 of IS:3025 (P-39) 2021
24	Nitrate as NO3, mg/l	2.4	45	45	IS:3025 (P 34) 1988 RA 2019
25	Phenolic Compounds as C6H5OH, mg/l	<0.001	0.001	0.002	IS:3025 (P 43) Sec 1 2022
26	Selenium as Se, mg/l	<0.005	0.01	0.01	IS:3025 (P 2) 2019
27	Silver as Ag ,mg/l	<0.005	0.1	0.1	IS:3025 (P 2) 2019
28	Molybdenum as Mo, mg/l	<0.001	0.07	0.07	IS: 3025 (P 2) 2019
29	Sulphate as SO4, mg/l	6.8	200	400	IS:3025 (P 24) Sec 1 2022
30	Sulphide as H2S, mg/l	<0.01	0.05	0.05	IS:3025 (P 29) :1999 RA 2019
31	Total Alkalinity as CaCO3, mg/l	25.0	200	600	IS:3025 (P 23) :1986 RA 2019
32	Total Hardness as CaCO3, mg/l	30.72	200	600	IS:3025 (P 21) :2009 RA 2019
33	Zinc as Zn, mg/l	0.024	5	15	IS:3025 (P 2) 2019
34	Cadmium as Cd, mg/l	<0.001	0.003	0.003	IS:3025 (P 2) 2019
35	Cyanide as CN,mg/l	<0.01	0.05	0.05	IS:3025 (P 27) Sec 1 2021
36	Lead as Pb, mg/l	<0.005	0.01	0.01	IS: 3025 (P 2) 2019
37	Mercury as Hg, mg/l	<0.0005	0.001	0.001	USEPA 200.7 Rev 4.4
38	Nickel as Ni, mg/l	<0.001	0.02	0.02	IS:3025 (P 2) 2019
39	Total Arsenic as As, mg/l	<0.002	0.01	0.01	IS:3025 (P 2) 2019
40	Sodium as Na, mg/l	8.0	–	–	IS:3025 (P 45) :1993 RA 2019
41	Potassium as K, mg/l	<1	–	–	IS:3025 (P 45)
42	Hexavalent Chromium as Cr+6, mg/l	<0.03	–	–	IS:3025 (P 52) 2014
43	Escherichia coli/100ml	Absent	–	–	IS:1622:1981
44	Total Coliforms/100ml	<1	–	–	IS:1622.1981

END OF REPORT

ABDUL KOUSAR
Dy. Chemical
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesblng@gmail.com, www.envtest.in

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MoEFCC(CPCB) under E(P) Act 1986 recognition valid upto 23.05.2023

TEST REPORT

Issued To: ..Vedanta Ltd
Block-I Bicholim Mineral Block, Bicholim, Bardem, Lamgao, Mulgao & Sirigao Village, Bicholim Taluk, North Goa-Goa

Report No.: ED0006230061
Issue Date : 10/06/2023
Your ref. : LETTER
Ref.Date : 28/05/2023

Sample collected by : Environmental Laboratory Representative
Date of sample collection : 28/05/2023
Particulars of sample collected : GW-9 Pilgao Village Well Water
Date of sample receipt : 01/06/2023
Lab Code : ED/23/06/1-0006
Sampling Type : Grab
Sample quantity : 10 Ltrs
Date of Commencement of testing : 01/06/2023
Date of Completion of testing : 10/06/2023
Condition of the sample : Satisfactory

TEST RESULTS

Sl. No.	Test Parameters	Results	ACCEPTABLE LIMITS AS PER IS:10500-2012	PERMISSIBLE LIMITS AS PER IS:10500-2012	Test Methods
1	Color, Hazen Units	<1	5.0	15	IS 3025 (P 4) 2021
2	Odour	Agreeable	Agreeable	Agreeable	IS:3025 (P 5) 2018
3	pH	5.80	6.5 to 8.5	6.5 to 8.5	IS:3025 (P 11) 2022
4	Taste	Agreeable	Agreeable	Agreeable	IS:3025 (P 8) 1984 RA 2017
5	Turbidity as NTU	0.8	1	5	IS:3025 (P 10) 1984 RA 2017
6	Conductivity,µmhos/cm	82.0	–	–	IS:3025 (P 14)
7	Total Dissolved Solids, mg/l	90.0	500	2000	IS:3025 (P 16) 1984 RA 2017
8	Temperature ,°C	25.0	–	–	IS:3025 (P 9)
9	Aluminium as Al, mg/l	<0.01	0.03	0.2	IS:3025 (P 55) 2003 RA 2019
10	Ammonia (as total ammonia-N) mg/l	<0.1	0.5	0.5	IS:3025 (P 34) 1988 RA 2019
11	Anionic Detergents as MBAS, mg/l	<0.1	0.2	1.0	Annexure-K of IS:13428 Amd 11 2022
12	Barium as Ba mg/l	0.076	0.7	0.7	IS:3025 (P-2) 2019
13	Boron as B, mg/l	<0.1	0.5	2.4	IS:3025 (P-57) 2021
14	Calcium as Ca, mg/l	6.54	75	200	IS:3025(P 40) 1991 RA 2019
15	Copper as Cu, mg/l	<0.005	0.05	1.5	IS:3025 (P-2) 2019
16	Chloride as Cl, mg/l	30.20	250	1000	IS:3025 (P 32) 1988 RA 2019
17	Fluoride as F, mg/l	0.2	1.0	1.5	IS:3025 (P 60) 2008 RA 2019
18	Residual Free Chlorine, mg/l	<0.1	0.2	1.0	IS:3025 (P 26) 2021
19	Chloramines as Cl2,mg/l	<0.1	4.0	4.0	IS:3025 (P 26) 2021
20	Iron as Fe, mg/l	0.092	1.0	1.0	IS:3025 (P 2) 2019

ARUNESH KOLSAR
Dy. T.M. Chemical
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesbng@gmail.com, www.envtest.in

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MoEFCC (CPCB) under E(P) Act 1986 Recognition valid upto 23.06.2023

ISO 45001:2018

TEST REPORT

Report No. ED0000623061 Report Issued Date: 10/06/2023

TEST RESULTS

Sl. No.	Test Parameters	Results	ACCEPTABLE LIMITS AS PER IS:10500-2012	PERMISSIBLE LIMITS AS PER IS:10500-2012	Test Methods
21	Magnesium as Mg, mg/l	3.47	30	100	IS:3025 (P 46) 1994 RA 2019
22	Manganese as Mn, mg/l	0.028	0.1	0.3	IS:3025 (P 2) 2019
23	Mineral Oil, mg/l	<0.5	1.0	1.0	Clause 6 of IS:3025 (P-39) 2021
24	Nitrate as NO3, mg/l	2.2	45	45	IS:3025 (P 34) 1988 RA 2019
25	Phenolic Compounds as C6H5OH, mg/l	<0.001	0.001	0.002	IS:3025 (P 43) Sec 1 2022
26	Selenium as Se, mg/l	<0.005	0.01	0.01	IS:3025 (P 2) 2019
27	Silver as Ag ,mg/l	<0.005	0.1	0.1	IS:3025 (P 2) 2019
28	Molybdenum as Mo, mg/l	<0.001	0.07	0.07	IS: 3025 (P 2) 2019
29	Sulphate as SO4, mg/l	8.40	200	400	IS:3025 (P 24) Sec 1 2022
30	Sulphide as H2S, mg/l	<0.01	0.05	0.05	IS:3025 (P 29) :1986 RA 2019
31	Total Alkalinity as CaCO3, mg/l	20.0	200	600	IS:3025 (P 23) :1986 RA 2019
32	Total Hardness as CaCO3, mg/l	30.6	200	600	IS:3025 (P 21) :2009 RA 2019
33	Zinc as Zn, mg/l	0.014	5	15	IS:3025 (P 2) 2019
34	Cadmium as Cd, mg/l	<0.001	0.003	0.003	IS:3025 (P 2) 2019
35	Cyanide as CN,mg/l	<0.01	0.05	0.05	IS:3025 (P 27) Sec 1 2021
36	Lead as Pb, mg/l	<0.005	0.01	0.01	IS: 3025 (P 2) 2019
37	Mercury as Hg, mg/l	<0.0005	0.001	0.001	USEPA 200.7 Rev 4.4
38	Nickel as Ni, mg/l	<0.001	0.02	0.02	IS:3025 (P 2) 2019
39	Total Arsenic as As, mg/l	<0.002	0.01	0.01	IS:3025 (P 2) 2019
40	Sodium as Na, mg/l	11.0	--		IS:3025 (P 45) :1993 RA 2019
41	Potassium as K, mg/l	<1	--		IS:3025 (P 45)
42	Hexavalent Chromium as Cr+6, mg/l	<0.03	--	--	IS:3025 (P 52) 2014
43	Escherichia coli/100ml	Absent	-	-	IS:1622:1981
44	Total Coliforms/100ml	<1	-	-	IS:1622:1981

END OF REPORT

ARSHIYA KOUSAR
Dy. T.M. Chemical
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesbng@gmail.com, www.envtest.in

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ENVIRONMENTAL LABORATORY

(UNIT OF MINERAL ENGINEERING SERVICES)

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MoEFCC(CPCB) under E(P) Act 1986 recognition valid upto 23.05.2023

TEST REPORT

Issued To: Vedanta Ltd
B.Block-I Bicholim Mineral Block, Bicholim, Bardora, Luxgao, Mulgao & Salgao Village, Bicholim Taluk
North Goa-Goa

Report No. : ED000723061
Issue Date : 10/06/2023
Your ref. : LETTER
Ref.Date : 29/05/2023

Sample collected by : Environmental Laboratory Representative
Date of sample collection : 29/05/2023
Particulars of sample collected : GW-10 Mayem Village Well Water
Date of sample receipt : 01/06/2023
Lab Code : ED/23/06/1-0007
Sampling Type : Water
Sample quantity : 10 Ltrs
Date of Commencement of testing : 01/06/2023
Date of Completion of testing : 10/06/2023
Condition of the sample : Satisfactory

TEST RESULTS

Sl. No.	Test Parameters	Results	ACCEPTABLE LIMITS AS PER IS:10500-2012	PERMISSIBLE LIMITS AS PER IS:10500-2012	Test Methods
1	Color, Hazen Units	<1	5.0	15	IS:3025 (P 4) 2021
2	Odour	Agreeable	Agreeable	Agreeable	IS:3025 (P 5) 2018
3	pH	6.28	6.5 to 8.5	6.5 to 8.5	IS:3025 (P 11) 2022
4	Taste	Agreeable	Agreeable	Agreeable	IS:3025 (P 8) 1984 RA 2017
5	Turbidity as NTU	0.9	1	5	IS:3025 (P 10) 1984 RA 2017
6	Conductivity,µmho/cm	91.0	-	-	IS:3025 (P 14)
7	Total Dissolved Solids, mg/l	20.0	500	2000	IS:3025 (P 16) 1984 RA 2017
8	Temperature ,°C	25.0	-	-	IS:3025 (P 9)
9	Aluminium as Al, mg/l	<0.01	0.03	0.2	IS:3025 (P 55) 2003 RA 2018
10	Ammonia (as total ammonia-N) mg/l	<0.1	0.5	0.5	IS:3025 (P 34) 1988 RA 2019
11	Anionic Detergents as MBAS, mg/l	<0.1	0.2	1.0	Annexure-K of IS:13428 Amd 11 2022
12	Barium as Ba mg/l	0.040	0.7	0.7	IS:3025 (P-2) 2019
13	Boron as B, mg/l	<0.1	0.5	2.4	IS:3025 (P-57) 2021
14	Calcium as Ca, mg/l	4.80	75	200	IS:3025(P 40) 1991 RA 2019
15	Copper as Cu, mg/l	<0.005	0.05	1.5	IS:3025 (P-2) 2019
16	Chloride as Cl, mg/l	14.06	250	1000	IS:3025 (P 32) 1988 RA 2019
17	Fluoride as F, mg/l	<0.1	1.0	1.5	IS:3025 (P 60) 2008 RA 2018
18	Residual Free Chlorine, mg/l	<0.1	0.2	1.0	IS:3025 (P 26) 2021
19	Chloramines as Cl2,mg/l	<0.1	4.0	4.0	IS:3025 (P 26) 2021
20	Iron as Fe, mg/l	0.061	1.0	1.0	IS:3025 (P 2) 2019

ARSHIYA KOUSAR
Dy. T.M. Chemist
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968, E-mail : mesbng@gmail.com, www.envtest.in

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TEST REPORT

Report No. ED000723061 Report Issued Date: 10/06/2023

TEST RESULTS

Sl. No.	Test Parameters	Results	ACCEPTABLE LIMITS AS PER IS:10500-2012	PERMISSIBLE LIMITS AS PER IS:10500-2012	Test Methods
21	Magnesium as Mg, mg/l	1.99	30	100	IS:3025 (P 46) 1994 RA 2019
22	Manganese as Mn, mg/l	<0.001	0.1	0.3	IS:3025 (P 2) 2019
23	Mineral Oil, mg/l	<0.5	1.0	1.0	Clause 8 of IS:3025 (P-39) 2021
24	Nitrate as NO3, mg/l	0.6	45	45	IS:3025 (P 34) 1988 RA 2019
25	Phenolic Compounds as C6H5OH, mg/l	<0.001	0.001	0.002	IS:3025 (P 43) Sec 1 2022
26	Selenium as Se, mg/l	<0.005	0.01	0.01	IS:3025 (P 2) 2019
27	Silver as Ag ,mg/l	<0.005	0.1	0.1	IS:3025 (P 2) 2019
28	Molybdenum as Mo, mg/l	<0.001	0.07	0.07	IS: 3025 (P 2) 2019
29	Sulphate as SO4, mg/l	7.40	200	400	IS:3025 (P 24) Sec 1 2022
30	Sulphide as H2S, mg/l	<0.01	0.05	0.05	IS.3025 (P 29) :1986 RA 2019
31	Total Alkalinity as CaCO3, mg/l	20.0	200	600	IS:3025 (P 23) :1986 RA 2019
32	Total Hardness as CaCO3, mg/l	20.4	200	600	IS:3025 (P 21) :2009 RA 2019
33	Zinc as Zn, mg/l	0.009	5	15	IS:3025 (P 2) 2019
34	Cadmium as Cd, mg/l	<0.001	0.003	0.003	IS:3025 (P 2) 2019
35	Cyanide as CN,mg/l	<0.01	0.05	0.05	IS.3025 (P 27) Sec 1 2021
36	Lead as Pb, mg/l	<0.005	0.01	0.01	IS: 3025 (P 2) 2019
37	Mercury as Hg, mg/l	<0.0005	0.001	0.001	USEPA 200.7 Rev 4.4
38	Nickel as Ni, mg/l	<0.001	0.02	0.02	IS:3025 (P 2) 2019
39	Total Arsenic as As, mg/l	<0.002	0.01	0.01	IS:3025 (P 2) 2019
40	Sodium as Na, mg/l	12.0	--	--	IS:3025 (P 45) :1993 RA 2019
41	Potassium as K, mg/l	<1	--	--	IS:3025 (P 45)
42	Hexavalent Chromium as Cr+6, mg/l	<0.03	--	--	IS:3025 (P 52) 2014
43	Escherichia coli/100ml	Absent	--	--	IS:1622:1981
44	Total Coliform/100ml	<1	--	--	IS:1622:1981

END OF REPORT

ARCHANA KOUSAR
M. Tech. Chemical
Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesbng@gmail.com, www.envtest.in

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ISO 45001:2018

TEST REPORT

GROUND WATER LEVEL

Project : Block I - Bicholim Mineral Block

Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages,

Bicholim Taluka, North Goa

Client : Vedanta Limited

Code No.	Locations	Date of Samples	Depth (M)
GW1	Well water Bicholim	29.05.2023	6.10
GW2	Well water Sarvan village	29 05 2023	5.50
GW3	Well water Lamgao village	29.05.2023	4.15
GW4	Well water Mulgao village	29.05.2023	1 27
GW5	Well water Mavlinge Village	29.05.2023	5.18
GW6	Well water Nanoda village	29.05.2023	2.60
GW7	Well water Sircaim village	29.05.2023	5.53
GW8	Well water Assonora	29.05.2023	2.56
GW9	Well water Pilgao village	29.05 2023	9.78
GW10	Well water Mayem village	29 05 2023	5.84

Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
Phone : 080-25432969 Tel/fax : 25432968. E-mail : mesbng@gmail.com, www.envtest.in

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1978

1966

388 / 789

Table No. 33

SOIL TEST REPORT

ENVIRONMENTAL LABORATORY

(UNIT OF MINERAL ENGINEERING SERVICES)

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MoEFCC(CPCB) under E(P) Act 1986 recognition valid upto 23.05.2025

ISO 45001:2018

TEST REPORT

Project : Block I - Bicholim Mineral Block, Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages, Bicholim Taluka, North Goa

Client : Vedanta Limited

Date of samples : 06.05.2023

Date of Report : 06.06.2023

Lab code :

Sl. No.	PARAMETERS	Unit	S1	S2	S3	S4	S5	S6	S7	– Normal	– High
PHYSICAL PROPERTIES											
1	Colour		Red soil	Red soil	Red soil	Red soil	Red soil	Red soil	Red soil	--	--
2	Textural class	–	Sandy CLAY	Clay Loam	Clay Loam	CLAY Loam	Clay Loam	CLAY Loam	CLAY Loam	–	–
3	Size Distribution										
	Sand	%	48.60%	44.96%	34.50%	42.62%	39.63%	36.55%	34.68%	--	--
	Silt	%	27.60%	35.46%	33.63%	34.18%	34.85%	34.62%	35.62%	–	–
	Clay	%	23.80%	19.58%	31.87%	23.20%	25.52%	28.83%	29.75%	--	--
4	Moisture Content	%	14.30	11.3	10.6	11.65	9.82	9.48	8.96	–	–
5	Bulk Density	gm/cc	1.36	1.44	1.30	1.44	1.31	1.41	1.38	–	--
6	Porosity	%	48.87	45.80	51.13	45.80	50.60	46.99	48.12	–	--
7	Water holding capacity	%	35.26	30.26	33.63	30.67	30.42	31.05	32.56	--	--
8	pH	–	5.78	5.63	5.48	5.58	5.44	5.65	5.78	6.5	>8.5
9	EC	dS/m	0.296	0.315	0.296	0.315	0.296	0.318	0.28	1.0 to 2.0	>2
Chemical Properties											
10	Organic Carbon	%	0.76	0.65	1.09	0.62	0.75	1.18	1.08	0.5 to 0.75	>0.75
11	Nitrogen as N	Kg/Ha	218	206	200	216	220	275	226	280-560	>560
12	Phosphorous as P	Kg/Ha	17.6	14.3	15.6	14.6	16.5	14.6	17.8	9 to 22	>22
13	Potassium as K_2O	Kg/Ha	255	247	230	240	260	246	263	50 to 120	>120
14	Calcium as Ca^{++}	mg/kg	760	480	630	790	680	768	586	--	--
15	Magnesium as Mg^{++}	mg/kg	136	128	134	112	146	210	140	–	--
16	Sodium as Na_2O	mg/kg	170	172	160	144	162	156	160	--	--
17	Chloride as Cl	mg/kg	196	200	185	164	190	176	170	--	–
18	Sodium absorption ratio	%	1.11	1.34	1.33	0.94	1.10	0.95	1.35	--	--
19	Salinity	ppt	0.35	0.36	0.33	0.30	0.34	0.32	0.31	–	–
20	Sulphate as SO_4	%	116	105	120	110	105	114	128	--	--
Micro- nutrients											
21	Boron (as B)	mg/kg	0.28	0.36	0.47	0.35	0.29	0.18	0.34	--	--
22	Zinc (as Zn)	mg/kg	0.22	0.16	0.42	0.35	0.47	0.27	0.28	–	--
23	Copper (as Cu)	mg/kg	0.24	0.22	0.25	0.18	0.23	0.27	0.24	--	–
24	Iron (as Fe)	%	2.63	3.42	2.48	4.35	4.19	3.65	3.27	--	--

Sample Code :
S1 -Top Soil ML Area
S2- Lamgao village Agricultural Land
S3 -Fairly dense forest Cashew Plantation Land near Mapem
S4 - Sirsaim village Agricultural Land
S5 -Pilgao village Agricultural Land
S6 -Sirgao Agricultural Land
S7 - Mulgao Village Agricultural Land

Govt. Analyst / Authorised Signatory

948, 2nd Cross, St. Thomas Town Post, Kammanahalli, Bangalore - 560 084.
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Note : This report is subject to the terms and conditions mentioned overleaf.

GOVERNMENT OF GOA
Office of the Deputy Conservator of Forests,
North Goa Division,
Ponda – Goa, 403 401

Ph No: 0832-2312856 Fax No: 2312095 email:- dcfnorth-forest.goa@nic.in

No.5/FCA/GEN/F& F/DCFN/TECH/2022-23/ 11 Dated: 04/04/2023

To,
Vedanta Limited
Sesa Goa iron Ore,
Sesa Ghor,
EDC Complex, Patto,
Panjim-Goa,
403001

Sub:- :- Authenticated list of Flora and Fauna - reg.

Sir,

With reference to your letter dated 15/02/2023, please find enclosed herewith the list of Flora & Fauna species present in core and buffer zone Iron Ore Mine of Vedanta Limited Ltd., of Bicholim Taluka , North Goa District, Goa State duly authenticated by Forest personel.

Yours faithfully,

Dy. Conservator of Forests,
North Goa Division,
Ponda- Goa.

Encl:- As above.

AUTHENTICATED LIST OF FLORA AND FAUNA IN CORE AND BUFFER ZONE OF BLOCK I BICHOLIM MINERAL BLOCK OF VEDANTA LIMITED, BICHOLIM TALUKA, NORTH GOA

A. List of flora (trees, shrubs, and herbs) reported from Core zone

Sl. No	Species name	Family	Common Name
		TREE	
1	*Anacardium occidentale*	Anacardiaceae	Cashew
2	*Acacia auriculiformis*	Fabaceae	Acacia
3	*Acacia mangium*	Fabaceae	Acacia
4	*Eucalyptus sps*	Myrtaceae	Nilgiri
5	*Casuringa equisettifolia*	Casuarinaceae	Suru
6	*Alstonia scholaris*	Apocynaceae	Saten
7	*Samanea saman*	Fabacaeae	Rain tree
8	*Bauhinia racemosa*	Fabacaeae	Apto
9	*Artocarpus heterophyllus*	Moraceae	Phanas
10	*Bombox ceiba*	Bombacaceae	Sanwar
11	*Delonix regia*	Fabacaeae	Gulmohar
12	*Emblica officinalis*	Phyllanthaceae	Aonia
13	*Garcinia indica*	Clusiaceae	Kokum
14	*Gmelina arborea*	Lamiaceae	Shivan
14	*Leucaena leucocephala*	Fabacaeae	Subabul
15	*Mangifera indica*	Anacardiaceae	Mango
16	*Syzygium cumini*	Myrtaceae	Jamun
17	*Trema orientalis*	Cannabaceae	Charcoal tree
18	*Acacia catechu*	Fabacaeae	Khair
19	*Canthium dicoccum*	Rubiaceae	Ceylon boxwood
20	*Ziziphus mauritiana*	Rhamnaceae	Indian jujube
21	*Macaranga peltata*	Euphorbiaceae	Chandada
		SHRUBS	
1	*Acacia paniculata*	Mimosaceae	sickle wattle
2	*Calotropis gigantean*	Asclepidiaceae	crown flower
3	*Carissa congesta*	Apocynaceae	Karamda
4	*Crotolaria virosa.*	Fabacaeae	Rattlepod
5	*Helicteres isora*	Malvaceae	Marodphali
6	*Lantana camara*	Verbenaceae	Lantana
7	*Ziziphus oenoplea*	Rhamnaceae	Jackal jujube
		HERBS AND CLIMBERS	
1	*Asparagus racemosa*	Asparagaceae	Satavar
2	*Bidens biternata*	Asteraceae	Chirchitta
3	*Ipomea cmuricata*	Convolvulaceae	Bhingari
4	*Ocimum sanctum*	Lamiaceae	*Tamole*
5	*Parthenium hysterophorus*	Asteraceae	Santa-Maria
6	*Smilax zeylanica*	Smilacaceae	Kumarika

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RANGE FOREST OFFICER
KERI-SANQUELIM
GOA

1001C

AUTHENTICATED LIST OF FLORA AND FAUNA IN CORE AND BUFFER ZONE OF BLOCK I BICHOLIM MINERAL BLOCK OF VEDANTA LIMITED, BICHOLIM TALUKA, NORTH GOA

B. List of faunal species (Birds, Mammals and Reptiles) found in the core zone

Sl. No.	Common name	Scientific name	Family	IUCN / WPA status
	BIRDS			
1	Common Iora	*Aegithina tiphia*	Irenidae	R/IV
2	Common Myna	*Acridotheres tristis*	Sturnidae	R/IV
3	Crow Pheasant	*Centropus sinensis*	Cuculidae	R/IV
4	Green Bee Eater	*Merops orientalis*	Meropidae	MR/IV
5	House Crow	*Corvus splendens*	Corvidae	R/IV
6	House Sparrow	*Passer domesticus*	Passeridae	R/IV
7	House Swift	*Apus affinis*	Apodidae	R/IV
8	Indian Robin	*Saxicoloides fulicata*	Turdinae	R/IV
9	Jungle Crow	*Corvus macrorhynchos*	Corvidae	R/IV
10	Jungle Myna	*Acridotheres fuscus*	Sturnidae	R/IV
11	Red-wattled Lapwing	*Vanellus indicus*	Charadriidae	R/IV
12	Red-whiskered Bulbul	*Pycnonotus jocosus*	Pycnonotidae	R/IV
	MAMMALS			
13	Indian Hare	*Lepus nigricollis*	Leporidae	Lower risk/ IV
14	Rat	*Rattus rattus*	Muridae	Sch-V
	REPTILES			
15	Green Forest lizard	*Calotes calotes*	Agamidae	Common
16	Roux's Forest lizard	*Calotes rouxii*	Agamidae	Common
17	Garden lizard	*Calotes elloti*	Agamidae	Common

P. Singh
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AUTHENTICATED LIST OF FLORA AND FAUNA IN CORE AND BUFFER ZONE OF BLOCK I BICHOLIM MINERAL BLOCK OF VEDANTA LIMITED, BICHOLIM TALUKA, NORTH GOA

C. List of Trees growing in buffer zone

Sl.No.	Species name	Family
1	*Acacia catechu (L.f.) Willd. var.*	Fabaceae
2	*Adina cordifolia Hook. f. ex Brandis*	Dipterocarpaceae
3	*Alstonia scholaris (L.) R.Br.*	Apocynaceae
4	*Annona squamosa L.*	Annonaceae
5	*Arlocapus lakoochu Wall. ex Roxb*	Moraceae
6	*Artocarpus heterophyllus Lam.*	Moraceae
7	*Artocapus integrifolius Auct.*	Moraceae
8	*Bischofia javanica Bl.*	Phyllanthaceae
9	*Bombax malabaricum DC.*	Bombacaceae
10	*Buchanania latifolia Roxb.*	Anacardiaceae
11	*Butea monosperma (Lam.) Taub.*	Fabaceae
12	*Caesalpinia bonducella (L.) Fleming*	Caesalpinaceae
13	*Canthium dicoccum (Gaert.) T. & B.*	Rubiaceae
14	*Careya arborea Roxb.*	Lecythidaceae
15	*Caryota urens L. (Kithul) sap.*	Arecaceae
16	*Cassia fistula L.*	Fabacaeae
17	*Casearia ovoidea Sleumer*	Salicaceae
18	*Cassia siamea Lam.*	Fabaceae
19	*Celtis cinnamomea Lindl. ex Planch.*	Ulmaceae
20	*Clerodendron sp.,*	Lamiaceae
21	*Cordia wallichii L.*	Boraginaceae
22	*Dalbergia calofolia Roxb.*	Fabaceae
23	*Delonix regia (Hk.) Raf.*	Fabaceae
24	*Diospyros montana Roxb.*	Ebenaceae
25	*Erythrina indica L.*	Fabaceae
26	*Ficus arnottiana (Miq.) Miq.*	Moraceae
27	*Ficus glomerata Roxb.*	Moraceae
28	*Ficus microcarpa L.f.*	Moraceae
29	*Flueggea leucopyrus Willd.*	Phyllanthaceae
30	*Gliricidia sepium (Jacq.) Kunth*	Fabaceae
31	*Glochidion velutinum L.*	Euphorbiaceae
32	*Grewia robusta L.*	Tiliaceae
33	*Grewia tiliifolia Vahl.*	Tiliaceae
34	*Holoptelea integrifolia (Roxb.) Planch.*	Ulmaceae
35	*Holarrhena pubescens (Buch.-Ham.)*	Apocynaceae

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AUTHENTICATED LIST OF FLORA AND FAUNA IN CORE AND BUFFER ZONE OF BLOCK I BICHOLIM MINERAL BLOCK OF VEDANTA LIMITED, BICHOLIM TALUKA, NORTH GOA

98/C

36	*Hopia perviflora Bedd.*	Lythraceae
37	*Hydnocarpus wightiana Bl.*	Achariaceae
38	*Lannea grandis (Dennst.) Engl.*	Anacardiaceae
39	*Macaranga peltata (Roxb.) Muell.*	Euphorbiaceae
40	*Mallotus philippensis (Lam.) Muell.*	Euphorbiaceae
41	*Mangifera indica L.*	Anacardiaceae
42	*Memecylon umbellatum Burm.*	Melastomataceae
43	*Mitragyna parviflora (Roxb.) Korth.*	Rubiaceae
44	*Olea dioica L.*	Oleaceae
45	*Peltophorum pterocarpum (DC.)*	Fabaceae
46	*Polyalthia longifolia Sonn.*	Annonaceae
47	*Pterocarpus marsupium Roxb.*	Fabaceae
48	*Radermachera xylocarpa (Roxb.) Schm.*	bignoniaceae
49	*Randia dumetorum L.*	Rubiaceae
50	*Sapindus emarginatus L.*	Sapindaceae
51	*Schleichera oleosa (Lour.) Oken*	Euphorbiaceae
52	*Semecarpus anacardium L. f.*	Anacardiaceae
53	*Spondias mangifera Willd.*	Anacardiaceae
54	*Syzygium caryophyllatum (L.) Alton*	Myrtaceae
55	*Syzygium cumini (L.) Skeels*	Myrtaceae
56	*Terminalia paniculata Roth*	Combretaceae
57	*Thespesia populnea (L.) Correa*	Malvaceae
58	*Trema orientalis (L.) Bl.*	Cannabinaceae
59	*Vitex alticima L. f.*	Verbenaceae
60	*Wrightia tinctoria*	Apocynaceae
61	*Xylia xylocarpa (Roxb.) Taub.*	Mimosaceae
62	*Ziziphus mauritiana Lam.*	Rhamnaceae

D. List of Shrubs found in buffer zone

Sl.No.	Species name	Family
1	*Acacia paniculata Willd.*	Mimosaceae
2	*Amaranthus spinosus L.*	Amarantheceae
3	*Annona murocata L.*	Annonaceae
4	*Calotropis gigantean L.*	Asclepidiaceae
5	*Canthium parviflorum Lam.*	Rubiaceae
6	*Carissa congesta L.*	Apocynaceae
7	*Chromolaena odorata (L.) K.R.*	Astraceae
8	*Crotolaria virosa (Roxb.) Bake.*	Fabacaeae

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AUTHENTICATED LIST OF FLORA AND FAUNA IN CORE AND BUFFER ZONE OF BLOCK I BICHOLIM MINERAL BLOCK OF VEDANTA LIMITED, BICHOLIM TALUKA, NORTH GOA

9	*Dendrocalamus strictus*	Poaceae
10	*Helictris isora*	Malvaceae
11	*Ixora brachiata Roxb. ex DC*	Rubiaceae
12	*Jatropha gossypiifolia*	Euphorbiaceae
13	*Lantana camara L.*	Verbenaceae
14	*Rosa chinensis Jacq.*	Rosaceae
15	*Vitex negundo*	Verbenaceae
16	*Ziziphus oenoplea Miller.*	Rhamnaceae

E. List of herbs, climbers and grass species reported in the buffer zone

Sl. No	*Species name*	Family
1	*Acrostichum aureum*	Pteridaceae
2	*Ageratum conyzoides*	Astraceae
3	*Asparagus racemosa*	Asparagaceae
4	*Atlantia species*	Rutaceae
5	*Bidens biternata*	Asteraceae
6	*Borreria articulata*	Rubiaceae
7	*Cassia tora*	Caesalpinaceae
8	*Cymbopogon citratus*	Poaceae
9	*Cyperus difformis*	Cyperaceae
10	*Ipomea cmuricata*	Convolvulaceae
11	*Ocimum sanctum*	Lamiaceae
12	*Parthenium spp*	Asteraceae
13	*Premna coriacea*	Verbenaceae
14	*Sida cordifolia*	Malvaceae
15	*Solanum indicum*	Solanaceae

F. List of Mangrove species found in buffer zone

Sl. No.	Species Name	Family
1	*Rhizophora mucronata*	Rhizophoraceae
2	*Rhizophora apiculata*	Rhizophoraceae
3	*Avicennia marina*	Acanthaceae
4	*Avicennia officinalis*	Acanthaceae
5	*Sonneratia alba*	Lythraceae
6	*Sonneratia caseolaris*	Lythraceae
7	*Ceriops tagal*	Rhizophoraceae
8	*Bruguira gymnorhiza*	Rhizophoraceae
9	*Bruguiera cylindrica*	Rhizophoraceae
10	*Kandelia candel*	Rhizophoraceae
11	*Lumnitzera racemosa*	Combretaceae

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12	*Aegiceras corniculatum*	Primulaceae
13	*Dolichandron spathecae*	Bignoniaceae
14	*Excocaria agalocha*	Euphorbiaceae
15	*Acanthus ilicifolius*	Acanthaceae
16	*Acrostichum aureum*	Pteridaceae

G. List of flora species found in the avenue and human settlement

Sl. No	Species name	common name	Family	habit
1	*Tamarindus indica*	Tamrind/imli	Cesalpinaceae	Tree
2	*Annona reticulata*	Ramphal	Annonaceae	Tree
3	*Bambusa sp*	Bamboo	Bambocaceae	Tree
4	*Bougainvillea spectabilis*	Bouganvilla	Nyctaginaceae	Tree
5	*Cassia fistula*	Amaltas	Fabaceae	Tree
6	*Dalbergia latifolia*	Shisam/ Shisoo	Fabaceae	Tree
7	*Delonix regia*	Gulmohar	Fabaceae	Tree
8	*Phyllanthus emblica*	Awala/.Avala	Phyllanthaceae	Tree
9	*Psidium guajava*	Peru/Gauva	Myrtaceae	Tree
10	*Samanea saman*	Rain tree	Fabaceae	Tree
11	*Sapindus mukorossi*	Ritha/Reetha	Sapindaceae	Tree
12	*Swetenia mahagoni*	Mohagony	Meliaceae	Tree
13	*Syzygium cumini*	Jamun	Myrtaceae	Tree
14	*Terminalia bellerica*	Ghoting/behada	Combretaceae	Tree
15	*Acacia auriculiformis*	Babul	Mimosaceae	Tree
16	*Garcinia indica*	kokum	Clusiaceae	Tree
17	*Pongamia pinnata*	Karuaini	Fabaceae	Tree
18	*Ficus benghalensis*	Banyan tree	Moraceae	Tree
19	*Ficus religiosa*	Peepal Tree	Moraceae	Tree
20	*Vitex negundo*	Nirgundi	Lamiaceae	Shrub
21	*Mucuna pruriens*	Velvet bean / Khaj-kuiri	Fabaceae	Climber
22	*Dioscorea bulbifera*	bitter yam	Dioscoreaceae	Climber
23	*Zornia diphylla*	Tow Leaf zornia	Fabaceae	Herb
24	*Justicia simplex*	shrimp plant/ water-willow	Acanthaceae	Herb
25	*Cynodon dactylo*	Bermuda grass	Poaceae	Grass

H. List of flora which are domesticated or cultivated from the farmland

Sl. No.	Species name	common name	Family	habit
1	*Annona reticulata*	Ramphal	Annonaceae	Tree
2	*Phyllanthus emblica*	Awala/.Avala	Phyllanthaceae	Tree
3	*Psidium guajava*	Peru/Gauva	Myrtaceae	Tree
4	*Carica papaya*	Caricaceae	Caricaceae	Tree

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5	*Musa paradisiaca*	Bannana	Musaceae	Tree
6	*Acacia auriculiformis*	Babul	Mimosaceae	Tree
7	*Anacardium occidentale*	Cashew	Anacardiaceae	Tree
8	*Areca catechu*	Areca Nut	Arecaceae	Tree
9	*Cocos nucifera*	Coconut	Arecaceae	Tree
10	*Garcinia indica*	Kokum	Clusiaceae	Tree
11	*Tamarindus indica*	Tamarind	Cesalpinaceae	Tree
12	*Mangifera indica*	Mango	Anacardiaceae	Tree
13	*Piper betle*	Betel leaves	Piperaceae	climber
14	*Oryza sativa*	Paddy	Poaceae	Herb

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I. List of fauna reported/recorded in buffer zone

Sl. No	Local Name	Scientific name	Family	IUCN Status/ WPA Schedule
Mammals				
1	Common grey mongoose	*Herpestes edwardsii*	Herpestidae	Lower risk/ IV
2	Indian Hare	*Lepus nigricollis*	Leporidae	Lower risk/ IV
3	Flying fox bat	*Pteropus giganteus*	Pteropodidae	Sch-V
4	Rat	*Rattus rattus*	Muridae	Sch-V
5	Indian porcupine	*Hystrix indica*	Hystricidae	Lower risk/IV
6	Wild boar	*Sus scrofa*	Suidae	Lower risk/III
7	Striped squirrel	*Funambulus palmarum*	Sciuridae	Sch-IV
8	Common leopard	*Panthera pardus*	Felidae	Lower risk/I
9	Small Indian civet	*Viverricula indica*	Viverridae	Lower risk/II
10	Bonnet macaque	*Macaca radiate*	Cercopithecidae	Lower risk/II
Reptiles				
1	Common Sand Boa	*Gongylophis conicus*	*Boidae*	Common
2	Montane trinket snake	*Coelognathus helena monticollaris*	*Colubridae*	Common
3	Indian rat Snake	*Ptyas muscosa*	*Colubridae*	Sch-II
4	Common Kukri Snake	*Oligodon arnensis*	*Colubridae*	Common
5	Western Kukri Snake	*Oligodon affinis*	*Colubridae*	Uncommon
6	Checkered Keelback	*Xenochrophis piscator*	*Colubridae*	Sch-II

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7	Striped Keelback	*Amphiesma stolatum*	*Colubridae*	Common
8	Hill keelback	*Amphiesma monticola*	*Colubridae*	Endemic to WGs
9	Saw scaled Viper	*Echis carinathus*	*Viperidae*	Sch-IV
10	Cobra	*Naja naja*	*Elapidae*	Rare/II
11	Russell's Viper	*Daboia russelii*	*Viperidae*	Sch-II
12	Green Forest lizard	*Calotes calotes*	*Agamidae*	Common
13	Roux's Forest lizard	*Calotes rouxii*	*Agamidae*	Common
14	Indian Garden lizard	*Calotes versicolor*	*Agamidae*	Common
15	Bark/Marbled Tree gecko	*Hemidactylus leschenaultia*	*Gekkonidae*	Common
16	Common Indian monitor lizard	*Varanus bengalensis*	*Varanidae*	Least concern/II
Toads and Amphibians				
1	Common Indian toad	*Bufo melanostictus*	Bufonidae	LC
2	Jerdon's narrow mouthed frog	*Ramanella Montana*	Microhylidae	NT
3	Konkan bush frog	*Philautus bombayensis*	Rhacophoridae	VU
4	Marten's bush frog	*Philautus leucorhinus*	Rhacophoridae	LC
5	Bamboo tree frog	*Polypedates leucomystax*	Rhacophoridae	LC
6	Common tree frog	*Polypedates maculatus*	Rhacophoridae	LC
7	Malabar gliding frog	*Rhacophorus malabaricus*	Rhacophoridae	LC
8	Skipper frog	*Euphlyctis cyanophlyctis*	Ranidae	LC/IV
9	Jerdon's bull frog	*Hoplobatrachus crassus*	Ranidae	LC/IV
10	Indian bull frog	*Hoplobatrachus tigerinus*	Ranidae	LC/IV
11	Brown leaping frog	*Indirana semipalmata*	Ranidae	LC/IV
12	Paddyfield frog	*Limnonectes limnocharis*	Ranidae	LC/IV
13	Hill cricket frog	*Limnonectes syhadrensis*	Ranidae	LC/IV
14	Fungoid frog	*Rana malabaricus*	Ranidae	LC/IV
15	Bronzed frog	*Rana temporalis*	Ranidae	NT/IV
16	Indian burrowing frog	*Tomopterna breviceps*	Ranidae	LC/IV
17	Dobson's burrowing frog	*Tomopterna dobsoni*	Dicroglossidae	LC

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Note: *LC - Least concern, NT - near threaten, VU – Vulnerable, Wildlife Protection Act - Schedule IV*

J. List of birds reported in buffer zone

Sl. No.	Common name	Scientific name	Family	IUCN status/ WPA schedule
1	Little Grebe	*Tachybaptus ruficollis*	Podicipedidae	R/IV
2	Little Cormorant	*Phalacrocorax niger*	Phalacrocoracidae	R/IV
3	Indian Shag	*Phalacrocorax fuscicollis*	Phalacrocoracidae	R/IV
4	Great Cormorant	*Phalacrocorax carbo*	Phalacrocoracidae	M/IV
5	Darter	*Anhinga melanogaster*	Phalacrocoracidae	RV/IV
6	Little Egret	*Egretta garzetta*	Ardeidae	R/IV
7	Western Reef Egret	*Egretta gularis*	Ardeidae	RM/IV
8	Grey Heron	*Ardea cinerea*	Ardeidae	RM/IV
9	Purple Heron	*Ardea purpurea*	Ardeidae	R/IV
10	Large Egret	*Casmerodius albus*	Ardeidae	R/IV
11	Median Egret	*Mesophoyx intermedia*	Ardeidae	M/IV
12	Cattle Egret	*Bubulcus ibis*	Ardeidae	R/IV
13	Indian Pond-Heron	*Ardeola grayii*	Ardeidae	R/IV
14	Little Green Heron	*Butorides striatus*	Ardeidae	R/IV
15	Black-crowned Night Heron	*Nycticorax nycticorax*	Ardeidae	RM/IV
16	Malayan Night Heron	*Gorsachius melanocephalus*	Ardeidae	M/IV
17	Chestnut Bittern	*Ixobrychus cinnamomeus*	Ardeidae	M/IV
18	Black Bittern	*Dupetor flavicollis*	Ardeidae	M/IV
19	Painted Stork	*Mycteria leucocephala*	Cioniidae	M/IV
20	Lesser Whistling-Duck	*Dendrocygna javanica*	Anatidae	MR/IV
21	Cotton Teal	*Nettapus coromandelianus*	Anatidae	MR/IV
22	Spot-billed Duck	*Anas poecilorhyncha*	Anatidae	M/IV
23	Oriental Honey-buzzard	*Pernis ptilorhyncus*	Accipitridae	T/IV
24	Black Kite	*Milvus migrans*	Accipitridae	R/IV
25	Brahminy Kite	*Haliastur indus*	Accipitridae	R/IV
26	White-bellied Sea-Eagle	*Haliaeetus leucogaster*	Accipitridae	R/I
27	Long-billed Vulture	*Gyps indicus*	Accipitridae	CE/IV
28	Crested Serpent Eagle	*Spilornis cheela*	Accipitridae	R/IV
29	Eurasian Marsh Harrier	*Circus aeruginosus*	Accipitridae	R/IV
30	Crested Goshawk	*Accipiter trivirgatus*	Accipitridae	MR/IV
31	Shikra	*Accipiter badius*	Accipitridae	R/IV

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32	Besra Sparrowhawk	*Accipiter virgatus*	Accipitridae	R/IV
33	Black Eagle	*Ictinaetus malayensis*	Accipitridae	R/IV
34	Jungle Bush Quail	*Perdicula asiatica*	Phasianidae	R/IV
35	Red Spurfowl	*Galloperdix spadicea*	Phasianidae	R/IV
36	Grey Junglefowl	*Gallus sonneratii*	Phasianidae	R/IV
37	Indian Peafowl	*Pavo cristatus*	Phasianidae	R/I
38	Common Buttonquail	*Turnix suscitator*	Turnicidae	R/IV
39	Blue-breasted Rail	*Gallirallus striatus*	Rallidae	R/IV
40	White-breasted Waterhen	*Amaurornis phoenicurus*	Rallidae	R/IV
41	Purple Moorhen	*Porphyrio porphyrio*	Rallidae	RM/IV
42	Pheasant-tailed	*Hydrophasianus chirurgus*	Jacanidae	R/IV
43	Bronze-winged Jacana	*Metopidius indicus*	Jacanidae	R/IV
44	Common Ringed Plover	*Charadrius hiaticula*	Charadriidae	M/IV
45	Little Ringed Plover	*Charadrius dubius*	Charadriidae	M/IV
46	Kentish Plover	*Charadrius alexandrines*	Charadriidae	M/IV
47	Yellow-wattled Lapwing	*Vanellus malarbaricus*	Charadriidae	M/IV
48	Red-wattled Lapwing	*Vanellus indicus*	Charadriidae	R/IV
49	Eurasian Woodcock	*Scolopax rusticola*	Scolopacidae	R/IV
50	Nilgiri Wood Pigeon	*Columba elphinstonii*	Columbidae	RV/ IV
51	Spotted Dove	*Streptopelia chinensis*	Columbidae	R/IV
52	Emerald Dove	*Chalcophaps indica*	Columbidae	R/IV
53	Green Imperial Pigeon	*Ducula aenea*	Columbidae	R/IV
54	Mountain Imperial-Pigeon	*Ducula badia*	Columbidae	R/IV
55	Indian Hanging-Parrot	*Parrot Loriculus vernalis*	Psittacidae	R/IV
56	Rose-ringed Parakeet	*Psittacula krameri*	Psittacidae	R/IV
57	Plum-headed Parakeet	*Psittacula cyanocephala*	Psittacidae	R/IV
58	Blue-winged Parakeet	*Psittacula columboides*	Psittacidae	RE/IV
59	Brainfever Bird	*Hierococcyx varius*	Cuculidae	R/IV
60	Indian Cuckoo	*Cuculus micropterus*	Cuculidae	U/IV
61	Common Cuckoo	*Cuculus micropterus*	Cuculidae	M/IV

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62	Banded Bay Cuckoo	*Cacomantis sonneratii*	Cuculidae	RM/IV
63	Indian Plaintve Cuckoo	*Cacomantis passerinus*	Cuculidae	R/IV
64	Drongo Cuckoo	*Surniculus lugubris*	Cuculidae	R/IV
65	Asian Koel	*Eudynamys scolopacea*	Cuculidae	R/IV
66	Small Green-billed Malkoha	*Phaenicophaeus viridirostris*	Cuculidae	R/IV
67	Greater Coucal	*Centropus sinensis*	Cuculidae	R/IV
68	Lesser Coucal	*Centropus bengalensis*	Cuculidae	U/IV
69	Oriental Scops-Owl	*Otus sunia*	Strigidae	R/IV
70	Forest Eagle-Owl	*Bubo nipalensis*	Strigidae	U/IV
71	Ketupa zeylonensis	*Brown Fish-Owl*	Strigidae	R/IV
72	Brown Wood Owl	*Strix leptogrammica*	Strigidae	R/IV
73	Glaucidium radiatum	*Jungle Owlet*	Strigidae	R/IV
74	Spotted Owlet	*Athene brama*	Strigidae	R/IV
75	Indian Jungle Nightjar	*Caprimulgus indicus*	Caprimulgidae	RM/IV
76	Indian Edible-nest Swiftlet	*Collocalia unicolor*	Apodidae	RM/IV
77	White-rumped Needletail-Swift	*Zoonavena sylvatica*	Apodidae	M/IV
78	Brown-backed Needletail-Swift	*Hirundapus giganteus*	Apodidae	M/IV
79	Asian Palm Swift	*Cypsiurus balasiensis*	Apodidae	R/IV
80	Alpine Swift	*Tachymarptis melba*	Apodidae	U/IV
81	Pacific Swift	*Apus pacificus*	Apodidae	U/IV
82	House Swift	*Apus affinis*	Apodidae	R/IV
83	Crested Tree-swift	*Hemiprocne coronata*	Hemiprocnidae	R/IV
84	Malabar Trogon	*Harpactes fasciatus*	Trogonidae	R/IV
85	Small Blue Kingfisher	*Alcedo atthis*	Alcedinidae	R/IV
86	Oriental Dwarf Kingfisher	*Ceyx erithacus*	Alcedinidae	R/IV
87	Stork-billed Kingfisher	*Halcyon capensis*	Alcedinidae	R/IV
88	White-breasted Kingfisher	*Halcyon smyrnensis*	Alcedinidae	R/IV
89	Black-capped Kingfisher	*Halcyon pileata*	Alcedinidae	R/IV
90	Collared Kingfisher	*Todiramphus chloris*	Alcedinidae	R/IV
91	Blue-eared Kingfisher	*Alcedo meningting*	Alcedinidae	R/IV
92	Ceryle rudis	*Lesser Pied Kingfisher*	Alcedinidae	R/IV
93	Blue-bearded Bee-eater	*Nyctyornis athertoni*	Meropidae	R/IV

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94	Small Bee-eater	*Merops orientalis*	Meropidae	R/IV
95	Blue-tailed Bee-eater	*Merops philippinus*	Meropidae	M/IV
96	Chestnut-headed Bee-eater	*Merops leschenaulti*	Meropidae	R/IV
97	Brown-headed Barbet	*Megalaima zeylanica*	Capitonidae	R/IV
98	Crimson-throated Barbet	*Megalaima rubricapilla*	Capitonidae	R/IV
99	Coppersmith Barbet	*Megalaima haemacephala*	Capitonidae	R/IV
100	Brown-capped Pygmy woodpecker	*Dendrocopos nanus*	Picidae	R/IV
101	Yellow-fronted Pied woodpecker	*Dendrocopos mahrattensis*	Picidae	R/IV
102	Wire-tailed Swallow	*Hirundo smithii*	Hirudinidae	R/IV
103	Red-rumped Swallow	*Hirundo daurica*	Hirudinidae	R/IV
104	Large Pied Wagtail	*Motacilla maderaspatensis*	Motacillidae	R/IV
105	Yellow Wagtail	*Motacilla flava*	Motacillidae	M/IV
106	Paddyfield Pipit	*Anthus rufulus*	Motacillidae	R/IV
107	Large Cuckoo-shrike	*Coracina macei*	Campephagidae	R/IV
108	Small Minivet	*Pericrocotus cinnamomeus*	Campephagidae	R/IV
109	Scarlet Minivet	*Pericrocotus flammeus*	Campephagidae	R/IV
110	Red-whiskered Bulbul	*Pycnonotus jocosus*	Pycnonotidae	R/IV
111	Red-vented Bulbul	*Pycnonotus cafer*	Pycnonotidae	R/IV
112	White-browed Bulbul	*Pycnonotus luteolus*	Pycnonotidae	R/IV
113	Yellow-browed Bulbul	*Iole indica*	Pycnonotidae	R/IV
114	Common Iora	*Aegithina tiphia*	Irenidae	R/IV
115	Asian Fairy-Bluebird	*Irena puella*	Irenidae	R/IV
116	Jerdon's Chloropsis	*Chloropsis cochinchinensis*	Irenidae	R/IV
117	Malabar Whistling Thrush	*Myophonus horsfieldii*	Turdinae	R/IV
118	Orange-headed Thrush	*Zoothera citrinacyanotus*	Turdinae	R/IV
119	Oriental Magpie-Robin	*Copsychus saularis*	Turdinae	R/IV
120	White-rumped Shama	*Copsychus malabaricus*	Turdinae	R/IV

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121	Indian Robin	*Saxicoloides fulicata*	Turdinae	R/IV
122	Pied Bushchat	*Saxicola caprata*	Turdinae	R/IV
123	Spotted Babbler	*Pellorneum ruficeps*	Timaliinae	R/IV
124	Indian Scimitar Babbler	*Pomatorhinus horsfieldii*	Timaliinae	R/IV
125	Rufous-bellied Babbler	*Dumetia hyperythra*	Timaliinae	R/IV
126	Black-headed Babbler	*Rhopocichla atriceps*	Timaliinae	R/IV
127	Yellow-eyed Babbler	*Chrysomma sinense*	Timaliinae	R/IV
128	Rufous Babbler	*Turdoides subrufus*	Timaliinae	RE/IV
129	Jungle Babbler	*Turdoides striatus*	Timaliinae	R/IV
130	Quaker Tit-Babbler	*Alcippe poioicephalA*	Timaliinae	R/IV
131	Streaked Fantail-Warbler	*Cisticola juncidis*	Sylviinae	R/IV
132	Franklin's Prinia	*Prinia hodgsonii*	Sylviinae	R/IV
133	Ashy Prinia	*Prinia socialis*	Sylviinae	R/IV
134	Plain Prinia	*Prinia inornata*	Sylviinae	R/IV
135	Common Tailorbird	*Orthotomus sutorius*	Sylviinae	R/IV
136	Tickell's Blue-Flycatcher	*Cyornis tickelliae*	Muscicapinae	R/IV
137	Tickell's Flowerpecker	*Dicaeum erythrorynchos*	Dicaeidae	R/IV
138	Plain Flowerpecker	*Dicaeum concolor*	Dicaeidae	R/IV
139	Purple-rumped Sunbird	*Nectarinia zeylonica*	Nectariniidae	R/IV
140	Black-headed Munia	*Lonchura malacca*	Estrildidae	MR/IV
141	House Sparrow	*Passer domesticus*	Passeridae	R/IV
142	Yellow-thraoted Sparrow	*Petronia xanthocollis*	Passeridae	R/IV
143	Common Myna	*Acridotheres tristis*	Sturnidae	R/IV
144	Jungle Myna	*Acridotheres fuscus*	Sturnidae	R/IV
145	Common Hill-Myna	*Gracula religiosa*	Sturnidae	R/IV
146	Black Drongo	*Dicrurus macrocercus*	Dicruridae	R/IV
147	Ashy Drongo	*Dicrurus leucophaeus*	Dicruridae	M/IV
148	Bronzed Drongo	*Dicrurus aeneus*	Dicruridae	R/IV
149	Greater Racket-tailed Drongo	*Dicrurus paradiseus*	Dicruridae	R/IV
150	Indian Treepie	*Dendrocitta vagabunda*	Corvidae	R/IV
151	White-bellied Tree Pie	*Dendrocitta leucogaster*	Corvidae	U/IV
152	House Crow	*Corvus splendens*	Corvidae	R/IV
153	Jungle Crow	*Corvus macrorhynchos*	Corvidae	R/IV

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AUTHENTICATED LIST OF FLORA AND FAUNA IN CORE AND BUFFER ZONE OF BLOCK I BICHOLIM MINERAL BLOCK OF VEDANTA LIMITED, BICHOLIM TALUKA, NORTH GOA

Note: *M - Migratory, R - Resident, U - unclear, E - Endemic, CE - Critically endangered, NT - Near threatened, V – Vulnerable, I – IV – Schedule species as per WPA*

K. List of butterflies recorded in buffer zone

Sl. No.	Common name	Scientific name	Family	IUCN status/ WPA schedule
1	Spot swordtail	*Graphium nomius* Esper	Papilionidae	Common
2	Crimson rose	*Pachiopta hector* Linnaeus	Papilionidae	Schedule I
3	Common rose	*Pachliopta aristolachiae* Fabricius	Papilionidae	Common
4	Red helan	*Princepes helenus helenus* Hampson	Papilionidae	Common
5	Malabar banded peacock	*Papilio buddh* Westwood	Papilionidae	Schedule II
6	Lime butterfly	*Papilio demoleus* Linnaeus	Papilionidae	Common
7	Chocolate albatross	*Appias lyncida* Cramer	Pierinae	Schedule II
8	Common Jezebel	*Delias eucharis* Drury	Pierinae	Common
9	Common emigrant	*Catopsilia pomona* Fabricius	Coliadinae	Common
10	Common grass Yellow	*Eurema hecabe contubernalis* Moore	Coliadinae	Common
11	Angled Sunbeam	*Curetis dentata* Moore	Curetinae	Common
12	Common Silverline	*Spindasis vulcans fusca* Moore	Theclinae	Common
13	Angled pierrot	*Caleta caleta decidia* Cromer	Polypmmatinae	Common
14	Pea Blue	*Lamipes boeticus* Linneaus	Polypmmatinae	Schedule II
15	Common pierrot	*Castalius rosimon rosimon*	Polypmmatinae	Schedule II
16	Dark pierrot	*Tarueus ananda*	Polypmmatinae	Schedule IV
17	Common four ring	*Ypthima hubenri hubenri* Fabricius	Polypmmatinae	Common
18	Common nawab	*Polyura athamas athamas* Drury	Charaxinae	Common
19	Angled Castor	*Ariadne ariadne pallidior* Frusthorfer	Nymphalinae	Common
20	Common castor	*Ariadne merione assama* Evans	Nymphalinae	Common
21	Lemon pansy	*Precis lemonias lemonias* L.	Nymphalinae	Common
22	Commander	*Moduza procis procis* Cramer	Nymphalinae	Common
23	Tree Nymph	*Idea malabarica* Moore	Danainae	Common
24	Common Indian Crow	*Euploea core* Cramer	Danainae	Common

ROUND FORESTER
BICHOLIM ROUND

RANGE FOREST OFFICER
KERI-SANQUELIM
GOA

AUTHENTICATED LIST OF FLORA AND FAUNA IN CORE AND BUFFER ZONE OF BLOCK I BICHOLIM MINERAL BLOCK OF VEDANTA LIMITED, BICHOLIM TALUKA, NORTH GOA

25	Plain Tiger	*Danaus (Anosia) chrysippus* L.	Danainae	Common
26	Grass demon	*Edaspes folcus* Cramer	Hesperiidae	Common
27	Common dart	*Potanthus spp* Fabricius	Hesperiidae	Common

L. List of aquatic species (fishes and crab) reported in buffer zone

Sl.No.	Common name	Scientific name	Family	IUCN status/ WPA Schedule
1	Spangled emperor	*Lethrinus nebulosus*	Lethrinidae	Not evaluated
2	Mangrove red snapper	*Lutjanus argentimaculatus*	Lutjanidae	Not evaluated
3	Malabar blood snapper	*Lutjanus malabaricus*	Lutjanidae	Not evaluated
4	John's snapper	*Lutjanus johni*	Lutjanidae	Not evaluated
5	Yellowfin tuna	*Thunnus albacares*	Lutjanidae	Near Threatened
6	Bigeye tuna	*Thunnus obesus*	Lutjanidae	Vulnerable
7	Indian mackerel	*Rastrelliger kanagurta*	Lutjanidae	Data Deficient
8	Black marlin	*Makaira indica*	Lutjanidae	Data Deficient
9	Goatee croaker	*Dendrophysa russelli*	Sciaendae	Not evaluated
10	Blotched croaker	*Nibea maculate*	Sciaendae	Not evaluated
11	Indian oil-Sardinella	*Sardinella longiceps*	Sciaendae	Least Concern
12	Indian spiny turbot	*Psettodes erumei*	Psettodidae	Not evaluated
13	Malabar tonguesole	*Cynoglossus macrostomus*	Cynoglossidea	Not evaluated
14	Dorab wolf-herrings	*Chirocentrus dorab*	Chirocentridae	Not evaluated
15	Chacunda gizzard-shad	*Anodontostoma Chacunda*	Clupeidae	Not evaluated
16	Engraved catfish	*Arius caelatus*	Ariidae	Not evaluated
	Crabs			
17	Christian crabs	*Charybdis cruciate*	Portunidae	Not evaluated
18	Blue swimming crab	*Portunus Pelagicus*	Portunidae	Not evaluated

RANGE FOREST OFFICER KERI-SANQUELIM GOA

ROUND FORESTER BICHOLIM - ROUND

vedanta
transforming elements

sesa goa iron ore

Date: 19/06/2023

To,

The Executive Engineer
Works Division VI
Water Resource Department
Bicholim Goa

Subject: Application regarding permission for pumping/extraction of water from Block I- Bicholim Mineral Block of Vedanta Limited, Bicholim, Goa

Respected Sir,

We hereby inform your good office that State Government has issued the Letter of Intent to Vedanta Ltd for grant of mining lease for the Block I- Bicholim Mineral Block. We are in process of obtaining the Environment Clearance from MoEF &CC. As part of the Terms of Reference we are required to obtain permission from the water resources department for pumping/extraction of water from mine pits.

We are attaching the duly filled application form 1 along with a detailed hydrogeology study carried out by accredited consultant.

We request you to kindly process our application and issue us the permission as early as possible

Thanking you

Yours faithfully

Dhiraj Kumar Jagdish
Dy. CEO and authorised signatory

RECEIVED
AE SDL WDVI
WRD BICHOLIM

VEDANTA LIMITED
Sesa Goa iron ore, Sesa Ghor, 20 EDC Complex, Patto, Panjim, Goa – 403 001, India
T +91 0832 2460600 | Website: www.sesagoaironore.com

Registered Office: Vedanta Limited, 1st Floor, 'C' wing, Unit 103, Corporate Avenue, Atul Projects, Chakala, Andheri (East), Mumbai 400093, Maharashtra, India
CIN: L13209MH1965PLC291394

vedanta
transforming elements

sesa goa iron ore

To
Chief Wildlife Warden
Goa Forest Department,
Van Bhavan, Altinho, Panaji,
Goa

Dated: 19/06/2023

Sub: Approval of Wild Life Conservation Plan w.r.t Block I- Bicholim Mineral Block

Ref: Letter of Intent for Block I- Bicholim Mineral Block vide letter No. DMG/25/Auction Cell/LOI-function/2023/2801, dated 13/01/2023

Sir,

The State Government of Goa has issued The Letter of Intent (LOI) for Grant of mining lease for Block I- Bicholim Mineral Block for Iron ore in Bicholim, Bordem, Lamgao, Mulgoa, Mayem & Sirigao Village, Bicholim Taluka, North Goa District on 478.5206 Hectare area to Vedanta Limited for 50 years. The LOI copy is attached for ready reference as **Annexure 1.**

As a process to prepare Environment Impact Assessment and obtain Environment Clearance, we are required to prepare a Wild Life Conservation plan (WLCP) and get it approved from Chief Wild Life Warden.

We would like to inform your good office that, a detailed assessment of flora and fauna was carried out in the study area of Block I- Bicholim Mineral Block and it was observed that there are four schedule 1 species in the area. We are submitting herewith a detailed Wild Life Conservation plan w.r.t Block I- Bicholim Mineral Block for your approval.

We request you to kindly process our application and approve the WLCP.

Thanking you

Your faithfully

19/6/2023
Office of the
Pr. Chief Conservator of Forests
Altinho, Panaji - Goa 403 001

Jagdish Ravindranath Desai
Head Environment
Authorised Signatory
For Vedanta Limited

VEDANTA LIMITED
Sesa Goa iron ore: Sesa Ghor, 20 EDC Complex, Patto, Panjim, Goa – 403 001, India
T +91 0832 2460600 | Website: www.sesagoaironore.com

Registered Office: Vedanta Limited, 1st Floor, 'C' wing, Unit 103, Corporate Avenue, Atul Projects, Chakala, Andheri (East), Mumbai 400093, Maharashtra, India
CIN: L13209MH1965PLC291394

Government of Goa
Office of The Dy. Conservator of Forests
Working Plan Division
"Goa Van Bhavan"
Altinho Panaji Goa – 403 001

No: - DCF(WP)/Tech/Digi/Vol-I/75/2022-23/968 Dated: - 23 /01/2023

To,
Vedanta Limited,
Sesa Goa iron ore,
Sesa Ghor, 20 EDC Complex,
Patto, Panaji-Goa.

Sub: - Authentication of distance of wildlife sanctuaries from boundary of Block I- Bicholim Mineral Block of Vedanta Ltd at Bicholim, Goa.
Ref: - Your letter No. Nil dated 17/01/2023.

Sir,

With reference to above cited letter dated on 17/01/2023, it is to clarify that proposed Bicholim Mineral Block-I is not situated within the 10 km radius from the boundary of any of the protected area in the State of Goa. Further, Map showing distance of proposed site from PAs is enclosed for ready reference.

Yours Sincerely,

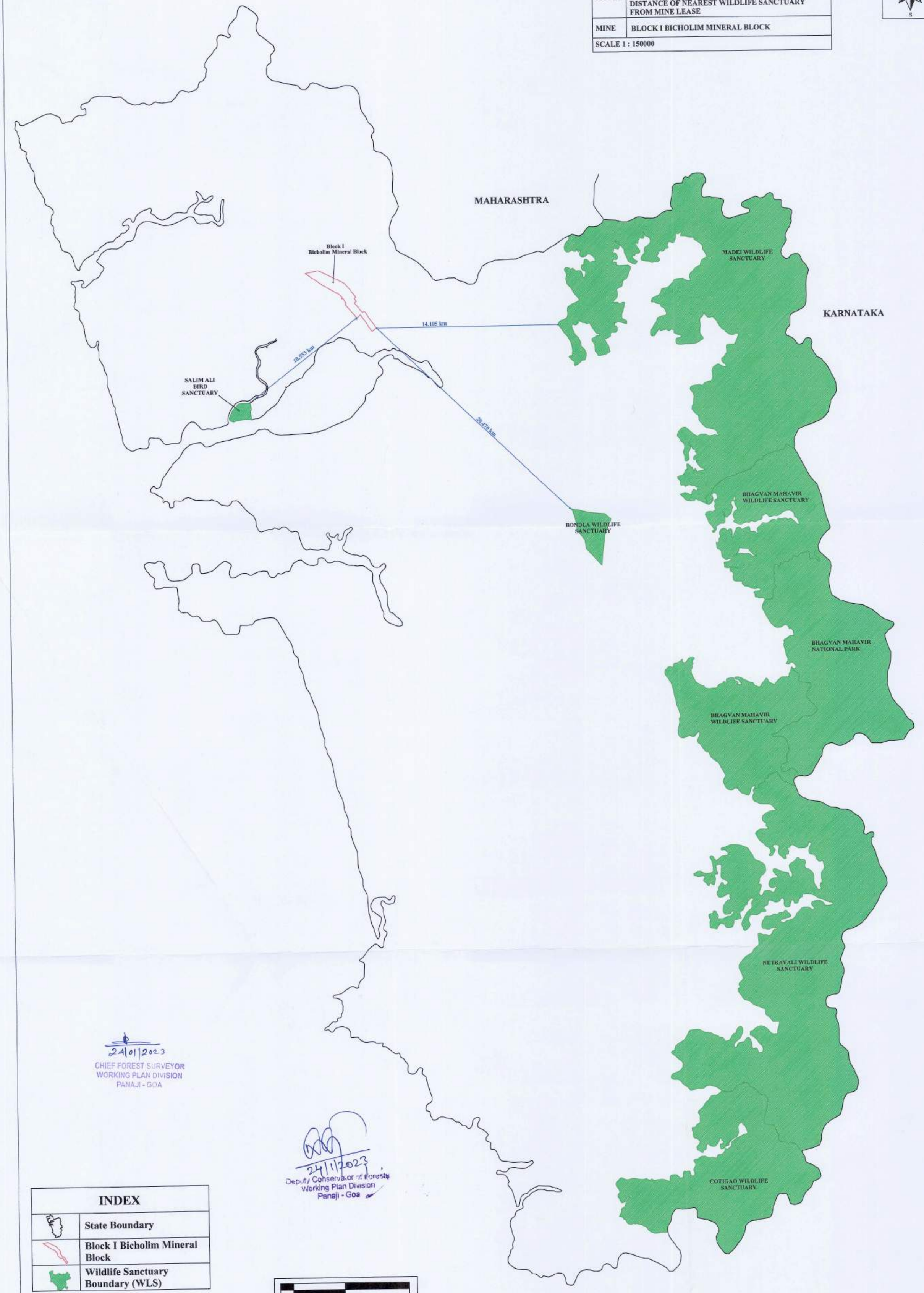
Encl: As above.

(Naveen Kumar, IFS)
Dy. Conservator of Forests,
Working Plan Division,
Panaji-Goa.

Phone No.: - 0832-2492529 *Fax No.: - 2492529*

"स्वच्छ भारत नितळ गोंय"
Towards greener & Cleaner Goa

TITTLE	MAP SHOWING 10KM RADIUS STUDY AREA OF BLOCK I BICHOLIM MINERAL BLOCK AND DISTANCE OF NEAREST WILDLIFE SANCTUARY FROM MINE LEASE
MINE	BLOCK I BICHOLIM MINERAL BLOCK
SCALE 1 : 150000	



24/01/2023
CHIEF FOREST SURVEYOR
WORKING PLAN DIVISION
PANAJI - GOA

24/1/2023
Deputy Conservator of Forests
Working Plan Division
Panaji - Goa

INDEX	
	State Boundary
	Block I Bicholim Mineral Block
	Wildlife Sanctuary Boundary (WLS)

1km 5km 10km
BAR SCALE 1:150000

Annexure-9A

GOA STATE ENVIRONMENT IMPACT ASSESSMENT AUTHORITY
Constituted by the Ministry of Environment, Forest and Climate Change,
Government of India
C/o Department of Environment and Climate Change
4th Floor, Dempo Towers, Patto Panaji Goa - 403001.
e-mail: goaseac@gmail.com

No. 106/3/2022-23/GSEIAA/Project -Prop/291 Date: 22 / 02 / 2023

To,
Vedanta Limited,
Sesa Goa Iron Ore: Sesa Ghor,
20 EDC Complex,
Patto Panaji

Sub: Regarding applicability of Eco Sensitive Area w.r.t. Block-I Bicholim Mineral Block of Vedanta Ltd, Bicholim Goa.

Ref: Your E-mail dated 17/02/2023.

sir,

This Authority is in receipt of mail dated 17/02/2023 from Vedanta Limited Sesa Goa Iron Ore. The Authority has examined your request seeking clarification regarding applicability of Eco Sensitive Area w.r.t. Block-I Bicholim Mineral Block of Vedanta Ltd, Bicholim Goa.

The Authority on perusal of Draft Zonal Master Plan for Eco-Sensitive Zones of Goa 2022 noticed that Eco Sensitive Zones declared by the Ministry of Environment & Forest in the State of Goa covers six Talukas such as Sattari, Dharbandora, Ponda, Sanguem, Canacona and Quepem, Bicholim taluka is not inlcuded in Draft Zonal Plan and it is not part of Eco Sensitive Zones.

Further through Draft notification issued by MoEF&CC dated 06th July 2022 it is clarify that Block -I Bicholim Mineral Block of Vedanta Ltd, Bicholim Goa is also not a part of any Eco Sensitive Area .

This is for your kind information and further necessary action.

Yours faithfully

22/02/2023

(Dr. Geeta S. Nagvenkar)
Director (Environment) &
Member Secretary, Goa-SEIAA

गोंय राज्य प्रदूषण नियंत्रण मंडळ

(An ISO 9001:2015, ISO 14001:2015, ISO 45001:2018 Certified Board)

फोन क्र: 0832-2407120
2407721, 2407722 2407723

ईमेल आयडी:
फॅक्स: डीजीपीसीबी dsirmsm.gspcb.gov.in.in
अधिकृत संकेतस्थळ: www.gspcb.gov.in.in
फाईल: mail.gspcb@gmail.com

क्र. 11/35/2022-पीसीबी/हिरवाई/1871 तारीख: 05/07/2022

पर्यावरणीय पैलूंचे मूल्यांकन समिती पैलूंचे कार्यालय

जे आदेश, 14/36/2006-मध्ये पर्यावरण संरक्षण कायदा, 1986 (29 ऑफ 1986) च्या कलम 3 च्या उप-कलम (1) आणि उप-कलम (2) च्या खंड (v) सह वाचलेल्या, पर्यावरण (संरक्षण) नियम, 1986 च्या नियम 5 च्या उप-नियम (3) च्या खंड (d) च्या अनुषंगाने, आणि पर्यावरण मूल्यांकन अधिसूचना, 2006 च्या परिच्छेद 7 च्या उप-परिच्छेद (i) च्या अनुषंगाने, आणि पर्यावरण मूल्यांकन अधिसूचना, 2006 च्या परिच्छेद IV च्या विरोधात केलेले पहिले पाऊल.

14.09.2006 रोजीच्या पर्यावरण संरक्षण अधिसूचनेनुसार, ज्यात केलेली दुरुस्ती ज्यामध्ये प्रस्ताव जिल्हाधिकाऱ्यांकडून त्या अधिकार क्षेत्रातील उप-विभागीय अधिकाऱ्यांकडून केलेला पर्यावरणीय पैलूंचा मूल्यांकनाचे अभ्यासक्रम पाठवले आहे.

जे आदेश, त्यानुसार केलेले प्रस्ताव जिल्हा प्रदूषण नियंत्रण मंडळाने प्रस्तावित केलेल्या ठिकाणी प्रत्यक्ष भेट देऊन तपासणी केली आणि त्यानुसार पर्यावरणीय पैलूंचे मूल्यांकन करून पर्यावरणीय मंजुरीसाठी शिफारस केली आहे.

अनु.क्र.	प्रस्ताव तपशील	तारीख	वेळ	स्थळ
1.	जिल्हाधिकारी, उत्तर गोवा जिल्हा, गोवा राज्यातील दिवाणी, फौजदारी, न्यायालय, कर्मचारी निवासस्थान इत्यादींसाठी अधिकाऱ्यांच्या 479.53Cr किंमत असलेले 1 लोकप्रतिनिधी आणि निवास निवासस्थान 1 न्यायाधीश, एकात्मकतेसाठी उपलब्ध करावयाचे असलेले 4 खासदार पर्यावरणीय परिणाम मूल्यांकन 2006 प्रमाण पैलूंचे मूल्यांकनी.	11/08/2022	सकाळी 10.30 नंतर नाही	कदंबा पठार पर्यावरणीय सेलचे कार्यालय, दयानंद, तिसवाडी गोवा.

पर्यावरणीय पैलूंचे मूल्यांकन समितीचे सर्वांना आपण येण्याचा आग्रह. हे आपले निष्पक्ष प्रस्तावांचे समर्थन या प्रस्तावांचे समर्थन करण्याचा आपली या प्रस्तावांचा निर्णय समजावा.

दरम्यान हे सदिच्छा आपले सोबत आपली सर्व साहित्यांचे अभ्यास आपले प्रतिनिधींचे आपली नाही, मूल्यांकनाचे आपले अधिकार पैलूंचे मूल्यांकनाचा निर्णयांचा व्यवहार या पैलूंचा मूल्यांकनाचा निर्णयांचा

GOA STATE POLLUTION CONTROL BOARD
गोंय राज्य प्रदूषण नियंत्रण मंडळ

(An ISO 9001:2015, ISO 14001:2015, ISO 45001:2018 Certified Board)

Phone Nos.: 0832-2402786,2402789, 2402700

Email Ids: (Chairman, GSPCB: chairman@gspcb.goa.gov.in
Member Secretary GSPCB: ms-gspcb.goa@gov.in
Office: mail.gspcb@gov.in

No. 15/15/2022-PCB/Legal/ 7871 Date:- 05/10/2023

PUBLIC NOTICE FOR ENVIRONMENTAL PUBLIC HEARING

Whereas as per the Environmental Impact Assessment Notification No. S.O.1533 (E) dated 14/09/2006 as Amended by the Ministry of Environment, Forests and Climate Change, Government of India, Environmental Public Hearing at the site or in its close proximity-district wise has to be carried out in the manner prescribed in Appendix IV for ascertaining concerns of the affected persons for the project is covered in Schedule I of the said notification.

In accordance with the procedure stipulated in the amended Environment Impact Assessment Notification dated 14/9/2006 as amended, the District Collector or the Additional Collector or the Deputy Collector is required to preside over the aforesaid Environmental Public Hearing.

Whereas, as required, the Environmental Public Hearing is proposed to be conducted by the Goa State Pollution Control Board in consultation with the District Collector for the following Project on the Date, Time and Venue as mentioned below:

Sr. No	Project details	Date	Time	Venue
1.	**Public Hearing as per Environmental Impact Assessment 2006 w.r.t. Block I Bicholim Mineral Block with area of 478.5206 Ha located in Bicholim, Bordem, Laengas, Maigao, Mayem and Shirgao villages of Bicholim Taluka, North Goa District, Goa for the production of 3.0 MPTA of Iron ore by M/s. Vedanta Ltd**	11/08/2023	10.30 a.m.	**Narayan Zantye Multipurpose Sports Complex, Sarvan, Bicholim Goa**

The Environmental Public Hearing is conducted for ascertaining the concerns of the affected persons who can express their views or seek information or clarifications from the project proponent.

The participants who intend to express their views and speak shall register their names separately from 9.30 am to 12.00 p.m. on the day of the hearing.

The concerned persons having plausible stake in the Environmental aspects of the project or activity can send their views, suggestions, comments and objections in writing on or before the scheduled date of Public Hearing to the Additional Director, Ministry of Environment, Forests & Climate Change, (IA-III Division) Paryavaran Bhawan, CGO Complex, Lodhi Road, New Delhi - 110003 or the Goa State Pollution Control Board, Opp. Saligao Seminary, Nr. Plasma Ind. Estate, Saligao, Bardez Goa.

Hard/ Soft copies of the Draft Environmental Impact Assessment Report along with Executive Summary in Konkani and English submitted by the project proponent is made available for reference at the following offices. The soft copies can be also referred on the website of Goa State Pollution Control Board i.e. www.gspcb.goa.gov.in.

1	*The Collector & District Magistrate (North), Collectorate Bldg., Panaji Goa*
2	*The Director, Directorate of Mines and Geology, Ground Floor of Institute Menezes Braganza, Panaji, Goa 403001.*
3	*The Chief Officer, Sanquelim Municipal Council, Sanquelim Goa*
4	*The Chief Officer, Bicholim Municipal Council, Bicholim Goa.*
5	*The Dy Collector & SDO, Bicholim-Goa*
6	*The Block Development Officer, Bicholim*
7	*The Chief Exec.tive Officer, North Zilla Panchayat, Junta House, 3rd flr, Panaji, Tiswadi Goa*
8	*The Secretary/Sarpanch, Village Panchayat Alorna, Pernem*
9	*The Secretary/Sarpanch, Village Panchayat Brampur, Pernem*
10	*The Secretary/Sarpanch, Village Panchayat Cannacorem, Pernem*
11	*The Secretary/Sarpanch, Village Panchayat Carpolim, Pernem*
12	*The Secretary/Sarpanch, Village Panchayat Tuem, Pernem*
13	*The Secretary/Sarpanch, Village Panchayat Corti, Bardez*
14	*The Secretary/Sarpanch, Village Panchayat Revora, Bardez*
15	*The Secretary/Sarpanch, Village Panchayat Nadora, Bardez*
16	*The Secretary/Sarpanch, Village Panchayat Pirna Bardez*
17	*The Secretary/Sarpanch, Village Panchayat Assonora, Bardez*
18	*The Secretary/Sarpanch, Village Panchayat Sirsaim, Bardez*
19	*The Secretary/Sarpanch, Village Panchayat Pelem, Bardez*
20	*The Secretary/Sarpanch, Village Panchayat Ucassaim, Bardez*
21	*The Secretary/Sarpanch, Village Panchayat Rachinola, Bardez*
22	*The Secretary/Sarpanch, Village Panchayat Colvale, Bardez*
23	*The Secretary/Sarpanch, Village Panchayat Calvim, Bardez*
24	*The Secretary/Sarpanch, Village Panchayat Porriorpa, Bardez*
25	*The Secretary/Sarpanch, Village Panchayat Arossim, Tiswadi*
26	*The Secretary/Sarpanch, Village Panchayat Navelim, Sanquelim*
27	*The Secretary/Sarpanch, Village Panchayat Malar, Tiswadi*
28	*The Secretary/Sarpanch, Village Panchayat Bainguinim, Tiswadi*
29	*The Secretary/Sarpanch, Village Panchayat Dumacem, Bicholim*
30	*The Secretary/Sarpanch, Village Panchayat Salem, Bicholim*
31	*The Secretary/Sarpanch, Village Panchayat Advalpale, Bicholim*
32	*The Secretary/Sarpanch, Village Panchayat Shirgao Bicholim*
33	*The Secretary/Sarpanch, Village Panchayat Mulgao, Bicholim*
34	*The Secretary/Sarpanch, Village Panchayat Maulinguem, Bicholim*
35	*The Secretary/Sarpanch, Village Panchayat Sarvone Sanquelim Goa*
36	*The Secretary/Sarpanch, Village Panchayat Mayem Bicholim Goa*
37	*The Secretary/Sarpanch, Village Panchayat Nerul, Bicholim Goa*
38	*The Secretary/Sarpanch, Village Panchayat Pilgao Bicholim Goa*
39	*The Secretary/Sarpanch, Village Panchayat Cudnem Sanquelim Goa*
40	*The Secretary/Sarpanch, Village Panchayat Amone Sanquelim Goa*
41	*The Secretary/Sarpanch, Village Panchayat Morlem, Sattari*
42	*The Secretary/Sarpanch, Village Panchayat Matoi Sattari*
43	*The Secretary/Sarpanch, Village Panchayat Tivrem, Ponda*
44	*The Secretary/Sarpanch, Village Panchayat Bergui, Ponda*
45	*The Secretary/Sarpanch, Village Panchayat Ashcona Ponda*
46	*The Secretary/Sarpanch, Village Panchayat Curdalim, Ponda*
47	*The Curator, Government Library, Rutan Vachanalaya, Bhatt Path, Bicholim - Goa*
48	*Office of the, Goa State Pollution Control Board, Saligao Bardez Goa.*

The proceedings of the Environmental Public Hearing shall be forwarded to the Ministry of Environment, Forests and Climate Change, Govt. of India, New Delhi, for appropriate action in the matter.

Sd/- (Dr. Shamila Monteiro)
Member Secretary
For Goa State Pollution Control Board

DI/Advt/753/2023

गोवा राज्य प्रदूषण नियंत्रण मंडळ

गोवा राज्य प्रदूषण नियंत्रण मंडळ

(आस्थापनेची वर्ष्ये-२०१९, आस्थापनेची तारीख:१९९५, आस्थापनेची अधिसूचना तारीख: प्रसिद्धीस पाठवू)

फोन क्र: ०८३३-२४०७००, २४०७०१, २४०७०३

ईमेल आयडी:
अध्यक्ष, जीपीसीबी: chairman-gspcb.goa@nic.in
सदस्य सचिव, जीपीसीबी: ms-gspcb.goa@nic.in
कार्यालय: mail.gspcb@gov.in

क्र. १९/१५/२०२२ - पीसीबी/आयदेशी/७८७१ दिनांक: १५/०८/२०२२

पर्यावरणीय सार्वजनिक सुनावणीसाठी जाहीर सूचना

जसे की, एसबिएल, कन आणि इक्सपल वहन मंत्रालय, भारत सरकार यांनी सूचित केलेल्या दि. १५/११/२०१९ तिच्या पर्यावरणीय प्रभाव मूल्यांकन सूचना क्र. ९७३ (ई) अनुसार तसा सुधारित पक्षक 1 यासी येत असलेला प्रकल्पाने प्रस्तावित ग्रीन आयलेण्ड पर्यटनिका आहारासोबी सार्वजनिक आयव्यासाठी परिशिष्ट IV यासे विहित नमुन्यात रिपोर्टसाठी विस्तार-प्रस्तावित अहवील परिसरासी किंवा तसा प्रकल्पाच्या ठिकाणी पर्यावरणीय सार्वजनिक सुनावणी घेण्यात येणार आहे.

त्या अनुषंगाने, सुधारित केलेल्या दि. १५/११/२०१९ रोजीच्या पर्यावरणीय प्रभाव मूल्यांकन सूचनेमधी तरतूद देण्यात आलेल्या प्रक्रियेनुसार, जिल्हाधिकारी किंवा अतिरिक्त जिल्हाधिकारी किंवा उपजिल्हाधिकारी यांनी या सोबतच्या जोडलेल्या पर्यावरणीय सार्वजनिक सुनावणीस अध्यक्षपदी उपस्थित असावे.

जसे की, अपेक्षित व्यवसेवकांनी, पुढील प्रकल्पासंबंधी स्वतंत्र सोबतच्या जोडलेल्या तारखेस, ठेवेल अशिल जिल्हाधिकारी तसा पर्यावरणीय सार्वजनिक सुनावणी ही गोवा राज्य प्रदूषण नियंत्रण मंडळाने जिल्हाधिकारी यांच्यासी समन्वयकर्तीने आयोजित करावी अशी प्रसिद्धित व्यवस्था करने आहे.

अनु. क्र.	प्रकल्पाचा तपशील	तारीख	वेळ	स्थान
१	सिरोडे, पोर्ये, डायपाल, मुळगाव, पर्ये आणि सिरोडा या सलुक सिरोडे, जिल्हा उत्तर गोवा, गोवा राज्यातील एकूण क्षेत्र ३७८.५७५ हेक्टर क्षेत्रावर असलेल्या खाणे : सिरोडी ग्रानिट खनिज्या लायसेंस ने. सीडीजे नि.४७ ३.० एकत्रीकृत नेटवर्कसिंह प्रस्तावित पर्यावरणीय प्रभाव मूल्यांकन २०२६ मुळा सार्वजनिक सुनावणी	११/०८/२०२३	स. १०.३० वा.	व्यवस्थापन इमारती बहुउद्देशी हॉल्ल खुलुल, सांगे, सिरोडी, गोवा

प्रस्तावाने प्रकल्पकार होत असलेल्या व्यवसेवकी व्यवस्थापनी सार्वजनिक सुनावणी घेण्यात येणार आहे, त्यासंबंधी प्रकल्प प्रस्तावकर्त्यांनी हे आपले पक्ष प्रसिद्धित करून सर्वसंबंधित किंवा व्यक्तींना किंवा संघटनांना पाठविला.

आपले पक्ष पाठवण्यासाठी किंवा बोलण्यासाठी जे लोक उपलब्ध होऊ इच्छित आहेत, त्यांनी सदर सुनावणीच्या दिवशी स. ९.३० वा. ते ६. ३०.०० वा. पर्यंत या बैठक आपली व्यवस्थेसाठी नाव नोंदणी करायची आहे.

त्या संदर्भात सर्वसंबंधित या प्रकल्पाच्या बाबतीत पर्यावरणविषयक परिणामाने जाणते सहकार्य असेल अशी आशा बाळगतो. सुधारित, सक्षमचे अशिल हाताशी ठेवा सदर सार्वजनिक सुनावणीच्या दरम्यान किंवा त्यानंतरी अतिरिक्त संपर्कासाठी, पर्यावरण, वन आणि हवामान बदल मंत्रालय, (मसाप-III विभाग), एसीमाय भवन, कोबीजी बंगुलन, लोधी रोड, नवी दिल्ली - ११००३ किंवा गोवा राज्य प्रदूषण नियंत्रण मंडळ, व्यवसाय सेक्शन्स इन्फो, सिरोडी औद्योगिक वसाहतीजवळ, सत्तरवाडा, पर्वरी, गोवा येथेही संपर्क साधता येऊ शकेल.

प्रकल्प प्रस्तावक पक्षकारांकडून सदर पर्यावरण प्रभाव मूल्यांकन अहवालाचा मसुदा त्याच्या कोणत्याही आणि इतरही पार्श्वभूमीवर पर्यावरणी संबंधांकरिता ऑनलाईन सेवेद्वारे उपलब्ध करण्यात आलेला आहे. त्यासाठी लॉग ऑनही ही गोवा राज्य प्रदूषण नियंत्रण मंडळाच्या www.gspcb.gov.in या वेबसंकेतस्थळावर माहितीकरिता देण्यात आलेली आहे.

१	जिल्हाधिकारी अशिल जिल्हा दंडाधिकारी (उत्तर), जिल्हाधिकारी कचेरी, पणजी, गोवा
२	संचालक, खाणी आणि भूगर्भशास्त्र, तळ मजला, इन्स्पायर्ड निधि बिल्डिंग इमारत, पणजी, गोवा ४०३००१
३	मुख्य अधिकारी, सासष्टी नगरपालिका, मडगाव, गोवा
४	मुख्य अधिकारी, सिरोडी नगरपालिका, सिरोडे, गोवा
५	उपजिल्हाधिकारी आणि एसडीओ, सिरोडी, गोवा
६	गट विकास अधिकारी, सिरोडी
७	मुख्य कार्यकारी अधिकारी, अंत जिल्हा पंचायत, मुख्य इमारत, ३रा मजला, पणजी, तिसवाडी, गोवा
८	सचिव / सरपंच, ग्रामपंचायत हळर्ण, पेडणे
९	सचिव / सरपंच, ग्रामपंचायत इब्रामपूर, पेडणे
१०	सचिव / सरपंच, ग्रामपंचायत दाभलाली, पेडणे
११	सचिव / सरपंच, ग्रामपंचायत पालये, पेडणे
१२	सचिव / सरपंच, ग्रामपंचायत हुरी, पेडणे
१३	सचिव / सरपंच, ग्रामपंचायत मोपोला, पेडणे
१४	सचिव / सरपंच, ग्रामपंचायत पेरोला, फोंडा
१५	सचिव / सरपंच, ग्रामपंचायत वाडोडा, फोंडा
१६	सचिव / सरपंच, ग्रामपंचायत दिवे, फोंडा
१७	सचिव / सरपंच, ग्रामपंचायत अगसैम, फोंडा
१८	सचिव / सरपंच, ग्रामपंचायत शिरवई, फोंडा
१९	सचिव / सरपंच, ग्रामपंचायत मडकई, फोंडा
२०	९. सचिव / सरपंच, ग्रामपंचायत असनोरा, फोंडा
२१	सचिव / सरपंच, ग्रामपंचायत रायतोरा, फोंडा
२२	सचिव / सरपंच, ग्रामपंचायत खोर्ली, फोंडा
२३	सचिव / सरपंच, ग्रामपंचायत कवलवी, फोंडा
२४	सचिव / सरपंच, ग्रामपंचायत पोंडुरे, फोंडा
२५	सचिव / सरपंच, ग्रामपंचायत अंकवे, सिरोडी
२६	सचिव / सरपंच, ग्रामपंचायत रुमडोली, सत्तरी
२७	सचिव / सरपंच, ग्रामपंचायत शापोरा, तिसवाडी
२८	सचिव / सरपंच, ग्रामपंचायत खोर्जुवे, तिसवाडी
२९	सचिव / सरपंच, ग्रामपंचायत खोर्ली, सिरोडी
३०	सचिव / सरपंच, ग्रामपंचायत लाक, सिरोडी
३१	सचिव / सरपंच, ग्रामपंचायत अडवलपाल, सिरोडी
३२	सचिव / सरपंच, ग्रामपंचायत सिरवडा, सिरोडी
३३	सचिव / सरपंच, ग्रामपंचायत मुळगाव, सिरोडी
३४	सचिव / सरपंच, ग्रामपंचायत मालभिवे, सिरोडी
३५	सचिव / सरपंच, ग्रामपंचायत सर्वण, पाळणी, गोवा
३६	सचिव / सरपंच, ग्रामपंचायत कारी, सिरोडी, गोवा
३७	सचिव / सरपंच, ग्रामपंचायत पारी, सिरोडी, गोवा
३८	सचिव / सरपंच, ग्रामपंचायत सिरलाय, सिरोडी, गोवा
३९	सचिव / सरपंच, ग्रामपंचायत कुडणे, सासली, गोवा
४०	सचिव / सरपंच, ग्रामपंचायत आसोणे, सावर्डे, गोवा
४१	सचिव / सरपंच, ग्रामपंचायत धोर्ली, सत्तरी
४२	सचिव / सरपंच, ग्रामपंचायत पाळोली, सत्तरी
४३	सचिव / सरपंच, ग्रामपंचायत दिवो, फोंडा
४४	सचिव / सरपंच, ग्रामपंचायत वेलसी, फोंडा
४५	सचिव / सरपंच, ग्रामपंचायत अडकोण, पोंडा
४६	सचिव / सरपंच, ग्रामपंचायत कुंडई, फोंडा
४७	सेक्रेटरी, प्रादेशिक आराखडा, मुख्य बांधकाम, खाजगी पेठ, सिरोडी - गोवा
४८	गोवा राज्य प्रदूषण नियंत्रण मंडळ गोवे कार्यालय, सत्तरवाडा, पर्वरी, गोवा

वरील पर्यावरणीय सार्वजनिक सुनावणीची कार्यवाही ही या बाबतीत पुढील योग्य सूचनेसाठी पर्यंतच्या, वर अशिल प्रकल्प वहन मंत्रालय, भारत सरकार, नवी दिल्ली यांच्या मार्गदर्शनाखाली चालेल.

सही/-
(डॉ. सविता धोंडेकर)
सदस्य सचिव
गोवा राज्य प्रदूषण नियंत्रण मंडळ(जीपीसीबी)

2004 Public Hearing Photos 1992

Proceedings of the Environmental Public Hearing held on 11/08/2023 at 10.30 am onwards at Naravan Zantye Multipurpose Sports Complex, Sarvan, Bicholim Goa.

In respect of:

"As per Environmental Impact Assessment 2006 w.r.t. Block I Bicholim Mineral Block with area of 478.5206 Ha located in Bicholim, Bordem, Lamgao, Mulgao, Mayem and Sirigao villages of Bicholim Taluka, North Goa District, Goa for the production of 3.0 MPTA of iron ore by M/s. Vedanta Ltd. "

This Environmental Public Hearing (EPH) is conducted as per the revised EIA Notification dated 14/09/2006 (as amended) issued by the Ministry of Environment,Forest and Climate Change, Government of India.

Ms. Mamu Hage, IAS, Collector North Goa and Dr. Mohan Girap, Scientist 'C' of the Goa State Pollution Control Board presided over the hearing.

The hearing commenced at 10.30.A.M. so as to enable the public present to complete formalities of registration as speakers.

At the outset, the Collector North welcomed the public present for the Public Hearing and explained the procedure to be followed during the Environmental Public Hearing.

The public present was requested to express their views/objections/suggestions if any, after the Project Proponent gave its presentation on the proposed project.

It was informed that the views/objections/suggestions made by the public during the hearing would be recorded and forwarded to the Concerned Authority for processing and requisite action on application regarding environmental clearance for the proposed project.

With regard to the Publicity of the Environmental Public Hearing, the Presiding Officer informed that the GSPCB has issued public notices in the newspapers namely; O Heraldo (English), Lokmat (Marathi), Free Press Journal, Mumbai (English), BhangarBhuim (Konkani), informing the general public regarding the date, time, venue, submissions of objections, suggestions, views, placement of EIA reports for reference, etc. The GSPCB has also issued advertisements on local Television/radio channels continuously for 3 days informing general public of the Public Hearing. The local Authorities such as Village Panchayats and Municipalities were requested to give vide publicity of the Public Hearing within their Jurisdiction. Poster/banners were pasted at prominent places and Public were informed through public address system. Thus, enough publicity was given.

The Board was in receipt of reply dated 07/08/2023 from Village Panchayat Mulgao stating that the village Panchayat has conducted joint meeting with Devasthan Committees Mulgao, Communidade committees of Mulgao, Mulgao Nagrik Kruti Samiti of Mulgao and Mulgao Sesa Mining worker with panchayat members of village Panchayat Mulgao on Sunday dated 23.07.2023 in the office of the village Panchayat Mulgao. Regards mining in mulgao village they strongly oppose resumption of mining in mulgao village till the unit fulfill the below mention Point.

1. Demarcation of village boundaries active mining lease boundaries & Buffer Zone boundaries to be done in presence of all committees and Village Panchayat Mulgao.
2. Company should exclude houses, Temples, Lakes paddy Fields bhagayatis from mulgao mining blocks as per new mining lease.
3. Desilting of paddy fields should be carry out by company on priority.
4. Pending compensations of famers from 2011 to till date to be release on immediate basis.
5. Priority to be given to mulgao villagers for Employment, the Company should also give preference to mulgao villagers for business opportunities.
6. Mulgao Communidade is having 2.21 laks sq.mrts area in the said mining block of which lease rent is in arrears from the year 2011.
7. Mulgao communidad is having three water lakes under Survey No.69/1 & 71/0 which has been filled with mining silt need to be cleaned in original form.
8. Arrangement of smooth flow of water to the kulagars in the area in summer season.
9. Attend and provide solution to the difficulties faced by the ritreched sesa mining worker of the mulgao village.
10. Mining grants to Village Panchayat and Devasthan to be increased.
11. Compensation for houses damaged caused due to operation of mines in the VP Jurisdiction.
12. Also brings to your notice that villagers require Public information in details with regards mining in mulgao village. We strongly opposed resumption of mining in mulgao village till we fulfill the above Point.

The Board was also in receipt of letter from Mr. Nilesh A. Karbatkar and others stating that; ***" M/s. Vedanta's representatives are on agriculture campaign in gartering support to the mining project, which has public hearing on 11/08/2023. The representatives have already approached the Panchayats of Sirigao, Pilgao, Mulgao and others for CSR. This is an illegitimate attempt to influence public hearing prior to the scheduled date. This act of Vedanta should be viewed seriously and action be initiated accordingly. There is already a document EIA which speaks all out in support to Vedanta."***

Copy of letter dated 24/7/2023 from Mr. Nilesh A.Karbatkar and Others was forwarded to the Addl. Principal Chief Conservator of Forest (C) , and MoEF and CC, Bangalore, for necessary action.

The Board received objections to the Environmental Public Hearing wherein it is stated that;

"The joint meeting of all the committees with Devasthan Committees Mulgao,Communidade committees of Mulgao,Mulgao Nagrik Kruti Samiti of Mulgao and Mulgao Sesa Mining worker was held on 08.08.2023 in the office of the village Panchayat Mulgao, with regards environmental public hearing of mining in mulgao

village. We strongly opposed resumption of mining in Mulgao village till we get clearance on the point raised by us.

This is to inform you that we are in receipt of the EIA Report furnished by you in regards to the Public hearing scheduledon11th August 2023w.r.t.Block I Bicholim Mineral Block with area of 478.5206Ha located in Bicholim, Bordem, Lamgao, Mulgao, Mayem and Sirigao villages of Bicholim taluka for the production of 3.0 MPTA iron ore by M/sVedanta Ltd.

The said Report is too voluminous with technical terms that we are notable to understand. The villagers are coming and inquiring with us and we are not able to provide them with any satisfactory replies.We were expecting that someone from your department or from Vendanta will come to explain us the report but no one as such has approach us for explaining the said report thousand the villagers.

Moreover we had submitted a letter to M/s Vendanta Ltd raising some concerns related to the village with are quest to be present in the VP Mulgao office on 05/08/2023at03:30 pm for clearing the issues raised. However they reached the VP office on 03/08/2023,when the Panch Body meeting was in progress and insisted for sometime. We granted them time and also explained our concerns as mentioned in the letter. They heard to our concerns but did not provide with any concrete solutions and abruptly left the meeting .On 05th they submitted a letter to the VP in the afternoon requesting for adjournment of the scheduled meeting later in the meeting.

As there is no awareness and clarification on the said project/ EIA Report neither from the Government nor from M/sVedanta, we request you to kindly cancel the Public Hearing scheduled on 11th August2023and tore-schedule it only after clearly explaining the content of the EIA Report to the villagers of Mulgao and after clearing our concerns as listed in the letter submitted to M/s Vedanta."

The Board also received supporting representations, wherein it is stated that mining is very important industry of Goa and needs to be started as early as possible. The project will result into lot of positive impacts to the surrounding villages as well to the State. The people are getting benefit from company's CSR projects, which will help earn the livelihood.

The Representatives of the Project Proponent have thereafter made a Power Point presentation concerning the project by explaining the contents thereof in Konkani and then as requested by the Public in English language.

The Collector thereafter invited the public present at the Public Hearing to come forward and submit their views on the project.

The Collector requested the speakers to try to restrict their submissions to 10 minutes each. She stated that speakers will be called upon to speak sequence wise.

Accordingly, the following individuals have submitted views/ objections/ suggestions, which are indicated as under.

1.	**Deepak Popkar** • He is the resident of Bicholim. • He stated that he stands here on behalf of resident of Bicholim. • He stated that dust can cause pollution in villages which affects children and old people, which causes cold and other diseases. • He stated that fields, houses get destroyed. Because of this EC should not be granted, He stated that he had filed RTI in Municipality. • The agencies were hired to conduct monitoring. The agency if approved then the report is correct or else it is faulty.
2.	**Siddesh Parab, Bicholim** • He is the resident of Bicholim. • He stated that the mine was closed and now reopening. • He stated that all the truck owners etc. are thankful that the mine is reopening as they depend on it.
3.	**Nilesh Dhabolkar, R/o of Mayem** • He strongly objects to the operation of the mine, No EC to be granted to the mine. • He stated that he stays 1 km away from the mining lease area. • He stated that the houses in the villages are one and half kilometre away from the mine, water bodies are located within the lease area, however it is not shown in the EIA report. EIA report is false and fabricated. • He stated that the earlier mining activities have impacted our full village.
4.	**Bhimakar H. Pal, r/o Bordem, Bicholim** • He stated that he is from Bordem. He is a farmer. • His parents were also farmers. He stated the land which is inherited from ancestors is destroyed. Governments Subsidies and funds are provided for farmers. Bordem village is a land of farmers. • He requested to conduct a joint survey to see how the land is destroyed. • Tractors cannot be used in the fields as the fields are filled with water. • He stated that he does not get to see the farmers and cannot see the fields. • He stated that there is a Devasthan but it is also submerged in water. • He requested the officials to visit the site and see the problems faced by the villagers of Bordem. • He stated that as he can see the photo of his father but he cannot see him in the same way, he can see his fields in Form I and XIV and not his land. • He stated that he cannot do any agricultural activity because of mining.

5.	**Naresh Naik** • He is a resident of Kelbaiwada Mayem. • He stated that in ward no.1 and ward no.2 that there are several lakes, Kulagars, springs, water bodies, ponds which are not mentioned in the EIA Report. • There are many ponds in the village which are destroyed due to mining, He stated that he was an employee of Sesa and Vedanta and he has proof of it, but he has been retrenched. • He sought to know how the company retrenched him when it is still in operation.
6.	**Prashant Dhargalkar** • He states that he is supporting mining. • He states that Divkar village is totally dependent on the mining company, our all fate is dependent on mining. • He states that because we don't have any other source of income. • He state that if I am unemployed, how will I take care of my children, their studies and their needs, etc. • He further state that Sesa Company has promised many things, it is we people should be united and get it done
7.	**Pritibha Dhargalkar** • She states that she lives in Bicholim. • She states that since 2012 mining is shut/ closed. • Many people suffered, due to unemployment and shortage of money, etc. • She states that since we don't have income we cannot put our children for higher studies. • So I am totally supporting the mining wants mining activities to resume as soon as possible and youngsters should get employment
8.	**Shrikant Dhargalkar** • He states that He is resident of Lamgao, Bicholim. • He requested to start the Bicholim block. • So, He is totally supporting the mining

9.	**Sanjay Parab** • He stated that he fully supports the mining activities. He requests the mining company to provide employment to all the nearby villagers.
10.	**Shailesh Navelkar** • He stated that he fully supports the mining activities as all the people in the villages will get employment.
11.	**Sanjay Mandrekar , R/o Lamgaon** • He stated that he supports the mining activities . • He stated that he is stays right next to the mine lease area and that there are no bad effects of the mine to the water bodies or residential houses. • He stated that if the mines starts there will be a lot of employment opportunities in the villages as trucks drivers , canteen facilities etc will get employment. • He stated that around 1000 people are dependent on mining activities. • He requests to start the mine and give employment to all.
12.	**Kustulo Pal** • He states that he strongly objects to the operations of the mine. • He stated that from 2003 a lot of mud has come into his field and destroyed the field
13.	**Kamlesh Teli Ex Councillor Bicholim** • He states that he strongly supports the operations of the mine. • He stated that employment opportunities will be generated and the truck owners will be benefited
14.	**Anand Naik** He stated that he is happy for the commencement of mining. • He has requested that mining should be started. • He states that if mining has to start some criteria has to be followed . In Karnataka the mines are 25 to 30 km away from the residential area. • Mining has to start as it provides employment opportunities • He states that he strongly supports to the operations of the mine.

	• He stated that he was working in the mine and is unemployed now. Hence mining has to start. • But he states if the mining starts no temple, no water bodies, no villages should to be destroyed. • He stated that that not only the other people but the people living in the area near the mining lease have to be given employment. • He requests the company that if the employers were taken out of the company they should hold talks with the ex workers and come to a solution and take them back in the company as employees. • He stated that the company has to start 100% but nothing should be destroyed or affected by the mining operation.
15.	**Sandeep Gaokar- not present**
16.	**Shailesh Gaonkar** • He is a resident of Bicholim. • He stated that there is a mine around his house. • He sought to know whether pollution is caused due to mining industry only? • He stated that that mining company has been taking all the precautions to curb pollution. • He sought to know whether any survey is conducted to know how many people are dependent on mining . • He stated that mining is required in Goa. He supports the project.
17.	**Milind Bharve** • He supports the project. • He requested to grant the EC as soon as possible. • For the last 10-12 years the people dependent on mining are waiting for it to be started. • He stated that if there are any small issues they can be sought it up. • People can sit together and support mining and solve the problem. • He stated that the State of Goa should be sustainable where ore is available within the State than why it should be imported. • He stated that there will be social benefits due to the mining. • He stated that the EC should be granted to the project proponent.

18.	**Sadashiv Falkar** • He is a resident of Pilgao. • He supports the project. • He requested to grant EC to the project .
19.	**Franco Sequeira** • He requested for sustainable mining by proper discussion as it will provide employment to the youth. He supported the project.
20.	**Sudan Govekar, r/o Lamgaon , councillor** • He states that he strongly supports the operations of the mine activities as soon as possible. • He states that there are 200 truck owners , garage , shop which were depending on mining operation which have been stopped now. However he request to save the temples, village boundaries and water bodies and start the operation. • He thanks the CM for taking a led in the start of mine
21.	**Shailendra Natekar** • He is a resident of Bicholim. • He supports the project. • He requested to grant EC to the project . • He stated that the workers, villagers and the Government should come together and solve the issues.
22.	**Dinesh Divekar** • Mining should start as soon as possible • mining is shut for 10 years • favour of mining as thousand lost their jobs • mining is backbone of small state like Goa • It is required for development

23.	**Manuel Fernandes Bicholim** • He states that he and his family are fully dependent on the mine and he supports the operations of the mine activities.
24.	**Pradeep Revodkar Mulgao** • He states that He strongly objects to the operation of the mine. • He states that last 50 years he has seen the people cultivating the fields the Mining operations have destroyed the fields, temples, houses and the water bodies and other plantations in the nearby villages. • He strongly opposes the grant of EC. • He states that this is dictatorship and not democracy.
25.	**Kashinath Shivram Parab** • He is a resident of Barazan wado Bicholim. • He stated that his house is located near the mining pit. • He stated that cracks are developed for his house. • His stated that his company was informed about this for the past 12 years. • He stated that he is going to the company to get compensation. • He stated that the company asked him to submit the Form I & XIV. He stated that he has spent Rs. 50,000/ towards his mutation. • He stated that the slab of his house is leaking. • He requested to company to give a plot whether the company stated that they have taken the loan on that plot, but we will give you compensation however till date no compensation is paid, i have been given the flat in rental bases. I have remained the company to give the payment. • He requested the company to give him tarpaulin but the company did not give him tarpaulin. He stated that the company gives lots but they don't get anything. • He requested the Collector, GSPCB to solve the problems of other workers. • He stated that he wants the company to restarts only after these problems are resolved. • He stated that his application may be considered. • He had asked for the plot however the company stated that they have taken loan in that plot. Hence the company can't give the plot but the company stated that they will give compensation even after 13 months no compensation is paid. • He stated that he had asked for simple tarpolin but the company didn't give the same. • He stated that the company gave him a rental flat and every time he had to remind the company to pay his rent.

26.	**Nikhil Jan Naik** • Mining will affect natural water bodies/ springs /lakes • will invite disease- cardiovascular/health issues • farms are destroyed by silting • trees which require 10 to 15 years to grow hall be destroyed in 5 mins • possible chances of landslide • no geographical study is done by the authorities • Buddhist caves, etc like worship places shall be affected.
27.	**Premnath Hoble** • He is a resident of Bicholim. • He stated that there are around 1500-2000 locals. • Around 40-50 workers are employed out of which some are locals and some are outsiders. • He stated that he wanted the security of his village and not mining. • He stated that there are Buddhist caves in Bicholim. • He stated that the village should be protected. • Villagers were not taken into consideration. • Lomgao is the lease. Plan has to be there. • Lamgao village can be developed through tourisms and through mines. • He stated that who has God faith face problem here.. • He stated that If you operate after 10 the animals will come to the village and eat the dogs. There is money but it brings tension. • The area is histories, should we destroy it? We should make it tourist and no mining. • He further stated that his brother is working now he is removed. Village is destroyed.
28.	**Ganesh Govekar – Not present**
29.	**Vasant Gad** • He is the resident of Mulgao. • He stated that people are affected and facing probles. • There is limit of their patience. • He stated that Government should consider everything before given EC. • When Mulgao Village Panchayat received EIA report in Panchayat, it was kept on table. Sarpanch, Panch did not know anything. • If public did not know about it and then how they will place their grievances. 223 houses, 13 temple, Panchayat building, 2 schools, lakes, ponds in Mulgao are not shown in EIA

	• Our village will be destroyed. • We have written to GSPCB. 30% of area of Mulgao is coming within lease. In my tenure 3 times mining collapsed and Sesa has not given mining support. People were injured. • Surface right is not given. The mine should be restored back to original. No water in Kulaghar. • If still it goes again in the same way, I am sure the villagers are not supporting mining. • Workers are not taken for jobs. All the workers are from Dempo Mining Corporation. • Supreme Court Petition was filed, workers went door to door support. • If Mulgao Villagers problems are not solved, remove from lease. If we are not satisfied no EC to be granted.
30.	**Pandurang Parab** • Requested GPSCB to restore the earlier damage area by the Sesa Goa and then only grant the EC.
31.	**Bhau Gad – Not present**
32.	**Gajanan Gaonkar –** • He states that he is a resident of Lamgao. • Mining has effected fields/forests • dust pollution is caused. • Unwanted trees are planted • Springs are destroyed • Fields in the area are affected and no royalty given. They come as and when they want. • Rs. 250 to Rs. 300 is given as compensation which is insufficient • Survey should be made of springs/ lakes. • By sitting in ACs cabins won't give the exact picture. • Ignorant about fields and livelihood • For 5 years Sesa never turned up, 6th year came and said adopting the village • No company is ready to give in writing about the give and take terms • All said verbally and hence goes unfulfilled • Children of the employees go umemployed after their end in

	service.
33.	**Prashant Shirodkar** • He is a resident of Mayem. • He supports the project. • He stated that the mine has been operating for the past 50 years. • He stated that the workers are 40-50 years old. • He stated that decision should be taken considering both sides. • He stated that the workers are jobless. • Further he stated that nobody will support when you are in need. • That the company has given 50% during the past 12 years. • Whereas other companies have taken out people from their jobs.
34.	**Ramkrishna Kundaikar – Mulgao** • He states that he used to sell brown rice but now because of the mine there is a loss of revenue. • He states that the walls have been collapsed but they have not done anything about it nor have they repaired the same and given. • He states that their ancestors used to live on farming and plantation as there was revenue generated from the same.
35.	**Satyavan Chodankar** • He states that he is a resident of mulgao village. • He states that his 20000sq m area was under cultivation and due to mining he is not able to cultivate the same. • He is having a farm house in Sy. no. 70/1, his retaining was near his house has collapsed 16 yrs ago 2 times which hasn't been repaired till date. • The company is a liar as they had said they would build a wall of concrete but nothing has been done till date. • The farm house area is 4000sq m in which betel nut plantation and coconut plantation and pepper corn plantation has been destroyed. • 156 m compound wall has been collapsed. • The trenches are not repaired. • 17000sqm paddy field has been destroyed. • Once upon a time he was selling rice for Rs.10 per kg and now the same rice he has to buy Rs.70 per kg. • His house is in the lease area. • When the mine collapsed in 2016, 565 pepper plantations were destroyed. • The company didn't compensate for the same. • He fully opposes for the same.

36.	**Prakash Popkar** • Resident of Lamgoan. Entire village is destroyed. • First do survey and than give lease • I am not opposing mining but because of mining everything will be destroyed • Big machines are being bought by Vedanta • Our village is a agricultural Village • 90% of the Village is farming • First do desilting of farms so that we can cultivate the farm. • lakes are destroyed, name of lake is also removed by the company • 1984 first revolt was done and I was sent to jail • I request you to do survey first and than give lease
37.	**Vithal Parab – Not present**
38.	**Gajanand Mandrekar** • He is the Deputy Sarpanch of Mulgao. • He stated that when the company was operated by Dempo, villagers had no issue, Vedanta has created lot of issues. • He opposes mining activity by the company.
39.	**Madhukar Halarnkar** • He Strongly opposes the mine operations. • He states that all the points have been discussed. • He thinks that the company has done a One man show as they have submitted an EIA report without taking the villagers, local people and the farmers and the other committee members into account and have done the demarcation. • He states that the company is a liar as they promised that they will come for discussion in front of a joint meeting with the people of the area, however they didn't turn up for the said meeting of the said day.
40.	**Gopal Parab** • He Strongly opposes the mine operations and requests not to grant EC clearance to the mine. • He states that the mining has destroyed the fields and the plantation and the water bodies and the villages in the area. • He states that there is o employment, no land left for cultivation after the mine came into existence. • First there were big fields but now there is no water for the fields and the water table is destroyed completely.

	• When the mines collapsed the bodies were washed into his fields. • He states that that the company is a liar and he says everything is done systematically but nothing is done at all.
41.	**Devidas Govenkar – Not present**
42.	**Ganpat Parab** • He supports the mining project.
43.	**Shaikh Nisar** • One issue pertains to workers of the company. • Company had 10-12 years to ensure that the fields in Mulgao Village are cultivated. • He stated that Muslim community in Bicholim i.e. young generation are not given job opportunities by the company. • Idgah at Gaunkarwada has not been supported by the company. • Company should help poor people of the area. • No financial support is given to the Muslim Wada.
44.	**Nilesh Gosavi** • He states that he strongly supports the operations of the mine activities as soon as possible as he states that the mine has generated a lot of employment.
45.	**Swayam Kamat** • He is a resident of Mayem • farmers presented their grievances • 12 000 sq meters field is owned by him, herited from his father, but now he cannot ask his sons to step down into the fields as they are thickly layered with mud soil. • 600 farmers are registered and he is representing them and they are affected by this mining. • He said for consultation purpose we are charged by the government and we have to pay consultation fee. • He says matter is pending in court and on the other hand

	this project is considered. • Mayem people are fond of Parboiled rice (Uokde Rice) but in the circumstances it seems to be not possible for getting the seeds • Green Field Project is only in pictures but colour is brown. • If we want to eat Parboiled rice (Uokde Rice), we should give strength to farmers. • He asked to make the farmers strong and than to look into the project.
46.	**Tushar Falari** • He states that he strongly supports the operations of the mine activities and requests to start it as soon as possible as he states that the mine has generated a lot of employment. • He states it will provide employment to the truck owners . • There are skilled youth which are waiting for the mines to start as they are unemployed and need employment in the field of mining related area. • When the mining stopped all the students who studied mining related work had to go out of the state inspite of being qualified. • He request for starting of the mine.
47.	**Krishna Gadekar** • He is the President of All India Kissan Sabha Mayem. • He stated that a large number of people from Mayem depend on agriculture. • He stated that there are four major water bodies in Mayem. All four water bodies are filled with silt on account of mining activities by the company. • He stated that water shortages for agriculture is caused due to this. • ZAO report is submitted that fields in Mayem are damaged due to minig silt. • Company has dragged more than 600 farmers to the Court. • The effect of granting a 50 years lease to the company on local farmers is not being considered by the Authority. • He stated that the Company does not have a rehabilitation plan. • Further, he stated that continuous mining operation will cause huge water shortages. • He strongly opposes grant of EC to the company.
48.	**Chandrashekar Palni** • I am supporting the Block 1 project and he further stated that mines should start as fast as possible. • The Trucks should be restarted and given back work. • The Difficulties of every household should be solved.

49.	**Rutvik Sanjay Mandrekar** • He stated that the mining has stopped in 2012. • He stated that 2.5% mining operational in Goa. • He stated that royalty loss to the Government. • He stated that he supports the mining. • He stated that the lease owner/ mining truck owner/ worker are given jobs through mining, • The truck owners are supported by the mining company. • The truck owners have not given any compensation during tenure of 2012 till date. • He stated that there are profit and losses in the business and start mining in sustainable manner.
50.	**Narayan Kharade** • EIA report seems to be more of Advertisement /Publication . • It was informed consent / objective is defied in a EIA, However it is misinformed that Consent has been provided. • He refused to call EIA it is more like Advertisement . • He referred to Office Memorandum MOEF of dated 29th October 2014 , which is related to Impact of Mining Activity on Habitations- Issues related to mining project wherein Habitations and Villages are the part of mine lease areas or Habitations and Villages are surrounded by the mine lease area- Regarding, he further requested authorities for the same. • He found that this Green Field Project is just smeared with new face. • If the company does not have re- habitation and resettlement plan than project proponent does not have right to present before public. • He blamed new media for making false propagating. • The productivity of agriculture is affected as certified by agriculture admits compensation has to be given then it moves to collector but in the end nothing happen. • he pointed out the company as videshi (foreign) it not a swadeshi, the Sesa headoffice is located in London so we cannot call them as swadeshi company. • As CSR activities by companies including the Mining Establishments has become mandatory upto 20% of their financial turn- over, Socio Economic Development of the neighborhood . Habitats could also be planned and executed by the PPs more systematically based on the Need based door to door survey by established Social Institutes / workers on the lines as required under TOR. " 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. • 2500 Zambia workers represented in UK Court, which judged it as illegal. • He further submitted that he will submit the written submission.

51.	**Sanjay Gaonkar – Not present**
52.	**Rajesh Vaigankar** • Mining should be started as fast as possible
53.	**Pandu Kundaikar – Not present**
54.	**Sandesh Palni – Not present**
55.	**Uday Saraf** • He states that he strongly supports the operations of the mine activities and requests to start it as soon as possible as he states that the mine has generated a lot of employment.
56.	**Sitaram Walawalkar** • I am in support of giving EC to this project since we had participated in lot of morcha strike etc to start of this mining in past, so I am confident people will support and Ec will be granted to this project

57.	**Udesh Mandrekar** • He expressed grief about a child wanting to study further and states it is not possible as father is mining affected. • The child in future falls in bad company due to mining bandh.
58.	**Nitesh Parab Gaonkar – Not present**
59.	**Sanjay Pawaskar** • He states that he strongly supports the operations of the mine activities and requests to start it as soon as possible as he states that the mine has generated a lot of employment. He states it will provide employment to the truck owners . • He states Discussion has to be held on the problems faced by the people.
60.	**Prajal Gaonkar – Not present**
61.	**Vishwas Thanekar** • Many people are depended on mining because of this I am in support of this project.
62.	**Dinesh Naik** • He is a resident of Sankhalim • He starts that mining should be resumed.

63.	**Ajay Anant Gaonkar** **He supports the mine.** **He demands modernisation of education , give employment, legal agreemants are required to be made between him and the company**
64.	**Chandra Gaonkar** • I have fully support for the mining Block 1 Bicholim project. • He further requested to start project as earlier as possible.
65.	**Ramchandra Popkar** • He is a resident of Lamgao. • He states that he is in favour of mining.
66.	**Rajesh Parab – Not present**
67.	**Sandip Sinari – Not present**
68.	**Amit Naik** • He is a resident of Sirsaim. • He states that mining dependents for past 23 years. He is in support for mining. He states that he was paid by the Company during its non- operation. • He requested that mine should be kept in operation.

69.	**Milind T. Pal– Not present**
70.	**Santosh Devari** • He supports the mining project . • He stated that sustainable mining should be carried out in everybody's interest.
71.	**Vaibhav Fadte** • He states that he strongly supports the operations of the mine activities and requests to start it as soon as possible as he states that the mine has generated a lot of employment. • He states that the problems faced by the people have to be solved and a sustainable mining has to be done. • A lot of people depend on mining and had taken loans previously and when the mining stopped they faced a lot of problems hence he requests to start the mining operations . • He states to protect the temples, houses and the fields of the villages and solve all the problems they face.
72.	**Vithal Gawas** • I am supporting Block 1 Bicholim • In 2012 mining was closed for past 10 years we are representing the Government to start Mining. • The efforts which we put to start the mining now got result. • Many people say that sustainable mining, he raised the question what is sustainable mining? I feel sustainable mining means all peoples grievances should company resolved by the company. • So I am fully support to the project.
73.	**Sandeep Sinari – Not present**

74.	**Umesh Kadam** - Honda • He states that he strongly supports the operations of the mine activities and requests to start the operation as soon as possible as it will provide employment for the people as the people faced alot of problems when the mining activities were stopped.
75.	**Lawrence Braganza** • I am fully support of mining activity at Block 1 Bicholim • Today we have got one step to start mining by way of Public Hearing . • But I am of opinion that company should look into peoplesgrievances and resolve by the same. • Many people is of opinion that Vedanta company is giving false assures but I am disagreeing with the same. • All grievances should go to our company owner Mr.AmitAgrawal he will definitely help us, since during the covid time he supplied with oxygen, he supported education fields.
76.	**Babal Shetgaonkar** • He stated that he is in full support of the mine.
77.	**Kashinath Mayenkar** • From 2012 Mining was stopped , for 11 years everything was in dark • I am the truck owner and we had seen very difficult time. • So I fullysupport Block 1 Bicholim Project
78.	**Bala Khan Goni** • He states that he strongly supports the operations of the mine activities and requests to start the operation as soon as possible as it will provide employment for the people. • He represents the muslim wada and he request to provide employment opportunities to the people of the community as only one person is provided with employment for the time being. • He request to construct a way which is the biggest problem faced by the community. • He states that he worked for sesa and dempo but he states that when sesa took over there was a huge turnover and the employees were

	benefitted by teh same. however when dempo was operating the mine no benefits were given to the employees.
79.	**Sanjay Naik** • Company has never had any of its employees. • He is support of the mining company
80.	**Pramod Sawant** • He states that he strongly supports the operations of the mine activities.
81.	**Shivdas Gawade** • I fullysupport Block 1 Bicholim Project, since there is lot of employment issue in the village & EC should be granted. • Many problems are faced by us due to closure of mining activities, like many graduates engineer are unemployed and I feel they should get jobs.
82.	**Sameer Kurdikar** • He stated that for the upliftment of village, restoration of employment and to get freed from debts. • He supports mining.
83.	**Rajaram Gaonkar** - Representative Bicholim Municipal Council • He states that he strongly supports the operations of the mine activities. • He was a truck member and had taken a loan and faced problems regarding the repayment of the same due to the closure of the mines. • He requests the management to solve the worker problems and to provides business to the truck owners.

	• He states that he has some issues but he has given a written representation regarding the same which may be considered. • He requests that a sustainable mining shall be done.
84.	**Sandesh Sinari – Not present**
85.	**Sameer Teli – Mayem Bicholim** • He states that he strongly supports the operations of the mine activities. • He requests to start the operation as soon as possible as it will provide employment for the people as the people faced alot of problems when the mining activities were stopped. • There are skilled youth which are waiting for the mines to start as they are unemployed and need employment in the field of mining related area. • When the mining stopped all the students who studied mining related work had to go out of the state inspite of being qualified. • He request for starting of the mine.
86.	**Subhash Kinalkar** • I am representing Bicholim Truck Owner as an Association Secretary we have seen many people spoken their grievances but no one has spoken about us. That is effected truck owners who has suffered due to the closure activity of the mining. • No company has supported us or given any compensation during the closure of the mining activity, it is Manohar BhaiParrikar who had brought Umbrella Scheme for effected truck owners, 138 cases running in the court against truck owners but no one has taken note of thesame. • Many times our children ask to complete their wishes but we can not full fill the same because we are in huge loans. Therefore if mines starts we will be very greatfull. • Now sustainable mining if Hon'ble Supreme Court wants to start why this peoples are opposing for the same . • I asked GSPCB to have communication with the Government to relax tax levied on them.

87.	**Azad Kadkade** • He is a resident of Bicholim • He stated that he has seen mining from childhood. • He stated that the development in the village is solely due to mining. • He clarified that the person who claimed that company did not give place has also paid house rent for 10 long years.
88.	**Samir Teli– Not present**
89.	**Premanand Gaonkar – Not present**
90.	**Vishwajit Chari – Not present**
91.	**Laximan Gaonkar – Not present**
92.	**Ladu Mardolkar – Not present**

93.	**Devanand Parab – Not present**
94.	**Paresh Ghadi – Not present**
95.	**Sujay Parrikar** • **He supports the mining operation but he states that the youth have done diploma in mine engineering hence he request to provide employment for the people.**
96.	**Siddhesh Naik – Not present**
97.	**Sudhir Kamat – Not present**
98.	**Vaman Gawas – Not present**

99.	**Riaz Anwar Baig – Not present**
100.	**Kashinath Mhato – Not present**
101.	**Sanjay Sawant – Not present**
102.	**Tulsidas Chodankar** • He is a resident of Mayem. • He stated that Mayem is a picturesque village. It has lots of orchards and farming activities during mining the farmers undergo lots of difficulties. • If ever compensation is sought it has to be only through strikes. • Most of the people are directly dependent on mining. • The residents should be given first preference with regards to employment. • Requisite compensation and other facilities are to be given on time. • Mining should be resumed but it should not bring disgrace to the village. • He supports mining.
103.	**Dilip Shet – Not present**

104.	**Vasudev Gaonkar – Not present**
105.	**Manohar S. Naik – Not present**
106.	**Rajan Naik – Not present**
107.	**Atmaram Tilve- Bicholim** • He states that he strongly supports the operations of the mine activities and requests to start the operation as soon as possible as it will provide employment for the people as the people faced alot of problems when the mining activities were stopped.
108.	**Mahesh Mhambre – Not present**
109.	**Surekha Suresh Navelkar** • She states that she is a resident of Pilgao. • She states that she has an agricultural land in the proposed mining area. • She further states that our agricultural land we want for the future, so she strongly opposes the project
110.	**Krupali Kashinath Parab r/o Barazan wada.**

	• She states that her house walls got cracks 12 years ago due to mining. • She states that she was promised a plot of 300 Sq meters and 120 Sqmtrs house. • She states that she was later promised by Mr. Patil and Mr. Joshi that she will be provided with alternate land. • She states that they showed her 2 plots at Borda. She states that there was an agreement done w.r.t that land. • She states that later Mr. Joseph Coelho came and said that the land is under the loan and we cannot allot the land. • So, Mr. Coelho showed another place at Dhab-Dhaba (waterfall). • She states that they made false promises for 13 years. • She further states that she approached Municipality and met Shri. SantoshMandrekar and told him her grievances. • She further states that she approached Honorable Shri. Chandrakant Shetye,the local MLA. • The MLA later called the company and asked them about the situation regarding land allotment. • She states that they informed the MLA that it will happen. • She further met Honorable Chief Minister and discussed about her grievances. • She sates that they had made all fake promises that they had sanctioned money but when went to ask, they just ignored us • .Hence I strongly oppose the project • In 2014 an agreement was done by Mahesh Patil and Upendra Joshi to give my husband kashinath parab 300 mts land and 120 mts house in it. • And also made and agreement of exchange of deed.
111.	**Neena B. Salelkar** • She States that she is depended on mining. • She wants a mining with proper measures. • she states that her house is just near the plant and near the mining dump. • She states that we are losing our agricultural land due to mining activities. • She states that she is facing the dust every second. • She states that there are many people employed and many are unemployed in our locality. • He states that one of them is her husband, who went on strike for starting of the mines activities. The Government should give us justice
112.	**Mohini , Pilgao sarpanch** • She stated that the Vedanta company is a liar. • She stated because of the mining company there are disputes between workers and family members and I

	request to all to give us justice. • She stated the villages, fields the temples are destroyed in other areas and i don't want the same in my village hence I strongly object to the operation o f the operation of the mine.
113.	**Sunaina Halarnkar – r/o Pilgao** • She Objects to the operation of the mine • She states that the environment is effected due to the operation of the mine • There is dust problems , due to transportation and dumping of the Ore • She states that the water bodies are destroyed • She states that a proper survey has to be done with village committee and the final report has to be shown to the village committee
114.	**Priya Dinesh Morajkar** • She states that she fully supports the mining activities and requests to start the mines activities as soon as possible.
115.	**Manasi M. Khautankar – Not present**
116.	**Sushma S. Sutar** • Resident of Dhabdaba. • She stated that she supports for mining.
117.	**Ashwita S. Mandrekar – Not present**
118.	**Anil Salelkar** • He states that he is from Pilgaom. • He states that few days back that a Tiger entered the village eat dogs in the Mulgao Village as the Tigers don't have a place to stay in the forest area. • If this situation remains the same they will start eating the humans. • He further requested all to come at the unloading point and see the dust on the houses, almost all the houses are covered with dust, there is no need of painting the houses in that area. • He states that when he was deployed to operate pollution control machine . • He asked his senior as why all machines are placed in particular direction, on which his senior replied stating that we should not get the black paper • We strongly oppose this project till our all grievances like agricultural land and worker issue, etc are not resolved.
119.	**Mukund S. Prabhugaonkar – Not present**
120.	**Sudesh Vaigankar – Not present**
121.	**Adv. Ajay Prabhugaonkar**

	• He opposes the Project. • The mining was operational since 1941. • He stated that the mining was started for production of 1.2 to 3.0 million tons. • He stated that the loading, screening, dumping activities damage the fields / national habitat. • He is the resident of Pilgao Village. • He objects to the word Green field used in the EIA report and this project is destroying the Land, fields and other greenery. • He stated that the EIA report is bogus and faulty. • The EIA report at page no 148 shows only rats and rabbits. No details of other wildlife animals are mentioned. • EIA report is not based on ground reality. • He stated that recently employment was not given on skilled basis, it was given on compensation basis while doing retrenchment they removed everyone. We want a sustainable mining. • Future of Bicholim Taluka will be decided based on this public hearing. He opposes this public hearing. • He requested to scrap the EIA report. The EIA report has to be as per the actual.
122.	**Hanumant Salelkar** • He is a resident of Barazan waddo, Bicholim. • He stated that his ancestors land is destroyed by mine. • He stated that plants spread an area of 2.5 kilometers has destroyed the environment. There was a lake within the mine which has been destroyed due to dumping.
123.	**Sakharam A. Pednekar** • He States that he is a Chairman of Mayem Biodiversity Board and various other committees. • We had placed all the grievances before Government • Pior an inspection has to be carried out to check upon damage caused by mines and largely • compensation cases are pending till date. • Technically oppose the project • We have carried out study and found. • There are 170 birds species. • Questioned the authority, whether the mining companies have fulfilled the terms and condition of lease. • The one who failed earlier cannot be re-considered for fresh lease. Such units, should be blacked listed • Discussion to be conducted at village level, sustainable plan to be prepared.
124.	**Ramesh S. Gawas** • He questioned whether the consultants is present here for the Public Hearing.

	• As per the EIA report they are supposed toremain present for the hearing or else there is no meaning for public hearing as they have to answer the issues raised in the public area. • Vedanta Goa was doing copper mining in Zambia, they were thrown out from there for doing illegal mining. • what is green field mining project may be explained, • Vedanta is de-listed from London stock exchange. • SC passed judgment saying that they were carrying carry out illegal mining. • From 2011 -2012 100 Crores are due by Vedanta to the government. • 30 lakhs fine levied by SEBI illegal and misleading. • He challenged if anyone proves the water from pit is rain water or it is ground water. • 60 well water went dry as all the ground water is accumulated in the Sirigao pit. • Dr. Mohan Rao prepared siltation reports of mayem lake. As per the report the Mayem lakes is silted due to mining. • 1:8.39 ratio flooding of Bicholim River and 140 inches rain fall one can imagine how dangerous it will be. • No data given regarding tippers used to match with the production to verify its factuality. • Affected football ground. • Water Body infront of Shantadurga H/S, Surface study is not in EIA. It originates in the mining lease it meets River Bicholim carrying huge silt and empting it in Mandovi River.
125.	**Dilip D. Kudaskar– Not present**
126.	**Hanuman Gaonkar– Not present**
127.	**Ashok Karbe** • I am resident of sirsai , and I am mining dependent, mines were closed since 2012 all workers have suffered . • We made request to government to start mining activities and also made many representation to Government to know how mining is important to us. • Supreme Court after 9 years passed judgement to start with sustainable mining, so we should welcome this decision. • I am fully in support of mining project. • In 2009 Sesa Goa has purchased this mine and they got hardly one year to run this mining activity, for 50 years back peoples complaints / grievances , we should not blame/ put the Sesa Goa/ Vedanta.
128.	**Ajay B. Gaonkar – not present**
129.	**Ujwala Uttam Shirodkar** • She is resident of Mayem. • She stated that the fields are destroyed by the mining.

	• She stated that her orchards land is destroyed. • She further stated that the Mayem lake is destroyed due to mining. • She requested fields and orchards lands should be restored. • She stated that mining should start by restoring the environment.
130.	**Ratan Pednekar** • She is a resident of Mayem. • She stated that money is not given to her for 5 to 7 years. The orchards, fields and water pond are destroyed. • She stated that her husband was working in Dempo. • She requested to look into her money matter. She stated that Mamlatdar has not taken any action.
131.	**Kanchan Chodankar** • She stated that if farmers believe in sustainable farming than proceed with mining • Mayem is affected at large as it is skipped w.r.t. distribution of fertilizer • Mining maybe restarted if unemployed youths should be given employment and also our agricultural problems are resolved
132.	**Pundalik Pal – not present**
133.	**Nasir Baig– not present**
134.	**Ganesh Gaonkar** • Resident of Sirgao and is opposing the project • Representation are already given by him • report given by mining company is false, pictures shown during presentation are false, no conditions are fulfilled. Data which is shown is manipulated by the mine owners in the report, • Green field project which is declared is wrong • all five villages are destroyed namely Bicholim, mulgao, Lamgao, shirgao etc. requesting authority to practically come on site and do inspection before granting EC. • the company person should come to their village and tell from where they collected the data. I am the president of Devastan, no one approached me. • 4 temples come within the vicinity of mining area. Mining people told that the retaining wall will be built by them and taps will be provided but nothing is done. • After 3 years gap we approached the mine company but they told that no funds are available. I have all the photographs of the collapsed retaining wall. One day the temple wall will come down due to the landslide. • One mining pit is there near the temple, 50 meters away from the river. No refilling is done in this pit. The depth of river is 3 to 4 meters. The dept of the pit is 25 meters. Because of this pit all agricultural fields are destroyed. • Yearly we harvest 2 types of crops. So, in order to harvest

	2 types of crops the field should be not be dry, but come to april and may month water is there in field and everything is polluted. • Company told they will pay. • Government told they will pay through DMF, but not done. • Area occupied by mining is not their land it is communidade land • Government asked to produce the land ownership documents, but they failed. The company should produce the Form I and XIV, Property is not theirs than they should not be granted lease.
135.	**Dinanant Gaonkar,** • He is a President of Tenant Association. • He stated that the EIA Report is prepared in an office and not by ground visits. • Project is specified as Greenfield in report which is false. • Villages have written to the Director of Mines and Geology to exclude Shirigao buildings, Panchayats etc from the mining lease, however the DMG has not replied. • The road used for religious procession is destroyed by the Mining company. • Old survey record shows existence of road used for religious procession yet company denies its existence. • High Court directions to restore fields and only after the High Court Directions fields are restored. This was caused due to Mining company activities. • Issues are pending before Mamlatdars Courts. • When so many issues are pending , I oppose grant of EC and conduct of Mining operation.
136.	**Narendra Prabhugaonkar – not present**
137.	**Santosh Sawant – not present**
138.	**Devidas Prabhugaonkar – not present**
139.	**Anil Naik – not present**
140.	**Anand Gad, Advalpal** • He states that his village is not in Block 1 and is in the other unit of Vedanta. • The mine was closed due to some accident and then it was restarted by the impact it caused. • He states that the Vedanta company is not fit to run the mine. • He states that The company has changed so many names and they always lie to the villagers. • He states that he has 2 field and the company has put dumps in his field. • He questioned why should we not oppose because of some people who are dependents on the mine for their living.

	• There was mining silt which came from the mines and destroyed the nallahs & fields. • There was alot of air pollutions when the mines were in previously in operation but the people were very happy when the mines stopped as the air and dust pollution had stopped. • He states that the picture of the EIA report is all false and fabricated. • He states that He still is fighting the cases his ancestors have filed against the company for his land.
141.	**Laxmikant Gaonkar – not present**
142.	**Sharmila Volvoikar Panch member of pilgao** • She states that she is not against mining but against the granting of EC to the lease for 2.00 MTPA. • She states Dempo was allotted 1.3MTPA EC was granted for beneficiation plant to the mining company • A tailing pond was constructed but still waste enters in the agricultural fields causing destruction to the fields and other land. • There is contamination of water and 60 Hecters of agricultural field was destroyed due to mining chemicals. If the capacity is increased more 1.3. siltation will increase in agriculture land and will destroy the fertile land. • She strongly objects for the mine. • The company needs to employ the 35 nos of employees which were removed.
143.	**Ibrahim Shaikh – not present**
144.	**Glen – not present**
145.	**Prakash Parab- Pilgao** • He states that he strongly supports the operations of the mine activities as soon as possible as he states that the mine has generated a lot of employment.
146.	**Dr. Govind Parab – not present**
147.	**Raghuvir K. Karbotkar** • He is a resident of Lamgao. • His residence is located within 2 Km from the mining area. • He stated that the destruction which has taken place should be rectified. • He supports the sustainable mining.
148.	**Sebastiao A. Rodrigues** • He sought clarification from the project proponent • He observed that application for EIA was 16/03/2023 • Baseline data collected • project proponent stated baseline study carried out pre-monsoon which was locked down period of covid and

	such wrong dates are mentioned • fresh baseline data has to be created • fresh PH should be carried out • The Project is referred as Green Field which is wrong • He questioned so as to how Dempo Mining Corporation got changed to Sesa Mining Corporation, if so done all the prior liabilities should be transferred to the later company. • He states that Bicholim is a flood prone area • He states that 2 scientific studies are done in bicholim river pollution by Rane and Matha of marine science department of goa. North goa disaster management Plan pertaining to mining lease of the project proponent. • The collector requested copies of these two studies. Both studies were shared on whats app no.9921876712.
149.	**Abhijeet Prabhudessai** • He stated that it has been 80 years since lease is granted to this mine . • He stated that the grievances put forth by farmers states that they are not benefited by mining. • He states that the situation of everyone ie. Farmers, Fisherman, workers etc is helpless. • He sought to know during the time the mines were not in operation why the loans of the workers were not forgiven if the government was really concerned. • He pointed out that the major violations in todays public hearing is that the Consultant is not present for the hearing. Hence there is no point in seeking clarification. • Dr. Mohan, representative of GSPCB, clarified that the consultant will be available to answer the concerns. • He stated that Dr. Salim Ali Wildlife Sanctuary is within range of 10 Kms. • The report seems to be fraud • Fresh lease is clubbed within earlier 5 years and termed as Block-I. • He requested that the houses coming under the mining lease be skipped out. • He stated that in the name of Greenfield project, the people are deceived. • He stated that the EIA report falsely points out that area as desert and in future this will give the wrong notion that it was barren. • Before the commencement of mining, everything in the village should be recorded . if not, people will have to leave their homes. • Things are hidden in EIA. Back waters are to be covered in the EIA report. • He referred to Dr. Mohan Girap's report on Mayem Lake which clearly points out to the entry of Manganese ore. • He sought to know the future of the forth coming generation as they

	have more right on these mining areas. • He pointed out that 30% of the mining ore which belongs to future generation has been already extracted. • He requested common man to be involved in the study. • He stated that there is no mention of flora /fauna and hydrological life in the EIA Report. • In view of above, he stated that the project has to be rejected.
150.	**Manoj Parab** • EIA report submitted is a false report and joke on Goans. • The EIA report contains a chapter on chemical analysis of ore. The report does not mention analysis of 35% of ore sample. This 35% will include heavy metals and rare elements. • The EIA report is being hidden from Goans. • Goa has gold in its ore and mud. This is not mentioned in the EIA report. • Dr. Nandakumar Kamat has done a research on this and submitted a paper on this to Chief Minister and Mining Minister. • Vedanta seeks to export this gold to China. • Research paper of Dr. kamat states that 6-8 kilo of one ton of ore will be gold. • EC states 3 MT of ore will be excavated from mines and as such 20-24 thousand of kilos of gold amounting to 10,000 crores worth of gold will be excavated by the company. • Why is Goa's gold sold to China and benefit not given to Goans. • Research papers of Dr. kamat regarding gold in Goan soil should be refered to. • He demands that a sample of ore should be analyse to prove evidence of gold. • He states that mining is required . • Government should made it compulsory for the mining company to give jobs for locals. • Company is using only 20 ton trucks, Volvo trucks. Locals do not have these trucks. Transport contracts will not be given to locals. • Government is dividing locals for and against mining. • He states that he has worked at a mining company of Vedanta at Codli and it has done huge frauds. • He states that 10,000 crores to be earned by the company should be informed to the Goans, but illegal mining is not wanted. • Huge loss is being caused to the state due to loss of royalty on gold as ore being excavated. • 5 villages in mining lease area have unemployed youths. Human resource mapping is not done by the company in the EIA reports. • Details of jobs to be given to locals is not done. In Mopa, locals have been cheated of jobs by the locals. • In an LAQ government has stated that mining company will only give preference to Goans in jobs in mining companies. It is not a compulsion.

	• EIA report does not have a social impact study. He states that company has wrongly submitted that the project is Greenfield. It should have been verified before conducting the hearing. • He states that the EIA report should be redone and environment and locals of Goa should be saved.
151.	**Jayesh Walawalkar - not present**
152.	**Pandu Pilgoankar** He supports the mining company
153.	**Nilesh Karbotkar - not present**
154.	**Kishor Ishwar Lokre** • He stated that the Government has removed notification that it is a Green Field Project . • He stated that mining is operating from 1941 this is not a green project. And should be taken back. • The EIA report is false. The agency has not come on the site and the 3 seasons are not taken into account while preparing the EIA report peoples problems are not taken into account the authorities have considered this false report and conducted this public Hearing . • If now there are problems for the villages then after 50 years what will be the situation. • He requested the collector to tell the MoEF that the EIA the report itself is false . he stated that he was working in the mine once. He states that it is not a green project and he strongly objects to the operation of the mine. Frsh EIA report has to be prepared after considering 3 seasons data. It is not green project and prepare EIA report is false.
155.	**Manohar Shirodkar R/o Lamgao** • The Mining had started from the time of the Portuguese and going on for last 60 years. • There are good and bad effects of the mining unit. • It has reached the residential area and still why more 50 years are given to the mine, Unit to excavate the area. • The company if given 30 years of excavation then the mine will reach the field are the humble request to the GSPCB that before issuing the EC, carry out site visit and survey along with the mining dept, local villagers, committee, GSPCB. • He stated that the EIA report is false. • He states that the picture shown is one sided that CSR activities will be taken up by the company but will they executes their promise and who will monitor the issues. • He stated that There are Buddhist caves and tourists spot are shown the mining area and this issue has to be taken. • We are not against the mining operation but has to be done in sustainable manner. • The Union workers were having problems with the company.

	• The temples, the tourist spots and the Buddhist caves are shown in the mining area, the same will be destroyed if the mines are given to operate • We want mining but not at the cost of destruction of our houses, water bodies, fields etc. • The CM can solve all our problems if he takes the issue personally.
156.	**Vinayak Samant - not present**
157.	**Arun Naik** • Resident of Lamgaon. • He stated that the mine has been existing for a long period. • He stated that the previous experiences showed that environment are effected due to mining. The report submitted by the Project Proponent is one sided. • He requested for a detailed survey to be conducted along with the villagers and also by taking in account of previous experiences. • He stated that mining company has never given justice. • They have never fulfilled their promises. • Mining lease should be given for 30 years , he sought to know why this mining project was granted 50 years of lease. • He sought to know whether this lease is revocable, if not the clause should be added in the lease. • He sought to know whether the report are done considering the period when the mine was in operation or for the last 12 years.
158.	**Navin Jan Naik** • He is a resident of Lamgaon. • He stated that he oppose the project. • He stated that the area marked for mining is below 500 meters. • He stated that area which is marked is close to Lamgao and can cause damage to Environment, health safety of locals. • He stated that the mine has an adverse effect on health and our fields. • He stated that the EIA is one-sided mining has destroyed ecosystem.
159.	**Gajanan Karbotkar** • He is a resident of Mayem. • He stated that he is in full support of this project. • He requested the Goa State Pollution Control Board to grant the Environmental Clearance.
160.	**Sagun Gad** • He requested to start the Mining block. • So he is totally supporting the mining activity to start.
161.	**Mansi Kauthankar** • She is a Panch member of Mulgao. • She stated that she oppose the project. • She stated that the EIA is given to Village Panchayat.

	• She stated that the report is not explained to the people. • Temples, fields which will be destroyed should be checked. • The company was called for a joint meeting in the Panchayat but they sought for police protection. • She stated that the people questioned them during the gram sabha . • She stated that the government should think about the welfare of the people. • She stated that the job is required, food is required but not of the cost of their lives.
162.	**Anil Nagvenkar** • He states that he is from Bicholim. • He states that he is very grateful to Chief Minister and MLA for starting of mining activity.
163.	**Ajay Shetkar** • He states that he is a resident of Mayem Village. • He states that his main grief is about unemployment, if mining is started than our main problem will be resolved.
164.	**Suresh Kudaskar**
165.	**Vivek Kudaskar** • He is a resident of Mayem. • He supports the project. • He requested to grant EC to the project .
166.	**Mohan Parab** • He states that he requests the Government to start the company as soon as possible. • He strongly supports the project.
167.	**Satish Sutar** • He states that he strongly supports to the operations of the mine. • He stated that employment opportunities will be generated and the truck owners will be benefited.
168.	**Govind Ghatwal** • He states that he is a resident of Shirgao. • He supports the company.
169.	**Shankar Rawale** • He states that he strongly supports the operations of the mine as soon as possible.
170.	**Swapnesh Sheldekar** • He states that he is placing objection on granting of EC to M/s Vedanta Ltd for starting of Block I Bicholim Mineral Block, • He is a resident of Mulgao Village and the Chairman of Bio Diversity from his Village. • He states that the EIA report is prepared without consultation or taking local knowledge of the people into consideration. • He states that no one has approached their village to collect

	the baseline data. • He states that the data collected is inaccurate, unreliable. • He states that no authority is aware of any person visiting the village for collection of the data. • Data collected from buffer zone . • The data provided in the EIA report is nor accurate and appears to be fabricated. • False data is given in the report . • Temples, caves Lakes etc does not find mentioned in the EIA report. • Entire study to be redone after taking into consideration biodiversity committees and local bodies and then conduct public hearing.
171.	**Vinod Naik - Pirna** • He states that he strongly supports the operations of the mine as soon as possible.
172.	**Shrikant Karbotkar** • He states that he strongly supports the operations of the mine activities. • He requests to start a sustainable mine without hurting the sentiments of the villagers.
173.	**Prashant Kinalkar - Mayem** • He states that he strongly supports the operations of the mine activities. • He states that he has his vehicles in the area. • He request company should take into the confidence all the truck owners and other people who they used to provide benefits monetary and others into confident and start the mining operation as soon as possible.
174.	**Prakash Naik – not present**
175.	**Navnath Jannaik** • He is the resident of Lamgao • Production of supari has decreased due to mining . • the cost of fertilizers is more than the input they get from the produce
176.	**Sumit Talawnekar - Mayem** • He states that he strongly supports the operations of the mine activities as soon as possible. • He states that he is a Truck owner and his land is next to the mine lease area. • He states that he is unemployment and no one came to his aid when the mines were shut down.

177.	**Khemlo Sawant – Not Present**
178.	**Pravir Prabhakar Fadte** • He states that he has inwarded Goa Foundations' application in Collector office yesterday on 10-08-2023. • The necessary environmental information and data which are required to be produced in response to the TOR are missing from the draft EIA document. The suppression of necessary information has been achieved by claiming that the Mining Block is a "Greenfield project" . Such a characterization of what is clearly accepted. The Mining Block has been operated from inception as a series of five leases (TC 11-15/1941) neighbouring each other in a straight line, and thereafter, amalgamated lease is the relabelled "I-Bicholim" and has the same boundaries. • These 5 leases before and after amalgamation have been in operation since 1941, and have been operated by a variety of actors, including Dempo Mining Corporation and Sesa Mining Corporation Ltd. SMC is a wholly owned subsidiary of Vedanta Ltd., which is now assigned this mineral block. The production data of the 5 leases, from 1941 to 2012, is available in public domain. The leases were also operated between 2015 and 2018 by SMC /Vedanta. In normal and legal terminology, such a mine site could never been cauterised as a Greenfield project for the purpose of obtaining Environmental Clearance. • The important thing to emphasis here is that the wilful characterisation of the project site as a "Greenfield" project has been relied upon to withhold data and the past record of this project proponent (PP) required to be made part of the draft EIA and to the public. This includes the environmental data collected since the lease started operation in 1941 as well as studies by academics and entities like NEERI, which data and information must be used to understand past impacts so as to foresee future impacts. • There are people who have their own grievances and hence has to be give sufficient time to place their grievances and requested to adjourn the public hearing as EIA report has suppressed basic data . It series of 5 leases which are amalgamated to single number • The investigation report of assessment of depletion of ground water sources and land degradation in Sirgao Village ,and mitigation Measures by National Environmental Engineering Research institute under Council of Scientific & Industrial , Nagpur dated 16/06/2008 in PIL No. 1/2008 was submitted to the Hon. High Court of Bombay at Goa in which it clearly shows the worst condition of natural water sources and other issues are mentioned in it. Why this report was not included in the draft EIA. Copy of the report is submitted to Goa State Pollution Control Board. • He requested the Collector to personally visit the mining lease areas and do the surveys of the critical conditions of the people living there and requested to re-schedule the Public Hearing.

179.	**Narayan Sawant - not present**
180.	**Hanumant Malik - not present**
181.	**Vallabh Parab - not present**
182.	**Vinod Mandrekar** • He States that he strongly opposes the mine lease • He States that he wants to seek clarification from the Project proponent. • He questions how many people are employed from the core mining belt. • He States that the most important thing is roti kapda and makan. • He States that if roti is provided but their homes are taken • He requests the GSPCB to excluded the houses and demarcate the area. • He wants clarification whether the GSPCB, have visited all the villages. • He States that there are govt primary schools in Mansgao Mulgao which is not mention in the report. • He States that he visited the school today and the same is operational but the GSPCB nor Project Proponent has visited the school. • He States that the mining lease boundary in my village mulgao, there is no drainage system which has to be taken into account. • He States that he wants a detailed report what activities are proposed in the unused area as the same are not mentioned by the Project Proponent.
183.	**Kalidas Kavlekar** • He is from Mayem Village. The EIA report is erroneous, It is not known as to who and when survey is conducted. • Several complaints against the mining go unattended. Likewise many cases are pending before Mamlatdar which are unsolved. • There are 167 water bodies mayem lake not shown on the EIA report. • Heritage sites are omitted. He requested that proper survey be conducted and then processed EC. • Ancestors houses not shown or mentioned . • Latambarcem / Mayem details not given. • If mines can give justice to everyone than they can definitely proceed with lease mining project. • No representative present from mine. • Lots of dust pollution due to mines which is creating air pollution in the area. • GSPCB should take everyone into confidence and the same presentation should be presented before the villagers.
184.	**Rohan Shirodkar** • He strongly objects to the operation of the mine. • He states that the EIA report has not reached him.

	• The presentation given states that there are 200 houses which are illegally demarcated. • There are archaeological protected sites which are there in the lease area. • He states that no local person or farmers were taken into consideration while preparing the EIA report. • Our houses temples, villages have to be taken into account before commeing the mning operations. • Previously only few were given employment because their houses were effected . And now there are taken out of employment. Their problems have to be solved first. • Their he requests the company to solve their problems first.
185.	**Bhagwant Gaonkar** • He is a resident of Mayem. • He stated that his house is within 3 kms. • He supports the mine.
186.	**Trupti Gad** • There are different committees in our villages and all the committees had come together and a draft ahd been put up with all the problems faced by the villages of the area. • She states that the temples, houses, fields are in the lease area. • She states that 2 times the mine had collapsed and they had to face a lot of problems. • She requests to first solve the problems of the villagers affected by the mining operations and then start the mine.
187.	**Ranjana Chodankar** • She states that there are big trees which have been grown in our area and which have to be cut down and the area has to be cleaned. • She states that the area has to be cleaned as there are crocodiles there. • She states that no employment is given to our children . • She states that mining has destroyed everything. • She requested the company to first solve the problems of the people and then start the mining activities.

Clarification sought from the Project proponent by;

Clarification sought from the Project proponent / EIA consultant by; The consultant was requested by the Chair to provide short summarised response to the queries .

1. Shri. Swapnesh Sheldekar

   a. He sought to know the exact duration for which the baseline data was collected by the consultant for incorporating in the EIA report.

The Project proponent has stated as follows;

The baseline data initially collected in the year Oct, Nov, Dec 2020, since the data validity was nearing expiry on Sep 2023 , the baseline data was again collected from March to May 2023.

b. How is it that the consultant representatives have not been seen or identified by the local villagers during the exercise of collection of baseline data in the village of Mulgao as claimed to be carried out by the Consultant.

The Project proponent has stated as follows;

It is a sample survey and the sampling team has collected the baseline data.

c. Does the Consultant posses photograph of the Leopard clicked during the process of data collection?

It is clearly mentioned in the Draft EIA report that the information of presence of Leopardwas provided by locals i.e secondary data. The detailed List list of Flora and Fauna is provided in Chapter 3

d. There was no mention of forest in Muogao Village in EIA report , how is this possible when across the boundary of village of Mayem is shown to have forest in the EIA report and also how can this be possible when there are two temples located in the village of Mulgao dedicated to the Goddess of Forest (Dhaktivan Devi and Vodlivan Devi).

The Project proponent has stated as follows;

The is no forest land within the Mineral Block and the same is confirmed by the state govt.

e. The EIA report does not mention the presence of large number of water bodies and temples in the Village of Mulgao. How is this possible?

The Project proponent has stated as follows;

Only major temples like lairai temple is mentioned in EIA. However there are several such temples in the habitation for which a buffer of 50 m from the habitation is mentioned. There are no natural water bodies within the mineral block. As per the information there are settling ponds which were developed or constructed by erst while mining company.

f. The existence of archaeological site that is 2500 year old Buddhist caves at Lamgao are not been mentioned in the EIA report. How is this possible? The Project Proponent is requested to include this in the report.

The Project proponent has stated as follows;

Yes we will incorporate in final EIA

g. Project proponent was questioned as to how the consultant being qualified has classified this project as a Greenfield project knowing fully that it is a Brownfield project.

The Project proponent has stated as follows;

The mine is a fresh grant through auction regime by state govt for which LOI is issued to Vedanta Ltd. As per the MoEF EAC minutes of meeting, in case of LOI grant it is classified as green field.

h. With reference to table 2.3 at page no. 15 of 600 of the EIA report, Consultant was requested to clarify as to the feasibility of the figure of 17.05 of Free Feasibility Mineral Resource which requires washing as the mine does not have facility for washing.

The Project proponent has stated as follows;

Clarified that it is not a proved reserve and will have to undertake further exploration to prove the same.

i. Based on the reserves as stated at Table 2.3 at page 15 of 600 of the EIA report can the Project Proponent windup operations in 10 years?

The Project proponent has stated as follows;

No

j. With reference to a corrigendum dated 06/06/2023 issued by the DMG putting a gap of 40 trips per hour on the road on the company, the Company will not be able to transport more than 1 million tons per annum. The Project Proponent was requested to clarify.

The Project proponent has stated as follows;

The above referred notification is for auction ore only .

2. Shri. Ramesh Gauns

a. According to EIA the Consultant visited 68 places out of which 58 are the villages having Gram Panchayats. And the Gram Panchayat maintains biodiversity register based on the Biodiversity Act. Whether the consultants approached gram Panchayts to go through the register to find out the Biodiversity of the Village.

The Project proponent has stated as follows;

No.

b. They studied the surface water but did not study the surface water of the water body flowing infront of Shantadurga School and which emerges from within the mining lease carries lot of silt then meets the River Bicholim and empties into Mandovi River. It is a pollution of water body is concealed.

The Project proponent has stated as follows;

The same nalla flows and mixes with the Bicholim river and Upstream and downstream of the Bicholim is collected.

c. The water in the pits according to EIA report is stated that pit water is rain water. But when the study is carried out the main period of summer in the month of March, April and May, the pits are full of water in the month of May. The colour of the water clearly states that it is ground water and not rain water.

The Project proponent has stated as follows;

The rainwater is channelised in to the mine pits and as per the hydrogeological survey there exists bands of impervious layer comprising of Phyllite and clay and hence there is no ground water seepage. However the project proponent will take approval form Water resources Dept for pumping of the rain water/ ground water accumulated in the mine pit.

d. He sought to know whether the wells have been studied from Mulgoa, Mayem, Bicholim, Lamgao, as wells are the indicators of ground water and they should have checked the levels of well water in the month of May not to give any scope to the company that the drying of wells is not because of them. The study would have provided a substantial evidence against the Company to refute on the perennial fresh water in the wells.

The Project proponent has stated as follows;

All villages mentioned above is covered .

He asked for the gradient of the mining area as the top most point of this area is 169 meter plus a huge waste generated to a tune of 1:8.39 tons based on the annual production of 3 million tons the waste generated will be 2, 51,70,000. Therefore, the gradient is very high to ration. The gradient to was very much important because no mechanism can stop a huge silt moving out of the mining lease when entering into River Bicholim which is connected to the mining lease precisely to the lake which is sy. No. 25/1. The steam is as of now heavily silted used for fishing purpose in the town it self. Everything is wiped off.

The Project proponent has stated as follows;

The gradient of Dumps is provided in the EIA report. The EIA also contains the environment protective measures which will be carried out for dump stabilisation.

e. Mayem lake is used for surface water study but the 2 springs have gone completely dry because of the pit which has gone deep at Dhabdabha resulting in the depletion of water level of these 2 lakes goes low in the month of May.

The Project proponent has stated as follows;

There is no connection between the mine pit and mayem lake. A detailed hydrogeology study is provided as part of EIA.

f. Then there are lakes in Malgao and Mulgao. Among these there are 6 lakes are in Mulgao and 7 lakes in Lamgao according to the RTI sought from the Mamlatdar of Bicholim on 01/07/2009. The total area of all these lakes comes to more than 27,000 sq. mtr which is nearly 3 hector of the land. All these lakes are totally silted which once upon a time feed the agriculture in Mulgao, bittlenut plantation in Mulgao so also in Lamgao. All these lakes find no place in the EIA report. One of the lake in Lamgoa belong to Government having 3375 sq. mtr. This fact is defeated by the company instead they claim it to be their tailing pond. The same lake was used for Ganesh immersion and now no immersion takes place in the tailing ponds.

The Project proponent has stated as follows;

All the water bodies within the bufferzone are covered under Landuse pattern under chapter 3 of EIA

g. A number of tipper/trucks is missing in EIA which would have helped to calculate actually the ore is transported and thereby can be matched up with the production as given in the EIA report.

The Project proponent has stated as follows;

Covered under Chapter 4 pg No.129

3. Shri. Vinod Mandrekar

a. There is a Government Primay school located at Manasbhag Mulgao which is operational as on 10/08/2023. This school is located within the mining lease/core are of the proposed project. However, this school is not mentioned any where in the EIA report. The Consultant is requested to clarify this point.

The Project proponent has stated as follows;

We will reconfirm regarding this additional school in Mulgao, Manaswada and functionality of Govt Primary school shall be included. However a sufficient buffer zone will be maintained towards habitaion.

b. In the EIA report there is a mention of unused area (refer Map on page 262 of the detailed EIA report). Consultant is requested to clarify as to the meaning of the term unused area. Further, consultant is specifically requested to clarify as to whether unused area in the EIA that includes the residential areas in the unused area.. If not the Consultant should give a specific undertaking in this regard whether it will be used in the future.

The Project proponent has stated as follows;

The residential area is included in unused area as per existing available ezploration data. 50 meters buffer zone will be maintained from the residential areas/houses in the village of Mulgao.

4. Shri. Pravir Phadte

He raised the following queries for clarification by the Consultant of the Project Proponent;

a. Do you think that your draft EIA report can be understood by common people without any awareness programme about it? Or what are your suggestions to enable common people /illiterate people to understand this EIA report?

All the procedure stipulated in EIA notification is followed.

b. The amount time taken by you to prepare this EIA report?

How is it that though the TOR for the project was granted on 16/06/2023 the draft EIA report was signed on 20/06/2023 by the Mining Engineering Services Consultant, M.S. Raju.

The Project proponent has stated as follows;

The work of EIA was started basis the standard TOR issued by the MoEF and CC and the baseline was carried out from march to may. Although the TOR was issued on16th june, the minutes of meeting including all the points was received earlier and the EIA work was continued and completed.

c. Explain in detail how the Consultant has classified this project as a Greenfield project?

The Project proponent has stated as follows;

Explained earlier

Why has the MoEF terminology not been explained in the EIA report? EIA is prepared based on the TOR issued

d. Why was the detailed EIA report not explained to the public/ awareness regarding the same not done by the Project Proponent when keeping the report with the Local Panchayat. How does the project Proponent expect the detailed EIA report to be understood by the Public present for today's hearing only on the basis of short Power Point Presentation made today?

The Project proponent has stated as follows;

Explained earlier

e. As the time to seek clarification is being restricted to 5 minutes; it is requested that the written submissions submitted to the Collector's Office on 10/08/2023 by The Goa Foundation should be clarified by the project proponent now. Copy of the submission is handed over.

The Project proponent has stated as follows;

All the issues raised during the PH will be adressed in the final EIA

5. Dr. Sebastiao A Rodrigues,Convener of Bharat MuktaMorcha (Goa State)

a. Regarding baseline data presented in EIA, so I want to know periods of data collections . Because the consultant Raju has stated that he had collected data upto September, 2020 .When I questioned on that on this subject Mr Raju informed that indeed baseline study was upto September 2020.

The Project proponent has stated as follows;

Explained earlier. The base line data was done during mar to may 2023.

b. Regarding project proponent application dated 16/03/2023 seeking TOR ,wherein it is mentioned that the period of baseline data collection as from 01/10/2020 to 31/12/2020.

The Project proponent has stated as follows;

explained earlier

c. October 2020 to December 2020 there was covid-19 lock down in Goa. Did company carry out baseline data collection during lockdown period?

The Project proponent has stated as follows;

Yes, explained earlier. The data was again collected afresh during march to may 2023 which is considered in EIA.

d. When TOR requires baseline data collection of three non monsoons in a year, why baseline data was collected only for one season of march to may 2023?

The Project proponent has stated as follows;

Mr. Raju answered that only one season data is required .I mentioned that PP has admitted for tweaking TOR on baseline data collection in EIA. **Mr. Raju denied**

e. Asked whether the comments received from public will be incorporated in the EIA report and shown to the public again.

The Project proponent has stated as follows;

Mr. Raju answered all the issues raised shall be addressed and submitted to Moef&cc

f. Now my last clarification is will all the applications received against this mining projects be forwarded to MOEF&CC considering that former environment cum public relation officer of Project proponent Mr. Mahesh Patil is the Chairman of GSPCB, as the case of likely conflict of interest.

The Project proponent has stated as follows;

All shall be forwaded.

Collector North requested the people present that if they so desire they may file their written objection/suggestion/views within 7 days from today to the GSPCB. The same will be part of the hearing and accordingly it would be forwarded to the concerned Regulatory Authority.

The recorded minutes were accordingly read out/explained to the public in Konkani and subsequently after receiving suggestions and as agreed were signed by

Ms. Mamu Hage, IAS, Collector North Goa, and Dr. Mohan Girap, Scientist 'C' of Goa State Pollution Control Board

A total of **834** numbers of persons present for the public hearing and have signed the enclosed attendance sheet.

A total of **4708** written objections/suggestions have been received.

A total of **5183** written supporting have been received

The hearing ended at **1.30** a.m.

On this 12th day of August, 2023.

Ms. Mamu Hage, IAS,
Collector North Goa

Dr. Mohan Girap,
Scientist 'C'
Goa State Pollution Control Board

GOA STATE POLLUTION CONTROL BOARD
SALIGAO - GOA

vedanta
transforming elements

sesa goa iron ore

Letter No. VL/MIN/Block I/23-24/006 Date: 28/08/2023

To,
Member Secretary,
Goa State Pollution Control Board
Near Pilerne Industrial Estate, Opp Saligao Seminary,
Saligao - Goa - 403511

Subject: Regarding clarification against the Environmental Public Hearing held on 11/08/2023

Madam,
Please find attached herewith the point wise clarification w.r.t the points raised by the speakers. We have also included the responses w.r.t some of the letters which were shared by your good office.

We request you to kindly forward our responses to MoEF &CC and share the copy with us for further necessary online submissions to MoEF &CC from our end .

Thanking you,

Yours faithfully
For Vedanta Limited

Jagdish Desai
Head Environment- Sesa Goa
Authorized Signatory

VEDANTA LIMITED
Sesa Goa iron ore: Sesa Ghor, 20 EDC Complex, Patto, Panjim, Goa – 403 001, India
T: +91 0832 2460600 Website: www.sesagoaironore.com

Registered Office: Vedanta Limited, 1st Floor, 'C' wing, Unit 103, Corporate Avenue, Atul Projects, Chakala, Andheri (East), Mumbai 400093, Maharashtra, India.
CIN: L13209MH1965PLC291394

Clarification against the Environmental Public Hearing held on 11th August 2023, w.r.t. Block-I, Bicholim Mineral Block

Sr No	NAME & COMMENTS	RESPONSE	BUDGET
1	**Deepak Popkar**	Various air pollution control activities will be undertaken during the mining operations, details are provided in chapter 10. A sufficient buffer of 50m will be maintained from habitation, Drilling and blasting activities are not proposed and hence there are no chances of damage to houses etc. All the necessary erosion control, monsoon preparedness activities will be carried out to prevent flow of silt outside the mining area. The details of the same are mentioned in chapter 10 of EIA document. The Baseline monitoring is carried out during March to May 2023 by NABET accredited consultants.	
	He is the resident of Bicholim.		
	He stated that he stands here on behalf of resident of Bicholim.		
	He stated that dust can cause pollution in villages which affects children and old people, which causes cold and other diseases.		The budget towards Environment Monitoring and Air pollution control measures: 408 Lakhs
	He stated that fields, houses get destroyed. Because of this EC should not be granted, He stated that he had filed RTI in Municipality.		The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs
	The agencies were hired to conduct monitoring. The agency if approved then the report is correct or else it is faulty		
2	**Siddesh Parab, Bicholim**	Thank you for the support.	
	He is the resident of Bicholim.		

Sensitivity: Internal (C3)

	He stated that the mine was closed and now reopening.		
	He stated that all the truck owners etc. are thankful that the mine is reopening as they depend on it.		
3	**Nilesh Dhabolkar, R/o of Mayem**	There is habitation within the mineral block at Mulgao and Lamgao villages, the same is mentioned in the EIA document. A buffer of minimum 50m. would be maintained form the habitation. The allegations made regarding fabrication of EIA are false and baseless. Details of water bodies are provided in EIA report. The habitations, water bodies, places of worship near the mines will not be affected. The EIA document is prepared by Mineral Engineering Services (accredited by QCI-NABET) and based on the Terms of reference issued by MOEF&CC	
	He strongly objects to the operation of the mine, No EC to be granted to the mine.		
	He stated that he stays 1 km away from the mining lease area.		
	He stated that the houses in the villages are one and half kilometre away from the mine, water bodies are located within the lease area, however it is not shown in the EIA report. EIA report is false and fabricated.		
	He stated that the earlier mining activities have impacted our full village.		
4	**Bhimakar H. Pal, r/o Bordem, Bicholim**	The speaker has made generalised statement which cannot be ascertained. He has requested the government authorities for inspection. Agriculture development is one of the key aspect of companies CSR. The company will engage with the farmers and with help of state agriculture dept will help the interested farmers to cultivate their fields. A minimum buffer of 50 m. would be maintained towards all the habitations which are located inside the mineral block. Budget will be provided as part of CER towards agriculture development in the surrounding areas.	
	He stated that he is from Bordem. He is a farmer.		
	His parents were also farmers. He stated the land which is inherited from ancestors is destroyed. Governments Subsidies and funds are provided for farmers. Bordem village is a land of farmers.		
	He requested to conduct a joint survey to see how the land is destroyed.		The budget towards erosion control

Sensitivity: Internal (C3)

	Tractors cannot be used in the fields as the fields are filled with water.		measures, monsoon preparedness on mines and water treatment: 232 Lakhs
	He stated that he does not get to see the farmers and cannot see the fields.		
	He stated that there is a Devasthan but it is also submerged in water.		
	He requested the officials to visit the site and see the problems faced by the villagers of Bordem.		
	He stated that as he can see the photo of his father, but he cannot see him in the same way, he can see his fields in Form I and XIV and not his land.		
	He stated that he cannot do any agricultural activity because of mining.		
5	**Naresh Naik**	A 50m buffer will be maintained from the habitation. The land use of study area is provided in Chapter 3 of EIA. All the necessary environment protective measures would be adopted to safeguard the water bodies from surrounding villages. The speaker (Nagesh Naik) was employee of erst while mine owner i.e., Sesa Mining Corporation limited (SMCL) and was retrenched by SMCL company. The project proponent has provided opportunity to join the work force for all such retrenched employees and many of the employees took benefit of the opportunity and joined the company. State government has auctioned the mine as fresh mineral block and Vedanta ltd is selected as preferred bidder. Total 716 no of employment opportunities would be generated and preference will be given to locals.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs
	He is a resident of Kelbaiwada Mayem.		
	He stated that in ward no.1 and ward no.2 that there are several lakes, Kulagars, springs, water bodies, ponds which are not mentioned in the EIA Report.		
	There are many ponds in the village which are destroyed due to mining, He stated that he was an employee of Sesa and Vedanta and he has proof of it, but he has been retrenched.		
	He sought to know how the company retrenched him when it is still in operation.		

Sensitivity: Internal (C3)

6	**Prashant Dhargalkar** He states that he is supporting mining. He states that Divkar village is totally dependent on the mining company, our all fate is dependent on mining. He states that because we don't have any other source of income. He states that if I am unemployed, how will I take care of my children, their studies and their needs, etc. He further state that Sesa Company has promised many things, it is we people should be united and get it done	Thank you for the support.	
7	**Pritibha Dhargalkar** She states that she lives in Bicholim. She states that since 2012 mining is shut/ closed. Many people suffered, due to unemployment and shortage of money, etc. She states that since we don't have income, we cannot put our children for higher studies. So, I am totally supporting the mining wants mining activities to resume as soon as possible and youngsters should get employment	Thank you for the support.	
8	**Shrikant Dhargalkar**	Thank you for the support.	

Sensitivity: Internal (C3)

	He states that He is resident of Lamgao, Bicholim.		
	He requested to start the Bicholim block.		
	So, he is totally supporting the mining		
9	**Sanjay Parab**	Thank you for the support., Preference will be given to locals for employment	
	He stated that he fully supports the mining activities. He requests the mining company to provide employment to all the nearby villagers.		
10	**Shailesh Navelkar**	Thank you for the support.	
	He stated that he fully supports the mining activities as all the people in the villages will get employment.		
11	**Sanjay Mandrekar , R/o Lamgaon**	Thank you for the support.	
	He stated that he supports the mining activities.		
	He stated that he is stays right next to the mine lease area and that there are no bad effects of the mine to the water bodies or residential houses.		
	He stated that if the mines start there will be a lot of employment opportunities in the villages as trucks drivers, canteen facilities etc will get employment.		
	He stated that around 1000 people are dependent on mining activities.		
	He requests to start the mine and give employment to all.		
12	**Kustulo Pal**		

Sensitivity: Internal (C3)

	He states that he strongly objects to the operations of the mine.	The company will have detailed environmental management plan in place. and will take all the necessary measures to prevent flow of silt outside the mine. The details of EMP are provided in Chapter 10. Company as part of its CSR activities conducts lot of agriculture development programme in association with Agriculture department and any farmer who is interested in cultivating his filed will be provided support by the company. Budget for the same will be provided in CER. We would also like to highlight that the person is a retrenched worker by earlier mine owner.	
	He stated that from 2003 a lot of mud has come into his field and destroyed the field		The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs
13	**Kamlesh Teli Ex Councillor Bicholim**	Thank you for the support.	
	He states that he strongly supports the operations of the mine.		
	He stated that employment opportunities will be generated, and the truck owners will be benefited		
14	**Anand Naik**	Thank you for the support., Preference will be given to locals for employment. A buffer of 50m will be maintained from habitations. Necessary environment protective measures will be adopted during mining operations.	Budget towards environment management plan: 693 lakhs
	He stated that he is happy for the commencement of mining.		
	He has requested that mining should be started.		
	He states that if mining has to start some criteria has to be followed. In Karnataka the mines are 25 to 30 km away from the residential area.		
	Mining has to start as it provides employment opportunities		
	He states that he strongly supports to the operations of the **mine.**		

Sensitivity: Internal (C3)

	He stated that he was working in the mine and is unemployed now. Hence mining has to start.		
	But he states if the mining starts no temple, no water bodies, no villages should be destroyed.		
	· He stated that that not only the other people but the people living in the area near the mining lease have to be given employment.		
	· He requests the company that if the employers were taken out of the company, they should hold talks with the ex-workers and come to a solution and take them back in the company as employees.		
	· He stated that the company has to start 100% but nothing should be destroyed or affected by the mining operation.		
15	**Sandeep Gaokar- not present**		
16	**Shailesh Gaonkar**	Thank you for the support.	
	· He is a resident of Bicholim.		
	· He stated that there is a mine around his house.		
	· He sought to know whether pollution is caused due to mining industry only?		

Sensitivity: Internal (C3)

	· He stated that that mining company has been taking all the precautions to curb pollution.		
	· He sought to know whether any survey is conducted to know how many people are dependent on mining.		
	· He stated that mining is required in Goa. He supports the project.		
17	**Milind Bharve**	Thank you for the support.	
	· He supports the project.		
	· He requested to grant the EC as soon as possible.		
	· For the last 10-12 years the people dependent on mining are waiting for it to be started.		
	· He stated that if there are any small issues, they can be sought it up.		
	· People can sit together and support mining and solve the problem.		
	· He stated that the State of Goa should be sustainable where ore is available within the State than why it should be imported.		
	· He stated that there will be social benefits due to the mining.		
	· He stated that the EC should be granted to the project proponent.		
18	**Sadashiv Falkar**	Thank you for the support.	
	· He is a resident of Pilgao.		
	· He supports the project.		

Sensitivity: Internal (C3)

	· He requested to grant EC to the project.		
19	**Franco Sequeira**	Thank you for the support.	
	· He requested for sustainable mining by proper discussion as it will provide employment to the youth. He supported the project.		
20	**Sudan Govekar, r/o Lamgaon, councillor**	Thank you for the support, 50m buffer would be maintained from habitation.	Budget towards environment management plan : 693 lakhs
	· He states that he strongly supports the operations of the mine activities as soon as possible.		
	· He states that there are 200 truck owners, garage, shop which were depending on mining operation which have been stopped now. However, he requests to save the temples, village boundaries and water bodies and start the operation.		
	· He thanks the CM for taking a led in the start of mine		
21	**Shailendra Natekar**	Thank you for the support.	
	· He is a resident of Bicholim.		
	· He supports the project.		
	· He requested to grant EC to the project.		
	· He stated that the workers, villagers and the Government should come together and solve the issues.		
22	**Dinesh Divekar**	Thank you for the support.	
	· Mining should start as soon as possible		
	· Mining is shut for 10 years		

Sensitivity: Internal (C3)

	· Favour of mining as thousand lost their jobs · Mining is backbone of small state like Goa · It is required for development		
23	**Manuel Fernandes Bicholim** · He states that he and his family are fully dependent on the mine, and he supports the operations of the mine activities.	Thank you for the support.	
24	**Pradeep Revodkar Mulgao** · He states that He strongly objects to the operation of the mine. · He states that last 50 years he has seen the people cultivating the fields the Mining operations have destroyed the fields, temples, houses and the water bodies and other plantations in the nearby villages. · He strongly opposes the grant of EC. · He states that this is dictatorship and not democracy.	All the Necessary environment protective measures will be adopted during mining operations as detailed in Chapter 10. A buffer of minimum 50m will be maintained from the habitation and the fields, houses, temples, water bodies within the habitation will be protected.	The budget for environment management plan is 693 lakhs
25	**Kashinath Shivram Parab** · He is a resident of Barazan Wado Bicholim. · He stated that his house is located near the mining pit. · He stated that cracks are developed for his house. · His stated that his company was informed about this for the past 12 years.	There is no drilling and blasting involved in the project. Also, a buffer of 50m would be maintained from the habitation. A proper stake holder engagement and grievance redressal mechanism would be followed in case of any stake holders facing issues due to mining. It is understood that the speaker is in discussion with the erst while company (SMCL)for compensation and till then the monthly house rent is paid by the earlier mining company to him.	

Sensitivity: Internal (C3)

	· He stated that he is going to the company to get compensation.		
	· He stated that the company asked him to submit the Form I & XIV. He stated that he has spent Rs. 50,000/ towards his mutation.		
	· He stated that the slab of his house is leaking.		
	· He requested to company to give a plot whether the company stated that they have taken the loan on that plot, but we will give you compensation however till date no compensation is paid, i have been given the flat in rental bases. I have remained the company to give the payment.		
	· He requested the company to give him tarpaulin, but the company did not give him tarpaulin. He stated that the company gives lots, but they don't get anything.		
	· He requested the Collector, GSPCB to solve the problems of other workers.		
	· He stated that he wants the company to restart only after these problems are resolved.		
	· He stated that his application may be considered.		

Sensitivity: Internal (C3)

	· He had asked for the plot however the company stated that they have taken loan in that plot. Hence the company can't give the plot, but the company stated that they will give compensation even after 13 months no compensation is paid.		
	· He stated that he had asked for simple tarpaulin, but the company didn't give the same.		
	· He stated that the company gave him a rental flat and every time he had to remind the company to pay his rent.		
26	**Nikhil Jan Naik**		
	· Mining will affect natural water bodies/ springs /lakes	Necessary environment protective measures will be implemented to safeguard the surrounding areas. A buffer zone of 50 m will be maintained along the habitation. The EIA also addresses the measures taken w.r.t Assnora river. The EIA also comprises of detailed hydrogeology report based on CGWA guidelines which concludes that there won't be any adverse impact of mining on surrounding ground water regime. The water bodies/springs /lakes in surrounding areas will not be affected.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs

Sensitivity: Internal (C3)

	· Will invite disease-cardiovascular/health issues	Proper dust control measures will be implemented during the operations of mine. The employees will be provided with necessary PPE's. The details of various air pollution control measures are provided in chapter 10 of EIA. Company will provide budget for health-related facilities in surrounding villages as part of CER. It will maintain medical records of all the people visiting the facility. health camps also will be conducted in the villages.	The budget towards Environment Monitoring, Air pollution control measures and PPE's: 423 Lakhs
	· Farms are destroyed by silting	The speaker is making generalised statement. The impacts associated with mining are discussed in Chapter 4. All the necessary safeguards will be followed while carrying out the mining operations.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs
	· Trees which require 10 to 15 years to grow shall be destroyed in 5 mins		
	· Possible chances of landslide		
	· No geographical study is done by the authorities	Details of land use of the study area is provided in Chapter 3 of EIA.	
	· Buddhist caves, etc like worship places shall be affected.	The places of worship like Buddhist caves in Lamgao and other temples within the habitation won't be affected due to mining operations.	
27	**Premnath Hoble**	Preference will be provided to locals w.r.t employment, around 716 no of direct employment opportunities will be available. Habitation/ places of worships etc inside and outside the mineral block will be protected a buffer of 50m will be maintained towards the same. Noise levels will be maintained within the norm's details of Noise level management and control are provided in Chapter 10. Impact on wildlife and measures proposed to prevent any negative impact on wild animals are discussed in EIA. The speaker is referring to retrenchment of the workers executed by earlier mine owner i.e., SMCL. Vedanta Ltd has not retrenched any	
	· He is a resident of Bicholim.		
	· He stated that there are around 1500-2000 locals.		
	· Around 40-50 workers are employed out of which some are locals, and some are outsiders.		
	· He stated that he wanted the security of his village and not mining.		
	· He stated that there are Buddhist caves in Bicholim.		

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	· He stated that the village should be protected.	employee moreover all the retrenched employees were provided opportunity to join the company's work force.	
	· Villagers were not taken into consideration.		
	· Lamgaon is the lease. Plan has to be there.		
	· Lamgao village can be developed through tourisms and through mines.		
	· He stated that who has God faith face problem here.		
	· He stated that if you operate after 10 the animals will come to the village and eat the dogs. There is money but it brings tension.		
	· The area is histories, should we destroy it? We should make it tourist and no mining.		
	· He further stated that his brother is working now he is removed.		
	Village is destroyed.		
28	**Ganesh Govekar – Not present**		
29	**Vasant Gad**	All the procedure stipulated in the EIA notification is followed. EIA as well as executive summary (Konkani and English) of the EIA was submitted to all the surrounding village panchayats. The habitation within the mineral block at Mulgao and Lamgao will be protected and a buffer of 50m will be maintained towards habitation. Various environment protective measures will be carried out during the mining	The budget for environment management plan is 693 lakhs
	· He is the resident of Mulgao.		
	· He stated that people are affected and facing problems.		
	· There is limit of their patience.		
	· He stated that Government should consider everything before given EC.		

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	· When Mulgao Village Panchayat received EIA report in Panchayat, it was kept on table. Sarpanch, Panch did not know anything.	operations to prevent any negative impact on the habitation, the details of the measures are provided in Chapter 10 of EIA. The water bodies referred by speaker within the mineral block in Mulgao are settling ponds which were constructed by the erst while mining company and was regularly maintained by them. The same will be maintained in future also. The land use details of surrounding villages are provided in Chapter 3. The earlier mine owner i.e. SMCL retrenched the workers, however the project proponent provided opportunity to all the retrenched workers to join the company's work force and many of the retrenched workers who wanted jobs took opportunity of the offer. Locals will be given first preference for employment.	
	· If public did not know about it and then how they will place their grievances. 223 houses, 13 temple, Panchayat building, 2 schools,		
	lakes, ponds in Mulgao are not shown in EIA		
	· Our village will be destroyed.		
	· We have written to GSPCB. 30% of area of Mulgao is coming within lease. In my tenure 3 times mining collapsed and Sesa has not given mining support. People were injured.		
	· Surface right is not given. The mine should be restored back to original. No water in Kulaghar.		
	· If still it goes again in the same way, I am sure the villagers are not supporting mining.		
	· Workers are not taken for jobs. All the workers are from Dempo Mining Corporation.		
	· Supreme Court Petition was filed; workers went door to door support.		
	· If Mulgao Villagers problems are not solved, remove from lease. If we are not satisfied no EC to be granted.		

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30	**Pandurang Parab** · Requested GPSCB to restore the earlier damage area by the Sesa Goa and then only grant the EC.	The allegations on Sesa Goa are false. The project proponent Vedanta Ltd will ensure all the necessary environment protective measures during mining operations. Details are provided in Chapter 10 of EIA and Budget for the EMP is also provided.	The budget for environment management plan is 693 lakhs
31	**Bhau Gad – Not present**		
32	**Gajanan Gaonkar –** · He states that he is a resident of Lamgao. · Mining has affected fields/forests · Dust pollution is caused. · Unwanted trees are planted · Springs are destroyed · Fields in the area are affected and no royalty given. They come as and when they want. · Rs. 250 to Rs. 300 is given as compensation which is insufficient · Survey should be made of springs/ lakes. · By sitting in ACs cabins won't give the exact picture. · Ignorant about fields and livelihood · For 5 years Sesa never turned up, 6th year came and said adopting the village · No company is ready to give in writing about the give and take terms	The impacts associated with mining operations are discussed in Chapter 4. Necessary environment protective measures will be carried out during mining operations to prevent air, water, noise pollution. Budget for the EMP is provided in the EIA. Only native plant species (mix of horticulture and forest species (It will be used for plantation in consultation with state forest and agriculture department. Water bodies in the surrounding villages will be protected. The speaker has made general comments. During the course of mining operations, in case of complaints regarding silting of fields, damage to crop due to company operations, the company will take support of state agriculture department or qualified agriculture valuer to determine the damages caused and compensation will be paid accordingly. The company will also scientifically desilt or reclaim the area scientifically.	The budget for environment management plan is 693 lakhs

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	· All said verbally and hence goes unfulfilled		
	· Children of the employees go unemployed after their end in service		
33	**Prashant Shirodkar**	Thank you for the support.	
	· He is a resident of Mayem.		
	· He supports the project.		
	· He stated that the mine has been operating for the past 50 years.		
	· He stated that the workers are 40-50 years old.		
	· He stated that decision should be taken considering both sides.		
	· He stated that the workers are jobless.		
	· Further he stated that nobody will support when you are in need.		
	· That the company has given 50% during the past 12 years.		
	· Whereas other companies have taken out people from their jobs.		
34	**Ramkrishna Kundaikar – Mulgao**	As part of CSR activities, company carry out agriculture development programmes within its buffer zone. Budget for the same will be provided in CER.	
	· He states that he used to sell brown rice but now because of the mine there is a loss of revenue.		The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs

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	· He states that the walls have been collapsed but they have not done anything about it nor have they repaired the same and given.		
	· He states that their ancestors used to live on farming and plantation as there was revenue generated from the same.		
35	**Satyavan Chodankar**	As part of CSR activities, company carry out agriculture development programmes within its buffer zone. The company will engage with the villagers and verify the issue w.r.t retaining wall. In case the request is genuine, the repair work will be executed. It is also understood that the earlier mine owner had desilted the entire affected area in Mulgao in the past however the farmers didn't show any interest in cultivating the same.	
	· He states that he is a resident of Mulgao village.		
	· He states that his 20000sq m area was under cultivation and due to mining he is not able to cultivate the same.		
	· He is having a farmhouse in Sy. no. 70/1, his retaining was near his house has collapsed 16 yrs ago 2 times which hasn't been repaired till date.		
	· The company is a liar as they had said they would build a wall of concrete, but nothing has been done till date.		
	· The farmhouse area is 4000sq m in which betel nut plantation and coconut plantation has been destroyed.		The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs
	· 156 m compound wall has been collapsed.		
	· The trenches are not repaired.		
	· 17000sqm paddy field has been destroyed.		

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	· Once upon a time he was selling rice for Rs.10 per kg and now the same rice he has to buy Rs.70 per kg. · His house is in the lease area. · When the mine collapsed in 2016, 565 pepper plantations were destroyed. · The company didn't compensate for the same. · He fully opposes for the same.		
36	**Prakash Popkar** · Resident of Lamgaon. Entire village is destroyed. · First do survey and then give lease · I am not opposing mining but because of mining everything will be destroyed · Big machines are being bought by Vedanta · Our village is a agricultural Village · 90% of the Village is farming · First do desilting of farms so that we can cultivate the farm. · Lakes are destroyed, name of lake is also removed by the company · 1984 first revolt was done, and I was sent to jail · I request you to do survey first and then give lease	The speaker is asking government to survey the habitation and then issue lease. It is to note that the mine was in operation since several decades and state government has auctioned the same lease area as a fresh mineral block. The area of the mine remains the same and the habitation at Lamgao and Mulgao was always part of the mines. Necessary environment protective measures will be carried out during mining operations. a safety buffer of 50m would be maintained towards the habitation. A budget for agriculture development is provided as part of CER, any farmer group who is interested in cultivation can contact the company for the same.	The budget for environment management plan is 693 lakhs

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37	**Vithal Parab – Not present**		
38	**Gajanand Mandrekar** · He is the Deputy Sarpanch of Mulgao. · He stated that when the company was operated by Dempo, villagers had no issue, Vedanta has created lot of issues. · He opposes mining activity by the company.	The speaker has not raised any specific issues and falsely alleged that Vedanta has created issues. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism.	
39	**Madhukar Halarnkar** · He Strongly opposes the mine operations. · He states that all the points have been discussed. · He thinks that the company has done a One man show as they have submitted an EIA report without taking the villagers, local people and the farmers and the other committee members into account and have done the demarcation. · He states that the company is a liar as they promised that they will come for discussion in front of a joint meeting with the people of the area, however they didn't turn up for the said meeting of the said day.	The EIA document is prepared by Mineral Engineering Services (accredited by QCI-NABET) and based on the Terms of reference issued by MOEF&CC. The officials of company had a meeting with the Village Panchayat members who are elected representatives of the community. Regarding the joint meeting, company had communicated to the concerned in advance their inability to attend the said meeting.	
40	**Gopal Parab** · He Strongly opposes the mine operations and requests not to grant EC clearance to the mine.	Necessary environment protective measures will be carried out during mining operations. Water bodies in the surrounding villages will be protected. Preference will be given to locals w.r.t employment. The EIA also comprises of	

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	· He states that the mining has destroyed the fields and the plantation and the water bodies and the villages in the area.	detailed hydrogeology report based on CGWA guidelines which concludes that there will not be any adverse impact of mining on surrounding ground water regime. Company will provide support to farmers in case they are interested cultivate their fields. Pit water will be pumped and channelised to the horticulture gardens in Mulgao village.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs
	· He states that there is o employment, no land left for cultivation after the mine came into existence.		
	· First there were big fields but now there is no water for the fields and the water table is destroyed completely.		
	· When the mines collapsed the bodies were washed into his fields.		
	· He states that that the company is a liar, and he says everything is done systematically but nothing is done at all.		
41	**Devidas Govenkar – Not present**		
42	**Ganpat Parab**	Thank you for the support.	
	· He supports the mining project.		
43	**Shaikh Nisar**	Preference will be given to locals w.r.t employment. Said Idgah is within lease area and 200m buffer zone will be maintained. The Idgah is maintained by archaeological department. A thick green belt is proposed as a buffer between the mine pit and Idgah.	
	· One issue pertains to workers of the company.		
	· Company had 10-12 years to ensure that the fields in Mulgao Village are cultivated.		
	· He stated that Muslim community in Bicholim i.e. young generation are not given job opportunities by the company.		
	· Idgah at Gaunkarwada has not been supported by the company.		

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	· Company should help poor people of the area.		
	· No financial support is given to the Muslim Wada.		
44	**Nilesh Gosavi**	Thank you for the support.	
	· He states that he strongly supports the operations of the mine activities as soon as possible as he states that the mine has generated a lot of employment.		
45	**Swayam Kamat**	It is understood that Mayem farmers had approached court and as per court directions the earlier mining companies have paid compensation to the farmers. There is no negative impact on agriculture envisaged in Mayem w.r.t the current project.	
	· He is a resident of Mayem		
	· Farmers presented their grievances		
	· 12 000 sq. meters field is owned by him, inherited from his father, but now he cannot ask his sons to step down into the fields as they are thickly layered with mud soil.		
	· 600 farmers are registered, and he is representing them, and they are affected by this mining.		
	· He said for consultation purpose we are charged by the government, and we have to pay consultation fee.		
	· He says matter is pending in court and on the other hand this project is considered.		
	· Mayem people are fond of Parboiled rice (Uokde Rice) but in the circumstances		

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	it seems to be not possible for getting the seeds		
	· Green Field Project is only in pictures, but colour is brown.		
	· If we want to eat Parboiled rice (Uokde Rice), we should give strength to farmers.		
	· He asked to make the farmers strong and then to look into the project.		
46	**Tushar Falari**	Thank you for the support.	
	· He states that he strongly supports the operations of the mine activities and requests to start it as soon as possible as he states that the mine has generated a lot of employment.		
	· He states it will provide employment to the truck owners.		
	· There are skilled youth which are waiting for the mines to start as they are unemployed and need employment in the field of mining related area.		
	· When the mining stopped all the students who studied mining related work had to go out of the state inspite of being qualified.		
	· He requests for starting of the mine.		
47	**Krishna Gadekar**	Necessary environment protective measures will be carried out during mining operations to prevent flow of silt outside the mine area. The EIA also comprises of detailed	The budget towards erosion control measures, monsoon
	· He is the President of All India Kissan Sabha Mayem.		

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	· He stated that a large number of people from Mayem depend on agriculture. · He stated that there are four major water bodies in Mayem. All four water bodies are filled with silt on account of mining activities by the company. · He stated that water shortages for agriculture is caused due to this. · ZAO report is submitted that fields in Mayem are damaged due to mining silt. · Company has dragged more than 600 farmers to the Court. · The effect of granting a 50 year lease to the company on local farmers is not being considered by the Authority. · He stated that the Company does not have a rehabilitation plan. · Further, he stated that continuous mining operation will cause huge water shortages. · He strongly opposes grant of EC to the company.	hydrogeology report which concludes that there won't be any significant impact on ground water in surrounding areas because of the project. As understood, the 600 farmers were paid compensation by the earlier mine owners as per the court order. There is no population to be displaced because of mine hence the rehabilitation plan is not applicable.	preparedness on mines and water treatment: 232 Lakhs
48	**Chandrashekar Palni** · I am supporting the Block 1 project and he further stated that mines should start as fast as possible. · The Trucks should be restarted and given back work.	Thank you for the support. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism.	

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	· The Difficulties of every household should be solved.		
49	**Rutvik Sanjay Mandrekar**	Thank you for the support.	
	He stated that the mining has stopped in 2012.		
	He stated that 2.5% mining operational in Goa.		
	He stated that royalty loss to the Government.		
	He stated that he supports the mining.		
	He stated that the lease owner/ mining truck owner/ worker are given jobs through mining,		
	The truck owners are supported by the mining company.		
	The truck owners have not given any compensation during tenure of 2012 till date.		
	He stated that there are profit and losses in the business and start mining in sustainable manner.		
50	**Narayan Kharade**		
	EIA report seems to be more of Advertisement /Publication.	The EIA document is prepared by Mineral Engineering Services (accredited by QCI-NABET) and based on the Terms of reference issued by MOEF&CC	
	It was informed consent / objective is defied in a EIA, However it is misinformed that Consent has been provided.		
	He refused to call EIA it is more like Advertisement.		

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	He referred to Office Memorandum MOEF of dated 29th October 2014 , which is related to Impact of Mining Activity on Habitations- Issues related to mining project wherein Habitations and Villages are the part of mine lease areas or Habitations and Villages are surrounded by the mine lease area- Regarding, he further requested authorities for the same.	Necessary environment protective measures will be carried out during mining operations as given in EMP of EIA to prevent air, water, noise pollution. Minimum buffer of 50 meters will be maintained from Habitation. No drilling and Blasting will be carried out as stated in EIA	The budget towards Environment Monitoring / Air pollution control measures : 408 Lakhs The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	He found that this Green Field Project is just smeared with new face.	The mine is a fresh grant through auction regime by state govt for which LOI is issued to Vedanta Ltd. As per the MoEF&CC minutes of meeting, in case of LOI grant it is termed as green field.	
	If the company does not have re- habitation and resettlement plan than project proponent does not have right to present before public.	There is no population to be displaced because of mine hence the rehabilitation plan is not applicable.	
	He blamed new media for making false propagating.		
	The productivity of agriculture is affected as certified by agriculture admits compensation has to be given then it moves to collector but in the end nothing happen.		
	he pointed out the company as videshi (foreign) it not a swadeshi, the Sesa head office is located in London so we cannot call them as swadeshi company.	These are false statements, Vedanta ltd is an Indian company.	

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	As CSR activities by companies including the Mining Establishments has become mandatory up to 20% of their financial turn- over, Socio Economic Development of the neighbourhood . Habitats could also be planned and executed by the PPs more systematically based on the Need based door to door survey by established Social Institutes / workers on the lines as required under TOR. " 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.	Socio economic studies have been carried out within scope of TOR. Annual CSR spend of Vedanta Limited is more than 2% (mandatory requirement as per CSR rule) in the previous financial years. There is no displacement involved due to mining therefore the rehabilitation plan is not applicable.	
	2500 Zambia workers represented in UK Court, which judged it as illegal.	Not related to the project	
	He further submitted that he will submit the written submission.		
51	**Sanjay Gaonkar – Not present**		
52	**Rajesh Vaigankar**	Thank you for the support.	
	Mining should be started as fast as possible		
53	**Pandu Kundaikar – Not present**		
54	**Sandesh Palni – Not present**		
55	**Uday Saraf**	Thank you for the support.	
	He states that he strongly supports the operations of the mine activities and requests to start it as soon as possible as he		

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	states that the mine has generated a lot of employment.		
56	**Sitaram Walawalkar**	Thank you for the support.	
	· I am in support of giving EC to this project since we had participated in lot of morcha strike etc to start of this mining in past, so I am confident people will support and Ec will be granted to this project		
57	**Udesh Mandrekar**	Thank you for the support.	
	· He expressed grief about a child wanting to study further and states it is not possible as father is mining affected.		
	· The child in future falls in bad company due to mining bandh.		
58	**Nitesh Parab Gaonkar – Not present**		
59	**Sanjay Pawaskar**	Thank you for the support., Company will engage with the local communities as part of its CSR, stakeholder management and grievance redressal mechanism.	
	· He states that he strongly supports the operations of the mine activities and requests to start it as soon as possible as he states that the mine has generated a lot of employment.		
	He states it will provide employment to the truck owners .		
	· He states Discussion has to be held on the problems faced by the people.		
60	**Prajal Gaonkar – Not present**		
61	**Vishwas Thanekar**	Thank you for the support.	

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	· Many people are depended on mining because of this I am in support of this project.		
62	**Dinesh Naik** · He is a resident of Sankhalim · He starts that mining should be resumed.	Thank you for the support.	
63	**Ajay Anant Gaonkar He supports the mine.** He demands modernisation of education, give employment, legal agreements are required to be made between him and the company	Thank you for the support. Education is one of the important focus areas of development under company's CSR and required support would be provided to local schools for its upgradation. Preference will be given to locals in employment	
64	**Chandra Gaonkar** · I have fully support for the mining Block 1 Bicholim project. · He further requested to start project as earlier as possible.	Thank you for the support.	
65	**Ramchandra Popkar** · He is a resident of Lamgao. · He states that he is in favour of mining.	Thank you for the support.	
66	**Rajesh Parab – Not present**		
67	**Sandip Sinari – Not present**		
68	**Amit Naik** He is a resident of Sirsaim. He states that mining dependents for past 23 years. He is in support for mining. He states that he was paid by the Company during its non- operation.	Thank you for the support.	

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	He requested that mine should be kept in operation.		
69	**Milind T. Pal– Not present**		
70	**Santosh Devari**	Thank you for the support.	
	· He supports the mining project .		
	· He stated that sustainable mining should be carried out in everybody's interest.		
71	**Vaibhav Fadte**	Thank you for the support. Necessary environment protective measures will be carried out during mining operations. As part of its CSR approach and Stakeholders management, stakeholders will be regularly engaged, and grievance redressal mechanism will be followed to address local concerns if any.	
	· He states that he strongly supports the operations of the mine activities and requests to start it as soon as possible as he states that the mine has generated a lot of employment.		
	· He states that the problems faced by the people have to be solved and a sustainable mining has to be done.		
	· A lot of people depend on mining and had taken loans previously and when the mining stopped they faced a lot of problems hence he requests to start the mining operations .		
	· He states to protect the temples, houses and the fields of the villages and solve all the problems they face.		The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
72	**Vithal Gawas**	Thank you for the support.	

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	· I am supporting Block 1 Bicholim · In 2012 mining was closed for past 10 years we are representing the Government to start Mining. · The efforts which we put to start the mining now got result. · Many people say that sustainable mining, he raised the question what is sustainable mining? I feel sustainable mining means all peoples grievances should company resolved by the company. · So I am fully support to the project.		
73	**Sandeep Sinari – Not present**		
74	**Umesh Kadam** - Honda · He states that he strongly supports the operations of the mine activities and requests to start the operation as soon as possible as it will provide employment for the people as the people faced a lot of problems when the mining activities were stopped.	Thank you for the support.	
75	**Lawrence Braganza** · I am fully support of mining activity at Block 1 Bicholim · Today we have got one step to start mining by way of Public Hearing. · But I am of opinion that company should look into people's grievances and resolve by the same.	Thank you for the support.	

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	· Many people is of opinion that Vedanta company is giving false assures but I am disagreeing with the same.		
	· All grievances should go to our company owner Mr.Amit Agrawal he will definitely help us, since during the covid time he supplied with oxygen, he supported education fields.		
76	**Babal Shetgaonkar**	Thank you for the support.	
	· He stated that he is in full support of the mine.		
77	**Kashinath Mayenkar**	Thank you for the support.	
	· From 2012 Mining was stopped , for 11 years everything was in dark		
	· I am the truck owner and we had seen very difficult time.		
	· So I fully support Block 1 Bicholim Project		
78	**Bala Khan Goni**	Thank you for the support. Preference will be given to locals in employment	
	He states that he strongly supports the operations of the mine activities and requests to start the operation as soon as possible as it will provide employment for the people.		
	He represents the Muslim wada and he request to provide employment opportunities to the people of the community as only one person is provided with employment for the time being.		

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	He request to construct a way which is the biggest problem faced by the community. He states that he worked for Sesa and dempo but he states that when Sesa took over there was a huge turnover and the employees were benefitted by the same. however, when dempo was operating the mine no benefits were given to the employees.		
79	**Sanjay Naik** · Company has never had any of its employees. · He is support of the mining company	Thank you for the support.	
80	**Pramod Sawant** · He states that he strongly supports the operations of the mine activities.	Thank you for the support.	
81	**Shivdas Gawade** I fullysupport Block 1 Bicholim Project, since there is lot of employment issue in the village & EC should be granted. Many problems are faced by us due to closure of mining activities, like many graduate's engineer are unemployed and I feel they should get jobs.	Thank you for the support.	
82	**Sameer Kurdikar** He stated that for the upliftment of village, restoration of employment and to get freed from debts. He supports mining.	Thank you for the support.	

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83	**Rajaram Gaonkar -** Representative Bicholim Municipal Council	Thank you for the support. Preference will be given to locals in employment as well as in truck business	
	He states that he strongly supports the operations of the mine activities.		
	He was a truck member and had taken a loan and faced problems regarding the repayment of the same due to the closure of the mines.		
	He requests the management to solve the worker problems and to provides business to the truck owners.		
	He states that he has some issues, but he has given a written representation regarding the same which may be considered.		
	He requests that a sustainable mining shall be done.		
84	**Sandesh Sinari – Not present**		
85	**Sameer Teli – Mayem Bicholim**	Thank you for the support.	
	He states that he strongly supports the operations of the mine activities.		
	He requests to start the operation as soon as possible as it will provide employment for the people as the people faced a lot of problems when the mining activities were stopped.		
	There are skilled youth which are waiting for the mines to start as they are		

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	unemployed and need employment in the field of mining related area.		
	When the mining stopped all the students who studied mining related work had to go out of the state in spite of being qualified.		
	He request for starting of the mine.		
86	**Subhash Kinalkar**	Thank you for the support.	
	I am representing Bicholim Truck Owner as an Association Secretary we have seen many people spoken their grievances but no one has spoken about us. That is effected truck owners who has suffered due to the closure activity of the mining.		
	No company has supported us or given any compensation during the closure of the mining activity, it is Manohar Bhai Parrikar who had brought Umbrella Scheme for effected truck owners, 138 cases running in the court against truck owners but no one has taken note of the same.		
	Many times our children ask to complete their wishes but we can not full fill the same because we are in huge loans. Therefore if mines starts we will be very grateful.		
	Now sustainable mining if Hon'ble Supreme Court wants to start why this peoples are opposing for the same .		

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	I asked GSPCB to have communication with the Government to relax tax levied on them.		
87	**Azad Kadkade** He is a resident of Bicholim He stated that he has seen mining from childhood. He stated that the development in the village is solely due to mining. He clarified that the person who claimed that company did not give place has also paid house rent for 10 long years.	Thank you for the support.	
88	**Samir Teli– Not present**		
89	**Premanand Gaonkar – Not present**		
90	**Vishwajit Chari – Not present**		
91	**Laximan Gaonkar – Not present**		
92	**Ladu Mardolkar – Not present**		
93	**Devanand Parab – Not present**		
94	**Paresh Ghadi – Not present**		
95	**Sujay Parrikar** He supports the mining operation but he states that the youth have done diploma in mine engineering hence he request to provide employment for the people.	Thank you for the support. Preference will be given to locals in employment	
96	**Siddhesh Naik – Not present**		
97	**Sudhir Kamat – Not present**		
98	**Vaman Gawas – Not present**		
99	**Riaz Anwar Baig – Not present**		

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100	**Kashinath Mhato – Not present**		
101	**Sanjay Sawant – Not present**		
102	**Tulsidas Chodankar**	Thank you for the support. Agriculture development is one of the important focus areas of CSR by the company. Based on the needs of the farmers will carry out necessary programmes for crop cultivation. Preference will be given to locals in employment	
	He is a resident of Mayem.		
	He stated that Mayem is a picturesque village. It has lots of orchards and farming activities during mining the farmers undergo lots of difficulties.		
	If ever compensation is sought it has to be only through strikes.		
	Most of the people are directly dependent on mining.		
	The residents should be given first preference with regards to employment.		
	Requisite compensation and other facilities are to be given on time.		
	Mining should be resumed but it should not bring disgrace to the village.		
	He supports mining.		
103	**Dilip Shet – Not present**		
104	**Vasudev Gaonkar – Not present**		
105	**Manohar S. Naik – Not present**		
106	**Rajan Naik – Not present**		
107	**Atmaram Tilve- Bicholim**	Thank you for the support.	
	He states that he strongly supports the operations of the mine activities and requests to start the operation as soon as possible as it will provide employment for		

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	the people as the people faced a lot of problems when the mining activities were stopped.		
108	**Mahesh Mhambre – Not present**		
109	**Surekha Suresh Navelkar**	The Block I Bicholim mineral block does not fall in Pilgao village. The company will engage with the farmers in the surrounding areas and support Agriculture development through CER and through government support.	
	She states that she is a resident of Pilgao.		
	She states that she has an agricultural land in the proposed mining area.		
	She further states that our agricultural land we want for the future, so she strongly opposes the project		
110	**Krupali Kashinath Parab r/o Barazan wada.**	There is no drilling and blasting involved in the project. Also, a buffer of 50m would be maintained from the habitation. A proper stake holder engagement and grievance redressal mechanism would be followed in case of any stake holders facing issues due to mining. It is understood that the speaker's family is in talks with the earlier mine owner to settle their claims till then the earlier mine owner is paying their monthly house rent.	
	She states that her house walls got cracks 12 years ago due to mining.		
	She states that she was promised a plot of 300 Sq meters and 120 Sq mtrs house.		
	She states that she was later promised by Mr. Patil and Mr. Joshi that she will be provided with alternate land.		
	She states that they showed her 2 plots at Borda. She states that there was an agreement done w.r.t that land.		
	She states that later Mr. Joseph Coelho came and said that the land is under the loan and we cannot allot the land.		
	So, Mr. Coelho showed another place at Dhab-Dhaba (waterfall).		

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	She states that they made false promises for 13 years.		
	She further states that she approached Municipality and met Shri. Santosh Mandrekar and told him her grievances.		
	She further states that she approached Honorable Shri. Chandrakant Shetye, the local MLA.		
	The MLA later called the company and asked them about the situation regarding land allotment.		
	She states that they informed the MLA that it will happen.		
	She further met Honorable Chief Minister and discussed about her grievances.		
	She sates that they had made all fake promises that they had sanctioned money but when went to ask, they just ignored us		
	Hence, I strongly oppose the project		
	In 2014 an agreement was done by Mahesh Patil and Upendra Joshi to give my husband Kashinath Parab 300 mts land and 120 mts house in it.		
	And also made and agreement of exchange of deed.		
111	**Neena B. Salelkar**	Thank you for expressing support for mining. All the necessary measures will be carried out to prevent dust pollution. The details of the same are mentioned in chapter	
	She States that she is depended on mining.		
	She wants a mining with proper measures.		

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	she states that her house is just near the plant and near the mining dump.	10 of EIA document. A 50m buffer will be maintained from the habitation. All the retrenched workers of earlier mining company were offered employment, and many of the workers took benefit of the offer and joined the work force of the project proponent.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs
	She states that we are losing our agricultural land due to mining activities.		
	She states that she is facing the dust every second.		The budget towards Environment Monitoring / Air pollution control measures: 408 Lakhs
	She states that there are many people employed and many are unemployed in our locality.		
	He states that one of them is her husband, who went on strike for starting of the mines activities.		
	The Government should give us justice		
112	**Mohini , Pilgao sarpanch**	The speaker is making false allegations on Vedanta ltd. The company operations will not damage the fields, temples and other areas within habitation. Pilgao village doesn't form part of Mineral block. A ll the retrenched workers of earlier mining company were offered employment, and many of the workers took benefit of the offer and joined the work force of the project proponent.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs
	She stated that the Vedanta company is a liar.		
	She stated because of the mining company there are disputes between workers and family members and I request to all to give us justice.		
	She stated the villages, fields the temples are destroyed in other areas and i don't want the same in my village hence I strongly object to the operation o f the operation of the mine.		

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113	**Sunaina Halarnkar – r/o Pilgao**	Necessary environment protective measures will be adopted during mining and transportation activities. The proposed measures are listed in chapter 10 of EIA.EIA document is prepared in line with TOR given by MOEF&CC	
	She Objects to the operation of the mine		
	She states that the environment is effected due to the operation of the mine		The budget towards Environment Monitoring / Air pollution control measures : 408 Lakhs
	There is dust problems , due to transportation and dumping of the Ore		
	She states that the water bodies are destroyed		The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	She states that a proper survey has to be done with village committee and the final report has to be shown to the village committee		
114	**Priya Dinesh Morajkar**	Thank you for the support.	
	She states that she fully supports the mining activities and requests to start the mines activities as soon as possible.		
115	**Manasi M. Khautankar – Not present**		
116	**Sushma S. Sutar**	Thank you for the support.	
	Resident of Dhabdaba.		
	She stated that she supports for mining.		
117	**Ashwita S. Mandrekar – Not present**		
118	**Anil Salelkar**	The person is referring Leopard as the Tiger. Chapter 3 of EIA mentions presence of schedule I species which includes	
	He states that he is from Pilgaom.		

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	He states that few days back that a Tiger entered the village eat dogs in the Mulgao Village as the Tigers don't have a place to stay in the forest area.	Leopard. A detailed wildlife management plan is also prepared and submitted to forest department. All the necessary measures will be carried out to prevent dust pollution as referred in EMP chapter 10 of EIA. The person is not part of monitoring team and the allegations made regarding incorrect monitoring are false and baseless. As part of company's Stakeholders management program, stakeholders will be regularly engaged, and grievance redressal mechanism will be followed to address any local concerns.	
	If this situation remains the same they will start eating the humans.		
	He further requested all to come at the unloading point and see the dust on the houses, almost all the houses are covered with dust, there is no need of painting the houses in that area.		The budget towards Environment Monitoring / Air pollution control measures : 408 Lakhs
	He states that when he was deployed to operate pollution control machine .		
	He asked his senior as why all machines are placed in particular direction, on which his senior replied stating that we should not get the black paper		
	We strongly oppose this project till our all grievances like agricultural land and worker issue, etc are not resolved.		
119	**Mukund S. Prabhugaonkar – Not present**		
120	**Sudesh Vaigankar – Not present**		
121	**Adv. Ajay Prabhugaonkar**		
	He opposes the Project.		
	The mining was operational since 1941.		
	He stated that the mining was started for production of 1.2 to 3.0 million tons.		

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	He stated that the loading, screening, dumping activities damage the fields / national habitat.	All the necessary measures will be carried out to prevent pollution as referred in EMP chapter 10 of EIA. Sufficient buffer would be maintained from the habitation.	The budget towards Environment Monitoring / Air pollution control measures : 408 Lakhs The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	He is the resident of Pilgao Village.		
	He objects to the word Green field used in the EIA report and this project is destroying the Land, fields and other greenery.	The state govt has auctioned mine as a fresh lease and as per minutes of meeting of MoEF&CC in case LOI is issued it is termed as Green field.	
	He stated that the EIA report is bogus and faulty.	The allegation made regarding EIA is false and baseless. The EIA report is prepared as per the TOR issued by MoEF&CC. Detailed list of Flora and Fauna is mentioned in Chapter 3 of EIA.	
	The EIA report at page no. 148 shows only rats and rabbits. No details of other wildlife animals are mentioned.		
	EIA report is not based on ground reality.		
	He stated that recently employment was not given on skilled basis, it was given on compensation basis while doing retrenchment they removed everyone. We want a sustainable mining.	Locals will be given preference for jobs on mines based on the skill and educational qualifications.	

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	Future of Bicholim Taluka will be decided based on this public hearing. He opposes this public hearing.		
	He requested to scrap the EIA report. The EIA report has to be as per the actual.		
122	**Hanumant Salelkar**	Vedanta Ltd has been awarded the LOI. There is no lake within the working / mining area of the mineral block. There are some settling ponds constructed by the earlier mine owner which are referred by the locals as lake. All the necessary measures will be carried out to prevent pollution as referred in EMP chapter 10 of EIA.	
	· He is a resident of Barazan waddo, Bicholim.		
	· He stated that his ancestors land is destroyed by mine.		
	· He stated that plants spread an area of 2.5 kilometres has destroyed the environment. There was a lake within the mine which has been destroyed due to dumping.		The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
123	**Sakharam A. Pednekar**	The person has asked these questions to the government. As part of the EIA detailed biological assessment was conducted and the list of flora and fauna is listed in chapter 3, which is authenticated by the forest department. As a good practice the company will engage with the local biodiversity committees and take into account the local flora while preparing annual environment management plan when the mining operation starts.	
	· He States that he is a Chairman of Mayem Biodiversity Board and various other committees.		
	· We had placed all the grievances before Government		
	· Pior an inspection has to be carried out to check upon damage caused by mines and largely		
	· compensation cases are pending till date.		
	· Technically oppose the project		
	· We have carried out study and found.		

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	· There are 170 birds species.		
	· Questioned the authority, whether the mining companies have fulfilled the terms and condition of lease.		
	· The one who failed earlier cannot be re-considered for fresh lease. Such units, should be blacked listed		
	· Discussion to be conducted at village level, sustainable plan to be prepared.		
124	**Ramesh S. Gawas**		
	He questioned whether the consultants is present here for the Public Hearing.	The Consultant was present for the public hearing throughout the proceedings. The consultant went on the stage only when the collector invited him when he was required to provide the clarifications.	
	As per the EIA report they are supposed to remain present for the hearing or else there is no meaning for public hearing as they have to answer the issues raised in the public area.		
	Vedanta Goa was doing copper mining in Zambia, they were thrown out from there for doing illegal mining.	Allegations made against Vedanta are incorrect and further it is Not related to the project.	
	what is green field mining project may be explained,	The state govt has auctioned mine as a fresh lease and as per minutes of meeting of MoEF in case LOI is issued it is termed as Green field.	
	Vedanta is de-listed from London stock exchange.	Incorrect statement. The current project proponent is Vedanta Ltd which was never listed on London stock exchange. The other issues raised are also not related to the project. The Block I Bicholim mineral block was auctioned in terms of Supreme Court directions only.	
	SC passed judgment saying that they were carrying carry out illegal mining.		
	From 2011 -2012 100 Crores are due by Vedanta to the government.		

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	30 lakhs fine levied by SEBI illegal and misleading.		
	He challenged if anyone proves the water from pit is rain water or it is ground water.	The mine pit comprises of both rainwater which is channelised in to the mine pit as well as ground water. Applied for permission of Ground water withdrawal from Goa state water resources department.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	60 well water went dry as all the ground water is accumulated in the Sirigao pit.	Detailed hydrogeology study is carried out as per CGWA guidelines which is part of EIA report. The water accumulated in pit is not having any impact on surrounding wells.	
	Dr. Mohan Rao prepared siltation reports of mayem lake. As per the report the Mayem lakes is silted due to mining.	Details of Environment management plan is provided in chapter 10 to ensure that there is no water pollution caused to surrounding areas. Proper care will be taken for dump stabilisation as mentioned in the EIA report.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	1:8.39 ratio flooding of Bicholim River and 140 inches rain fall one can imagine how dangerous it will be.		
	No data given regarding tippers used to match with the production to verify its factuality.	Traffic density study is provided in chapter 4 of EIA.	
	Affected football ground.	This is not related to the project	
	Water Body in front of Shantadurga H/S, Surface study is not in EIA. It originates in the mining lease it meets River Bicholim carrying huge silt and emptying it in Mandovi River.	The same nalla flows and mixes with the Bicholim river and Upstream and downstream of the Bicholim river is collected.	
125	**Dilip D. Kudaskar– Not present**		
126	**Hanuman Gaonkar– Not present**		
127	**Ashok Karbe**	Thank you for the support.	

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	· I am resident of sirsai , and I am mining dependent, mines were closed since 2012 all workers have suffered .		
	· We made request to government to start mining activities and also made many representation to Government to know how mining is important to us.		
	· Supreme Court after 9 years passed judgement to start with sustainable mining, so we should welcome this decision.		
	· I am fully in support of mining project.		
	· In 2009 Sesa Goa has purchased this mine and they got hardly one year to run this mining activity, for 50 years back peoples complaints		
	/ grievances , we should not blame/ put the Sesa Goa/ Vedanta.		
128	**Ajay B. Gaonkar – not present**		
129	**Ujwala Uttam Shirodkar**	The anticipated impacts of the mining operations are dealt in chapter 4 of EIA and the necessary measures/EMP required for control of pollution are provided in EMP chapter 10 of EIA. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism. Mayem lake is not destroyed, in fact it is one of the tourist places and is in very good condition.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	· She is resident of Mayem.		
	· She stated that the fields are destroyed by the mining.		
	· She stated that her orchards land is destroyed.		
	· She further stated that the Mayem lake is destroyed due to mining.		
	· She requested fields and orchards lands should be restored.		

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	· She stated that mining should start by restoring the environment.		
130	**Ratan Pednekar**		
	· She is a resident of Mayem.		
	· She stated that money is not given to her for 5 to 7 years. The orchards, fields and water pond are destroyed.	The speaker is mentioning about some money matter pending with Mamlatdar. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism.	
	· She stated that her husband was working in Dempo.		
	· She requested to look into her money matter. She stated that Mamlatdar has not taken any action.		
131	**Kanchan Chodankar**	Thank you for support, as part of CSR activities, company will carry out agriculture development programmes within its buffer zone. Preference will be given to locals in employment.	
	She stated that if farmers believe in sustainable farming than proceed with mining		
	Mayem is affected at large as it is skipped w.r.t. distribution of fertilizer		
	Mining maybe restarted if unemployed youths should be given employment and also our agricultural problems are resolved		
132	**Pundalik Pal – not present**		
133	**Nasir Baig– not present**		
134	**Ganesh Gaonkar**	The allegation made regarding EIA is false and baseless. The EIA report is prepared as per the TOR issued by MoEF&CC. The state govt has auctioned mine as a fresh lease and as per minutes of meeting of MoEF&CC in case LOI is issued it is	
	Resident of Sirgao and is opposing the project		
	Representation are already given by him		

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	report given by mining company is false, pictures shown during presentation are false, no conditions are fulfilled. Data which is shown is manipulated by the mine owners in the report,	termed as Green field. The socio-economic survey was a sample survey wherein data from 25 villages was collected. A detailed study carried out with respect to impact of mine pit on Assonora river and same is annexed to the EIA report as annexure number III which concludes because of the elevation difference, existing environment protective measures inside the mine and the impervious lithology there is no flow of water between mine pit and the river. As per the mining plan backfilling of waste is proposed into the pit near the Assonora river. There are temples and other public utility infrastructure within the habitation however minimum 50m buffer will be maintained from the habitation. As part of CSR activities, company will carry out agriculture development programmes within its buffer zone. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism. Regarding the land rights, the mine has been auctioned as fresh lease and the property rights will be settled once the mining lease is executed.	
	Green field project which is declared is wrong		
	all five villages are destroyed namely Bicholim, mulgao, Lamgao, shirgao etc. requesting authority to practically come on site and do inspection before granting EC.		
	the company person should come to their village and tell from where they collected the data. I am the president of Devastan, no one approached me.		
	4 temples come within the vicinity of mining area. Mining people told that the retaining wall will be built by them and taps will be provided but nothing is done.		
	After 3 years gap we approached the mine company but they told that no funds are available. I have all the photographs of the collapsed retaining wall. One day the temple wall will come down due to the landslide.		
	One mining pit is there near the temple, 50 meters away from the river. No refilling is done in this pit. The depth of river is 3 to 4 meters. The dept of the pit is 25 meters.		

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	Because of this pit all agricultural fields are destroyed.		
	Yearly we harvest 2 types of crops. So, in order to harvest		
	2 types of crops the field should be not be dry, but come to april and may month water is there in field and everything is polluted.		The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	Company told they will pay.		
	Government told they will pay through DMF, but not done.		
	Area occupied by mining is not their land it is communidade land		
	Government asked to produce the land ownership documents, but they failed. The company should produce the Form I and XIV, Property is not theirs than they should not be granted lease.		
135	**Dinanant Gaonkar,**	The EIA report is prepared as per the TOR issued by MoEF&CC. The state govt has auctioned mine as a fresh lease and as per minutes of meeting of MoEF&CC in case LOI is issued it is termed as Green field. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism. The speaker also informed that the fields are restored by the mining company. It is also	
	He is a President of Tenant Association.		
	He stated that the EIA Report is prepared in an office and not by ground visits.		
	Project is specified as Greenfield in report which is false.		
	Villages have written to the Director of Mines and Geology to exclude Shirigao		

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	buildings, Panchayats etc from the mining lease, however the DMG has not replied.	understood that the earlier mining company used to provide access to the villagers to perform religious procession and same will be continued.	
	The road used for religious procession is destroyed by the Mining company.		
	Old survey record shows existence of road used for religious procession yet company denies its existence.		
	High Court directions to restore fields and only after the High Court Directions fields are restored. This was caused due to Mining company activities.		
	Issues are pending before Mamlatdars Courts.		
	When so many issues are pending, I oppose grant of EC and conduct of Mining operation.		
136	**Narendra Prabhugaonkar – not present**		
137	**Santosh Sawant – not present**		
138	**Devidas Prabhugaonkar – not present**		
139	**Anil Naik – not present**		
140	**Anand Gad, Advalpal**	The speaker is making false allegations on the company. The issues raised by the speaker are with respect to the mines in Advalpal village and not related to the existing project namely Block I Bicholim Mineral Block. The EIA report is prepared as per the TOR issued by MoEF&CC.	
	He states that his village is not in Block 1 and is in the other unit of Vedanta.		
	The mine was closed due to some accident and then it was restarted by the impact it caused.		
	He states that the Vedanta company is not fit to run the mine.		

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	He states that The company has changed so many names and they always lie to the villagers.		
	He states that he has 2 field and the company has put dumps in his field.		
	He questioned why should we not oppose because of some people who are dependents on the mine for their living.		
	There was mining silt which came from the mines and destroyed the nallahs & fields.		The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	There was alot of air pollutions when the mines were in previously in operation but the people were very happy when the mines stopped as the air and dust pollution had stopped.		The budget towards Environment Monitoring / Air pollution control measures : 408 Lakhs
	He states that the picture of the EIA report is all false and fabricated.		
	He states that He still is fighting the cases his ancestors have filed against the company for his land.		
141	**Laxmikant Gaonkar – not present**		
142	**Sharmila Volvoikar Panch member of pilgao**	There is no beneficiation plant (washing plant) proposed in the project and hence there will not be any generation of	

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	She states that she is not against mining but against the granting of EC to the lease for 2.00 MTPA.	tailings. The anticipated impacts of the mining operations are dealt in chapter 4 of EIA and the necessary measures/EMP required for control of pollution are provided in EMP chapter 10 of EIA. There are no chemicals used in mining as mentioned by the speaker. Preference will be given to locals in employment. Offer to join the workforce was provided to all the workers who were retrenched by the earlier mine owner. many of them took benefit of the offer and joined the company work force.	
	She states Dempo was allotted 1.3MTPA EC was granted for beneficiation plant to the mining company		
	A tailing pond was constructed but still waste enters in the agricultural fields causing destruction to the fields and other land.		The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	There is contamination of water and 60 Hectares of agricultural field was destroyed due to mining chemicals. If the capacity is increased more 1.3. siltation will increase in agriculture land and will destroy the fertile land.		
	She strongly objects for the mine.		
	The company needs to employ the 35 nos of employees which were removed.		
143	**Ibrahim Shaikh – not present**		
144	**Glen – not present**		
145	**Prakash Parab- Pilgao**	Thank you for the support.	
	He states that he strongly supports the operations of the mine activities as soon as possible as he states that the mine has generated a lot of employment.		
146	**Dr. Govind Parab – not present**	Thank you for the support.	

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147	**Raghuvir K. Karbotkar**		
	He is a resident of Lamgao.		
	His residence is located within 2 Km from the mining area.		
	He stated that the destruction which has taken place should be rectified.		
	He supports the sustainable mining.		
148	**Sebastiao A. Rodrigues**	The EIA report is prepared as per the TOR issued by MoEF&CC. The baseline study was conducted during March to May 2023 for preparation of this EIA. The state govt has auctioned mine as a fresh lease and as per minutes of meeting of MoEF&CC in case LOI is issued it is termed as Green field. All the necessary precautions will be carried out during monsoon to manage the storm water. Details are provided in Chapter 10 of EIA	The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	He sought clarification from the project proponent		
	He observed that application for EIA was 16/03/2023		
	Baseline data collected		
	project proponent stated baseline study carried out pre- monsoon which was locked down period of covid and such wrong dates are mentioned		
	fresh baseline data has to be created		
	fresh PH should be carried out		
	The Project is referred as Green Field which is wrong		
	He questioned so as to how Dempo Mining Corporation got changed to Sesa Mining Corporation, if so done all the prior liabilities should be transferred to the later company.		
	He states that Bicholim is a flood prone area		

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	He states that 2 scientific studies are done in bicholim river pollution by Rane and Matha of marine science department of goa. North goa disaster management Plan pertaining to mining lease of the project proponent.		
	The collector requested copies of these two studies. Both studies were shared on whats app no.9921876712.		
149	**Abhijeet Prabhudessai**	The speaker has made false statements. State government has auctioned the mine as fresh lease, Vedanta limited was declared as a preferred bidder and LOI is issued by the government. The consultant mineral engineering services was present throughout the PH, however he came on the stage only when the collector called him to clarify certain points. The distance between the Mineral Block and Dr. Salim Ali Wildlife Sanctuary is 10.553 Kms. The state govt has auctioned mine as a fresh lease and as per minutes of meeting of MoEF&CC in case LOI is issued it is termed as Green field. EIA does not mention desert in any of the chapters. Details of flora and fauna is provided in chapter 3. Details of environment settings are provided in chapter 2 wherein Asnora creek and mangroves are mentioned. The influence of creek water is also seen in the surface water quality in buffer zone mentioned in chapter 3.	
	He stated that it has been 80 years since lease is granted to this mine		
	He stated that the grievances put forth by farmers states that they are not benefited by mining.		
	He states that the situation of everyone ie. Farmers, Fisherman, workers etc is helpless.		
	He sought to know during the time the mines were not in operation why the loans of the workers were not forgiven if the government was really concerned.		
	He pointed out that the major violations in todays public hearing is that the Consultant is not present for the hearing. Hence there is no point in seeking clarification.		
	Dr. Mohan, representative of GSPCB, clarified that the consultant will be available to answer the concerns.		

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	He stated that Dr. Salim Ali Wildlife Sanctuary is within range of 10 Kms.		
	The report seems to be fraud		
	Fresh lease is clubbed within earlier 5 years and termed as Block-I.		
	He requested that the houses coming under the mining lease be skipped out.		
	He stated that in the name of Greenfield project, the people are deceived.		
	He stated that the EIA report falsely points out that area as desert and in future this will give the wrong notion that it was barren.		
	Before the commencement of mining, everything in the village should be recorded . if not, people will have to leave their homes.		
	Things are hidden in EIA. Back waters are to be covered in the EIA report.		
	He referred to Dr. Mohan Girap's report on Mayem Lake which clearly points out to the entry of Manganese ore.		
	He sought to know the future of the forth coming generation as they have more right on these mining areas.		
	He pointed out that 30% of the mining ore which belongs to future generation has been already extracted.		

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	He requested common man to be involved in the study.		
	He stated that there is no mention of flora /fauna and hydrological life in the EIA Report.		
	In view of above, he stated that the project has to be rejected.		
150	**Manoj Parab**	The speaker has made baseless and general remarks. The EIA report is prepared as per the TOR issued by MoEF&CC. The project is for mining of iron ore. Preference for employment will be given to the locals. Locals will be involved for the transportation of ore from mines to the jetty by using their 10.5 T capacity tipper trucks. The higher capacity trucks mentioned by the speaker are the company owned heavy earth moving machinery which will be used inside the mines. The state govt has auctioned mine as a fresh lease and as per minutes of meeting of MoEF&CC in case LOI is issued it is termed as Green field.	
	EIA report submitted is a false report and joke on Goans.		
	The EIA report contains a chapter on chemical analysis of ore. The report does not mention analysis of 35% of ore sample. This 35% will include heavy metals and rare elements.		
	The EIA report is being hidden from Goans.		
	Goa has gold in its ore and mud. This is not mentioned in the EIA report.		
	Dr. Nandakumar Kamat has done a research on this and submitted a paper on this to Chief Minister and Mining Minister.		
	Vedanta seeks to export this gold to China.		
	Research paper of Dr. kamat states that 6-8 kilo of one ton of ore will be gold.		
	EC states 3 MT of ore will be excavated from mines and as such 20- 24 thousand of kilos of gold amounting to 10,000 crores worth of gold will be excavated by the company.		

Sensitivity: Internal (C3)

	Why is Goa's gold sold to China and benefit not given to Goans.		
	Research papers of Dr. kamat regarding gold in Goan soil should be refered to.		
	He demands that a sample of ore should be analyse to prove evidence of gold.		
	He states that mining is required .		
	Government should made it compulsory for the mining company to give jobs for locals.		
	Company is using only 20 ton trucks, Volvo trucks. Locals do not have these trucks. Transport contracts will not be given to locals.		
	Government is dividing locals for and against mining.		
	He states that he has worked at a mining company of Vedanta at Codli and it has done huge frauds.		
	He states that 10,000 crores to be earned by the company should be informed to the Goans, but illegal mining is not wanted.		
	Huge loss is being caused to the state due to loss of royalty on gold as ore being excavated.		
	5 villages in mining lease area have unemployed youths. Human resource mapping is not done by the company in the EIA reports.		

Sensitivity: Internal (C3)

	Details of jobs to be given to locals is not done. In Mopa, locals have been cheated of jobs by the locals.		
	In an LAQ government has stated that mining company will only		
	give preference to Goans in jobs in mining companies. It is not a compulsion.		
	EIA report does not have a social impact study. He states that company has wrongly submitted that the project is Greenfield. It should have been verified before conducting the hearing.		
	He states that the EIA report should be redone and environment and locals of Goa should be saved.		
151	**Jayesh Walawalkar - not present**		
152	**Pandu Pilgoankar**	Thank you for the support.	
	He supports the mining company		
153	**Nilesh Karbotkar - not present**		
154	**Kishor Ishwar Lokre**	The state govt has auctioned mine as a fresh lease and as per minutes of meeting of MoEF&CC in case LOI is issued it is termed as Green field. The EIA report is prepared as per the TOR issued by MoEF&CC.	
	He stated that the Government has removed notification that it is a Green Field Project .		
	He stated that mining is operating from 1941 this is not a green project. And should be taken back.		
	The EIA report is false. The agency has not come on the site and the 3 seasons are not taken into account while preparing the EIA		

Sensitivity: Internal (C3)

	report peoples problems are not taken into account the authorities have considered this false report and conducted this public Hearing .		
	If now there are problems for the villages then after 50 years what will be the situation.		
	He requested the collector to tell the MoEF that the EIA the report itself is false . he stated that he was working in the mine once.		
	He states that it is not a green project and he strongly objects to the operation of the mine. Fresh EIA report has to be prepared after considering 3 seasons data.		
	It is not green project and prepare EIA report is false.		
155	. **Manohar Shirodkar R/o Lamgao**	State government has freshly auctioned the mine as new mine, Vedanta limited was declared as a preferred bidder and LOI is issued by the government. A buffer of 50m will be maintained from habitations. EIA report is prepared as per the TOR issued by MoEF&CC. The Buddhist caves are located in the habitation within the mineral block in Lamgao village. These caves are not notified monuments and hence were not specifically mentioned in the draft EIA. However, the same will be included in the final EIA. As mentioned above, a buffer of 50m will be maintained from habitations and the distance from the ultimate pit limit and the caves is around 300m. Preference will be provided to	
	The Mining had started from the time of the Portuguese and going on for last 60 years.		
	There are good and bad effects of the mining unit.		
	· It has reached the residential area and still why more 50 years are given to the mine, Unit to excavate the area.		
	· The company if given 30 years of excavation then the mine will reach the field are the humble request to the GSPCB		

Sensitivity: Internal (C3)

	that before issuing the EC, carry out site visit and survey along with the mining dept, local villagers, committee, GSPCB.	locals w.r.t employment. Necessary environment protective measures will be adopted during mining operations. Company carries out CSR activities in the buffer zone of its area of operations. The focus would be on agriculture, healthcare, education, alternative livelihood, sports, women empowerment.	
	· He stated that the EIA report is false.		
	· He states that the picture shown is one sided that CSR activities will be taken up by the company but will they executes their promise and who will monitor the issues.		
	· He stated that There are Buddhist caves and tourists spot are shown the mining area and this issue has to be taken.		
	· We are not against the mining operation but has to be done in sustainable manner.		
	· The Union workers were having problems with the company.		
	· The temples, the tourist spots and the Buddhist caves are shown in the mining area, the same will be destroyed if the mines are given to operate		The budget for environment management plan is 693 lakhs
	· We want mining but not at the cost of destruction of our houses, water bodies, fields etc.		
	· The CM can solve all our problems if he takes the issue personally.		
156	**Vinayak Samant - not present**		
157	**Arun Naik**	EIA report is prepared as per the TOR issued by MoEF&CC. The anticipated impacts of the mining operations are dealt in	The budget for environment
	· Resident of Lamgaon.		

Sensitivity: Internal (C3)

	· He stated that the mine has been existing for a long period. · He stated that the previous experiences showed that environment are effected due to mining. The report submitted by the Project Proponent is one sided. · He requested for a detailed survey to be conducted along with the villagers and also by taking in account of previous experiences. · He stated that mining company has never given justice. · They have never fulfilled their promises. · Mining lease should be given for 30 years , he sought to know why this mining project was granted 50 years of lease. · He sought to know whether this lease is revocable, if not the clause should be added in the lease. · He sought to know whether the report are done considering the period when the mine was in operation or for the last 12 years.	chapter 4 of EIA and the necessary measures/EMP required for control of pollution are provided in EMP chapter 10 of EIA. Baseline study is for the period of March to May 2023.	management plan is 693 lakhs
158	**Navin Jan Naik** He is a resident of Lamgaon. He stated that he oppose the project.	A buffer of minimum 50m will be maintained from habitations. The anticipated impacts of the mining operations are dealt in	The budget for environment

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	· He stated that the area marked for mining is below 500 meters.	Chapter 4 of EIA and the necessary measures/EMP required for control of pollution are provided in EMP Chapter 10 of EIA. EIA report is prepared as per the TOR issued by MoEF&CC.	management plan is 693 lakhs.
	· He stated that area which is marked is close to Lamgao and can cause damage to Environment, health safety of locals.		
	· He stated that the mine has an adverse effect on health and our fields.		
	· He stated that the EIA is one-sided mining has destroyed ecosystem.		
159	**Gajanan Karbotkar**	Thank you for the support.	
	· He is a resident of Mayem.		
	· He stated that he is in full support of this project.		
	· He requested the Goa State Pollution Control Board to grant the Environmental Clearance.		
160	**Sagun Gad**	Thank you for the support.	
	· He requested to start the Mining block.		
	· So he is totally supporting the mining activity to start.		
161	**Mansi Kauthankar**	All the steps prescribed in the EIA notification with respect to public consultation are followed. The EIA and executive summary of the report was submitted to all the surrounding Panchayats and Municipal Councils. A buffer of minimum 50m will be maintained from habitations. The mines management had meeting with the panchayat members who are the elected representatives of the community.	
	· She is a Panch member of Mulgao.		
	· She stated that she opposes the project.		
	· She stated that the EIA is given to Village Panchayat.		
	· She stated that the report is not explained to the people.		

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	· Temples, fields which will be destroyed should be checked.		
	· The company was called for a joint meeting in the Panchayat but they sought for police protection.		
	· She stated that the people questioned them during the gram sabha .		
	· She stated that the government should think about the welfare of the people.		
	· She stated that the job is required, food is required but not of the cost of their lives.		
162	**Anil Nagvenkar**	Thank you for the support.	
	· He states that he is from Bicholim.		
	· He states that he is very grateful to Chief Minister and MLA for starting of mining activity.		
163	**Ajay Shetkar**	Thank you for the support.	
	· He states that he is a resident of Mayem Village.		
	· He states that his main grief is about unemployment, if mining is started than our main problem will be resolved.		
164	**Suresh Kudaskar-Not Present**		
165	**Vivek Kudaskar**	Thank you for the support.	
	He is a resident of Mayem.		
	He supports the project.		
	He requested to grant EC to the project .		
166	**Mohan Parab**	Thank you for the support.	

Sensitivity: Internal (C3)

	He states that he requests the Government to start the company as soon as possible. He strongly supports the project.		
167	**Satish Sutar** · He states that he strongly supports to the operations of the mine. · He stated that employment opportunities will be generated and the truck owners will be benefited.	Thank you for the support.	
168	**Govind Ghatwal** · He states that he is a resident of Shirgao. · He supports the company.	Thank you for the support.	
169	**Shankar Rawale** · He states that he strongly supports the operations of the mine as soon as possible.	Thank you for the support.	
170	**Swapnesh Sheldekar** He states that he is placing objection on granting of EC to M/s Vedanta Ltd for starting of Block I Bicholim Mineral Block, He is a resident of Mulgao Village and the Chairman of Biodiversity from his Village. He states that the EIA report is prepared without consultation or taking local knowledge of the people into consideration. He states that no one has approached their village to collect the baseline data.	EIA report is prepared as per the TOR issued by MoEF&CC. baseline study was conducted during March to May 2023, details are provided in the Chapter 3. Prominent and famous temple like Lairai Devi temple, notified archaeological monuments like Namujgah are mentioned in the EIA. There are several other religious places of worships within the habitation located in mineral block, minimum buffer of 50m will be maintained. The speaker has made false allegations w.r.t the EIA report.	

Sensitivity: Internal (C3)

	He states that the data collected is inaccurate, unreliable.		
	He states that no authority is aware of any person visiting the village for collection of the data.		
	Data collected from buffer zone .		
	The data provided in the EIA report is nor accurate and appears to be fabricated.		
	False data is given in the report .		
	Temples, caves. Lakes etc does not find mentioned in the EIA report.		
	Entire study to be redone after taking into consideration biodiversity committees and local bodies and then conduct public hearing.		
171	**Vinod Naik - Pirna**	Thank you for the support.	
	· He states that he strongly supports the operations of the mine as soon as possible.		
172	**Shrikant Karbotkar**	Thank you for the support.	
	He states that he strongly supports the operations of the mine activities.		
	He requests to start a sustainable mine without hurting the sentiments of the villagers.		
173	**Prashant Kinalkar - Mayem**	Thank you for the support.	
	He states that he strongly supports the operations of the mine activities.		
	He states that he has his vehicles in the area. ‘		

Sensitivity: Internal (C3)

	He request company should take into the confidence all the truck owners and other people who they used to provide benefits monetary and others into confident and start the mining operation as soon as possible.		
174	**Prakash Naik – not present**		
175	**Navnath Jannaik** · He is the resident of Lamgao · Production of supari has decreased due to mining . · the cost of fertilizers is more than the input they get from the produce	Agriculture development is one of the key aspects of company's CSR. The company will engage with the farmers and with help of state agriculture dept will help the interested farmers in crop development	
176	**Sumit Talawnekar - Mayem** He states that he strongly supports the operations of the mine activities as soon as possible. · He states that he is a Truck owner and his land is next to the mine lease area. · He states that he is unemployment and no one came to his aid when the mines were shut down.	Thank you for the support.	
177	**Khemlo Sawant – Not Present**		
178	**Pravir Prabhakar Fadte** He states that he has inwarded Goa Foundations' application in Collector office yesterday on 10-08-2023.	EIA report is prepared as per the TOR issued by MoEF&CC. it is true that this particular mineral block was earlier operated by Sesa mining Corporation ltd (formerly known as Dempo mining corporation Ltd). Pursuant to Supreme Court	

Sensitivity: Internal (C3)

	The necessary environmental information and data which are required to be produced in response to the TOR are missing from the draft EIA document. The suppression of necessary information has been achieved by claiming that the Mining Block is a “Greenfield project” . Such a characterization of what is clearly accepted. The Mining Block has been operated from inception as a series of five leases (TC 11- 15/1941) neighbouring each other in a straight line, and thereafter, amalgamated lease is the relabelled “I-Bicholim” and has the same boundaries.	judgement in Goa Foundation 2 dated 07.02.2018, all the mining leases granted by the state government were cancelled. Thereafter, State Government in terms of the said order and as per the provisions of MMDR Act put this block for auction as a fresh lease/ grant. Vedanta Ltd was selected as the preferred bidder in the said auction for Block I Bicholim mineral block and accordingly LOI was issued to Vedanta Ltd. As per the MoEF&CC EAC minutes of meeting, in case of LOI grant it is classified as green field and hence in the EIA it has been mentioned as green field. There is no hiding of facts as alleged by the speaker/ goa foundation, as the earlier pits can be seen in the surface plan which is provided as plate no 5 of EIA.	
	These 5 leases before and after amalgamation have been in operation since 1941, and have been operated by a variety of actors, including Dempo Mining Corporation and Sesa Mining Corporation Ltd. SMC is a wholly owned subsidiary of Vedanta Ltd., which is now assigned this mineral block. The production data of the 5 leases, from 1941 to 2012, is available in public domain. The leases were also operated between 2015 and 2018 by SMC /Vedanta. In normal and legal terminology, such a mine site could never been cauterised as a Greenfield project for the purpose of obtaining Environmental Clearance.	The EIA also comprises of detailed hydrogeology report based on CGWA guidelines which concludes that there won’t be any adverse impact of mining on surrounding ground water regime.	

Sensitivity: Internal (C3)

	The important thing to emphasis here is that the wilful characterisation of the project site as a "Greenfield" project has been relied upon to withhold data and the past record of this project proponent (PP) required to be made part of the draft EIA and to the public. This includes the environmental data collected since the lease started operation in 1941 as well as studies by academics and entities like NEERI, which data and information must be used to understand past impacts so as to foresee future impacts.	As per our information, the erstwhile leaseholders have complied with all recommendations prescribed by NEERI in PIL no 1/2008. According to the official records, the three erstwhile leaseholders namely Chowgule and Company Private Limited, Rajaram Bandekar Mines Private Limited and Sesa Mining Corporation Limited have submitted an amount of Rs. 65,00,000 with the High Court. Desilting work is being carried out by Water Resource Department.	
	There are people who have their own grievances and hence has to be give sufficient time to place their grievances and requested to adjourn the public hearing as EIA report has suppressed basic data . It series of 5 leases which are amalgamated to single number		
	The investigation report of assessment of depletion of ground water sources and land degradation in Sirgao Village ,and mitigation Measures by National Environmental Engineering Research institute under Council of Scientific & Industrial , Nagpur dated 16/06/2008 in PIL No. 1/2008 was submitted to the Hon. High Court of Bombay at Goa in which it clearly shows the worst condition of natural water		

Sensitivity: Internal (C3)

	sources and other issues are mentioned in it. Why this report was not included in the draft EIA. Copy of the report is submitted to Goa State Pollution Control Board.		
	He requested the Collector to personally visit the mining lease areas and do the surveys of the critical conditions of the people living there and requested to re-schedule the Public Hearing.		
179	**Narayan Sawant - not present**		
180	**Hanumant Malik - not present**		
181	**Vallabh Parab - not present**		
182	**Vinod Mandrekar**	State government has freshly auctioned the mine as new mine and Vedanta ltd is selected as preferred bidder. As mentioned in the EIA the project will generate employment opportunities to 716 locals and preference will be given to the locals. A buffer of minimum 50 m. will be maintained towards habitation. There are primary schools (at Gaonkarwada (not in use) and Manasbag) in Mulgao village within the Mineral block. A buffer of 120m will be maintained from the Manasbag habitation and will be updated in the EIA report. Necessary protective measures to be taken are mentioned in EMP which also includes drainage details. There is no planned activity in the unused area.	
	He States that he strongly opposes the mine lease		
	He States that he wants to seek clarification from the Project proponent.		
	He questions how many people are employed from the core mining belt.		
	He States that the most important thing is roti kapda and makan.		
	He States that if roti is provided but their homes are taken		
	He requests the GSPCB to excluded the houses and demarcate the area.		

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	He wants clarification whether the GSPCB, have visited all the villages.		
	He States that there are govt primary schools in Manasgao Mulgao which is not mention in the report.		
	He States that he visited the school today and the same is operational but the GSPCB nor Project Proponent has visited the school.		
	He States that the mining lease boundary in my village mulgao, there is no drainage system which has to be taken into account.		The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	He States that he wants a detailed report what activities are proposed in the unused area as the same are not mentioned by the Project Proponent.		
183	**Kalidas Kavlekar**	The speaker has made false allegations. EIA report is prepared as per the TOR issued by MoEF&CC. Land use plan given as an annexure covers all the water bodies in 10km buffer zone including Mayem lake. Important archaeological sites are mentioned in EIA for ex. Namujgah which is located within the mineral block. The presence of habitation within mineral block (in Lamgao and Mulgao Village) is clearly specified in the EIA report. Necessary environment protective measures will be adopted during mining operations and the same is covered in Chapter 10 of EIA. Representatives from mining company	
	He is from Mayem Village. The EIA report is erroneous, It is not known as to who and when survey is conducted.		
	Several complaints against the mining go unattended. Likewise many cases are pending before Mamlatdar which are unsolved.		
	There are 167 water bodies mayem lake not shown on the EIA report.		

Sensitivity: Internal (C3)

	Heritage sites are omitted. He requested that proper survey be conducted and then processed EC.	and the EIA consultant were present for the PH. the Consultant also clarified the points raised on request of Collector.	
	Ancestors houses not shown or mentioned .		
	Latambarcem / Mayem details not given.		
	If mines can give justice to everyone than they can definitely proceed with lease mining project.		
	No representative present from mine.		
	Lots of dust pollution due to mines which is creating air pollution in the area.		The budget towards Environment Monitoring / Air pollution control measures : 408 Lakhs
	GSPCB should take everyone into confidence and the same presentation should be presented before the villagers.		
184	**Rohan Shirodkar**	The EIA report along with executive summary was submitted to all surrounding Village Panchayats office for further awareness. The presence of habitation within mineral block (in Lamgao and Mulgao Village) is clearly specified in the EIA report and a minimum buffer of 50m will be maintained from the habitation. The notified archaeological monument within the mineral block is listed in the EIA. EIA report is prepared as per the TOR issued by MoEF&CC. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism for any concerns.	
	He strongly objects to the operation of the mine.		
	He states that the EIA report has not reached him.		
	The presentation given states that there are 200 houses which are illegally demarcated.		
	There are archaeological protected sites which are there in the lease area.		

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	He states that no local person or farmers were taken into consideration while preparing the EIA report.		
	Our houses temples, villages have to be taken into account before commencing the mining operations.		
	Previously only few were given employment because their houses were effected . And now there are taken out of employment. Their problems have to be solved first.		
	Their he requests the company to solve their problems first.		
185	**Bhagwant Gaonkar**	Thank you for the support.	
	He is a resident of Mayem.		
	He stated that his house is within 3 kms.		
	He supports the mine.		
186	**Trupti Gad**	The anticipated impacts of the mining operations are dealt in chapter 4 of EIA and the necessary measures/EMP required for control of pollution are provided in EMP chapter 10 of EIA. A minimum buffer of 50m will be maintained from the habitation. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism.	The budget towards Environment Monitoring / Air pollution control measures : 408 Lakhs The budget towards erosion control measures, monsoon preparedness on
	There are different committees in our villages and all the committees had come together and a draft ahd been put up with all the problems faced by the villages of the area.		
	She states that the temples, houses, fields are in the lease area.		
	She states that 2 times the mine had collapsed and they had to face a lot of problems.		

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	She requests to first solve the problems of the villagers affected by the mining operations and then start the mine.		mines and water treatment : 232 Lakhs
187	**Ranjana Chodankar**	The speaker has made general statements like requesting to cut big trees in her area, cleaning the area. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism. Preference will be given to locals for employment. All the retrenched employees of earlier mine owner were offered job and many of them have taken advantage of this opportunity. Company also runs a technical institute (ITI) in Sanquelim village which caters to skill development of local youth and making them employable.	
	She states that there are big trees which have been grown in our area and which have to be cut down and the area has to be cleaned.		
	She states that the area has to be cleaned as there are crocodiles there.		
	She states that no employment is given to our children .		
	She states that mining has destroyed everything.		
	She requested the company to first solve the problems of the people and then start the mining activities.		

Sensitivity: Internal (C3)

Clarifications provided by the consultant during the Public Hearing on 11th August 2023

Sr No	NAME & COMMENTS	RRESPONSE	BUDGET
1	**Shri. Swapnesh Sheldekar**		
	He sought to know the exact duration for which the baseline data was collected by the consultant for incorporating in the EIA report.	The baseline data initially collected in the year Oct, Nov, Dec 2020, since the data validity was nearing expiry on Sep 2023, the baseline data was again collected from March to May 2023.	
	How is it that the consultant representatives have not been seen or identified by the local villagers during the exercise of collection of baseline data in the village of Mulgao as claimed to be carried out by the Consultant.	It is a sample survey, and the sampling team has collected the baseline data.	
	Does the Consultant posses photograph of the Leopard clicked during the process of data collection?	It is clearly mentioned in the Draft EIA report that the information of presence of Leopard was provided by locals i.e. secondary data. The detailed List of Flora and Fauna is provided in Chapter 3	
	There was no mention of forest in Mulgao Village in EIA report , how is this possible when across the boundary of village of Mayem is shown to have forest in the EIA report and also how can this be possible when there are two temples located in the village of Mulgao dedicated to the Goddess of Forest (Dhaktivan Devi and Vodlivan Devi).	The is no forest land within the Mineral Block and the same is confirmed by the state govt.	
	The EIA report does not mention the presence of large number of water bodies and temples in the Village of Mulgao. How is this possible?	Only major temples like Lairai Devi temple are mentioned in EIA. However, there are several such temples in the habitation for which a buffer of 50 m from the habitation is mentioned. There are no natural water bodies within the mineral block. As per the information there are settling ponds which were developed or constructed by erst while	

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		mining company. These ponds were maintained, desilted by the earlier mining company and the same system will be followed. Flow of water to the Mulgao horticulture area will be ensured as was done by earlier mine owner.		
	The existence of archaeological site that is 2500 year old Buddhist caves at Lamgao are not been mentioned in the EIA report. How is this possible? The Project Proponent is requested to include this in the report	The Lamgao caves are not a notified monument, however the same will be incorporated in final EIA. It is within the habitation of Lamgao and a sufficient safety buffer will be maintained.		
	Project proponent was questioned as to how the consultant being qualified has classified this project as a Greenfield project knowing fully that it is a Brownfield project	The mine is a fresh grant through auction regime by state govt for which LOI is issued to Vedanta Ltd. As per the MoEF&CC minutes of meeting, in case of LOI grant it is classified as green field.		
	With reference to table 2.3 at page no. 15 of 600 of the EIA report, Consultant was requested to clarify as to the feasibility of the figure of 17.05 of Free Feasibility Mineral Resource which requires washing as the mine does not have facility for washing.	Clarified that it is not a proved reserve and will have to undertake further exploration to prove the same.		
	Based on the reserves as stated at Table 2.3 at page 15 of 600 of the EIA report can the Project Proponent windup operations in 10 years?	NO		
	With reference to a corrigendum dated 06/06/2023 issued by the DMG putting a gap of 40 trips per hour on the road on the company, the Company will not be able to transport more than 1 million tons per annum. The Project Proponent was requested to clarify.	The above referred notification is for auction ore only.		
2	**Shri. Ramesh Gauns**			

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	According to EIA the Consultant visited 68 places out of which 58 are the villages having Gram Panchayats. And the Gram Panchayat maintains biodiversity register based on the Biodiversity Act. Whether the consultants approached gram Panchayts to go through the register to find out the Biodiversity of the Village.	NO		
	They studied the surface water but did not study the surface water of the water body flowing infront of Shantadurga School and which emerges from within the mining lease carries lot of silt then meets the River Bicholim and empties into Mandovi River. It is a pollution of water body is concealed.	The same nalla flows and mixes with the Bicholim river and Upstream and downstream of the Bicholim is collected.		
	The water in the pits according to EIA report is stated that pit water is rain water. But when the study is carried out the main period of summer in the month of March, April and May, the pits are full of water in the month of May. The colour of the water clearly states that it is ground water and not rain water.	The rainwater is channelised in to the mine pits and as per the hydrogeological survey there exists bands of impervious layer comprising of Phyllite and clay and hence there is no ground water seepage. However the project proponent will take approval form Water resources Dept for pumping of the rain water/ ground water accumulated in the mine pit.		
	He sought to know whether the wells have been studied from Mulgoa, Mayem, Bicholim, Lamgao, as wells are the indicators of ground water and they should have checked the levels of well water in the month of May not to give any scope to the company that the drying of wells is not because of them. The study would have provided a substantial evidence against the Company to refute on the perennial fresh water in the wells.	All villages mentioned above is covered.		

Sensitivity: Internal (C3)

	Mayem lake is used for surface water study but the 2 springs have gone completely dry because of the pit which has gone deep at Dhabdabha resulting in the depletion of water level of these 2 lakes goes low in the month of May.	There is no connection between the mine pit and Mayem lake. A detailed hydrogeology study is provided as part of EIA.		
	Then there are lakes in Malgao and Mulgao. Among these there are 6 lakes are in Mulgao and 7 lakes in Lamgao according to the RTI sought from the Mamlatdar of Bicholim on 01/07/2009. The total area of all these lakes comes to more than 27,000 sq. mtr which is nearly 3 hector of the land. All these lakes are totally silted which once upon a time feed the agriculture in Mulgao, bittlenut plantation in Mulgao so also in Lamgao. All these lakes find no place in the EIA report. One of the lake in Lamgoa belong to Government having 3375 sq. mtr. This fact is defeated by the company instead they claim it to be their tailing pond. The same lake was used for Ganesh immersion and now no immersion takes place in the tailing ponds.	All the water bodies within the buffer zone are covered under Land use pattern under chapter 3 of EIA		
	A number of tipper/trucks is missing in EIA which would have helped to calculate actually the ore is transported and thereby can be matched up with the production as given in the EIA report.	Covered under Chapter 4 pg No.129		

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	He asked for the gradient of the mining area as the top most point of this area is 169 meter plus a huge waste generated to a tune of 1:8.39 tons based on the annual production of 3 million tons the waste generated will be 2, 51,70,000. Therefore, the gradient is very high to ration. The gradient to was very much important because no mechanism can stop a huge silt moving out of the mining lease when entering into River Bicholim which is connected to the mining lease precisely to the lake which is sy. No. 25/1. The steam is as of now heavily silted used for fishing purpose in the town it self. Everything is wiped off.	The gradient of Dumps is provided in the EIA report. The EIA also contains the environment protective measures which will be carried out for dump stabilisation.		
3	**Shri. Vinod Mandrekar**			
	There is a Government Primay school located at Manasbhag Mulgao which is operational as on 10/08/2023. This school is located within the mining lease/core are of the proposed project. However, this school is not mentioned any where in the EIA report. The Consultant is requested to clarify this point.	We will reconfirm regarding this additional school in Mulgao, Manaswada and functionality of Govt Primary school shall be included. However, a sufficient buffer zone will be maintained towards habitation.		
	In the EIA report there is a mention of unused area (refer Map on page 262 of the detailed EIA report). Consultant is requested to clarify as to the meaning of the term unused area. Further, consultant is specifically requested to clarify as to whether unused area in the EIA that includes the residential areas in the unused area.. If not the Consultant	The residential area is included in unused area as per existing available exploration data. 50 meters buffer zone will be maintained from the residential areas/houses in the village of Mulgao.		

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	should give a specific undertaking in this regard whether it will be used in the future.			
4	**Shri. Pravir Phadte**			
	Do you think that your draft EIA report can be understood by common people without any awareness programme about it? Or what are your suggestions to enable common people /illiterate people to understand this EIA report?	All the procedure stipulated in EIA notification is followed.		
	The amount time taken by you to prepare this EIA report? How is it that though the TOR for the project was granted on 16/06/2023 the draft EIA? report was signed on 20/06/2023 by the Mining Engineering Services Consultant, M.S. Raju.	The work of EIA was started basis the standard TOR issued by the MoEF&CC and the baseline was carried out from march to May. Although the TOR was issued on16th June, the minutes of meeting including all the points was received earlier and the EIA work was continued and completed.		
	Explain in detail how the Consultant has classified this project as a Greenfield project?	Explained earlier		
	Why was the detailed EIA report not explained to the public/ awareness regarding the same not done by the Project Proponent when keeping the report with the Local Panchayat. How does the project Proponent expect the detailed EIA report to be understood by the Public present for today's hearing only on the basis of short Power Point Presentation made today?	Explained earlier		

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	As the time to seek clarification is being restricted to 5 minutes; it is requested that the written submissions submitted to the Collector's Office on 10/08/2023 by The Goa Foundation should be clarified by the project proponent now. Copy of the submission is handed over.	All the issues raised during the PH will be addressed in the final EIA		
	Why has the MoEF terminology not been explained in the EIA report?	EIA is prepared based on the TOR issued		
5	**Dr. Sebastiao A Rodrigues,Convener of Bharat MuktaMorcha (Goa State)**			
	Regarding baseline data presented in EIA, so I want to know periods of data collections . Because the consultant Raju has stated that he had collected data upto September, 2020 .When I questioned on that on this subject Mr Raju informed that indeed baseline study was upto September 2020	Explained earlier. The base line data was done during Mar to May 2023.		
	Regarding project proponent application dated 16/03/2023 seeking TOR ,wherein it is mentioned that the period of baseline data collection as from 01/10/2020 to 31/12/2020.	Explained earlier		
	October 2020 to December 2020 there was covid-19 lock down in Goa. Did company carry out baseline data collection during lockdown period?	Yes, explained earlier. The data was again collected afresh during March to May 2023 which is considered in EIA.		
	When TOR requires baseline data collection of three non monsoons in a year, why baseline data was collected only for one season of march to may 2023?	Mr. Raju answered that only one season data is required. I mentioned that PP has admitted for tweaking TOR on baseline data collection in EIA. Mr. Raju denied.		
	Asked whether the comments received from public will be incorporated in the EIA report and shown to the public again.	Mr. Raju answered all the issues raised shall be addressed and submitted to MoEF&CC.		

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	Now my last clarification is will all the applications received against this mining projects be forwarded to MOEF&CC considering that former environment cum public relation officer of Project proponent Mr. Mahesh Patil is the Chairman of GSPCB, as the case of likely conflict of interest.	All shall be forwarded. Collector North requested the people present that if they so desire, they may file their written objection/suggestion/views within 7 days from today to the GSPCB. The same will be part of the hearing and accordingly it would be forwarded to the concerned Regulatory Authority.	

Clarifications to the letters received w.r.t. the Public Hearing on 11th August 2023

REPLY TO LETTERS RECEIVED			
Sr. No.	**Letter**	**Response**	**Budget**
Letter 1 and letter 2 are same letters hence common response provided	**Dr. Sebastiao A. Rodrigues,** 48/2, P.O. Piedade, Vanxim, lihas, Goa-403403 Mobile:9923336347, 17August2023 **From: Ramesh S. Gauns** 1724, Pajwadda, Bicholim. Goa Mobile:9270085105		

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	17August2023 The Member Secretary Goa State Pollution Control Board, Saligao, Bardez, Goa Subject: Failure of GSPCB to complete minutes of the Public Hearing of Block - | Bicholim Mineral Block on 11 August 2023 at Sarvan Bicholim Madam, Above referred Public Hearing (PH) that began at 09.00 am on 11 August 2023 came to an abrupt end at 01.30 am on 12 August 2023 without minutes being finalized and shared in hard copies to the participants of the PH. It was total mess thanks to incompetent staff in compiling notes at the PH. It was observed that the large number of points raised by several speakers were not recorded in the minutes. In some cases entire presentation of the speakers found to be omitted along with their names. In other cases in spite of rectifications suggested by speakers who were present at the PH venue till mid night minutes could not be completed. Mess created by the on duty staff went out of control of the Presiding Officer who is North Goa Collector and an IAS officer. Presiding officer went on to announce at 1.30 am that the minutes of the PH will be shared online at GSPCB website. This is complete violation of the norms of PH followed where in minutes used ta be finalized immediately after the conclusion of the PH and print copies were shared with the participants present at that time at the venue duly	These are false allegations, the public hearing was completed after the minutes of meeting were read out in presence of public and the finalised minutes were signed by the Chair of the meeting and representative of GSPCB. The entire proceedings of the PH were video graphed by the GSPCB. The consultant was present for the Ph throughout the proceeding; however he went on the stage only when he was invited by the Chair of the meeting for providing clarifications to the speakers. The speaker is making false and baseless allegations on the officials, it appears that he has come with a predetermined agenda. We would like to state that the Minutes of public hearing meeting were finalised on the same day in the presence of the public. The document was signed by the Chair (Collector North Goa) and the GSPCB representative Dr. Girap and the copy of the same was handed over to us as well as the collector immediately after the conclusion of PH. The speaker also could have collected the copy immediately after the conclusion of the PH.	

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	signed by the Collector as the Presiding officer. We are worried that messy situation created thus might be used by vested interests to manipulate/omit/delete part of the contents before the minutes are made available online. Biggest danger we fear to the integrity of minutes is from the Chairman of the GSPCB Mahesh Patil who is an exEnvironment cum Public Relations Officer of Sesa Mining Corporation that is wholly subsidiary of Vedanta who Is currently the project proponent. Tempering of minutes in order to favor Project Proponent is real possibility. And quality of online minutes confirms this further. Therefore we strongly object to the procedures adopted by Presiding Officer of PH of putting minutes of the PH online without giving print copies immediately after the conclusion of the PH. When Ramesh S. Gauns asked for the consultant of EIA Presiding Officer responded saying that Consultant is not present at the PH proceedings. Consultant appeared in the night at around 08.00 pm. Time given for asking queries was only 05 minutes. Ridiculous trend is set in PH by granting only 10 minutes to seek clarification on document that consisted more than 600 pages of EIA/EPM. Several People could not get access to the Hall before 11.00 am because Project Proponent mobilized management and employees from all its buffer zone and out of buffer zone units to enter the Hall and occupied the entire hall to its fullest capacity. Minutes are put online after five days on 16 August 2023. What is recorded in the minutes is different from what was spoken at the meeting. Minutes has innumerable errors,		

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	Pages 12, 31, 32, 33 encompassing 20 people and their presentations are missing from the records of minutes. Your are therefore required to hold Public Hearing afresh based on fresh EIA. Thanking you, Yours Sincere, Dr. Sebastiao A. Rodrigues Copy to: 1. Collector (North Goa), Panaji 2. Union Minister of Environment, Forest and Climate Change, Indira Paryavaran Bhavan, Jorbag Road, New Delhi 110 003 INDIA 3, Chairman and Members of Expert Appraisal Committee, MoEF&CC, Indira Paryavaran Bhavan, Jorbag Road, New Delhi 110 003 INDIA		
Letter 3 and Letter 4 are same hence merged and common	**Dr. Sebastiao A. Rodrigues** 48/2,.P.0 Piedade, Vanxim, Ithas, Goa 403 403 Mobile: 9923336347 Date: 18" August 2023 Member Secretary, Goa State Pollution Control Board, Saligao, Bardez, Goa **Ramesh S. Gauns** 1724, Pajwadda, Bicholim. Goa Mobile: 92 70085105 Date: 18" August 2023 Member Secretary, Goa State Pollution Control Board, Saligao, Bardez, Goa	A detailed traffic density study was conducted and details are provided in Chapter 3 of EIA. The google map showing the transportation route is also part of the EIA. The details of the road are also provided in the traffic density study, Out of the 5.4 km of transportation route around 0.9km of road is public road after which the trucks enter the iron ore loading jetty at Sarmanas(not the public ferry jetty) .The pollution control measures proposed to be taken are detailed in Chapter 10. The entire transport route is shown on the google earth map which is part of the EIA. It is true that there are two	The budget towards environment monitoring and air pollution control measures is 408 lakhs.

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response provided	Subject: Concealment of usage of Public Road in front of the main Gates at Bicholim of Block I Bicholim Mineral Block in ETA report Madam, Road from Bicholim to Chorao Ferry, Narve, Mayem lake, Poira, Siqueri, Mayem, Tikhazan is under crowded vehicles (two wheeler and four wheeler) daily except Sunday. The same road is intersected in front of the gates of the mining area. The road has got a slope and if ends exactly at a point of intersection. Most of the vehicles on road are headed towards the Ferry crossing into Chorao. Local people of all the villages mentioned above use the road to approach to reach Bicholim town for various reasons particularly taking the young children for schooling in Bicholim. Therefore instead of using this public road use a fly-over like structure to avoid risk for the lives of the heavily crowded ruad by all the commuters. Secondly, mining road from within the Project Proponent's mining area also intersects the road to Pilgao village in front of the turn to Sarmanas Ferry. Some fly over like structure is required to be installed to ensure safety of the commuters. 900 meters road as mentioned in EIA does not reveal actually which public road will be uscd for the transportation of the ore. EIA does not speak that it is none other than the Pilgao road which ts also heavily crowded by the two wheeler and the four wheeler to reach Sarmanas ferry to attend to their duties. In fact immediately after that 900 meters of the said road the ferry point hardly at a	junctions namely at Mulgao and Pilgao on the transportation route and both the junctions will be provided with traffic marshals for smooth flow of public as well as ore traffic. Government will be constructing the underpass at the cost of project proponent at Mayem junction so that the interface between ore transportation and public is avoided . Till the underpass is constructed, dedicated manpower would be deployed to facilitate smooth and safe flow of transport.	

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	distance of 100 meters but it is not recorded in EIA, There are two ferries operating indicating that there is a heavy load on the road by the people travelling with two wheeler and four wheeler. Therefore using the 900 meters of public road of Pilgao village is nothing but creating dangerous situations two all the commuters. Also the loaded trucks will create dust pollution which people will face and also the clothes will be severely dusted. Hence the road should not be used for transportation instead a conveyor belt from the road from where trucks move on the public road of 900 meters should be constructed and used. On ground verification of 900 meters road at Pilgao connecting Sarmunas Jetty is 1 km distance and not 900 meters in length as mentioned in EIA report. This means that Project Proponent has cheated with facts on ground. Project Proponents therefore be denied Environmental Clearance for the Block I Bicholim Mineral Block as use of Public Village road is in violation of Terms of Reference. Thanking You. Yours sincerely, **Dr. Sebastiao A. Rodrigues** **Ramesh gauns**		
Letter 5	From: Ramesh S. Gauns 1724, Pajwadda, Bicholim. Goa Mobile: 92 70085105 Date: 17 August 2023 The member secretary, Goa State Pollution Control Board, Saligao, Bardez, Goa SubJect: Discrepancies in baseline data collection in EIA	The base line data was earlier conducted during Oct-Dec 2020. The same was mentioned in the TOR application also. However, as there is a validity of three years for the baseline data, The base line monitoring was again conducted for the period Mar- May 2023. The base line monitoring is carried out as per the TOR issued by MoEF&CC and is valid.	

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	Project Apptlication and Statement of Consultant M.S. Raju of Mineral Engineering Services regarding Block-I Bicholim Mineral Block Madam, We wish to bring to your notice the following discrepancies with regards to period of baseline data collection as stated in above mentioned subject: 1. Project Proponent (PP) Vedanta Limited submitted application to MoEF&CC dated 16 March 2023 seeking Terms of Reference (TOR) to prepare EIA/EMP. In their application PP has stated that the baseline data for EJA Study was collected from the three month post monsoon season period 01 October 2020 to 31 December 2020. 2. EIA report in compliance to TOR 44 by PP states that the baseline data was conducted during summer season 2023. 3. At the Public Hearing held on 1) August 2023 regarding this project consultant M.S. Raju stated during clarification queries by Swapnesh Sherlekar that consultant had collected bascline data upto September 2020 and this is even recorded in the minutes posted online at Goa State Pollution Control Board (GSPCB) on 16" August 2023. 4. Project consultant M.S. Raju confirmed again in response to query raised by Dr. Sebastiao A. Rodrigues that the baseline data collected was upto September 2020. The three months bascline data upto September 2020 would involve data covering monsoon season of July to September 2020 in violation of TOR 44. When it was pointed out to the above consultant that the Project application for TOR states that period of data collection mentioned is of post monsoon season from Of October 2020 10 31 December	Mr. Ramesh Gauns is making false and baseless allegations. Measurement of rain is a very common practise and the same is done every year by the mining companies. The consultant has collected the rain data for last 5 years from the earlier mine owner. All the land use features are provided in the EIA. Details about the habitation aswell as main water resources like river etc are provided.	

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	2020 Mr. Raju denied having collected baseline data during this period stated in the Project Application for FOR. This indicates that the baseline data collection period mentioned in the Project Application as from 01 October 2020 to 33 December 2020 is false. Further Mr. Raju stated the rainfall data stated in EIA as 3500 mm was collected not only from the meteorological department but also from on-site physical monitoring of rainfall at Block -I Bicholim Mineral Block. This means that baseline data collected is of monsoon season. When it was questioned about the credibility of the content of Project Application to MoEF &CC regarding baseline dats collection period M.S. Raju denied his own statement saying his baseline data is upto September 2020 and said period from 01 October 2020 to 31 December 2020 is correct. {f this was indeed correct then why did Mr. Raju stated that his baseline data is upto September 2020? This means that baseline data collection periods stated both in Project Application to MoEF & CC as well as in EIA report are fictitious in nature. 5. Additionally Consultant M.S. Raju was questioned by Dr. Sebastiao A Rodrigues whether his agency really carried on baseline data collection during 01 October 2020 to 31 December 2020 considering that it was strict lockdown period due to Covid-19, Project Consultant M.S. Raju answered affirmatively stating that indeed baseline data in 2020 was collected during COVID-19 lockdown period. 6. Since the stated period of data collection (01 October 2020 to 31 December 2020) stated by PP in Project Application is impossible to believe or accept on the ground of inherent inconsistency the suspicion of the conduct of		

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	the PP manifesting fraud are established beyond doubt. The stated period of baseline data in EIA of March to May 2023 too is suspect due the past record of cheating about baseline period datas as established from above facts and analysis. 7. Baseline data being the foundation of EIA and having established that Consultant ot PP has engaged in gross manipulations fresh documentation and fresh EIA be directed to be conducted by PP. This is required to be done not only because of several defects in EIA relating to baseline data related to lakes, rivers, wells and Perennial flowing rivers but more because PP has violated TOR and cheated on disclosure period of bascline data collection itself thereby violating TOR 44 & 70. Hoping for sincerely and decisive directions from MoEF & CC to direct PP to compile fresh documentation and conduct Public Hearing again as required under TOR 70. Thanking you, Yours sincerely, Ramesh S. Gauns Copy to (1) The Minister of Environment, Forest and Climate Change, New Detha (2) The Chairman and members of the Expert Appraisal Committee, MoEF&CC, New Delhi		
Letter 6	From: Anil D Salekar, Begwada, Pilgao, Bicholim, Goa Mobile: 9850138372 date: The Member Secretary, Goa State Pollution Control Board, Saligao. Bardez, Goa Subject: Grievances regarding choice of venue for Block-I	The venue of the public hearing was selected by the GSPCB as it was the most convenient in all aspects. The venue is also less than 2 km aerial distance from the mine boundary. The project proponent also provided refreshments twice during the hearing. Ample time was provided to the public for	

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	Bicholim Minerai Block Public HearinG (PH) held on 11 AuGust 2023 at Sarvan organised by Goa State Pollution Control Board GSPCB Madam, We have observed that the venue for PH at Zantye Sports Complex, Savona, Bicholim chosen by GSPCB was unreasonably far from the villages in the core zone areas and those impacted directly. Venue was 13 kms from Sirigao, 09 kms from Mulgao, 05 kms from Lamgao, 07 kms from Pilgao, 12 kms from Maem and 03 kms from Bicholim. Case law in india requires that the venue for the PH should be within 01 kms from the proposed mining project. PH was held in Sarvan village Panchayat Jurisdiction that is not in the core zone of the mining project. Several people could not make it to the venue as it was far from the the core zone localities. There were available Halls attached to Temples in Sirigao, Muigao, Lamga Maem, and very big Hirabai Zantye Memorial Hall in Bicholim but the were not taken. The venue of PH at Bicholim was inconvenient because Public Hearing that an at 09.00 am on 11 August 2023 went on till 01.30 am on 12 August 2023 for nearly seventeen hours. There was not a single hotel at the venue of the Public Hearing. Number of people stayed in the hall starving. Women who stayed on till 01.00 am at night had major problems. We were under impression that It was an absolute prerogative of GSPCB to decide on the date and venue of PH. However after the consultation with some knowledgeable	registration. Hence the allegations are of baseless nature as 834 people attended the PH.	

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	people in this matter we realized that venue had to be within 2 kms from the proposed project. if we had to know this in advance then we would have objected to the venue selected by GSPCB to hold this PH. In the light of various judicial directions given by National Green Tribunal B6(NGT) and Gujarat High Court Judgement of 2003 we call upon you to conduct fresh PH close to our localities and villages at core zone of the mining project. Thanking you, Yours sincerely, Anil D Salelkar Copy to 1. The Union Minister for Environment, Forest and Climate Change, Indira Paryavaran Bhavan, Jorbag Road, New Delhi 110 003 INDIA 2. Chairman and the Members of the Expert Appraisal Committee, MoEF & CC, indira Paryavaran Bhavan, Jorbag Road, New Delhi 110 003 INDIA		
Letter 7	From: Mr. Sharadchandra Krishnarao Vishwasrao Desai Son of late Shri. Krishnarac Ravioba Vishwasrao Desai & that of Ms. Sundarabai Krishnarao Vishwasrao Desai Resident of house no: 1996, Vishwasnagar, Larngao, Bicholim Goa. Date: 11.08.2023. To _ The Member Secretary Pollution Control Board Saligao, Bardez Goa. he Deputy collector of Bicholim Taluka Bicholim Goa. SUBJECT: OBJECTION FOR MINING IN LAMGAO VILLAGE & IN BICHOLIM BLOCK Sir, I am permanent resident of Bicholim being born and	With respect to civil suit bearing no. 188/2015, it is our understanding and on the basis of available official records, the matter was filed against the erstwhile leaseholder SMCL. Vedanta Limited is not a party to the proceedings and no adverse orders have been passed against it. With respect to case no. SDM.BICH.133 CRPC,4.2013., it is our understanding and on the basis of available official records, the matter was filed against the erstwhile leaseholder SMCL wherein SMCL had challenged the order dated 20.02.2018 in a criminal revision application before	The budget towards Environment Monitoring and Air pollution control measures: 408 Lakhs The budget towards Erosion Control Measures,

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	brought up at Village Lamgao having my landed properties in Bicholim and in Lamgao Village. I have alse filed civil suit bearing no: 188/2015-C which is pending in the court of Civil Judge Junior division at Bicholim. Already there is intunction granted by the Civil Court in my favour vide order dated 18.04.2022. The said order reads as under: ORDER i. The application for temporary injunction at exhibit D-3 is granted. ii. The Defendants, thcir relatives, servants, agents, or any other person claiming through or under them are hereby restrained from interfering with the suit property and digging pit in the suit property or from carrying out any such mining activity in the suit property bearing survey no; 15/1 of village Lamgao of Bicholim tatuka until the disposal of suit on merits. The Defendants in the above referred order are : i. Sesa Mining Corporation Limited, Bichclim Iron Ore Mines, Dhabdhaba Bicholim Goa, Pincode: 403504. ii. The Mines Manager, Sesa Mining Corporation Limited, Bicholim Iron Ore Mines, Dhabdhaba_ Bicholim Goa, Pincode: 403504. iii. The A.G.M. Sesa Mining Corporation Limited, Bicholim Iron Ore Mines, Dhabdhaba Bicholim Goa, Pincode: 403504. That the above stated order dated 18.04.2022 passed by the civil court is till date operational in force and binding on the defendants of the suit.	the District and Sessions Court, Mapusa. On 04.07.2023, the District and Sessions Court passed an order quashing the order dated 20.02.2018. With respect to case no. MAM.BICH.MINE.08.2016, it is our understanding and on the basis of available official records, the matter was filed against the erstwhile leaseholder SMCL and the same is pending for adjudication. Necessary measures will be put in place to ensure that there is no flow of mine silt in the neighbouring habitations/ agriculture land. The details of various erosion control measures are provided in Chapter 10. Only the water within the mining area is channelised into the pits and harvested. Detailed hydrogeology study is carried out as per CGWA guidelines and attached as anexure to the EIA. The complainant is referring to the incidents happened during earlier mining operations. All necessary safety and environment protective measures will be taken during the mining operations so as to ensure that there is no occurrence of any untoward incident.	Monsoon preparedness on mines and water treatment is 232 lakhs.

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	That the honorable Deputy Collector has passed Judgement and order dated 20.02.2018 in case no: SDM.BICH.133 CRPC, 4.2013. The said order reads as under: ORDER The Opponent is hereby directed to refill the existing pits with mud in the property surveyed under no: 15 and 16 of village Lamgao on or before 15.03.2018 under strict compliance. Pronounced in the open court. The opponent of the above mentioned case is: M/s Sesa Mining Corporation, Dhabdhaba Bicholim Goa. That the Opponent went in appeal in the Session Court and have got the said order set aside and the matter is sub judice before the Deputy Collector of Bicholim. I have also filed contempt application before Deputy collector Bicholim and the same is pending under no: DCB.BICH. 133 CRPC.4. 2013.2019. That I have also filed application to the office of Mamlatdar of Bicholim Taluka which is also pending under no MAM.BICH.MINE.09.2016 with respect to survey numbers 26/1, 18/6, 24/3, 11/1-O, 11/1-L, 11/1 M, 11/1-Q of village Lamgao of Bicholim Taluka. That there is contamination of well water in the area of village Lamgao. I am having Water testing report issued by the office of Pollution control Board. Water wells of Lamgao Village were getting dried up so also were getting pollutants in the water due to mining. I am having my residential house 1856 in the property surveyed under no: 16/1-A of village Lamgao. That one Mr. Narayan Mone has also filed application to the		

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	office of Mamlatdar of Bicholim Taluka which is also pending under no MAM.BICH.MINE.08.2016 with respect to properties situated in village Maem of Bicholim Taluka. The properties of Mone are situated touching the Mining area mining belt. The zonal agricultural officer / official has also deposed that the plantation is getting affected due to running of mining silt in the water pond serving irrigation of plant. There were frequent accidents of mining burst brining mining silt, boulders, stones down in the Bicholim city, Mulgao Village. One such land slide was witnessed on 16.07.2011 at Mulgao, on 06.06.16 at Pajwada Bicholim. Reference of the above incidents has come in the Judgement of Deputy Collector dated 20.2.2018.. That old Temple situated at Lamgao Village had to be reconstructed. The school in village Lamgao had to be reconstructed due to passing of pit water through school building. The mining pit which is existing at present is situated at the higher level than village of Lamgao and Bicholim City. The said mining pit is having huge accumulation of water posing danger to the inhabitants of Lamgao Village and Bicholim City. If any untoward incident takes place there will be flowing away of nearby human habitation causing numerous casualties and countless monetary & economic irreparable loss of property. That the farmers are getting affected due to reckless mining done previously by the Dempo Mining Corporation' / Sesa Mining Corporation / Vedanta limited. The above companies did mining only by changing their names one after another. The names were changed to cheat farmers.		

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	Farming and plantation in the nearby areas has become difficult rather impossible. The water in the locality is channelized in one pit affecting water elsewhere in the locality. In Lamgao Villlage previously there use to be water at a just distance of 1 to 3 meters from surface but now it is not possible to have the same due to mining pit taking water dip in the pit. Houses have also got cracks due to mining done in the locality. Environmental damage caused by previous mining is irreparable. Flaura and fauna is affected causing damage to nature, plants, water sources, water courses, animals, birds. Considering all the above facts, I pray that no mining be permitted in "Bicholim Mineral Block" as sought to be proposed. Yours faithfully, .		
Letter 8	GOA FOUNDATION, G-8, St Britto's Apartment, Feira Alta, Mupusa, Goa, INDIA The Collector (I), North GOA District, North Goa Collectorate, Panaji 403001 Goa. Subj: Request to cancel Public Hearing on the Vedanta mineral block I-Bicholim, scheduled for 11 August, 2023 Dear Sir, We are writing to you to seek cancellation of the Public Hearing scheduled in respect of the Vedanta mineral block I-Bicholim on 11 August, 2023.	EIA report is prepared as per the TOR issued by MoEF&CC. it is true that this particular mineral block was earlier operated by Sesa mining Corporation ltd (formerly known as Dempo mining	

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	There are very serious grounds for considering and acceding to this request. These are set out below: a) The necessary environmental information and data which are required to be produced in response to the TOR are missing from the draft ELA document. The suppression of necessary information has been achieved by claiming that the Mining Block is a "greenfield project." Such a characterization of what is clearly a brownfield project as a greenfield project is wholly incorrect and cannot be accepted. The Mining Block has been operated from inception as a series of five leases (TC 11-15/1941) neighbouring each other in a straight line, and thereafter, as an amalgamated lease with a single lease number (08/AMLG). The amalgamated lease is the relabelled "I-Bicholim" and has the same boundaries. b) These 5 leases before and after amalgamation have been in operation since 1941, and have been operated by a variety of actors, including Dempo Mining Corporation and Sesa Mining Corporation Ltd, SMC is a wholly owned subsidiary of Vedanta Ltd, which is now assigned this mineral block. The production data of the 5 leases, from 1941 to 2012, is available in public domain. The leases were also operated between 2015 and 2018 by SMC/Vedanta. In normal and legal terminology, such a mine site could never been characterized as a "Greenfield project" for the purpose of obtaining environment clearance. c) The important thing to emphasize here is that the willful	corporation Ltd). Pursuant to Supreme Court judgement in Goa Foundation 2 dated 07.02.2018, all the mining leases granted by the state government were cancelled. Thereafter, State Government in terms of the said order and as per the provisions of MMDR Act put this block for auction as a fresh lease/ grant. Vedanta Ltd was selected as the preferred bidder in the said auction for Block I Bicholim mineral block and accordingly LOI was issued to Vedanta Ltd. As per the MoEF EAC minutes of meeting, in case of LOI grant it is classified as green field and hence in the EIA it has been mentioned as green field. There is no hiding of facts as alleged by the Goa foundation, as the earlier pits can be seen in the surface plan which is provided as plate no 5 of EIA. As per our information, the erstwhile leaseholders have complied with all recommendations prescribed by NEERI in PIL no 1/2008. According to the official records, the three erstwhile leaseholders namely Chowgule and Company Private Limited, Rajaram Bandekar Mines Private Limited and Sesa Mining Corporation Limited have submitted an amount of Rs. 65,00,000 with the	

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	characterization of the project site as a “Greenfield” project has been relied upon to withhold data and the past record of this project proponent (PP) required to be made part of the draft EIA and to the public. This includes the environmental data collected since the lease started operation in 1941 as well as studies by academics and entities like NEERI, which data and information must be used to understand past impacts so as to foresee future impacts. d) We were not able to write this letter earlier for obvious reasons. The Terms of Reference have been communicated to the PP on 16 June 2023 and the 624 page has been manufactured in 4 days! It is unrealistic to expect the public to be able to read such a report in the space of a month. In fact, all the data produced is related to periods prior to the issue of TOR letter, including a report prepared in 2010! In other words, the draft EIA cannot be considered as conforming to the TOR either in letter and spirit. e) Please note that the lease is now granted for a period of 50 years. During the past existence of these leases unparalleled damaged has been done by the mining activity to water bodies including the Asnoda river, springs, fields (most outside the lease boundary), biodiversity, hill slopes, and most seriously, to the ground water aquifer. This has been permanently destroyed. The entire development has been documented and proven in the NEERI report organized under the directions of the	High Court. Desilting work is being carried out by Water Resource Department. The EIA also comprises of detailed hydrogeology report based on CGWA guidelines which concludes that there won’t be any adverse impact of mining on surrounding ground water regime. Explained as above. The EIA report is prepared on the lines of TOR issued to Vedanta ltd. The Baseline monitoring was carried out in march to May 2023. The EIA work did not wait for the issuance of TOR, as standard TOR is available for this purpose. Other specific points raised during EAC meeting held on 3rd May were immediately noted and studies carried out without waiting for the Minutes of Meeting. The	

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	Bombay High Court. The water resources available to this hitherto water surplus village have evaporated, turning the village into an area of drought. The PP has now sought to eradicate all this history of severe ill-effects of mining by terming it a “Greenfield project”. This makes a complete mockery of the EIA process, and cannot be permitted under any circumstances. For these reasons, the public hearing is important. It is the right of the people, especially the villagers of Sirigao, to represent what happened in the past 50 years, and to hear whether the scenario would be repeated in the next fifty years. No village should be gifted with such a ghastly legacy. f) We set out various items from the Terms of Reference Compliance section draft EIA report (pp.5-18) which have not been complied with. 6. The Project Proponent shall conduct drone survey of the mine lease area and buffer area and submit during the appraisal for EC. **The drone survey was conducted and will be Submitted during appraisal for EC** **Comment of Goa Foundation: This is material information to understand the topography of the site in the context of aspects such as hydrogeology. If the survey has been conducted, why is it being suppressed?** 7. During the meeting, the EAC noted that old excavated pits exist within the mine lease area. Hence, the Project Proponent needs to submit a letter from the Department	complainant is simply trying to make false allegations. The mineral block is auctioned as a fresh lease and EIA is based on the baseline study carried out during the period March to May 2023. The project proponent has detailed out the various impacts and the environment management plan in details to reduce the environmental impact. As clearly specified in the TOR, the drone survey will be submitted to the EAC during appraisal for EC The clarification from State govt is obtained as part of the Final EIA.	

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	of Geology and Mining, Government of Goa clarifying whether any illegal mining within the mine lease area has been carried out or not and whether the same has been carried out by M/s. Vedanta Limited or not? **The state govt. auctioned Block-I Bicholim Mineral Block as fresh mine and Vedanta was preferred bidder. We have requested to state Govt. for the Clarification, and response is awaited and same shall be provided** **Comment of Goa Foundation: This is an absurd statement given that Sesa Mining Corporation/Vedanta was the earlier operator. Whether illegal mining took place by the project proponent is material information for a public hearing** 20. 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. The production details need to submit since inception of mine duly authenticated by Department of Mines & Geology, State Government **GREEN FIELD PROJECT** **Comment of Goa Foundation: This is another absurd statement given that Sesa Mining Corporation/Vedanta was the earlier mine operator. The relevant information required to be produced has not been produced.** 24. The PP should submit the real-time aerial video	The 3 month data collected from two PHC's is representative and sufficient for evaluation for the EIA purpose and budgetary allocations are made in the EIA The state government in compliance to the hon. Supreme court order auctioned the mine as a Fresh lease . Vedanta Ltd was selected as a preferred bidder and LOI issued. In such case past data is not required. In case the application for EC was w.r.t renewal of mine lease or expansion project the past production data etc are required. In this particular case the past production data is not required to be produced. The real time video footage of the mine lease will be submitted at the time of EAC meeting. The point made by complainant is in case of a operational mine which is applying for EC for the purpose of lease renewal or expansion. In this case the mine is auctioned as a Fresh lease and the proposal is accordingly prepared.	

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	footage & video of the mining lease area and of the transportation route. **PP shall submit the real —time video footage of the mining lease at the time EAC Meeting.** **Comment of Goa Foundation: This is material information to understand the vegetation that currently exists in the mine and along the transportation route. It must be provided as a link so that the public can study the facts on the ground.** 34. Compliance of the Ministry's Office Memorandum No. F: 350/2017-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 EJA/EMP Report **The Affidavit is enclosed as Annexure-2** **Comment of Goa Foundation: This relates to violations of the Environmental Clearance by Vedanta and is material information for the public hearing. An affidavit is not equivalent to compliance. Compliance would require a statement of violations, if any, and payment of sums as required as per the MoEFCC OM.** 35. PP Shall Submit a Certificate from Chief Conservator of Forests regarding involvement of forest Land in the Mining lease area if any. In case forest and is involved: i) PP should submit the proof of application made for obtaining forest clearance and ii) a map clearly showing the forest & nonforest area.	The annexure 3 is the letter of approval of mining plan. The surface plan and geological sections are part of EIA as plate no 5 and plate no 4A1 to A4. The auction document of the state government clearly states that there is no forest area within the mineral block. Letter from the state forest department is also attached in the final EIA. Even earlier i.e before auction of the mines , there was no forest land within the mines. Approved lease sketch is attached in the EIA and land classification is provided in final EIA.	

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	As per the auctioned document given by state govt. there is no forest area involved in Block-I Bicholim Mineral Block Comment of Goa Foundation: No certificate is produced as required by the TOR. 36. 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. **NA** **Comment of Goa Foundation: This is another absurd statement considering that the leases have been operated from 1941 till 2018.** 37. PP should submit the details of survey number [viz. survey no, area in hectare, classification of land (government, private, forest, grazing land etc.), villages] duly authenticated by State Government, falling in the mining lease area **Enclosed in lease sketch as Plate.No.2** **Comment of Goa Foundation: The classification of land has not been provided by survey number as required.** 55. 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. **The socio-economic study was conducted Ref. Chapter-3, Para.3.9**	The base line monitoring is carried out as per the TOR . The data is valid as per specific TOR point no 4.1 . Point clarified above. The report from Regional office is required in case of a existing valid EC. In this particular case there is no existing EC. The mine is auctioned as fresh mine and for which purpose EC is being applied for . Once the EC is obtained the lease would be executed and other permissions obtained, then the mining operations will start.	

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	Comment of Goa Foundation: The health survey in para 3.9.1.19 has been conducted by collecting data from two PHCs working in the buffer zone, for just three months prior to the survey. This is absurd as much longer data is available, especially since the PP and Mineral Foundation of Goa partly funded by the PP have been conducting health camps as part of CSR for decades. 68. The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry **Comment of Goa Foundation: There is no response at all by Vedanta. The response to the Questionnaire ts not roduced.** 70. 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. rocess) will entail conducting the PH again with the revised documentation **Baseline collected during summer season, 2023** **Comment of Goa Foundation: The response has little connection with the ToR point. Note that since required information has been suppressed, this would anyway require conducting the PH again with revised documentation**	The project proponent will obtain both CTE and CTO from the GSPCB before starting the mining operations.	

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	71. 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. **Green field Project** **Comment of Goa Foundation: The claim is that because this is a Greenfield project (which is incorrect), the report need not be produced.** g) Other important information relevant for a public hearing has not been provided, most important of which is the mining plan. Without a mining plan, it is not possible to evaluate its environmental impacts. The Annexure 3 of the EIA / EMP also refers to an "*annexure attached of surface mining plan and cross-section*", which is missing. I am confident that once you recognize this glaring misrepresentation and suppression of essential information after receipt of this letter, you will also conclude that the Public Hearing is vitiated due to an incomplete draft EIA report — which is based on the false claim that the project is a green field project when it is actually (and quite clearly and without doubt) a brownfield project. The Public Hearing is being conducted with the assistance of the Goa State Pollution Control Board. The Board will doubtless produce before you, if required, copies of the		

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	consent orders issued to the erstwhile leaseholder (Sesa Mining Corporation/Vedanta) for operation of these leases since the time the Board was constituted in 1987. In fact, if this were a Greenfield project, why is there no consent to establish (CTE) issued by the Board? An environmental Public Hearing is not an occasion to correct blatant errors in the draft EJA nor is the public required to point out such egregious claims. The draft EIA report must conform to the TORs in all respects, and only then can the public hearing proceed. The draft EIA uploaded to the website of the PCB is severely deficient in this regard. This issue needs to be settled first. Your office can sort out this problem with the PCB, especially with regard to the claim of then project being a “Greenfield project.” After a proper draft EIA report conforming with the TORs in all respects is received and verified, the public hearing can be notified and held. We therefore reiterate our demand that the public hearing be cancelled in the circumstances, till a fresh draft E]A — prepared with some degree of honesty and scientific integrity — can be placed before the public. Sincerely, Dr Claude Alvares Director Cc: Goa State Pollution Control Board		
Letter 9	Letter from Village Panchayat Mulgao dtd 7/8/2023		

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	1. Demarcation of village boundaries active mining lease boundaries & Buffer Zone boundaries to be done in presence of all committees and Village Panchayat Mulgao. 2. Company should exclude houses, Temples, Lakes paddy Fields bhagayatis from mulgao mining blocks as per new mining lease. 3. Desilting of paddy fields should be carry out by company on priority. 4. Pending compensations of famers from 2011 to till date to be release on immediate basis. 5. Priority to be given to mulgao villagers for Employment, the Company should also give preference to mulgao villagers for business opportunities. 6. Mulgao Communidade is having 2.21 laks sq.mrts area in the said mining block of which lease rent is in arrears from the year 2011. 7. Mulgao communidad is having three water lakes under Survey No.69/1 & 71/0 which has been filled with mining silt need to be cleaned in original form. 8. Arrangement of smooth flow of water to the kulagars in the area in summer season. 9. Attend and provide solution to the difficulties faced by the ritreched sesa mining worker of the	The mineral block is auctioned by state government. The habitations within the lease were always existing . A safety buffer of minimum50m will be maintained form these habitations which includes houses, temples, agriculture properties etc. Vedanta ltd is a new lessee and the mining operations have not started. There is no compensation liability with Vedanta ltd company. The earlier mine owner was a different entity and the compensation matters would be dealt by them. Employment preference will be given to locals only. There would be lot of indirect employment and business opportunities due to mining which will benefit the local population. The lease needs to be executed first for further needful in this case. It is understood that the earlier mining company had constrcted these ponds which are referred by the villagers as lakes. These ponds were maintained and desilted by earlier mine owner and the practise will follow. Flow of water will be ensured .	

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	mulgao village. 10. Mining grants to Village Panchayat and Devasthan to be increased. 11. Compensation for houses damaged caused due to operation of mines in the VP Jurisdiction. 12. Also brings to your notice that villagers require Public information in details with regards mining in mulgao village. We strongly opposed resumption of mining in mulgao village till we fulfill the above Point.	All the retrenched workers were provided opportunity to join the work force of Vedanta ltd and many of the workers took benefit of this opportunity. Vedanta has won the mine in auction and has not yet started the mining operations. It is to ensure the villagers of mulgao that a safety barrier of minimum 50 m will be maintained towards the habitation. There wont be any drilling and blasting . There is no shifting of habitation proposed.	
Letter 10	Letter from Pilgao village panchayat RefNo.VP/PIL/BICH/2023-24/L.SI To The Mermber Secretary, Goa State Pollution Control Board, Saligao Bardez Goa. Sub :- Point to be discussed in Public Hearing. Sir, With regards to the public Hearing as per the Environmental impact assessment 2006 w.rt Block Bicholim Mineral Block with area of 478.5206 ha located in Bicholim Taluka whích was held on 11/08/2 023. In this regards I would like to bring to your attention to add the following points on the record as the same has not been recorded on the minutes of the hearing. 1) The Dempo Mining Corporation was allotted approximately 1.3 MPTA EC as per the reliable sources.	The current project doesnot include beneficiation plant.	

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	Accordingly they had designed and structure the beneticiation plant (Washing Plantl Known as New Beneficiation Plant in Pligao Village Bicholim Goa. The tailing Pond was also constructed considering the 1.3 MPTA EC still the water from the tailfíng point (silt) enters in the agriculture field which leads to the contamination of soil, ground water and surface water by chemical emitted from mining processes and agriculture field get destroyed, about 60 hector of agriculture field has been destroyed so far. Later on Sesa Mining Corporation Linited took over mining business from Dempo Mining Corporation and presently Vedanta is running the said mining business. 2) The Beneficiation plant has a capacity of 1.3 MPTA if the capacity is increased beyond the 1.3 MPTA than the tailing point will overflowed and silt will enter in the agriculture field and water bodies, which will leads to soil contamination and water pollution. The infrastructure of Mining Company was not enough to handle 1.3 MPTA of Ore and it will destroyed all major fertile land and natural habited if any Mining company is allowed to operate over and above. Hence we have strong objection for production of 2.0 MPTA Ore and all the damages to the fields and land to be restored. 3) Also there is some agriculture land bearing sy.no.66/40,164/01, 184/4,5,9,10,14, 15,16,19,20 &21. 165/8. 187/4,5,6,8, 10,12, 13. 66/40, 154 and others of Village Piligao, where there is illegal encroachment have been done by mining company to run miníng activities.	There is a beneficiation plant of SMCL in Pilgao village. However it is a separate project and not part of the Block I Bicholim mineral block. In case the SMCL company requires to expand its capacity, they would be required to obtain Environment clearance for the same.	

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	Hence the issue related to above agriculture land farmers regards to the agriculture land has to be resolved on the priority, until it gets resolved we have strong objectíion for operatíon of míning activities in Piligao Village Bicholim Taluka. Kindly take note of the above point and do the needful.		

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Government of Goa
Directorate of Mines Geology
Institute Menezes Braganza, Panaji-Goa
Website: dmg.goa.gov.in e-mail:dir-mine.goa@nic.in
Phone Nos. 0832 – 2426431/2425287/2422765

File No. 03/24/2023/Major/Mines/Part/ 1489 Date:25/07/2023

To,
M/s. Vedanta Ltd.
Sesa Ghor, 20 EDC Complex,
Patto, Panaji, Goa.
403001

Sub: Clarification letter with respect to Terms of Reference granted to Vedanta Limited for Block I Bicholim Mine.

Sir,

This has reference to your letter dated 18/5/2023 on the subject cited above. With regards to the special condition no. xvii mentioned in the summary records of the 14th meeting of the Expert Appraisal Committee held on 3-4 May 2023, it is clarified that:-

(a) M/s. Vedanta has been declared as Preferred Bidder for Bicholim Mineral Block- Block I through an auction process conducted by the Government of Goa as per the Mineral Auction Rules, 2015.

(b) M/s. Vedanta Ltd., was not the erstwhile lessee of the said Block prior to auction.

(c) The matter of illegal mining in the State of Goa is under investigation by the Special Investigation Team (SIT).

Yours faithfully,

(Dr. S. Shanbhogue)
Director

371/C

GOVERNMENT OF GOA
Office of the Deputy Conservator of Forests,
North Goa Division,
Ponda – Goa, 403 401

Ph No: 0832-2312856 Fax No: 2312095 email:- dcfnorth-forest.goa@nic.in

No.5/MINES-GEN/DCFN/TECH/2023-24/56 Dated:- 12/04/2023

To,
The Conservator of Forests (Conservation)
Van Bhavan,
Panaji- Goa

Sub:- Status of land within Block -1 of Bicholim Mineral Block – reg.

Madam,

With reference to the letter No. CF(C)/General/FD/2022-23/5176 dated 17/02/2023 on the above cited subject , the detail of village wise Survey Nos. (as per the list attached as Annexure-I) within Block -1 of Bicholim Mineral Block is verified and found that the area under the above mentioned Survey Nos is not a Govt. Forest and also does not identified as Private Forest by State Level Expert Committee headed by Sawant / Dr. Karapurkar/ V. T. Thomas. The plan showing Block-1 – Bicholim Mineral Block is enclosed herewith as Annexure-II for kind information.

The Plan & Survey Nos. of Block II, III and IV were not submitted by the User agency, therefore could not be verified by this office.

Yours faithfully,

Dy. Conservator of Forests,
North Goa Division,
Ponda- Goa.

Encl:- As above.

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ASSTT. CONSERVATOR OF FORESTS
PONDA GOA

Annexure-13

List of Survey Numbers with land classification

Village	Taluka	Area (Ha)	Khasara number	Type of land	Nature of land
Bicholim	Bicholim	1.0539	Road	Road	Road
Bicholim	Bicholim	0.7787	72	Private	Cultivable
Bicholim	Bicholim	17.6247	77	Private	UnCultivable
Bicholim	Bicholim	8.6111	78	Private	UnCultivable
Bicholim	Bicholim	0.1600	78	Govt	UnCultivable
Bicholim	Bicholim	0.7132	79	Private	UnCultivable
Bicholim	Bicholim	5.9200	80	Private	Cultivable
Bicholim	Bicholim	2.6637	81	Private	UnCultivable
Bicholim	Bicholim	5.4255	82	Private	Cultivable
Bicholim	Bicholim	0.0368	83	Private	Cultivable
Bicholim	Bicholim	1.3110	84	Private	Cultivable
Bicholim	Bicholim	0.0192	86	Private	Cultivable
Bicholim	Bicholim	0.0580	88	Private	Cultivable
Bicholim	Bicholim	2.4912	89	Private	Cultivable
Bicholim	Bicholim	0.4157	89	Private & Govt	Cultivable
Bicholim	Bicholim	0.3441	90	Private	Cultivable
Bicholim	Bicholim	0.0008	95	Private	Cultivable
Bicholim	Bicholim	0.7824	96	Private	Cultivable
Bicholim	Bicholim	3.0120	99	Private	Cultivable
Bicholim	Bicholim	0.5438	99	Govt	Cultivable
Bicholim	Bicholim	1.4080	99	Private & Govt	Cultivable
Bordem	Bicholim	0.1748	Road	Road	Road
Bordem	Bicholim	0.2974	19	Private	Cultivable
Bordem	Bicholim	0.0004	21	Private	Cultivable
Bordem	Bicholim	3.0445	23	Private	Cultivable
Bordem	Bicholim	3.7355	31	Private	Cultivable
Bordem	Bicholim	0.1219	32	Private	Cultivable
Bordem	Bicholim	3.6893	33	Private	Cultivable
Bordem	Bicholim	0.8195	34	Private	Cultivable
Bordem	Bicholim	0.1201	40	Private	Cultivable
Bordem	Bicholim	4.5125	41	Private	Cultivable
Bordem	Bicholim	8.5600	42	Private	Cultivable
Bordem	Bicholim	6.5744	43	Private	Cultivable
Bordem	Bicholim	0.1923	44	Private	Cultivable
Lamgao	Bicholim	0.6074	Road	Road	Road
Lamgao	Bicholim	1.1198	1	Private	Cultivable
Lamgao	Bicholim	0.0100	1	Govt	Cultivable
Lamgao	Bicholim	0.0139	1	Private & Govt	Cultivable
Lamgao	Bicholim	0.1882	9	Private	Cultivable
Lamgao	Bicholim	1.4280	10	Private	Cultivable
Lamgao	Bicholim	0.0008	11	Private	Cultivable
Lamgao	Bicholim	0.3244	13	Private	Cultivable
Lamgao	Bicholim	0.8722	14	Private	Cultivable

Annexure-13

List of Survey Numbers with land classification

Village	Taluka	Area (Ha)	Khasara number	Type of land	Nature of land
Lamgao	Bicholim	1.6150	15	Private	Cultivable
Lamgao	Bicholim	18.9600	16	Private	Cultivable
Lamgao	Bicholim	6.3556	17	Private	Cultivable
Lamgao	Bicholim	35.5802	18	Private	Cultivable
Lamgao	Bicholim	6.2320	19	Private	Cultivable
Lamgao	Bicholim	11.4400	20	Private	Cultivable
Lamgao	Bicholim	29.8800	21	Private	Cultivable
Lamgao	Bicholim	30.5161	22	Private	Cultivable
Lamgao	Bicholim	3.1425	23	Private	Cultivable
Lamgao	Bicholim	0.5425	24	Private	Cultivable
Lamgao	Bicholim	0.3375	25	Govt	UnCultivable
Lamgao	Bicholim	1.1100	26	Private	Cultivable
Lamgao	Bicholim	2.2980	27	Private	Cultivable
Lamgao	Bicholim	0.1045	28	Private	Cultivable
Lamgao	Bicholim	2.5263	29	Private	Cultivable
Lamgao	Bicholim	0.0608	30	Private	Cultivable
Lamgao	Bicholim	0.1312	46	Private	Cultivable
Mayem	Bicholim	3.0144	Road	Road	Road
Mayem	Bicholim	3.9309	114	Govt	Cultivable
Mayem	Bicholim	0.1536	142	Private	Cultivable
Mayem	Bicholim	0.3543	143	Private	Cultivable
Mayem	Bicholim	5.2502	144	Govt	Cultivable
Mayem	Bicholim	0.3400	145	Govt	Cultivable
Mayem	Bicholim	7.4794	146	Private	Cultivable
Mayem	Bicholim	0.4363	162	Govt	Cultivable
Mayem	Bicholim	10.0093	163	Govt	Cultivable
Mayem	Bicholim	0.3275	164	Govt	Cultivable
Mayem	Bicholim	4.8500	165	Govt	Cultivable
Mayem	Bicholim	10.4853	166	Govt	Cultivable
Mayem	Bicholim	1.9089	167	Govt	Cultivable
Mayem	Bicholim	2.5505	84	Govt	Cultivable
Mayem	Bicholim	3.7996	85	Govt	Cultivable
Mayem	Bicholim	3.1179	86	Govt	Cultivable
Mulgao	Bicholim	0.3397	River	River	River
Mulgao	Bicholim	1.5041	Road	Road	Road
Mulgao	Bicholim	0.1199	Water Body	Water Body	Water Body
Mulgao	Bicholim	0.4475	33	Private	Cultivable
Mulgao	Bicholim	1.9800	34	Private	Cultivable
Mulgao	Bicholim	0.4930	35	Private	Cultivable
Mulgao	Bicholim	2.4730	48	Private	Cultivable
Mulgao	Bicholim	0.2965	48	Govt	UnCultivable
Mulgao	Bicholim	0.6903	61	Private	Cultivable
Mulgao	Bicholim	0.0500	61	Govt	UnCultivable

Annexure-13

List of Survey Numbers with land classification

Village	Taluka	Area (Ha)	Khasara number	Type of land	Nature of land
Mulgao	Bicholim	0.6000	62	Private	Cultivable
Mulgao	Bicholim	0.8774	63	Private	Cultivable
Mulgao	Bicholim	1.9300	64	Private	Cultivable
Mulgao	Bicholim	0.0200	64	Govt	UnCultivable
Mulgao	Bicholim	0.5500	65	Private	Cultivable
Mulgao	Bicholim	0.9595	66	Private	Cultivable
Mulgao	Bicholim	3.3550	67	Private	Cultivable
Mulgao	Bicholim	0.7725	68	Private	Cultivable
Mulgao	Bicholim	1.6000	69	Private	UnCultivable
Mulgao	Bicholim	0.9000	70	Private	Cultivable
Mulgao	Bicholim	0.3100	71	Private	UnCultivable
Mulgao	Bicholim	0.6600	72	Private	Cultivable
Mulgao	Bicholim	0.6650	73	Private	UnCultivable
Mulgao	Bicholim	0.1300	74	Private	UnCultivable
Mulgao	Bicholim	0.1900	75	Private	UnCultivable
Mulgao	Bicholim	0.1700	76	Private	Cultivable
Mulgao	Bicholim	0.7650	77	Private	Cultivable
Mulgao	Bicholim	0.4225	78	Private	Cultivable
Mulgao	Bicholim	0.1623	79	Private	Cultivable
Mulgao	Bicholim	0.0428	80	Private	Cultivable
Mulgao	Bicholim	0.1397	81	Private	Cultivable
Mulgao	Bicholim	0.1006	86	Private	Cultivable
Mulgao	Bicholim	0.2322	88	Private	Cultivable
Mulgao	Bicholim	0.9700	89	Private	Cultivable
Mulgao	Bicholim	0.4500	90	Private	Cultivable
Mulgao	Bicholim	0.1900	91	Private	Cultivable
Mulgao	Bicholim	0.4300	92	Private	Cultivable
Mulgao	Bicholim	0.5203	93	Private	Cultivable
Mulgao	Bicholim	0.2442	94	Private	Cultivable
Mulgao	Bicholim	0.9365	95	Private	Cultivable
Mulgao	Bicholim	0.0357	96	Private	Cultivable
Mulgao	Bicholim	0.0032	101	Private	Cultivable
Mulgao	Bicholim	1.1630	102	Private	Cultivable
Mulgao	Bicholim	0.6103	103	Private	Cultivable
Mulgao	Bicholim	1.1556	104	Private	Cultivable
Mulgao	Bicholim	0.0110	109	Private	Cultivable
Mulgao	Bicholim	0.5500	110	Private	Cultivable
Mulgao	Bicholim	0.8974	111	Private	Cultivable
Mulgao	Bicholim	0.7761	112	Private	Cultivable
Mulgao	Bicholim	100.4000	113	Private	UnCultivable
Mulgao	Bicholim	2.5100	114	Private	UnCultivable
Mulgao	Bicholim	11.2000	115	Private	Cultivable
Mulgao	Bicholim	5.1700	116	Private	Cultivable

Annexure-13

List of Survey Numbers with land classification

Village	Taluka	Area (Ha)	Khasara number	Type of land	Nature of land
Mulgao	Bicholim	2.6421	117	Private	Cultivable
Mulgao	Bicholim	0.0383	118	Private	Cultivable
Mulgao	Bicholim	0.0139	124	Private	Cultivable
Sirgao	Bicholim	0.3293	Road	Road	Road
Sirgao	Bicholim	0.0066	70	Private	UnCultivable
Sirgao	Bicholim	0.3204	75	Private	Cultivable
Sirgao	Bicholim	0.9467	76	Private	Cultivable
Sirgao	Bicholim	0.0227	77	Private	Cultivable
Sirgao	Bicholim	3.6478	78	Private	Cultivable
Sirgao	Bicholim	0.1581	79	Private	Cultivable
Sirgao	Bicholim	2.5202	80	Private	Cultivable
Sirgao	Bicholim	4.5433	81	Private	Cultivable
Sirgao	Bicholim	12.5380	82	Private	UnCultivable
Total Area		478.5206			

The land Classifcation as given in the geological report issued by Mines and Geology Dept. of Govt. of Goa

Forest		Non-forest	
Forest (Specify)	Area (Ha)	Category	Area (Ha)
-	-	(i) Waste Land (Pvt.)	150.8050
-	-	(ii) Grazing Land	-
-	-	(iii) Agriculture Land (Pvt.)	320.5718
-	-	(iv) Others Road (Public)	6.6840
		River	0.3398
-	-	Water Body	0.1200
-	-	**Total**	**478.5206**

APPENDIX

HYDROGEOLOGY AND IMPACT ASSESSMENT OF GROUND WATER IN RESPECT OF BLOCK -I BICHOLIM MINERAL BLOCK LOCATED IN BICHOLIM, BORDEM, LAMGAO, MULGAO, MAYEM & SIRIGAO VILLAGES OF BICHOLIM TALUKA, NORTH GOA DISTRICT, GOA OF VEDANTA LIMITED, (GOA)

Submitted to

Water resources department of Goa

Prepared By

M.C. REDDY
Consultant
Former Regional Director,
Central Ground Water Board
Ministry of Water Resources, Govt.of India
NABET & CGWA Accredited

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HYDROGEOLOGY IN AND AROUND BLOCK -I BICHOLIM IRON ORE MINE OF VEDANTA LIMITED, BICHOLIM, BORDEM, LAMGAO, MULGAO, MAYEM & SIRIGAO VILLAGES, BICHOLIM TALUKA, NORTH GOA DISTRICT, GOA

1. INTRODUCTION

The Bicholim mine is situated in North Goa district and extends between (Coordinates : Latitude :15^{0}34'20.518 N to 15^{0}36'54.018 N & Longitude :73^{0}54'4.754 E to 73^{0}57'09.51 E). The leases are on a hill range running in a NW-SE direction. The highest and lowest elevations are 169.14 m (amsl) in the South western corner and -37.24 m (amsl) in the North East respectively. The hill is gently sloping on the SE and SW parts located at **BICHOLIM, BORDEM, LAMGAO, MULGAO, MAYEM & SIRIGAO VILLAGES, BICHOLIM TALUKA, NORTH GOA DISTRICT, GOA.** Detailed hydrogeological assessment including field investigations were carried out to report on the movement of ground water in and around the Block-I Bicholim Mineral Block. The main lease comprises parts of villages at the foot of the hill to the north, and the buffer zone consists of 6 villages. The Mayem Lake (in Mayem village) is situated about 500m from the lease boundary towards the SW side. The mining method is mechanized **Open Cast.**

1.1 Location Details

The Mining Lease falls in Survey no, List Vide Annexure-1 of 6 Villages, Bicholim Taluka, North Goa District. As per DGPS plan of the Mining Lease duly certified by the Directorate of Mines and Geology, Government of Goa, the extent of Mining Lease is 478.5206 Ha and the entire Mining Lease falls under non forest area. The Mining lease is connected to the major district road SH-1 by an approach road having an area. Location map of the project core and buffer area is shown in **Plate-1**. Mining Lease Boundary superimposed on toposheet of 1:50,000 scale, is enclosed as Key Plan in **Plate-2,** Site Plan as **Plate-3** and Google Plan of the project area as **Plate-4.**

PREPARED BY: M. C. Reddy, Former Regional Director, Central Ground Water Board,
Accredited for NABET for Geology & Hydrogeology and CGWA. mcreddycgwb@yahoo.co.in

1.2 Mining Lease Boundary

DGPS Co-ordinates of the Mining Lease boundary pillars is shown below in **Table-1**.

Table-1. Mining Lease Boundary coordinates of the Project

S. No.	PILLAR ID	LATITUDE			LONGITUDE		
		D	M	S	D	M	S
1	BP1	15°	34'	29.237"	73°	57'	9.051"
2	BP2	15°	34'	20.518"	73°	56'	58.049"
3	BP3	15°	35'	2.564"	73°	56'	27.305"
4	BP4	15°	34'	55.008"	73°	56'	18.070"
5	BP5	15°	35'	28.029"	73°	55'	48.621"
6	BP6	15°	35'	31.312"	73°	55'	50.638"
7	BP7	15°	35'	33.692"	73°	55'	48.745"
8	BP8	15°	35'	34.581"	73°	55'	48.564"
9	BP9	15°	35'	36.045"	73°	55'	48.005"
10	BP10	15°	35'	38.606"	73°	55'	46.104"
11	BP11	15°	35'	41.836"	73°	55'	44.458"
12	BP12	15°	35'	44.097"	73°	55'	42.365"
13	BP13	15°	35'	42.180"	73°	55'	40.104"
14	BP14	15°	35'	44.493"	73°	55'	37.981"
15	BP15	15°	35'	46.421"	73°	55'	40.230"
16	BP16	15°	35'	48.165"	73°	55'	38.543"
17	BP17	15°	35'	50.029"	73°	55'	36.922"
18	BP18	15°	35'	52.695"	73°	55'	34.603"
19	BP19	15°	35'	53.998"	73°	55'	32.418"
20	BP20	15°	35'	58.110"	73°	55'	28.071"
21	BP21	15°	35'	57.193"	73°	55'	27.361"
22	BP22	15°	35'	57.996"	73°	55'	24.414"
23	BP23	15°	36'	2.083"	73°	55'	18.076"

S. No.	PILLAR ID	LATITUDE			LONGITUDE		
		D	M	S	D	M	S
24	BP24	15°	36'	2.770"	73°	55'	16.018"
25	BP25	15°	36'	3.697"	73°	55'	14.536"
26	BP26	15°	36'	6.268"	73°	55'	10.016"
27	BP27	15°	36'	7.134"	73°	55'	9.341"
28	BP28	15°	36'	7.279"	73°	55'	8.237"
29	BP29	15°	36'	10.371"	73°	55'	2.799"
30	BP30	15°	36'	11.513"	73°	55'	1.441"
31	BP31	15°	36'	12.228"	73°	54'	59.636"
32	BP32	15°	36'	15.130"	73°	54'	54.917"
33	BP33	15°	36'	15.199"	73°	54'	54.305"
34	BP34	15°	36'	17.857"	73°	54'	49.835"
35	BP35	15°	36'	47.359"	73°	54'	4.754"
36	BP36	15°	36'	54.018"	73°	54'	38.669"
37	BP37	15°	36'	41.460"	73°	55'	6.583"
38	BP38	15°	36'	21.653"	73°	55'	46.776"
39	BP39	15°	35'	54.379"	73°	56'	9.956"
40	BP40	15°	35'	47.351"	73°	56'	15.530"
41	BP41	15°	35'	43.500"	73°	56'	11.400"
42	BP42	15°	35'	37.025"	73°	56'	16.952"
43	BP43	15°	35'	32.102"	73°	56'	11.580"
44	BP44	15°	35'	8.063"	73°	56'	33.322"
45	BP45	15°	35'	11.339"	73°	56'	37.395"

1.3 Details of the Project

Bicholim Mineral Block, having an area of 478.5206 Ha. is situated located in Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao Villages of Bicholim Taluka of North Goa District, Goa Coordinates : Latitude :15^{0}34'20.518 N to 15^{0}36'54.018 N & Longitude : 73^{0}54'4.754 E to 73^{0}57'09.51 E, is granted to Vedanta Limited for a period of 50 years for Iron Ore.

1.4 Lessee / Project Proponent Details

Name: Vedanta Limited (Mine Owner)

Status: Limited

Represented by Dhirajkumar Jagdish.

Address: Sesa Ghor, 20 EDC Complex, Patto, Panajim, Goa

Mobile: 9823993664

Email: dhirajkumar.jagdish@vedanta.co.in

1.5 Type of the Project

Mining Lease was granted for mining of Iron Ore. The total Mineral Reserves and Resources of Iron Ore in the Mining Lease is about 84.61 Million Metric Tonnes as on 01/04/2023. Presently, the total area put to use for mining and allied activities is 327.3611 Ha. The proposed production and dispatch capacity of this mine is 3.0 Million Tonnes Per Annum (MTPA) of Iron Ore.

1.6 Mining Method

Opencast Mining Method will be practiced using Heavy Earth Moving Machinery such as Ripper & dozers, excavators, wheel Loaders, dumpers, etc. Hard material will be broken using Ripper Dozer. Excavators with bucket capacity of 4.10 cum will be deployed in the mines for digging / excavation. Tippers /dumpers will be engaged for transporting the excavated material within the mine. Wheel-loaders with bucket capacity of 2.70 to 3.60 cum. will be used for loading /dozing and other miscellaneous works. Hydraulic rock breakers will be used for secondary breaking of hard material. Water tankers with capacities of 8000-10,000 liters will be used for dust suppression on the haul roads within the mining lease. Mine will be worked under the supervision of technically qualified professionals like Mines Manager, Asst. Mines Managers, Mining Engineers, Geologists, Mechanical Engineers, Environmental Engineer, Surveyor, Plant Engineer, Civil engineer, CSR Officer etc., having relevant qualification and vast experience in their respective fields.

In general, mining and mine development related activities are being carried out since early 1950s in the State of Goa. Natural resources in the area need to continuously monitored for the dynamic changes in the water and land environment caused by mining activities in Goa.

1.7 Layout of Mine Workings

Iron Ore deposit within the Mining Lease is found at a maximum depth of 100m (hence the maximum depth of the pit will be maintained at 100 m) The height of the mine benches will be 7 m and the width of the bench will be more than the height of the bench. The haul road gradient will be maintained at 1:16. Overall pit slope will be maintained at <26 degrees. The width of the haulage road will be maintained as required under statutes. Safety bunds will be maintained along the main haulage roads.

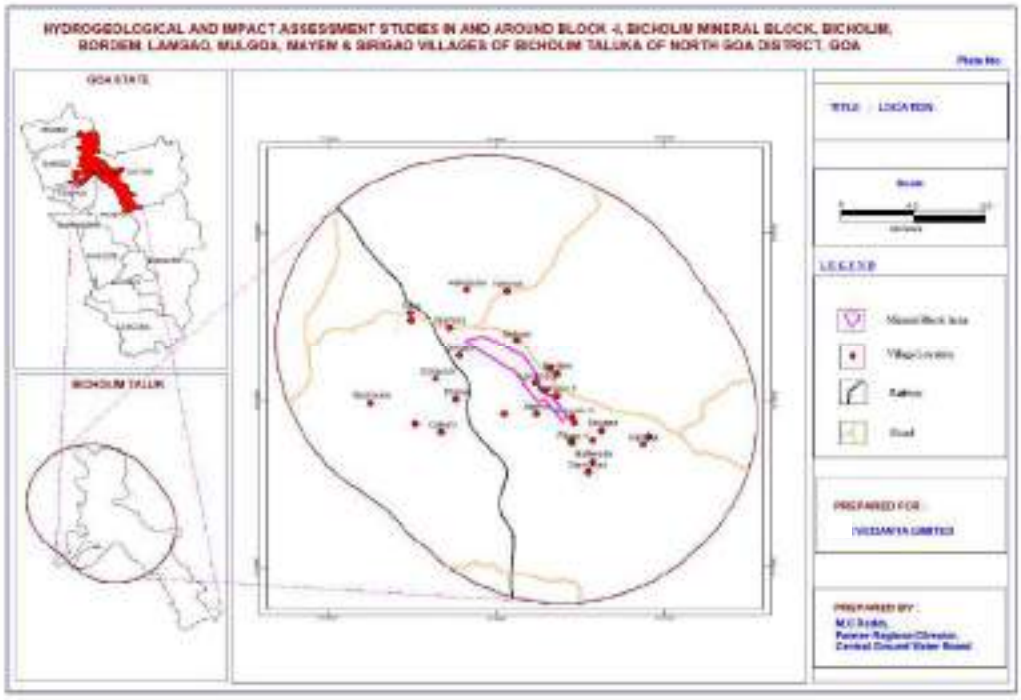


Plate-1 Location of Bicholim Mineral Block-I, Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao, Bicholim Taluk, North Goa, Goa

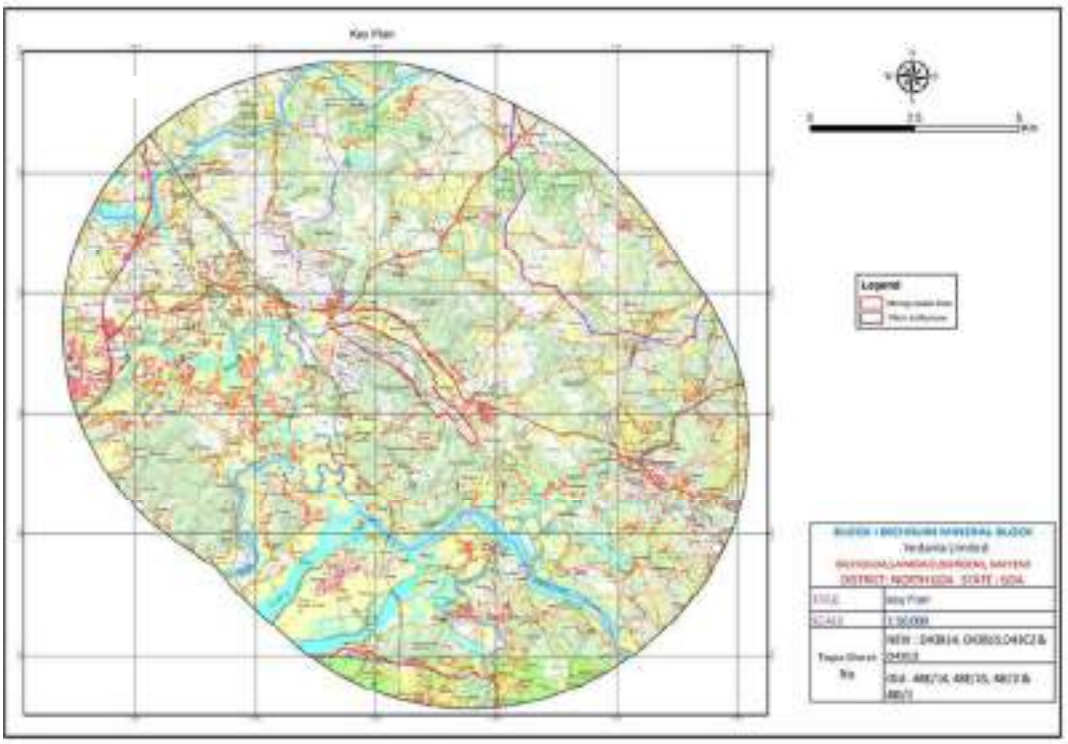


Plate-2 Topo map of the Bicholim Mineral Block-I

Plate-3A Site Plan of the Bicholim Mineral Block-I

Plate-3B Site Plan of the Bicholim Mineral Block-I

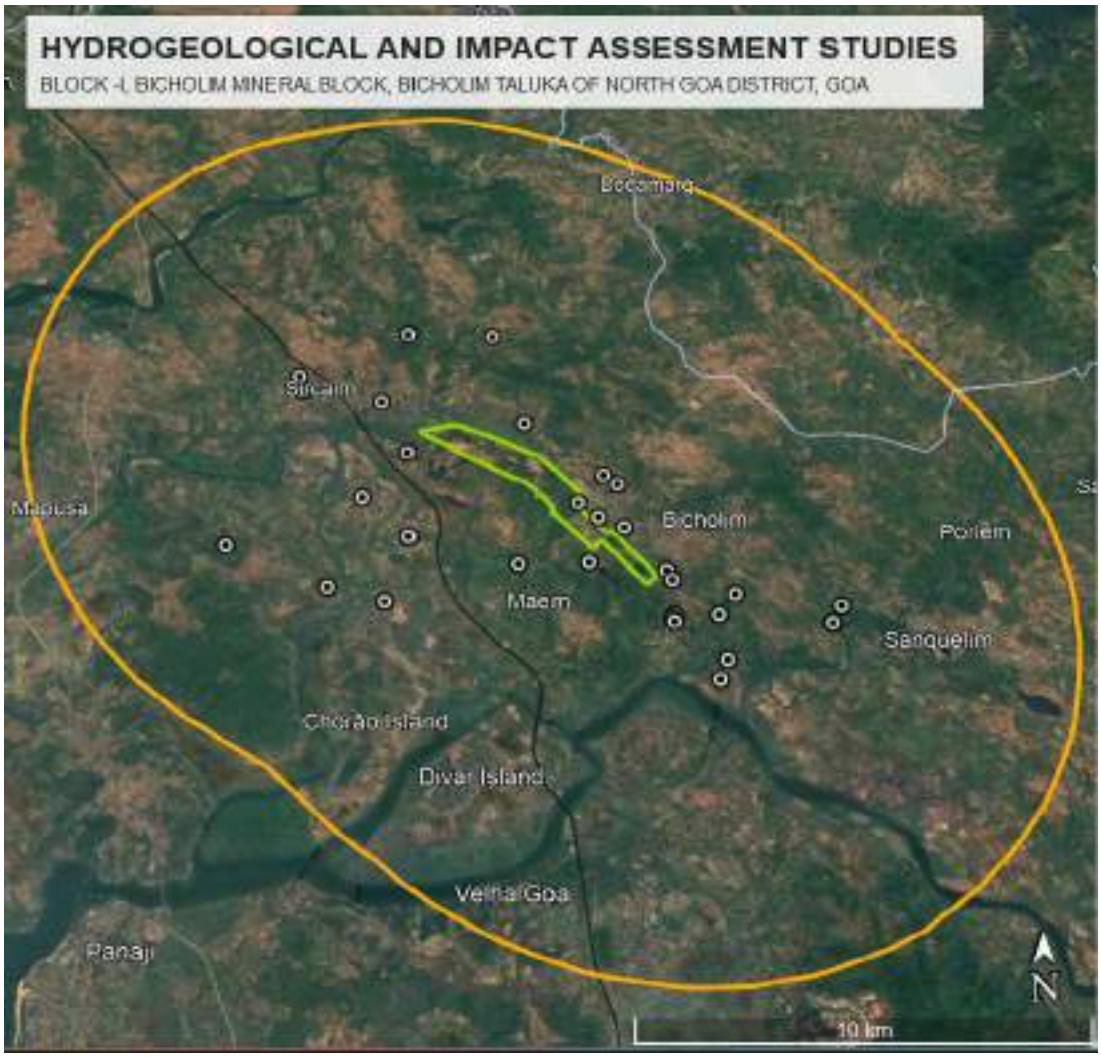


Plate-4 Google Plan of the project area

2 OBJECTIVE OF THE STUDY

The objective of the study is to fulfill the requirements of conditions stipulated in Standard Terms of Reference approved by the MoEFCC Authority vide their TOR identification No. .TO23A0000GA5700309N. Subsequent to site visit and after several discussions with the management, review of pertinent reports and maps of the mine area, various ground water and surface water sources, the following objectives were summed up for detailed study to fulfill the stipulated requirements.

i. Based on actual monitored data, it should be established whether working will intersect ground water. Necessary data and documentation in this regard may be provided.
ii. In case the working will intersect ground water table, a detailed hydrogeological study should be undertaken and report furnished. The report inter-alia shall include aquifers presence and impact of mining activities on these aquifers.
iii. Information on site elevation, working depth and ground water table should be provided both in AMSL and bgl (below ground level). A schematic diagram may also be provided for the same.
iv. The water requirements of the project, its availability and source should be provided. A detailed water balance should also be provided. Fresh water requirements of the project should be prepared.
v. Carry out monitoring of ground water levels and quality in and around the buffer and core zone of the mine to study the impact of project on the ground water regime – Depth to water level, Water table elevation with reference to the Above Mean Sea Level (A MSL) and Ground Level (GL), water quality study for various constituencies including Fluoride, Iron, Nitrate etc.,
vi. Conduct an aquifer performance test to understand the occurrence and movement of ground water.
vii. Study of the long-term National Hydrograph Stations water level data for the trend analysis (rise and fall of water levels)
viii. Monitor the ground water conditions in the mining area to ensure the accumulated rainwater in the pit and seepage ground water into the storage pit is effectively put to use.

ix. Implement suitable conservation measures to augment Ground Water resources in the area

x. Establishing a network of existing wells and constructing dedicated bore hole for new piezometers during the mining operations for monitoring water levels and quality. The monitoring should be carried out 4 times in a year vis-a-vis Pre-monsoon (April-May), Monsoon (August), Post-monsoon (November) and Winter (January) and the data thus collected may be analyzed and suitable drawings and maps are to be prepared.

2.1 Scope of the study

The studies are concentrated within the study area comprising of the mining lease (Core area) and an area of 10 km radius from the mine lease boundary (Buffer area) on the following aspects:

i. Collection, preparation and presentation of the historical data on ground water available from different agencies.

ii. Monitoring of ground water levels and quality from selected wells in Core and Buffer area.

iii. Conducting aquifer test to evaluate the aquifer conditions in the area.

iv. Preparation of ground water level and quality regime maps for the area – depth to water level (with reference to GL), water table elevation (with reference to AMSL), water quality with reference to Bureau of Indian Standards (BIS)

a) Study on change of ground water level and quality over space

b) Impact assessment of mining activities on ground water quantity and quality.

v. Plan for Augmentation of Recharge to Ground Water through various conservation measures. Implementing Rainwater Harvesting through Rainfall Run-off management and Roof Top Rainwater Harvesting.

vi. Preparation of water budget for the project

2.2 Methodology

Historical real time data and pertinent reports on groundwater available with Central and state agencies connected with Ground Water development and management were collected and discussions held with the representatives of the Lessee, forms the base for the study. To prepare a mitigation plan it becomes essential to evaluate the exact hydro-geological conditions and aquifer parameters. To achieve the aims, geology of the area

and surface conditions has to be interpreted based on the exploratory data and geological studies made by different agencies.

Intensive well inventory represented by phreatic aquifers of the area have to be undertaken to measure the status of the water level and impact of ground water development in the study area. The water samples are to be collected and analyzed to establish the water quality regime. The seasonal fluctuation of water level in response to groundwater recharge due to rainfall have to be estimated based on local information, field observations and secondary data.

To evaluate the aquifer characteristics, aquifer performance test on the existing dug well in the project study area is to be conducted at constant pumping rate. The data will be analyzed using standard analytical technique suited to field conditions of testing site.

The groundwater resources of the study area estimated based on the norms of the Ground Water Estimation Committee, Govt. of Goa and Govt. of India, will be the guiding factor for development of resources. The ground water flow regime estimated using network and Piezometer data, will be an indicator for the impact of ground water development in the area, vis-à-vis to decipher "SAFE", "SEMI CRITICAL", "CRITICAL", "OVER-EXPLOITED" and "WATER LOGGED" based on stage of development and long-term water level trend. The detailed explanation of the above categorization and remedial measures are as below:

Status (state wise) of ground water development of the area as defined by the Central Ground Water Authority.

a. **Safe (Stage of development < 70 %)**
    a. Areas where stage of ground water development is less than 70 % and there is no significant long-term decline of pre-monsoon or post-monsoon water level trend. Such areas have potential for ground water development.
    b. To be brought under the purview if quantity of abstraction exceeds 10000 m^3/ day in hard rock areas and 2000 m^3/ day in alluvial areas. RWH (Rain Water Harvesting) to be adopted.
b. **Semi Critical (Stage of development 70 - 90 %)**

Areas where stage of ground water development is 70 – 90 % and water table during either pre or post-monsoon shows a significant long term declining water level trend. Caution may be exercised in future ground water development in such areas and if necessary, the density of network monitoring in such areas are to be increased to have better data based on the long-term behavior of water table.

i. Efficient utilization of recycle and reuse of water should be mandatory; Water audit to be adopted.
ii. Withdrawal may be permitted subject to undertaking of recharge measures at least 50 % recharge compared to withdrawal quantity may be made mandatory.

c. Critical (Stage of development 90 - 100 %)

i. Areas where stage of ground water development is more than 90 % and long-term water level trend during pre-monsoon or post-monsoon shows a falling trend.
ii. Areas where stage of ground water development is less than or equal to 100% and water table trend during pre-monsoon or post-monsoon shows a significant long term falling trend. There is very marginal scope for future ground water development in critical areas.

Following measures are to be adopted in these areas:

- Density of observation wells for monitoring may be increased
- Water conservation measures may be adopted
- Micro level ground water studies may be carried out to reassess ground water resources more precisely.

iii. Efficient utilization of recycle and reuse of water should be mandatory Water audit to be adopted.

Withdrawal may be permitted subject to quantum of recharge should be equal or more than the proposed withdrawal.

d. Over-Exploited (Stage of development 100 – 200 % & 200 – 300 %)

i. Areas where stage of ground water development is more than 100 % and long term water table trend during pre-monsoon or post-monsoon show a significant declining trend and categorized as over exploited areas. There is no scope for future ground water development in over exploited areas indicates alarming

situations. All three measures as suggested in case of critical areas may be adopted in over exploited areas also.

ii. Efficient utilization of recycle and reuse of water should be mandatory. Water audit to be adopted, withdrawal may be permitted up to 60% of proposed recharge.

e. Water Logged areas

Where water levels are shallow i.e. 2 m. from ground level in post – monsoon period and 3 m. from ground level in pre – monsoon period resulting in salinization and fertile land is lost. In such cases extraction of ground water is encouraged by recommending change of cropping pattern so that water level will be lowered and prevent salinization of fertile land. This phenomenon is commonly seen near canal command areas.

Surface run-off management in respect of the monsoon period forms the source water for augmentation of recharge to ground water body and various conservation structures are to be designed for the project area taking into consideration the rainfall and site conditions.

3 GEOMORPHOLOGY, LAND USE LAND COVER, PHYSIOGRAPHY & DRAINAGE

3.1 Geomorphology of Study Area (10 Km),

Geomorphologically, the state is divided into four morphological units namely;

1. The coastal plains with dominant marine land forms on the west,
2. Vast etch plain,
3. Low dissected denudational hills with valleys
4. Deeply dissected high Western Ghats with denudational hills rising to a maximum of 832m amsl and occurring all along the eastern part of the state. Geomorphology of the area is shown in **Plate-5.**

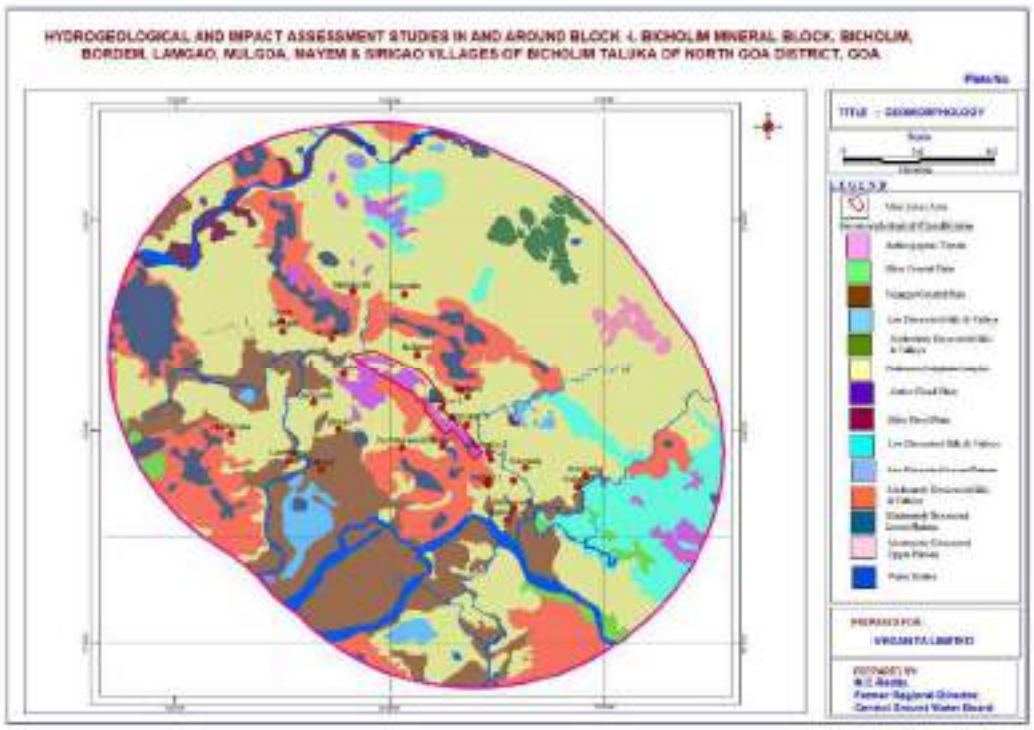


Plate-5 Geomorphology of the Block-I Bicholim Mineral Block B Study area

3.2 Land Use Land Cover (LULC)

Land Use Land Cover of the core and buffer area is presented in Plate-6. Study area is essentially falling in the open mixed jungle constituting 50 % of the study area. The project area falls under low dissected hills and valleys. Water body is occurring in the study area as minor nalla course. Major water bodies are concentrated in the South and

South western part of the study area. The remaining 50% of the land constitutes plantation, built-up area, etc. The LULC map is presented as **Plate-6.**

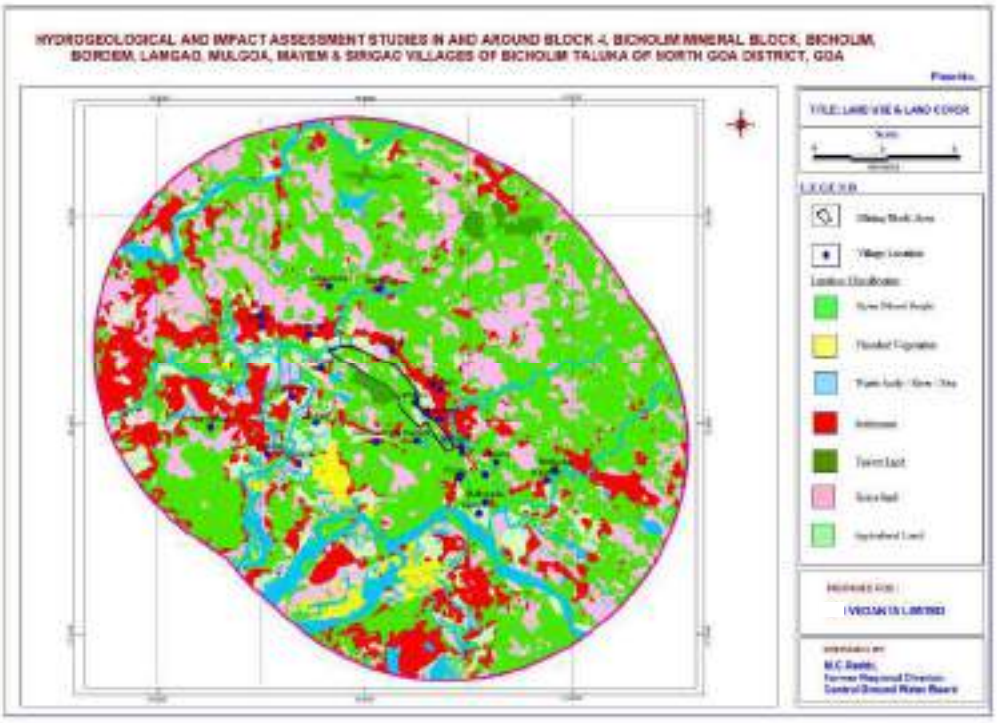


Plate-6. LULC of the Bicholim Mineral Block-I

Sl. No	Current Land Use	Area in Ha
1	Settlements	32.4047
2	Degraded by Pits & Excavation	306.8497
3	Degraded by Dumps & Material Staking	41.6116
4	Covered under Mine Infrastructure (plants, shades,	6.4707
5	Land under Public Infrastructure / Utilities	1.021
6	Barren / Waste land with small bushes & shrubs	90.1629
Total		478.5206

Sl. No	CONCEPTUAL MINING Land Use	Area in Ha
1	Settlements	32.4047
2	Degraded by Pits & Excavation	355.5659
3	Covered under Mine Infrastructure (plants, shades,	6.4707
4	Barren / Waste land with small bushes & shrubs	76.3437
5	Degraded by Dumps & Material Staking	6.7146
6	Land under Public Infrastructure / Utilities	1.021
Total		478.5206

Land use details for buffer area :

Sl. No	Current Land Use	Area in Ha
1	Water Bodies	3092.1
2	Open mixed forest	22008.0
3	Flooded Vegetation	1328.0
4	Agricultural Land	2917.5
5	Settlements	7210.2
6	Scrub Land	9811.9
7	Forest Area	429.5
Total		46797

3.3 Physiography

The topography is undulating low hill terrain extending all along the mining lease in the North west and South East direction. Physiographically, the Mining Lease is located on a hilly undulating terrain Mine does not have any forest land within the lease.

Physiographically Goa, though famous for its beaches, is essentially a rugged hilly and mountainous tract with narrow valleys and sandy linear plains along the coast. The Western Ghats run in a general north-south direction from Salginim to Surla ghat along the eastern margin of the territory. This segment of Sahyadri ranges are clad with evergreen forests with altitude ranging from 600 m to over 800 m. The highest peak Sosogad is 1022m m height. In the western margin of the territory, there are long and narrow strips of sandy plains and low flat topped laterite hills ranging in altitude from

50 m to 100 m. having a hillock in the center of the mining lease and sloping in all directions. There are no surface water bodies within the Mining Lease area. The average annual rainfall in the region is about 3881 mm per year since 2008 till date. Due to the hilly topography, all the rain water flow along the first order drains observed flowing from the hill top downwards along the natural course forming a dendritic drainage pattern. The highest elevation within the mining lease area is more than 169.14m above MSL and lowest is about -37.24 m above MSL.

3.4Drainage

As the area is located on the foot hills of Western Ghats belt and receives heavy rainfall during monsoon season and the average annual rainfall is about 3500 to 4000mm. Dendritic to sub dendritic type of drainage is observed in study area Water is accumulated in these mine pits during monsoon rainfall and seepage from the ore body. The accumulated water is being used for dust suppression purposes. Some of the finest sea beaches of the country are located in Goa. The terrain is undulating with alternate chain of hills and long, narrow valleys. The maximum altitude of the hills is 250 m Amsl. The Vageri hill near Valpoi, is located much to the west of the Western Ghats and is connected by a narrow link with the Surla ghat. The state receives an annual average rainfall of about 3500 to 4000 mm, from southwest monsoon and is drained by several west flowing rivers. The eastern border of the state generally marks the water divide between easterly and westerly flowing rivers. Drainage of the study area is shown in Plate-7.

3.5Soil Characteristics

Soils of the district can be classified into 4 types namely (i) Laterite soil (ii) Saline soil and (iii) Marshy soil and (iv) Alluvial soil.

The soil types observed within the buffer area are as follows:

(i) Lateritic soil is the major soil type in the district. It is highly porous & permeable, slightly acidic with low pH values, low in organic matter, Calcium and Phosphorus.

(ii) Saline soil in the district occurs in the flood plains of Bardze taluka.

The dominant soil type observed in the mining lease is of lateritic type.

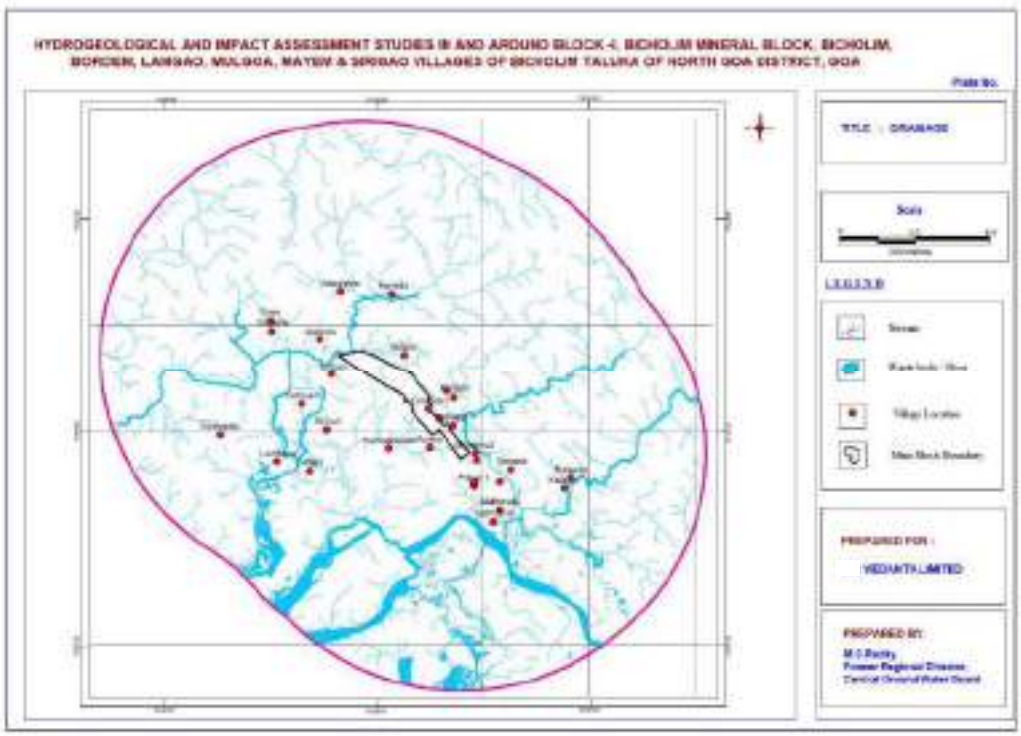


Plate-7. Drainage of the Bicholim Mineral Block-I

PREPARED BY: M. C. Reddy, Former Regional Director, Central Ground Water Board,
Accredited for NABET for Geology & Hydrogeology and CGWA. mcreddycgwb@yahoo.co.in

4 HYDROMETEOROLOGY

4.1 Climate

The study area experiences hot summer and mild winter climate with well-defined three seasons, namely winters followed by summer and rainy season. The weather parameters recorded in the observatory at the Panjim are considered as representative of the meteorological conditions for the study area. The various mean climatological parameters for the period 1968-2010 are presented in Table-2.

4.2. Temperature

Mean maximum temperature is around 33 °C during April -May. It falls to around 29°C during monsoon period i.e. during July and August. The mean minimum temperature is around 26°C during April – May, which decreases to around 15°C during January - February period. Graph showing monthly minimum maximum temperature is given in Fig.1.

Table-2. Climate & Temperature

Month	Mean Temperature °C		Mean Total Rainfall (mm)	Mean Number of Rainy Days	Mean Number of days with			
	Daily Minimum	Daily Maximum			HAIL	THUNDER	FOG	SQUALL
Jan	19.6	31.6	0.2	0	0	0	0.4	0
Feb	20.5	31.5	0.1	0	0	0	0.6	0
Mar	23.2	32	1.2	0.1	0	0.4	0.5	0
Apr	25.6	33	11.8	0.8	0	1.8	0	0
May	26.3	33	112.7	4.2	0	3.3	0	0

Jun	24.7	30.3	868.2	21.9	0	4.8	0	0.1
Jul	24.1	28.9	994.8	27.2	0.1	0.9	0.1	0.2
Aug	24	28.8	518.7	23.3	0	0.4	0.1	0
Sep	23.8	29.5	251.9	13.5	0	2.5	2.2	0.1
Oct	23.8	31.6	124.8	6.2	0	4.7	3.9	0
Nov	22.3	32.8	30.9	2.5	0	2.6	0.8	0
Dec	20.6	32.4	16.7	0.4	0	0.1	0.2	0
Annual	23.2	31.3	2932	100.1	0.1	21.5	8.8	0.4

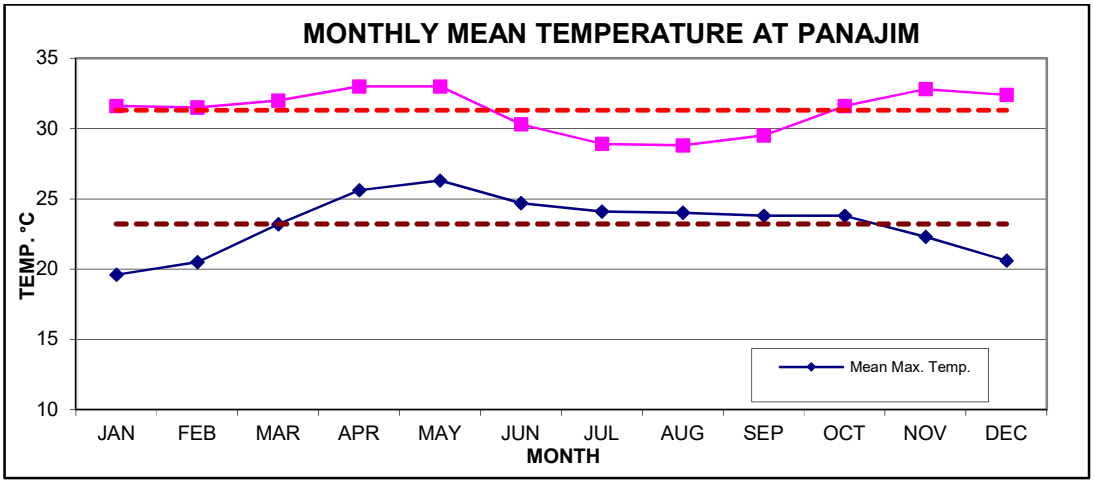
4.3 Rainfall

Rainfall is the primary source of ground water recharge. Other sources are seepage from surface water bodies. An attempt has been made to study rainfall, its distribution, and periodicity etc., based on statistical approach.

4.4 Rainfall normal

Normal are essentially averages pertaining to a period of sufficiently long duration. There are two rain gauge stations in and around the study area. These two rain gauge stations having consistence rainfall data for longer period. The monthly and annual normal rainfall and seasonal percentages stations are given in table-2.

Fig.1



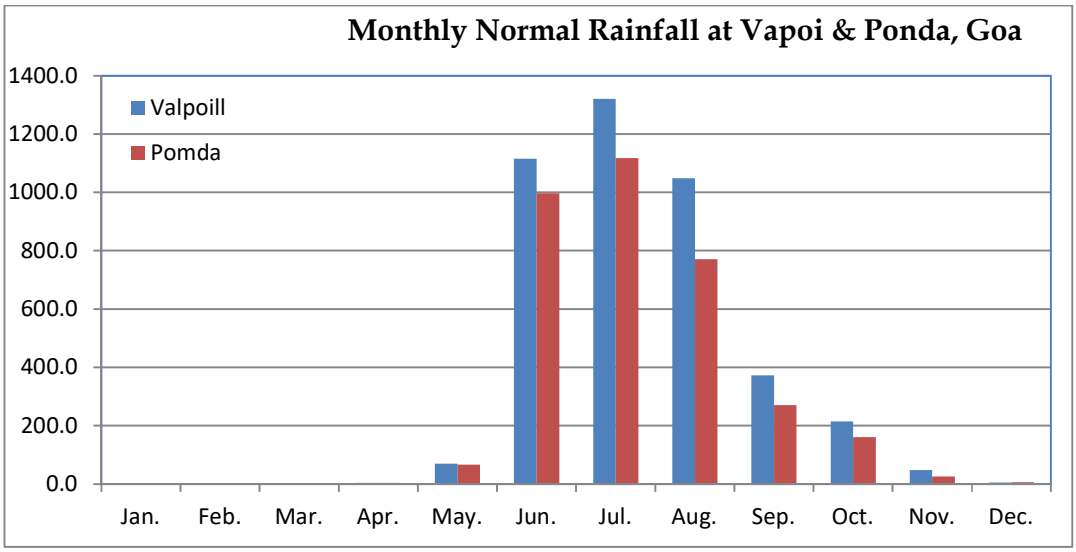
4..5 Rainfall analysis

The monthly normal rainfall in Ponda station ranges from almost nil rainfall during February and March to 1117mm during August. The station annual average works out to 3948mm, the monthly normal rainfall in Valpoi station ranges from nil rainfall during February to 1320mm during August. The station annual average works out to 3948 mm (Table.3) and the graph is shown in Fig.2

Table-3. Normal of Monthly and annual Rainfall

Normal of monthly and annual Rainfall, Goa state for the period 1971-2000 based on data obtained from IMD, Poona													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Augt	Sep	Oct	Nov	Dec	Annual
Ponda	0.6	0.0	0.0	4.0	66.8	997.1	1117.9	771.6	269.7	161.2	25.9	6.4	3237.4
Valpoi	0.3	0.0	1.3	3.9	70.4	1115.7	1320.3	1048.7	372.1	214.6	46.9	5.5	3948.3

Fig.2



5 GROUND WATER CONDITIONS & QUALITY

5.1 Brief Geology of the Area

The rock formations in the area are classified as Precambrian Dharwar Super Group (Dharwar Schist Belts) of rocks. In Goa these are locally called as Goa Group of formations and subdivided in to 4 formations viz., Barcem, Sanvordem, Bicholim and Vageri formations (Table 1). Most of the Iron and Manganese ore bearing deposits in Goa fall under Bicholim formations. Ore deposit occurring in the local mine area is located in Bicholim-Sirigao local sub deposit. Formations have general characteristic strike of Dharwar formations NNW – SSE about 40^0 and varying dip of beddings 45^0 to 75^0 . Ore Mineral concentration is confined to largely to the limbs of the folds due to deep weathering of Banded ferruginous quartzite and super-gene enrichment processes. Entire area was originally covered with 15 to 20 m thick Laterite capping (Mascarenhas and Kalampara, 2009). The rocks of the Bicholim Mineral Block area have been classified under the Goa Group of the Dharwar Super Group.

5.2 Geology of the Study area

The Stratigraphic sequence of the North Goa is as given in **Table- 4.** Geology of the area is shown in **Plate-8.** The potential iron ore bodies are available within the Bicholim Formation of the Goa Group. Mineral concentration is confined largely to the limbs, while the apical portions are generally non-mineralized. The deposits of North and South Goa have been formed under different geological conditions and hence are of entirely different nature. The deposit in South Goa occurs as discrete synclinal basins with top laterite cover often enriched with iron ore in isolated pockets. The ore body Groundwater conditions in Bicholim Mineral Block, North Goa intercalated with phyllite, limonitic and manganiferous clay is mineralogically a mixture of hematite and limonite - goethite and minor quantities of martite. Decomposed quartzite forms the footwall. There are some intrusions in the form of altered dolerite dykes & sills. The top laterite is usually followed by lumpy ore zone followed by friable ore and powdery ore. The ore bearing intercalations consists of several horizons mainly manganiferous and phyllitic clay. The footwall is generally decomposed B.H.Q with silica. The existing mine pit shows exposures of the various horizons of ore. The iron ore deposits consist essentially haematite and partially of magnetite, limonite and goethite. They occur as lensoid bodies on the crests and slopes of hills. The deposits were formed as residual concentration and enrichment process called lateritization of the banded ferruginous quartzite and phyllite of the Goa Group of metasediments.

Table-4 Stratigraphic sequence of North Goa district, Goa

Eon/Era/Epoch	Supersuite/Suite/Group	Formation	Litho assemblage
Quaternary			Beach sands and River alluvium
Pliocene to Pleistocene			Laterite and aluminous laterite
Late Cretaceous to Palaeocene	Deccan Trap		Continental flood basalts-mainly tholeiitic type with dykes
Palaeo Proterozoic to Meso-Proterozoic	Closepet Granite	Chandranath Granite, Dudsagar Granite, Canacona Granite	Alkaline granites mainly; also variants from monzo granite to granodiorite
	Mafic –ultramafic Layerd Complex		Peridotite-cromitite, dunite-Gabro-Norite, Pyroxinite
Archaean to Palaeo Proterozoic	Goa Group = Chitradurga Group of Dharwar Super Group	Vageri	Carbonite-quartz-chlorite Schist/greywacke
		Bicholim	Dolomite limestone
			Quartz-sericite -schist
			Banded Iron Formation
			Quartz-chlorite-biotite-schist inter-layered with chert, iron and Mn Oxides, carbonates, metabasalt and meta-gabbro
		Sanvordem	Quartzite/greywcke with conglomerate
		Barcem	Quartz-chlorite-schist
			Meta-acid volcanic (meta-rhyodacite), quartz Porphyry, tuff
			Meta basalt meta-gabbro and meta-anorthositic Gabbro, quartzite
Archaean	Peninsular Gneiss-II	Arkola Gneiss,Anmod Ghat Gneiss	Migmatite and granites(s.1) tonolite-trondjhmite-granodiorite

This is the best deposit in the entire territory of Goa and is situated between Bicholim in the southeast and Sirigao in the northwest. The deposit consists of two ore bodies, southwestern one is larger and the northeastern one smaller. The southwestern ore body is in the shape of "S" and it occurs on the overturned southwestern limb of the anticlinal fold and also on the refolded nose portion of the fold. The northeastern ore body occurs on the other limb of the fold. Both the ore bodies are present along the dip slope. The southwestern ore body extends from Bicholim-Piligao road via Sirigao hill up to Sirigao

nala for a length of about 6.25 km and the width varies from 20 – 50 m and true thickness may vary from 20-40 m. The greater true thickness of about 40-50 m and best concentration of iron ore are seen between Lamgao and Sirigao hill. The thickness of ore gradually decreases to about 25 m in the south eastern part. The thickness again reduces to 20 - 35m on the northern and western slopes of the Sirigao hill. The thickness varies from 20 – 40 m and the grade of the ore is comparatively low in the conical portion between Sirigao and Poira Village. The northern ore body is about 1.75 km long and the width varies from 20 m - 35 m. The thickness of the ore body in Bicholim Mineral Block, North Goa revealed by data from the adit varies from 35 – 60 m and the average thickness is about 40 m (GSI, 2006).

Lateralization has played an important role in the concentration of Iron in the lease area, giving rise to rich accumulation of Iron Ore. The laterite is basically brownish pink to pinkish in colour, hard to medium in nature with concentration of Alumina. At places it is concentrated with Iron Ore. Laterite analyses about 30-35% Fe with 15-20% Al_2O_3 and 20-25% SiO_2.

The Phyllites are pale pinkish and soft in nature with fine to medium grain size. The phyllites are having about 25-30% Fe with 18-22% Al_2O_3 and 15-20% SiO_2. The Iron ore of this area is grayish blue in colour and is fine to medium grained size. The main mineral is haematite followed by limonite and goethite. The iron ore generally analyses about 55-58% Fe with 3.5-8% Al_2O_3 and 1.5-3.5% SiO_2. The Bicholim mine lease and continuous occurrence of Phyllitic clay formation was observed within the mine lease. Extension of the phyllitic clay layers is a significant feature in the Bicholim Mineral Block. At most places encapsulating nature of phyllitic clay surrounding the iron ore formations could be seen from the exposed mine cut sections. The impervious nature of phyllitic clays with regard to groundwater movement resulting in very insignificant impact on groundwater regime due to the groundwater pumping from the open pits from the lease hold areas. Good groundwater potential zones have been identified at shallow depths in the villages adjacent to the mine lease. The ongoing groundwater pumping in the Bicholim Mineral Block has not shown significant change in water table configuration during past few years. Most of the monsoon rainfall emerges as surface runoff flowing in the garland canals leading to the mine pits and thereby replenishing the shallow water table aquifer. Hence, dewatering conditions could not be identified outside the mine lease area in the

adjoining villages of the Bicholim mine lease area. Groundwater conditions in Bicholim Mineral Block, North Goa. GPR investigations in the Bicholim mine lease established that there is no hydrological connection between the open mine pit water in the mine lease and the groundwater regime in the surrounding villages. The resistivity of the formations confirms presence of laterite underlain with all pervading phyllitic clay formations in the Bicholim Mineral Block area. The resistivity estimated from the VES investigations found that proposed deep iron ore mining in the Lamgao and Mulgao regions in future may not pose significant impact on the groundwater regime due to the presence of thick laterite layer underlain with large thickness of phyllitic clay layer encapsulating the iron ore formations in the area. The groundwater levels indicate shallow water table condition in the entire watershed and there is no regional groundwater flow pattern in the mine lease area within the micro-watershed. In situ infiltration rate was found minimum of 1.58 cm/hr on the old dump whereas it was about 6.79 cm/hr on an active dump. In general the infiltration rates are found quite low on the OB dumps due to compaction of overburden material enriched with clay formations. Surface water flows in the irrigation canal established saturated condition resulting in shallow water table conditions particularly in the Mulgao village.

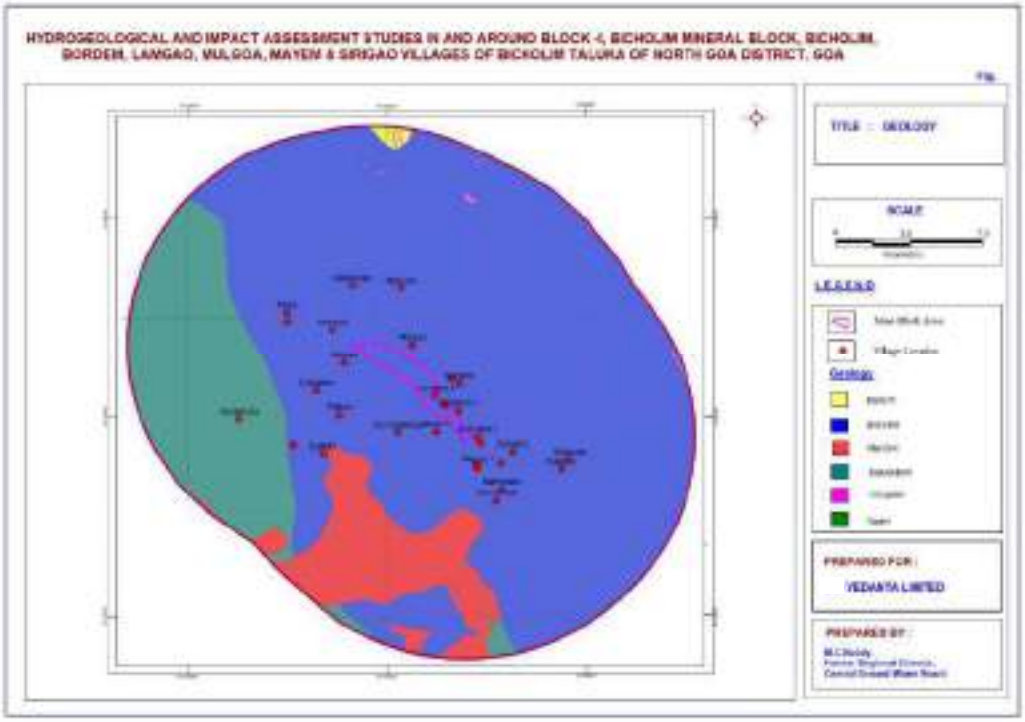


Plate-8. Geology of the area

5.3 Hydrogeology

Hydrogeological conditions based on the monitoring of water levels in core and buffer area is presented in **Plate-9** and the details of the ground water structures are given in Table-5. Water levels in the study area in general is represented by Phreatic aquifers. Deep aquifers represented by bore wells are not common in the area especially for irrigation. Very sparsely seen bore wells are located for domestic use. Depth to water level in the area varies from less than 2 m below ground level (bgl) to to about 15 m bgl. Most of the wells are in the range of 5-7 m bgl water levels.

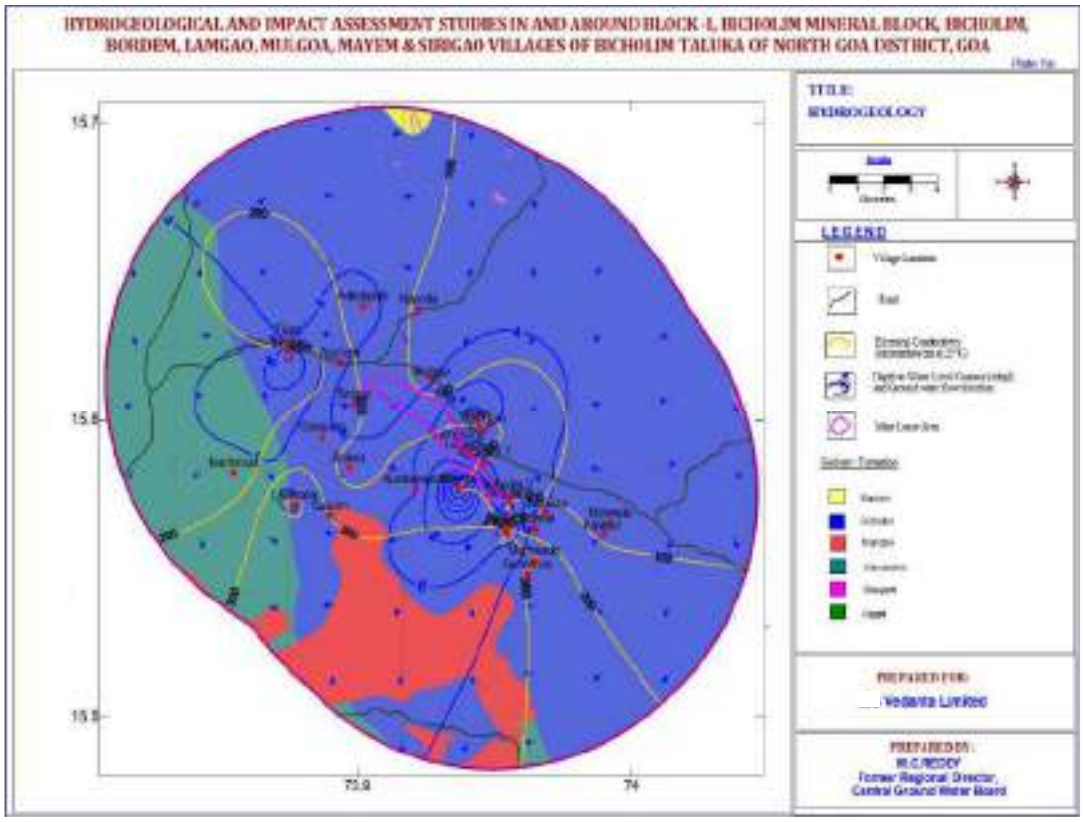


Plate-9. Hydrogeology of the area

PREPARED BY: M. C. Reddy, Former Regional Director, Central Ground Water Board,
Accredited for NABET for Geology & Hydrogeology and CGWA. mcreddycgwb@yahoo.co.in

5.4 Aquifer description

Hydrogeological surveys carried out in parts of Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao Villages of Bicholim Taluka of North Goa District, Goa show rise in water level in Phreatic aquifer over a period of more than 10 years. The fluctuations are less near the drainage system and topographic lows and higher in the topographic highs and hilly areas. Change in ground water scenario over a decade shows rise in water level in respect of two wells and decline in water levels in one well located in North Goa.

5.5 Aquifer Performance Test

Aquifer performance test was conducted on one open dug well located at **Lamgao** Village of Bicholim Taluk. The discharge of the bore well is 0. 5 m^3/hour sustaining pumping for more than 3 hours per day. The draw down recorded in the open well is 0.80 m. The Transmissivity estimated to be 5 m^2 / day. The details of the test are given in **Table 6** and the plots are given in Fig. 3 and Fig.4.

Table-5 Well Details of Lamgao Village Open Dug Well

Location : lamgao Village	
Taluk : Bicholim District : North Goa State : Goa	Owner: Panchayat Dug well
Dia. : 0.0508 m	Dia of Bore Well: 153 mm
Pump : 1 HP Centrifugal Pump	
Discharge : 5.5m^3 / hour	SWL: 3.66 m. bgl.
Measuring Point : 0.65 m	

Table 6

Time in hrs	Time in minutes since pump started	Time in minutes since pump stopped	Pumping water level m. bgl	Draw Down m. / Residual Draw Down	Remarks
12:03	0	-	3.66	-	Pump started
12:05	2	-	4.14	0.48	
12:07	4	-	4.18	0.52	

12:09	6	-	4.21	0.61	
12:11	8	-	4.23	0.63	
12:13	10	-	4.26	0.66	
12:15	12	-	4.28	0.68	
12:20	17	-	4.31	0.71	
12:25	22	-	4.33	0.73	
12:30	27	-	4.35	0.75	
12:35	32	-	4.36	0.76	
12:40	37	-	4.38	0.78	
12:50	47	-	4.46	0.80	Pump Stopped
12:52	-	2	3.75	0.09	
12:54	-	4	3.73	0.07	
12:56	-	6	3.71	0.05	
12:58	-	8	3.70	0.04	
13:00	-	10	3.70	0.04	
13:02	-	12	3.69	0.03	
13:07	-	17	3.68	0.02	
13:22	-	22	3.675	0.015	
13:27	-	27	3.67	0.01	
13:37	-	37	3.665	0.005	
13:47	-	47	3.665	0.005	
13:57	-	57	3.66	0.00	

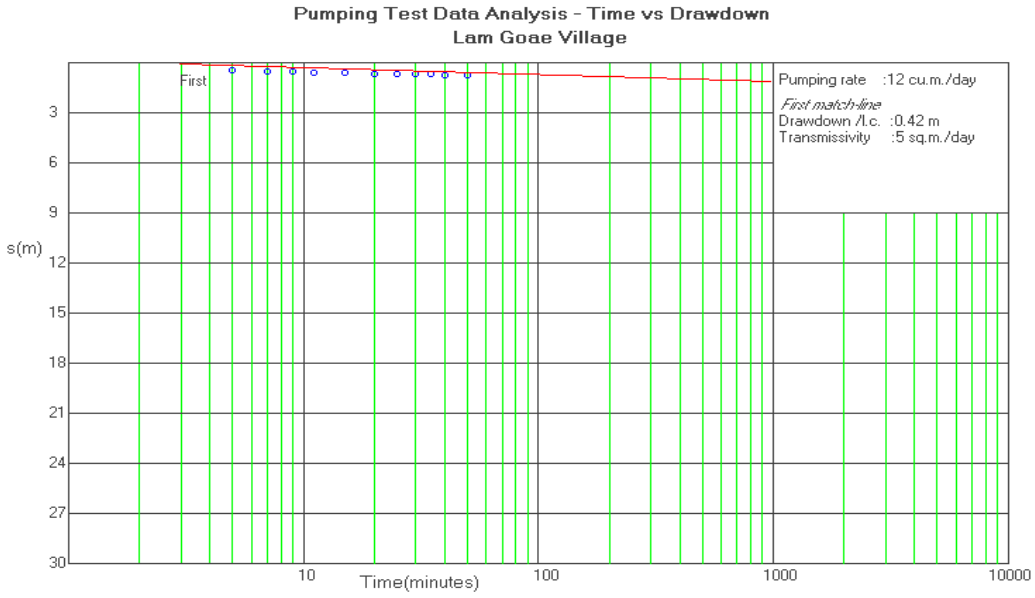
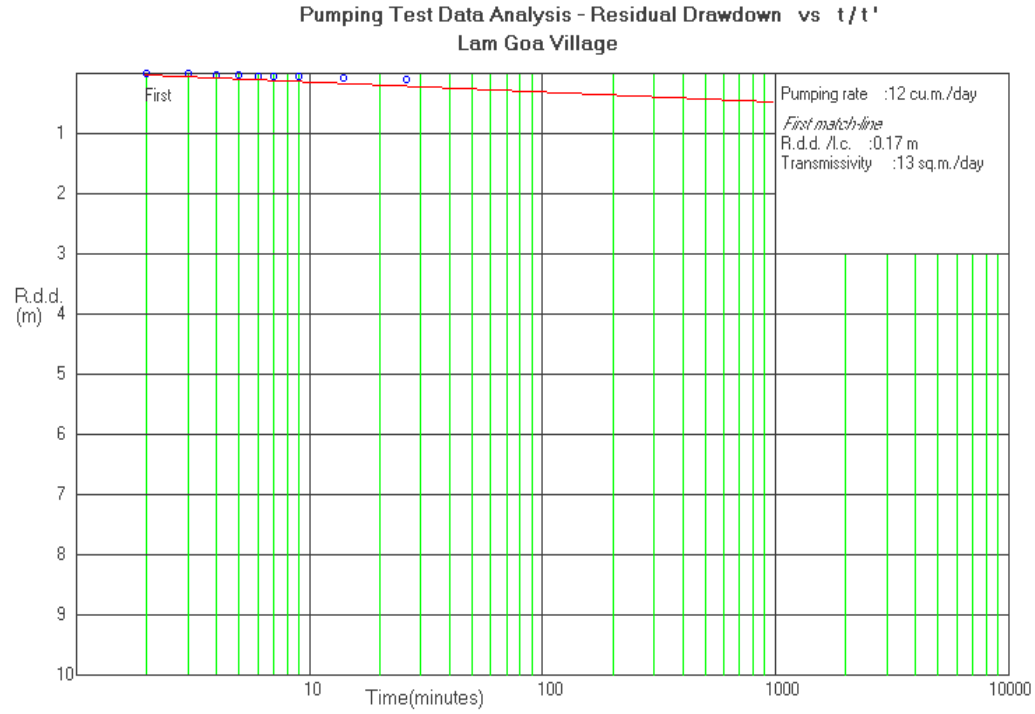


Fig 3: Plot of time Vs Draw Down at open well at Lamgao village of Bicholim Taluka, in the Bicholim mine study area



PREPARED BY: M. C. Reddy, Former Regional Director, Central Ground Water Board,
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Fig.4: Plot of time Vs Residual Draw Down Vs time at open well at Lamgao of Bicholim mine study area

5.6 Ground water flow and aquifer interaction

Hydrogeological surveys were carried out in Mining Lease Area (core area) and in the area falling within 10 Km from Bicholim Mining Block-I Mining Lease boundary (buffer area) during November 2022 to evaluate the groundwater regime. The core and buffer area forms a part of Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao Villages of Bicholim Taluka of North Goa District, Goa. Water levels were monitored in 30 villages tapping shallow aquifers to delineate the ground water regime in the study area. The location and details of the abstraction structures in the core and buffer area in parts of Bicholim Taluka of North Goa District are shown in **Plate-1**. The location details, coordinates, elevation and water levels of the abstraction structures in core and buffer area is given in **Table-7.** The abstraction structures inventoried are essentially open wells tapping phreatic aquifers. Well density with respect to the unit area as an index to assess the ground water development, vis-à-vis the potential of the area show the density of the wells as observed during the present hydrogeological surveys indicate the area falls in the range 3-4 wells / km. Water samples were collected from 30 shallow aquifer wells in buffer area. The details of the water quality analysis carried in NABL Accredited Laboratory is given in **Table-8** and the lab results are presented as **Annexure-2.**

Table-7: Details of open wells inventoried for water level in study area of Bicholim Iron Ore mine Mineral Block-I

Code No.	Locations	latitude			longitude			Elevation (m)	Water Levels (m)
		D	M	S	D	M	S		
GW1	Bicholim	15	35	8.00	73	56	47.6	29	6.30
GW2	Bicholim	15	34	28.6	73	57	16.7	28	4.40
GW3	Pilgao	15	33	42.7	73	57	15.9	35	7.65
GW4	Pilgao	15	33	45.2	73	57	14.7	36	3.10
GW5	Pilgao	15	33	48.2	73	57	16.6	40	7.73
GW6	Mathwada	15	33	9.4	73	57	52.5	31	3.30
GW7	Sarmanas	15	32	52.7	73	57	43.7	17	2.50
GW8	Batwada	15	33	48.7	73	57	52.2	21	1.80
GW9	DabDaba	15	34	19.6	73	57	20	31	9.00
GW10	Mayem	15	34	36.4	73	56	13.6	30	14.70
GW11	Lamgao	15	35	17.6	73	56	27.3	29	5.00
GW12	Lamgao	15	35	31.1	73	56	12	32	6.60
GW13	Bordem	15	35	48.8	73	56	48.1	32	5.70
GW14	Walsi	15	35	57.2	73	56	37.3	35	9.70
GW15	Mulgao	15	36	47.8	73	55	37.6	29	3.77
GW16	Sirigao	15	36	20.6	73	53	55.1	22	1.90
GW17	Tivim	15	37	36.8	73	52	28.6	27	3.06
GW18	Sirsaim	15	37	22.4	73	52	30	33	10.70

GW19	Assnora	15	37	10.6	73	53	37.9	31	4.40
GW20	Adwalpale	15	38	18.5	73	54	7.5	38	5.00
GW21	Karapur	15	33	40.4	73	59	22.7	22	3.60
GW22	Bolwada	15	33	55.3	73	59	32.8	32	2.96
GW23	Sarvana	15	34	6.5	73	58	8.6	27	3.78
GW24	Corjuem	15	35	39	73	53	13.3	28	4.58
GW25	Sikeri	15	35	2	73	53	48.4	24	5.80
GW26	Kumbarwada	15	34	35.7	73	55	16	33	5.75
GW27	Calvim	15	34	3.9	73	53	23.4	22	4.70
GW28	Lamkona	15	34	17.1	73	52	37.5	27	6.15
GW29	Nachinola	15	34	55.8	73	51	16.9	28	5.50
GW30	Nanoda	15	38	15.1	73	55	20.5	33	2.15

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Table-8: Details of open wells inventoried for water Quality in study area of Bicholim Iron Ore mine

Sl. No.	Parameters	Desirable Limts	Permissible Limts	Result																													
				GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8	GW9	GW10	GW11	GW12	GW13	GW14	GW15	GW16	GW17	GW18	GW19	GW20	GW21	GW22	GW23	GW24	GW25	GW26	GW27	GW28	GW29	GW30
i	Colour (Hazen Units), Max	5	15	1.0	<1	2.0	4.0	1.0	1.0	1.0	<1	<1	<1	2.0	1.0	<1	<1	<1	1.0	1.0	<1	<1	<1	<1	<1	1.0	1.0	<1	1.0	<1	<1	<1	<1
ii	Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
iii	pH	6.5 to 8.5	6.5 - 8.5	6.55	7.95	7.37	7.80	8.40	7.50	7.05	5.88	8.95	8.10	8.16	7.01	6.62	5.85	5.53	7.50	7.80	5.92	7.70	8.20	6.07	5.96	7.82	7.85	5.73	7.46	7.83	7.56	8.12	8.85
iv	Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
v	Turbidity,NTU, Max	1	5	2.5	3.60	1.5	2.5	1.8	4.0	3.8	3.7	4.5	3.1	2.8	4.1	3.5	4.7	3.0	1.2	4.6	2.7	5.0	4.2	2.7	1.8	3.2	4.0	2.1	1.2	0.7	4.0	2.8	4.0
vi	Total Dissolved Solids,mg/l, Max	500	2000	98	118	236	226	76	194	172	72	50	118	152	156	150	108	34	130	178	54	134	98	50	46	66	172	84	162	178	260	66	54
vii	Aluminium (as Al) mg/l, Max	0.03	0.2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
viii	Ammonia (as total Ammonia -N),mg/l, Max	0.5	0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
ix	Anionic Detergents (as MBAS),mg/l , Max	0.2	1.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
x	Barium (as Ba), mg/l, Max	0.7	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
xi	Boron (as B), mg/l, Max	0.5	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
xii	Calcium (as Ca),mg/l, Max	75	200	24.0	27.2	52.1	54.5	12.0	41.6	24.0	5.6	8.0	24.1	20.0	23.2	26.4	11.2	4.8	17.6	38.4	7.2	32.0	20.0	6.4	5.6	8.0	32.0	8.8	36.8	32.0	48.9	9.6	8.0
xiii	Chloramines (as Cl_2), mg/l. Max	4.0	4.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
xiv	Chloride as Cl (mg/l),mg/l, Max	250	1000	12.0	13.0	25.0	26.0	13.0	18.0	34.0	24.0	12.0	16.0	20.0	30.0	22.0	30.0	12.0	16.0	22.0	14.0	20.0	14.0	14.0	12.0	14.0	20.0	28.0	22.0	30.0	68.0	12.0	10.0
xv	Copper (as Cu),mg/l, Max	0.05	1.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
xvi	Fluoride (as F),mg/l, Max	1	1.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.12	0.20	0.15	<0.1	<0.1	<0.1	<0.1	<0.1	0.11	0.22	0.24	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
xvii	Residual, Free Chlorine,mg/l, Max	0.2	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
xviii	Iron (as Fe),mg/l, Max	1.0	1.0	0.18	<0.05	<0.05	<0.05	<0.05	0.18	0.15	0.11	0.12	0.05	0.08	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
xix	Magnesium (as Mg)mg/l, Max	30	100	4.9	5.3	7.3	6.3	4.9	9.2	6.8	2.4	2.9	5.3	16.5	5.8	7.3	3.0	1.0	7.3	7.3	2.0	5.4	5.8	2.9	2.4	2.9	12.6	2.4	6.8	9.7	8.7	4.8	2.9
xx	Manganese (as Mn),mg/l, Max	0.1	0.3	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
xxi	Mineral Oil,mg/l, Max	0.5	0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
xxii	Nitrates (as NO_3),mg/l, Max	45	45	3.7	2.8	12.0	2.0	1.6	1.7	10.7	1.5	1.4	2.3	6.2	30.2	7.0	24.8	<0.1	1.4	4.6	4.0	2.0	1.8	4.5	1.6	1.2	4.2	5.6	1.3	18.2	1.1	1.5	1.0
xxiii	Phenolics (as C_6H_5OH),mg/l, Max	0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
xxiv	Selenium (as Se),mg/l, Max	0.01	0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
xxv	Silver (as Ag), mg/l. Max	0.1	0.1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
xxvi	Sulphates (as SO_4),mg/l, Max	200	400	6.0	7.2	22.0	20.0	8.0	26.0	30.0	16.0	11.0	20.0	22.0	26.0	28.0	20.0	4.0	10.0	20.0	8.0	24.0	8.0	8.0	5.0	16.0	14.0	8.0	10.0	25.0	22.4	6.2	4.4
xxvii	Sulphide (as H_2S) , mg/l, Max	0.05	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
xxviii	Alkalinity (as $CaCO_3$) mg/l, Max	200	600	76	90	164	180	52	140	80	20	20	78	110	60	86	20	8	100	130	20	98	74	12	24	26	132	26	122	100	130	40	30
xxix	Total Hardness (as $CaCO_3$),mg/l, Max	200	600	80	90	160	162	50	142	88	24	32	82	118	82	96	40	16	74	126	26	102	74	28	24	32	132	32	120	120	158	44	32
xxx	Zinc (as Zn),mg/l, Max	5	15	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
xxxi	Cadmium (as Cd),mg/l, Max	0.003	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
xxxii	Cyanide (as CN),mg/l, Max	0.05	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
xxxiii	Lead (as Pb),mg/l, Max	0.01	0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
xxxiv	Molybdenum (as Mo), mg/l, Max	0.07	0.07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
xxxv	Mercury (as Hg),mg/l. Max	0.001	0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
xxxvi	Nickel (as Ni),mg/l, Max	0.02	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
xxxvii	Pesticides,mg/l, Max	Absent	0.001	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
xxxviii	Polychlorinated biphenyls mg/l, Max	0.0005	0.0005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
xxix	Polynuclear Aromatic Hydrocarbons (as PAH),mg/l, Max	0.0001	0.0001	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
XL	Arsenic (as As),mg/l, Max	0.01	0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
XLI	Chromium (as Cr^{+6}),mg/l, Max	0.05	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
XLii	Trihalomethanes,mg/l, Max	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
XLiii	Radioactive materials,Bq/l,mg/l	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
XLiv	Total Coliform (per 100ml)	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
XLv	E-Coli (per 100ml)	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
XLvi	Water levels in well from surface (m)	--	--	6.30	4.40	7.65	3.10	7.73	3.30	2.50	1.80	9.00	14.70	5.00	6.60	5.70	9.70	3.77	1.90	3.06	10.70	4.40	5.00	3.60	2.96	3.78	4.58	5.80	5.75	4.70	6.15	5.50	2.15

PREPARED BY: M. C. Reddy, Former Regional Director, Central Ground Water Board,
Accredited for NABET for Geology & Hydrogeology and CGWA. mcreddycgwb@yahoo.co.in

5.7 Depth to water level

Water levels based on the abstraction structures inventoried in the study area is shown in depth to water level map prepared for the shallow aquifers in **Plate-10**. Depth to water level varied from less than 2 m below ground level (bgl) to more than 7 m bgl. Shallow water levels of less than 2 m bgl is found to occur in and around Sirigao and Batwada;2-5 m bgl in and around Adwalpale, Nanoda, Calivim, Corquem, Sarvana, Bolwada, Kalapur, Assnora, Mulgao, Lamgao, Sarmanas, Tivim, Bicholim, Mathwada and Pilgao; between 5 and 7 m bgl in and around Nachinala, Lamkona , Kumbarwada, Shikari, Bordam, Pilgao, Lamgoa and Bicholim. Water levels of more than 7 m bgl is found to occur in and around Walsi, Sirsaim, Mayem, Pilgao and Dabdaba.

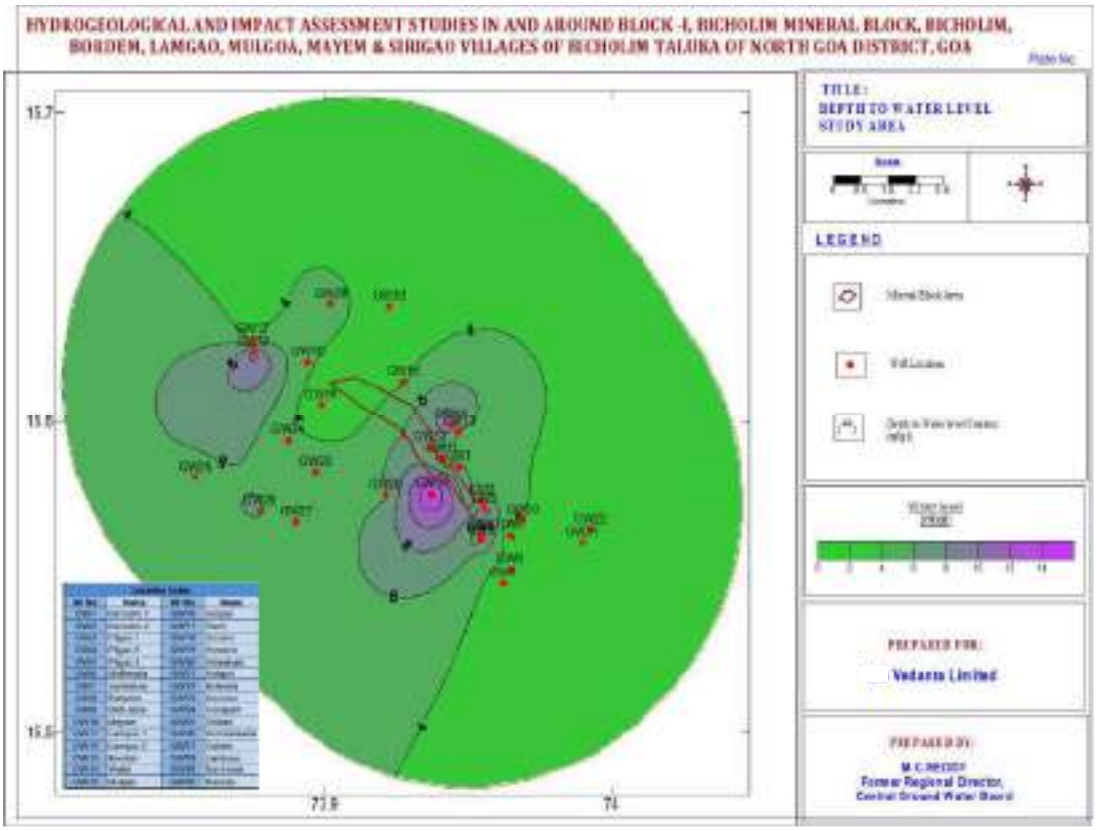


Plate-10. Depth to Water Level in Bicholim study area

5.8 Water Table Elevation

Water table elevation for the study area tapping shallow aquifer is shown in **Plate-10**. Water table elevation is in the range of less than 20 m. above mean sea level (amsl) to more than 35 m amsl. The water table elevation is less than 20 m amsl in and around Calivim,

Sarmanas and Lamkona; between 20 and 25 m amsl in and around Batwada, Dabdaba, Mayem, Mulgao, Kalapur, Shikari, Sirigao, Sarvana, Bicholim, Lamgao, Tivim and Sirsaim; Water table elevation is between 25 and 30 m amsl in and around Corquem, Mathwada, Kumbarwada, Nanoda, Bolwada, Nachinala, Bicholim, Pilgao, Pilgao, Lamgoa, Bordam, Walsi, Pilgao; Water table elevation is between 30 and 35 m amsl in and around Assnora and Adwalpale. Ground water flow direction is following the topography.

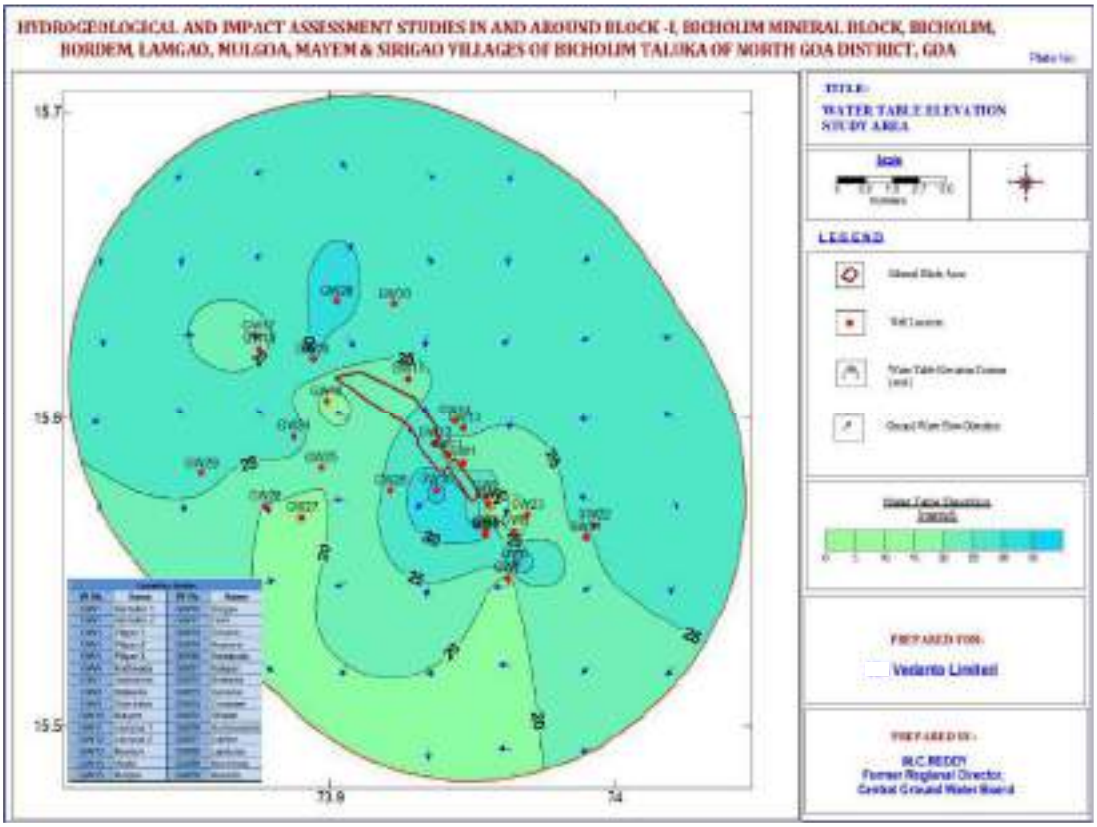


Plate-11. Water Table Elevation in Bicholim study area

5.9 Yield of bore wells

Bore wells are not common in the study area. Based on the information gathered during the hydrogeological survey bore wells are mostly confined to a few villages and that too are fitted with hand pumps for domestic use. 3 existings bore wells are located in the in the core area. The Lessee proposed to have one ground water structures for domestic uses for the mine staff. However, a Piezometer will be established in the core area for monitoring of water levels on a monthly basis and water quality once in a year. The piezometer will be installed with a Telemetry system of monitoring.

5.10 Ground water level trend analysis

In all 3 National Hydrograph stations maintained by Central Ground Water Board is considered for the analysis. Long term trends for Pre-monsoon, Post monsoon and all seasons were attempted. Rise in water level is recorded at two hydrograph stations and Fall in water levels were recorded at three hydrograph stations. Details of water levels for trend analysis attempted for the 10 years period is given in **Table-9-11** and the hydrographs are presented in **Fig 5 – Fig 13**.

Ground water trend analysis attempted for the 10 years period Water level data of national network of hydrograph stations of CGWB at Adavapal, Mulgaon Shivalkherwad and Sal, Bicholim Taluk, Goa State

Table-9. Water Level Data for the 10 years period of national network of hydrograph stations of CGWB

Water level data of national network of hydrograph station at Adavapal, Bicholim Taluk, Goa				
Year	Jan	May	Aug	Nov
2011	-	-	-	-
2012	-	-	-	-
2013	-	6.4	4.3	4.09
2014	-	5.64	4.41	-
2015	-	-	5.1	5.51
2016	5.57	5.78	4.51	5.46
2017	5.39	5.99	4.29	3.39
2018	5.55	5.46	4.53	4.45
2019	5.53	5.25	4.29	3.67
2020	3.79	-	-	5.08
2021	4.89			
Source: https://indiawris.gov.in/				

Table-10. Water Level Data for the 10 years period of national network of hydrograph stations of CGWB

Water level data of national network of hydrograph station at Mulgaon Shivalkherwad, Bicholim Taluk, Goa				
Year	Jan	May	Aug	Nov
2011	3.29	3.74	1.08	2.21
2012	4.3	2.66	-	3.89
2013	4.12	2.93	0.93	2.98
2014	1.91	0.8	0.21	2.22
2015	3.48	3.13	2.53	2.8
2016	-	2.89	2.36	2.95
2017	-	2.62	-	2.93
2018	3.36	3.1	1.97	-
2019	3.55	3.64	-	2.55
2020	2.74	-	-	2.82
2021	2.82			

Table-11. Water Level Data for the 10 years period of national network of hydrograph stations of CGWB

Water level data of national network of hydrograph station at Sal, Bicholim Taluk, Goa				
Year	Jan	May	Aug	Nov
2011	3.07	3.4	1.03	2.86
2012	2.9	3.21	-	3.17
2013	2.86	3.31	0.96	2.7
2014	2.75	2.82	1.86	1.72
2015	2.72	3.17	2.25	2.41
2016	-	2.86	2.08	2.71
2017	2.91	2.63	1.41	2.91
2018	2.68	2.74	1.58	-
2019	2.56	2.57	2.11	2.29
2020	2.65	-	-	-
2021	2.53			

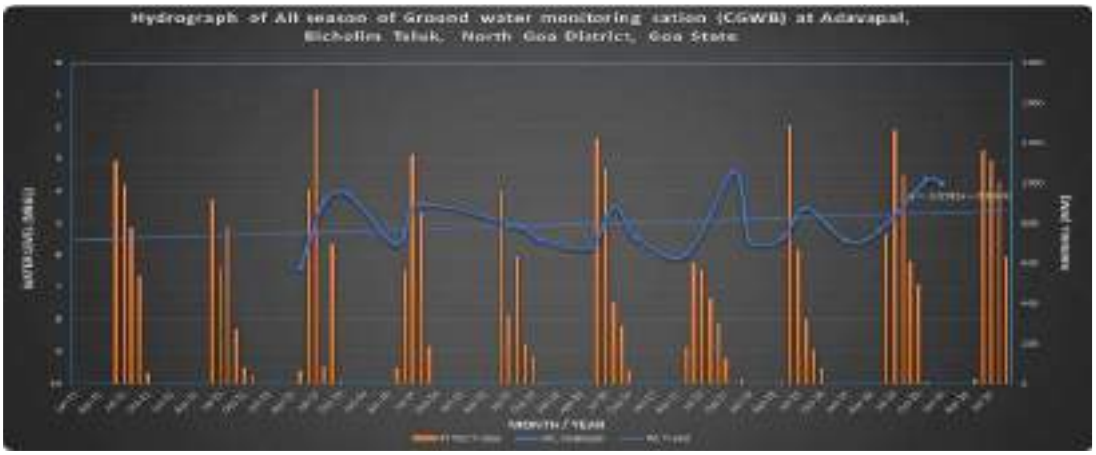
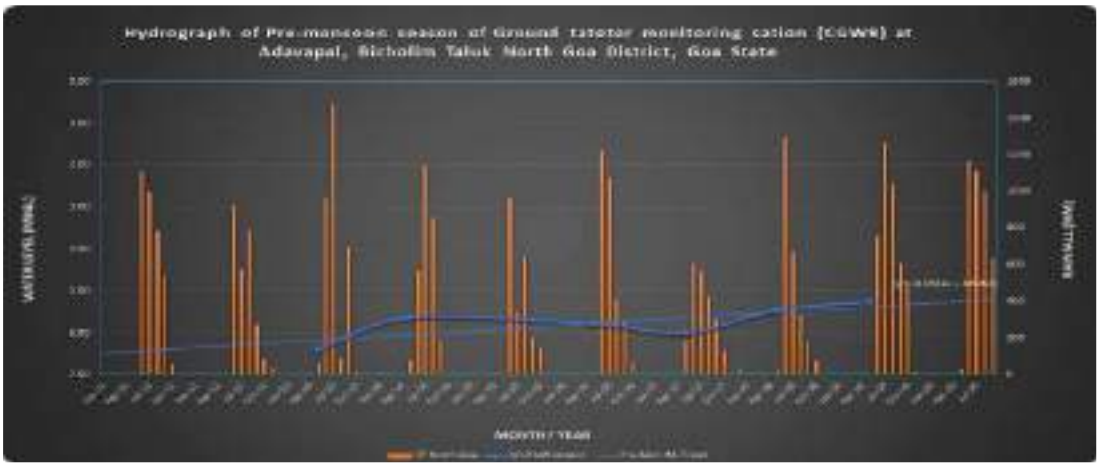


Fig. 5



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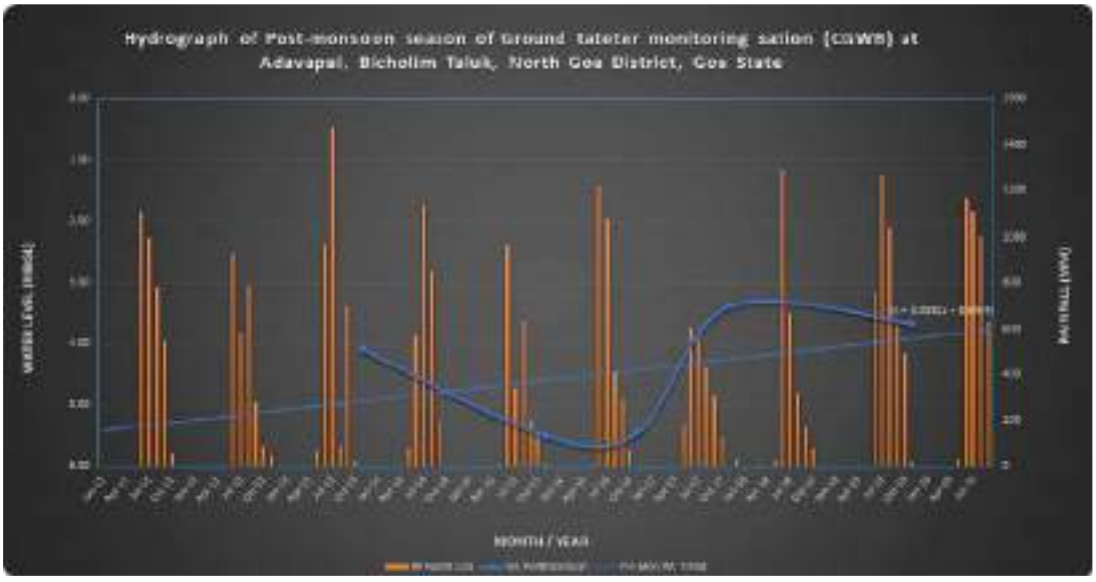
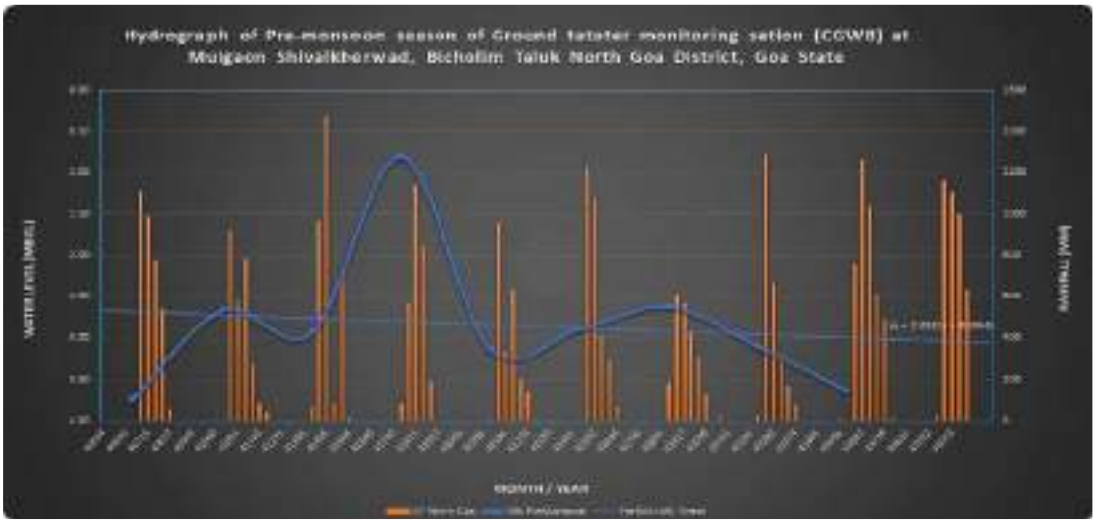


Fig. 7

Fig. 8



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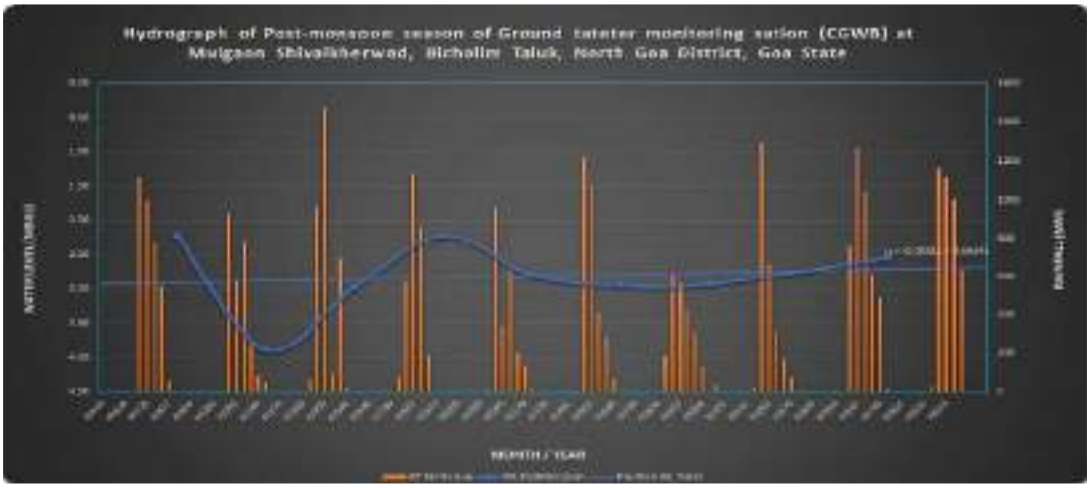

Fig. 10

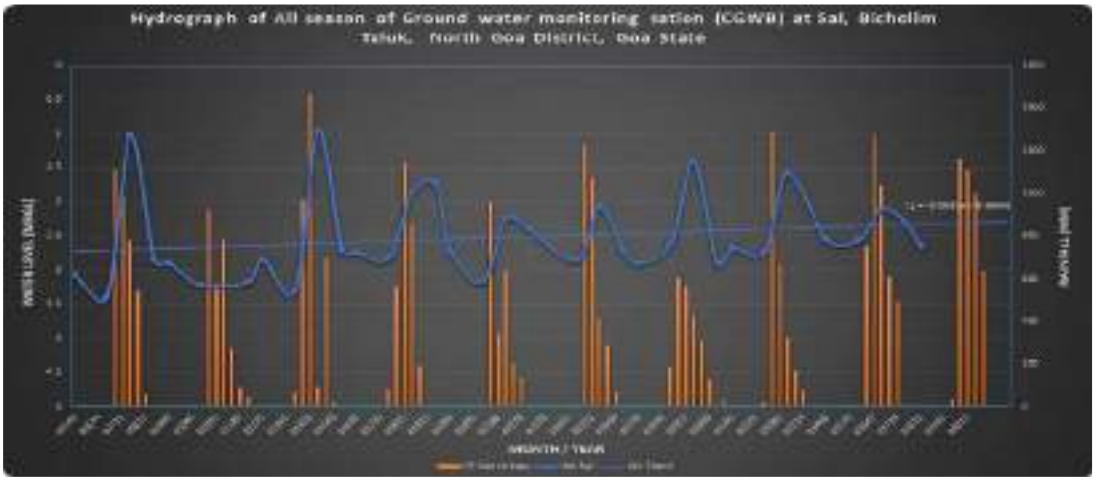

Fig. 11

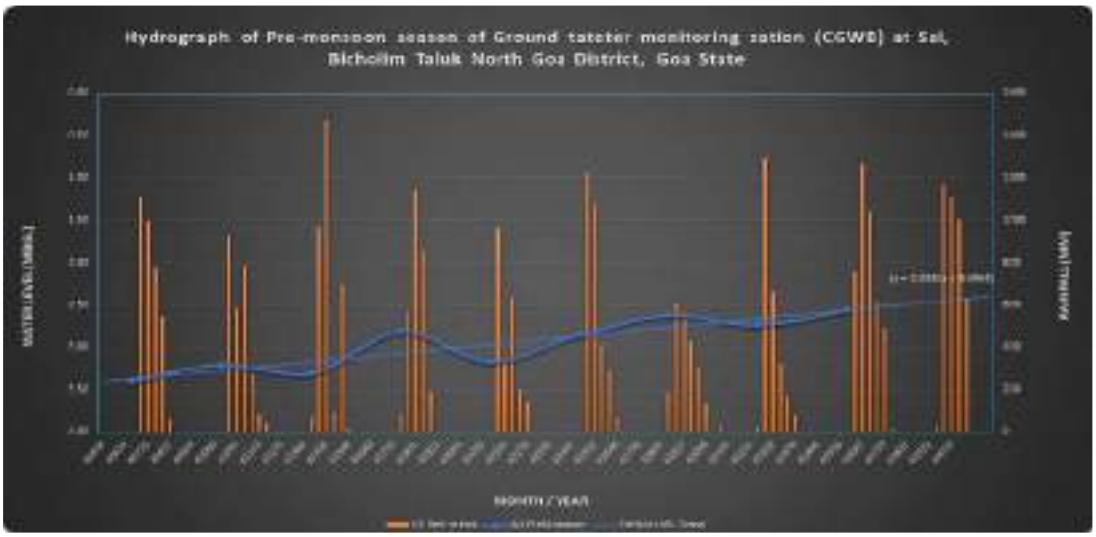

Fig. 12

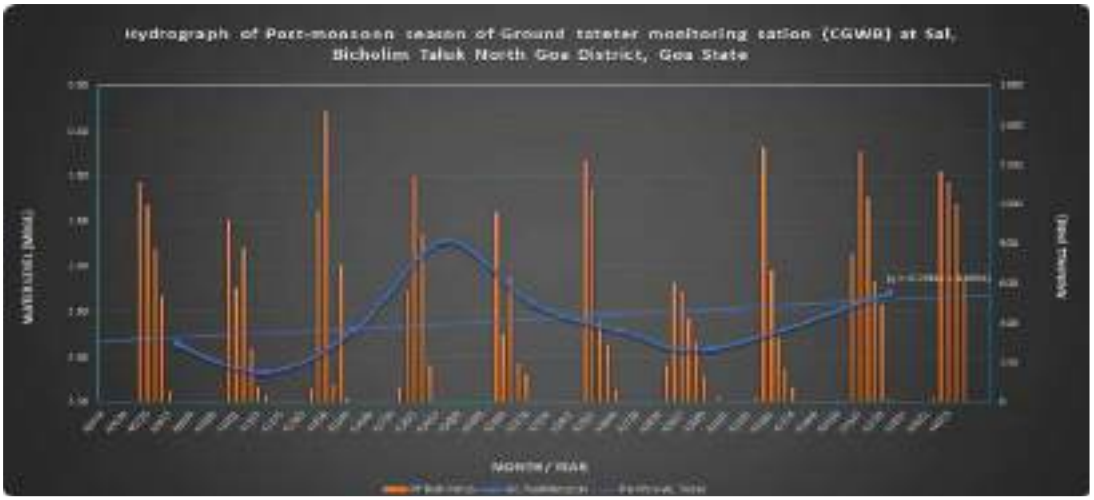

Fig. 13

5.11 Hydrograph for 5 years and Predicted Water Levels

Water level trend analysis carried out on data collected from 3 Ground water monitoring stations of Central Ground Water Board (CGWB). The data available with these observation wells is from 2011 to 2020 i.e., for 10 years and considered to be long enough to carry out trend analysis. All the Three wells are monitoring the shallow aquifers of Bicholim taluk, which are considered to extrapolate the trend analysis results to the study area. Trend analysis is calculated for pre-monsoon and post-monsoon water level using 'linear regression' method is applied using 'Microsoft Excel trend analysis tool'. Based on current water level trend, the ground water regime is also projected for after five years and presented in Table -12 and upon which, following observations are also made:

Table-12. Water level trend analysis and 5 years projected water level

Stationwise Ground water level Trend Analysis (2011- 2021) of CGWB Stations in Bicholim Taluk, North Goa district, Goa				
Station	Ground water level Trend (m/ Year)		Projected DTW after 5 years based on present trend	
	Pre-Monsoon	Post-monsoon	Pre-Monsoon	Post-monsoon
Adavapa	0.13	0.18	4.55	2.80
Mulgaon Shivalkher	-0.04	0.03	3.25	2.58
Sal	0.11	0.06	1.88	1.98

1. The Pre-monsoon Water level trend in two stations are rising, except for the station Mulgaon Shivalkherwad where it showing declining trend of 0.04 m/year. The two stations which are showing positive trend in the range of 0.13 to 0.11 m/year in Adavapal and Sal respectively.
2. During post-monsoon season all three stations are showing rising water level trend in the range of 0.03 to 0.18 m/year.
3. The declining water level trend during pre-monsoon at Mulgaon Shivalkherwad station indicates the ground water abstraction is more, which may attribute to more irrigation practices in the region.
4. The water level trend of these three wells is projected for five years based on the present water level trend and following observations are made.

a. The water level in Adavapal and Sal monitoring continue to rise in both the seasons, indicating the ground water development in non-monsoon and monsoon seasons is less and the regime in this area is undisturbed.

b. The pre-monsoon projected water level observed around five meters in Adavapal and around two meters in Sal. The declining trend station Mulgaon Shivalkherwad the projected water levels is 3.25m and which is not so alarming.

c. The post-monsoon projected water level is around two to three meters in all the stations indicating the expected *waterlogging* conditions in these areas may be after few years.

6. GROUND WATER RESOURCES

Water Resources Department, Government of Goa in association with Central Ground Water Board has been making all efforts to assess the quality of ground water estimation since last ten years. Of late, the ground water has gained more importance due to scarcity of surface water and frequent fluctuations in supply of water to the various consumers. Keeping this in view, the Government of Goa has enacted Goa Ground Water Regulation Act 2002; wherein various measures have been adapted to keep the control over extraction of ground water. At present the entire commercial establishment throughout Goa has been covered by computerized metering and billing.

The attempt has been made by the Department of Water Resources, Government of Goa and Central Ground Water Board, South Western Region, Bangalore to assess the resources of State of Goa as per the Ground Water Estimation Methodology 2015 on administrative unit basis. The Annual Extractable Ground Water Resources as on March 2020 in the state of Goa is 32169.66 HAM and stage of ground water extractions is 23.48%.

The average stage of ground water development in North Goa district is 24.26% with Bicholim taluk recording the lowest stage of development of 13.01%, while Bardez taluk recording the highest stage of development of 32.81%.

In respect of south Goa district, the average stage of development is 21.49% with Cancona taluk recording the lowest stage of development of 8%, while Marmagao taluk has recorded the highest stage of development of 40.07%. The overall stage of ground water development in the state of Goa is 23.48% and all the taluks are falling under safe category

The salient features of the groundwater resources of the state during 2020 as compared to that in 2017 is presented below: Table -12

PREPARED BY: M. C. Reddy, Former Regional Director, Central Ground Water Board,
Accredited for NABET for Geology & Hydrogeology and CGWA. mcreddycgwb@yahoo.co.in

Table -12

Particulars	As on 2017	As on 2020
Annual Extractable Ground Water Resources (HAM)	16033	32169.66
Existing Ground water Extraction for Irrigation (HAM)	2058	2425.14
Existing Ground water Extraction for domestic and Industrial water supply (HAM)	3314	5129.58
Existing Ground water Extraction for all uses (HAM)	5371	7554.75
Provision for domestic and industrial requirement supply for 2025	3669	5168.79
Net annual ground water availability for future irrigation development (HAM)	6993	24190.33
Stage of Ground water Extraction (%)	34	23.48
Category	Safe	Safe

Since the methodology is also dynamic with provision for improvement and refinements based on field data, the same has been applied in respect of Goa State. The major refinements are in the assessment of net groundwater availability, Groundwater draft and in the provision for domestic and industrial requirements as explained in the preceding chapters. The stage of development has changed from 34 to 23.48%. During 2020 assessment all the 12 taluks categorized under Safe Category.

6.1 Ground Water Fluctuations

Water Level Fluctuation (May 2019 with November 2019)

Amongst the 68 analysed, 64 wells (94%) have a recorded rise in water level and 4 wells (6%) have fall in water level during November 2019 as compared to May 2019. Rise of water level in the range 0 to 2 m is observed in 37 wells accounting for 54% of the analysed wells. Rise in water level in the range of 2 to 4 m and >4m is recorded in 15 wells (22%) and 12 wells (18%) respectively. Fall in water level of 0 to 2 m is noticed in 3 wells and fall in water level in the range of more than 4m is recorded in 1 well (accounting for 4% of wells analysed.

The water level rise in the range of 0 to 2 m is general in the Goa State. Rise in water level of 2 to 4 m is observed in almost all the taluks and more than 4 m is observed in parts of Bardez, Ponda, Salcete, Satari and Sanguem taluks. Fall in water level in the

range of 0 to 2 m is observed in parts of Perne taluk. Fall in water level in the range of more than 4 m is observed as isolated patch in Sanguem taluk.

6.2 Ground water table at Bicholim

Detailed study on ground water conditions in the watershed covering Bicholim mines by the NGRI team of scientists indicated the safe ground water conditions prevailing for mining in Bicholim area. The Mayem lake situated about 500 m from the Bicholim mine lease boundary presents pleasant surprise for tourist's eye with clean lake Water. The greenery and paddy fields along the irrigation canal adjacent to the Face 5 of the Bicholim Mineral Block in the Mulgao also indicate unaffected still nature of the Bicholim mine surroundings. Sesa Mining Corporation Limited has initiated implementing overburden dump stabilization program using geotextile on Pit 2 top and in the backfilling area since 2010. The clay benches on the foot wall side have been protected from erosion through use of silpaulin sheets in the mine. The storm water runoff collected was being lifted through pumping water into the irrigation canal joining the Dicholi river.. Presence of phyllitic clay layers dominate the mine lease area at depths varying from 8-22m and the extension of the phyllitic clay layers is a predominant feature in the mine lease. Encapsulating nature of phyllitic clays around the iron ore formations could be noticed along the exposed mine cut sections. As the phyllitic clay layers are impervious with regard to groundwater movement, mining and dewatering operations from the lease hold areas may not show significant impact on the surrounding groundwater regime.

Good groundwater potential zones have been identified in the villages adjacent to the mine lease and in spite of the ongoing mine pit water pumping in the Bicholim mines, there is no significant change noticed in the water table configuration during the past. Most of the monsoon rainfall emerges as surface water runoff flowing into the streams and thereby replenishing the shallow water table aquifer. Hence dewatering conditions could not be found in the adjoining villages to the Bicholim mine lease.

The significant finding from the GPR investigations in the Bicholim mine lease established that there is no significant hydrologic connection between the open mine pits in the mine lease and groundwater regime in the surrounding villages.

There is no necessity of creation of water harvesting structures in the mine lease area as most of the overburden and underlying formations are found enriched with clay formations, which does

not possess good infiltration characteristics. Partially backfilled mine pits with over burden material from mines are holding water throughout the year because of this reason.

6.3 Water quality

Water samples were collected from thirty abstraction structures representing the shallow aquifers (Open wells) in buffer area. The water samples collected were analyzed at Accredited Laboratory. The details of the various constituents prevailing in the area are given in **Table-8**. Water quality in general is safe and potable in all the sites and is within the maximum permissible limits of the Bureau of Indian Standards (BIS). Fluoride, Nitrate, Total dissolved solids, Chloride and Iron are within the maximum permissible limits as per Bureau of Indian Standards (BIS). pH is less than desirable limit varying from 5.73 to 6.07 at Kalapur, Bolwada and Shikar villages. pH is more than the permissible limits of 8.95 at Dabdaba village. **Electrical conductivity, Chlorides** distribution, Nitrate and Fluoride concentration in the study area is shown in **Plate-12** , **Plate-13, Plate-14 and Plate-15.**

i. **Electrical conductivity (EC)**

Distribution of Electrical Conductivity in the core and buffer area ranges from less than 250 to more than 350 micro mhos / cm are within the fresh water standards and is potable in all the sites. Electrical Conductance from distribution is shown in **Plate-12.**

ii. Chlorides

Chloride distribution in the study area and ranges from 10 ppm to 18 ppm and is within the permissible limits prescribed by BIS Standards for drinking water. Chlorides in the Project area and 10 kms radius is shown in **Plate-13.**

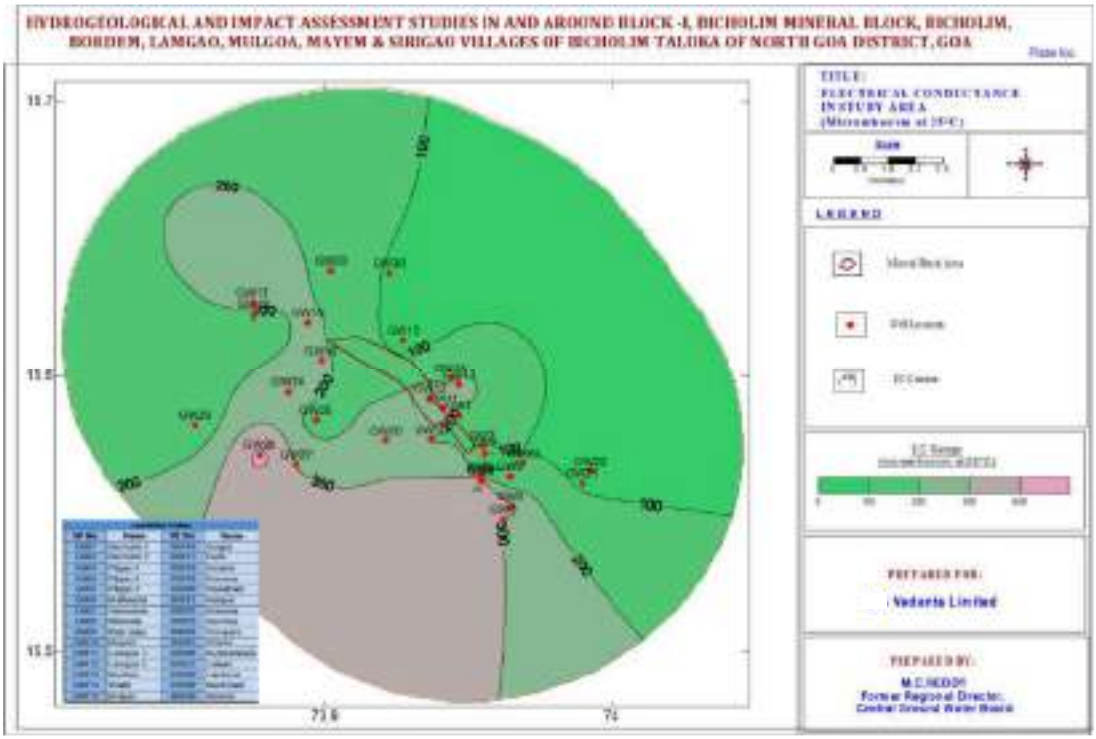

Plate-12. EC distribution in Bicholim Study area

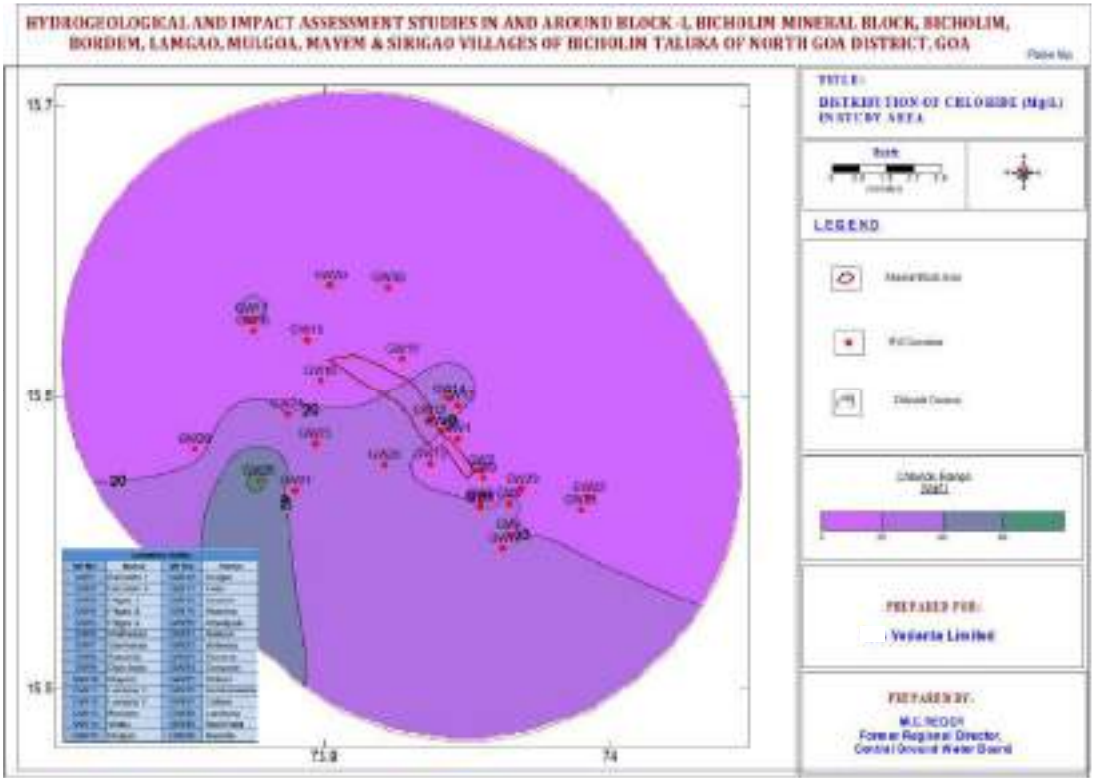

Plate-13. Chloride distribution in Bicholim Study area

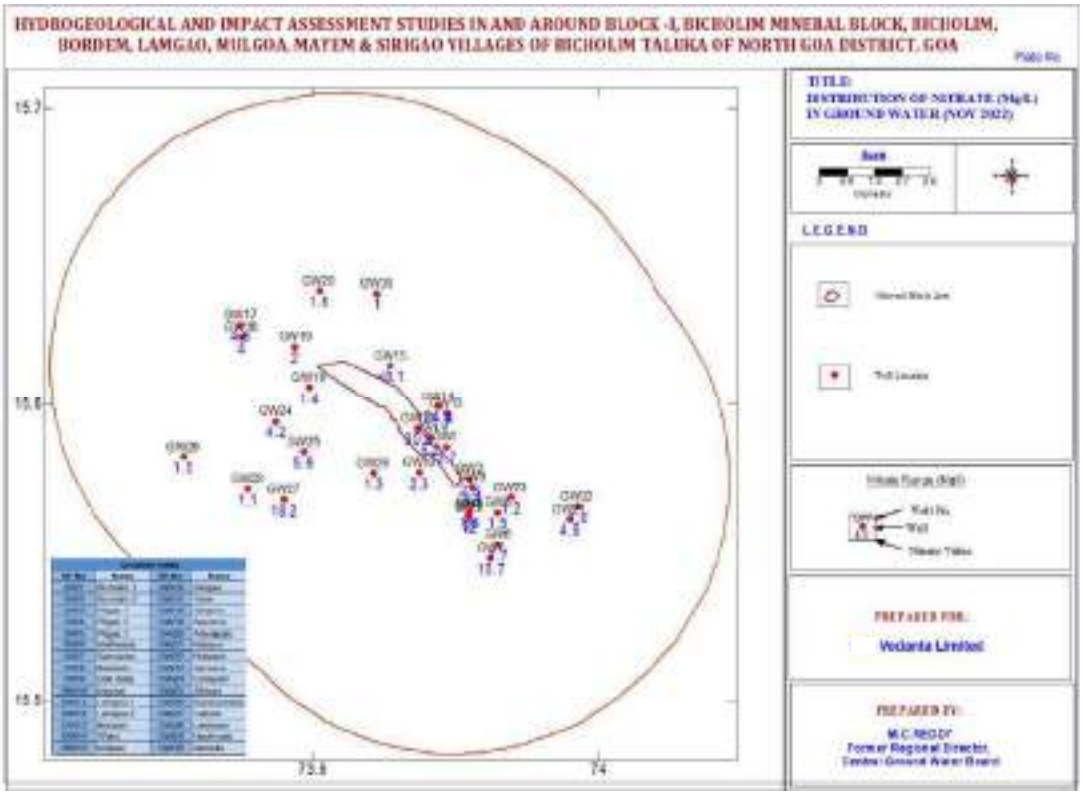

Plate-14. Nitrate concentration in Bicholim Study Area

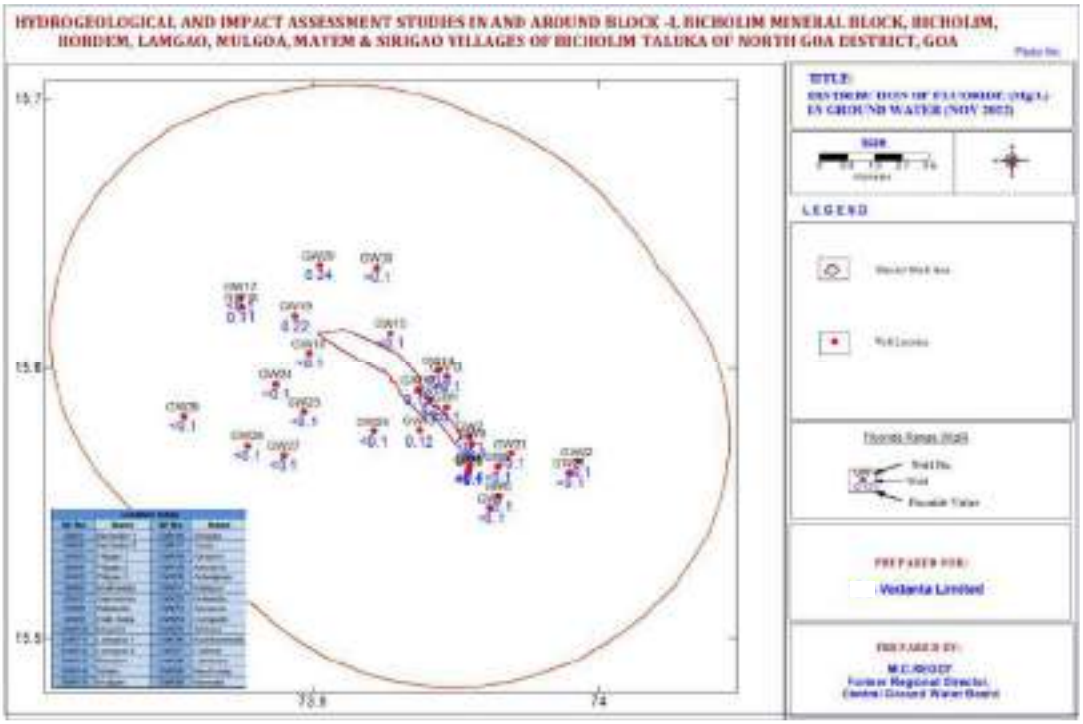

Plate-15. Fluoride concentration in Bicholim Study Area

6.4 BIS Standards

The suitability of water with reference to the BIS standards vis-à-vis desirable limits and maximum permissible limits in respect of phreatic and deep aquifers are shown in **Fig. 14 – Fig 36**.

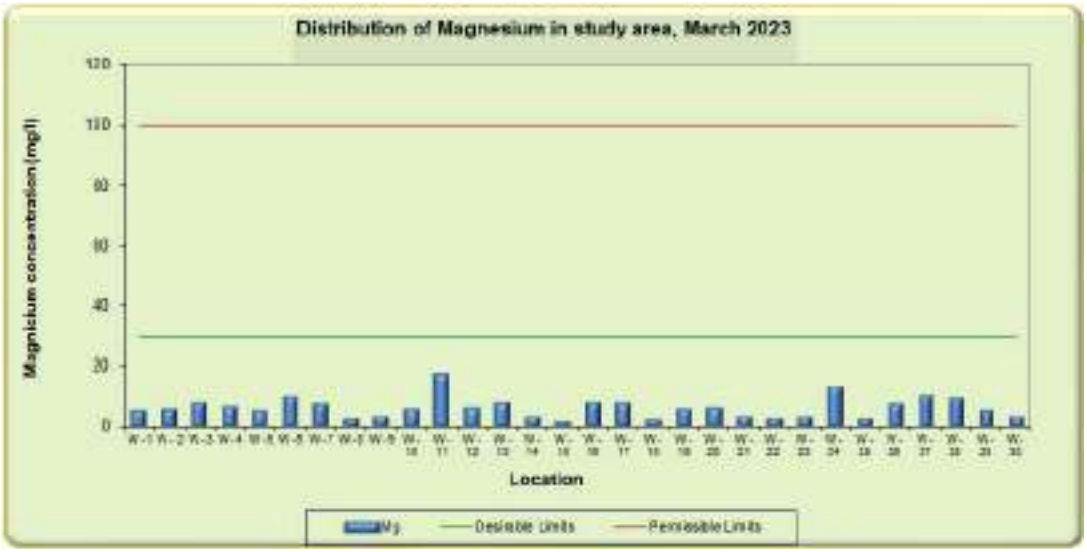

Fig.14

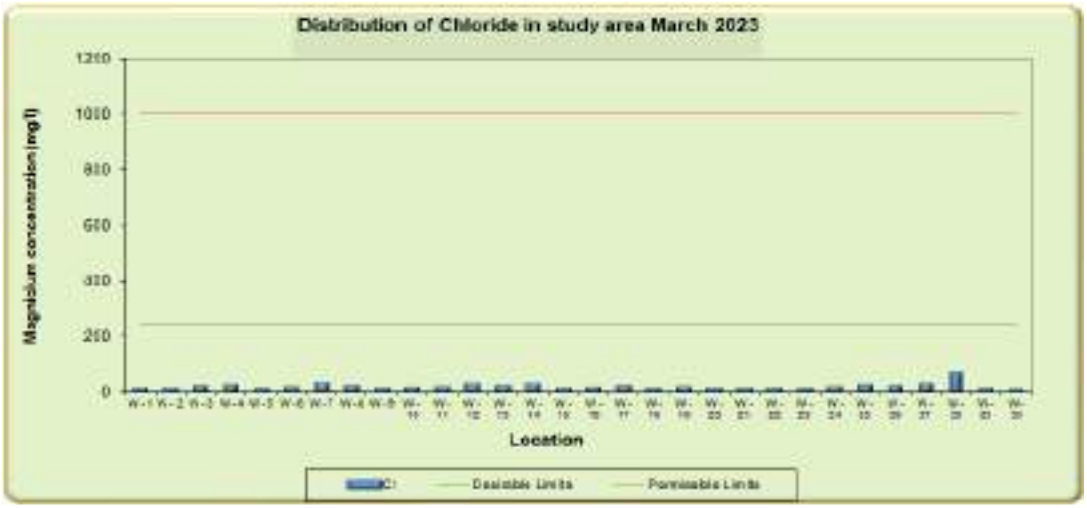

Fig.15

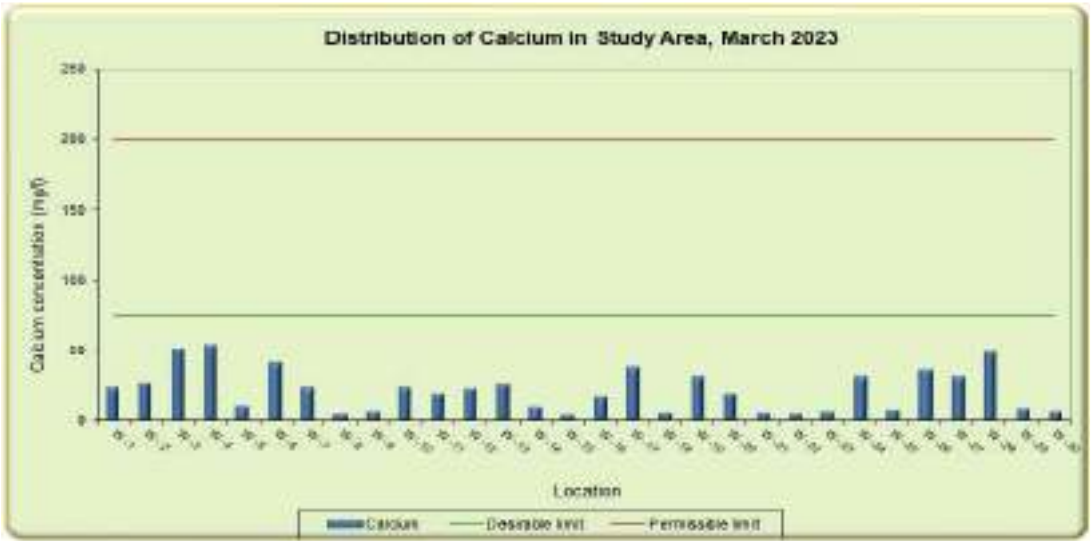

Fig.16

Fig.17

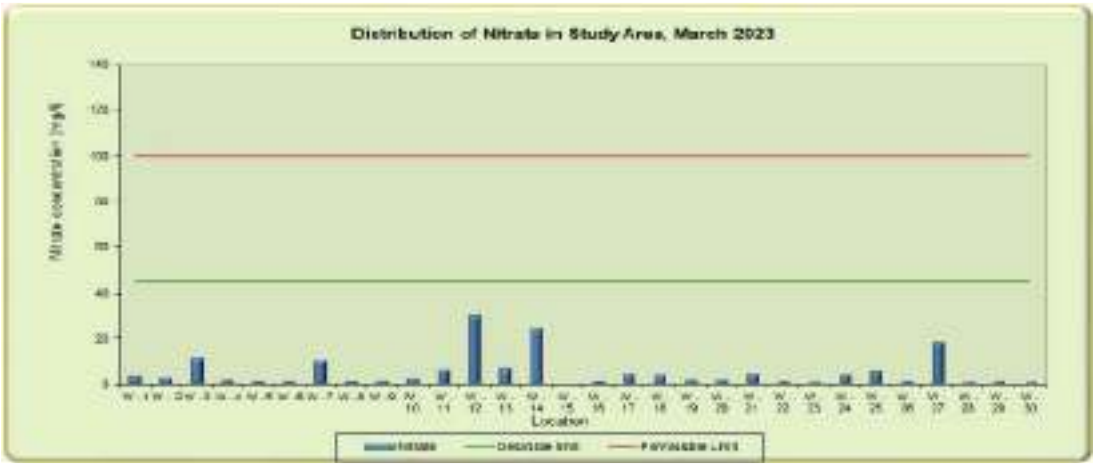

Fig.18

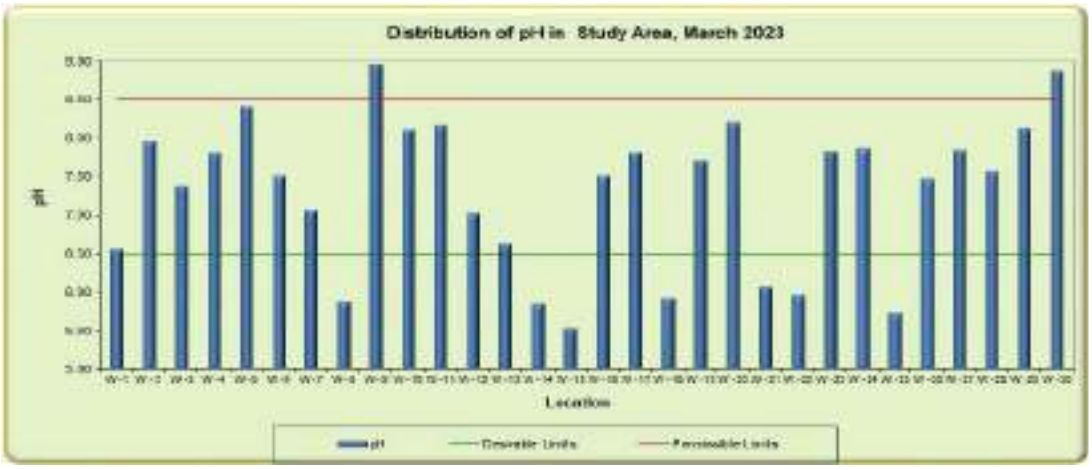

Fig.19

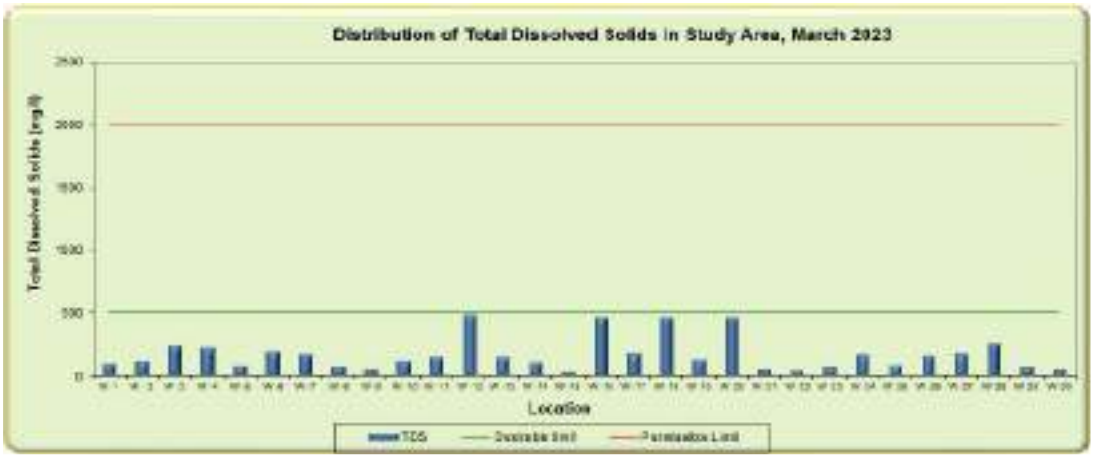

Fig.20

Fig.21

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Accredited for NABET for Geology & Hydrogeology and CGWA. mcreddycgwb@yahoo.co.in

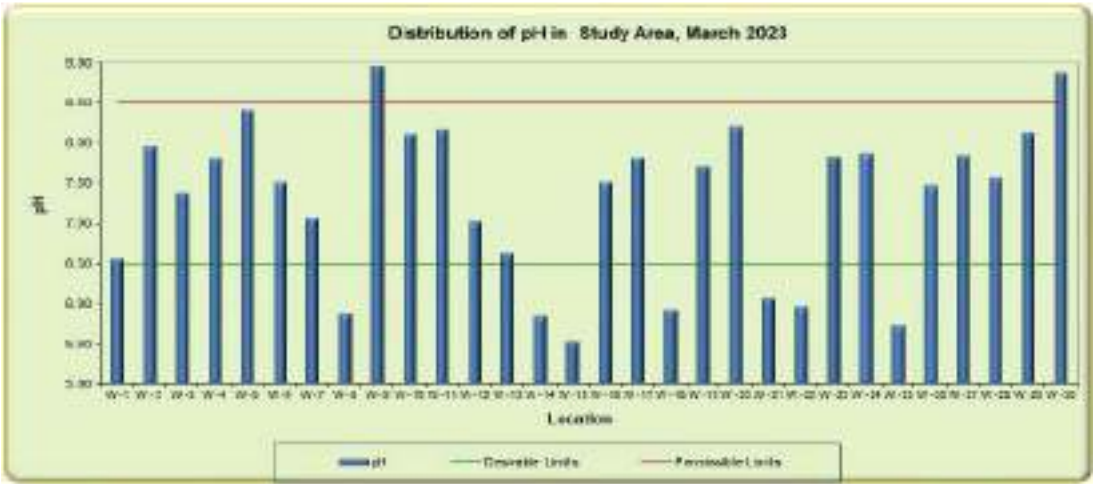

Fig.22

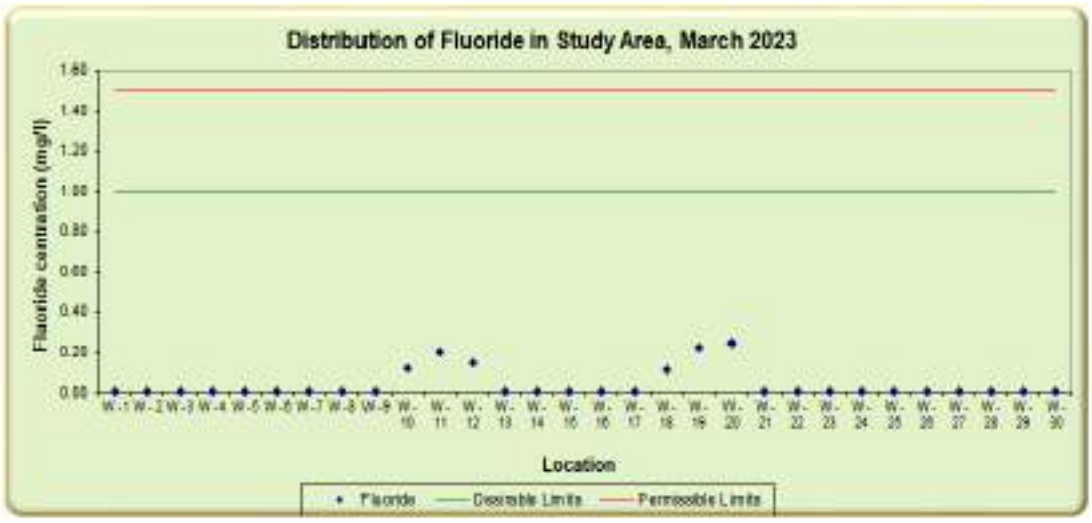

Fig.23

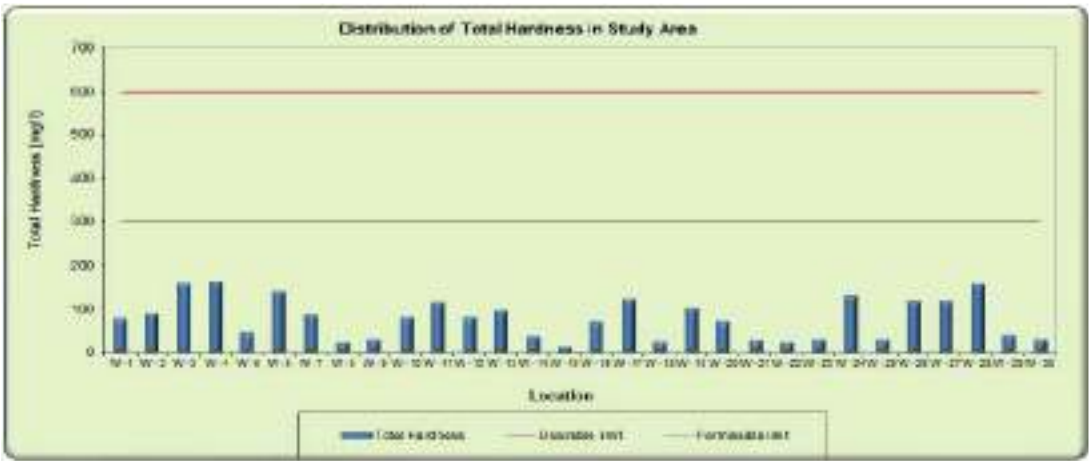

Fig.24

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Accredited for NABET for Geology & Hydrogeology and CGWA. mcreddycgwb@yahoo.co.in

6.5 Observation Wells for monitoring ground water levels in the study area

Based on the inventory of abstraction structures, established nine network of existing open wells in buffer area for monitoring water levels on monthly basis and water quality monitoring once in a year, during Pre-monsoon,(first week of May). Details of the well location are given in **Table-13.** Data is to be submitted to the Water Resources Department, Goa and Regional Director, Central Ground Water Board, South Western Region, Bangalore.

Table-13: Established Network of existing wells in and around Bicholim Mineral Block-I for monitoring Water Levels and Water Quality

Code No.	Locations	latitude			longitude		
		D	M	S	D	M	S
GW1	Bicholim	15	35	8	73	56	47.6
GW7	Sarmanas	15	32	52.7	73	57	43.7
GW11	Lamgoa	15	35	17.6	73	56	27.3
GW17	Tivim	15	37	36.8	73	52	28.6
GW21	Kalapur	15	33	40.4	73	59	22.7
GW24	Corquem	15	35	39	73	53	13.3
GW27	Calivim	15	34	3.9	73	53	23.4
GW29	Nachinala	15	34	55.8	73	51	16.9
GW30	Nanoda	15	38	15.1	73	55	20.5

6.6 Details of Piezometer proposed to be constructed for monitoring Water Levels and Water Quality.

6.6.1 Bore wells

The water requirements for mining and dust suppression will be met through the rainwater harvested in the pits available in the mine lease area.

6.6.2Piezometer

One piezometer has been proposed to be constructed up to a depth of 100 m. within the core area. The location coordinates of the Piezometer proposed is NE corner of the mine lease area. The piezometer is to be fitted with Telemetry system for monitoring water levels monthly and water quality once in a year i.e., pre-monsoon period (April / May) of ever year. The data collected is to be submitted to the Water Resources Department, Goa and Regional Director, Central Ground Water Board, South Western Region, Bangalore.

6.6.3Water Budget

The water requirement for Bicholim Mineral Block-I is 628 m^3 / day, intends to collect from the rainwater harvesting pits within the mine lease area through local contractors. The water requirements are essentially for various activities such as green belt, dust suppression and mine maintenance. The Lessee plans to conserve rain water through Roof Top Rainwater harvesting and Rainfall Run-off management for the water requirements of the mine and recharge to ground water body by constructing various conservation structures. There is no waste water generation in the mining area. Three bore wells exiting in the mining area shall be used domestic use for mine staff. As per Ground Estimation Committee (GEC) norms of year 2020, Ground Water Department, Government of Goa and Central Ground Water Board, Government of India has categorized Bicholim Iron mine Block-I area, Bicholim Taluk, N Goa is categorized as "SAFE" category in ground water development. The details of the water requirements and utilization plan are given below.

6.7 Projected Water Requirements and utilization plan

I. Water Requirement:

Groundwater: For Domestic use: 36 m^3 / day

(One bore well proposed)

Surface water through rainwater harvesting: 628 m^3 / day

Sr. No.	Particulars	Source	Quantity (m3/day)
1	Dust suppression, green belt and other mining activities	Rain and storm water harvested in mine pit	628
	Total		**628**

II. Rainfall Run-off Management (Proposed)

Total Mining Lease area : 4785206 sq m 478.5206

Vegetated / Green area) : 966336sq m

Open area : 3068497sq m

Dumps area : 416116 sq m

Avg. rainfall of the study area : 3,881 mm

RWH (Green area) : 56255.25 m^3 / annum

RWH (Open area & Dumps) : 270475 m^3 / annum

Total available water (A) : 895.15 m^3/day

III. Use of Water

i. Domestic Use : 36 m^3 / day

ii. Greenbelt development : 20 m^3 / day

iii. Other (wheel washing) : 8 m^3 / day

iv. Dust Suppression : 600 m^3 / day

Total (B) : 664**m^3 / day**

IV. Recharge to groundwater (A-B) : 231.15 m^3 / day

V. Total Recharge to Ground Water

i. Return flow from applied greenbelt : 10 m^3 / day

ii. Return flow from dust suppression : 300 m ^{3} / day

iii. Water available for recharge to ground water body : 310 m ^{3} / day

Total: : 541.15 m^3/day

VI. Proposed to withdraw ground water **:** 36 m ^{3} / day

There are three existing bore wells with in ML block for abstraction of ground water over an extent of 36 m ^{3} / day for domestic use for staff. Rainwater harvesting and recharge to the ground water body through conservation structures like Check dams, Gulley plugs, Toe wall, Garland drains, Trenches, and Percolation tanks is proposed for the area is a continuous process. Every year the conservation structures will be well maintained. Withdrawal of accumulated rainwater in the mine pit of Bicholim Block-I Iron Ore Mine, situated at Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao Villages of Bicholim Taluka of North Goa District, Goa will not create any impact on Ground Water body in the core and buffer area. .

7. DE-WATERING

7.1 Dewatering Project Details

Accumulated rainwater in the mine pit will be used for requirement of mine for dust suppression, greenbelt and Wheel washing systems.

7.1. Approved Dewatering Plan

Not Applicable as the area is not falling in De-watering zone

7.2. Proposed usage of pumped water in case of Dewatering Project

Not applicable as the area is not falling in De-watering zone

8. COMPREHENSIVE ASSESSMENT OF THE IMPACT ON GROUND WATER, RISKS AND MANAGEMENT STRATEGY.

Impact on ground water sources

The ground water extraction in the Mining Lease area is 36 KLD for domestic purpose and hence no adverse impact is created due to the mining activities. The project area and Bicholim Taluk, North Goa District, Goa is categorised as SAFE in Ground Water extraction point of view. The stage of Ground Water Development is 23.48% in the year 2020.

8.1.1. Impact on Ground Water

The ground water extraction in the project area is 36 KLD for domestic purpose and hence no adverse impact is created due to the mining activities in the core area as well as in the surrounding 10 kms radius buffer area. The Lessee proposes to actively implement rainwater harvesting activities to recharge the ground water body through the percolation tanks and other conservation structures. There are no major rivers/streams in the project site. No adverse impact on the groundwater will be observed due to drawl of harvested rainwater from the Mine pit in the core area. The core and buffer area of Block-I Bicholim Mineral Block is categorized as **SAFE** in respect of ground water development and management. The water Quality Analysis from the accredited laboratory has shown all the parameters are well within the maximum permissible limits of the BIS for drinking water.

8.1.2. Likely Impacts – because of any past Ground water abstraction

The ground water extraction in the project area is negligible and hence no adverse impact is likely to be created. The proponent monitors established observation wells for water level and water quality. The data will be regularly sent to the Goa Ground Water Department and Central Ground Water Board, Bangalore. The proponent undertakes to take immediate remedial measures if any adverse effects are noticed

8.2 Dependency on source of water

The Buffer area consists of many lower order streams & nallahs. Villages located in the buffer area are dependent on availability of surface water through tanks located locally for the household chores and Ground water from community open wells or rural water

supply schemes. The agriculture is dependent on monsoon for the seasonal crops like Rice & etc.

8.3 Ground water users

Ground water in the buffer area is mainly used for domestic purpose and to a lesser extent for irrigation through bore wells.

9. PROPOSED MEASURES FOR DISPOSAL OF WASTE WATER BY INDUSTRIES DRAWING SALINE WATER

The Mining project is not extracting any saline water and hence no measures are in practice.

10. MEASURES TO BE ADOPTED FOR WATER CONSERVATION

Existing Ground Water Recharge Measures

The proposed project is planning to implement various conservation measures to recharge to ground water body and to meet the water requirement The proposal to implement rainwater conservation in Block-I Bicholim Mineral Block area is as follows:

1. The surface rainwater within mining lease (broken up area) is proposed to be collected in mining pit through a network of trenches. The collected water in the mine pit will act as water harvesting measure thereby recharging the groundwater table through percolation.
2. The overburden dumps will be terraced and the rain water shall be channelized through garland drains and trenches into the mine pit.

LAYING OF PIPELINE ERW pipes are installed on the benches for channelization of water from the dump to the settling ponds

BOULDERWALL The laterite boulder wall is constructed at the toe of the dump to control erosion in monsoon.

SETTLING POND

Water in monsoon is channelized into the settling ponds. In our Bicholim iron ore mine we have total 32 settling ponds including mining pit which acts as settling pond in monsoon. These settling 13 ponds are desilted every year and capacity of each settling pond is surveyed prior to monsoon.

OVERFLOW ARRANGEMENTS TO SETTLING PONDS

Water is allowed to settle in the settling pond and only clear overflow then enters next settling pond through overflow arrangements. Proper overflow arrangements are provided to all the settling ponds

FILTER-BEDS

The series of filter-beds are provided to the settling pond and drainage to further filter out in case of any turbidity

SURFACE WATER QUALITY/MINES DISCHARGE POINT Water is properly treated within mining lease area and only clear water is discharged out

Channelization of water into pit

Channelization of water using erw pipes

Sedimentation pits are made and are desilted before monsoon every year

PREPARED BY: M. C. Reddy, Former Regional Director, Central Ground Water Board,
Accredited for NABET for Geology & Hydrogeology and CGWA. mcreddycgwb@yahoo.co.in

- Truck speed is controlled and administered by Director of Mines & Geology.
- Wheel wash system is installed at all mine exits to reduce the dust emission due to truck movement.
- Road Sweeping machines are used to collect the dust from the transport roads which further control the emissions..
- After transportation hours manual washing of junctions is practiced.
- Erection of green fencing at habitation areas of transport route.

Road tarring

Green fencing

Road Washing

Wheel wash

11. PROPOSED GROUND WATER RECHARGING MEASURES / ARTIFICIAL RECHARGE OF GROUND WATER.

Rainwater harvesting in the Mining Lease area is one of the main conservations of water for direct use / recharge to the ground water body. The structures planned for the project are given below:

A. Recharge Pits

To strengthen the recharge to ground water body, the best practiced conservation method is construction a recharge pits. The surface runoff water will be diverted in the mining pit and settling ponds through trenches and garland drains. Synoptic view of recharge pit is shown below.

B. Recharge Trenches

Based on the survey 2 m contour data for the mine lease area land, separation of steep slope areas will be demarcated to locate the sites for Recharge trench sites. Initially about 5 trenches are planned to construct in the first phase. Recharge trenches are simple and effective ground water recharge structures over a wide area. These trenches may be constructed across the slope of the ground surface. These trenches help in slowing down and retaining the sheet-flow of rain water and enhance recharge. The trenches can be continuous or discontinuous. Recharge trenches of dimensions 20m (L) x 1m (W) x 1m (D) will be dug and filled with 40 mm gravel, 20mm gravel and coarse sand so as to arrest the flow of run-off rainwater and capture for recharge to the ground water body. The design is as follows:

Synoptic view of Recharge Trenches

These trenches are effective structures

- in conserving sheet-flow of rain water falling in the project premises
- in enhancing the process of recharging ground water
- conserving soil profile
- avoid formation of new gullies and protect the existing ground surface profile

It is an effective long term environment protective measure and simultaneously enhancing the natural resource. The entire stretch of the trenches become a wide spatial rechargezone.

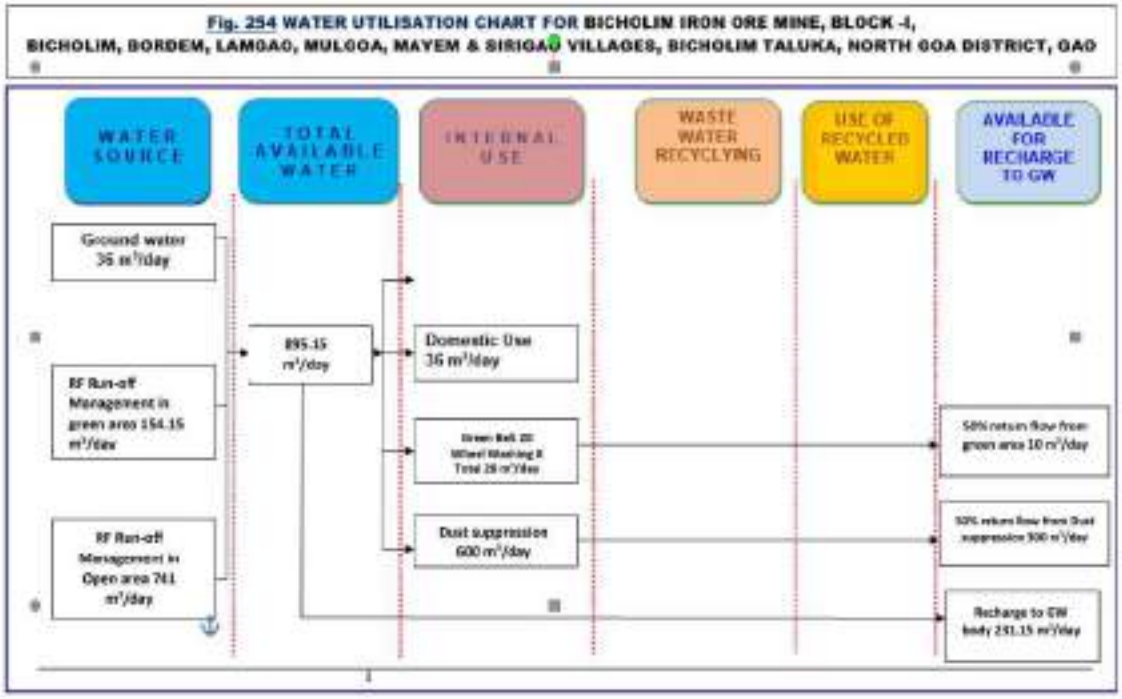

Fig.25 Flow Chart showing water Utilization

12 CONCLUSION

1. The core and buffer area of the Mining Lease is declared as SAFE in respect of ground water development and management.
2. The groundwater extraction in the Mining Lease is negligible and hence there is no adverse impact is created due to mining & allied activities in the surrounding 10 Km radius of buffer area
3. No adverse impact is observed on the environment because of any past groundwater abstraction in the area.
4. The iron ore strata seen between impervious hanging wall and foot wall strata containing impervious layer. Therefore there will not be any chance of seepage of ground water into the mining workings.
5. Block-I Bicholim Mineral Block is situated on a hilly region at an elevation of about 169.14m amsl and does not have any surface water bodies. It was observed from the studies carried out on the open wells that water levels in Phreatic aquifer is mostly shallow where the ground water abstraction structures are located at an elevation of 15m to 125m (a msl). Borewells are located at an average elevation of 35 m amsl having drilling depths of 30 m (bgl) indicate the presence of shallow aquifers in the buffer area.
6. Water quality tested for various parameters in the monitored open wells were found to be within the permissible limits prescribed by the Bureau of Indian Standards and thereby considered safe and potable.

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PREPARED BY: M. C. Reddy, Former Regional Director, Central Ground Water Board,
Accredited for NABET for Geology & Hydrogeology and CGWA. mcreddycgwb@yahoo.co.in

Final Report

on

Study of the Stability of Slopes at Bicholim Iron Ore Mine of M/s. V S Dempo, Goa

Project no. SS - 09 - 02 - c

October, 2010

Atul Gandhe*, Scientist - 2*
Dr V Venkateswarlu*, Scientist - 5*

MINE DESIGN DEPRATMENT

National Institute of Rock Mechanics
Champion Reefs - 563 117
(**Kolar Gold Fields, Karnataka, India**)
Ph : 08153 - 275008, 275000; Fax : 08153 - 275002
e-mail : gcd@nirm.in; www.nirm.in

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Study of the Stability of Slopes at Bicholim Iron Ore Mine of M/s. Dempo Mining Corp. Ltd., Goa

1. INTRODUCTION

Iron ore extraction is being carried out by opencast method at Bicholim mine of M/s. Dempo Mining Corp. Ltd. **(**DMCL), in Goa. Bicholim iron ore mine consists of five different pits, namely, 1 Top, 2 Top, 3/4 Bottom, 5 Top, and 5 Bottom. At present the maximum depth of working at this mine is 80 m. The mine management proposes to go further deep by about 50 m in near future. In view of this, they requested NIRM to study the stability of the pit slopes at the mine, and suggest suitable slope design parameters (vide email from GM, M/s. DMCL, dt. 29.09.2009).

Field investigations were made by NIRM Scientists at the mine, and soil samples were collected from different pits in the mine area. Laboratory tests were carried out at NIRM to determine the physico-mechanical properties of different soil samples from the mine. Analysis was carried out using limit equilibrium method to estimate the stability of the slopes. Accordingly, the optimum bench parameters and overall slope angles of the pit are designed, and are given in this report.

2. OBJECTIVE

To carry out studies related to the stability of the pit slopes at Bicholim iron ore opencast mine of M/s. DMCL, Goa and advice regarding the optimum slope parameters. To achieve the objectives, the following work elements were identified :

- Preliminary field visit to the mine for collecting the geotechnical data.
- Collection of soil samples which form the benches in the pit.
- Laboratory tests of rock and soil samples at NIRM for determining various physico-mechanical properties required for the analysis.
- Analysis of the stability of the slopes using GALENA software.
- Analysis of the results and preparation of final report.

The slopes in an open pit mine should be flat enough to be stable and steep enough to allow economic mining operations. The overall slope angle is formed by the line joining the crest of the top most bench and toe of the bottom most bench of the pit. The inter-ramp angle is formed by the line joining the crest of the upper bench and toe of the lower bench existing between two ramps. For the purpose of this project, a minimum factor of safety of 1.3 is considered for long term stability (Gandhe, 2008), and it is assumed that utmost care will be undertaken while working at final pit limits.

3. GEOMINING DETAILS

3.1 GEOLOGY OF THE AREA

Bicholim mine is situated in Bicholim village of Bicholim taluka of North Goa district. The chief mineral of the iron ore is hematite. The hanging wall of the ore body comprises laterite, phyllitic (Phy) clay, and manganiferous (Mn) clay, while the footwall comprises limonitic (Li) clay, phyllitic (Phy) clay, and laterite. The grade of the ore varies from 50% to 62% Fe.

There are five major ore shoots in the area with the thickness of the ore body ranging from 35 m to 50 m. There are four pits in the mine, namely 1 Top, 2 Top, 5 Top, and 5 Bottom. The depth of the present workings in these pits ranges from 40 m to 80 m (Figures 1 - 4). The strike of the formations is NE – SW. The ore body dips by 60^{o} due SE. There are a few faults in the area. Joints and fractures are present in the sill and weathered dyke.

Figure 1. 1 Top pit of Bicholim mine of M/s. DMCL

Figure 2. 2 Top pit of Bicholim mine of M/s. DMCL

Figure 3. 5 Top pit of Bicholim mine of M/s. DMCL

Figure 4. 5 Bottom pit of Bicholim mine of M/s. DMCL

3.2 MINING DETAILS

Extraction of ore at the mine is by opencast method. The mining in the area was started in December, 1941. As reported by the mine management, the mine is covering an area of about 479.30 hectares (Figure 5 - 8), with total reserves of about 9.5 MT. The mine is at present producing 2 MT iron ore per annum and 2.5 Lakh T per month. The ore being soft in nature is mined by mechanized excavators and no drilling and blasting is done. The present mining depth is about 80 m from the surface. Conventional bench and face method is being adopted here. There are 10 to 12 benches in each of the pits on the East and West side of the mine. The bench width ranges from 12 m to 15 m, and the maximum bench height is 7 m. The bench width is considered from the toe of the upper slope to the crest of the lower bench. There are a number of wide ramps existing in the present overall slope profiles. In most of the pits the area on the hanging wall side is surrounded either by a river or a village. Hence, it is challenging as the slopes have to be designed taking utmost care and at the same time keeping the techno-economics.

For carrying out the slope stability analysis in all the pits, typical benches were identified along different Sections to cover the entire area of the mine. Initially soil testing was carried out in the field for determining bulk density, and sample collection was done from all the pits for determining moisture content and other soil mechanics tests at NIRM. Laboratory testing was carried out to determine the shear parameters of the samples of different lithological units collected from the pits.

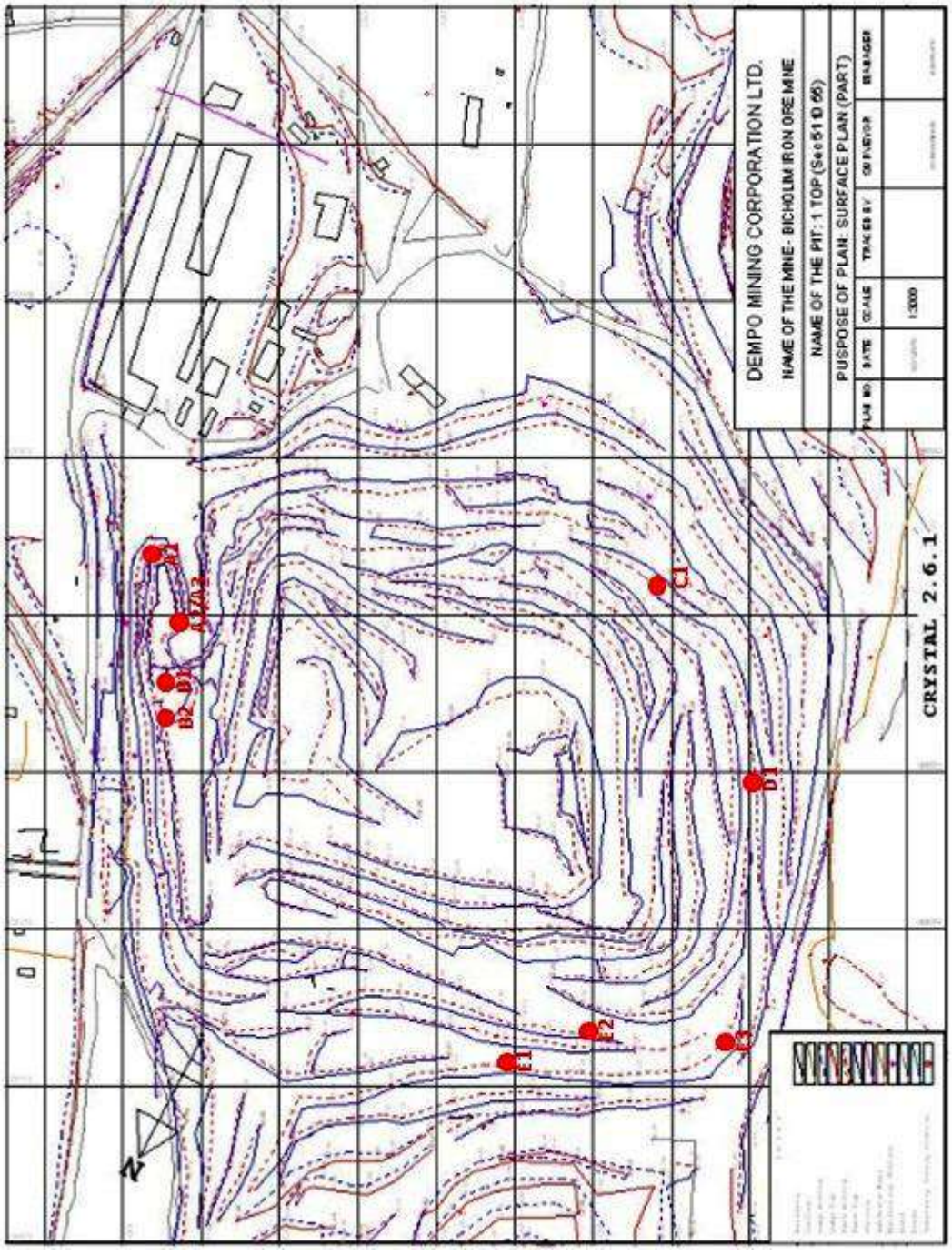

Figure 5. Surface plan of 1 Top pit with sample locations

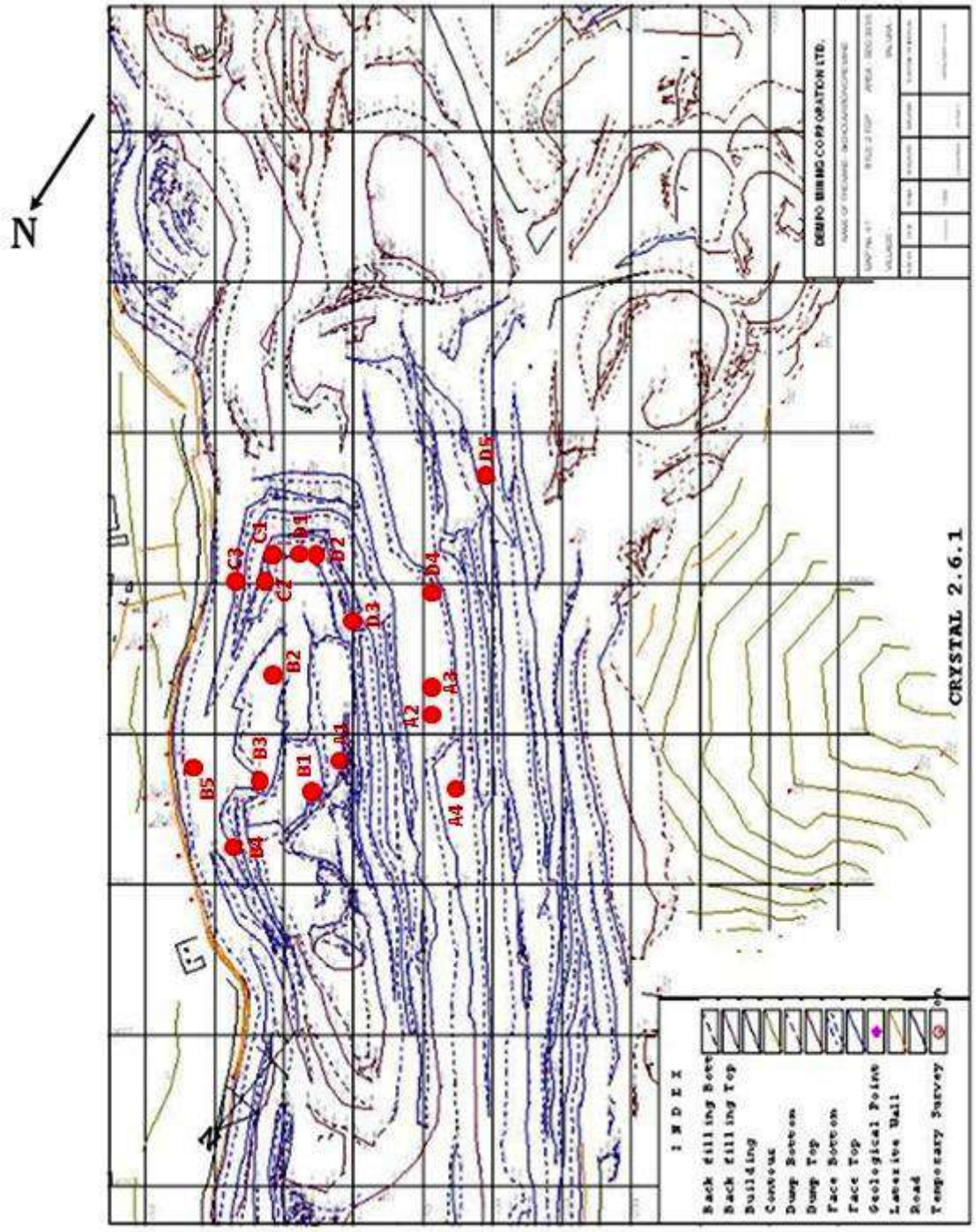

Figure 6. Surface plan of 2 Top pit with sample locations

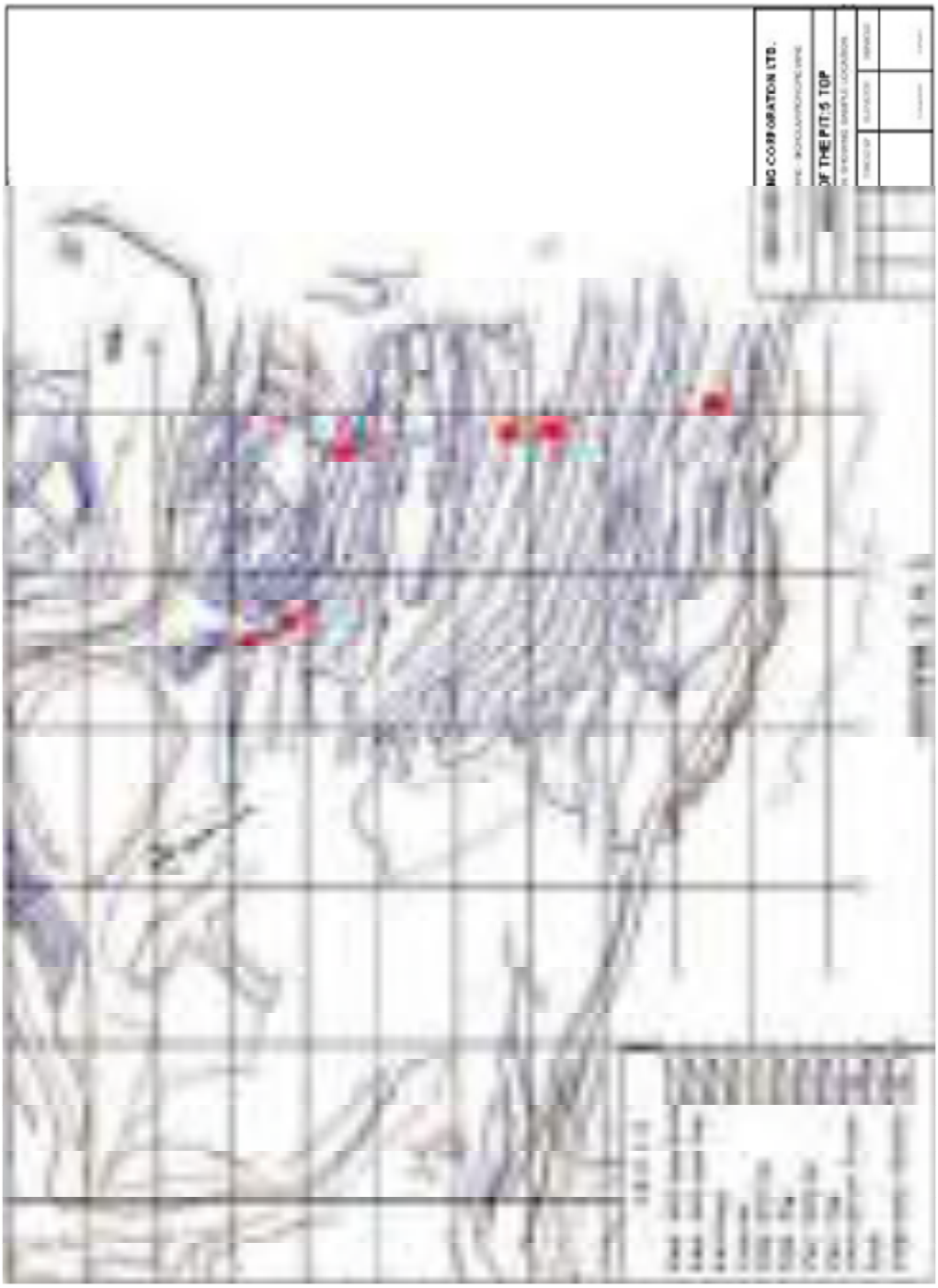

Figure 7. Surface plan of 5 Top pit with sample locations

Figure 8. Surface plan of 5 Bottom pit with sample locations

4. PHYSICO-MECHANICAL PROPERTIES

A number of samples of the material forming the benches were collected from different Sections covering the entire area of the mine. As the material was soft, it was treated like a soil, and soil testing procedures were adopted to determine its physico-mechanical properties. Samples were collected using a core-cutter and hammer in the field (Figure 9), and the bulk density was determined by weighing it at the site itself. For determining the moisture content of the soil samples, the in-situ wet weight of the samples was determined in the field itself.

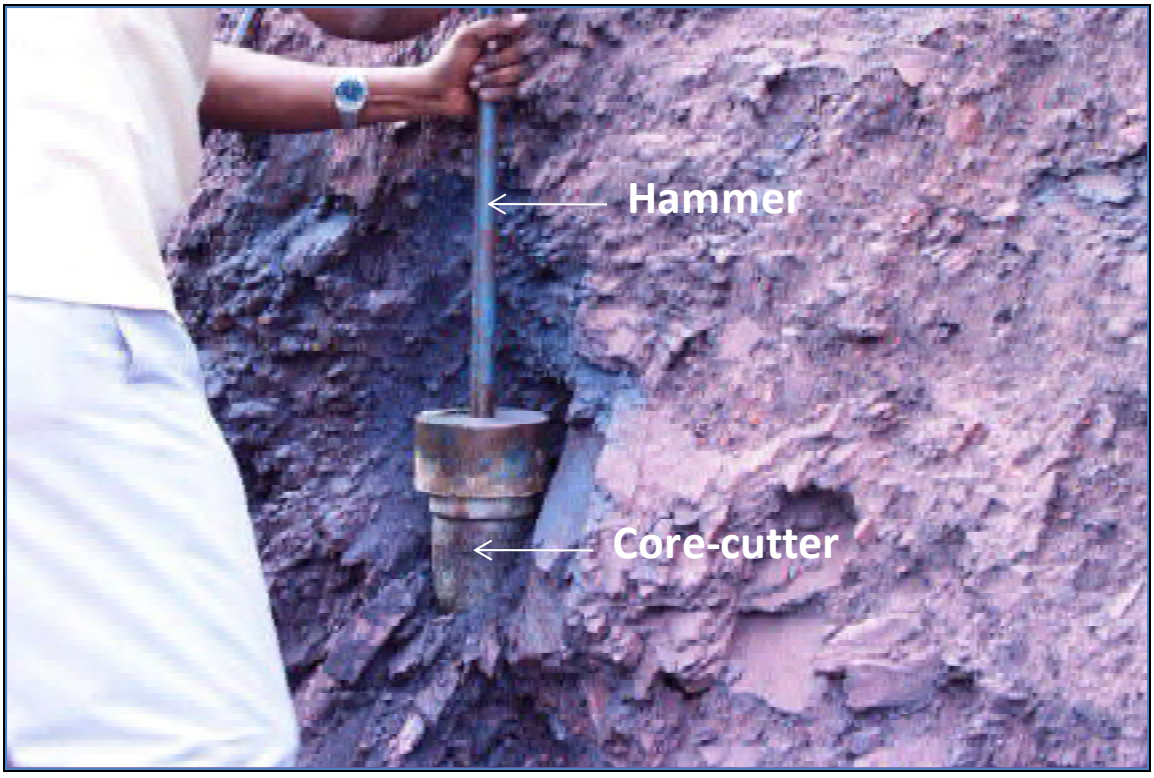

Figure 9. Sample collection for determination of bulk-density at the mine

The location of the samples collected from all the pits of Bicholim mine is as given in Table 1.

Table 1. Location of the samples collected from Bicholim mine

S. No	Sample Id.	Location		
		Section	Bench No.	RL (m)
1 Top pit				
1	A-1	54-East	2	2.67
2	A-2	54-East	1	-0.98
3	B-1	53-East	2	1.16
4	B-2	53-East	2	1.92
5	C-1	54-West	8	19.78
6	D-1	53-West	8	23.85
7	E-1	25-North	9	36.13
8	E-2	25-North	7	27.55
9	E-3	10-North	8	29.12
2 Top pit				
1	A-1	35-West	1	11.49
2	A-2	35-West	7	37.23
3	A-3	35-West	7	37.31
4	A-4	35-West	8	50.18
5	B-1	35-East	1	7.16
6	B-2	35-East	2	16.04
7	B-3	35-East	2	11.16
8	B-4	35-East	3	18.13
9	B-5	35-East	5	29.35
10	C-1	36-East	3	22.47
11	C-2	36-East	4	28.30
12	C-3	36-East	6	36.23
13	D-1	36-West	3	23.92
14	D-2	36-West	3	24.13
15	D-3	36-West	3	23.88
16	D-4	36-West	7	43.80
5 Top pit				
1	A-1	7-West	5	46.70
2	A-2	7-West	5	47.55
3	B-1	8-South	4	44.20
4	B-2	8-South	12	91.70
5	B-3	8-South	13	92.64
6	B-4	8-South	18	125.27
5 Bottom pit				
1	A-1	7-South	6	2.90
2	A-2	7-South	10	25.85
3	B-1	6-North	6	2.79

S. No	Sample Id.	Location		
		Section	Bench No.	RL (m)
4	B-2	6-North	9	13.20
5	B-3	6-North	8	7.56

The physical properties of iron ore, Phy, Mn, Li clays and laterite as determined in the field are given in Table 2.

Table 2. Physical properties of samples determined in the field

Sl. No.	Sample Id	Strata type	Bulk density (g/cc)	Moisture content (%)
1 Top pit				
1	A-1	High grade ore	2.79	3
2	A-2	High grade ore	2.47	12
3	B-1	Lim clay mix with ore	2.47	10
4	B-2	Lim clay	2.10	17
5	C-1	Mn clay	2.15	16
6	D-1	Soft laterite	2.27	11
7	E-1	Lumpy ore	2.38	12
8	E-2	Phy clay mix with Mn clay	2.11	13
9	E-3	Hard Laterite	2.65	2
2 Top pit				
1	A-1	High grade ore	2.57	09
2	A-2	Low grade ore mixed with Li clay	2.07	12
3	A-3	Contact between Phy-Mn clay	2.11	19
4	A-4	Phylitic clay	2.12	18
5	B-1	High grade ore	3.04	06
6	B-2	Weathered dyke	2.20	22
7	B-3	Mn clay	1.92	33
8	B-4	Mn clay mixed with Li clay	2.78	12
9	B-5	Laterite	1.87	08
10	C-1	High grade ore	2.68	04
11	C-2	Mn clay	1.92	27
12	C-3	Laterite	2.26	07
13	D-1	Phyllitic weathered dyke	2.06	17
14	D-2	High grade ore	2.42	07

Sl. No.	Sample Id	Strata type	Bulk density (g/cc)	Moisture content (%)
15	D-3	Low grade ore mixed with Li clay	2.28	15
16	D-4	Phylitic clay	2.10	17
5 Top pit				
1	A-1	High grade ore	2.71	03
2	A-2	Low grade ore mixed with Li clay	2.29	04
3	B-1	Phylitic weathered clay	2.17	18
4	B-2	Phyllite	1.75	09
5	B-3	Phyllite	1.82	11
6	B-4	Laterite	2.30	10
7	B-5	Laterite	2.43	08
5 Bottom pit				
1	A-1	Phylitic weathered clay	2.39	12
2	A-2	Lumpy ore	2.36	12
3	B-1	Phylitic weathered clay	2.36	12
4	B-2	Weathered dyke	1.68	11
5	B-3	Phylitic weathered clay-Siliceous	1.89	5

It can be seen that the bulk density for the different lithological units such as high grade iron ore, Mn clay, Phy clay, and low grade ore varies in all the pits. However, the moisture content of the samples from most of the benches is almost negligible except for those from the benches containing Mn clay.

In the laboratory, direct shear tests were conducted to determine the shear strength properties of the samples. The samples were subjected to shearing under vertical/normal stress of 0.05 kg/cm^2, 0.1 kg/cm^2, 0.5 kg/cm^2, and 0.75 kg/cm^2, and the maximum loads at shear were recorded. The results of the tests (Table 3) were used to determine the cohesion and angle of friction. These values are the input parameters for the numerical/limit equilibrium analysis.

Table 3. Shear properties of samples determined from laboratory testing

Sl. No.	Location	Material	Cohesion, kPa	Angle of internal friction, degrees
1 Top pit				
1	A-1	High grade ore	39	41.98
2	A-2	High grade ore	42	45.28
3	B-1	Lim clay mix with ore	39	43.94
4	B-2	Lim clay	29	43.44
5	C-1	Mn clay	26	35.97
6	D-1	Soft laterite	35	38.72
7	E-1	Lumpy ore	33	33.94
8	E-2	Phy clay mix with Mn clay	32	38.06
9	E-3	Hard Laterite	39	35.56
2 Top pit				
1	A-1	High grade ore	31	48.30
2	A-2	Low grade ore mixed with Li clay	39	47.82
3	A-3	Contact between Phy-Mn clay	34	32.70
4	A-4	Phylitic clay	31	31.55
5	B-1	High grade ore	39	47.17
6	B-2	Weathered dyke	38	29.85
7	B-3	Mn clay	26	36.00
8	B-4	Mn clay mixed with Li clay	29	36.85
9	B-5	Laterite	34	47.80
10	C-1	High grade ore	43	43.00
11	C-2	Mn clay	28	30.75
12	C-3	Laterite	36	41.86
13	D-1	Phylitic weathered dyke	33	36.28
14	D-2	High grade ore	39	47.23
15	D-3	Low grade ore mixed with Li clay	31	39.45
16	D-4	Phylitic clay	24	32.78
5 Top pit				
1	A-1	High grade ore	43	41.93
2	A-2	Low grade ore mixed with Li clay	42	45.50
3	B-1	Phylitic weathered clay	24	32.79
4	B-2	Phyllite	29	34.45
5	B-3	Phyllite	28	35.65
6	B-4	Laterite	36	34.18
7	B-5	Laterite	40	36.17
5 Bottom pit				
1	A-1	Phylitic weathered clay	37	34.372

Sl. No.	Location	Material	Cohesion, kPa	Angle of internal friction, degrees
2	A-2	Lumpy ore	34	40.85
3	B-1	Phylitic weathered clay	32	39.38
4	B-2	Weathered dyke	32	37.30
5	B-3	Phylitic weathered clay-Siliceous	24	29.33

5. LIMIT EQUILIBRIUM ANALYSIS

In iron ore mines with soft strata such as at Bicholim, generally circular failures in the benches are experienced (Venkateswarlu, 2007). Keeping this in view, limit equilibrium method was used for the slope stability analysis, considering a number of circular failure surfaces. The analysis was carried out using the software 'Geometrical Algorithm for Limit Equilibrium Numerical Analysis', developed by the BHP, Australia (Galena, 1994). In this, the factor of safety of potential failure surface is computed for different Sections, and the critical failure surface (the surface having the least factor of safety) is identified.

In the limit equilibrium analysis, two different conditions, namely, dry and saturated slopes, were considered to estimate the safety factor. Bishop's method was used for dry conditions, while Bishop's multiple analysis method was used for saturated conditions considering phreatic and piezometeric surfaces (Bishop, 1995). It was observed that the slopes under dry condition are much safer compared to the slopes under fully saturated condition. The presence of ground water reduces the shear strength property of the soil resulting in overall instability. Bishop's method is mainly used for the analysis of circular failures in soft soil slopes.

The analysis was carried out for the individual slopes to determine the optimum bench height and slope angle, and for the overall slopes to determine the ultimate pit slope angle. Eight Sections covering the entire area of the mine

were selected and analyzed. A factor of safety of 1.3 was considered for the long term stability. The slope stability analysis has been done independently for all the pits. The results of the analysis for the individual slopes, overall pit slope, and the ultimate pit slope are discussed below.

5.1 INDIVIDUAL BENCHES

5.1.1 1 Top pit

Limit equilibrium analysis was carried out for the individual slopes to understand the influence of the bench geometry on its stability. Typical benches were identified along Section 52, and 54 towards East – West, and the analysis was carried out for the different lithological units. The parameters influencing the stability were identified, and based on the analysis; a modified design was suggested where required.

In Section 52 towards footwall side in West, the height of the high grade ore bench was 7 m and the slope angle was about 70^{o}. The safety factor calculated for the dry condition was 2.05, and for the saturated condition it was 1.38 (Figure 10). This shows that the slope is fairly stable with the above bench parameters under fully saturated condition also.

In Section 54 towards East on hanging wall side, the height of one bench in Mn clay was 7 m and the slope angle was 70^{o}. The safety factor calculated for the dry condition was 1.90 and for the saturated condition it was 1.16 (Figure 11). This indicated that the slope angle of the bench has to be reduced to enhance its stability under saturated condition. Therefore, the bench parameters were modified by reducing the angle of the bench slope to 64^{o} and reducing the bench height to 6 m. The safety factor of the modified bench for the dry condition was 2.27, and for the saturated condition it was 1.46 (Figure 12).

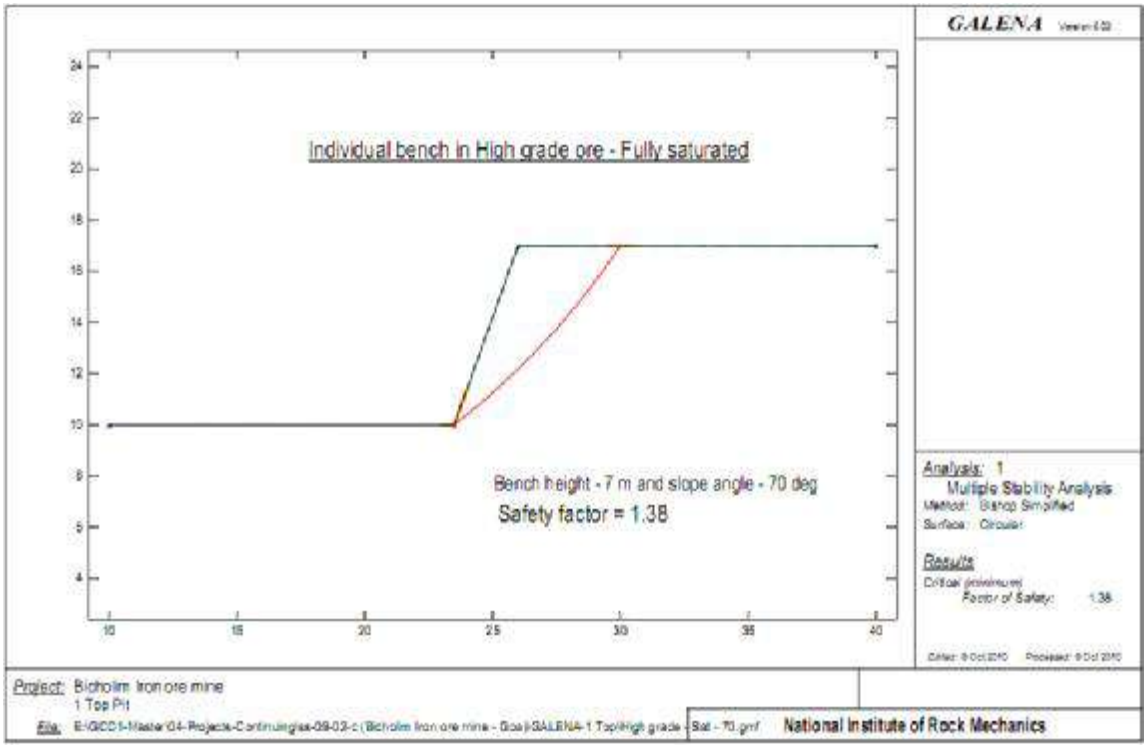

Figure 10. Analysis of a high grade ore saturated bench along Section 52-West

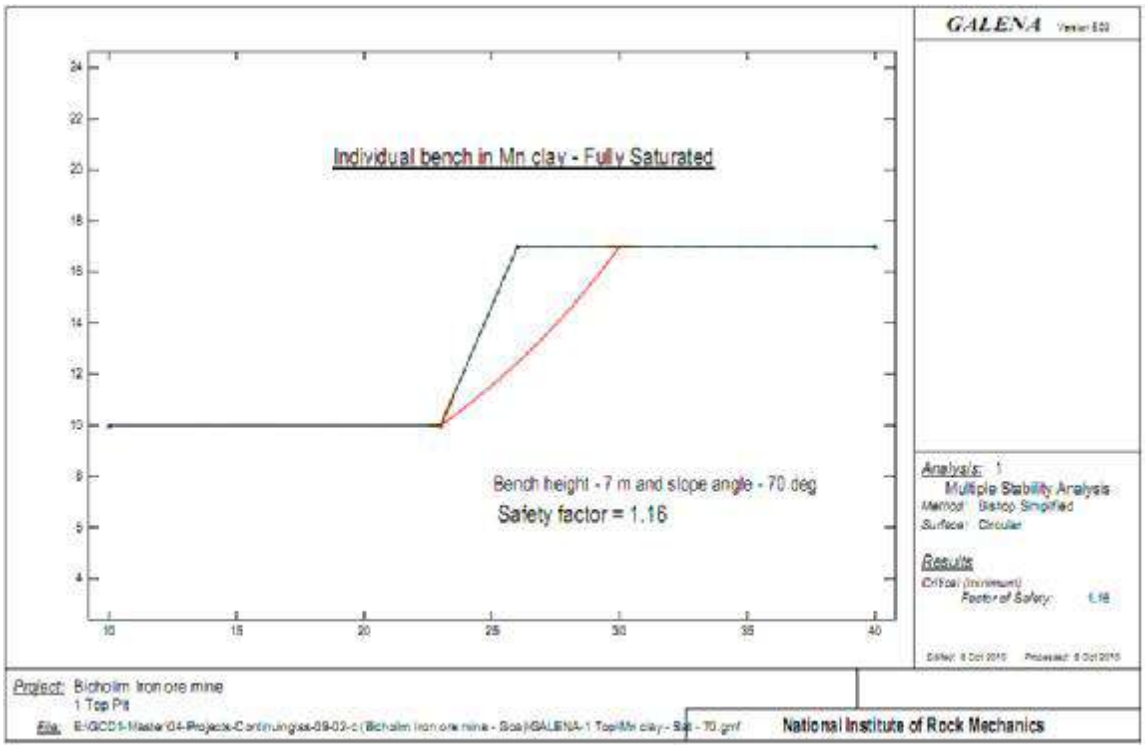

Figure 11. Analysis of a fully saturated Mn clay bench along Section 54-East

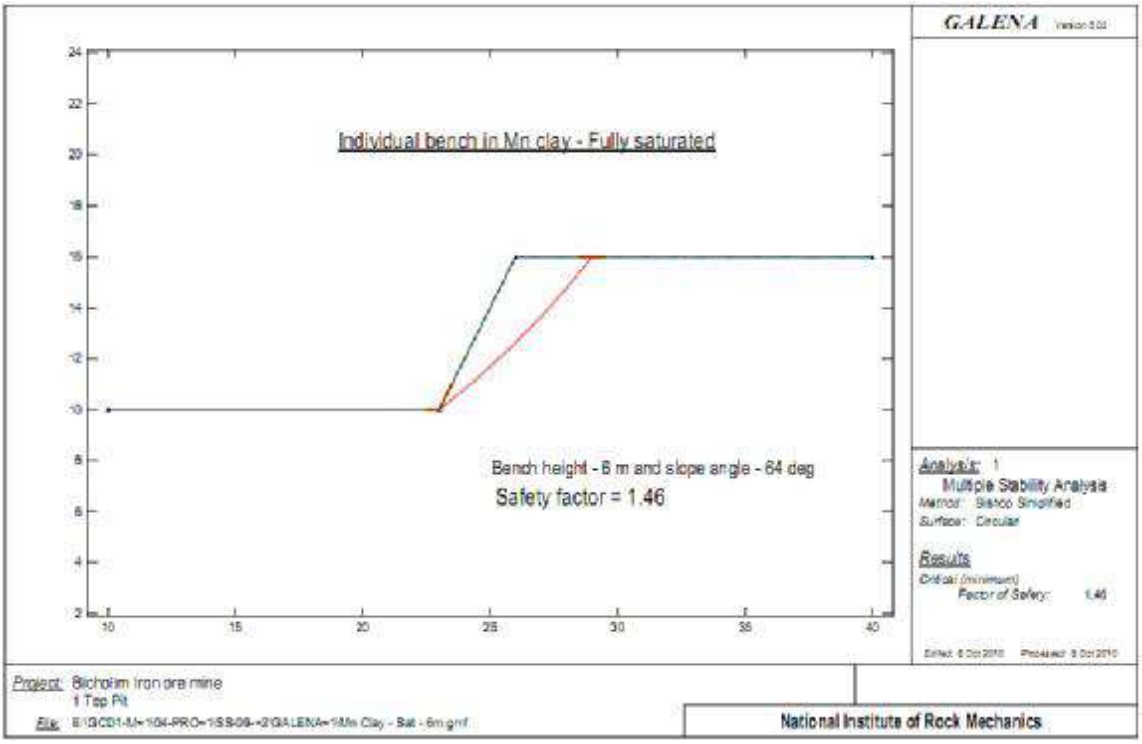

Figure 12. Analysis of the modified Mn clay bench along Section 54-East

The results of the limit equilibrium analysis for the individual benches in different lithological units at 1 Top pit are summarized in Table 4.

Table 4. Safety factors for the individual bench (width = 12m)

Sl. No.	Material	Bench height	Recommended slope angle	Safety factor	
				Dry	Wet
1	High grade ore	7 m	70^o	2.05	1.38
2	Low grade ore	7 m	70^o	2.10	1.41
3	Laterite	7 m	70^o	2.22	1.45
4	Phy clay	6 m	64^o	1.90	1.34
5	Mn clay	6 m	64^o	2.27	1.46
6	Li clay	6 m	64^o	2.10	1.40

5.1.2 2 Top pit

Limit equilibrium analysis was carried out for the individual slopes to understand the influence of the bench geometry on its stability. Typical benches were identified along Section 35, and 36 towards East – West, and the analysis was carried out for the different lithological units. The parameters influencing the stability were identified, and based on the analysis, a modified design was suggested where required.

In Section 35 towards footwall side in West, the height of the high grade ore bench was 7 m and the slope angle was about 70^{o}. The safety factor calculated for the dry condition was 2.25 (Figure 13), and for the saturated condition it was 1.45 (Figure 14). This shows that the slope is fairly stable with the above bench parameters under fully saturated condition also.

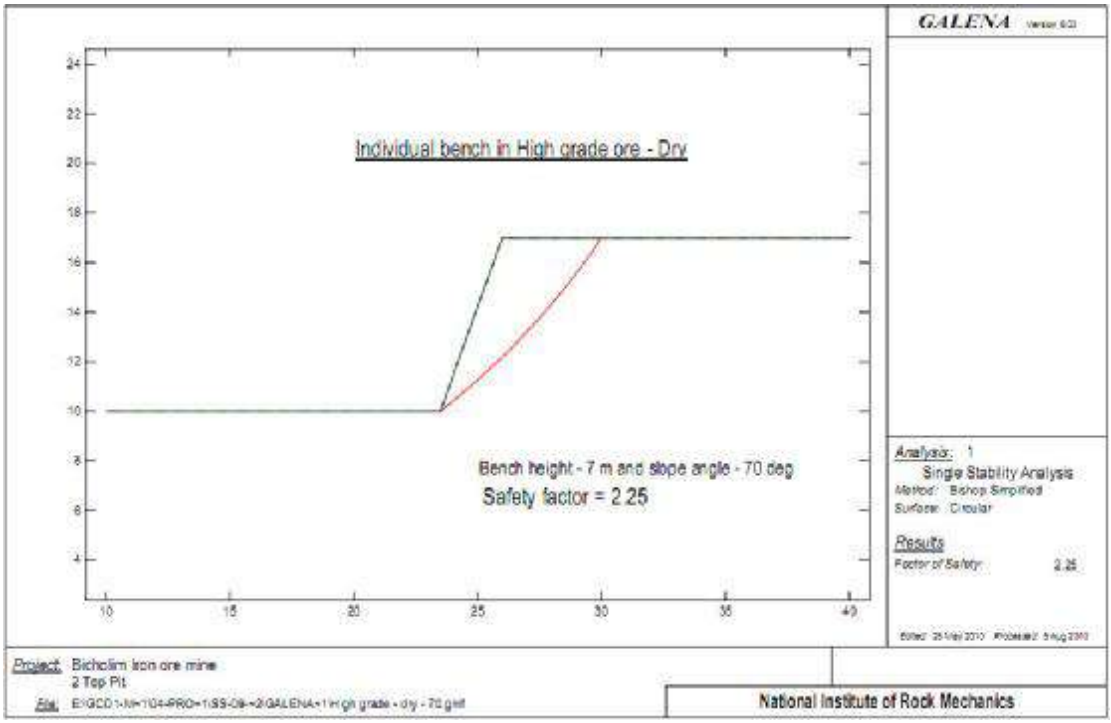

Figure 13. Analysis of a high grade ore dry bench along Section 35-West

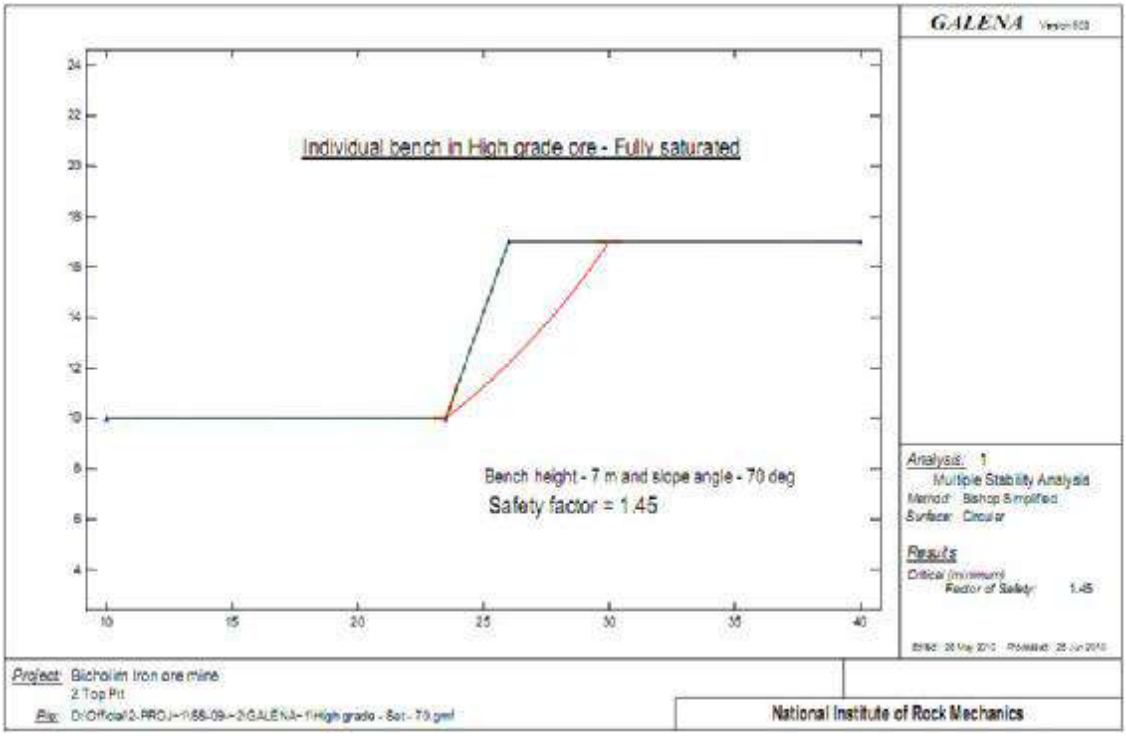

Figure 14. Analysis of high grade ore saturated bench along Section 35-West

In Section 35 towards West, the height of one bench in Phy clay was 7 m, with a slope angle of 70^{o}. The safety factor calculated for the dry condition was 1.55, and for the saturated condition it was 0.94 (Figure 15 - 16). This indicated that the slope angle of the bench has to be reduced to enhance its stability under saturated condition.

Therefore, the bench parameters were modified by reducing the angle of the bench slope to 64^{o} and reducing the bench height to 6 m. The safety factor of the modified bench for the dry condition was 1.87 and for the saturated condition it was 1.32 (Figure 17).

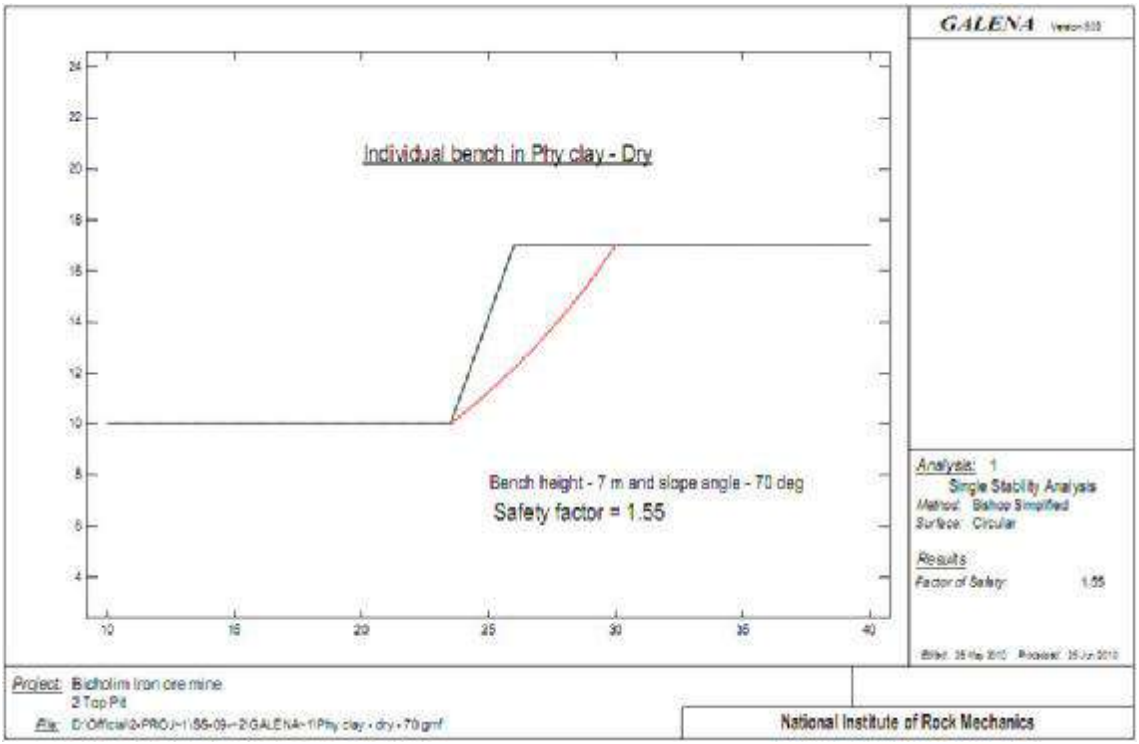

Figure 15. Analysis of a dry Phy clay bench along Section 35-West

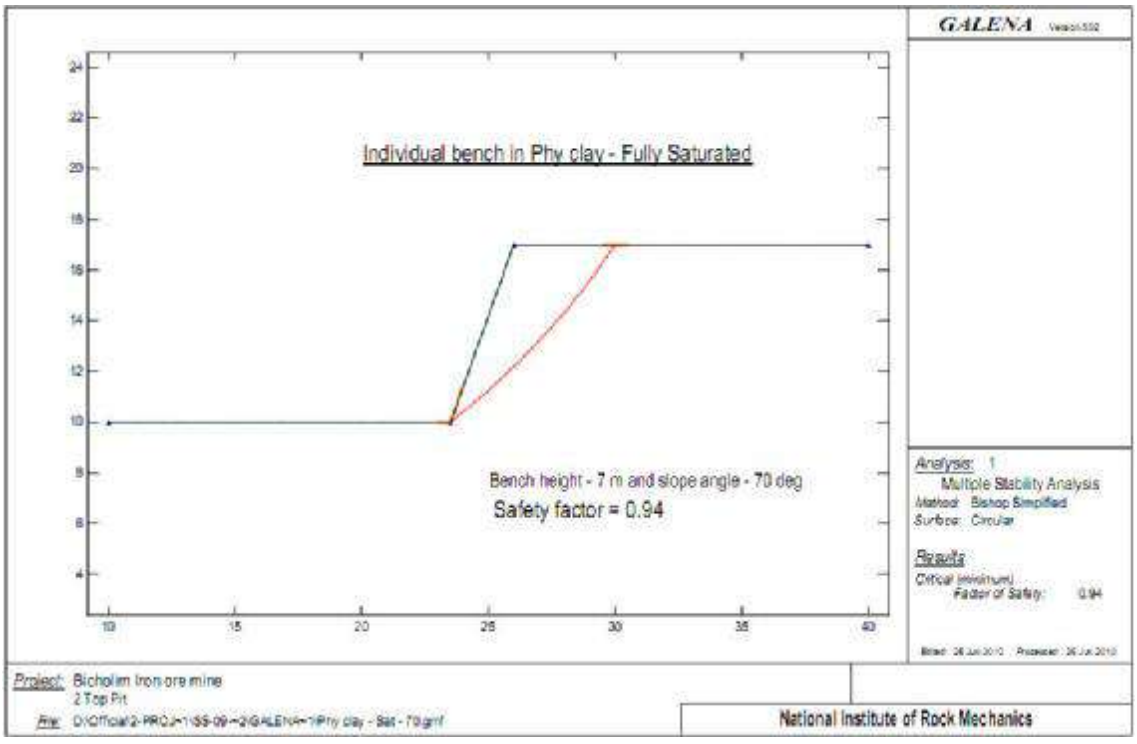

Figure 16. Analysis of a fully saturated Phy clay bench along Section 35-West

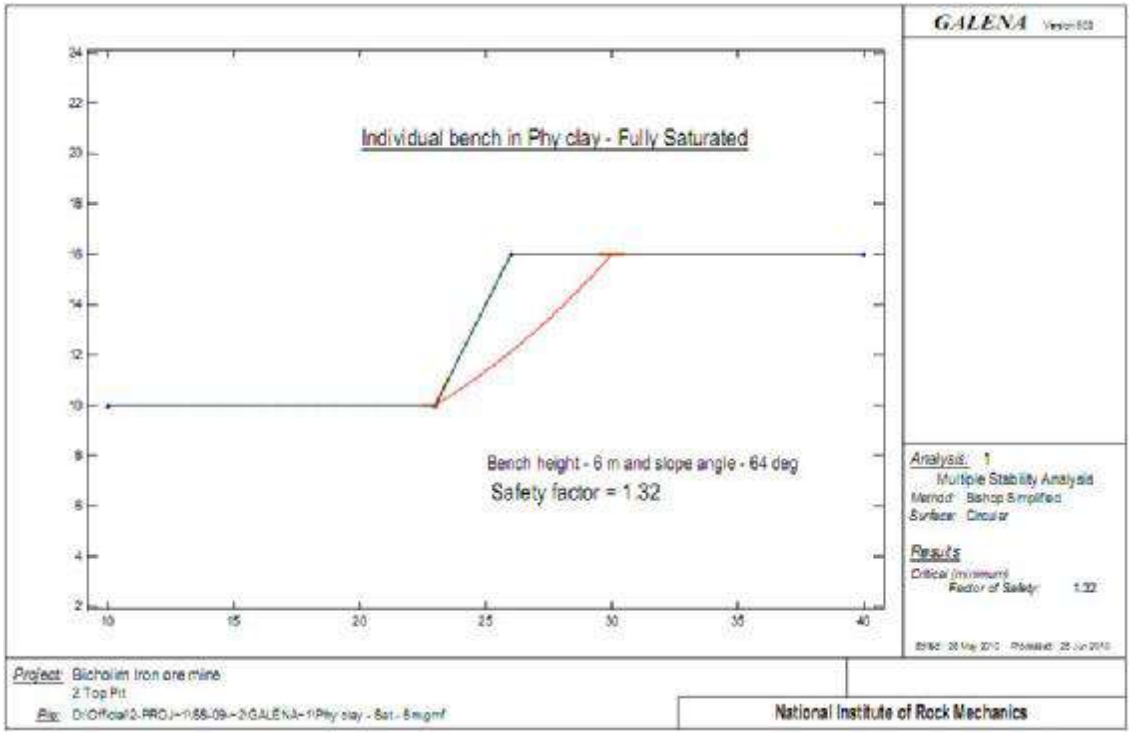

Figure 17. Analysis of the modified Phy clay bench along Section 35-West

In Section 35 towards East on hanging wall side, the height of one bench in Mn clay was 7 m and the slope angle was 70^{o}. The safety factor calculated for the dry condition was 1.91 and for the saturated condition it was 1.16 (Figure 18). This indicated that the slope angle of the bench has to be reduced to enhance its stability under saturated condition.

Therefore, the bench parameters were modified by reducing the angle of the bench slope to 64^{o} and reducing the bench height to 6 m. The safety factor of the modified bench for the dry condition was 2.30 and for the saturated condition it was 1.55 (Figure 19). This indicates the stability of these benches with the modified bench parameters.

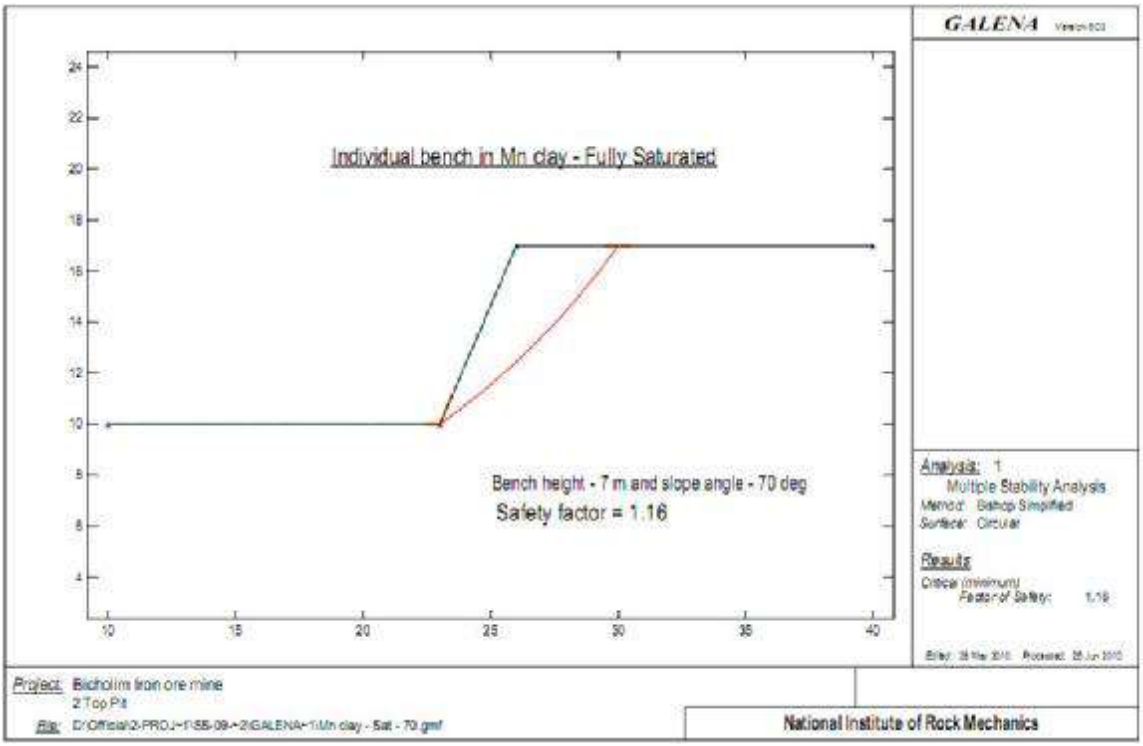

Figure 18. Analysis of a fully saturated Mn clay bench along Section 35-East

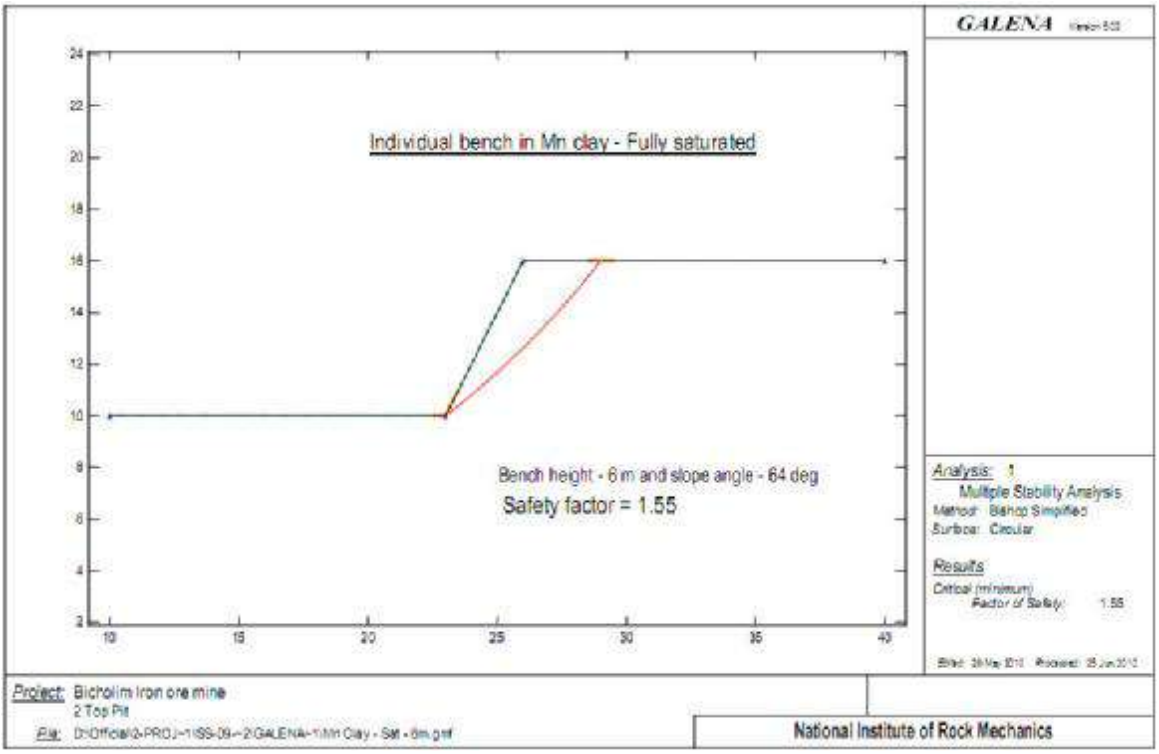

Figure 19. Analysis of the modified Mn clay bench along Section 35-East

In Section 35 towards East, the height of a low grade ore bench was 7 m and the slope angle was 70^{o}. The shear strength properties were high as compared to the different clays in the mine. The safety factor calculated for the dry condition was 2.29 and for the saturated condition it was 1.37 (Figure 20). This shows that the slope is stable with the above bench parameters even under fully saturated condition. Similarly, in Section 36 towards West in footwall side, the height of one bench in Laterite was 7 m and the slope angle was 70^{o}. The safety factor calculated for the dry condition was 2.18 and for the saturated condition it was 1.38 (Figure 21). This shows that the slope is stable with the above bench parameters even under fully saturated condition.

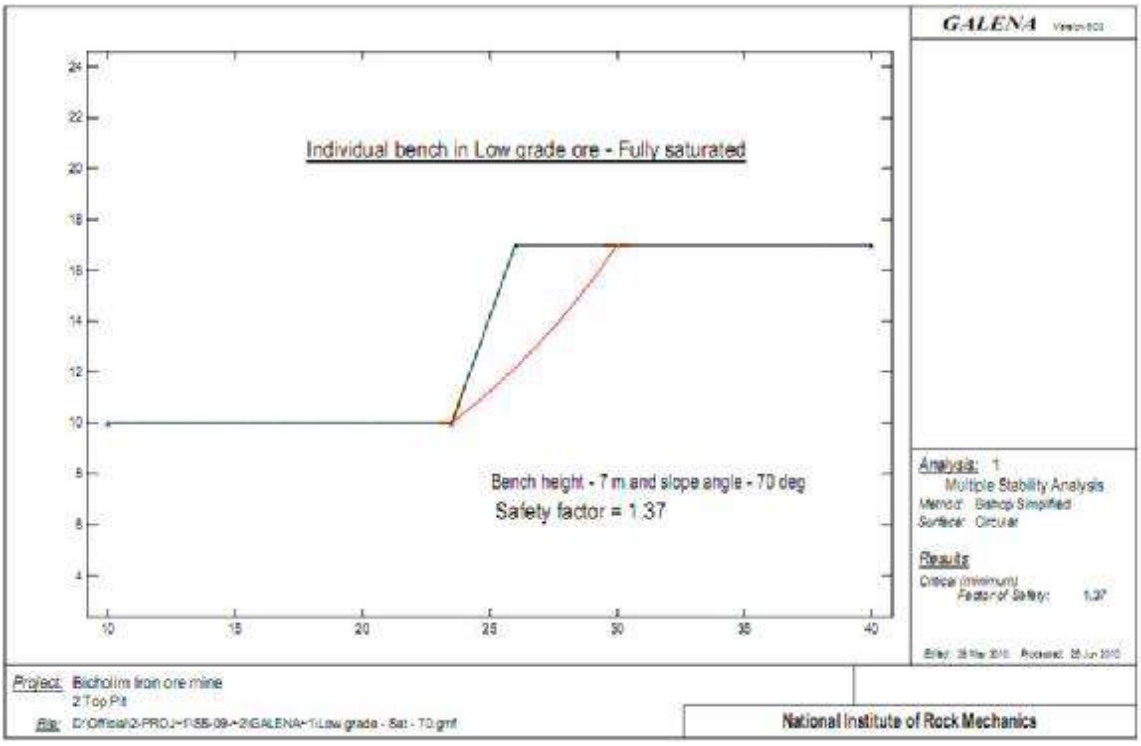

Figure 20. Analysis of a Low grade ore bench along Section 35-East

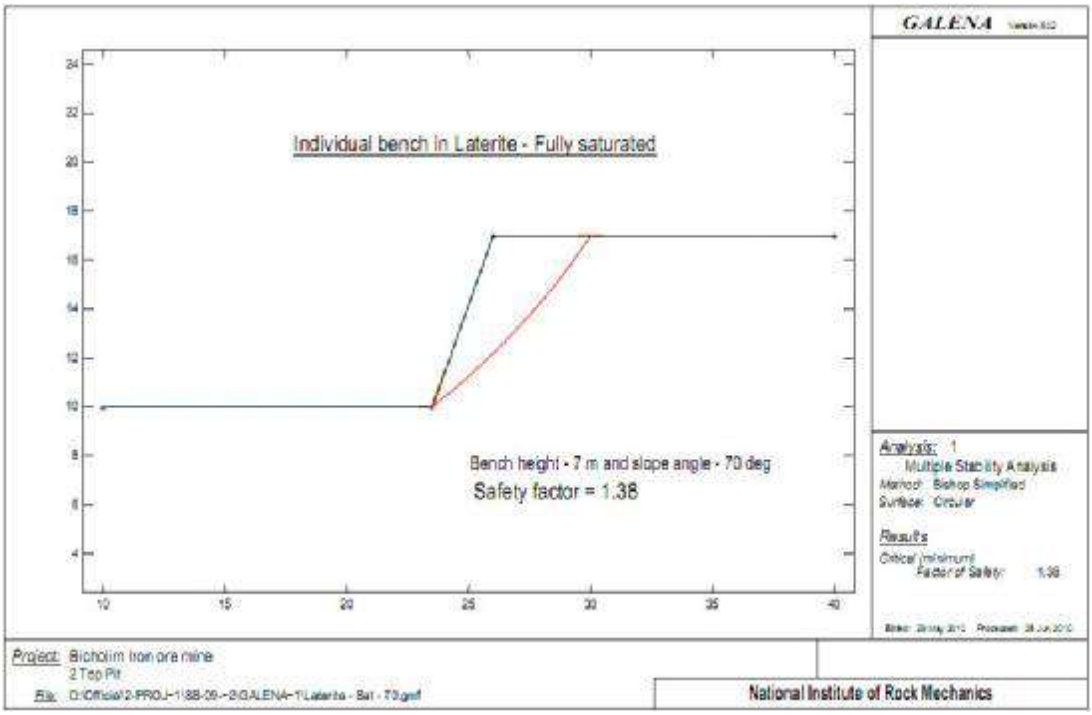

Figure 21. Analysis of a Laterite bench along Section 36-West

The results of the limit equilibrium analysis for the above individual benches are summarized in Table 5.

Table 5. Safety factors for the individual bench (width = 12m)

Sl. No.	Material	Bench height	Recommended slope angle	Safety factor	
				Dry	Wet
1	High grade ore	7 m	70^o	2.25	1.45
2	Low grade ore	7 m	70^o	2.29	1.37
3	Laterite	7 m	70^o	2.18	1.38
4	Phy clay	6 m	64^o	1.87	1.32
5	Mn clay	6 m	64^o	2.30	1.55

5.1.3 5 Top pit

Limit equilibrium analysis was carried out for the individual slopes to understand the influence of the bench geometry on its stability. Typical benches were identified along Section 7, and 8 towards East – West, and the analysis

was carried out for the different lithological units. The parameters influencing the stability were identified, and based on the analysis; a modified design was suggested where required.

In Section 7 towards footwall side in West, the height of the high grade ore bench was 7 m and the slope angle was about 70^{o}. The safety factor calculated for the dry condition was 2.15, and for the saturated condition it was 1.49 (Figure 22). This shows that the slope is fairly stable with the above bench parameters under fully saturated condition also.

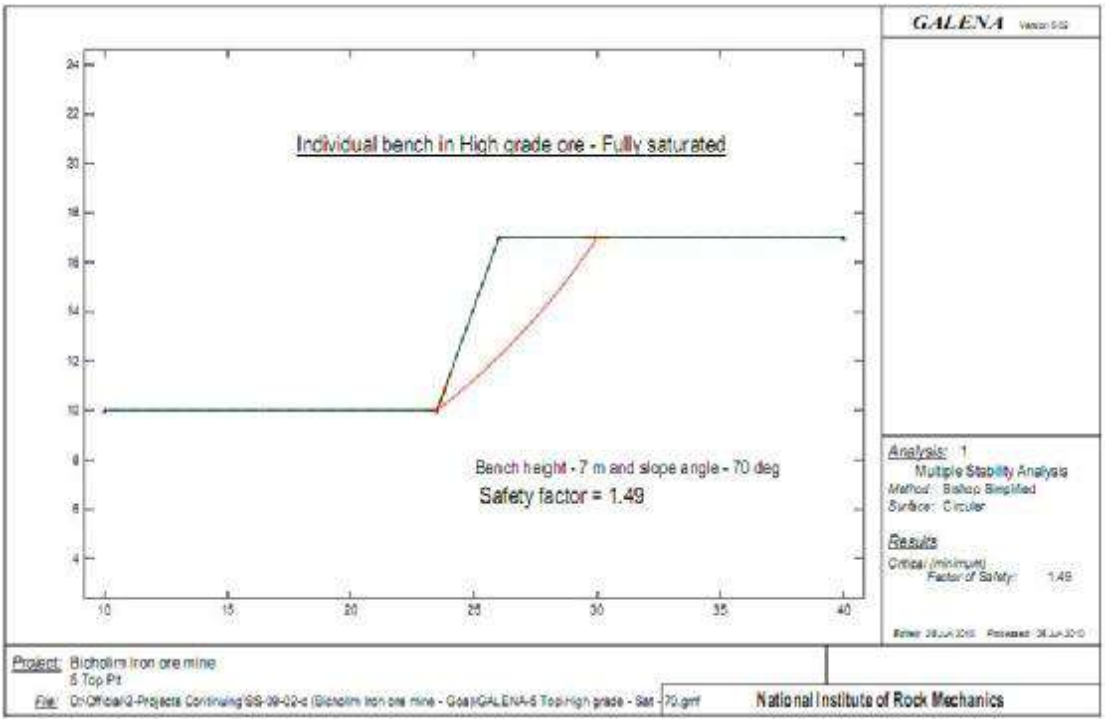

Figure 22. Analysis of high grade ore saturated bench along Section 7-West

In Section 7 towards South, the height of one bench in Phy clay was 7 m, with a slope angle of 70^{o}. The safety factor calculated for the dry condition was 1.56, and for the saturated condition it was 0.99, which indicated that the slope angle of the bench has to be reduced to enhance its stability under saturated condition. Therefore, the bench parameters were modified by reducing the angle of the bench slope to 64^{o} and reducing the bench height to 5 m. The safety

factor of the modified bench for the dry condition was 2.13, and for the saturated condition it was 1.53 (Figure 23).

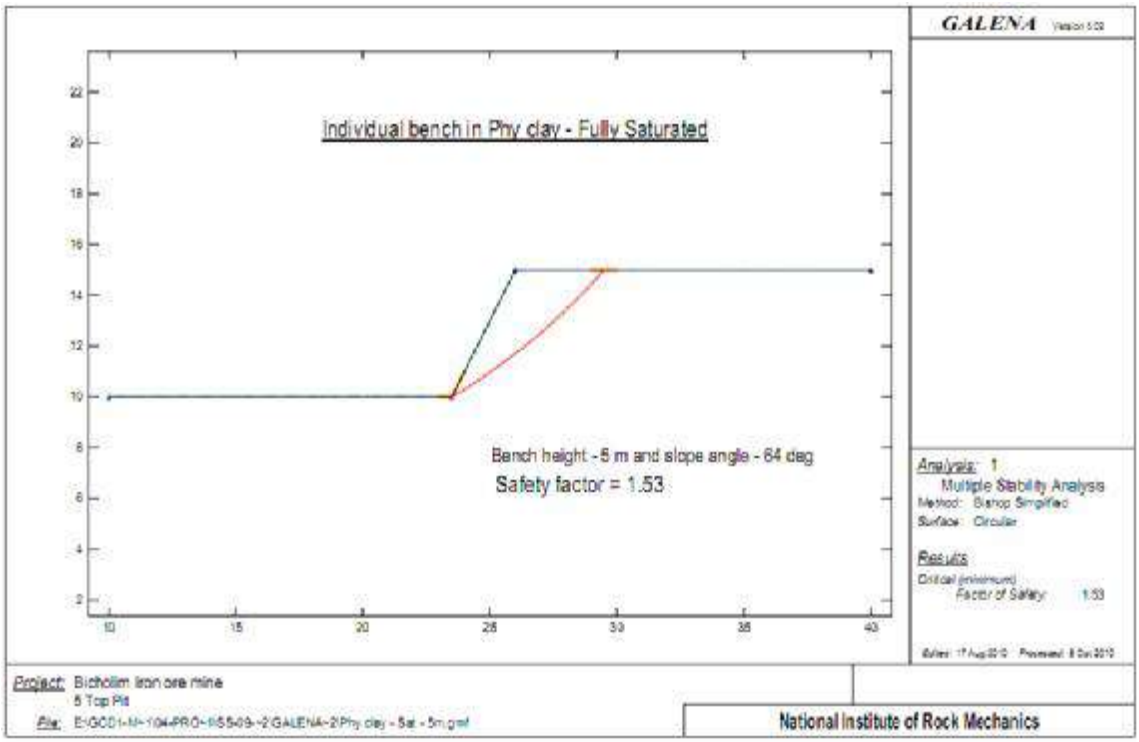

Figure 23. Analysis of the modified Phy clay bench along Section 7-West

The results of the limit equilibrium analysis for the above individual benches are summarized in Table 6.

Table 6. Safety factors for the individual bench (width = 12m)

Sl. No.	Material	Bench height	Recommended slope angle	Safety factor	
				Dry	Wet
1	High grade ore	7 m	70^o	2.15	1.49
2	Low grade ore	7 m	70^o	2.47	1.58
3	Laterite	7 m	70^o	2.04	1.44
4	Phy clay	5 m	64^o	2.13	1.53

5.1.4 5 Bottom pit

Limit equilibrium analysis was carried out for the individual slopes to understand the influence of the bench geometry on its stability. Typical benches were identified along Section 6, and 7 towards East – West, and the analysis was carried out for the different lithological units. The parameters influencing the stability were identified, and based on the analysis; a modified design was suggested where required.

In Section 6 towards footwall side in West, the height of the low grade ore bench was 7 m and the slope angle was about 70^{o}. The safety factor calculated for the dry condition was 2.27, and for the saturated condition it was 1.41 (Figure 24). This shows that the slope is fairly stable with the above bench parameters under fully saturated condition also.

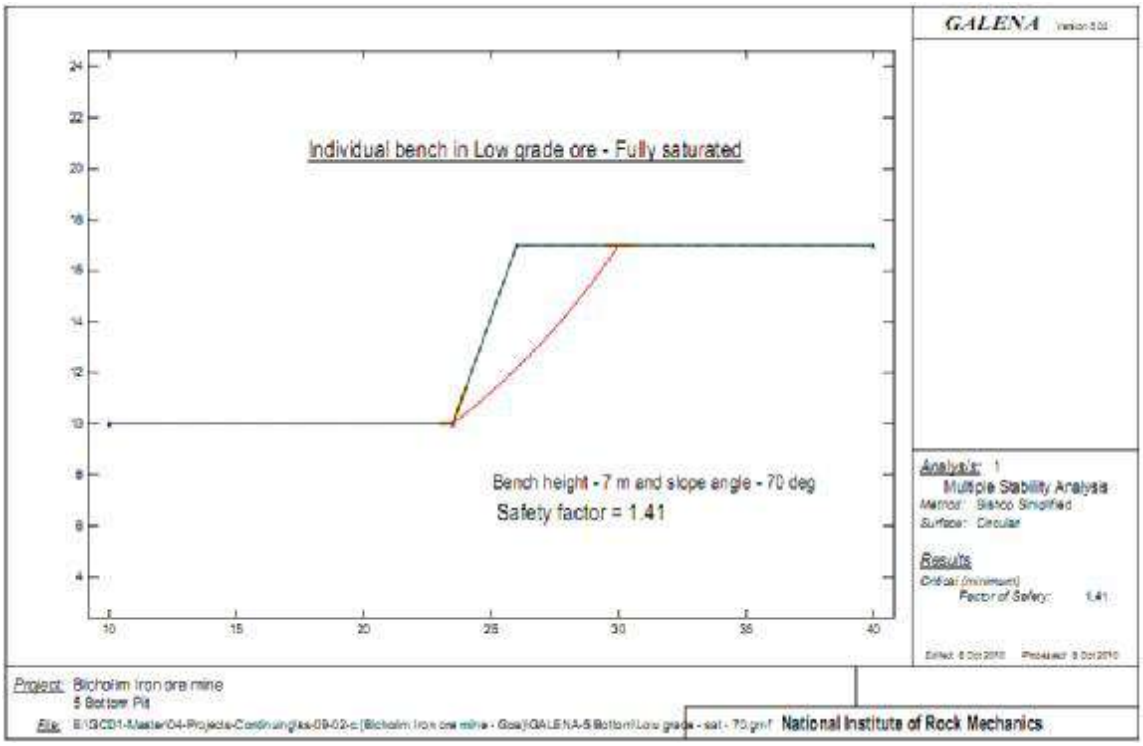

Figure 24. Analysis of low grade ore saturated bench along Section 6-West

In Section 6 towards West, the height of one bench in Phy clay was 7 m, with a slope angle of 70^o. The safety factor calculated for the dry condition was 1.65, and for the saturated condition it was 1.04, which indicated that the slope angle of the bench has to be reduced to enhance its stability under saturated condition. Therefore, the bench parameters were modified by reducing the angle of the bench slope to 64^o and reducing the bench height to 6 m. The safety factor of the modified bench for the dry condition was 1.95, and for the saturated condition it was 1.33 (Figure 25).

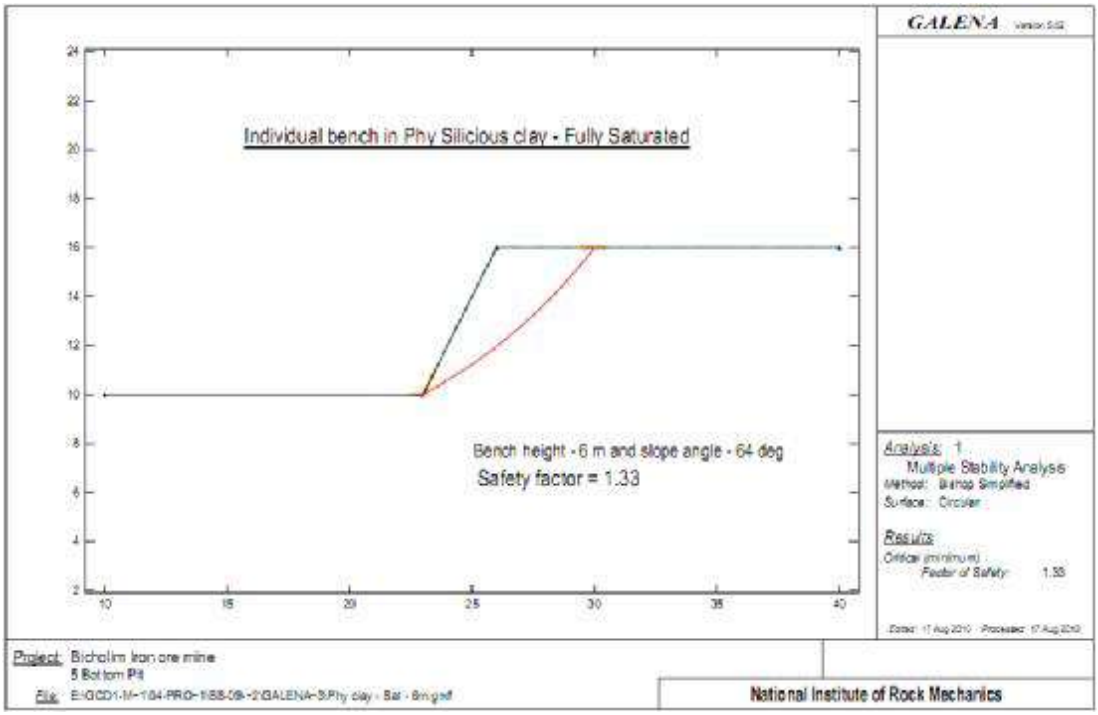

Figure 25. Analysis of the modified Phy clay bench along Section 6-West

The results of the limit equilibrium analysis for the above individual benches are summarized in Table 7.

Table 7. Safety factors for the individual bench (width = 12m)

Sl. No.	Material	Bench height	Recommended slope angle	Safety factor	
				Dry	Wet
1	High grade ore	7 m	70^o	2.15	1.49
2	Low grade ore	7 m	70^o	2.27	1.41
3	Phy clay	6 m	64^o	1.95	1.33

5.2 OVERALL PIT SLOPE

The slope stability analysis was carried out for the overall pits for different sections in all the pits, considering dry and saturated conditions. Critical failure surfaces were identified for the different slope profiles and the factor of safety was estimated. The present slopes are found stable under dry condition with a safety factor of more than 2.0. Some of the slope sections from all the pits under wet condition (fully saturated condition) are given in Figures 26 – 35.

5.2.1 1 Top pit

In one Section along F/w side, the safety factor of the overall pit slope was estimated for the fully saturated condition. The individual benches in Phy clay were considered as per the recommendation with a bench height of 6 m. It was imperative to understand the influence of the dump on the top benches, hence the dumps were also simulated. The safety factor for the present overall slope of 23^{o} with the modified individual bench parameters was found to be 1.35. This indicates that the present overall slope is fairly stable under fully saturated condition (Figure 26).

The safety factor for the ultimate pit slope at a depth of 130 m with more modification in individual benches was found to be 1.30. It has to be noted that the Phy clay benches below 100 m are designed with a maximum bench height of 5 m, and with a minimum bench width of 15 m. Further, at least two high grade ore benches have to be left against the ultimate pit slope in order to provide the recommended safety factor (Figure 27).

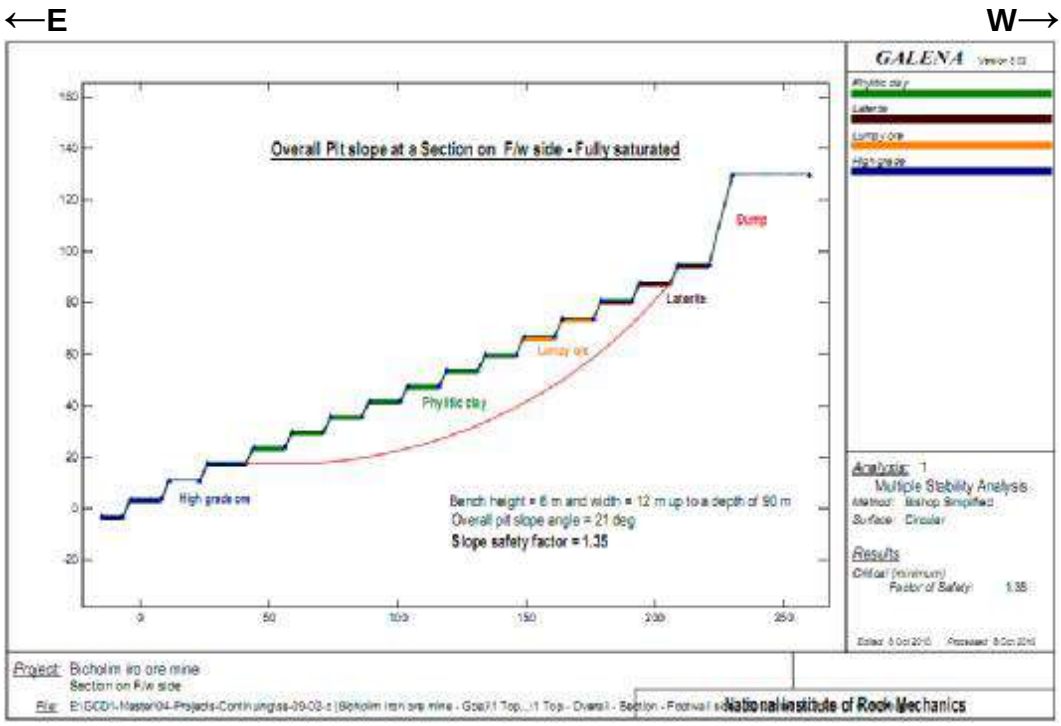

Figure 26. Analysis of Section on F/w side for fully saturated condition (Overall slope angle = 23.2^{o}; SF = 1.35)

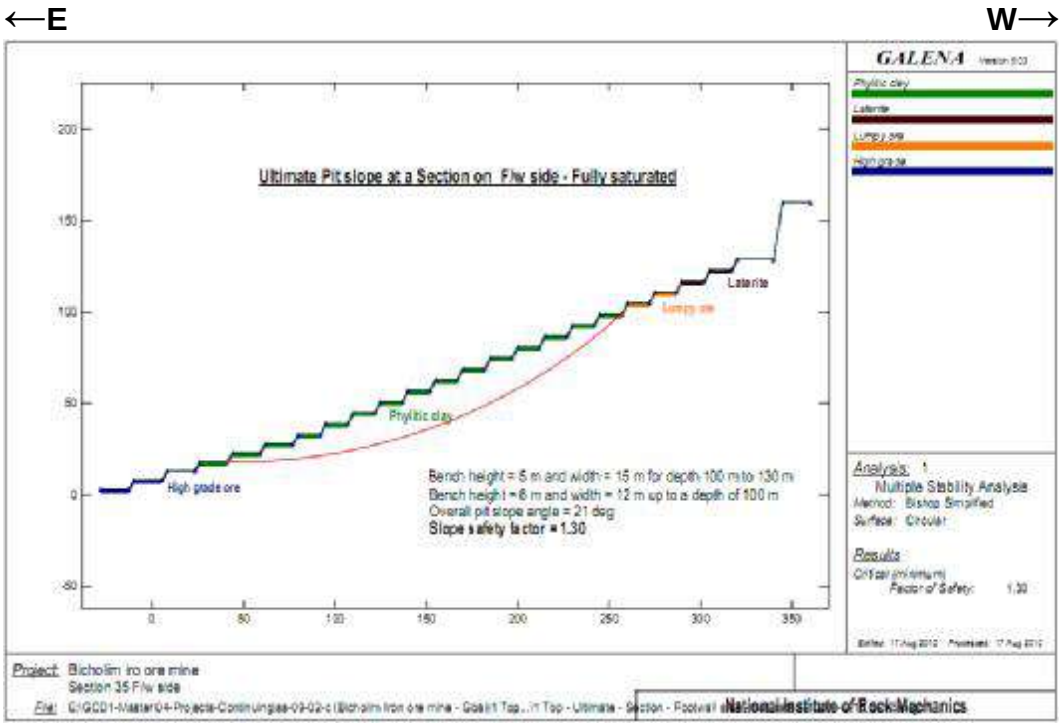

Figure 27. Analysis of ultimate pit slope for 130 m depth on F/w side (Overall slope angle = 21^{o}; SF = 1.30)

5.2.2 2 Top pit

In Section 35 towards West in 2 Top pit, the individual bench parameters were taken as per the recommendations made in table no. 4 and the bench width was considered as 12 m. The limit equilibrium analysis was carried out for dry as well as fully saturated condition. The results show that the overall slope of 26^{o} has a safety factor of 1.55 which is above the recommended safety factor 1.3 (Figure 28). Similarly, in Section 36 towards West, the overall slope of 26^{o} has a safety factor of 1.49 (Figure 29).

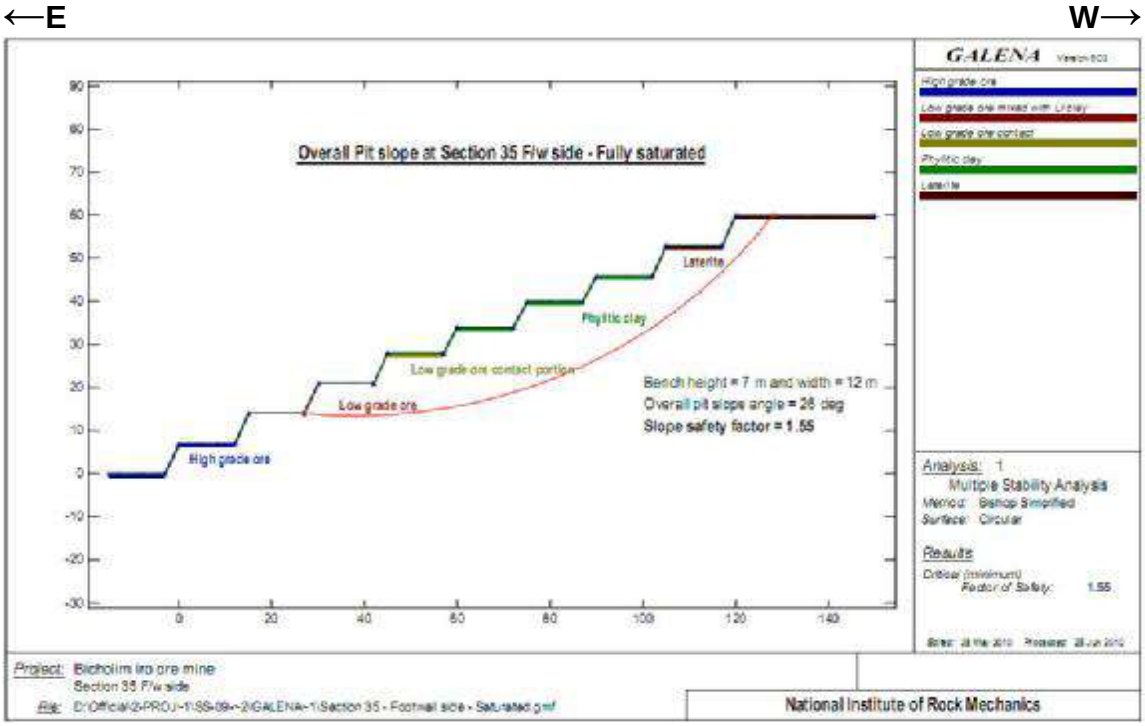

Figure 28. Analysis of Section 35-West for fully saturated condition (Overall slope angle = 26^{o}; SF = 1.55)

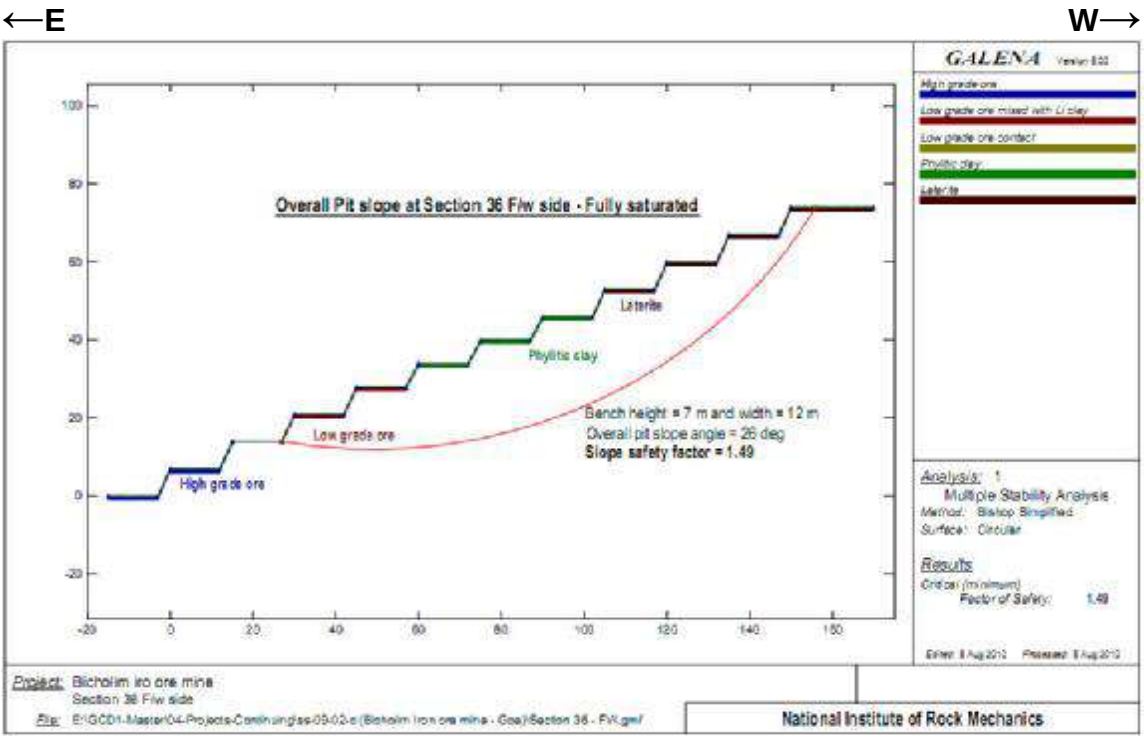

Figure 29. Analysis of Section 36-West for fully saturated condition (Overall slope angle = 26^o; SF = 1.49)

The main parameters for the slope design are the overall slope angle and the factor of safety. As mentioned earlier, a safety factor of 1.3 is considered for designing the slopes. It can be seen from the results of the analysis that the existing slopes at the mine at present are stable with an average overall pit slope angle of about 26^o.

The safe overall pit slope angle was estimated for the proposed depth of 100 m. Critical failure surfaces were identified for the profile at Section 35 towards West. The results show that the optimum safe overall slope angle under fully saturated condition for a depth of 100 m shall be 23^o (Figure 30).

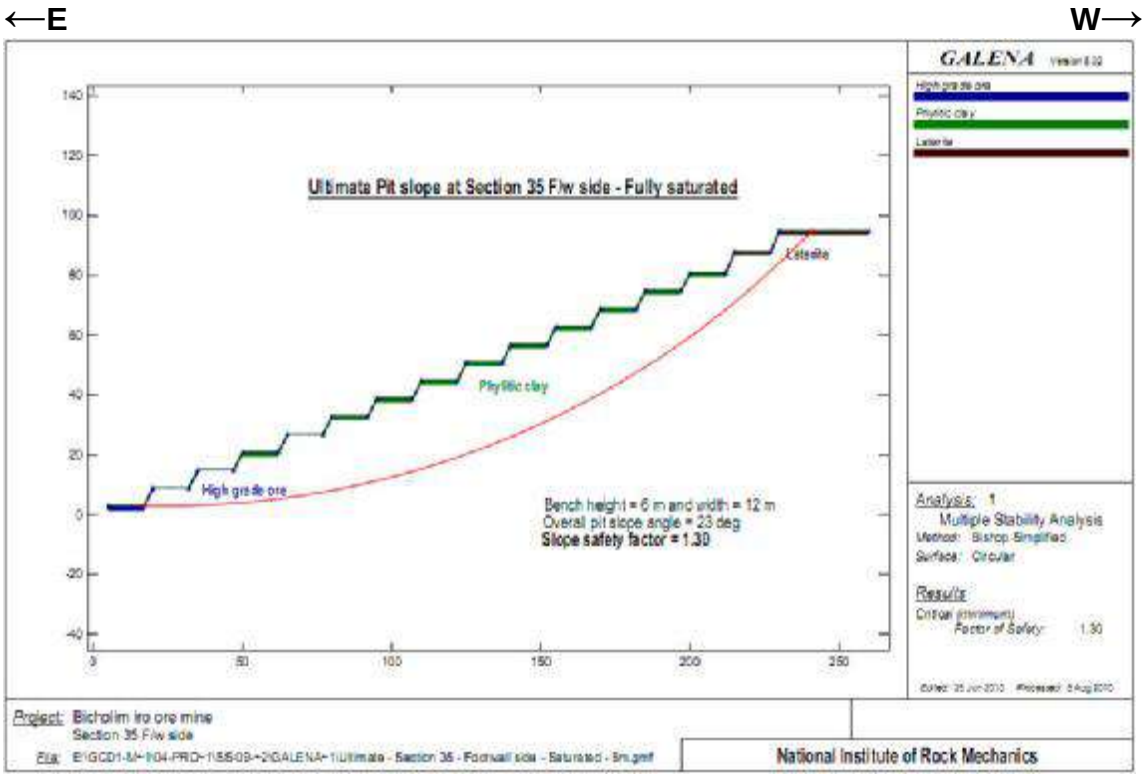

Figure 30. Analysis of overall pit slope for 100 m depth along Section 35-West

As mentioned earlier, a safe overall pit slope shall have minimum of 1.3 safety factor. Keeping this in view, stability analysis was also carried out for the proposed maximum depth of 130 m. Critical failure surfaces were identified for the profiles at Section 35 and Section 36 - West. The stability was assessed for different overall slope angles, to obtain a factor of safety of 1.3 under fully saturated condition. The results show that the optimum ultimate pit slope angle for a depth of 130 m shall be 20.7^{o}. To achieve the recommended safety factor, the benches in Phy clay needs to be maintained at a height of 5 m and 15 m wide for the depth range from 100 to 130 m (Figure 31).

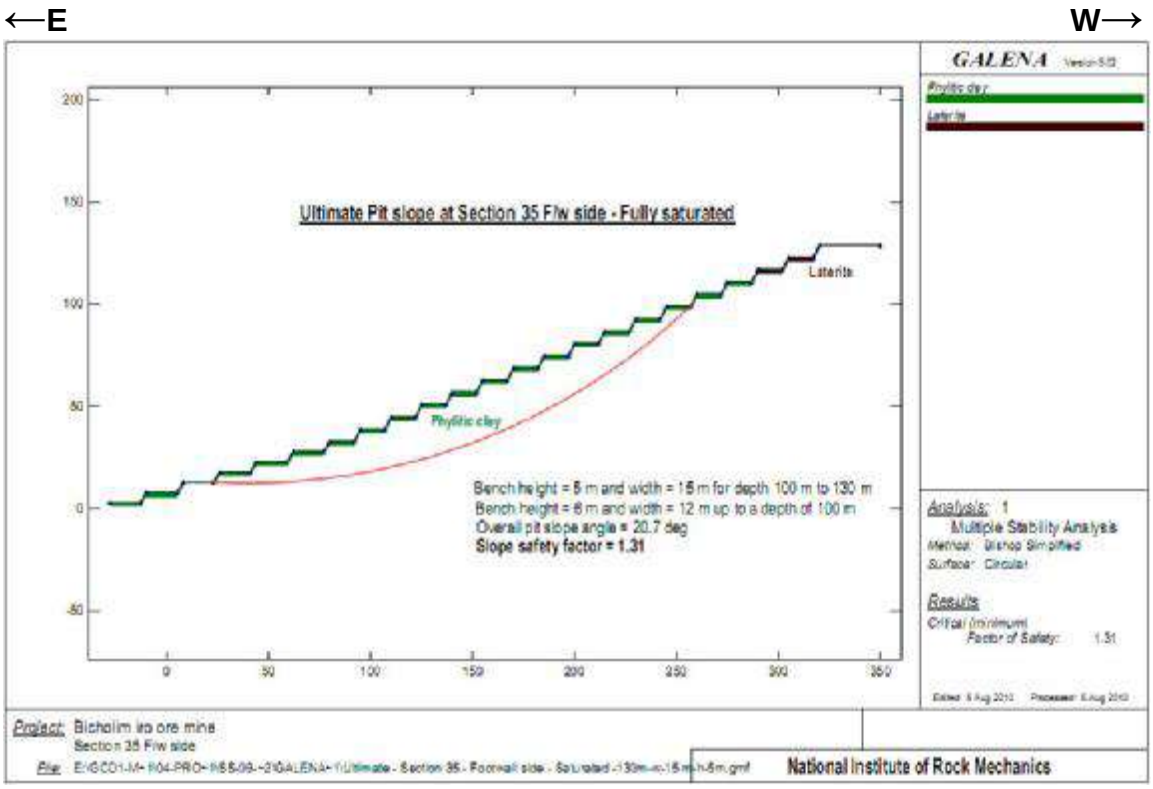

Figure 31. Analysis of ultimate pit slope for 130 m depth along Section 35-West

5.2.3 5 Top pit

In Section 7 in footwall (F/w) side, the safety factor of the overall pit slope was estimated for the fully saturated condition. The safety factor for the present average overall slope of 22^{o} with the modified individual bench parameters was found to be 1.46. This indicates that the present overall slope at a depth of 70 m is fairly stable under fully saturated condition (Figure 32).

The safety factor for the ultimate pit slope of 21^{o} at a depth of 100 m with more modification in individual benches was found to be 1.31. Further, at least two high grade ore benches have to be left against the ultimate pit slope in order to provide the recommended safety factor (Figure 33).

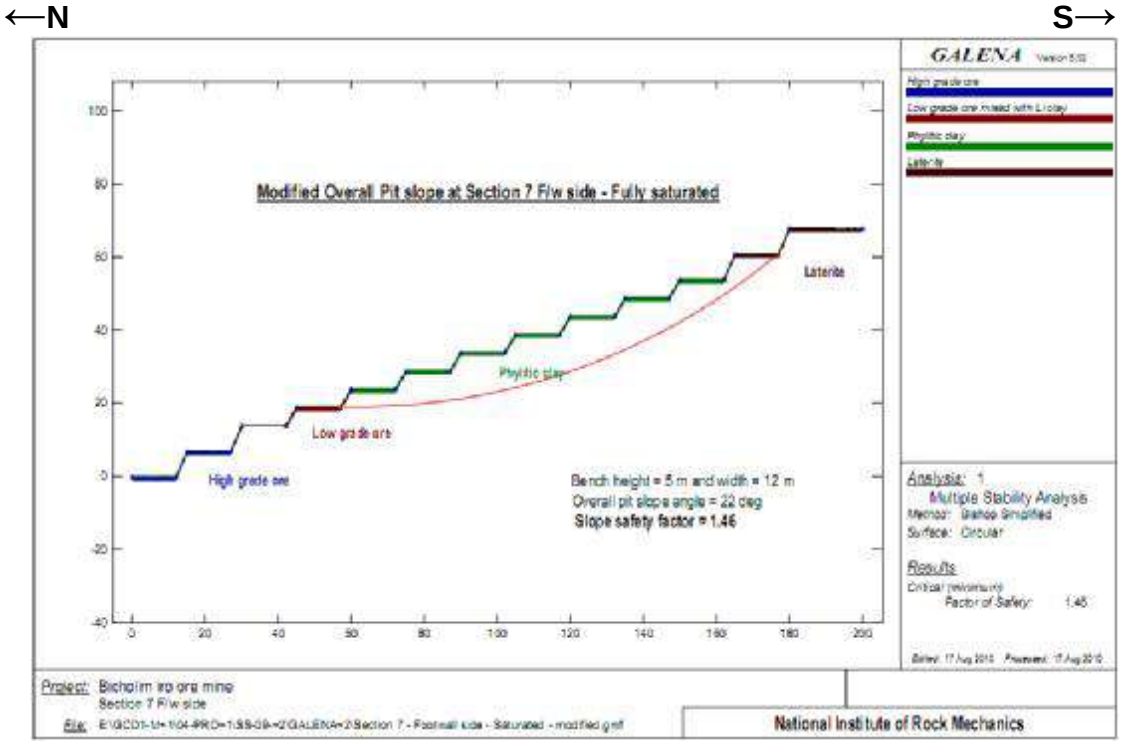

Figure 32. Analysis of Section 7-North for fully saturated condition (Overall slope angle = 22^{o}; SF = 1.46)

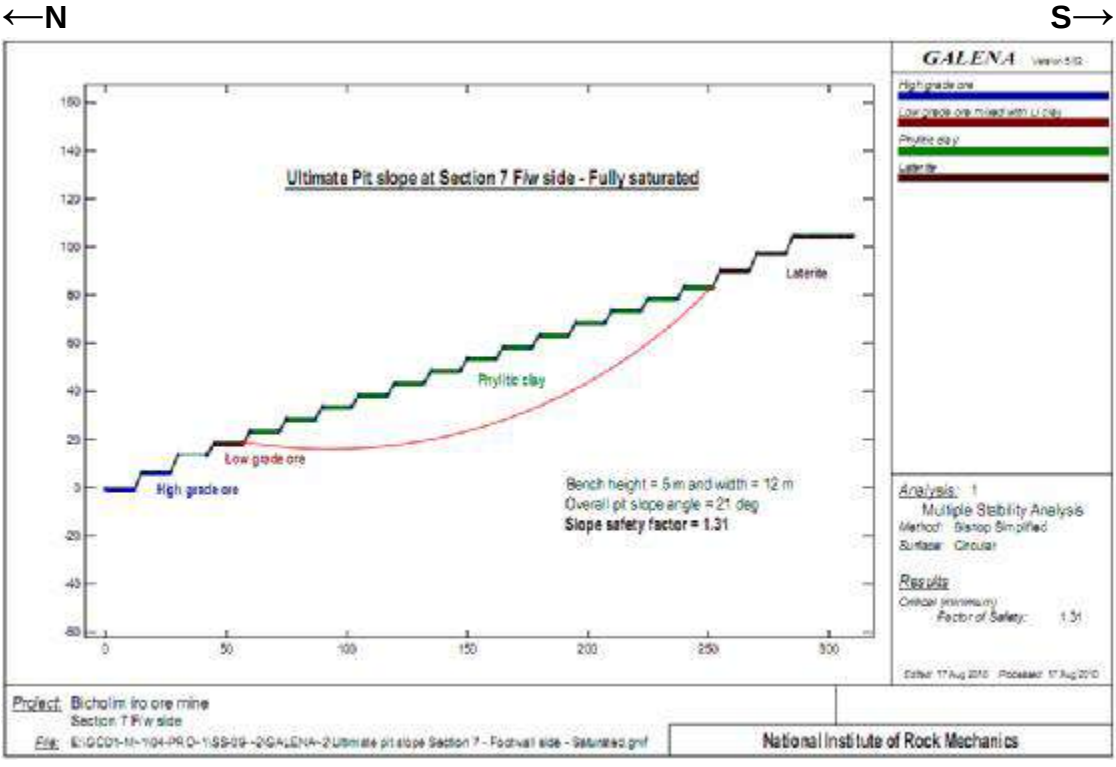

Figure 33. Analysis of ultimate pit slope for 130 m depth along Section 35-West

5.2.3 5 Bottom pit

In Section 6 in F/w towards east side, the safety factor of the overall pit slope was estimated for the fully saturated condition. The safety factor for the present average overall slope of 24^{o} with the modified individual bench parameters was found to be 1.35. This indicates that the present overall slope at a depth of 80 m is fairly stable under fully saturated condition (Figure 34).

The safety factor for the ultimate pit slope of 21^{o} at a depth of 100 m with more modification in individual benches was found to be 1.31. Further, at least two high grade ore benches have to be left against the ultimate pit slope in order to provide the recommended safety factor (Figure 35).

←W E→

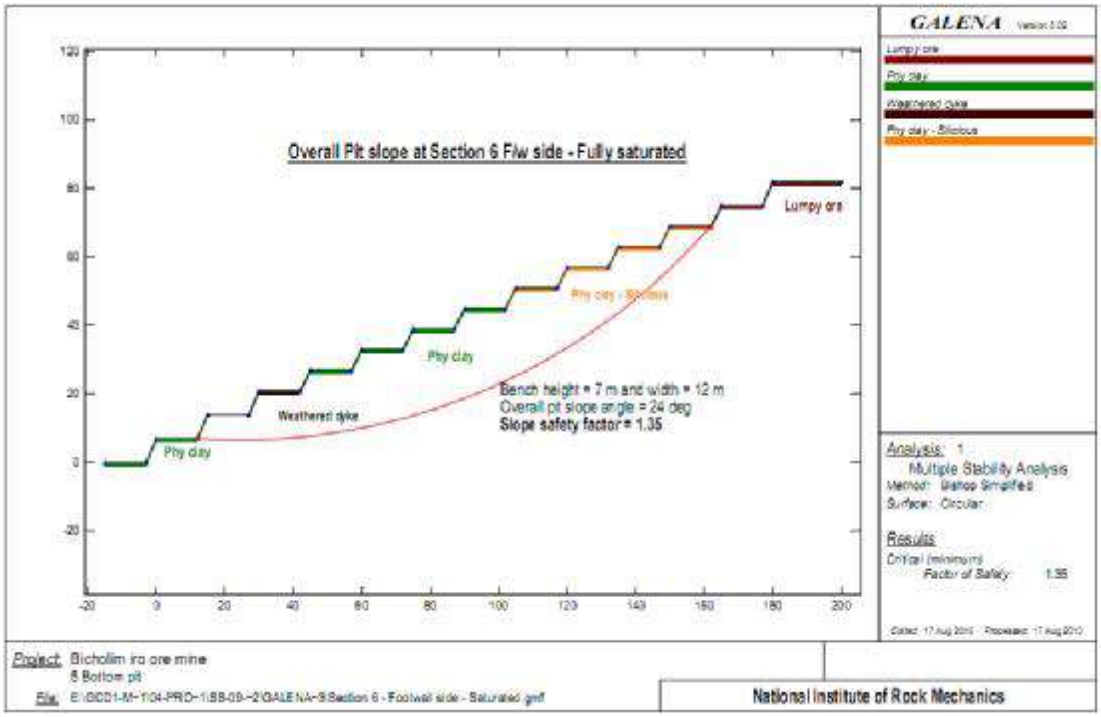

Figure 34. Analysis of Section 6-East for fully saturated condition (Overall slope angle = 24^{o}; SF = 1.35)

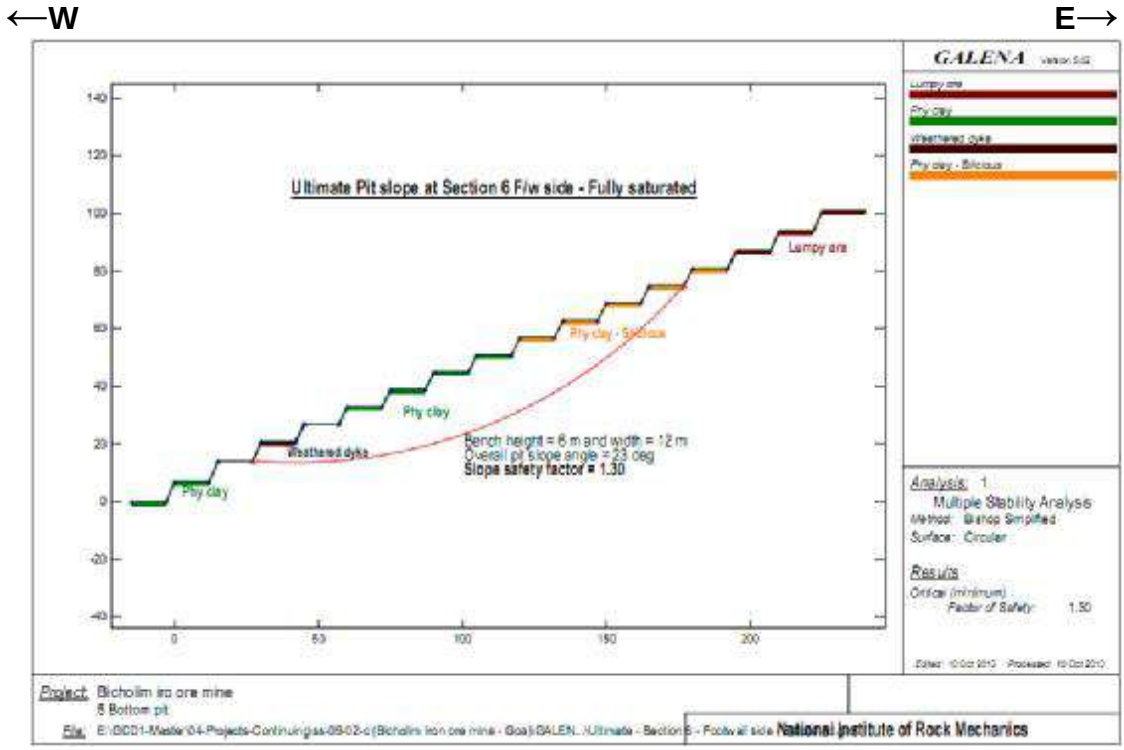

Figure 35. Analysis of ultimate pit slope for 100 m depth along Section 6-East

The main parameters for the slope design are the overall slope angle and the factor of safety. As mentioned earlier, a safety factor of 1.3 is considered for designing the slopes. The results of the limit equilibrium analysis for the above Sections in all the pits for the ultimate pit limits are summarized in Table 8.

Table 8. Safety factors for the overall and ultimate pit slope angle

Sl. No.	Pits	Existing overall pit slope angle (degrees)	Ultimate pit limit	
			Depth (m)	Angle (degrees)
1	1 Top	23.2	130	21
2	2 Top	26	130	21
3	5 Top	22	100	21
4	5 Bottom	24	100	23

6. CONCLUSIONS & RECOMMENDATIONS

Based on the limit equilibrium analysis, the following conclusions and recommendations are made for different pits:

6.1.1 1 Top pit

a) The analysis for the individual benches in different lithological units under dry as well as fully saturated condition indicated that the maximum angle of the individual benches shall be 70^o, and the maximum height shall be 7 m. However, for the benches in Phy clay, Li clay and Mn clay, a maximum slope angle of 64^o is required with bench height of 6 m. The width of all the individual benches shall be minimum 12 m.

b) The existing overall slope profiles at different Sections in 1 Top pit at Bicholim iron ore mine under dry as well as fully saturated conditions are having safety factor more than 1.3, indicating the stability of the slopes.

c) The overall safe slope angle for the maximum depth of 100 m of the pit is estimated as 23^o under fully saturated conditions. However, the ultimate pit slope for a depth of 130 m is estimated as 21^o. This can be achieved by maintaining the Phy clay bench height at 5 m and the width of these benches shall be 15 m for the depth range of 100 m to 130 m. To achieve the safe ultimate pit slope, at least two high grade ore benches have to be left against the ultimate pit slope in order to provide the recommended safety factor.

6.1.2 2 Top pit

a) The analysis for the individual benches in different lithological units indicated that the maximum angle of the individual benches shall be 70^o, and the maximum height shall be 7 m. However, for the benches in Phy clay, and Mn clay, a maximum slope angle of 64^o is required for the bench height of 6 m. The width of all the individual benches shall be minimum 12 m.

b) The existing overall slope profiles at different Sections at 2 Top pit under dry as well as fully saturated conditions are having safety factor more than 1.3, indicating the stability of the slopes. The overall safe slope angle for the present depth of 60 m of the pit is estimated as 26^o under fully saturated conditions.

c) The ultimate safe pit slope angle for the maximum depth of 130 m of the pit is estimated as 21^o under fully saturated conditions. To achieve the recommended safety factor, the benches in Phy clay needs to be maintained with a maximum height of 5 m and minimum width of 15 m for the depth range from 100 to 130 m.

6.1.3 5 Top pit

a) The analysis for the individual benches in different lithological units indicated that the maximum angle of the individual benches shall be 70^o, and the maximum height shall be 7 m. However, for the benches in Phy clay, a maximum slope angle of 64^o is required for the bench height of 5 m. The width of all the individual benches shall be minimum 12 m.

b) The existing overall slope profiles at different Sections under dry as well as fully saturated conditions are having safety factor more than 1.3,

indicating the stability of the slopes. The overall safe slope angle for the present depth of 60 m of the pit is estimated as 22^o under fully saturated conditions.

c) The ultimate safe pit slope angle for the maximum depth of 100 m of the pit is estimated as 21^o under fully saturated conditions.

6.1.3 5 Bottom pit

a) The analysis for the individual benches in different lithological units indicated that the maximum angle of the individual benches shall be 70^o, and the maximum height shall be 7 m. However, for the benches in Phy clay, a maximum slope angle of 64^o is required for the bench height of 6 m. The width of all the individual benches shall be minimum 12 m.

b) The existing overall slope profiles at different Sections under dry as well as fully saturated conditions are having safety factor more than 1.3, indicating the stability of the slopes. The overall safe slope angle for the present depth of 80 m of the pit is estimated as 24^o under fully saturated conditions.

c) The ultimate safe pit slope angle for the maximum depth of 100 m of the pit is estimated as 23^o under fully saturated conditions.

Since there is no soft Phy clay on the hanging wall side in any of the pits, the ultimate pit slope up to a depth of 130 m can be designed at an angle of 26^o.

The soft strata loses its shear strength as it comes in contact with the hydrostatic pressure. To reduce the ground water pressure, surface drains should be made, and all visible or identified tension cracks should be filled up to restrict the rain water from entering into the slopes.

While approaching the ultimate pit limits, regular monitoring of slope/crack movement shall be carried out using instruments such as inclinometers, total station, crack meters, piezometers etc.

It is appropriate here to mention that, the mine management has already taken measures by implementing some of the stabilization features for the dumps such as use of geotextiles. Precautions are taken for improving the drainage system by providing systematic garland drains throughout the periphery of the mine (Figures 36-38). The same practices may be continued in future.

Figure 36. Application of geotextiles at 2 Top pit

Figure 37. Application of geotextiles over dumps and roadside

Figure 38. Garland drainage system at hanging wall side

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Atul Gandhe
(Project Leader)

V Venkateswarlu
(Project Coordinator)

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ADDITIONAL STUDY OF SILT LOAD CALCULATION, DESILTATION MANAGEMENT AND LIKELIHOOD OF SEEPAGE FROM ASSONORA RIVER TO 5 BOTTOM PIT

Prepared Under the Supervision of:
Prof C.S Dubey
Vice Chancellor, K.R. Mangalam University, Gurgaon, Haryana
Former Director, Institute of Lifelong Learning, Delhi University
Former Director, Campus of Open Learning, Delhi University
Retired Professor, HOD, Centre for Advanced Studies, Department of Geology, University of Delhi, Delhi-110007
Former Member Expert, Environmental Appraisal Committee (EAC), Ministry of Environment and Forests, GOI, Industries

Field Study and Documentation by:
Dr Prem Kumar, PhD, Centre for Advanced Studies, Department of Geology, University of Delhi, Delhi-110007

Prepared For
VEDANTA LIMITED
(BLOCK -I BICHOLIM MINERAL BLOCK- (MLA 478.5206 ha.))

At

BICHOLIM, BORDEM, LAMGAO, MULGAO, MAYEM & SIRIGAO VILLAGES, BICHOLIM TALUKA, NORTH GOA DISTRICT, GOA

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1. Introduction

Sediment management represents a key point to promote sustainable water resources development and it is strictly connected with the proper management of land use change, especially in the areas devoted to mining activities.

Water management plays a key role for determining strategies to reduce these impacts, e.g. necessity of restoring natural drainage patterns, implementing flood control measures and restoring hydrological natural behavior. Fundamental aspects are certainly represented by the runoff variation, and the proper sediment management that influences both the quality of water bodies and the functionality of existing hydraulic structures.

Different framework have been applied to evaluate the soil erosion / sedimentation processes and to analyze the effect of land use changes on hydrological processes.

The objectives of this study are given below:

1) To design garland drain, settling tank & check dams and its efficacy and find out the per day silt load, settling velocity of the silt, retention time required based on the annual rainfall with a provision to monitor the water quality.
2) To explore the likelihood of river water entering into the mine pit below the RL of the HFL and the measures that are required to be taken for prevention of seepage.

2. Study Area

The Block I – Bicholim Mineral Block is situated in North Goa district and extends between Coordinates: Latitude: 15034'20.518 N to 15036'54.018 N & Longitude: 73054'4.754 E to 73057'09.51 E. The block area is on a hill range running in a NW-SE direction. The highest and lowest elevations are 169.14 m (amsl) in the North-Eastern area and -37.24 m (amsl) in the South Eastern area respectively. The hill is gently sloping on the SE and SW parts located at BICHOLIM, BORDEM, LAMGAO, MULGAO, MAYEM & SIRIGAO VILLAGES, BICHOLIM TALUKA, NORTH GOA DISTRICT, GOA. The location map of study area is given in Figure 1.

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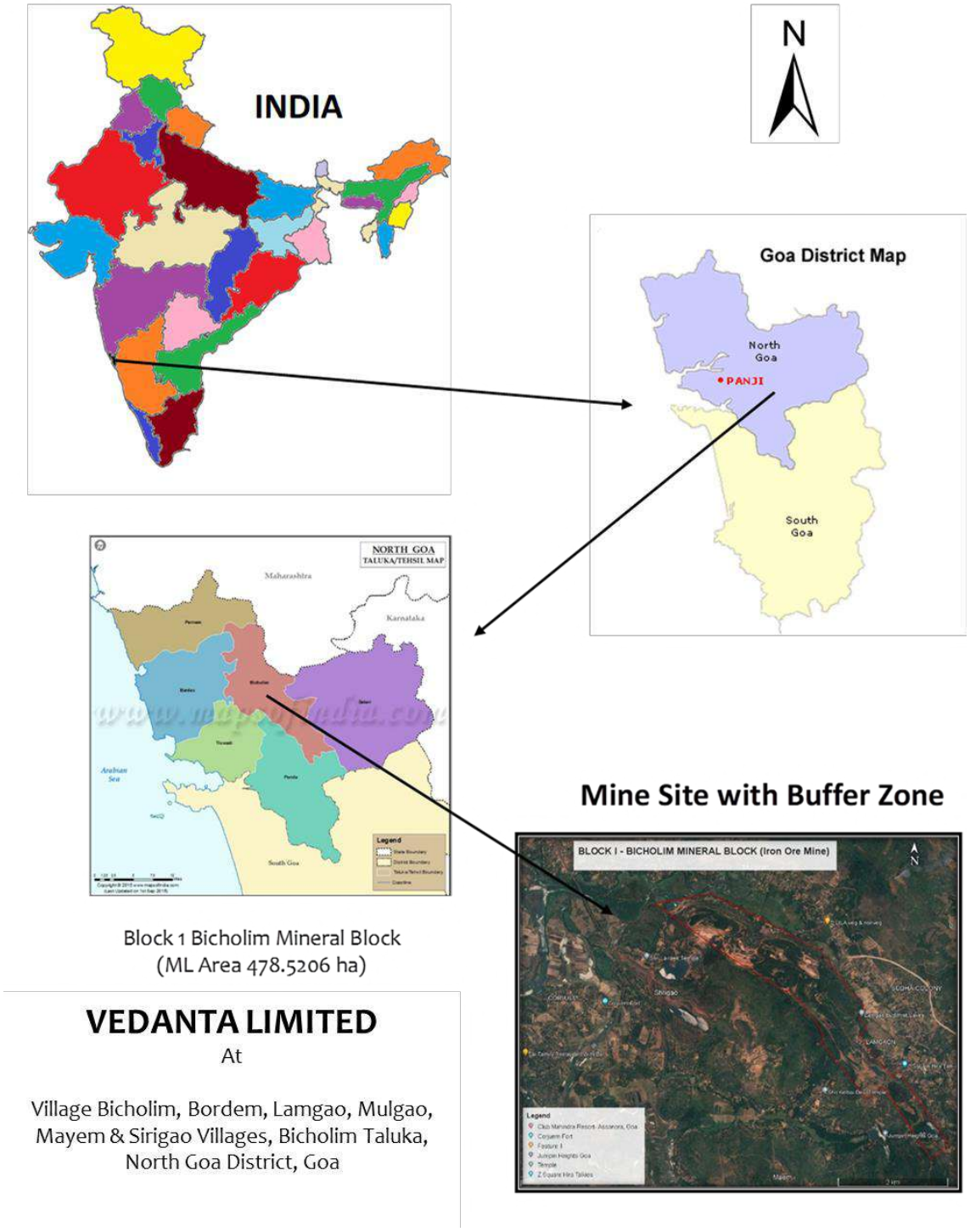

Figure 1: Location Map of the study area

2.1 CLIMATE & RAINFALL

The State has a tropical-maritime monsoonal type climate with distinct aerographic influence. The climate is equable and humid throughout the year. Due to the maritime climate the diurnal variation in temperature is not much. The months of January and February are dry with clear skies and generally pleasant. May is the hottest month with temperature around 30°C and January the coolest month with temp 25°C. Rain occurs during the monsoon period from June to September. Over 90 percent of annual rainfall occurs during monsoon period. The balance of 10 percent occurs during the non-monsoon season. However, the rainy period extends from May to November. The analysis of Rainfall data from January 2018 to December 2022 from IMD GRID data over the North Goa district indicates that the maximum rainfall received in the district is during July month. The average annual rainfall of the district from 2018 to 2022 is 3918 mm.

Table 1: Monthly Cumulative Rainfall information from Jan-2018 to Dec-2022 (Source – IMD)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
2018	0	1.63	3.32	13.34	123.33	986.42	1177.28	747.19	113.75	130.98	12.38	1.64	3311.26
2019	0	0	1.97	4.79	2.2	631.17	1477.71	1396.07	779.79	508.25	50.35	0.19	4852.49
2020	0.05	0	6.49	20.48	22.59	934.62	748.26	1368.11	640.71	266.83	0.46	20.23	4028.83
2021	16.31	10.25	0.64	10.26	346.07	971.99	1038.61	401.84	606.93	240.19	192.86	76.55	3912.5
2022	0.75	0	10.39	42.18	121.64	728.32	1249.01	652.56	465.73	197.96	8.1	7.09	3483.73
										Average			**3917.76**

2.2 DEM/TOPOGRAPHY

As per the USGS SRTM data, the 10km study area from the mineral block boundary consists of undulation topography. The elevation within the buffer zone of the study area ranges from 241 m to -2 m amsl. The highest elevation is towards the south eastern region while the minimum elevation is towards the south western portion of the study area. The digital elevation model of the study area is shown in figure 2. The Highest and lowest elevation of the mineral block area as per the USGS SRTM data ranges from 150m to -5m amsl (figure 3).

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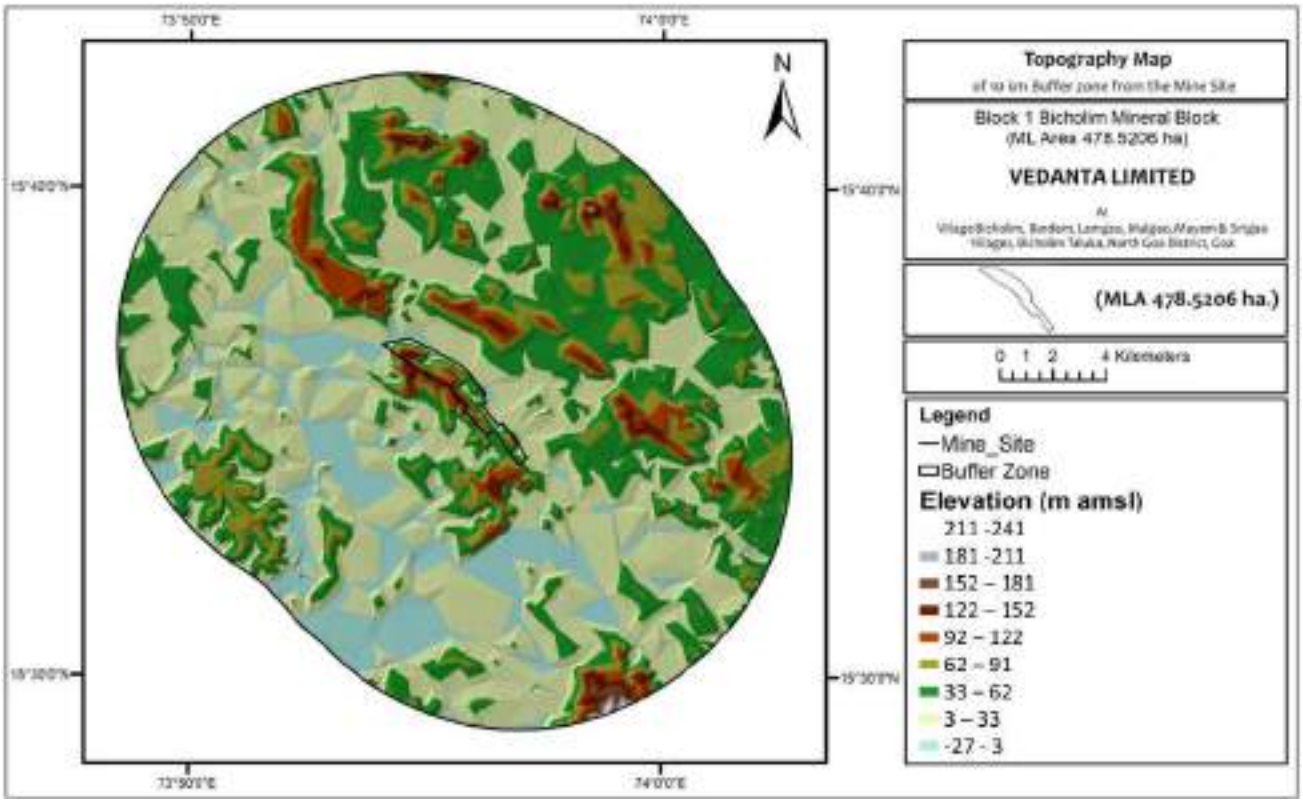

Figure 2: **Map Showing Digital Elevation Model in and around 10Km Buffer Area of Block 1 Bicholim Mineral Block (MLA: 478.5206 ha) (Source: USGS)**

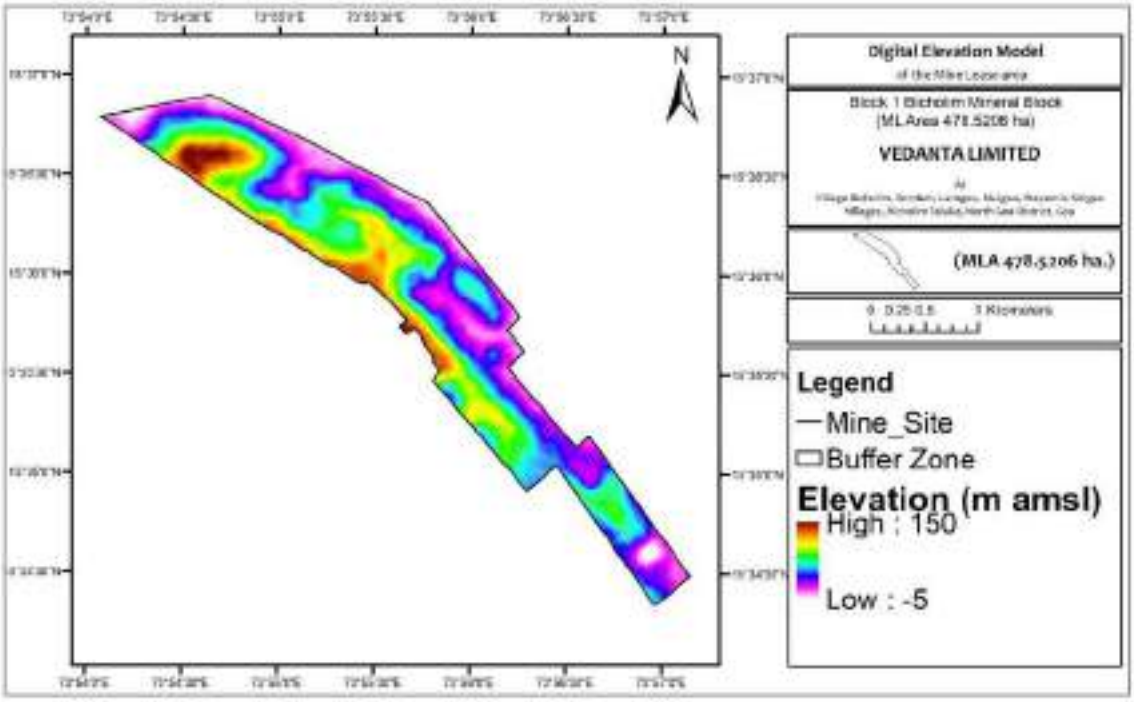

Figure 3: **Digital Elevation Model of the Mineral block area (Source: USGS)**

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2.3 GEOMORPHOLOGY OF NORTH GOA DISTRICT

Goa State forms part of coastal tract of the west coast of India. Physiographically, the Goa State is divided into four morphological units namely,

1. Coastal plains with dominant Marine land forms on the west, followed successively towards the east
2. Vast etch plain.
3. Low dissected denudation hills and table land and
4. Deeply dissected high Western Ghats

The denudational hills occurring all along the eastern part of Goa rising to a maximum of 832m above MSL. The Alluvial landforms are limited in aerial extent.

2.4 Geomorphology of the study area (10 km buffer area)

The 10 km buffer area mainly comprises of pediment pediplain complex. The major area in south western region comprises of younger coastal plain while the south eastern region is majorly covered with low dissected structural hills and valley (figure 4). The north eastern and eastern region of the 10km buffer area has moderately dissected denudational hills & valleys and moderately dissected structural upper plateau. Other geomorphological features within the study area includes abandoned quarry, active flood plain, active quarry, low to dissected denudational hills and valleys, low to moderately dissected structural lower plateau, mine dump, moderately dissected structural hills and valleys, older coastal plain, older flood plain, younger coastal plain, river, dam and reservoir along with different waterbodies such as lakes, ponds and stream/nallah.

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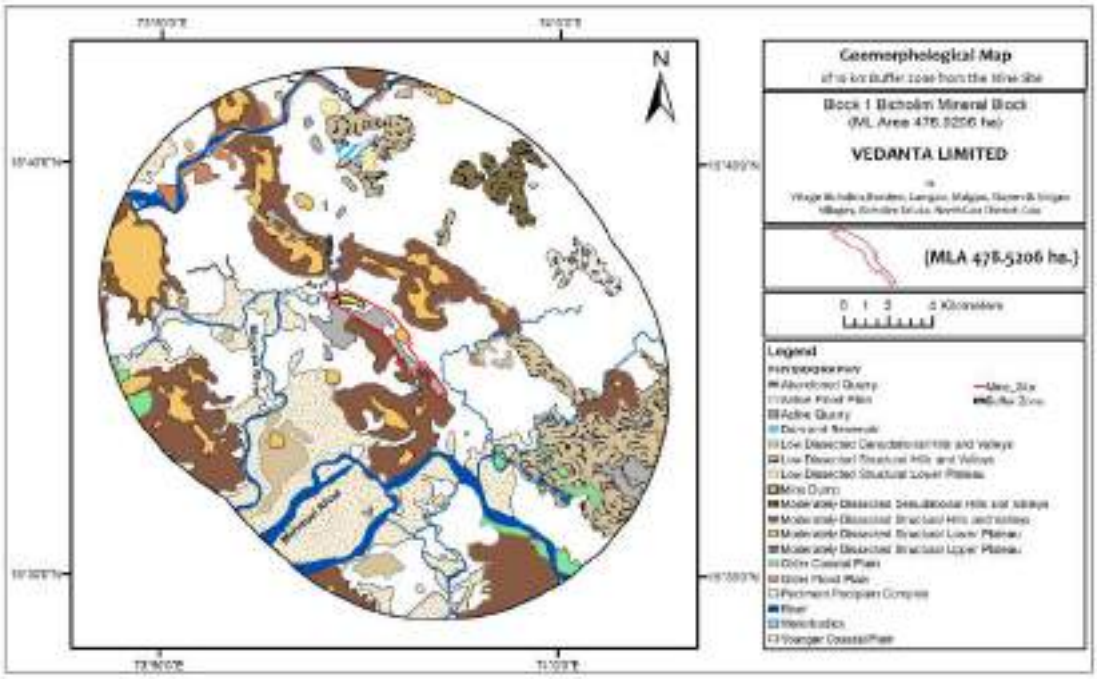

Figure 4: Map Showing Geomorphology in and around 10Km Buffer Area of Block 1 Bicholim Mineral Block (MLA: 478.5206 ha) (Source: BHUKOSH)

2.5 GEOLOGICAL SETUPS

The Stratigraphic sequence of the North Goa is as given below (Table.2). The potential iron ore bodies are available within the Bicholim Formation of the Goa Group. Mineral concentration is confined largely to the limbs, while the hinge portions are generally not mineralized. The deposits of North and South Goa have been formed under different geological conditions and hence the deposits are of entirely different nature. The deposit in South Goa occurs as discrete synclinal basins with top laterite cover often enriched with iron ore in isolated pockets. The ore body Groundwater conditions in Bicholim Mine, North Goa intercalated with phyllite, limonitic and mangniferrous clay is mineralogically a mixture of hematite and limonite - goethite and minor quantities of martite. Decomposed quartzite forms the footwall. There are some intrusions in the form of dolerite dykes. The top laterite is usually followed by lumpy ore zone followed by friable ore and powdery ore. The ore bearing intercalations consists of several horizons mainly manganiferous and phylitic clay. The footwall is generally decomposed B.H.Q with silica. The pit shows exposures of the various horizons of ore. The iron ore deposits consist essentially haematite and partially of magnetite, limonite and goethite. They occur as lensoid bodies on the crests and slopes of hills. The deposits were formed as residual

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concentration and enrichment process called lateritization of the banded ferruginous quartzite and phyllite of the Goa group of metasediments.

Table 2: Regional Stratigraphy

Eon/Era/Epoch	Supersuite/Suite/Group	Formation	Litho assemblage
Quaternary			Beach sands and River alluvium
Pliocene to Pleistocene			Laterite and aluminous laterite
Late Cretaceous to Palaeocene	Deccan Trap		Continental flood basalts-mainly tholeiitic type with dykes
Palaeo Proterozoic to Meso-Proterozoic	Closepet Granite	Chandranath Granite, Dudsagar Granite, Canacona Granite	Alkaline granites mainly; also variants from monzo granite to granodiorite
	Mafic –ultramafic Layerd Complex		Peridotite-cromitite, dunite-Gabro-Norite, Pyroxinite
Archaean to Palaeo Proterozoic	Goa Group = Chitradurga Group of Dharwar Super Group	Vageri	Carbonite-quartz-chlorite Schist/greywacke
		Bicholim	Dolomite limestone
			Quartz-sericite -schist
			Banded Iron Formation
			Quartz-chlorite-biotite-schist inter-layered with chert, iron and Mn Oxides, carbonates, metabasalt and meta-gabbro
		Sanvordem	Quartzite/greywcke with conglomerate
		Barcem	Quartz-chlorite-schist
			Meta-acid volcanic (meta-rhyodacite), quartz Porphyry, tuff
			Meta basalt meta-gabbro and meta-anorthositic Gabbro, quartzite
Archaean	Peninsular Gneiss-II	Ankola Gneiss,Anmod Ghat Gneiss	Migmatite and granites(s.1) tonolite-trondjhmite-granodiorite

2.6 GEOLOGY OF THE STUDY AREA

The Entire study area (10km Buffer Zone) is composed of clayey sand (active floodplain), gabbro (basic intrusive), meta-gabbro, argillite, banded iron formation, chlorite schist, banded iron formation, meta-basalt, argillite, banded iron formation, argillite, banded iron formation, chlorite schist, banded iron formation, graywacke, banded iron formation and argillite. Chlorite schist comprises the major portion of the study area, clayey sand is

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found along the active floodplain area in south western portion of the buffer zone. North western and eastern portion is composed of argillite and the central region has banded iron formation. The stratigraphic sequence of the study area is shown in table 3.

Different tectonic lineaments area also observed within the study area such as Dyke, Fault, Joints/Fractures and drainage parallels. The gabbro within the study area occurs as basic intrusive on the eastern corner of the 10 km buffer zone. The geological map of the study area showing the major lithology and lineaments is given in figure 5.

Table 3: Local Stratigraphy of study area

SUPERGROUP	GROUP_NAME	FORMATION	LITHOLOGIC	AGE
-	ACTIVE FLUVIAL DEPOSIT	MANDOVI	CLAYEY SAND (ACTIVE FLOODPLAIN)	MEGHALAYAN
	LAYERED ULTRAMAFIC COMPLEX	USGAON	GABBRO (BASIC INTRUSIVE)	ARCHAEAN
			META-GABBRO	
DHARWAR	GOA (=CHITRADURGA)	VAGERI	ARGILLITE	ARCHAEAN
		BICHOLIM	BANDED IRON FORMATION	
			CHLORITE SCHIST	
			BANDED IRON FORMATION	
		BARCEM	META-BASALT	
		SANVORDEM	ARGILLITE	
		BICHOLIM	BANDED IRON FORMATION	
			ARGILLITE	
			BANDED IRON FORMATION	
			CHLORITE SCHIST	
			BANDED IRON FORMATION	
			GRAYWACKE	
			BANDED IRON FORMATION	
		SANVORDEM	ARGILLITE	
		BICHOLIM	CHLORITE SCHIST	

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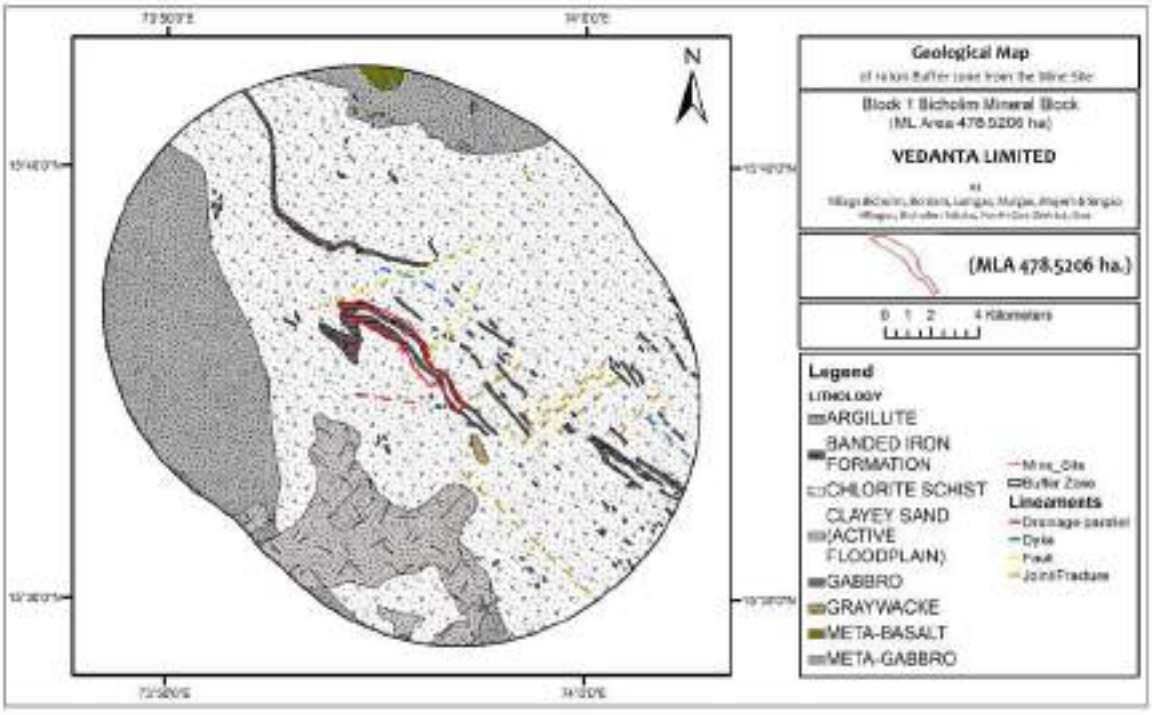

Figure 5: Map Showing Geology & Lineament in and around 10Km Buffer Area of Block 1 Bicholim Mineral Block (MLA: 478.5206 ha) (Source: USGS and BHUKOSH)

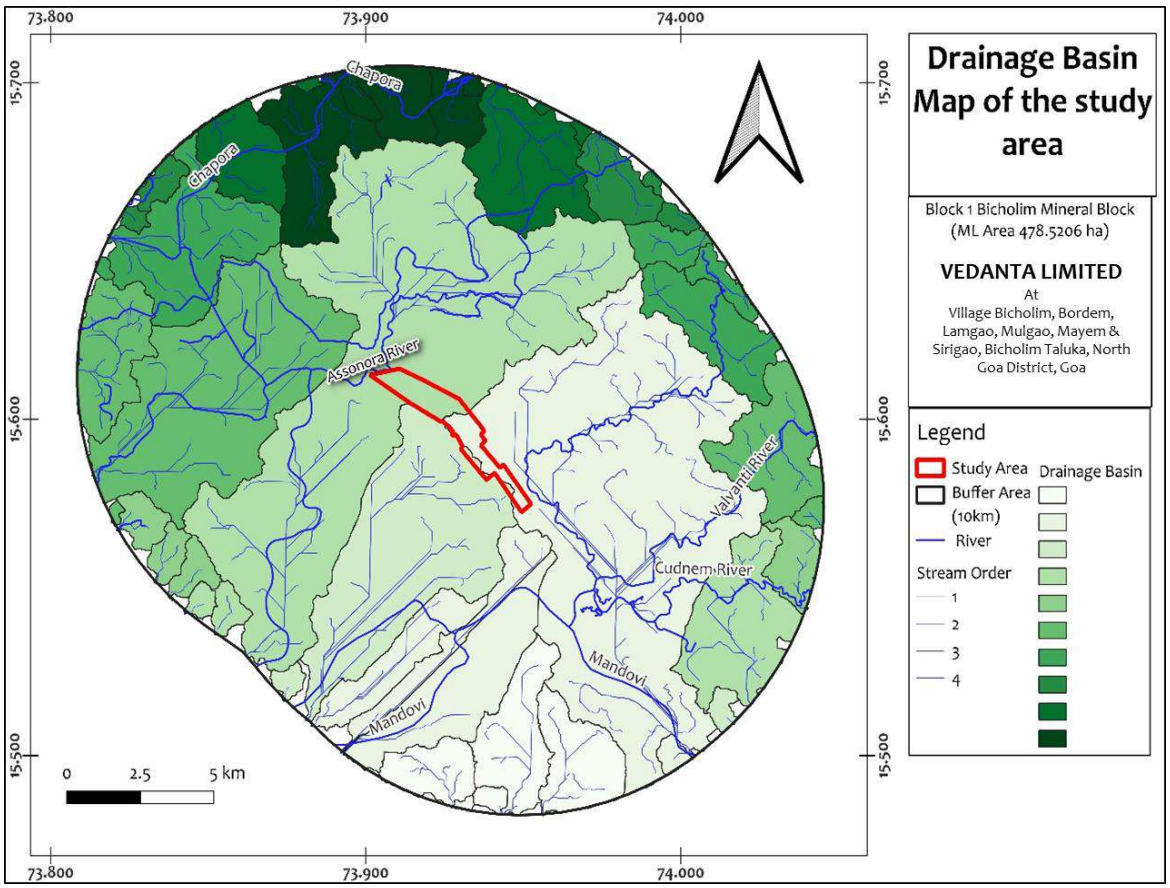

Figure 6: Drainage Basin Map of the Study Area

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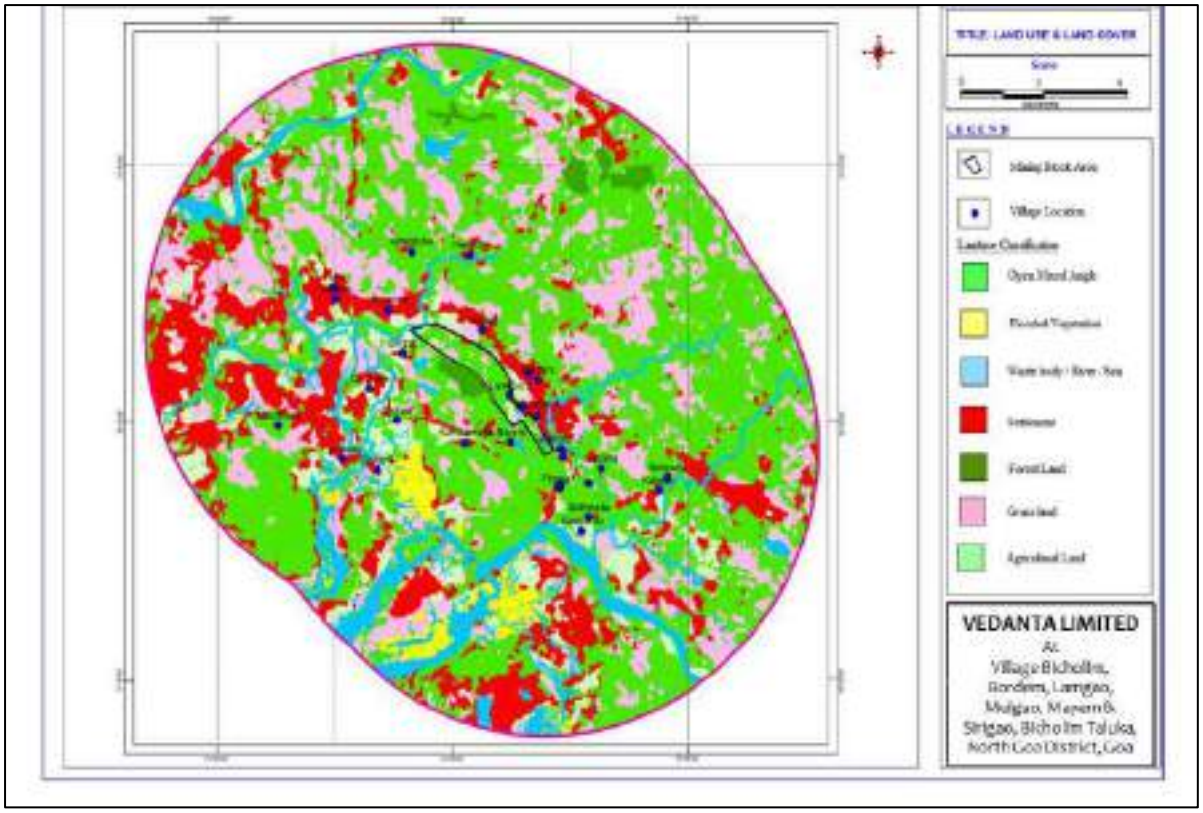

Figure 7: Land use Land cover map of the study area

3. Methodology

In this study, different approaches and methodologies have been adopted to achieve the objectives. A detailed field work has been conducted in the study area to understand the present condition of the mine and the working of different structures like garland drain, settling pits, etc. The study during the field also includes the efficacy of the structures between the river & mine area, soil of the study area and measures taken for retention of silt. The orientation of the beds and its lithology in the study area, with the cross sections of mining plan was verified. The drainage basin map and landuse landcover map (Figure 6& 7) prepared around the buffer zone of the study area to understand the surface runoff ad to plan the garland drains & settling ponds. The Assonora River which is near to mineral block was visited during field work. The data of the High Flood Level (HFL) and depth of the river has been obtained from the WATER RESOURCES DEPARTMENT SARVAN, BICHOLIM - GOA for our study. The daily rainfall has been measured through the rain gauge station present inside the mineral block area. The daily suspended sediment load has been obtained from the monthly surface water analysis report. The water sample analyzed has been taken from 2 top and 5 top in the study area to obtain

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the overall condition of the study area and measures to be taken to reduce the soil erosion.

4. Results and Discussion

4.1 Design of Garland Drain, Settling Pits, Check Dams and their importance

The detailed study of the mine site area has been conducted. Remote sensing based data of Digital elevation model has been used for topographic study, which has been cross verified by ground truthing in field survey. As this mine was earlier worked garland drains, settling ponds with check dams are already present at different locations in the mine site (figure 8, 9). Based on the topographical study in the field and through elevation map, it has been observed that all the runoff generated from the rainfall will be collected through these drains and will eventually flow through the series of settling ponds. It has been observed that the gradient of the garland drains is properly maintained and only regular cleaning of the drain is needed to avoid the blockages. The garland drains are made such that from upstream to the downstream where the drains are meeting the settling ponds will show decrease in elevation, to maintain a free flowing gradient of rainfall runoff. The dimension of the drains is maintained to be about 2m in width and 1.5m in depth. A proper height has been maintained in the form of bund on the sides of the garland drain so that there is no spillage of storm water from the drains.

Total length of the Garland drain = 11313 m

Peak rainfall = 154 mm/day

Peak runoff in a day = 110591 m^3 (calculated by peak rainfall for the year in a day)

Capacity of garland drain = 33939 m^3

Some of the runoff will directly go into the settling pits through the natural slope of the Mineral Block area and remaining will be drained to the pits through the garland drains. Some more drains of same dimensions needs to be constructed in the Mineral Block area at base of the hills to accommodate all the surface runoff during peak rainfall events.

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Figure 8: Series of settling pits and header system

Figure 9: Settling pits, garland drains and channelization of water

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Figure 10: Desiltation is in progress before monsoon season from settling pond

The drains are connected to the series of settling ponds of dimensions as given below:

Table 4: Dimension & capacity of settling ponds with abandoned pits converted into settling ponds (location is provided in the surface mining plan)

Pit ID	Area in m^2	Depth in m	Volume in m^3	Location
Pit 1	1824	1.8	3283.2	5top mining pit
Pit 2	1667	1.8	3000.6	
Pit 3	27879	8	223032	
Pit 4	5208	2	10416	5top mulgao area
Pit 5	8602	2	17204	
Pit 6	4661	2.5	11652.5	
1top sec 43	3896	1.5	5844	1 top
pit1 sec 22	3753	1.5	5629.5	3 top
pit 2 sec 22	5564	1.5	8346	
3/4 bot mining pit	6728	5	33640	3/4 bottom
5 bottom mining pit	22556	20	451120	5 bottom

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4.2 Silt load, settling velocity of silt and retention time based on annual rainfall

The surface water analysis had been carried out on monthly basis from 2015 in the mine site. In the surface water analysis surface runoff sample has been collected at different locations in the mine site so that the sample gives the idea of whole catchment. The average suspended sediment concentration calculated to be 53.82 mg/l. The rain gauge stations are installed in the mine site area, daily average rainfall has been calculated based on rain gauge stations and IMD stations founds to be 19.5 mm/day. The average rainy days in a year is found to be 185 days.

Area of Mineral block = 4785206 m^2

Total yearly rainfall = 3.594 m

Daily rainfall = 0.0195 m

Total surface runoff generated through lease area = Area of Mineral block * Total yearly rainfall* Runoff Coefficient (yearly rainfall calculated from 10 years average)

Total surface runoff generated through lease area (in a year) = 4785206 m^2* 3.594 m * 0.15

= 2579705 m^3

Total surface runoff generated through lease area (in a day) = 4785206 m^2* 0.0195 m * 0.15

=13997 m^3

Total suspended sediment load per day (in tons) = Total surface runoff generated through lease area (in a day) (in liters) * Average suspended sediment concentration (mg/l) * 10^{-9}

= 13996727 *53.82*10^{-9}

=0.75 tons

Total suspended sediment load per year (in tons) = Total surface runoff generated through lease area (in a year) (in liters) * Average suspended sediment concentration (mg/l) * 10^{-9}

=2579704555 *53.82*10^{-9}

=139 tons

Capacity of the settling pits in the mineral block area as given above in the table 4 needs to be be de-silted time to time before the monsoon season, to accommodate maximum amount of silt load eroded during the monsoon period (figure 10). The capacities of the

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settling ponds are enough to accommodate sediments. An experiment has been conducted to find out the settling time of the sediment in one litre of water containing 53.82 mg of sediment, which is found to be 4 hours 30 mins (figure 8). As there are sufficient number of settling ponds, so most of the sediments will be settled in the settling ponds before discharged out of the mineral block area. In each pond, the runoff will get enough time for the settling of the sediments. For the over flow of water from one settling ponds to another settling pond, header system is used. As the water level increases in the pond, the water discharge increases by increase in the discharge rate with the help of header system. Multiple remedial techniques have been implemented to reduce the erosion of sediments which are as follows:

1) Plantation of trees
2) Use of geotextile
3) Check dams
4) Settlings ponds
5) Pre-monsoon De-siltation of Settling Ponds

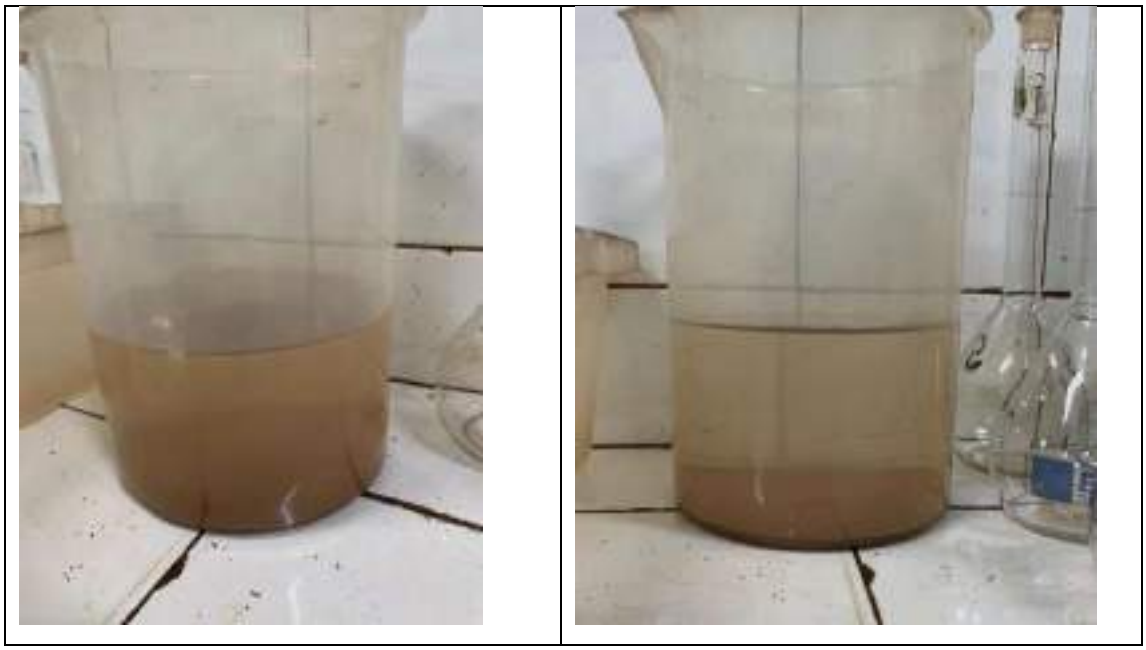

Figure 11: Figure showing the settling of sediments with time

4.3 Likelihood of seepage within the 5 bottom pit due to Assonora River

A detailed field study has been conducted to understand the likelihood of seepage of water from Assonora River to 5-Bottom Pit (5-Bottom Pit dimension given in Table 4). The Assonora River flows 50 meters away from the 5 bottom pit, at the north east part of the Mineral Block area (figure 12). The HFL of the Assonora River recorded by the Water

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Resources Department, Sarvan, Bicholim, Goa found to be 3.5 meters above mean sea level near Assonora River bridge. In the field, it is observed that the area between the river and 5 Bottom Pit is approximately 6 meters above mean sea level which obstructs the flow of water between them, even in high flood condition (Figure 12) and at the place where river is touching the block boundary, it is 10.93 meters above mean sea level. So even during high flood level, river water will not interact with the pit water. The 5 Bottom Pit is filled with rain water, which is found to be above ground water level in that area. Further no mining has to be done from the 5 bottom pit. The 5 bottom pit is also getting backfilled from the sediments collected from the series of settling ponds. The garland drains are also present around the 5-bottom pit to collect the surface runoff generated during rainfall. The historic data provides that no overflow has been observed from the 5 bottom pit even during peak rainy days. But if this scenario appears in the future dewatering setup of water from 5 bottom pit has been already in plan. The report of NGRI, field study and bore hole data suggests that ore which has been excavated from the 5 Bottom Pit is encapsulated by impervious phyllitic and manganiferous clays. These clay beds are dipping towards North East (i.e. towards the River) (figure 13). Thus, the impervious bedding lithology between 5 Bottom Pit and River forms a favorable condition for no seepage of water from the river into the 5 Bottom Pit. The depth of the river is only 2.5 meters and the considerable thickness of about 15m of impervious lithology acts as a favourable condition that prevents the seepage of water from river in to the pit.

Sensitivity: Public (C4)

Figure 12: Area between the 5 bottom pit and Assonora River is shown by red arrow on the right side.

Figure 13: Surface Plan Bicholim Mineral Block showing location of 5 bottom pit and Assonora River flowing nearby to pit, with the cross-sections made around that area with the help of borehole logs data. (more details will be provided in annexure attached of surface mining plan and cross-sections)

Sensitivity: Public (C4)

5. Conclusion and Recommendations

The study reveals that the garland drains, settling pits and check dams are made properly in the Mineral Block area and being maintained for the proper flow of rainfall runoff generated during the year. The de-siltation work is also being monitored and done before the monsoon season. The flow of storm water through series of settling ponds which have been provided with natural slope and enough time is maintained for the proper settling of sediments. The daily silt load calculated is found to be 53.82 mg/l. All the structures which are made in the Mineral Block area to avoid erosion and settling of sediments are maintained and checked before monsoon season. All the structures made for the settling of sediments are found to be more than sufficient to accommodate sediments even during peak rainfall, which has been given in Table 4.

The likelihood of seepage from Assonora River in the 5 bottom pit is studied very carefully and in detailed manner. Further no mining has to be done from the 5 bottom pit. The 5 bottom pit is also getting backfilled from the sediments collected from the series of settling ponds. The garland drains are also made around the 5-bottom pit to collect the surface runoff generated during rainfall. The historic data provides that no overflow has been observed from the 5 bottom pit even during peak rainy days. But if this scenario appears in the future dewatering setup of water from 5 bottom pit has been already in plan. The lithology of the beds nearby the river and pit is observed through borehole logs and cross-section which clearly depicts that the dip of the bedding plane and the impervious clay rich lithology prevents the seepage of water from the river in to the 5 Bottom Pit. The depth of the river nearby pit is only 2.5 meter and underlain by 15 m impervious thick clay rich lithology, so there is no seepage of Assonora River water inside the 5 Bottom Mine Pit.

Sensitivity: Public (C4)

WILD LIFE CONSERVATION PLAN

of

Block-I Bicholim Mineral Block

Area : 478.5206 Ha.

Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages of - Bicholim Taluka, North Goa District, Goa State of

Bicholim Taluk,

North Goa District, Goa State

PROPONENT

Vedanta Limited

Sesa Ghor, 20 EDC Complex, Patto, Panjim
Goa- 403001

June-2023

EIA Consultant

MINERAL ENGINEERING SERVICES

25/XXV, Club Road, BALLARI-583103, Karnataka
email : mes_msraju@yahoo.co.uk
Tel: 08392-267421

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CHAPTER -1
INTRODUCTION

1.0 INTRODUCTION

Vedanta Limited in pursuant with Mines and Minerals (Development and Regulation) Act 1957, and the Mineral (Auction) Rules, 2015 as amended from time to time, the Government of Goa issued the notice inviting tender dated 03.09.2022 to commence the Auction process for grant of mining lease for Block-I Bicholim Mineral Block located in Bicholim, Bordem, Lamgao, Mulgao,Mayem & Sirigao villages of Bicholim Taluka, North Goa District, Goa State.

The e-auction process was conducted in accordance with the Tender Document for said Block-I Bicholim Mineral Block and Vedanta limited being the highest qualified bidder who submitted the highest final price offer was declared as preferred bidder

Further, upon submission of the first instalment, being 20% of the upfront payment, Government of Goa issued a Letter of Intent (LOI) vide letter no. DMG/25/Auction Cell/LOI-function/2023/2081 dated 13.01.2023 for the grant of a mining lease for Block-I Bicholim Mineral Block in Bicholim, Bordem, Lamgao, Mulgao, Mayem & Sirigao villages, of Bicholim Taluka, North Goa District, Goa State over an area of 478.5206 Ha. The Letter of Intent was accepted by Vedanta Limited (Preferred Bidder/Applicant) vide Letter dated 13.01.2023. Copy of the Letter of Intent & ToR Letter are attached as ***Annexure No. 1 & 2***

Mining Plan is prepared and submitted to Indian Bureau of Mines (IBM) in compliance with the terms and conditions no. 3(3.2)(a)(iv) of the Letter of Intent and under the provisions of Rule 16(1) of MCR 2016 for grant of mining lease over an area of 478.5206 Ha and to obtain EC for the production capacity of 3.0 million tonnes of Iron Ore per annum.

1.2 PROJECT PROPONENT & PROJECT

1.2.1 PROJECT

Vedanta Limited is proposing the iron ore mining project located in Bicholim, Bordem, Lamgao, Mulgao,Mayem & Sirigao villages of Bicholim Taluka, North Goa District, Goa State. The proposed iron ore mining project is over an area of 478.5206 Ha. The capacity of project is about 3.0 MTPA . Mode of mining will be mechanical, with the use of Heavy earth moving machinery such as excavators and ripper dozer. There will no drilling and blasting operations for winning of ore and for removal of waste.

1.2.2 PROJECT PROPONENT & ADDRESS

Registered Address: Vedanta. Limited.,
Sesa Ghor, 20EDC Complex, Patto, Panjim
Goa- 403001
Phone no. : (0832) 2460600
Email : MK.Reddy@vedanta.co.in

1.3 LOCATION OF THE PROJECT

The lease area of 478.5206 Ha falls under Bicholim, Bordem, Lamgao, Mulgao,Mayem & Sirigao villages of Bicholim Taluka, North Goa District, Goa State. The lease area falls under the Survey of India Toposheet no 48 E/14 and bounded by latitude of 15° 34' 20.518" to 15° 36′ 54.018″ N & longitude of 73°54′ 4.754" to 73° 57′ 09.51″ E.

This mining lease lies in Toposheet number 48 E/14 as shown in Map-.1

SH-1 is about 0.65 km from Mineral Block , nearest Railway station is Tivim Railway station is at a distance of 10 kms by road, nearest jetty is Sarmonas Jetty at a distance of 5.4 km .

1.3.1 Proposed Land Use Pattern

Table 1.1: Land Use in the Study Area . The land use map of the study area is given vide Map-2

Land Use - ML Area

Pre Mining Use	**AREA** (Ha)
Barren / Waste land with small bushes & shrubs	90.1629
Land under Agriculture / Crops	0
Land covered with Plants	0
Land under Grass Cover	0
Land under Public Infrastructure / Utilities (water bodies, roads, railways, electric lines, telephone lines etc.)	1.0210

Land under Habitation	32.4047
Land under Monuments & places of Historical Importance	0
Degraded by Pits & Excavation	306.85
Degraded by Dumps & Material Staking	41.6116
Covered under Mine Infrastructure (plants, shades, buildings etc.)	6.4707
Land under Forest	0
Historically, Culturally & Ecologically Important Places	0
Any Other, please specify below	0
	478.5206

Table.1.2 Land Use at the Conceptual Stage

Post Mining LU	**AREA** (Ha)
Barren / Waste land with small bushes & shrubs	76.3437
Land under Agriculture / Crops	0
Land covered with Plants	0
Land under Grass Cover	0
Land under Public Infrastructure / Utilities (water bodies, roads, railways, electric lines, telephone lines etc.)	1.0210
Land under Habitation	32.4047
Land under Monuments & places of Historical Importance	0
Degraded by Pits & Excavation	355.5659
Degraded by Dumps & Material Staking	6.7146
Covered under Mine Infrastructure (plants, shades, buildings etc.)	6.4707
Land under Forest	0
Historically, Culturally & Ecologically Important Places	0
Any Other, please specify below	0
	478.5206

1.4 Statutory Clearance:

a. Status of Forest Clearance.

No Forest Land Involved in the proposed project.

Details of Linear Infrastructures:

Roads: State Highway SH-1 passing at a distance of 0.65 Km from Mineral Block-I area towards South direction.

Table 1.4: Environmental Sensitivity

Land Details & Survey Nos	478.5206 Ha **Sy.Nos** : Bordem : Parts of Survey No. 19, 21, 23, 31, 32, 33, 34, 40, 41, 42, 43, 44 Bicholim : Survey No. 80, 81 & Parts of Survey No. 72, 77, 78, 79, 82, 83, 84, 86, 88, 89, 90, 95, 96 & 99 Lamgao : Survey No. 20, 24, 25, 26 & Parts of Survey No. 1, 9, 10, 11, 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 27, 28, 29, 30 & 46 Maem : Survey No. 145, 164, 165 & Parts of Survey No. 84, 85, 86, 114, 142, 143, 144, 146, 162, 163, 166 &167 Mulgao: Survey No. 34, 62, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 89, 91, 110, 114, 115, 116 & Parts of Survey No. 33, 35, 48, 61, 63, 79, 80, 81, 86, 88, 90, 92, 93, 94, 95, 96, 101, 102, 103, 104, 109, 111, 112, 113, 117, 118 & 124 Sirigao : Parts of Survey No. 70, 75, 76, 77, 78, 79, 80, 81 & 82	
Geographical Coordinates	Latitude 15° 34' 20.518" to 15° 36′ 54.018″ N & longitude of 73°54′ 04.754" to 73° 57′ 09.51″ E.	
Survey of India (SOI) Topo-sheet No	48 E/14	
Reserves & Resources	84.743 million tonnes	
Production Capacity	3.0 Million Tonnes	
Life of the Mine	30 Years The mining lease will be valid for 50 years from the date of execution of the mining lease.	
Water requirement	664 KLD	
Power requirement	5.8 MW	
Sanctuary / Tiger Reserve/Elephant / any other Reserve Forest	None	
Biosphere Reserve	None	-
Water Bodies	Asnora river	Touching lease boundary at one point
	Bicholim River	0.23 Km
	Mandovi River	2.3 kms
	Chapora River	7.5 km
Defence Installation	None	--
Nearest airport	Mopa	27.3 Kms
Nearest Railway Station	Tivim	10.5 kms
Nearest Highway	SH-1	0.65 KM from ML area
Seismic Zone	II	--
Nearest Habitat	Within the lease	Min Buffer of 50mts shall be provided and no drilling and blasting shall be carried out.
Environmental Protection Cost	Capital Cost: Rs. 72 lakhs Recurring Cost: Rs. 448 Lakhs	--

Project Cost	25000 lakhs	
Man Power Requirement	716	Both Direct & Indirect employment
Archaeological monuments/ places of worships/public utilities etc.	Namuzgah/Idgah	Archaeological monuments Within ML area. (200m buffer will be maintained)
	Shri Lairae Temple	0.86 km from ML area .
	Amthane Dam	7 kms
	Saptakoteshwar temple and caves at Narve	2.5 kms, There are other monuments within 10km radius namely Churches at Old Goa, Site at Gujir,
	Fort at Khorjuvem	2 kms, there are few other forts also within study area like fort at Colvale & Sanquelim
Coastal Regulation Zone (CRZ)	--	--
Distance from the HFL of the river in m	Asnora river is touching one part of the lease boundary, but the elevation difference is min 10mts.	Asnora river is touching one part of the lease boundary but the elevation difference is min 10mts.
Nearest School	Mulgao Government Primary School Lamgao Government Primary School	Within Lease (School is non functional since last few years) 0.015 kms outside the mine lease
Mangrove	Asnora Creek Mangrove	210 mts from ML Block

CHAPTER -2
PROJECT & IMPACT AREA

2.0 PROJECT & IMPACT AREA

2.1 Description of study area (Core and Buffer Area) : In this subsection, data on age and sex composition of population, caste composition of population and literacy levels are presented. This data helps in estimating population size in different groups like, Scheduled Caste (SC) and Scheduled Tribe (ST) population, male and female population, child population, older persons, and women in reproductive ages, adolescent women, unemployed youth and illiterates. Such data help to design and implement group specific welfare programs.

The population dependency on agriculture and village economy has also been discussed to assess the level of local economic development and employment opportunities.

There are 68 villages/towns - 56 villages and 12 Census towns (CT), in the buffer zone. Of these, 68 villages/towns, 48 villages and 12 towns are located in 6 talukas of North Goa and 8 villages in one taluka in Maharashtra. As the data pertains to large number of villages and towns are in North Goa, the buffer zone is compared to North Goa District. The sex ratio in buffer zone is balanced as it is closed to 1000 - 978 females per 1000 males according to 2011 Census .

Table 2.1: Population in buffer zone villages, 2011 Census.

Village	Number of households	Male	Female	Total	Sex ration/(F/M per 1000)
Alorna	600	1351	1300	2651	962
Ibrampur	555	1262	1167	2429	925
Cansarvornem	310	752	630	1382	838
Dargalim	1331	2872	2824	5696	983
Tuem	652	1422	1329	2751	935
Oxel	633	1329	1465	2794	1102
Revora	631	1308	1322	2630	1011
Nadora	295	648	609	1257	940
Pirna	632	1267	1301	2568	1027
Assonora	944	1898	1972	3870	1039
Sircaim	713	1442	1408	2850	976
Paliem	314	778	599	1377	770
Ucassaim	278	509	568	1077	1116
Nachinola	645	1360	1365	2725	1004
Corjuem	640	1303	1422	2725	1091
Calvim	113	180	223	403	1239
Olaulim	172	308	351	659	1140
Pomburpa	757	1554	1541	3095	992
Mapusa (M Cl)	9466	20322	19667	39989	968
Salvador do Mundo (CT)	1516	3228	3145	6373	974
Aldona (CT)	1624	2925	3345	6270	1144
Ambarim	27	44	49	93	1114
Navelim	280	522	611	1133	1170

Goltim	423	755	879	1634	1164
Malar	382	813	817	1630	1005
Bainguinim	388	754	747	1501	991
Jua (CT)	1057	1971	2163	4134	1097
Corlim (CT)	1583	3386	3182	6568	940
Goa Velha (CT)	1055	2129	2193	4322	1030
Mercurim (CT)	1233	2329	2641	4970	1134
Dumacem	59	147	149	296	1014
Salem	761	1724	1703	3427	988
Adwalpale	326	686	726	1412	1058
Sirigao	361	820	797	1617	972
Mulgao	926	1998	1894	3892	948
Ona	167	336	349	685	1039
Maulinguem North	323	739	718	1457	972
Curchirem	435	1033	1010	2043	978
Sarvona	787	1865	1721	3586	923
Maem	1728	3763	3781	7544	1005
Vainguinim	156	347	359	706	1035
Aturli	112	234	233	467	996
Naroa	419	952	945	1897	993
Piligao	600	1295	1348	2643	1041
Cudnem	763	1714	1594	3308	930
Amone	694	1482	1481	2963	999
Navelim	611	1387	1316	2703	949
Bicholim (M Cl)	3978	8771	8215	16986	937
Sanquelim (M Cl)	3239	7071	6580	13651	931
Podocem	241	479	487	966	1017
Ravona	256	606	559	1165	922
Morlem	762	1674	1616	3290	965
Maloli	90	218	198	416	908
Tivrem	454	960	918	1878	956
Betqui	382	871	836	1707	960
Adcolna	385	883	805	1688	912
Cundaim	913	1988	1871	3859	941
Ponda (M Cl)	5818	11729	10935	22664	932
Candola (CT)	1280	2742	2612	5354	953
Orgao (CT)	1156	2264	2338	4602	1033
Maneri	472	945	1026	1971	1086
Kasai	931	1964	1847	3811	940
Girode	64	145	121	266	834
Vazare	342	698	695	1393	996
Ambadgaon	283	552	565	1117	1024
Matane	467	1073	921	1994	858
Ayee	386	850	803	1653	945
Talekhol	278	630	571	1201	906
Buffer Zone	60654	128356	125478	253834	978
North Goa	191766	416677	401331	818008	963

2.2 EMPLOYMENT

The major employment in this part of the district is Agriculture, small businesses, animal husbandry and some of the people are also employed as workers in the Mines and nearby Industries.

2.3 CROPPING PATTERN

Agriculture in the area mostly depends on rains. The major crop is Cashew, betel nuts, Mangoes, Paddy etc. are grown to some extent. Some people also grow vegetables which find a ready market.

2.4 TOPOGRAPHY , NATURAL DRAINAGE LINES, WATER SOURCE:

The topography is undulating low hill terrain extending all along the mining lease in the North west and South East direction. Mine does not have any forest land within the lease. As the area is located on the foot hills of Sahyadri Hills and receives heavy rainfall during monsoon season and the average annual rainfall is about 3500mm. The Bicholim group of mines is situated in north Goa district and extends between Lat 15° 34' 20.518" N to 15° 36′ 54.018″ N & longitude of 73°54′ 4.754" E to 73° 57′ 09.51″ E. The mining area consists of five contiguous leases covering an area of 478.5206 ha. The leases are on a hill range running in a SE-NW direction. The highest and lowest elevations are 169.14m (amsl) in the North eastern area and -37.24m (amsl) in the south eastern area respectively

DRAINAGE: No specific drainage pattern is observed in the Mining Lease area. Bicholim Mineral block study area fall under Mondovi River basin of Talukas Bicholim, Bardez, Sattari, Sanguem, Tiswadi & Ponda. The catchment area of Mondovi River 1580 Sqkm. The Sahyadri hill ranges in the east form the main watershed. The streams originating here flow in west and north west direction to join the Arabian Sea. The study area drainage pattern is dendritic and sub dentric.

Main River in study area
Mandovi River -Aerial Distance of 2.30 Km at Pilgao Village
Bicholim River - Aerial Distance of 0.23Km at Mandrekarwada (Bicholim)
Assonara River - Assonara river which touch Mining lease area
Chapora River- Aerial Distance of 7.3 Km at Colvale Village

2.5 GEOLOGY

As per Geological Survey of India (GSI) studies, Bicholim Mine area comes under Bicholim-Sirigao type Deposit. The deposit consists of two ore bands running nearly parallel to each other, in which the South-western ore band (Top) is larger extends for a length of 6.5Kms, has width 20 to 45m and North-eastern ore band is comparatively smaller extends over a length of 2Kms which also has 30 to 60m widths.

The south-western ore band is in the shape of S and it occurs on the overturned south-western limb of the anticlinal fold and also on the refolded nose portion of the fold. The north-eastern ore band occurs on the other limb of the fold. Both the ore bands occur along the dip slope. Between the two limbs of anticlinal fold, which are ore bearing; there is a barren phyllite occurring, about 250m wide, which represents the axial portion of the fold. The mineral deposit extends over strike length of 7km in at 50 to 60 degree NW-SE direction.

The mineralisation occurs in the form of bands dipping at 45 to 70 due NE occupying slopes of the hillocks. Thickness of the strata exposed in the mine varies from place.

The average thickness of different litho units is as below; Laterite 10 to 15m Lumpy Laterite 05 to 10m Friable Powdery Ores 20 to 45m Limonitic Clays 5 to 10m Phyllite Clays 30 to 100m Manganiferous Clays 10 to 30m Intrusive / Dykes 02 to 15m Litho units are highly folded and the rocks have attained green schist facies grade of metamorphism

2.6 Climate

The diurnal range is the least being 4 to 6^0 C during monsoon season and increases to the maximum of 10 to 20^0C during December & January. May is the hottest month where the mean daily temperature increases to 30^0C. January is the coolest with mean daily temperature of about 23^0C. It is noted that the day temperature is the lowest in monsoon months of July and August and not in the cool winter months of December and January. The temperature is highest (around 33^oC) in pre – monsoon months of April & May and again in post monsoon months of November & January.

Due to proximity to the Arabian Sea, humidity throughout the year is more than 60% with range from 80 to 90% during monsoon period. As a result of orographic influence, rainfall increases towards the Western Ghats, with average annual rainfall is about 3500 mm Over 90% of annual rainfall occurs during monsoon months of June to September

FLORA & FAUNA

2.7 A STUDY REGION

2.7.1 Study Region

The biodiversity study was undertaken to assess the biodiversity of Mineral block Area and its buffer area of 10 Km radius with the following objectives.

1. Collection and synthesis of secondary information on the status of biodiversity in study region
2. Field survey to assess the status of flora and fauna component in core and buffer areas of project site
3. Identification and listing of flora and fauna which are important as per the Wildlife (protection) Act 1972.

2.7.2 Approach

A participatory and consultative approach was followed in executing the assignment on Ecology & Biodiversity assessment of the mining lease and 10-km buffer region.

Further enquiries were made with forest officials, revenue department and local villagers. Literature survey included a review of the forest working plan, Census hand book, Gazetteer and other records related to the ecology of the region.

A team comprising flora and fauna specialist from Mineral Engineering Services along with Mr. M.S. Raju (EIA coordinator) have visited the Block-I Bicholim Mineral Block Iron Ore Mine and 5-km buffer area during 6th to 9th April 2023; and held discussion with Mr. Jagdish (Head Env) & Ms. Sneha (Env officer) .

Mining officers have highlighted the mining history, shown us the mine lease boundary, and they have further explained to us about the future afforestation works to be undertaken in the region and the prior afforestation as recommended in the TOR. They have shown us the surrounding land use, villages and agro biodiversity area such as Mango and Cashew orchards and mangrove forest around creeks and backwater falling within the 10Km radius area of project.

2.7.3 Approach

For the proposed study, we have followed the "EIA Guidance manual for mining of minerals prepared by the administrative staff college of Hyderabad. With the help of Ms. Sneha and field staff of MES , we have collected the baseline data on biodiversity of the region during January 2023 and presented the data on the format provided in model TOR in EIA Guidance manual prepared by Administrative Staff College of Hyderabad, 2010 on behalf of MoEF, Government of India.

2.7.4 FLORAL STUDIES

Forest Types: Forest types were closely observed on the ground and identified using Champion & Seth, forest classification of India. The identified forest types have been verified, and confirmed from forest working plan for the north Goa Forest Division with specific emphasis on Bicholim forest ranges, Bicholim village, Bicholim taluka published and other authenticated sources.

Quartile Approach: In order to provide representative ecological status 10-km buffer has been divided into four quartiles for biodiversity sampling, i.e., NE (Q-1), NW (Q-2) SW (Q-3) and SE (Q-4) is given in Fig. 3.1. Each of the quartiles have been examined for representative flora on randomly sampled quadrats for trees (25x25-m), shrubs (10x10-m) and herbs (2x2-m) depending upon prevailing geographical conditions and bio-diversity aspects of study area.

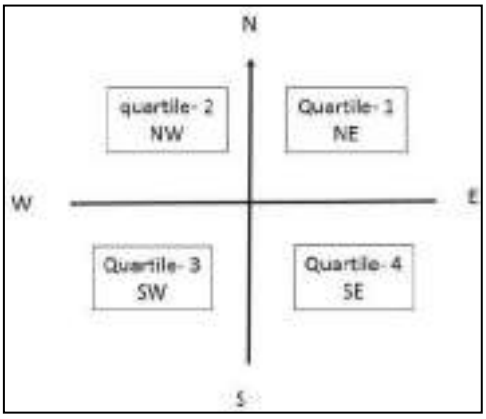


Figure. 2.1. Schematic diagram shown 10- km radius buffer area representation under four quartiles for ecology and biodiversity sampling.

Phyto-sociological parameters, viz., Abundance, Density, Frequency (%) were measured as given below. A total of 10 quadrats were laid down randomly within core area and 40 quadrats were laid down within four quartiles randomly (10/quartile) in buffer area each quadrat trees, shrubs, and herbs as per the Fig.2.1

Quadrats method: Quadrats of 25 × 25-m were laid down randomly within core and 10-km buffer area; each quadrat was laid to assess the trees (>5 cm GBH) and one, 10 × 10-m sub-quadrat nested within the quadrat for shrubs, and two, plots 2 × 2-m for herbs, climbers & grass is given in **Fig. 2.2**. The quadrats were laid randomly to cover the area to maximize the sampling efforts and minimize the species homogeneity, such as small stream area, trees in agricultural bunds, tank bunds, farm forestry plantations, wildlife areas, natural forest area, avenue plantations, house backyards, etc.

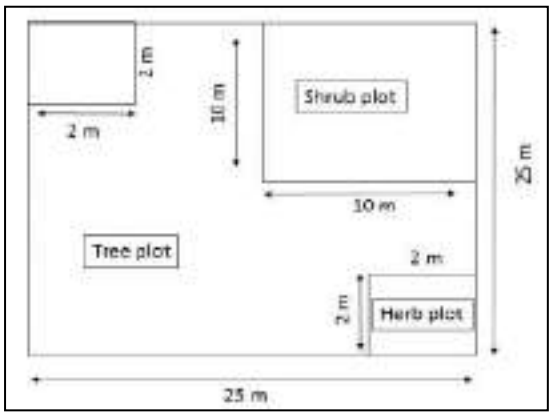


Figure.2.2. Schematic representation of quadrats for trees, shrubs, herbs & grass.

Following formulae was used for calculating the frequency (%), abundance and density of the floral species

$$\%\ \text{Frequency of species A} = \frac{\text{Number of quadrats of occurrence of species A}}{\text{Total number of quadrats studied}} \times 100$$

$$\text{Abundance of species A} = \frac{\text{Number of individuals of species A in total quadrats studied}}{\text{Number of quadrats of occurrence of species A}}$$

$$\text{Density of species A} = \frac{\text{Number of individuals of species A in total quadrats studied}}{\text{Total area studied}}$$

Biodiversity Analysis using index: Species diversity will be calculated by using Shannon and Wiener (1963) formula as follows:

$$H' = -\sum_{i=1}^{R} p_i \ln p_i$$

Whereas H' is Shannon index of general diversity, p_i is often the proportion of individuals belonging to the i^{th} species in the dataset of interest.

Screening IUCN and other sources for species Conservation status: Besides measuring these parameters, other biodiversity aspects in the form of endemic status, keystone species, threatened status, and IUCN, Red-data books of the Botanical Survey of India (BSI), have been verified for their conservation status (*see* http://www.iucnredlist.org/static/categories_criteria_3_1).

A keystone species: Is a species that has a disproportionately large effect on its environment relative to its abundance. Such species are described as playing a critical role in maintaining the structure of an ecological community, affecting many other organisms in an ecosystem and helping to determine the types and numbers of various other species in the community. The IUCN Species Programme of the IUCN Species Survival Commission (SSC), has for more than four decades been assessing the conservation status of species, subspecies, varieties, and even selected sub-populations on a global scale in order to highlight taxa threatened with extinction, and therefore promote their conservation.

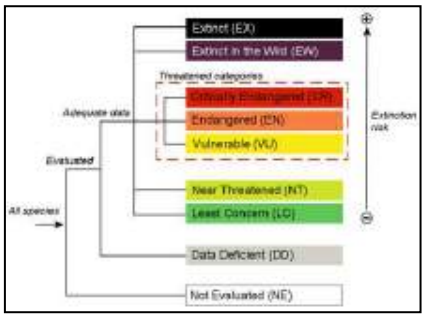


Figure 2.3. IUCN categories showing threatened species categories

The IUCN Red List of Threatened Species provides taxonomic, conservation status and distribution information on plants and animals that have been globally evaluated using the IUCN Red List Categories and Criteria (Fig. 2.3).

This system is designed to determine the relative risk of extinction, and the main purpose of the IUCN Red List is to catalogue and highlight those plants and animals that are facing a higher risk of global extinction (i.e., those listed as *Critically Endangered, Endangered,* and *Vulnerable*).

The IUCN Red List also includes information on plants and animals that are categorised as *Extinct* or *Extinct in the Wild*; on taxa that cannot be evaluated because of insufficient. information (i.e., are *Data Deficient*); and on plants and animals that are either close to meeting the threatened thresholds or that would be *threatened* if not considered for an ongoing taxon-specific conservation programme (i.e., *Near Threatened*).

3.7.1.5 FAUNAL DIVERSITY

Mammals: Mammals were observed using indirect methods such as faucal matter (i.e., scat) and pug mark by establishing 10 × 100-m linear transects depending on the habitat (i.e., existing wildlife game routes/forest trails used). We have also documented few mammals by direct sighting.

Birds: We have used point count method for bird documentation as per standard method by Sutherland (1996), which involved 10-minute observation in each point during early morning hours (6.00 to 10.00 AM). We have enumerated 20 point-counts in each quartile, which constitute a total of 80 points-counts (20 × 4) within 10-km radius area.

Butterfly: The butterfly was enumerated by two linear transects, of 10 × 100 m were laid at each quartile at an interval of 1 km. Further, reptiles and fishes documented in existing literature and secondary information in consultation with local people and wildlife experts were recorded. Apart from field observation, consultations were held with knowledgeable persons of the villages, and frontline forest department officials to validate the field observation and information cited in the literature.

To know the endemic or conservation status of the fauna, Schedule 1 of the Wildlife Preservation Act (1972) has been screened

Fig No. 2.4 Study area quartile I, II, III, & IV

3.7.2 OBSERVATIONS AND DISCUSSIONS

3.7.2.1 Overview of project areas

The forest of the region was categorized as southern moist deciduous mixed forests and Southern secondary moist mixed deciduous forests (Champion & Seth, 1967), in 'A revised survey of the forest types of India'. The region presents a wide range of altitudes, aspects, slopes, drainage, and spills giving rise to a variety of locality factors reflected in the occurrence of number of forest types from tropical semi-evergreen to mangrove forests. These types are broadly differentiated and described here as per recognized and revised forest classification of Champion & Seth.

- 3BC2 – Southern moist mixed deciduous forests
- 3BC2S1 – Southern secondary moist mixed deciduous forests
- 8A/DS1 – South Indian sub-tropical hill savannah woodland forests

Photo.1

Open grass with regenerated with *Acacia auriculiformis* in open area

People scale with over grown native vegetation with coconut trees etc,

Mixed forest with cashew plantation and *Trema orientalis* species

Coconut trees in and arround Village settlement conut trees in and arround Village settlement

FLORA: Total 34 species were recorded within core area, of which 21 species trees (5/ ha), and 7 species shrubs (13 /ha), and 6 species herbs (115/ha) recorded (Table 2.1)

Table . 2.1 . List of plants (trees, shrubs and herbs) reported from Core area

Sl. No	Species name	Family	Common Name
		TREE	
1	*Anacardium occidentale*	Anacardiaceae	Cashew
2	*Acacia auriculiformis* *	Fabaceae	Acacia
3	*Eucalyptus sps*	Myrtaceae	Nilgiri
4	*Casuringa equisettifolia*	Casuarinaceae	Suru
5	*Alstonia scholaris*	Apocynaceae	Saten
6	*Samanea saman*	Fabacaeae	Rain tree
7	*Bauhinia racemose*	Fabacaeae	Apto
8	*Artocarpus heterophyllus*	Moraceae	Phanas
9	*Bombox ceiba*	Bombacaceae	Sanwar
10	*Delonix regia*	Fabacaeae	Gulmohar
11	*Emblica officinalis*	Phyllanthaceae	Aonia
12	*Garcinia indica*	Clusiaceae	Kokum
13	*Gmelina arborea*	Lamiaceae	Shivan
14	*Leucaena leucocephala*	Fabacaeae	Subabul
15	*Mangifera indica*	Anacardiaceae	Mango
16	*Syzygium cumini*	Myrtaceae	Jamun
17	*Trema orientalis*	Cannabaceae	Charcoal tree
18	*Acacia catechu*	Fabacaeae	Khair

19	*Canthium dicoccum*	Rubiaceae	Ceylon boxwood
20	*Ziziphus mauritiana*	Rhamnaceae	Indian jujube
21	*Macaranga peltata*	Euphorbiaceae	Chandada
SHRUBS			
1	*Acacia paniculate*	Mimosaceae	sickle wattle
2	*Calotropis gigantean*	Asclepidiaceae	crown flower
3	*Carissa congesta*	Apocynaceae	Karamda
4	*Crotolaria virosa.*	Fabacaeae	Rattlepod
5	*Helictris isora*	Malvaceae	Marodphali
6	*Lantana camara**	Verbenaceae	Lantana
7	*Ziziphus oenoplea*	Rhamnaceae	Jackal jujube
HERBS AND CLIMBERS			
1	*Asparagus racemosa*	Asparagaceae	Satavar
2	*Bidens biternata*	Asteraceae	Chirchitta
3	*Ipomea cmuricata*	Convolvulaceae	Bhingari
4	*Ocimum sanctum*	Lamiaceae	*Tamole*
5	*Parthenium hysterophorus*	Asteraceae	Santa-Maria
6	*Smilax zeylanica*	Smilacaceae	Kumarika

NOTE: * Invasive species

FAUNA: Total 17 species were observed within the core area, of which 12 species are birds, 2 species of mammals and 3 species of reptiles **(Table 2.2).**

Table 2.2 List of faunal species – Birds, Mammals and Reptiles in the core area

Sl. No.	Common name	Scientific name	Family	IUCN / WPA status
	BIRDS			
1	Common Iora	*Aegithina tiphia*	Irenidae	R/IV
2	Common Myna	*Acridotheres tristis*	Sturnidae	R/IV
3	Crow Pheasant	*Centropus sinensis*	Cuculidae	R/IV
4	Green Bee Eater	*Merops orientalis*	Meropidae	MR/IV
5	House Crow	*Corvus splendens*	Corvidae	R/IV
6	House Sparrow	*Passer domesticus*	Passeridae	R/IV
7	House Swift	*Apus affinis*	Apodidae	R/IV
8	Indian Robin	*Saxicoloides fulicata*	Turdinae	R/IV
9	Jungle Crow	*Corvus macrorhynchos*	Corvidae	R/IV
10	Jungle Myna	*Acridotheres fuscus*	Sturnidae	R/IV
11	Red-wattled Lapwing	*Vanellus indicus*	Charadriidae	R/IV
12	Red-whiskered Bulbul	*Pycnonotus jocosus*	Pycnonotidae	R/IV
	MAMMALS			
13	Indian Hare	*Lepus nigricollis*	Leporidae	Lower risk/ IV
14	Rat	*Rattus rattus*	Muridae	Sch-V
	REPTILES			
15	Green Forest lizard	*Calotes calotes*	Agamidae	Common
16	Roux's Forest lizard	*Calotes rouxii*	Agamidae	Common
17	Garden lizard	*Calotes elloti*	Agamidae	Common

2.7.2 BUFFER AREA

Overview of buffer area (10-km radius) in all 4 directional quartiles - eco-sensitive areas, plantations and development activities so on (Table 2.3).

Table. 2.3 General description of landscape within 10 km radius from core area (all 4 directions of North, East, West and South).

Quartiles	Trees/ Shrubs	Species richness	Density/ha	Species diversity (H')	Habitat Characteristics
Quartile 1 North-East	Trees	42	1834	2.37	Kharpal and Ambadgaon Reserve Forest Cashew mixed forest, Open scrub rest Main powerline (High tension wire) Maharashtra State boundary (<5 km)
	Shrubs	13	4710	2.14	
	Herbs	10	86500	2.16	
Quartile 1 North-West	Trees	35	1714	2.78	Konkan Railway track, Salem Reserve Forest Amthene Dam. Main power line
	Shrubs	9	2120	1.84	
	Herbs	9	2050	2.36	
Quartile 3 South-West	Trees	54	234	1.87	Diwadi Island. Mandavi river and its tributaries Mangove forest and swamps, Konkan railway track
	Shrubs	8	1220	1.84	
	Herbs	10	2500	1.36	
Quartile 4 South-East	Trees	44	734	2.17	Mandavi River and its tributaries, Mangrove Forest / swamps, Open scrub, Kudne river, Volvot river, Harvelem Waterfalls
	Shrubs	11	3820	2.64	
	Herbs	9	11500	2.06	
Overall	Trees	62			
	Shrubs	16			
	Herbs	15			

Detailed Eco-Sensitive Areas

Table 2.4 Ecologically Important habitat from the core area boundary

Sl. No.	Important ecosystem	Distance from Core area	Quartile direction
1	Ambadgaon RF	7.6 Km	Q 1 (North-East)
2	Karpal Rf	6.7 Km	Q 1 (North-East)
3	Kasarpal RF	5.1 Km	Q 1 (North-East)
4	Amthane dam & up-stream	5.8 km	Q 2 (North-East)
5	Chaporar River	7.5 km	Q2 (North-West)
6	Mayem Forest	Common Boundary to Lease Area	Q2 (North-West)
7	Assonara River	Touches the Lease Area	Q2 (North-West)
8	Mapusa River	2.0 Km	Q2 (North-West)/ Q3 (South-West)
9	Mangroves	0.23 Km	Q2 (North-West)/ Q3 (South-West) & Q4 (South-East)/
10	Moira River	2.45 km	Q3 (South-West)
11	Divar Island	5.8 Km	Q3 (South-West)
12	Mandovi River	5.3 Km	Q4 (South-East)/ Q3 (South-West)
13	Valvat River	3.3 Km	Q4 (South-East
14	Bicholim River	0.2 Km	Q4 (South-East

FLORAL DIVERSITY

TREE: Overall 62 species of trees were enumerated from the reserve forest and riparian habitats.

Table 2.5 Trees growing in core and buffer area of 10-km radius

Sl.No.	Species name	Family
1	*Acacia catechu (L.f.) Willd. var.*	Fabaceae
2	*Adina cordifolia Hook. f. ex Brandis*	Dipterocarpaceae
3	*Alstonia scholaris (L.) R.Br.*	Apocynaceae
4	*Annona squamosa L.*	Annonaceae
5	*Arlocapus lakoochu Wall. ex Roxb*	Moraceae
6	*Artocarpus heterophyllus Lam.*	Moraceae
7	*Artocapus integrifolius Auct.*	Moraceae
8	*Bischofia javanica Bl.*	Phyllanthaceae
9	*Bombax malabaricum DC.*	Bombacaceae
10	*Buchanania latifolia Roxb.*	Anacardiaceae
11	*Butea monosperma (Lam.) Taub.*	Fabaceae
12	*Caesalpinia bonducella (L.) Fleming*	Caesalpinaceae
13	*Canthium dicoccum (Gaert.) T. & B.*	Rubiaceae
14	*Careya arborea Roxb.*	Lecythidaceae
15	*Caryota urens L. (Kithul) sap.*	Arecaceae
16	*Cassia fistula L.*	Fabacaeae
17	*Casearia ovoidea Sleumer*	Salicaceae
18	*Cassia siamea Lam.*	Fabaceae
19	*Celtis cinnamomea Lindl. ex Planch.*	Ulmaceae
20	*Clerodendron sp.,*	Lamiaceae
21	*Cordia wallichii L.*	Boraginaceae
22	*Dalbergia calofolia Roxb.*	Fabaceae
23	*Delonix regia (Hk.) Raf.*	Fabaceae
24	*Diospyros montana Roxb.*	Ebenaceae
25	*Erythrina indica L.*	Fabaceae
26	*Ficus arnottiana (Miq.) Miq.*	Moraceae
27	*Ficus glomerata Roxb.*	Moraceae
28	*Ficus microcarpa L.f.*	Moraceae
29	*Flueggea leucopyrus Willd.*	Phyllanthaceae
30	*Gliricidia sepium (Jacq.) Kunth*	Fabaceae
31	*Glochidion velutinum L.*	Euphorbiaceae
32	*Grewia robusta L.*	Tiliaceae
33	*Grewia tiliifolia Vahl.*	Tiliaceae
34	*Holoptelea integrifolia (Roxb.) Planch.*	Ulmaceae
35	*Holarrhena pubescens (Buch.-Ham.)*	Apocynaceae
36	*Hopia perviflora Bedd.*	Lythraceae
37	*Hydnocarpus wightiana Bl.*	Achariaceae
38	*Lannea grandis (Dennst.) Engl.*	Anacardiaceae
39	*Macaranga peltata (Roxb.) Muell.*	Euphorbiaceae
40	*Mallotus philippensis (Lam.) Muell.*	Euphorbiaceae

41	*Mangifera indica L.*	Anacardiaceae
42	*Memecylon umbellatum Burm.*	Melastomataceae
43	*Mitragyna parviflora (Roxb.) Korth.*	Rubiaceae
44	*Olea dioica L.*	Oleaceae
45	*Peltophorum pterocarpum (DC.)*	Fabaceae
46	*Polyalthia longifolia Sonn.*	Annonaceae
47	*Pterocarpus marsupium Roxb.*	Fabaceae
48	*Radermachera xylocarpa (Roxb.) Schm.*	bignoniaceae
49	*Randia dumetorum L.*	Rubiaceae
50	*Sapindus emarginatus L.*	Sapindaceae
51	*Schleichera oleosa (Lour.) Oken*	Euphorbiaceae
52	*Semecarpus anacardium L. f.*	Anacardiaceae
53	*Spondias mangifera Willd.*	Anacardiaceae
54	*Syzygium caryophyllatum (L.) Alton*	Myrtaceae
55	*Syzygium cumini (L.) Skeels*	Myrtaceae
56	*Terminalia paniculata Roth*	Combretaceae
57	*Thespesia populnea (L.) Correa*	Malvaceae
58	*Trema orientalis (L.) Bl.*	Cannabinaceae
59	*Vitex alticima L. f.*	Verbenaceae
60	*Wrightia tinctoria*	Apocynaceae
61	*Xylia xylocarpa (Roxb.) Taub.*	Mimosaceae
62	*Ziziphus mauritiana Lam.*	Rhamnaceae

Shrubs: Total 16 species recorded 10 km buffer area .

Table 2.4 Shrubs growing in core and reserve forest of 10-km radius from Bicholim mine north Goa

Sl.No.	Species name	Family
1	*Acacia paniculata Willd.*	Mimosaceae
2	*Amaranthus spinosus L.*	Amarantheceae
3	*Annona murocata L.*	Annonaceae
4	*Calotropis gigantean L.*	Asclepidiaceae
5	*Canthium parviflorum Lam.*	Rubiaceae
6	*Carissa congesta L.*	Apocynaceae
7	*Chromolaena odorata (L.) K.R.*	Astraceae
8	*Crotolaria virosa (Roxb.) Bake.*	Fabacaeae
9	*Dendrocalamus strictus*	Poaceae
10	*Helictris isora*	Malvaceae
11	*Ixora brachiata Roxb. ex DC*	Rubiaceae
12	*Jatropha gossypiifolia*	Euphorbiaceae
13	*Lantana camara L.*	Verbenaceae
14	*Rosa chinensis Jacq.*	Rosaceae
15	*Vitex negundo*	Verbenaceae
16	*Ziziphus oenoplea Miller.*	Rhamnaceae

Herbs: Total 15 species recorded form 10 km buffer area. The dominated species were *Acrostichum aureum*, *Asparagus racemose*, *Borreria articulata*, and *Cymbopogon citratus*,

Table 2.5. Checklist of herbs, climbers and grass species reported from the core and reserve forest within 10-km radius from Bicholim mine north Goa

Sl. No	*Species name*	Family
1	*Acrostichum aureum*	Pteridaceae
2	*Ageratum conyzoides*	Astraceae
3	*Asparagus racemosa*	Asparagaceae
4	*Atlantia species*	Rutaceae
5	*Bidens biternata*	Asteraceae
6	*Borreria articulata*	Rubiaceae
7	*Cassia tora*	Caesalpinaceae
8	*Cymbopogon citratus*	Poaceae
9	*Cyperus difformis*	Cyperaceae
10	*Ipomea cmuricata*	Convolvulaceae
11	*Ocimum sanctum*	Lamiaceae
12	*Parthenium spp*	Asteraceae
13	*Premna coriacea*	Verbenaceae
14	*Sida cordifolia*	Malvaceae
15	*Solanum indicum*	Solanaceae

Mangrove forest

Total 12 species recorded from the mangrove estuary nearby Assonara and Mandavi River and closer to Salim Ali Bird Sanctuary. The dominated family was Rhizophoraceae and followed by Lythraceae and Acanthaceae

Table 2.6 Checklist of Mangrove species recorded from the 10 km radius from ML

Sl. No.	Species Name	Family
1	*Rhizophora mucronata*	Rhizophoraceae
2	*Rhizophora apiculata*	Rhizophoraceae
3	*Avicennia marina*	Acanthaceae
4	*Avicennia officinalis*	Acanthaceae
5	*Sonneratia alba*	Lythraceae
6	*Sonneratia caseolaris*	Lythraceae
7	*Ceriops tagal*	Rhizophoraceae
8	*Bruguira gymnorhiza*	Rhizophoraceae
9	*Bruguiera cylindrica*	Rhizophoraceae
10	*Kandelia candel*	Rhizophoraceae
11	*Lumnitzera racemosa*	Combretaceae
12	*Aegiceras corniculatum*	Primulaceae
13	*Dolichandron spathecae*	Bignoniaceae
14	*Excocaria agalocha*	Euphorbiaceae
15	*Acanthus ilicifolius*	Acanthaceae
16	*Acrostichum aureum*	Pteridaceae

OUTSIDE FOREST LANDSCAPE:

Avenue trees and human settlement:

Total 25 species recorded in the roadside and human settlement; most of these species were planted and some are naturally regenerated.

Table. 2.7 Checklist of species recorded from avenue forest and nearby human settlement within 10 km radius.

Sl. No	Species name	common name	Family	habit
1	*Tamarindus indica*	Tamrind/imli	Cesalpinaceae	Tree
2	*Annona reticulata*	Ramphal	Annonaceae	Tree
3	*Bambusa sp*	Bamboo	Bambocaceae	Tree
4	*Bougainvillea spectabilis*	Bouganvilla	Nyctaginaceae	Tree
5	*Cassia fistula*	Amaltas	Fabaceae	Tree
6	*Dalbergia latifolia*	Shisam/ Shisoo	Fabaceae	Tree
7	*Delonix regia*	Gulmohar	Fabaceae	Tree
8	*Phyllanthus emblica*	Awala/.Avala	Phyllanthaceae	Tree
9	*Psidium guajava*	Peru/Gauva	Myrtaceae	Tree
10	*Samanea saman*	Rain tree	Fabaceae	Tree
11	*Sapindus mukorossi*	Ritha/Reetha	Sapindaceae	Tree
12	*Swetenia mahagoni*	Mohagony	Meliaceae	Tree
13	*Syzygium cumini*	Jamun	Myrtaceae	Tree
14	*Terminalia bellerica*	Ghoting/behada	Combretaceae	Tree
15	*Acacia auriculiformis*	Babul	Mimosaceae	Tree
16	*Garcinia indica*	kokum	Clusiaceae	Tree
17	*Pongamia pinnata*	Karuaini	Fabaceae	Tree
18	*Ficus benghalensis*	Banyan tree	Moraceae	Tree
19	*Ficus religiosa*	Peepal Tree	Moraceae	Tree
20	*Vitex negundo*	Nirgundi	Lamiaceae	Shrub
21	*Mucuna pruriens*	Kavachkuiri	Fabaceae	Climber
22	*Dioscorea bulbifera*	Aerial yam	Dioscoreaceae	Climber
23	*Zornia diphylla*	Two-Leaf Zornia	Fabaceae	Herb
24	*Justicia simplex*	Simple Justicia	Acanthaceae	Herb
25	*Cynodon dactylo*	Lawn Grass	Poaceae	Grass

DOMESTICATED / CULTIVATED SPECIES

The landscape many horticulture plants grown around their house's backyard. In addition, large scale plantations like Cashew, Coconut, Mango and *Areca catechu* their farmland. There are seasonal paddy and vegetable cultivations also seen within the 10 km buffer area.

Table. 2.8 List of species from 10 km radius which are domesticated or cultivated from the farmland

Sl. No.	Species name	common name	Family	habit
1	*Annona reticulata*	Ramphal	Annonaceae	Tree
2	*Phyllanthus emblica*	Awala/.Avala	Phyllanthaceae	Tree
3	*Psidium guajava*	Peru/Gauva	Myrtaceae	Tree
4	*Carica papaya*	Caricaceae	Caricaceae	Tree
5	*Musa paradisiaca*	Bannana	Musaceae	Tree
6	*Acacia auriculiformis*	Babul	Mimosaceae	Tree
7	*Anacardium occidentale*	Cashew	Anacardiaceae	Tree
8	*Areca catechu*	Areca Nut	Arecaceae	Tree
9	*Cocos nucifera*	Coconut	Arecaceae	Tree
10	*Garcinia indica*	Kokum	Clusiaceae	Tree
11	*Tamarindus indica*	Tamarind	Cesalpinaceae	Tree
12	*Mangifera indica*	Mango	Anacardiaceae	Tree
13	*Piper betle*	Betel leaves	Piperaceae	climber
14	*Oryza sativa*	Paddy	Poaceae	Herb

The plant species recorded in the study area were grouped into three categories i.e. endemic, rare, and threatened and keystone species and are given in below Table 2.9 Overall, 6 important species recorded within the study area. Within buffer area, 5 keystone, one endemic species was recorded.

Table 2.9 Endemic, Keystone and Threatened species recorded in 10-km radius area

Sl. No.	Species	Family	Core/buffer region	Habitat	Status
1	*Artocarpus heterophyllus* Lam.	Moraceae	Buffer	Open / Reserve Forest	Endemic
2	*Ficus arnottiana* (Miq.) Miq.	Moraceae	Buffer	Open	Keystone
3	*Ficus benghalensis* L.	Moraceae	Buffer	Open	Keystone
4	*Ficus glomerata* Roxb.	Moraceae	Buffer	Open	Keystone
5	*Ficus racemosa* L.	Moraceae	Buffer	Open	Keystone
6	*Ficus religiosa* L.	Moraceae	Buffer	Open/ Rivulets	Keystone

BIODIVERSITY : FAUNA

Overall, 239 species recorded from both primary observation and secondary publications and reports, in case of fauna Mammals (10 species), frogs and toads (17 species), Birds (153), butterfly (27) and aquatic fishes and crabs (16) were reported from the region.

Based on flora and fauna both primary and secondary information we have arrived mitigation measure to manage the biodiversity. The details listed below -

Mammals: Total 10 mammal species reported within core and buffer areas of which one species Schedule- I, 2 species of Schedule-II, 1 of Schedule-III and 3 species Schedule - IV, and 2 from Schedule V.

Table 2.9. List of the mammal species reported from 10-km radius.

Sl. No	Local Name	Scientific name	Family	IUCN Status/ WPA Schedule
1	Common grey mongoose	*Herpestes edwardsii*	Herpestidae	Lower risk/ IV
2	Indian Hare	*Lepus nigricollis*	Leporidae	Lower risk/ IV
3	Flying fox bat	*Pteropus giganteus*	Pteropodidae	Sch-V
4	Rat	*Rattus rattus*	Muridae	Sch-V
5	Indian porcupine	*Hystrix indica*	Hystricidae	Lower risk/IV
6	Wild boar	*Sus scrofa*	Suidae	Lower risk/III
7	Striped squirrel	*Funambulus palmarum*	Sciuridae	Sch-IV
8	Common leopard	*Panthera pardus*	Felidae	Lower risk/I
9	Small Indian civet	*Viverricula indica*	Viverridae	Lower risk/II
10	Bonnet macaque	*Macaca radiate*	Cercopithecidae	Lower risk/II

Reptiles: Total 16 reptile species recorded within core and buffer areas out of 12 species of snakes and 5 species of lizards were recorded. As per IUCN, the least concern. Further, as per the wildlife Protection Act, 4 species under snake and 1 species under lizard of Schedule-II.

Table 2.10 List of Reptile's reported from the 10-km radius.

Sl. No.	Common name	Scientific name	Family	IUCN status / WPA schedule
1	Common Sand Boa	*Gongylophis conicus*	*Boidae*	Common
2	Montane trinket snake	*Coelognathus helena monticollaris*	*Colubridae*	Common
3	Indian rat Snake	*Ptyas muscosa*	*Colubridae*	Sch-II
4	Common Kukri Snake	*Oligodon arnensis*	*Colubridae*	Common
5	Western Kukri Snake	*Oligodon affinis*	*Colubridae*	Uncommon
6	Checkered Keelback	*Xenochrophis piscator*	*Colubridae*	Sch-II
7	Striped Keelback	*Amphiesma stolatum*	*Colubridae*	Common
8	Hill keelback	*Amphiesma monticola*	*Colubridae*	Endemic to WGs
9	Saw scaled Viper	*Echis carinathus*	*Viperidae*	Sch-IV
10	Cobra	*Naja naja*	*Elapidae*	Rare/II
11	Russell's Viper	*Daboia russelii*	*Viperidae*	Sch-II
12	Green Forest lizard	*Calotes calotes*	*Agamidae*	Common
13	Roux's Forest lizard	*Calotes rouxii*	*Agamidae*	Common
14	Indian Garden lizard	*Calotes versicolor*	*Agamidae*	Common
15	Bark/Marbled Tree gecko	*Hemidactylus leschenaultia*	*Gekkonidae*	Common
16	Common Indian monitor lizard	*Varanus bengalensis*	*Varanidae*	Least concern/II

AMPHIBIANS

Total 17 species of frogs recorded within the various habitat ranges from paddy field, scrub jungle, riparian forest, streams, and evergreen forest patches . The Jordon's narrow mouthed frog and Bronzed frog are near threatened and one Konkan bush frog vulnerable under IUCN and the rest of all were under the least concern category. As per WPA 9, species were recorded under Schedule-IV and 8 species under common but yet to validate.

Table 2.11 List of toads and amphibians reported from 10-km radius.

Sl. No.	Common name	Scientific name	Family	IUCN status / WPA schedule
1	Common Indian toad	*Bufo melanostictus*	Bufonidae	LC
2	Jerdon's narrow mouthed frog	*Ramanella Montana*	Microhylidae	NT
3	Konkan bush frog	*Philautus bombayensis*	Rhacophoridae	VU
4	Marten's bush frog	*Philautus leucorhinus*	Rhacophoridae	LC
5	Bamboo tree frog	*Polypedates leucomystax*	Rhacophoridae	LC
6	Common tree frog	*Polypedates maculatus*	Rhacophoridae	LC
7	Malabar gliding frog	*Rhacophorus malabaricus*	Rhacophoridae	LC
8	Skipper frog	*Euphlyctis cyanophlyctis*	Ranidae	LC/IV
9	Jerdon's bull frog	*Hoplobatrachus crassus*	Ranidae	LC/IV
10	Indian bull frog	*Hoplobatrachus tigerinus*	Ranidae	LC/IV
11	Brown leaping frog	*Indirana semipalmata*	Ranidae	LC/IV
12	Paddyfield frog	*Limnonectes limnocharis*	Ranidae	LC/IV
13	Hill cricket frog	*Limnonectes syhadrensis*	Ranidae	LC/IV
14	Fungoid frog	*Rana malabaricus*	Ranidae	LC/IV
15	Bronzed frog	*Rana temporalis*	Ranidae	NT/IV
16	Indian burrowing frog	*Tomopterna breviceps*	Ranidae	LC/IV
17	Dobson's burrowing frog	*Tomopterna dobsoni*	Dicroglossidae	LC

Note: *LC - Least concern, NT - near threaten, VU – Vulnerable, Wildlife Protection Act -Schedule IV*

BIRDS

Total 153 species of birds recorded within the habitat ranges from paddy field to evergreen forest . As per the Wildlife Protection Act 1972, 2- species were of Schedule I and 151 species were of Schedule IV. and one threatened species recorded. In that 126 species were resident locally. Out of 2 were endemic to the Western Ghats, and 28 species recorded migratory birds in that 11 species were locally migratory birds. two were vulnerable species.

Table 2.12 List of birds reported from 10-km radius.

Sl. No.	Common name	Scientific name	Family	IUCN status/ WPA schedule
1	Little Grebe	*Tachybaptus ruficollis*	Podicipedidae	R/IV
2	Little Cormorant	*Phalacrocorax niger*	Phalacrocoracidae	R/IV
3	Indian Shag	*Phalacrocorax fuscicollis*	Phalacrocoracidae	R/IV
4	Great Cormorant	*Phalacrocorax carbo*	Phalacrocoracidae	M/IV
5	Darter	*Anhinga melanogaster*	Phalacrocoracidae	RV/IV
6	Little Egret	*Egretta garzetta*	Ardeidae	R/IV
7	Western Reef Egret	*Egretta gularis*	Ardeidae	RM/IV
8	Grey Heron	*Ardea cinerea*	Ardeidae	RM/IV
9	Purple Heron	*Ardea purpurea*	Ardeidae	R/IV
10	Large Egret	*Casmerodius albus*	Ardeidae	R/IV
11	Median Egret	*Mesophoyx intermedia*	Ardeidae	M/IV
12	Cattle Egret	*Bubulcus ibis*	Ardeidae	R/IV
13	Indian Pond-Heron	*Ardeola grayii*	Ardeidae	R/IV
14	Little Green Heron	*Butorides striatus*	Ardeidae	R/IV
15	Black-crowned Night Heron	*Nycticorax nycticorax*	Ardeidae	RM/IV
16	Malayan Night Heron	*Gorsachius melanocephalus*	Ardeidae	M/IV
17	Chestnut Bittern	*Ixobrychus cinnamomeus*	Ardeidae	M/IV
18	Black Bittern	*Dupetor flavicollis*	Ardeidae	M/IV
19	Painted Stork	*Mycteria leucocephala*	Cioniidae	M/IV
20	Lesser Whistling-Duck	*Dendrocygna javanica*	Anatidae	MR/IV
21	Cotton Teal	*Nettapus coromandelianus*	Anatidae	MR/IV
22	Spot-billed Duck	*Anas poecilorhyncha*	Anatidae	M/IV
23	Oriental Honey-buzzard	*Pernis ptilorhyncus*	Accipitridae	T/IV
24	Black Kite	*Milvus migrans*	Accipitridae	R/IV
25	Brahminy Kite	*Haliastur indus*	Accipitridae	R/IV
26	White-bellied Sea-Eagle	*Haliaeetus leucogaster*	Accipitridae	R/I
27	Long-billed Vulture	*Gyps indicus*	Accipitridae	CE/IV
28	Crested Serpent Eagle	*Spilornis cheela*	Accipitridae	R/IV
29	Eurasian Marsh Harrier	*Circus aeruginosus*	Accipitridae	R/IV
30	Crested Goshawk	*Accipiter trivirgatus*	Accipitridae	MR/IV
31	Shikra	*Accipiter badius*	Accipitridae	R/IV
32	Besra Sparrowhawk	*Accipiter virgatus*	Accipitridae	R/IV
33	Black Eagle	*Ictinaetus malayensis*	Accipitridae	R/IV
34	Jungle Bush Quail	*Perdicula asiatica*	Phasianidae	R/IV
35	Red Spurfowl	*Galloperdix spadicea*	Phasianidae	R/IV
36	Grey Junglefowl	*Gallus sonneratii*	Phasianidae	R/IV
37	Indian Peafowl	*Pavo cristatus*	Phasianidae	R/I
38	Common Buttonquail	*Turnix suscitator*	Turnicidae	R/IV
39	Blue-breasted Rail	*Gallirallus striatus*	Rallidae	R/IV
40	White-breasted Waterhen	*Amaurornis phoenicurus*	Rallidae	R/IV
41	Purple Moorhen	*Porphyrio porphyrio*	Rallidae	RM/IV
42	Pheasant-tailed	*Hydrophasianus chirurgus*	Jacanidae	R/IV
43	Bronze-winged Jacana	*Metopidius indicus*	Jacanidae	R/IV
44	Common Ringed Plover	*Charadrius hiaticula*	Charadriidae	M/IV

45	Little Ringed Plover	*Charadrius dubius*	Charadriidae	M/IV
46	Kentish Plover	*Charadrius alexandrines*	Charadriidae	M/IV
47	Yellow-wattled Lapwing	*Vanellus malarbaricus*	Charadriidae	M/IV
48	Red-wattled Lapwing	*Vanellus indicus*	Charadriidae	R/IV
49	Eurasian Woodcock	*Scolopax rusticola*	Scolopacidae	R/IV
50	Nilgiri Wood Pigeon	*Columba elphinstonii*	Columbidae	RV/ IV
51	Spotted Dove	*Streptopelia chinensis*	Columbidae	R/IV
52	Emerald Dove	*Chalcophaps indica*	Columbidae	R/IV
53	Green Imperial Pigeon	*Ducula aenea*	Columbidae	R/IV
54	Mountain Imperial-Pigeon	*Ducula badia*	Columbidae	R/IV
55	Indian Hanging-Parrot	*Parrot Loriculus vernalis*	Psittacidae	R/IV
56	Rose-ringed Parakeet	*Psittacula krameri*	Psittacidae	R/IV
57	Plum-headed Parakeet	*Psittacula cyanocephala*	Psittacidae	R/IV
58	Blue-winged Parakeet	*Psittacula columboides*	Psittacidae	RE/IV
59	Brain fever Bird	*Hierococcyx varius*	Cuculidae	R/IV
60	Indian Cuckoo	*Cuculus micropterus*	Cuculidae	U/IV
61	Common Cuckoo	*Cuculus micropterus*	Cuculidae	M/IV
62	Banded Bay Cuckoo	*Cacomantis sonneratii*	Cuculidae	RM/IV
63	Indian Plaintve Cuckoo	*Cacomantis passerinus*	Cuculidae	R/IV
64	Drongo Cuckoo	*Surniculus lugubris*	Cuculidae	R/IV
65	Asian Koel	*Eudynamys scolopacea*	Cuculidae	R/IV
66	Small Green-billed Malkoha	*Phaenicophaeus viridirostris*	Cuculidae	R/IV
67	Greater Coucal	*Centropus sinensis*	Cuculidae	R/IV
68	Lesser Coucal	*Centropus bengalensis*	Cuculidae	U/IV
69	Oriental Scops-Owl	*Otus sunia*	Strigidae	R/IV
70	Forest Eagle-Owl	*Bubo nipalensis*	Strigidae	U/IV
71	Ketupa zeylonensis	*Brown Fish-Owl*	Strigidae	R/IV
72	Brown Wood Owl	*Strix leptogrammica*	Strigidae	R/IV
73	Glaucidium radiatum	*Jungle Owlet*	Strigidae	R/IV
74	Spotted Owlet	*Athene brama*	Strigidae	R/IV
75	Indian Jungle Nightjar	*Caprimulgus indicus*	Caprimulgidae	RM/IV
76	Indian Edible-nest Swiftlet	*Collocalia unicolor*	Apodidae	RM/IV
77	White-rumped Needletail-Swift	*Zoonavena sylvatica*	Apodidae	M/IV
78	Brown-backed Needletail-Swift	*Hirundapus giganteus*	Apodidae	M/IV
79	Asian Palm Swift	*Cypsiurus balasiensis*	Apodidae	R/IV
80	Alpine Swift	*Tachymarptis melba*	Apodidae	U/IV
81	Pacific Swift	*Apus pacificus*	Apodidae	U/IV
82	House Swift	*Apus affinis*	Apodidae	R/IV
83	Crested Tree-swift	*Hemiprocne coronata*	Hemiprocnidae	R/IV
84	Malabar Trogon	*Harpactes fasciatus*	Trogonidae	R/IV
85	Small Blue Kingfisher	*Alcedo atthis*	Alcedinidae	R/IV
86	Oriental Dwarf Kingfisher	*Ceyx erithacus*	Alcedinidae	R/IV
87	Stork-billed Kingfisher	*Halcyon capensis*	Alcedinidae	R/IV
88	White-breasted Kingfisher	*Halcyon smyrnensis*	Alcedinidae	R/IV
89	Black-capped Kingfisher	*Halcyon pileata*	Alcedinidae	R/IV

90	Collared Kingfisher	*Todiramphus chloris*	Alcedinidae	R/IV
91	Blue-eared Kingfisher	*Alcedo meningting*	Alcedinidae	R/IV
92	Ceryle rudis	*Lesser Pied Kingfisher*	Alcedinidae	R/IV
93	Blue-bearded Bee-eater	*Nyctyornis athertoni*	Meropidae	R/IV
94	Small Bee-eater	*Merops orientalis*	Meropidae	R/IV
95	Blue-tailed Bee-eater	*Merops philippinus*	Meropidae	M/IV
96	Chestnut-headed Bee-eater	*Merops leschenaulti*	Meropidae	R/IV
97	Brown-headed Barbet	*Megalaima zeylanica*	Capitonidae	R/IV
98	Crimson-throated Barbet	*Megalaima rubricapilla*	Capitonidae	R/IV
99	Coppersmith Barbet	*Megalaima haemacephala*	Capitonidae	R/IV
100	Brown-capped Pygmy woodpecker	*Dendrocopos nanus*	Picidae	R/IV
101	Yellow-fronted Pied woodpecker	*Dendrocopos mahrattensis*	Picidae	R/IV
102	Wire-tailed Swallow	*Hirundo smithii*	Hirudinidae	R/IV
103	Red-rumped Swallow	*Hirundo daurica*	Hirudinidae	R/IV
104	Large Pied Wagtail	*Motacilla maderaspatensis*	Motacillidae	R/IV
105	Yellow Wagtail	*Motacilla flava*	Motacillidae	M/IV
106	Paddyfield Pipit	*Anthus rufulus*	Motacillidae	R/IV
107	Large Cuckoo-shrike	*Coracina macei*	Campephagidae	R/IV
108	Small Minivet	*Pericrocotus cinnamomeus*	Campephagidae	R/IV
109	Scarlet Minivet	*Pericrocotus flammeus*	Campephagidae	R/IV
110	Red-whiskered Bulbul	*Pycnonotus jocosus*	Pycnonotidae	R/IV
111	Red-vented Bulbul	*Pycnonotus cafer*	Pycnonotidae	R/IV
112	White-browed Bulbul	*Pycnonotus luteolus*	Pycnonotidae	R/IV
113	Yellow-browed Bulbul	*Iole indica*	Pycnonotidae	R/IV
114	Common Iora	*Aegithina tiphia*	Irenidae	R/IV
115	Asian Fairy-Bluebird	*Irena puella*	Irenidae	R/IV
116	Jerdon's Chloropsis	*Chloropsis cochinchinensis*	Irenidae	R/IV
117	Malabar Whistling Thrush	*Myophonus horsfieldii*	Turdinae	R/IV
118	Orange-headed Thrush	*Zoothera citrinacyanotus*	Turdinae	R/IV
119	Oriental Magpie-Robin	*Copsychus saularis*	Turdinae	R/IV
120	White-rumped Shama	*Copsychus malabaricus*	Turdinae	R/IV
121	Indian Robin	*Saxicoloides fulicata*	Turdinae	R/IV
122	Pied Bushchat	*Saxicola caprata*	Turdinae	R/IV
123	Spotted Babbler	*Pellorneum ruficeps*	Timaliinae	R/IV
124	Indian Scimitar Babbler	*Pomatorhinus horsfieldii*	Timaliinae	R/IV
125	Rufous-bellied Babbler	*Dumetia hyperythra*	Timaliinae	R/IV
126	Black-headed Babbler	*Rhopocichla atriceps*	Timaliinae	R/IV
127	Yellow-eyed Babbler	*Chrysomma sinense*	Timaliinae	R/IV
128	Rufous Babbler	*Turdoides subrufus*	Timaliinae	RE/IV
129	Jungle Babbler	*Turdoides striatus*	Timaliinae	R/IV
130	Quaker Tit-Babbler	*Alcippe poioicephalA*	Timaliinae	R/IV
131	Streaked Fantail-Warbler	*Cisticola juncidis*	Sylviinae	R/IV
132	Franklin's Prinia	*Prinia hodgsonii*	Sylviinae	R/IV
133	Ashy Prinia	*Prinia socialis*	Sylviinae	R/IV
134	Plain Prinia	*Prinia inornata*	Sylviinae	R/IV
135	Common Tailorbird	*Orthotomus sutorius*	Sylviinae	R/IV

136	Tickell's Blue-Flycatcher	*Cyornis tickelliae*	Muscicapinae	R/IV
137	Tickell's Flowerpecker	*Dicaeum erythrorynchos*	Dicaeidae	R/IV
138	Plain Flowerpecker	*Dicaeum concolor*	Dicaeidae	R/IV
139	Purple-rumped Sunbird	*Nectarinia zeylonica*	Nectariniidae	R/IV
140	Black-headed Munia	*Lonchura malacca*	Estrildidae	MR/IV
141	House Sparrow	*Passer domesticus*	Passeridae	R/IV
142	Yellow-thraoted Sparrow	*Petronia xanthocollis*	Passeridae	R/IV
143	Common Myna	*Acridotheres tristis*	Sturnidae	R/IV
144	Jungle Myna	*Acridotheres fuscus*	Sturnidae	R/IV
145	Common Hill-Myna	*Gracula religiosa*	Sturnidae	R/IV
146	Black Drongo	*Dicrurus macrocercus*	Dicruridae	R/IV
147	Ashy Drongo	*Dicrurus leucophaeus*	Dicruridae	M/IV
148	Bronzed Drongo	*Dicrurus aeneus*	Dicruridae	R/IV
149	Greater Racket-tailed Drongo	*Dicrurus paradiseus*	Dicruridae	R/IV
150	Indian Treepie	*Dendrocitta vagabunda*	Corvidae	R/IV
151	White-bellied Tree Pie	*Dendrocitta leucogaster*	Corvidae	U/IV
152	House Crow	*Corvus splendens*	Corvidae	R/IV
153	Jungle Crow	*Corvus macrorhynchos*	Corvidae	R/IV

Note: *M - Migratory, R - Resident, U - unclear, E - Endemic, CE - Critically endangered, NT - Near threatened, V – Vulnerable, I – IV – Schedule species as per WPA*

BUTTERFLY: Total 27 species of butterfly were recorded within various habitats such as Paddy field, degraded habitat, scrub forest, open grassland, evergreen forest, and near settlements Out of 1 species were under schedule-I, 4 were Schedule-II and one in Schedule-IV, and 21 were common in these habitats.

Table 2.11 List of butterfly species recorded within 10-km radius around Bicholim Iron ore mine, Goa.

Sl. No.	Common name	Scientific name	Family	IUCN status/ WPA schedule
1	Spot swordtail	*Graphium nomius* Esper	Papilionidae	Common
2	Crimson rose	*Pachiopta hector* Linnaeus	Papilionidae	Schedule I
3	Common rose	*Pachliopta aristolachiae* Fabricius	Papilionidae	Common
4	Red helan	*Princepes helenus helenus* Hampson	Papilionidae	Common
5	Malabar banded peacock	*Papilio buddh* Westwood	Papilionidae	Schedule II
6	Lime butterfly	*Papilio demoleus* Linnaeus	Papilionidae	Common
7	Chocolate albatross	*Appias lyncida* Cramer	Pierinae	Schedule II
8	Common Jezebel	*Delias eucharis* Drury	Pierinae	Common
9	Common emigrant	*Catopsilla pomona* Fabricius	Coliadinae	Common
10	Common grass Yellow	*Eurema hecabe contubernalis* Moore	Coliadinae	Common
11	Angled Sunbeam	*Curetis dentata* Moore	Curetinae	Common
12	Common Silverline	*Spindasis vulcans fusca* Moore	Theclinae	Common
13	Angled pierrot	*Caleta caleta decidia* Cromer	Polypmmatinae	Common
14	Pea Blue	*Lamipes boeticus* Linneaus	Polypmmatinae	Schedule II

15	Common pierrot	*Castalius rosimon rosimon*	Polypmmatinae	Schedule II
16	Dark pierrot	*Tarueus ananda*	Polypmmatinae	Schedule IV
17	Common four ring	*Ypthima hubenri hubenri* Fabricius	Polypmmatinae	Common
18	Common nawab	*Polyura athamas athamas* Drury	Charaxinae	Common
19	Angled Castor	*Ariadne ariadne pallidior* Frusthorfer	Nymphalinae	Common
20	Common castor	*Ariadne merione assama* Evans	Nymphalinae	Common
21	Lemon pansy	*Precis lemonias lemonias* L	Nymphalinae	Common
22	Commander	*Moduza procis procis* Cramer	Nymphalinae	Common
23	Tree Nymph	*Idea malabarica* Moore	Danainae	Common
24	Common Indian Crow	*Euploea core* Cramer	Danainae	Common
25	Plain Tiger	*Danaus (Anosia) chrysippus* L	Danainae	Common
26	Grass demon	*Edaspes folcus* Cramer	Hesperiidae	Common
27	Common dart	*Potanthus spp* Fabricius	Hesperiidae	Common

AQUATIC SPECIES: FISHES & CRABS

Total 16 species of fishes recorded within the regions and 2 species of crabs in the streams, rivers, and estuaries. The species *Thunnus albacares* under near threatened and *Thunnus obesus* are Vulnerable, and most of them were not being evaluated under IUCN status and no schedule species were recorded.

Table 2.12 List of Aquatic species reported from 10-km radius.

Sl.No.	Common name	Scientific name	Family	IUCN status/ WPA Schedule
Fishes				
1	Spangled emperor	*Lethrinus nebulosus*	Lethrinidae	Not evaluated
2	Mangrove red snapper	*Lutjanus argentimaculatus*	Lutjanidae	Not evaluated
3	Malabar blood snapper	*Lutjanus malabaricus*	Lutjanidae	Not evaluated
4	John's snapper	*Lutjanus johni*	Lutjanidae	Not evaluated
5	Yellowfin tuna	*Thunnus albacares*	Lutjanidae	Near Threatened
6	Bigeye tuna	*Thunnus obesus*	Lutjanidae	Vulnerable
7	Indian mackerel	*Rastrelliger kanagurta*	Lutjanidae	Data Deficient
8	Black marlin	*Makaira indica*	Lutjanidae	Data Deficient
9	Goatee croaker	*Dendrophysa russelli*	Sciaendae	Not evaluated
10	Blotched croaker	*Nibea maculate*	Sciaendae	Not evaluated
11	Indian oil-Sardinella	*Sardinella longiceps*	Sciaendae	Least Concern
12	Indian spiny turbot	*Psettodes erumei*	Psettodidae	Not evaluated
13	Malabar tonguesole	*Cynoglossus macrostomus*	Cynoglossidea	Not evaluated
14	Dorab wolf-herrings	*Chirocentrus dorab*	Chirocentridae	Not evaluated
15	Chacunda gizzard-shad	*Anodontostoma Chacunda*	Clupeidae	Not evaluated
16	Engraved catfish	*Arius caelatus*	Ariidae	Not evaluated
Crabs				
17	Christian crabs	*Charybdis cruciate*	Portunidae	Not evaluated
18	Blue swimming crab	*Portunus Pelagicus*	Portunidae	Not evaluated

Wildlife management is complex and need to be considered multifaceted factors such as food-web, resources competitions, anthropogenic, forest fragmentation, and sociological issues such community livelihoods, culture, ethics and forest dependency etc. Total of 4 species of fauna falls within the category of Wildlife Protection Act 1972 under Schedule I. The details of each species ecology and conservation issues given below.

Table.2.13 List of Scheduled I Wildlife species

Sl. No.	Common Name	Scientific name	Family	IUCN / WPA schedule
	Mammals			
1	Common leopard	Felidae	*Panthera pardus*	I
	Birds			
2	White-bellied Sea-Eagle	Accipitridae	*Haliaeetus leucogaster*	I
3	Indian Peafowl	Phasianidae	*Pavo cristatus*	I
	Butterflies			
4	Crimson rose	Papilionidae	*Pachiopta hector*	I

The Mineral Block area is located at the distance of a > 10 km from the Salim Ali Bird Sanctuary, hence, there is very less chance of threat to the sanctuary and mangrove ecosystem, however, mine management could work with downstream riparian and mangrove forest and assist ecological restoration as per the EMP suggested species.

The Mineral Block area is s already degraded and been away from community settlement usage; hence, there is not much additional impact or social ecological constraints

CHAPTER -3
PROBABLE IMPACTS OF THE PROJECT ON FLORA & FAUNA

3.0 PROBABLE IMPACTS OF THE PROJECT ON FLORA AND FAUNA

3.1 *IMPACT*

The Environmental Impacts can be broadly categorized into Primary and Secondary Impacts. If the impact is directly due to the Project Activity, it is termed as Primary Impact. In case, the impacts are indirectly induced, then it is called Secondary Impact. The project can create impact in two phases. One is during the construction phase, which are temporary and short term in nature, while the impacts created during the operation phase can have long term impacts

Operation Stage:

3.1.1 Impact on Air: Activities at Operation stage will be permanent in nature and will continue till the end of the mine lease. The impacts which are perceived during this phase will be due to the following activities.

Loading & unloading of waste/ore: The loading of Waste/Ore is proposed by excavators. These activities are likely to contribute air pollution in the form of dust/ particulate matter during discharge of material from bucket and gaseous pollutant like SO2, NO2 and hydrocarbons due to combustion of diesel in the loading machinery. The generated waste/ore will be transported by dumpers and unloaded at the designated locations i.e. at dump site or crusher site. During unloading operation at the dump site of the waste/Ore, air pollution in the form of dust (PM) and gaseous pollutants namely SO2, NO2 and hydrocarbons due to consumption of diesel in dumper is anticipated.

Line Sources: These are normally mobile sources, which emit pollutants in the area through which they pass. The following are the sources of air pollution falling under this category.

Transportation: Surface transport consists of transport of overburden and iron ore. Overburden will be transported by dumpers to respective waste dumps. Haul roads have been provided for movement of dumpers. Transportation also includes movement of service vehicles in the mine lease area.

The traffic on the haul roads is likely to contribute towards increase in dust and gaseous pollutants concentration in the mining area. However, this is more of a localized phenomenon within the mining areas that have limited human exposure.

Dozing: Dozing is envisaged during mining operations. The dozing activity is likely to contribute to air pollution in the form of PM, SO2, NO2 and hydrocarbons due to use of diesel operated machines.

Area Sources/Multiple Sources : The total mine area with all mining activities like operation of equipment/machinery, active mine pit, mineral stock yard and waste dump locations and haul roads constitute the area source, which lead to increase in air pollution in and around mine lease area.

3.1.2 Impact on Soil

The area proposed for the mining is more or less covered by hard laterite, the occurrence of the topsoil very sparse and that too in patches beneath the tree growth.

3.1.3 Impact on Vegetation

There exist orchards and shrub growth within the Mining Lease area. A detailed biological study has been carried out. Tree enumeration has been carried out.

3.1.4 Impact on Water Regime

Surface Water : There is no perennial surface water source passing through the Mining Lease Area. However, rain water during monsoon season is diverted into the mine pit. Bicholim Mineral block study area fall under Mondovi River basin of Taluka Bicholim, Bardez, Satari, Sanguem, Tiswadi & Ponda. The catchment area of Mondovi River 1580 Sqkm. The Sahyadri hill ranges in the east form the main watershed.

Ground Water : Impact on Core and buffer zone due to Discharge of effluent/waste water from Mine.

Intersection of water table as the ground level in the mine is about 10M BGL. Draining of Suspended solids into the nearby nallahs. Occurrence of leachability

3.1.5 Impact on Noise

During the mine operation phase, noise will be generated from all sources. With increasing distance from the source, the noise level decreases due to wave divergence.

Additional decrease also occurs due to atmospheric effects and interaction with objects in the transmission paths.

Machinery / equipment proposed to be deployed in mining complex are used as input as noise generating sources.

Probable increase in the vehicular traffic

Transportation of Iron Ore and raw material by road. The road traffic to and from the proposed mine during operation phase would not be so intensive.

3.1.6 Nature of threat to the Flora and Fauna on account of project implementation

Identification of all potential environmental impacts due to a project is an essential step of Environmental Impact Assessment. Mining activities are normally carried out over a long period of about 50 years. This also encourages downstream industrial development in the area, which adds to environmental degradation. Positive impacts on the socio-economic environment are expected to create employment opportunities and development of infrastructure such as roads, school, hospitals etc.

The impact on biodiversity would be high if the project is located close to a sensitive area. The impact on biodiversity is difficult to quantify because of its diverse and dynamic characteristics.

Identification of all potential environmental impacts due to a project is an essential step of Environmental Impact Assessment. In generally Mining are normally carried out over a long period till the ore get exhausted. This is important to predict downstream of the industrial development to find the suitable mitigation measures. The impact on biodiversity would be high if the project is located close to a sensitive area. So, impact of biological environment was assessed based on the ground observation and distance from the project. The impact will be assessed 1 to 10 scale, if the scale 1 indicate higher chances of impact on biodiversity and 10 score will be least impact on biodiversity as given in the Table 3.1.

Table 3.1. Significance of Impact on Biological Environment (Score 1 higher impact and 10 – least impact on biodiversity)

Issues	Observations
Proximity to national park / wildlife sanctuary/ reserve forest/mangroves/ coastline/estuary/sea	Amthane dam and Mandavi River upstream river riparian vegetation closer to the core area (<3.5 km range) . Eco-sensitive scale ranges **2 (high sensitive area)**.
	Mangrove ecosystem nearest south east and west region <3 km Eco sensitive scale range **1**
	Salim Ali Bird Sanctuary and Mangrove ecosystem >10 km from core area Eco-sensitive scale would be **8. (Less sensitive area).**
	Anjuna, and Moira river aquatic life and riparian vegetation <<2.5 km eco-sensitive scale ranges **1 (high sensitive areas)**
Activities of the project affects the breeding/nesting sites of birds and animals	Migratory bird species may effect due to the Mining activity due to noise, dust and ground vibrations from the vehicles etc, such as vehicle noise, Further Yellow wattled lapwing and Red wattled lapwings which prefers the ground for their nesting, which may affect only closer to the core area.
	The butterfly may get affected due to host plant availability and due to dust deposition on the host plant in the nearby area
	Fishes and crabs may effected due downstream soil erosion to the Anjuna, and Moira river and its aquatic species
Located near an area populated by rare or endangered species	The fauna's species given species list dominate species are locally resident and seasonal migrator.
Proposed project restricts access to waterholes for wildlife.	There is possibility of wild boars venture into the core areas for water/foraging .
Proposed mining project impact surface water quality that also provide water to wildlife	No such water effectively used for wildlife, the large proportion of water utilized itself for native species plantations and land stabilization process.
Proposed mining project increase siltation that would effect nearby Biodiversity area.	There are chances of soil erosion, but proper garland trench and followed by different level sedimentation tanks might avoids damages to aquatic biodiversity at the downstream orders.
Risk of fall/slip or cause death to wild animals due to project activities	The proposed mine area enclosed with fence, but by chance any such incident; the rescue squad of Forest department will be informed
The project release effluents into a water body that also supplies water to a wildlife	No such effluents coming from ML, the water will be recycled within the plant itself.
Mining project effect the forest based livelihood/ any specific forest product on which local livelihood depended	The proposed ML, did not have such non-timber forest product depending communities. There is small hamlet of them were depending upon Agriculture such as vegetables so on.
	Many villages' households were working within the mine either driver, or itself mine and office staff of the company.
Project likely to effect migration routes	No such wildlife corridors

Project likely to effect flora of an area, which have medicinal value.	No such significantly important medicinal value species within the mineral block area.
Forestland is to be diverted, has carbon high sequestration	Not applicable
The project likely to affect wetlands, fish breeding grounds, marine ecology	There is chance of soil erosion to the nearby rivers anjuna , moira river and 1st and 2nd order stream. There should be proper mine EMP to be followed to not to let out any sedimentation from the mine lease area

CHAPTER -4
MITIGATION MEASURES REQUIRED

4.0 MITIGATIVE MEASURES AND EMP MANAGEMENT

4.1 Project Area

It has been provided in the Environment Impact Assessment and Environmental Management Plan of the total area will be planted up with indigenous species and maintained as green belt. Hence no further steps are required.

4.2 Control of Water Pollution

There is no perennial water course within ML which can get polluted. The wastes or the ore do not contain any leachable toxic elements or heavy metals. Thus no leachate water is generated either from the waste dump or from the pit workings.

Stacking of waste: Boulder wall at the foot of the dump has been put a cement concrete layer so that there is no lechates. Garland drain around the dump yard is constructed 1m bottom width, 2m top width and 1m deep in inclined chutes and length of 6100 m to divert water to sedimentation tank / pond for settling of suspended solids for over proposed five year plan period . Covering slopes of the dumps with intercalated soil , coir mat and planting grasses, legumes and bush variety of species to prevent erosion Garland drains to divert rain water to sedimentation pond for settling of suspended solids. Construction of Check Dams to arrest suspended solids. Collecting the rainwater in a sump at the bottom of the Mine Pit to settle the suspended solid particles

Proposed rain water harvesting measures: The total water received in year 16748221 m^3, the water harvested in mining pits is about 10128221 m^3 . This collected water in the Mine Pit for water sprinkling and greenbelt development

The garland land constructed along the river bed of the Asnora river which reduces the flow of the Suspended solids into the river from the runoff mine during monsoon.

No generation of industrial waste water from Mining Operations

Ground Water Intersection: There is no proposal to take mine workings below water table

4.3 Control of Air Pollution

Drilling & Blasting: No drilling & Blasting

Loading & unloading : Continuous Water spray over the areas, proper maintenance of machinery & equipment as per manufactures specification, avoiding over loading of trucks

Haul Road: Water spray on mine haul roads, speed restriction, proper maintenance of roads & blacktopping of permanent roads, proper maintenance of machinery & equipment as per manufactures specification.

Mining area : Wide green belt surrounding ML area. Proper maintenance of machinery & equipment. Introducing the state-of-the-art dust suppression system, Fixing permanent pipe sprinklers along the haul road in the mine lease area

Plantation of trees on the either side of the haul roads to minimize dust emission

High canopy plantation(local species like Cashew , Alva, Arjuna, Bamboo etc) shall be carried out to reduce dust emission

Transportation : No overloading of trucks, speed restriction, transport by covered vehicles, plantation along the road side proper maintenance of machinery & equipment as per manufactures specification, PUC for transport vehicle, maintenance of surrounding transport roads

Waste & Topsoil Handling : Stabilization of waste dumps with proper wind erosion control measures, covering with geo-textiles immediately, plantation with initial reclamation crops of grasses and mulches, afforestation with shrub and tree species

DG Set : No generator is in operation

4.4 Control of Noise Pollution

The areas are separated by agricultural fields, and therefore there is no possibility of the noise generated from the mining activity reaching these areas. Further, no drilling operations generating high noise level and blasting operations generating impulsive noise are completely avoided. The ML is enclosed by wide green barrier.

Following management measures will be adopted to control noise levels:

- Reduction of noise level at source will be achieved by proper maintenance of machinery and the equipment. Interruption of noise path from the source to the

receiver will be achieved by the development of wide green belts in-between.

- Provision of acoustic cabins for operators deployed on HEMM
- Vehicular traffic within the mine is restricted by reducing the number of trips, using heavy duty articulated dumpers within the ML.
- Selection of new low-noise equipment from the manufactures failing which use of additional retrofits if available
- Green belt developed acts as an acoustic barrier

Use of Protective equipment- Administrative Control

As part of a hearing protection PP shall consider:

- The need for hearing protectors
- Defining hearing protector areas
- Selection of hearing protectors
- Issuing of hearing protection equipment to individuals
- Cleaning, maintenance and replacement of hearing protectors
- Training and education of people wearing hearing protectors.
- Provision of job rotation in noisy areas that will reduce personal exposure
- Setting targets for noise levels in existing work areas
- Training on noise impact and consequences
- Including Noise aspects in work agreements with contractors

4.5 Control of Traffic Density

The following steps will be taken to reduce pollution level:

- Regular maintenance of vehicles shall limit the pollution within limits.
- The present road conditions is good for proposed movement of traffic. However, take necessary steps to upgrade and maintain the road condition and traffic movements during the normal course of operation.

4.6 Measures to maintain ecology

- A planned 5-year Afforestation scheme shall be developed
- The species proposed to be planted shall be selected based on the criteria prescribed by CPCB as "Guidelines for Developing Greenbelts".

- Local species shall be preferred; As this aspect has been provided in the Environment Management Plan, no separate provision for plantation is made.
- Dust suppression shall be done by regular water sprinkling to minimize the impact on plants
- Green belt area : Plantation over the backfilled area after stabilization is completed.

4.7 Wildlife Conservation and Management measures

The project area does not involve any forest area for industrial purpose. Wildlife conservation and management is complex and need to be considered multifaceted factors such as food-web, resources competitions, anthropogenic, forest fragmentation, and sociological issues such community livelihoods, culture, ethics and forest dependency so on. Total of 5 species of fauna falls within the category of Wildlife Protection Act 1972 under Schedule I. The details of each species ecology and conservation issues given below.

Table 4.1: List of Scheduled I Wildlife species

Sl. No.	Common Name	Scientific name	Family	IUCN / WPA schedule
	Mammals			
1	Common leopard	Felidae	*Panthera pardus*	I
	Birds			
2	Indian Peafowl	Phasianidae	*Pavo cristatus*	I
3	White-bellied Sea-Eagle	Accipitridae	*Haliaeetus leucogaster*	I
	Butterflies			
4	Crimson rose	Papilionidae	*Pachiopta hector*	I

*Note * Secondary sources (literature, field guide and Forest working plan*

MAMMALS

Common Leopard

Scientific Classification

Kingdom	Animalia
Phylum	Chordata
Class	Mammalia
Order	Carnivora
Family	Felidae
Genus	Panthera

Description of Indian Leopard:

The Indian Leopard (*Panthera Pardus* fusca) is widely distributed in the Indian Sub-continent. This is one of the five big cats found India. There are 27 sub species of leopards exist in the world. The one in India is the sub species fusca.

Food habits: Carnivore generally found around the human settlements and nearby forest. The Leopards are versatile and opportunistic hunters and have a very broad diet from fowls to ungulates, domestic livestock and dogs and wildlife, many herbivores include deer, Sambar deer, Nilgai, (not in the project area) wild boar, Spotted deer, Langur, Macaque, Hare, Peafowl, Spur fowl etc.

Habitat Loss: Leopards are facing the threat of habitat loss by the stone quarries, urbanization, encroachment etc. Most of the Leopards take shelter in the rocky caves of hillocks that belong to revenue land. When the same revenue land is leased out for stone quarrying, the Leopards are forced to leave their age-old natural shelters. Such leopards go in search of new habitat and face threat of killing by the people out of fear. The fragmentation of the natural habitat resulted in loss of prey base.

The loss of prey base: The loss of habitat is resulted in loss of natural prey base of Leopards. Hence they depend majorly on feral dogs, live stocks and minor prey animals only.

Vengeance Killing: In some cases the when a leopard kills a sheep or goat and any other livestock; the people sometimes poison the same and kill the leopards. These retaliatory killings go unnoticed generally.

Conservation and management measures:

Proposed measures for mitigation of Man-Leopard conflict:

Habitat enrichment:

Enrich the habitat by following conservation measures:

- Plant the endemic / local wild species of fruiting trees in forest outside the project area. This will attract the Bonnet macaque and Hanuman Langur, Wild boars etc., which are the food base for Leopards.
- Enrich the ecosystem by Soil and moisture conservation activities, this helps the enrichment of the habitat and help growth of floral diversity.

- Provide artificial waterholes in the Leopards habitat away from human settlements, so as to provide them water during all seasons. This measure will prevent them from roaming around human habitation for water.

Awareness:

- Create awareness among the people of villages within 10 kms from the Project area about the importance of Leopards, reasons for conflicts and preventive measures etc.
- Install sign boards along the mining / civil roads in the wildlife landscape about cautioning the divers to go slowly and watchfully to prevent hitting the wildlife.
- Install the sign boards / Posters about importance of wildlife and how to prevent any instances of attack.

Monitoring and facilitating:

- Identify the Leopards regular path or movements in different seasons and alert the people in this corridor.
- Establish a network of informers / watchers to monitor the movement of wildlife including Leopards; provide communication gadgets such as walkie-talkie to them.
- Appoint the watchers or facilitators to help the victims of attack get suitable treatment or compensation. In case of attack on livestock, help the People to get suitable compensation for loss of their livestock / domestic animals in Leopard attack.
- Clear the thick bushes and invasive weeds of Lantana, Ipomoea, Eupatorium etc., in and around the villages to prevent the leopards from hiding in it. Also clear the bushes along the roads side in the Leopard corridor
- Establish a rapid response team to rush to the spot of Leopard attack and help the victims to get first aid and suitable treatment.
- Use camera traps to monitor the regular movement of Leopards.

BIRDS

1.0 Indian Peafowl

Kingdom: Animalia
Phylum: Chordata
Class: Aves
Order: Galliformes
Family: Phasianidae
Subfamily: Phasianinae
Genus: Pavo
Species: *Pavo cristatus*
Common name : Indian peafowl or peacock

This species has an extremely large range, and hence does not approach the thresholds for Vulnerable under the range size criterion (Extent of Occurrence <20,000 km^2 combined with a declining or fluctuating range size, habitat extent/quality, or population size and a small number of locations or severe fragmentation).

Food: It is an omnivorous bird. Its diet consist of small mammals (Mice), reptiles (Lizards and snakes), amphibians (frogs), arthropods, insects, termites, ants, locusts and scorpions. It also feeds upon seeds, fruit, vegetables, flowers, leaves, and minnows in shallow streams and so on. With its strong bill it is able to kill a snake, around cultivated areas, peafowl feed on a wide range of crops.

Threat: Poaching of peacocks for their meat, feathers and accidental poisoning by feeding on pesticide treated seeds are known threats. Feathers are decorative and associated with religious importance. However, presently, there is no severe threat to this species, primarily for its status as a National bird and secondarily due to religious belief these species are protected. Since its feathers are in great demand for commercial purpose, its main threat to its survival. Their loud calls make them easy to detect. In natural habitats, panther and tigers are major predators.

Conservation Plan: Following activities will be done along with forest department to assist conservation of the species in the 10 km buffer area:

- Walkie-talkie will be provided to the watch and ward persons
- Awareness program will be run with the help of experts
- Strict vigilance on trade of feathers

- Creating green belt and water harvesting structures so that it will increase its food in the natural habitat.

2.0 WHITE-BELLIED SEA EAGLE

Kingdom : Animalia
Phylum : Chordata
Class : Aves
Order : Accipitriformes
Family: Accipitridae
Genus : Haliaeetus
Species: H. leucogaster

The white-bellied sea eagle has a white head, rump and underparts, and dark or slate-grey back and wings. In flight, the black flight feathers on the wings are easily seen when the bird is viewed from below. The large, hooked bill is a leaden blue-grey with a darker tip, and the irises are dark brown. The cere is also lead grey. The legs and feet are yellow or grey, with long black talons (claws). Unlike those of eagles of the genus Aquila, the legs are not feathered. The sexes are similar. Males are 66–80 cm (26–31 in) long and weigh 1.8–3 kg (4.0–6.6 lb). Females are slightly larger, at 80–90 cm (31–35 in) and 2.5–4.5 kg (5.5–9.9 lb). The wingspan ranges from 1.78 to 2.2 m

Habitat : The white-bellied sea eagle is generally sedentary and territorial, although it may travel long distances. They have been reported travelling upriver to hunt for flying foxes. The white-bellied sea eagle is generally territorial; some birds form permanent pairs that inhabit territories throughout the year, while others are nomadic. The species is monogamous, with pairs remaining together until one bird dies, after which the surviving bird quickly seeks a new mate. This can lead to some nest sites being continuously occupied for many years . Immature birds are generally dispersive, with many moving over 50 km (31 mi) away from the area they were raised.

Food : The white-bellied sea eagle is an opportunistic carnivore and consumes a wide variety of animal prey, including carrion. It often catches a fish by flying low over the water and grasping it in its talons. It prepares for the strike by holding its feet far forward (almost under its chin) and then strikes backward while simultaneously beating its wings to lift upwards. Generally, only one foot is used to seize prey.

The white-bellied sea eagle may also dive at a 45-degree angle from its perch and briefly submerge to catch fish near the water surface. While hunting over water on sunny days, it often flies directly into the sun or at right angles to it, seemingly to avoid casting shadows over the water and hence alerting potential prey.

Main fish prey is usually catfish and barramundi. and the eagles frequently hunt both small and large specimens, which can exceed 50 cm (20 in). Other important fish prey includes needlefish and wrasses. Along with osprey, white-bellied sea-eagles sometimes take fish that are toxic, including some porcupinefish and Tetraodontidae fish.

Status and conservation

The white-bellied sea eagle global population is estimated to number 10,000 to 100,000 individual birds. These white-bellied sea eagle species have an extremely large range, and hence considered not vulnerable. The sea eagle population is under decline due breeding habitat loss caused by the clearance of water-edge vegetations. Shooting, poisoning and human activity near breeding sites are the threats to their survival. The IUCN (International Union for Conservation of Nature) has categorized and evaluated these sea eagle species and has listed them as "Least Concern".

BUTTERFLIES

CRIMSON ROSE

Kingdom: Animalia
Phylum: Arthropoda
Class: Insecta
Order: Lepidoptera
Family: Papilionidae
Genus: Pachliopta
Species: Pachliopta hector
Common Name: Crimson rose

The life cycle of butterfly completes in four stages from laying eggs in a host plant from the eggs emerges larvae called caterpillars which vigorously feeds upon host plant and transforms into pupa and now development takes place inside and then comes adult butterfly the development from pupa to adult butterfly is called metamorphosis. Life of an adult butterfly is very short like two weeks and during this period it has to find a mate and host plant for propagation of species.

Food : Butterflies, apart from nectar of flowers feed upon decaying fruits, dead animals and can be seen basking on rocks and on mud puddles near any water body; sometimes they can be seen sucking minerals from bird dropping or any other source of decaying plant. It is not necessary that all beautiful gardens with all sort of greenery with flowering plants should have butterflies; host plants are important in a park for butterfly diversity that is why natural jungles are important for these lepidoptera.

Conservation Plan: Following activities will enhance the population within 10 km of buffer area:

- Awareness program about the butterfly ecosystem services such as pollination so on.
- Promote butterfly food plants in the gardens and suitable habitats within the RF
- Support restoring local species habitats within riverine areas

MEASURES FOR CONSERVATION OF WILDLIFE:

The forest department is responsible for conservation of wildlife in the protected areas and the project proponent can only support the department by providing some funds for implementing some of the initiatives . some of the measures for protection of environment within the core zone of mineral block would be responsibility of the project proponent and will be carried out as per requirement.

(i) Water holes for habitat improvement:

Animals and birds need a regular water source for their daily consumption. As the area receives copious amount of Avg. 3500 mm rainfall annually. During hot summer wild animals and birds stay outside forest in search of water source for quenching thirst. It is therefore proposed to construct water holes/check-dams in the forested area at buffer zone at convenient points.

These water holes would be sufficient to store the water to meet drinking requirement of animals and birds. The water holes should be provided with cement concrete bedding, side walls with stone pitching and grass should be grown in gap for gripping while animals enter into the water holes.

These water holes are cleaned at regular intervals to remove leaf litter, de-silting and refilling water. Few shades are provided around water holes for animal resting during summer season. Fruit bearing trees shall be grown around water holes to nesting and food for birds and shade for wild animals. Project proponent will provide some funds to forest department to undertake water holes.

(ii) Noise levels

During mine operation noise levels will increase due to Machinery movement of HEMM. Wildlife is sensitive to higher noise levels like human beings. To reduce the noise levels during mining operations the following steps are proposed.

i) Use of well-maintained loading machines with sharp bucket teeth

ii) Well maintained roads. No over speeding of vehicles

(iii) Air Quality:

The ambient air quality in the buffer zone shall be maintained within the CPCB limits in respect of PM_{10}, SO_2, NO_2 and CO emissions. For this the following steps are proposed.

i) Regular sprinkling of water on roads

ii) No overloading to avoid spillage, trucks covered with tarpaulins.

iii) Creation of green belt around the mine area and avenue plantation with thick foliage to arrest dust.

(iv) Green Belt Development

- As per the Standard condition No. 4.(VIII) specified in the EC issued by MOEF&CC dated 15.07.2021, the project shall be earmarked for green belt development plan to mitigate the effects of air and noise pollution from the project activity. The species proposed to be planted shall be selected based on the criteria prescribed by CPCB as "Guidelines for Developing Greenbelts" and also in consultation with local forest department.

Table.4.1. Green belt planning next 5 years

Plan Period	Plantation			Retaining Wall (m)	Garland Drains (m)	Settling Pond (No.)
	Area (Ha.)	No. of Sapling	Name of species			
I	4.0432	10108	Species like Cashew, Mango ,Jambul Aonla ,etc.	--	1600	--
II	3.1319	7830		--	2000	--
III	4.092	10230		--	1700	--
IV	4.7443	11861		--	300	--
V	3.1609	7902		--	500	--

Table 4.2 List of Species suggested for future Greenbelt development

S.No	Botanical Name	Family	Common Name	S/T	Habitat	Height
Shrubs - < 5m (1st tier of Plantation)						
1	*Citrus limon*	Rutaceae	Lemon	T	Shrub	3m
2	*Duranta repens*	Verenaceae	Golden Dew Drop	T	Shrub	3m
3	*Hibiscus rosa sinensis*	Malvaceae	China Rose/ DasavaLa	T	Shrub	3m
4	*Nerium indicum*	Apocynaceae	Oleander/Chandaatha	T	Shrub	5m
Trees 5 - 10m (2nd tier of Plantation)						
6	*Acacia nilotica*	Mimoseae	Gum Arabic/ Babli	T	Tree	8m
7	*Bauhinia varigata*	Caesalpinaceae	Kachnar/ Arisinantige	T	Tree	5m
8	*Annona squamosa*	Annonaceae	Setha palla	T	Tree	6m
9	*Butea monosperma*	Fabaceae	Flame of the Forest/ Muttuga	T	Tree	10m
10	*Gardenia jasminoides*	Rubiaceae	Cape jasmine/ Suvasane Malle	T	Tree	5m
11	*Moringa oleifera*	Moringaceae	Drumstick Tree/Guggala	S	Tree	10m
12	*Pithecellobium dulce*	Mimosaceae	Manilla Tamarind/Seeme hunase	T	Tree	8m
13	*Thevetia peruviana*	Apocynaceae	Mexican oleander	T	Shrub	6m
14	*Phyllanthus emblica*	Phyllanthaceae	Ambla	T	Shrub	7m
Trees >10m (3rd tier of Plantation)						
15	*Aegle marmelos*	Rutaceae	Maredu / Bilva	T	Tree	12m
16	*Albizia lebbeck*	Mimoseae	Siris tree	T	Tree	20m
17	*Albizia procera*	Mimoseae	White siris/Belari	T	Tree	20m
18	*Alstona scholaris*	Apocynaceae	Devil Tree/ Aelele Haale	T	Tree	15m
19	*Azadirachta indica*	Meliaceae	Neem/ Turakabevu	T	Tree	20m
20	*Bambusa vulgaris*	Poaceae	Yellow Bamboo	T	Perennial grass	15m
21	*Cassia fistula*	Caesalpinaceae	Golden Shower/ Kakke	T	Tree	12m
22	*Delonix regia*	Caesalpinaceae	Flame Tree/ Kempu torai	T	Tree	15m
23	*Ficus benghalensis*	Moraceae	Banyan tree/ Aaladamara	T	Tree	20m
24	*Ficus religiosa*	Moraceae	Peepal/ Arali	T	Tree	20m
25	*Mangifera indica*	Anacardiaceae	Mango/ Mavinamara	S	Tree	15m
26	*Polythia longifolia*	Anonaceae	Ashok/Ubbina	S	Tree	15m
27	*Wrightia tinctoria*	Apocynaceae	Alae mara	T	Tree	12 m
28	*Hardwickia binata*	Fabaceae	Small leaves	T	Shrub	6m
29	*Syzygium cumini*	Myrtaceae	Neredu/ Neereedu	T	Tree	20m
30	*Tectona grandis*	Verbenaceae	Teak	T	Tree	20m

(iv) Training staff and Awareness activity :

All the mine workers and staff shall be trained in conservation of wildlife and develop a liking for wildlife conservation by celebrating Environment Day involving local village people and school students. The drivers shall be trained to give way for wildlife with the support of local forest department.

The villagers are also made aware of wildlife conservation by conducting meetings using pamphlets, audio and video means. Importance of plants and wildlife will be informed through conducting quiz, drawing, painting competitions and essay writing for students.

Prizes shall be distributed to the winners; Women participation in conserving the forest plants shall be rewarded.

Villagers are awarded for protecting and preventing wood theft and tree cutting helping Forest Dept. Guards in catching Poachers. Conservation activities for protection of flora & fauna shall be implemented in consultation of Forest Department officials.

(v) Awareness programmes:

Forest department carries a lot of awareness programmes in the the state of goa. The project proponent through its conservation plan will support the initiative by providing funds for conducting awareness campaigns , celebrating wild life week, sponsoring prizes etc for various activities conducted by forest department.

(vi) Prevention of man and animal conflict:

The project proponent will support the forest department in strengthening the fencing in the protected areas thus prevent man and animal conflict.

Details are provided in table 6.0

CHAPTER -5
ANIMAL PASSAGE PLAN

5.0 ANIMAL PASSAGE PLAN

Not applicable

The proposed project is a open cast mining its not a linear project

CHAPTER -6
FINANCIAL IMPLICATIONS AND MONITORING

6. FINANCIAL IMPLICATIONS AND MONITORING

Fund for wildlife conservation:

Detailed cost estimates and design are providing site specific activity plan. However, based on the studies a total of Rs.50 lakhs are earmarked for implementation of wildlife conservation plan for 5 years period .

The budgetary allocation is as given in the Table below.

Table 6.0: Budget Layout for Implementation of Wildlife Management & Mitigation Plan

Sr.No	**Plan of Operations**	**1st year**	**2nd year**	**3rd year**	**4th year**	**5th year**
1	Support towards protection of forest and avoid man and animal conflict by strengthening fencing of protected areas	10	10	10	10	10
1	Establishment of waterholes for wildlife in the buffer area					
2	Financial support to the department for conducting awareness campaigns for various stakeholders					
3	Financial support to the department for celebrating Wildlife week and sponsoring the prizes for the competitions					
		10	**10**	**10**	**10**	**10**
	Total	**50 lakhs**				

The habitat management in and around the study area must be adopted by planting suitable fodder species to enable wild herbivores to thrive upon. Following suggestions, if implemented will encourage the native fauna to return to the areas:

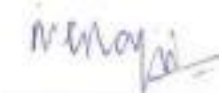
- A dense green belt consisting of shrubs and trees of different species must be created around the mine area and also along the roads which will act also as a dust and noise barrier.

- Awareness programs amongst the local people as well as mine staff, regarding the importance of wildlife, their habits and habitats, should be organized so that stray and displaced fauna (due to degradation and de-fragmentation of their habitat) is not killed.
- Rock fill dams and check dams shall be constructed in the forest area of buffer zone to prevent the soil erosion. This will be able to store sufficient quantity of filtered water in the area and will act as water holes for the faunal life present in the region.
- The green cover loss due to construction of roads and heavy vehicular movements will restrict the animal movements to the adjoining areas. Therefore, development of a green belt and massive afforestation program of local species and shade giving plant species in the forest area along with approach road shelter for them.
- Intense campaign amongst the local people/schools children as well as project staff shall be carried out regarding the importance of regional biodiversity and need for their conservation for posterity.
- Fire lines should also be cleared along permanent features like roads, nallas and footpaths at suitable intervals to prevent forest fire from spreading, in case it breaks out.
- People should be trained with forest fire fighting measures and equipped with necessary materials like rakes, shovels, billhook, bucket etc and suitable dresses.
- Obviously, all this would be done at project cost and would be apart from what the local forest department traditionally practices.

From our field investigation and secondary literature review, we can safely conclude as follows:

- The Mine area is located at the distance of a > 9.0 km from the Salim Ali Bird Sanctuary, hence, there is very less chance of threat to the sanctuary and mangrove ecosystem, however, mine management could work with downstream riparian and mangrove forest and assist ecologically restoration as per the EMP suggested species.
- The Mine area is already degraded and been away from community settlement usage; hence, there is not much additional impact or social ecological constraints,
- In case of flora and fauna of the conservation as per suggested EMP, greenbelt all along the mine area and roadside both core and buffer area to be executed along with local forest department.
- The proposed biodiversity management plan will be implemented as per the standard guidelines prescribed by regulatory authorities.

Budget allocations and time bound interventions will be monitored by local authority to ensure to biodiversity conservation and not damage existing ecosystem habitats



Prepared By : Dr. Chetan H C
Ecology & Biodiversity- FAE(NABET)

(M.S.RAJU)
NABET CONSULTANT

Place: Ballari

Date: 19.06.2023

vedanta
transforming elements

Annexure R7-7

sesa goa iron ore

Dated: 19/06/2023

To
Chief Wildlife Warden
Goa Forest Department,
Van Bhavan, Altinho, Panaji,
Goa

Sub: Approval of Wild Life Conservation Plan w.r.t Block I- Bicholim Mineral Block

Ref: Letter of Intent for Block 1- Bicholim Mineral Block vide letter No. DMG/25/Auction Cell/LOI-function/2023/2801, dated 13/01/2023

Sir,

The State Government of Goa has issued The Letter of Intent (LOI) for Grant of mining lease for Block I- Bicholim Mineral Block for Iron ore in Bicholim, Bordem, Lamgao, Mulgoa, Mayem & Sirigao Village, Bicholim Taluka, North Goa District on 478.5206 Hectare area to Vedanta Limited for 50 years. The LOI copy is attached for ready reference as **Annexure 1.**

As a process to prepare Environment Impact Assessment and obtain Environment Clearance, we are required to prepare a Wild Life Conservation plan (WLCP) and get it approved from Chief Wild Life Warden.

We would like to inform your good office that, a detailed assessment of flora and fauna was carried out in the study area of Block I- Bicholim Mineral Block and it was observed that there are four schedule 1 species in the area. We are submitting herewith a detailed Wild Life Conservation plan w.r.t Block I- Bicholim Mineral Block for your approval.

We request you to kindly process our application and approve the WLCP.

Thanking you

Your faithfully

19/6/2023
Office of the
Pr. Chief Conservator of Forests
Altinho, Panaji - Goa 403 001

Jagdish Ravindranath Desai
Head Environment
Authorised Signatory
For Vedanta Limited

VEDANTA LIMITED
Sesa Goa iron ore: Sesa Ghor, 20 EDC Complex, Patto, Panjim, Goa – 403 001, India
T +91 0832 2460600 | Website: www.sesagoaironore.com

Registered Office: Vedanta Limited, 1st Floor, 'C' wing, Unit 103, Corporate Avenue, Atul Projects, Chakala, Andheri (East), Mumbai 400093, Maharashtra, India.
CIN: L13209MH1965PLC291394

Sensitivity: Public (C4)

GOA STATE POLLUTION CONTROL BOARD

गोंयराज्यप्रदूषणनियंत्रणमंडळ

(An ISO 9001-2015, ISO 14001:2015, ISO 45001:2018 Certified Board)

Phone Nos: 0832- 2407700,
2407701, 2407702,
2407703
Tel/Fax No: 0832-2407700

Email Ids:
Chairman, GSPCB: chairman-gspcb.goa@nic.in
Member Secretary, GSPCB: ms-gspcb.goa@nic.in
Office: mail.gspcb@gov.in

No.12/2024-PCB/2088123/R00014708 Date: 04/03/2024

Consent to Operate under Section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 & under Section 21 of the Air (Prevention & Control of Pollution) Act, 1981 and Authorization under Rule 6(i) of the Hazardous and Other Wastes (Management and Transboundry Movement) Rules 2016, as amended thereafter

[To be referred as Water Act, Air Act and HW (M & T) Rules respectively]

CONSENTTO OPERATE & AUTHORIZATION is hereby granted to

BICHOLIM MINERAL BLOCK- BLOCK 1
(AUCTION BLOCK), OF M/S VEDANTA LIMITED
Mine Lease area of 478.5206 ha
(Represented by: Mr. Dhiraj kumar Jagdish)
(Red Category)

Bicholim, Bordem, Lamgao, Mulgoa,
Mayem & Sirigao
Villages of Bicholim- Goa.

Located in the area declared under the provisions of the Water Act & Air Act, subject to the provisions of the Act and the Rules and the Orders that may be made further and subject to the following terms and conditions:

1. This Consent to operate & authorization is valid for a trial period of **Six months from the date of issue of this consent.**

2. This Consent to Operate is valid for the activity of:

Sr. No	Description	Quantity/ Capacity
1.	Production of Iron Ore	3.0 MTPA
2.	Dry Crushing and Screening Plant	4.0 MTPA

3. CONDITIONS REQUIRED TO BE COMPLIED UNDER THE WATER ACT:

(i) The daily quantity of industrial effluent from workshop of the mining block shall not exceed **8 KLD.**

Near Pilerne Industrial Estate, Opp.- Saligao Seminary, Saligao-Bardez Goa-403511

Sensitivity: Public (C4)

Andreza

IN THE HIGH COURT OF BOMBAY AT GOA

PUBLIC INTEREST LITIGATION WRIT PETITION NO. 6 OF 2024
WITH
MISC. CIVIL APPLICATION NO. 199 OF 2024
WITH
MISC. CIVIL APPLICATION NO. 215 OF 2024
IN
PUBLIC INTEREST LITIGATION WRIT PETITION NO. 6 OF 2024
WITH
MISC. CIVIL APPLICATION NO. 239 OF 2024
IN
PUBLIC INTEREST LITIGATION WRIT PETITION NO. 6 OF 2024
WITH
MISC. CIVIL APPLICATION NO. 1216 & 1217 OF 2024 (F)
IN
MISC. CIVIL APPLICATION NO. 239 OF 2024
AND
MISC. CIVIL APPLICATION NO. 1416 OF 2024 (F)
IN
PUBLIC INTEREST LITIGATION WRIT PETITION NO. 6 OF 2024

PUBLIC INTEREST LITIGATION WRIT PETITION NO. 6 OF 2024

1. The Mulakh Khajan Farmers Association, with office at Haldanwadi, Mayem, Bicholim, Goa – 403504, through its Secretary, Mr. Sakharam Anant Pednekar, age 58 years, H. No. 766, Gaonkarwada, Mayem, Bicholim, Goa – 403504, Approx. Annual Income – Rs. 1,20,000/-. Aadhar No. 439600055987, Mobile – 9767050503.

2. The Goa Foundation, through its Secretary Dr. Claude Alvares, age 75 years, having Regd. Office at Room No. 7, Above Mapusa Clinic, Mapusa, Goa – 403507, PAN No.AAAAG0249C, Income : Rs – 10 – 15,00,000/- p.a. (approx.) Registration No. - 23/Goa/86, Email id: goafoundation@gmail.com. ... Petitioners

WITH

MISC. CIVIL APPLICATION NO. 199 OF 2024
IN
PUBLIC INTEREST LITIGATION WP NO. 6 OF 2024

Surakshit Distributors Pvt. Ltd., a Company incorporated under the Companies Act, 1956, having its office at Unit No. 306, 3rd Floor, Gera Imperium Grand, EDC Complex, Patto Plaza, Panaji, Goa, and represented herein by its Authorised signatory, Mr. Sushil Khandelwal.

... Applicant

IN

1. The Mulakh Khajan Farmers Association, with office at Haldanwadi, Mayem, Bicholim, Goa – 403504, through its Secretary, Mr. Sakharam Anant Pednekar, age 58 years, H. No. 766, Gaonkarwada, Mayem, Bicholim, Goa – 403504, Approx. Annual Income – Rs. 1,20,000/-. Aadhar No. 439600055987, Mobile – 9767050503.

2. The Goa Foundation, through its Secretary Dr. Claude Alvares, age 75 years, having Regd. Office at Room No. 7, Above Mapusa Clinic, Mapusa, Goa – 403507, PAN No.AAAAG0249C, Income : Rs – 10 – 15,00,000/- p.a. (approx.) Registration No. - 23/Goa/86, Email id: goafoundation@gmail.com.

Versus

1. The Director of Mines and Geology, through its Director, Ground Floor of Institute Menezes Braganza, Panaji, Goa – 403 001.

2. The State of Goa, through its Chief Secretary, Secretariat, Porvorim, Goa, 403 521.

3. The Deputy Collector and SDO Bicholim, Bicholim, Goa – 403 504.

4. The Mamlatdar Bicholim, Office of the Mamlatdar, Bicholim, Goa – 403 504.

5. The Bicholim Police Station, through its Police Inspector, Bicholim, Goa – 403 504.

6. The Goa State Pollution Control Board, through its Member Secretary, near Pilerne Industrial Estate, Opposite Saligao Seminary, Saligao, Bardez, Goa, 403 511.

7. M/s. Blueglobe Exports Private Limited, B-3, F-1, Prudential Paradise, Peddem, Mapusa, Goa – 403 507. ... Respondents.

WITH

MISC. CIVIL APPLICATION NOS. 215 AND 239 OF 2024
IN
PUBLIC INTEREST LITIGATION WRIT PETITION NO. 6 OF 2024

Vedanta Limited, A public company duly incorporated under the provisions of the Indian Companies Act, 1956, having its registered office at 1st Floor, C wing, Unit 103, Corporate Avenue Atul Projects, Chakala, Andheri (East) NA Mumbai , Mumbai City MH 400093 IN. Having local office at Sesa Ghor, 20 EDC Complex, Patto, Panaji, Goa, 403 001, Represented in this petition through its authorised signatory, Mr. Benecio Menezes, 56 years of age, Indian National, Having residence at St. Roque Waddo, Colvale, Bardez, Goa.

IN

... Applicant

1. The Mulakh Khajan Farmers Association, through its Secretary Sakharam Anant Pednekar, H. No. 776, Gaonkarwada, Mayem, Bicholim, Goa – 403504.

2. The Goa Foundation, through its Secretary Dr. Claude Alvares, having Regd. Office at Room No. 7, Above Mapusa Clinic, Mapusa,

Goa – 403507.

Versus

1. The Director of Mines and Geology, through its Director, Ground Floor of Institute Menezes Braganza, Panaji, Goa – 403 001.

2. The State of Goa, through its Chief Secretary, having office at the Secretariat Complex, Porvorim, Bardez, Goa.

3. The Deputy Collector and SDO Bicholim, Office of the Deputy Collector and SDO, Bicholim, Bicholim, Goa.

4. The Mamlatdar, Office of the Mamlatdar, Bicholim, Goa.

5. The Bicholim Police Station, through its Police Inspector, Bicholim, Goa.

6. The Goa State Pollution Control Board, through its Member Secretary, near Pilerne Industrial Estate, Opposite Saligao Seminary, Saligao, Goa, 403 511.

7. Blueglobe Exports Private Limited, through its Director, B-3, F-1 Prudential Paradise, Peddem, Mapusa, North Goa, GA – 403 507 In.

8. The Union of India, through the Secretary, Ministry of Environment, Forests and Climate change, Government of India, Indira Paryavaran Bhavan, Jor Bagh Road, Aliganj, New Delhi, 110 003. ... Respondents.

WITH
MISC. CIVIL APPLICATION NO. 1216 OF 2024 (F)
IN

MISC. CIVIL APPLICATION NO. 239 OF 2024
IN
PUBLIC INTEREST LITIGATION WRIT PETITION NO. 6 OF 2024

Vedanta Limited, A public company duly incorporated under the provisions of the Indian Companies Act, 1956, having its registered office at 1st Floor, C wing, Unit 103, Corporate Avenue Atul Projects, Chakala, Andheri (East) NA Mumbai , Mumbai City MH 400093 IN. Having local office at Sesa Ghor, 20 EDC Complex, Patto, Panaji, Goa, 403 001, Represented in this petition through its authorised signatory, Mr. Benecio Menezes, 56 years of age, Indian National, Having residence at St. Roque Waddo, Colvale, Bardez, Goa.

IN

1. The Mulakh Khajan Farmers Association, through its Secretary Sakharam Anant Pednekar. ... Applicant

2. The Goa Foundation, through its Secretary Dr. Claude Alvares, having Regd. Office at Room No. 7, Above Mapusa Clinic, Mapusa, Goa – 403507.

Versus

1. The Director of Mines and Geology, through its Director, Ground Floor of Institute Menezes Braganza, Panaji, Goa – 403 001.

2. The State of Goa, through its Chief Secretary, having office at the Secretariat Complex, Porvorim, Bardez, Goa.

3. The Deputy Collector and SDO Bicholim, Office of the Deputy Collector and SDO, Bicholim, Bicholim, Goa.

4. The Mamlatdar, Office of the Mamlatdar, Bicholim, Goa.

5. The Bicholim Police Station, through its Police Inspector, Bicholim, Goa.

6. The Goa State Pollution Control Board, through its Member Secretary, near Pilerne Industrial Estate, Opposite Saligao Seminary, Saligao, Goa, 403 511.

7. Blueglobe Exports Private Limited, through its Director, B-3, F-1 Prudential Paradise, Peddem, Mapusa, North Goa, GA – 403 507 In.

8. The Union of India, through the Secretary, Ministry of Environment, Forests and Climate change, Government of India, Indira Paryavaran Bhavan, Jor Bagh Road, Aliganj, New Delhi, 110 003. ... Respondents.

AND

Shri Narendra Vinayak P. Gaoncar, aged about 50 years, Son of late Vinayak P. Gaoncar, R/o. Pilgao, Bicholim, Goa. ...Applicant/ Intervener

WITH
MISC. CIVIL APPLICATION NO. 1217 OF 2024 (F)
IN
MISC. CIVIL APPLICATION NO. 239 OF 2024
IN
PUBLIC INTEREST LITIGATION WRIT PETITION NO. 6 OF 2024

Vedanta Limited, A public company duly incorporated under the provisions of the Indian Companies Act, 1956, having its registered office at 1st Floor, C wing, Unit 103, Corporate Avenue Atul Projects, Chakala, Andheri (East) NA Mumbai , Mumbai City

MH 400093 IN. Having local office at Sesa Ghor, 20 EDC Complex, Patto, Panaji, Goa, 403 001, Represented in this petition through its authorised signatory, Mr. Benecio Menezes, 56 years of age, Indian National, Having residence at St. Roque Waddo, Colvale, Bardez, Goa.

IN

1. The Mulakh Khajan Farmers Association, through its Secretary Sakharam Anant Pednekar. ... Applicant

2. The Goa Foundation, through its Secretary Dr. Claude Alvares, having Regd. Office at Room No. 7, Above Mapusa Clinic, Mapusa, Goa – 403507.

Versus

1. The Director of Mines and Geology, through its Director, Ground Floor of Institute Menezes Braganza, Panaji, Goa – 403 001.

2. The State of Goa, through its Chief Secretary, having office at the Secretariat Complex, Porvorim, Bardez, Goa.

3. The Deputy Collector and SDO Bicholim, Office of the Deputy Collector and SDO, Bicholim, Bicholim, Goa.

4. The Mamlatdar, Office of the Mamlatdar, Bicholim, Goa.

5. The Bicholim Police Station, through its Police Inspector, Bicholim, Goa.

6. The Goa State Pollution Control Board, through its Member Secretary, near Pilerne Industrial Estate, Opposite Saligao Seminary, Saligao, Goa, 403 511.

7. Blueglobe Exports Private Limited, through its Director, B-3, F-1 Prudential Paradise, Peddem, Mapusa, North Goa, GA – 403 507 In.

8. The Union of India, through the Secretary, Ministry of Environment, Forests and Climate change, Government of India, Indira Paryavaran Bhavan, Jor Bagh Road, Aliganj, New Delhi, 110 003. ... Respondents.

AND

Shri Trivikram Govind Prabhu Gaunkar alias Prabhugaonkar, aged about 47 years, son of Govind Vasudev Prabhu Gaunkar, R/o. H. No. 76, Pilgao, Bicholim, Goa 403 504 ...Applicant/ Intervener

AND

MISC. CIVIL APPLICATION NO. 1416 OF 2024
IN
PUBLIC INTEREST LITIGATION WRIT PETITION NO. 6 OF 2024

Vedanta Limited, A public company duly incorporated under the provisions of the Indian Companies Act, 1956, having its registered office at 1st Floor, C wing, Unit 103, Corporate Avenue Atul Projects, Chakala, Andheri (East) NA Mumbai , Mumbai City MH 400093 IN. Having local office at Sesa Ghor, 20 EDC Complex, Patto, Panaji, Goa, 403 001, Represented in this petition through its authorised signatory, Mr. Benecio Menezes, 56 years of age, Indian National, Having residence at St. Roque Waddo, Colvale, Bardez, Goa.

IN

1. The Mulakh Khajan Farmers Association, through its Secretary Sakharam Anant ... Applicant

Pednekar.

2. The Goa Foundation, through its Secretary Dr. Claude Alvares, having Regd. Office at Room No. 7, Above Mapusa Clinic, Mapusa, Goa – 403507.

Versus

1. The Director of Mines and Geology, through its Director, Ground Floor of Institute Menezes Braganza, Panaji, Goa – 403 001.

2. The State of Goa, through its Chief Secretary, having office at the Secretariat Complex, Porvorim, Bardez, Goa.

3. The Deputy Collector and SDO Bicholim, Office of the Deputy Collector and SDO, Bicholim, Bicholim, Goa.

4. The Mamlatdar, Office of the Mamlatdar, Bicholim, Goa.

5. The Bicholim Police Station, through its Police Inspector, Bicholim, Goa.

6. The Goa State Pollution Control Board, through its Member Secretary, near Pilerne Industrial Estate, Opposite Saligao Seminary, Saligao, Goa, 403 511.

7. Blueglobe Exports Private Limited, through its Director, B-3, F-1 Prudential Paradise, Peddem, Mapusa, North Goa, GA – 403 507 In.

8. The Union of India, through the Secretary, Ministry of Environment, Forests and Climate change, Government of India, Indira Paryavaran Bhavan, Jor Bagh Road,

Aliganj, New Delhi, 110 003.

... Respondents.

AND

1. Shankar Chandrakant Jalmi, aged 25.

2. Savlo Raghu Kavlekar, aged 49, both major, residents of H. No. ...., Bagwada, Pilgao, Bicholim, Goa.

3. Sudhakar Vasudev Vaignkar, Age 43, major, resident of H. No. 65,Bagwadao, Bicholim, Goa.

4. Govind Shankar Kavlekar, age 62, major, resident of H. No. 23, Gaonkar Wada, Pilgao, Bicholim, Goa. ...Applicant/ Interveners

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Ms. Norma Alvares, Advocate *with Mr. Om D'Costa, Advocate for the Petitioners.*

Mr Y. V. Nadkarni, Advocate *with Mr Nilay Naik and Ms. Simran S. Khadilkar, Advocate for the Applicant in MCA No. 199/2024.*

Mr. D. Pangam, Advocate General *with Mr. Deep Shirodkar, Additional Government Advocate for Respondent nos. 1 to 5.*

Mr. Manish Salkar, Government Advocate *for Respondent no.6-GSPCB.*

Mr. Raviraj Chodankar, Central Government Standing Counsel *for the Union of India-Respondent No.8.*

Mr. A. D. Bhobe, Advocate *with Ms. A. Fernandes Advocate for Respondent No. 9.*

Mr. Janak Dwarkadas, Senior Advocate *(Through V.C.) with Mr. Shivan Desai, Mr. A. Gosavi, Advocate with Ms. Krupa Naik and Mr. Guruprasad Naik, Advocates for the Interveners-Applicants in MCA No. 215/2024 and MCA No. 239/2024.*

Mr. H. D. Naik, Advocate *for the Applicant in MCA No. 1216/2024(F) and MCA No. 1217/2024(F).*

Mr. Nigel Da Costa Frias, Advocate *with Ms. Sonadevi Nishad and Mr. Shane Coutinho, Advocates for the Applicants-Interveners in MCA No.1416/2024(F)*

CORAM: M. S. KARNIK &
VALMIKI MENEZES, JJ.

RESERVED ON : 26th JUNE 2024
PROUNOUNCED ON : 29th JUNE 2024

JUDGMENT (*Per M. S. Karnik, J.)*

1. We have taken up this petition for final disposal in view of the earlier order passed and with the consent of all parties.

2. It is the case of the petitioner that the otherwise tranquil situation in the village will be jeopardised as a result of the large scale transportation of mineral ore. The safety of the villagers, and that of the school going children will be endangered with the sudden increase in the traffic of trucks/tippers carrying the ore. The resultant noise pollution as well as the environmental pollution resulting from such unwarranted intrusion in the serene and peaceful environs of the village is in complete conflict with the cherished principles of

fundamental right enshrined by Article 21 of the Constitution of India. The submission is that this massive invasion will completely disturb the equilibrium of the village which serves only the business interests of the project proponent to the detriment of the villagers. The villagers say that they do not deserve such intrusion.

3. The concern expressed by the villagers is genuine. On one hand are the fundamental rights of villagers and on the other are the economic interests of the State as well as the rights of the project proponent. These are competing interests in conflict with each other.

4. It goes without saying that it is the foremost duty of the State to work towards achieving and maintaining a fine balance between competing interests taking into account various myriad considerations. Present is a case where there is an apparent conflict between the fundamental rights of the villagers and that of the State. The State finds mining and as a consequence transportation necessary to further its economic interest for the development of the State. A conflict in the present case has arisen between the right to life under Article 21 of the Constitution of India on one hand and Article 19(1)(g) of the Constitution of India on the other. The villagers claim a right to a dignified existence in a safe pollution free environment. The State asserts its economic right necessitating such transportation which villagers submit amounts to bulldozing the otherwise peaceful life

which they are accustomed to for a long time. The task of achieving this fine balance is surely a difficult one as observed by His Lordship in **K. S. Puttaswamy (Aadhaar-5J) vs. Union of India**[1]**.** The observations which form a part of a dissenting opinion in **K. S. Puttaswamy** (supra) are significant. An ideal situation would be one which would preserve the core of the right for both sets of citizens whose entitlements to freedom appears to be in conflict. Realistically, drawing balances is not a simple task. Balances involve sacrifices and the foregoing of entitlements.

5. While forming an opinion, we have extensively sought guidance from the aforementioned decision of the Supreme Court and the observations in **Rajeev Suri vs. Delhi Development Authority & Ors.**[2], which we have referred to in the later part of our order.

6. Let us now consider the facts of the present case. Our attention is invited to the interim order dated 17.01.2024 and the subsequent orders passed during the pendency of the petition. This petition raises an important issue in the public interest about the transportation of mineral ore by road through the village of Mayem. The petition as filed was limited to the problems to be faced by village 'Mayem'

1 (2019) 1 SCC 1

2 (2022) 11 SCC 1

7. By subsequent orders, the scope of the petition was expanded to the transportation of ore through the villages in Goa. The State of Goa and the project proponents opposed restrictions in the transportation of ore through the village roads asserting their rights on the basis of valid permissions and right to carry on business. Examination of such conflicting interests is surely not an easy task. How do we achieve the right balance while considering competing interests in the present case; does such transportation pass the muster of the relevant legislations; what should be the safeguards; are the measures to mitigate the perils of transportation through village roads adequate, are questions which arise for our consideration. Please show compassion to those living in the villages is the fervent plea of Ms. Norma Alvares, learned counsel for the petitioner.

8. The petitioners contended that the permissions granted by the Goa State Pollution Control Board ('*GSPCB*', for short), and the Director of Mines and Geology ('*DMG*', for short), were without any application of mind to several relevant considerations, including, but not restricted to the conditions referred to in the Office Memorandum (OM) dated 29.10.2014, issued by the Ministry of Environment, Forests and Climate Change (Annexures to the petition at pages 40 and 42 of the paper book) and the ground conditions at the Mayem village. Pursuant to the filing of the petition, the GSPCB and DMG

have by way of SOPs, proposed several safeguards and measures for safe transport and as fairly submitted by Ms. Norma Alvares, these measures are positive. Such submission is made by the learned Counsel for the petitioners with a caveat that the concern of the villagers must be more adequately addressed in the best manner possible. She submits that though several safeguards are put in place, the environmental concerns affecting the safety and health of the villagers must be monitored effectively and addressed from time to time with the aid of real time monitoring of pollution with modern sophisticated equipment.

9. Learned Advocate General has serious objection to the course adopted by us in expanding the scope of the PIL as according to him there are no pleadings to justify such a course. We strongly feel that the concern of transportation through village roads needs to be addressed. We cannot ignore the larger issue of such large scale transportation through the village roads. Do we overlook the concerns of those residing in these villages through which roads the transporting operations are to take place only on some technical objections raised? We do appreciate the submission that the concerns may differ from village to village. It is the duty of the State and the statutory authorities to conduct a scientific exercise in evaluating what requirements are best suited on a village to village basis to ensure the

safety of the life and limb of its subjects. Howsoever small the population may be, the basic aspiration of their right to live should not be bulldozed on some technical considerations. The Court is not expected to shut its eyes and not even question the State as to what the measures proposed for the safety of the villagers are. There is not the slightest doubt in our mind that such a course is necessary. The petition was filed specific to village Mayem. During the course of hearing, learned Advocate General submits a decision is taken that there is to be no transportation through village 'Mayem'.

10. Let us examine what are the measures in place to regulate transportation through such villages in the first place. The problems cited of transportation of ore through the villages will have to be addressed in the context of two scenarios which are :-

(i) Transportation of the ore which was already extracted in the course of the decisions in **Goa Foundation vs. Union of India & Ors.**[3] (referred to as *Goa Foundation-I*) and **Goa Foundation vs. Sesa Sterlite Limited & Ors.**[4] (referred to as *Goa Foundation-II*), which we refer to as 'e-auction ore'; and

(ii) Transportation of ore by the project proponent i.e. Vedanta, who has intervened in the present case in whose favour there exists a 50-year lease having been granted Environmental Clearance (EC, for short) under the

3 (2014) 6 SCC 590

4 (2018) 4 SCC 218

Environment Protection Act. This aspect pertains to transportation pursuant to the EC granted as a result of fresh leases executed.

11. The second aspect i.e. in respect of EC granted to Vedanta, need not detain us much. This petition does not challenge the EC granted to Vedanta. We make it clear that though learned Senior Advocate Shri Janak Dwarkadas was at pains to point out that the EC has been granted pursuant to a detailed examination by an expert body constituted under the EP Act, we do not express any opinion on such submission in this petition. The limited issue that we are examining is transportation of ore through the villages which allegedly creates disharmony in the fundamental right to life of the villagers. We make it clear that it is open for the aggrieved persons to lay a challenge to the EC on its own merits and in accordance with law before the forum competent to entertain such a challenge. It must be noted that the measures and safeguards recommended and which are part of the EC are accepted by Vedanta.

12. The first aspect of transportation of 'e-auction ore" is something we need to examine in some detail. Ms. Alvares alleged that the conditions imposed by the GSPCB and DMG were not complied with by the transporters during the earlier regime. It was pointed out that there was incessant transportation of ore through trucks right from 4.30 a.m. in the morning till 6.30 p.m. in the evening. It is submitted

that such transportation is a source of pollution that has affected the entire village and the villagers.

13. On the basis of the submission of learned Counsel appearing for the petitioners and hearing the respondents, this Court was of the *prima facie* opinion that there was not much application of mind by either the GSPCB and DMG before the clearances or transit permits were issued in the context of the route now proposed by the project proponent, i.e. the seventh respondent. This Court *prima facie* observed that the authorities, without adverting to several relevant considerations, not to mention the Ministry's OM dated 29.10.2014, mechanically issued the clearance or the transit pass. It was noticed that there was confusion about the roles the GSPCB and the DMG was expected to play in such matters affecting the lives and properties of the villagers. After referring to the provisions of OM dated 29.10.2014, this Court was of the opinion that some measures had to be put in place which would safeguard the life and properties of the Villagers. The relevant directions issued from paragraph 26 onwards which form part of the interim Order dated 17.01.2024 read thus :

> "26. We direct the DMG and GSPCB to file detailed affidavits on the issue of grant of permissions, etc., for transportation of ore through villages in the State of Goa. The affidavits, as far as possible, should state the procedure that is

presently followed and the procedure that the authorities would like to follow in the future in case there are any shortcomings in the existing procedure. We think that the DMG and GSPCB should act in tandem and coordinate with each other so that proper procedures are evolved. For this, if possible, the authorities should hold a meeting. Other stakeholders, like the representatives of the mining industry, transportation industry, environmentalists, representatives of the Panchayat, etc., could also be invited to such meetings so that some policy which takes care of the interests of all stakeholders could be evolved.

27. The affidavits must also deal with an action plan for implementation or enforcement of the conditions included in the permissions. There is no point in imposing conditions to prevent pollution and hardships to villagers if there is no will or proper mechanism for effective implementation. It is not uncommon that considerable police forces are deployed when villagers raise their voices against ore transportation through villages. While it is improper for the villagers to take the law into their own hands, the Authorities must be vigilant in the enforcement of the conditions imposed for the benefit of such villagers. If the transporters disregard such conditions with impunity, strict action must be taken.

28. Since there is no clarity on the procedures for granting permissions for transportation or ores through villages, and at least prima facie, we get the

impression that DMG and GSPCB are passing the buck on each other without each of them assuming any responsibility, we direct that until the next date, no permissions shall be granted for transportation of ore by private parties through villages, without the leave of this Court. Such a direction is necessary to avoid a repetition of what has happened in the present case. Besides, we propose to dispose of this Petition at an early date.

29. We stand over this matter to 20.02.2024. The affidavits should be filed by 12.02.2024 by giving advance copies to the learned counsel for the petitioners. If the petitioners wish to file any rejoinder, they may do so on or before 20.02.2024 by giving advance copies to the learned counsel for the respondents. We also direct the Petitioners to implead and serve the Union of India through the Ministry of Environment, Forests and Climate Change.

30. The matter is posted for final disposal at the admission stage."

14. Learned Counsel for the petitioners submitted that having regard to the measures and safeguards provided and placed on record by the GSPCB and DMG pursuant to the filing of the petition so far as transportation of 'e-auction ore' is concerned, the spirit of the conditions which are set out in the OM of 2014 has been imbibed in the Standard Operating Procedure ('SOP' for short). At one stage, learned Advocate General did proceed to canvas that the OM of 2014

does not bind the GSPCB or the DMG as the said OM is only an executive instruction which does not pass muster of Section 3 of 'The Environment (Protection) Act, 1986, (herein after referred to as the *EP Act* for short). In view of the aforesaid submission of the learned Counsel for the petitioners, we refrain from expressing any opinion on such contention of learned Advocate General in this petition.

15. It needs to be considered whether there should be a complete ban on transport of the ore through village routes or providing safeguards and measures for mitigating the concerns of the villagers while permitting transportation can be a solution. For a better understanding, it would be apposite to refer to the decisions of the Supreme Court in **Goa Foundation vs. Union of India & Ors.**[5] (*supra*) and **Goa Foundation vs. Sesa Sterlite Limited & Ors.**[6] (*supra*). The facts related to mining in Goa is set out by Their Lordships in Goa Foundation-I, which reads thus :

> "2. Prior to 19-12-1961 when Goa was a Portuguese territory, its Portuguese Government had granted mining concessions in perpetuity to concessionaires. On 19-12-1961, Goa was liberated and became part of the Indian Union and on 1-10-1963, the Mines and Minerals (Development and Regulation) Act, 1957 (for short "the MMDR Act") was made applicable to the State of Goa. On 10-3-1975, the

5 (2014) 6 SCC 590

6 (2018) 4 SCC 218

Controller of Mining Leases issued a Notification calling upon every lessee and sub-lessee to file returns under Rule 5 of the Mining Leases (Modification of Terms) Rules, 1956 and sent copies of the notification to the concessionaires in Goa. Aggrieved, the concessionaires moved the Bombay High Court, Goa Bench, and by judgment dated 29-9-1983, in *Vassudeva Madeva Salgaocar* v. *Union of India*, the Bombay High Court restrained the Union of India from treating the concessions as mining leases and from enforcing the notification against the concessionaires.

3. Parliament thereafter passed the Goa, Daman and Diu Mining Concessions (Abolition and Declaration as Mining Leases) Act, 1987 (for short "the Abolition Act") which received the assent of the President on 23-5-1987. Section 4 of the Abolition Act abolished the mining concessions and declared that with effect from the 20th day of December, 1961, every mining concession will be deemed to be a mining lease granted under the MMDR Act and that the provisions of the MMDR Act will apply to such mining lease. Section 5 of the Abolition Act further provided that the concession holder shall be deemed to have become a holder of the mining lease under the MMDR Act in relation to the mines in which the concession relates and the period of such lease was to extend up to six months from the date when the Abolition Act received President's assent i.e. up to 22-11-1987. On 14-10-1987, sub-rules (8) and (9) were inserted in Rule 24-A of the Mineral Concession Rules, 1960 (for short "the MC Rules")

which deal with renewal of mining leases in Goa, Daman and Diu.

4. The Abolition Act was challenged by the lessees before the Bombay High Court in a writ petition. The High Court passed an interim order permitting the lessees to carry on mining operations and the mining business in the concessions for which renewal applications had been filed under Rule 24-A of the MC Rules. Subsequently, the High Court held in its judgment dated 20-6-1997 that the Abolition Act was valid but Section 22(1)(a) of the Abolition Act would operate prospectively and not retrospectively. The concessionaires filed special leave petition against the judgment dated 20-6-1997 before this Court. On 2-3-1998, this Court passed an interim order permitting the concessionaires to carry on mining operations and mining business in the mining areas for which renewal applications have been made on the condition that the lessee pays to the Government dead rent from the date of commencement of the Abolition Act. Subsequently, this Court granted leave in the special leave petition and continued the aforesaid interim order.

The Justice Shah Commission and its Report

5. As reports were received from various State Governments of widespread mining of iron ore and manganese ore in contravention of the provisions of the MMDR Act, the Forest (Conservation) Act, 1980, the Environment (Protection) Act, 1986 and other rules and guidelines issued thereunder, the Central Government appointed the Justice Shah Commission under Section 3 of the Commissions of

Inquiry Act, 1952 by Notification dated 22-11-2010. Paras 2 and 3 of the Notification, which are relevant, are extracted hereinbelow:

"2. The terms of reference of the Commission shall be-

(i) to inquire into and determine the nature and extent of mining and trade and transportation, done illegally or without lawful authority, of iron ore and manganese ore, and the losses therefrom; and to identify, as far as possible, the persons, firms, companies and others that are engaged in such mining, trade and transportation of iron ore and manganese ore, done illegally or without lawful authority;

(ii) to inquire into and determine the extent to which the management, regulatory and monitoring systems have failed to deter, prevent, detect and punish offences relating to mining, storage, transportation, trade and export of such ore, done illegally or without lawful authority, and the persons responsible for the same;

(iii) to inquire into the tampering of official records, including records relating to land and boundaries, to facilitate illegal mining and identify, as far as possible, the persons responsible for such tampering; and

(iv) to inquire into the overall impact of such mining, trade transportation and export done illegally or without lawful authority, in terms of destruction of forest wealth, damage

to the environment, prejudice to the livelihood and other rights of tribal people, forest dwellers and other persons in the mined areas, and the financial losses caused to the Central and State Governments.

3. The Commission shall also recommend remedial measures to prevent such mining, trade, transportation and export done illegally or without lawful authority."

6. The Justice Shah Commission visited Goa and issued notices under Section 4 of the Commissions of Inquiry Act, 1952 calling for information from the authorities concerned and the lessees and submitted its interim report on 15-3-2012 to the Ministry of Mines, Union of India. On 7-9-2012, the Justice Shah Commission Report on Goa was tabled in Parliament along with an Action Taken Report of the Ministry of Mines and on 10-9-2012 the State Government of Goa passed an Order suspending all mining operations in the State of Goa with effect from 11-9-2012. Pursuant to this Order of the State Government, on 11-9-2012 and 12-9-2012 the District Magistrates of the State of Goa banned transportation of iron ore in their respective districts and the Director of Mines and Geology ordered for verification of mineral ore which was already extracted. On 13-9-2012, the Director of Mines and Geology, Government of Goa issued show-cause notices to 40 mining leases. On 14-9-2012, the Ministry of Environment and Forests of the Union of India also directed that all

environmental clearances granted to mines in the State of Goa be kept in abeyance.

7. On the basis of findings in the Report of the Justice Shah Commission on illegal mining in the State of Goa, Goa Foundation has filed Writ Petition (C) No. 435 of 2012 as public interest litigation praying for directions to the Union of India and the State of Goa to take steps for termination of the mining leases of lessees involved in mining in violation of the Forest (Conservation) Act, 1980, the Mines and Minerals (Development and Regulation) Act, 1957, the Mineral Concessions Rules, 1960, the Environment (Protection) Act, 1986, the Water (Prevention and Control of Pollution) Act, 1974 and the Air (Prevention and Control of Pollution) Act, 1981 as well as the Wild Life (Protection) Act, 1972. Goa Foundation has prayed that a direction be issued to the respondents to prosecute all those who have committed offences under the different laws and are involved in the pilferage of State revenue through illegal mining activities in the State of Goa including the public servants who have aided and abetted the offences. Goa Foundation has also sought for appointment of an independent authority with full powers to take control, supervise and regulate mining operations in the State of Goa and to ensure the implementation of the laws. Besides, the aforesaid main reliefs, Goa Foundation has also prayed for some incidental and consequential reliefs.

8. On 5-10-2012, this Court issued notice in Goa Foundation v. Union of India to the respondents and

directed the Central Empowered Committee (for short "CEC") to submit its report on the writ petition and also directed that till further orders, all mining operations in the leases identified in the report of the Justice Shah Commission and transportation of iron ore and manganese ore from those leases, whether lying at the mine-head or stockyards, shall remain suspended, as recommended in the report of the Justice Shah Commission.

9. Different mining lessees of the State of Goa and the Goa Mining Association also filed writ petitions in the Bombay High Court, Goa Bench for a declaration that the report of the Shah Commission is illegal and for quashing the findings in the Report of the Justice Shah Commission and also for quashing the Order dated 10-9-2012 of the Government of Goa suspending mining operations in the State of Goa and the Order dated 14-9-2012 of the Ministry of Environment and Forests, Government of India, directing that the environmental clearances granted to the mines in the State of Goa be kept in abeyance. These writ petitions have been transferred to this Court for hearing along with the hearing of Writ Petition (Civil) No. 435 of 2012 filed by Goa Foundation.

10. The writ petitions and the transferred cases were heard during September, October and November 2013. On 11-11-2013 an order was passed by this Court directing that the inventory of the excavated mineral lying ores in different mines/stockyards/jetties/ports in the State of Goa made by the Department of Mines and Geology of

the Government of Goa be verified and thereafter the whole of the inventoried mineral ores be sold by e-auction and the sale proceeds (less taxes and royalty) be retained in separate fixed deposits (leasewise) by the State of Goa till the Court delivers the judgment in these matters on the legality of the leases from which the mineral ores were extracted. The Court has also directed that this entire process of verification of the inventory, e-auction and deposit of sale proceeds be monitored by a Monitoring Committee appointed by the Court. By the said order dated 11-11-2013, this Court also constituted an Expert Committee to conduct a macro-EIA study on what should be the ceiling of annual excavation of iron ore from the State of Goa considering its iron ore resources and its carrying capacity, keeping in mind the principles of sustainable development and intergenerational equity and all other relevant factors. On 11-11-2013 the case was also reserved for judgment."

16. Upon considering the submissions, Their Lordships in Goa Foundation-I held thus :

"87. In the result, we declare that:

87.1. The deemed mining leases of the lessees in Goa expired on 22-11-1987 and the maximum of 20 years renewal period of the deemed mining leases in Goa expired on 22-11-2007 and consequently mining by the lessees after 22-11-2007 was illegal and hence the impugned Order dated 10-9-2012 of Government of Goa and the impugned Order dated

> 14-9-2012 of MoEF, Government of India are not liable to be quashed.
>
> 87.2. Dumping of minerals outside the leased area of the mining lessees is not permissible under the MMDR Act and the Rules made thereunder.
>
> 87.3. Until the order dated 4-8-2006 of this Court is modified by this Court in IA No. 1000 in *T.N. Godavarman Thirumulpad v. Union of India*, there can be no mining activities within one kilometre from the boundaries of national parks and sanctuaries in Goa.
>
> 87.4. By the order dated 4-12-2006 in *Goa Foundation v. Union of India*, this Court has not prohibited mining activities within 10 kilometres' distance from the boundaries of the national parks or wildlife sanctuaries.
>
> 87.5. It is for the State Government to decide as a matter of policy in what manner mining leases are to be granted in future but the constitutionality or legality of the decision of the State Government can be examined by the Court in exercise of its power of judicial review."

17. After the declaration and directions in Goa Foundation-I, some controversy arose as the State of Goa granted second renewals to the mining lease holders. It was one of the contention of the petitioners in Goa Foundation-II that the State of Goa was obliged to grant fresh mining leases in accordance with law and not second renewals to the mining lease holders. The observations of Their Lordships in Goa

Foundation-II which also contains reference to the observations in Goa Foundation-I are significant, which read thus :

> "1. Rapacious and rampant exploitation of our natural resources is the hallmark of our iron ore mining sector coupled with a total lack of concern for the environment and the health and well-being of the denizens in the vicinity of the mines. The sole motive of mining leaseholders seems to be to make profits (no matter how) and the attitude seems to be that if the rule of law is required to be put on the backburner, so be it. Unfortunately, the State is unable to firmly stop violations of the law and other illegalities, perhaps with a view to maximise revenue, but without appreciating the long- term impact of this indifference. Another excuse generally put forth by the State is that of development, conveniently forgetting that development must be sustainable and equitable development and not otherwise.
>
> 2. Effective implementation and in some instances circumvention of the mining and environment related laws is a tragedy in itself. Laxity and sheer apathy to the rule of law gives mining leaseholders a field day, being the primary beneficiaries, with the State being left with some crumbs in the form of royalty. For the State to generate adequate revenue through the mining sector and yet have sustainable and equitable development, the implementation machinery needs a tremendous amount of strengthening while the law enforcement machinery needs strict vigilance.

Unless the two marry, we will continue to be mute witnesses to the plunder of our natural resources and left wondering how to retrieve an irretrievable situation.

3. The Government of India appears to have received information of large-scale illegal mining of iron ore and manganese ore in different States in contravention of the provisions of the Mines and Minerals (Development and Regulation) Act, 1957 (the MMDR Act); the Forest (Conservation) Act, 1980; the Environment (Protection) Act, 1986 and other rules and guidelines issued on the subject from time to time.

4. Acting on this information, the Government of India appointed Justice M. B. Shah, a former Judge of this Court as a Commission of Inquiry under Section 3 of the Commissions of Inquiry Act, 1952 by a Notification dated 22-11-2010. The terms of reference of the Commission for the State of Goa were as follows:

> "2. The terms of reference of the Commission shall be-
>
> (i) to inquire into and determine the nature and extent of mining and trade and transportation, done illegally or without lawful authority, of iron ore and manganese ore, and the losses therefrom; and to identify, as far as possible, the persons, firms, companies and others that are engaged in such mining, trade and transportation of iron ore and manganese ore, done illegally or without lawful authority;
>
> (ii) to inquire into and determine the extent to which the management, regulatory transportation, trade and export of such

ore, done illegally or without lawful authority, and the persons responsible for the same;

(iii) to inquire into the tampering of official records, including records relating to land and boundaries, to facilitate illegal mining and identify, as far as possible, the persons responsible for such tampering; and

(iv) to inquire into the overall impact of such mining, trade, transportation and export, done illegally or without lawful authority, in terms of destruction of forest wealth, damage to the environment, prejudice to the livelihood and other rights of tribal people, forest dwellers and other persons in the mined areas, and the financial losses caused to the Central and State Governments.

3. The Commission shall also recommend remedial measures to prevent such mining, trade, transportation and export done illegally or without lawful authority."

5. Justice Shah visited Goa and after calling for and receiving information from the authorities concerned as well as the mining leaseholders, he submitted a report on 15-3-2012 and another on 25-4-2012 to the Ministry of Mines in the Government of India. The reports were tabled in Parliament on 7-9-2012 along with an Action-Taken Report and as a result, the Government of Goa passed an order dated 10-9-2012 suspending all mining operations in the State with effect from 11-9-2012. The Ministry of Environment and Forests (MoEF) of the Government of India acted similarly and kept in abeyance the environmental clearances granted to 139 mines (actually 137 mines - there is some duplication) in the State of Goa by an order dated 14-9-2012.

6. Subsequent to the reports given by Justice Shah, a writ petition was filed by Goa Foundation in this Court being WP (C) No. 435 of 2012. The writ petition was a public interest litigation praying, inter alia, for directions to the Union of India and the State of Goa to take steps to terminate the mining leases where mining was carried out in violation of various statutes.

7. Similarly, several mining leaseholders preferred writ petitions in the Bombay High Court for a declaration that the reports given by Justice Shah are illegal and also for quashing the orders dated 10-9-2012 and 14-9-2012 whereby mining operations were suspended and environmental clearances were kept in abeyance. The writ petitions filed in the High Court were transferred to this Court for hearing along with WP (C) No.435 of 2012.

8. This Court heard all these matters and rendered its decision in Goa Foundation v. Union of India on 21-4-2014. Among other conclusions arrived at, it was held by the Court that all the iron ore and manganese ore leases had expired on 22-11-2007. Consequently, any mining operation carried out by the mining leaseholders after that date was illegal. It was also held that all the mining leaseholders had enjoyed a first deemed renewal of the mining lease and for a second renewal an express order was required to be passed in view of and in terms of Section 8(3) of the MMDR Act. For a second renewal of the mining lease, it was held that the State Government must apply its mind and record reasons for renewal being in the interest of mineral

development and the necessity to renew the mining lease. Any decision taken by the State Government should also be in conformity with the constitutional provisions. The decision taken by the State of Goa to grant a mining lease in a particular manner or to a particular party could be examined by way of judicial review. It was also held that the orders dated 10-9-2012 and 14-9-2012 are not liable to be quashed and that they would continue till decisions are taken to grant fresh leases and fresh environmental clearances for mining projects." (emphasis supplied)

18. The Supreme Court in Goa Foundation-II concluded thus :

"154 - In view of our discussion, we arrive at the following conclusions:

154.1. As a result of the decision, declaration and directions of this Court in Goa Foundation, the State of Goa was obliged to grant fresh mining leases in accordance with law and not second renewals to the mining lease holders.

154.2. The State of Goa was not under any constitutional obligation to grant fresh mining leases through the process of competitive bidding or auction.

154.3. The second renewal of the mining leases granted by the State of Goa was unduly hasty, without taking all relevant material into consideration and ignoring available relevant material and therefore not in the interests of mineral development. The decision was taken only to

augment the revenues of the State which is outside the purview of Section 8(3) of the MMDR Act. The second renewal of the mining leases granted by the State of Goa is liable to be set aside and is quashed.

154.4. The Ministry of Environment and Forest was obliged to grant fresh environmental clearances in respect of fresh grant of mining leases in accordance with law and the decision of this Court in Goa Foundation and not merely lift the abeyance order of 14th September, 2012.

154.5. The decision of the Bombay High Court in Lithoferro v. State of Goa (and batch) (2014 SCC Online Bom 997) giving directions different from those given by this Court in Goa Foundation is set aside.

154.6. The mining lease holders who have been granted the second renewal in violation of the decision and directions of this Court in Goa Foundation are given time to manage their affairs and may continue their mining operations till 15th March, 2018. However, they are directed to stop all mining operations with effect from 16th March, 2018 until fresh mining leases (not fresh renewals or other renewals) are granted and fresh environmental clearances are granted.

154.7. The State of Goa should take all necessary steps to grant fresh mining leases in accordance with the provisions of the Mines and Minerals(Development and Regulation) Act, 1957. The Ministry of Environment and Forest should also take all necessary steps to grant fresh environmental clearances to those who are successful in obtaining

fresh mining leases. The exercise should be completed by the State of Goa and the Ministry of Environment and Forest as early as reasonably practicable.

154.8. The State of Goa will take all necessary steps to ensure that the Special Investigating Team and the Team of Chartered Accountants constituted pursuant to the Goa Grant of Mining Leases Policy, 2014 give their reports at the earliest and the State of Goa should implement the reports at the earliest, unless there are very good reasons for rejecting them.

154.9. The State of Goa will take all necessary steps to expedite recovery of the amounts said to be due from the mining lease holders pursuant to the show cause notices issued to them and pursuant to other reports available with the State of Goa including the report of Special Investigating Team and the Team of Chartered Accountants.

155. The writ petitions and SLPs are disposed of in accordance with the above conclusions and directions."

19. The State of Goa, therefore, now had to proceed with the auction of the ore ('e-auction ore'), which was already extracted; and secondly, initiate the process of issuing fresh mining leases (allotment of blocks) in accordance with the directives of the Supreme Court as per law.

20. What is in issue in this PIL are the problems caused by bulk transport of minerals (iron ore) through mining villages in the mining zone of Goa that have plagued village communities in the past. The petitioner expects the Government to accept their rights to a clean, healthy and pollution free environment as the primary consideration which should guide them while granting transport permissions to the mining companies/transporters of the minerals, rather than the commercial interests of the project proponent/transporters. The grievance is that though statutory provisions are in place to regulate such operations, they are grossly inadequate and worse still poorly implemented. The submission is that poor implementation of norms lead to road deaths, insufferable dust pollution, destruction of roads and water delivery infrastructure, occupation of the road by heavy vehicles from dawn to dusk resulting in the degeneration of quality of life in the villages. It is submitted that with a fresh regime of mining now commencing, it was necessary that the transportation Rules ought to have been comprehensively re-examined especially in the context of findings of the two-year study of environmental impacts of mining done by the Dhanbad Institute of Mines, by the Ministry of Environment. According to the petitioners there is no scientific study of the village routes for sustainable transport before granting the permissions. Thus, it is vehemently urged that the transportation of the ore by means of trucks/tippers will not only disturb the peace and

tranquillity of the villages but seriously affect the safety of the villagers apart from increased pollution which will have an adverse effect on the health of the villagers.

21. As indicated earlier, learned Advocate General submitted that so far as village Mayem is concerned, the grievance is worked out as no transportation will be permitted from this village. It is further submitted that there are adequate safeguards in place in the form of rules, notifications, under the EP Act and also SOPs have been issued pursuant to the interim orders passed by this Court providing for adequate safety measures for safeguarding life and property of the villagers apart from addressing environmental concerns expressed.

22. We completely agree with learned Counsel for the petitioners, that there is bound to be heavy increase of transportation through the village roads as the materials on record indicate. However, in balancing the conflicting rights, we must bear in mind the observations of the Supreme Court in the matter in **Rajeev Suri vs. Delhi Development Authority & Ors.**(supra)**.** Their Lordships made significant observations for striking a just balance between two competing environmental and development concerns. Paragraph 519 to paragraph 528 reads thus :

"519. Indubitably, environment and development are not sworn enemies of each other. It would be an anomalous approach to consider environment as a hurdle in development and vice versa. The entities like EAC and NGT are created to strike a just balance between two competing interests and a time-tested principle of striking this balance is timely invocation of mitigating environmental measures amidst a development activity. True that mere application of certain mitigating measures may not alleviate environmental concerns in all matters and in some circumstances, the project is simply incomprehensible with the environment. But as long as a legitimate development activity can be carried on in harmony with the idea of environmental protection and preservation including sustainable development, the Courts as well as expert bodies should make their best endeavour to ensure that harmony is upheld and hurdles are minimised by resorting to active mitigating measures.

520. The principle of sustainable development and precautionary principle need to be understood in a proper context. The expression "sustainable development" incorporates a wide meaning within its fold. It contemplates that development ought to be sustainable with the idea of preservation of natural environment for present and future generations. It would not be without significance to note that sustainable development is indeed a principle of development, it posits controlled development. The primary requirement underlying this principle is to ensure that every development work is *sustainable*;

and this requirement of sustainability demands that the first attempt of every agency enforcing environmental rule of law in the country ought to be to alleviate environmental concerns by proper mitigating measures. The future generations have an equal stake in the environment and development. They are as much entitled to a developed society as they are to an environmentally secure society.

521. By the Declaration on the Right to Development, 1986, the United Nations has given express recognition to a right to development. Article 1 of the Declaration defines this right as:

> " i. The right to development is an inalienable human right by virtue of which every human person and all peoples are entitled to participate in, contribute to, and enjoy economic, social, cultural and political development, in which all human rights and fundamental freedoms can be fully realized."

522. The right to development, thus, is intrinsically connected to the preservance of a dignified life. It is not limited to the idea of infrastructural development, rather, it entails human development as the basis of all development. The jurisprudence in environmental matters must acknowledge that there is immense interdependence between the right to development and the right to natural environment.

523. In *International Law and Sustainable Development*, Arjun Sengupta in the chapter "*Implementing the Right to Development* [*International Law and Sustainable Development*

— *Principles and Practice* (Publisher : Martinus Nijhoff, Edn. 2004) p. 354.] " notes thus:

> "... Two rights are interdependent if the level of enjoyment of one is dependent on the level of enjoyment of the other..."
>
> The concern of the regulatory agencies is to weed out the unsustainable from the development plan and to parallelly ensure that the right to development is not trumping upon any other right. Sengupta further notes:
>
> "... There is an improvement in the right to development only if at least one of the constituent rights improves and no other right deteriorates or is violated, which means the right to development conforms to the principle of the indivisibility of human rights... [*International Law and Sustainable Development — Principles and Practice* "

524. The precautionary principle duly mandates that all agencies of the State, including Courts, must make their best endeavour to ensure that precaution is instilled in the process of development. The very requirement of prior EC is born out of this need for precaution. It is a manifestation of the precautionary principle in India and if development work is carried out in furtherance of prior EC and such EC is not vitiated by illegality, it would be a case of proper adherence with the precautionary principle.

525. In matters of balancing between competing environmental and development concerns, the Court has to be project-specific. In environmental matters, even one fact here or there may have the effect of attributing a totally distinct character to the project and accordingly, the scope of judicial review may vary. This sentiment is best reflected in the following words of Professor Schotland [D.C. Circuit Judicial

Conference, *Environmental Protection : Law and Policy*, 2nd Edn. (Cambridge : Cambridge University Press, 2007) p. 122.] who proposed ranking of standards of judicial review according to strictness:

> "3. ... I have always thought of scope of review as a spectrum, with de novo at one end, with unconstitutionality at the other end, and in between a number of what I will call "mood-points" or degrees of judicial aggressiveness or restraint, such as preponderance of the evidence, clearly erroneous, substantial evidence on the whole record, scintilla of evidence, abuse of discretion and last, right next to or even into unconstitutionality, arbitrary and capricious. And since these are only "mood-points", there is considerable room within each for difference."

526. The proper balance of judicial review in environmental matters in a constantly developing society is a matter of great debate across all jurisdictions. In *Ethyl Corpn.* v. *Environmental Protection Agency* [*Ethyl Corpn.* v. *Environmental Protection Agency*, 426 US 941 (1976). Ed. : Cert. denied in *Ethyl Corpn.* v. *Environmental Protection Agency*, 426 US 941 (1976) against *Ethyl Corpn.* v. *Environmental Protection Agency*, 541 F 2d 1 (DC Cir 1976).] , the observations of Wright, J. present a just balance. He observed thus:

> "There is no inconsistency between the deferential standard of review and the requirement that the reviewing court involve itself in even the most complex evidentiary matters; rather, the two indicia of arbitrary and capricious review stand in careful balance. The close scrutiny of the evidence is intended to educate the court. It must understand enough about the problem confronting the agency to comprehend the meaning of the evidence relied upon and the evidence discarded; the questions

> addressed by the agency and those bypassed; the choices open to the agency and those made. The more technical the case, the more intensive the court's effort to understand the evidence, for without an appropriate understanding of the case before it the court cannot properly perform its appellate function. ..."

527. Wright, J. in *Ethyl Corporation* [*Ethyl Corpn.* v. *Environmental Protection Agency*, 426 US 941 (1976). **Ed.** : Cert. denied in *Ethyl Corpn.* v. *Environmental Protection Agency*, 426 US 941 (1976) against *Ethyl Corpn.* v. *Environmental Protection Agency*, 541 F 2d 1 (DC Cir 1976).] then notes the need for realising the limits of judicial function thus:

> "*But the function must be performed with conscientious awareness of its limited nature. The enforced education into the intricacies of the problem before the agency is not designed to enable the court to become a superagency that can supplant the agency's expert decision-maker*. To the contrary, the court must give due deference to the agency's ability to rely on its own developed expertise. The immersion in the evidence is designed solely to enable the court to determine whether the agency decision was rational and based on consideration of the relevant factors. It is settled that we must affirm decisions with which we disagree so long as this test is met...." (emphasis supplied)

528. They must always look for a careful balance when two equally relevant interests compete with each other. The task may not be easy, but is the only reasonable recourse. For the proper application of these principles, the first and foremost thing to be kept in mind is the nature of the project. In the present case, the subject project is an independent building and construction project wherein one-time

> construction activity is to be carried out. It is not a perpetual or continuous activity like a running industry. It is absolutely incomprehensible to accept that a project of this nature would be unsustainable with the needs and aspirations of future generations. Furthermore, the increase in footprint is not shown to be substantial and the inclusion of new Members of Parliament after the delimitation exercise is anyway going to lead to an inevitable increase in footprint (floating though) that cannot be countenanced as a concern here."

23. We have therefore to look for a careful balance when two equally relevant interests compete with each other. At this juncture itself, we may refer to the MCA No. 239 of 2024 filed by Vedanta Limited. Shri Janak Dwarkadas submitted that Vedanta Limited has been granted Environmental Clearance (EC) to the project for Block – I, Bicholim Mineral Block and Block VII-Cudnem Mineral Block. It is submitted that the EC is granted after following a detailed procedure laid down under the EP Act and the Rules framed thereunder. Our attention is invited to the Notification dated 14.09.2012 published by the Ministry of Environment, Forest and Climate Change, which provides for requirements of prior environmental clearances for matters falling under category 'A' of the Schedule. Shri Dwarkadas submitted that the Expert Appraisal Committee comprises of domain experts. It is submitted that rigorous conditions are imposed in the EC. It is further submitted that transportation is a mechanism

provided under the Expert Appraisal Committee (EAC) regime. It is submitted that the EAC comprises of persons who are outstanding environmental policy experts with wide expertise in the relevant development sector. It consists of only professionals and experts fulfilling the qualifying criteria provided by the notification. It is submitted that a detailed procedure is prescribed for appraisal. A procedure is conducted for public hearing. It is thus submitted that before granting EC, it has to pass the muster of the stringent provisions of the EP Act and the Rules framed therein.

24. It is already indicated by us that we are not examining the challenge to the EC hence we refrain from expressing any opinion to the legality or otherwise of the EC. In appropriate proceedings, such challenge can be gone into. We also make it clear that what is being recorded by us are the assurances accepted by Vedanta in the matter of transportation. We may not be understood to mean that we have examined the legality and propriety of the conditions for transport in the EC and the Consent to Operate ('CTO' for short). The challenge to these conditions in the EC and the CTO regarding the transport and the measures incorporated is kept open for consideration in appropriate proceedings before the appropriate forum as and when a proper challenge to the EC as well as the CTO is made.

25. Shri Dwarkadas was at pains to point out that Vedanta's consent to operate incorporates all the safeguards necessary to ensure that the competing rights of the villagers regarding their safety and environmental concern are properly balanced with that of the right of the project proponent to carry mining operations pursuant to the valid EC. Shri Dwarkadas submitted that Vedanta's affidavit dated 17.06.2024 provides for measures of safeguards to prevent pollution under CTO. On instructions, Shri Dwarkadas submits that Vedanta shall be strictly complying with all conditions of transportation mentioned at serial nos. 13 to 24 of the CTO.

26. The CTO has been granted by the GSPCB under Section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and under Section 21 of the Air (Prevention & Control of Pollution) Act, 1981 and Authorization under Rule 6(i) of the Hazardous and Other Wastes (Management and Transboundry Movement) Rules 2016, as amended thereafter. In the EC granted to Vedanta Limited, we find that during the site inspection, certain observations were made by the sub-committee. The observations at item 4 and the reply of the project proponent thereon are relevant, reading thus :

> "4. The Project Proponent needs to bypass the public road and also to explore the possibility of increasing the capacity of the truck so as to reduce the no. of trips. The EAC opined that the Project

Proponent needs to revisit the traffic load by considering the cycle time and waiting time. The Project Proponent needs to submit the action plan for strengthening the road and for converting the unpaved road into concrete road.

The Project Proponent submitted the map showing the transportation route comprising of dedicated road corridor and public road. The total travel distance upto Jetty is 5.48 kms (4.54 km dedicated road and 0.94 km MDR-20 Public Road). Traffic load and effective distance between two trucks are as follows :-

S.No.	Transportation working days	Quantity (In TPA)	Tonnes/Day	Trips per day	Mode of trnasport
1	237	30,00,000	12658	1205	Road
	Total trips per day			1205	

The road witdth details for various segments are as follows :

Dedicated Road corridor	
3.31 km	1.23 km
12-15 mts wide Road	7 mts wide Road

Further, the Project Proponent submitted the following details :

i. Capacity of truck is 10.5 tons as per directives of Dept. Of Mines & Geology, Goa.

ii. Total Handling per day is 12658 tons/day

iii. Transportation timings are 6.00 a.m. to 7.00 am, 8.00 a.m. to 12.45 pm and 2.00 p,m to 5.45 pm. Therefore, the effective transportation time is 9.30 hrs.

iv. Per Hour Handling is : 1332 tons/hour

v. No. of vehicles per Hour (One Way): 127 vehicles

vi. No. of Vehicles per Hour (to and fro) : 254 vehicles

vii. The Speed of vehicle is 25 KMPH and the lead distance is 5.48 kms.

viii. The time taken for 5.48 km is 13.15 mins for each truck and loading time is 1 min, weighment time at both source location is 2 min, Tarpaulin typing and untying time is 2 min, unloading time 1 min and waiting time 10 min.

ix. Each truck length is 15'.5" (4.58 m)

x. Distance from truck to truck is 5 m both side – 10 m

xi. Each vehicle occupies a min. distance of 14.58 m =~ 15 m

xii. The length of road is 5.48 Km = 5480

xiii. No. of vehicle which can travel on this road for one side =5480/15=365, However we would be plying only 127 trucks hence effective distance between two vehicles is 43 m.

The Project Proponent submitted the following mitigation measures for transportation :

i. Public road is hot mixed and same will be maintained.

ii. Dedicated road is proposed to be hot mixed in phased manner.

iii. Entire Dedicated transportation route is surrounded by thick Green Belt

iv. Transportation vehicles shall be properly maintained to minimize the exhaust emission.

v. Regular tests shall be carried out to check exhaust emission and PUC certification of transportation vehicles at prescribed interval.

vi. Transportation trucks will be loaded with prescribed capacity and covered with tarpaulin before leaving mines premises.

vii. Overloading of the material will be avoided.

viii. Regular monitoring of the emission levels.

ix. Over speeding of Vehicle will not be allowed.

x. Traffic Marshalls shall be provided for regulating movement of vehicles as well as for safety of persons.

xi. Training will be given to all drivers about safe driving.

xii. Regular water sprinkling by means five hired water tanker of 10kL capacity on haul road and loading points will be carried out.

xiii. Used of fixed dust suppression system on haul roads

xiv. Installation of two wheel washed system (one each at the exit of the dedicated road and jetty exit respectively.

xv. Manual and mechanised machines for road sweeping.

xvi. Washing of mine exit points/Junctions (Mayem, Pilgao and Jetty exit area) after transportation hours/at night with water tanker having pipe arrangements

xvii. Underpass proposed at Mayem junction to prevent interface with public."

27. By way of a note submitted at the time of hearing, a summary of major compliances ensured by Vedanta are as under:

CTO CONDITION	COMPLIANCE	STATUS
13	The mining unit shall install online noise monitoring station approved by USEPA, TUV or CPCB, CSR or MCERTs at the transportation route near sarmanas in consultation with the Board and connect the same to thye Board server within one month of receipt of this Consent and submit compliance report to the Board.	24 x 7 real time online monitoring station connected with GSPCB has been set-up
14	The mining unit shall install CCTV Camera at exit gate from mine towards the jetty to monitor if the trucks are properly covered with tarpaulin before exit and should	Installed Camera shall give the status of compliance by Trucks to GSPCB

	be connected online to GSPCB, within one month of receipt of this Consent to Operate	
16	The trucks/tippers engaged in transportation of ore shall have with atleast six inches free board after filling the cargo box to avoid spillage	This shall be complied with
17	All trucks/tippers engaged in the transportation of ore shall be covered with tarpaulin and the tarpaulin shall be properly fastened to the cargo box ensure the ore does not get air borne or spill on the road.	
20	The mining unit shall provide wheel washing facility for the ore transport vehicles shall be provided at the	Wheel Washing System already set-up

	exit point of the mine	
23	The mining company should submit details regarding transportation of ore mentioning Source, Destination, Qty., No. Of trips (tipper trucks), Route (names of villages through which transportation takes place), Remarks	This shall be complied with

28. Shri Dwarkadas submitted, on instructions, that Vedanta is bound by the aforesaid conditions and the mitigating measures provided for transportation. Furthermore, even the CTO has provided for conditions for transportation mentioned at serial nos. 13 to 24. In the affidavit dated 17.06.2024 filed by Vedanta, it is assured that all the conditions pertaining therein will be strictly adhered to. Statements in the affidavit and the assurances aforementioned are accepted as an undertaking to this Court.

29. This Court by an Order dated 22.04.2024, directed the GSPCB to file an affidavit pursuant to the inspection carried out and place a status report on record. So far as Vedanta is concerned, the route applied for permission was NSP-1, Top-NBP Junction-NBP-Matwada Junction-Sarmanas jetty. As directed by DMG, the Board officials inspected the site along with unit representative on 03.05.2024. Following were the recommendations for pollution control safeguard:

> "**Recommendations for pollution control safeguard**
>
> • The truck/tippers engaged in transportation of ore shall have sufficient free board after filling the cargo box to avoid spillage.
>
> • All trucks/tippers engaged in the transportation of ore shall be covered with tarpaulin and the tarpaulin shall be properly fastened to the cargo box to ensure the ore does not get air borne or spill on the road.
>
> • In case of break down of loaded trucks/tippers unloading of ore at the road side shall be strictly avoided.
>
> • The roads within mining lease areas shall be sprinkled with water to suppress dust pollution.
>
> • Spillage of ore on the public roads shall be removed immediately on occurrence.
>
> • The mining company should make suitable arrangement for sweeping of roads affected due to transportation of iron ore.
>
> • The mining firm should manage the daily trips in staggered manner in consultation with DMG, so that traffic congestion is avoided at major junctions.
>
> • The Board shall carry out monitoring along the route through the Ministry of Environment, Forests and Climate

Change approved lab and monitoring charges shall be recovered from the transporters/mining firms as per actual. The Transportation/mining firms shall pay an advances of Rupees Three lakhs towards the monitoring charges.

- The Department of Mines to provide the transportation route for enabling the Board to identify suitable monitoring locations. The Department may also ensure power supply for the monitoring stations.
- Speed of ore carrying trucks should be controlled by online GPS monitoring done by DMG through its authorized agency.
- Road sweeping machines may be jointly/severally developed in hotspot areas/ stretches.
- The shoulders of the mining transport roads may be tarred whenever needed.
- DMG may ensure maintenance of public road in the mining area with respect to repair of potholes/widening of roads whenever necessary.
- The Operator is required to carry out manual wheel washing in order to clean the wheels of the trucks and subdue dust arising out of it whenever wheel washing stations are not installed.
- In case the air quality standards are breached the transport frequency should be reduced and the transporters to be levied polluter pays penalty.

Permission can be granted to above mentioned route."

30. Shri Dwarkadas submitted that the Project Proponent-Vedanta is accepting all these safeguards and assures this Court on instructions that the conditions will be strictly followed and implemented. The learned Advocate General as well as learned Counsel for the implementing agencies assures that the monitoring will be strict and

effective and not an eye wash. We accept these assurances as undertaking to this Court.

31. It is submitted by Shri Dwarkadas that in any case the transportation of Vedanta is through a dedicated corridor and not through village roads. The stretch of 0.9 kms though not a part of dedicated corridor is not a village road. Learned Senior Advocate submitted that they are even willing to provide for additional safeguards for this non-village/Major District Road of 0.9 kms by deployment of traffic marshals to avoid congestion and inconvenience to the public at large on arrival of the ferry. Whether to accept these additional safeguards is something which the DMG and transport authorities shall look into and take an informed decision depending on the ground conditions.

32. MCA No.1416/2024, is an intervention filed by Shri Shankar Chandrakant Jalmi and others in Vedanta's application. Upon hearing Mr. Frias, learned Counsel for the interveners, we are satisfied that the grievance about the road being illegally constructed through the lands of the interveners cannot be made a subject matter of this PIL Petition as and by way of an intervention application. It is for the Applicant-intervener to resort to appropriate remedies available in law. If any authority is required in support of this view, we may refer to the decision of the Supreme Court in **Saraswati Industrial Syndicate**

Ltd. vs. Commissioner of Income Tax, Haryana, Rohtak[7]. In paragraph 12, Their Lordships held that the only purpose of granting an intervention application is to entitle the intervener to address arguments in support of one or the other side. Keeping all contentions open with liberty to avail of appropriate remedies in accordance with law, the intervention application is disposed of.

33. Let us now examine the measures and safeguards provided for transportation of 'e-auction ore'. A meeting was convened by DMG along with the Officials of GSPCB, Transport Department, Police Department, Stakeholders, Transporters, Panchayat Representatives on 29.01.2024 at 3.30 p.m. It was decided that the DMG and GSPCB should mutually devise a Standard Operating Procedure (SOP) for grant of route approvals for transportation of ore through village roads. The Standard Operating Procedure (SOP) for grant of route approvals for transportation of ore through village roads, reads thus :

> "1. The transporter will first approach the Directorate of Mines and Geology for approval of the route of transportation. In their application they shall indicate the approximate width of the road and facts about number of houses along the route and availability of alternate route. The Directorate of Mines and Geology will examine the applications and decide upon the route to be allowed for transportation. Upon such approval, the transporter

7 (1999) 3 SCC 141

will apply to the GSPCB for setting up monitoring stations on the route. After the GSPCB sets up the stations, the transporter will then apply to the DMG for transit permits, which shall be accordingly decided by DMG.

2. The transporter upon receiving transit permit shall ensure that all conditions of transportation are adhered and complied. All trucks shall be registered with the Department and fitted with GPS.

3. GEL shall continuously monitor Vehicle speed and any Violation (above 40 km/hr) shall entail penalty i.e. Trucks shall be blocked for 3 days and further as per the Order dated 26/04/2016.

4. On the Bhumija Potal GEL through VTS System shall ensure that the total number of trips shall be restricted per Operator on the route to min 20 and maximum 40 per hour.

5. The road congestion shall be monitored by GEL on Bhumija Ore Monitoring System on a real time basis and accordingly trips shall be restricted.

6. Intimation about permitted transport shall be made to SP. North, SP. South and SP Traffic informing them that transporter has to strictly follow the Goa (Prevention of Illegal Mining, Storage and Transportation of Minerals) Rules, 2013, Order of the Directorate of Mines & Geology dated 26/04/2016, check whether the above conditions are followed by the Transporters and monitor the same.

7. The timing of the Ore Transportation along the designated route should be from 8.00 am to 1.00 pm

with a break from 1.00 pm to 2.00 pm and then transportation can continue from 2.00 pm to 5.45 pm from the source location.

8. GEL should ensure that no trip sheets are generated beyond the prescribed time so that transportation of Ore happens only within the specified time."

34. Apart from the aforesaid, there are in place "The Goa (Prevention of Illegal Mining Storage and Transportation of Minerals) Rules 2013, published in the Official Gazette, of the Government of Goa, dated 17.10.2013. Rule 17 under Chapter V deals with Regulation of Transport and Extraction. The Regulation provides for various stipulations regarding transporting the ore. These Rules shall be scrupulously followed and measures provided effectively monitored. Rule 23 provides for reasonable restrictions on transport reading thus :

"23. Reasonable Restriction on Transport.- The Government shall have power to impose reasonable restrictions, such as, restricting the number of carriers to be permitted for transport of mineral, fixing the maximum number of years for using carriers for mining transport, deciding a cut off date after which the carrier registered with Transport Department shall not be registered for transportation of the mining ore or any other similar restriction that may be necessary to ensure smooth

> flow of traffic in the State, to counter congestion on State roads, for public safety, to regulate damage to ecology and environment of the State due to haphazard movement of trucks or vehicles or due to any other mode of transport authorized to carry ore including barges."

35. Our attention is also invited to the instructions containing route safety in the matters concerning transportation on road issued by the DMG on 26.04.2016. The instructions are for strict compliance by the truck owners, machinery owners, leaseholders, traders, end users, etc. These instructions are issued in exercise of powers under the Goa (Prevention of illegal Mining, Storage and Transportation of Minerals) Rules, 2013 and all other powers enabling in this behalf. The instructions are thus :

> "INSTRUCTIONS CONCERNING ROAD SAFETY IN MATTERS CONCERNING TRANSPORTATION ON ROAD
>
> Following instructions are issued to all Truck Owners, Machinery Owners, Leaseholders, Traders, Endusers, etc. for strict compliance in exercise of powers under the Goa (Prevention of Illegal Mining, Storage and Transportation of Minerals) Rules, 2013 and all other powers enabling in this behalf:
>
> 1. Since Hon'ble Supreme Court of India in Writ Petition No. 435/2012 in order dated 21/04/2014 directed the State Government to strictly enforce the Goa (Prevention of Illegal Mining, Storage and Transportation of Minerals) Rules, 2013, as such in exercise of power under Rule 17(10) of Goa (Prevention of Illegal Mining, Storage and

Transportation of Minerals) Rules, 2013, the speed limit for vehicles used for transportation of minerals is fixed at 40 km/hr.

2. The upper speed limit is applicable to the trucks registered with department irrespective of the facts whether it is involved in transportation of minerals or is driven for any other purpose. The speed limit shall be applicable to all such registered vehicles throughout the State of Goa and throughout the year so that confidence is reposed in the citizen that such vehicles shall not endanger the lives of other commuters on road.

3. The software with the help of VTS device fitted on transportation vehicles shall automatically debar all the trucks found to be exceeding the speed limit for the period mentioned as under:

(1) 1st Violation: Debarred upto 1 day
(2) 2nd Violation: Debarred upto 3 days
(3) 3rd Violation: Debarred upto 7 Days
(4) 4th Violation: Debarred upto 10 days
(5) 5th Violation: Debarred upto 15 days
(6) 6th Violation: Debarred upto 30 days
(7) 7th Violation: Debarred upto 60 days
(8) 8th Violation: Debarred upto full season

4. If in exigency situation if the truck exceeds limit beyond 40 km/hr. upto 50 km/hr., it shall not be treated as wilful violation of the speed limit. For this purpose any increase in speed of vehicle above 40 km/hr. up to 60 second at a time shall be presumed to be such exigency and shall not be treated as wilful violation of speed limit.

5. The list of violators shall be displayed on the website in the late evening of the same day or on next day.

6. It shall be the duty of the Leaseholder/Trader/end User, Transportation Contractors etc. not to employ such debarred vehicles' for any activities concerning Major Minerals like using such vehicles for internal movements within lease or jetty or storage points.

7. If the debarred vehicle is used for transportation of the minor minerals like sand, laterite stones, rubbles, murram etc. during when it was debarred, such vehicle may be made liable for exorbitant fines' so also person who employed such vehicles.

8. Since debarring of trucks is done by use of software, the Social Status, Political Status or Economical Status either of the truck owner or driver shall not influence either monitoring or process of debarring trucks.

9. The registration of vehicles with the department is voluntary, as such once registered with the department, the owner and driver of the truck or machinery shall be governed by provisions of the MMDR Act, 1957 and rules made therein, so also administrative instructions issued by Department from time to time.

10. Irrespective of financial arrangements or other commercial decision with regards to employing of vehicle between Lease Holders, traders and endusers etc. and owner of vehicles or machinery, the department shall fake serious note if any attempt by owner of vehicle or through others' to illegal stop the transport. The department reserves the right to take stern action against such person if they are found to have stopped or abated legal transportation in accordance with law which is authorised by this department.

11. The department shall monitor all the vehicles registered with it throughout the year, as such VTS device of all the vehicles registered with department shall be active throughout the year irrespective of the fact whether it is mining season or otherwise.

12. The choice of vehicles to be used for transportation concerning the particular lease holder, traders or end users shall be exclusively left to the choice of lease holders, traders or end users. As such mere registration of vehicle with department shall not give any rights to any of the vehicle owner

to get business of transportation as a matter of right from the department/lease holder, end user etc.

13. The vehicle engaged for one lease hold area/end user shall be expressively barred for undertaking transportation or other allied activities for other lease holder/end user on the same day.

14. The time for transportation of minerals though starts from 6 a.m. to 10 p.m. the same may be modified from time to time at different locations' taking into accounts the usage of infrastructure facilities by members of public, so also all school going children etc.

15. To decongest the roads it is hereby ordered that there shall be equal way bridges at loading and unloading points.

16. Proper care shall be taken by the owner and driver of the vehicle to cover the minerals with turpentine etc. so that no wastage of mineral takes place at the same time dust pollution is avoided.

17. The Lease Holders or transportation contractors, end users shall ensure that before vehicles leaves their premises, the tyres of the vehicles are washed properly so that dust pollution on the road due to tyres 'can be avoided.

18. The trucks owners shall ensure that speedometer of vehicles are in good condition so as to enable the driver to control the speed of the vehicle and drive within the speed limit.

19. When any violation shall be noticed, the message of debarring of the truck shall be sent to all the owners/drivers on mobile numbers provided by them to department for over speeding. The duration for which they are debarred shall be intimated by auto generated SMS and when such message is received, it shall be the duty of such owner/driver not to use vehicle for any mining related activity during such period, any wilful defines of such instruction shall be solely attributed to such owner/driver and

employing of such debarred vehicle shall be liable for further grievous action both monitory and otherwise.

20. In case when vehicle registered with the department meets with an accident, it shall be presumed to be at fault and strict action shall be initiated against such vehicle. It shall be the duty of the vehicle owner to prove his innocence.

21. It is hereby clarified that whenever the old vehicles shall be replaced, they shall be replaced with new vehicles of capacity of at least 15 tons.

The above instructions are issued not only for implementation of the Goa (Prevention of illegal Mining, Storage and Transportation of Minerals) Rules, 2013 but also for honouring directions of the Hon'ble Supreme Court of India. The said action is initiated so that confidence is reposed in the minds of general public that the transportation of ore is not only in compliance with legal requirements but also keeping in mind safety of the general public, which is of paramount importance.

Since actions are initiated by the help of software with electronics monitoring devices there is no scope of human intervention for favouring any person or against any person as such should be taken into right spirit so that necessary corrective majors are taken.

Place: Panaji sd/-
(Prasanna A. Acharya)
Dated: 26th April, 2016. Director of Mines & Geology

(emphasis supplied)

36. The underlined portion of the instructions is significant. DMG is conscious of the directions of the Supreme Court. It also has in mind safety of the general public. As far as back as in 2016, the need

was felt to use software to do away with the scope for any human intervention. As experts concerned with the safety of citizens, adopting modern technology, upgrading software should be routine. To this end, we expect the DMG and GSPCB to be proactive. The suggestions of learned Counsel for the petitioners which we have dealt with in the later part of this judgment assumes relevance and need to be seriously looked into. As an expert body, we expect the DMG and GSPCB to examine these suggestions and depending on the scientific study enforce them if found useful.

37. In respect of transportation of 'e-auction ore', vide Corrigendum dated 06.06.2023, the DMG has imposed the following restrictions on traffic movement on different transportation routes. Such restrictions read thus:

> **CORRIGENDUM**
>
> **Subject: Transportation of Ore**
>
> This Department vide Memorandum No.03/66/2023/Major/Mines/194 dated 05/04/2023 had put restriction on number of trips per hour to avoid traffic congestion on village roads. This restriction stands amended to the extent given below:
>
> The traffic movement on different transportation routes will be monitored by Goa Electronics Limited on real time basis and the number of trips will be staggered between

20 trips to 40 trips per hour depending on the traffic congestion on the roads.

Sd/-
(Dr. S. Shanbhogue)
Director & Ex-officio Joint Secretary

38. Now we come to OM dated 29.10.2014 issued by the Ministry of Environment, Forests and Climate Change, as regards the 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. The said OM provides thus :

OFFICE MEMORANDUM

Subject: 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- Regarding.

The Ministry has been receiving mining proposals wherein the habitations and villages are part of mine lease areas or habitations and villages are surrounded by the mine lease area.

2. To discuss the impact of mining activities on habitations and to develop a code of practice on these issues, a meeting was held under the Chairmanship of Shri M.S. Nagar, Chairman EAC (Non Coal Mining Sector) on 23.06.2014. After detailed deliberations by the Experts, the following suggestions were made as part of mitigation

measures to avoid adverse impact of mining operations in the case of such habitations/villages:-

a) The Project Authority shall adopt Best Mining Practice for the given mining conditions. In the mining area, adequate number of check dams, retaining walls/structures, garland drains and settling ponds should be provided to arrest the wash-off with rain water in catchment area.

b) The natural water bodies and or streams which are flowing in and around the village should not be disturbed. The Water Table should be nurtured so as not to go down below the pre-mining period. In case of any water scarcity in the area, the Project Authorities have to provide water to the villagers for their use. A provision for regular monitoring of water table in open dug well located in village should be incorporated to ascertain the impact of mining over ground water table.

c) 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. The Project Proponents (PPs) must ensure that the

biological clock of the villagers is not disturbed by orienting the floodlights/ masks away from the villages and keeping the noise levels well within the prescribed limits for day/night hours.

d) The Project Authority shall make necessary alternative arrangements, where required, in consultation with the State Government to provide alternate arrangements for livestock grazing. In this context, Project Authority should implement the directions areas for the Hon'ble Supreme Court with regard to acquiring grazing land. The sparse trees on such grazing ground, which provide mid-day shelter from the scorching sun should be scrupulously guarded against felling, lest the cattle abandon the grazing ground or return home by noon.

e) Where ever blasting is undertaken as part of mining activity, the Project Authority shall carry out vibration studies well before approaching any such habitats or other buildings to evaluate the zone of influence and impact of blasting on the neighbourhood. Within 500 meters of such sites vulnerable to blasting vibrations, avoidance of use of explosives and adoption of alternative means of mineral extraction, such as ripper/dozer combination/rock breakers/surface miners etc. should be seriously considered and practiced

wherever practicable. A provision for monitoring of each blast should be made so that the impact of blasting on nearby habitation and dwelling units could be ascertained. The covenant of lease deed under Rule 31 of MCR 1960 provides that no mining operations shall be carried out within 50 meters of public works such as public roads and buildings or inhabited sites except with the prior permission from the Competent Authority.

f) Main haulage road in the mine should be provided with permanent water sprinklers and other roads should be regularly wetted with water tankers fitted with sprinklers. Crusher and material transfer points should invariably be provided with Bag filters and or dry fogging system. Belt- conveyors should be fully covered to avoid air borne dust.

g) The Project Authority shall ensure that the productivity of agricultural crops is not affected due to mining operations. Crop Liability Insurance Policy has to be taken by the PP as a precaution to compensate for any crop loss. The impact zone shall be 5km from the boundary of mine lease area for such insurance policy. In case, several mines are located in a cluster, the Associations of owners of the cluster mines, formed inter-alia, to sub-serve such an

objective, shall take responsibility for securing such Crop Liability Policy.

h) In case any village is located within the mining leasehold which is not likely to be affected due to mining activities during the life of mine, the Expert Appraisal Committee (EAC) should consider the proposal of Environmental Clearance (EC) for reduced mining area. The Mining lease may be executed for the area for which EC is accorded. The mining plan may also be accordingly revised and required stipulations under the MMDR Act, 1957 and MCR, 1960 met.

i) Transportation of the minerals by road passing through the village shall not be allowed. A 'bypass' road should be constructed (say, leaving a gap of at least 200 meters) for the purpose of transportation of the minerals so that the impact of sound, dust and accidents could be mitigated. The PP shall bear the cost towards the widening and strengthening of existing public road network in case the same is proposed to be used for the Project. No road movement should be allowed on existing village road network without appropriately increasing the carrying capacity of such roads.

j) Likewise, alteration or re-routing of foot paths, pagdandies, cart roads, and village infrastructure/public utilities or

roads (for purposes of land acquisition for mining) shall be avoided to the extent possible and in case such acquisition is inevitable, alternative arrangements shall be made first and then only the area acquired. In these types of cases, Inspection Reports by site visit by experts may be insisted upon which should be done through reputed Institutes.

k) As CSR activities by Companies including the Mining Establishments has become mandatory up to 2% of their financial turn-over, Socio Economic Development of the neighborhood Habitats could also be planned and executed by the PPs more systematically based on the 'Need based door to door survey' by established Social Institutes/Workers on the lines as required under TOR. "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 located in the mine lease area will be shifted or not. The issues relating to shifting of Village including their R&R and socio-economic aspects should be discussed in the EIA report."
>
> 3. The matter was examined in the Ministry and accordingly, it has been decided that the above mentioned conditions at para-2 (a-k) may be included as a condition of Environmental Clearance letter to mitigate the adverse impact of mining operations in the case of such habitations/villages.
>
> 4. This issues with the approval of Competent Authority." (emphasis supplied)

39. It is therefore not as if transportation of the ore through village roads is completely prohibited as fairly submitted by the learned Counsel for the petitioner. Moreover, the aforesaid SOPs/measures are put in place to mitigate the adverse impact of mining operations in the case of such habitations/villages. Learned Counsel for the petitioners fairly submitted that the spirit of the OM dated 29.10.2014 is imbibed in the SOPs issued by the authorities from time to time. The safeguards imposed by way of SOPs, instructions, Rules and Regulations before and after filing of the PIL accords with the spirit of the OM dated 29.10.2014. These measures be strictly implemented.

40. Learned Counsel for the petitioners made a fervent plea that the number of trips per hour be reduced and that there should be real time monitoring about the impact of pollution caused as a result of such transport. Learned counsel submitted that so far as transport is concerned, as a result of this Court's intervention, the SOP was evolved jointly by the DMG and the GSPCB. Learned Counsel submitted that the timing of ore transportation should be from 9.00 a.m. instead of 8.00 a.m. to 1.00 p.m. as per the SOP condition no.7. It is submitted that time period of 8.00 a.m. to 9.00 a.m. is the peak time for people travelling, large number of children going to school, etc. It is submitted that heavy truck movement is dangerous for human safety and it would seriously impede and inconvenience the day to day travel of a large number of people during this period from 8.00 a.m. to 9.00 a.m. It is then submitted that the total number of trips be restricted to the minimum or less than 20 trucks per hour and not the upper cap of 40 trucks per hour. It is submitted that no technical study has been carried out for the capacity of village roads and the figure proposed in the SOP is an adhoc figure not backed by data. The constant movement of the trucks would be hazardous for the locals. It is requested that the total number of trips ought not to be higher than 20 (load) trips per hour.

41. So far as monitoring of ore transportation operation by GSPCB and DMG is concerned, learned Counsel for the petitioners submitted that the monitoring of ore transportation is proposed to be done under the new regime i.e. installation of monitoring stations along the ore transportation route, readings of air quality taken twice a week and averaged out for 24 hours and results obtained after six days. She submits that the use of 24-hour ambient air quality monitoring data for truck transport of ore is wholly inappropriate since the truck transport does not happen over a 24-hour period as is the case with an industrial unit working three shifts. Thus, while the actual transportation period in which air pollution levels are higher are approximately 8 hours only, these air pollution readings are merged into the readings captured over the period of 24 hours, which results in the air pollution levels being averaged out and almost always being within permissible limits on account of no major activity taking place in the balance 16 hours (i.e. of non transportation). According to learned Counsel, the average pollution level readings are thus deemed to be within the norms (Ambient Air Quality for Residential Areas). Learned Counsel for the petitioners suggested that, (a) the monitoring of air pollution needs to be done daily and exclusively within the ore transportation timings and (b) monitoring should be in the nature of real time, online monitoring, with the equipment linked with the PCB servers and Panchayat. Learned Counsel submitted that at present the

monitoring system neither indicates the true picture of dust pollution levels during ore transportation nor does it enable the Board to respond quickly by reducing the transport or shutting it down temporarily and more focused method is required to achieve proof of air pollution and most importantly, enable the Board to conduct what is actually "point source" monitoring. It is further submitted that while the movement and timing of trucks is already subject to real time monitoring online by the DMG, the measurement of pollution levels (in terms of PM10 and PM2.5) is available only six days after the actual events, due to outdated technology. Learned Counsel submitted that with the outdated system, the chance of policy intervention and quick action being taken against excessive pollution is ruled out.

42. Learned Counsel for the petitioners urged that the need of the hour is to ensure the updation of pollution monitoring technology to keep up with scientific advancements. According to her, Real Time monitoring of air pollution levels will enable the Pollution Control Board to swiftly take action in the event air pollution levels are breached on a particular day. The petitioner wants this Court to recommend to the Board to invest in and use low-cost air quality monitoring for dust pollution in village settlements and crowded roads in the forthcoming season itself, commencing September 2024. It is

submitted that the costs may be recovered from the transporter. It is submitted that the transportation of 'e-auction ore, which is actually never ending process will always be an ongoing phenomenon. Learned Counsel urged that the Board must take a proactive approach while entering a new phase of mining. It is submitted that trials of the new, low-cost electronic sensor-based air quality technologies (also used by Govt. Pollution Control Boards in Rajasthan, Maharashtra and - Karnataka) should be started during the monsoon itself, so that the difference between pure air and polluted air will be obvious, if pollution is generated by this activity. The low-cost systems suggested (or any other sensible equivalent) would enable the person at the monitoring station /P.C.B. officer to immediately shut down the activity or warn the transporter (and connected leaseholder), if the PM standards (100 for PM10 and 60 for PM 2.5) are breached. This according to the learned Counsel would be similar to the real time action that the D.M.G. states it will take if the number of trucks deployed is in violation of the number permitted, or if stipulated speed levels are exceeded. The petitioners have provided details about some of the low cost air quality monitoring device which has been deployed in various cities. Learned Counsel suggested that 'ATMOS' real time Air Quality Monitoring Device, developed by the research team at IIT Kanpur is useful. The features of this device are :

- It enables real time monitoring of PM 1, PM 2.5 and PM 10 levels.

- The average cost per unit is Rs,30,000/-

- It has an inbuilt GPRS module and does not require additional WIFI/network setups.

- Monitoring data is transmitted real time and is accessible on an online dashboard.

- On a full charge, the device can monitor air levels for a period of 8 hours.

43. Pursuant to the orders passed by this Court, we find that the DMG and the GSPCB have suggested measures and put SOPs in place which are mitigating measures. We have no manner of doubt that the GSPCB and DMG will adopt a proactive approach in embracing modern technology which will go a long way in striking a just balance between two competing interests as the time tested principle of striking this balance is primary invocation of mitigating measures amidst such activity. We have no manner of doubt that the suggestions made by the learned Counsel for the petitioners which we find worth considering will be given due weightage. The GSPCB as an expert body should make best possible endeavor to ensure that harmony is upheld and hurdles for the citizens are minimised by resorting to active mitigating measures. The suggestions of the learned Counsel for the petitioners be given serious consideration by

the authorities. It is the primary duty of the expert agencies to ensure a right balance and we expect that a proactive approach be adopted in the best interest of the villagers.

44. The DMG and GSPCB to ensure that the measures aforesaid are strictly monitored and implemented in its true letter and spirit. Any violation be dealt with firmly.

45. We thus find from the materials that the expert bodies like GSPCB and the DMG have issued the SOPs and imposed necessary safeguards in the transportation of the 'e-auction ore'. It is not possible for us to substitute our opinion for that of the expert body like the GSPCB and DMG. The recommendations and decision of the DMG and GSPCB cannot be undermined in a light manner and due deference must be accorded to expert agencies when the decisions do not attract the taint of legal unjustness/infirmity. We, however, feel the need to record that the mitigating measures must be strictly observed by the project proponent/transport operators in letter and spirit during the transportation of the ore. They shall ensure regular monitoring. Any infraction be dealt with seriously. The suggestions made by the petitioners be given due weightage by the GSPCB and DMG. The GSPCB and the DMG should make every possible endeavour to strike a just balance in the conflict of competing interests by resorting to modern techniques amidst the transportation activity.

46. We find it necessary to direct that a proper study be carried out by preparing a report specific to each route permitted by DMG and GSPCB for transportation of ore through the villages on the basis of carrying capacity of each road. The DMG and GSPCB undoubtedly will have to consider the length of the route, number of houses/hamlets, situated on the route with the study of the population enroute, the details of schools or other such activities that may exist along the route apart from other factors while taking a decision on granting transport permission based on the carrying capacity set down for each route. This will accord with the spirit of the OM issued by the Ministry of Environment. The DMG and GSPCB shall, as far as possible, monitor the trucks on each route on Real Time basis, install CCTV cameras connected to DVR devices at Panchayat Ghars and/or public schools and/or the office of the GSPCB and DMG to enable the DMG/GSPCB and/or Panchayat officials or other designated officials to monitor and observe the movement of trucks carrying such ore along the route.

47. The DMG and GSPCB shall as far as possible install pollution monitoring devices of the nature that may upload information/data to the server of the DMG and GSPCB in Real Time to enable the Departments to monitor the air quality along the designated routes in Real Time and to arrest the movement of trucks, if required to bring air pollution to within permissible norms.

48. We reserve the liberty of the petitioners/any of the affected person or in public interest to approach this Court in case of difficulty in the implementation of the aforesaid measures, breach of any conditions or for any other genuine cause concerning the transport activity at any stage when necessary.

49. The PIL Writ Petition is disposed of in the above terms. No order as to costs.

VALMIKI MENEZES, J. **M. S. KARNIK, J.**

Annexure R7-10

Government of Goa
Office of The Dy. Conservator of Forests
Working Plan Division
"Goa Van Bhavan"
Altinho Panaji Goa – 403 001

No: - DCF(WP)/Tech/Digi/Vol-I/75/2022-23/968 Dated: - 23 /01/2023

To,
Vedanta Limited,
Sesa Goa iron ore,
Sesa Ghor, 20 EDC Complex,
Patto, Panaji-Goa.

Sub: - Authentication of distance of wildlife sanctuaries from boundary of Block I- Bicholim Mineral Block of Vedanta Ltd at Bicholim, Goa.
Ref: - Your letter No. Nil dated 17/01/2023.

Sir,

With reference to above cited letter dated on 17/01/2023, it is to clarify that proposed Bicholim Mineral Block-I is not situated within the 10 km radius from the boundary of any of the protected area in the State of Goa. Further, Map showing distance of proposed site from PAs is enclosed for ready reference.

Yours Sincerely,

Encl: As above.

(Naveen Kumar, IFS)
Dy. Conservator of Forests,
Working Plan Division,
Panaji-Goa.

Phone No.: - 0832-2492529 *Fax No.: - 2492529*

TITTLE	MAP SHOWING 10KM RADIUS STUDY AREA OF BLOCK I BICHOLIM MINERAL BLOCK AND DISTANCE OF NEAREST WILDLIFE SANCTUARY FROM MINE LEASE
MINE	BLOCK I BICHOLIM MINERAL BLOCK
SCALE 1 : 150000	

N
W E
S

MAHARASHTRA

KARNATAKA

Block I
Bicholim Mineral Block

14.105 km

10.553 km

20.476 km

SALIM ALI
BIRD
SANCTUARY

MADEI WILDLIFE
SANCTUARY

BONDLA WILDLIFE
SANCTUARY

BHAGVAN MAHAVIR
WILDLIFE SANCTUARY

BHAGVAN MAHAVIR
NATIONAL PARK

BHAGVAN MAHAVIR
WILDLIFE SANCTUARY

NETRAVALI WILDLIFE
SANCTUARY

COTIGAO WILDLIFE
SANCTUARY

24/01/2023
CHIEF FOREST SURVEYOR
WORKING PLAN DIVISION
PANAJI - GOA

24/1/2023
Deputy Conservator of Forests
Working Plan Division
Panaji - Goa

INDEX	
	State Boundary
	Block I Bicholim Mineral Block
	Wildlife Sanctuary Boundary (WLS)

1km 5km 10km
BAR SCALE 1:150000

Press Information Bureau
Government of India
Ministry of Road Transport & Highways

31 MAR 2022 12:59PM by PIB Delhi

GREENFIELD AND BROWNFIELD PROJECTS

The widening/development of existing road is categorized as Brownfield, whereas construction of project on a new alignment is categorized as Greenfield project. The Greenfield project generally passes through new area, wherein the per unit cost of land acquisition is generally less considering less development in these areas. Construction of Greenfield alignment generates new areas for development besides several other advantages.

The project of Amas to Darbhanga, a Greenfield Project, passes through areas near Patna. The details of the project are as under:

Name of project	Length (km)	Status
Amas to Shivrampur	52.002	Approved
Shivrampur to Ramnagar	54.322	Approved
Ramnagar to Kachhi Dargha	13	DPR stage
Kachhi Dargha to Kalyanpur including bridge across Ganga	19.6	Construction stage
Kalyanpur to Balbhadarpur	47.00	Approved
Balbhadarpur to Bela Nawada	42.21	Approved

In addition, Detailed Project Report (DPR) preparation work for greenfield connectivity from Purvanchal Expressway to Patna has also been initiated.

This information was given by Union Minister for Road Transport and Highways, Shri Nitin Gadkari in a written reply in the Lok Sabha.

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MJPS

सत्यमेव जयते

Government of India

Ministry of Environment, Forest and Climate Change

IA Division

(Non-Coal Mining)

AGENDA FOR 14th EAC MEETING OF THE EXPERT APPRAISAL COMMITTEE (NON-COAL MINING SECTOR), SCHEDULED TO BE HELD DURING 3-4 MAY, 2023 THROUGH VIDEO CONFERENCE.

Agenda ID	EC/AGENDA/EAC/777238/4/2023
Agenda Creation Date	20/04/2023
Title of Meeting	AGENDA FOR 14th EAC MEETING OF THE EXPERT APPRAISAL COMMITTEE (NON-COAL MINING SECTOR), SCHEDULED TO BE HELD DURING 3-4 MAY, 2023 THROUGH VIDEO CONFERENCE.
Meeting Mode	Virtual
Meeting Venue	N/A
Meeting Date	**Start Date :** 03/05/2023 **End Date :** 04/05/2023

	Meeting Date	Meeting Mode	Start Time	End Time
Day 1	03/05/2023	Virtual	10:30 AM	05:30 PM
Day 2	04/05/2023	Virtual	10:30 AM	05:30 PM

List of Proposals

Sr. No.	Proposal No.	Proposal Details	Location	Meeting Date	Proponent
1	IA/RJ/MIN/426653/2023	**Project Name**	**State:**	03/05/2023	SANDEEP

		:Revalidation of EC under MoEF&CC Notification S.O 1530(E) dated 06th April, 2018 for Lakheri Limestone Mine (ML Area 1516.88 ha) with production capacity of 1.5 MTPA and waste/ topsoil 11.25 Lakhs CuM per annum (Maximum) with existing Wobbler and screening plant of 400 TPH at villages Gendoli Kala, GendoliKhurdh, Pholai, Gutha, Mahuwa, Dangaheri, Budel, Kankra, Chamavali, Uttarana, Lkaheri, Sakhoda, Nayagaon & Papadi, Tehsil: Indergarh&Kesoraipatan, District: Bundi, Rajasthan of M/s ACC Limited. **Proposal For:** Fresh EC **Activity:** 1(a) Mining of minerals **Sector:** MIN	RAJASTHAN **District:** BUNDI		KUMAR
2	IA/GA/MIN/422323/2023	**Project Name :**Block 1-Bicholim Mineral Block for Iron Ore **Proposal For:** Fresh ToR **Activity:** 1(a) Mining of minerals **Sector:** MIN	**State:** GOA **District:** NORTH GOA	03/05/2023	VEDANTA LIMITED
3	IA/MP/MIN/425852/2023	**Project Name :**Sagmania Limestones Mines(852.5 Ha) **Proposal For:** Fresh ToR **Activity:** 1(a) Mining of minerals **Sector:** MIN	**State:** MADHYA PRADESH **District:** SATNA	03/05/2023	BIRLA CORPORATION LTD.
4	IA/RJ/MIN/424348/2023	**Project Name :**Proposed expansion of Sanu-II Limestone Mining Project (M.L. No. 01/1997, Area 998.4 ha.) with Mine Material handling capacity from existing 2.73 MILLION TPA to 10.23 MILLION TPA which includes ROM SMS grade Limestone resource- 2.73 MILLION TPA, Cement Grade Limestone resource-5 MILLION TPA & recovery of mineral from Handling	**State:** RAJASTHAN **District:** JAISALMER	04/05/2023	RAJASTHAN STATE MINES & MINERALS LIMITED

		of old backfilled limestone size reject dumps (0-30 mm size)-2.5 MILLION TPA along with Crushing (1X300TPH & 1X200 TPH) & Screening plants (4X250 TPH) **Proposal For:** Fresh ToR **Activity:** 1(a) Mining of minerals **Sector:** MIN			
5	IA/RJ/MIN/424123/2023	**Project Name :**Unroi-II SMS Grade Limestone Mines, ML-06/2020, Village- Unroi, Tehsil-Sam, District- Jaisalmer, State- Rajasthan. (ML Area 998 Hectare). **Proposal For:** Fresh ToR **Activity:** 1(a) Mining of minerals **Sector:** MIN	**State:** RAJASTHAN **District:** JAISALMER	04/05/2023	RAJASTHAN STATE MINES & MINERALS LIMITED
6	IA/RJ/MIN/424677/2023	**Project Name :**Unroi-I SMS Grade Limestone Mines, ML-05/2020, LEASE AREA : 998.00 Hectares **Proposal For:** Fresh ToR **Activity:** 1(a) Mining of minerals **Sector:** MIN	**State:** RAJASTHAN **District:** JAISALMER	04/05/2023	RAJASTHAN STATE MINES & MINERALS LIMITED
7	IA/RJ/MIN/424210/2023	**Project Name :**KHUIYALA-I SMS GRADE LIMESTONE MINES (ML-01/2020) TOTAL LEASE AREA 944 Ha. **Proposal For:** Fresh ToR **Activity:** 1(a) Mining of minerals **Sector:** MIN	**State:** RAJASTHAN **District:** JAISALMER	04/05/2023	RAJASTHAN STATE MINES & MINERALS LIMITED

Any Other Item(s)

Sr. No.	Proposal No.	Proposal Details	Location

Expert Appraisal Committee Members Details

Sr. No.	Name	Designation	Email ID
1	Mr Pankaj Verma	Scientist E	pankaj.verma@nic.in
2	Dr Dinesh Misra	IFS (Retired)	dmisra56@gmail.com
3	Sh Niranjan Kumar Vasu	Member (EAC)	vasuifs@gmail.com
4	Dr Asha Rajvanshi	Member (EAC)	asharajvanshi@gmail.com
5	Shri Avijit Gosh	Member (EAC)	avijitmining@gmail.com
6	Shri Bandi Ramchandra Reddy	Member (EAC)	reddyramchandra8858@gmail.com
7	Prof Pramod Kumar	Member (EAC)	nita_pramod@yahoo.com
8	Prof Devesh Walia	Member (EAC)	wadevesh@gmail.com
9	Dr Suresh Tiwari	Member (EAC)	smbtiwari@gmail.com
10	Dr K G Asha Manjari	Member (EAC)	kimberlite2016@gmail.com
11	Prof Dev Dutt Sharma	Member (EAC)	ddshpu@gmail.com
12	Shri Mohammad Niyazi	Member (EAC)	dirsnt.dgms@gmail.com
13	Mr V K Soni Representative of IMD	Member (EAC)	vijay.soni@imd.gov.in
14	Dr Y G Kale Representative of IBM	Member (EAC)	ygkale@ibm.gov.in

Remarks	AGENDA FOR 14th EAC MEETING OF THE EXPERT APPRAISAL COMMITTEE (NON-COAL MINING SECTOR), SCHEDULED TO BE HELD DURING 3-4 MAY, 2023 THROUGH VIDEO CONFERENCE.

(NON-COAL MINING SECTOR)

***

AGENDA FOR 14th EAC MEETING OF THE EXPERT APPRAISAL COMMITTEE (NON-COAL MINING SECTOR), SCHEDULED TO BE HELD DURING 3-4 MAY, 2023 THROUGH VIDEO CONFERENCE.

Instructions: Project Proponents are requested to strictly follow the following instructions:

1. It is requested that the project proponent or his/her authorized representative should participate in EAC meeting through Video Conferencing only (preferably not more than two representatives) who can make a presentation on their behalf on the salient features of the project, the related environmental issues, proposed Environmental Management Plan, commitment made during public hearing, CER, occupational health plan, plantation plan, method of mining, beneficiation activities, transportation plan, R&R issues and also respond to the queries/suggestions of the Committee.
2. NIC, MoEF&CC will moderate the Video Conferencing meeting. The Guidelines related to connecting VC is annexed herewith. PP will be ready before 10 minutes of the slot allowed to them. If any problem faced please contact Mr. Kamal, Moderator, NIC (**Mobile No. 8800225087, email- support-ipb@nic.in**).
3. As there it a time restriction in Video Conferencing, therefore, PP is requested to submit the **requisite documents along with presentation through email to all the Committee Members and Officials of the Ministry by 24.04.2023**. There must be maximum 20 slides for ToR presentation and 30 slides for EC presentation. The Project Proponent is requested to include a separate slide for the matter of court case.
4. The presentation should reflect-
   i. Point wise ToR Compliance;
   ii. Contain information regarding total excavation from mines;
   iii. Method of mining,
   iv. Stage wise mine development preferably at 5-year interval showing the surface features such as habitations, roads, railway line, transmission line, water body, nallah, forest or other eco-sensitive zones, protection against the surface features
   v. Surface features through KML file
   vi. beneficiation, crusher,
   vii. details of mining lease its validity,
   viii. transfer,
   ix. impact of mining activities on air, water, soil, noise, flora & fauna, habitation, socio-economic issues,
   x. public hearing issues,
   xi. involvement of forest land,
   xii. requirement of clearance under Forest Conservation act, 1980,

xiii. Wildlife protection act, 1972 and CRZ Notification, 2011, authenticated map regarding distance from ESZ if any falling within 10 Km of the ML.
xiv. permission for withdrawal of ground water,
xv. intersection of ground water table, permission for surface water / CGWA,
xvi. air quality modelling,
xvii. mitigation measures to all impacts,
xviii. violation if any of any of the statutory requirement with action taken if any, In case of the expansion proposals in the flat of Annexure
xix. undertaking for compliance of various court orders and statutory requirement,
xx. time bound activity wise action plan for plantation, occupation health plan, CER, EMP,
xxi. Court case/litigation, violation if any etc.
xxii. Show the transportation route of minerals on maps during presentation.
xxiii. Certificate of compliance and compliance status in case of expansion proposals
xxiv. Point wise reply to observation made earlier by committee, if any.

5. Presentations for ToR should be brief, precise and supported by Letter of Intent/ mine lease and topo-sheet etc. All important features such as National Parks, Wildlife Sanctuary, Mangroves, Biosphere Reserves/Bio-diversity, Heritage sites, Reserve Forests, Rivers, water Bodies, Highways, Railway line, Habitations, Critically Polluted Areas (CPA), cluster situation etc. should be clearly indicated in an area of 10 km radius of the proposed site.

6. The project proponents applied their on-line application should submit the Form-2, Form-1, Pre-feasibility report, approval from concerned department/states, compliance of existing EC, Environment Impact Assessment (EIA/EMP) Report, public hearing report, approved mining plan/review of mining plan, lease deed /LoI with its validity , queries subsequently raised by the Ministry, if any, and your para-wise comments thereto etc., in accordance with Environment Impact Assessment Notification, 2006 are required to be forwarded to the Chairman/Members of the Expert Appraisal Committee (Non-Coal) including details of the court matters/Orders of the Court pertaining to the project, if any. Accordingly, I request you to forward a copy of each of these documents – Soft Copies to the Chairman/members of the Expert Appraisal Committee, at earliest before the meeting.

7. **All the brown field projects applied for EC, ToR, Amendment in ToR and EC should submit details in Annexure-III with all supporting documents** along with supporting documents which *inter-alia* include past production of mine since its inception, duly authenticated by Department of Mines & Geology, State

Government. PP and Consultant shall examine the proposal in light of S.O. 804(E) dated 14.03.2017 and Common Cause Judgment dated 02.08.2017 and specifically mentioned about the violation if any. Details of demand if any raised by concerned Department of Mining and Geology in pursuant to common cause judgment dated 02.08.2017 and details of payment, if any made to Department of Mines & Geology.

8. Copy of affidavit needs to be submitted by PP in compliance of the Ministry's OM no. 3-50/2017-IA.III (Pt.), dated 30th May, 2018.
9. In accordance with the circular no. J-11011/618/2010-IA. II (I) dated 30.5.2012, in case of expansion project, for which environment clearance was issued earlier, the project proponent shall submit a certified report of the status of compliance of the conditions stipulated in the environment clearance for the on-going / existing operations of the project by the Regional Offices of Ministry of Environment, Forest and Climate Change. The status of compliance of the conditions stipulated in the EC as highlighted in the report(s) will be discussed by the EAC during appraisal of the project. PP and Consultant shall clearly bring out the non-compliance of EC Conditions if any and further course of action for compliance of the same.
10. KML/Shape Files of the mine lease area at the time of presentation before EAC and to present on the details of mine lease online to show the present status of mine lease and also other leases in 10 km radius. PP shall ensure that KML file is correct in all respect and in case mining activities is showing outside the mining lease than a letter from concerned mining department needs to be submitted to certify that the mining activities is within the mining lease area only. The KML/Shape files should be emailed to all EAC Members & Ministry Officials by 24.04.2023.
11. PP needs to submit the documents w.r.t. validity of the mining lease (brown filed projects) and letter of intent (green filed projects) along with supporting documents. PP should submit the details of lease renewal/ transfer/surrender in chronological manner.
12. All Certificates' should be addressed to the Ministry on letter head with letter number & dispatch number.
13. Please indicate the item number of the Agenda while circulating the documents.
14. The Project Proponents shall ensure that the Certificate/NOC uploaded on the website or submitted to Ministry should have of the Name, Designation, Office Contact details and signature of the competent authority from the concern Department. In absence of this information, the certificate will be treated as invalid.
15. The PP shall submit the hard copy of the documents circulated to the EAC members, uploaded online or presented during the meeting to the Ministry as per the travel advisory issued by Govt. Of India.
16. The PP need to ascertain from the consultant that all the documents have been submitted in the Ministry as per the agenda.
17. The Consultant shall include an undertaking in the EIA report that the prescribed TOR have been complied with and that the data

submitted is factually correct and also an undertaking shall be submitted owning the contents (information and data) of the EIA report. In case any document of information found misleading at any stage then EC/TOR/Amendment granted shall be liable for rejection and action may be initiated against consultant for cancellation of accreditation.

18. The Project Proponent during the submission of application or at the stage of TOR should indicate the name of the consultant/ consultancy firm, Serial number they propose to hire for preparing EIA/EMP reports along with their complete details including their accreditation.
19. All correspondence with MoEF&CC including submission of application for TOR/EC, subsequent clarifications, as may be required from time to time, participation in the EAC meeting on behalf of the PPs shall be made by the authorized signatory only who should be a reasonably Senior Officer/Executive duly authorized in writing.
20. PP may kindly intimate the mobile numbers of the representing people in advance for communicating regarding login and logout in VC to the MS in advance.
21. Kindly send a brief write up of project/executive summary of the project (maximum three page, in word format without any table) and the name of the consultant with the Sl. No. In the QCI/NABET list in a week's time by e-mail to the following address: pankaj.verma@nic.in, munna.shah@gov.in, vidyasagar.jha@gov.in

Sd/

(**Pankaj Verma**)
Scientist 'E'

Note: The items listed for environmental clearances will be taken up for appraisal only on fulfilment of relevant instruction given above.

Annexure-I

Basic Information

Important Note: Please send the information by e-mail in word format and a signed & scanned copy to the Member Secretary *prior to the EAC meeting.* Please also provide a copy to the members of the EAC during the EAC meeting.

I. PROJECT DETAILS

1. Name of the project:
2. Name of the Company, Address Tele No. & E-mail Head of organization:
3. If a Joint venture, the names & addresses of the JV partners including their share
4. Latitude and Longitude of the project
5. Whether the project is in the Critically Polluted Area(CPA):
6. Cost of the project
7. Whether new or expansion project. If expansion:

   (i) from …….MT to .....MT
   (ii) What is the % of expansion

8. If for expansion, whether the application is under 7(ii) of the EIA Notification, 2006.
9. No. and Date of the ToR /and revised ToR, if any, letter issued by the MoEF (if this is a case for EC)
10. No. and Date of the EC and the revised EC letter issued by the MoEF (if this is a case for reconsideration. If so, what specific reconsideration(s) being sought by the proponent)
11. If the project was considered in EAC, Pl. give dates of the meeting(s).
12. Type of Mine: (Opencast/Underground/mixed):
13. Capacity of the mine applied for
14. Mine Lease Area
    (i) As per block allotment
    (ii) As per approved mine plan
15. Date of approval of mine plan, mine closure plan, status &date
16. Date of Board's approval:
17. Date of Ground water clearance and surface water approval.
18. Existing Ground water level in(M)
19. Date of mine closure approval
20. Any river/Nallah flowing near or adjacent to the proposed mine. If yes, please give details.

Details of mine lease: -

1. Date of entering into original lease deed. 2. Date of expiry of original lease deed	1. Date of 1st lease renewal 2. Whether renewal or deemed renewal. 3. Date of expiey of 1st lease renewal/deemed renewal	1. Date of 2nd lease Renewal 2. Whether renewal or deemed renewal 3. Date of expiry of 2nd lease renewal/deemed renewal	1. Date of lease renewal 2…… 3…… 3rd

II TECHNICALDETAILS

21. Geological Reserve:

(i) Total geological reserve
(ii) Mineable reserve
(iii) Extractable reserve
(iv) Per cent (%) of extraction
(v) Range of ground water level
(vi) Total estimated water requirement:
(vii) Details of intersecting ground water level

22. Details of Deposits:
(i) Depth of ore body
(ii) Grade of ore
(iii) Stripping ratio

23. Method of mining:
24. Life of mine
25. Whether ambient air quality seasonal data has been monitored. If so, from which season to which season and whether the results are within the prescribed limits.
26. Whether the monitoring report of earlier EC from MoEF Regional Office has been obtained, in case the proposal is for expansion.
27. Details of O.B.
(i) External OB dumps
(ii) No of OB dumps
(iii) Area of each dump
(iv) Height of each dump
(v) Quantity (in MCm) of OB in each dump
(vi) Year of backfilling
(vii) No. of OB dumps reclaimed
(viii) If garland drains and settlement facility for runoff created
(ix) Whether runoff water being utilized

28. Details of Internal Dumps
    (i) Number of internal dumps
    (ii) Area of each dump
    (iii) Height of each dump
    (iv) Quantity of wastes filled(MCm)

29. Utilization potential of wastes
    (i) Within the mines
    (ii) Outside mines
    (iii) Efforts made by proponent

30. Details of final MineVoids
    (i) Area
    (ii) Depth

31. Details ofQuarry:
    (i) Total quarry area:
    (ii) Backfilled quarry area of …..ha shall be reclaimed with plantation
    (iii) A void of ….. ha at a depth of …… m which is proposed to be converted into a waterbody
    (iv) Green belt created in ha.

32. Details of Land usage
    (i) Pre-mining
    (ii) Post-Mining
    (iii) Core area

33. Details of Forest issues
    (i) Total forest area involved (in ha) for mining lease.
    (ii) Total broken forest area.
    (iii) Status of Forest Clearance and extend of forest land diverted in ha.
    (iv) Is there any National Park, eco-sensitive Zones, within 10 km radius? If so, give the details.
    (v) Extent of forest land in the project (including safety zone and all types of forest land) (in ha)
    (vi) Total forest land for which Stage-1 FC is available (give area in ha), provide breakup of this area in following format:

Area(in ha)	Stage-1 FC issued vide letter no. & date	Validity period of earlier FC granted

    (vii) Balance forest land for which Stage-1 FC is not available (give area in ha)
    (viii) Details of wild life issues involved, if any. If so, whether WL management plan has been prepared; pl. indicates the status.

(ix) Whether schedule -I species, if yes conservation plan is approved by CWLW?

34. Costs of the project:

(i) Total capital Cost:
(ii) Cost of Production:
(iii) Sale Price:
(iv) CSR cost:
(v) R&R Cost:
(vi) No of PAFs:
(vii) Cost for implementing EMP:

35. Details of villages/habitation in mine lease area

(i) Inside the lease
(ii) Surrender by lease
(iii) Extent of cropland acquired/ being acquired in ha.

36. Details of transportation of mineral

(i) In pit:
(ii) Surface to siding:
(iii) Siding to loading:
(iv) Quantity being transported by Road/Rail/conveyer/ropeway
(v) Proposed change in transportation means it any, give details

37. Details of reclamation:

a. Afforestation shall be done covering an area of: ……. ha at the end of mining. This will include:
(i) Reclaimed external OB dump (in ha):
(ii) internal dump (in ha),
(iii) Green belt (in ha)
(iv) Density of tree plantation (in no of plants)
(v) Void (in ha) at a depth of (in m)which is proposed to be converted into water body
(vi) Others in ha (such as excavation area along ML boundary, along roads and infrastructure, embankment area and in township located outside the lease etc).
(vii) Agriculture and horticulture
(viii) Fisheries
(ix) ECO Tourist/recreation spot

III. LEGAL ISSUES

38. Any court case pending. If so, please provide a list with details asannexure.
(i) Environment (Protection) Act
(ii) Air(P&CP) Act.

(iii) Water (P&CP) Act.
(iv) MMDR Act
(v) The Factories Act.
(vi) Other land R&R related cases.

39. Any violation cases pending. If so, please provide a list with details as annexure
40. Give details of actual production vis-à-vis sanctioned capacity since the inception of mine in following format or since 1993-94 as applicable:

Year	EC sanctioned capacity (MTPA)	Actual productio n (MTPA)	Excess production beyond the EC sanctioned capacity

IV. PUBLIC HEARING ISSUES

41. Date and Place of public hearing:
42. The designation of officer presided our the PH
43. Issues raised during Public Hearing and assurance given along with the financial provisions and action plan, if any, by the project proponent. (Please attach as an annexure in a tabular form.)
44. Number of representation received in writing from the district and outside of district, please give details

V. Consultant;

45. Name of the EIA consultant who prepared the EIA/EMP report.
46. Whether the consultant has been accredited by the QCI and NABET as per the MoEF OM dated 2nd December,2009.
47. Name of specialists/consultants involved in making EIA report and in collecting data.

VI. Other Information

48. One page summary for TOR and EC separately as applicable.
49. Brief Background of the Project as per table:

1.	Details of PP and Group companies (a)Financial Position (b)Group companies (c)Legal issues (d) Past and current litigations	
2.	Social, economic and environmental aspects of the project in brief.	

Annexure-II

Compliance of MoEFCC's Office Memorandum No. 22-8/2018-IA. III, dated 20th April 2018 for submission of FORM 2 for EC Proposals

Form-2

APPLICATION FOR PRIOR ENVIRONMENTAL CLEARANCE

[Non-coal Mining Projects]

1	**Details of Project**			
	a.	Name of the Project (s)	:	
	b.	Name of the Company / Organization	:	
	c.	Registered Address	:	
	d.	Legal Status of the Company	:	
	e.	Joint Venture (Yes/No)	:	
		If Yes,		
		(i) No. of JV Partners(***Multiple Entries Allowed***)	:	

Name of the JV Partner	Share of the JV Partner	Address of the JV Partner	Email Id of JV Partner	Mobile No. of JV Partner

2	**Address for the correspondence**			
	a	Name of the applicant	:	
	b	Designation (Owner / Partner / CEO)	:	
	c.	Address		
	d	Pin code		
	e	e-mail		
	f.	Telephone No.		
	g.	Fax No.		
3	**Category of the Project/Activity as per Schedule of EIA Notification,2006**			
	a.	Project / Activity [1(a)(i)/1(a)(ii)/1(b)/1(c)/1(d)/1(e)/2(a)/2(b)/3(a)/ 3(b) / 4(a) / 4(b)(i)/ 4(b) (ii) / 4(c) / 4(d) / 4(e) / 4(f) / 5(a) /5(b) /5(c)/5(d)/5(e)/5(f)/5(g)/5(h)/5(i)/5(j)/6(a)/6(b)/ 7(a) / 7(b)/ 7 (c) / 7 (d) / 7 (da) / 7 (e) / 7 (f) / 7 (g) / 7 (h) / 7(i) / 8 (a) / 8 (b)		
	b.	Category (A/B1/B2)	:	
		If B1 or B2		
		Reason for application at Central Level / State level (in case of B2 projects)	:	
		If Others		
	c.	Please Specify	:	

	d.	EAC concerned (for category A Projects only) (Coal Mining / Non-coal Mining / Thermal / River Valley & Hydro / Industry-I / Industry-II / Infrastructure-I / Infrastructure-II / Nuclear &Defence / CRZ	:	
	e.	New/Expansion/Modernization/OneTimeCapacityexpansion (only for Coal Mining) / Expansion under Para 7(ii) / Modernization under Para 7(ii) / Change of Product Mix under Para 7(ii))	:	
4	**Location of the Project**			
	a.	Plot / Survey / Khasra No.	:	
	b.	Village	:	
	c.	Tehsil	:	
	d.	District		
	e.	State		
	f.	Pin Code		
	g.	Bounded Latitudes (North)		
		From	:	
		To	:	
	h.	Bounded Longitudes(East)		
		From	:	
		To	:	
	i.	Survey of India Topo Sheet No.	:	
	j.	Upload Topo Sheet File (*Upload pdf only*)	:	
	k.	Maximum Elevation Above Means Sea Level(AMSL)	:	
	l.	Upload (kml) File (*Upload kml only*)	:	
	m.	Distance of Nearest HFL from the project boundary within the study area	:	
	n.	Seismic Zone (Zone: 1 / 2 / 3 / 4 / 5)	:	
5	**Whether project is executed in multiple States (Yes / No)?**			
	If Yes			
	a.	Number of States in which Project will be Executed (e.g. *1,2,3,4,5,6*)		
	b.	Main State of the Project		
	c.	Other State (*Multiple Entries Allowed*) (If the project to be executed, does not belong to any state, then state category could be selected as 'Other')		

State	District	Tehsil	Village

6	**Details of Terms of Reference (ToR)**			
	a.	Whether ToR is mandatory for submitting application (Yes / No)?		
		If Yes		
	b.	Date of issue of ToR / Standard ToR		

	c.	MoEF&CC / SEIAA File No.		
	d.	Upload ToR letter (PDF only)		
7	**Details of Public Consultation**			
	a.	Whether the Project Exempted from Public Hearing (Yes/No)?		
		If yes,		
		Reason		
	b.	Supporting Document (*upload pdf only*)		
	c.	Whether details of Public Hearing available (Yes/No)?	:	
		If No,		
	d.	Reason thereof		
		Supporting Document (*upload pdf only*)		
		If Yes,		
	e.	Date of Advertisement of Public Hearing		
	f.	Copy of advertisement in English (Upload PDF only)	:	
	g.	Whether Public hearing was presided over by an officer of the rank of Additional District Magistrate or above(Yes/No)?	:	
		If yes		
	h.	Designation of Presiding Officer (District Magistrate / District Collector / Deputy Commissioner / others - please specify)		
	i.	Copy of duly signed Proceedings of Public Hearing in English (*Upload pdfonly*)	:	
	j.	Date of Public Hearing	:	
	k.	Venue of Public Hearing:	:	
		Village		
		Tehsil		
		District		
		State		
	l.	Distance of Public Hearing Venue from the Proposed Project (km)	:	
	m.	No. of people attended	:	
	n.	If the multiple public hearings conducted		
		Pl give the details of each PH as per (e) to (o) above		
8	**Details of Project Configuration / Product (*Multiple Entries Allowed*)**			
	a.	Whether the project is New (Yes/No?)		
		If yes,		
	b.	Project Configuration		

Plant / Equipment / Facility	Configuration	Remarks if any

	c.	Product	:	

Product / Activity (Capacit	Quantity	Unit	Mode of Transport / Transmission of

	y / Area)			Product		

- Unit:- (Tons per Annum(TPA), Mega Watt(MW), Hectares(ha), Kilo Litreper Day(KLD), Tons Crushed per Day(TCD), Cubic Meter per Day, Kilometers(Km), Million Liters per Day(MLD),Others)
- Mode of Transport/Transmission of Product (Road, Rail, Conveyor Belt,Pipe Conveyor, Arial Ropeway, combination of two or three modes, Others)

9	**If Expansion / Modernisation / One Time Capacity expansion (only for Coal Mining) / Expansion under Clause 7(ii) / Modernisation under Clause 7(ii) / Change of Product Mix under Clause 7(ii)))**				
	a.	Details of environmental clearance granted earlier			
		(i)	Date of issue of environmental clearance	:	
		(ii)	MoEFCC / SEIAA File Number		
		(iii)	Upload EC Letter		
	b.	Details ofcertifiedreportoncomplianceofearlierenvironmental clearance conditions			
		(i)	Details of Regional OfficeofMoEFCC / Zonal Office of CPCB / SPCB / UTPCC from which certified reporton compliance of earlier environmental clearance conditions obtained	:	
		(ii)	Letter No	:	
		(iii)	Status of Compliance	:	
		(iv)	Certified reporton compliance of earlier environmental clearance conditions (Including Monitoring Report) (*Upload pdf only*)	:	
		(v)	Date of site visit	:	
	c.	**Details of Consent to Operate**			
		(i)	Whether Consent to operate obtained (Yes/No)?		
			If yes,		
		(ii)	Upload Copies of all Consent to operate obtained since inception (*Upload pdf only*)		
		(iii)	Date of issue		
		(iv)	Valid up to		
		(v)	File No.		
		(vi)	Application No.		
		(vii)	Upload Copy of Consent to operate valid as on date (*Upload pdf only*)		
	d.	Details of Capacity Expansion (*Multiple Entries Allowed*)			

Product/Activity(Capacity/Area)	Quantity From	Quantity To	Unit	Mode of Transport/Transmission of Product

- Unit:- (Tons per Annum(TPA), Mega Watt(MW), Hectares(ha), KiloLitre per Day(KLD), Tons Crushed per Day(TCD), Cubic Meter per Day, Kilometers(Km), Million Liters per Day(MLD),Others)
- Mode of Transport/Transmission of Product (Road, Rail, Conveyor Belt, Pipe Conveyor, Arial Ropeway,combination of two or threemodes, Others)

e. Details of Configuration (*Multiple Entries Allowed*)

Plant / Equipment/Facility	Existing Configuration	Proposed Configuration	Final configuration After expansion	Remarks if any

10	**Project Cost**			
	a.	Total Cost of the Project at current price level (in Lakhs)	:	
	b.	Funds Allocated for Environment Management (Capital) (in Lakhs)	:	
	c.	Funds Allocated Towards ESC (Entrepreneur Social Responsibility) (in Lakhs)	:	
	d.	Funds Allocated for Environment Management Plan (EMP) (Recurring per Annum) (in Lakhs)	:	
11	**Whether project attracts the General Condition specified in the Schedule of EIA Notification (Yes/No)? [provide name of WL/CPA/ESA/Inter-state boundary / International boundary and distance from the project**		:	
		If Yes		
	a.	Protected Area Notified Under the Wild Life(Protection) Act,1972	:	
	b.	Critically Polluted Areas as identified by the Central Pollution Control Board from Time to Time	:	
	c.	Notified Eco-Sensitive Areas	:	
	d.	Inter-State Boundaries and International Boundaries	:	
12	**Whether projects attract the Specific Condition specified in the**		:	

	Schedule of EIA Notification (Yes/No)?			
	If Yes			
	a.	If any Industrial Estate/Complex / Export processing Zones /Special Economic Zones/Biotech Parks / Leather Complex with homogeneous type of industries such as Items 4(d), 4(f), 5(e), 5(f), or those Industrial estates with pre-defined set of activities (not necessarily homogeneous, obtains prior environmental clearance, individual industries including proposed industrial housing within such estates /complexes will not be required to take prior environmental clearance, so long as the Terms and Conditions for the industrial estate/complex are complied with (Such estates/complexes must have a clearly identified management with the legal responsibility of ensuring adherence to the Terms and Conditions of prior environmental clearance, who may be held responsible for violation of the same throughout the life of the complex/estate		
13	**Raw Material / Fuel Requirement (*Multiple Entries Allowed*)**			
	a.	Details of Raw Material / Fuel Requirement		

Raw Material / Fuel	Quantity per Annum	Unit	Source(in case of Import, please specify country and Name of the port from which Raw Material / Fuel is received)	Mode of Transport	Distance of Source from Project Site (in Kilo meters) (In case of import, distance from the port from which the raw material / fuel is received	Type of Linkage (Linkage / Fuel Supply Agreement / e-auction / MoU / LOA / Captive / Open market / Others)

	In case of expansion proposals, total requirement of raw material / fuel shall be given - Unit:- (Tons per Annum(TPA), Mega Watt(MW), Hectares(ha), Kilo Litre per Day(KLD), Tons Crushed per Day(TCD), Cubic Meter per Day, Kilometers(Km), Million Liters per Day(MLD),Others) - Mode of Transport/Transmission of Product (Road, Rail, Conveyor Belt,Pipe Conveyor, Arial Ropeway,combination of two or three modes, Others)			
	b.	Upload copy of Linkage / Fuel Supply Agreement / e-auction / Memorandum of Understanding / Letter of Allocation / Captive source / others.	:	
14	**Baseline Data (Air / Water / Noise / Soil / Ground water table/ Others)**			
	a.	Period of Base Line Data Collection		
		From (DD/MM/YYYY)	:	
		To (DD/MM/YYYY)	:	
	b.	Season (Summer / Pre-monsoon / Post-monsoon / Winter)	:	
	c.	No. of Ambient Air Quality (AAQ) Monitoring Locations	:	
	d.	Details of AAQ Monitoring (*Multiple Entries Allowed*)		

Criteria Pollutants	Unit	Maximum Value	Minimum Value	98 Percentile Value	Prescribed Standard

- Criteria Pollutants: - (PM10, PM2.5, SO2,NOx, Others parameters specific to sector)
- Unit: - (Micro Gram per Meter Cube,Nano Gram per Meter Cube,Mili Gramper Meter Cube, NA)

	e.	No. of Ground Water Monitoring Locations (*Multiple Entries Allowed*)	:	
	f.	Details of Ground Water Monitoring		

Criteria Pollutants	Unit	Maximum Value	Minimum Value	98 Percentile Value	Prescribed Standard

	Criteria Pollutants: - (pH, TSS, TDS, Total Hardness, Chlorides, Fluoride, Heavy Metals, other parameters specific to the sector) - Unit :- (mg/l,NA)			
	g.	No. of Surface Water Monitoring Locations	:	
	h.	Details of Ground Water Monitoring (*Multiple Entries Allowed*)		

Criteria Pollutants	Unit	Maximum Value	Minimum Value	98 Percentile Value	Prescribed Standard

- Parameter :- (pH, DO, BOD, COD, Others parameters specific to thesector)
- Unit :- (mg/l,NA)

	i.	No. of Ambient Noise Monitoring Locations	:	
	j.	Details of Noise Monitoring (*Multiple Entries Allowed*)		

Parameter	Unit	Maximum Value	Minimum Value	98 Percentile Value	Prescribed Standard

- Parameter:-(Leq(Day),Leq(Night))
- Unit :- (A-weighteddecibels(dB(A))

	k.	No. of Soil Monitoring Locations (*Multiple Entries Allowed*)	:	

Parameter	Unit	Maximum Value	Minimum Value	98 Percentile Value

- Parameter :- (pH, N(Nitrogen), P(Phosphorus), K(Potassium),Electric Conductivity)
- Unit :- (Millisiemens per Centimeter, Milligram per Litre, Percent, Centimeter per Second,Milliequivalents per 100 Gram, Milligram per Kilogram,Parts per Million, Kilogram per hectare, Others)

	l	**Ground Water Table**		
	i	Range of Water Table Pre-Monsoon Season (Meters Below Ground Level (m bgl)):		
		From	:	
		To	:	

	ii	Range of Water Table Post-Monsoon Season (Meters Below Ground Level (m bgl)):		
		From	:	
		To	:	
	iii	Whether Ground Water Intersection will be there (Yes / No)?	:	
		If Yes,		
		(i) Upload Copy of Central Ground Water Authority Letter (*Upload pdf only*)	:	
		(ii) Letter No.	:	
		(iii) Date of issue	:	
15	**Details of Water Requirement (During Operation)**(*Multiple Entries Allowed*)			
	a.	Details		

Source	Quantity in KLD	Method of water withdrawal	Distance from Source	Mode of Transport

- Source: Surface /Ground Water /Sea/Others
- Modeof Transportation**:** Pipeline /Canal/Others
- Method of water withdrawal: Barrage / Weir / Intake well / Jackwell / Tube well / Open well /Others

	b.	Upload Copy of Permission from Competent Authority (*Upload pdf only*)		
	c.	Letter No.	:	
	d.	Date of issue	:	
	e.	Permitted quantity	:	
	f.	Whether Desalination is proposed (Yes/ No)	:	
		If Yes,		
		(i) Desalination capacity (KLD)	:	
		(ii) Quality of Brine (KLD)	:	
		(iii) Mode of Disposal of brine	:	
16	**Waste Water Management (During Operation)**			

Type / Source	Quantity of Waste Water Generated (Kilo Litre per Day)	Treatment Capacity (Kilo Litre per Day)	Treatment Method	Mode of Disposal	Quantity of Treated Water Used in Recycling / Reuse (Kilo Litre perDay)	Quantity of Discharged W ter (Kilo Litre per Day)

	a.	Total Waste Water Generation	:	
	b.	Total Discharged Water	:	
	c.	Total Reused Water	:	

17 **Solid Waste Generation Management**(*Multiple Entries Allowed*)

Item	Quantity per Annum	Unit	Distance from Site	Mode of Transport	Mode of Disposal

- Item:- (Industrialwaste,MunicipalSolidwaste,Flyash,Bottom Ash, Hazardous Waste (as per Hazardous and Other Waste Management Rules 2016),E Waste,Bio-Medical waste,Construction&Demolitionwaste,PlasticWaste,Others)
- Unit:-(Tons,Kiloliter)
- Mode of Disposal**:-** **(**Treatment, Storage and Disposal Facility(TSDF),AuthorizedRe-cyclers,Landfills,SanitaryLandfills,Others**)**

18 **Air Quality Impact Prediction** (*Multiple Entries Allowed*)

Criteria Pollutants	Unit	Baseline Concentration	Minimum Value	Incremental Concentration	Total GLC	Prescribed Standard

- Parameter:- (PM10, PM, SO2,NOx, Others parameters specific to thesector)
- Unit :- (Microgram per Meter Cube,NA)

19 **Power Requirement**

	a.	Quantity (Kilo Volt Amps (KVA))	:	
	b.	Source	:	
	c.	Upload Copy of Agreement (*Upload pdf only*)	:	
	d.	Standby Arrangement (Details of DG Sets)	:	
	e.	Stack Height (in m)	:	

20 **Land Ownership Pattern (Prior to the project proposal) in Ha**

	a.	Forest land	:	
	b.	Private Land	:	
	c.	Government Land	:	
	d.	Revenue Land	:	

	e.	Other Land	:	
		Total land		
21	**Present Land Use breakup in Ha**			
	a.	Agriculture Area	:	
	b.	Waste/Barren Area	:	
	c.	Grazing/ Community Area	:	
	d.	Surface Water bodies	:	
	e.	Settlements		
	f.	Industrial		
	g.	Forest	:	
	h.	Mangroves		
	i.	Marine area		
	j.	Others (Specify)	:	
		Total	:	
22	**Land requirement for various activities (Multiple entries allowed) in Ha**		:	

Description of Activity / Facility / Plant / Others	Land requirement	Remarks
Green belt		
Total		

- Activity / Facility / Plant / Others include: Main Plant, Township, Greenbelt, Ash pond, Quarry area, OB dump Area, Safety zone, Tailing pond, Landfill, Water reservoir, De-salination plant, Area for solid waste management,Built-up area, others

23	**Ecological and Environmental Sensitivity (Within 10 Km):-<u>WLS-Wild LifeSpecies; NPA-Notified Protected Area; ESAs-Eco Sensitive Areas;ESZs- Eco Sensitive Zones)</u>**			
	a.	Details of Ecological Sensitivity		

Details of Ecological Sensitivity	Name	Distance from the Project (Km)	Remarks

- Details of Ecological Sensitivity**: - (**Critically Polluted Area, WLS,NPA, ESAs, ESZs, Corridors, Wildlife Corridors**)**

	b.	Whether NBWL recommendation is required (Yes/No)?		
		If yes		
		Upload NBWL recommendation in PDF		
	c.	Details of Environmental Sensitivity		

Details of Environmental Sensitivity	Name	Distance from the Project (Km)	Remarks

- Details ofEnvironmentalSensitivity**:-(**Forest, ArchaeologicalSites,Defence Installations, Others**)**

	d.	Whether NoC / Permission from the competent authority is required (Yes/No)?		
		If yes		
		Upload NoC / Permission from the competent authority in PDF		
24	**Forest Land**			
	1	Whether any Forest Land involved(Yes/No)?		
		If Yes		
	a.	Forests Clearance Status (In-Principle(Stage-I) Approval Obtained / Final (Stage-II) Approval Obtained / Forest Clearance Under Process(Stage-I) / Forest Clearance Under Process(Stage-II) / Application for Forest Clearance yet to be Submitted)	:	
		If In-Principle (Stage-I) Approval Obtained,		
		(i) MoEFCC file number	:	
		(ii) Date of InPrinciple (Stage-I) approval	:	
		(iii) Area diverted	:	
		(iv) Upload FC Letter (Upload pdf only and attach it as Annexure-FC letter)	:	
		If Final (Stage-II) Approval Obtained,		
		(i) MoEFCC file number	:	
		(ii) Date of Final Approval	:	
		(iii) Date of In-Principle Approval	:	
		(iv) Area diverted	:	
		(v) Upload FC Letter*(Upload pdf only and attach it as Annexure-FC letter)*		
		If Forest Clearance under process (Stage-I),		
		(i) MoEFCC file number	:	
		(ii) Area applied	:	
		If Forest Clearance under process (Stage-II),		

		(i) MoEFCC file number	:	
		(ii) Area applied	:	
	b.	Legal Status of Forest Land (Reserved, Protected, Private, Village, Others)		
		If Others,		
		Please Specify Others	:	
25	**Tree Cutting, if any**			
	a.	No. of Trees Cut for the Project (if Forestland not involved)	:	
	b.	Details of Tree Cutting and Planting of Trees (*Upload pdf Only*)	:	
26	**Land Acquisition Status**			
	a.	Acquired Land		
	b.	Land yet to be acquired		
	c.	Status of Land acquisition if not acquired		
27	**Rehabilitation and Resettlement (R&R)**			
	a.	No. of Villages		
	b.	No. of Households		
	c.	No. of PDFs (Project Displaced Families)		
	d.	No. of PAFs (Project Affected Families)		
	e.	Funds Allocated for R&R		
	f.	Status of R&R (Completed / In-progress / Yet to start)		
28	**Whether there is Presence of Schedule-I Species (Yes/No)?**		:	
		If yes,		
	a.	Details of Schedule-I Species	:	
	b.	Whether conservation plan for Schedule-I Species has been prepared (Yes/ No)?	:	
		If Yes,		
		(i) Upload conservation plan (Upload onlyPDF)		
		(ii) Fund Provisionmade		
		(iii) Period ofImplementation		
	c.	Whether conservation plan for Schedule-I Species has been approved by competent authority (Yes/ No)?		
		(i) Upload copy of approval (Upload PDFOnly)	:	
		(ii) LetterNo.	:	
		(iii) Date ofissue	:	
		(iv) Recommendations ifany	:	
29	**Whether there is Presence of Water Bodies in Core Area(Yes/No)?**		:	
		If yes,		
	a.	Details of Water Bodies in Core Area	:	
	b.	Whether there is Diversion required (Yes/No)?		
		If yes,		
	c.	Details of diversion required		

	d.	Details of study conducted		
	e.	Whether permission has been obtained from competent authority (Yes/No)?		
		(i) Upload copy of permission (Upload PDF Only)		
		(ii) Letter No.		
		(iii) Date of issue		
		(iv) Recommendations if any		
30	**Whether there is Presence of Water Bodies in Buffer Area(Yes/No)?**		:	
		If Yes		
	a.	Details of Water Bodies in Buffer Area	:	
	b.	Direction of Water Bodies in Buffer Area (North / South / East / West / North East / North West / South East / South West)	:	
	c.	Distance of Water Bodies in Buffer Area (kilo meters)		
31	**Manpower Requirement**			
	a.	Permanent employment during construction	:	
	b.	Permanent employment during operation	:	
	c.	Temporary employment during construction	:	
	d.	Temporary employment during operation	:	
	e.	No. of working days	:	
	f.	Total manpower	:	
32	**Green Belt in Ha**			
	a.	In case of new projects	:	
	i.	Total Area of Green Belt		
	ii.	Percentage of Total Project Area	:	
	iii.	No. of Plants to be Planted	:	
	iv.	Funds Allocated for Plantation	:	
	v	Upload Green Belt Plan (Upload PDF Only)		
	b.	Incase of expansion / modernization / change in product mix etc.		

	i.	Description	Existing	Proposed	Total
		Total Area of Green Belt			
		Percentage of Total Project Area			
		No. of Plants			
		Funds Allocated			

	ii.	Upload Green Belt Plan (Upload PDF Only)		
33	**Project Benefit (*Multiple entry allowed*)**			

Type of Project Benefits	Details of Project Benefit

(Project benefits shall include environmental, social and others)

34	**Whether the Project / Activity attracts the provisions of CRZ (Yes/No)?**					
	If yes,					
	1	**Project Details**				
		a.	CRZ Classification: (CRZ I (A), CRZ I(B), CRZ II, CRZ III, CRZ IV (A), CRZ IV(B))			
		b.	Location type: (Non-Eroding Coast, Low and Medium Eroding Coast, High Eroding Coast)			
		c.	Details of Mangroves Land Involved, if Any			
		d.	Area of Mangroves Land (hectare)			
		e.	EIA (Terrestrial) Studies: (Carried Out, Not Carried Out)			
			If Carried Out,			
			1)	Summary Details of EIA (Terrestrial) Studies		
			2)	Upload Recommendation made in EIAs (Upload pdf only)		
			3)	Period of Study from (EIA Terrestrial)		
			4)	Period of Study to (EIA Terrestrial)		
			If Not Carried out			
				Give Reason		
		f.	EIA (Marine) Studies: (Carried Out, Not Carried Out)			
			If carried out			
			1)	Summary Details of EIA (Marine) Studies		
			2)	Upload Recommendation made in EIAs		
			3)	Period of Study from (EIA Marine)		
			4)	Period of Study to (EIA Marine)		
			If Not Carried out,			
			Give Reason			
		g.	Disaster Management Plan/National Oil Spill Disaster Contingency Plan (if Applicable)			
	2.	**<u>Description of the Project Under Consideration</u>**				
		a.	Type of Project: (Resort/Buildings/civic amenities, Coastal Roads/Roads on Stilt, Pipelines from Thermal power Blow Down, Marine Disposal of Treated Effluent, Facility for Storage of Goods/Chemicals, Offshore structures, Desalination Plant, Mining of Rare Earth/Atomic Minerals, Sewage Treatment Plants, Lighthouse, Wind Mills, Others)			
			If Resort/Buildings/civic amenities,			
			1)	Agency Name for Preparing CRZ Maps		
			2)	Total Area/Built-up Area (hectare)		
			3)	Height of Structure		
			4)	FSI Ratio		

			5)	The governing Town Planning Rules/Regulations		
			6)	Details of Provision of Car Parking Area		
			If Coastal Roads/Roads on stilt,			
			1)	Agency Name for Preparing CRZ Maps		
			2)	Area of Land Reclamation		
			3)	Estimated Quantity of Muck/Earth for Reclamation		
			4)	Carrying Capacity of Traffic		
			If Pipelines from Thermal Power Blow Down,			
			1)	Agency Name for Preparing CRZ Maps		
			2)	Length of Pipeline		
			3)	Length Traversing CRZ Area		
			4)	Depth of Excavation		
			5)	Width of Excavation		
			6)	Length of Pipeline from Seashore to Deep Sea		
			7)	Depth of Outfall Point from Surface of Sea Water		
			8)	Temperature of effluent above Ambient at Disposal Point		
			If Marine Disposal of Treated Effluent,			
			1)	Agency Name for Preparing CRZ Maps		
			2)	Location of Intake/Outfall		
			3)	Depth of Outfall Point		
			4)	Length of Pipeline		
			5)	Length Traversing CRZ Area		
			6)	Depth of Excavation		
			7)	Width of Excavation		
			8)	Length of Pipeline from Seashore to Deep Sea/Creek		
			9)	Depth of Outfall Point from Surface of Sea Water		
			10)	Depth of Water at Disposal Point		
			11)	Type of Disposal		
			If Facility for Storage of Goods/Chemicals,			
			1)	Agency Name for Preparing CRZ Maps		
			2)	Name and Type of Chemical		
			3)	End use of the Chemical		
			4)	No. of Tanks for Storage		
			5)	Capacity of tanks		
			If offshore structures,			
			1)	Agency Name for Preparing CRZ Maps		
			2)	Exploration or Development		
			3)	Depth of Sea Bed		
			4)	No. of Rigs/Platform		

			5)	Details of Group Gathering Stations		
			If Desalination Plant,			
			1)	Agency Name for Preparing CRZ Maps		
			2)	Capacity of Desalination		
			3)	Total Brine Generation		
			4)	Temperature of Effluent above Ambient at Disposal Point		
			5)	Ambient Salinity		
			6)	Disposal Point		
			If Mining of Rare Earth/Atomic Minerals,			
			1)	Agency Name for Preparing CRZ Maps		
			2)	Capacity of Mining		
			3)	Volume/Area to be mined		
			4)	Type of Mineral to be Extracted		
			5)	End use of the Mineral		
			If Sewage Treatment Plants,			
			1)	Agency Name for Preparing CRZ Maps		
			2)	Capacity		
			3)	Total Area of Construction		
			4)	Compliance of effluent parameters as laid down by CPCB/SPCB/other authorized agency		
			5)	Whether discharge is in sea water/creek? If yes,		
				Distance of Marine Outfall Point from Shore/from the tidal river bank		
				Depth of Outfall Point from Sea Water Surface		
				Depth of Sea at Outfall Point		
			If Lighthouse,			
			1)	Agency Name for Preparing CRZ Maps		
			2)	Total Area of Construction		
			3)	Height of the Structure		
			If Wind Mills,			
			1)	Agency Name for Preparing CRZ Maps		
			2)	Capacity (MW)		
			3)	Transmission Lines: (Overhead, Underground)		
			4)	Diameter of Windmill		
			5)	Length of Blade		
			6)	Speed of Rotation		
			7)	Height of the Structure		
			If Others,			
			1)	Agency Name for Preparing CRZ Maps		
			2)	Please Specify with salient features		

			3)	Upload relevant Document (*Upload pdf only*)		
	3.	**Distance of Project (In Meters) from LTL/HTL to be Stated**				
		a.	Clause of CRZ Notification Under which the Project is a Permissible/Regulated Activity			
		b.	Whether CRZ Map Indicating HTL, LTL Demarcation in 1:4000 Scales Prepared? (Yes/No)			
			If Yes,			
			1)	Distance of Project (in meters) from HTL to be Stated		
			2)	Upload Maps(*kml File*)		
			3)	Distance of Project(in meters) from LTL to be Stated		
			4)	Upload Maps (*kml File*)		
		c.	Whether Project Layout Superimposed on CRZ Map 1:4000 Scales?: (Yes/No)			
			If Yes,			
			1)	Upload Maps (*kml File*)		
		d.	Whether CRZ Map 1:25000 Covering 7 km Radius Around Project Site Prepared? (Yes/No)			
			If Yes,			
			1)	Upload Maps (*kml File*)		
		e.	Whether CRZ Map Indicating CRZ-I,II,III and IV Including Other Notified ESAs Prepared?: (Yes/No)			
			If Yes,			
			1)	Upload Maps (*kml File*)		
		f.	NOC from State Pollution Control Boards Obtained: (Yes/No)			
			If Yes			
			1)	Upload Copy of NOC (*Upload pdf only*)		
		g.	Details of Rain Water Harvesting System			
	4.	**Recommendation of State Coastal Zone Management Authority**				
		a.	Upload Copy of CZMA (*Upload pdf Only*)			
		b.	State the Conditions Imposed			
		c.	Social and Environmental Issues and Mitigations Measures Suggested Including but not Limited to R&R, Water, Air, Hazardous Wastes, Ecological aspects, etc. (Brief Details to be Provided)			
35	**Sector Specific Details**					
I	**Whetherthepproposalisminingofminerals(coal/non-coal) project (Yes/No)?**					
		If yes,				
	1	No. of Mineral to be Mined (Multiple Entries Allowed)			:	

			Minerals To be Mined	Major or Minor Mineral		
	2	Mine Capacity in ROM (Run of Mine)				
	3	Upload 500 meters Cluster Certificate from State Mines and Geology in case of minor minerals (Upload pdf Only)				
	4	**Mining Plan**				
		a.	Approval Letter No.			
		b.	Date of Approval			
		c.	Upload Approved Letter (*Upload pdf only*)			
		d.	Approved by State Mines & Geology Department / Indian Bureau of Mines / Ministry of Coal /Ministry of Mines /State Government /Atomic Mineral Directorate / Others)			
		e.	If Others,			
			Please specify			
		f.	Approved Mining Lease Area			
		g.	Approved Capacity			
	5	**Technical Details**				
		a.	Total Geological Reserves (Million Ton)			
		b.	Mineable Reserves (Million Ton)			
		c.	Extractable Reserves(Million Ton)			
		d.	Percent of Extraction(%)			
		e.	Grade of Coal /Ore /Mineral			
		f.	Stripping Ratio			
		g.	Category of Gaseousness (Only for Coal Mining, Others may write Not applicable)			
		h.	Average Gradient(Degree)			
		i.	Maximum Thickness of Seams(meters) (Only for Coal Mining, Others may write Not applicable)			
		j.	Mining Method (Opencast / Underground /Mixed(Opencast + Underground) /Adit			
		k.	Life of Mine (Years)			
	6	**Details of beneficiation (including crushing / screening/others)**				
		a.	Whether it is proposed to install crusher within the mining lease area (Yes/No)?			
			If yes,			
		b.	No. of crushers			
		c.	Details of crusher (Multiple entries allowed)			
			Crusher ID	Capacity (in TPH)	Remarks	

		d.	Whether it is proposed to install beneficiation plant / Coal washery within the mining lease area (Yes/No)?				
			If yes,				
		e.	Beneficiation / washing Technology				
		f.	Capacity				
	7	**Details of Seams if applicable**					
		a.	No. of seams				
		b.	Thickness of seams to be worked on				
		c.	Maximum Thickness of Seams(meters) (if not Applicable, may Write NA)				
	8	**Details of Mining Lease**					
		a.	Details of Mining Lease				
		b.	Upload Letter of Intent (Upload pdf only)				
		c.	Date of Execution of Mining Lease with Reference Number				
		d.	Validity of Mining Lease				
		e.	Upload Copy of Executed Lease deed valid as on Date (Upload pdf only)				
		f.	Earlier Renewals (Multiple Entries Allowed)				
			Uploaded Copy of Earlier Lease	Date of Renewal			
	9	**OB (Over Burden) Management (Only if Mining Method: Opencast)**					
		a.	**Details of External Dumps**				
			i) No. of OB Dumps				
			ii) Total Area (in Hectare)				
			iii) Height (in meter)				
			iv) Quantity (in Million Cubic meter)				
			v) No. of year back fill up				
		b.	**Details of Internal Dump**				
			i) No. of Internal Dumps				
			ii) Total Area (in Hectare)				
			iii) Height (in meter)				
			iv) Quantity (in Million Cubic meter)				
	10	**Details of Topsoil Management**					
		a.	Quantity of Topsoil excavated during the entire life of the mine (in Million Cubic meter)				
		b.	Quantity of Topsoil proposed for utilization for reclamation				

			during the entire life of the mine (in Million Cubic meter)		
		c.	Quantity of Topsoil proposed for utilization for other activities during the entire life of the mine (in Million Cubic meter)		
	11	**Detail of Final Mine Void(Only if Mining Method: Opencast)**			
		a.	Area (in Hectare)		
		b.	Depth (in meter)		
		c.	Volume (in Million Cubic meter)		
	12	**Details of Quarry(Only if Mining Method: Opencast)**			
		a.	Final Void of (hectare)		
		b.	At a Depth of (meter which is proposed to be converted into a Water Body.)		
		c.	Total Quarry Area (ha)		
	13	**Details of Transportation**			
		a.	In Pit/Underground to Surface		
		b.	Surface to Siding/Loading		
		c.	Transportation / Conveyor Details		
	14	**Details of Land Usage (Pre-Mining)**			

Land Use	Within ML Area (Hectare)	Outside ML Area (Hectare)	Total
Agriculture Land			
Forest Land			
Waste Land			
Grazing Land			
Surface Water Bodies			
Settlements			
Others(Specify)			

	15	**Details of Transportation**			
		a.	In Pit/Underground to Surface		
		b.	Surface to Siding/Loading		
		c.	Transportation / Conveyor Details		
	16	**Details of Land Usage (Pre-Mining)**			

Land Use	Within ML Area (Hectare)	Outside ML Area (Hectare)	Total
Agriculture Land			
Forest Land			
Waste Land			

		Grazing Land					
		Surface Water Bodies					
		Settlements					
		Others(Specify)					
		Others					
	17	**Details of Land Usage (Post-Mining)**					
		Land Use	Plantation	Water Body	Public Use	Others	
		Excavation / quarry					
		Top Soil Storage					
		External OB dumps					
		Internal OB dumps					
		Roads					
		Built Up Area (Colony/Office)					
		Green Belt					
		Virgin Area					
		Other					
		Total					
	18	**Details ofReclamation(Only if Mining Method: Opencast)Total Afforestation Plan shall be Implemented Covering of Mining. This will include:**					
		a.	External OB Dump(in hectare)				
		b.	Internal Dump(in hectare)				
		c.	Quarry(in hectare)				
		d.	Safety Zone(in hectare)			:	
		e.	Final Void of (hectare)			:	
		f.	At a Depth of (*meter which is proposed to be converted into a Water Body.*)			:	
		g.	Density of Tree Plantation per ha (in no.)			:	
		h.	Others in ha (such as Excavation Area along ML Boundary, along Roads and Infrastructure, Embankment Area and in Township Located outside the Lease etc.)				
		i.	Total afforestation plant (in hectare)				

	19	**Status of Progressive Mining Closure Plan (For Expansion Projects only)**			
		a.	Implementation of Various Activities as per Approved Progressive Mine Closure Plan (in Bar Chart) (pdf) (*Upload pdf only*)		
		b.	Any Deviation from the Approved Progressive Mine Closure Plan		
		c.	Total Area Excavated(in hectare)		
		d.	Total Area Backfilled after Excavation(in hectare)		
		e.	Total Area Reclaimed (in hectare)		
	20	**Actual Coal/Ore Production vis-à-vis sanctioned capacity Since inception (*Multiple Entries Allowed*)**			

Financial Year	Sanctioned Capacity as per EC (MTPA)	Sanctioned capacity as per CTO	Sanctioned capacity as per approved Mining Plan	Actual Production	Excess Productuion Beyond the EC/CTO/Mining Plan Sanctioned Capacity (MTPA)

36	**Details of Court Cases if any**			
	a.	Whether there is any Court Cases pending against the project and/or land in which the project is proposed to be set up (Yes/No)?		
		If Yes,		
	b.	Name of the Court (Districts *Court / High Court / NGT / Tribunals /* *Supreme Court of India*)		
		If name of Court: (Districts Court, High Court, NGT, Tribunals)		
	c.	Name of the Sub-court		
	d.	Case No.		
	e.	Orders/Directions of the court,if any and its relevance with the proposed project		
	f.	Case Details		
	g.	Upload Court Order if any (*Upload pdf Only*)		
37	**Details of direction issuedunder Environment (Protection) Act / Air (Prevention & Control of Pollution)) Act / Water (Prevention & Control of Pollution) Act**			

	a.	Whether any direction issued under Environment (Protection) Act/Air (Prevention & Control of Pollution)) Act/Water (Prevention& Control of Pollution) Act(Yes/No)?		
		If yes,		
	b.	Details of directions issued under Environment (Protection) Act/Air (Prevention & Control of Pollution)) Act/Water (Prevention & Control of Pollution) Act		
	c.	Upload copy of directions issued under Environment (Protection) Act/Air (Prevention & Control of Pollution)) Act/Water (Prevention& Control of Pollution) Act		
	d.	Compliance status of the directions		
38	**Details of EIA Consultant**			
	a.	Have you hired Consultant for preparing document(Yes/No)?	:	
		If No,		
		(i) Reason for not engaging the Consultant	:	
		If Yes,		
		(i) Accreditation No.	:	
		(ii) Name of the EIA Consultant	:	
		(iii) Address		
		(iv) Mobile No.	:	
		(v) Landline No.	:	
		(vi) E-mail Id	:	
		(vii) Category of Accreditation (Eligible for Category A / Eligible for Category B)	:	
		(viii) Sector of Accreditation	:	
		(ix) Validity of Accreditation	:	
		(x) Upload Certificate of Accreditation certified by QCI/NABET (*Upload pdf Only*)	:	
39	**Documents to be attached**			
I	***If Project Type is New / Expansion / Modernization / one-time capacity expansion for coal mining:***			
	a.	Upload Copy of EIA/EMP Report		
	b.	Upload Copy of Risk Assessment Report		
	c.	Upload Copy of Feasibility Report/ Detailed Project Report(DPR) /Detailed Engineering Report /Detailed Conceptual Plan / Approved Mining Plan (in case of Mining proposals) (*Upload pdf only*)		

	d.	Upload Copy of Final Layout Plan (*Upload pdf only*)		
	e.	Upload Cover Letter *(Upload pdf only and attach it as Annexure-document of Cover letter)*		
	f.	Upload a copy of documents in support of the competence/authority of the person making this application to make application on behalf of the User *Agency (Upload pdf only and attach It as Annexure-authorization)*		
	g.	Upload copy of District Survey Report (for mining of minor minerals only)		
		Upload copy of Replenishment Study Report & Baseline Survey data (for river sand mining proposals only)		
	g.	Upload Additional File, if any (*Upload pdf only*)		
II	***If Project Type is other than New / Expansion / Modernization / one-time capacity expansion for coal mining: -***			
	a.	Upload Copy of Feasibility Report/ Detailed Project Report(DPR)/Detailed Engineering Report /Detailed Conceptual Plan (*Upload pdf only*)		
	b.	Upload Copy of Final Layout Plan (*Upload pdf only*)		
	c.	Upload Cover Letter*(Upload pdf only and attach it as Annexure-document of Cover letter)*		
	d.	Upload a copy of documents in support of the competence/authority of the person making this application to make application on behalf of the User Agency *(Upload pdf only and attachitasAnnexure-authorization)*		
	e.	Upload Additional File, if any*(Upload pdf only)*		
	f.	Upload Updated Form1*(Upload pdf only)*		
40	**Undertaking**			
	a.	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 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 above, I hereby give undertaking that no activity / construction / expansion has since been taken up		
	b.	Name	:	
	c.	Designation	:	
	d.	Company	:	
	e.	Address	:	

*****

No. J-11015/200/2008-IA.II(M)
Government of India
Ministry of Environment & Forests

Paryavaran Bhavan,
C.G.O. Complex, Lodi Road,
New Delhi-110003.
Telefax: 24362434

Dated the 31st March, 2011

Office Memorandum

Sub: Consideration of projects for grant of environmental clearance under EIA Notification, 2006 which involve forestland – Procedure to be followed – Regarding.

Ref: Office Memorandum no. J-11013/41/2006-IA.II(I) dated 2nd December, 2009 regarding Procedure for consideration of proposals for grant of environmental clearance under EIA Noti9fication, 2006, which involve forestland and or wildlife habitat.

The issue regarding consideration of proposals especially mining project for grant of environmental clearance under EIA Notification, 2006, which also involve diversion of forestland has been under consideration for quite some time and circulars / guidelines have been issued in the past in this regard from time to time. In this regard, reference is also invited to para 8 (v) of the EIA Notification, 2006 reads as follows:

"Clearances from other regulatory bodies or authorities shall not be required prior to receipt of applications for prior environmental clearance of projects or activities, or screening, or scoping, or appraisal, or decision by the regulatory authority concerned, unless any of these is sequentially dependent on such clearance either due to a requirement of law, or for necessary technical reasons."

According to the above provision, the environmental clearance under EIA Notification, 2006 is independent of other clearances and submission of clearances under other relevant Acts and Rules as may be applicable to a project is not a pre-requisite for obtaining environmental clearance except in specific cases where it is sequentially dependent on such clearance either due to requirement of law or for necessary technical reason. This aspect was earlier discussed and deliberated and the office memorandum dated 2nd December, 2009 referred to above was an outcome of the same.

However, in view of the complexity of the issues involved, the matter has been considered further in the Ministry and in supersession of the earlier instructions, it has now been decided to adopt the following procedure for consideration of such projects.

I. Projects in Pipeline:

(A) Projects received for TORs and yet to be considered by EAC:

In case of the proposals which have been received for prescribing TORs and involve forestland, in part or in full, and are yet to be considered by the EAC, during consideration of such proposals, clarifications will be obtained from the project proponent regarding feasibility of undertaking the project only in non forestland. In case, the project proponent confirms to undertake the project in non forest area only, the proponent may be advised to submit the revised proposal by deleting the forestland involved in the project. In case, it is not possible to undertake the project without involving diversion of forestland, the project proponent will be asked to first apply for stage-I forestry clearance for the forestland involved in the project and thereafter submit the proposal for obtaining terms of reference as per the procedure prescribed under EIA Notification, 2006.

(B) Projects for which TORs have already been prescribed but the proposal for environmental clearance is yet to be submitted:

In case of the proposals, which involve forestland, in part or in full, and for which TORS have already been prescribed, the project proponents are advised to ensure that the requisite stage-I forestry clearance has been granted and its copy is submitted along with their application / proposal for environment clearance. Alternatively, the proponent should delete from their land requirement, the forestland involved in the project and the proposal so amended without any forestland may be submitted for appraisal by the EAC.

In case of projects where forest diversion (Stage I Clearance) has been approved for part of the total forestland involved in the project, the proposal will be considered only for the land for which forest diversion has been approved and the non forestland, if any. For the purpose, the onus of demonstrating that the project activities will be limited to that much area only would lie with the project proponent and necessary supporting documents will be submitted in this regard.

(C) Projects submitted for environmental clearance based on the TORs prescribed by EAC:

The proposals already submitted for environmental clearance will be appraised by the EAC on their merit and in case of involvement of forestland, the proponent will be asked either to delete the forestland and submit the revised proposal or approach the EAC after the stage-I forestry clearance for

the forestland involved in the project has been granted, till which time the proposal will stand delisted.

In case of projects for which diversion of forestland has been granted for part of the forestland, the proposal will be appraised taking into account that much of land only (land for which FC granted + Non forestland) for the project activities and the proponent should demonstrate the viability of the project with requisite supporting documents.

(D) Projects already considered by EAC and recommended for grant of environmental clearance:

In accordance with the recommendations of EAC, such projects will be processed on file for obtaining approval of the MEF for grant of environment clearance. After MEF has approved, a communication will be sent to the project proponent informing that the Competent Authority has approved the project; however, the formal environmental clearance will be issued only after the stage-I forestry clearance for the forestland involved in the project has been obtained and submitted. For the purpose, a maximum time limit of one year will be provided to the proponent during which time the proposal will be kept in abeyance. In case, the formal forestry clearance is not submitted within this time frame, the proposal will stand rejected and the process for obtaining environmental clearance will have to be initiated, de-novo, as per the procedure prescribed under EIA Notification, 2006.

II. Expansion Projects:

(i) Mining Projects involving enhancement of production by increasing the depth and or number of shifts, without any increase in lease area and having already obtained the forestry clearance for the forestland involved in the mine lease, shall be considered on merit and decision taken.

(ii) The Expansion projects involving horizontal spread with additional land requirement will be dealt with as green field projects, if additional forestland is to be diverted.

III. Greenfield Projects:

(i) If any green field project does not envisage any diversion of forest land, it would be considered as per the provisions of EIA Notification, 2006.

(iii) In case of any green field project, which involves diversion of forest land, the project proponents are advised to re-examine the requirement of forestland and submit the proposal without forestland for consideration of the EAC. Otherwise, the proponent should submit the proposal for TORs under the EIA Notification, 2006 only after

applying the stage-I forestry clearance for the forestland involved in the project.

(iii) All cases of grant / renewal of EC for any abandoned mine or sick project under revival etc. would be considered as a green field project for appraisal under EIA Notification, 2006 and the procedure mentioned above will be followed.

This issues with the approval of the Competent Authority.

(Dr. S.K. Aggarwal)
Director

To

1. All the Officers of IA Division
2. Chairpersons / Member Secretaries of all the SEIAAs/SEACs

Copy to:-

1. PS to MEF
2. PPS to Secretary (E&F)
3. PPS to SS(JMM)
4. Advisor (NB)
5. Website, MoEF
6. Guard File

GOVERNMENT OF GOA
OFFICE OF THE EXECUTIVE ENGINEER
& GROUND WATER OFFICER,
WORKS DIVISION I
WATER RESOURCES DEPARTMENT
PORVORIM GOA

To,
Vedanta Limited,
Sesa Ghar, 20EDC Complex,
Patto, Panaji,
Goa 403001.

Sub: Issue NOC reg.... Registration of existing mining pit in the location identified between Latitude 15°34'20.518" N to 15°36'54.018" N and Longitude 73°54'4.754"E to 73°57"09.51"E, in Bicholim Talukas, State of Goa.

Sir,

The application submitted vide letter dated. 19/06/2023 along with Hydrogeological and impact assessment of Ground Water, prepared by Shri. M.C. Reddy Consultant with NABET & CGWA accreditation and former Regional Director, CGWB is examined by the Ground Water Cell during its 127th meeting held on 18/09/2023.

The NOC/Registration is hereby issued as below with conditions.

FORM – III
[See Rule 3(6)(2)]

Certificate of Registration of an existing well/mine and permission for it's continuous use in the Scheduled area under 5(4) of the Goa Ground Water Regulation Act, 2002 (Goa Act 1 of 2002).

*** Well be read as Mine**

Registration Certificate

No. **3634** Date: **21/09/ 2023**

1. Register Number of well/mine: **Block I-Bicholim Mineral Block of Vedanta Limited.**

Location of well/Mining Pits,
a)Survey Number:
i) Bordem Parts of Survey No. 19, 21, 23, 31, 32, 33, 34, 40, 41, 42, 43, 44.
ii) Bicholim : Survey No. 80, 81 & Parts of Survey No. 72,77,78,79, 82, 83, 84, 86, 88, 89, 90, 95, 96 & 99.
iii) Lamgao Survey No: 20, 24, 25, 26 & Parts of Survey No. 1, 9, 10, 11 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 27, 28, 29, 30 & 46.
iv) Maem: Survey No: 145, 164, 165 & Parts of Survey No. 84, 85, 86, 114, 142, 143, 144, 146, 162, 163, 166, & 167.
v) Mulgao: Survey No. 34,62, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 89, 91, 110, 114, 115, 116 & Parts of Survey No. 33, 35, 48, 61, 63, 79, 80, 81, 86, 88, 90, 92, 93, 94, 95, 96, 101, 102, 103, 104, 109, 111, 112, 113, 117, 118 & 124.
vi) Sirigao: Parts of Survey No. 70, 75, 76, 77, 78, 79, 80, 81, & 82.
b) Name of land: ___-____
c) Revenue Village Panchayat: **Bordem, Bicholim, Lamgao, Maem, Mulgao & Sirigao.**
d) Taluka: **Bicholim**

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e) District: **North –Goa**

Type of well/tank: **Mining Pit**

Details of well/mine
a) Diameter size of well/mining pits: } **As per submitted mining plan.**
b) Depth of well/tank/mining pits: }
c) Year of construction: **Existing Mining Pits.**
d) Year of commissioning: -
Name of occupant and address: - **Block I-Bicholim Mineral Block of Vedanta Limited, Sesa Ghor, 20 EDC Complex, Patto, Panaji – Goa 403001**

The device used for lifting the ground water Pump
Details of power supply
(a) Type of pump: } **Centrifugal**
(b) Horse power - } **6 pumps of 120 HP and two standby pumps of 75Hp & 120 Hp**
(c) Pump capacity - } **as per pit planning for mining operation.**
(d) E.D. Power supply connection number-

8. (a)Number of hours of pumping allowed per day As required for scientific operation of mine
(b)The quantity of drawal of ground water allowed per day As required for scientific operation of mine
(c)The total period of use permissible in each year Full year

9. Validity period of registration: 2 (Two) year from date of issue **(21/09/2023 to 20/09/2025)**

This is subject to the following conditions

1. The certificate holder should not deviate in any way from specification regarding well, pump etc. mentioned above without approval of Ground Water Officer.

2. The drawal of ground water under this license should not interfere with the normal activities of the locality nor should it cause any traffic hazard.

3. The Ground Water Officer or any person duly authorized by him shall have the right to inspect the place with such assistance as may be necessary to satisfy itself or himself whether the condition of restrictions specified as complied.

4. Installation of Peizometers: The applicant should install Peizometers of type (One DWLR and One DWLR with Telemetry System) for monitoring the Ground Water levels within the core area of mining lease for observation & monitoring.

5. Monitoring the Ground Water level in the buffer zone the established network of existing wells in the buffer zone (as per table 15 of the report), needs to be monitored on monthly basis and submitted to Ground Water Officer (WRD) and CGWB.

6. The project proponent needs to monitor the water quality of the mines seepage and mine discharge through NABL accredited/ Government approved laboratory on monthly basis to WRD and CGWB, Bangalore.

7. The applicant needs to ensure that the water available from the dewatering operations needs to be properly treated and quantity utilised for supply to irrigation/dust suppression/mining process.

8. The applicant needs to install digital water meter for measurement of the quantity of water abstraction, which will be chargeable as per the notification of Ground Water Act 2002.

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9. Once the mining activities commence, year wise mine planning including excavation depth, area and mine seepage are to be submitted to WRD/CGWB every year.

10. All activities committed in the report on ground water recharge and rain water harvesting is to be implemented satisfactorily.

Place : **Porvorim**

Date : **21/09/2023**

21/9/23

Signature of the Ground Water Officer

Works Division I, Water Resources Department
बांधकाम विभाग I, उदका साधन खाते
पर्वरी-गोवा
Porvorim-Goa

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IN THE HIGH COURT OF BOMBAY AT GOA

PUBLIC INTEREST LITIGATION WP NO. 1 OF 2008

VILLAGERS OF THE SHIRGAO VILLAGE ... Petitioner
Versus
SIRIGAO NAGARIK SANGHATANA,
SIRIGAO GOA AND 7 ORS., ... Respondents

Ms. Norma Alvares,Amicus Curiae
Mr. A. Kamat, Additional Government Advocate for the respondent Nos.2,3,4.
Mr. A. N. S. Nadkarni, Senior Advocate with Mr. D. Lawande, Advocate for the respondent No.5.
Mr. S. D. Lotlikar, Senior Advocate with Mr. P. S. Lotlikar, Advocate for the respondent No.7.
Mr. Sudin Usgaonkar, Advocate for the respondent No.8.
Mr.A. F. Diniz, Advocate for the respondent No.6.
Mr. J. Vaz, Central Govt. Standing Counsel for the respondent No.9.

Coram:- B. P. DHARMADHIKARI &
U. D. SALVI, JJ.

Date:- 15th June, 2009

P.C.

The respective Mining Companies are seeking time of four weeks to file their response upon the report submitted by the NEERI. Advocate Vaz for the added respondent No.9 is also seeking time to file an appropriate reply, if necessary. In the circumstances, list the matter for further consideration on 20/07/2009.

B. P. DHARMADHIKARI, J.

U. D. SALVI, J.

SMA

IN THE HIGH COURT OF BOMBAY AT GOA

PUBLIC INTEREST LITIGATION WP NO. 1 OF 2008

VILLAGERS OF THE SHIRGAO VILLAGE ... Petitioner
Versus
SIRIGAO NAGARIK SANGHATANA,
SIRIGAO GOA AND 7 ORS., ... Respondents

Advocate Ms. Norma Alvoares, Amicus Curiae.
Mr. S. S. Kantak, Advocate General with Ms. Guari Bhonsule, Addl. Govt. Advocate for respondents No.2, 3 and 4.
Mr. D. Lawande, Advocate for respondent No.5.
Mr. A. F. Diniz, Advocate for respondent No.6.
Mr. S. D. Lotlikar, Senior Advocate with Mr. H. Kankonkar, Advocate for respondent No.7.
Mr. Sudin Usgaonkar, Advocate for respondent No.8.
Mr. Joseph Vaz, Central Govt. Standing Counsel for respondent No.9.

Coram:- SMT. V.K.TAHILRAMANI & N. A. BRITTO, JJ.

Date:- 16th November, 2009

P.C.

Heard. Report from NEERI has already been filed. Ms. Alvares, learned Amicus Curia, submits that after objections were filed by the private respondents to NEERI report, she has obtained certain clarifications/comments from NEERI which she has already placed on record, with copies to the private respondents. We would like to know the stand of Goa State Pollution Control Board in relation to the said NEERI report and/or further comments as regards the same.

2. Let response be filed by Monday 23rd November, 2009. Counsel on behalf of the private respondents also desire to file a rejoinder to the subsequent comments given by NEERI. They may

do so by Monday 23rd November, 2009, by exchanging copies to the Counsel for the other side.

3. Mr. Vaz is present on behalf of Union of India. In case he want to offer any comments on behalf of Union of India on NEERI report, he may do so along with other respondents. Stand over to 30th November, 2009.

SMT. V.K.TAHILRAMANI, J.

N. A. BRITTO, J.

ssm.

IN THE HIGH COURT OF BOMBAY AT GOA

PUBLIC INTEREST LITIGATION WRIT PETITION NO. 1 OF 2008

VILLAGERS OF THE SHIRGAO VILLAGE ... Petitioner

V e r s u s

SIRIGAO NAGARIK SANGHATANA,
SIRIGAO GOA AND 7 ORS., ... Respondents

Ms. Norma Alvares, Advocate as Amicus Curiae.
Mr. S. S. Kantak, Advocate General with Mr. A. Kamat, Addl. Government Advocate for the Respondent nos. 2, 3 and 4.
Mr. A. N. S. Nadkarni, Senior Advocate with Mr. D. Lawande, Advocate for Respondent no. 5.
Mr. A. F. Diniz, Advocate for Respondent no.6.
Mr. S. D. Lotlikar, Senior Advocate with Mr. H. Kankonkar, Advocate for the Respondent no.7.
Mr. Sudin Usgaonkar, Advocate for Respondent no.8.
Mr. C. A. Ferreira, Central Government Standing Counsel for Respondent no.9.

Coram :- **A. S. OKA**
F. M. REIS, JJ.
Date : **8th July, 2010.**

P.C.

We have heard the learned Counsel appearing for the parties.

2. The issue of adverse impact on water resources and agricultural fields on account of mining activity in Shirgao Village, arises in this Petition. Considering the issues raised, we issue Rule. Learned Counsel for the Respondents waive service.

3. We have perused various affidavits and documents placed on record. We have perused the earlier Orders passed by this Court. We have gone through the report of National Environmental Engineering Research Institute (for short 'NEERI'), submitted in March, 2009. Our attention has been invited to last relevant Order passed by this Court on 23rd February, 2010. Clause 2 of the said Order records the decision taken by Goa Pollution Control Board in its meeting held on

9th February, 2010. The decision of the Goa Pollution Control Board to implement the three recommendations has been recorded in Clause 2 of the said Order.

4. The learned Senior Counsel appearing for Goa Pollution Control Board has invited our attention to directions issued under Section 33(A) of the Water (Prevention and Control of Pollution) Act, 1974, issued by the Board on 3rd March, 2010. Directions have been issued vide said Order dated 3rd March, 2010 to comply with various measures including the three recommendations accepted by the Goa Pollution Control Board in its meeting dated 9th February, 2010. In short, the mandate issued by the Goa Pollution Control Board to various Mining Companies is to comply with various directions which are based on recommendations of NEERI as well as Orders issued by this Court from time to time. The Companies have been directed to submit a detailed time schedule and action plan on the basis of which they propose to comply with the directions. The Companies were called upon to submit the detailed time schedule within a period of 15 days from the date of receipt of the directions. The Mining Companies have been put to notice that on their failure to comply with the directions, the Board will be compelled to initiate legal action in accordance with the provisions of law including closure of the unit.

5. The learned Amicus Curiae made a grievance regarding the nature of direction in Clause 3 incorporated in the directions dated 3rd March, 2010, on the basis of decision taken by the Board on 9th February, 2010. The learned Counsel pointed out that the decision of the Board was to adopt "*remediation techniques for bio remediation of silted soils*" but on 3rd March, 2010, the Board has directed to

"*Design remediation technique for bio remediation of silted soils/fields*". The learned Amicus Curiae submitted that the use of this phraseology indicates that remediation techniques will have to be designed and thereafter the same will have to be implemented.

6. As far as this objection raised by the learned Amicus Curiae is concerned, the Goa Pollution Control Board has filed an affidavit dated 8th July, 2010 of its Member Secretary. Paragraph 2 of the said affidavit reads thus :

> "I state that before explaining the reason for using the word "design", at the outset I have to state that remediation technique for bioremediation of silted soils/fields and design remediation technique for bioremediation of silted soil/fields is one and the same thing; it makes no difference to the direction concerned or compliance thereof."

7. In paragraph 4 of the affidavit, it is stated thus :

> "It is for this reason that the word "design" came to be used. Use of the word "design" is logical and legal too. I therefore state that the use of the word "design" does not in any manner whatsoever, change or dilute the direction or that the use of the word "design" does not in any manner whatsoever, change either the decision taken in the meeting of the Pollution Control Board or the directions issued."

8. We accept the statements made in the said affidavit. The said statements take care of the apprehension expressed by the learned Counsel appointed as Amicus Curiae. It is reiterated by the Pollution Control Board that the use of the word "design" does not in any manner whatsoever change or dilute the direction or that the use of the word "design" does not in any manner whatsoever

change either the decision taken in the meeting of the Pollution Control Board or the directions issued.

9. The learned Counsel pointed out that in terms of directions dated 3rd March, 2010, some outer limit will have to be prescribed within which the compliance should be made by the Mining Companies with the directions. She pointed out that the Order dated 3rd March, 2010 shows that there is no direction issued for making compliance with the directions within a specified time limit.

10. As far as the aforesaid objection is concerned, we feel that the Pollution Control Board will have to conduct regular inspection and monitoring to ascertain the compliance with the directions issued on 3rd March, 2010. In case the Pollution Control Board finds that the concerned Companies or concerned persons are slow in implementing the directions, the Pollution Control Board will have to issue further directions specifying the time limit for compliance with directions. As of today, it is not possible to fix an outer limit for compliance with the said directions. Pollution Control Board is seized of the matter and it is expected that the Pollution Control Board will take action and will issue necessary further directions in case requirement of issuing such directions arises on the basis of inspection and monitoring.

11. We direct that the directions contained in Order dated 23rd February, 2010 as well as in the earlier Orders passed by this Court will continue to operate till further orders. We direct the Pollution Control Board to file compliance report in this Court as regards the compliance by the Mining Companies of the directions

issued under Section 33(A) of the Water (Prevention and Control of Pollution), Act, 1974. The compliance report shall be filed within a period of three months from today. We direct the Pollution Control Board to file compliance report as regards compliance with what is stated in paragraph 4 of the Order dated 23rd February, 2010. The compliance report shall be filed by the Pollution Control Board by 31st August, 2010.

12. On application made by the parties to the Petition, Registry is directed to make available copies of the compliance reports submitted by the Goa Pollution Control Board subject to payment of necessary copying charges. As and when reports are submitted by the Goa Pollution Control Board, the parties to the Petition will be free to apply to this Court for seeking necessary directions. We make it clear that copies of the reports filed by the parties to the Petition shall be supplied free of costs to the learned Amicus Curiae appointed to espouse the cause of the Petitioner.

13. In terms of the directions issued by this Court, the Director of the Ministry of Environment & Forest, Government of India, has filed affidavit dated 5th July, 2010. In view of what is stated in the affidavit and in particular what is stated in paragraph 8 thereof, we find that the Ministry has taken appropriate steps. Therefore, at this stage, we are not issuing any further directions against the Ministry.

A. S. OKA, J.

F. M. REIS, J.

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IN THE HIGH COURT OF BOMBAY AT GOA

PIL WRIT PETITION NO.1/2008

VILLAGERS OF THE SHIRGAO VILLAGE ⋯ PETITIONER
Versus
SIRIGAO NAGARIK SANGHATANA, SIRIGAO GOA AND 7 ORS. ⋯ RESPONDENTS

Ms Norma Alvares and Mr J. A. Lobo, Amicus Curaie.
Mr Deep Shirodkar, AGA for the State.
Mr Pavithran A.V. with Mr P. Kholkar, Advocates for Resp. No.5.
Mr A. F. Diniz, Senior Advocate with Mr Ryan Menezes with Mr Nigel Fernandes, Advocates for Respondent No.6.
Mr S.D. Lotlikar, Senior Advocate with Ms S. Kenny, Advocate for Respondent No.7.
Mr Sudin Usgaonkar, Senior Advocate with Ms Pooja Naik, Advocate for Respondent No.8.

WITH
WRIT PETITION NO.214/2020

RAJARAM BANDEKAR (SIRIGAO) MINES PVT. LTD., REP. BY ITS AUT. GEN. MANAGER, FELIX FERNANDES ⋯ PETITIONER
Versus
THE STATE OF GOA, THR. ITS CHIEF SECRETARY AND 2 ORS. ⋯ RESPONDENTS

Mr A. F. Diniz, Senior Advocate with Mr Ryan Menezes with Mr Nigel Fernandes, Advocates for the Petitioner.
Ms Maria Correia, AGA for the State.

CORAM: M. S. KARNIK &
VALMIKI MENEZES, JJ.
DATE: 24th JUNE 2024

P.C.:

1. Stand over to 24.07.2024 at 3.30 p.m. The parties are put to notice that an endeavour will be made to decide both these petitions finally.

VALMIKI MENEZES, J. **M. S. KARNIK, J.**

vedanta
transforming elements

sesa goa iron ore

Letter No. VL/MIN/Block I/23-24/006 Date: 28/08/2023

To,
Member Secretary,
Goa State Pollution Control Board
Near Pilerne Industrial Estate, Opp Saligao Seminary,
Saligao - Goa - 403511

Subject: Regarding clarification against the Environmental Public Hearing held on 11/08/2023

Madam,
Please find attached herewith the point wise clarification w.r.t the points raised by the speakers. We have also included the responses w.r.t some of the letters which were shared by your good office.

We request you to kindly forward our responses to MoEF &CC and share the copy with us for further necessary online submissions to MoEF &CC from our end .

Thanking you,

Yours faithfully
For Vedanta Limited

Jagdish Desai
Head Environment- Sesa Goa
Authorized Signatory

VEDANTA LIMITED
Sesa Goa iron ore: Sesa Ghor, 20 EDC Complex, Patto, Panjim, Goa – 403 001, India
T +91 0832 2460600 | Website: www.sesagoaironore.com

Registered Office: Vedanta Limited, 1st Floor, 'C' wing, Unit 103, Corporate Avenue, Atul Projects, Chakala, Andheri (East), Mumbai 400093, Maharashtra, India.
CIN: L13209MH1965PLC291394

Clarification against the Environmental Public Hearing held on 11th August 2023, w.r.t. Block-I, Bicholim Mineral Block

Sr No	NAME & COMMENTS	RESPONSE	BUDGET
1	**Deepak Popkar**	Various air pollution control activities will be undertaken during the mining operations, details are provided in chapter 10. A sufficient buffer of 50m will be maintained from habitation, Drilling and blasting activities are not proposed and hence there are no chances of damage to houses etc. All the necessary erosion control, monsoon preparedness activities will be carried out to prevent flow of silt outside the mining area. The details of the same are mentioned in chapter 10 of EIA document. The Baseline monitoring is carried out during March to May 2023 by NABET accredited consultants.	
	He is the resident of Bicholim.		
	He stated that he stands here on behalf of resident of Bicholim.		
	He stated that dust can cause pollution in villages which affects children and old people, which causes cold and other diseases.		The budget towards Environment Monitoring and Air pollution control measures: 408 Lakhs
	He stated that fields, houses get destroyed. Because of this EC should not be granted, He stated that he had filed RTI in Municipality.		The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs
	The agencies were hired to conduct monitoring. The agency if approved then the report is correct or else it is faulty		
2	**Siddesh Parab, Bicholim**	Thank you for the support.	
	He is the resident of Bicholim.		

Sensitivity: Internal (C3)

	He stated that the mine was closed and now reopening.		
	He stated that all the truck owners etc. are thankful that the mine is reopening as they depend on it.		
3	**Nilesh Dhabolkar, R/o of Mayem**	There is habitation within the mineral block at Mulgao and Lamgao villages, the same is mentioned in the EIA document. A buffer of minimum 50m. would be maintained form the habitation. The allegations made regarding fabrication of EIA are false and baseless. Details of water bodies are provided in EIA report. The habitations, water bodies, places of worship near the mines will not be affected. The EIA document is prepared by Mineral Engineering Services (accredited by QCI-NABET) and based on the Terms of reference issued by MOEF&CC	
	He strongly objects to the operation of the mine, No EC to be granted to the mine.		
	He stated that he stays 1 km away from the mining lease area.		
	He stated that the houses in the villages are one and half kilometre away from the mine, water bodies are located within the lease area, however it is not shown in the EIA report. EIA report is false and fabricated.		
	He stated that the earlier mining activities have impacted our full village.		
4	**Bhimakar H. Pal, r/o Bordem, Bicholim**	The speaker has made generalised statement which cannot be ascertained. He has requested the government authorities for inspection. Agriculture development is one of the key aspect of companies CSR. The company will engage with the farmers and with help of state agriculture dept will help the interested farmers to cultivate their fields. A minimum buffer of 50 m. would be maintained towards all the habitations which are located inside the mineral block. Budget will be provided as part of CER towards agriculture development in the surrounding areas.	
	He stated that he is from Bordem. He is a farmer.		
	His parents were also farmers. He stated the land which is inherited from ancestors is destroyed. Governments Subsidies and funds are provided for farmers. Bordem village is a land of farmers.		
	He requested to conduct a joint survey to see how the land is destroyed.		The budget towards erosion control

Sensitivity: Internal (C3)

	Tractors cannot be used in the fields as the fields are filled with water.		measures, monsoon preparedness on mines and water treatment: 232 Lakhs
	He stated that he does not get to see the farmers and cannot see the fields.		
	He stated that there is a Devasthan but it is also submerged in water.		
	He requested the officials to visit the site and see the problems faced by the villagers of Bordem.		
	He stated that as he can see the photo of his father, but he cannot see him in the same way, he can see his fields in Form I and XIV and not his land.		
	He stated that he cannot do any agricultural activity because of mining.		
5	**Naresh Naik**	A 50m buffer will be maintained from the habitation. The land use of study area is provided in Chapter 3 of EIA. All the necessary environment protective measures would be adopted to safeguard the water bodies from surrounding villages. The speaker (Nagesh Naik) was employee of erst while mine owner i.e., Sesa Mining Corporation limited (SMCL) and was retrenched by SMCL company. The project proponent has provided opportunity to join the work force for all such retrenched employees and many of the employees took benefit of the opportunity and joined the company. State government has auctioned the mine as fresh mineral block and Vedanta ltd is selected as preferred bidder. Total 716 no of employment opportunities would be generated and preference will be given to locals.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs
	He is a resident of Kelbaiwada Mayem.		
	He stated that in ward no.1 and ward no.2 that there are several lakes, Kulagars, springs, water bodies, ponds which are not mentioned in the EIA Report.		
	There are many ponds in the village which are destroyed due to mining, He stated that he was an employee of Sesa and Vedanta and he has proof of it, but he has been retrenched.		
	He sought to know how the company retrenched him when it is still in operation.		

Sensitivity: Internal (C3)

6	**Prashant Dhargalkar** He states that he is supporting mining. He states that Divkar village is totally dependent on the mining company, our all fate is dependent on mining. He states that because we don't have any other source of income. He states that if I am unemployed, how will I take care of my children, their studies and their needs, etc. He further state that Sesa Company has promised many things, it is we people should be united and get it done	Thank you for the support.	
7	**Pritibha Dhargalkar** She states that she lives in Bicholim. She states that since 2012 mining is shut/ closed. Many people suffered, due to unemployment and shortage of money, etc. She states that since we don't have income, we cannot put our children for higher studies. So, I am totally supporting the mining wants mining activities to resume as soon as possible and youngsters should get employment	Thank you for the support.	
8	**Shrikant Dhargalkar**	Thank you for the support.	

Sensitivity: Internal (C3)

	He states that He is resident of Lamgao, Bicholim.		
	He requested to start the Bicholim block.		
	So, he is totally supporting the mining		
9	**Sanjay Parab**	Thank you for the support., Preference will be given to locals for employment	
	He stated that he fully supports the mining activities. He requests the mining company to provide employment to all the nearby villagers.		
10	**Shailesh Navelkar**	Thank you for the support.	
	He stated that he fully supports the mining activities as all the people in the villages will get employment.		
11	**Sanjay Mandrekar , R/o Lamgaon**	Thank you for the support.	
	He stated that he supports the mining activities.		
	He stated that he is stays right next to the mine lease area and that there are no bad effects of the mine to the water bodies or residential houses.		
	He stated that if the mines start there will be a lot of employment opportunities in the villages as trucks drivers, canteen facilities etc will get employment.		
	He stated that around 1000 people are dependent on mining activities.		
	He requests to start the mine and give employment to all.		
12	**Kustulo Pal**		

Sensitivity: Internal (C3)

	He states that he strongly objects to the operations of the mine. He stated that from 2003 a lot of mud has come into his field and destroyed the field	The company will have detailed environmental management plan in place. and will take all the necessary measures to prevent flow of silt outside the mine. The details of EMP are provided in Chapter 10. Company as part of its CSR activities conducts lot of agriculture development programme in association with Agriculture department and any farmer who is interested in cultivating his filed will be provided support by the company. Budget for the same will be provided in CER. We would also like to highlight that the person is a retrenched worker by earlier mine owner.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs
13	**Kamlesh Teli Ex Councillor Bicholim** He states that he strongly supports the operations of the mine. He stated that employment opportunities will be generated, and the truck owners will be benefited	Thank you for the support.	
14	**Anand Naik** He stated that he is happy for the commencement of mining. He has requested that mining should be started. He states that if mining has to start some criteria has to be followed. In Karnataka the mines are 25 to 30 km away from the residential area. Mining has to start as it provides employment opportunities He states that he strongly supports to the operations of the **mine.**	Thank you for the support., Preference will be given to locals for employment. A buffer of 50m will be maintained from habitations. Necessary environment protective measures will be adopted during mining operations.	Budget towards environment management plan: 693 lakhs

Sensitivity: Internal (C3)

	He stated that he was working in the mine and is unemployed now. Hence mining has to start.		
	But he states if the mining starts no temple, no water bodies, no villages should be destroyed.		
	· He stated that that not only the other people but the people living in the area near the mining lease have to be given employment.		
	· He requests the company that if the employers were taken out of the company, they should hold talks with the ex-workers and come to a solution and take them back in the company as employees.		
	· He stated that the company has to start 100% but nothing should be destroyed or affected by the mining operation.		
15	**Sandeep Gaokar- not present**		
16	**Shailesh Gaonkar**	Thank you for the support.	
	· He is a resident of Bicholim.		
	· He stated that there is a mine around his house.		
	· He sought to know whether pollution is caused due to mining industry only?		

Sensitivity: Internal (C3)

	· He stated that that mining company has been taking all the precautions to curb pollution.		
	· He sought to know whether any survey is conducted to know how many people are dependent on mining.		
	· He stated that mining is required in Goa. He supports the project.		
17	**Milind Bharve**	Thank you for the support.	
	· He supports the project.		
	· He requested to grant the EC as soon as possible.		
	· For the last 10-12 years the people dependent on mining are waiting for it to be started.		
	· He stated that if there are any small issues, they can be sought it up.		
	· People can sit together and support mining and solve the problem.		
	· He stated that the State of Goa should be sustainable where ore is available within the State than why it should be imported.		
	· He stated that there will be social benefits due to the mining.		
	· He stated that the EC should be granted to the project proponent.		
18	**Sadashiv Falkar**	Thank you for the support.	
	· He is a resident of Pilgao.		
	· He supports the project.		

Sensitivity: Internal (C3)

	· He requested to grant EC to the project.		
19	**Franco Sequeira**	Thank you for the support.	
	· He requested for sustainable mining by proper discussion as it will provide employment to the youth. He supported the project.		
20	**Sudan Govekar, r/o Lamgaon, councillor**	Thank you for the support, 50m buffer would be maintained from habitation.	Budget towards environment management plan : 693 lakhs
	· He states that he strongly supports the operations of the mine activities as soon as possible.		
	· He states that there are 200 truck owners, garage, shop which were depending on mining operation which have been stopped now. However, he requests to save the temples, village boundaries and water bodies and start the operation.		
	· He thanks the CM for taking a led in the start of mine		
21	**Shailendra Natekar**	Thank you for the support.	
	· He is a resident of Bicholim.		
	· He supports the project.		
	· He requested to grant EC to the project.		
	· He stated that the workers, villagers and the Government should come together and solve the issues.		
22	**Dinesh Divekar**	Thank you for the support.	
	· Mining should start as soon as possible		
	· Mining is shut for 10 years		

Sensitivity: Internal (C3)

	· Favour of mining as thousand lost their jobs · Mining is backbone of small state like Goa · It is required for development		
23	**Manuel Fernandes Bicholim** · He states that he and his family are fully dependent on the mine, and he supports the operations of the mine activities.	Thank you for the support.	
24	**Pradeep Revodkar Mulgao** · He states that He strongly objects to the operation of the mine. · He states that last 50 years he has seen the people cultivating the fields the Mining operations have destroyed the fields, temples, houses and the water bodies and other plantations in the nearby villages. · He strongly opposes the grant of EC. · He states that this is dictatorship and not democracy.	All the Necessary environment protective measures will be adopted during mining operations as detailed in Chapter 10. A buffer of minimum 50m will be maintained from the habitation and the fields, houses, temples, water bodies within the habitation will be protected.	The budget for environment management plan is 693 lakhs
25	**Kashinath Shivram Parab** · He is a resident of Barazan Wado Bicholim. · He stated that his house is located near the mining pit. · He stated that cracks are developed for his house. · His stated that his company was informed about this for the past 12 years.	There is no drilling and blasting involved in the project. Also, a buffer of 50m would be maintained from the habitation. A proper stake holder engagement and grievance redressal mechanism would be followed in case of any stake holders facing issues due to mining. It is understood that the speaker is in discussion with the erst while company (SMCL)for compensation and till then the monthly house rent is paid by the earlier mining company to him.	

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	· He stated that he is going to the company to get compensation. · He stated that the company asked him to submit the Form I & XIV. He stated that he has spent Rs. 50,000/ towards his mutation. · He stated that the slab of his house is leaking. · He requested to company to give a plot whether the company stated that they have taken the loan on that plot, but we will give you compensation however till date no compensation is paid, i have been given the flat in rental bases. I have remained the company to give the payment. · He requested the company to give him tarpaulin, but the company did not give him tarpaulin. He stated that the company gives lots, but they don't get anything. · He requested the Collector, GSPCB to solve the problems of other workers. · He stated that he wants the company to restart only after these problems are resolved. · He stated that his application may be considered.		

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	· He had asked for the plot however the company stated that they have taken loan in that plot. Hence the company can't give the plot, but the company stated that they will give compensation even after 13 months no compensation is paid.		
	· He stated that he had asked for simple tarpaulin, but the company didn't give the same.		
	· He stated that the company gave him a rental flat and every time he had to remind the company to pay his rent.		
26	**Nikhil Jan Naik**		
	· Mining will affect natural water bodies/ springs /lakes	Necessary environment protective measures will be implemented to safeguard the surrounding areas. A buffer zone of 50 m will be maintained along the habitation. The EIA also addresses the measures taken w.r.t Assnora river. The EIA also comprises of detailed hydrogeology report based on CGWA guidelines which concludes that there won't be any adverse impact of mining on surrounding ground water regime. The water bodies/springs /lakes in surrounding areas will not be affected.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs

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	· Will invite disease-cardiovascular/health issues	Proper dust control measures will be implemented during the operations of mine. The employees will be provided with necessary PPE's. The details of various air pollution control measures are provided in chapter 10 of EIA. Company will provide budget for health-related facilities in surrounding villages as part of CER. It will maintain medical records of all the people visiting the facility. health camps also will be conducted in the villages.	The budget towards Environment Monitoring, Air pollution control measures and PPE's: 423 Lakhs
	· Farms are destroyed by silting	The speaker is making generalised statement. The impacts associated with mining are discussed in Chapter 4. All the necessary safeguards will be followed while carrying out the mining operations.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs
	· Trees which require 10 to 15 years to grow shall be destroyed in 5 mins		
	· Possible chances of landslide		
	· No geographical study is done by the authorities	Details of land use of the study area is provided in Chapter 3 of EIA.	
	· Buddhist caves, etc like worship places shall be affected.	The places of worship like Buddhist caves in Lamgao and other temples within the habitation won't be affected due to mining operations.	
27	**Premnath Hoble**	Preference will be provided to locals w.r.t employment, around 716 no of direct employment opportunities will be available. Habitation/ places of worships etc inside and outside the mineral block will be protected a buffer of 50m will be maintained towards the same. Noise levels will be maintained within the norm's details of Noise level management and control are provided in Chapter 10. Impact on wildlife and measures proposed to prevent any negative impact on wild animals are discussed in EIA. The speaker is referring to retrenchment of the workers executed by earlier mine owner i.e., SMCL. Vedanta Ltd has not retrenched any	
	· He is a resident of Bicholim.		
	· He stated that there are around 1500-2000 locals.		
	· Around 40-50 workers are employed out of which some are locals, and some are outsiders.		
	· He stated that he wanted the security of his village and not mining.		
	· He stated that there are Buddhist caves in Bicholim.		

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	· He stated that the village should be protected.	employee moreover all the retrenched employees were provided opportunity to join the company's work force.	
	· Villagers were not taken into consideration.		
	· Lamgaon is the lease. Plan has to be there.		
	· Lamgao village can be developed through tourisms and through mines.		
	· He stated that who has God faith face problem here.		
	· He stated that if you operate after 10 the animals will come to the village and eat the dogs. There is money but it brings tension.		
	· The area is histories, should we destroy it? We should make it tourist and no mining.		
	· He further stated that his brother is working now he is removed.		
	Village is destroyed.		
28	**Ganesh Govekar – Not present**		
29	**Vasant Gad**	All the procedure stipulated in the EIA notification is followed. EIA as well as executive summary (Konkani and English) of the EIA was submitted to all the surrounding village panchayats. The habitation within the mineral block at Mulgao and Lamgao will be protected and a buffer of 50m will be maintained towards habitation. Various environment protective measures will be carried out during the mining	The budget for environment management plan is 693 lakhs
	· He is the resident of Mulgao.		
	· He stated that people are affected and facing problems.		
	· There is limit of their patience.		
	· He stated that Government should consider everything before given EC.		

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	· When Mulgao Village Panchayat received EIA report in Panchayat, it was kept on table. Sarpanch, Panch did not know anything.	operations to prevent any negative impact on the habitation, the details of the measures are provided in Chapter 10 of EIA. The water bodies referred by speaker within the mineral block in Mulgao are settling ponds which were constructed by the erst while mining company and was regularly maintained by them. The same will be maintained in future also. The land use details of surrounding villages are provided in Chapter 3. The earlier mine owner i.e. SMCL retrenched the workers, however the project proponent provided opportunity to all the retrenched workers to join the company's work force and many of the retrenched workers who wanted jobs took opportunity of the offer. Locals will be given first preference for employment.	
	· If public did not know about it and then how they will place their grievances. 223 houses, 13 temple, Panchayat building, 2 schools,		
	lakes, ponds in Mulgao are not shown in EIA		
	· Our village will be destroyed.		
	· We have written to GSPCB. 30% of area of Mulgao is coming within lease. In my tenure 3 times mining collapsed and Sesa has not given mining support. People were injured.		
	· Surface right is not given. The mine should be restored back to original. No water in Kulaghar.		
	· If still it goes again in the same way, I am sure the villagers are not supporting mining.		
	· Workers are not taken for jobs. All the workers are from Dempo Mining Corporation.		
	· Supreme Court Petition was filed; workers went door to door support.		
	· If Mulgao Villagers problems are not solved, remove from lease. If we are not satisfied no EC to be granted.		

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30	**Pandurang Parab** · Requested GPSCB to restore the earlier damage area by the Sesa Goa and then only grant the EC.	The allegations on Sesa Goa are false. The project proponent Vedanta Ltd will ensure all the necessary environment protective measures during mining operations. Details are provided in Chapter 10 of EIA and Budget for the EMP is also provided.	The budget for environment management plan is 693 lakhs
31	**Bhau Gad – Not present**		
32	**Gajanan Gaonkar –** · He states that he is a resident of Lamgao. · Mining has affected fields/forests · Dust pollution is caused. · Unwanted trees are planted · Springs are destroyed · Fields in the area are affected and no royalty given. They come as and when they want. · Rs. 250 to Rs. 300 is given as compensation which is insufficient · Survey should be made of springs/ lakes. · By sitting in ACs cabins won't give the exact picture. · Ignorant about fields and livelihood · For 5 years Sesa never turned up, 6th year came and said adopting the village · No company is ready to give in writing about the give and take terms	The impacts associated with mining operations are discussed in Chapter 4. Necessary environment protective measures will be carried out during mining operations to prevent air, water, noise pollution. Budget for the EMP is provided in the EIA. Only native plant species (mix of horticulture and forest species (It will be used for plantation in consultation with state forest and agriculture department. Water bodies in the surrounding villages will be protected. The speaker has made general comments. During the course of mining operations, in case of complaints regarding silting of fields, damage to crop due to company operations, the company will take support of state agriculture department or qualified agriculture valuer to determine the damages caused and compensation will be paid accordingly. The company will also scientifically desilt or reclaim the area scientifically.	The budget for environment management plan is 693 lakhs

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	· All said verbally and hence goes unfulfilled		
	· Children of the employees go unemployed after their end in service		
33	**Prashant Shirodkar**	Thank you for the support.	
	· He is a resident of Mayem.		
	· He supports the project.		
	· He stated that the mine has been operating for the past 50 years.		
	· He stated that the workers are 40-50 years old.		
	· He stated that decision should be taken considering both sides.		
	· He stated that the workers are jobless.		
	· Further he stated that nobody will support when you are in need.		
	· That the company has given 50% during the past 12 years.		
	· Whereas other companies have taken out people from their jobs.		
34	**Ramkrishna Kundaikar – Mulgao**	As part of CSR activities, company carry out agriculture development programmes within its buffer zone. Budget for the same will be provided in CER.	
	· He states that he used to sell brown rice but now because of the mine there is a loss of revenue.		The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs

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	· He states that the walls have been collapsed but they have not done anything about it nor have they repaired the same and given.		
	· He states that their ancestors used to live on farming and plantation as there was revenue generated from the same.		
35	**Satyavan Chodankar**	As part of CSR activities, company carry out agriculture development programmes within its buffer zone. The company will engage with the villagers and verify the issue w.r.t retaining wall. In case the request is genuine, the repair work will be executed. It is also understood that the earlier mine owner had desilted the entire affected area in Mulgao in the past however the farmers didn't show any interest in cultivating the same.	
	· He states that he is a resident of Mulgao village.		
	· He states that his 20000sq m area was under cultivation and due to mining he is not able to cultivate the same.		
	· He is having a farmhouse in Sy. no. 70/1, his retaining was near his house has collapsed 16 yrs ago 2 times which hasn't been repaired till date.		
	· The company is a liar as they had said they would build a wall of concrete, but nothing has been done till date.		
	· The farmhouse area is 4000sq m in which betel nut plantation and coconut plantation has been destroyed.		The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs
	· 156 m compound wall has been collapsed.		
	· The trenches are not repaired.		
	· 17000sqm paddy field has been destroyed.		

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	· Once upon a time he was selling rice for Rs.10 per kg and now the same rice he has to buy Rs.70 per kg. · His house is in the lease area. · When the mine collapsed in 2016, 565 pepper plantations were destroyed. · The company didn't compensate for the same. · He fully opposes for the same.		
36	**Prakash Popkar** · Resident of Lamgaon. Entire village is destroyed. · First do survey and then give lease · I am not opposing mining but because of mining everything will be destroyed · Big machines are being bought by Vedanta · Our village is a agricultural Village · 90% of the Village is farming · First do desilting of farms so that we can cultivate the farm. · Lakes are destroyed, name of lake is also removed by the company · 1984 first revolt was done, and I was sent to jail · I request you to do survey first and then give lease	The speaker is asking government to survey the habitation and then issue lease. It is to note that the mine was in operation since several decades and state government has auctioned the same lease area as a fresh mineral block. The area of the mine remains the same and the habitation at Lamgao and Mulgao was always part of the mines. Necessary environment protective measures will be carried out during mining operations. a safety buffer of 50m would be maintained towards the habitation. A budget for agriculture development is provided as part of CER, any farmer group who is interested in cultivation can contact the company for the same.	The budget for environment management plan is 693 lakhs

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37	**Vithal Parab – Not present**		
38	**Gajanand Mandrekar** · He is the Deputy Sarpanch of Mulgao. · He stated that when the company was operated by Dempo, villagers had no issue, Vedanta has created lot of issues. · He opposes mining activity by the company.	The speaker has not raised any specific issues and falsely alleged that Vedanta has created issues. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism.	
39	**Madhukar Halarnkar** · He Strongly opposes the mine operations. · He states that all the points have been discussed. · He thinks that the company has done a One man show as they have submitted an EIA report without taking the villagers, local people and the farmers and the other committee members into account and have done the demarcation. · He states that the company is a liar as they promised that they will come for discussion in front of a joint meeting with the people of the area, however they didn't turn up for the said meeting of the said day.	The EIA document is prepared by Mineral Engineering Services (accredited by QCI-NABET) and based on the Terms of reference issued by MOEF&CC. The officials of company had a meeting with the Village Panchayat members who are elected representatives of the community. Regarding the joint meeting, company had communicated to the concerned in advance their inability to attend the said meeting.	
40	**Gopal Parab** · He Strongly opposes the mine operations and requests not to grant EC clearance to the mine.	Necessary environment protective measures will be carried out during mining operations. Water bodies in the surrounding villages will be protected. Preference will be given to locals w.r.t employment. The EIA also comprises of	

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	· He states that the mining has destroyed the fields and the plantation and the water bodies and the villages in the area.	detailed hydrogeology report based on CGWA guidelines which concludes that there will not be any adverse impact of mining on surrounding ground water regime. Company will provide support to farmers in case they are interested cultivate their fields. Pit water will be pumped and channelised to the horticulture gardens in Mulgao village.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs
	· He states that there is o employment, no land left for cultivation after the mine came into existence.		
	· First there were big fields but now there is no water for the fields and the water table is destroyed completely.		
	· When the mines collapsed the bodies were washed into his fields.		
	· He states that that the company is a liar, and he says everything is done systematically but nothing is done at all.		
41	**Devidas Govenkar – Not present**		
42	**Ganpat Parab**	Thank you for the support.	
	· He supports the mining project.		
43	**Shaikh Nisar**	Preference will be given to locals w.r.t employment. Said Idgah is within lease area and 200m buffer zone will be maintained. The Idgah is maintained by archaeological department. A thick green belt is proposed as a buffer between the mine pit and Idgah.	
	· One issue pertains to workers of the company.		
	· Company had 10-12 years to ensure that the fields in Mulgao Village are cultivated.		
	· He stated that Muslim community in Bicholim i.e. young generation are not given job opportunities by the company.		
	· Idgah at Gaunkarwada has not been supported by the company.		

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	· Company should help poor people of the area.		
	· No financial support is given to the Muslim Wada.		
44	**Nilesh Gosavi**	Thank you for the support.	
	· He states that he strongly supports the operations of the mine activities as soon as possible as he states that the mine has generated a lot of employment.		
45	**Swayam Kamat**	It is understood that Mayem farmers had approached court and as per court directions the earlier mining companies have paid compensation to the farmers. There is no negative impact on agriculture envisaged in Mayem w.r.t the current project.	
	· He is a resident of Mayem		
	· Farmers presented their grievances		
	· 12 000 sq. meters field is owned by him, inherited from his father, but now he cannot ask his sons to step down into the fields as they are thickly layered with mud soil.		
	· 600 farmers are registered, and he is representing them, and they are affected by this mining.		
	· He said for consultation purpose we are charged by the government, and we have to pay consultation fee.		
	· He says matter is pending in court and on the other hand this project is considered.		
	· Mayem people are fond of Parboiled rice (Uokde Rice) but in the circumstances		

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	it seems to be not possible for getting the seeds		
	· Green Field Project is only in pictures, but colour is brown.		
	· If we want to eat Parboiled rice (Uokde Rice), we should give strength to farmers.		
	· He asked to make the farmers strong and then to look into the project.		
46	**Tushar Falari**	Thank you for the support.	
	· He states that he strongly supports the operations of the mine activities and requests to start it as soon as possible as he states that the mine has generated a lot of employment.		
	· He states it will provide employment to the truck owners.		
	· There are skilled youth which are waiting for the mines to start as they are unemployed and need employment in the field of mining related area.		
	· When the mining stopped all the students who studied mining related work had to go out of the state inspite of being qualified.		
	· He requests for starting of the mine.		
47	**Krishna Gadekar**	Necessary environment protective measures will be carried out during mining operations to prevent flow of silt outside the mine area. The EIA also comprises of detailed	The budget towards erosion control measures, monsoon
	· He is the President of All India Kissan Sabha Mayem.		

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	· He stated that a large number of people from Mayem depend on agriculture. · He stated that there are four major water bodies in Mayem. All four water bodies are filled with silt on account of mining activities by the company. · He stated that water shortages for agriculture is caused due to this. · ZAO report is submitted that fields in Mayem are damaged due to mining silt. · Company has dragged more than 600 farmers to the Court. · The effect of granting a 50 year lease to the company on local farmers is not being considered by the Authority. · He stated that the Company does not have a rehabilitation plan. · Further, he stated that continuous mining operation will cause huge water shortages. · He strongly opposes grant of EC to the company.	hydrogeology report which concludes that there won't be any significant impact on ground water in surrounding areas because of the project. As understood, the 600 farmers were paid compensation by the earlier mine owners as per the court order. There is no population to be displaced because of mine hence the rehabilitation plan is not applicable.	preparedness on mines and water treatment: 232 Lakhs
48	**Chandrashekar Palni** · I am supporting the Block 1 project and he further stated that mines should start as fast as possible. · The Trucks should be restarted and given back work.	Thank you for the support. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism.	

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	· The Difficulties of every household should be solved.		
49	**Rutvik Sanjay Mandrekar**	Thank you for the support.	
	He stated that the mining has stopped in 2012.		
	He stated that 2.5% mining operational in Goa.		
	He stated that royalty loss to the Government.		
	He stated that he supports the mining.		
	He stated that the lease owner/ mining truck owner/ worker are given jobs through mining,		
	The truck owners are supported by the mining company.		
	The truck owners have not given any compensation during tenure of 2012 till date.		
	He stated that there are profit and losses in the business and start mining in sustainable manner.		
50	**Narayan Kharade**		
	EIA report seems to be more of Advertisement /Publication.	The EIA document is prepared by Mineral Engineering Services (accredited by QCI-NABET) and based on the Terms of reference issued by MOEF&CC	
	It was informed consent / objective is defied in a EIA, However it is misinformed that Consent has been provided.		
	He refused to call EIA it is more like Advertisement.		

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	He referred to Office Memorandum MOEF of dated 29th October 2014 , which is related to Impact of Mining Activity on Habitations- Issues related to mining project wherein Habitations and Villages are the part of mine lease areas or Habitations and Villages are surrounded by the mine lease area- Regarding, he further requested authorities for the same.	Necessary environment protective measures will be carried out during mining operations as given in EMP of EIA to prevent air, water, noise pollution. Minimum buffer of 50 meters will be maintained from Habitation. No drilling and Blasting will be carried out as stated in EIA	The budget towards Environment Monitoring / Air pollution control measures : 408 Lakhs The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	He found that this Green Field Project is just smeared with new face.	The mine is a fresh grant through auction regime by state govt for which LOI is issued to Vedanta Ltd. As per the MoEF&CC minutes of meeting, in case of LOI grant it is termed as green field.	
	If the company does not have re- habitation and resettlement plan than project proponent does not have right to present before public.	There is no population to be displaced because of mine hence the rehabilitation plan is not applicable.	
	He blamed new media for making false propagating.		
	The productivity of agriculture is affected as certified by agriculture admits compensation has to be given then it moves to collector but in the end nothing happen.		
	he pointed out the company as videshi (foreign) it not a swadeshi, the Sesa head office is located in London so we cannot call them as swadeshi company.	These are false statements, Vedanta ltd is an Indian company.	

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	As CSR activities by companies including the Mining Establishments has become mandatory up to 20% of their financial turn- over, Socio Economic Development of the neighbourhood . Habitats could also be planned and executed by the PPs more systematically based on the Need based door to door survey by established Social Institutes / workers on the lines as required under TOR. " 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.	Socio economic studies have been carried out within scope of TOR. Annual CSR spend of Vedanta Limited is more than 2% (mandatory requirement as per CSR rule) in the previous financial years. There is no displacement involved due to mining therefore the rehabilitation plan is not applicable.	
	2500 Zambia workers represented in UK Court, which judged it as illegal.	Not related to the project	
	He further submitted that he will submit the written submission.		
51	**Sanjay Gaonkar – Not present**		
52	**Rajesh Vaigankar**	Thank you for the support.	
	Mining should be started as fast as possible		
53	**Pandu Kundaikar – Not present**		
54	**Sandesh Palni – Not present**		
55	**Uday Saraf**	Thank you for the support.	
	He states that he strongly supports the operations of the mine activities and requests to start it as soon as possible as he		

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	states that the mine has generated a lot of employment.		
56	**Sitaram Walawalkar**	Thank you for the support.	
	· I am in support of giving EC to this project since we had participated in lot of morcha strike etc to start of this mining in past, so I am confident people will support and Ec will be granted to this project		
57	**Udesh Mandrekar**	Thank you for the support.	
	· He expressed grief about a child wanting to study further and states it is not possible as father is mining affected.		
	· The child in future falls in bad company due to mining bandh.		
58	**Nitesh Parab Gaonkar – Not present**		
59	**Sanjay Pawaskar**	Thank you for the support., Company will engage with the local communities as part of its CSR, stakeholder management and grievance redressal mechanism.	
	· He states that he strongly supports the operations of the mine activities and requests to start it as soon as possible as he states that the mine has generated a lot of employment.		
	He states it will provide employment to the truck owners .		
	· He states Discussion has to be held on the problems faced by the people.		
60	**Prajal Gaonkar – Not present**		
61	**Vishwas Thanekar**	Thank you for the support.	

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	· Many people are depended on mining because of this I am in support of this project.		
62	**Dinesh Naik** · He is a resident of Sankhalim · He starts that mining should be resumed.	Thank you for the support.	
63	**Ajay Anant Gaonkar He supports the mine.** He demands modernisation of education, give employment, legal agreements are required to be made between him and the company	Thank you for the support. Education is one of the important focus areas of development under company's CSR and required support would be provided to local schools for its upgradation. Preference will be given to locals in employment	
64	**Chandra Gaonkar** · I have fully support for the mining Block 1 Bicholim project. · He further requested to start project as earlier as possible.	Thank you for the support.	
65	**Ramchandra Popkar** · He is a resident of Lamgao. · He states that he is in favour of mining.	Thank you for the support.	
66	**Rajesh Parab – Not present**		
67	**Sandip Sinari – Not present**		
68	**Amit Naik** He is a resident of Sirsaim. He states that mining dependents for past 23 years. He is in support for mining. He states that he was paid by the Company during its non- operation.	Thank you for the support.	

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	He requested that mine should be kept in operation.		
69	**Milind T. Pal– Not present**		
70	**Santosh Devari** · He supports the mining project . · He stated that sustainable mining should be carried out in everybody's interest.	Thank you for the support.	
71	**Vaibhav Fadte** · He states that he strongly supports the operations of the mine activities and requests to start it as soon as possible as he states that the mine has generated a lot of employment. · He states that the problems faced by the people have to be solved and a sustainable mining has to be done. · A lot of people depend on mining and had taken loans previously and when the mining stopped they faced a lot of problems hence he requests to start the mining operations . · He states to protect the temples, houses and the fields of the villages and solve all the problems they face.	Thank you for the support. Necessary environment protective measures will be carried out during mining operations. As part of its CSR approach and Stakeholders management, stakeholders will be regularly engaged, and grievance redressal mechanism will be followed to address local concerns if any.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
72	**Vithal Gawas**	Thank you for the support.	

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	· I am supporting Block 1 Bicholim · In 2012 mining was closed for past 10 years we are representing the Government to start Mining. · The efforts which we put to start the mining now got result. · Many people say that sustainable mining, he raised the question what is sustainable mining? I feel sustainable mining means all peoples grievances should company resolved by the company. · So I am fully support to the project.		
73	**Sandeep Sinari – Not present**		
74	**Umesh Kadam** - Honda · He states that he strongly supports the operations of the mine activities and requests to start the operation as soon as possible as it will provide employment for the people as the people faced a lot of problems when the mining activities were stopped.	Thank you for the support.	
75	**Lawrence Braganza** · I am fully support of mining activity at Block 1 Bicholim · Today we have got one step to start mining by way of Public Hearing. · But I am of opinion that company should look into people's grievances and resolve by the same.	Thank you for the support.	

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	· Many people is of opinion that Vedanta company is giving false assures but I am disagreeing with the same.		
	· All grievances should go to our company owner Mr.Amit Agrawal he will definitely help us, since during the covid time he supplied with oxygen, he supported education fields.		
76	**Babal Shetgaonkar**	Thank you for the support.	
	· He stated that he is in full support of the mine.		
77	**Kashinath Mayenkar**	Thank you for the support.	
	· From 2012 Mining was stopped , for 11 years everything was in dark		
	· I am the truck owner and we had seen very difficult time.		
	· So I fully support Block 1 Bicholim Project		
78	**Bala Khan Goni**	Thank you for the support. Preference will be given to locals in employment	
	He states that he strongly supports the operations of the mine activities and requests to start the operation as soon as possible as it will provide employment for the people.		
	He represents the Muslim wada and he request to provide employment opportunities to the people of the community as only one person is provided with employment for the time being.		

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	He request to construct a way which is the biggest problem faced by the community.		
	He states that he worked for Sesa and dempo but he states that when Sesa took over there was a huge turnover and the employees were benefitted by the same. however, when dempo was operating the mine no benefits were given to the employees.		
79	**Sanjay Naik**	Thank you for the support.	
	· Company has never had any of its employees.		
	· He is support of the mining company		
80	**Pramod Sawant**	Thank you for the support.	
	· He states that he strongly supports the operations of the mine activities.		
81	**Shivdas Gawade**	Thank you for the support.	
	I fullysupport Block 1 Bicholim Project, since there is lot of employment issue in the village & EC should be granted.		
	Many problems are faced by us due to closure of mining activities, like many graduate's engineer are unemployed and I feel they should get jobs.		
82	**Sameer Kurdikar**	Thank you for the support.	
	He stated that for the upliftment of village, restoration of employment and to get freed from debts.		
	He supports mining.		

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83	**Rajaram Gaonkar -** Representative Bicholim Municipal Council	Thank you for the support. Preference will be given to locals in employment as well as in truck business	
	He states that he strongly supports the operations of the mine activities.		
	He was a truck member and had taken a loan and faced problems regarding the repayment of the same due to the closure of the mines.		
	He requests the management to solve the worker problems and to provides business to the truck owners.		
	He states that he has some issues, but he has given a written representation regarding the same which may be considered.		
	He requests that a sustainable mining shall be done.		
84	**Sandesh Sinari – Not present**		
85	**Sameer Teli – Mayem Bicholim**	Thank you for the support.	
	He states that he strongly supports the operations of the mine activities.		
	He requests to start the operation as soon as possible as it will provide employment for the people as the people faced a lot of problems when the mining activities were stopped.		
	There are skilled youth which are waiting for the mines to start as they are		

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	unemployed and need employment in the field of mining related area.		
	When the mining stopped all the students who studied mining related work had to go out of the state in spite of being qualified.		
	He request for starting of the mine.		
86	**Subhash Kinalkar**	Thank you for the support.	
	I am representing Bicholim Truck Owner as an Association Secretary we have seen many people spoken their grievances but no one has spoken about us. That is effected truck owners who has suffered due to the closure activity of the mining.		
	No company has supported us or given any compensation during the closure of the mining activity, it is Manohar Bhai Parrikar who had brought Umbrella Scheme for effected truck owners, 138 cases running in the court against truck owners but no one has taken note of the same.		
	Many times our children ask to complete their wishes but we can not full fill the same because we are in huge loans. Therefore if mines starts we will be very grateful.		
	Now sustainable mining if Hon'ble Supreme Court wants to start why this peoples are opposing for the same .		

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	I asked GSPCB to have communication with the Government to relax tax levied on them.		
87	**Azad Kadkade** He is a resident of Bicholim He stated that he has seen mining from childhood. He stated that the development in the village is solely due to mining. He clarified that the person who claimed that company did not give place has also paid house rent for 10 long years.	Thank you for the support.	
88	**Samir Teli– Not present**		
89	**Premanand Gaonkar – Not present**		
90	**Vishwajit Chari – Not present**		
91	**Laximan Gaonkar – Not present**		
92	**Ladu Mardolkar – Not present**		
93	**Devanand Parab – Not present**		
94	**Paresh Ghadi – Not present**		
95	**Sujay Parrikar** He supports the mining operation but he states that the youth have done diploma in mine engineering hence he request to provide employment for the people.	Thank you for the support. Preference will be given to locals in employment	
96	**Siddhesh Naik – Not present**		
97	**Sudhir Kamat – Not present**		
98	**Vaman Gawas – Not present**		
99	**Riaz Anwar Baig – Not present**		

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100	**Kashinath Mhato – Not present**		
101	**Sanjay Sawant – Not present**		
102	**Tulsidas Chodankar**	Thank you for the support. Agriculture development is one of the important focus areas of CSR by the company. Based on the needs of the farmers will carry out necessary programmes for crop cultivation. Preference will be given to locals in employment	
	He is a resident of Mayem.		
	He stated that Mayem is a picturesque village. It has lots of orchards and farming activities during mining the farmers undergo lots of difficulties.		
	If ever compensation is sought it has to be only through strikes.		
	Most of the people are directly dependent on mining.		
	The residents should be given first preference with regards to employment.		
	Requisite compensation and other facilities are to be given on time.		
	Mining should be resumed but it should not bring disgrace to the village.		
	He supports mining.		
103	**Dilip Shet – Not present**		
104	**Vasudev Gaonkar – Not present**		
105	**Manohar S. Naik – Not present**		
106	**Rajan Naik – Not present**		
107	**Atmaram Tilve- Bicholim**	Thank you for the support.	
	He states that he strongly supports the operations of the mine activities and requests to start the operation as soon as possible as it will provide employment for		

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	the people as the people faced a lot of problems when the mining activities were stopped.		
108	**Mahesh Mhambre – Not present**		
109	**Surekha Suresh Navelkar**	The Block I Bicholim mineral block does not fall in Pilgao village. The company will engage with the farmers in the surrounding areas and support Agriculture development through CER and through government support.	
	She states that she is a resident of Pilgao.		
	She states that she has an agricultural land in the proposed mining area.		
	She further states that our agricultural land we want for the future, so she strongly opposes the project		
110	**Krupali Kashinath Parab r/o Barazan wada.**	There is no drilling and blasting involved in the project. Also, a buffer of 50m would be maintained from the habitation. A proper stake holder engagement and grievance redressal mechanism would be followed in case of any stake holders facing issues due to mining. It is understood that the speaker's family is in talks with the earlier mine owner to settle their claims till then the earlier mine owner is paying their monthly house rent.	
	She states that her house walls got cracks 12 years ago due to mining.		
	She states that she was promised a plot of 300 Sq meters and 120 Sq mtrs house.		
	She states that she was later promised by Mr. Patil and Mr. Joshi that she will be provided with alternate land.		
	She states that they showed her 2 plots at Borda. She states that there was an agreement done w.r.t that land.		
	She states that later Mr. Joseph Coelho came and said that the land is under the loan and we cannot allot the land.		
	So, Mr. Coelho showed another place at Dhab-Dhaba (waterfall).		

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	She states that they made false promises for 13 years.		
	She further states that she approached Municipality and met Shri. Santosh Mandrekar and told him her grievances.		
	She further states that she approached Honorable Shri. Chandrakant Shetye, the local MLA.		
	The MLA later called the company and asked them about the situation regarding land allotment.		
	She states that they informed the MLA that it will happen.		
	She further met Honorable Chief Minister and discussed about her grievances.		
	She sates that they had made all fake promises that they had sanctioned money but when went to ask, they just ignored us		
	Hence, I strongly oppose the project		
	In 2014 an agreement was done by Mahesh Patil and Upendra Joshi to give my husband Kashinath Parab 300 mts land and 120 mts house in it.		
	And also made and agreement of exchange of deed.		
111	**Neena B. Salelkar**	Thank you for expressing support for mining. All the necessary measures will be carried out to prevent dust pollution. The details of the same are mentioned in chapter	
	She States that she is depended on mining.		
	She wants a mining with proper measures.		

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	she states that her house is just near the plant and near the mining dump.	10 of EIA document. A 50m buffer will be maintained from the habitation. All the retrenched workers of earlier mining company were offered employment, and many of the workers took benefit of the offer and joined the work force of the project proponent.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs
	She states that we are losing our agricultural land due to mining activities.		
	She states that she is facing the dust every second.		The budget towards Environment Monitoring / Air pollution control measures: 408 Lakhs
	She states that there are many people employed and many are unemployed in our locality.		
	He states that one of them is her husband, who went on strike for starting of the mines activities.		
	The Government should give us justice		
112	**Mohini , Pilgao sarpanch**	The speaker is making false allegations on Vedanta ltd. The company operations will not damage the fields, temples and other areas within habitation. Pilgao village doesn't form part of Mineral block. A ll the retrenched workers of earlier mining company were offered employment, and many of the workers took benefit of the offer and joined the work force of the project proponent.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment: 232 Lakhs
	She stated that the Vedanta company is a liar.		
	She stated because of the mining company there are disputes between workers and family members and I request to all to give us justice.		
	She stated the villages, fields the temples are destroyed in other areas and i don't want the same in my village hence I strongly object to the operation o f the operation of the mine.		

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113	**Sunaina Halarnkar – r/o Pilgao**	Necessary environment protective measures will be adopted during mining and transportation activities. The proposed measures are listed in chapter 10 of EIA.EIA document is prepared in line with TOR given by MOEF&CC	
	She Objects to the operation of the mine		
	She states that the environment is effected due to the operation of the mine		The budget towards Environment Monitoring / Air pollution control measures : 408 Lakhs
	There is dust problems , due to transportation and dumping of the Ore		
	She states that the water bodies are destroyed		The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	She states that a proper survey has to be done with village committee and the final report has to be shown to the village committee		
114	**Priya Dinesh Morajkar**	Thank you for the support.	
	She states that she fully supports the mining activities and requests to start the mines activities as soon as possible.		
115	**Manasi M. Khautankar – Not present**		
116	**Sushma S. Sutar**	Thank you for the support.	
	Resident of Dhabdaba.		
	She stated that she supports for mining.		
117	**Ashwita S. Mandrekar – Not present**		
118	**Anil Salelkar**	The person is referring Leopard as the Tiger. Chapter 3 of EIA mentions presence of schedule I species which includes	
	He states that he is from Pilgaom.		

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	He states that few days back that a Tiger entered the village eat dogs in the Mulgao Village as the Tigers don't have a place to stay in the forest area.	Leopard. A detailed wildlife management plan is also prepared and submitted to forest department. All the necessary measures will be carried out to prevent dust pollution as referred in EMP chapter 10 of EIA. The person is not part of monitoring team and the allegations made regarding incorrect monitoring are false and baseless. As part of company's Stakeholders management program, stakeholders will be regularly engaged, and grievance redressal mechanism will be followed to address any local concerns.	
	If this situation remains the same they will start eating the humans.		
	He further requested all to come at the unloading point and see the dust on the houses, almost all the houses are covered with dust, there is no need of painting the houses in that area.		The budget towards Environment Monitoring / Air pollution control measures : 408 Lakhs
	He states that when he was deployed to operate pollution control machine .		
	He asked his senior as why all machines are placed in particular direction, on which his senior replied stating that we should not get the black paper		
	We strongly oppose this project till our all grievances like agricultural land and worker issue, etc are not resolved.		
119	**Mukund S. Prabhugaonkar – Not present**		
120	**Sudesh Vaigankar – Not present**		
121	**Adv. Ajay Prabhugaonkar**		
	He opposes the Project.		
	The mining was operational since 1941.		
	He stated that the mining was started for production of 1.2 to 3.0 million tons.		

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	He stated that the loading, screening, dumping activities damage the fields / national habitat.	All the necessary measures will be carried out to prevent pollution as referred in EMP chapter 10 of EIA. Sufficient buffer would be maintained from the habitation.	The budget towards Environment Monitoring / Air pollution control measures : 408 Lakhs The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	He is the resident of Pilgao Village.		
	He objects to the word Green field used in the EIA report and this project is destroying the Land, fields and other greenery.	The state govt has auctioned mine as a fresh lease and as per minutes of meeting of MoEF&CC in case LOI is issued it is termed as Green field.	
	He stated that the EIA report is bogus and faulty.	The allegation made regarding EIA is false and baseless. The EIA report is prepared as per the TOR issued by MoEF&CC. Detailed list of Flora and Fauna is mentioned in Chapter 3 of EIA.	
	The EIA report at page no. 148 shows only rats and rabbits. No details of other wildlife animals are mentioned.		
	EIA report is not based on ground reality.		
	He stated that recently employment was not given on skilled basis, it was given on compensation basis while doing retrenchment they removed everyone. We want a sustainable mining.	Locals will be given preference for jobs on mines based on the skill and educational qualifications.	

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	Future of Bicholim Taluka will be decided based on this public hearing. He opposes this public hearing.		
	He requested to scrap the EIA report. The EIA report has to be as per the actual.		
122	**Hanumant Salelkar**	Vedanta Ltd has been awarded the LOI. There is no lake within the working / mining area of the mineral block. There are some settling ponds constructed by the earlier mine owner which are referred by the locals as lake. All the necessary measures will be carried out to prevent pollution as referred in EMP chapter 10 of EIA.	
	· He is a resident of Barazan waddo, Bicholim.		
	· He stated that his ancestors land is destroyed by mine.		
	· He stated that plants spread an area of 2.5 kilometres has destroyed the environment. There was a lake within the mine which has been destroyed due to dumping.		The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
123	**Sakharam A. Pednekar**	The person has asked these questions to the government. As part of the EIA detailed biological assessment was conducted and the list of flora and fauna is listed in chapter 3, which is authenticated by the forest department. As a good practice the company will engage with the local biodiversity committees and take into account the local flora while preparing annual environment management plan when the mining operation starts.	
	· He States that he is a Chairman of Mayem Biodiversity Board and various other committees.		
	· We had placed all the grievances before Government		
	· Pior an inspection has to be carried out to check upon damage caused by mines and largely		
	· compensation cases are pending till date.		
	· Technically oppose the project		
	· We have carried out study and found.		

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	· There are 170 birds species.		
	· Questioned the authority, whether the mining companies have fulfilled the terms and condition of lease.		
	· The one who failed earlier cannot be re-considered for fresh lease. Such units, should be blacked listed		
	· Discussion to be conducted at village level, sustainable plan to be prepared.		
124	**Ramesh S. Gawas**		
	He questioned whether the consultants is present here for the Public Hearing.	The Consultant was present for the public hearing throughout the proceedings. The consultant went on the stage only when the collector invited him when he was required to provide the clarifications.	
	As per the EIA report they are supposed to remain present for the hearing or else there is no meaning for public hearing as they have to answer the issues raised in the public area.		
	Vedanta Goa was doing copper mining in Zambia, they were thrown out from there for doing illegal mining.	Allegations made against Vedanta are incorrect and further it is Not related to the project.	
	what is green field mining project may be explained,	The state govt has auctioned mine as a fresh lease and as per minutes of meeting of MoEF in case LOI is issued it is termed as Green field.	
	Vedanta is de-listed from London stock exchange.	Incorrect statement. The current project proponent is Vedanta Ltd which was never listed on London stock exchange. The other issues raised are also not related to the project. The Block I Bicholim mineral block was auctioned in terms of Supreme Court directions only.	
	SC passed judgment saying that they were carrying carry out illegal mining.		
	From 2011 -2012 100 Crores are due by Vedanta to the government.		

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	30 lakhs fine levied by SEBI illegal and misleading.		
	He challenged if anyone proves the water from pit is rain water or it is ground water.	The mine pit comprises of both rainwater which is channelised in to the mine pit as well as ground water. Applied for permission of Ground water withdrawal from Goa state water resources department.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	60 well water went dry as all the ground water is accumulated in the Sirigao pit.	Detailed hydrogeology study is carried out as per CGWA guidelines which is part of EIA report. The water accumulated in pit is not having any impact on surrounding wells.	
	Dr. Mohan Rao prepared siltation reports of mayem lake. As per the report the Mayem lakes is silted due to mining.	Details of Environment management plan is provided in chapter 10 to ensure that there is no water pollution caused to surrounding areas. Proper care will be taken for dump stabilisation as mentioned in the EIA report.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	1:8.39 ratio flooding of Bicholim River and 140 inches rain fall one can imagine how dangerous it will be.		
	No data given regarding tippers used to match with the production to verify its factuality.	Traffic density study is provided in chapter 4 of EIA.	
	Affected football ground.	This is not related to the project	
	Water Body in front of Shantadurga H/S, Surface study is not in EIA. It originates in the mining lease it meets River Bicholim carrying huge silt and emptying it in Mandovi River.	The same nalla flows and mixes with the Bicholim river and Upstream and downstream of the Bicholim river is collected.	
125	**Dilip D. Kudaskar– Not present**		
126	**Hanuman Gaonkar– Not present**		
127	**Ashok Karbe**	Thank you for the support.	

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	· I am resident of sirsai , and I am mining dependent, mines were closed since 2012 all workers have suffered .		
	· We made request to government to start mining activities and also made many representation to Government to know how mining is important to us.		
	· Supreme Court after 9 years passed judgement to start with sustainable mining, so we should welcome this decision.		
	· I am fully in support of mining project.		
	· In 2009 Sesa Goa has purchased this mine and they got hardly one year to run this mining activity, for 50 years back peoples complaints		
	/ grievances , we should not blame/ put the Sesa Goa/ Vedanta.		
128	**Ajay B. Gaonkar – not present**		
129	**Ujwala Uttam Shirodkar**	The anticipated impacts of the mining operations are dealt in chapter 4 of EIA and the necessary measures/EMP required for control of pollution are provided in EMP chapter 10 of EIA. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism. Mayem lake is not destroyed, in fact it is one of the tourist places and is in very good condition.	The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	· She is resident of Mayem.		
	· She stated that the fields are destroyed by the mining.		
	· She stated that her orchards land is destroyed.		
	· She further stated that the Mayem lake is destroyed due to mining.		
	· She requested fields and orchards lands should be restored.		

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	· She stated that mining should start by restoring the environment.		
130	**Ratan Pednekar**		
	· She is a resident of Mayem.		
	· She stated that money is not given to her for 5 to 7 years. The orchards, fields and water pond are destroyed.	The speaker is mentioning about some money matter pending with Mamlatdar. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism.	
	· She stated that her husband was working in Dempo.		
	· She requested to look into her money matter. She stated that Mamlatdar has not taken any action.		
131	**Kanchan Chodankar**	Thank you for support, as part of CSR activities, company will carry out agriculture development programmes within its buffer zone. Preference will be given to locals in employment.	
	She stated that if farmers believe in sustainable farming than proceed with mining		
	Mayem is affected at large as it is skipped w.r.t. distribution of fertilizer		
	Mining maybe restarted if unemployed youths should be given employment and also our agricultural problems are resolved		
132	**Pundalik Pal – not present**		
133	**Nasir Baig– not present**		
134	**Ganesh Gaonkar**	The allegation made regarding EIA is false and baseless. The EIA report is prepared as per the TOR issued by MoEF&CC. The state govt has auctioned mine as a fresh lease and as per minutes of meeting of MoEF&CC in case LOI is issued it is	
	Resident of Sirgao and is opposing the project		
	Representation are already given by him		

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	report given by mining company is false, pictures shown during presentation are false, no conditions are fulfilled. Data which is shown is manipulated by the mine owners in the report,	termed as Green field. The socio-economic survey was a sample survey wherein data from 25 villages was collected. A detailed study carried out with respect to impact of mine pit on Assonora river and same is annexed to the EIA report as annexure number III which concludes because of the elevation difference, existing environment protective measures inside the mine and the impervious lithology there is no flow of water between mine pit and the river. As per the mining plan backfilling of waste is proposed into the pit near the Assonora river. There are temples and other public utility infrastructure within the habitation however minimum 50m buffer will be maintained from the habitation. As part of CSR activities, company will carry out agriculture development programmes within its buffer zone. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism. Regarding the land rights, the mine has been auctioned as fresh lease and the property rights will be settled once the mining lease is executed.	
	Green field project which is declared is wrong		
	all five villages are destroyed namely Bicholim, mulgao, Lamgao, shirgao etc. requesting authority to practically come on site and do inspection before granting EC.		
	the company person should come to their village and tell from where they collected the data. I am the president of Devastan, no one approached me.		
	4 temples come within the vicinity of mining area. Mining people told that the retaining wall will be built by them and taps will be provided but nothing is done.		
	After 3 years gap we approached the mine company but they told that no funds are available. I have all the photographs of the collapsed retaining wall. One day the temple wall will come down due to the landslide.		
	One mining pit is there near the temple, 50 meters away from the river. No refilling is done in this pit. The depth of river is 3 to 4 meters. The dept of the pit is 25 meters.		

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	Because of this pit all agricultural fields are destroyed.		
	Yearly we harvest 2 types of crops. So, in order to harvest		
	2 types of crops the field should be not be dry, but come to april and may month water is there in field and everything is polluted.		The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	Company told they will pay.		
	Government told they will pay through DMF, but not done.		
	Area occupied by mining is not their land it is communidade land		
	Government asked to produce the land ownership documents, but they failed. The company should produce the Form I and XIV, Property is not theirs than they should not be granted lease.		
135	**Dinanant Gaonkar,**	The EIA report is prepared as per the TOR issued by MoEF&CC. The state govt has auctioned mine as a fresh lease and as per minutes of meeting of MoEF&CC in case LOI is issued it is termed as Green field. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism. The speaker also informed that the fields are restored by the mining company. It is also	
	He is a President of Tenant Association.		
	He stated that the EIA Report is prepared in an office and not by ground visits.		
	Project is specified as Greenfield in report which is false.		
	Villages have written to the Director of Mines and Geology to exclude Shirigao		

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	buildings, Panchayats etc from the mining lease, however the DMG has not replied.	understood that the earlier mining company used to provide access to the villagers to perform religious procession and same will be continued.	
	The road used for religious procession is destroyed by the Mining company.		
	Old survey record shows existence of road used for religious procession yet company denies its existence.		
	High Court directions to restore fields and only after the High Court Directions fields are restored. This was caused due to Mining company activities.		
	Issues are pending before Mamlatdars Courts.		
	When so many issues are pending, I oppose grant of EC and conduct of Mining operation.		
136	**Narendra Prabhugaonkar – not present**		
137	**Santosh Sawant – not present**		
138	**Devidas Prabhugaonkar – not present**		
139	**Anil Naik – not present**		
140	**Anand Gad, Advalpal**	The speaker is making false allegations on the company. The issues raised by the speaker are with respect to the mines in Advalpal village and not related to the existing project namely Block I Bicholim Mineral Block. The EIA report is prepared as per the TOR issued by MoEF&CC.	
	He states that his village is not in Block 1 and is in the other unit of Vedanta.		
	The mine was closed due to some accident and then it was restarted by the impact it caused.		
	He states that the Vedanta company is not fit to run the mine.		

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	He states that The company has changed so many names and they always lie to the villagers.		
	He states that he has 2 field and the company has put dumps in his field.		
	He questioned why should we not oppose because of some people who are dependents on the mine for their living.		
	There was mining silt which came from the mines and destroyed the nallahs & fields.		The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	There was alot of air pollutions when the mines were in previously in operation but the people were very happy when the mines stopped as the air and dust pollution had stopped.		The budget towards Environment Monitoring / Air pollution control measures : 408 Lakhs
	He states that the picture of the EIA report is all false and fabricated.		
	He states that He still is fighting the cases his ancestors have filed against the company for his land.		
141	**Laxmikant Gaonkar – not present**		
142	**Sharmila Volvoikar Panch member of pilgao**	There is no beneficiation plant (washing plant) proposed in the project and hence there will not be any generation of	

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	She states that she is not against mining but against the granting of EC to the lease for 2.00 MTPA.	tailings. The anticipated impacts of the mining operations are dealt in chapter 4 of EIA and the necessary measures/EMP required for control of pollution are provided in EMP chapter 10 of EIA. There are no chemicals used in mining as mentioned by the speaker. Preference will be given to locals in employment. Offer to join the workforce was provided to all the workers who were retrenched by the earlier mine owner. many of them took benefit of the offer and joined the company work force.	
	She states Dempo was allotted 1.3MTPA EC was granted for beneficiation plant to the mining company		
	A tailing pond was constructed but still waste enters in the agricultural fields causing destruction to the fields and other land.		The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	There is contamination of water and 60 Hectares of agricultural field was destroyed due to mining chemicals. If the capacity is increased more 1.3. siltation will increase in agriculture land and will destroy the fertile land.		
	She strongly objects for the mine.		
	The company needs to employ the 35 nos of employees which were removed.		
143	**Ibrahim Shaikh – not present**		
144	**Glen – not present**		
145	**Prakash Parab- Pilgao**	Thank you for the support.	
	He states that he strongly supports the operations of the mine activities as soon as possible as he states that the mine has generated a lot of employment.		
146	**Dr. Govind Parab – not present**	Thank you for the support.	

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147	**Raghuvir K. Karbotkar**		
	He is a resident of Lamgao.		
	His residence is located within 2 Km from the mining area.		
	He stated that the destruction which has taken place should be rectified.		
	He supports the sustainable mining.		
148	**Sebastiao A. Rodrigues**	The EIA report is prepared as per the TOR issued by MoEF&CC. The baseline study was conducted during March to May 2023 for preparation of this EIA. The state govt has auctioned mine as a fresh lease and as per minutes of meeting of MoEF&CC in case LOI is issued it is termed as Green field. All the necessary precautions will be carried out during monsoon to manage the storm water. Details are provided in Chapter 10 of EIA	The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	He sought clarification from the project proponent		
	He observed that application for EIA was 16/03/2023		
	Baseline data collected		
	project proponent stated baseline study carried out pre- monsoon which was locked down period of covid and such wrong dates are mentioned		
	fresh baseline data has to be created		
	fresh PH should be carried out		
	The Project is referred as Green Field which is wrong		
	He questioned so as to how Dempo Mining Corporation got changed to Sesa Mining Corporation, if so done all the prior liabilities should be transferred to the later company.		
	He states that Bicholim is a flood prone area		

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	He states that 2 scientific studies are done in bicholim river pollution by Rane and Matha of marine science department of goa. North goa disaster management Plan pertaining to mining lease of the project proponent.		
	The collector requested copies of these two studies. Both studies were shared on whats app no.9921876712.		
149	**Abhijeet Prabhudessai**	The speaker has made false statements. State government has auctioned the mine as fresh lease, Vedanta limited was declared as a preferred bidder and LOI is issued by the government. The consultant mineral engineering services was present throughout the PH, however he came on the stage only when the collector called him to clarify certain points. The distance between the Mineral Block and Dr. Salim Ali Wildlife Sanctuary is 10.553 Kms. The state govt has auctioned mine as a fresh lease and as per minutes of meeting of MoEF&CC in case LOI is issued it is termed as Green field. EIA does not mention desert in any of the chapters. Details of flora and fauna is provided in chapter 3. Details of environment settings are provided in chapter 2 wherein Asnora creek and mangroves are mentioned. The influence of creek water is also seen in the surface water quality in buffer zone mentioned in chapter 3.	
	He stated that it has been 80 years since lease is granted to this mine		
	He stated that the grievances put forth by farmers states that they are not benefited by mining.		
	He states that the situation of everyone ie. Farmers, Fisherman, workers etc is helpless.		
	He sought to know during the time the mines were not in operation why the loans of the workers were not forgiven if the government was really concerned.		
	He pointed out that the major violations in todays public hearing is that the Consultant is not present for the hearing. Hence there is no point in seeking clarification.		
	Dr. Mohan, representative of GSPCB, clarified that the consultant will be available to answer the concerns.		

Sensitivity: Internal (C3)

	He stated that Dr. Salim Ali Wildlife Sanctuary is within range of 10 Kms.		
	The report seems to be fraud		
	Fresh lease is clubbed within earlier 5 years and termed as Block-I.		
	He requested that the houses coming under the mining lease be skipped out.		
	He stated that in the name of Greenfield project, the people are deceived.		
	He stated that the EIA report falsely points out that area as desert and in future this will give the wrong notion that it was barren.		
	Before the commencement of mining, everything in the village should be recorded . if not, people will have to leave their homes.		
	Things are hidden in EIA. Back waters are to be covered in the EIA report.		
	He referred to Dr. Mohan Girap's report on Mayem Lake which clearly points out to the entry of Manganese ore.		
	He sought to know the future of the forth coming generation as they have more right on these mining areas.		
	He pointed out that 30% of the mining ore which belongs to future generation has been already extracted.		

Sensitivity: Internal (C3)

	He requested common man to be involved in the study.		
	He stated that there is no mention of flora /fauna and hydrological life in the EIA Report.		
	In view of above, he stated that the project has to be rejected.		
150	**Manoj Parab**	The speaker has made baseless and general remarks. The EIA report is prepared as per the TOR issued by MoEF&CC. The project is for mining of iron ore. Preference for employment will be given to the locals. Locals will be involved for the transportation of ore from mines to the jetty by using their 10.5 T capacity tipper trucks. The higher capacity trucks mentioned by the speaker are the company owned heavy earth moving machinery which will be used inside the mines. The state govt has auctioned mine as a fresh lease and as per minutes of meeting of MoEF&CC in case LOI is issued it is termed as Green field.	
	EIA report submitted is a false report and joke on Goans.		
	The EIA report contains a chapter on chemical analysis of ore. The report does not mention analysis of 35% of ore sample. This 35% will include heavy metals and rare elements.		
	The EIA report is being hidden from Goans.		
	Goa has gold in its ore and mud. This is not mentioned in the EIA report.		
	Dr. Nandakumar Kamat has done a research on this and submitted a paper on this to Chief Minister and Mining Minister.		
	Vedanta seeks to export this gold to China.		
	Research paper of Dr. kamat states that 6-8 kilo of one ton of ore will be gold.		
	EC states 3 MT of ore will be excavated from mines and as such 20- 24 thousand of kilos of gold amounting to 10,000 crores worth of gold will be excavated by the company.		

Sensitivity: Internal (C3)

	Why is Goa's gold sold to China and benefit not given to Goans.		
	Research papers of Dr. kamat regarding gold in Goan soil should be refered to.		
	He demands that a sample of ore should be analyse to prove evidence of gold.		
	He states that mining is required .		
	Government should made it compulsory for the mining company to give jobs for locals.		
	Company is using only 20 ton trucks, Volvo trucks. Locals do not have these trucks. Transport contracts will not be given to locals.		
	Government is dividing locals for and against mining.		
	He states that he has worked at a mining company of Vedanta at Codli and it has done huge frauds.		
	He states that 10,000 crores to be earned by the company should be informed to the Goans, but illegal mining is not wanted.		
	Huge loss is being caused to the state due to loss of royalty on gold as ore being excavated.		
	5 villages in mining lease area have unemployed youths. Human resource mapping is not done by the company in the EIA reports.		

Sensitivity: Internal (C3)

	Details of jobs to be given to locals is not done. In Mopa, locals have been cheated of jobs by the locals.		
	In an LAQ government has stated that mining company will only		
	give preference to Goans in jobs in mining companies. It is not a compulsion.		
	EIA report does not have a social impact study. He states that company has wrongly submitted that the project is Greenfield. It should have been verified before conducting the hearing.		
	He states that the EIA report should be redone and environment and locals of Goa should be saved.		
151	**Jayesh Walawalkar - not present**		
152	**Pandu Pilgoankar**	Thank you for the support.	
	He supports the mining company		
153	**Nilesh Karbotkar - not present**		
154	**Kishor Ishwar Lokre**	The state govt has auctioned mine as a fresh lease and as per minutes of meeting of MoEF&CC in case LOI is issued it is termed as Green field. The EIA report is prepared as per the TOR issued by MoEF&CC.	
	He stated that the Government has removed notification that it is a Green Field Project .		
	He stated that mining is operating from 1941 this is not a green project. And should be taken back.		
	The EIA report is false. The agency has not come on the site and the 3 seasons are not taken into account while preparing the EIA		

Sensitivity: Internal (C3)

	report peoples problems are not taken into account the authorities have considered this false report and conducted this public Hearing .		
	If now there are problems for the villages then after 50 years what will be the situation.		
	He requested the collector to tell the MoEF that the EIA the report itself is false . he stated that he was working in the mine once.		
	He states that it is not a green project and he strongly objects to the operation of the mine. Fresh EIA report has to be prepared after considering 3 seasons data.		
	It is not green project and prepare EIA report is false.		
155	. **Manohar Shirodkar R/o Lamgao**	State government has freshly auctioned the mine as new mine, Vedanta limited was declared as a preferred bidder and LOI is issued by the government. A buffer of 50m will be maintained from habitations. EIA report is prepared as per the TOR issued by MoEF&CC. The Buddhist caves are located in the habitation within the mineral block in Lamgao village. These caves are not notified monuments and hence were not specifically mentioned in the draft EIA. However, the same will be included in the final EIA. As mentioned above, a buffer of 50m will be maintained from habitations and the distance from the ultimate pit limit and the caves is around 300m. Preference will be provided to	
	The Mining had started from the time of the Portuguese and going on for last 60 years.		
	There are good and bad effects of the mining unit.		
	· It has reached the residential area and still why more 50 years are given to the mine, Unit to excavate the area.		
	· The company if given 30 years of excavation then the mine will reach the field are the humble request to the GSPCB		

Sensitivity: Internal (C3)

	that before issuing the EC, carry out site visit and survey along with the mining dept, local villagers, committee, GSPCB.	locals w.r.t employment. Necessary environment protective measures will be adopted during mining operations. Company carries out CSR activities in the buffer zone of its area of operations. The focus would be on agriculture, healthcare, education, alternative livelihood, sports, women empowerment.	
	· He stated that the EIA report is false.		
	· He states that the picture shown is one sided that CSR activities will be taken up by the company but will they executes their promise and who will monitor the issues.		
	· He stated that There are Buddhist caves and tourists spot are shown the mining area and this issue has to be taken.		
	· We are not against the mining operation but has to be done in sustainable manner.		
	· The Union workers were having problems with the company.		
	· The temples, the tourist spots and the Buddhist caves are shown in the mining area, the same will be destroyed if the mines are given to operate		The budget for environment management plan is 693 lakhs
	· We want mining but not at the cost of destruction of our houses, water bodies, fields etc.		
	· The CM can solve all our problems if he takes the issue personally.		
156	**Vinayak Samant - not present**		
157	**Arun Naik**	EIA report is prepared as per the TOR issued by MoEF&CC. The anticipated impacts of the mining operations are dealt in	The budget for environment
	· Resident of Lamgaon.		

Sensitivity: Internal (C3)

	· He stated that the mine has been existing for a long period. · He stated that the previous experiences showed that environment are effected due to mining. The report submitted by the Project Proponent is one sided. · He requested for a detailed survey to be conducted along with the villagers and also by taking in account of previous experiences. · He stated that mining company has never given justice. · They have never fulfilled their promises. · Mining lease should be given for 30 years , he sought to know why this mining project was granted 50 years of lease. · He sought to know whether this lease is revocable, if not the clause should be added in the lease. · He sought to know whether the report are done considering the period when the mine was in operation or for the last 12 years.	chapter 4 of EIA and the necessary measures/EMP required for control of pollution are provided in EMP chapter 10 of EIA. Baseline study is for the period of March to May 2023.	management plan is 693 lakhs
158	**Navin Jan Naik** He is a resident of Lamgaon. He stated that he oppose the project.	A buffer of minimum 50m will be maintained from habitations. The anticipated impacts of the mining operations are dealt in	The budget for environment

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	· He stated that the area marked for mining is below 500 meters.	Chapter 4 of EIA and the necessary measures/EMP required for control of pollution are provided in EMP Chapter 10 of EIA. EIA report is prepared as per the TOR issued by MoEF&CC.	management plan is 693 lakhs.
	· He stated that area which is marked is close to Lamgao and can cause damage to Environment, health safety of locals.		
	· He stated that the mine has an adverse effect on health and our fields.		
	· He stated that the EIA is one-sided mining has destroyed ecosystem.		
159	**Gajanan Karbotkar**	Thank you for the support.	
	· He is a resident of Mayem.		
	· He stated that he is in full support of this project.		
	· He requested the Goa State Pollution Control Board to grant the Environmental Clearance.		
160	**Sagun Gad**	Thank you for the support.	
	· He requested to start the Mining block.		
	· So he is totally supporting the mining activity to start.		
161	**Mansi Kauthankar**	All the steps prescribed in the EIA notification with respect to public consultation are followed. The EIA and executive summary of the report was submitted to all the surrounding Panchayats and Municipal Councils. A buffer of minimum 50m will be maintained from habitations. The mines management had meeting with the panchayat members who are the elected representatives of the community.	
	· She is a Panch member of Mulgao.		
	· She stated that she opposes the project.		
	· She stated that the EIA is given to Village Panchayat.		
	· She stated that the report is not explained to the people.		

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	· Temples, fields which will be destroyed should be checked.		
	· The company was called for a joint meeting in the Panchayat but they sought for police protection.		
	· She stated that the people questioned them during the gram sabha .		
	· She stated that the government should think about the welfare of the people.		
	· She stated that the job is required, food is required but not of the cost of their lives.		
162	**Anil Nagvenkar**	Thank you for the support.	
	· He states that he is from Bicholim.		
	· He states that he is very grateful to Chief Minister and MLA for starting of mining activity.		
163	**Ajay Shetkar**	Thank you for the support.	
	· He states that he is a resident of Mayem Village.		
	· He states that his main grief is about unemployment, if mining is started than our main problem will be resolved.		
164	**Suresh Kudaskar-Not Present**		
165	**Vivek Kudaskar**	Thank you for the support.	
	He is a resident of Mayem.		
	He supports the project.		
	He requested to grant EC to the project .		
166	**Mohan Parab**	Thank you for the support.	

Sensitivity: Internal (C3)

	He states that he requests the Government to start the company as soon as possible. He strongly supports the project.		
167	**Satish Sutar** · He states that he strongly supports to the operations of the mine. · He stated that employment opportunities will be generated and the truck owners will be benefited.	Thank you for the support.	
168	**Govind Ghatwal** · He states that he is a resident of Shirgao. · He supports the company.	Thank you for the support.	
169	**Shankar Rawale** · He states that he strongly supports the operations of the mine as soon as possible.	Thank you for the support.	
170	**Swapnesh Sheldekar** He states that he is placing objection on granting of EC to M/s Vedanta Ltd for starting of Block I Bicholim Mineral Block, He is a resident of Mulgao Village and the Chairman of Biodiversity from his Village. He states that the EIA report is prepared without consultation or taking local knowledge of the people into consideration. He states that no one has approached their village to collect the baseline data.	EIA report is prepared as per the TOR issued by MoEF&CC. baseline study was conducted during March to May 2023, details are provided in the Chapter 3. Prominent and famous temple like Lairai Devi temple, notified archaeological monuments like Namujgah are mentioned in the EIA. There are several other religious places of worships within the habitation located in mineral block, minimum buffer of 50m will be maintained. The speaker has made false allegations w.r.t the EIA report.	

Sensitivity: Internal (C3)

	He states that the data collected is inaccurate, unreliable.		
	He states that no authority is aware of any person visiting the village for collection of the data.		
	Data collected from buffer zone .		
	The data provided in the EIA report is nor accurate and appears to be fabricated.		
	False data is given in the report .		
	Temples, caves. Lakes etc does not find mentioned in the EIA report.		
	Entire study to be redone after taking into consideration biodiversity committees and local bodies and then conduct public hearing.		
171	**Vinod Naik - Pirna**	Thank you for the support.	
	· He states that he strongly supports the operations of the mine as soon as possible.		
172	**Shrikant Karbotkar**	Thank you for the support.	
	He states that he strongly supports the operations of the mine activities.		
	He requests to start a sustainable mine without hurting the sentiments of the villagers.		
173	**Prashant Kinalkar - Mayem**	Thank you for the support.	
	He states that he strongly supports the operations of the mine activities.		
	He states that he has his vehicles in the area. ‘		

Sensitivity: Internal (C3)

	He request company should take into the confidence all the truck owners and other people who they used to provide benefits monetary and others into confident and start the mining operation as soon as possible.		
174	**Prakash Naik – not present**		
175	**Navnath Jannaik** · He is the resident of Lamgao · Production of supari has decreased due to mining . · the cost of fertilizers is more than the input they get from the produce	Agriculture development is one of the key aspects of company's CSR. The company will engage with the farmers and with help of state agriculture dept will help the interested farmers in crop development	
176	**Sumit Talawnekar - Mayem** He states that he strongly supports the operations of the mine activities as soon as possible. · He states that he is a Truck owner and his land is next to the mine lease area. · He states that he is unemployment and no one came to his aid when the mines were shut down.	Thank you for the support.	
177	**Khemlo Sawant – Not Present**		
178	**Pravir Prabhakar Fadte** He states that he has inwarded Goa Foundations' application in Collector office yesterday on 10-08-2023.	EIA report is prepared as per the TOR issued by MoEF&CC. it is true that this particular mineral block was earlier operated by Sesa mining Corporation ltd (formerly known as Dempo mining corporation Ltd). Pursuant to Supreme Court	

Sensitivity: Internal (C3)

	The necessary environmental information and data which are required to be produced in response to the TOR are missing from the draft EIA document. The suppression of necessary information has been achieved by claiming that the Mining Block is a "Greenfield project" . Such a characterization of what is clearly accepted. The Mining Block has been operated from inception as a series of five leases (TC 11- 15/1941) neighbouring each other in a straight line, and thereafter, amalgamated lease is the relabelled "I-Bicholim" and has the same boundaries.	judgement in Goa Foundation 2 dated 07.02.2018, all the mining leases granted by the state government were cancelled. Thereafter, State Government in terms of the said order and as per the provisions of MMDR Act put this block for auction as a fresh lease/ grant. Vedanta Ltd was selected as the preferred bidder in the said auction for Block I Bicholim mineral block and accordingly LOI was issued to Vedanta Ltd. As per the MoEF&CC EAC minutes of meeting, in case of LOI grant it is classified as green field and hence in the EIA it has been mentioned as green field. There is no hiding of facts as alleged by the speaker/ goa foundation, as the earlier pits can be seen in the surface plan which is provided as plate no 5 of EIA.	
	These 5 leases before and after amalgamation have been in operation since 1941, and have been operated by a variety of actors, including Dempo Mining Corporation and Sesa Mining Corporation Ltd. SMC is a wholly owned subsidiary of Vedanta Ltd., which is now assigned this mineral block. The production data of the 5 leases, from 1941 to 2012, is available in public domain. The leases were also operated between 2015 and 2018 by SMC /Vedanta. In normal and legal terminology, such a mine site could never been cauterised as a Greenfield project for the purpose of obtaining Environmental Clearance.	The EIA also comprises of detailed hydrogeology report based on CGWA guidelines which concludes that there won't be any adverse impact of mining on surrounding ground water regime.	

Sensitivity: Internal (C3)

	The important thing to emphasis here is that the wilful characterisation of the project site as a "Greenfield" project has been relied upon to withhold data and the past record of this project proponent (PP) required to be made part of the draft EIA and to the public. This includes the environmental data collected since the lease started operation in 1941 as well as studies by academics and entities like NEERI, which data and information must be used to understand past impacts so as to foresee future impacts.	As per our information, the erstwhile leaseholders have complied with all recommendations prescribed by NEERI in PIL no 1/2008. According to the official records, the three erstwhile leaseholders namely Chowgule and Company Private Limited, Rajaram Bandekar Mines Private Limited and Sesa Mining Corporation Limited have submitted an amount of Rs. 65,00,000 with the High Court. Desilting work is being carried out by Water Resource Department.	
	There are people who have their own grievances and hence has to be give sufficient time to place their grievances and requested to adjourn the public hearing as EIA report has suppressed basic data . It series of 5 leases which are amalgamated to single number		
	The investigation report of assessment of depletion of ground water sources and land degradation in Sirgao Village ,and mitigation Measures by National Environmental Engineering Research institute under Council of Scientific & Industrial , Nagpur dated 16/06/2008 in PIL No. 1/2008 was submitted to the Hon. High Court of Bombay at Goa in which it clearly shows the worst condition of natural water		

Sensitivity: Internal (C3)

	sources and other issues are mentioned in it. Why this report was not included in the draft EIA. Copy of the report is submitted to Goa State Pollution Control Board.		
	He requested the Collector to personally visit the mining lease areas and do the surveys of the critical conditions of the people living there and requested to re-schedule the Public Hearing.		
179	**Narayan Sawant - not present**		
180	**Hanumant Malik - not present**		
181	**Vallabh Parab - not present**		
182	**Vinod Mandrekar**	State government has freshly auctioned the mine as new mine and Vedanta ltd is selected as preferred bidder. As mentioned in the EIA the project will generate employment opportunities to 716 locals and preference will be given to the locals. A buffer of minimum 50 m. will be maintained towards habitation. There are primary schools (at Gaonkarwada (not in use) and Manasbag) in Mulgao village within the Mineral block. A buffer of 120m will be maintained from the Manasbag habitation and will be updated in the EIA report. Necessary protective measures to be taken are mentioned in EMP which also includes drainage details. There is no planned activity in the unused area.	
	He States that he strongly opposes the mine lease		
	He States that he wants to seek clarification from the Project proponent.		
	He questions how many people are employed from the core mining belt.		
	He States that the most important thing is roti kapda and makan.		
	He States that if roti is provided but their homes are taken		
	He requests the GSPCB to excluded the houses and demarcate the area.		

Sensitivity: Internal (C3)

	He wants clarification whether the GSPCB, have visited all the villages.		
	He States that there are govt primary schools in Manasgao Mulgao which is not mention in the report.		
	He States that he visited the school today and the same is operational but the GSPCB nor Project Proponent has visited the school.		
	He States that the mining lease boundary in my village mulgao, there is no drainage system which has to be taken into account.		The budget towards erosion control measures, monsoon preparedness on mines and water treatment : 232 Lakhs
	He States that he wants a detailed report what activities are proposed in the unused area as the same are not mentioned by the Project Proponent.		
183	**Kalidas Kavlekar**	The speaker has made false allegations. EIA report is prepared as per the TOR issued by MoEF&CC. Land use plan given as an annexure covers all the water bodies in 10km buffer zone including Mayem lake. Important archaeological sites are mentioned in EIA for ex. Namujgah which is located within the mineral block. The presence of habitation within mineral block (in Lamgao and Mulgao Village) is clearly specified in the EIA report. Necessary environment protective measures will be adopted during mining operations and the same is covered in Chapter 10 of EIA. Representatives from mining company	
	He is from Mayem Village. The EIA report is erroneous, It is not known as to who and when survey is conducted.		
	Several complaints against the mining go unattended. Likewise many cases are pending before Mamlatdar which are unsolved.		
	There are 167 water bodies mayem lake not shown on the EIA report.		

Sensitivity: Internal (C3)

	Heritage sites are omitted. He requested that proper survey be conducted and then processed EC.	and the EIA consultant were present for the PH. the Consultant also clarified the points raised on request of Collector.	
	Ancestors houses not shown or mentioned .		
	Latambarcem / Mayem details not given.		
	If mines can give justice to everyone than they can definitely proceed with lease mining project.		
	No representative present from mine.		
	Lots of dust pollution due to mines which is creating air pollution in the area.		The budget towards Environment Monitoring / Air pollution control measures : 408 Lakhs
	GSPCB should take everyone into confidence and the same presentation should be presented before the villagers.		
184	**Rohan Shirodkar**	The EIA report along with executive summary was submitted to all surrounding Village Panchayats office for further awareness. The presence of habitation within mineral block (in Lamgao and Mulgao Village) is clearly specified in the EIA report and a minimum buffer of 50m will be maintained from the habitation. The notified archaeological monument within the mineral block is listed in the EIA. EIA report is prepared as per the TOR issued by MoEF&CC. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism for any concerns.	
	He strongly objects to the operation of the mine.		
	He states that the EIA report has not reached him.		
	The presentation given states that there are 200 houses which are illegally demarcated.		
	There are archaeological protected sites which are there in the lease area.		

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	He states that no local person or farmers were taken into consideration while preparing the EIA report.		
	Our houses temples, villages have to be taken into account before commencing the mining operations.		
	Previously only few were given employment because their houses were effected . And now there are taken out of employment. Their problems have to be solved first.		
	Their he requests the company to solve their problems first.		
185	**Bhagwant Gaonkar**	Thank you for the support.	
	He is a resident of Mayem.		
	He stated that his house is within 3 kms.		
	He supports the mine.		
186	**Trupti Gad**	The anticipated impacts of the mining operations are dealt in chapter 4 of EIA and the necessary measures/EMP required for control of pollution are provided in EMP chapter 10 of EIA. A minimum buffer of 50m will be maintained from the habitation. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism.	The budget towards Environment Monitoring / Air pollution control measures : 408 Lakhs The budget towards erosion control measures, monsoon preparedness on
	There are different committees in our villages and all the committees had come together and a draft ahd been put up with all the problems faced by the villages of the area.		
	She states that the temples, houses, fields are in the lease area.		
	She states that 2 times the mine had collapsed and they had to face a lot of problems.		

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	She requests to first solve the problems of the villagers affected by the mining operations and then start the mine.		mines and water treatment : 232 Lakhs
187	**Ranjana Chodankar** She states that there are big trees which have been grown in our area and which have to be cut down and the area has to be cleaned. She states that the area has to be cleaned as there are crocodiles there. She states that no employment is given to our children . She states that mining has destroyed everything. She requested the company to first solve the problems of the people and then start the mining activities.	The speaker has made general statements like requesting to cut big trees in her area, cleaning the area. Company will engage with the local communities as part of its stakeholder management and grievance redressal mechanism. Preference will be given to locals for employment. All the retrenched employees of earlier mine owner were offered job and many of them have taken advantage of this opportunity. Company also runs a technical institute (ITI) in Sanquelim village which caters to skill development of local youth and making them employable.	

Sensitivity: Internal (C3)

Clarifications provided by the consultant during the Public Hearing on 11th August 2023

Sr No	NAME & COMMENTS	RRESPONSE	BUDGET
1	**Shri. Swapnesh Sheldekar**		
	He sought to know the exact duration for which the baseline data was collected by the consultant for incorporating in the EIA report.	The baseline data initially collected in the year Oct, Nov, Dec 2020, since the data validity was nearing expiry on Sep 2023, the baseline data was again collected from March to May 2023.	
	How is it that the consultant representatives have not been seen or identified by the local villagers during the exercise of collection of baseline data in the village of Mulgao as claimed to be carried out by the Consultant.	It is a sample survey, and the sampling team has collected the baseline data.	
	Does the Consultant posses photograph of the Leopard clicked during the process of data collection?	It is clearly mentioned in the Draft EIA report that the information of presence of Leopard was provided by locals i.e. secondary data. The detailed List of Flora and Fauna is provided in Chapter 3	
	There was no mention of forest in Mulgao Village in EIA report , how is this possible when across the boundary of village of Mayem is shown to have forest in the EIA report and also how can this be possible when there are two temples located in the village of Mulgao dedicated to the Goddess of Forest (Dhaktivan Devi and Vodlivan Devi).	The is no forest land within the Mineral Block and the same is confirmed by the state govt.	
	The EIA report does not mention the presence of large number of water bodies and temples in the Village of Mulgao. How is this possible?	Only major temples like Lairai Devi temple are mentioned in EIA. However, there are several such temples in the habitation for which a buffer of 50 m from the habitation is mentioned. There are no natural water bodies within the mineral block. As per the information there are settling ponds which were developed or constructed by erst while	

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		mining company. These ponds were maintained, desilted by the earlier mining company and the same system will be followed. Flow of water to the Mulgao horticulture area will be ensured as was done by earlier mine owner.		
	The existence of archaeological site that is 2500 year old Buddhist caves at Lamgao are not been mentioned in the EIA report. How is this possible? The Project Proponent is requested to include this in the report	The Lamgao caves are not a notified monument, however the same will be incorporated in final EIA. It is within the habitation of Lamgao and a sufficient safety buffer will be maintained.		
	Project proponent was questioned as to how the consultant being qualified has classified this project as a Greenfield project knowing fully that it is a Brownfield project	The mine is a fresh grant through auction regime by state govt for which LOI is issued to Vedanta Ltd. As per the MoEF&CC minutes of meeting, in case of LOI grant it is classified as green field.		
	With reference to table 2.3 at page no. 15 of 600 of the EIA report, Consultant was requested to clarify as to the feasibility of the figure of 17.05 of Free Feasibility Mineral Resource which requires washing as the mine does not have facility for washing.	Clarified that it is not a proved reserve and will have to undertake further exploration to prove the same.		
	Based on the reserves as stated at Table 2.3 at page 15 of 600 of the EIA report can the Project Proponent windup operations in 10 years?	NO		
	With reference to a corrigendum dated 06/06/2023 issued by the DMG putting a gap of 40 trips per hour on the road on the company, the Company will not be able to transport more than 1 million tons per annum. The Project Proponent was requested to clarify.	The above referred notification is for auction ore only.		
2	**Shri. Ramesh Gauns**			

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	According to EIA the Consultant visited 68 places out of which 58 are the villages having Gram Panchayats. And the Gram Panchayat maintains biodiversity register based on the Biodiversity Act. Whether the consultants approached gram Panchayts to go through the register to find out the Biodiversity of the Village.	NO		
	They studied the surface water but did not study the surface water of the water body flowing infront of Shantadurga School and which emerges from within the mining lease carries lot of silt then meets the River Bicholim and empties into Mandovi River. It is a pollution of water body is concealed.	The same nalla flows and mixes with the Bicholim river and Upstream and downstream of the Bicholim is collected.		
	The water in the pits according to EIA report is stated that pit water is rain water. But when the study is carried out the main period of summer in the month of March, April and May, the pits are full of water in the month of May. The colour of the water clearly states that it is ground water and not rain water.	The rainwater is channelised in to the mine pits and as per the hydrogeological survey there exists bands of impervious layer comprising of Phyllite and clay and hence there is no ground water seepage. However the project proponent will take approval form Water resources Dept for pumping of the rain water/ ground water accumulated in the mine pit.		
	He sought to know whether the wells have been studied from Mulgoa, Mayem, Bicholim, Lamgao, as wells are the indicators of ground water and they should have checked the levels of well water in the month of May not to give any scope to the company that the drying of wells is not because of them. The study would have provided a substantial evidence against the Company to refute on the perennial fresh water in the wells.	All villages mentioned above is covered.		

Sensitivity: Internal (C3)

	Mayem lake is used for surface water study but the 2 springs have gone completely dry because of the pit which has gone deep at Dhabdabha resulting in the depletion of water level of these 2 lakes goes low in the month of May.	There is no connection between the mine pit and Mayem lake. A detailed hydrogeology study is provided as part of EIA.		
	Then there are lakes in Malgao and Mulgao. Among these there are 6 lakes are in Mulgao and 7 lakes in Lamgao according to the RTI sought from the Mamlatdar of Bicholim on 01/07/2009. The total area of all these lakes comes to more than 27,000 sq. mtr which is nearly 3 hector of the land. All these lakes are totally silted which once upon a time feed the agriculture in Mulgao, bittlenut plantation in Mulgao so also in Lamgao. All these lakes find no place in the EIA report. One of the lake in Lamgoa belong to Government having 3375 sq. mtr. This fact is defeated by the company instead they claim it to be their tailing pond. The same lake was used for Ganesh immersion and now no immersion takes place in the tailing ponds.	All the water bodies within the buffer zone are covered under Land use pattern under chapter 3 of EIA		
	A number of tipper/trucks is missing in EIA which would have helped to calculate actually the ore is transported and thereby can be matched up with the production as given in the EIA report.	Covered under Chapter 4 pg No.129		

Sensitivity: Internal (C3)

	He asked for the gradient of the mining area as the top most point of this area is 169 meter plus a huge waste generated to a tune of 1:8.39 tons based on the annual production of 3 million tons the waste generated will be 2, 51,70,000. Therefore, the gradient is very high to ration. The gradient to was very much important because no mechanism can stop a huge silt moving out of the mining lease when entering into River Bicholim which is connected to the mining lease precisely to the lake which is sy. No. 25/1. The steam is as of now heavily silted used for fishing purpose in the town it self. Everything is wiped off.	The gradient of Dumps is provided in the EIA report. The EIA also contains the environment protective measures which will be carried out for dump stabilisation.		
3	**Shri. Vinod Mandrekar**			
	There is a Government Primay school located at Manasbhag Mulgao which is operational as on 10/08/2023. This school is located within the mining lease/core are of the proposed project. However, this school is not mentioned any where in the EIA report. The Consultant is requested to clarify this point.	We will reconfirm regarding this additional school in Mulgao, Manaswada and functionality of Govt Primary school shall be included. However, a sufficient buffer zone will be maintained towards habitation.		
	In the EIA report there is a mention of unused area (refer Map on page 262 of the detailed EIA report). Consultant is requested to clarify as to the meaning of the term unused area. Further, consultant is specifically requested to clarify as to whether unused area in the EIA that includes the residential areas in the unused area.. If not the Consultant	The residential area is included in unused area as per existing available exploration data. 50 meters buffer zone will be maintained from the residential areas/houses in the village of Mulgao.		

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	should give a specific undertaking in this regard whether it will be used in the future.			
4	**Shri. Pravir Phadte**			
	Do you think that your draft EIA report can be understood by common people without any awareness programme about it? Or what are your suggestions to enable common people /illiterate people to understand this EIA report?	All the procedure stipulated in EIA notification is followed.		
	The amount time taken by you to prepare this EIA report? How is it that though the TOR for the project was granted on 16/06/2023 the draft EIA? report was signed on 20/06/2023 by the Mining Engineering Services Consultant, M.S. Raju.	The work of EIA was started basis the standard TOR issued by the MoEF&CC and the baseline was carried out from march to May. Although the TOR was issued on16th June, the minutes of meeting including all the points was received earlier and the EIA work was continued and completed.		
	Explain in detail how the Consultant has classified this project as a Greenfield project?	Explained earlier		
	Why was the detailed EIA report not explained to the public/ awareness regarding the same not done by the Project Proponent when keeping the report with the Local Panchayat. How does the project Proponent expect the detailed EIA report to be understood by the Public present for today's hearing only on the basis of short Power Point Presentation made today?	Explained earlier		

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	As the time to seek clarification is being restricted to 5 minutes; it is requested that the written submissions submitted to the Collector's Office on 10/08/2023 by The Goa Foundation should be clarified by the project proponent now. Copy of the submission is handed over.	All the issues raised during the PH will be addressed in the final EIA		
	Why has the MoEF terminology not been explained in the EIA report?	EIA is prepared based on the TOR issued		
5	**Dr. Sebastiao A Rodrigues,Convener of Bharat MuktaMorcha (Goa State)**			
	Regarding baseline data presented in EIA, so I want to know periods of data collections . Because the consultant Raju has stated that he had collected data upto September, 2020 .When I questioned on that on this subject Mr Raju informed that indeed baseline study was upto September 2020	Explained earlier. The base line data was done during Mar to May 2023.		
	Regarding project proponent application dated 16/03/2023 seeking TOR ,wherein it is mentioned that the period of baseline data collection as from 01/10/2020 to 31/12/2020.	Explained earlier		
	October 2020 to December 2020 there was covid-19 lock down in Goa. Did company carry out baseline data collection during lockdown period?	Yes, explained earlier. The data was again collected afresh during March to May 2023 which is considered in EIA.		
	When TOR requires baseline data collection of three non monsoons in a year, why baseline data was collected only for one season of march to may 2023?	Mr. Raju answered that only one season data is required. I mentioned that PP has admitted for tweaking TOR on baseline data collection in EIA. Mr. Raju denied.		
	Asked whether the comments received from public will be incorporated in the EIA report and shown to the public again.	Mr. Raju answered all the issues raised shall be addressed and submitted to MoEF&CC.		

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	Now my last clarification is will all the applications received against this mining projects be forwarded to MOEF&CC considering that former environment cum public relation officer of Project proponent Mr. Mahesh Patil is the Chairman of GSPCB, as the case of likely conflict of interest.	All shall be forwarded. Collector North requested the people present that if they so desire, they may file their written objection/suggestion/views within 7 days from today to the GSPCB. The same will be part of the hearing and accordingly it would be forwarded to the concerned Regulatory Authority.	

Clarifications to the letters received w.r.t. the Public Hearing on 11th August 2023

REPLY TO LETTERS RECEIVED			
Sr. No.	**Letter**	**Response**	**Budget**
Letter 1 and letter 2 are same letters hence common response provided	**Dr. Sebastiao A. Rodrigues,** 48/2, P.O. Piedade, Vanxim, lihas, Goa-403403 Mobile:9923336347, 17August2023 **From: Ramesh S. Gauns** 1724, Pajwadda, Bicholim. Goa Mobile:9270085105		

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	17August2023 The Member Secretary Goa State Pollution Control Board, Saligao, Bardez, Goa Subject: Failure of GSPCB to complete minutes of the Public Hearing of Block - | Bicholim Mineral Block on 11 August 2023 at Sarvan Bicholim Madam, Above referred Public Hearing (PH) that began at 09.00 am on 11 August 2023 came to an abrupt end at 01.30 am on 12 August 2023 without minutes being finalized and shared in hard copies to the participants of the PH. It was total mess thanks to incompetent staff in compiling notes at the PH. It was observed that the large number of points raised by several speakers were not recorded in the minutes. In some cases entire presentation of the speakers found to be omitted along with their names. In other cases in spite of rectifications suggested by speakers who were present at the PH venue till mid night minutes could not be completed. Mess created by the on duty staff went out of control of the Presiding Officer who is North Goa Collector and an IAS officer. Presiding officer went on to announce at 1.30 am that the minutes of the PH will be shared online at GSPCB website. This is complete violation of the norms of PH followed where in minutes used ta be finalized immediately after the conclusion of the PH and print copies were shared with the participants present at that time at the venue duly	These are false allegations, the public hearing was completed after the minutes of meeting were read out in presence of public and the finalised minutes were signed by the Chair of the meeting and representative of GSPCB. The entire proceedings of the PH were video graphed by the GSPCB. The consultant was present for the Ph throughout the proceeding; however he went on the stage only when he was invited by the Chair of the meeting for providing clarifications to the speakers. The speaker is making false and baseless allegations on the officials, it appears that he has come with a predetermined agenda. We would like to state that the Minutes of public hearing meeting were finalised on the same day in the presence of the public. The document was signed by the Chair (Collector North Goa) and the GSPCB representative Dr. Girap and the copy of the same was handed over to us as well as the collector immediately after the conclusion of PH. The speaker also could have collected the copy immediately after the conclusion of the PH.	

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	signed by the Collector as the Presiding officer. We are worried that messy situation created thus might be used by vested interests to manipulate/omit/delete part of the contents before the minutes are made available online. Biggest danger we fear to the integrity of minutes is from the Chairman of the GSPCB Mahesh Patil who is an exEnvironment cum Public Relations Officer of Sesa Mining Corporation that is wholly subsidiary of Vedanta who Is currently the project proponent. Tempering of minutes in order to favor Project Proponent is real possibility. And quality of online minutes confirms this further. Therefore we strongly object to the procedures adopted by Presiding Officer of PH of putting minutes of the PH online without giving print copies immediately after the conclusion of the PH. When Ramesh S. Gauns asked for the consultant of EIA Presiding Officer responded saying that Consultant is not present at the PH proceedings. Consultant appeared in the night at around 08.00 pm. Time given for asking queries was only 05 minutes. Ridiculous trend is set in PH by granting only 10 minutes to seek clarification on document that consisted more than 600 pages of EIA/EPM. Several People could not get access to the Hall before 11.00 am because Project Proponent mobilized management and employees from all its buffer zone and out of buffer zone units to enter the Hall and occupied the entire hall to its fullest capacity. Minutes are put online after five days on 16 August 2023. What is recorded in the minutes is different from what was spoken at the meeting. Minutes has innumerable errors,		

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	Pages 12, 31, 32, 33 encompassing 20 people and their presentations are missing from the records of minutes. Your are therefore required to hold Public Hearing afresh based on fresh EIA. Thanking you, Yours Sincere, Dr. Sebastiao A. Rodrigues Copy to: 1. Collector (North Goa), Panaji 2. Union Minister of Environment, Forest and Climate Change, Indira Paryavaran Bhavan, Jorbag Road, New Delhi 110 003 INDIA 3, Chairman and Members of Expert Appraisal Committee, MoEF&CC, Indira Paryavaran Bhavan, Jorbag Road, New Delhi 110 003 INDIA		
Letter 3 and Letter 4 are same hence merged and common	**Dr. Sebastiao A. Rodrigues** 48/2,.P.0 Piedade, Vanxim, Ithas, Goa 403 403 Mobile: 9923336347 Date: 18" August 2023 Member Secretary, Goa State Pollution Control Board, Saligao, Bardez, Goa **Ramesh S. Gauns** 1724, Pajwadda, Bicholim. Goa Mobile: 92 70085105 Date: 18" August 2023 Member Secretary, Goa State Pollution Control Board, Saligao, Bardez, Goa	A detailed traffic density study was conducted and details are provided in Chapter 3 of EIA. The google map showing the transportation route is also part of the EIA. The details of the road are also provided in the traffic density study, Out of the 5.4 km of transportation route around 0.9km of road is public road after which the trucks enter the iron ore loading jetty at Sarmanas(not the public ferry jetty) .The pollution control measures proposed to be taken are detailed in Chapter 10. The entire transport route is shown on the google earth map which is part of the EIA. It is true that there are two	The budget towards environment monitoring and air pollution control measures is 408 lakhs.

Sensitivity: Internal (C3)

response provided	Subject: Concealment of usage of Public Road in front of the main Gates at Bicholim of Block I Bicholim Mineral Block in ETA report Madam, Road from Bicholim to Chorao Ferry, Narve, Mayem lake, Poira, Siqueri, Mayem, Tikhazan is under crowded vehicles (two wheeler and four wheeler) daily except Sunday. The same road is intersected in front of the gates of the mining area. The road has got a slope and if ends exactly at a point of intersection. Most of the vehicles on road are headed towards the Ferry crossing into Chorao. Local people of all the villages mentioned above use the road to approach to reach Bicholim town for various reasons particularly taking the young children for schooling in Bicholim. Therefore instead of using this public road use a fly-over like structure to avoid risk for the lives of the heavily crowded ruad by all the commuters. Secondly, mining road from within the Project Proponent's mining area also intersects the road to Pilgao village in front of the turn to Sarmanas Ferry. Some fly over like structure is required to be installed to ensure safety of the commuters. 900 meters road as mentioned in EIA does not reveal actually which public road will be uscd for the transportation of the ore. EIA does not speak that it is none other than the Pilgao road which ts also heavily crowded by the two wheeler and the four wheeler to reach Sarmanas ferry to attend to their duties. In fact immediately after that 900 meters of the said road the ferry point hardly at a	junctions namely at Mulgao and Pilgao on the transportation route and both the junctions will be provided with traffic marshals for smooth flow of public as well as ore traffic. Government will be constructing the underpass at the cost of project proponent at Mayem junction so that the interface between ore transportation and public is avoided . Till the underpass is constructed, dedicated manpower would be deployed to facilitate smooth and safe flow of transport.	

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	distance of 100 meters but it is not recorded in EIA, There are two ferries operating indicating that there is a heavy load on the road by the people travelling with two wheeler and four wheeler. Therefore using the 900 meters of public road of Pilgao village is nothing but creating dangerous situations two all the commuters. Also the loaded trucks will create dust pollution which people will face and also the clothes will be severely dusted. Hence the road should not be used for transportation instead a conveyor belt from the road from where trucks move on the public road of 900 meters should be constructed and used. On ground verification of 900 meters road at Pilgao connecting Sarmunas Jetty is 1 km distance and not 900 meters in length as mentioned in EIA report. This means that Project Proponent has cheated with facts on ground. Project Proponents therefore be denied Environmental Clearance for the Block I Bicholim Mineral Block as use of Public Village road is in violation of Terms of Reference. Thanking You. Yours sincerely, **Dr. Sebastiao A. Rodrigues** **Ramesh gauns**		
Letter 5	From: Ramesh S. Gauns 1724, Pajwadda, Bicholim. Goa Mobile: 92 70085105 Date: 17 August 2023 The member secretary, Goa State Pollution Control Board, Saligao, Bardez, Goa SubJect: Discrepancies in baseline data collection in EIA	The base line data was earlier conducted during Oct-Dec 2020. The same was mentioned in the TOR application also. However, as there is a validity of three years for the baseline data, The base line monitoring was again conducted for the period Mar- May 2023. The base line monitoring is carried out as per the TOR issued by MoEF&CC and is valid.	

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	Project Apptlication and Statement of Consultant M.S. Raju of Mineral Engineering Services regarding Block-I Bicholim Mineral Block Madam, We wish to bring to your notice the following discrepancies with regards to period of baseline data collection as stated in above mentioned subject: 1. Project Proponent (PP) Vedanta Limited submitted application to MoEF&CC dated 16 March 2023 seeking Terms of Reference (TOR) to prepare EIA/EMP. In their application PP has stated that the baseline data for EJA Study was collected from the three month post monsoon season period 01 October 2020 to 31 December 2020. 2. EIA report in compliance to TOR 44 by PP states that the baseline data was conducted during summer season 2023. 3. At the Public Hearing held on 1) August 2023 regarding this project consultant M.S. Raju stated during clarification queries by Swapnesh Sherlekar that consultant had collected bascline data upto September 2020 and this is even recorded in the minutes posted online at Goa State Pollution Control Board (GSPCB) on 16" August 2023. 4. Project consultant M.S. Raju confirmed again in response to query raised by Dr. Sebastiao A. Rodrigues that the baseline data collected was upto September 2020. The three months bascline data upto September 2020 would involve data covering monsoon season of July to September 2020 in violation of TOR 44. When it was pointed out to the above consultant that the Project application for TOR states that period of data collection mentioned is of post monsoon season from Of October 2020 10 31 December	Mr. Ramesh Gauns is making false and baseless allegations. Measurement of rain is a very common practise and the same is done every year by the mining companies. The consultant has collected the rain data for last 5 years from the earlier mine owner. All the land use features are provided in the EIA. Details about the habitation aswell as main water resources like river etc are provided.	

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	2020 Mr. Raju denied having collected baseline data during this period stated in the Project Application for FOR. This indicates that the baseline data collection period mentioned in the Project Application as from 01 October 2020 to 33 December 2020 is false. Further Mr. Raju stated the rainfall data stated in EIA as 3500 mm was collected not only from the meteorological department but also from on-site physical monitoring of rainfall at Block -I Bicholim Mineral Block. This means that baseline data collected is of monsoon season. When it was questioned about the credibility of the content of Project Application to MoEF &CC regarding baseline dats collection period M.S. Raju denied his own statement saying his baseline data is upto September 2020 and said period from 01 October 2020 to 31 December 2020 is correct. {f this was indeed correct then why did Mr. Raju stated that his baseline data is upto September 2020? This means that baseline data collection periods stated both in Project Application to MoEF & CC as well as in EIA report are fictitious in nature. 5. Additionally Consultant M.S. Raju was questioned by Dr. Sebastiao A Rodrigues whether his agency really carried on baseline data collection during 01 October 2020 to 31 December 2020 considering that it was strict lockdown period due to Covid-19, Project Consultant M.S. Raju answered affirmatively stating that indeed baseline data in 2020 was collected during COVID-19 lockdown period. 6. Since the stated period of data collection (01 October 2020 to 31 December 2020) stated by PP in Project Application is impossible to believe or accept on the ground of inherent inconsistency the suspicion of the conduct of		

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	the PP manifesting fraud are established beyond doubt. The stated period of baseline data in EIA of March to May 2023 too is suspect due the past record of cheating about baseline period datas as established from above facts and analysis. 7. Baseline data being the foundation of EIA and having established that Consultant ot PP has engaged in gross manipulations fresh documentation and fresh EIA be directed to be conducted by PP. This is required to be done not only because of several defects in EIA relating to baseline data related to lakes, rivers, wells and Perennial flowing rivers but more because PP has violated TOR and cheated on disclosure period of bascline data collection itself thereby violating TOR 44 & 70. Hoping for sincerely and decisive directions from MoEF & CC to direct PP to compile fresh documentation and conduct Public Hearing again as required under TOR 70. Thanking you, Yours sincerely, Ramesh S. Gauns Copy to (1) The Minister of Environment, Forest and Climate Change, New Detha (2) The Chairman and members of the Expert Appraisal Committee, MoEF&CC, New Delhi		
Letter 6	From: Anil D Salekar, Begwada, Pilgao, Bicholim, Goa Mobile: 9850138372 date: The Member Secretary, Goa State Pollution Control Board, Saligao. Bardez, Goa Subject: Grievances regarding choice of venue for Block-I	The venue of the public hearing was selected by the GSPCB as it was the most convenient in all aspects. The venue is also less than 2 km aerial distance from the mine boundary. The project proponent also provided refreshments twice during the hearing. Ample time was provided to the public for	

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	Bicholim Minerai Block Public HearinG (PH) held on 11 AuGust 2023 at Sarvan organised by Goa State Pollution Control Board GSPCB Madam, We have observed that the venue for PH at Zantye Sports Complex, Savona, Bicholim chosen by GSPCB was unreasonably far from the villages in the core zone areas and those impacted directly. Venue was 13 kms from Sirigao, 09 kms from Mulgao, 05 kms from Lamgao, 07 kms from Pilgao, 12 kms from Maem and 03 kms from Bicholim. Case law in india requires that the venue for the PH should be within 01 kms from the proposed mining project. PH was held in Sarvan village Panchayat Jurisdiction that is not in the core zone of the mining project. Several people could not make it to the venue as it was far from the the core zone localities. There were available Halls attached to Temples in Sirigao, Muigao, Lamga Maem, and very big Hirabai Zantye Memorial Hall in Bicholim but the were not taken. The venue of PH at Bicholim was inconvenient because Public Hearing that an at 09.00 am on 11 August 2023 went on till 01.30 am on 12 August 2023 for nearly seventeen hours. There was not a single hotel at the venue of the Public Hearing. Number of people stayed in the hall starving. Women who stayed on till 01.00 am at night had major problems. We were under impression that It was an absolute prerogative of GSPCB to decide on the date and venue of PH. However after the consultation with some knowledgeable	registration. Hence the allegations are of baseless nature as 834 people attended the PH.	

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	people in this matter we realized that venue had to be within 2 kms from the proposed project. if we had to know this in advance then we would have objected to the venue selected by GSPCB to hold this PH. In the light of various judicial directions given by National Green Tribunal B6(NGT) and Gujarat High Court Judgement of 2003 we call upon you to conduct fresh PH close to our localities and villages at core zone of the mining project. Thanking you, Yours sincerely, Anil D Salelkar Copy to 1. The Union Minister for Environment, Forest and Climate Change, Indira Paryavaran Bhavan, Jorbag Road, New Delhi 110 003 INDIA 2. Chairman and the Members of the Expert Appraisal Committee, MoEF & CC, indira Paryavaran Bhavan, Jorbag Road, New Delhi 110 003 INDIA		
Letter 7	From: Mr. Sharadchandra Krishnarao Vishwasrao Desai Son of late Shri. Krishnarac Ravioba Vishwasrao Desai & that of Ms. Sundarabai Krishnarao Vishwasrao Desai Resident of house no: 1996, Vishwasnagar, Larngao, Bicholim Goa. Date: 11.08.2023. To _ The Member Secretary Pollution Control Board Saligao, Bardez Goa. he Deputy collector of Bicholim Taluka Bicholim Goa. SUBJECT: OBJECTION FOR MINING IN LAMGAO VILLAGE & IN BICHOLIM BLOCK Sir, I am permanent resident of Bicholim being born and	With respect to civil suit bearing no. 188/2015, it is our understanding and on the basis of available official records, the matter was filed against the erstwhile leaseholder SMCL. Vedanta Limited is not a party to the proceedings and no adverse orders have been passed against it. With respect to case no. SDM.BICH.133 CRPC,4.2013., it is our understanding and on the basis of available official records, the matter was filed against the erstwhile leaseholder SMCL wherein SMCL had challenged the order dated 20.02.2018 in a criminal revision application before	The budget towards Environment Monitoring and Air pollution control measures: 408 Lakhs The budget towards Erosion Control Measures,

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	brought up at Village Lamgao having my landed properties in Bicholim and in Lamgao Village. I have alse filed civil suit bearing no: 188/2015-C which is pending in the court of Civil Judge Junior division at Bicholim. Already there is intunction granted by the Civil Court in my favour vide order dated 18.04.2022. The said order reads as under: ORDER i. The application for temporary injunction at exhibit D-3 is granted. ii. The Defendants, thcir relatives, servants, agents, or any other person claiming through or under them are hereby restrained from interfering with the suit property and digging pit in the suit property or from carrying out any such mining activity in the suit property bearing survey no; 15/1 of village Lamgao of Bicholim tatuka until the disposal of suit on merits. The Defendants in the above referred order are : i. Sesa Mining Corporation Limited, Bichclim Iron Ore Mines, Dhabdhaba Bicholim Goa, Pincode: 403504. ii. The Mines Manager, Sesa Mining Corporation Limited, Bicholim Iron Ore Mines, Dhabdhaba_ Bicholim Goa, Pincode: 403504. iii. The A.G.M. Sesa Mining Corporation Limited, Bicholim Iron Ore Mines, Dhabdhaba Bicholim Goa, Pincode: 403504. That the above stated order dated 18.04.2022 passed by the civil court is till date operational in force and binding on the defendants of the suit.	the District and Sessions Court, Mapusa. On 04.07.2023, the District and Sessions Court passed an order quashing the order dated 20.02.2018. With respect to case no. MAM.BICH.MINE.08.2016, it is our understanding and on the basis of available official records, the matter was filed against the erstwhile leaseholder SMCL and the same is pending for adjudication. Necessary measures will be put in place to ensure that there is no flow of mine silt in the neighbouring habitations/ agriculture land. The details of various erosion control measures are provided in Chapter 10. Only the water within the mining area is channelised into the pits and harvested. Detailed hydrogeology study is carried out as per CGWA guidelines and attached as anexure to the EIA. The complainant is referring to the incidents happened during earlier mining operations. All necessary safety and environment protective measures will be taken during the mining operations so as to ensure that there is no occurrence of any untoward incident.	Monsoon preparedness on mines and water treatment is 232 lakhs.

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	That the honorable Deputy Collector has passed Judgement and order dated 20.02.2018 in case no: SDM.BICH.133 CRPC, 4.2013. The said order reads as under: ORDER The Opponent is hereby directed to refill the existing pits with mud in the property surveyed under no: 15 and 16 of village Lamgao on or before 15.03.2018 under strict compliance. Pronounced in the open court. The opponent of the above mentioned case is: M/s Sesa Mining Corporation, Dhabdhaba Bicholim Goa. That the Opponent went in appeal in the Session Court and have got the said order set aside and the matter is sub judice before the Deputy Collector of Bicholim. I have also filed contempt application before Deputy collector Bicholim and the same is pending under no: DCB.BICH. 133 CRPC.4. 2013.2019. That I have also filed application to the office of Mamlatdar of Bicholim Taluka which is also pending under no MAM.BICH.MINE.09.2016 with respect to survey numbers 26/1, 18/6, 24/3, 11/1-O, 11/1-L, 11/1 M, 11/1-Q of village Lamgao of Bicholim Taluka. That there is contamination of well water in the area of village Lamgao. I am having Water testing report issued by the office of Pollution control Board. Water wells of Lamgao Village were getting dried up so also were getting pollutants in the water due to mining. I am having my residential house 1856 in the property surveyed under no: 16/1-A of village Lamgao. That one Mr. Narayan Mone has also filed application to the		

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	office of Mamlatdar of Bicholim Taluka which is also pending under no MAM.BICH.MINE.08.2016 with respect to properties situated in village Maem of Bicholim Taluka. The properties of Mone are situated touching the Mining area mining belt. The zonal agricultural officer / official has also deposed that the plantation is getting affected due to running of mining silt in the water pond serving irrigation of plant. There were frequent accidents of mining burst brining mining silt, boulders, stones down in the Bicholim city, Mulgao Village. One such land slide was witnessed on 16.07.2011 at Mulgao, on 06.06.16 at Pajwada Bicholim. Reference of the above incidents has come in the Judgement of Deputy Collector dated 20.2.2018.. That old Temple situated at Lamgao Village had to be reconstructed. The school in village Lamgao had to be reconstructed due to passing of pit water through school building. The mining pit which is existing at present is situated at the higher level than village of Lamgao and Bicholim City. The said mining pit is having huge accumulation of water posing danger to the inhabitants of Lamgao Village and Bicholim City. If any untoward incident takes place there will be flowing away of nearby human habitation causing numerous casualties and countless monetary & economic irreparable loss of property. That the farmers are getting affected due to reckless mining done previously by the Dempo Mining Corporation' / Sesa Mining Corporation / Vedanta limited. The above companies did mining only by changing their names one after another. The names were changed to cheat farmers.		

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	Farming and plantation in the nearby areas has become difficult rather impossible. The water in the locality is channelized in one pit affecting water elsewhere in the locality. In Lamgao Villlage previously there use to be water at a just distance of 1 to 3 meters from surface but now it is not possible to have the same due to mining pit taking water dip in the pit. Houses have also got cracks due to mining done in the locality. Environmental damage caused by previous mining is irreparable. Flaura and fauna is affected causing damage to nature, plants, water sources, water courses, animals, birds. Considering all the above facts, I pray that no mining be permitted in "Bicholim Mineral Block" as sought to be proposed. Yours faithfully, .		
Letter 8	GOA FOUNDATION, G-8, St Britto's Apartment, Feira Alta, Mupusa, Goa, INDIA The Collector (I), North GOA District, North Goa Collectorate, Panaji 403001 Goa. Subj: Request to cancel Public Hearing on the Vedanta mineral block I-Bicholim, scheduled for 11 August, 2023 Dear Sir, We are writing to you to seek cancellation of the Public Hearing scheduled in respect of the Vedanta mineral block I-Bicholim on 11 August, 2023.	EIA report is prepared as per the TOR issued by MoEF&CC. it is true that this particular mineral block was earlier operated by Sesa mining Corporation ltd (formerly known as Dempo mining	

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	There are very serious grounds for considering and acceding to this request. These are set out below: a) The necessary environmental information and data which are required to be produced in response to the TOR are missing from the draft ELA document. The suppression of necessary information has been achieved by claiming that the Mining Block is a "greenfield project." Such a characterization of what is clearly a brownfield project as a greenfield project is wholly incorrect and cannot be accepted. The Mining Block has been operated from inception as a series of five leases (TC 11-15/1941) neighbouring each other in a straight line, and thereafter, as an amalgamated lease with a single lease number (08/AMLG). The amalgamated lease is the relabelled "I-Bicholim" and has the same boundaries. b) These 5 leases before and after amalgamation have been in operation since 1941, and have been operated by a variety of actors, including Dempo Mining Corporation and Sesa Mining Corporation Ltd, SMC is a wholly owned subsidiary of Vedanta Ltd, which is now assigned this mineral block. The production data of the 5 leases, from 1941 to 2012, is available in public domain. The leases were also operated between 2015 and 2018 by SMC/Vedanta. In normal and legal terminology, such a mine site could never been characterized as a "Greenfield project" for the purpose of obtaining environment clearance. c) The important thing to emphasize here is that the willful	corporation Ltd). Pursuant to Supreme Court judgement in Goa Foundation 2 dated 07.02.2018, all the mining leases granted by the state government were cancelled. Thereafter, State Government in terms of the said order and as per the provisions of MMDR Act put this block for auction as a fresh lease/ grant. Vedanta Ltd was selected as the preferred bidder in the said auction for Block I Bicholim mineral block and accordingly LOI was issued to Vedanta Ltd. As per the MoEF EAC minutes of meeting, in case of LOI grant it is classified as green field and hence in the EIA it has been mentioned as green field. There is no hiding of facts as alleged by the Goa foundation, as the earlier pits can be seen in the surface plan which is provided as plate no 5 of EIA. As per our information, the erstwhile leaseholders have complied with all recommendations prescribed by NEERI in PIL no 1/2008. According to the official records, the three erstwhile leaseholders namely Chowgule and Company Private Limited, Rajaram Bandekar Mines Private Limited and Sesa Mining Corporation Limited have submitted an amount of Rs. 65,00,000 with the	

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	characterization of the project site as a “Greenfield” project has been relied upon to withhold data and the past record of this project proponent (PP) required to be made part of the draft EIA and to the public. This includes the environmental data collected since the lease started operation in 1941 as well as studies by academics and entities like NEERI, which data and information must be used to understand past impacts so as to foresee future impacts. d) We were not able to write this letter earlier for obvious reasons. The Terms of Reference have been communicated to the PP on 16 June 2023 and the 624 page has been manufactured in 4 days! It is unrealistic to expect the public to be able to read such a report in the space of a month. In fact, all the data produced is related to periods prior to the issue of TOR letter, including a report prepared in 2010! In other words, the draft EIA cannot be considered as conforming to the TOR either in letter and spirit. e) Please note that the lease is now granted for a period of 50 years. During the past existence of these leases unparalleled damaged has been done by the mining activity to water bodies including the Asnoda river, springs, fields (most outside the lease boundary), biodiversity, hill slopes, and most seriously, to the ground water aquifer. This has been permanently destroyed. The entire development has been documented and proven in the NEERI report organized under the directions of the	High Court. Desilting work is being carried out by Water Resource Department. The EIA also comprises of detailed hydrogeology report based on CGWA guidelines which concludes that there won’t be any adverse impact of mining on surrounding ground water regime. Explained as above. The EIA report is prepared on the lines of TOR issued to Vedanta ltd. The Baseline monitoring was carried out in march to May 2023. The EIA work did not wait for the issuance of TOR, as standard TOR is available for this purpose. Other specific points raised during EAC meeting held on 3rd May were immediately noted and studies carried out without waiting for the Minutes of Meeting. The	

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	Bombay High Court. The water resources available to this hitherto water surplus village have evaporated, turning the village into an area of drought. The PP has now sought to eradicate all this history of severe ill-effects of mining by terming it a “Greenfield project”. This makes a complete mockery of the EIA process, and cannot be permitted under any circumstances. For these reasons, the public hearing is important. It is the right of the people, especially the villagers of Sirigao, to represent what happened in the past 50 years, and to hear whether the scenario would be repeated in the next fifty years. No village should be gifted with such a ghastly legacy. f) We set out various items from the Terms of Reference Compliance section draft EIA report (pp.5-18) which have not been complied with. 6. The Project Proponent shall conduct drone survey of the mine lease area and buffer area and submit during the appraisal for EC. **The drone survey was conducted and will be Submitted during appraisal for EC** **Comment of Goa Foundation: This is material information to understand the topography of the site in the context of aspects such as hydrogeology. If the survey has been conducted, why is it being suppressed?** 7. During the meeting, the EAC noted that old excavated pits exist within the mine lease area. Hence, the Project Proponent needs to submit a letter from the Department	complainant is simply trying to make false allegations. The mineral block is auctioned as a fresh lease and EIA is based on the baseline study carried out during the period March to May 2023. The project proponent has detailed out the various impacts and the environment management plan in details to reduce the environmental impact. As clearly specified in the TOR, the drone survey will be submitted to the EAC during appraisal for EC The clarification from State govt is obtained as part of the Final EIA.	

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	of Geology and Mining, Government of Goa clarifying whether any illegal mining within the mine lease area has been carried out or not and whether the same has been carried out by M/s. Vedanta Limited or not? **The state govt. auctioned Block-I Bicholim Mineral Block as fresh mine and Vedanta was preferred bidder. We have requested to state Govt. for the Clarification, and response is awaited and same shall be provided** **Comment of Goa Foundation: This is an absurd statement given that Sesa Mining Corporation/Vedanta was the earlier operator. Whether illegal mining took place by the project proponent is material information for a public hearing** 20. 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. The production details need to submit since inception of mine duly authenticated by Department of Mines & Geology, State Government **GREEN FIELD PROJECT** **Comment of Goa Foundation: This is another absurd statement given that Sesa Mining Corporation/Vedanta was the earlier mine operator. The relevant information required to be produced has not been produced.** 24. The PP should submit the real-time aerial video	The 3 month data collected from two PHC's is representative and sufficient for evaluation for the EIA purpose and budgetary allocations are made in the EIA The state government in compliance to the hon. Supreme court order auctioned the mine as a Fresh lease . Vedanta Ltd was selected as a preferred bidder and LOI issued. In such case past data is not required. In case the application for EC was w.r.t renewal of mine lease or expansion project the past production data etc are required. In this particular case the past production data is not required to be produced. The real time video footage of the mine lease will be submitted at the time of EAC meeting. The point made by complainant is in case of a operational mine which is applying for EC for the purpose of lease renewal or expansion. In this case the mine is auctioned as a Fresh lease and the proposal is accordingly prepared.	

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	footage & video of the mining lease area and of the transportation route. **PP shall submit the real —time video footage of the mining lease at the time EAC Meeting.** **Comment of Goa Foundation: This is material information to understand the vegetation that currently exists in the mine and along the transportation route. It must be provided as a link so that the public can study the facts on the ground.** 34. Compliance of the Ministry's Office Memorandum No. F: 350/2017-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 EJA/EMP Report **The Affidavit is enclosed as Annexure-2** **Comment of Goa Foundation: This relates to violations of the Environmental Clearance by Vedanta and is material information for the public hearing. An affidavit is not equivalent to compliance. Compliance would require a statement of violations, if any, and payment of sums as required as per the MoEFCC OM.** 35. PP Shall Submit a Certificate from Chief Conservator of Forests regarding involvement of forest Land in the Mining lease area if any. In case forest and is involved: i) PP should submit the proof of application made for obtaining forest clearance and ii) a map clearly showing the forest & nonforest area.	The annexure 3 is the letter of approval of mining plan. The surface plan and geological sections are part of EIA as plate no 5 and plate no 4A1 to A4. The auction document of the state government clearly states that there is no forest area within the mineral block. Letter from the state forest department is also attached in the final EIA. Even earlier i.e before auction of the mines , there was no forest land within the mines. Approved lease sketch is attached in the EIA and land classification is provided in final EIA.	

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	As per the auctioned document given by state govt. there is no forest area involved in Block-I Bicholim Mineral Block Comment of Goa Foundation: No certificate is produced as required by the TOR. 36. 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. **NA** **Comment of Goa Foundation: This is another absurd statement considering that the leases have been operated from 1941 till 2018.** 37. PP should submit the details of survey number [viz. survey no, area in hectare, classification of land (government, private, forest, grazing land etc.), villages] duly authenticated by State Government, falling in the mining lease area **Enclosed in lease sketch as Plate.No.2** **Comment of Goa Foundation: The classification of land has not been provided by survey number as required.** 55. 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. **The socio-economic study was conducted Ref. Chapter-3, Para.3.9**	The base line monitoring is carried out as per the TOR . The data is valid as per specific TOR point no 4.1 . Point clarified above. The report from Regional office is required in case of a existing valid EC. In this particular case there is no existing EC. The mine is auctioned as fresh mine and for which purpose EC is being applied for . Once the EC is obtained the lease would be executed and other permissions obtained, then the mining operations will start.	

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	Comment of Goa Foundation: The health survey in para 3.9.1.19 has been conducted by collecting data from two PHCs working in the buffer zone, for just three months prior to the survey. This is absurd as much longer data is available, especially since the PP and Mineral Foundation of Goa partly funded by the PP have been conducting health camps as part of CSR for decades. 68. The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry **Comment of Goa Foundation: There is no response at all by Vedanta. The response to the Questionnaire ts not roduced.** 70. 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. rocess) will entail conducting the PH again with the revised documentation **Baseline collected during summer season, 2023** **Comment of Goa Foundation: The response has little connection with the ToR point. Note that since required information has been suppressed, this would anyway require conducting the PH again with revised documentation**	The project proponent will obtain both CTE and CTO from the GSPCB before starting the mining operations.	

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	71. 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. **Green field Project** **Comment of Goa Foundation: The claim is that because this is a Greenfield project (which is incorrect), the report need not be produced.** g) Other important information relevant for a public hearing has not been provided, most important of which is the mining plan. Without a mining plan, it is not possible to evaluate its environmental impacts. The Annexure 3 of the EIA / EMP also refers to an "*annexure attached of surface mining plan and cross-section*", which is missing. I am confident that once you recognize this glaring misrepresentation and suppression of essential information after receipt of this letter, you will also conclude that the Public Hearing is vitiated due to an incomplete draft EIA report — which is based on the false claim that the project is a green field project when it is actually (and quite clearly and without doubt) a brownfield project. The Public Hearing is being conducted with the assistance of the Goa State Pollution Control Board. The Board will doubtless produce before you, if required, copies of the		

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	consent orders issued to the erstwhile leaseholder (Sesa Mining Corporation/Vedanta) for operation of these leases since the time the Board was constituted in 1987. In fact, if this were a Greenfield project, why is there no consent to establish (CTE) issued by the Board? An environmental Public Hearing is not an occasion to correct blatant errors in the draft EJA nor is the public required to point out such egregious claims. The draft EIA report must conform to the TORs in all respects, and only then can the public hearing proceed. The draft EIA uploaded to the website of the PCB is severely deficient in this regard. This issue needs to be settled first. Your office can sort out this problem with the PCB, especially with regard to the claim of then project being a “Greenfield project.” After a proper draft EIA report conforming with the TORs in all respects is received and verified, the public hearing can be notified and held. We therefore reiterate our demand that the public hearing be cancelled in the circumstances, till a fresh draft E]A — prepared with some degree of honesty and scientific integrity — can be placed before the public. Sincerely, Dr Claude Alvares Director Cc: Goa State Pollution Control Board		
Letter 9	Letter from Village Panchayat Mulgao dtd 7/8/2023		

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	1. Demarcation of village boundaries active mining lease boundaries & Buffer Zone boundaries to be done in presence of all committees and Village Panchayat Mulgao. 2. Company should exclude houses, Temples, Lakes paddy Fields bhagayatis from mulgao mining blocks as per new mining lease. 3. Desilting of paddy fields should be carry out by company on priority. 4. Pending compensations of famers from 2011 to till date to be release on immediate basis. 5. Priority to be given to mulgao villagers for Employment, the Company should also give preference to mulgao villagers for business opportunities. 6. Mulgao Communidade is having 2.21 laks sq.mrts area in the said mining block of which lease rent is in arrears from the year 2011. 7. Mulgao communidad is having three water lakes under Survey No.69/1 & 71/0 which has been filled with mining silt need to be cleaned in original form. 8. Arrangement of smooth flow of water to the kulagars in the area in summer season. 9. Attend and provide solution to the difficulties faced by the ritreched sesa mining worker of the	The mineral block is auctioned by state government. The habitations within the lease were always existing . A safety buffer of minimum50m will be maintained form these habitations which includes houses, temples, agriculture properties etc. Vedanta ltd is a new lessee and the mining operations have not started. There is no compensation liability with Vedanta ltd company. The earlier mine owner was a different entity and the compensation matters would be dealt by them. Employment preference will be given to locals only. There would be lot of indirect employment and business opportunities due to mining which will benefit the local population. The lease needs to be executed first for further needful in this case. It is understood that the earlier mining company had constrcted these ponds which are referred by the villagers as lakes. These ponds were maintained and desilted by earlier mine owner and the practise will follow. Flow of water will be ensured .	

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	mulgao village. 10. Mining grants to Village Panchayat and Devasthan to be increased. 11. Compensation for houses damaged caused due to operation of mines in the VP Jurisdiction. 12. Also brings to your notice that villagers require Public information in details with regards mining in mulgao village. We strongly opposed resumption of mining in mulgao village till we fulfill the above Point.	All the retrenched workers were provided opportunity to join the work force of Vedanta ltd and many of the workers took benefit of this opportunity. Vedanta has won the mine in auction and has not yet started the mining operations. It is to ensure the villagers of mulgao that a safety barrier of minimum 50 m will be maintained towards the habitation. There wont be any drilling and blasting . There is no shifting of habitation proposed.	
Letter 10	Letter from Pilgao village panchayat RefNo.VP/PIL/BICH/2023-24/L.SI To The Mermber Secretary, Goa State Pollution Control Board, Saligao Bardez Goa. Sub :- Point to be discussed in Public Hearing. Sir, With regards to the public Hearing as per the Environmental impact assessment 2006 w.rt Block Bicholim Mineral Block with area of 478.5206 ha located in Bicholim Taluka whích was held on 11/08/2 023. In this regards I would like to bring to your attention to add the following points on the record as the same has not been recorded on the minutes of the hearing. 1) The Dempo Mining Corporation was allotted approximately 1.3 MPTA EC as per the reliable sources.	The current project doesnot include beneficiation plant.	

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	Accordingly they had designed and structure the beneticiation plant (Washing Plantl Known as New Beneficiation Plant in Pligao Village Bicholim Goa. The tailing Pond was also constructed considering the 1.3 MPTA EC still the water from the tailfíng point (silt) enters in the agriculture field which leads to the contamination of soil, ground water and surface water by chemical emitted from mining processes and agriculture field get destroyed, about 60 hector of agriculture field has been destroyed so far. Later on Sesa Mining Corporation Linited took over mining business from Dempo Mining Corporation and presently Vedanta is running the said mining business. 2) The Beneficiation plant has a capacity of 1.3 MPTA if the capacity is increased beyond the 1.3 MPTA than the tailing point will overflowed and silt will enter in the agriculture field and water bodies, which will leads to soil contamination and water pollution. The infrastructure of Mining Company was not enough to handle 1.3 MPTA of Ore and it will destroyed all major fertile land and natural habited if any Mining company is allowed to operate over and above. Hence we have strong objection for production of 2.0 MPTA Ore and all the damages to the fields and land to be restored. 3) Also there is some agriculture land bearing sy.no.66/40,164/01, 184/4,5,9,10,14, 15,16,19,20 &21. 165/8. 187/4,5,6,8, 10,12, 13. 66/40, 154 and others of Village Piligao, where there is illegal encroachment have been done by mining company to run miníng activities.	There is a beneficiation plant of SMCL in Pilgao village. However it is a separate project and not part of the Block I Bicholim mineral block. In case the SMCL company requires to expand its capacity, they would be required to obtain Environment clearance for the same.	

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	Hence the issue related to above agriculture land farmers regards to the agriculture land has to be resolved on the priority, until it gets resolved we have strong objectíion for operatíon of míning activities in Piligao Village Bicholim Taluka. Kindly take note of the above point and do the needful.		

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VILLAGE PANCHAYAT MULGAO

TALUKA: BICHOLIM GOA. 403 503

ग्रामपंचायत कार्यालय, मुळगाव

ता. डिचोली - गोवा. ४०३ ५०३ Ph.:0832-2215261

Ref. No.:-VP/MUL-BICH/2023-24/450 **Date: - 05/08/2023**

To,
The General Manager,
Sesa/Vedanta Mining Pvt. Ltd,
Bicholim-Goa.

Sub: - Regarding Joint meeting regarding Mining issue of Mulgao villagers

Sir,

With reference to above cited subject, your letter dated 04.08.2023 and our office inward No. 308 dated 05.08.2023, timing at 12.50 afternoon regarding joint meeting regarding mining issue of mulgao villagers.

Further to inform you that Panchayat has rejected your request to adjourn the meeting which is held on 05.08.2023. However all the committee have decided to have joint meeting today only at 5. P.m. as per joint meeting (schedule) all Committees were present in the Panchayat hall.

In view of above request to attend the meeting.

Certified Copy Under ... of RTI Act
Public Information Officer
Cum Village Secretary
Village Panchayat Mulgao Goa

Thanking you

Yours Faithfully

(Trupti T.Gad)
Sarpanch
Village Panchayat Mulgao
Bicholim-Goa

Sesa Mining Corp. Ltd.
Bicholim - Goa
Received on 05/08/2023
Signature
5/8/2023. 4.40 pm